

Creams Mill and Hall Lane, Bolton

Environmental Impact Assessment

On behalf of

Watson Construction (Holdings) Limited

November 2020

Contents

1. Introduction	3
2. The Proposal.....	10
3. EIA Approach	13
4. The Site and Surroundings	20
5. Drainage and Flood Risk.....	24
6. Ground Conditions and Contamination	45
7. Ecology and Nature Conservation.....	95
8. Landscape and Visual Impact.....	126
9. Traffic and Transport.....	166
10. Socio Economic.....	185
11. Conclusions.....	220

1. Introduction

- 1.1. Watson Construction (Holdings) Limited has submitted a full planning application for residential development at land off Mytham Road comprising of the former Creams Mill and at Hall Lane in Little Lever as well as repairs to the Manchester, Bolton and Bury Canal, related access and landscaping. A site location plan is provided at **Appendix 1**.
- 1.2. The Environmental Statement (ES) is a statutory document that presents the Environmental Impact Assessment (EIA) undertaken for the proposal.
- 1.3. The Town and Country (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations') as amended, require that before consent is granted for certain types of development, an EIA must be undertaken.
- 1.4. Schedule 1 of The EIA Regulations lists the types of development which must be accompanied by an EIA. Other developments which may require assessment are set out in Schedule 2. The Local Planning Authority (LPA) must determine whether Schedule 2 development is likely to give rise to any significant environmental impacts. If the LPA determines that the development may give rise to any significant environmental effects, an EIA must be undertaken. The Local Authority's determination is made using Schedule 3 of the Regulations.
- 1.5. A scoping report was submitted to Bolton Metropolitan Borough Council on 15 September 2020 (Appendix 2). Bolton Metropolitan Borough Council's ('the Council') response was received on 14 October 2020 (Appendix 3). The Council determined that the ES scoping was satisfactory, and the proposed chapters and their contents were appropriate for the proposed development.
- 1.6. It is important to note that where EIA's are necessary, they are required to be proportionate to the proposal. The National Planning Policy Guidance (NPPG) relating to EIAs states:

"The Environmental Statement should be proportionate and not be any longer than necessary to assess properly those effects. Where, for example only one environmental factor is likely to be significantly affected, the assessment should focus on that issue only. Impacts which have little or no significance for the particular development in question will need only brief treatment to indicate that their possible relevance has been considered." (our emphasis)
- 1.7. The overall process outlined below has been followed to form this EIA:
 - Collating the existing baseline data for the proposed development site and

surrounding area;

- Undertaking assessments to provide baseline data;
- Identifying features of the environment likely to be affected by the proposed development;
- Undertaking consultation with the relevant stakeholders where necessary including public consultation;
- Identifying the environmental impacts of the proposed development;
- Providing feedback on the design process;
- Identifying mitigation and enhancement measures;
- Preparation of an ES to support the planning application.

- 1.8. The ES includes information on the characteristics of the proposed development and environmental features likely to be affected by the proposal in accordance with Regulation 15(6) of the 2017 EIA Regulations.

Structure of the Environmental Statement

- 1.9. This ES has been undertaken in accordance with the EIA Regulations (2017)

- 1.10. The information in this report is set out as follows;

- Section 1 – Introduction and Structure of the ES
- Section 2 – Description of the Proposal
- Section 3 – Approach to the EIA
- Section 4 – Description of the existing and surrounding area
- Section 5-11 – Assessment of each discipline
- Section 12 – Conclusion

- 1.11. Within the sections set out above, the ES includes the following main elements as set out in Schedule 4 of the Regulations:

- A description of the proposed development;
- A description of the aspects of the environment likely to be significantly affected by the proposed development;
- A description of the reasonable alternatives;
- A description of the likely significant effects of the development on the environment;
- A description of measures envisaged to prevent, reduce and where possible, offset any significant adverse effects on the environment;
- An indication of any difficulties encountered in compiling the required information;

and

- A non-technical summary of the information.

1.12. The EIA will be in three parts

- A Non-Technical Summary – This comprises a summary of the ES in non-technical language. It provides an introduction to the proposal, a description of the scheme and details of the predicted environmental effects of the proposal.
- The ES Main Text – this includes the introduction, provides the policy context, followed by a chapter on each of the environmental factors assessed, based on the findings of the technical reports
- Appendices – the appendices are made up of the specialist technical reports and other information beneficial to the assessment and understanding of the environmental impact of the proposal.

1.13. Sections 5-10 provide an assessment of significant environmental effects in each discipline taking into account any proposed mitigation measures to be implemented. The following topics have been scoped into the ES, following the outcome of the basic data and research:

- Section 5 – Drainage and Flood Risk
- Section 6 – Ground Conditions and Contamination
- Section 7 – Ecology and Nature Conservation
- Section 8 – Landscape and Visual Impact
- Section 9 – Traffic and Transport
- Section 10 – Socio Economic

1.14. To assist, all of the topics above are reported in a similar format to ensure consistency and ease of reference. The format of each chapter is as follows;

Baseline Studies

1.15. The baseline studies have been prepared in support of the planning submission and this ES to enable a detailed understanding of the site's context and existing condition.

- Flood Risk Assessment
- Foul Sewage and Utilities Impact Assessment
- Land Stability Report
- Coal Report
- Contaminated Land Assessment
- Air Quality Assessment
- Noise Impact Assessment

- Transport Assessment and Travel Plan
- Sustainability/Energy Statement
- Landscape and Visual Impact Assessment
- Ecological Assessment
- Archaeological Assessment
- Arboricultural Impact Assessment
- Viability Assessment

Statement of Competence

- 1.16. The 2017 EIA regulations set out the requirement to ensure that EIA is undertaken by competent professional. This section provides our competence statement which includes the credentials and experience of each of the practitioners who have contributed to this ES.

Planning and Coordination

Bill Davidson BA (Hons) Dip TP Dip MD MRTPI

- 1.17. Bill Davidson has over 25 years experience in planning and development consultancy. He is a chartered town planner and has been a member of the Royal Town Planning Institute for more than 20 years. Bill was a board director at a major planning consultancy for over 10 years before founding his own practice, P4 Planning in 2013.
- 1.18. Throughout his career, he has been engaged on major development project and so has considerable experience in coordination and managing consultant teams in the preparation of Environmental Impact Assessments.

Gillian Worden BA (Hons) MPlan MRTPI

- 1.19. Gillian Worden is an Associate at P4 Planning. She became a chartered member of the Royal Town Planning Institute in 2012 and is an APC assessor for the Institute.
- 1.20. Gillian has twelve years' experience in planning, both in consultancy and working for a developer. She has undertaken a range of development and regeneration projects during her career for landowners, developers, and occupiers. Gillian has proficient experience in managing large projects and teams of consultants, including the coordinating of Environmental Statements for large scale developments.

Drainage and Flood Risk

Louis McLoughlin

- 1.21. Louis McLoughlin in the Group CEO for ELLUC projects Group and managing director for the United Kingdom business, having founded the business 18 years ago. Louis has 30 years of design and management experience for civil and structural engineering schemes and provides expert witness services for residential and commercial planning applications.

- 1.22. Louis has extensive experience in projects across many sectors including residential, mixed use, hotels, commercial, offices and industrial schemes including projects in South America, Middle East, and Australia.

Stuart Fraser

- 1.23. Stuart is a Chartered Civil Engineer with 20 years of consultancy experience in a range of different sectors managing cross-discipline design teams, including the preparation of Environmental Impact Assessments.

Ground Conditions and Contamination

Colin Crompton

- 1.24. Colin is a director of LK Consult Ltd. He has 22 years' experience in the geo-environmental consultancy sector, including 5 years as a local authority regulator. He is a Chartered Environmentalist by the Society for the Environment. Colin has undertaken a wide range of contamination and geotechnical ground investigations for local authorities, developers, landowners, registered providers and utility providers. These include the design and execution of ground investigations, the interpretation and risk assessment of data and the design of remediation strategies.
- 1.25. Colin's project experience includes low and high rise residential, commercial, retail, public open space, highways and small to large infrastructure projects.

Ecology and Nature Conservation

Chris Formaggia

- 1.26. Chris Formaggia has 31 years of professional experience in the fields of ecology, wildlife conservation, outdoor recreation/education and navigation within the regulatory, public and private sectors. He has particular expertise in the areas of wetland ecology, biodiversity planning, environmental impact assessment, countryside recreation planning, species and habitat surveying, and habitat creation and restoration. He is a seasoned ecological manager and has serviced some of the largest infra-structure projects in the UK, including the LPG gas pipeline from Milford Haven.
- 1.27. He has expertise of working on problems associated with invasive/alien species in marine, freshwater and terrestrial environments. As an invasion ecologist he has worked on aquatic and terrestrial plants, invasive vertebrates and is involved in the production of marine biosecurity plans. His invasives experience is both ecological and practical, and he has worked on a number of control programmes. He works as an Expert Witness in this field.
- 1.28. Chris has over 16 years of experience within environmental consultancy at the Director level and has managed various ecology teams across the UK and brought to bear his substantial experience built up in the regulatory sector.

Landscape and Visual Impact

Will Hope BA (Hons) MA LA AMLI

- 1.29. Will has over 6 years' experience working in landscape consultancy. His work comprises master planning, landscape design and management, as well within landscape planning, working for both private and charitable sector organisations. Will has undertaken numerous landscape and visual impact assessments, gaining significant experience assessing residential developments, energy and infrastructure, leisure and tourism and landfill operations. In support of his assessment work, Will has also gained experience preparing designs for mitigation proposals, including ecological restoration, as well as for input into LVIA and EIA. Will is currently undertaking the Pathway to Chartership, in order to become a fully chartered member of the Landscape Institute.

Carolyn Gratty BA (Hons) Dip LA CMLI

- 1.30. Carolyn has over 25 years' experience of working in both the public and private sectors and is a Chartered Landscape Architect. She has acquired skills including EIA coordination, landscape design and implementation but has primarily focussed on landscape and visual impact assessment and landscape planning. Carolyn's work has involved undertaking LVIA for many different types of projects and providing inputs to EIA for projects including utilities, energy, commercial, residential, sports and leisure related developments. Carolyn works for a range of clients advising on landscape mitigation, masterplans, detailed landscape proposals for a wide variety of developments in both rural and urban settings and has provided evidence for planning appeals, hearings and inquiries in relation to landscape and visual impact.

Traffic and Transport

Mark Devenish CEng FCIHT

- 1.31. Mark Devenish is an Associate Director at SCP, Transportation Planners and Infrastructure Designers, with offices in Manchester, Leeds and London. He is a Chartered Engineer in Transport Planning and is a fellow of the Chartered Institute of Highways and Transportation. Mark has over 15 years' experience in providing transport and highways advice on a wide range of EIA developments across the UK.

Socio-Economic

David Watson BA (Hons) Geography; MSc Urban Regeneration

- 1.32. David Watson is an Associate Director at Hatch, formerly Regeneris Consulting. He has 17 years' experience in economic development and regeneration and works across Hatch's core disciplines of economic analysis and impact assessments; strategy development, economic visions and masterplanning; economic appraisal and business cases; as well as the preparation of socio-economic chapters for Environmental Statements. David specializes in socioeconomics for the land and property sector, demonstrating the need for, and benefits of development and infrastructure projects. David regularly undertakes socio-economic assessments of

residential and mixed-use developments and prepares socio-economic Environmental Statement chapters. In recent years he successfully led on assessing the socio-economic impacts of the major residential led redevelopment of the former Shell site at Carrington in Trafford. Carrington Village's first phase will deliver approximately 300 homes but could eventually lead to approximately 5,000 new homes and other uses, including employment. He has also undertaken the assessment and prepared the ES for an approved new residential scheme on land south of Heywood in Rochdale, which also included a new link road to serve the site and the adjacent industrial area.

2. The Proposal

- 2.1. This chapter of the ES sets out the description of the proposed development and its construction and identifies the main reasonable alternatives to the proposed development that have been considered and the main reasons for selecting the chosen option.
- 2.2. The planning application seeks full planning permission for 274 residential dwellings on land at the former Creams Mill site with adjacent land next to Mytham Road (Creams Mill) and land to the south of Hall Lane and end of Newbury Road (Hall Lane). The proposal comprises an affordable housing led, mixed tenure development, with associated access, hard and soft landscaping as well as repairs to an existing breach on the Manchester, Bolton and Bury Canal.
- 2.3. The description of development included on the application form is set out below;

Residential development on land at former Creams Mill site alongside land off Mytham Road with associated internal access, landscaping and infrastructure including a new two-way bridge at the former Creams Mil site and provision of two woodland walks

Residential development on land south of Hall Lane and west of Newbury Road with new access from Hall Lane and associated landscaping, internal access and infrastructure including path along the canal frontage and path linking Moses Gate Country Park.

Repair to the canal breach alongside wider restoration works and re-lining of the Manchester, Bolton and Bury Canal including restoration of towpath for the canal to be brought back into water.

- 2.4. Should further details be required prior to the commencement of development or occupation of the dwellings, these are anticipated to be controlled by planning conditions.
- 2.5. Both application sites are located within the Green Belt. Part of the Creams Mill site was previously occupied by Creams Mill, a paper mill which closed in 2004 and was demolished in 2011. A full site and surroundings description have been provided in Section 4 of this report.

Land Use and Quantum of Development

- 2.6. As set out in the development description, the proposed development includes C3 (residential), associated access, infrastructure, and hard and soft landscaping, as well as repairs to a breach on the Manchester, Bury and Bolton Canal.
- 2.7. A total of 274 dwelling units are proposed across both sites, of which 244 units would be affordable.

- 2.8. The proposed residential development at the Creams Mill site would provide 178 units (see **Appendix 4** for the proposed site layout). This would be split over the 4 distinct development parcels, including the land previously occupied by the mill.
- 2.9. As set out on the site layout plan at **Appendix 4**, 50 two bed houses, 51 three bed houses and 9 four bed houses will be provided across the whole of the Creams Mill site, with 49 one bed apartments and 19 two bed apartments on the lower site, closest to the River Irwell.
- 2.10. The Hall Lane site would deliver 96 new homes (see **Appendix 5** for the proposed site layout). The development would comprise 96 dwellings in total with 29 two bed; 31 three bed and 7 four bed houses and 18 one bed and 11 two bed apartments.
- 2.11. The development will enable repair and restoration works to the Canal breach which is expected to act as a catalyst to the wider restoration of the Canal, fulfilling the long held intentions of Bolton Council, the Canal and River Trust and the Manchester Bolton and Bury Canal Society, through putting water back into the Canal and reinstating the footways for the first time in 84 years.

The consideration of Reasonable Alternatives

- 2.12. In accordance with the EIA Regulations, an ES is required to include a description of the main alternatives considered in developing the proposal and reasons for the choices to be taken forward.
- 2.13. The vision for the redevelopment of Creams Mill and the development of Hall Lane bore out of the desire to restore the Manchester, Bury and Bolton Canal to water, through the repair of the breach. The costs associated with achieving this have largely impacted upon the proposed quantum of development and limited the reasonable alternatives that could be considered for the site.
- 2.14. The site benefits from an extant planning permission for the development of 95 dwellings on the area of land previously occupied by the former Creams Mill. This planning permission was granted in 2016 but due to viability reasons, has never come forward. The applicant considered the implementation of this consent, however, it would not deliver significant benefits generated by the redevelopment of the wider site and Hall Lane in restoring the canal. This option was therefore discounted.
- 2.15. Part of the Creams Mill site was in an employment use, up until the closure of the paper mill in 2004. The continuation of the site as an employment site would be a reasonable alternative, given the site's h
- 2.16. The applicant also considered the option of increasing density across both sites, with less affordable housing and more open market properties. However, due to the Green Belt status of the site and the need to minimise the quantum of development to the minimum required to

deliver the aspirations of the canal, the development proposal as they stand were considered the most appropriate.

- 2.17. The conclusion of these reports and discussions has enabled a detailed understanding of the site's context, limitations and the physical, social and economic conditions and factors which are driving forward the proposal. This has allowed the project team to review alternative development proposals for the scheme and to create a final design which is the most sympathetic to the surroundings and the Green Belt status of the site as well as the only viable development solution.

3. EIA Approach

- 3.1. The aim of the ES is to provide an objective, assessed and systematic account of the significant environmental effects of the proposed development and to assess the ability of the development site and surrounding area to accept the identified impacts.
- 3.2. The EIA covers the physical extent of the proposed development as described in Section 4 and as indicated on the site location plans. It is defined by the area of land to be used, the nature of the current environmental conditions and the way impacts are likely to be generated.
- 3.3. It is important to note however that the influence of many predicted impacts extend beyond the site boundaries. Where identified and relevant, these impacts have been assessed as part of the EIA. The geographical extent of the EIA also considers the potential implications of related and unrelated development activities.
- 3.4. In order to inform the scope of the ES, these stages were followed;
 - i. Identification of the planning application boundary
 - ii. Identification of the key characteristics of the development and the establishment of the environmental baseline through a series of desktop and site studies;
 - iii. Identification of gaps in the base line and the further survey work required to address the gaps;
 - iv. Consideration of potential sources and nature of environmental impacts through assessment methodologies utilised.
- 3.5. Due to the tight timescales for the applicant to achieve planning permission, a screening request for the development was not submitted to the Council. Instead, it was agreed with the consultant team and the Council that as the proposed development exceeded the thresholds for an ES, that a scoping report would be prepared.
- 3.6. The scoping report was submitted to Bolton Metropolitan Borough Council on 14 September 2020.
- 3.7. The scoping report set out the initial baseline positions from the identified potential environmental receptors and sensitivities. A copy of the scoping report is provided at **Appendix 2**.
- 3.8. A response was received from the Council on 14 October 2020 (**Appendix 3**). The Council accepted the approach proposed within the scoping report and the proposed topics to be covered within the ES, along with the technical reports to be submitted in support of the application. The topics to be covered within the ES are;

- Drainage and Flood Risk
- Ground Conditions and Contamination
- Ecology and Nature Conservation
- Landscape and Visual Impact
- Traffic and Transport
- Socio-Economics

3.9. Additional matters were also assessed by were found unlikely to give rise to significant environmental effects and were therefore 'scoped out' of the ES. These topics are set out below and where required summarised under the relevant topic chapters.

- Heritage and Archaeology
- Noise
- Air Quality

Consultation

3.10. A detailed account of the consultation process undertaken prior to the submission of the application is set out further in the Statement of Community Involvement submitted with the application. Further information of the consultation process and the design response can also be found in the Planning Statement and Design and Access Statement.

3.11. Consultation has undertaken with Bolton MBC to inform the approach of this ES. Representatives of the applicant's project team including, planning, design, landscape, transport and ecology have discussed the application in depth over a three month period prior to the submission of the application.

3.12. As required by the EIA Regulations, a public notice will be published in the Bolton News and site notices erected on site.

Objectives of the ES

3.13. The aim of the ES is to provide an objective and systematic account of the significant environmental effects of the development to assess the ability of the development and the surrounding area to accept those impacts.

3.14. The EIA serves to:

- Improve the environmental design of the proposal;
- Check the environmental acceptability of the proposal in relation to the capacity of the site and the receiving environment;
- Ensure resources are used appropriately and efficiently;
- Identify appropriate measures for mitigation of the potential impacts of the

proposals; and

- Facilitate informed decision making, including setting the environmental terms and conditions for implementing the proposal.

Scope of Work

- 3.15. The EIA covers the physical extent of the application site as described and included in the site location plans. It is defined by the area to be used, the nature of the current environmental conditions and the manner in which impacts are likely to be generated. The influences of many predicated impacts can extend beyond the site boundary. Where these impacts are identified and relevant, they have been assessed as part of the EIA.
- 3.16. The geographical extent of the EIA also considered the potential impacts of related and unrelated development activities and direct and indirect impacts as a result of the proposal.

Assessment Criteria

- 3.17. The assessment to be presented within the ES must consider the potential for significant environmental impacts to affect the baseline conditions as a direct/indirect result of the proposed development. The baseline conditions are defined as the existing state of the environment and how it may develop in the future in the absence of the proposals.
- 3.18. The following scenarios have been assessed;
- The existing sites at the time of the assessment (baseline conditions);
 - The proposed development; and
 - The cumulative impacts on the development

Baseline Scenario

- 3.19. Each topic chapter will initially examine the baseline scenario. The baseline scenario comprises the existing state of each site as it currently stands and how it would continue to develop in the absence of the proposed development. A description of the site is provided at Section 4 of this report and more fully within the Design and Access Statement. In brief, part of Creams Mill was previously occupied by a large paper mill, which closed in 2004 and was demolished in 2011. The remainder of the site is used for the grazing of horses (upper site) and areas of informal open space and self-seeded trees. The Manchester, Bolton and Bury Canal dissects the site, with the 1936 breach located to the west.
- 3.20. Hall Lane is an undeveloped site, albeit it was previously mined for coal and crafter remains from a former mine shaft is located in the middle of the site. The site is bounded by the Manchester, Bolton and Bury Canal to the south, with dense woodland to the west, Hall Lane to the north and existing residential dwellings to the east.

Proposed Development Scenario

- 3.21. Set against the results of the baseline scenario, each chapter assesses the potential impacts of the proposed development outlined in section 2 on the proposed topics.

Cumulative Development

- 3.22. The ES assesses the cumulative effects of the proposed development and considers two types of effect, including intra-project cumulative effects and inter project cumulative effects.
- 3.23. The inter project cumulative effects, the ES has taken into consideration two nearby planning applications as detailed below.

- Lever Gardens, Little Lever, Bolton (Application reference - 08816/20)
Erection of Extra Care units comprising 62 Apartments and 6 bungalows with Bistro, Staff Facilities, Communal Areas, Ancillary Accommodation, Parking and Landscaping.
Pending determination.
- Land at Victory Road, Little Lever, Bolton (04748/18)
22 dwellings with associated parking, landscaping and re-routing of existing public right of way. Approved 29 March 2019.

Assessment Definition

- 3.24. There are no universally recognised terms of what constitutes ‘significance’ so to assist the interpretation of this EIA, a common framework of assessment criteria and terminology has been developed for the presentation of anticipated impacts. The terminology is used as standard within EIA assessments. It considers the magnitude and nature of the characteristics and the sensitivity of the receptor. The definitions are set out below.

Sensitivity of a receptor

The sensitivity of a receptor refers to its importance i.e. its environmental value/attributes. This may include a feature’s level of statutory designation. It will generally be regarded as more important/sensitive than another site with a national or local designation. The terminology defining sensitivity can vary according to discipline. Within this ES sensitivity is generally determined as:

Sensitivity	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance

Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or low importance
Negligible	The receptor is resistant to change and is of little environmental value.

Determining Impact (Magnitude and Nature)

- 3.25. Magnitude of impact on environmental baseline conditions is identified through consideration of the development taking into account the scale or degree of change from the existing situation as a result of the impact; the duration and reversibility of the impact as well as consideration of the relevant legislation or policy standards/guidance.
- 3.26. Where possible, magnitude will be quantified, but where this is not possible, a fully defined qualitative assessment will be undertaken. The assessment of magnitude will be carried out considering any 'design mitigation (i.e. relevant design features) in the proposal forming part of the development description. The EIA assessment may result in the requirement of additional mitigation measures to further reduce the impacts of the proposal, therefore, the magnitude of impacts both before and after the additional mitigation will be stated.
- 3.27. Each chapter will assess magnitude as set out in the table below. there may be slight variations where best practice of particular disciplines suggest slightly different definitions and therefore the best practice for the individual discipline has been used.

Magnitude of impact	Definition
Substantial	Total loss or major alteration to key elements/features of the baseline conditions such that post development character/composition of baseline conditions will be fundamentally changed.
Moderate	Loss of alteration to one of more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Slight	Minor shift away from baseline condition. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the predevelopment situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Determining the significance of effects

- 3.28. Determination of the significance of effects identified requires consideration of both the sensitivity of the receptor and the magnitude of the impact. There may be a negligible magnitude of impact of a very high sensitivity receptor which would result in potentially major impact. The table below provides a reference which is used within each of the assessments;

Sensitivity of receptor	Magnitude of impact			
	Substantial	Moderate	Slight	Negligible
Very High	Major	Major-intermediate	Intermediate	Minor
High	Major intermediate	Intermediate	Intermediate-minor	Neutral
Medium	Intermediate	Intermediate	Minor	Neutral
Low/negligible	Intermediate-minor	Minor	Minor-neutral	Neutral

- 3.29. Any limitations or uncertainties identified arising from the absence of data or other factors will give rise to uncertainty within the assessment. Any limitations will be identified within each topic chapter. The effect of the uncertainty on the impact of the proposed development will be addressed within each chapter where the impact identified is given a confidence level.

Mitigation

- 3.30. A description of the mitigation measures is one of the key requirements of the ES. This includes a description of the measures undertaken and proposed to be undertaken in order to avoid, reduce and if possible, remedy significant adverse effects. The mitigation measures will be included within each topic chapter. If no mitigation is required, a simple statement setting out that no mitigation is required will be included.
- 3.31. Mitigation includes both 'design mitigation' and additional mitigation'. 'Design mitigation' is where the design of the site has been altered to take into account particular issues or accommodate features which serve to mitigate the identified impacts. 'Additional mitigation' includes other mitigation that has been identified as a result of the impact assessment that will be undertaken on the fixed design scheme. Details of the proposed mitigation methods are set out within each chapter.

Residual impact magnitude

- 3.32. Residual impacts refer to those environmental effects predicted to remain after the application of mitigation is outlined within each chapter of the ES. An assessment of residual magnitude will be conducted following the determination of suitable additional mitigation measures and will use the definitions as when defining the original impact magnitude.

Residual significance of effects

- 3.33. The assessment of residual significance will identify the residual environmental effects, these being the final outcome of the EIA process. A decision will be taken on the significance of residual effects in line with significance of impact table.

Confidence Level

- 3.34. It is considered that there is a generally high level of confidence regarding the assessment of the impacts and risk based upon the degree of baseline information that will be available. This

includes the assumptions that strategies, designs and requirements will be adopted in accordance with legislation and the planning regime. Full regulatory approval will be required, thereby ensuring that Bolton MBC and statutory bodies are satisfied that all necessary controls and mitigation measures are in place to protect the environment.

