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THE NETWORK RAIL (STALYBRIDGE TO DIGGLE (SADDLEWORTH) ENHANCEMENTS) ORDER

DOCUMENT: VOLUME 3 APPENDIX 12B FLOOD RISK ASSESSMENT

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This Technical Appendix presents the Flood Risk Assessment (FRA) undertaken to support the 'Stalybridge to Diggle (Saddleworth) Enhancements' Order (referred to as 'the Order Scheme').
- 1.1.2 Details of the Order Scheme, as well as the temporary construction required to deliver the Order Scheme (referred to as 'the relevant works components'), are provided in Table 1.1 of Chapter 1 in Volume 1 of this Report [NR14] and illustrated in Figures 12B.3.1 to 12B.4.24 in Volume 2 of this Report [NR14].
- 1.1.3 As part of the assessment process, potential sources and mechanisms of flooding that may affect, or be affected by, the Order Scheme and its relevant works components have been reviewed. The assessment also identifies site-specific constraints and outlines appropriate flood risk mitigation measures.
- 1.1.4 This early-stage evaluation enables flood risk to be considered during the initial design phases, allowing mitigation measures to be embedded into the Order Scheme's design, site layout, and construction methodology.
- 1.1.5 The Environmental Report serves to provide reassurance at the outline design stage that appropriate mechanisms and controls are in place to manage surface water drainage in advance of construction. These controls are established under the Order and will be implemented via the Code of Construction Practice (CoCP) Part B. No discharge will occur without prior consent via the Order's protective provisions from the respective authorities. These include the Environment Agency (EA) for discharges into main rivers, the Lead Local Flood Authority (LLFA) for discharges into ordinary watercourses, and United Utilities for discharges into surface water sewers.
- 1.1.6 In Volume 2 of this Report [NR14], the following figures provide relevant hydrological background information and can be referred to in the context of this Technical Note:
- Figures 12B.3.1 to 12B.3.6 – show the locations of watercourses and the topographic terrain in the context of the Order Scheme.
 - Figures 12B.4.1 to 12B.4.6 – show the Flood Map for Planning in the context of the Order Scheme.
 - Figures 12B.4.7 to 12B.4.12 – show the extent of the Risk of Flooding from River and the Sea in the context of the Order Scheme.
 - Figures 12B.4.13 to 12B.4.18 – show the extent of the Risk of Flooding from Surface Water in the context of the Order Scheme.
 - Figures 12B.4.19 to 12B.4.24 – show the extent of the Risk of Flooding from Reservoirs in the context of the Order Scheme.

2. RELEVANT LEGISLATION, POLICY AND GUIDANCE

2.1.1 This section outlines national and local planning policies relevant to the Order Scheme concerning flood risk.

2.2 National Planning Policy

2.2.1 The National Planning Policy Framework¹ (NPPF) and the Flood Risk and Coastal Change Planning Practice Guidance² (FRCC-PPG) set out how flood risk should be considered in the development planning process. The NPPF mandates that developments avoid all sources of flooding and be steered away from areas with the highest flood risk. Furthermore, any residual risk must be safely managed, and developments must demonstrate safe access and escape routes. To meet these requirements, developers must ensure that flood risk is assessed in the initial planning stages of development.

2.2.2 The Environment Agency Flood Map for Planning (FMfP) outlines three main zones of fluvial flood risk, defined as follows³:

- Flood Zone 1 – represents a low probability of flooding. This means the land has less than 1 in 1,000 annual probability (<0.1% annual exceedance probability (AEP)) of flooding from rivers or the sea.
- Flood Zone 2 – represents a medium probability of flooding. This means the land has between 1 in 100 to 1 in 1,000 annual probability (1% - 0.1% AEP) of flooding from rivers, or between 1 in 200 to 1 in 1,000 annual probability (0.5% - 0.1% AEP) of flooding from the sea.
- Flood Zone 3(a) – represents a high probability of flooding. This means the land has 1 in 100 or more annual probability ($\geq 1\%$ AEP) of flooding from rivers, or 1 in 200 or more annual probability ($\geq 0.5\%$ AEP) of flooding from the sea.
- Flood Zone 3(b)² – represents functional floodplains, where water from rivers or the sea must flow or be stored in times of flood. This zone is not mapped in the FMfP but instead mapped by Local Planning Authorities (LPAs) in their Strategic Flood Risk Assessments (SFRA) in agreement with the Environment Agency. Flood Zone 3b is not separately distinguished from Zone 3a on the FMfP. A functional floodplain typically includes:
 - Land having a 1 in 30 or more annual probability ($\geq 3.3\%$ AEP) of flooding, with any existing flood risk management infrastructure operating effectively; or

¹ [National Planning Policy Framework - GOV.UK](#) 2024

² [Flood risk and coastal change - GOV.UK](#)

³ [Flood map for planning - GOV.UK](#)

- Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in extreme events (such as 0.1% AEP of flooding).
- 2.2.3 The NPPF – supplemented by the FRCC-PPG, which is complemented by the ‘Annex 3: Flood Risk Vulnerability Classification’ of development types (see Annex A)⁴ – sets out the following:
- Whether the development requires a site-specific FRA.
 - Whether the development is subject to a Sequential Test.
 - Whether the development is subject to an Exception Test (see Annex B).
- 2.2.4 The details of the site-specific FRA, Sequential Test, and Exception Test are discussed below, along with their implications for the Order Scheme and relevant works components.

Site-Specific FRA

- 2.2.5 In compliance with the NPPF, a site-specific FRA is required for development proposed in:
- Flood Zone 2 and 3 (including 3b); and
 - Flood Zone 1 that:
 - Covers an area of 1 hectare (ha) or more;
 - Is in an area with critical drainage problems;
 - Is identified in a Local Planning Authority’s (LPA’s) Strategic Flood Risk Assessment (SFRA) as being at increased risk of flooding during its lifetime;
 - May be subject to other sources of flooding besides rivers and sea; or
 - Involves a change of use that increases its vulnerability classification (e.g. from car park to hospital).

⁴ [National Planning Policy Framework - Annex 3: Flood risk vulnerability classification - Guidance - GOV.UK](#)

Implications of Site-Specific FRA on the Order Scheme and Relevant Works Components

- 2.2.6 The Order Scheme and its associated relevant works components are collectively over 1 ha in area. Therefore, a site-specific FRA is required, which this report achieves.
- 2.2.7 The developer is responsible for demonstrating the following:
- Whether the Proposed Development is likely to be affected by flooding;
 - Whether the Proposed Development will increase flood risk to adjacent third-party land; and
 - Mitigation measures to address any flood risk.
- 2.2.8 The developer (or in this instance the Promoter) must demonstrate that all sources of flood risk – including fluvial, ordinary watercourses, surface water, groundwater, sewers, reservoirs, and canals – to and from the proposed development can be satisfactorily managed.

Sequential Test

- 2.2.9 The Sequential Test aims to ensure that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding from any source. Development will not be allocated or permitted if appropriate sites with lower flood risk are available. The SFRA provides the basis for applying the Sequential Test.
- 2.2.10 The Sequential Test should be applied to ‘major development’ and ‘non-major development’ (defined in Annex C) proposed in areas at risk of flooding. However, the Sequential Test is not required where the site of the proposed development satisfies one of the following²:
- Is allocated for development in the Local Plan (see ‘Places for Everyone Joint Development Plan’ section 2.4) and subject to the test at the plan-making stage (provided that the proposed development is consistent with the use for which the site was allocated and that there have been no significant changes to the known level of flood risk to the site, now or in the future, which would have affected the outcome of the test);
 - Is at low risk from all sources of flooding, unless the SFRA or other information indicates there may be a risk of flooding from sources in the future;
 - Demonstrate that no built development, including access routes, escape routes, land raising, or other vulnerable elements, is located in areas at risk of flooding now or in the future¹; or
 - Is a type of minor development and change, including householder development and small non-residential extensions (with a footprint of

less than 250 m²). However, changes of use to a caravan, camping, chalet site, or a mobile home or park home site will require the application of the Sequential Test and, where appropriate, Exception Tests¹.

Implications of Sequential Test on the Order Scheme and Relevant Works Components

2.2.11 The Order Scheme and its associated relevant works components are:

- Classed as ‘major development’, which is defined as “development carried out on a site having an area of 1 hectare or more” (see Annex C).
- Primarily located within Flood Zone 1, except for the following, which fall within Flood Zone 2 and/or 3:
 - Temporary land take for Scout West Compound – falls partially in Flood Zones 2 and 3. Refer to Figure 12B.4.3 in Volume 2 of this Report [NR14].
 - Temporary land take for Egmont Street Replacement Car park, and temporary right of access of Egmont Street road to Plevins Site Compound Works – the mid-section of this road is situated in Flood Zones 2 and 3, and falls within the high, medium, and low risk of fluvial flood extent. Refer to Figure 12B.4.3 in Volume 2 of this Report [NR14].
 - Temporary land take of Heron Lane road to Heron Lane Site Compound – falls partially in Flood Zones 2 and 3. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
 - Temporary land take for Armit Road Site Compound – falls partially in Flood Zone 2. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
 - Temporary land take of Saddleworth Rangers Replacement Car park – falls within Flood Zone 2. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
 - Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works – falls partially in Flood Zone 2. Refer to Figure 12B.4.5 in Volume 2 of this Report [NR14].
 - Temporary land take for Diggle Access and Diversion Works – falls within Flood Zone 2 and 3. Refer to Figure 12B.4.6 in Volume 2 of this Report [NR14].
- Not within sites allocated for development in the Local Plan (see ‘Places for Everyone Joint Development Plan’ section 2.4¹⁰).

2.2.12 Under the NPPF, a Sequential Test is required for the seven sites listed above, as they are located within Flood Zone 2 and/or 3, classed as ‘major

development', and not within sites allocated for development in the Local Plan.

- 2.2.13 Suitable land along the route is extremely limited due to topographical constraints, existing land use, and operational requirements. Multiple reviews have been taken to refine the location, size, and layout of work sites to minimise environmental impacts, including flood risk. Where feasible, sites have been located outside Flood Zones 2 and 3, with preference given to lower-risk where operationally viable. However, in some cases, avoidance is not possible due to the linear nature of the railway corridor, the need for proximity to specific worksites, and the lack of alternative accessible land.
- 2.2.14 Flood risk has been carefully balanced against the practical and logistical needs of delivering the Order Scheme. As the Order Scheme and its relevant works components cannot be relocated or substituted elsewhere, an Expectation Test is required in line with the NPPF.

Exception Test

- 2.2.15 Should the Sequential Test indicate no suitable sites at lower flood risk that can appropriately accommodate the development outside the site, the proposed development must undertake and pass the Exception Test to be permitted on the site with flood risk. Two criteria need to be satisfied to pass the Exception Test²:
- The development would provide wider sustainability benefits to the community that outweigh the flood risk; and
 - 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.
- 2.2.16 The Exception Test should only be applied if the Sequential Test shows no reasonably suitable, lower-risk sites are available for the proposed development. Moreover, the Exception Test should only be applied in the circumstances set out in the 'Flood Risk Vulnerability and Flood Zone Compatibility' table in Annex B, which is a matrix based on the Environment Agency FMfP and the 'Flood Risk Vulnerability Classification' of development types (Annex A).

Implications of Exception Test on the Order Scheme and Relevant Works Components

- 2.2.17 The Order Scheme and its associated relevant works components:
- Have a varying flood risk vulnerability classification (see Annex A). For example, some elements of the Order Scheme required for the operation of the railway infrastructure (e.g. overhead line equipment) would be classified as 'essential infrastructure'. Meanwhile, some elements of the Order Scheme that are not required for the functioning

of the railway itself (e.g. footbridges) would be classed as 'less vulnerable'.

- Is primarily located within Flood Zone 1, except for the following, which falls within Flood Zone 2 and/or 3 (this is further detailed in the 'Flood Risk from Main Rivers' section).
- Temporary land take for Scout West Compound – falls partially in Flood Zones 2 and 3. Refer to Figure 12B.4.3 in Volume 2 of this Report [NR14].
- Temporary land take for Egmont Street Replacement Car park – is situated in Flood Zones 2 and 3, and falls within the high, medium, and low risk of fluvial flood extent. Refer to Figure 12B.4.3 in Volume 2 of this Report [NR14].
- Temporary land take of Heron Lane road to Heron Lane Site Compound – falls partially in Flood Zones 2 and 3. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
- Temporary land take for Armit Road Site Compound – falls partially in Flood Zone 2. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
- Temporary land take of Saddleworth Rangers Replacement Car park – falls within Flood Zone 2. Refer to Figure 12B.4.4 in Volume 2 of this Report [NR14].
- Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works – falls partially in Flood Zone 2. Refer to Figure 12B.4.5 in Volume 2 of this Report [NR14].
- Temporary land take for Diggle Access and Diversion Works – falls within Flood Zone 2 and 3. Refer to Figure 12B.4.6 in Volume 2 of this Report [NR14].

2.2.18 The locations of the permanent works were assessed against future flooding using the EA Flood Zone Flood Map for Planning with Climate Change allowance extents⁵. This dataset only considers the 'Central' Climate Change allowance which is less than the 'Higher Central' allowance appropriate for 'essential infrastructure'. However the difference between the 'Central' and 'Higher Central' allowances for the 2080's epoch (to 2125) in the location of the works (Upper Mersey Management Catchment) is 12% (41% to 53%).

2.2.19 Based on the EA climate change Flood Map for Planning extents, the permanent works are located in Flood Zone 1 with the 'Central' allowance to 2125. The permanent works – as 'essential infrastructure', are appropriate for Flood Zone 1 and 2. As the permanent works are located outside the future 'Central' Flood Zone 2 it is considered that the additional 12% for the 'Higher Central' climate change will not result in the permanent works being

⁵ [Gov.uk Flood Map for Planning Climate Change dataset](#)

impacted. by the smaller Flood Zone 3 climate change extent, which would require additional mitigation works.

2.2.20 It is therefore considered that the permanent works will be safe for the lifetime of the development – as required by the Exception Test.

2.2.21 Under the NPPF, if the Sequential Test determines that no reasonably available sites exist in areas of lower flood risk, an Exception Test must be applied.

2.2.22 The Exception Test is required for the following four sites associated with the Order Scheme, as they fall within Flood Zone 3 as well as 2 and are classed as ‘essential infrastructure’ (see Annex B):

- Temporary land take for Scout West Compound.
- Temporary land take for Egmont Street Replacement .
- Temporary land take of Heron Lane road to Heron Lane Site Compound.
- Temporary land take for Diggle Access and Diversion Works.

2.2.23 While the other three sites do not require an Exception Test associated with the Order Scheme, as they fall within Flood Zone 2 and are classed as ‘essential infrastructure’ (see Annex B):

- Temporary land take for Armit Road Site Compound.
- Temporary land take of Saddleworth Rangers Replacement Car park.
- Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works.

2.2.24 The Order Scheme and its relevant works components meet the two criteria of the Exception Test:

- Wider sustainability benefits – the development forms part of the Transpennine Route Upgrade in line national objectives on ‘levelling up’ the north of England. The development is expected to deliver sustainability and associated economic benefits to the wider community by supporting a cleaner mode of transport on a regional scale. This benefit is considered to outweigh the minimal flood risk impact identified in this FRA following the implementation of proposed mitigation measures.
- Safety and flood risk management – the proposed rail infrastructure improvement will remain safe for use throughout its operational lifetime, taking into account the vulnerability of its users. It will not increase flood risk elsewhere and, where feasible, may contribute to reducing flood risk. This reflects the requirements of the ‘Weather Resilience and Climate Change Adaptation’ section in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]).

2.2.25 The review provided above, based on the requirements of the NPPF Sequential Test and the Exception text, confirms that the relevant tests are passed (including the seven high-risk sites listed above that falls within Flood Zone 2 and/or 3).

2.3 Consents, Permit, and Approvals

Flood Risk Activity Permit (FRAP) and Land Drainage Consent

2.3.1 FRAPs and land drainage consent are regulatory requirements in England, governed by the Environmental Agency and Lead Local Flood Authority (LLFA), respectively. These permits are required for certain works in, over, under, or near main rivers, flood defences, and ordinary watercourses. Failure to obtain permits constitutes a breach of UK environmental legislation that can lead to consequences, including financial penalties and legal proceedings.

2.3.2 Permits are required for activities involving:

- Erecting, altering, repairing, or maintaining any structure (temporary or permanent) in, over, or under a main river.
- Dredging, raising, or removing material from a main river.
- Diverting or impounding the flow of water in a main river.
- Quarrying or excavation within:
 - 8 metres of a main river (non-tidal); or
 - 16 metres of a tidal main river or flood defence.
- Building or altering structures designed to contain or divert floodwaters.
- Working on or near flood defences, including embankments, walls, weirs, and sluices.

2.3.3 While permits are not required for activities involving:

- Activities that qualify for an exemption or standard rules permit.

Canal and River Trust Approval

2.3.4 The Canal and River Trust advises that any development located adjacent to or near a canal will require consultation and, in some cases, formal approval⁶. This applies to any works on, near, under, or over canals⁷ where there is potential to affect the structural integrity of the canal or towpath,

⁶ [Canal and River Trust: Is the development appropriate?](#)

⁷ [Canal and River Trust: Undertaking works and code of practice](#)

interfere with navigation or maintenance access, or impact water levels or drainage patterns⁸.

2.3.5 In addition, the Canal and River Trust defines specific "notified areas" around canals that they must be consulted on for proposed developments. These areas vary depending on the scale of the development:

- A 150 m buffer applies for major developments.
- A 50 m buffer applies for minor and household developments but can extend to 75 or 150 m where there are assets such as reservoirs, tunnels, cuttings, and embankments⁹.

Implications of FRAP and Land Drainage Consent on the Order Scheme and Relevant Works Components

2.3.6 The Order Scheme, if granted, provides Network Rail with planning permission and deemed consent for the works in, over, under, or near main rivers or flood defences. However, this does not override environmental legislation; rather, it streamlines the process by replacing certain permitting requirements with protective provisions. These provisions ensure that the Environment Agency remains engaged in the process, requiring submission of detailed designs and allowing for consultation and agreement.

2.3.7 So while formal permits such as FRAPs may not be required, the EA retains the right to review and respond to proposals, with the Order stipulating that agreement cannot be unreasonably withheld. In practice, this means the same level of scrutiny and environmental rigour is applied, but through a mechanism that de-risks delivery and provides certainty for the Order Scheme. Should any conditions require FRAPs, these will be prepared in advance by the contractor/designer prior to the relevant works.

Implications of Canal and River Trust Approval on the Order Scheme and Relevant Works Components

2.3.8 The Order, if granted, provides Network Rail with planning permission and deemed consent for the works on, near, under, or over canals. However, this does not remove the need for engagement with the Canal & River Trust. Under the Order's protective provisions, Network Rail must submit detailed designs and seek the Trust's approval. While formal approval is not required,

⁸ [Canal and River Trust: Development management checklist for waterside developments.pdf](#)

⁹ [Canal and River Trust: Our notified area](#)

the Trust retains the right to review and respond to proposals, with the Order stipulating that agreement cannot be unreasonably withheld.

- 2.3.9 Engagement arrangements with the Trust will be reviewed and clarified by the designer/contractor prior to the start of construction for each applicable work elements, ensuring continued collaboration and oversight.

2.4 Local Plan and Local Flood Risk Guidance and Strategies

- 2.4.1 The Order Scheme and its associated relevant works components are located within the administrative boundaries of Tameside Metropolitan Borough Council (TMBC) and Oldham Metropolitan Borough Council (OMBC). These two Council are the local planning authorities (LPAs) and the Lead Local Flood Authority (LLFA) for their respective districts.
- 2.4.2 The Local Plans and the flood risk management plans for TMBC and OMBC have been reviewed as below. These include the Places for Everyone Plan, the Greater Manchester Level 1 Greater Manchester Strategic Flood Risk Management Framework (SFRMF), and SFRA.

Places for Everyone Joint Development Plan (2024)¹⁰

- 2.4.3 Places for Everyone, previously known as the Greater Manchester Spatial Framework (GMSF), is a joint development plan between nine Greater Manchester districts, including TMBC and OMBC. It outlines the approach to housing, employment, and sustainable growth until 2039. The plan prioritises using brownfield land and urban spaces while protecting Green Belt land and important environmental assets from unplanned development.
- 2.4.4 In relation to flood risk, the location of new developments in this local plan is guided by the Sequential Test and Exception Test, as required by the NPPF. These tests aim to direct new development to areas with the lowest flood risk. If new developments are proposed in higher flood risk zones, they must provide wider community benefits and be safe from flooding for their design lifetime.

Greater Manchester Strategic Flood Risk Management Framework (SFRMF)¹¹

- 2.4.5 Published in March 2019, the Greater Manchester SFRMF informed the GMSF (now known as the Places for Everyone Joint Development Plan as detailed above). The SFRMF provides a spatial framework for flood risk management across the region, highlighting key flood risk issues and recommending priorities for intervention by taking into account previous, existing, and planned interventions delivered or to be delivered by Risk Management Authorities. The Framework intends to be an overarching strategic framework for policies and activities developed and implemented

¹⁰ [Modifications Documentation 2023 - Greater Manchester Combined Authority](#)

¹¹ [Greater Manchester Strategic Flood Risk Management Framework \(SFRMF\)](#)

by Greater Manchester local authorities, including the TMBC and OMBC. The SFRMF aims to manage current and future flood risk to enable sustainable development in Greater Manchester by adopting a catchment-based approach.

Greater Manchester Level 1 Strategic Flood Risk Assessment (SFRA)¹²

- 2.4.6 The Greater Manchester Level 1 SFRA, published in March 2019, supports the GMSF (now known as the Places for Everyone Development Plan as detailed above). It was carried out in accordance with the NPPF and FRCC-PPG at the time of its writing.
- 2.4.7 The Level 1 SFRA provides guidance on the Sequential Approach, including the application of the Sequential Test and Exception Test. It is supported by several appendices¹³, including the ‘SFRA Maps of Proposed Development Sites and Flood Zone 3b’^{14,15} (see Annex E), Development Sites Assessment spreadsheets^{16,17}, and Development Sites Summary Reports¹⁸.
- 2.4.8 Potential Development Sites within Greater Manchester have been identified and categorised into several types of strategic recommendations based on:
- Environment Agency FMfP³;
 - ‘Flood Risk Vulnerability Classification’ of development types (Annex A)⁴; and
 - ‘Flood Risk Vulnerability and Flood Zone Compatibility’ matrix table of the two points above (Annex B)².

¹² [Greater Manchester Level 1 Strategic Flood Risk Assessment \(SFRA\)](#)

¹³ [Supporting and Background Evidence Documents - Greater Manchester Combined Authority](#)

¹⁴ [04.02.05 Appendix A Oldham Interactive Maps.zip](#)

¹⁵ [04.02.08 Appendix A Tameside Interactive Maps.zip](#)

¹⁶ [04.02.11 GM SFRA Level 1 Appendix B Sites Assessment Part 1.xlsx](#)

¹⁷ [04.02.12 GM SFRA Level 1 Appendix B Sites Assessment Part 2.xlsx](#)

¹⁸ [04.02.13 GM SFRA Level 1 Appendix C - Development Sites Assessments Summary Reports.pdf](#)

Implications of Local Plan and Local Flood Risk Guidance to the Order Scheme and Relevant Works Components

- 2.4.9 A review of the 'Places for Everyone Policies' proposals map (see Annex D) indicates that the Order Scheme and its relevant works components do not fall within any sites of the 'strategic allocation of Local Plan'.

Greater Manchester SFRMF¹¹

- 2.4.10 The SFRMF is complemented by the Greater Manchester Level 1 SFRA, which identifies areas at the most significant flood risk.
- 2.4.11 Critical Drainage Areas (CDAs) are locations identified by local authorities and the Environment Agency as having significant drainage problems and prone to flooding. These areas often include multiple and interlinked sources of flood risk, including surface water, groundwater, sewer, rivers, and tidal flooding. Identifying CDAs supports the effective management and mitigation of existing flood risks by ensuring that development within these areas is carefully planned. Developers are required to demonstrate that surface water drainage systems are both adequate and maintainable for the lifetime of the development and to provide details of long-term maintenance arrangements to ensure that new developments do not exacerbate existing flooding issues.
- 2.4.12 The 'SFRA Maps of Flood Risk Management' shows that the Order Scheme and its relevant works components are not located within any designated CDA (see Annex G) and, thus, are not considered at risk of flooding due to significant drainage issues.
- 2.4.13 Canal Hazard Zones are identified in the SFRMF as areas that could potentially be flooded if canal embankments are overtopped or if raised canal embankments are breached. It should be noted that properties on low-level sites may still encounter the risk of canal flooding despite not being within the Canal Hazard Zone.
- 2.4.14 The 'SFRA Maps of Flood Risk Management' indicate that the Order Scheme and its relevant works components do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone (see Annex G). Although a few sections of the Order Scheme and its relevant works components are on low-level sites, very near the Huddersfield Narrow Canal (e.g. the temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works, is at equivalent elevation as and <1 m from the Huddersfield Narrow Canal), the risk of canal flooding is low. This is because canals are artificial waterways where water flow is strongly controlled, thus making them less prone to flooding than natural watercourses during storm events.

Greater Manchester Level 1 SFRA¹²

- 2.4.15 According to the 'SFRA Maps of Proposed Development Sites and Flood Zone 3b' for Oldham¹⁴ and Tameside¹⁵ (see Annex E), the Order Scheme

and its relevant works components do not fall within Flood Zone 3b and are largely not within sites allocated for development except for:

- Temporary land take for the construction access route to Standedge Tunnel Bywash Underbridge (MVL3/39B) Replacement, and Diggle Road Overbridge (MVL3/39) Reconstruction and Utilities Bridge Works. These sites fall within the Development Site (see Annex E1 – ‘SHA1217’)¹⁴ allocated with Strategic Recommendation C¹⁷: “consider site layout and design around the identified flood risk”¹². Both parcels of land are suitable for their proposed temporary purposes, as they do not fall within Flood Zone 2 or 3, and a range of mitigation measures, potentially including Protective Provisions* will be in place to mitigate any potential flood risk. Hence, no further consideration is required for the layout and design of these proposed temporary sites.
- Temporary land take for the construction access route to Ward Lane Overbridge (MVL3/36) Reconstruction and Utilities Bridge Works – this site falls within a Development Site (see Annex E1 or E2 – ‘HLA3147’)¹⁴ allocated with Strategic Recommendation D¹⁷: “flood risk to the site is low however an FRA is required to show flood risk can be mitigated”¹²; which this FRA report achieves.
- Temporary land take for Armit Road Site Compound – this site falls within a Development Site (see Annex E5 – ‘508’)¹⁴ allocated with Strategic Recommendation B¹⁷: “Exception Test required if site passes Sequential Test. For development to proceed, the site must be subject to and pass the Exception Test”¹². This compound passes the Exception Test, as detailed in the ‘Exception Test’ section, and can be permitted on the higher flood-risk site.
- Plevins Site Compound Works – this site falls within a Development Site (see Annex E6 or E7 – ‘H-MOSSLE-012’)¹⁵ allocated with Strategic Recommendation D¹⁷: “flood risk to the site is low however an FRA is required to show flood risk can be mitigated”¹², which this FRA report achieves.
- Printworks Road Site Compound, Access and Drainage Works – this site falls within a Development Site (see Annex E7 – ‘302’)¹⁵ allocated with Strategic Recommendation D¹⁷: “flood risk to the site is low however an FRA is required to show flood risk can be mitigated”¹², which this FRA report achieves.