3.35. The confidence level shows the level of certainty that an impact will occur as predicted:

- Low: 0-50% probability, where there have been many assumptions within the assessment;
- High – 51-100% probability, where assessment have been based on satisfactory surveys and baseline information.

3.36. The confidence level of the assessment, is set out within each topic chapter.

4. The Site and Surroundings

- 4.1. This section provides a detailed description of the application site and its surroundings.
- 4.2. The application site is split into two physical separate parcels of development (see plans at **Appendices 1, 4 and 5**):
 - Land along the river valley comprising the former Creams Mill Paper site stretching up to the 1936 breach to the Manchester Bolton and Bury Canal and an additional parcel of land to the east of Mytham Road
 - A triangular parcel of land to the south of Hall Lane and west of Newbury Road
- 4.3. Although the separate parcels are located 1.4km apart, the proposed development is required in its entirety to enable the repair to the canal breach and through pre-application discussions with Council Officers, it was agreed that the proposals should form a single planning application.
- 4.4. The submission documents supporting the planning application have largely described the sites in these ways, unless specified otherwise.
- 4.5. The Archaeological Desk Based Assessment (ADBA) that supports this application (prepared by Archaeological Research Service) provided some historical context for this section.

Development Sites

- 4.6. While there are two main development parcels identified above, for clarity this section splits the residential development at the Creams Mill from the works to the Canal. Due to the size of Creams Mill site, the proposed residential development would be further split into four separate development parcels (Sites 1-4) which is elaborated in Section 4.

Creams Mill

- 4.7. The Creams Mill site comprises two parcels of land located off Mytham Road in Little Lever, divided in two by the (Manchester, Bolton and Bury) Canal.
- 4.8. The 'top site' comprises a 1.6 ha parcel of relatively flat land, screened effectively by existing residential development on Cedar Avenue which bounds it to the north, and by a dense belt of trees to the east, south and west. Access is taken from Mytham Road to the west from which point the site is visible from the public highway. The top site is largely flat and currently used for grazing and exercising horses, with the land falling away steeply through the trees down to the canal to the south.
- 4.9. The 'lower site' is 2.7 ha in size and is also accessed from Mytham Road, which currently narrows into single track falling steeply before crossing the canal and dropping down towards

the river as you enter the proposed development site (**Appendix 6** provides a Section Drawing of Creams Mill site that highlights the change in levels).

- 4.10. Existing access into the lower site is via a one-way bridge over the disused canal. The lower site is densely populated with self-seeded trees which have become more prevalent since the former buildings were demolished. It has a steep gradient down to the area of land along the waterfront, previously occupied by the Creams Mill paper mill. The paper mill only ceased use in 2004, and was demolished in 2011 following fire and vandalism, with large areas of hardstanding remaining. Historic maps and photographs of the former paper mill can be found at **Appendix 7**.
- 4.11. There are many typically urban features associated with the lower site that include the extent of hardstanding (particularly towards the River Irwell), the retaining wall which supports the Canal and the existing access through to the lower site from Mytham Road. There are also remnants of buildings and other apparatus such as streetlamps which were previously in this area. **Appendix 8** provides some photos of these features that are currently in situ.
- 4.12. The area previously occupied by Creams Mill is formally allocated (Allocation 56SC). The area occupied by the former Creams Mill paper mill benefits from planning permission for 95 open market dwellings and the construction of a new bridge over the canal which lapses in April 2021 (application reference 97139/16). It has never been implemented and has proved unviable.
- 4.13. The Creams Mill site is identified on the Bolton Council Core Strategy Proposals Map as being within the Green Belt and the Little Lever and Kearsley Core Strategy Sub Area; within a Mineral Safeguarding Area (for coal/brick and clay); sites of biological importance due to the proximity to the canal; and within a designated landscape area. The Creams Mill site is not within a Conservation Area and does not contain any listed buildings or structures. There are no Tree Preservation Orders on site. The Canal towpath located between the two areas of the Creams Mill site is a Public Right of Way.
- 4.14. The top site is located within Flood Zone 1, and is at low risk of flooding, as well as the area immediately south of the canal. Most of the bottom site is located with Flood Zone 1, with some areas located within Flood Zones 2 and 3.
- 4.15. The site is partly located within a Coal Development High Risk Area and is known to contain contaminants and invasive species.
- 4.16. Taking this into consideration, the development of the lower site would be challenging given the topography, the investment and infrastructure required to deliver any development, the previously developed land and required remediation of contamination and invasive species, flood risk in part and large number of self-seeded trees in situ.

Hall Lane

- 4.17. The Hall Lane site is located approximately 1.4km as the crow flies to the west of the Creams Mill site. It comprises a roughly triangular piece of well-contained undeveloped land approximately 2.15 hectares in area. The site is bounded by residential development to the north/north-east, the Canal to the south, Hall Lane to the north and a woodland to the west. The Hall Lane site stands at the western extent of the Canal, where it terminates in a basin.
- 4.18. The site can be accessed currently from Newbury Road and Hall Lane by foot. There are existing established informal footpaths across the north of the site leading to the woodland and the footpath network to the south of the canal, which will be retained as part of the development.
- 4.19. The site slopes from Newbury Road down to the canal. The site was previously mined with the crater the remnants of the mining shaft access. This is reflected in the site being identified as within a Mineral Safeguarding Area for coal, brick and clay.
- 4.20. Like the Creams Mill site, the Hall Lane site is located within the Green Belt and the Little Lever and Kearsley Core Strategy Sub Area; within a Mineral Safeguarding Area (for coal/brick and clay); sites of biological importance due to the proximity to the canal; and within a designated landscape area. The site is not within a conservation area but there is a Grade II Listed mile marker for the canal within the red line boundary of the Hall Lane site.
- 4.21. There are no TPOs within the application site, however a blanket TPO (ref: 20) is located to the south-eastern end of the site towards the rear of the Ascot Road properties.

Manchester Bolton and Bury Canal

- 4.22. The Manchester, Bolton and Bury Canal (the Canal) opened in 1797. As the name suggested, the Canal originally ran north from Manchester and Salford north to Prestolee near Little Lever. The Canal split in two at this point (via Prestolee Locks), with the main part of the Canal continuing towards Bury (which bypasses the Creams Mill site) and a branch that headed north-west to Bolton (towards the Hall Lane site). This Bolton branch is known to have gone further into the town however it currently terminates in a basing adjacent to the Hall Lane site.¹
- 4.23. The ABDA noted that the construction of the canals in this part of Bolton aided the coal mines in the area during the Industrial Revolution, in which a former mine shaft is known to have existed at Hall Lane.
- 4.24. In 1936, there was a breach in the Canal approximately 160 m to the west of the bridge over the Canal (as identified in **Appendix 9**), which restricted navigation along this canal.

¹ <https://canalrivertrust.org.uk/enjoy-the-waterways/canal-and-river-network/manchester-bolton-and-bury-canal>

- 4.25. The Canal has a towpath which is defined as a Public Right of Way between the backfilled stretches. The towpath provides links with Radcliffe to the east and Moses Gate Country Park and Farnworth to the West. The towpath negotiates the canal breach through the towpath being stopped up and diverted around the breach of the Canal before re-joining the towpath.
- 4.26. The backfilled part of the Canal is within the applicant's ownership and is largely overgrown with vegetation.
- 4.27. The former paper mill also made use of the empty Canal by building a warehouse for storage close to the existing access bridge over the Canal. The building was demolished following cessation of the former paper mill, however the remnants of building material still evident in the Canal bed.
- 4.28. The applicant had several meetings with the Canal and River Trust (CRT) prior to submission of this application. The CRT are a charitable body that manage over 2,000 miles of rivers, canals and their infrastructure within England and Wales. The CRT took over management in July 2012, having previously been managed by British Waterways.²
- 4.29. Following meetings with the CRT, it is understood that the redevelopment of the Canal is the CRT's top priority, with the CRT website confirming that *'plans are being formulated with a view to complete restoration of the canal within the next few years'*.³

The Surroundings

- 4.30. The application sites are both located within a predominantly residential area, comprising of one and two storey dwellings. The sites are within the administrative boundaries of Bolton Council.
- 4.31. The Creams Mill lies to the south of existing dwellings, with Council owned allotments to the west, the River Irwell to the south and Boscow's nursery and the Manchester, Bolton and Bury Canal breach to the west.
- 4.32. At Creams Mill, beyond the River Irwell, the land is predominantly in agricultural use and is in the Green Belt.
- 4.33. The land beyond the canal at Hall Lane is Moses Gate Country Park which provides 750 acres of woodlands, children's play areas, a nature reserve and trails for horses and cycling. It is dissected by the River Croal which joins with the River Irwell to the south of Prestolee Locks, located between the two development sites.

² <http://www.britishwaterways.co.uk/about>

³ <https://canalrivertrust.org.uk/enjoy-the-waterways/canal-and-river-network/manchester-bolton-and-bury-canal>

5. Drainage and Flood Risk

Introduction

- 5.1. ELLUC Projects Ltd were commissioned by Watson homes in June 2020 to conduct civil and Structural engineering designs for the proposed residential developments off Hall Lane and Creams mill which is in the borough of Bolton. As part of the design process ELLUC will carry out assessments involving the characterisation of the hydrological and hydrogeological regimes of the sites and its surrounding areas, the determination of the potential for impact posed by the residential development upon these regimes and definition of requirements for mitigation to minimise those impacts to an acceptable level.

Legislation

- 5.2. The following Legislation shall be reviewed during the development sites design process, and production of this report including any supplementary associated reports

National Planning Policy Framework (2019)

- 5.3. The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

Planning Practice Guidance (2014)

- 5.4. The NPPF is supported by a Planning Practice Guidance, which provides additional guidance on flood risk.

Flood and Water Management Act (2010)

- 5.5. The Flood and Water Management Act (FWMA) aims to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the Act that affect adoption of Sustainable Drainage Systems (SuDS) features and the role of the Environment Agency to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.

Water Resources Act (1991) & (2018)

- 5.6. The Water Resources Act 1991 sets out the regulatory controls and restrictions that provide protection to the water environment through controls on abstractions, impounding and discharges, as well as identifying, amongst other things conservation, water quality and drought provisions. The Act is supplemented by The Environment Protection Act 1991 which established the Environment Agency and The Environment Act 1995 which provides for integrated pollution control.

Water Framework Directive (2000)

- 5.7. The Water Framework Directive (WFD) requires all inland and coastal waters to reach 'good' chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters.
- 5.8. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as 'protected sites'.

Building Regulations (2010) Drainage and Waste Disposal

- 5.9. The Building Regulations Requirement (part H) stipulates that rainwater from roofs and paved areas is disposed of by, in order of priority: a soakaway or infiltration system; a nearby watercourse, or a public sewer. The proposed surface water drainage strategy has taken account of this order of priority

CIRIA C753 – The SuDS Manual (2015)

- 5.10. Sustainable Drainage System (SuDS) techniques as described in CIRIA C753 'The SuDS Manual' (CIRIA 20115) aim to deal with surface water as close to the source as possible and reproduce natural drainage patterns to prevent an increase in the volume and peak discharge from development sites. CIRIA C753 provides developers with best practice guidance on the planning, design, construction, operation, and maintenance of SuDS.

Sewers for Adoption 7th Edition (2012)

- 5.11. Sewers for Adoption provides guidance on the design, construction and maintenance of drains and sewers outside buildings which are to be adopted by a relevant public authority.

BS EN 752:2008 – Drain and Sewer Systems Outside Buildings (2008)

- 5.12. BS EN 752 provides a framework for the design, construction, rehabilitation, maintenance and operation of drain and sewer systems outside buildings.

River Irwell Catchment Flood Management Plan (2009)

- 5.13. The EA River Irwell Catchment Flood Management Plan (Irwell CFMP) is a high-level strategic planning document through which the EA will work with other stakeholders to identify and agree policies for long-term flood risk over the next 50-100 years.

Strategic Flood risk assessment (2008) and Bolton council Flood Risk Assessment (2011)

- 5.14. The Strategic Flood Risk assessments for Greater Manchester was prepared to inform the council's Local Development Framework and Sustainability Appraisal with respect to local flood risk issues and the location of future development in the Borough through the use of a sequential, risk-based approach to assessing development and flood risk

Methodology and Scope

Scoping Criteria

- 5.15. P4 Planning Limited, on behalf of Watson Homes consulted Bolton Council (BC) in August 2020 and requested a Screening and Scoping opinion in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.
- 5.16. The Screening and Scoping report submitted to the Council identified the hydrology and drainage issues to be addressed by the EIA
- An assessment of floodplain extents
 - Surface water management
- 5.17. Following consultation with the Environment Agency (EA), and The Canal and Rivers Trust (CRT) BC confirmed (14th October 2020) that the contents of the Scoping Report were considered acceptable. Following this, the Environment Agency consultation response dated (6th October 2020) and the Canal and rivers trust consultation dated (9th October 2020) was received (14 October 2020).
- 5.18. This chapter of the EIA has therefore been prepared in accordance with the scope set out in the aforementioned Scoping Report and takes into account the comments of the EA and CRT made in their associated correspondence.

Methodology

- 5.19. Surface and sub-surface receptors potentially susceptible to environmental impact from flooding and drainage issues associated with the proposed development have been identified. The identification of receptors has been informed by an assessment of baseline conditions.
- 5.20. The EIA has been informed by a site-specific Flood Risk Assessment (FRA) undertaken by ELLUC Projects (June 2020). The FRA was prepared in accordance with the National Planning Policy Framework (NPPF) and assesses the risk of flooding from a variety of potential sources including fluvial flood risk, the risk of flooding from the failure of water impounding structures such as reservoirs and canals, groundwater emergence and from surface water. The FRA also includes details of the existing drainage of the site and presents a surface water drainage scheme.
- 5.21. The proposals include the installation of a new packaged foul water pumping station (PS) to pump foul water (sewage) from the creams mill development to a local adopted gravity foul water network
- 5.22. Details of the catchment hydrology have been sourced from the Bolton council SFRA, Environment Agency supplied river modelling data and the Flood Estimation Handbook (FEH). A review of historical flooding information has been reviewed and confirmed by the EA, Flood

levels from the River Irwell have been reviewed including river gauging review of the river Irwell for FEH calculations.

- 5.23. Geological and hydrogeological information for the site has been sourced from the Phase 1 site appraisal report and associated EnviroCheck report, from the British Geological Society (BGS) data. The aforementioned information sources have been used to assess the risk of groundwater and surface water flooding, also to inform the outline surface water drainage scheme for the proposed development.
- 5.24. Informed by the baseline assessment, surface and sub-surface hydrology receptors of potential environmental effects have been identified. The 'importance' of each receptor has been designated using professional judgment and by reference to the guidance criteria presented in the tables below

Receptor Importance Criteria

Importance	Criteria	Measures
Very High	Receptor has high quality on national or regional scale	Surface Water
		High WFD Ecological status High WFD Chemical status Protected under UK Habitat legislation
		Ground Water
		Principal aquifer Source protection zone 1 WFD "Good status"
		Flood Risk
		Flood zones 3a 3b
High	Receptor has a high Quality on a local scale	Surface Water
		Good WFD Ecological status Good WFD Chemical status Protected under UK Habitat legislation
		Ground Water
		Principal aquifer Source protection zone 2 WFD "Good status"
		Flood Risk
		Flood zones 2
Medium	Receptor has a Medium quality on a local scale	Surface Water
		Moderate WFD Ecological status Moderate WFD Chemical status
		Ground Water
		Secondary aquifer Source protection zone 3 WFD "Good / poor status"
		Flood Risk
		Flood zones 2

Low	Receptor has a Low quality on a local scale	Surface Water
		Poor / Bad WFD Ecological status
		Poor / bad WFD Chemical status
		Ground Water
		Unsuitable strata
		WFD "poor status"
		Flood Risk
		Flood zones 1

Receptor ????

Importance	Criteria	Measures
Substantial	Loss of receptor / loss of quality	Surface Water
		Reduction in WFD Class
		High risk of pollution
		Loss of conservation area
		Ground Water
		Reduction in WFD Class
Moderate	Reduced effect of receptor / loss of part receptor	Loss/change to aquifer
		High risk of pollution
		Flood Risk
		100 yr levels increase
		increase of flood risk due to blockages
		increase of flood zones (plus 3Ha)
Minor	Minor effect of receptor	Surface Water
		Reduction in WFD Class
		medium risk of pollution
		part loss of conservation area
		Ground Water
		Reduction in WFD Class
		Partial change to aquifer
		Moderate risk of pollution
		Flood Risk
		100 yr levels increase (50mm to 100mm)
		increase of flood risk due to blockages
		increase of flood zones (plus 1 - 3Ha)
		Surface Water
		Minor risk of pollution
		Ground Water
		minor risk of Pollution
		Flood Risk
		100 yr levels increase (less than 50mm)

Receptor Benefit Criteria

Benefit	Criteria	Description
Negligible	Insufficient effect on	Surface Water
		No pollution spillage
		Ground Water
		No impact on aquifer No pollution risks
		Flood Risk
		negligible change in flood levels no change in flood zone
Minor	Minor effect on receptor	Surface Water
		Improved WFD Class
		Ground Water
		reduced risk of pollution
		Flood Risk
		reduced change in flood levels reduced extent of flood zone
Moderate	Moderate effect on receptor	Surface Water
		Improved WFD Class
		Ground Water
		moderate reduced risk of pollution Improved WFD Class
		Flood Risk
		reduced change in flood levels reduced extent of flood zone (3Ha)
Substantial benefit	major effect on receptor	Surface Water
		Improved WFD Class removal of Pollution discharge
		Ground Water
		removal of pollution discharge Improved WFD Class
		Flood Risk
		reduced change in flood levels (+100mm) reduced extent of flood zone (3Ha) Reduced properties in flood zone 2

Significance Matrix Assessment

Importance of Attribute	Magnitude of impact				
		major	Moderate	Minor	Negligible
	Very High	Very Large	Large/very Large	Moderate/large	Neutral
	High	Large/very Large	Moderate/large	Slight /moderate	Neutral
	Medium	Large	Moderate	Slight	Neutral
	Low	Slight Moderate	Slight	Neutral	Neutral

5.25. Impacts are determined without taking into account the mitigation measures and good practice construction techniques, impacts that remain following mitigation measures being taken into consideration are residual impacts. Temporary impacts are considered in the construction period whilst permanent impacts are discussed in the operational phase. Impacts of moderate adverse or worse are considered to be significant

Consultation

5.26. Consultation has been undertaken with the EA (regarding flood risk and drainage issues) and United Utilities with regards network adoption and foul water issues

Baseline Conditions

5.27. The following information was received from the Environment agency or sourced from there live/active website

- Confirmation status (main river) for watercourses
- Locations of nearby Gauging stations
- Flood warning / alert areas
- Groundwater source protection zones
- Aquifers
- Local water abstraction licences
- Historic river quality
- **Site location**

5.28. The three sites are located off Mytham Road and Hall lane, Little Lever, Bolton. The sites are located next to the Manchester /Bolton / Bury canal and river Irwell, the canal is currently disused and as part of the development proposals will be made back into use and repairs to be

made to the existing breach, the larger creams mill site is located adjacent to the River Irwell and adjacent to flood zones 1, 2 & 3

- 5.29. A site walkover has been completed (numerous times) to review the sites layout, topography, and site features, including a walkover and assessment of the existing canal (existing breach area / existing bridge structure) and the river Irwell.

- **Surface water Quality**

- 5.30. Under the WFD the uk is divided into river basin districts. The study area is in the North west area and the proposed development area is within the Irwell (Roch to Croal zone), the data for the area is based upon, ecological, physio-chemical, hydro morphological parameters, the summary is highlighted below;

- hydro morphological – Heavily modified
- Overall classification – Moderate (2019)
- Current chemical quality – Fail
- Current ecological status – Moderate

- 5.31. Issues that are preventing the river Irwell from achieving “Good status” is;

- Pollution from wastewater (3 instances)
- Pollution from local towns and cities
- **Hydrogeology baseline**

- 5.32. The bedrock geology for the said sites is Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone with superficial deposits of description of Till, Devensian (information sourced from BGS records).

- 5.33. Aquifer designation is known as Secondary A, this is the usual designation for a minor Aquifer. These are permeable layers capable of supporting water supplies at a local level rather than at a strategic scale and in some cases forming an important source of base flow to local rivers.

Flood Risk Baseline

Flooding from rivers

- 5.34. The site is located adjacent to the river Irwell and has been fully modelled by the environment agency
- 5.35. The Environment Agency model confirm the site is within flood zones 1, 2 and 3
- 5.36. The Environment Agency have no records of any historic flooding of the said development site

Flooding from Land

- 5.37. The topography of an area impacts upon the flooding from land, including drainage systems, the proposed development sites have either been green field development areas or existing brownfield development zones
- 5.38. Based upon the topography of all sites any overland flows would generally flow and discharge into the canal or River Irwell

Flooding from Ground water

- 5.39. The hydrogeology of the site was confirmed as Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone with superficial deposits of description of Till, Devensian. During site visits water levels were within the constraints of the river and canal, there was no evidence of ground water flooding within the said development sites

Flooding from sewers and water mains

- 5.40. Proposed United utilities asset plans have been obtained, there are no sewers or water mains crossing the site development sites and there are no known problems with sewers or water mains (these are maintained by United utilities).
- 5.41. The risk to the proposed sites from flooding from watermains or sewers is low

Flooding from artificial sources (reservoirs, canals, lakes, and ponds)

- 5.42. There are no know reservoirs located within the local area of the new proposed development sites.
- 5.43. There is an existing canal 'Manchester Bolton and bury canal' which is located next to all 3 proposed development sites.
- 5.44. Historically the canal has had a significant breach which outfallen into the river Irwell, as part of these development proposals the Breach will be remediated, and the canal opened for reuse for the canal and rivers trust.
- 5.45. Hall lane site and Mytham road sites are higher than the existing canal and therefore no effected by the canal.
- 5.46. Creams mill site is significantly lower and the breach remedial works are required to be fully completed to structural engineering designs and approved /sign off by the Canal and rivers trust and Bolton council engineers, with regards the remaining section of the canal (area which shall be opened up) this will have additional water proofing to avoid any future leaks, upon completion the canal will be fully maintained by the canal and rivers trust whom shall manage the structure and water levels.
- 5.47. If the above (highlighted in section 5.5.29) is competed to statutory approvals the risk will be reduced to low from artificial sources.

Drainage proposals

- 5.48. The proposed drainage designs will be carried out taking into consideration potential environmental impacts
- 5.49. The outfalls into the canals (Hall Lane and Mytham road) shall be designed to Canal and rivers trust approvals, site designs will be duly completed to avoid any contaminated waters from entering the canal by using smart sponges in gullies, petrol interceptors and suitable gully pots
- 5.50. Connections to the canal shall be via temporary cofferdams and bund installed to avoid on site contaminated soils from entering the water source
- 5.51. The installation of any new structure along the canal or riverbanks will have permanent localised impact on the river/canal through loss of bank habitat, in addition to secondary impacts on fauna. The detailed designs will need to consider the water environment so that the new structures are environmentally sympathetic

Assessment of Effects

- 5.52. If not adequately controlled, impacts from construction and operation may have several effects on the water quality of the canal and river
- 5.53. During the construction phase, temporary impacts on water quality could occur if good practice mitigation measures are not implemented on site. The potential impacts of the proposed scheme on surface water quality could include:
 - Water pollution from silt-laden runoff if, allowed to drain directly into the river or canal untreated
 - Chemical/fuel spillages and leaks from plant and machinery, and from chemicals and other pollutants (e.g. cement, paints, etc.) used/stored on site
 - Localised erosion of banks and beds of the river when works are required in their proximity
 - Inappropriate disposal of foul water from the construction site.
- 5.54. If not adequately controlled, impacts from construction may have several short-term impacts on the quality of the river and canal within the study area.
- 5.55. Silt-laden runoff is generated principally by rainfall onto land where surface vegetation has been removed and the ground compacted, preventing infiltration. Other sources of silt-laden runoff come from the use of water as part of construction works (e.g. vehicle washings, runoff from stockpiles, works next to the river and pumping from excavations). High levels of suspended sediment in water can remove essential oxygen from the water, and can adversely affect plants, animals and insects living in water by stopping sunlight reaching them.
- 5.56. The greatest risk is where works are carried out near the river or canal, or on steep slopes which will encourage overland flow. There is also the risk from existing drains and other

conveyors of silt laden runoff to watercourses. The proposed construction work will be carried out in accordance with good practice. The Construction Environmental Management Plan (CEMP) will make reference to mitigation measures to prevent/reduce the formation of silt-laden runoff, to protect rivers and canals (by using earth bunds, silt fences etc.) and to intercept and filter runoff prior to disposal, either by spraying over grassed fields or via temporary discharges (under EA consent) into watercourses. These measures are set out in more detail in the “Mitigation” section of this chapter which follows.

Magnitude of impact from silt pollution		
Receptor	Importance	magnitude of impact without mitigation
River Irwel	High	Moderate adverse
bolton / bury canal	very high	Moderate adverse

- 5.57. During construction, fuel, hydraulic fluids, solvents, paints and detergents and other potentially polluting substances will be stored and/or used on site. Leaks and spillages of these substances could pollute the river / canal within the study area. To allow such substances to enter a watercourse would be in breach of the Water Resources Act 1991. Therefore, measures to control the storage, handling and disposal of such substances will need to be put in place prior to and during construction.
- 5.58. The storage of potentially hazardous substances will be in accordance with the Control of Substances Hazardous to Health Regulations 2002 and the Control of Pollution (Oil Storage) (England) Regulations 2001. Construction works will take place following good practice. This will include bunded fuel storage areas (minimum 110% storage capacity), designated refuelling areas isolated from surface runoff drainage, easily accessible spill kits and oil absorbent materials, and training for construction workers. As a result, it is unlikely that the storage of these substances will lead to pollution of the canal and river. Specific measures will be required for any plant operating close to the canal and water course.

Magnitude of impact from chemical pollution		
Receptor	Importance	magnitude of impact without mitigation
River Irwel	very high	Moderate adverse
bolton / bury canal	very high	Very high adverse

- 5.59. Foul water drainage from the construction site will be connected to the nearest public sewer. If this is not possible, portable toilets, etc. will be used. These will be regularly emptied by an appropriate contractor and disposed of at a suitable facility off-site. Construction site foul water will not be discharged into the river or canal under any circumstances. Therefore, the magnitude of this potential impact is **negligible**.