* Protective Provisions are the requirements to be included in the TWAO where the Order Scheme could affect the statutory powers, obligations or assets of another body. Protective Provisions govern the relationship between the Order Scheme promoter – in this instance Network Rail – and the owner or undertaker of an asset. Generally, they cover the design, protection, mitigation, construction and operation of the asset or utility concerned – for example a watercourse or waterbody. Protective Provisions usually provide a means for the body concerned to monitor, enforce compliance with and to review the effectiveness of the matters covered by such provisions.

- 2.4.16 The 'SFRA Maps of Historic Flooding' for Oldham¹⁴ and Tameside¹⁵ (see Annex F) show no recorded history of flooding at or around the vicinity of the Order Scheme and its relevant works components.
- 2.4.17 The 'SFRA Maps of Historic Flooding' (see Annex F) indicate that sections of the Order Scheme and its associated relevant works components fall within the Surface Water Hotspots, which are areas at risk of surface water flooding (identified by the Greater Manchester Surface Water Management Plan (SWMP)). However, it is important to note that these hotspots represent a high-level identification of surface water flood risk. The Environment Agency Risk of Flooding from Surface Water map (detailed in the 'Flood Risk from Ordinary Watercourses' section) provides a more precise assessment, as discussed below. It reveals that the Order Scheme and its relevant works components have isolated pockets of varying surface water flood risk, with levels ranging from low to high.

3. Appraisal Of Impacts And Effects

3.1 Methodology and Data Sources

- 3.1.1 This assessment is based on the best available data at the time of writing. Desktop research was conducted to collate relevant flood risk and hydrological information via the Defra (Department for Environment, Food, and Rural Affairs) online data platform and other publicly available sources, including:
- Defra National LiDAR Programme¹⁹.
 - British Geology Survey (BGS) Geology of Britain Viewer²⁰.
 - DEFRA Multi-Agency Geographic Information for the Countryside (MAGIC) Map²¹.
 - Cranfield LandIS Soilsclapes Viewer²².
 - Places for Everyone Joint Development Plan¹⁰.
 - Greater Manchester Strategic Flood Risk Management Framework¹¹.
 - Greater Manchester Level 1 Strategic Flood Risk Assessment¹².
 - Environment Agency Flood Map for Planning (FMfP)³.
 - Environment Agency Risk of Flooding from Rivers & Sea²³.

¹⁹ [National LIDAR Programme - data.gov.uk](https://data.gov.uk)

²⁰ [GeoIndex - British Geological Survey](https://www.bgs.gov.uk/geology-viewer)

²¹ [Magic Map Application](https://magic.defra.gov.uk)

²² [LandIS - Land Information System - Soilsclapes soil types viewer](https://landis.defra.gov.uk)

²³ [Risk of Flooding from Rivers and Sea](https://www.environment-agency.gov.uk/risk-of-flooding)

- Environment Agency Risk of Flooding from Surface Water²⁴.
- Environment Agency Risk of Flooding from Reservoirs ‘Dry Day’²⁵ and ‘Wet Day’²⁶ Scenarios.

3.2 Relevant works components of the Order Scheme

3.2.1 The Order Scheme and its relevant works components – which require deemed planning and thus require assessment, are listed below and presented in Figures 12B.3.1 to 12B.4.24 in Volume 2 of this Report [NR14] and detailed in Table 1.1 of Chapter 1 in Volume 1 of this Report [NR14]:

- Stalybridge Tunnel Ground Stabilisation Works
- Printworks Road Site Compound, Access and Drainage Works
- Heyrod Hall Overbridge (MVL3/07), Site Compound and Access Works
- Works to Footbridge off Springbank Lane (MVL3/08)⁵⁰
- Springbank Lane Overbridge Works (MVL3/09)
- Wakefield Road Plant Access and Compound
- Manchester Road Underbridge (MVL3/10) and Drainage Works
- Manchester Road Footbridge (MVL3/10A) Reconstruction
- Scout West Ramp Compound (supporting Ground Stabilisation Works)
- Scout West Laydown Compound (supporting Ground Stabilisation Works)
- Scout Spoil Point Compound (supporting Ground Stabilisation Works)
- Scout West Compound (supporting Ground Stabilisation Works)
- Scout Tunnel Ground Stabilisation Works
- Scout East Laydown Compound (supporting Ground Stabilisation Works)
- Scout East Car Park Compound (supporting Ground Stabilisation Works)
- Scout East Ramp Compound (supporting Ground Stabilisation Works)
- Scout East Access Compound (supporting Ground Stabilisation Works)
- Plevins Site Compound Works

²⁴ [Risk of Flooding from Surface Water](#)

²⁵ [Reservoir Flood Extents - Dry Day \(National\)](#)

²⁶ [Reservoir Flood Extents - Wet Day \(National\)](#)^f

- Mossley Cottages Works
- Stamford Road Pipebridge (MVL3/12A) Diversion Works
- MVL3/13 (diversion of utilities bridge)
- Mossley Station Relocation Works and Site Compounds
- Scout West Compound
- Roughtown Road Overbridge (MVL3/17) Works
- Roughtown Road Footbridge (MVL3/18) Works
- Heron Lane Site Compound
- Stockport Road Level Crossing Diversion
- Wright Mill Overbridge (MVL3/20) Reconstruction
- Armit Road Site Compound
- Royal George Underbridge (MVL3/25) and Site Compound Works
- Oaklands Road Site Compound Works
- New Oldham Road Footbridge (proposed MVL3/27B) and Greenfield Station Platform 2 Secondary Means of Escape Works
- Oldham Road Overbridge (MVL3/28) Reconstruction
- Oldham Road Access and Drainage Works
- Uppermill Viaduct (MVL3/31) and Site Compound Works
- Former Butterhouse Tunnel Site Compound Works
- Saddleworth Old Railway Tunnel Compound
- Ravenstone Drive Footbridge (MVL3/35) Works
- Ward Lane Overbridge (MVL3/36) Reconstruction and Utilities Bridge Works
- Ward Lane Site Compound Works:
- Grandpa Greene's Site Compound 1
- Grandpa Greene's Site Compound 2
- Diggle Compound Works:
- Diggle Welfare, Rail hub and Office Compound
- Diggle Access and Diversion Works
- Sam Road Car Park Compound
- Diggle Road Overbridge (MVL3/39) and Utilities Bridge Works
- Standedge Canal Tunnel (MVL3/39A)
- Standedge Tunnel Bywash Underbridge (MVL3/39B) Replacement

3.3 Study Area Overview – Baseline Conditions and Hydrological Context

3.3.1 For the purposes of this assessment the Order Scheme and its relevant component works have been sectioned into six areas:

- Stalybridge, Tameside (two Order Scheme components: Stalybridge Tunnel Ground Stabilisation Work; Printworks Road Site Compound, Access and Drainage Works).
- Millbrook, Tameside (six Order Scheme components: Heyrod Hall Overbridge (MVL3/07), Site Compound and Access Works; Works to Footbridge off Springbank Lane (MVL3/08); Springbank Lane Overbridge Works (MVL3/09); Wakefield Road Plant Access and Compound; Manchester Road Underbridge (MVL3/10) and Drainage Works; Manchester Road Footbridge (MVL3/10A) Reconstruction).
- Mossley, Tameside (seventeen Order Scheme components: Scout West Ramp Compound (supporting Ground Stabilisation Works); Scout West Laydown Compound (supporting Ground Stabilisation Works); Scout Spoil Point Compound (supporting Ground Stabilisation Works); Scout West Compound (supporting Ground Stabilisation Works); Scout Tunnel Ground Stabilisation Works; Scout East Laydown Compound (supporting Ground Stabilisation Works); Scout East Car Park Compound (supporting Ground Stabilisation Works); Scout East Ramp Compound (supporting Ground Stabilisation Works); Scout East Access Compound (supporting Ground Stabilisation Works); Plevins Site Compound Works; Mossley Cottages Works; Stamford Road Pipebridge (MVL3/12A) Diversion Works; MVL3/13 (diversion of utilities bridge); Mossley Station Relocation Works and Site Compounds; Scout West Compound; Roughtown Road Overbridge (MVL3/17) Works; Roughtown Road Footbridge (MVL3/18) Works).
- Greenfield, Oldham (nine Order Scheme components: Heron Lane Site Compound; Stockport Road Level Crossing Diversion; Wright Mill Overbridge (MVL3/20) Reconstruction; Armit Road Site Compound; Royal George Underbridge (MVL3/25) and Site Compound Works; Oaklands Road Site Compound Works; New Oldham Road Footbridge (proposed MVL3/27B) and Greenfield Station Platform 2 Secondary Means of Escape Works; Oldham Road Overbridge (MVL3/28) Reconstruction; Greenfield Site Compounds Works)
- Uppermill, Oldham (five Order Scheme components: Oldham Road Access and Drainage Works; Uppermill Viaduct (MVL3/31) and Site Compound Works; Former Butterhouse Tunnel Site Compound Works; Saddleworth Old Railway Tunnel Compound).
- Diggle, Oldham (eleven Order Scheme components: Ravenstone Drive Footbridge (MVL3/35) Works; Ward Lane Overbridge (MVL3/36) Reconstruction and Utilities Bridge Works; Ward Lane Site Compounds Works; Grandpa Greene's Site Compound 1; Grandpa Greene's Site Compound 2; Diggle Welfare, Rail hub and Office

Compound; Diggle Access and Diversion Works; Sam Road Car Park Compound; Diggle Road Overbridge (MVL3/39) Reconstruction and Utilities Bridge Works; Standedge Canal Tunnel (MVL3/39A); Standedge Tunnel Bywash Underbridge (MVL3/39B) Replacement.

Topographic Terrain Overview

- 3.3.2 A high-level overview of the topographic terrain for each area, based on the LiDAR Digital Terrain Model (DTM) with a 1 m grid resolution from the Environment Agency Open Data, is as follows:

Stalybridge, Tameside

- 3.3.3 The Order Scheme and its associated relevant works components between Stalybridge and Millbrook are situated on gentle terrain with an average elevation of approximately 125 m Above Ordnance Datum (mAOD). There is no significant change in ground level as this section is an even-level tunnel. Refer to Figure 12B.3.1 in Volume 2 of this Report [NR14].

Millbrook, Tameside

- 3.3.4 The Order Scheme and its associated relevant works components between Millbrook and Mossley are situated on gentle terrain with an average elevation of approximately 133 m mAOD. The ground level changes by about 5 m, ascending north-east from 130 to 135 mAOD. Refer to Figure 12B.3.2 in Volume 2 of this Report [NR14].

Mossley, Tameside

- 3.3.5 The Order Scheme and its associated relevant works components between Mossley and Greenfield are situated on moderate topographic relief with an average elevation of approximately 153 mAOD. The ground level changes by about 25 m, ascending north-east from 140 to 165 mAOD. Refer to Figure 12B.3.3 in Volume 2 of this Report [NR14].

Greenfield, Oldham

- 3.3.6 The Order Scheme and its associated relevant works components between Greenfield and Uppermill are situated on gentle terrain with an average elevation of approximately 170 mAOD. The ground level changes by about 10 m, descending north-eastward from 165 to 175 mAOD. Refer to Figure 12B.3.4 in Volume 2 of this Report [NR14].

Uppermill, Oldham

- 3.3.7 The Order Scheme and its associated relevant works components between Uppermill and Diggle are situated on gentle terrain with an average elevation of approximately 170 mAOD. The ground level changes by about 10 m,

descending north-east from 175 to 165 mAOD. Refer to Figure 12B.3.5 in Volume 2 of this Report [NR14].

Diggle, Oldham

- 3.3.8 The Order Scheme and its associated relevant works components within Diggle are situated on gentle terrain with an average elevation of approximately 202 mAOD. The ground level changes by about 13 m, ascending north-east from 195 to 208 mAOD. Refer to Figure 12B.3.6 in Volume 2 of this Report [NR14].

3.4 Assessment of Flood Risk to the Relevant Works Components of the Order Scheme

- 3.4.1 This section outlines the potential flood risks to the Order Scheme and its relevant works components from all sources of flooding as defined in the NPPF. Appropriate high-level mitigation measures are proposed to support the Order Scheme design where flood risks are identified. These measures may require further consideration during the detailed design process.
- 3.4.2 Aerial photography and Ordnance Survey (OS) mapping were reviewed to identify nearby main rivers (managed by the Environment Agency) and ordinary watercourses (managed by the LLFA). Additionally, maps from the Environment Agency Open Data were reviewed to identify the Flood Zone and all sources of flood risk.

Flood Risk from Main Rivers

- 3.4.3 In England, the main rivers are large watercourses for which the Environment Agency is responsible, including maintenance, improvement, and flood risk mitigation. These rivers are represented in the 'Statutory Main River Map'²⁷, which has been plotted as 'Main Rivers' in Figures 12B.3.1 to 12B.4.24. Fluvial flooding occurs when a watercourse exceeds capacity due to high inflows into the catchment, causing it to overflow or overtop its banks.
- 3.4.4 An assessment of flood risk from Main Rivers has been undertaken for the Order Scheme and its associated relevant works components by reviewing the Environment Agency FMfP and Flood Risk from Rivers & Sea maps, as detailed below.

Environment Agency Flood Map for Planning

- 3.4.5 The Environment Agency's FMfP shows Flood Zones, which represent the likelihood and extent of land at risk of flooding from rivers and the sea at present-day. Flood Zones do not consider the presence and impact of flood

²⁷ [Environment Agency's Statutory Main River Map](#)

defences (except for Flood Zone 3b) unless those defences increase the potential flood risk. Flood Zones definitions are included in section 2.2.2.

- 3.4.6 The Environment Agency's FMfP does not map Flood Zone 3b; it is instead defined by the Local Planning Authorities (LPAs) in their Strategic Flood Risk Assessments (SFRA) in agreement with the Environment Agency. Nevertheless, Flood Zone 3b is usually included within the mapped extent of Flood Zone 3; Flood Zone 3b is thus not separately distinguished from Zone 3a in the Environment Agency's FMfP. The identification of functional floodplains takes local conditions into account and is not defined solely by rigid probability parameters.
- 3.4.7 The Environment Agency's FMfP is a high-level strategic illustration of the fluvial flood risk extent from main rivers. In England, the main rivers are large watercourses for which the Environment Agency is responsible. The Environment Agency's FMfP does not consider the possible impact of other sources of flood risk (such as surface water, ordinary watercourses, groundwater, infrastructure failure (sewers and reservoirs), and changing flood risk consequential to climate change). Hence, a location may still be at risk of flooding from other sources, and flood risk may change over the lifetime of a development. The Environment Agency's FMfP is a planning tool designed only to indicate flood risk, not necessarily predict whether a specific place will or will not flood. Therefore, it is not suitable for determining the flood risk of individual properties, as detailed information about each property is unknown.

Environment Agency Risk of Flooding from Rivers & Sea²³

- 3.4.8 The Environment Agency's Flood Risk from Rivers & Sea map is a high-level illustration showing the extent and probability of flooding from rivers and the sea to the land at present-day, considering the presence and condition of flood defences, including the chance of them overtopping or failing. While flood defences reduce flood risk, they do not eliminate it as they can be overtopped, fail in extreme weather conditions, or if they are in poor condition.
- 3.4.9 The Flood Risk from Rivers & Sea map is a probabilistic dataset that shows the overall risk rather than the risk associated with a specific event or scenario. It categorises the likelihood into the following three annual probabilities:
- 'High' – represents greater than or equal to 1 in 30 ($\geq 3.3\%$ AEP) annual probability of flooding.
 - 'Medium' – represents less than 1 in 30 but greater than or equal to 1 in 100 ($< 3.3\%$ to $\geq 1\%$ AEP) annual probability of flooding.
 - 'Low' – represents less than 1 in 100 but greater than or equal to 1 in 1,000 ($< 1\%$ to $\geq 0.1\%$ AEP) annual probability of flooding.
 - 'Very low' – represents less than 1 in 1,000 ($< 0.1\%$ AEP) annual probability of flooding.

Stalybridge, Tameside

- 3.4.10 The River Tame, a main river, is 75 m southeast of the Order Scheme and its relevant works components between Stalybridge and Millbrook. It flows southwest, parallel to the existing railway line. The Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map – refer to Figures 12B.4.1 and 12B.4.7 in Volume 2 of this Report [NR14], respectively.

Millbrook, Tameside

- 3.4.11 The River Tame is approximately 150 m east of the Order Scheme and its relevant works components between Millbrook and Mossley. It flows south, parallel to the existing railway line. The Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map – refer to Figures 12B.4.2 and 12B.4.8 in Volume 2 of this Report [NR14], respectively.

Mossley, Tameside

- 3.4.12 The River Tame is approximately 150 m east of the Order Scheme and its relevant works components between Mossley and Greenfield. It flows south, parallel to the existing railway line. The majority of the Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map, except for the following:

- Temporary land take for Scout West Compound – a small section along the southeastern fringe of this site is situated in Flood Zones 2 and 3 and falls within the medium and low risk of fluvial flood extent. Refer to Figures 12B.4.3 and 12B.4.9 in Volume 2 of this Report [NR14], respectively.
- Temporary land take for Egmont Street Replacement Car Park – is situated in Flood Zones 2 and 3, and falls within the high, medium, and low risk of fluvial flood extent. Refer to Figures 12B.4.3 and 12B.4.9 in Volume 2 of this Report [NR14], respectively.

Greenfield, Oldham

- 3.4.13 The River Tame is approximately 250 m southeast of the Order Scheme and its relevant works components between Greenfield and Uppermill. It flows southwest, parallel to the existing railway line. The majority of the Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map, except for the following:

- Temporary land take of Heron Lane road to Heron Lane Site Compound – the mid-section of this site is situated in Flood Zones 2

and 3, and falls within the high-risk fluvial flood extent. Refer to Figures 12B.4.4 and 12B.4.10 in Volume 2 of this Report [NR14], respectively.

- Temporary land take for Armit Road Site Compound – this site is partially situated in Flood Zone 2 and falls within the low risk of fluvial flood extent. Refer to Figures 12B.4.4 and 12B.4.10 in Volume 2 of this Report [NR14], respectively.

3.4.14 The access route to Heron Lane Site Compound, Heron Lane road, is affected by fluvial flood risk, as it falls within Flood Zones 2 and 3 and the high and medium fluvial flood risk extent.

Uppermill, Oldham

3.4.15 The River Tame is approximately 80 m east of the Order Scheme and its relevant works components between Uppermill and Diggle. It flows south, parallel to the existing railway line. The majority of the Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map extent, except for the following:

- Temporary land take of Saddleworth Rangers Replacement Car Park – this site is situated in Flood Zone 2 and falls within the low risk of fluvial flood extent. Refer to Figures 12B.4.5 and 12B.4.11 in Volume 2 of this Report [NR14], respectively
- Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works – this site is situated in Flood Zone 2 and falls within the high, medium, and low risk of fluvial flood extent. Refer to Figures 12B.4.5 and 12B.4.11 in Volume 2 of this Report [NR14], respectively.

Diggle, Oldham

3.4.16 The Diggle Brook, a main river, is approximately 80 m east of the Order Scheme and its relevant works components within Diggle. It flows southwest, parallel to the existing railway line. The majority of the Order Scheme and its relevant works components in this area are within Flood Zone 1 and do not fall within the Environment Agency Risk of Flooding from Rivers & Sea map extent, except for the following:

- Temporary land take for Diggle Access and Diversion Works – falls within Flood Zone 2 and 3. Figures 12B.4.6 and 12B.4.12 in Volume 2 of this Report [NR14], respectively.

Summary of Flood Risk from Main Rivers

3.4.17 Based on the available data (Environment Agency's Flood Map for Planning, Risk of Flooding from Rivers & Sea Water map, and historical flooding), the Order Scheme and its relevant works components are not at risk of fluvial flooding from main rivers, as they are primarily located within Flood Zone 1

and outside the fluvial flood extent of the Environment Agency Risk of Flooding from Rivers & Sea map, except for the following that falls within Flood Zone 2 and/or 3 and the high, medium, and low fluvial flood risk extent:

- Temporary land take for Scout West Compound.
- Temporary land take for Egmont Street Replacement Car Park.
- Temporary land take of Heron Lane road to Heron Lane Site Compound.
- Temporary land take for Armit Road Site Compound.
- Temporary land take of Saddleworth Rangers Replacement Car Park
- Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works.
- Temporary land take for Diggle Access and Diversion Works.

3.4.18 A range of mitigation measures will cover the sites listed above. This includes adhering to guidance, such as surface water management measures outlined in the Pollution Prevention and Incident Control Plan (PPICP) which forms part of the CoCP Part B, the Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site Guide (C811D)²⁸, Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015, Volume 3, Appendix 1A of this Report [NR14]) and the CoCP. CoCP Part A [NR17] has already been prepared and is submitted with the TWAO application [NR16] to establish general construction practice and principles and the general environmental management system for the Order Scheme. CoCP Part A [NR17] will subsequently be supplemented by Part B, comprising a suite of specialist plans, including any such documents that are required through the implementation of planning conditions as included in the Order application document 'Request for deemed planning permission and statement of proposed conditions' [NR12]. CoCP Part B will be subject to the approval of each local authority for the Order Scheme Development that require planning permission.

3.4.19 Of particular relevance to flood risk, the CoCP will act as the mechanism to ensure that water resources are appropriately protected through the application of a comprehensive PPICP and Piling Risk Assessment. The PPICP will be a condition of the Order Scheme for the elements that require planning permission. The PPICP will include consideration of site drainage including surface runoff and discharge requirements arising. The PPICP will seek, where necessary, any appropriate consents and approval for discharges to sewers or controlled waters in accordance with EA guidelines.

3.4.20 Potential mitigation also includes agreement of Protective Provisions with asset owners such as the EA or LLFA. Although no additional flood risk

²⁸ [Environmental good practice on site guide \(fifth edition\)](#)

mitigations are necessary beyond compliance with such mitigation measures, several flood resilience measures have been recommended under the 'Mitigation and Consideration of Control Measures' section of this report to prevent increase flood risk and minimise potential flood-related hazards, especially at high-risk sites as listed above.

Flood Risk from Ordinary Watercourses and Surface Water

- 3.4.21 Ordinary watercourses are watercourses through which water flows and do not form part of a main river. This includes smaller rivers, streams, ditches, drains, cuts, dykes, sluices, and sewers (excluding public sewers, which are drainage networks serving more than one property, including associated manholes, and is managed by water companies).
- 3.4.22 Surface water flooding occurs when rainwater exceeds the capacity of the sewer or drainage network systems or does not infiltrate into the ground and instead pools or flows over the ground as surface water runoff. Surface water flooding can be difficult to predict as it depends on rainfall volume and location, which are challenging to forecast. Local features can significantly affect the occurrence and severity of surface water flooding. Typically, runoff occurs on sloping land and impermeable ground surfaces. The ground can be impermeable either naturally, through soil type and geology, or unnaturally, due to development such as large areas of impervious material (e.g. paving and roads).
- 3.4.23 The responsibility for managing the risk of flooding from ordinary watercourses (fluvial) and surface water (pluvial) is the LLFA, in this case, TMBC and OMBC.
- 3.4.24 Understanding flood risk from ordinary watercourses is limited, as detailed hydraulic modelling is not always available. Subsequently, flood risk from ordinary watercourses is included under the term 'surface water' and is considered within the Environment Agency's Risk of Flooding from Surface Water map. This inclusion is due to ordinary watercourses flooding through mechanisms similar to surface water flooding, which is the methodology used by the Environment Agency for its Risk of Flooding from Surface Water mapping.
- 3.4.25 The Environment Agency's Risk of Flooding from Surface Water map is a high-level illustration showing the extent and probability of surface water at present-day. The map is not suitable for identifying whether an individual site will flood from surface water, as information regarding floor levels, construction characteristics, or designs of structures is not considered.
- 3.4.26 The Environment Agency's Risk of Flooding from Surface Water map is a probabilistic dataset, meaning that it shows the overall risk rather than the

risk associated with a specific event or scenario. It categorises the likelihood into the following three annual probabilities²⁴:

- High – represents greater than or equal to 1 in 30 ($\geq 3.3\%$ AEP) annual probability of flooding.
- Medium – represents less than 1 in 30 but greater than or equal to 1 in 100 ($< 3.3\%$ to $\geq 1\%$ AEP) annual probability of flooding.
- Low – represents less than 1 in 100 but greater than or equal to 1 in 1,000 ($< 1\%$ to $\geq 0.1\%$ AEP) annual probability of flooding.

3.4.27 An assessment of flood risk from ordinary watercourses has been undertaken for the Order Scheme and its associated relevant works components by reviewing the Environment Agency Risk of Flooding from Surface Water map, as detailed below.

Stalybridge, Tameside

3.4.28 Three ordinary watercourses are near the Order Scheme and its relevant works components between Stalybridge and Millbrook. These include the Fern Bank (approximately 200 m southeast, flowing southwest adjacent to the existing railway line), Acres Brook (approximately 300 m southeast, flowing southwest adjacent to the existing railway line), and Huddersfield Narrow Canal (approximately 300 m southeast, flowing southwest parallel to the existing railway line). A review of the Environment Agency Risk of Flooding from Surface Water map shows the Order Scheme and its relevant works components between Stalybridge and Millbrook have pockets of low, medium, and high risk of surface flooding. Refer to Figure 12B.4.13 in Volume 2 of this Report [NR14].

Millbrook, Tameside

3.4.29 Two ordinary watercourses are near the Order Scheme and its relevant works components between Millbrook and Mossley. These include the Swineshaw Brook (approximately 250 m east, flowing southwest adjacent to the existing railway line) and Huddersfield Narrow Canal (approximately 250 m east, flowing south parallel to the existing railway line). A review of the Environment Agency Risk of Flooding from Surface Water map shows the Order Scheme and its relevant works components between Millbrook and Mossley have pockets of low, medium, and high risk of flooding. Refer to Figure 12B.4.14 in Volume 2 of this Report [NR14], respectively.

Mossley, Tameside

3.4.30 Two ordinary watercourses are near the Order Scheme and its relevant works components between Mossley and Greenfield. These include the Micklehurst Brook (approximately 250 m east, flowing west, adjacent to the existing railway line) and Huddersfield Narrow Canal (approximately 250 m east, flowing south parallel to the existing railway line). A review of the Environment Agency Risk of Flooding from Surface Water map shows the

Order Scheme and its relevant works components between Mossley and Greenfield have pockets of low, medium, and high risk of flooding. Refer to Figure 12B.4.15 in Volume 2 of this Report [NR14].

Greenfield, Oldham

- 3.4.31 Two ordinary watercourses are near the Order Scheme and its relevant works components between Greenfield and Uppermill. These include Clough Lane (approximately 150 m southeast, flowing west adjacent to the existing railway line) and Huddersfield Narrow Canal (approximately 120 m southeast, flowing southwest parallel to the existing railway line). A review of the Environment Agency Risk of Flooding from Surface Water map shows the Order Scheme and its relevant works components between Greenfield and Uppermill have pockets of low, medium, and high risk of flooding. Refer to Figure 12B.4.16 in Volume 2 of this Report [NR14].

Uppermill, Oldham

- 3.4.32 Two ordinary watercourses are near the Order Scheme and its relevant works components between Uppermill and Diggle. These include the White Brook (approximately 300 m east, flowing southwest adjacent to the existing railway line) and Huddersfield Narrow Canal (approximately 50 m east, flowing south parallel to the existing railway line). A review of the Environment Agency Risk of Flooding from Surface Water map shows the Order Scheme and its relevant works components between Uppermill and Diggle have pockets of low, medium, and high risk of flooding. Refer to Figure 12B.4.17 in Volume 2 of this Report [NR14].

Diggle, Oldham

- 3.4.33 The Huddersfield Narrow Canal, an ordinary watercourse, is approximately 0 to 140 m from the Order Scheme and its relevant works components within Diggle. It flows southwest parallel to the existing railway line. A review of the Environment Agency Risk of Flooding from Surface Water map shows the Order Scheme and its relevant works components in Diggle have pockets with low, medium, and high risk of flooding. Refer to Figure 12B.4.18 in Volume 2 of this Report [NR14].