Flood risk

Flooding from Rivers

- 5.60. As detailed under baseline conditions, the site is adjacent to the river Irwell. There is, therefore, the potential for the construction of the scheme to impact the river and subsequently cause flood risk. For example, the construction process could cause blockages within the river and/or impact upon the floodplain of these watercourses and reduce their floodwater storage capability.
- 5.61. Based on the size and characteristic of the existing river (size, fast flowing and steep channels), the baseline risk of flooding from the river or construction works causing flooding during the construction period is considered to be **minor adverse**.

Flooding from Land

- 5.62. The construction of the scheme could potentially impact the existing drainage systems within the site areas area and change overflow flow routing in the area. The construction of the new infrastructure could also potentially increase the rate of surface water runoff if impermeable areas are temporarily increased.
- 5.63. Based on the site area, any impact on flooding from the land is **minor adverse** during construction.

Flooding from Ground

- 5.64. Groundwater levels within the drift and underlying bedrock are below proposed road pavement level. During construction there will be house footings works which are likely to intercept local areas of holding water (subject to completion of a formal geotechnical intrusive site investigation). There is, therefore, the potential for localised groundwater flooding to occur, if appropriate groundwater exclusion construction techniques are not implemented.
- 5.65. Based on the fact groundwater is only likely to be encountered at house footings works during construction, the potential impact on groundwater flooding, if appropriate construction techniques are not implemented, is considered to be **minor adverse**.

Flooding from sewers and water mains

- 5.66. If the construction process does not take into account the location of existing water mains and sewers, there could be a risk of flooding from water mains and sewers during construction. The impact would be a short term **moderate adverse impact**.
- 5.67. Foul water services need to be provided during construction. As previously detailed, the preferred option is to connect foul water services to the nearest public sewer. If this is not possible portable toilets etc. will be provided. The foul services should be maintained by a professional contractor and removed regularly from the site for appropriate disposal. If these services are not maintained appropriately there is the potential for foul water flooding to occur. Based on the nature of the study area, and the temporary nature of the risk, the potential impact on foul water flooding is **minor adverse**.

Mitigation

- 5.68. If not adequately controlled, impacts from construction activities may have significant short-term impacts on the surface water environment. Appropriate measures will need to be put in place prior to, and during, the construction phase of the proposed scheme in accordance with legislative requirements and good site practice guidance.

Surface and Ground water

- 5.69. Procedures and mitigation measures to be adopted during the construction phase are recommended to be documented in a CEMP. Construction work will require several separate consents and licences from the Environment Agency, which are in part required to prevent adverse impacts on the water environment.
- The discharge of trade effluent (including treated site runoff) into a controlled water will require a Water Activity Permit under the Water Resources Act 1991 and the Environmental Permitting Regulations 2010
 - Flood Defence Consents under the Land Drainage Act 1991 for works along Main Rivers where they are required in, over, under, or within 8 m of the bank top that could affect the flow
- 5.70. Applications for appropriate permits as described above will be made following detailed design. All consents and licences will be in place prior to commencement of any works. The works will be carried out in accordance with any conditions imposed by these consents and licences.
- 5.71. The following good practice guidance documents should be reviewed and referred to in the CEMP:
- CIRIA Report 697 (2007) The SUDS Manual
 - CIRIA Report 648 (2006) Control of Water Pollution from Linear Construction Sites
 - CIRIA Report 532 (2001) Control of Water Pollution from Construction Sites
 - CIRIA Report 142 (1994) Control of Pollution from Highway Drainage Discharges
 - PPG 1 – General Guide to the Prevention of Pollution (no date);
 - PPG 2 – Above Ground Oil Storage Tanks (February 2004);
 - PPG 3 – Use and Design of Oil Separators in Surface Water Drainage Systems (April 2006);
 - PPG 5 – Works or Maintenance in, or Near Watercourses (October 2007);
 - PPG 6 – Working at Construction and Demolition Sites (no date);
 - PPG 7 – Refuelling Facilities (August 2004);
 - PPG 8 – Safe Storage and Disposal of Used Oils (February 2004);

- PPG 13 – Vehicle Washing and Cleaning (July 2007);
- PPG 18 – Managing Fire Water and Major Spillages (no date);
- PPG 21 – Pollution Incidence Response Planning (February 2004);
- PPG 22 – Dealing with Spillages on Highways (no date); and
- PPG 23 – Maintenance of Structures Over Water (no date)

Silt Management Plan

5.72. A suitable Silt management plan should be prepared to include the following

- Works that are likely to generate silt-laden runoff (e.g. earthworks and excavations) will be undertaken preferentially during the drier months of the year
- Site compounds and stockpiles will be located away from water bodies
- The drainage system will be developed to prevent silt-laden runoff from entering surface water drains without treatment (e.g. earth bunds, silt fences, straw bales, or proprietary treatment)
- Where possible an 8m buffer strip of existing vegetation will be maintained alongside watercourses. Where this buffer zone is necessarily breached (i.e. at crossings) the design and construction of structures will be environmental sympathetic
- Any work along the river or canal will be isolated to prevent silt propagating downstream
- Earth stockpiles will be seeded as soon as possible, covered with geotextile mats or surrounding by a bund to minimise the risk of sediment-rich runoff;
- Mud will be controlled at entry and exits to the site using wheel washes and/or road sweepers
- Tools and plant to be washed out and cleaned in designated areas within the site compound where runoff can be isolated for treatment before discharge to river or sewer under appropriate consent
- If required, vehicles will cross the canal at designated crossing points only, which will include protection to minimise silt-laden runoff/mud from entering the canal / river
- Debris and other material will be prevented from entering the river / canal
- Construction SUDS (such as settlement lagoons or other temporary attenuation) to be used during construction if necessary
- Discharges to the river and canal will only be carried out under a consent from the Environment agency or canal and rivers trust

Storage and Spillage Emergency Response

5.73. A suitable management plan should be prepared to include the following

- Fuel and other potentially polluting chemicals will be stored in a secure impermeable

and bunded storage area (minimum capacity 110%)

- Refuelling of plant will take place in a designated area at the site compound only
- Maintenance of vehicles will take place at designated areas in the site compound
- Fixed plant will be self bunded
- Mobile plant will be in good working order, kept clean and fitted with drip trays where appropriate
- Spillage kits and oil absorbent material will be carried by mobile plant and located at vulnerable locations (e.g. crossings of land drains and ditches)
- The site will be secured to prevent vandalism that could lead to a pollution incident
- Designated concrete wash out areas will be constructed in accordance with good practice guidance and will be clearly identified and used
- Construction workers will be trained to respond to spillages
- An Emergency Response Plan will be prepared
- Construction waste/debris will to be prevented from entering any water body

Work in and Adjacent to Watercourses

5.74. Potential adverse impacts are greater where works are in and adjacent to watercourses. Such work must be minimised where possible, but where it is essential it should be carried out in accordance with the Environment agency's Flood Defence Consent, a suitable management plan should be prepared to include the following

- Affected area to be kept to a minimum
- It would be preferable if works were carried out during dry weather
- Temporary crossings have been avoided where possible. However, the temporary haul road over the canal will subject to the same design controls as permanent structures
- Illustrates the proposed design for this crossing which will prevent vehicles travelling through the canal
- Works in the channel carried out in a bunded, dry working space with any waste water pumped out for treatment
- Pre-fabricated structures to be used wherever possible to minimise the use of wet concrete near water
- Once structures are erected, debris netting should be provided to stop material falling into the channel
- No refuelling of plant or machinery is to take place near the canal or river (designated

sites within construction compound to be used only)

- All plant to be clean and self bunded
- Following completion of any canal or river works, the channel will be cleared of debris/materials, the natural bed reinstated, and water allowed to flow from downstream spilling up channel to prevent remobilisation of loosened material.

Flooding from Rivers

- 5.75. The impact of the construction process on the rivers within the site area, and their floodplains should be mitigated as far as practically possible. It is obviously not possible to prohibit construction work within the river / canal channels and floodplains, although where this should occur it would be temporary and short term. However, it is possible to monitor and limit construction work carried out within the fluvial floodplain. Furthermore, construction equipment should not be stored within the fluvial floodplain outline.

Flooding from Land (i.e. surface water and overland flow)

- 5.76. It is recommended that the impact of the construction phase on flooding from land is considered further during construction. If surface water runoff and overland flow are assessed to be having a significantly adverse effect, then installing a temporary appropriate drainage system may be necessary.
- 5.77. Installing an appropriate temporary drainage system would mitigate any adverse impact and could possibly be provided in the form of a simple ditch drainage system discharging to the river.

Flooding from Groundwater

- 5.78. The construction process should take the groundwater level into account. If groundwater is encountered during the bridge or footing works, appropriate construction techniques should be utilised to mitigate the risk. Dewatering and ground freezing techniques are examples of appropriate construction techniques that could be utilised during construction, if required

Flooding from Sewers and Water Mains

- 5.79. The construction process should take the location of existing water mains and sewers into account, and it should be ensured that the construction process does not impact on these assets. This should ensure that there is no risk of flooding from sewers or water mains during the construction phase.
- 5.80. Foul water from services provided during construction should be drained to a nearby sewer where possible. If there are no suitable nearby sewers, then foul flows should be maintained by a professional contractor and removed regularly from the site for appropriate disposal. This should ensure that there is no foul discharge to surface water, either directly or indirectly via sewers, and that there is no risk of foul water flooding

Flooding from the Bolton and Bury Canal

- 5.81. The impact of the construction process on the canal within the site area should be mitigated as far as practically possible. Where the works are to be completed it is currently a closed canal area and would have no impact upon any water quality or breach, the works on the breach should be completed following engineers details / designs which should be approved by the Canal and rivers trust engineers and Bolton council
- 5.82. The remaining section of the canal should be fully reviewed (water proofing and structural integrity) and an agreed method of water proofing agreed with the Canal and River Trust.

Cumulative Impacts

- 5.83. The proposed creams mill residential development will reduce the existing impermeable area run off into the river Irwell, currently a free discharge. The reduced and controlled run off will have an impact upon the reduced water volume and discharge rate entering the river during peak flows (peak storm durations) which will aid in reducing off site flooding.
- 5.84. The controlled run off through a modern drainage network will also have an additional benefit in reducing and pollution run off from the site
- 5.85. The New developments planned will introduce new urban areas and therefore increase urban pollution into the catchments of the Bury and Bolton canal. These developments will need to include appropriate SuDS measures or other treatment to ensure that long term water quality impacts do not occur.

Residual Effects

- 5.86. The residual impacts predicted for the construction and operation phases have been presented in the tables below respectively. These have been determined following the methodology and scope and present the impacts predicted to occur once mitigation measures have been taken into account.

Residual impacts (Construction)						
Surface water Quality	Description of potential impact	Classification of potential impact	Receptor (importance)	Magnitude of the impact without mitigation	Proposed and recommended Mitigation measures	Residual Impact significance (with mitigation)
	water ploution from silt runoff	Likley Temporary Short term	River Irwell	Minor Adverse	The site will operate a temporary drainage system using construction SUDS (e.g. silt fences, sedimentation lagoons, earth bunds etc.) to control control and treat silt-laden runoff generated by works. Discharge consents from the EA will be in place if necessary	Neutral
			Bolton / Bury Canal	Moderate adverse		Neutral
	Chemical spills from oils and other polluting substances	unLikley Temporary Short term	River Irwell	Minor Adverse	The storage of potentially hazardous substances will be in accordance with the Control of Substances Hazardous to Health Regulations 2002 and the Control of Pollution (Oil Storage) (England) Regulations 2001. Construction work will also take place following good practice as set out in the various	Neutral
			Bolton / Bury Canal	Moderate adverse		Neutral
	Localised erosion of banks and beds of the river/canal when works are required in their proximity	Likley Temporary Short term	River Irwell	Moderate adverse	Any works close to or within a watercourse (Controlled Water) will need to be strictly controlled to prevent adverse impacts on water quality (and therefore aquatic fauna/flora) or through physical changes (long term changes considered under operation impacts). All work will be controlled by good practice guidance Such works will require Flood Defence Consent from the EA. With these measures the magnitude of adverse impacts can be reduced to minor adverse on all watercourses works to the canal will be approved by the canal and rivers trust and Bolton council for the breach works, water proofing and structural integrity	Neutral
			Bolton / Bury Canal	Moderate adverse		Neutral
	Inappropriate disposal of construction Foul water	unLikley Temporary Short term	River Irwell	Negligible	If possible construction foul water will be discharged to the nearest foul sewer. If this is not possible foul water (e.g. waste from chemical toilets) would be collected from site by an approved specialist contractor for appropriate disposal elsewhere.	Neutral
			Bolton / Bury Canal	Moderate adverse		Neutral

Residual impacts (Construction)						
Groundwater	Description of potential impact	Classification of potential impact	Receptor (importance)	Magnitude of the impact without mitigation	Proposed and recommended Mitigation measures	Residual Impact significance (with mitigation)
	Pollution during foundation and drainage construction	unLikely Temporary Short term	River Irwell Bolton / Bury Canal	Minor Adverse Minor Adverse	Carry out good practice measures as for working near to water courses.	Neutral Neutral
Flood risk	Flooding from rivers	Likely Temporary Short term	River Irwell Bolton / Bury Canal	Minor adverse Minor adverse	Monitor and limit construction work carried out within watercourse channels and their floodplains. Construction equipment should not be stored within the fluvial floodplain outline.	Neutral Neutral
	Flooding from Land	Likely Temporary Short term	River Irwell Bolton / Bury Canal	Negligible Negligible	If surface water runoff during construction is assessed to have a significantly adverse affect then a temporary drainage system should be installed.	Neutral Neutral
	Flooding from Groundwater	unLikely Temporary Short term	River Irwell Bolton / Bury Canal	Negligible Negligible	Groundwater exclusion techniques should be implanted during construction, if required. Dewatering and ground freezing techniques are examples of appropriate groundwater exclusion techniques.	Neutral Neutral
	Flooding from sewers and water mains	unLikely Temporary Short term	River Irwell Bolton / Bury Canal	Negligible Negligible	Review the local of existing sewers and water mains and ensure construction does not impact the asset	Neutral Neutral
					If possible construction foul water will be discharged to the nearest foul sewer. If this is not possible foul water (e.g. waste from chemical toilets) would be collected from site by an approved specialist contractor for appropriate disposal elsewhere.	

Residual impacts (operation)						
	Description of potential impact	Classification of potential impact	Receptor (importance)	Magnitude of the impact without mitigation	Proposed and recommended Mitigation measures	Residual Impact significance (with mitigation)
Surface water Quality	water pollution from highway and housing runoff	Likely	River Irwell	Negligible	The drainage design for the proposed highways and housing to include SUDS where possible together with conventional methods	Neutral
		Permanent long term	Bolton / Bury Canal	Negligible		Neutral
	Spillage polluting substances	unLikely	River Irwell	Negligible	Spillage risk from the roads and housing is low gullies and smart sponges etc., should contain any spillages	Neutral
		Temporary Short term	Bolton / Bury Canal	Minor Adverse		slight adverse
Groundwater	water pollution from roads and housing	Likely	Secondary A Aquifer	Minor Adverse	infiltration will be limited to where the secondary aquifer may be exposed at the surface	slight adverse
		Temporary long term				
	Spillage polluting substances	unLikely	Secondary A Aquifer	Minor Adverse	infiltration will be limited to where the secondary aquifer may be exposed at the surface	slight adverse
		Temporary Short term				
Flood risk	Flooding from Rivers	Likely	River Irwell	Negligible	Appropriately designed site levels for new roads, drives and houses	Neutral
		Temporary Short term				
	Flooding from land	Likely	River Irwell	Negligible	Install appropriate drainage system without increasing the flood risk	Neutral
		Temporary Short term	Bolton / Bury Canal	Negligible		Neutral
	Flooding from sewers and water mains	unLikely	River Irwell	Negligible	water mains and sewers design to current standards to cope with required loads	Neutral
		Temporary Short term	Bolton / Bury Canal	Negligible		Neutral
	Flood from canal	unLikely	Bolton / Bury Canal	Negligible	canal remedial works shall be completed following engineering detailed designs which in turn shall be reviewed and approved by the CRT and Bolton Council, Upon completion the canal shall be fully maintained by CRT including the water levels	Neutral
		Temporary Short term				

Assessment Summary

- 5.87. Potential impacts on the water environment through the construction phase would be managed by a range of operational, control and monitoring measures including the implementation of a Construction Environmental Management Plan and best construction practice. Foul water from temporary staff welfare facilities would be contained within sealed storage vessels and disposed of off-site. Storage of plant, machinery or materials in areas at risk of flooding would be avoided wherever possible. Flood risk would be mitigated through the implementation of a flood management and response plan linked to the EA flood warning service for the River Irwell
- 5.88. A sequential approach to the layout has been adopted. No residential development will be located in Flood Zone 3. Finished floor levels of residential dwellings would be raised to mitigate the risk of flooding from all sources

- 5.89. Surface water from the developed site will be managed by a drainage scheme based on sustainable drainage principles. Peak runoff rates will be limited to existing Greenfield rates (Hall Lane and Mytham Road) and a 50% betterment for the Creams mill site area, using a mix of attenuation storage facilities. The use of infiltration devices will be investigated further as part of the detailed design stage. The drainage system will incorporate oil and silt traps where required and would improve water quality using at least two treatment trains.
- 5.90. It is proposed that the development is served by a new packages foul water pumping station, located on the creams mill site in an area of low flood risk. The station would comply fully with Environment agency and United utilities pollution prevention guidelines and would discharge to public sewers in Mytham Road.
- 5.91. No adverse impact to groundwater is predicted from potential spillages since the risk is very low across the three development sites.
- 5.92. The Proposed canal works to the Breach shall be designs by structural engineers and approved by the canal and rivers trust and Bolton council, the remaining section of the canal to be opened up shall be reviewed for structural integrity and water proofing and if required additional remedial works (i.e. water proofing) shall duly be completed.
- 5.93. Upon completion of the Canal works the ownership and management will be transferred to the canal and rivers trust to maintain the canal and water levels.

Conclusion

- 5.94. This Chapter of the EIA has considered the potential impacts of the proposed residential developments on the water environment, including appropriate assessments of the possible impacts on surface water, groundwater, and flood risk. Residual impacts have been presented in Tables (section 5.9) for the construction phase and for the operational phase, respectively.
- 5.95. The construction phase mitigation measures would significantly reduce the risks to the identified receptors and the residual significance is assessed to be not significant
- 5.96. There are no identified adverse residual effects during the operational phases of the development.

6. Ground Conditions and Contamination

Introduction

- 6.1. This chapter assesses the impact of the proposed development on ground conditions. In particular, it considers the potential effects of contamination on human health, flora and controlled waters (the wider environment), buildings / property, potential instability effects on buildings and infrastructure and potential sterilisation of mineral deposits.
- 6.2. The chapter describes the methods used to assess the impacts, the baseline conditions currently existing at the site, the potential direct and indirect impacts of the development arising from potential contamination, land instability and mineral extraction, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts from the completion of the development. It has been written by LK Consult Ltd. This chapter should be read in conjunction with Phase 1 PRA and Coal Mining Risk Assessment Report for each site and the site location plan and layout plans.

Legislation

National Planning Policy Framework

- 6.3. The National Planning Policy Framework (NPPF) document is the main planning policy document relevant to this chapter. With regards to potential contamination and land instability, Sections 178-179 aim to ensure that the site is suitable for its proposed use taking into account of ground conditions and any risks arising from land instability and contamination.
- 6.4. The NPPF also outlines that post remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990. In addition, it aims to ensure that adequate site investigation, prepared by a competent person, is available to inform these assessments.
- 6.5. Sections 203-206 of the NPPF set out a framework for the sustainable use of minerals. These sections require Mineral Planning Authorities to safeguard mineral resources that are or may become of economic performance by including them in a Mineral Safeguarding Area. The aim is to ensure mineral resources are adequately and effectively considered in land use planning decisions, to ensure that they are not needlessly sterilised by non-mineral development.
- 6.6. The assessment will also be undertaken with due recourse to the following main legislation with regards to contamination risks:

- Part IIA of the Environmental Protection Act (EPA) 1990 (as amended) i.e. the

‘contaminated land’ regime and its related statutory guidance (Part IIA);

- Contaminated Land (England) Regulations 2006 (as amended);
- Environmental Permitting Regulations 2010, which implements amongst other matters the EC Groundwater Directives 80/68/EEC and 2006/118/EC;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, which transpose the Water Framework Directive (Directive 2000/60/EC) (WFD) into UK law.
- The Building Act 1984.
- Building Regulations 2010.
- The main legislation drivers with respect to managing risk associated with land stability issues are:
 - Coal Mining Subsidence Act 1991;
 - Coal Industry Act 1994;
 - Mines and Quarries Act 1954; and,
 - Quarries Regulations 1999.

Local Planning Policy

UDP Policies

6.7. The following policies from the UDP are of particular relevance to the assessment of ground conditions on the site:

- Policy CG4 ‘Pollution Control’; and,
- Policy P4 ‘Minerals’ which is linked to Greater Manchester Joint Minerals Plan (2013).

Greater Manchester Joint Minerals Plan (2013)

6.8. Bolton Council area mapping within the above plan indicates the site lies within a Mineral Safeguarding Area for Brick Clay and for Coal and the northern part of Hall Lane lies within a Mineral Safeguarding Area for sand and gravel. Policies 2 and 8 are considered to be the most relevant policy for this development.

6.9. Policy 2 (Key Planning and Environmental Criteria) states that ‘All proposals for minerals working or the provision of minerals infrastructure will be permitted where any adverse impacts on the following criteria is avoided or can be appropriately mitigated:

- Controlled waters and flood risk management;
- Landscape and visual intrusion;
- Biological and geological conservation including European sites;

- Historic environment and built heritage;
- Best and most versatile agricultural land
- Infrastructure
- Traffic and access;
- Amenity e.g noise, dust, vibration, and odours;
- Air Quality;
- Land instability;
- Potential land use conflict;
- Design, phasing and operational details;
- Aviation safety.”

6.10. Policy 8 refers to the prior extraction of mineral resources for non-mineral development, within Mineral Safeguarding Areas. Policy 8 of the Minerals Plan states:

“... All non-mineral development proposals within the Mineral Safeguarding Area should extract any viable mineral resources present in advance of construction. Proposals for prior extraction of minerals will be permitted provided the proposal is in accordance with Policy 2 Key Planning and Environmental Criteria.

6.11. Proposals for non-mineral development within the Mineral Safeguarding Areas that do not allow for the prior extraction of minerals will only be permitted where:

*The need for the development outweighs the need to extract the mineral; or
It can be clearly demonstrated that it is not environmentally acceptable or economically viable to extract the mineral prior to non-mineral development taking place; or
It can be clearly demonstrated that the mineral is either not present or of no economic value or too deep to extract in relation to the proposed development; or
The development is limited or temporary and would not prevent minerals extraction taking place in the future...”*

6.12. If there will be any adverse effects to the criteria outlined in Policy 2, then it is assumed that prior extraction cannot be permitted under Policy 8.

Methodology and Scope

6.13. This chapter is based upon the following information sources:

- ‘Creams Mill’ Phase 1 Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 20 1371-01 R0), dated August 2020.
- ‘Creams Mill’ Desk-Based Coal Mining Risk Assessment, undertaken by LKC (Ref: LKC 20 1371-01 R0), dated August 2020.
- ‘Hall Lane’ Phase 1 Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC 20 1620-01 R0), dated August 2020.
- ‘Hall Lane’ Desk-Based Coal Mining Risk Assessment, undertaken by LKC (Ref: LKC 20

1620-01 R0), dated August 2020.

- Landmark Envirocheck Reports;
- Coal Authority Data – Consultants Coal Mining Reports, Mine Entry Data Sheets, Consultants Mining Report and Abandoned Mine Plans;
- British Geological Survey Maps and Data; and,
- Site Reconnaissance undertaken by LKC on 17th June 2020 and 30th July 2020.

- 6.14. The information sources consider the development boundaries of each site as illustrated at **Appendix 1, 4 and 5**.
- 6.15. Mitigation measures proposed in this chapter have been informed by the Phase 1 Preliminary Risk Assessment and Desk Based Coal Mining Risk Assessments.
- 6.16. The baseline conditions and identified contamination at the site have been assessed using risk assessment in line with current UK government approach and industry good practice, in particular the report produced by the Environment Agency (EA), CLR11, Model Procedures for the Management of Contaminated Land. It should be noted that this document was withdrawn 8th October 2020 and replaced with Environment Agency Land Contamination Risk Management (LCRM) guidance; however, the existing Phase 1 Preliminary Risk Assessment reports conform to Tier 1 of the LCRM guidance. Reference to CLR11 is therefore maintained in the chapter.
- 6.17. The assessment was used to identify the potential risk from contamination within the soil and groundwater at the site under its current conditions and site use. The assessment progresses to identify the potential risks to the future development under the planning application and associated risks during the construction and operational phases, where mitigation is detailed later in this chapter. The assessment involves identifying potential source, receptor and pathways and the significance of any potential risks identified. This is carried out by determining the sensitivity of the receptor to the risk and the magnitude of the potential impact.

Geology and soil

- 6.18. Site geological conditions and characteristics were initially identified from a review of the desk based assessment, a review of previous site investigation and mining records and a site reconnaissance.
- 6.19. The main potential impacts on geology and soils are associated with loss or damage to soils, the contamination of soils as a result of industrial activity both on and off site, and aggregation of soils from redevelopment works (and associated ground stability concerns). Magnitude of the impact of the scheme on geology and soils is based on the criteria shown in Table 6.1.

Hydrogeology

- 6.20. Groundwater and surface water represents a potential receptor for any pollutant emanating from the development, either during construction or operation. Information regarding aquifer classification, groundwater sensitivity and potential sensitive receptors was identified during the desk based stages of investigation.
- 6.21. Aquifers that are a source of public water supply or that connect directly to surface water bodies are particularly sensitive to pollution incidents. The magnitude of potential impacts on the hydrological resources that may be affected by the development is based on the criteria shown below in Table 6.1.

Contaminated Land

- 6.22. A Contaminated Land Phase 1 Preliminary Risk Assessment has been carried out in accordance with the guidance contained within CLR11. The assessment uses a risk-based approach following the source-pathway-receptor methodology promoted by the Environment Agency, which considers the nature of potentially contaminated areas in the relation to the proximity of any sensitive receptors such as controlled waters or residential developments.
- 6.23. The potential impact is based on the criteria presented in Table 6.1. Where sites have been categorised as 'major' risk sites, recommendations have been presented for ground investigations or for remedial and/ or mitigation measures as part of the scheme development. Investigation work will be carried out at the detailed design stage (as a condition to outline planning permission).

Hazardous and Ground Gas

- 6.24. An assessment of potential hazardous and ground gas sources was carried out in the Phase 1 Preliminary Risk Assessment.
- 6.25. The potential impact is based on the criteria presented in **Table 6.1**. Where sites have been categorised as 'major' risk sites, recommendations have been presented for ground investigations or for remedial and/ or mitigation measures as part of the scheme development. Investigation work will be carried out at the detailed design stage (as a condition to outline planning permission).

Assessment of Potential Impacts

- 6.26. The EIA provides an initial assessment of the likely significant effects of the proposed development in relation to site preparations and construction activities, and operational activities.
- 6.27. The environmental effects have been predicted with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessment has been carried out based on available knowledge and professional judgement. Where uncertainties exist, this has been noted.

- 6.28. The potential significance of predicted impacts has been determined by reference to criteria for each topic. Broadly, the significance of the impact is determined with reference to the magnitude of the potential impact, the value of the receiving environment or receptor and the likelihood of the impact occurring and its duration. In order to provide a consistent approach to expressing the outcomes of each assessments, the following terminology has been used to assist in determining the degree of significance.
- 6.29. An Impact Assessment Matrix (IAM) has been used to provide guidance in setting the level of impact significance and whole process has been guided and moderated by professional judgement where appropriate.

Magnitude

- 6.30. Magnitude refers to the 'size' or 'amount' of an impact. It is a function of other aspects such as the 'extent' of an impact being the area over which the impact occurs, the duration i.e. the time for which the impact is expected to last prior to recovery or replacement of the resource or feature, the likelihood (i.e. the chance that the impact will occur) and reversibility. An irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. The level of 'Magnitude' is defined in **Table 6.1**.

Value

- 6.31. The value or sensitivity of a receptor is a function of a variety of factors e.g. biodiversity value, social/ community value and economic value. The value or potential value of a resource or feature can be determined within a defined geographical context. The level of value is defined in **Table 6.2**.

Significance

- 6.32. Using the value of the environmental receptor, together with the determined magnitude of the impact and consideration of factors such as the sensitivity of the receptor to change, the significance of an impact can be determined.
- 6.33. The classification of significance aids in the identification of the main environmental effects of the proposed development and what weight should be given to these effects. There is no statutory definition of what constitutes a significant effect and guidance is of a generic nature. However, it is widely recognised that 'significance' reflects the relationship between the magnitude of an impact and the value of the affected resource or receptor.
- 6.34. To assist in the assessment process, an impact matrix (**Table 6.3**) has been used in determining the level of impact significance.

Magnitude	General Impact	Geology & Soils	Contaminated Land	Hazardous & Ground Gas	Hydrology/ Hydrogeology	Mining Instability
Substantial	Total loss or major alternation to key elements/features of the baseline conditions such that post development character/com position of baseline conditions will be fundamentally changed.	An internationally or nationally designated site, such as an Site of Special Scientific Interest (SSSI) or a significant area of high quality or rare soil type that will be significantly damaged or destroyed by the proposed development.	An area where contaminated zones are present or likely. Impacts from contamination and disturbance will affect the surrounding built and natural environment during construction and operation. Extensive, long term mitigation measures required to avoid adverse impacts.	An area where ground gas zones are present or likely. Impacts from ground gases and disturbance will affect surrounding built environment during construction and operation. Extensive long term mitigation measures required to avoid adverse impacts.	Pollution, damage or destruction of an aquifer within a Source Protection Zone (SPZ), public water supply, Principle Aquifer or main river.	Catastrophic collapse of ground during demolition and construction. Destruction of buildings and infrastructure. Extensive remediation required to avoid major adverse impacts.

Magnitude	General Impact	Geology & Soils	Contaminated Land	Hazardous & Ground Gas	Hydrology/ Hydrogeology	Mining Instability
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.	A locally designated or proposed site of geological interest, an area of high quality soil type. Loss of good agricultural land that will be significantly damaged.	An area where contaminated zones are present or likely. Impacts that affect the surrounding natural environment will be prevalent during construction but are unlikely to affect the operation of the scheme. Moderate/ short term mitigation measures to be incorporated.	An area where ground gas zones are present or likely. Impacts that affect the surrounding built environment will be prevalent during construction but are unlikely to affect the operation of the scheme. Moderate/ short term mitigation measures to be incorporated.	Pollution or damage to Secondary (Class A) Aquifer providing local resource/ base flow to rivers.	N/A

Magnitude	General Impact	Geology & Soils	Contaminated Land	Hazardous & Ground Gas	Hydrology/ Hydrogeology	Mining Instability
Slight	Noticeable temporary/reversible, changes for less than 6 months, or barely discernible changes for any length of time, over a small area, to keep characteristics or features of an environmental parameter.	Slight damage to locally designated site of geological interest or damage to non-statutory protected soil or good agricultural land.	An area where contaminated zones are possible, but where it is considered very unlikely that contamination will affect the environment during construction or operation. No mitigation measures anticipated. Minor site investigation may be required.	An area where ground gas zones are possible, but where it is considered very unlikely that ground gas will affect the environment during construction or operation. No mitigation measures anticipated. Minor site investigation may be required.	Pollution or damage to a Secondary (Class B) aquifer or Secondary (Class A) Aquifer that is used for industrial or agricultural purposes.	Localised, low levels of subsidence which require minimal or minor mitigation measures.

Magnitude	General Impact	Geology & Soils	Contaminated Land	Hazardous & Ground Gas	Hydrology/ Hydrogeology	Mining Instability
Negligible	Very little change from baseline conditions. Change is barely distinguishable , approximating to a 'no change' situation.	Slight damage to other sites of geological interest (non-statutory), soils or poor agricultural land that is in the vicinity of the site but will not be affected by the development.	Potentially contaminated site in the study area that is sufficiently distant from the development that it will not affect, or be affected by, its construction or operation.	Potentially ground gas at the site in the study area that is sufficiently distant from the development that it will not affect, or be affected by, its construction or operation.	Minor pollution of Secondary (Class B) Aquifer and/or where there is no significant groundwater resources.	Demolition and Construction works outside coal mining development high risk areas.

Table 6.1: Assessment of Magnitude

Value	Description	Examples
High	Features possessing key characteristics which contribute significantly to the distinctiveness, rarity and character of the site. Features possessing very significant biodiversity, social/ community value and/ or economic value at the national level. Feature is extremely rare.	Significant residential/ industrial development. Strategic sites e.g. hospital. Surface water: fisheries. River Ecological Quality High. Designated sites protected under International or UK wildlife legislation. Groundwater: Principle Aquifer providing a regionally important resource, Public water supply abstractions, SPZ or supporting site protected under wildlife legislation.
Medium	Feature possessing key characteristics which contribute significantly to the distinctiveness and character of the site. Feature possessing significant biodiversity, social/ community value and/ or economic value at the regional level. Feature is uncommon.	Site of Special Scientific Interest (SSSIs). Regionally Important Geological Sites (RIGS). Significant transport links e.g railway, airport. Significant utilities. Species protected under EU or UK wildlife legislation. Surface water: River Ecological Quality Good. Groundwater: Secondary Aquifer providing a locally important resource or supporting river ecosystem. High quality agricultural land.
Low	Feature possessing characteristics that are locally significant. Feature not designated or only designated at regional/ local level. Feature possesses moderate biodiversity, social/ community value and/ or economic value at the local level.	Surface Water: River Ecological Quality Moderate. Groundwater: Secondary (Class A) Aquifer providing water for agricultural or industrial use.
Very Low	Feature characteristic do not make a significant contribution to the character or distinctiveness locally. Feature not designated. Feature possesses low biodiversity, social/ community value and/ or economic value. Feature is common.	Minor residential/ industrial development. Surface Waters: River Ecological Quality Poor. Secondary (Class B) Aquifer with limited connection to surface water. Low quality agricultural land.

Table 6.2: Assessment of Receptor Value

Magnitude	Value and Sensitivity of Receptor			
	Very Low	Low	Medium	High
Negligible	Negligible	Negligible	Minor	Minor
Slight	Negligible	Minor	Minor	Moderate
Moderate	Minor	Minor	Moderate	Major
Substantial	Minor	Moderate	Major	Major

Table 6.3: Impact Significance

6.35. The ratings derived through the assessment process and as set out in Table 6.3 can also generally be described in a generic manner as shown in Table 6.4. The descriptors for the various significance ratings given in Table 6.4 can be used as a framework for confirmation (or not) of the ratings and also provide a greater understanding of the nature, scale and type of determined impact.

Significance	Generic Significance Ratings
Major	Very large or large change in environmental or social-economic conditions. Effects, both adverse and beneficial, which are important considerations at a national to regional level because they contribute to achieving national/ regional objectives, or, likely to result in exceedance of statutory objectives and/ or breaches of legislation.
Moderate	Intermediate change in environmental or social-economic conditions. Effects that are likely to be important considerations at a district to local level because they contribute to achieving local objectives, or, may result in exceedances of local statutory objectives and/ or breaches of legislation.
Minor	Small change in environmental or socio-economic conditions. These effects may be raised as local issues but are unlikely to be of importance in the decision making process.
Negligible	No discernible change in environmental or socio-economic conditions. An effect that is likely to have a negligible or neutral influence, irrespective of other effects.

Table 6.4: Generic Significance Descriptors

6.36. Although Tables 6.1 to 6.3 generally consider adverse effects that have a negative influence on receptors and resources potential impacts from the development may also be beneficial and have a positive influence on receptors or provide opportunities for improvement. Consequently, final residual significance rating may include:

- Major, Moderate, Minor, Negligible Beneficial impacts; and
- Major, Moderate, Minor, Negligible Adverse Impacts.

6.37. The rating of the impact significance may provide a strong indication as to whether mitigation may be required and determines whether, following the use of mitigation measures, identified impacts may be avoided, reduced or offset. The scale of significance is presented in Table 6.4 and describes generic descriptors for each scale of significance.

6.38. Only moderate and major significance will be considered to be taken forward for mitigation.

Consultation

6.39. Bolton Council Pollution Control section, the Coal Authority and the Environment Agency have been consulted as part of the EIA process. All welcome the approach identified in the scoping document and refer to UK guidance and legislation as outlined in Section XX.

Baseline Conditions

6.40. A Phase 1 Preliminary Risk Assessment and a Desk-Based Coal Mining Risk Assessment has been undertaken by LKC for each of the Creams Mill and Hall Lane development sites. These documents accompany the planning submission.

Creams Mill

6.41. The site details for Creams Mill are presented in Table 12.5.

Location	Creams Mill, Mytham Road, Little Lever. Centred at approximate National Grid Reference 375700E 406530N.
Approximate Area	8.02Ha.
Topography	The north of the site is at 86 metres Above Ordnance Datum (AOD), the canal is around 75mAOD and south of the site is around 50mAOD. The north of the site is relatively flat with a slope down to the canal but then falls steeply down to the south once beyond the canal.
Current Land Use	Site Open grassland in the north of the site. A partially infilled section of canal runs east to west through the centre of the site. The south of the site is heavily vegetated with several areas of bare concrete. Surrounding Area North: Allotment gardens and residential properties. East: River Irwell. South: River Irwell. West: Boscow Nurseries, undeveloped land and infilled canal.

Table 6.5: Site Details, Creams Mill.

Historical Land Use

6.42. A review of historical maps obtained from Landmark Information Group and from web based sources has been undertaken. Historical features have included a paper mill (c. 1677), reservoirs, canal, landfilling, gasometer, mill race, tanks, substation and housing.

6.43. A more detailed review is provided in Table 6.6.

Site Features	Location	Map Dates Present	Comments
Building	E	1850 to 1895	Annotated Turkey Vale. No longer present by 1909 mapping.
Houses	NW	1850 to 1930	Annotated Meg Row on 1850 mapping. Annotated Bailey Row by 1895 mapping. No longer present by 1937 mapping.
Houses	NW	1850 to 1980	Annotated Canal Row by 1895 mapping. No longer present by 1937 mapping. Rebuilt by 1955 mapping. No longer present by 1989 mapping.
Paper Mill	S	1850 to 2013	Annotated Creams Paper Mill since 1850 mapping. Expanded east and west by 1965 mapping. No longer present by 2020 mapping.
Reservoirs	SE	1850 to 2013	Five reservoirs all adjacent. All but two infilled by 1980 mapping. One remaining by 1992 mapping. No longer present by 2020 mapping.
Canal	NW	1850 to Present	Annotated as Disused by 1955 mapping and marked as marsh land. The west of the canal is annotated Sludge Bed by 1989 mapping.
Bridge	W	1850 to Present	
Road	NW	1850 to Present	Road straightened by 1909 mapping.
Earthworks	W	1894 to Present	A depression that is not seen on the 1850 mapping. Potentially associated with the sandstone quarry to the west.
Possible pipeline	SW	1895 to 1930	Unlabelled feature running from the canal, across the path to a small building then down along a raised earth slope to the Paper Mill. Assumed to be a pipe for water. No longer present by 1937 mapping. Replaced with a footpath.
Building	W	1895 to 1930	Associated with possible pipeline. No longer present by 1937 mapping.
Gasometer	SW	1909 to 1910	No longer present by 1929 mapping.
Glass Houses	E	1909 to 1910	No longer present by 1929 mapping.
Pond	N	1909 to 1930	No longer present b 1937 mapping.

Table 6.5: Historical Use, Creams Mill.

- 6.44. Internet sources suggest the paper mill was founded in 1677 and ceased production in 2004 due to rising production costs. At that time the mill was producing 63,000 tonnes of paper per annum for the corrugated packaging industry.
- 6.45. On the 6th July 1936 a canal breach occurred to the west of the site. This is the area 50m west of the site where 1955 historical mapping illustrates the appearance of “issues” along with an incised area.

- 6.46. Internet sources note there had been previous problems in this location and the embankment has been rebuilt with railway lines as reinforcement. This breach was never repaired.
- 6.47. It was noted at the time that a previous landslide had happened in this area and that the area had suffered from subsidence due to the nearby Ladyshore Colliery.

Geology

- 6.48. The geology beneath the site is summarised in Table 12.7.

BGS Digital Geology 1:10,000, dated 2008	Artificial	<p>Infilled ground is mapped along the western stretch of the canal and in an area in the centre south of the site.</p> <p>Worked ground (void) is mapped along the eastern stretch of the canal.</p>
	Superficial	<p>Slip deposits are noted in the far west of the site and across the whole of the opposite bank of the river to the south of the site.</p> <p>Till (Diamicton) Devensian, is present across the north of the site.</p> <p>The majority of the site has no mapped superficial.</p> <p>Glaciofluvial Sheet Deposits (sand and gravel) Devensian, are present offsite to the southwest and as such may be present in the south of the site.</p>
	Bedrock	<p>Pennine Middle Coal Measures (Mudstone, Siltstone and Sandstone), Carboniferous.</p> <p>Strata strike west northwest to east southeast with dip between 10° and 20° southwest.</p> <p>Two coal seams are shown subcropping across the norther half of the site, one annotated Ince New Coal and a younger unlabelled seam to the south of the Ince.</p> <p>One fault is present running west northwest to east southeast through the south of the site, downthrow to the southwest.</p> <p>A fault is present adjacent to the north of the site running west northwest to east southeast, downthrow to the northeast.</p>
Further Information (sheet mapping, explanatory notes, abandoned mine plans, historical boreholes)		<p>Past underground mining: Yes (Roger Seam, 55m depth, Rams 93m depth, Lower Florida 158m depth).</p> <p>Probable unrecorded shallow mining: Yes.</p> <p>Spine roadways at shallow depth: Yes. Within site.</p> <p>Mine entries: Yes. Six shafts, one adit onsite.</p> <p>Outcrops: Yes (Ince New and Park Yard onsite. Bulldog 10.6m north, dipping towards the site).</p> <p>Faults, fissures, breaklines: Fault present in the south of the site.</p> <p>Opencast mines: No.</p> <p>Coal Authority managed tips: No.</p>
		<p>Development High Risk Area across the northeast half of the site.</p> <p>Identified across the northeast half of the site as 'Probable Shallow Coal Mine Workings' and 'Coal Outcrop'.</p> <p>6no. shafts and 1no. adit on site.</p>
		<p>Two surface extractions within 250m.</p> <p>55m NE. Meg Row Gravel Pit. Opencast extraction of Sand and Gravel. Status Ceased.</p> <p>199m W. Nob End. Opencast extraction of Nob End Rock Sandstone. Status Ceased.</p>

Table 6.7: Site Geology, Creams Mill.

Hydrogeology

- 6.49. The Environment Agency Groundwater Designation Maps classify the underlying bedrock geology as a Secondary A Aquifer and the superficial bedrock as Secondary Undifferentiated.
- 6.50. The site does not lie within a Groundwater Protection Zone (SPZ). The nearest groundwater abstraction point is on site relating to the former paper mill.

Hydrology

- 6.51. The nearest surface water feature is the River Irwell, adjacent south. The nearest surface water abstraction is numerous on-site entries relating to the former paper mill.

Contamination Pollutant Linkages

- 6.52. A preliminary conceptual model was produced following the review of historical and environmental baseline information and following a site reconnaissance. This is summarised in Table 6.8 and taken from the Preliminary Risk Assessment. This follows the CIRIA C552 risk matrix guidelines based on probabilities and consequences for each pollutant linkage.

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to future site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	Moderate (ACM, Heavy metals, PAHs)	Whole site - Intrusive investigation required to include soil sampling.
		Moderate (Heavy end hydrocarbons)	South of the site - Intrusive investigation required (TPHCWG testing) if evidence of hydrocarbons identified in the ground.
		Moderate (Other inorganic and organic contaminants, Dioxins and Furans)	Limited testing in the south of the site and within the historic sludge bed where these contaminants are most likely present.
		Moderate / Low (Biocides, Pesticides, Herbicides, Insecticides)	Limited testing in the south of the site and close to the western boundary where these contaminants are most likely present.
2	Volatile contaminants posing a risk to future site users via the inhalation of vapours.	Moderate	Testing required if evidence of volatile contaminants identified in the ground.
3	Gas posing a risk to buildings and future site users via the migration of gas into building causing explosion and asphyxiation.	High	Either gas monitoring or precautionary measures required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Moderate / Low	North of the site - No testing required unless evidence of significant potentially mobile contamination is identified in the soil.
		Moderate	South of the site - Testing recommended in areas of significant fill and in the vicinity of storage tanks.

5	Sulphate posing a risk to building via direct contact (sulphate attack).	Moderate / Low	Intrusive investigation required as part of PL1.
6	Organic contaminants posing a risk to water pipes.	Moderate	Sampling required if made ground present at pipeline installation depths.
7	Phytotoxic metals posing a risk to flora via root uptake.	Very Low	Investigation work as part of PL1.

Table 6.8: Summary Preliminary Contamination Conceptual Model, Creams Mill.

Mining / Ground Instability

6.53. Table 6.9 below summarises the potential risks associated with coal mining legacy for Creams Mill development site:

Coal Mining Issue	Potential Risk	Risk Assessment
Underground coal mining (recorded at shallow depths)	X	No recorded shallow underground workings below the site. Shallowest recorded mine is the Roger Mine at 55m deep.
Underground coal mining (probable at shallow depths)	✓	<p>Probable underground shallow workings recorded by the Coal Authority. Based on information provided by the Coal Authority and geological mapping, the following coal seams are anticipated to be present at shallow depth below the site (>50m below rockhead):</p> <ul style="list-style-type: none"> -Brassey (Roger) -Ashton Great Coal -Bulldog -Ince New -Park Yard (Ashclough) -Park (Pottery) -New Jet Amber <p>Further coal seams may also be present. Investigation work recommended and a watching brief during groundworks.</p>
Mine entries (shafts / adits)	✓	<p>Six. mine shafts and one adit are recorded on site:</p> <ul style="list-style-type: none"> -375406-029 Adit – No treatment details. -375406-030 Shaft – No treatment details. -375406-031 Shaft – No treatment details. -375406-032 Shaft – No treatment details. -375406-033 Shaft – No treatment details. -375406-034 Shaft – search by excavation carried out by NKC Geotech Ltd April/May 2017 did not reveal this shaft. -375406-035 Shaft – search by excavation carried out by NKC Geotech Ltd April/May 2017 did not reveal this shaft. <p>Investigation work required to confirm the location, depth, past treatment and likely remedial measures of the onsite shaft. Further consideration is also required with respect to the offsite mine entries.</p>
Coal mining geology (geological faults,	✓	Fault present onsite in the south and adjacent to the north of the site.

fissures and breaklines)		
Record of past mine gas emissions	?	Not recorded on Coal Authority data. However, shallow potentially worked coal seams may be present below the site, which have the potential to be a source of ground gas. In addition, the Lower Florida seam (expected at 158m depth below the site) has the potential to spontaneously combust when being entered, worked or disturbed. Investigation work recommended. This should include monitoring during any intrusive mining investigation. In addition, either precautionary gas protection measures of gas monitoring in line with CIRIA 655 may be required depending on the outcome of the mining investigation.
Recorded coal mining surface hazard	X	No recorded coal mining surface hazard.
Surface mining (opencast workings)	X	No recorded surface mining (opencast workings).

Table 6.9: Potential Coal Mining Risks, Creams Mill.

Notes:

✓ = Risk identified; X = No risk identified; ? = Possible risk identified

Hall Lane

6.54. The site details for Creams Mill are presented in Table 6.10.

Location	South of Hall Lane, Little Lever, Bolton, BL3 1BW. Centred at approximate National Grid Reference 374600E, 407110W.
Approximate Area	2.01Ha
Topography	80 metres Above Ordnance Datum (AOD). The site slopes gently down to the southwest.
Current Land Use	<u>Site</u> Rough grassland bounded to the south by an abandoned branch of the Manchester, Bolton and Bury Canal. <u>Surrounding Area</u> North: Hall Lane with a school beyond that. East: Residential Properties. South: Disused canal and former basin and undeveloped land. West: Undeveloped land.

Table 6.10: Site Details, Hall Lane.

Historical Land Use

6.55. A review of historical maps obtained from Landmark Information Group and from web based sources has been undertaken. Historical features have included a coal shaft a former pond and a likely off loading point from the adjacent canal.

6.56. A more detailed review is provided in Table 6.11.

Site Features	Location	Map Dates Present	Comments
Coal Shaft	Centre of site	1850 to 1911	Annotated Coal Pit on 1850 mapping. Annotated Ventilation Shaft on 1893 mapping.

			No longer present on 1929 mapping.
Pond	NE	1850 to 1975	No longer present by 1979 mapping.

Table 6.11: Site History, Hall Lane.

Geology

6.57. The geology beneath the site is summarised in Table 6.12.

BGS Digital Geology 1:10,000, dated 2008	Artificial	Worked ground is recorded along the route of the canal adjacent to the south of the site. A large area of made ground is mapped adjacent to the northeast of the site.
	Superficial	Till (Diamicton) Devensian, across the majority of the site. Glaciolacustrine Deltaic Deposits (Sands and Gravel) Devensian, in the north of the site.
	Bedrock	Pennine Middle Coal Measures Formation (Mudstone, Siltstone and Sandstone), Carboniferous. A Coal Seam (potentially the Brassey/Roger Coal) runs through the north of the site striking northwest to southeast. A Coal Seam (potentially the Ashton Great Coal) runs through the centre of the site striking northwest to southeast. Strata dipping between 10° and 26° to the southeast
Further Information (sheet mapping, explanatory notes, abandoned mine plans, historical boreholes)		Past underground mining: Yes, 20 seams noted to a maximum depth of 370m (Crombouke 30m depth, Rams 69m depth, Higher Florida 87m depth). Probable unrecorded shallow mining: Yes. Spine roadways at shallow depth: No. Mine entries: Yes. Two onsite (374407-019, 374407-020). One within 20m of the site, mapped in the canal (374407-021). Outcrops: Yes (Crombouke, Ince Deep Yard). Faults, fissures, breaklines: No. Opencast mines: No. Coal Authority managed tips: No.
		Identified across the whole site as 'Probable Shallow Coal Mine Workings' associated with the coal outcrops. 2no. shafts on site.

Table 6.12: Site Geology, Hall Lane.

Hydrogeology

6.58. The Environment Agency Groundwater Designation Maps classify the underlying bedrock geology as a Secondary A Aquifer and the superficial bedrock as Secondary Undifferentiated with a Secondary A Aquifer in the north of the site .

6.59. The site does not lie within a Groundwater Protection Zone (SPZ). The nearest groundwater abstraction point is greater than 1km from the site.

Hydrology

6.60. The nearest surface water feature is the Manchester, Bury and Bolton Canal, adjacent south west. The nearest surface water abstraction is greater than 1km from the site.

Contamination Pollutant Linkages

6.61. A preliminary conceptual model was produced following the review of historical and environmental baseline information and following a site reconnaissance. This is summarised in Table 6.13 and taken from the Preliminary Risk Assessment. This follows the CIRIA C552 risk matrix guidelines based on probabilities and consequences for each pollutant linkage.

Pollutant Linkage		Risk	Recommendations
1	Contaminants posing a risk to future site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	Moderate (ACMs, heavy metals, PAHs,	Intrusive investigation required to include soil samples.
2	Volatile contaminants posing a risk to future site users via the inhalation of vapours.	Moderate	Testing required if significant quantity of tipped material / made ground encountered.
3	Gas posing a risk to buildings and future site users via the migration of gas into building causing explosion and asphyxiation.	High	Either gas monitoring or precautionary measures required.
4	Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Moderate / Low	No testing required unless evidence of significant potentially mobile contamination is identified in the soil.
5	Sulphate posing a risk to building via direct contact (sulphate attack).	Moderate / Low	Intrusive investigation required as part of PL1.
6	Organic contaminants posing a risk to water pipes.	Moderate	Sampling required if made ground present at pipeline installation depths.
7	Phytotoxic metals posing a risk to flora via root uptake.	Very Low	Investigation work as part of PL1.