Future Climate Change Allowances

- 3.4.34 The majority of the proposed works are temporary works which will not be subject to the future impacts of climate change. However, permanent works will require consideration of climate change in order to demonstrate that they will be safe for the lifetime of the development (understood to be to 2125).
- 3.4.35 The two permanent works – Mossley Station Boundary and Oaklands Road Compound - are located in the Flood Zone 1.
- 3.4.36 The potential impact of future climate change to the permanent works were assessed using the EA Flood Zone Flood Map for Planning with Climate Change allowance extents. This dataset only considers the 'Central' Climate

Change allowance which is less than the 'Higher Central' allowance appropriate for 'essential infrastructure'. However the difference between the 'Central' and 'Higher Central' allowances for the 2080's epoch (to 2125) in the location of the works (Upper Mersey Management Catchment) is 12% (41% to 53%).

- 3.4.37 Based on the EA climate change Flood Map for Planning extents, the permanent works are located in Flood Zone 1 with the 'Central' allowance to 2125. The permanent works – as 'essential infrastructure', are appropriate for Flood Zone 1 and 2. As the permanent works are located outside the future 'Central' Flood Zone 2 it is considered that the additional 12% for the 'Higher Central' climate change will not result in the permanent works being impacted by the smaller Flood Zone 3 climate change extent, which would require additional mitigation works.
- 3.4.38 It is therefore considered that the permanent works will be safe for the lifetime of the development – as required by the Exception Test.

Summary of Flood Risk from Ordinary Watercourses

- 3.4.39 The Order Scheme and its relevant works components encompass areas with varying levels of surface water flood risk, including low, medium, and high, as identified through the Environment Agency Risk of Flooding from Surface Water map. Much of the Order Scheme involves upgrading the existing infrastructure along the Network Rail railway line, which already has a range of design features and mitigation measures to mitigate surface water flood risk. However, there are three new permanent works, which are as follows:
- Mossley Station Relocation Works
 - Oldham Road Footbridge (proposed MVL3/27B)
 - Greenfield Station Platform 2 Secondary Means of Escape Works (as part of Greenfield Station Redevelopment Works)
- 3.4.40 The new Mossley Station and Greenfield Station Platform 2 Secondary Means of Escape Works will be constructed on elevated platforms above ground level, and similarly, the New Oldham Road Footbridge (proposed MVL3/27B) is a structure asset elevated above ground level. Therefore, they are less susceptible to surface water flooding.
- 3.4.41 Any potential surface water flood risk to the Order Scheme and its relevant works components will be covered by a range of mitigation measure, potentially including Protective Provisions. This mitigation includes adhering to guidance, such as surface water management measures outlined in the PPICP, CIRIA Environmental Good Practice on Site Guide (C811D), Network Rail's requirements detailed in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]) and CoCP Part B will be prepared setting out measures to be implemented to address relevant Order Scheme

impacts, ensuring that works are appropriately managed and impacts and effects reduced where feasible.

- 3.4.42 Therefore, no additional flood risk mitigation measures are required beyond compliance with these mitigation measures.

Flood Risk from Groundwater

- 3.4.43 Groundwater flooding occurs when the water table (upper surface of the groundwater) rises above ground level due to prolonged or intense rainfall. This can lead to flooding in below-ground and low-lying areas, such as underpasses and basements. Groundwater flooding is more likely in regions underlain by permeable rock (aquifers), but it can also occur in areas with sand and gravel floodplains.
- 3.4.44 Groundwater flooding is typically localised and does not generally pose a significant risk to life due to the slow rate at which the groundwater level rises above ground as overland flow. However, it can cause substantial property damage, especially in urban areas, and pose additional risks to the environment and ground stability.
- 3.4.45 Groundwater levels will likely be in hydraulic continuity with nearby watercourses, including the River Tame and Diggle Brook, which are likely the primary influence on the water table at the Order Scheme and its relevant works components. The extent of this continuity depends on factors such as the permeability, hydraulic gradient, and the connectivity between groundwater and surface waterbodies.
- 3.4.46 The responsibility for managing local flood risk from groundwater lies with the LLFA, in this case, TMBC and OMBC. Due to the complex below-ground processes of groundwater flooding, it is a difficult flood source to precisely predict and identify which areas are at risk of it. The risk of groundwater flooding varies greatly depending on local ground conditions and the built environment.
- 3.4.47 Detailed groundwater information on the whole Order Scheme is unavailable. The Groundsure assessment reports (Annex H: Groundsure Report Of Plevins Site Compound Works Groundwater Flood Risk Annex I: Groundsure Report Of Armit Road Site Compound Groundwater Flood Risk, Annex J: Groundsure Report of Saddleworth Rangers Replacement Car park Groundwater Flood Risk) – which contains groundwater flood risk, assessed based on a 1 in 100-year return period (1% AEP) and 5 m DTM – were only conducted for the sites close to the watercourse, where groundwater would be expected to be linked to water levels in channel and where excavation is expected to take place, as discussed below. Nevertheless, the hydrogeological characteristics and other information (soil type, superficial and bedrock geology, and aquifer designation) are available

to assess the Order Scheme and its relevant works components groundwater condition, as discussed below.

Stalybridge, Tameside

Soil Type²²

- 3.4.48 The soil type underlying the Order Scheme and its relevant works components between Stalybridge and Millbrook is Soilscape 17, which refers to slowly permeable, seasonally wet, clayey soils with impeded drainage that drain to stream networks.

Bedrock and Superficial Deposits²⁰

- 3.4.49 The bedrock geology that underlies the Order Scheme and its relevant works components between Stalybridge and Millbrook is a mixture of:

- Pennine Lower Coal Measures Formation (mudstone, siltstone, and sandstone) – typically has a variable permeability depending on the proportion of each material; sandstone layers generally have moderate permeability, while mudstone and siltstone layers have low permeability.
- Woodhead Hill Rock (sandstone) – typically has high permeability due to its coarse-grained texture that allows water to pass through more easily; Rough Rock (sandstone) generally has high permeability due to its coarse-grained texture.
- Rossendale Formation (mudstone and siltstone) – generally have a low permeability.
- Huddersfield White Rock (sandstone) – typically has a high permeability due to its coarse-grained texture, which allows water to pass through more easily.

- 3.4.50 The superficial deposit that underlies the Order Scheme and its relevant works components between Stalybridge and Millbrook is a mixture of:

- Till, Devensian (diamicton) – generally have a low permeability due to its dense and compact nature.
- Head (clay, silt, sand, and gravel) – typically has a highly variable permeability depending on the proportion of each material; clay and silt components have low permeability, while sand and gravel layers exhibit higher permeability.

Aquifer Designation²¹

- 3.4.51 The bedrock between Stalybridge and Millbrook is designated as a Secondary A aquifer. This type of aquifer consists of permeable geological layers that support the local water table and can sustain water supplies on a local scale. In some cases, these aquifers may be an important source of

river baseflow. During prolonged or intense rainfall, the water table may rise above the ground level, potentially resulting in groundwater flooding under extreme conditions. Secondary A aquifers were formerly classified as minor aquifers under the previous classification system.

Millbrook, Tameside

Soil Type

- 3.4.52 The soil underlying the Order Scheme and its relevant works components between Millbrook and Mossley is a mix of Soilscales 16 and 17. Soilscale 16 refers to very acidic, loamy upland soils with a wet, peaty surface that is characteristically saturated and drains to local streams. Soilscale 17 refers to slowly permeable, seasonally wet, clayey soils with impeded drainage that drain to stream networks.

Bedrock and Superficial Deposits

- 3.4.53 The bedrock geology that underlies the Order Scheme and its relevant works components between Millbrook and Mossley is a mixture of:
- Fletcher Bank Grit (sandstone) – typically has high permeability due to its coarse-grained texture, allowing water to pass through more easily.
 - Marsden Formation (mudstone and siltstone) – typically has low permeability due to its fine-grained nature, which does not allow water to pass through more easily due to its compact nature.
- 3.4.54 The superficial deposit that underlies this area is:
- Head (clay, silt, sand, and gravel) – which has a highly variable permeability depending on the proportion of each material; clay and silt components have low permeability, while sand and gravel layers exhibit high permeability.

Aquifer Designation

- 3.4.55 The bedrock between Millbrook and Mossley is designated as a Secondary A aquifer. This type of aquifer consists of permeable geological layers that support the local water table and can sustain water supplies on a local scale. In some cases, these aquifers may be an important source of river baseflow. During prolonged or intense rainfall, the water table may rise above the ground level, potentially resulting in groundwater flooding under extreme

conditions. Secondary A aquifers were formerly classified as minor aquifers under the previous classification system.

Mossley, Tameside

Soil Type

- 3.4.56 The soil underlying the Order Scheme and its relevant works components between Mossley and Greenfield is Soilscape 6, which is freely draining, slightly acidic, loamy soil that drains to local groundwater and rivers.

Bedrock and Superficial Deposits

- 3.4.57 The bedrock geology that underlies the Order Scheme and its relevant works components between Mossley and Greenfield is a mixture of:
- Fletcher Bank Grit (sandstone) – typically has high permeability due to its coarse-grained texture, which allows water to pass through more easily.
 - Marsden Formation (mudstone and siltstone) – typically has low permeability due to its fine-grained nature, which does not allow water to pass through more easily due to its compact nature.
 - Upper Kinderscout Grit (sandstone) – typically has a relatively high permeability due to its coarse-grained, cross-bedded nature that allows water to pass through more easily.
 - Hebden Formation (mudstone and siltstone) – generally exhibits low permeability due to its fine-grained and compact nature, which restricts fluid flow.
- 3.4.58 The area of the Order Scheme and its relevant works components between Mossley and Greenfield has no superficial deposits.

Groundwater Flood Risk

- 3.4.59 Temporary right of access of Egmont Street road to Plevins Site Compound Works – according to the Groundsure report, the groundwater flood risk of this road is primarily low, with the southwestern section assessed as negligible risk (Annex H).
- 3.4.60 Temporary land take for Egmont Street Replacement Car Park – according to the Groundsure report, the groundwater flood risk of this site primarily negligible (Annex H).

Aquifer Designation

- 3.4.61 The bedrock between Millbrook and Mossley is designated as a Secondary A aquifer, which supports local water supplies and contributes to river base flow. This aquifer indicates that groundwater sustains the water table and contributes to the baseflow of surface watercourses. Therefore, during

prolonged or intense rainfall, water table levels can rise above the surface, potentially leading to groundwater flooding in extreme conditions.

Greenfield, Oldham

Soil Type

- 3.4.62 The soil underlying the Order Scheme and its relevant works components between Greenfield and Uppermill is a mix of Soilscape 6 and 17. Soilscape 6 refers to freely draining, slightly acidic, loamy soil that drains to local groundwater and rivers. Soilscape 17 refers to slowly permeable, seasonally wet, clayey soils with impeded drainage that drain to stream networks.

Bedrock and Superficial Deposits

- 3.4.63 The bedrock geology that underlies the Order Scheme and its relevant works components from Mossley, heading north to Greenfield is a mixture of:
- Marsden Formation (mudstone and siltstone) – typically has low permeability due to its fine-grained nature, which does not allow water to pass through more easily due to its compact nature.
 - Lower Kinderscout Grit (sandstone) – typically has a relatively high permeability due to its medium to very coarse grain size and the presence of crossbedding that allows fluids to pass through more easily.
 - Hebden Formation (mudstone and siltstone) – generally exhibits low permeability due to its fine-grained and compact nature, which restricts fluid flow.
- 3.4.64 The area of the Order Scheme and its relevant works components between Greenfield and Uppermill has no superficial deposits.

Aquifer Designation

- 3.4.65 The bedrock between Mossley and Greenfield is designated as a Secondary A aquifer. This type of aquifer consists of permeable geological layers that support the local water table and can sustain water supplies on a local scale. In some cases, these aquifers may be an important source of river baseflow. During prolonged or intense rainfall, the water table may rise above the ground level, potentially resulting in groundwater flooding under extreme

conditions. Secondary A aquifers were formerly classified as minor aquifers under the previous classification system.

Groundwater Flood Risk

- 3.4.66 Temporary land take for Armit Road Site Compound – according to the Groundsure report, the groundwater flood risk along this route is primarily low (Annex I).
- 3.4.67 Temporary land take of Saddleworth Rangers Replacement Car Park – according to the Groundsure report, the groundwater flood risk along this site is primarily negligible (Annex J).

Uppermill, Oldham

Soil Type

- 3.4.68 The soil type underlying the Order Scheme and its relevant works components between Uppermill and Diggle is Soilscape 17. Soilscape 17 refers to slowly permeable, seasonally wet, clayey soils with impeded drainage that drain to stream networks.

Bedrock and Superficial Deposits

- 3.4.69 The bedrock geology that underlies the Order Scheme and its relevant works components between Uppermill and Diggle is:
- Lower Kinderscout Grit (sandstone) – typically has a relatively high permeability due to its medium to very coarse grain size and the presence of crossbedding that allows fluids to pass through more easily.
- 3.4.70 The area of the Order Scheme and its relevant works components between Uppermill and Diggle has no superficial deposits.

Aquifer Designation

- 3.4.71 The bedrock between Uppermill and Diggle is designated as a Secondary A aquifer. This type of aquifer consists of permeable geological layers that support the local water table and can sustain water supplies on a local scale. In some cases, these aquifers may be an important source of river baseflow. During prolonged or intense rainfall, the water table may rise above the ground level, potentially resulting in groundwater flooding under extreme

conditions. Secondary A aquifers were formerly classified as minor aquifers under the previous classification system.

Groundwater Flood Risk

- 3.4.72 Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works – according to the Groundsure report, the groundwater flood risk at this site is primarily low (Annex K).

Diggle, Oldham

Soil Type

- 3.4.73 The soil underlying the Order Scheme and its relevant works components in Diggle is a mix of Soilscape 6 and 17. Soilscape 6 refers to freely draining, slightly acidic, loamy soil that freely drains to local groundwater and rivers. Soilscape 17 refers to slowly permeable, seasonally wet, clayey soils with impeded drainage that drain to stream networks.

Bedrock and Superficial Deposits

- 3.4.74 The bedrock geology that underlies the Order Scheme and its relevant works components in Diggle is:
- Shale Grit (sandstone) – typically has moderate to high permeability due to its coarse grain size and interconnected pore spaces that allow fluids to move through the rock relatively more easily.

- 3.4.75 The area of the Order Scheme and its relevant works components in Diggle has no superficial deposits.

Aquifer Designation

- 3.4.76 The bedrock in Diggle is designated as a Secondary A aquifer. This type of aquifer consists of permeable geological layers that support the local water table and can sustain water supplies on a local scale. In some cases, these aquifers may be an important source of river baseflow. During prolonged or intense rainfall, the water table may rise above the ground level, potentially resulting in groundwater flooding under extreme conditions. Secondary A aquifers were formerly classified as minor aquifers under the previous classification system.

Groundwater Flood Risk

- 3.4.77 Temporary land take for access to Diggle Welfare, Rail hub and Office Compound; and Diggle Access and Diversion Works – according to the

Groundsure report, the groundwater flood risk at this site is primarily negligible (Annex L).

Summary of Flood Risk from Groundwater

- 3.4.78 Based on the area's hydrogeological characteristics and other information (soil type, superficial and bedrock geology, and aquifer designation), findings from the Groundsure assessments (which indicated negligible to low risk where conducted), and historical flood records – the risk of groundwater flooding is considered low for the Order Scheme and its relevant works components. Even in the rare event that groundwater flooding does occur, it is unlikely to pose a significant risk, as groundwater typically rises slowly above ground level and is generally of insufficient volume to cause widespread and consequential flood damage.
- 3.4.79 While groundwater flood risk should not typically prevent development, it is crucial to ensure that developments are not placed at unnecessary risk or exacerbate existing flood risk. The Order Scheme and its relevant works will involve minimal below-ground construction that could alter subsurface flow regimes.
- 3.4.80 Where below-ground work is necessary, it will be designed to withstand hydrostatic pressure and prevent groundwater ingress, ensuring it is not vulnerable to groundwater flooding. The depth of the underlying aquifers is expected to be greater than that of any proposed below-ground elements, and there are no proposals to discharge into the ground. Any potential groundwater emergence at the surface will be appropriately managed through the surface water management measures outlined in the PPICP, which forms part of the CoCP Part B.
- 3.4.81 Given the low groundwater flood risk of the Order Scheme and its relevant works components, the following mitigation measures are deemed sufficient, and no additional flood risk mitigation measures are required beyond them. This includes the surface water management measures outlined in the PPICP, CIRIA Environmental Good Practice on Site Guide (C811D), adherence to requirements included in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]) and the measures to be developed and implemented through the CoCP Part B.

Flood Risk from Reservoirs and Canals

- 3.4.82 An assessment of flood risk from canals and reservoirs has been undertaken for the Order Scheme and its associated relevant works components by reviewing the Huddersfield Narrow Canal Modelled Hazard Zone^{14,15} and the Environment Agency Risk of Flooding from Reservoir.

Canals

- 3.4.83 Canals are artificial waterways that often contain features such as locks and dams to regulate water levels, making them less susceptible to flooding than natural watercourses. Canal flooding is most likely to occur due to residual

risks related to defences, such as overtopping of canal banks, breaching of embanked reaches, or asset (gate) failure.

- 3.4.84 The Order Scheme and its relevant works components do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone (see Annex G)¹¹. Although some sections of the Order Scheme and its relevant works components are on low-level sites, very near the Huddersfield Narrow Canal (e.g. the temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works, is at equivalent elevation as and <1 m from the canal), the risk of canal flooding is low. This is because canals are artificial waterways where water flow is strongly controlled, thus making them less prone to flooding compared to natural watercourses during storm events.

Reservoir

- 3.4.85 Reservoirs are large natural or artificial lakes that store water for public supply, irrigation, and industrial use. Reservoirs play a crucial role in managing water resources, especially in areas with water fluctuations. The Environment Agency is responsible for managing flood risk from reservoirs.
- 3.4.86 The Environment Agency's Reservoir Flood map shows where water may go in the very unlikely event of a dam or reservoir failure. It should be noted that more than one reservoir could affect a location simultaneously. There are two flooding scenarios on the Reservoir Flood map:
- 3.4.87 'Dry day' scenario – predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels²⁵; and
- 3.4.88 'Wet day' scenario – predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood²⁶.
- 3.4.89 An assessment of flood risk from reservoirs for the Order Scheme and its associated relevant works components was conducted by reviewing the Environment Agency Risk of Flooding from Reservoirs map, as detailed below.

Stalybridge, Tameside

- 3.4.90 Reservoirs – small sections of the Order Scheme and its relevant works components between Stalybridge and Millbrook fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a reservoir failure¹⁵. Refer to Figure 12B.4.19 in Volume 2 of this Report [NR14].
- 3.4.91 Canals – the Order Scheme and its relevant works components between Stalybridge and Millbrook do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal

flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Millbrook, Tameside

- 3.4.92 Reservoirs – sections of the Order Scheme and its relevant works components between Millbrook and Mossley fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a reservoir failure¹⁵. Refer to Figure 12B.4.20 in Volume 2 of this Report [NR14].
- 3.4.93 Canals – the Order Scheme and its relevant works components between Millbrook and Mossley fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Mossley, Tameside

- 3.4.94 Reservoirs – sections of the Order Scheme and its relevant works components between Mossley and Greenfield fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a reservoir failure¹⁵. Refer to Figure 12B.4.21 in Volume 2 of this Report [NR14].
- 3.4.95 Canals – the Order Scheme and its relevant works components between Mossley and Greenfield do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Greenfield, Oldham

- 3.4.96 Reservoirs – small sections of the Order Scheme and its relevant works components between Greenfield and Uppermill fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a reservoir failure¹⁴. Refer to Figure 12B.4.22 in Volume 2 of this Report [NR14].
- 3.4.97 Canals – the Order Scheme and its relevant works components between Greenfield and Uppermill do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Uppermill, Oldham

- 3.4.98 Reservoirs – sections of the Order Scheme and its relevant works components between Uppermill and Diggle fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a

reservoir failure¹⁴. Refer to Figure 12B.4.23 in Volume 2 of this Report [NR14].

- 3.4.99 Canals – the Order Scheme and its relevant works components between Uppermill and Diggle do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Diggle, Oldham

- 3.4.100 Reservoirs – sections of the Order Scheme and its relevant works components in Diggle fall within the reservoir flood extent for both dry and wet day scenarios in the very unlikely event of a reservoir failure¹⁴. Refer to Figure 12B.4.24 in Volume 2 of this Report [NR14].

- 3.4.101 Canals – the Order Scheme and its relevant works components within Diggle do not fall within the Huddersfield Narrow Canal Modelled Hazard Zone¹¹, and there are no recorded incidents of canal flooding nearby. Thus, there is no risk of flooding from canals in this area (see Annex G).

Summary of Flood Risk from Reservoirs and Canals

- 3.4.102 Sections of the Order Scheme and its relevant works components fall within the risk of flooding if the reservoir(s) fail. However, the risk of reservoir failure is very unlikely based on historical flood records and regular inspections, surveys, and maintenance by the operating authorities; reservoirs in the UK have an excellent safety record, with no reservoir failure incidents resulting in the loss of life since 1925²⁹.

- 3.4.103 The Order Scheme and its relevant works components are not at risk of canal flooding. This is based on historical flood records, their location outside the Canal Hazard Zones, and canals being strongly controlled waterways with regulated water levels.

- 3.4.104 Given the absence of tidal flood risk and the low flood risk from reservoirs and canals for the Order Scheme and its relevant works components, the proposed mitigation measures are deemed sufficient, and no additional flood risk mitigation measures are required for the Order Scheme and its relevant works components. These include the surface water management measures outlined in the PPICP, CIRIA Environmental Good Practice on Site Guide (C811D), adherence to NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]), a requirement to ensure that the measures to be set out in the CoCP Part B are implemented to address Order Scheme impacts,

²⁹ [Biennial report on reservoir safety - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/674442/biennial-report-on-reservoir-safety-2019-2020.pdf)

ensuring that works are appropriately managed and the potential for the use of Protective Provisions as necessary.

3.5 Impacts of the Order Scheme on Flood Risk Elsewhere

- 3.5.1 An evaluation of the potential flood risk impact on third-party properties and land due to the Order Scheme and its relevant works components has also been conducted, as detailed below.

Impact of the Order Scheme on Fluvial Flood Risk Elsewhere

- 3.5.2 Development on floodplain can reduce the water storage capacity and alter overland flowpaths, potentially displacing floodwater changing flood extents and depths in the surrounding area. The Order Scheme and its relevant works components are primarily in Flood Zone 1 and outside the 0.1% AEP fluvial flood extent of the Environment Agency Risk of Flooding from Rivers and Sea map. However, the following elements fall within Flood Zone 2 and/or 3, and the high-risk 1% AEP fluvial flood extent:

- Temporary land take for Scout West Compound.
- Temporary land take for Egmont Street Replacement Car Park, and temporary right of access of Egmont Street road to Plevins Site Compound Works.
- Temporary land take of Heron Lane road to Heron Lane Site Compound.
- Temporary land take for Armit Road Site Compound.
- Temporary land take of Saddleworth Rangers Replacement Car Park
- Temporary land take for Uppermill Viaduct (MVL3/31) and Site Compound Works.
- Temporary land take for Diggle Access and Diversion Works.

- 3.5.3 The areas surrounding the sites listed above are already protected to prevent increased fluvial flood risk under mechanisms, including flood mechanisms or floodplain storage; therefore, no further flood risk mitigation measures are required. The impact on fluvial flood risk to the surrounding area as a result of the Order Scheme and its relevant works is thus considered low.

Impact of the Order Scheme on Surface Water Flood Risk Elsewhere

- 3.5.4 Development in areas prone to surface water ponding or that alter overland flow can displace stormwater runoff and increase surface water flood risk to the surrounding area. Increased impermeable surfaces can reduce ground infiltration capacity, leading to higher volumes and rates of surface water

runoff to nearby watercourses or drainage systems, potentially causing localised flooding.

3.5.5 Most permanent aspects of the Order Scheme will not introduce additional impermeable surfaces, as it primarily involves upgrading the existing infrastructure along the Network Rail railway line, so there would only be very limited change to flood mechanisms or floodplain storage. However, some elements of the Order Scheme include constructing new assets that may seemingly increase the impermeable surface area of the floodplain:

- (New) Mossley Station Relocation Works – will take place on vacant land approximately 300 m north of the existing Mossley Station. The site for the new station has a low to medium risk of surface water flooding, whereas the site of the existing station has a higher risk of surface water flooding, ranging from high to low. The relocation works effectively reduce the surface water flood risk exposure of Mossley Station; hence, there is no impact on surface water flood risk from this element of the Order Scheme to the surrounding area. Refer to Figure 12B.4.15 in Volume 2 of this Report [NR14].
- Greenfield Station Platform 2 Secondary Means of Escape Works (as part of Greenfield Station Redevelopment Works) – will replace the existing MVL3/27A Greenfield Station footbridge with a new, equivalent footbridge with lift shafts, in addition to a minor (<1 ha) extension of the existing Greenfield Station platform. As the new replacement footbridge is being constructed in a like-for-like manner to the existing footbridge, and the minor platform extension does not occupy a significant footprint area, there is no impact on surface water flood risk from this element of the Order Scheme to the surrounding area. Refer to Figure 12B.4.16 in Volume 2 of this Report [NR14].
- New Oldham Road Footbridge (proposed MVL3/27B) – will involve constructing a new footbridge adjacent to the existing Oldham Road Overbridge (MVL3/28). As the new footbridge is elevated above ground level, it effectively does not increase the impermeable area of the floodplain; hence, there is no impact on surface water flood risk from this element of the Order Scheme to the surrounding area. Refer to Figure 12B.4.16 in Volume 2 of this Report [NR14].

3.5.6 Although three works of the Order Scheme – Mossley Station Relocation, Greenfield Station Platform 2 Secondary Means of Escape Works, and New Oldham Road Footbridge (proposed MVL3/27B) – entails constructing new assets rather than upgrades to infrastructure, the overall change in impermeable area is minimal and not considered significant enough to

displace floodplain storage or increase the risk of surface water flooding in the surrounding area.

- 3.5.7 Therefore, no further flood risk mitigation measures are required. The impact on surface water flood risk to the surrounding area as a result of the Order Scheme and its relevant works is thus considered low.

Impact of the Order Scheme on Groundwater Flood Risk Elsewhere

- 3.5.8 The risk of groundwater flooding across the Order Scheme and its relevant works components is considered low, even during periods of high rainfall or elevated water tables. This is based on the area's hydrogeological characteristics and other information (soil type, superficial and bedrock geology, and aquifer designation), findings from the Groundsure assessments (Annex H: Groundsure Report Of Plevins Site Compound Works Groundwater Flood Risk Annex I: Groundsure Report Of Armit Road Site Compound Groundwater Flood Risk, Annex J: Groundsure Report of Saddleworth Rangers Replacement Car park Groundwater Flood Risk) (which indicated negligible to low risk where conducted), and historical flood record. In the rare event that groundwater flooding does occur, it is unlikely to pose a significant risk, as groundwater typically rises slowly above ground level and is generally of insufficient volume to cause widespread and consequential flood damage.
- 3.5.9 While groundwater flood risk should not typically prevent development, it is crucial to ensure that developments are not placed at unnecessary risk or exacerbate existing flood risk. The Order Scheme and its relevant works will involve minimal below-ground construction that could alter subsurface flow regimes.
- 3.5.10 The depth of the underlying aquifers is expected to be greater than that of any proposed below-ground elements, and there are no proposals to discharge into the ground. Moreover, the Order Scheme and its relevant works components will be covered by a range of mitigation measures to prevent any increase in groundwater flood risk in the surrounding area. Any potential groundwater emergence at the surface will be appropriately

managed through the surface water management measures outlined in the PPICP, which forms part of the CoCP Part B.