Table 6.13: Summary Preliminary Contamination Conceptual Model, Creams Mill.

Mining / Ground Instability

6.62. Table 6.14 below summarises the potential risks associated with coal mining legacy for the Hall Lane development site:

Coal Mining Issue	Potential Risk	Risk Assessment
Underground coal mining (recorded at shallow depths)	✓	Known underground shallow workings recorded by the Coal Authority. Workings within the Crombouke Seam at 30mbgl and the Rams Seam at 69mbgl Investigation work required to confirm the instability risk and likely remedial measures.
Underground coal mining (probable at shallow depths)	✓	Probable underground shallow workings recorded by the Coal Authority. Based on information provided by the Coal Authority and geological mapping, the following coal seams are anticipated to be present at shallow depth below the site (>50m below rockhead): -Ince Yard -Crombouke (Colonel) -Ashton Great -Brassey (Roger) -Top Furnace Further coal seams may also be present. Investigation work recommended and a watching brief during groundworks.
Mine entries (shafts / adits)	✓	Two mine shafts recorded on site – Shaft references 374407-019 and 374407-020 are within the site boundary. 374407-019 – Has been filled at some point in the past. There are no details of the fill material or the date of filling. 374407-020 – There are no details of any treatment undertaken. One mine shaft recorded within 20m of the site (offsite) - Shaft referenced 374407-021 is located in the canal within 20m of the site boundary (offsite). 374407-021 – There are no details of any treatment undertaken. Investigation work required to confirm the location, depth, past treatment and likely remedial measures of the onsite shaft. Further consideration is also required with respect to the offsite mine entries.
Coal mining geology (geological faults, fissures and breaklines)	X	Not recorded on Coal Authority data.
Record of past mine gas emissions	?	Not recorded on Coal Authority data. However, shallow potentially worked coal seams may be present below the site, which have the potential to be a source of ground gas. In addition, the Higher Florida seam (expected at 87m below the site) has the potential to spontaneously combust when being entered, worked or disturbed. Investigation work recommended. This should include monitoring during any intrusive mining investigation. In addition, either precautionary gas protection measures or gas monitoring in line with CIRIA 655 may be required depending on the outcome of the mining investigation.
Recorded coal mining surface hazard	X	No recorded coal mining surface hazard.
Surface mining (opencast workings)	X	No recorded surface mining (opencast workings).

Table 6.14: Potential Coal Mining Risks, Creams Mill.

Notes:

✓ = Risk identified; X = No risk identified; ? = Possible risk identified

Mineral Safeguarding (Creams Mill and Hall Lane Development Sites)

- 6.63. The Creams Mill and Hall Lane development sites are indicated as being within a Mineral Safeguarding Area for coal and brick clay. In addition the northern part of Hall Lane is in a Mineral Safeguarding Area for sand and gravel.
- 6.64. The Department for Communities and Local Government states that “...mineral operators should look to agree a programme of work with the mineral planning authority which takes account, as far as in practicable, the potential impacts on the local community and local environment (including wildlife), the proximity to occupied properties, and legitimate operational considerations over the expected duration of operations...”.
- 6.65. The superficial soils (where present) are variable in depth. In addition, the site has been subject to coal extraction at shallow depth. Coal Authority information and abandoned mine plans indicates probable workings in a number of coal seams at less than 50m depth.
- 6.66. Abandoned mine plans relating to the workings below the site indicate extensive workings in the 19th century. Therefore, it would appear that much of the economic and workable coal at shallow and deep levels has previously been exploited and uncertainties exist over the extent of any remaining coal. An unknown quantity of brick clay (i.e. Pennine Coal Measures mudstone) is still expected to be present below the site; however, the quantity and quality of the mudstone is not known therefore the viability for extraction cannot be confirmed at this stage. Unrecorded extraction of shallow brick clay may also have been undertaken, given the extensive mining work undertaken in the area.
- 6.67. In order to extract any remaining coal and brick clay in advance of any site development works, it would be necessary to remove the made ground and superficial soil and temporarily stockpile this on the site for the duration of the mineral extraction phase, which has the potential to cause nuisance from visual intrusion, dust generation and sound nuisance. The made ground may also pose a contamination risk. In addition, given the topography of the site and the presence of a number of substantial retaining structures the extraction itself may significantly destabilise the slope stability of the site.
- 6.68. Following the completion of any mineral extraction, engineered fill would need to be brought onto the site to supplement the superficial soils to ensure that the ground conditions would support the future construction of residential properties.
- 6.69. When this is considered alongside the thickness of the made ground and superficial deposits across the site, the uncertainties associated with the amount and viability of remaining coal and brick clay mineral deposits that are available for extraction, the requirement to replace any excavated rock or soil with engineered layers, the likely de-stabilising of slope stability on the site and the expected absence of any shallow coal which can be extracted during the

development it can be concluded that it would not be economically viable for the applicant to extract the mineral resource.

- 6.70. British Geological Survey Guide To Mineral Safeguarding provides an example of buffer zones being introduced within the Mineral Safeguarding Area to ensure the minerals at the periphery are not sterilised due to nearby development sites (e.g. nearby development may prevent future extraction of the mineral). Buffer zones of 50m for brick clay (uses small excavators), 250m for soft rock (required no blasting) and 500m for hard rock (requires blasting) were determined. Therefore, it is considered reasonable to use these buffers to assess to risk to existing developed land. Depending on the extraction methods required, either a 50m or 250m buffer would be anticipated around potential extraction of coal and brick clay. Given the surrounding development (residential to the north), this would significantly limit the extraction area.
- 6.71. In addition, the valley slope adjacent to the Creams Mill site across the River Irwell is recorded by the BGS as a landslip and the canal breach west of the development site currently comprises an unstable breached canal retaining wall and footpath. Blasting may destabilise these features.
- 6.72. It should be noted the Hall Lane site will require some element of earthworks to create the required development platform. Generally the site will seek to provide a “zero” earthworks balance. Therefore it is anticipated that shallow sand and gravel deposits will be used with in the development for road and construction layer sub base and reduce the requirement to import such aggregates from elsewhere.
- 6.73. As detailed in Policy 2, consideration should also be given to environmental impacts. Further details are provided below:
- 6.74. Landscape and Visual Intrusion – The application site is adjacent to a number of residential receptors which are likely to be significantly affected during the minerals works. Furthermore, the site is crossed by Public Rights of Way which would require either diversion or closure during the full period when any mineral works are being undertaken.
- 6.75. Ecology - The application site forms a wildlife corridor as set out by Policy EN 9, and as such, the proposed development has sought to preserve key vegetation routes and green corridors within the Illustrative Masterplan. These measures will serve as key functions to provide commutable habitat for species using the site in an east-west and north-south direction. If the site were to be subject to minerals development it is highly likely that these operations would result in the irreparable degradation of the majority of the habitats on site which are unlikely to be restored to their existing value.
- 6.76. Traffic and Access – Construction traffic for a residential development is significantly different to minerals extraction and operations traffic. It is not considered the existing highways

network would be suitable to accommodate a significant number of additional HGVs to export the mineral reserve. The proposed residential development will minimise the number of HGVs each day and encourage site workers to travel to site via sustainable means such as walking, cycling or public transport.

- 6.77. Amenity & Air Quality – The Institute of Air Quality Management ‘Guidance on the Assessment of Mineral Dust Impacts for Planning’ (May 2016) states that “it is commonly accepted that the greatest impacts will be within 100 metres of a source and this can include both large (>30 µm) and small dust particles”. Based on the significant number of adjacent residential receptors and proximity to other sensitive uses including a primary school, it is not considered that the prior extraction of minerals would be feasible given the significant of any potential effects on amenity for nearby receptors.
- 6.78. Therefore, it has can be demonstrated that the extraction of minerals on site would have a detrimental effect to a number of criteria outlined in Policy 2. Exceptions 2 and 3 of Policy 8 of the Minerals Plan can be satisfied. Given the site’s constraints and inability to contribute towards the overall provision of minerals then Policy P4 of Bolton Council’s Core Strategy can only carry very limited weight in this instance.
- 6.79. For these reasons LKC consider that Exceptions 2 and 3 as outlined in Policy 8 of the Minerals Plan are appropriate.

Assessment of Effects

- 6.80. This section provides details of the potential impacts of the proposed development, based on an assessment of the activities that will occur during the construction and the operation of the proposed development.

Demolition and Construction

- 6.81. An intrusive investigation with a subsequent contamination, geotechnical and mining risk assessment will be undertaken to inform the detailed design. Once all intrusive investigation work and risk assessments have been carried out, a Remediation Strategy will be produced detailing and appraising remedial options to ensure the site is suitable for its proposed end use.
- 6.82. Key activities which have the potential to impact ground conditions relate to the clearance, and preparation of the site prior to the construction of infrastructure and buildings. These include:

- Land clearance and fencing.
- Stripping of topsoil and subsoil and transfer to stockpile.
- Removal of any in ground structures.
- Construction of roads and drainage.
- Preparation of development platforms and placement of capping layers.
- Stabilisation of mine workings and possible mineshafts.

Geology and Soil

- 6.83. While it can be considered the majority of the soils across the site have already been impacted as a result of its long industrial history, it is considered that the impacts on geology and soil during the construction phase of the development will be minimal as the value of these are low.
- 6.84. It is thought that damage to the soil quality will occur during the topsoil stripping, movement and stockpiling. Infiltration of rainwater during stockpiling may enable constituents of the soil to leach from the matrix. The degradation of the soil quality from demolition and construction works is considered to be Minor Adverse.
- 6.85. Poor material management during the demolition and construction phase will result in cross contamination of soil and material, reducing the quality and reuse potential. The potential for cross contamination and poor management of material is considered to be **Moderate Adverse**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Soil stripping and material movement	Reduction in soil quality due to excavation and infiltration of rainwater potentially allowing nutrients to leach from the soil. Soil is considered low value.	Direct, non-permanent impact (negative)	Minor Adverse
Material management and movement	Cross contamination resulting in a reduction of quality of material due to poor material management.	Direct, short-term, mainly permanent impact (negative)	Moderate Adverse

Table 6.15: Demolition and Construction Potential Impacts and Significance for Geology and Soil.

Hydrology and Hydrogeology

- 6.86. The potential contamination identified within the soil and groundwater across the site could have a long-term ongoing negative impact on the quality of the groundwater and underlying aquifer. Without mitigation, the main impacts on hydrology and hydrogeology from the development would be as follows:
- 6.87. If left untreated, the contamination from the groundwater at the site could potentially enter the River Irwell and the Canal. Excavation of the unsaturated and saturated subsoils could potentially release contamination into the groundwater. This activity would result in a moderate magnitude of change resulting in a direct long-term Moderate Adverse significance of impact.
- 6.88. Dewatering and disruption to groundwater during demolition and construction would locally reduce the groundwater elevation which could potentially create instability within the ground. This would be a temporary low to moderate magnitude impact, which would rectify once the dewatering was stopped and groundwater levels return to resting elevations. Dewatering groundwater and the removal of deep structures could potentially alter the flow dynamics and regime of the groundwater which would allow contamination to migrate off site, affecting offsite receptors such as the buildings south of the site. The value of the offsite receptors are classed as medium to high due to the potential adverse effects on health and the magnitude of change would be moderate. Dewatering and affecting the flow regime is considered to be a Major Adverse impact.
- 6.89. Altering the flow regime of the ground could also encourage contamination to migrate onto the site, or around the site between areas with differing historical usage and potential contamination source such as the former Gas Holder and paper mill production areas. This is considered to be a Major Adverse impact.
- 6.90. Dewatering could smear potential free phase Light Non-Aqueous Phase Liquid (LNAPL) contamination within the ground, spreading and increasing the impacted area. Increased remediation would be required as part of the site development with the increased impacted area. The smearing of contamination would be a local impact to a low value soil so the impact is considered to be Moderate Adverse.
- 6.91. The 'Cut and Fill' of material across the development, especially the change in matrix such as replacing excavated soils with a more granular/ permeable material will change the groundwater flow regime. Additionally, the compaction of backfilled material would reduce permeability and any potential pathways for groundwater flow across the site. The geotechnical requirements for the backfill material following detailed design would ensure that the material is suitable for the development. The change in ground quality following backfill could be seen as positive or a negative impact on the site as the ground conditions will be improved locally with compliant backfilled material. Alternatively, the local groundwater flow regime will be changed which may have a negative affect down flow. The groundwater is

considered low value and does not appear to recharge any major aquifers. The impact is considered to be Negligible.

- 6.92. There is the risk of harm to human health from the exposure and contact of contaminated groundwater to the construction workers. The exposure could be from direct contact and absorption into the skin or inhalation of vapours or ingestion. The impact would be direct, long and short term and considered to be Moderate Adverse.
- 6.93. There would be a negative impact on groundwater from the potential release of oil, fuels or chemical stored during the construction phase. This would be a direct local impact of slight magnitude, and as the groundwater receptor is considered to be poor quality of low value, the significance of the impact is considered to be Minor Adverse.
- 6.94. Stockpiling of contaminated soils close to on-site drainage and The River Irwell and the Canal has the potential to directly contaminate through over ground runoff following rain. This is considered to be of low to medium value, and the magnitude moderate of receiving contaminated material, the significance is judged Moderate Adverse.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Excavation and Stockpiling	Contamination present within the unsaturated and saturated soils would be mobilise through excavation, migrating into the groundwater. The impacted groundwater over time could impact the underlying Aquifer and the River Irwell and the Canal.	Direct, Long term, moderate magnitude negative impact	Moderate Adverse
Dewatering	Dewatering could make sub-surface soils become unstable, which could affect future structures.	Direct, local and temporary negative impact of moderate magnitude	Major Adverse
	Dewatering will reduce groundwater elevation and alter groundwater flow dynamics. Changes to groundwater flow could allow contamination to	Direct, local temporary negative impact of moderate magnitude	Major Adverse

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
	migrate offsite affecting receptors.		
	Dewatering could smear free phase LNAPL contamination through the ground increasing the impacted area.	Direct, local negative impact of moderate magnitude	Moderate Adverse
Cut/ fill of material	Cut/ fill of material at the site to remove below ground structures or to build up the development platforms would result in backfill material which is more permeable than currently present which could change the flow regime of the groundwater. The material used for backfill is likely to be of improved quality to the current situation and geotechnically compliant to fulfil the requirements of the development.	Low value ground of positive and negative impact of slight magnitude	Negligible
Direct contact with contaminated groundwater	Harm to the health of the construction workers with direct contact with contaminated groundwater. Direct contact through absorption through the skin, ingestion and inhalation of vapours.	Direct, short term negative impact of moderate magnitude	Moderate Adverse
Storage of oils and fuels during the construction works	Potential release of oils or fuels into the groundwater would increase the contamination and potential impact on the	Direct, short term negative impact on low value groundwater with slight magnitude	Minor Adverse

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
	sensitive receptor, River Irwell and the Canal..		
Stockpiling contaminated material	Stockpiled contaminated material has the potential to create leachate and contaminated runoff which could enter the site drainage and enter River Irwell and the Canal. There is the potential for offsite migration.	Direct, long term on water course (negative)	Moderate Adverse

Table 6.16: Demolition and Construction Potential Impacts and Significance for Hydrology and Hydrogeology

Contaminated Land

- 6.95. It is expected that the Council, following review of the application will impose planning conditions relating to the development parameters, of which there will be a requirement for a Remediation Strategy to be produced and implemented.
- 6.96. The potential contamination expected within the soil and groundwater across the site will have a long-term ongoing negative impact on the quality of the soil and groundwater and thus, identified receptors.
- 6.97. Without further mitigation, the main impacts on contaminated land from the development would be as follows:
- 6.98. There are a number of identified sources and potential pathways whereby remediation and construction workers could be exposed to chemical contamination above generic assessment criteria and asbestos containing materials. Such pathways include direct contact with contaminated soils, inhalation of fugitive dust and fibres, inhalation of soil vapours, inhalation of groundwater vapours and ingestion of soil. The wellbeing of the construction workers is considered high value where the magnitude of change is considered moderate. This would result in a direct short term exposure timescale, resulting in an impact considered to be of **Major Adverse** significance.
- 6.99. Asbestos containing materials may be present on site, which would pose a risk to the health of the construction workers and also off-site receptors such as the residents to the south of the site. The exposure is judged to be short term permanent of moderate magnitude and is considered to be of **Major Adverse** significance.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Materials Management	Exposure of contaminated soils to construction workers during excavation and material movement and processing. Exposure through direct contact and absorption into the skin, inhalation of contaminated dust and fibres and ingestion of contaminated dust.	Direct short permanent negative impact	Major Adverse
	Exposure of contaminated dust and vapours to offsite receptors.	Direct, local, short term (negative)	Major Adverse
	Release of airborne asbestos fibres with risk to the health of the construction workers, offsite receptors.	Direct, local, short and long term permanent impact (negative)	Major Adverse

Table 6.17: Demolition and Construction Potential Impacts and Significance for Contaminated Land

Hazardous and Ground Gases

- 6.100. There are a number of areas where a potential risk from hazardous and ground gas has been identified. The presence of hazardous and ground gases can cause harm in two ways to the construction workers.
- 6.101. Firstly, a low oxygen atmosphere can develop within depressions due to the build-up of typically carbon dioxide and carbon monoxide, causing asphyxiation and potential death to human health of the construction workers, considered a high value receptor. The magnitude of change would be moderate resulting in a **Major Adverse** significance.
- 6.102. Secondly, gases can build up to create explosive and flammable atmospheres, typically due to methane, with the potential for loss of life of the construction workers, which is considered a high value receptor. The magnitude of the change is moderate and considered a **Major Adverse** significance of effect that is direct and permanent.
- 6.103. Excavation of contaminated ground and exposure of groundwater could release contaminated vapours, particularly volatile solvents, which will cause harmful effects to the construction

workers health from exposure. This significance is considered to be Major **Adverse** depending on the exposure time and concentration which is of **moderate magnitude**.

6.104. Excavation and backfilling of soils can change the soil gas regime within the subsurface, potentially pushing vapours and ground gases off site which would expose offsite receptors. The receptors would include the residential houses to the south of the site. The exposure to the vapours and ground gases would be harmful to health to a high value receptor and moderate magnitude of change. The local short term impact is considered to be **Major Adverse**.

6.105. Excavation and backfilling of material on site can change the soil gas regime, potentially allowing vapours and gases to migrate onto the site which would have a harmful effect to health for the construction site workers. The local short-term impact is considered to be **Major Adverse**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Excavation	Release of gases (typically carbon dioxide and methane) would directly affect the construction worker health. Firstly, an explosive atmosphere could develop from a build up of methane, resulting in loss of life. Secondly, a low oxygen atmosphere could be produced typically from carbon dioxide or carbon monoxide causing asphyxiation and harm to health with potential death.	Direct, permanent negative impact on high value receptor with moderate magnitude	Major Adverse
	Release of contaminated volatile vapours could cause harm to health of the construction	Direct, negative impact on high value receptor with moderate magnitude	Major Adverse

	workers when exposed to the vapours.		
	Migration of vapours and ground gases offsite during demolition and construction works which will affect the health off offsite receptors exposed to these vapours, such as the houses to the south of the site.	Short-term negative impact on high value receptor of moderate magnitude	Major Adverse

Table 6.18: Demolition and Construction Potential Impacts and Significance for Ground Gas

Mining Instability

6.106. Surface coal workings and underground coal workings have occurred on site and there are a number of mine entries which may affect the sites. Geological faulting on Creams Mill could also be affected by mining.

6.107. Collapse and subsidence around mine entries and in areas of faulting, surface coal and underground coal workings could pose a risk to construction workers and lead to loss of life. This is considered a short term impact with a substantial magnitude and is considered a **Major Adverse impact**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Excavation and construction of foundations and infrastructure	Catastrophic collapse of ground around mineshafts, geological faulting, backfilled surface workings and above shallow underground workings.	Direct, permanent negative impact on high value receptor with substantial magnitude	Major Adverse

Table 6.19: Demolition and Construction Potential Impacts and Significance for Mining Instability

Completed Development

6.108. This section provides details of the potential impacts of the proposed development, based on an assessment of the activities that will occur during the operational phase of the proposed development. Embedded mitigation has been included and taken into consideration when determining the potential impacts, although any further mitigation measures have not been considered at this stage.

6.109. The operational phase will be the completion of the proposed development, i.e. with the built development in place along with infrastructure and landscaping.

Geology and Soil

6.110. The changes to the soil and geology occurring through the construction phase will remain throughout the operational phase of the project and therefore any impacts will be long term.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Operational Phase	None, there will be no additional impact	None	None

Table 6.20 Completed Development Potential Impacts and Significance for Soil and Geology

Hydrology and Hydrogeology

6.111. In the absence of construction phase mitigation, the groundwater could still be contaminated and pose a potential risk to Controlled Water Receptors, which is a long-term permanent impact for the completed development and considered a **Major Adverse** significance.

6.112. The groundwater flow will only be affected by the newly installed piles required for the new building and structures to be built as part of the development. The building piles impact will be a permanent, direct, long-term impact considered **Moderate Adverse**.

6.113. There is the potential for the future development to store and accidentally release oils and fuels into the groundwater. This is considered a local, direct impact of slight magnitude as the volume will be low and is considered a Minor Adverse significance for the completed development.

6.114. The changes of infiltration of rain water from the original site to the completed proposed development is considered to be negligible. An increase in impermeable area will result from the development; however, this will be managed in the surface water strategy for the site, so the significance is considered **Negligible**.

6.115. Direct contact of the residents and users of the future completed development with contaminated groundwater will be unlikely due to the proposed hardstanding and garden capping layers. It is not considered likely that the home owners will excavate to come into

contact with the groundwater. The significance for the completed development is considered as **Negligible**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Operational Phase	Groundwater contamination below the site could migrate into the controlled water receptors.	Long-term, permanent impact (negative)	Major Adverse
	Groundwater flow will be affected by the building piles only.	Direct, permanent, long-term (negative)	Moderate Adverse
	Site activities with the storage of oils and fuels could potentially release into the ground and groundwater which would further contaminate the ground and pose a greater risk to human health and Controlled Waters.	Direct, local impact (negative)	Minor Adverse
	The changes of infiltration of rain water from the original site to the completed proposed development is considered to be negligible.	Local direct impact	Negligible
	Future residents contact with groundwater is unlikely due to the depth of the capping layer.	Local direct impact	Negligible

Table 6.21: Completed Development Potential Impacts and Significance for Hydrology and Hydrogeology

Contaminated Land

6.116. Without mitigation in place, contaminated soil could still allow vapours from the contaminated soils up through the soil matrix and into the completed development buildings creating a potential risk to human health. This is considered **Major Adverse**.

6.117. Without mitigation in place, the source of contamination within the soil would still leach into controlled waters and would be a long term Moderate Adverse significance for the completed development.

6.118. Contamination within the soil could damage new concrete structures installed as part of the completed development such as building piles. The damage would create a weakness with potential failure of the buildings resulting in a loss of life and/ or damage to the structure. This is considered **Major Adverse** significance.

6.119. The completion of service corridors for the completed development would create preferential pathways for contamination within the soil to migrate around the site or offsite. The contamination in the soil would also seep into the service pipes, most likely potable water supply, contaminating the supply and potentially causing harm to human health. Due to the long term direct health effects, this is considered **Major Adverse**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Operational Phase	Soil capping in gardens removes the potential impact of direct contact with contaminated soils for the completed development. This also includes the exposure to airborne asbestos fibres.	Long term direct (neutral)	Negligible
	Contamination in soil below the land raise would still allow vapours migrate up through the soil matrix and into the development buildings, with a risk to human health.	Short and long term direct impact (negative)	Major Adverse
	Contamination in the soil would continue to leach into the groundwater which in controlled waters.	Long term direct impact (negative)	Moderate Adverse
	The contaminated soils could damage new piles, particularly concrete, which could failure, resulting in loss of life and / or damage to structure.	Local long term impact (negative)	Major Adverse
	Contamination within the ground can migrate into the pipes used for potable water supply, contaminating the supply which would lead to harm to health of the site users using the water supply.	Long term, direct permanent (negative)	Major Adverse

Table 6.22 Completed Development Potential Impacts and Significance for Contaminated Land

Hazardous and Ground Gas

6.120. Gas may enter buildings which could impact on future site users where there would be harm to human health. This would be a long term permanent impact and considered **Major Adverse**.

6.121. Gas which may enter buildings may build up to explosive concentrations where there would be harm to human health and the building structures. This would be a long term permanent impact and considered **Major Adverse**.

6.122. The creation of service corridors for the completed development would allow for potential pathways for ground gas and vapour migration across the site.

6.123. There would be the potential impact of exposure to the future users and maintenance workers where there would be harm to human health.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Completed Development	Migration of gases and into buildings. This will affect human health of future site users.	Long term, direct, permanent (negative)	Major Adverse
	Migration of gases and into buildings causing an explosion risk.	Long term, direct, permanent (negative)	Major Adverse
	The service corridors within the completed development would create pathways for vapours and ground gases to migrate along from the ground.	Long term, direct, permanent (negative)	Major Adverse

Table 6.23 Completed Development Potential Impacts and Significance for Ground Gases

Mining Instability

6.124. If no mitigation measures are implemented, the potential instability posed by mineshafts, geological faulting, former surface and former underground workings would pose a potential risk to the future structures and buildings. This would destroy their integrity and stability. With a long-term direct impact this is considered to be **Major Adverse**.

Activity	Potential Impact	Extent, Duration and Magnitude	Significance without Mitigation
Completed Development	Catastrophic collapse of ground around mineshafts, backfilled surface workings and above shallow underground workings.	Direct, permanent negative impact on high value receptor with substantial magnitude	Major Adverse

Table 6.24: Completed Development Potential Impacts and Significance for Mining Instability

Mitigation

6.125. This section details the measures that are required and will be put in place to mitigate any significant identified impacts with the aim of reducing residual impacts to an acceptable level. These measures are additional to the embedded mitigation already outlined as part of the scheme.

6.126. The mitigation described here and general remediation approach comprises typical 'urban renewal' type remediation measures which have been implemented successfully on a number of sites with similar contamination and mining histories. The wording of a suitable planning condition would be agreed with the Council to secure further site investigations for refinement of the detailed Remediation Strategy.