- 3.5.11 The risk of the Order Scheme and its relevant works impacting groundwater flood risk elsewhere is thus considered low, and no further flood risk mitigation measures are required.

Impact of the Order Scheme on Reservoirs, Canals, and Tidal Flood Risk Elsewhere

- 3.5.12 The Order Scheme and its relevant works components are not within a tidal area. Therefore, the impact of the Order Scheme and its relevant works on tidal flood risk to the surrounding area is considered negligible.
- 3.5.13 Although the Order Scheme and its relevant works components are near the Huddersfield Narrow Canal, it does not fall within the Huddersfield Narrow Canal Modelled Hazard Zone. While a few sections of the Order Scheme and its relevant works components are on low-level sites, very near the Huddersfield Narrow Canal (e.g. the temporary land taken adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works, is at equivalent elevation as and <1 m from the canal), the risk of canal flooding is low. This is because canals are artificial waterways where water flow is greatly controlled, thus making them less prone to flooding than natural watercourses during storm events.
- 3.5.14 The Order Scheme and its relevant works components will not significantly alter overland flow paths, displace floodplain storage, or increase runoff volume at a level enough to overwhelm the nearby reservoirs. Additionally, the development will be designed with adequate drainage systems to effectively manage stormwater and minimise its contribution to potential flood risk in the surrounding area, including reservoirs.
- 3.5.15 Moreover, the Order Scheme and its relevant works components will be covered by mitigation measures to prevent increased reservoir and canal flood risk in the surrounding area; therefore, no further mitigation measures are required. The impact on reservoir and canal flood risk to the surrounding area as a result of the Order Scheme and its relevant works is thus considered low.

3.6 Mitigation And Consideration of Control Measures

- 3.6.1 Mitigation measures for the Order Scheme and its relevant works components are required during the construction and operational phases; these measures are summarised below.

Construction Phase Mitigation

- 3.6.2 No specific mitigation measures are required during the construction phase of the Order Scheme and its relevant works components, as there is no change in flood risk compared to the baseline flood risk. Nevertheless, as detailed below, flood resilience measures will still be implemented to prevent

increase flood risk and minimise potential flood-related impacts, especially at high-risk sites.

Surface Water Drainage

- 3.6.3 The NPPF requires that new developments do not exacerbate flood risk by reducing flood storage capacity or increasing overland flow. Surface water flood risk must be effectively managed to prevent any additional overland flow elsewhere. This involves directing overland flow away from vulnerable assets associated with the proposed development by conveying it to a drainage network designed to receive additional outfall or by containing it onsite.
- 3.6.4 Surface water management during construction will be implemented through the PPICP, which forms part of the CoCP Part B. These measures will ensure effective control of surface water to prevent any increase in flood risk to the sites or surrounding areas.
- 3.6.5 During the construction phase, any temporary drainage systems will comply with the protective provisions granted to the regulatory bodies under the Order as required. This includes any works carried out within 16 m of waterbodies, culverts, and drainage outfalls – existing or new. Drainage construction will be carefully managed to control discharges into drainage systems and watercourses, including runoff from earthworks, access roads, and haulage routes. Measures will be taken to ensure discharge rates do not exceed the capacity of existing drainage system or receiving watercourses, thereby preventing flooding from sewer surcharges or fluvial overflow at the sites and in the surrounding area.

Code of Construction Practice (CoCP)

- 3.6.6 The CoCP Part A [NR17] sets out best practice environmental management measures that will be implemented on-site during construction to address potential environmental impacts that may arise from the Order Scheme and its associated relevant works, ensuring the works are appropriately managed, and effects are reduced where feasible.
- 3.6.7 The CoCP is split into Part A and Part B. Part A sets out the general principles, relevant measures, standards, and environmental management requirements to be adhered to during construction. Part B applies to the Order Scheme Development that requires deemed planning permission; it will be a series of standalone reports and delivery plans. The CoCP sets out the environmental objectives and targets for the Order Scheme and how the environmental requirements stipulated will be delivered. It also details the processes to manage the environment during construction, ensuring compliance with relevant legislation and regulations. The aim of the CoCP,

to be secured via a planning condition, is to ensure that all relevant flood risk mitigation measures will be in place in advance of construction works.

Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015)

- 3.6.8 All of the relevant requirements included in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [**NR14**]) will be complied with. This document is comprised of a rigorous, effective and well-established set of environmental standards and procedures that are routinely implemented by Network Rail on its projects nationwide. This includes requiring the contractor to assess the risk of flooding from all sources for temporary construction facilities and locate them outside floodplains or areas prone to other sources of flooding; or use appropriate protection measures to minimise the risk. This also includes meeting the requirements outlined in the 'Weather Resilience and Climate Change Adaptation' section in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [**NR14**]).

CIRIA Environmental Good Practice on Site Guide (C811D)

- 3.6.9 The CIRIA Environmental Good Practice on Site Guide (C811D) is a comprehensive guide that provides practical information for managing environmental issues and delivering sustainable construction. The guide aims to assist with the adherence to high environmental standards and compliance with relevant legislation, such as the Environment Act 2021, ensuring that projects meet national environmental commitments.

Flood Warning Register

- 3.6.10 It is required that Heron Lane road to Heron Lane Site Compound, Egmont Street road to Plevins Site Compound Works, and Lee Side road (Diggle Access and Diversion Works) to Diggle Welfare, Rail hub and Office Compound – which falls within Flood Zones 2 and 3 – be registered with the Environment Agency's flood warning service. This service monitors and forecasts potential flooding, providing timely alerts that would support the implementation of evacuation procedures. Registering these sites and access routes would improve flood preparedness by facilitating the safe securing and evacuation of the compounds in the event of a flood warning.

Measures for Mitigating Flood-Related Hazards

- 3.6.11 Measures for mitigation flood-related hazards include the following, as outlined in the PPICP, which forms part of the CoCP Part B:
- Buffer zone protection – no materials, equipment, or waste should be stored or placed within 16 m of watercourses to prevent the risk of wash-in during high rainfall or flood events. Physical mitigation measures could be installed around the perimeter to further minimise the risk of accidental ingress.

- Fuel and chemical storage – the storage of fuels, oils, or chemicals on-site is prohibited unless appropriately contained within bunded areas that meet relevant environmental containment standards.
- Long-term material storage – where long-term storage of materials is proposed, flood resilience measures must be implemented to prevent displacement and wash-in during high rainfall or flood conditions. These may include elevated storage platforms, secure containment units (bunding), and fencing or other appropriate physical barriers.
- Flood monitoring and response – the site management plan must assign two designated personnel to be available on-call 24/7. These individuals must be registered to receive flood alerts and warnings from the Environment Agency. Upon receipt of a flood warning/alert, they are required to inspect flagged high-risk sites within one hour and initiate appropriate mitigation actions. The implementation of surveillance systems is recommended to support flood risk monitoring throughout the construction phase.

Operational Phase Mitigation

- 3.6.12 No specific mitigation measures are required during the operational phase of the Order Scheme and its relevant works components, as there is no change in flood risk compared to the baseline. Nevertheless, measures will still be implemented to prevent potential flood risk, detailed in the PPICP, as part of the CoCP Part B, which will include good practice measures and protocols for the storage, use and management of potential contaminants on site, criteria for adequate bunding and hardstanding and silt fencing.

Surface Water Drainage and Discharge

- 3.6.13 All discharges from the Order Scheme into the existing drainage system or nearby watercourse will be appropriately managed. This includes ensuring discharge rates do not exceed the capacity of the existing drainage system or the receiving watercourse; thereby, mitigating the risk of flooding from sewer surcharges at the sites or fluvial overflow in the surrounding area. No discharge will occur without prior consent via the Order's protective provisions from the respective authorities. These include the EA for discharges into main rivers, the LLFA for discharges into ordinary watercourses (TMBC and OMBC), and United Utilities for discharges into surface water sewers.
- 3.6.14 The Drainage Strategy is a standalone document, separate from this Technical Appendix FRA, and is being developed to support the internal progression of detailed design. The Drainage Strategy will be undertaken at the detailed design stage, specifying the discharge rates of the new outfalls and how surface water runoff will be managed in accordance with current regulatory guidance. While the Drainage Strategy is not intended for submission at this stage, the Environmental Report serves to provide reassurance at the outline design stage that appropriate mechanisms and controls are in place to manage surface water drainage in advance of

construction. These controls are established under the Order and will be implemented via the CoCP Part B.

4. Summary

- 4.1.1 The Order Scheme and its associated relevant works components are collectively over 1 ha in area. Therefore, a site-specific FRA (this report) is required.
- 4.1.2 This site-specific FRA presents the findings of flood risk to and from the Order Scheme and its associated relevant works components and, where necessary, an appraisal of possible mitigation measures to prevent or reduce flood risk.
- 4.1.3 The Order Scheme has been sub-divided into 43 components spread across six assessment areas:
- Stalybridge
 - Millbrook
 - Mossley
 - Greenfield
 - Uppermill
 - Diggle
- 4.1.4 Stalybridge, Millbrook, Mossley and Greenfield fall within the TMBC, while Uppermill and Diggle fall within OMBC. The relevant components of the Scheme within each of these areas are detailed in section 3.3.1.

Consents, Permit, and Approvals

- 4.1.5 No discharge will occur without prior consent via the Order's protective provisions from the respective authorities. These include the EA for discharges into main rivers, the LLFA for discharges into ordinary watercourses (TMBC and OMBC), and United Utilities for discharges into surface water sewers.

Flood Risk Activity Permit (FRAP) and Land Drainage Consent

- 4.1.6 FRAPs and land drainage consent are regulatory requirements in England, governed by the Environmental Agency and Lead Local Flood Authority (LLFA), respectively. These permits are required for certain works in, over, under, or near main rivers, flood defences, and ordinary watercourses. Failure to obtain permits constitutes a breach of UK environmental legislation that can lead to consequences, including financial penalties and legal proceedings.
- 4.1.7 The Order Scheme, if granted, provides Network Rail with planning permission and deemed consent for the works in, over, under, or near main rivers, flood defences, and ordinary watercourses. However, this does not override environmental legislation; rather, it streamlines the process by replacing certain permitting requirements with protective provisions. These

provisions ensure that the Environment Agency remains engaged in the process, requiring submission of detailed designs and allowing for consultation and agreement.

- 4.1.8 While formal permits such as FRAPs may not be required, the EA retains the right to review and respond to proposals, with the Order stipulating that agreement cannot be unreasonably withheld. In practice, this means the same level of scrutiny and environmental rigour is applied, but through a mechanism that de-risks delivery and provides certainty for the Order Scheme. Should any conditions require FRAPs, these will be prepared

Canal and River Trust Approval

- 4.1.9 The Canal and River Trust advises that any development located adjacent to or near a canal will require consultation and, in some cases, formal approval. This applies to any works on, near, under, or over canals where there is potential to affect the structural integrity of the canal or towpath, interfere with navigation or maintenance access, or impact water levels or drainage patterns.
- 4.1.10 In addition, the Canal and River Trust defines specific "notified areas" around canals that they must be consulted on for the planning application. These areas vary depending on the scale of the development:
- A 150 m buffer applies for major developments.
 - A 50 m buffer applies for minor and household developments, but can extend to 75 or 150 m where there are assets such as reservoirs, tunnels, cuttings, and embankments.
- 4.1.11 The Order, if granted, provides Network Rail with planning permission and deemed consent for the works on, near, under, or over canals. However, this does not remove the need for engagement with the Canal and River Trust. Under the Order's protective provisions, Network Rail must submit detailed designs and seek the Trust's approval. While formal approval is not required, the Trust retains the right to review and respond to proposals, with the Order stipulating that agreement cannot be unreasonably withheld.
- 4.1.12 Engagement arrangements with the Trust will be reviewed and clarified by the designer/contractor prior to the start of construction for each applicable work elements, ensuring continued collaboration and oversight.

Risk of Flooding from Rivers

- 4.1.13 The majority of the Order Scheme and its relevant works components are not at risk of fluvial flooding from main rivers, as they are primarily located within Flood Zone 1 and outside the fluvial flood extent of the Environment Agency Risk of Flooding from Rivers & Sea map, except for the following

seven sites listed in the ‘Summary of Flood Risk from Main Rivers’ section, that fall within Flood Zone 2 and/or 3 and the high-risk fluvial flood extent.

- 4.1.14 The permanent works for the development have been assessed against future climate change using the available data from the EA. The permanent works are expected to be located outside the future Flood Zone 3 (1% AEP) extent with the ‘Higher Central’ (53%) climate change allowance. This assessment is based on the site being located outside the larger Flood Zone 2 (0.1% AEP) with the marginally smaller ‘Central’ (41%) climate change allowance. Consequently the permanent works are considered to be appropriately located for future flood risk for the lifetime of the development.

Sequential Approach

- 4.1.15 In accordance with the NPPF, the following two tests are required.

Sequential Test

- 4.1.16 The Sequential Test is provided for the seven sites listed above, as they fall within Flood Zone 2 and/or 3, classed as ‘major development’ (see Annex C), and not within sites allocated for development in the Local Plan (as detailed in the ‘Places for Everyone Joint Development Plan’ section).
- 4.1.17 Suitable land along the route is extremely limited due to topographical constraints, existing land use, and operational requirements. Multiple reviews have been taken to refine the location, size, and layout of work sites to minimise environmental impacts, including flood risk. Where feasible, sites have been located outside Flood Zones 2 and 3, with preference given to lower-risk where operationally viable. However, in some cases, avoidance is not possible due to the linear nature of the railway corridor, the need for proximity to specific worksites, and the lack of alternative accessible land.
- 4.1.18 Flood risk has been carefully balanced against the practical and logistical needs of delivering the Order Scheme. As the Order Scheme and its relevant works components cannot be relocated or substituted elsewhere, an Expectation Test is required in line with the NPPF.

Exception Test

- 4.1.19 The Exception Test is provided for the following four of the seven sites listed above, as they fall within Flood Zone 3, as well as 2, and are classed as ‘essential infrastructure’ (see Annex B):
- Temporary land take for Scout West Compound.
 - Temporary land take for Egmont Street Replacement Car park,.
 - Temporary land take of Heron Lane road to Heron Lane Site Compound.
 - Temporary land take for Diggle Access and Diversion Works.

4.1.20 The following three of the seven sites listed above do not require an Exception Test, as they fall within Flood Zone 2 and are classed as ‘essential infrastructure’ (see Annex B):

- Temporary land take for Armit Road Site Compound.
- Temporary land take of Saddleworth Rangers Replacement Car park
- Temporary land take adjacent to High Street road for Uppermill Viaduct (MVL3/31) and Site Compound Works.

4.1.21 Order Scheme and its relevant works components meet the two criteria of the Exception Test:

- Wider sustainability benefits – the development forms part of the Transpennine Route Upgrade in line national objectives on ‘levelling up’ the north of England. The development is expected to deliver sustainability and associated economic benefits to the wider community by supporting a cleaner mode of transport on a regional scale. This benefit is considered to outweigh the minimal flood risk impact identified in this FRA following the implementation of proposed mitigation measures.
- Safety and flood risk management – the proposed rail infrastructure improvement will remain safe for use throughout its operational lifetime, taking into account the vulnerability of its users. It will not increase flood risk elsewhere and, where feasible, may contribute to reducing flood risk. This reflects the requirements of the ‘Weather Resilience and Climate Change Adaptation’ section in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]).

4.1.22 This assessment has confirmed that the requirements of the Sequential Test and the Exception Test have been fulfilled. The requirements of tests are passed for the Order Scheme and its associated relevant works components – including the seven high-risk sites.

4.1.23 Mitigation measures will cover those seven sites listed above. This includes adhering to guidance, such as surface water management measures outlined in the PPICP which forms part of the CoCP Part B, the Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site Guide (C811D)³⁰ adherence to NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]), a requirement to ensure that the measures to be set out in the CoCP Part B are implemented to address

³⁰ [Environmental good practice on site guide \(fifth edition\)](#)

Order Scheme impacts, ensuring that works are appropriately managed. and the potential for the use of Protective Provisions as necessary.

Risk of Flooding from Ordinary Watercourses and Surface Water Flooding

4.1.24 The risk of surface water flooding across the Order Scheme and its relevant works components varies between low, medium, and high. Much of the Order Scheme involves upgrading the existing infrastructure along the railway line, which already has protective measures to mitigate surface water flood risk. Although there are three new permanent works, which will have mitigation measures to minimise surface water flood risk:

- Mossley Station Relocation Works – will be constructed on elevated platforms above ground level, making it less susceptible to surface water flooding. A new drainage system will be implemented during the operation phase to mitigate flood risk.
- Greenfield Station Platform 2 Secondary Means of Escape Works (as part of Greenfield Station Redevelopment Works) – will be constructed on elevated platforms above ground level, making it less susceptible to surface water flooding. A new drainage system will be implemented during the operation phase to mitigate flood risk.
- New Oldham Road Footbridge (MVL3/27B) – is a structured asset above ground level, making it less susceptible to surface water flooding.

4.1.25 Nevertheless, any potential surface water flood risk to the Order Scheme and its relevant works components will be covered by various mitigation measures. This includes adhering to guidance, such as surface water management measures outlined in the PPICP which forms part of the CoCP Part B, CIRIA Environmental Good Practice on Site Guide (C811D), adhering to NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]) and adherence to the CoCP [NR17] to ensure that all relevant mitigation measures are in place prior to the commencement of construction. Therefore, no additional flood risk mitigation measures are required beyond compliance with these measures.

Risk of Flooding from Groundwater

4.1.26 The risk of groundwater flooding across the Order Scheme and its relevant works components is considered low. This is based on the area's hydrogeological characteristics and other information (soil type, superficial and bedrock geology, and aquifer designation), findings from the Groundsure assessments (Annex H: Groundsure Report Of Plevins Site Compound Works Groundwater Flood Risk, Annex I: Groundsure Report Of Armit Road Site Compound Groundwater Flood Risk, Annex J: Groundsure Report of Saddleworth Rangers Replacement Car park Groundwater Flood

Risk) which indicated negligible to low risk where conducted), and historical flood records.

- 4.1.27 Even in the rare event that groundwater flooding does occur, it is unlikely to pose a significant risk, as groundwater typically rises slowly above ground level and is generally of insufficient volume to cause widespread and consequential flood damage.
- 4.1.28 While groundwater flood risk should not typically prevent development, it is crucial to ensure that developments are not placed at unnecessary risk or exacerbate existing flood risk. The Order Scheme and its relevant works will involve minimal below-ground construction that could alter subsurface flow regimes.
- 4.1.29 Where below-ground work is necessary, it will be designed to withstand hydrostatic pressure and prevent groundwater ingress, ensuring it is not vulnerable to groundwater flooding. The depth of the underlying aquifers is expected to be greater than that of any proposed below-ground elements, and there are no proposals to discharge into the ground. Moreover, the Order Scheme and its relevant works components will be covered by various mitigation measures to prevent any increase in groundwater flood risk in the surrounding area. Any potential groundwater emergence at the surface will be appropriately managed through the surface water management measures outlined in the PPICP, which forms part of the CoCP Part B.
- 4.1.30 Given the low groundwater flood risk of the Order Scheme and its relevant works components, no additional flood risk mitigation measures are required beyond them. This includes the surface water management measures outlined in the PPICP which forms part of the CoCP Part B, CIRIA Environmental Good Practice on Site Guide (C811D), adherence to NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]) and compliance with the measures and requirements of the CoCP [NR17].

Risk of Flooding from Artificial Sources (Reservoirs, Canals, Sewers)

- 4.1.31 Although sections of the Order Scheme and its relevant works components fall within the reservoir flood extent, the potential risk of reservoir flooding is considered low. This is because reservoir failure is very unlikely based on historical flood records and regular inspections, surveys, and maintenance by the operating authorities. Reservoirs in the UK have an excellent safety record, with no reservoir failure incidents resulting in the loss of life since 1925.
- 4.1.32 The potential risk of canal flooding across the Order Scheme and its relevant works components is considered low based on historical flood records, their

location outside the Canal Hazard Zones, and canals being strongly controlled waterways with regulated water levels.

Risk of Flooding Elsewhere

4.1.33 The potential impact of the Order Scheme and its relevant works components on the surrounding area's flood risk is considered low due to the following:

- Fluvial flood risk – the Order Scheme and its relevant works components are mainly in Flood Zone 1 and outside the fluvial flood extent of the Environment Agency Risk of Flooding from Rivers and Sea map. For sites in Flood Zone 2 and/or 3, a range of mitigation measures, potentially include Protective Provisions will be in place to prevent increased fluvial flood risk in the surrounding area, including flood mechanisms or floodplain storage.
- Surface water flood risk – the Order Scheme primarily involves upgrading the existing infrastructure along the railway line, so there is no change to flood mechanisms or floodplain storage. Although three works of the Order Scheme – Mossley Station Relocation, Greenfield Station Platform 2 Secondary Means of Escape Works, and New Oldham Road Footbridge (proposed MVL3/27B – entails constructing new assets rather than upgrades to infrastructure, the overall change in impermeable area is minimal and not considered significant enough to displace floodplain storage or increase the risk of surface water flooding in the surrounding area.
- Groundwater flood risk – the Order Scheme and its relevant works involve minimal below-ground construction that could alter subsurface flow regimes. Additionally, the depth of the underlying aquifers is expected to be greater than that of any proposed below-ground elements, and there are no proposals to discharge into the ground.
- Reservoir flood risk – the Order Scheme and its relevant works components will not significantly alter overland flow paths, displace floodplain storage, or increase runoff volume enough to overwhelm nearby reservoirs. In addition, the development will be designed with adequate drainage systems to effectively manage stormwater and minimise its impact on flood risk in the surrounding area, including reservoirs.
- Canals flood risk – although the Order Scheme and its relevant works components are near the Huddersfield Narrow Canal, with some sites on low-level ground directly adjacent to the canal, the risk of canal flooding is overall low. This is because the development is not within the Huddersfield Narrow Canal Modelled Hazard Zone, and canals are artificial waterways with strongly controlled water flow, making them less prone to flooding than natural watercourses during storm events.

- 4.1.34 For the reasons outlined above, the Order Scheme and its relevant works components will not exacerbate flood risk on the surrounding area. Therefore, no further flood risk mitigation measures are required.

Mitigation Measures

Construction mitigation

- **Surface water drainage** – any temporary drainage systems during the construction phase will comply with the protective provisions afforded to the regulatory bodies by the Order, that is any works within 16 m of waterbodies, works to culverts, and drainage outfalls – existing and new. Drainage during construction will ensure that any discharge into the drainage system and watercourses is appropriately managed, such as runoff from earthworks, access roads and haulage routes. This includes ensuring discharge rates do not exceed the capacity of the existing drainage system or the receiving watercourse to prevent potential flooding from sewer surcharges at the sites or fluvial overflow in the surrounding area. Surface water management during construction will be addressed through the PPICP, as part of the CoCP Part B. These measures will ensure that surface water is appropriately controlled to prevent increased flood risk to the site or surrounding areas. This is in compliance with the NPPF and Local planning Policy.
- **Code of Construction Practice (CoCP)** – the CoCP sets out best practice environmental management measures that will be implemented on-site during construction to address potential environmental impacts that may arise from the Order Scheme and its associated relevant works, ensuring the works are appropriately managed, and effects are reduced where feasible. The CoCP is split into Part A and Part B. Part A sets out the general principles, relevant measures, standards, and environmental management requirements to be adhered to during construction. Part B applies to the Order Scheme, comprising a series of standalone reports and delivery plans. In relation to flood risk, the CoCP include a comprehensive PPICP and Piling Risk Assessment. The PPICP, which will be a condition of the Order Scheme for elements requiring planning permission, will address site drainage, surface runoff, and discharge requirements. Where necessary, it will also secure appropriate consents for discharges to sewers or controlled waters, in accordance with Environment Agency guidelines.
- **Network Rail's Environment and Social Minimum Requirements for Projects** – Design and Construction (NR/L2/ENV/015, Volume 3, Appendix 1A of this Report [NR14]) comprised of a rigorous, effective and well-established set of environmental standards and procedures that are routinely implemented by Network Rail on its projects nationwide. This document sets out the environmental objectives and targets for the Order Scheme and how environmental requirements will be delivered. This is an internal management document that

ensures all commitments are implemented. It also details the processes to manage the environment during construction, ensuring compliance with relevant legislation and regulations.

- **CIRIA Environmental Good Practice on Site Guide (C811D)** – the CIRIA Environmental Good Practice on Site Guide (C811D) is a comprehensive guide that provides practical information for managing environmental issues and delivering sustainable construction. The guide aims to assist with the adherence to high environmental standards and compliance with relevant legislation, such as the Environment Act 2021, ensuring that projects meet national environmental commitments.
- **Flood Warning Register** – it is required that Heron Lane road to Heron Lane Site Compound, Egmont Street road to Plevins Site Compound Works, and Lee Side road (Diggle Access and Diversion Works) to Diggle Welfare, Rail hub and Office Compound – which falls within Flood Zones 2 and 3 – be registered with the Environment Agency’s flood warning service. This service monitors and forecasts potential flooding, providing timely alerts that would support the implementation of evacuation procedures. Registering these access routes would improve flood preparedness by facilitating the safe securing and evacuation of the compounds in the event of a flood warning.
- **Measures for Mitigating Flood-Related Hazards** – a range of flood resilience measures is recommended to mitigate flood-related hazards at sites identified as high flood risk, as outlined in the PPICP, which forms part of the CoCP Part B:
 - Buffer zone protection – no materials, equipment, or waste should be stored or placed within 16 m of the watercourse to prevent the risk of wash-in during high rainfall or flood events. Physical mitigation measures could be installed around the perimeter to further minimise the risk of accidental ingress.
 - Fuel and chemical storage – the storage of fuels, oils, or chemicals on-site is prohibited unless appropriately contained within bunded areas that meet relevant environmental containment standards
 - Long-term material storage – where long-term storage of materials is proposed, flood resilience measures must be implemented to prevent displacement and wash-in during high rainfall or flood conditions. These may include elevated storage platforms, secure containment units (bundings), and fencing or other appropriate physical barriers.
 - Flood monitoring and response – the site management plan must assign two designated personnel to be available on-call 24/7. These individuals must be registered to receive flood alerts and warnings from the Environment Agency. Upon receipt of a flood warning/alert, they are required to inspect flagged

high-risk sites within one hour and initiate appropriate mitigation actions. The implementation of surveillance systems is recommended to support flood risk monitoring throughout the construction phase.

- 4.1.35 No discharge will occur without prior consent via the Order's protective provisions from the respective local authorities. These include the EA for discharges into main rivers, the LLFA for discharges into ordinary watercourses (TMBC and OMBC), and United Utilities for discharges into surface water sewers.
- 4.1.36 There are no significant flooding constraints for the Order Scheme and its relevant works components that cannot be mitigated during construction and operation. Therefore, no additional flood risk mitigation measures are required beyond compliance mitigation measures including the surface water management measures outlined in the PPICP which forms part of the CoCP Part B, CIRIA Environmental Good Practice on Site Guide (C811D), relevant requirements included in NR/L2/ENV/015 (Volume 3, Appendix 1A of this Report [NR14]), in addition to ensuring measures contained in the CoCP [NR17] regarding the management and application of best practice during construction are implemented.