6.127. It is considered that the assessment works completed to date have identified the main risks and highlighted the likely mitigation measures required for the development. To further refine the Remediation Strategy, further intrusive ground investigation will be required. The Conceptual Site Model is still considered appropriate. Further investigation of the soil, gas and groundwater will be required.

6.128. All works would be undertaken following current UK regulations, guidance and industry best practice.

Demolition and Construction

6.129. A detailed Remediation Strategy will be submitted prior to commencement of works on site and secured by way of a suitably worded planning condition based on results of the survey and assessment works to be submitted. It will include appropriate protocols for the identification and management of unforeseen contamination.

6.130. All contractors appointed will be appropriately licensed and experienced, working within the requirements of the Construction (Design and Management) Regulations 2015.

Geology and Soil

6.131. No significant loss for geology is anticipated during the demolition and construction phase or the completed development, and therefore mitigation measures are not required for geology.

- 6.132. All material will be managed through a Material Management Plan (MMP) in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice to track excavation, treatment and placement of material at the site, ensuring compliance with geotechnical and chemical criteria to be set out in the Remediation Strategy. Imported material would also require tracking through the MMP, especially where treatment of the soils may be required prior to placement at the site.
- 6.133. All stockpiled material will be sealed or covered to ensure infiltration of rainwater does not affect its geotechnical properties or allow the release of leachate. All contaminated material will be contained within a bund and away from the River Irwell and the Canal.
- 6.134. Good practice regarding excavation and segregation of clean/ contaminated soils to ensure the appropriate management streams are followed. Soils of different types/ condition will be stockpiled, labelled and managed appropriately, including covering where necessary.
- 6.135. It is intended that soils could remain on site for reuse within the development. Soils that fail the re-use and remediation target values will be remediated to concentrations compliant with the targets for reuse or removed from site. It is anticipated at this stage that all material will be able to be treated to a level suitable for use at the site. Soils will also be geotechnically compliant for use within the development, which will be defined following development platform design works. The geotechnical requirements of the soil and final platform level will be provided prior to commencement of development and discussed within the Remediation Strategy.

Identified Impact	Proposed Mitigation Measure
Reduction in soil quality due to excavation and infiltration of rainwater potentially allowing nutrients to leach from the soil	All stockpiles to be sealed to prevent rain infiltration.
Cross contamination resulting in a reduction of quality of material due to poor material management.	Implementation of Materials Management Plan throughout Demolition and Construction Phase Good practice of segregating clean/ dirty soils at the excavation face.
Release of contaminated material	All contaminated material to be contained within a bund and stockpiled away from site drainage and River Irwell and the Canal.

Table 6.25 Demolition and Construction Mitigation Measures for Soil and Geology

Hydrology and Hydrogeology

- 6.136. Groundwater remediation comprising hotspot removal is likely to be required to reduce groundwater contaminant concentrations. Details will be provided in the Remediation Strategy, following further investigation.

- 6.137. The excavations may expose groundwater and may require dewatering to enable works. In these instances, groundwater will be abstracted and treated, as required, to pre-determined concentrations for discharge to Foul Sewer under a Discharge Consent or discharge back to ground under an Environmental License granted by the Environment Agency.
- 6.138. A foundation Risk Assessment and Design will be undertaken prior to construction in accordance with relevant guidance. It will assess the piling and foundation method being undertaken and the likelihood of piling through contaminated ground and hence the risk to groundwater quality in the aquifer.
- 6.139. Fuels and chemicals would be stored in accordance with the Control of pollution (Oil Storage) Regulations in either double skinned tanks, or within appropriately sized bunds. Such storage containers would be inspected regularly for leaks or damage prior to construction, all emergency response would be set up to deal with incidents of construction spillage.
- 6.140. Surface water drainage at the site and arising from the works will need to be managed to prevent release of contaminated liquids or material into the drainage systems and into controlled waters. Follow good practice guidance notes for working in and near to water courses.

Identified Impact	Proposed Mitigation Measures
Migration of contaminated groundwater into Controlled Waters.	Remediation of contaminated groundwater in line with Remediation Strategy where it is identified as required. Removal of mobile contamination sources to prevent further leaching of contamination into the groundwater. Regular monitoring of groundwater to observe trends in concentrations throughout the works.
Dewatering could make some soils become unstable, which could affect future structures.	All dewatering activities to be planned and assessed through risk assessment. Regular monitoring of groundwater elevations when groundwater abstraction is being carried out either for obstruction removal or groundwater treatment.
Dewatering will lower groundwater elevation, potentially smearing free phase contamination through the ground spreading the area impacted.	Limit dewatering and lowering of the water table in contaminated areas to prevent smearing and migration of contamination. Regular monitoring on contamination plumes as will be set out in the Remediation Strategy.
Cut/ fill of material impact on flow regime.	Material used as fill to be chemically and geotechnically compliant with criteria to be set out in the Remediation Strategy. Material to have similar permeability to material excavated to ensure there are not too many changes to flow regime.

Identified Impact	Proposed Mitigation Measures
Harm to the health of the construction workers from direct contact with contaminated groundwater.	Appropriate management of Health and Safety on site under CDM 2015 by competent remediation and construction contractors. Health and Safety Plan to be produced along with risk assessments and method statements. PPE and RPE to be worn to prevent direct contact with contaminated groundwater. Operatives to be briefed on risk of contact. Control measures for health protection to be put in place such as dust monitoring and vapour monitoring.
Potential release of oils or fuels into the groundwater and River Irwell and the Canal.	All storage of oils and fuels to be in line with regulations and stored within bunds. Spill kits to be readily available and emergency procedures to be developed.
Stockpiled contaminated material has the potential to create leachate and contaminated runoff which could enter the site drainage and controlled waters. There is the potential for offsite migration.	All contaminated material stockpiles to be located within a bund and away from onsite drainage and River Irwell and the Canal. Material management plan to be produced and followed on site to ensure correct tracking of material including excavation, treatment and backfill.

Table 6.26 Demolition and Construction Mitigation Measures for Hydrology and Hydrogeology

Contaminated Land

- 6.141. The soil capping for gardens will meet the targets derived to be protective of human health at the site.
- 6.142. Detailed characterisation of the site conditions will be undertaken by way of a site investigation and risk assessment. The scope will be prior agreed with the regulators.
- 6.143. The detailed site investigation will confirm and refine the assessments made on the site current situation to inform a detailed Remediation Strategy. This will be submitted to the regulators for approval prior to commencing ground works on site.
- 6.144. Use of clean soil capping system within all gardens to break exposure pathways between site users and potentially contaminated soils.
- 6.145. Production of the Construction Environmental Management Plan (CEMP) to detail the management and monitoring of nuisance emissions associated with the contaminated soils and remediation works. The CEMP should be agreed with the Regulators prior to commencing construction works.
- 6.146. The production of a Site Waste Management Plan (SWMP) is a requirement in England for all aspects of construction works (including preparatory works, such as demolition and excavation. Disposal of material offsite may require waste classification in order to allow

disposal in accordance with current legislation. This will be addressed where necessary via the appropriate Environment Agency Permits.

- 6.147. As part of the contractors Construction Phase Health and Safety Plan, details of task-specific risk assessment and use of appropriate Personal Protective Equipment (PPE) will be detailed. This will mean that pollutant linkages will be managed whilst groundworks or remediation activities are undertaken.
- 6.148. All works with identified or suspected ACM will be in line with published guidance such as CAR 2012. An asbestos discovery and management strategy are to be produced for the remediation and construction works by the contractor.
- 6.149. All material, whether it is imported or 'site won', will be validated to ensure its suitability prior to reuse. This will ensure that no contaminants are present at levels which will result in further contamination to controlled waters.
- 6.150. All material, whether it is imported or 'site won', will be validated to ensure its suitability prior to reuse. This will ensure that no contaminants are present at levels which will result in further contamination to the human health.
- 6.151. A validation plan for the remediation works at the site will be produced and followed to ensure the site is validated and verified at the end of the development works.

Identified Impact	Proposed Mitigation Measures
Exposure of contaminated soils to construction workers during excavation and material movement and processing. Exposure through direct contact and absorption into the skin, inhalation of contaminated dust and fibres and ingestion of contaminated dust.	Further site investigation to ensure there is no unexpected contamination that site workers may be exposed to. Details to be set out within proposed Remediation Strategy. Appropriate management of Health and Safety on site under CDM 2015 by competent remediation and construction contractors. Health and Safety Plan to be produced along with risk assessments and method statements. PPE and RPE to be worn to prevent direct contact with contaminated soils. Operatives to be briefed on risk of contact. Control measures for health protection to be put in place such as dust monitoring and vapour monitoring.
Exposure of contaminated dust and vapours to offsite receptors.	Construction Environmental Management Plan (CEMP) to be developed to detail regular site monitoring including dust, noise, vapours, odours, as required. Actions plan to be developed if control limits are breached.
Release of airborne asbestos fibres with risk to the health of the construction workers, and offsite receptors.	Control of dust and asbestos impacted material using techniques such as dampening down and airborne fibre monitoring. Asbestos management plan to be developed, if required.

Identified Impact	Proposed Mitigation Measures
Once soils onsite have been treated and validated, there is the potential for offsite contamination to migrate onto the site and re-contaminate the soil and controlled waters.	Use of cross phase/ sectional area barriers to prevent cross contamination of remediated and validated placed material. Use of over treatment of validated areas. To be designed and detailed in Remediation Strategy.

Table 6.27 Demolition and Construction Mitigation Measures for Contaminated Land

Hazardous and Ground Gas

- 6.152. The development buildings will be installed with gas and vapour protection measures. The exact extent of mitigation measures will be confirmed at the detailed design stage once further intrusive investigations to confirm the ground gas regime have been concluded.
- 6.153. Through Risk Assessments, appropriate gas monitoring will be carried out during the demolition and construction works for the protection of human health. A device to monitor carbon dioxide and methane and trace gases such as carbon monoxide will be used to detect low oxygen atmospheres within depressions and potential explosive atmospheres. Emergency escape plans to be prepared if the monitoring devices are triggered.
- 6.154. Site operatives to be trained and competent in use of Respiratory Protective Equipment (RPE), where it may be required during the demolition and construction works phase.
- 6.155. Where gas is identified, treatment of the soil will be carried out which will be detailed in the Remediation Strategy following further investigation at the site prior to works.

Identified Impact	Proposed Mitigation Measures
Release of gases would directly affect the construction works. Firstly, an explosive atmosphere could develop resulting in loss of life. Secondly, a low oxygen atmosphere could be produced causing asphyxiation and harm to health with potential death.	Further site wide monitoring to define high risk areas for the construction workers. Appropriate monitoring during construction works including oxygen meter and LEL meter. Operatives to be trained in use of equipment and procedure if alarms are triggered. Emergency plans to be prepared. Appropriate RPE to be worn if low oxygen atmosphere is expected.
Release of vapours could cause a negative effect on the health of the construction workers when exposed to the vapours.	Monitoring of contaminated vapours during the excavation and treatment operations. Appropriate limits to be set for wearing RPE. All operatives to be trained and competent in wearing RPE.

Table 6.28 Demolition and Construction Mitigation Measures for Hazardous and Ground Gas

Mining Instability

- 6.156. Due to the potential impact of mining instability this will be fully assessed by way of site investigation. Appropriate treatment and stabilisation will be carried out and suitably validated prior to the commencement of works in each part of the site.
- 6.157. A watching brief will be maintained for any evidence of unrecorded mining features such as shafts and adits. Works will cease in these areas and a suitable assessment and treatment as required instigated.

Identified Impact	Proposed Mitigation Measures
Catastrophic collapse of ground around mineshafts, geological faulting, backfilled surface workings and above shallow underground workings.	Detailed characterisation of the risks. Appropriate stabilisation and treatment works which will be suitably validated. Works undertaken with appropriate Coal Authority licence. Works to be completed prior to demolition and construction works in the area.
Unrecorded mining features during earthworks.	Works to cease in the area pending a detailed characterisation of the identified feature. Appropriate stabilisation and treatment works, suitably validated. Works undertaken with appropriate Coal Authority licence. Works to be completed prior to recommencement of demolition and construction works in the area.

Table 6.29 Demolition and Construction Mitigation Measures for Mining Instability

Cumulative Impacts

- 6.158. It is considered that the development and the proposed remediation will have a major beneficial effect on the contamination risk to future site users and adjacent and neighbouring hydrology and hydrogeology receptors. Any potential adverse effects during the demolition and construction phase neighbouring receptors such as residents would be mitigated by the inclusion of the control measures proposed.

Residual Effects

- 6.159. The residual impact assessment assumes the embedded mitigation and the additional mitigation described above has been implemented.

Demolition and Construction

Geology and Soil

- 6.160. Residual impacts relating to soils during the construction phase are predicted to be negligible with the mitigation measures in place. This is mainly because of the likely low quality and value of the soils within the site.

Hydrology and Hydrogeology

- 6.161. The remediation of soil and groundwater contamination (where determined to be necessary), will have a direct, long-term major beneficial impact significance to controlled waters.
- 6.162. No significant changes to groundwater elevations are predicted, either within shallow localised groundwater or deeper groundwater within the Coal Measures. Whilst dewatering will be required during foundation and deep structure excavation and removal, the effects of this would be localised and would occur only within the Made Ground for a relatively short period of time. Following completion of construction phase, the groundwater would stabilise and there is not likely to be any further impact. The significance of effect is considered to be **negligible**.
- 6.163. Mitigation measures outlined for the control of site activities are expected to control any potential harmful releases to groundwater or surface water. Potential risks to groundwater and surface water during construction are therefore considered to be **negligible**.

Contaminated land

- 6.164. The remediation of the contaminated soils and groundwater that will be carried out as part of the development, where required, will ensure there are no unacceptable human health risks to the completed development users and is considered to have a significance of **Major Beneficial**.
- 6.165. With regards to contact with contamination risk to human health during construction, it is the duty of the site operator and any contractors to ensure Health and Safety of all personnel involved in the site development or located within the vicinity of the scheme that may be affected. Consequently, all potential impacts on Human Health are required to be negligible, and the mitigation measures described and implemented will meet this obligation.

Hazardous and Ground Gas

- 6.166. If the controls described within the mitigation measures are followed, along with industry guidance and personal alarmed gas monitoring, the effects of ground gas during the construction phase are considered to be **negligible**.

Mining Instability

- 6.167. The stabilisation and treatment of the mineshafts, geological faulting, surface workings and shallow underground workings, plus any previously unrecorded mining features that will be carried out as part of the development, where required, will ensure there are no unacceptable risks in the construction phase. This is considered to have a significance of **Major Beneficial** to future users and buildings.

Completed Development

Geology and Soil

- 6.168. Negligible residual impacts to soil are predicted during the operational phase, as the operational activities will not have any impact over and above those which occur and are mitigated for during the construction phase.

Hydrology and Hydrogeology

- 6.169. Potential exists for accidental spills of oil or fuel which could infiltrate permeable areas of ground cover and enter the groundwater or surface water. Measure and protocols are in place to avoid the likelihood of such events occurring and maintenance of drainage infrastructure will be maintained. However, there will always be the potential for accidental incidents. Occurrence of this nature are expected to be low in magnitude and infrequent in nature on a residential led development. Overall the residual effect is considered to be **minor adverse**.

Contaminated Land

- 6.170. It is considered the redevelopment and remediation works will improve ground quality across the site whilst simultaneously reducing risk posed to offsite receptors. This improvement of ground quality will be facilitated via the remedial treatment of soil/ groundwater during the development process as well as the site subsequent operation for predominantly residential led end use (i.e. lower contaminative potential than current operation). It is considered the overall residual impact of the site redevelopment will be of **major beneficial** to both site and its surroundings.

Hazardous and Ground Gas

- 6.171. The site redevelopment will improve the ground gas regime at the site and with the installation and verification of gas and vapour protection measures, the residual impact is **negligible**.
- 6.172. Ground gas and vapour protection measures to be maintained during the completed development.

Mining Instability

- 6.173. The stabilisation and treatment of the mineshafts, geological faulting, surface workings and shallow underground workings, plus any previously unrecorded mining features that will be carried out as part of the development, where required, will ensure there are no unacceptable risks to future users and buildings. The residual impact is considered to be **Major Beneficial**.

Description of Impact	Potential Impact	Mitigation	Residual Impact
Demolition and Construction			

Description of Impact	Potential Impact	Mitigation	Residual Impact
Geology and Soil	Minor to Moderate Adverse	Stockpiles to be sealed. Materials Management Plan. Use of best practice management and working practices.	Negligible
Hydrology and Hydrogeology	Minor to Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove or treat mobile sources of contamination. Foundation risk assessment to ensure appropriate quality of structures and effects of groundwater conditions. Follow regulations for storage of oils and fuels. Use of best practice management and working practices.	Negligible
Contaminated Land	Moderate to Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove source of contamination. Human health controls and protection to be used such as vapour monitoring and prevention in contact with contaminated soil through use of PPE. CEMP to be prepared Follow regulations for storage of oils and fuels. Use of best practice management and working practices.	Negligible to Major Beneficial
Hazardous and Ground Gas	Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove or mitigate sources of ground gas and vapour. Site wide monitoring programme. Human health controls and protection to be used such as vapour monitoring and prevention in contact with contaminated soil through use of PPE. CEMP to be prepared Installation of gas and vapour protection measures to new buildings. Use of best practice management and working practices.	Major Beneficial

Description of Impact	Potential Impact	Mitigation	Residual Impact
Mining Instability	Major Adverse	Investigation and risk assessment. Stabilisation and treatment works during the demolition and construction phase. Stabilisation and treatment works to be fully validated. Watching brief for unrecorded mining features.	Major Beneficial
Completed Development			
Geology and Soil	Negligible	Mitigation proposed at the remediation and construction phase. As such, no further mitigation is proposed.	Negligible
Hydrology and Hydrogeology	Negligible to Major Adverse	Long term maintenance of site drainage infrastructure.	Minor adverse
Contaminated Land	Negligible to Major Adverse	Mitigation proposed at the remediation and construction phase. As such, no further mitigation is proposed.	Minor adverse to Major Beneficial
Hazardous and Ground Gas	Minor to Major Adverse	No maintenance measures necessary.	Negligible
Mining Instability	Major Adverse	Mitigation proposed at the remediation and construction phase. As such, no further mitigation is proposed.	Major Beneficial

Table 6.30 Residual Impacts Summary

Assessment Summary

6.174. Potential receptors, impacts, potential mitigation and residual impact following application of the mitigation measures in the demolition and construction and the post development stage are summarised below.

Demolition and Construction Stage	Description of Impact	Potential Impact	Potential Mitigation	Residual Impact
	Geology and Soil	Minor to Moderate Adverse	Stockpiles to be sealed. Use of best practice management and working practices.	Negligible
	Hydrology and Hydrogeology	Minor to Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove or treat mobile contamination sources. Foundation risk assessment to ensure appropriate quality of structures and effects of groundwater conditions. Follow regulations for storage of oils and fuels. Use of best practice management and working practices.	Negligible
	Contaminated Land	Moderate to Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove source of contamination. Human health controls and protection to be used such as vapour monitoring and prevention in contact with contaminated soil through use of PPE. Use of best practice management and working practices.	Negligible to Major Beneficial

	Hazardous and Ground Gas	Major Adverse	Further investigation and assessment to develop Remediation Strategy. Remediation of soil and groundwater where required to remove or mitigate sources of ground gas and vapour. Site wide monitoring programme. Human health controls and protection to be used such as vapour monitoring and prevention in contact with contaminated soil through use of PPE. CEMP to be prepared Installation of gas and vapour protection measures to new buildings. Use of best practice management and working practices.	Major Beneficial
	Mining Instability	Major Adverse	Investigation and risk assessment. Stabilisation and treatment works during the demolition and construction phase. Stabilisation and treatment works to be fully validated. Watching brief for unrecorded mining features.	Major Beneficial

Table 6.31 Summary of Impacts and Mitigation Demolition and Construction

Post Development Summary

6.175. The sites represent a risk to human health for the intended residential end use and a risk to controlled waters. The planned redevelopment, including remediation of the soil, gas and groundwater as set out in the mitigation measures, presents an enhancement of the current situation. The remediation seeks to remove or reduce the source of the contamination and breaking contaminant exposure pathways towards identified receptors. The implementation of the remediation and adherence to the mitigation measures will bring **major beneficial** impacts to both the site and the local environment.

6.176. An instability risk exists across the site from mineshafts, surface workings and shallow underground working, plus any unrecorded mining features that may be present. The planned redevelopment, including the proposed treatment and stabilisation of mining features presents an enhancement of the current situation and seeks to reduce the risk of instability. The implementation of the stabilisation and treatment works and adherence to the mitigation measures will bring **major beneficial** impacts to both the site and the adjacent site.

6.177. Both development sites represent a risk to human health for the intended residential end use and a risk to controlled waters. The planned redevelopment, including remediation of the soil, gas and groundwater as set out in the mitigation measures, presents an enhancement of the current situation. The remediation seeks to remove or reduce the source of the contamination and breaking contaminant exposure pathways towards identified receptors. The implementation of the remediation and adherence to the mitigation measures will bring **major beneficial** impacts to both the site and the local environment.

6.178. An instability risk exists across the site from mineshafts, surface workings and shallow underground working, plus any unrecorded mining features that may be present. The planned redevelopment, including the proposed treatment and stabilisation of mining features presents an enhancement of the current situation and seeks to reduce the risk of instability. The implementation of the stabilisation and treatment works and adherence to the mitigation measures will bring **major beneficial** impacts to both the sites and the adjacent sites.

7. Ecology and Nature Conservation

Introduction

- 7.1. This chapter considers the ecological receptors within the zone-of influence and considers the scale of possible impacts upon them (alone and in-combination with other projects).

Legislation

National and European Legislation Afforded to Habitats

International Statutory Designations

- 7.2. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are sites of European importance and are designated under the EC Habitats Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and the EC Birds Directive 2009/147/EC on the conservation of wild birds respectively. Both form part of the wider Natura 2000 network across Europe.
- 7.3. Under the Habitats Directive Article 3 requires the establishment of a network of important conservation sites (SACs) across Europe. Over 1.000 animal and plant species, as well as 200 habitat types, listed in the directive's annexes are protected in various ways:
- 7.4. Annex II species (about 900): core areas of their habitat are designated as sites of Community importance (SCIs) and included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.
- 7.5. Annex IV species (over 400, including many annex II species): a strict protection regime must be applied across their entire natural range within the EU, both within and outside Natura 2000 sites.
- 7.6. Annex V species (over 90): Member States must ensure that their exploitation and taking in the wild is compatible with maintaining them in a favourable conservation status.
- 7.7. SPAs are classified under Article 2 of the Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds both for rare bird species (as listed on Annex I) and for important migratory species.
- 7.8. Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. The Convention covers all aspects of wetland conservation and recognises the importance of wetland ecosystems in relation to global biodiversity conservation. The Convention refers to wetlands as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”. However, they may also include riparian and coastal zones. Ramsar sites are statutorily protected under the Wildlife & Countryside Act 1981 (as amended 01.04.1996)

with further protection provided by the Countryside and Rights of Way (CROW) Act 2000. Policy statements have been issued by the Government in England and Wales highlighting the special status of Ramsar sites. The Government in England and Wales has issued policy statements which ensure that Ramsar sites are afforded the same protection as areas designated under the EC Birds and Habitats Directives as part of the Natura 2000 network (e.g. SACs & SPAs). Further provisions for the protection and management of SSSIs have been introduced by the Nature Conservation (Scotland) Act 2004.

National Statutory Designations

- 7.9. Sites of Special Scientific Interest (SSSI) are designated by nature conservation agencies in order to conserve key flora, fauna, geological or physio-geographical features within the UK. The original designations were under the National Parks and Access to the Countryside Act 1949 but SSSIs were then re-designated under the Wildlife & Countryside Act 1981 (as amended). As well as reinforcing other national designations (including National Nature Reserves), the system also provides statutory protection for terrestrial and coastal sites which are important within the European Natura 2000 network and globally.

Local Statutory Designations

- 7.10. Local authorities in consultation with the relevant nature conservation agency can declare Local Nature Reserves (LNRs) under the National Parks and Access to the Countryside Act 1949. LNRs are designated for flora, fauna or geological interest and are managed locally to retain these features and provide research, education and recreational opportunities.

Non- Statutory Designations

- 7.11. All non-statutorily designated sites are referred to as Local Wildlife Sites (LWS), although nomenclature varies across authorities, and can be designated by the local authority for supporting local conservation interest. Combined with statutory designation, these sites are considered within Local Development Frameworks under the Town and Country Planning system and are a material consideration during the determination of planning applications. The protection afforded to these sites varies depending on the local authority involved.
- 7.12. Regionally Important Geological Sites (RIGs) are the most important geological and geomorphological areas outside of statutory designations. These sites are also a material consideration during the determination of planning applications.

The Hedgerow Regulations 1997

- 7.13. The Hedgerow Regulations 1997 are designed to protect 'important' countryside hedgerows. Importance is defined by whether the hedgerow (a) has existed for 30 years or more; or (b) satisfies at least one of the criteria listed in Part II of Schedule 1 of the Regulations.
- 7.14. Under the Regulations, it is against the law to remove or destroy hedgerows on or adjacent to common land, village greens, SSSIs (including all terrestrial SACs, NNRs and SPAs), LNRs, land used for agriculture or forestry and land used for the keeping or breeding of horses, ponies or

donkeys without the permission of the local authority. Hedgerows 'within or marking the boundary of the curtilage of a dwelling-house' are excluded.