Permitted Development Rights Works

- 4.1.37 It is acknowledged that additional works, which are being consented via Permitted Development Rights (PDRs), are being undertaken as part of the Scheme. These works will likely be constructed concurrently with the relevant works components of the Order Scheme. It therefore may give rise to cumulative effects during the project's construction and operation phases.
- 4.1.38 For the elements of the Order Scheme for which planning permission is not sought, including works to be undertaken using PDR (refer to Volume 1 Chapter 1 of the Environment Report Table 1.2 [NR14]), environmental effects and mitigation are addressed through Network Rail's Environment and Social Minimum Requirements for Projects (NR/L2/ENV/015, Volume 3, Appendix 1A of this Report [NR14]). In particular, NR/L2/ENV/015 requires contractor to assess the risk of flooding from all sources for construction facilities and locate them outside floodplains or areas prone to other sources of flooding or sedimentation; or use appropriate protection measures to minimise the risk. There are therefore no risks of flooding from works to be undertaken using PDR, either in isolation, or in combination with the Order Scheme Development that cannot be mitigated during construction and operation.

5. Abbreviations

Abbreviation	Full terminology
TWAO	Transport and Works Act Order
TRU	Transpennine Route Upgrade
SuDS	Sustainable Drainage Systems
NPPF	National Planning Policy Framework
FRCC-PPG	Flood Risk and Coastal Change Planning Practice Guidance
FMfP	Flood Map for Planning
FRA	Flood Risk Assessment
AEP	Annual exceedance probability
LPA	Local Planning Authority
SFRA	Strategic Flood Risk Assessment
ha	Hectare
m	Meter
MBC	Metropolitan Borough Council
LLFA	Lead Local Flood Authority
SFRMF	Strategic Flood Risk Management Framework
GMSF	Greater Manchester Spatial Framework
CDA	Critical Drainage Area
BGS	British Geology Survey
MAGIC	Multi-Agency Geographic Information for the Countryside
LiDAR	Light Detection And Ranging
DTM	Digital Terrain Model
AOD	Above Ordnance Datum

Abbreviation	Full terminology
OS	Ordnance Survey
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice

ANNEX A: FLOOD RISK VULNERABILITY CLASSIFICATION⁴

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.

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. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').

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.

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.

Water-compatible development:

- 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.

ANNEX B: FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATIBILITY²

		Flood risk vulnerability classification				
		Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	Exception Test Required	✓	✓	✓
	Zone 3a	Exception Test Required †	✗	Exception Test Required	✓	✓
	Zone 3b	Exception Test Required*	✗	✗	✗	✓*

In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- Remain operational and safe for users in times of flood.
- Result in no net loss of floodplain storage.
- Not impede water flows and not increase flood risk elsewhere.

ANNEX C: THE TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015

Major Development³¹

Major development means development involving any one or more of the following:

- (a) The winning and working of minerals or the use of land for mineral-working deposits.
- (b) Waste development.
- (c) The provision of dwellinghouses where:
 - i. The number of dwellinghouses to be provided is 10 or more; or
 - ii. The development is to be carried out on a site having an area of 0.5 hectares or more, and it is not known whether the development falls within sub-paragraph (c)(i).
- (d) The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- (e) Development is carried out on a site having an area of 1 hectare or more.

Non-Major Development²

Non-major development is any development falling below the 'major development' thresholds but excluding 'minor development'. For example, a planning application for 8 dwellings, an office building creating 750 square metres of floor space, or a development with a site area of 0.4 hectares.

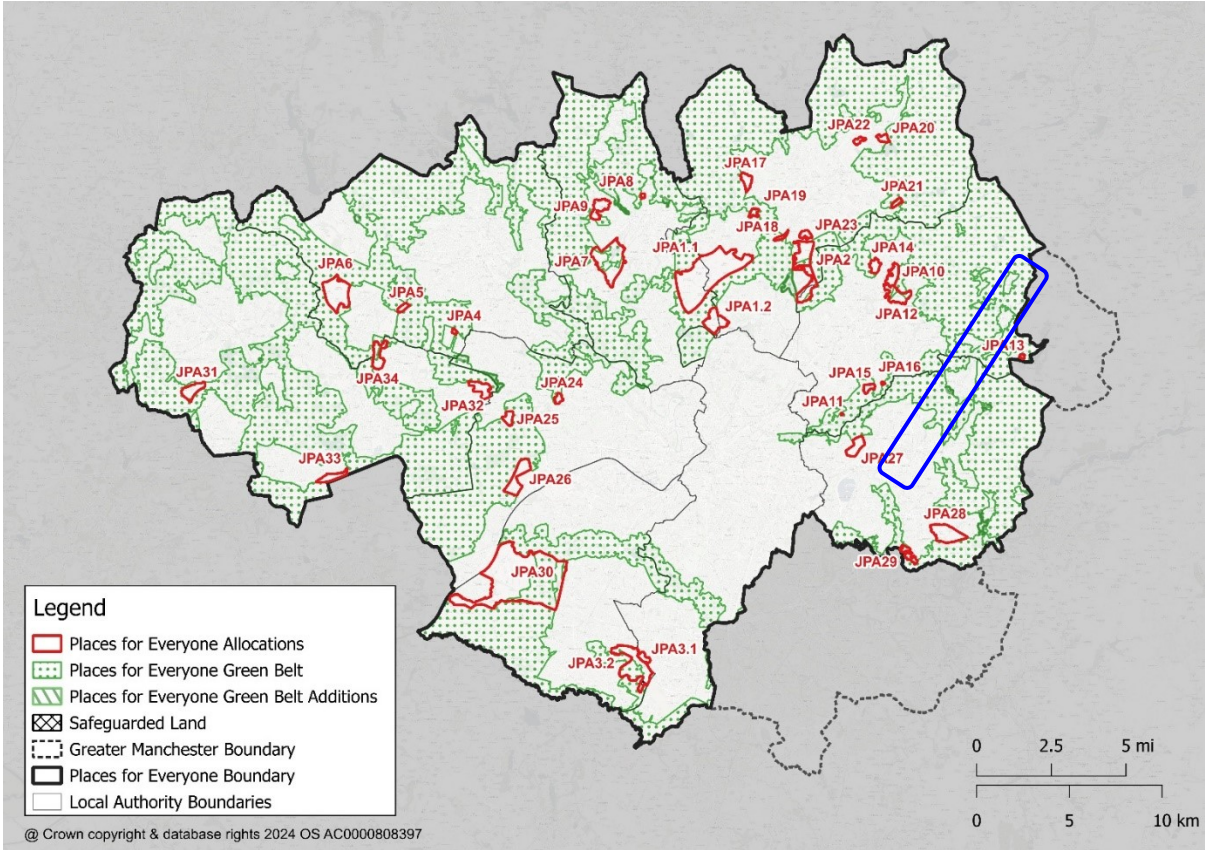
Minor Development²

Minor development means:

- Minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres;
- Alterations: development that does not increase the size of buildings, e.g. alterations to external appearance; or
- Householder development: for example, sheds, garages, games rooms, etc., within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.

³¹ [The Town and Country Planning \(Development Management Procedure\) \(England\) Order 2015](#)

ANNEX D: PLACES FOR EVERYONE (STRATEGIC ALLOCATION
OF LOCAL PLAN) POLICIES10

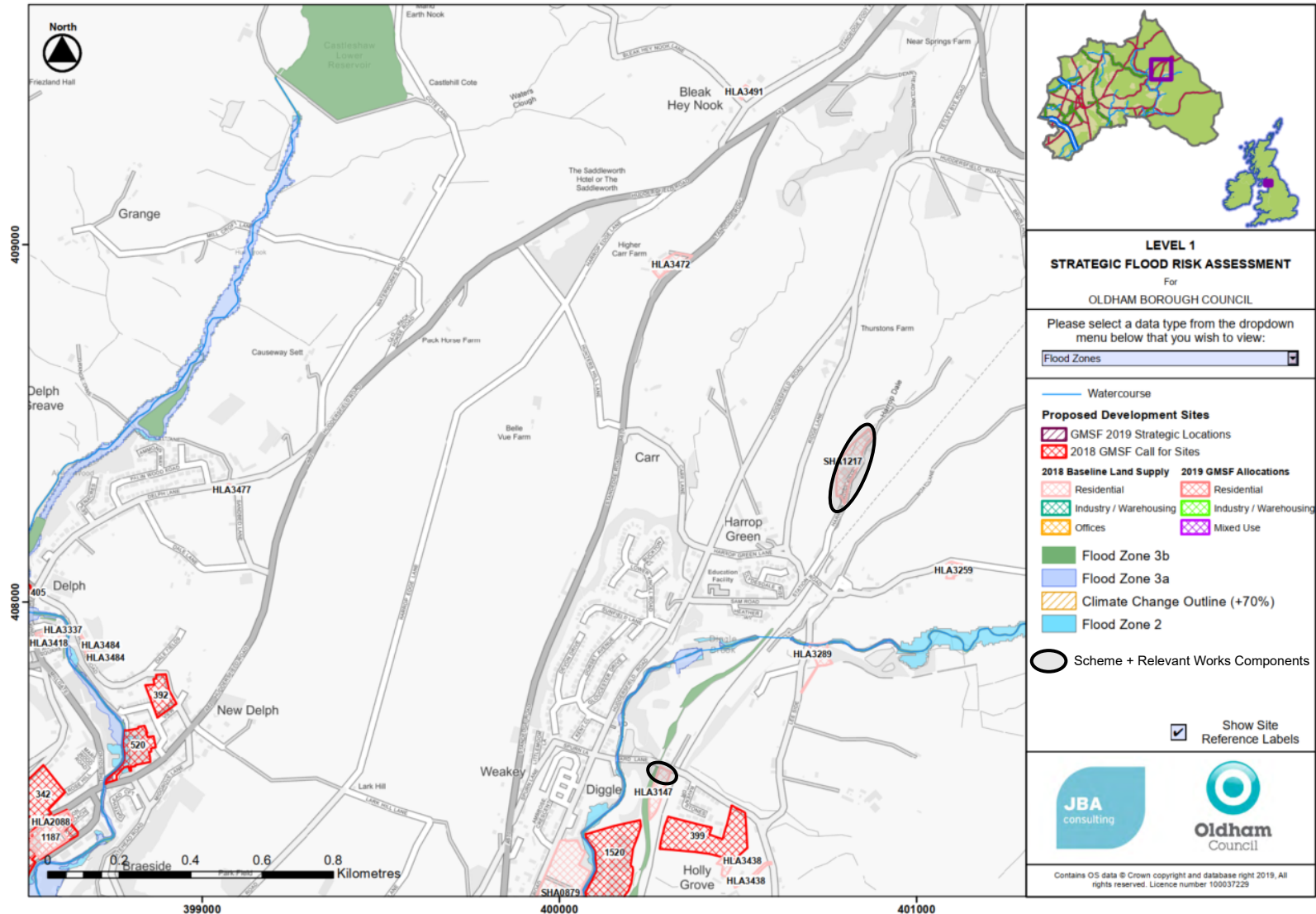


 Approximate Area of the Scheme

ANNEX E: SFRA MAPS OF PROPOSED DEVELOPMENT SITES AND FLOOD ZONE 3B (FUNCTIONAL FLOODPLAIN)

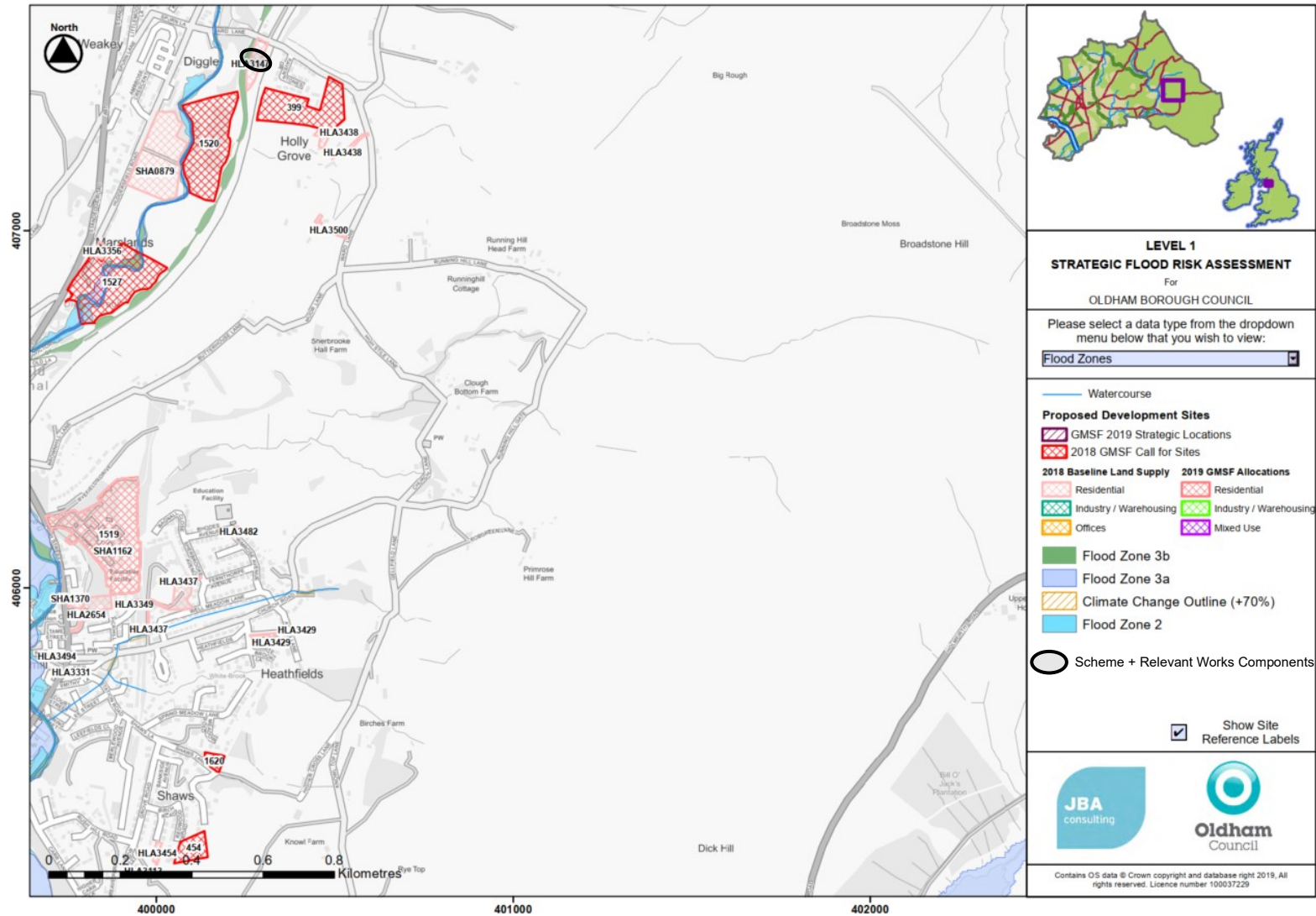
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Annex E1: Oldham¹⁴



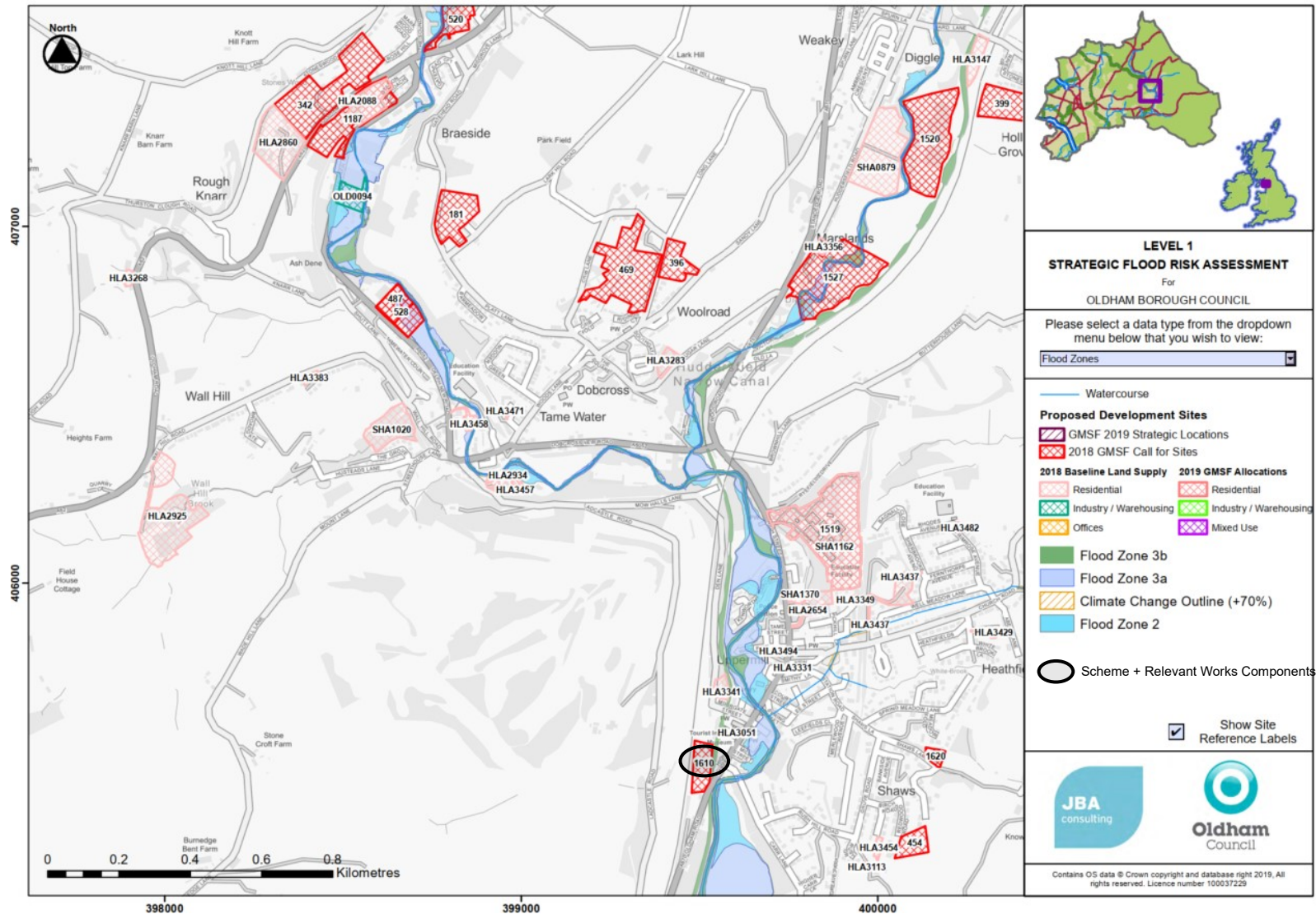
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Annex E2: Oldham¹⁴



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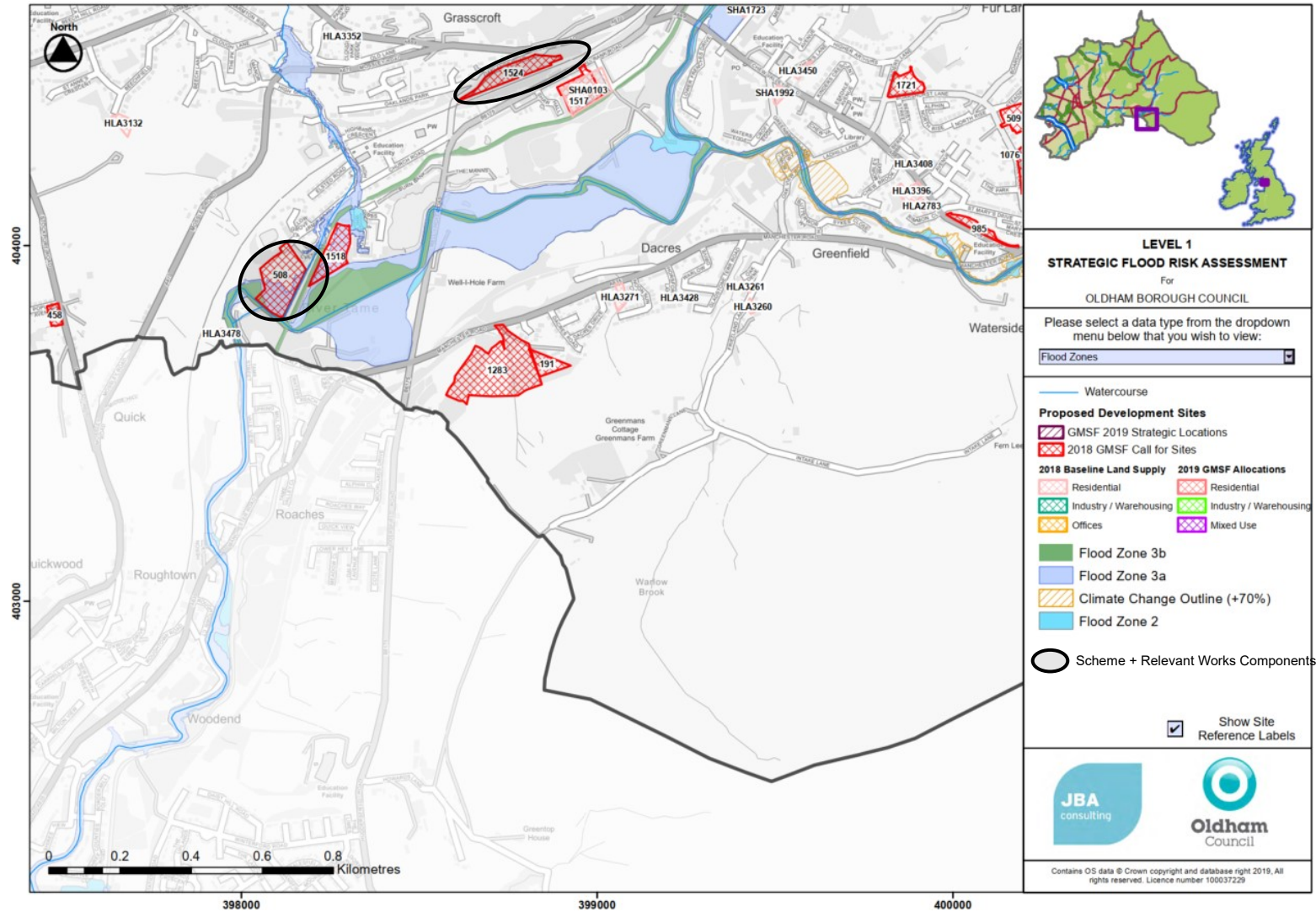
Annex E3: Oldham¹⁴



Annex E4: Oldham¹⁴

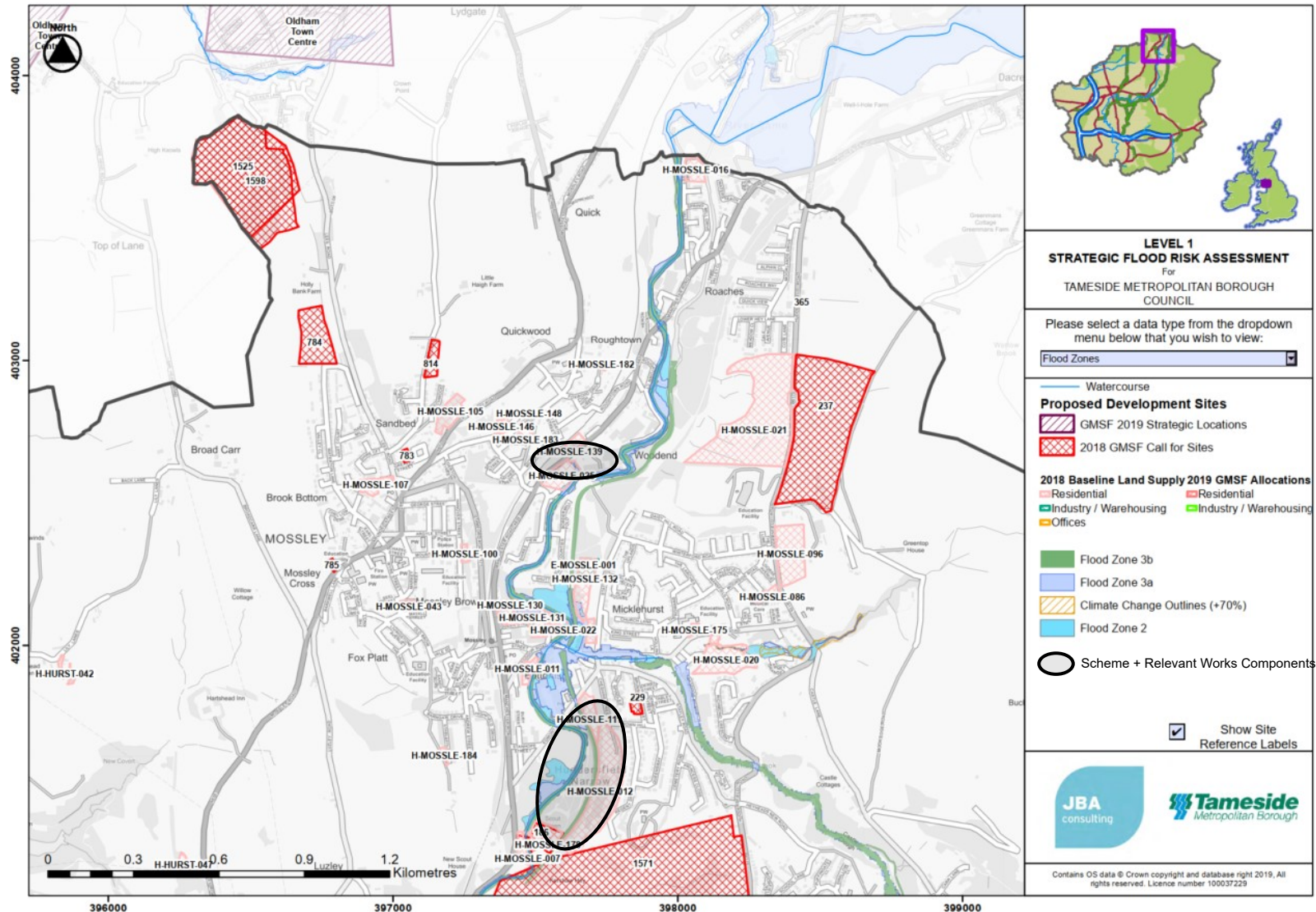
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Annex E5: Oldham¹⁴



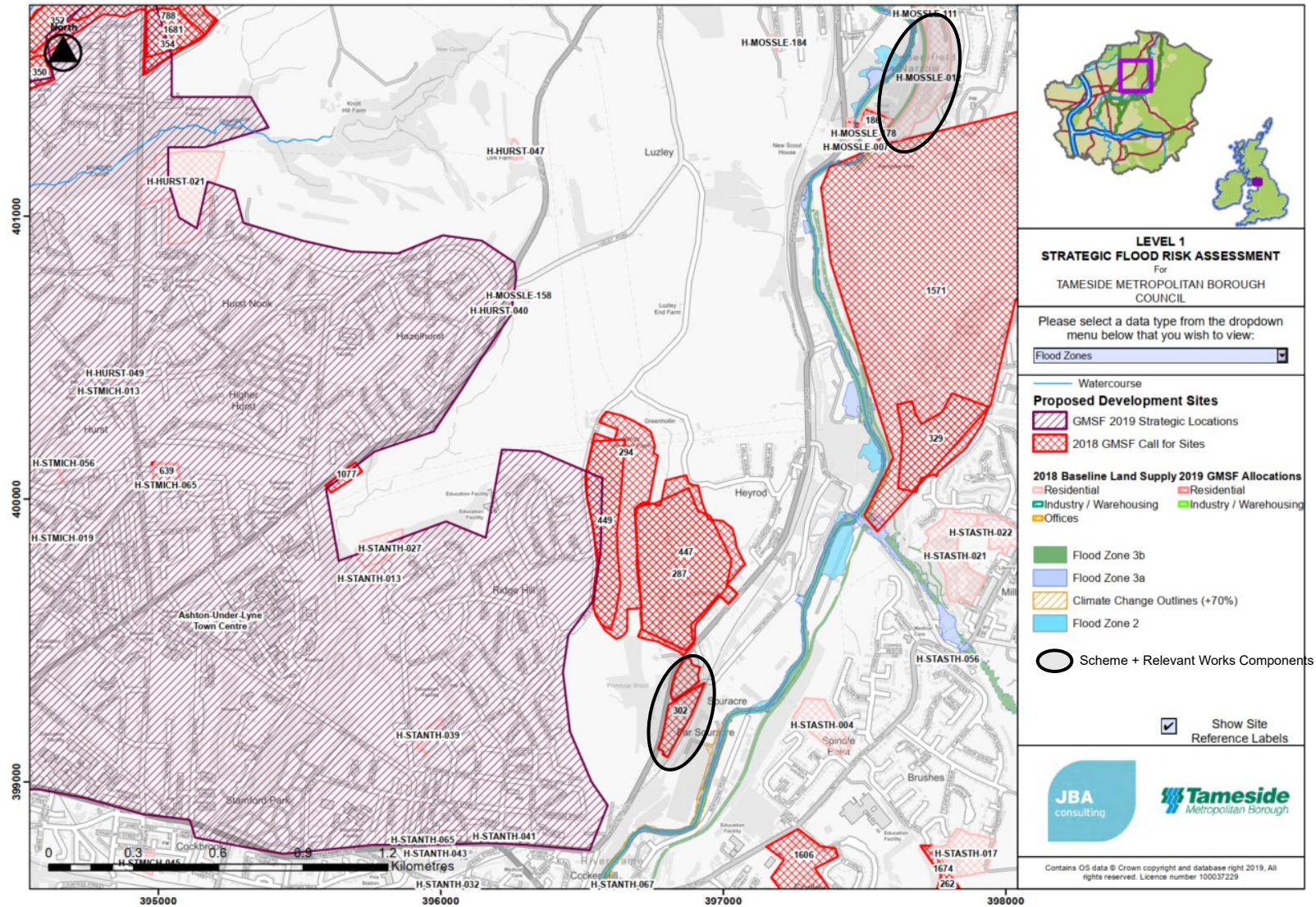
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Annex E6: Tameside¹⁵



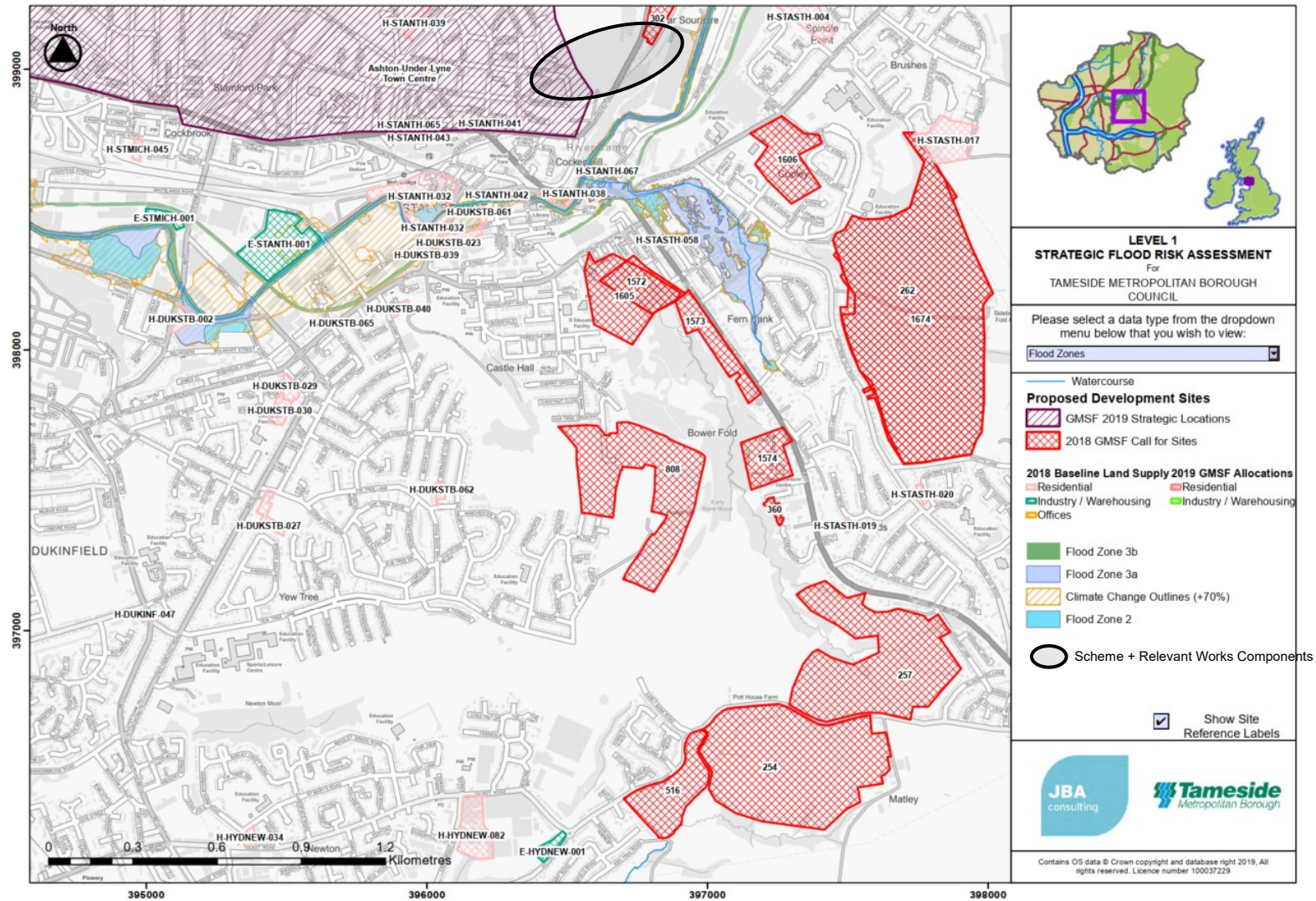
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Annex E7: Tameside¹⁵



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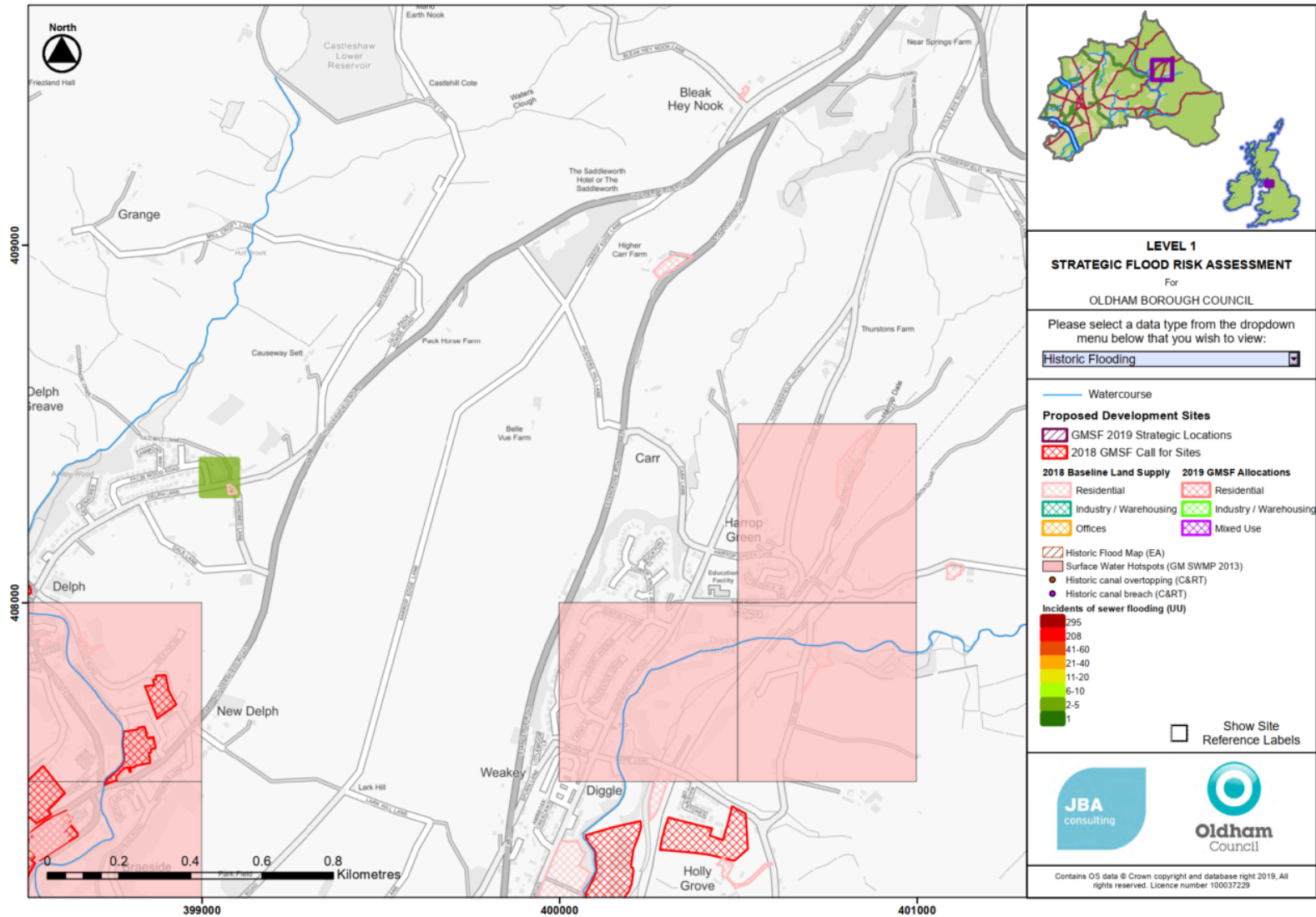
Annex E8: Tameside¹⁵



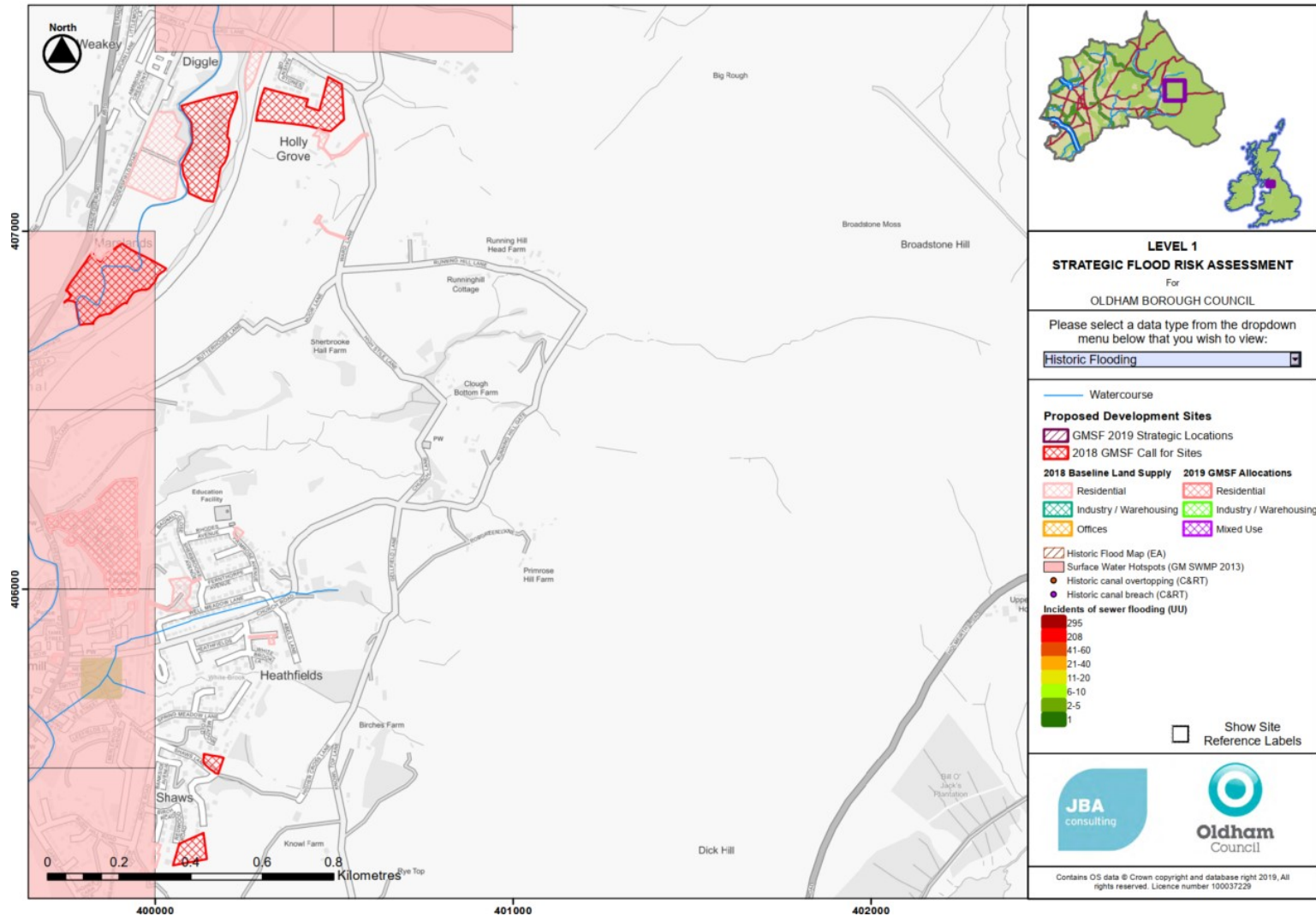
ANNEX F: SFRA MAPS OF HISTORIC FLOODING

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Annex F1: Oldham¹⁴

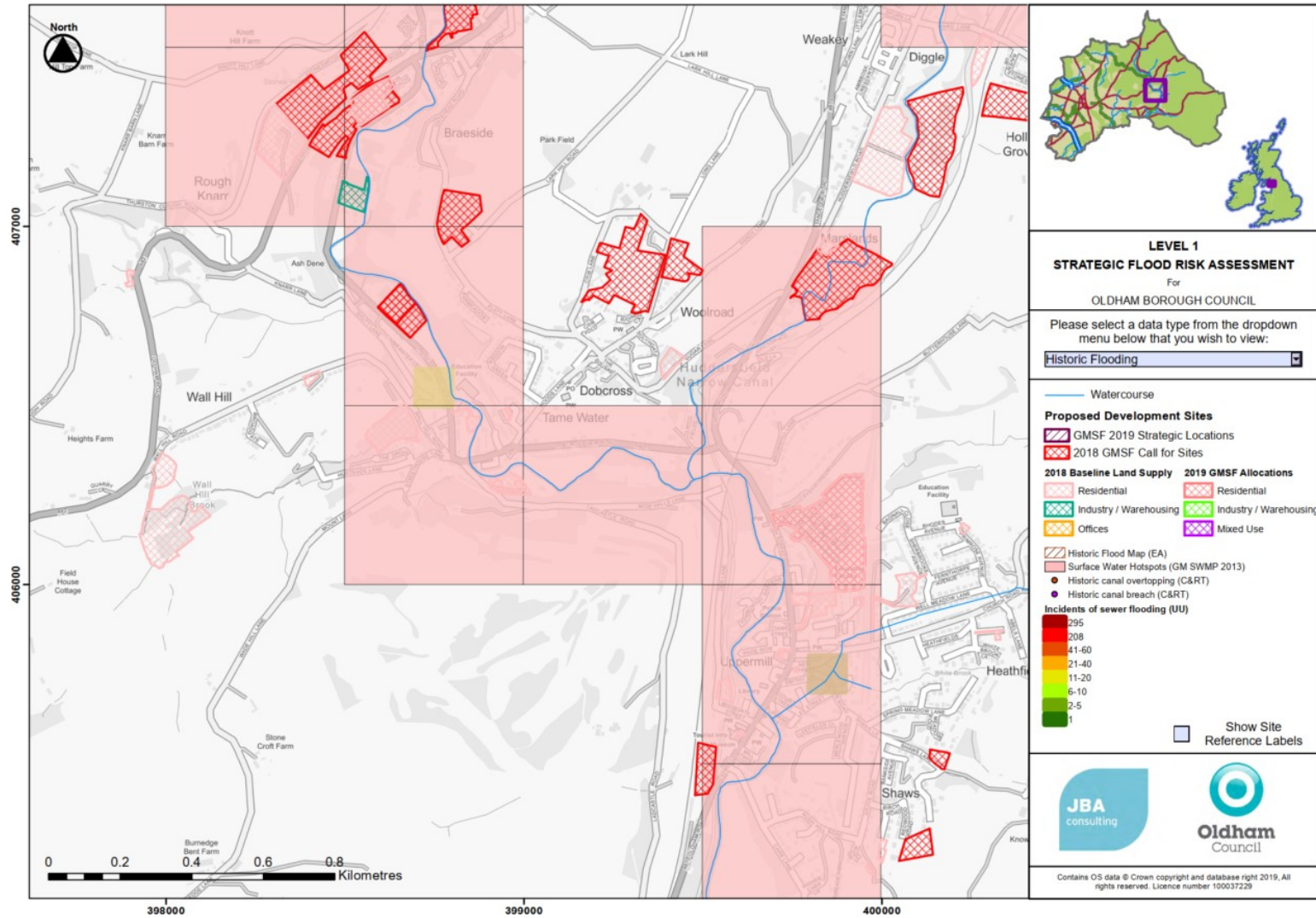


Annex F2: Oldham¹⁴



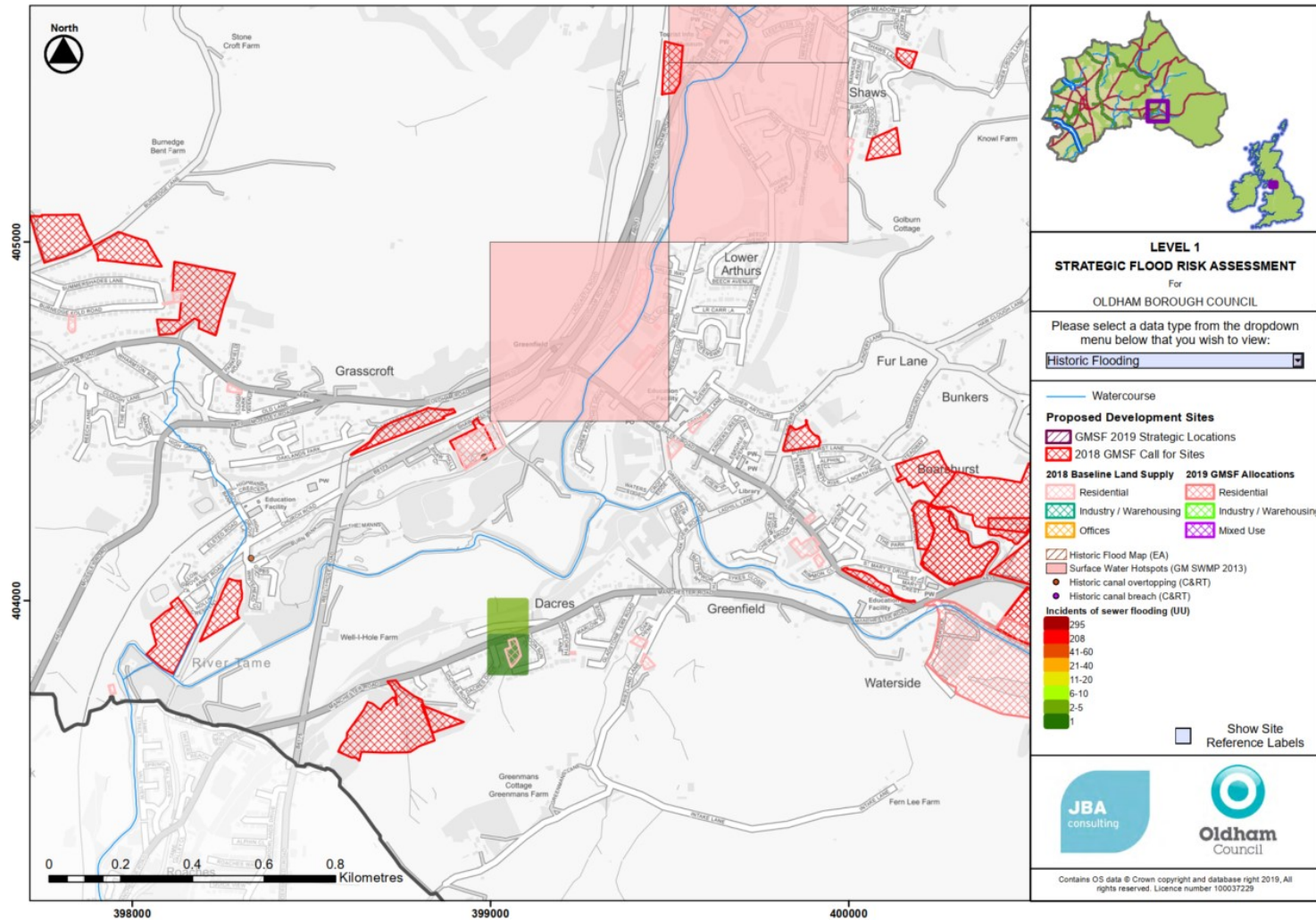
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Annex F3: Oldham¹⁴



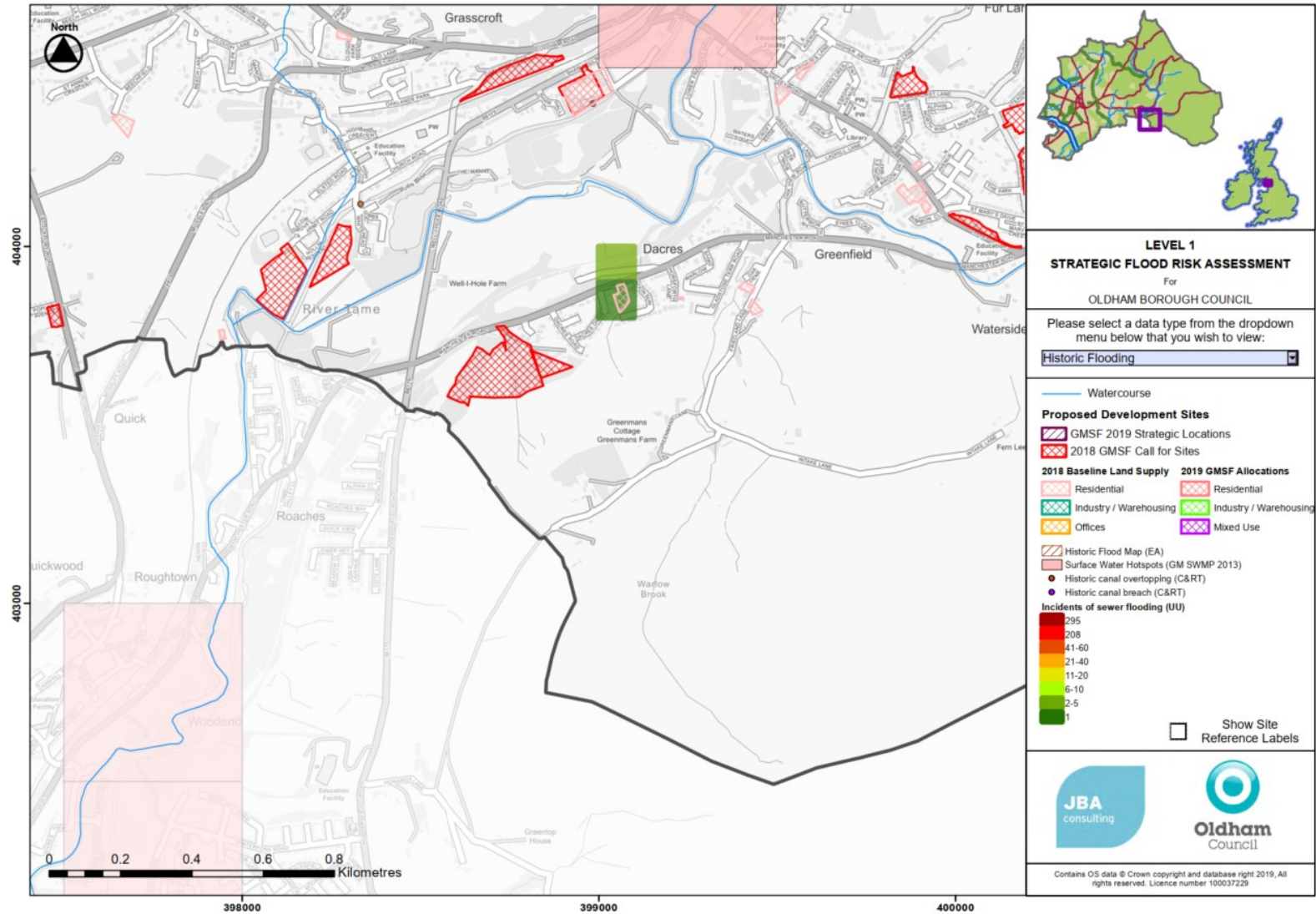
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Annex F4: Oldham¹⁴



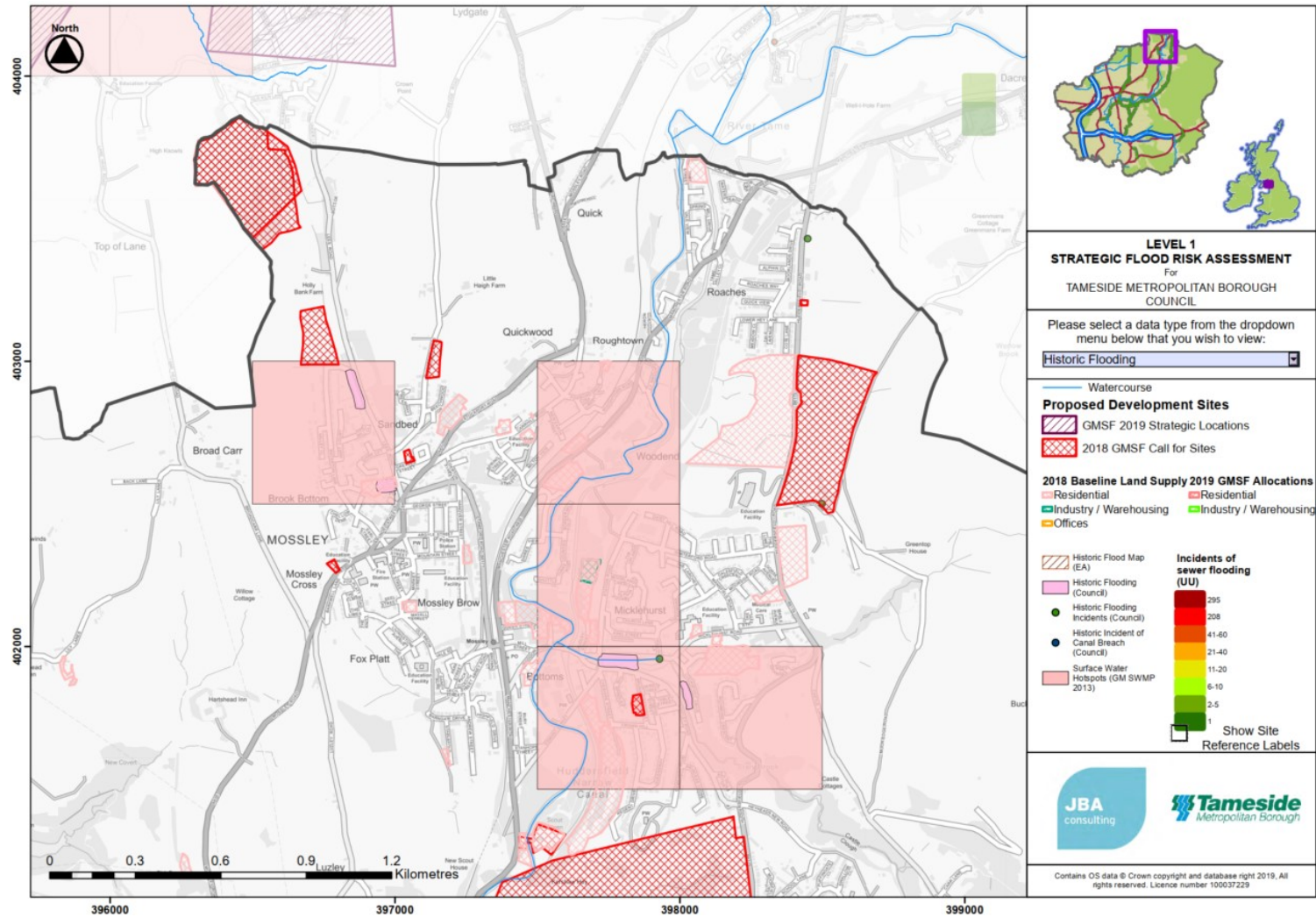
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Annex F5: Oldham¹⁴