National and European Legislation Afforded to Species

The Habitats Directive

- 7.15. The EC Habitats Directive aims to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those species of European importance. The Directive is transposed into UK law by The Conservation of Habitats and Species Regulations 2017 (the Conservation Regulations) and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended). The following notes are relevant for all species protected under the EC Habitats Directive:
- 7.16. In the Directive, the term 'deliberate' is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.
- 7.17. The Habitats Regulations do not define the act of 'migration' and, therefore, as a precaution, it is recommended that short distance movement of animals for e.g. foraging, breeding or dispersal purposes are also considered.
- 7.18. In order to obtain a European Protected Species Mitigation (EPSM) licence, the application must demonstrate that it meets all of the following three 'tests':
 - The action(s) are necessary for the purpose of preserving public health or safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment;
 - There is no satisfactory alternative; and
 - The action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

The Wildlife and Countryside Act (WCA) 1981 (as amended)

- 7.19. The Wildlife and Countryside Act (WCA) 1981 (as amended) implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1979, implemented 1982) and implements the species protection requirements of EC Birds Directive 2009/147/EC on the conservation of wild birds in Great Britain (the birds Directive). The WCA 1981 has been subject to a number of amendments, the most important of which are through the Countryside and Rights of Way (CROW) Act (2000) and Nature Conservation (Scotland) Act 2004.
- 7.20. Other legislative Acts affording protection to wildlife and their habitats include:

- Deer Act 1991
- Natural Environment & Rural Communities (NERC) Act 2006
- Protection of Badgers Act 1992
- Wild Mammals (Protection) Act 1996

Badgers

7.21. Badgers *Meles meles* are protected under The Protection of Badgers Act 1992 which makes it an offence to:

- Wilfully kill, injure, take, or attempt to kill, injure or take a badger
- Cruelly ill-treat a badger, including use of tongs and digging
- Possess or control a dead badger or any part thereof
- Intentionally or recklessly damage, destroy or obstruct access to a badger sett or any part thereof
- Intentionally or recklessly disturb a badger when it is occupying a badger sett
- Intentionally or recklessly cause a dog to enter a badger sett
- Sell or offers for sale, possesses or has under his control, a live badger

Effects on development works:

- A development licence will be required from the relevant countryside agency (i.e. Natural England, Natural Resources Wales, Scottish Natural Heritage) for any development works likely to affect an active badger sett, or to disturb badgers whilst they occupy a sett. Guidance has been issued by the countryside agencies to define what would constitute a licensable activity. It is no possible to obtain a licence to translocate badgers.

Birds

7.22. All wild birds, their nests and eggs are protected under Sections 1-8 of the WCA. Among other things, this makes it an offence to:

- Intentionally kill, injure or take any wild bird
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built
- Intentionally take or destroy an egg of any wild bird
- Sell, offer or expose for sale, have in his possession or transport for the purpose of sale any wild bird (dead or alive) or bird egg or part thereof.
- Intentionally or recklessly obstruct or prevent any wild bird from using its nest (Scotland only)

7.23. Certain species of bird, for example the barn owl, bittern and kingfisher receive additional protection under Schedule 1 of the WCA and Annex 1 of the European Community Directive

on the Conservation of Wild Birds (2009/147/EC) and are commonly referred to as “Schedule 1” birds. This affords them protection against:

- Intentional or reckless disturbance while it is building a nest or is in, on or near a nest containing eggs or young
- Intentional or reckless disturbance of dependent young of such a bird
- In Scotland only, intentional or reckless disturbance whilst lekking
- In Scotland only, intentional or reckless harassment

Effects on development works:

- 7.24. Works should be planned to avoid the possibility of killing or injuring any wild bird or damaging or destroying their nests. The most effective way to reduce the likelihood of nest destruction in particular is to undertake work outside the main bird nesting season which typically runs from March to August. Where this is not feasible, it will be necessary to have any areas of suitable habitat thoroughly checked for nests prior to vegetation clearance.
- 7.25. Schedule 1 birds are additionally protected against disturbance during the nesting season. Thus, it will be necessary to ensure that no potentially disturbing works are undertaken in the vicinity of the nest. The most effective way to avoid disturbance is to postpone works until the young have fledged. If this is not feasible, it may be possible to maintain an appropriate buffer zone or standoff around the nest.

Herpetofauna (Amphibians and reptiles)

- 7.26. The sand lizard *Lacerta agilis*, smooth snake *Coronella austriaca*, natterjack toad *Epidalea calamita*, pool frog *Pelophylax lessonae* and great crested newt *Triturus cristatus* receive full protection under Habitats Regulations through their inclusion on Schedule 2. Regulation 41 prohibits:
- Deliberate killing, injuring or capturing of Schedule 2 species
 - Deliberate disturbance of species in such a way as:
 - To impair their ability to survive, breed, or reproduce, or to rear or nurture young;
 - To impair their ability to hibernate or migrate
 - To affect significantly the local distribution or abundance of the species
 - Damage or destruction of a breeding site or resting place
- 7.27. With the exception of the pool frog, these species are also listed on Schedule 5 of the WCA and they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

7.28. Other native species of reptiles are protected solely under Schedule 5, Section 9(1) & (5) of the WCA, i.e. the adder *Vipera berus*, grass snake *Natrix natrix*, common lizard *Zootoca vivipara* and slow-worm *Anguis fragilis*. It is prohibited to:

- Intentionally or recklessly kill or injure these species.

Effects on development works:

- 7.29. A European Protected Species Mitigation (EPSM) Licence issued by the relevant countryside agency (i.e. Natural England, in this case) will be required for works likely to affect the breeding sites or resting places amphibian and reptile species protected under Habitats Regulations. A licence will also be required for operations liable to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licences are to allow derogation from the relevant legislation, but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.
- 7.30. Although not licensable, appropriate mitigation measures may also be required to prevent the intentional killing or injury of adder, grass snake, common lizard and slow worm, thus avoiding contravention of the WCA.

Water voles

7.31. The water vole *Arvicola terrestris* is fully protected under Schedule 5 of the WCA. This makes it an offence to:

- Intentionally kill, injure or take (capture) water voles
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection
- Intentionally or recklessly disturb water voles while they are occupying a structure or place used for shelter or protection

Effects on development works:

- 7.32. If development works are likely to affect habitats known to support water voles, the relevant countryside agency (Natural England) must be consulted. It must be shown that means by which the proposal can be re-designed to avoid contravening the legislation have been fully explored e.g. the use of alternative sites, appropriate timing of works to avoid times of the year in which water voles are most vulnerable, and measures to ensure minimal habitat loss. Conservation licences for the capture and translocation of water voles may be issued by the relevant countryside agency for the purpose of development activities if it can be shown that the activity has been properly planned and executed and thereby contributes to the conservation of the population. The licence will then only be granted to a suitably experienced

person if it can be shown that adequate surveys have been undertaken to inform appropriate mitigation measures. Identification and preparation of a suitable receptor site will be necessary prior to the commencement of works.

Otters

7.33. Otter *Lutra lutra* are fully protected under the Conservation Regulations through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species
- Deliberate disturbance of species in such a way as:
 - To impair their ability to survive, breed, or reproduce, or to rear or nurture young;
 - To impair their ability to hibernate or migrate
- To affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place
- Otters are also currently protected under the WCA through their inclusion on Schedule 5. Under this Act, they are additionally protected from:
 - Intentional or reckless disturbance (at any level)
 - Intentional or reckless obstruction of access to any place of shelter or protection

Effects on development works:

7.34. An EPSM Licence issued by Natural England will be required for works likely to affect otter breeding or resting places (often referred to as holts, couches or dens) or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, and rear young). The licence is to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored

Bats

- All species are fully protected by Habitats Regulations 2010 as they are listed on Schedule 2. Regulation 41 prohibits:
 - Deliberate killing, injuring or capturing of Schedule 2 species (e.g. All bats)
 - Deliberate disturbance of bat species in such a way as:
 - To impair their ability to survive, breed, or reproduce, or to rear or nurture young;
 - To impair their ability to hibernate or migrate
 - To affect significantly the local distribution or abundance of the species
 - Damage or destruction of a breeding site or resting place
- 7.35. Bats are afforded the following additional protection through the WCA as they are included on Schedule 5:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection

Effects on development works:

- 7.36. An EPSM Licence issued by Natural England will be required for works are likely to affect a bat roost or an operation which are likely to result in an illegal level of disturbance to the species will require an EPSM licence. The licence is to allow derogation from the legislation through the application of appropriate mitigation measures and monitoring.

Dormice

- 7.37. Hazel Dormice *Muscardinus avellanarius* are fully protected under Habitats Regulations through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species
- Deliberate disturbance of species in such a way as:
 - To impair their ability to survive, breed, or reproduce, or to rear or nurture young;
 - To impair their ability to hibernate or migrate
 - To affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place

- 7.38. Dormice are also protected under the WCA through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection

Effects on development works:

- 7.39. Works which are liable to affect a dormice habitat or an operation which are likely to result in an illegal level of disturbance to the species will require an EPSM licence issued by the relevant countryside agency (i.e. Natural England, Natural Resources Wales (NB: Hazel Dormouse are entirely absent from Scotland)). The licence is to allow derogation from the legislation through the application of appropriate mitigation measures and monitoring.

White clawed crayfish

- 7.40. There is a considerable amount of legislation in place in an attempt to protect the White-clawed crayfish *Austropotamobius pallipes*. This species is listed under the European Union's (EU) Habitat and Species Directive and is listed under Schedule 5 of the Wildlife and Countryside Act (1981). This makes it an offence to:

- Protected against intentional or reckless taking
- Protected against selling, offering or advertising for sale, possessing or transporting

for the purpose of sale

7.41. It is also classified as Endangered in the IUCN Red List of Endangered Species. As a result of this and other relevant crayfish legislation such as the Prohibition of Keeping of Live Fish (Crayfish) Order 1996, a series of licences are needed for working with White-clawed and non-native crayfish. These are:

- A licence to handle crayfish (therefore survey work) in England
- A licence for the keeping of crayfish in England and Wales with an exemption for Signal crayfish (England).
- People in the post-code areas listed with crayfish present prior to 1996 do not need to apply for consent for crayfish already established. It does not, however, allow any new stocking of non-native crayfish into waterbodies. Consent for trapping of non-native crayfish for control or consumption is most likely to be granted in Thames and Anglian regions in the areas with "go area" postcodes.
- Harvesting of crayfish is prohibited in much of England and in any part of Scotland and Wales.

Effects on development works:

7.42. Natural England will need to be consulted about development which could impact on a watercourse or wetland known to support white clawed crayfish. Conservation licences for the capture and translocation of crayfish can be issued if it can be shown that the activity has been properly planned and executed and thereby contributes to the conservation of the population. The licence will only be granted to a suitably experienced person if it can be shown that adequate surveys have been undertaken to inform appropriate mitigation measures. Identification and preparation of a suitable receptor site will be necessary prior to the commencement of the works.

Wild Mammals (Protection Act) 1996

- 7.43. All wild mammals are protected against intentional acts of cruelty under the above legislation. This makes it an offence to mutilate, kick, beat, nail or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal with intent to inflict unnecessary suffering.
- 7.44. To avoid possible contravention, due care and attention should be taken when carrying out works (for example operations near burrows or nests) with the potential to affect any wild mammal in this way, regardless of whether they are legally protected through other conservation legislation or not.

Legislation afforded to Plants

7.45. With certain exceptions, all wild plants are protected under the WCA. This makes it an offence for an 'unauthorised' person to intentionally uproot wild plants. An authorised person can be the owner of the land on which the action is taken, or anybody authorised by them.

7.46. Certain rare species of plant, for example some species of orchid, are also fully protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). This prohibits any person from:

- Intentionally picking, uprooting or destruction of any wild Schedule 8 species
- Selling, offering or exposing for sale, or possessing or transporting for the purpose of sale, any wild live or dead Schedule 8 plant species or part thereof
- In addition to the UK legislation outlined above, several plant species are fully protected under Schedule 5 of The Conservation of Habitats and Species Regulations 2010. These are species of European importance. Regulation 45 makes it an offence to:
 - Deliberately pick, collect, cut, uproot or destroy a wild Schedule 5 species
 - Be in possession of, or control, transport, sell or exchange, or offer for sale or exchange any wild live or dead Schedule 5 species or anything derived from such a plant.

Effects on development works:

7.47. An EPSM licence will be required from the relevant countryside agency (i.e. Natural England, Natural Resources Wales, Scottish Natural Heritage) for works which are likely to affect species of planted listed on Schedule 5 of the Conservation or Habitats and Species Regulations 2010. The licence is to allow derogation from the legislation through the application of appropriate mitigation measures and monitoring.

Problematic Species

7.48. Part II of Schedule 9 of the WCA lists non-native invasive plant species for which it is a criminal offence in England and Wales to plant or cause to grow in the wild due to their impact on native wildlife. Species included (but not limited to):

- Japanese knotweed *Fallopia japonica*
- Giant hogweed *Heracleum mantegazzianum*
- Himalayan balsam *Impatiens glandulifera*

Effects on development works:

7.49. It is not an offence for plants listed in Part II of Schedule 9 of the WCA 1981 to be present on the development site, however, it is an offence to cause them to spread. Therefore, if any of the species are present on site and construction activities may result in further spread (e.g. earthworks, vehicle movements) then it will be necessary to design and implement appropriate mitigation prior to construction commencing.

Injurious weeds

7.50. Under the Weeds Act 1959 any land-owner or occupier may be required prevent the spread of certain 'injurious weeds' including (but not limited to):

- Spear thistle *Cirsium vulgare*
- Creeping thistle *Cirsium arvense*
- Curled dock *Rumex crispus*
- Broad-leaved dock *Rumex obtusifolius*
- Common ragwort *Senecio jacobaea*

7.51. It is a criminal offence to fail to comply with a notice requiring such action to be taken. The Ragwort Control Act 2003 establishes a ragwort control code of practice as common ragwort is poisonous to horses and other livestock. This code provides best practice guidelines and is not legally binding.

National Planning Policy Framework (ENGLAND)

7.52. The National Planning Policy Framework promotes sustainable development. The Framework specifies the need for protection of designated sites and priority habitats and species. An emphasis is also made on the need for ecological infrastructure through protection, restoration and re-creation. The protection and recovery of priority species (considered likely to be those listed as UK Biodiversity Action Plan priority species) is also listed as a requirement of planning policy.

7.53. In determining a planning application, planning authorities should aim to conserve and enhance biodiversity by ensuring that: designated sites are protected from harm; there is appropriate mitigation or compensation where significant harm cannot be avoided; opportunities to incorporate biodiversity in and around developments are encouraged; and planning permission is refused for development resulting in the loss or deterioration of irreplaceable habitats including aged or veteran trees and also ancient woodland.

The Natural Environment and Rural Communities Act 2006 and the Biodiversity Duty

7.54. Section 40 of the Natural Environment and Rural Communities (NERC) Act, 2006, requires all public bodies to have regard to biodiversity conservation when carrying out their functions. This is commonly referred to as the 'biodiversity duty'.

7.55. Section 41 of the Act (Section 42 in Wales) requires the Secretary of State to publish a list of habitats and species which are of 'principal importance for the conservation of biodiversity.' This list is intended to assist decision makers such as public bodies in implementing their duty under Section 40 of the Act. Under the Act these habitats and species are regarded as a material consideration in determining planning applications. A developer must show that their protection has been adequately addressed within a development proposal.

Methodology and Scope

- 7.56. This Ecological Impact Assessment (EcIA) has been undertaken by taking into consideration the CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- 7.57. The Guidelines for Ecological Impact Assessment in the UK and Ireland (2018) combines the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition (2016) and the Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal (2010).
- 7.58. The aim of the Guidelines is to:
- promote good practice
 - promote a scientifically rigorous and transparent approach to Ecological Impact Assessment (EcIA)
 - provide a common framework to EcIA in order to promote better communication and closer cooperation between ecologists involved in EcIA
 - provide decision-makers with relevant information about the likely ecological effects of a project.
- 7.59. Biodiversity: Code of practice for planning and development, published by the British Standards Institute (BS 42020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on ecological impact assessment.
- 7.60. The Guidelines are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
- 7.61. The ecological condition of the sites at the former Creams Paper Mill and land off Hall Lane were evaluated by field survey and desk-study during the period July to October 2020.
- 7.62. The desk study informing the survey conclusions consisted of a review of nearby statutory and non-statutory designated sites, Biodiversity Action Plan (BAP) Priority Habitats and granted EPSML where known (the database is not complete). An assessment of the surrounding landscape structure was also completed using aerial images from Google Earth and OS maps.
- 7.63. To conform to best practice guidelines, biological records data (BRD) within a 2km radius of the site have been obtained from the local biological records centre (Greater Manchester Ecology Unit, in this case). The data search is confidential information that is not suitable for

public release and so has been analysed, declassified and summarised for presentation in the evaluation section in this report.

Site Survey methodology

- 7.64. The survey programme was led by Company Principal Chris Formaggia BSc (Joint Hons) CBiol CEnv MCIEEM MRBS VR of Arbtech Consulting Limited, who has 31 years of professional ecological experience.
- 7.65. The methodology for the Phase 1 Habitat Survey is based on the best practice publication, Phase 1 Habitat Survey Methodology (JNCC, 2010). All land parcels are described and mapped according to JNCC Phase 1 Habitat Classification. Where appropriate, target notes provide supplementary information on habitat conditions, features too small to map to scale, species composition, structure and management.
- 7.66. During the survey, habitats are assessed for their suitability to support protected species, and field signs indicating their presence recorded. The assessment takes into consideration the findings of the desk study, the habitat conditions on site and in the context of the surrounding landscape, and the ecology of the protected species. The likelihood of the presence of protected species is ranked; the habitats on site are evaluated against their likelihood to provide suitable habitat for protected species.
- 7.67. The ecological value of the survey area is assessed based on the Guidelines for Ecological Impact Assessment (CIEEM, 2018), and the Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring (Hill, 2005), using geographic frames of reference. The biodiversity value of any identified designated sites, habitat types and associated species assemblages is considered. The distribution and extent of invasive species listed on Schedule 9 of the Wildlife and Countryside Act (1981 as amended 1996) is also noted throughout the survey area.
- 7.68. Habitats on site are evaluated as to their likelihood to provide sheltering, roosting, foraging, basking or nesting habitat. The likelihood of the occurrence of protected species is ranked according to the criteria listed in Table 1 below.

Table 1: showing criteria considered when assessing the likelihood of occurrence of protected species

Present	Species are confirmed as present from the current survey or historical confirmed records.
High	Habitat and features of high quality for species or species assemblage. Species known to be present in wider landscape (desk study records). Good quality surrounding habitat and good connectivity.
Medium	Habitat and features of moderate quality. The site in combination with surrounding land provides all habitat or ecological conditions required by the species or assemblage. Within known national distribution of species and local records in desk study area.

	Limiting factors to suitability, including small area of suitable habitat, some severance or poor connectivity with wider landscape, poor to moderate habitat suitability in local area.
Low	Habitats within the survey area poor quality. Few or no records from data search. Despite above, presence cannot be discounted as within national range, all required features or conditions present on site and in surrounding landscape. Limiting factors could include isolation, poor quality landscape, or disturbance.
Negligible	Extremely limited poor-quality habitats and features. No local records from desk study; site on edge of, or outside, national range. Surrounding habitats considered unlikely to support species or species assemblage.

7.69. The combined desk-study and Enhanced Phase 1 Habitat Survey form a Preliminary Ecological Appraisal (PEA) which is in accordance with CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Assumptions, limitations and uncertainties

- 7.70. The assumptions are that ecological evaluations undertaken in 2016 (at the Creams mill site) are basically sound despite being historical in terms of shelf-life.
- 7.71. Many ecological evaluations are time specific (in terms of survey windows) so certain Phase II evaluations were programmed in for the 2020 season in advance of the PEA to facilitate an autumn 2020 planning submission.
- 7.72. A new UK Habitat Classification system is being proposed to replace Phase 1 Habitat Survey so data has been collected so that it can also be presented in this new hierarchy if required to do so.
- 7.73. The impacts resulting from any Brexit decision are unknown but are likely to impact within the project timeframe.
- 7.74. A suite of “Phase II” ecological evaluations has been conducted on site to allow a fuller investigation of the ecological functioning and nature conservation value of the site. These evaluations included:
- Bird counts
 - Bat activity surveys
 - Reptile presence/likely-absence surveys
 - Otter and water vole presence/likely-absence surveys

- Badger presence/likely-absence surveys
- Remote monitoring
- Problematic species management planning.

7.75. The methodologies for these evaluations are summarised in Table 2, below.

Table 2: Phase II Methodologies

Grouping	Summary of methodology
Bird Counts	The optimal breeding bird survey window (March to May) had passed when surveys were commissioned. In order to gain an ornithological evaluation of the site bird counts were made by a combination of walked transects and vantage point surveys undertaken in July, August and September 2020.
Bat Activity Surveys	Bat activity surveys were undertaken in July, August and September 2020. Six experienced bat surveyors walked fixed transects across the Creams Mill site utilising broadband bat detection equipment and data-loggers to obtain a record of bat activity. The surveys were conducted in the evenings commencing thirty minutes prior to sunset and lasting until two hours after sunset. They were conducted in favourable weather conditions (no rain, low wind speeds and air temperatures exceeding 10°C). The transects were determined to achieve good coverage of the site and also to allow roost detection if relevant.
Reptile Surveys	Artificial refuges were set out at Creams Mill and Hall Lane in advance of surveys to “bed-in” and be discovered by reptiles. The artificial refuges are sheets of corrugated metal and roofing felt, under which reptiles will shelter and use them to warm their body temperatures. The sheets are then periodically checked by turning the over and animals are identified and counted. The surveys were undertaken in September 2020 which is an optimal survey time and seven survey visits were made which is the guideline minimum standard.
Otter and water vole surveys	As both species are somewhat cryptic and (in the otter’s case at least) crepuscular, presence/likely absence is determined by searching for field signs of the species rather than directly for the animals. Field signs were searched for in July, August and September. The canal corridor was searched between National Grid Reference SD 75164 06449 and SD 76030 06741 (Creams Mill section – which is only partially wetted) and SD 74560 07139 and SD 74847 06910 (Hall Lane section). The River Irwell was searched between SD 75869 06464 (upstream) and SD 75485 06470 (downstream). The river was searched using dry suits so that physical access to the riparian corridor was possible.
Badger surveys	Both Creams Mill and Hall Land were systematically searched for field signs of badger activity and the presence of setts in July, August and September 2020. Surveys for setts were extended at least 30m beyond construction footprints so that legal buffer zones could be taken into account.
Remote Monitoring	A Titley Anabat Express remote bat detector was deployed at SD 75699 06419 between the 13 th August 2020 and the 2 nd September 2020 to datalog bat activity in the lower level of the Creams Mill site. Four remote wildlife trap cameras were deployed at SD 75629 06453; SD 75259 06494; SD 75703 06558; and SD 75765 06463. The cameras recorded between the 13 th August 2020 and the 2 nd September 2020 and were set to take still images with

	a 5 min delay between re-takes. The cameras were used to record mobile fauna along wildlife tracks.
Problematic Species Management Planning	A management plan for controlling issues related to problematic invasive species on site will be formulated. Given the gross contamination by Japanese knotweed, giant hogweed and Himalayan balsam at Creams Mill detailed mapping of stands was not undertaken because it is safe to declare that the whole construction site is contaminated. At Hall Lane, the contamination is only by Himalayan balsam and is largely restricted to the north east of the site.

7.76. Detailed methodologies for ecological surveys are included in the specific reports in the Appendices.

Consultation

7.77. On-site consultation was held with representatives of the Greater Manchester Ecological Unit (GMEU), The canal Trust, The Groundworks Trust and the Environment Agency on the 4th August 2020.

7.78. Biological records have been obtained from the GMEU.

7.79. Scoping guidance has been provided by the LPA, Environment Agency, Natural England and the Canal and Rivers Trust.

Baseline Conditions

7.80. The baseline condition of the Creams site was evaluated thoroughly by Appletons in 2016 for Creams Mill Development Ltd. Whilst this work would now be regarded as historical, evaluation in 2020 suggests that the bulk of that assessment is still relevant and useful to this EIA. It is believed that the Hall Lane site has not previously been assessed for its ecological baseline. Arbtech Consulting Limited have undertaken PEAs of both sites in 2020.

7.81. The Appletons report summarised *“Based on initial draft proposals, key potential ecological concerns in relation to the proposed development are the proximity of the site to the Ashclough SSSI, the presence of notable habitats and the potential presence of protected species. In order to ensure compliance with wildlife legislation and relevant planning policy, the following recommendations are made:*

- *Ashclough SSSI: Natural England should be consulted prior to any works commencing to discuss the likelihood of any impacts on this SSSI.*
- *Woodland and semi-mature / mature trees: These habitats should be retained and protected where feasible. Habitat losses should be compensated for within landscaping proposals.*
- *River Irwell: The river should be protected from site run-off and pollution throughout development works and post-development.*
- *Habitat Loss and Enhancement: Biodiversity enhancement measures should be*

incorporated into landscape proposals.