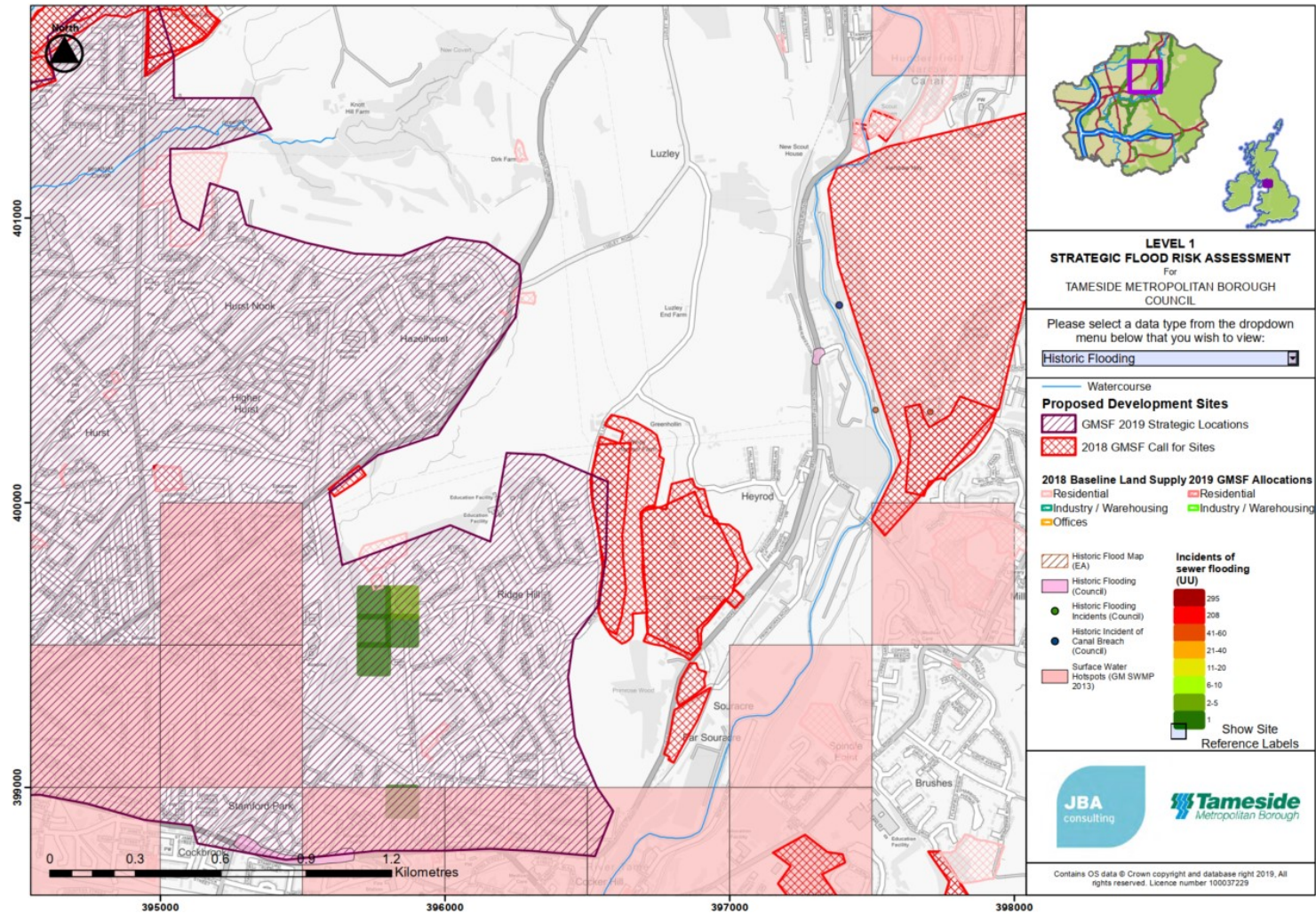
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Annex F6: Tameside¹⁵

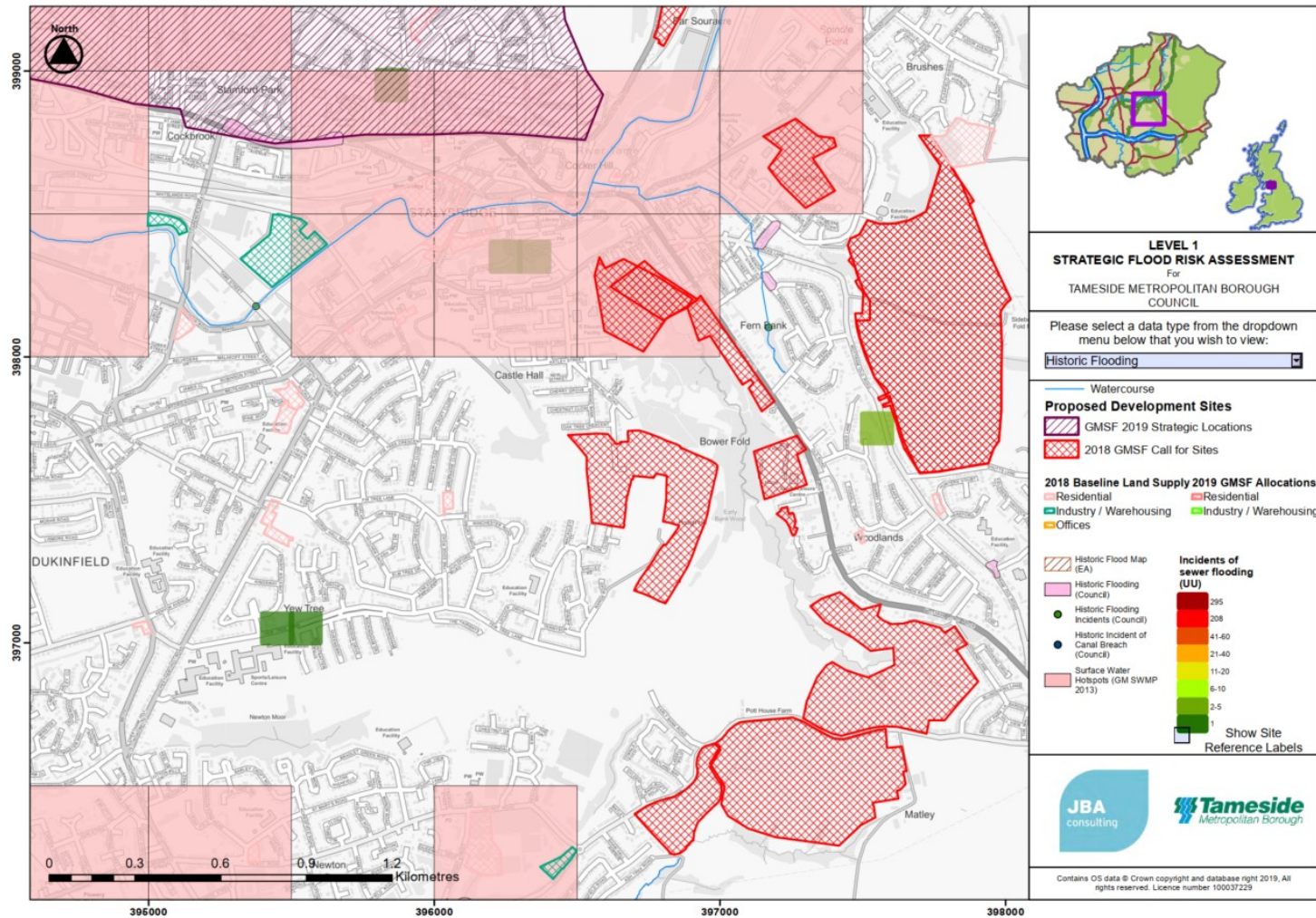


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Annex F7: Tameside¹⁵



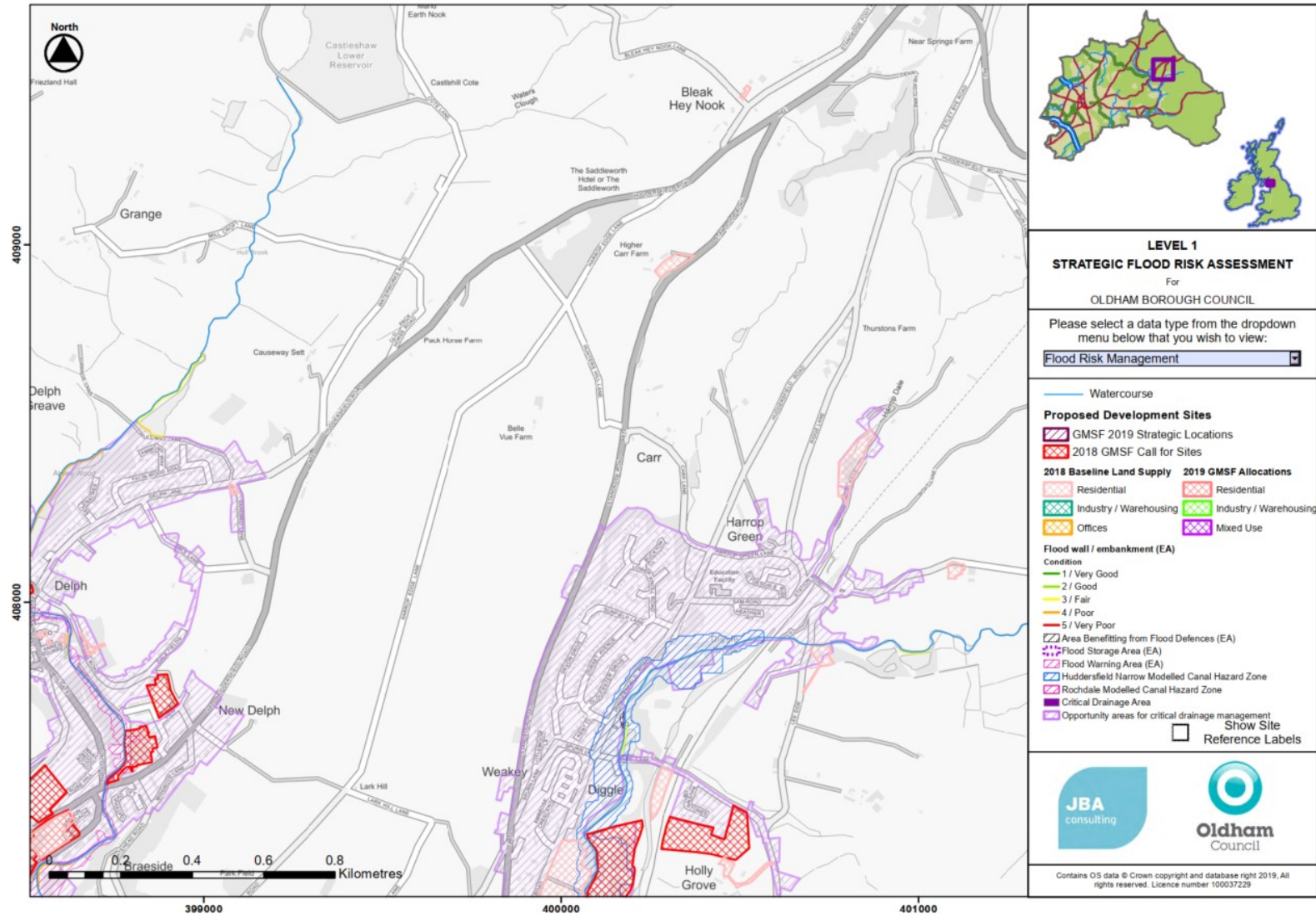
Annex F8: Tameside¹⁵



ANNEX G: SFRA MAPS OF FLOOD RISK MANAGEMENT

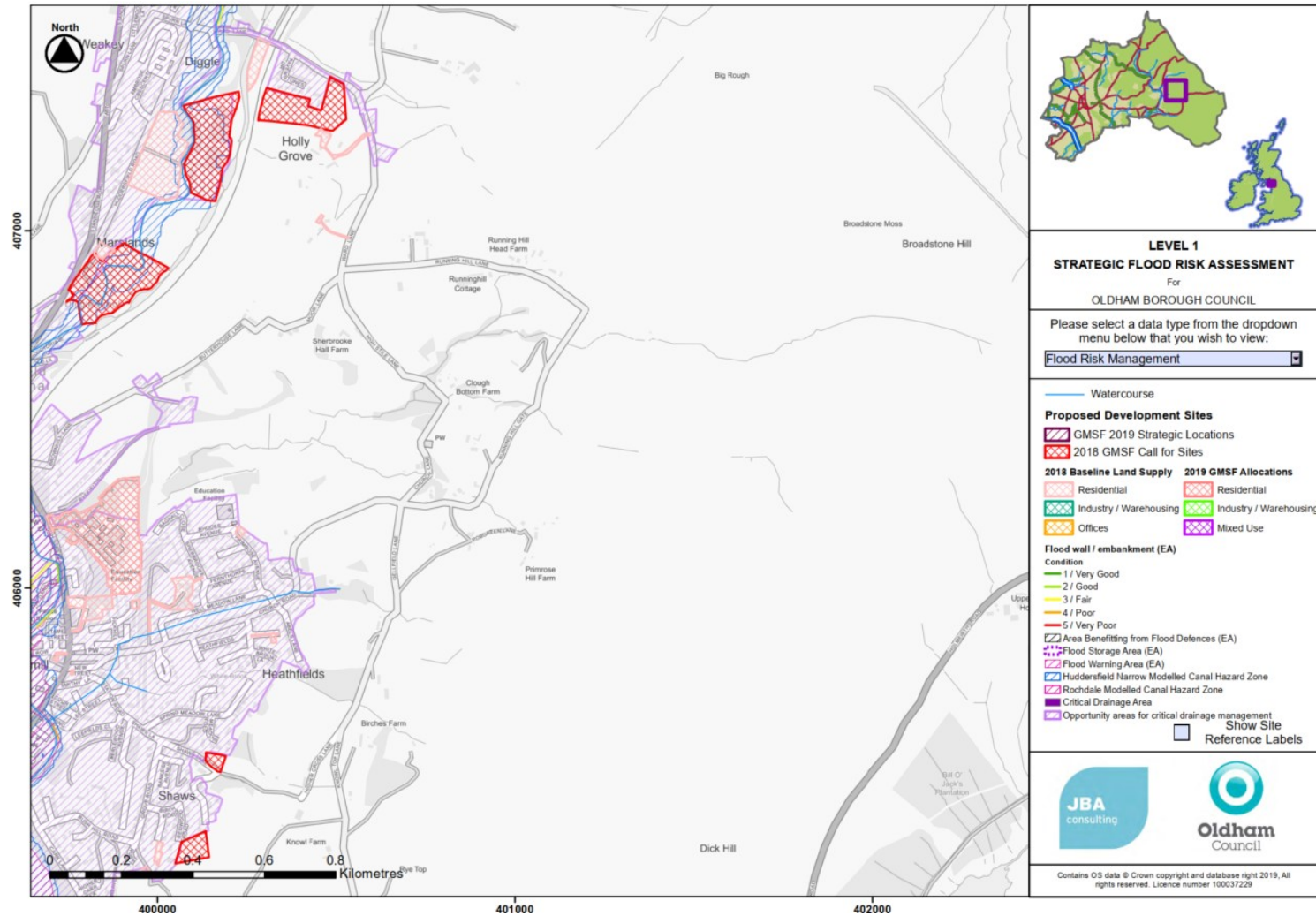
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Annex G1: Oldham¹⁴



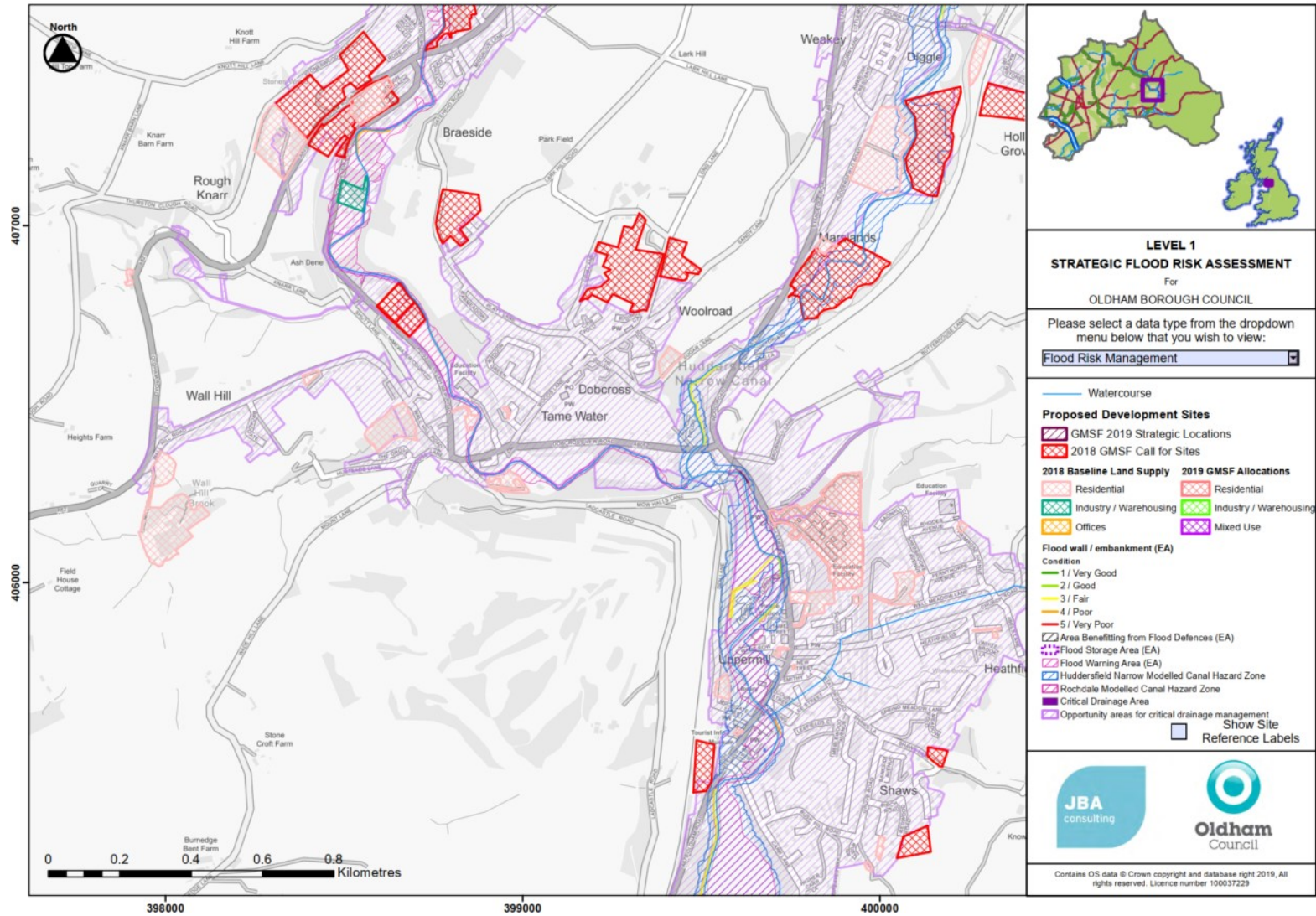
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Annex G2: Oldham¹⁴



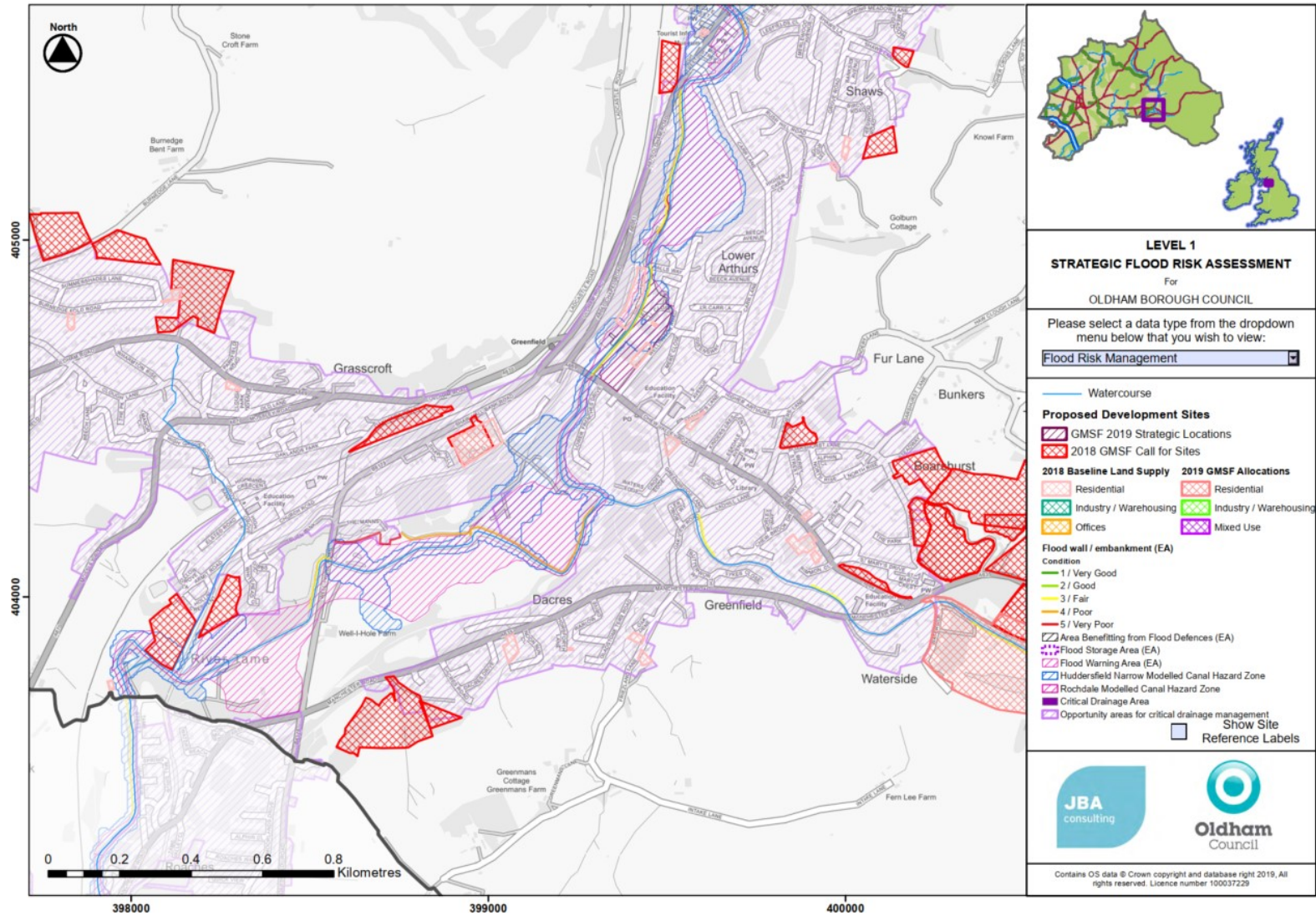
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Annex G3: Oldham¹⁴



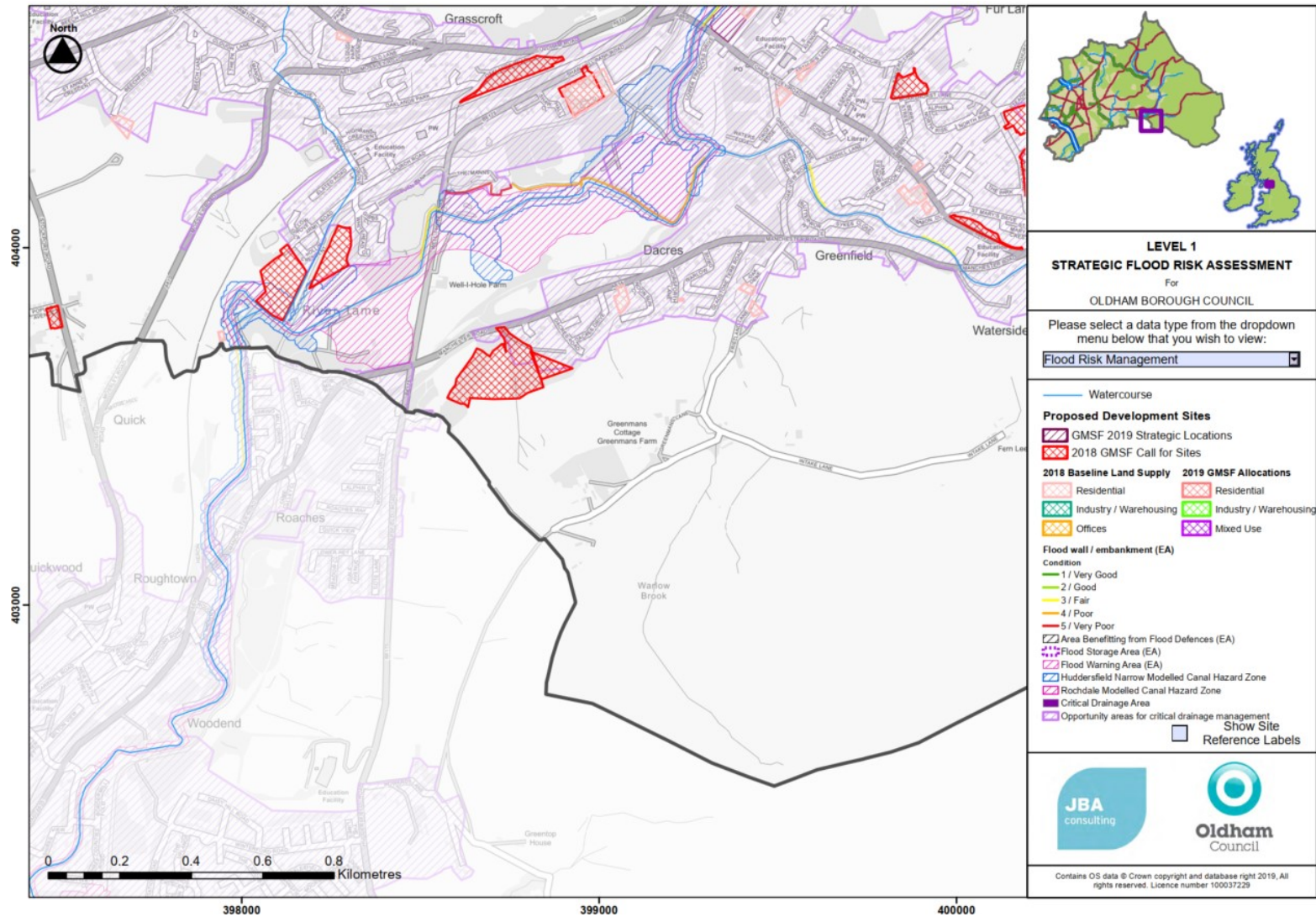
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Annex G4: Oldham¹⁴



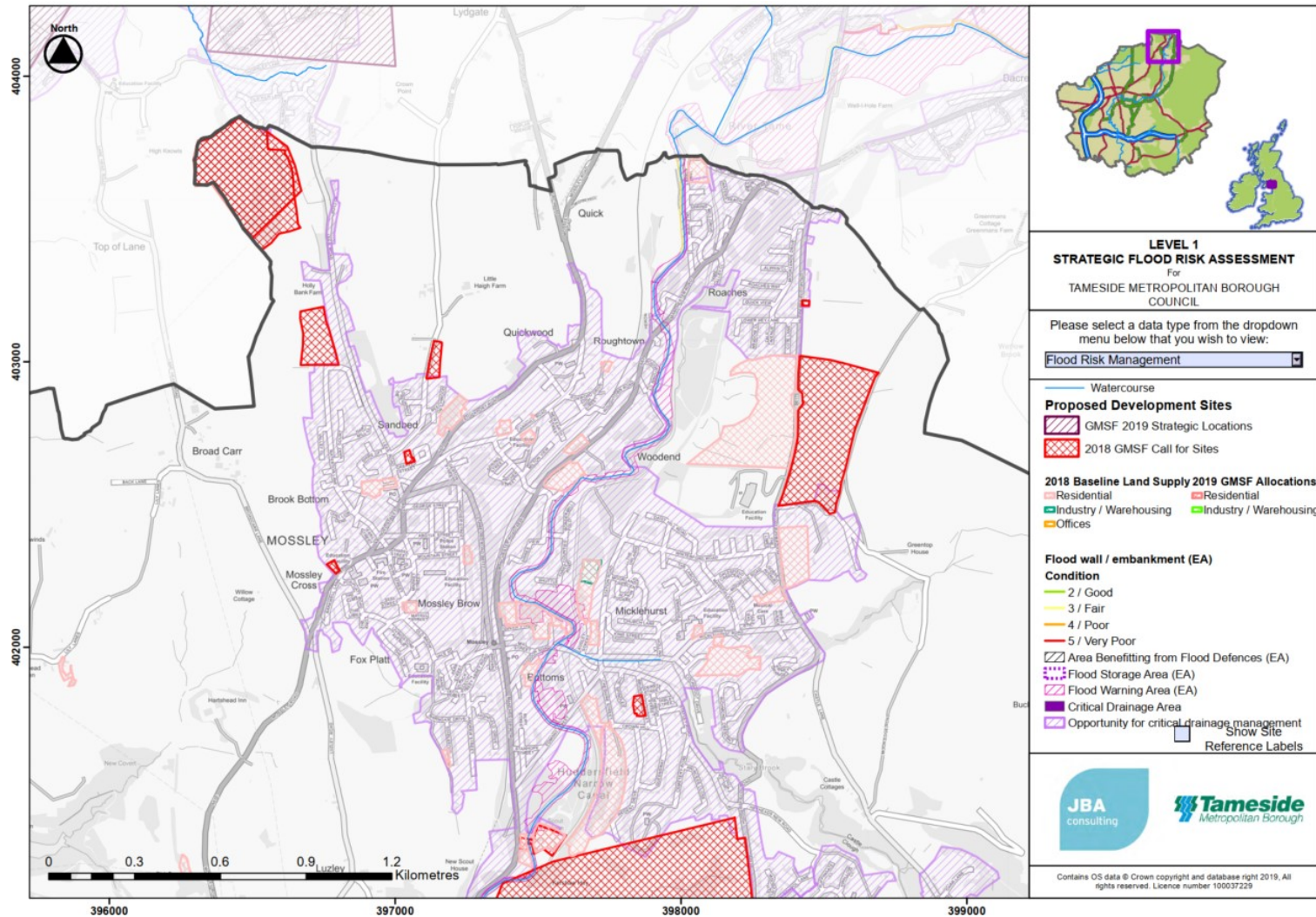
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Annex G5: Oldham¹⁴



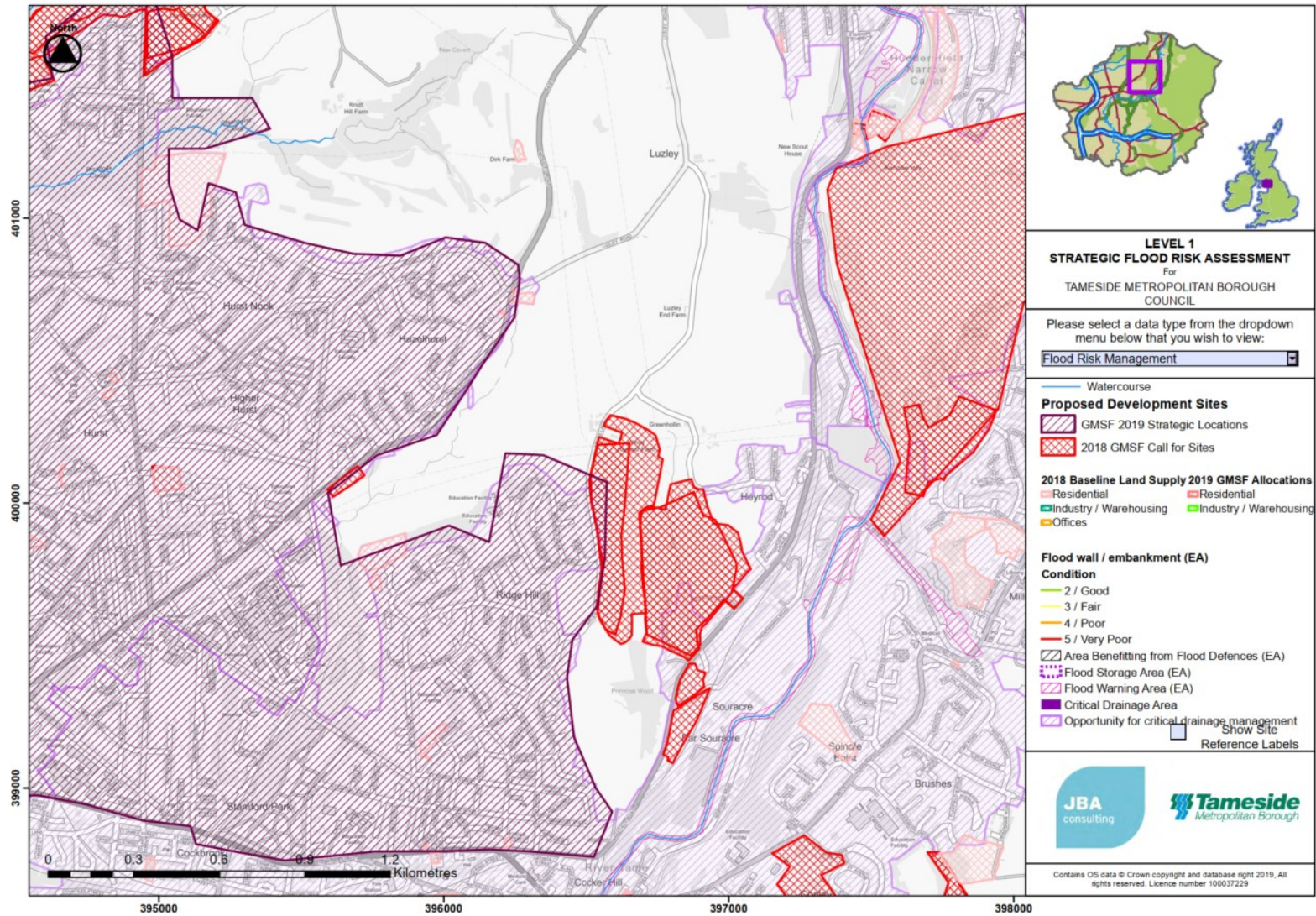
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Annex G6: Tameside¹⁵



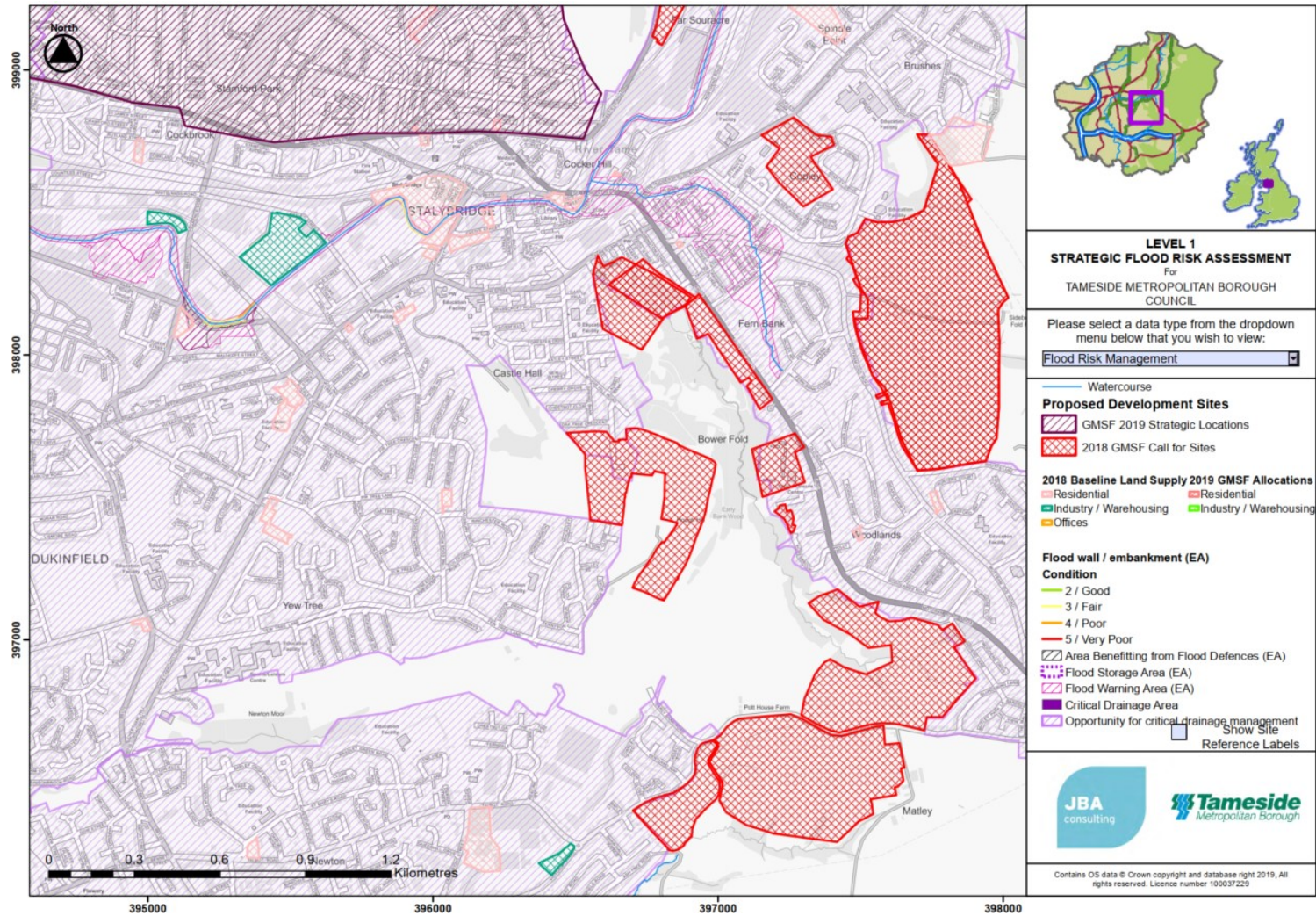
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Annex G7: Tameside¹⁵

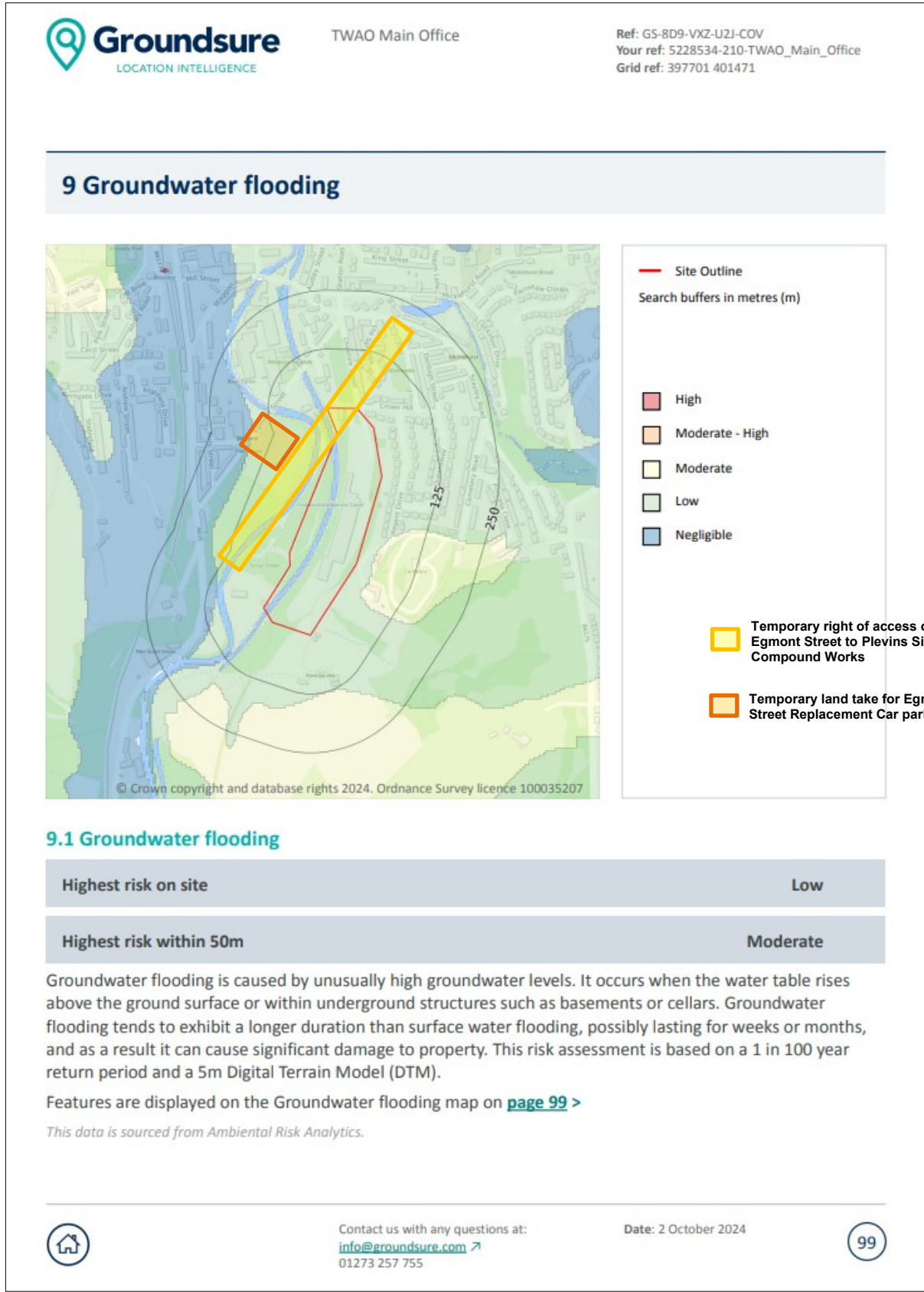


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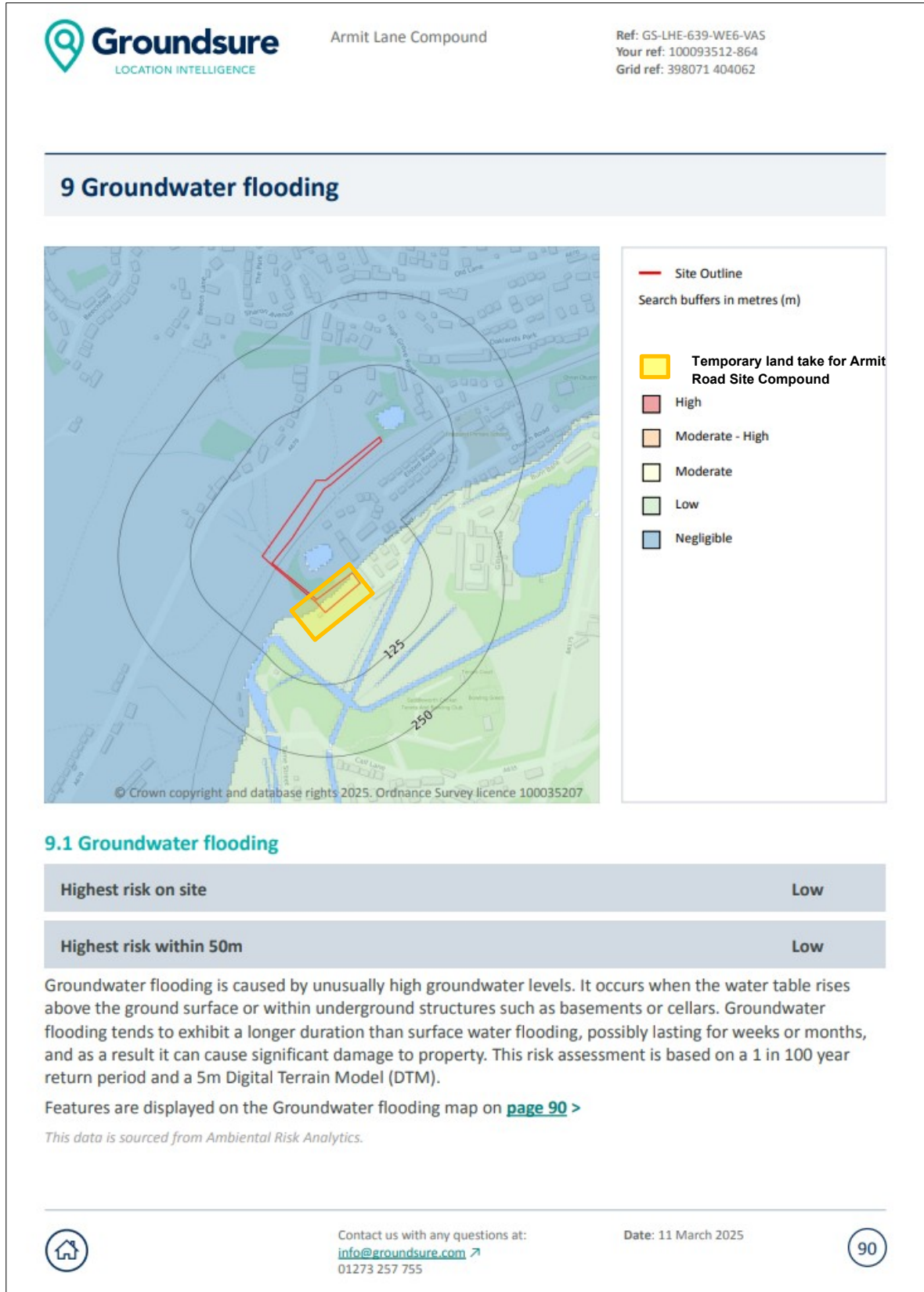
Annex G8: Tameside¹⁵



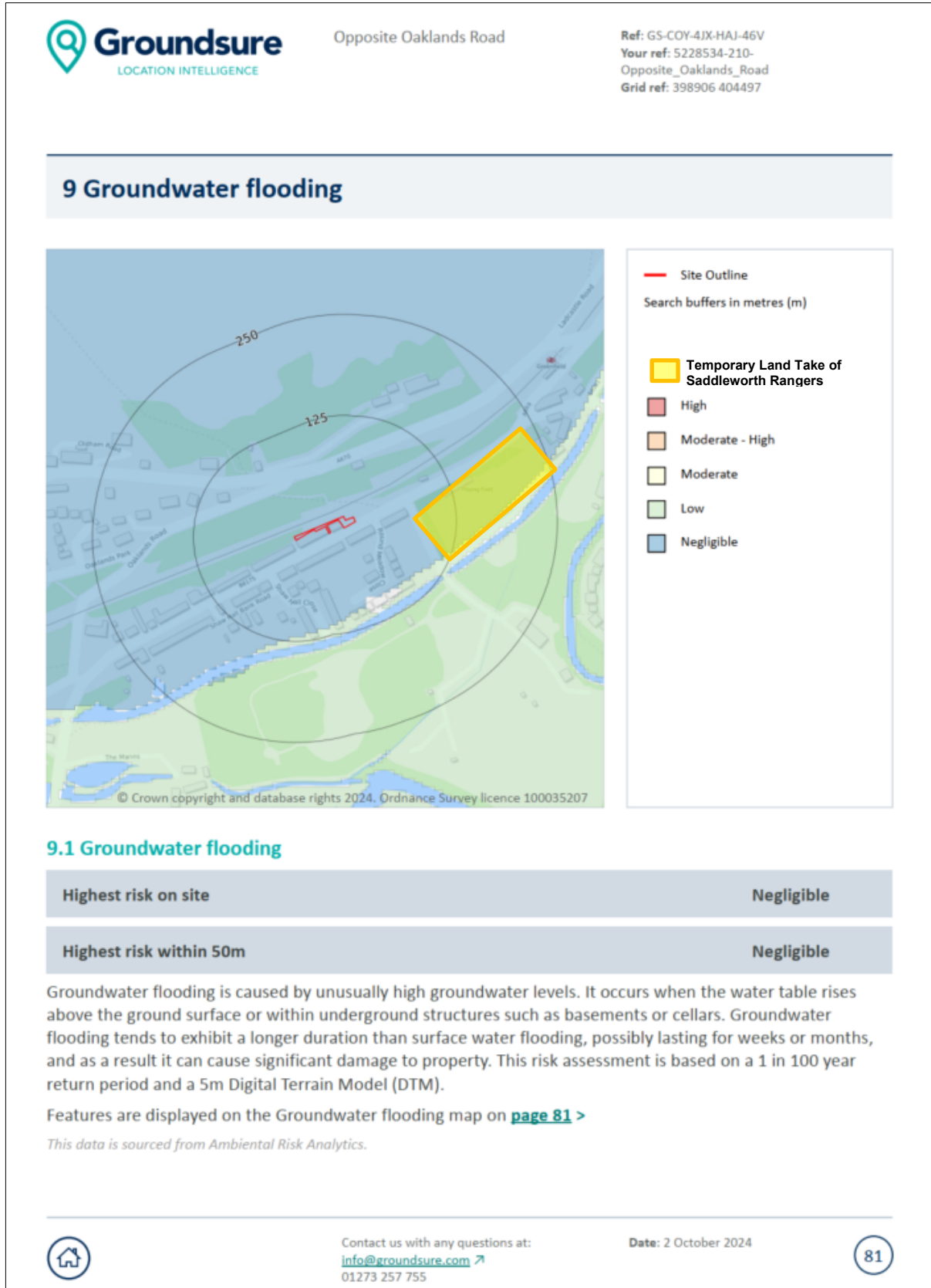
ANNEX H: GROUNDSURE REPORT OF PLEVINS SITE
COMPOUND WORKS GROUNDWATER FLOOD RISK



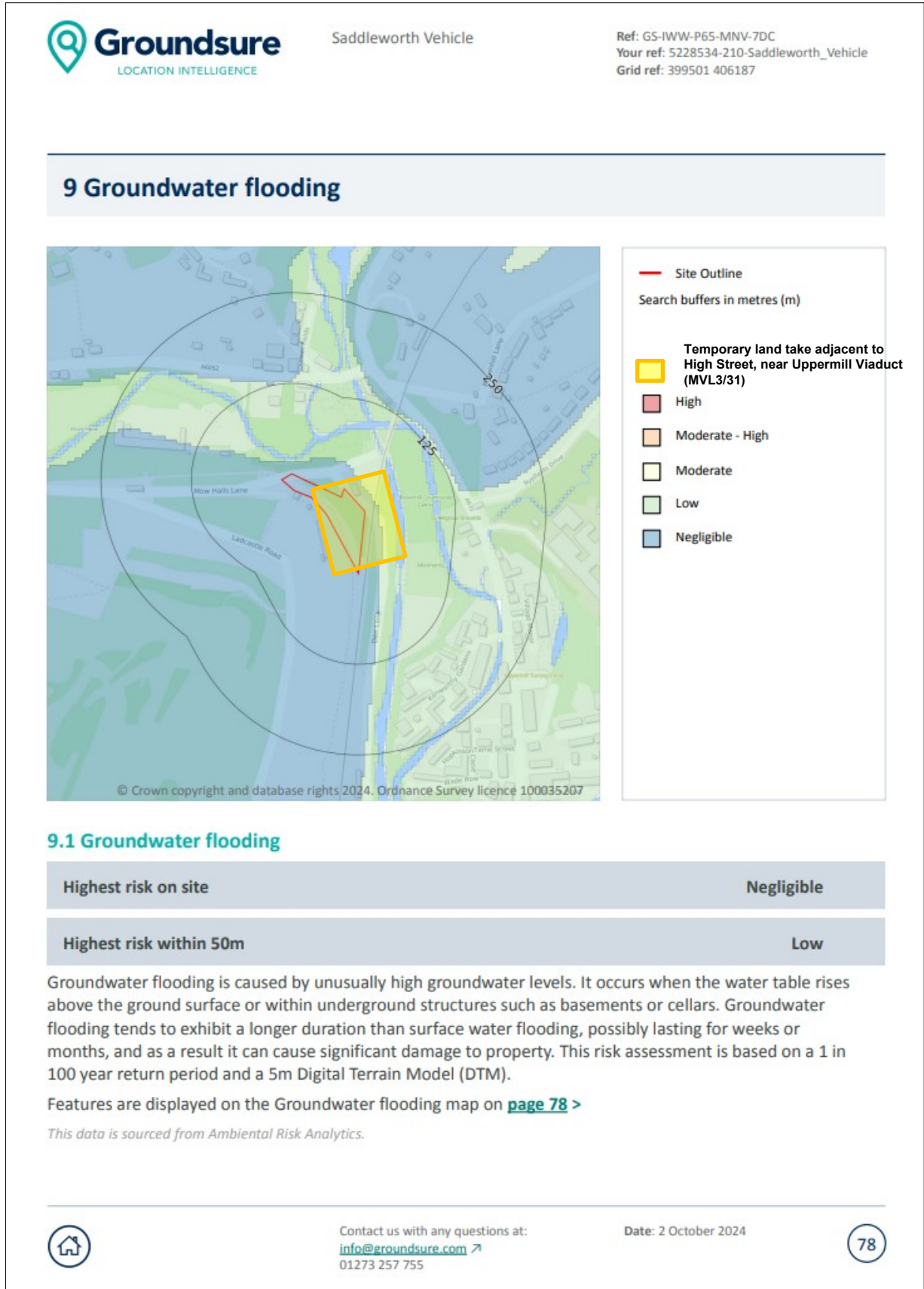
ANNEX I: GROUNDSURE REPORT OF ARMIT ROAD SITE
COMPOUND GROUNDWATER FLOOD RISK



ANNEX J: GROUNDSURE REPORT OF SADDLEWORTH
RANGERS REPLACEMENT CAR PARK GROUNDWATER FLOOD
RISK



ANNEX K: GROUNDWATER REPORT OF HIGH STREET, NEAR
UPPERMILL VIADUCT (MVL3/31), GROUNDWATER FLOOD RISK



ANNEX L: GROUNDSURE REPORT DIGGLE ACCESS AND
DIVERSION WORKS GROUNDWATER FLOOD RISK