- *Roosting bats: A daytime bat survey should be undertaken on trees, walls and structures to be impacted upon. This survey should also assess potential impacts upon foraging and commuting bats.*
- *Nesting birds: Any vegetation clearance should be undertaken outside of the nesting bird season.*
- *Water vole: If proposed works within the south-west of the site cannot avoid impacting upon land within 5 m of the earth riverbank, a water vole survey should be undertaken.*
- *Otter: An otter survey should be undertaken on the River Irwell adjacent to the site, and the site should be subject to a detailed search for potential holts and layup sites.*
- *Reptiles: A reptile survey should be undertaken of suitable habitats within the site area.*
- *Badger: A badger survey should be undertaken to determine whether any setts are located within 30 m of the proposed development.*
- *Invasive species: Reference should be made to Appletons Report 2069: Creams Mill Invasive Species Survey.*
- *Terrestrial Mammals: Any excavations or open pipework should be covered / blanked off overnight.*

7.82. The baseline conditions assessed by Arbtech in 2020 are summarised in the following tables:

Table 3: PEA summary evaluation Creams Mill (and Hall Lane)

Ecological Factor	Survey findings and commentary	Foreseen impacts	Recommendations	Enhancements The Local Planning Authority has a duty to ask for enhancements under the NPPF (July 2018)
Designated sites	The site is not subject to any designation. The Magic database shows that there are three statutory designated site within 2km – the Ashclough geological SSSI which is on the far side of the River Irwell, the Nob End SSSI and LNR to the west of the site and the Moses Gate LNR to the north west of site.	The proposed development is not of a sufficient scale to have an impact on any nearby designated sites. Whilst the site is within an SSSI	No further evaluation of impact on Special sites is required.	n/a

	There are 12 Sites of Biological Importance (SBIs) within the search area – two of which are the east and west canal sections on site.	Risk of Impact zones the proposal has been compared against the thresholds and criteria and does not result in Potentially Damaging Operations.		
Notable habitats and plants	The majority of the Creams Mill site is deciduous woodland priority habitat and the eastern section of the canal is mapped as lowland fen priority habitat.	The woodland in the construction footprint will be lost as part of the scheme as will be the mapped lowland fen in the unrestored canal basin. Woodland on the west of the site will be retained and sympathetic recreational use of it formalised by a woodland walk.	The site should be replanted with good structural tree planting as part of the landscape design with fruit-rich, regionally appropriate native tree species. Retained woodland should be put into sympathetic management. The canal corridor should be restored to form a range of grassland and wetland habitat types.	Establish a riparian meadow within the Irwell buffer zone.
Invasive / Non-native species	The site is grossly contaminated with giant hogweed, Himalayan balsam, and Japanese knotweed. There are also smaller occurrences of other problematic and invasive species.	There is a risk of causing problematic species to spread in the wild through uncontrolled working practices. There is a human health risk to contractors and end-users from giant hogweed. Japanese knotweed could cause physical	The works should be controlled by a problematic species management plan. A large proportion of the infestation to be stripped in the set-up phase and deposited in the breach area for deep burial.	Replant with pollen rich species to replace monostands

		damage to newly built structures.		
Bats	<p>The majority of the trees on site are relatively young <30 years old and have not developed potential roost features (prfs). Nonetheless there are some larger trees (mainly on the peripheries and edges that have minor prfs. There are also several masonry faces and natural rock faces that could support crevice dwelling bats.</p> <p>The site may be important for commuting and foraging bats – particularly along the riparian and canal corridors.</p> <p>Ecologically records show the area to be moderately important for bats supporting at least 8 of the 18 UK native species.</p>	<p>The scheme might result in the loss of trees/structures containing bat roosts. Any such action would require a Conservation Regulations Licence from Natural England.</p> <p>The site might support local commuting and foraging of bats that could be important at a population level.</p>	<p>The site should be subject to a bat activity survey in July, August and September 2020 to assess overall bat activity on site and possibly pin-point roosting locations.</p> <p>It is also recommended that static bat detection is used on site to help characterise bat use.</p>	Tbd.
Birds	<p>The site is likely to support common woodland and riparian bird species and much of the site is expected to be used for nesting.</p> <p>The grassland is unlikely to support ground-nesting bird species because it is used for horses.</p>	<p>Active nests could be destroyed by any loss of trees or shrub.</p>	<p>It is recommended that standard planning conditions are employed to protect breeding birds, their nest and eggs in accordance with the Wildlife and Countryside Act 1981 (as amended):</p> <p>Vegetation should be cleared outside the period 1st March to 31st August. If this timeframe cannot be avoided, a close inspection of the habitat should be undertaken immediately</p>	<p>Introduce new structural planting of fruit-rich, local provenance native species to increase foraging on site.</p>

			<p>prior to the commencement of works. All active nests will need to be retained until the young have fledged.</p> <p>Although the peak window for nesting birds has passed in 2020 it is recommended that some late season monitoring in August and September is conducted to gauge activity and to look for Schedule 1 species such as kingfisher.</p>	
Reptiles	<p>Some of the habitat on site could support common reptile species.</p> <p>There are two records of common reptiles within 2km of site – one grass snake and one slow-worm.</p>	<p>The proposed development could cause injury or death reptile species during the construction period. This would be an offence.</p>	<p>A reptile presence/likely-absence survey should be conducted in September 2020.</p>	Tbd
Amphibians	<p>The site will likely support common amphibian species but it is assessed that great crested newt (GCN) are unlikely to be encountered on site because of a lack of nearby breeding opportunity.</p> <p>There are numerous records of GCN on ponds to the north of the search area and of common toad throughout the search area.</p>	<p>The site is unlikely to be significantly important for amphibians.</p>	<p>No further work necessary.</p>	

Other Terrestrial Mammals	Badgers No badger setts were located during the PEA but badger dung was noted along with feeding signs. There are 6 known badger setts within 2 km of site.	Badgers Uncontrolled works could impact on any badger setts within of up to 30 m from the construction footprint.	Badgers The site should be subject to systematic survey and camera trapping to determine the extent of badger use and whether active setts might be compromised by the works.	Badgers Planting additional fruit trees on the developed site will provide additional foraging resources for badgers.
	Water Vole The canal and River Irwell provide suitable water vole habitat.	Water Vole The proposed development could have an impact on water voles or their burrows.	Water Vole A presence/likely-absence survey should be conducted. In the case of the river this may have to be achieved by boat access.	Water Vole Tbd
	Otter The canal and River Irwell provide suitable water vole habitat. There is one otter record within 2km of site.	Otter Water Vole The proposed development could have an impact on otter or their holts.	Otter A presence/likely-absence survey should be conducted. In the case of the river this may have to be achieved by boat access.	Otter Tbd
	Hazel Dormouse Not present in this area	n/a	n/a	n/a

Site Designations

- 7.83. An analysis of the DEFRA Magic Map has revealed there are no internationally designated sites within 10km of the proposal sites. These include the Natura 2000 network of Ramsar sites, Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) as well as Biosphere Reserves and UNESCO World Heritage Sites.
- 7.84. An analysis of the DEFRA Magic Map has revealed the following nationally statutorily designated sites within 2km of the Creams Mill site. Site Citations where available are given in Appendix XXX.

Assessment of Effects

- 7.85. A consistent description of impact has been employed across the Environmental Statement and terminology is summarised in Table 6, below.

Table 6: Magnitude of Effect Summary Descriptions

Magnitude of impact	Definition
Substantial	Total loss or major alternation to key elements/features of the baseline conditions such that post development character/composition of baseline conditions will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Slight	Minor shift away from baseline condition. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the predevelopment situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation

Effects of Protected Sites

International Sites

- 7.86. The highest tier of site designations in the UK comprises of sites regarded as having international importance. These include the Natura 2000 site network – the collective of Special Areas of Conservation (SACs); Special Protection Areas (SPAs) and Ramsar Sites as well as Biosphere Reserves and UNESCO World Heritage Sites. Potential Natura 2000 sites (i.e. those under consideration but not yet formally designated) are afforded the same level of protection as those formally designated. There are no internationally designated sites within 10km of the proposal sites. The proposals do not generate any indirect effects that could project beyond the 10km consideration zone. Therefore, the proposals will have a **negligible** impact upon highest tier protected sites.

Nationally Protected Sites

- 7.87. The middle tier of site designations in the UK are those site designations that seek to protect sites that are considered to be of national importance. These include the network of Sites of Special Scientific Interest (SSSI) that are designated by the Statutory Nature Conservation Organisations (SNCOs) under the Wildlife and Countryside Act 1981 (as amended) or preceding legislation. The SSSIs are designated for biological or geological value or a combination of both. SSSIs also form the basis of the internationally designated site network. Other nationally designated sites include Natural Heritage Areas (NHAs) and National Nature Reserves (NNRs).
- 7.88. The proposal sites are not part of any nationally designated sites and so the proposals present a negligible direct impact (habitat loss) on the national site network.
- 7.89. Within 2km of the sites are the following nationally designated sites:

Table 7: Nationally Designated Sites within 2km of proposal

Site Name and Type	Distance to Hall Lane	Distance to Creams Mill	Interest
Ashclough SSSI	1079m	Adjacent	Geological
Nob End SSSI	541m	198m	Biological

- 7.90. The Ashclough SSSI is a geological site. Its importance is for two exposures that allow the interpretation of Ashclough Marine Band and its associated strata. The Creams Mill site is immediately north of the two exposures which are on the adjacent south bank of the River Irwell. The proposals will not change the ability to interpret the Marine Band and the impact on the site is negligible.
- 7.91. The Nob End SSSI is a biological site – somewhat an anachronism the site owes its importance to historical waste deposition that has led to it developing an unusual limestone grassland-like nature. Nob End is also designated as a Local Nature Reserve (see below).
- 7.92. The most significant and extensive vegetation type found on the site closely resembles that occurring on eroding, base-rich clay cliffs typical of parts of the Durham, North Yorkshire and Humberside coastlines, and represented more locally on the Wirral coast of the Dee Estuary in Merseyside.
- 7.93. It is the best example in Greater Manchester and Merseyside of the nationally rare species rich variant of the tall fescue–coltsfoot plant community and is of especial interest because of its development on an unusual and scientifically interesting substrate. It is characterised by an open-structured sward in which grasses play a minor role and herbs typical of limestone grasslands predominate. As natural limestone grassland does not occur in Greater Manchester, many of the species found here are rare in the county. Examples include carline thistle *Carlina vulgaris*, blue fleabane *Erigeron acer*, purging flax *Linum catharticum*, rough hawkbit *Leontodon hispidus*, common centaury *Centaureum erythraea* and common broomrape *Orobanche minor*.
- 7.94. Orchids, too, are well represented and several species occur here in large numbers. Most notable amongst these are fragrant orchid *Gymnadenia conopsea*, northern marsh orchid *Dactylorhiza purpurella* and early marsh-orchid *D. incarnata*. Southern marsh-orchid *D. praetermissa* and common spotted-orchid *D. fuchsii* also occur and hybrid swarms between the *Dactylorhiza* species form large populations with considerable variability between individuals. Green-winged orchid *Orchis morio* has also been recorded here.
- 7.95. In some areas a more neutral grassland has developed with a denser sward in which coarse grasses such as Yorkshire fog *Holcus lanatus*, cocksfoot *Dactylis glomerata* and false oat-grass *Arrhenatherum elatius* are abundant. Herbs, however, are not infrequent and common knapweed *Centaurea nigra*, tufted vetch *Vicia cracca* and meadow vetchling *Lathyrus pratensis*

make a significant contribution to the sward. Adder's-tongue fern *Ophioglossum vulgatum*, devil's-bit scabious *Succisa pratensis* and eyebright *Euphrasia officinalis* also occur here. A few small patches of acidic grassland are found where boiler-ash has been spread over the surface of the Leblanc waste. Mat-grass *Nardus stricta*, wavy hair-grass *Deschampsia flexuosa* and even heather *Calluna vulgaris* occur in these areas.

- 7.96. Towards the north of the site the water-table lies close to the surface and areas of marshy grassland and willow carr have developed here. Small areas of sycamore woodland and patches of hawthorn scrub add to the habitat diversity of the site, and this is reflected in a high entomological interest. Particularly notable are the large populations of burnet moths and common blue butterflies *Polyommatus icarus*.
- 7.97. The Nob End site is not assessed to be hydrologically connected to the proposal sites and so the only impact pathways to the features of the site appear to be from arial deposition either from construction emissions or operational greenhouse emissions. The majority of construction dust fall-out is within 50m of source so the impact on site vegetation is considered to be **negligible**.
- 7.98. The proposals, alone and in-combination, will raise recreational pressure on accessible nature sites in the area. Nob End SSSI/LNR is owned by Bolton Council and is publicly accessible from Boscow Road, via Prestolee Road. It forms part of the Kingfisher Trail. The Kingfisher Trail is a scenic 14-mile route connecting the rural West Pennine Moors to the urban centres of Bolton, Bury and Salford. Increased recreational pressure is assessed as generating a **slight** negative impact upon conservation features at Nob End.

Locally Protected Sites

- 7.99. The third tier of site protection is that afforded to sites that are considered to have local or regional importance against a set of established criteria. These include sites designated as Local Nature Reserves (LNRs) and, in the Greater Manchester area, sites designated as Sites of Biological Importance (SBIs). Figure 4, above, shows the location of SBIs in relation to the proposal sites. There are 12 SBIs in a 2km search radius and the proposals are immediately adjacent to the two Manchester Bolton and Bury Canal sites (East and West respectively). The citations for the canal SBIs are provided in Appendix XX. There are three Local Nature Reserves within 2km of the proposal sites. These are the Moses Gate LNR, Leverhulme LNR and Nob End LNR.
- 7.100. The scheme proposes to restore ~0.75km of the Manchester, Bolton and Bury Canal between the two SBI designations. This will have a **substantial** but **positive** long-term impact on the two SBI sites as the breached section of canal that currently disconnects them will be restored to a wetted condition and a substantial wetland corridor will be recreated. Conceivably the SBI designation may become extended to cover the restored canal section so that the East and West sites become one. Initially construction work is likely to have **slight** negative impact on

ecological receptors at the canal termini as there is likely to be some local effect on water quality and disturbance to fauna.

Priority Habitats

7.101. Priority Habitats protected under NERC Act are present on site. The majority of the Creams Mill site is deciduous woodland priority habitat and the eastern section of the canal is mapped as lowland fen priority habitat. The north west of the Hall Lane site is deciduous woodland.

7.102. The woodlands are relatively recent (typical tree age ~30 years) and largely self-seeded regenerated. Their understories are hugely compromised by problematic invasive species. Individual trees generally lack especial intrinsic value – there is a general absence of mature and veteran trees or specimen trees. A substantial proportion of the Creams Mill woodland habitat will be cleared under the proposals with a **moderate** negative impact that will become ameliorated by structural planting over time.

Protected Species

7.103. A suite of protected species has been assessed and their presence or likely-absence determined (Refer Table 5, above).

7.104. The following protected species are considered to be present on or in the influence zones the proposal sites.

Table 8: Protected Species Present

Species	Creams Mill	Hall Lane
Otter	Yes (River Irwell)	No
Breeding Birds	Yes	Yes
Badger	Yes (but only transit/foraging)	No
Bats	Six species (but only transit/foraging)	Not surveyed but assumed transit and minor foraging.
White-clawed “native” crayfish	Yes (River Irwell) – determined by otter survey	Not determined

7.105. The otter is considered to have recolonized the River Irwell since 2009 although progress in its recolonisation has been hampered by subsequent pollution events. The 2020 surveys reveal the section of the River Irwell adjacent to the Creams Mill site is being routinely used by otter and that the river section forms part of a main territory. Different ages of spraints located during survey indicate otter usage over a passage of time rather than animals merely commuting through. A laying-up holt is present under the concrete revetments on the Creams Mill side of the Irwell on the lower platform of the site.

7.106. Likely impacts on the otter are assessed as coming from:

- Disturbance (noise, lighting and visual) during construction – to some extent this is self-mitigating because of the crepuscular nature of the species its activity period will largely be outside of construction working periods. The river topography also assists because the river is in a fairly deep gorge there is not line-of-site between much of the immediate riparian corridor and the construction platforms.
- Water pollution events during construction.
- Changes to the hydrological regime during construction
- Changes to the hydrological regime during occupation
- Changes to the light environment from artificial light during occupation
- Conflict with formalised riparian recreation – the intention to formalise the riparian footpath and provide recreational car-parking will increase recreational pressure on the riparian corridor (particularly from dog-walking)

7.107. The scale of impact on otter is assessed as slight but works will need to proceed under a Conservation Regulations licence that will have to be sought from Natural England.

7.108. The sites are considered as having at least a District-level ornithological value. As surveys were undertaken late in the nesting season this is likely to understate the avian value of the site and it is considered that the Creams Mill site, at least, probably has an ornithological value that is significant at the County-level.

7.109. The proposals require substantial clearance of woodland, scrub and other tall vegetation and so there is the likelihood of a **moderate** scale negative impact on nesting birds during construction from direct habitat loss and disturbance in its various guises. Post-construction there is a net loss of breeding bird niche habitat at a **moderate** scale although this becomes ameliorated over time by the development of new structural planting.

7.110. No badger setts have been identified on the sites and activity at Creams Mill by the badger is low and is likely minor commuting and foraging. A slight negative impact on badger movement is expected during construction.

7.111. The locale (for these purposes the considered 2km zone of influence) has an overall moderate “batscape” and eight of the native species have been recorded within 2km of the site. Six native bat species have been recorded at Creams Mill in 2020 although the fauna is overwhelmingly dominated by the widespread common pipistrelle bat (a bat of relatively lower nature conservation importance). The River Irwell (and the wetted canal sections) are important as commutes and forages for Daubenton’s bat but no roosts have been identified on site.

- 7.112. No bat roosts have been found on the Creams Mill site and bat activity suggests that bats recorded at site have come from roosts elsewhere. Bat activity is somewhat low and is generally constricted to a few commute routes.
- 7.113. The presence of white-clawed crayfish was confirmed by the 2020 otter and water vole surveys where otter prey discards included this species. Without mitigation, groundwater contamination could contaminate the controlled waters of the site, but the mitigation measures described in the above chapter, ameliorate these to **negligible**.
- Problematic species
- 7.114. Arguably the most significant ecological aspects of the proposal sites are their gross contamination by problematic species including non-native invasive species.
- 7.115. Most spectacularly this includes the heavy infestations of Himalayan balsam, giant hogweed and Japanese knotweed. However other problematic species present include signal crayfish in the Irwell (canal not determined); common ragwort, creeping thistle, bracken, butterfly-bush and cotoneaster.
- 7.116. The balsam, hogweed and knotweed pose threats to native biodiversity from crowding and competition by their spreading mono-stands. In addition, giant hogweed presents a substantial health and safety risk to humans from a phytotoxin in its sap and knotweed poses a structural risk to newly-built structures from its expanding rhizome network.
- 7.117. The above species and any material contaminated by them is regulated through statutory law and it is an offence to cause them to spread in the wild. If removed from site, they are to be treated as a controlled waste and can only be disposed of at approved landfill sites licensed to receive such material. As such the pose a substantial challenge to site management during construction particularly and operation.
- 7.118. Neighbouring third-party land is also grossly contaminated by these species so the prospect of wholesale eradication on the proposal sites is very unlikely because of constant re-infestation.
- 7.119. The Hall Lane site is altogether less contaminated than the Creams Mill site and only by Himalayan balsam which is present in the north west of the site and on the canal edges. There is a much greater prospect of eradication being achieved at this location.

Mitigation

Designated Site Mitigation

- 7.120. A risk of increased recreational pressure on the Nob End SSSI has been identified. The site proposals provide on-site mitigation to this impact through the restoration of the canal and the formalised woodland walk with associated car parking. In other words, the proposals provide for an increased recreational capacity on-site.

7.121. A commuted sum can be offered to Bolton Council as a contribution to the management of the SSSI to facilitate ways of alleviating recreational pressure through improvements to access and site interpretive materials.

7.122. Pollution control measures to be employed are described in the above chapter.

Protected Species Mitigation

7.123. It will be necessary to obtain an otter licence (and possibly a white-clawed crayfish licence as determined by hydrology assessment) to authorise construction work at Creams Mill. The licence application will have to detail mitigation and compensation measures with precision. The mitigation measures to be employed will comprise of:

- Timing of works – works will be confined to working hours and therefore outside of most otter activity
- Natural shielding – the riparian topography provides shielding to animals in the riparian corridor
- Artificial shielding during construction. It is proposed to install Heras fencing with Heras Noise Control Barriers along the bank-top during substantial construction works. This barrier system can reduce noise into the riparian corridor by up to 30Db. It also confers additional visual shielding and dust shielding.
- Employment of Pollution Prevention Measures
- Control of operational light-spill

7.124. The above measures will also mitigate for commuting bats and birds in the riparian corridor and are expected to reduce the impact on the species at a population level to negligible.

7.125. Standard planning conditions will be employed to ensure that most of the vegetation clearance on site is undertaken outside of the bird breeding season (March to August) or if in season that it is done under ecological supervision confirming that nests are not present and active.

7.126. New niche habitat will be added to a proportion of the new-builds in the form of externally or masonry-integrated bat and bird boxes.

7.127. New structural planting will include regionally appropriate native fruit-rich species to provide forage on site.

7.128. The canal restoration will include measures to increase corridor grassland as this is a habitat currently lacking in the canal corridor.

Problematic Species Mitigation

7.129. It is intended to substantially reduce and control problematic species on site. Mitigation measures to be employed are to include:

- The production of an integrated problematic species management plan. It is expected this will be secured by planning condition and that LPA approval will be needed prior to commencement.
- Site Access needs to be controlled and effective vehicle and plant washing facilities need to be installed at points of access/egress to prevent spread of contaminants beyond the site in contravention of legislation.
- At preliminary earth moving stage at Creams Mill it is intended to use dedicated plant to excavate as much contaminated material as possible to be deposited by controlled haul routes to the bottom of the canal breach. This contaminated material will then be deep buried (>5m) with clean material and therefore entombed. It is anticipated that this could remove up to 80% of contaminated material from the construction areas and therefore significantly reduce overall site infestation.
- Root barrier membranes will be utilised to protect the footings of newly built structures from knotweed rhizome damage.
- A herbicidal/physical control program will be employed to target remaining problematic plants – this will extend into the occupational phase and operational management will have to include routine inspection and control because of re-infestation from beyond the site.

7.130. Collectively these measures will ensure legal compliance and substantially reduce problematic species issues on site. Overall a **moderate** positive improvement is anticipated.

Cumulative Impacts

7.131. The following project set has been identified as possibly exerting cumulative effect in combination with the proposals.

Table 7: Cumulative Effect Summary Table

Summary description of the Project	Significance of potential impact	Nature of the impact	Mitigation	Residual effect	Confidence Level
Lever Gardens, Little Lever, Bolton (Application reference - 08816/20) Erection of Extra Care units comprising 62 Apartments and 6 bungalows with Bistro, Staff Facilities, Communal Areas, Ancillary	Negligible	n/a	n/a	n/a	High

Accommodation , Parking and Landscaping. Pending determination.					
Land at Victory Road, Little Lever, Bolton (04748/18) 22 dwellings with associated parking, landscaping and re-routing of existing public right of way. Approved 29 March 2019.	Moderate	Exacerbation of new recreational pressure on Nob End SSSI	Commuted sum contribution to the management of the SSSI to make it more resistant to increased recreational impact through education and visitor management	Negligible	Medium

Residual Effects

7.132. The proposals include a major canal restoration which will reconnect two isolated sections of wetted canal. This may be a significant stimulus to further canal restoration elsewhere and will have recreational and social benefit. Ecologically it will have a substantial benefit as it will bring about a substantial improvement in habitat connectivity and genetic flow. The breached sections of canal currently are dominated by shrub and tall ruderal habitat which will be lost and replaced by open water and marginal habitat, but this collectively is likely to be a net biodiversity gain.

7.133. There is a net loss in semi-natural habitat as a result of the proposals, but this is substantially ameliorated by retained habitat being improved in quality.

7.134. The River Irwell corridor is intruded into more than in its current condition by light-spill, noise and visual disturbance and new formalised recreational pressure.

Assessment Summary

7.135. The site proposals have been subjected to a suite of ecological evaluations including Preliminary Ecological Appraisal and a scoped range of Phase II ecological surveys.

7.136. The broader locale and zone-of-influence has been assessed through desk-study and historical records.

Conclusion

7.137. There are no sites of international importance such as SPAs or SACs within the site boundaries or within 10km of the proposals. No impact is generated on the highest tier of protected sites.

- 7.138. Two nationally important sites are within the zone of influence of the proposals. The geological Ashclough SSSI is unaffected by the proposals. The Nob End SSSI is impacted but the impact can be rendered insignificant by mitigation.
- 7.139. There are two non-statutory designated Sites of Biological Interest within the proposal sites and a further ten within the zone-of-influence. The proposed canal restoration represents a major long-term benefit to the two canal SBIs effectively reconnecting the two and producing a major wildlife corridor improvement.
- 7.140. Some protected, rare or notable fauna species are present on site or at least using the site for transit and foraging. Most significant is the presence of otter in the River Irwell however mitigation allows the impact on this species to be reduced to a point where it is not significant at a population level. Nesting birds are present throughout the sites and will be impacted upon. Landscape enhancements will generate a slight improvement for nesting and foraging birds in the long-term.
- 7.141. The main ecological aspect of the site is its gross contamination by problematic species. Whilst their presence presents challenges the proposals bring about a significant reduction in their presence. Eradication on the Creams Mill site is unlikely but may be achievable at Hall Lane but substantial control will be brought about to the benefit of native biodiversity and in the case of giant hogweed human safety.
- 7.142. In conclusion, all relevant ecological issues have been addressed within this Environmental Statement. The proposals are not considered to generate any substantial or moderate impacts, either direct or indirect, upon ecological receptors after mitigation. Landscaping improvements are likely to generate a minor improvement to the site ecology by providing new niche habitat and foraging opportunity.

8. Landscape and Visual Impact

Introduction

- 8.1. Enzygo Limited [Enzygo] has been commissioned by Watson Construction Limited to prepare a Landscape Visual Impact Assessment [LVIA] chapter, as part of this EIA and in support of a planning application for housing development on land at Creams Mill, Hall Lane and Manchester Bolton & Bury Canal.
- 8.2. Details of the proposed development can be found in Chapter 2. The Proposal, and a description of the site and its immediate environs have been included within **Chapter 4**. Detailed description, methodology, and full assessment used in support of this chapter have been included within our Technical Report that has been submitted alongside the planning application. Purpose of the Study
- 8.3. The aim of this chapter is to provide summary of the landscape and visual impacts, resultant from the proposed development, and will act as a précis for the evidence and findings identified in greater detail within the Technical Report.
- 8.4. This chapter seeks to recapitulate the existing landscape character and visual amenity resources (otherwise described as the 'Baseline Conditions') we identified with the technical report, which is used to distinguish the likely effects the proposals have on this baseline situation, and whether the proposed development would have a residual effect and on landscape character and visual amenity. This process has been used in order to determine the significance of these effects.

Legislation & Policy Review

- 8.5. This section identifies the information reviewed which is relevant to the Landscape and Visual assessment in relation to the proposed development, this includes:
 - Landscape Planning Policy; and
 - Statutory designations.

European Landscape Convention

- 8.6. The context of landscape policy in the UK can be placed within the broad framework provided by the European Landscape Convention [ELC]. The ELC was signed by the Government in February 2006 and signals a commitment to support the aims of the Convention which include promoting landscape protection, management, and planning. It suggests that "Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factor" and covers rural and urban situations.

National Planning Policy

- 8.7. The National Planning Policy Framework [NPPF]; 2019 provides the national level planning guidance and promotes sustainable development through its twelve core planning principles.

Sections 12, Achieving well-designed places and section 15, Conserving and Enhancing the Natural Environment are relevant to the landscape and the Proposed Development.

8.8. Section 12: Achieving well-designed places, paragraph 127 states that:

‘Planning policies and decisions should ensure that developments’:

- ‘will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development’;
- are visually attractive as a result of good architecture, layout and appropriate and effective landscaping’;
- ‘are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities)’;
- ‘establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit’;
- ‘optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks’; and
- ‘create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience’⁴

8.9. Section 15: Conserving and enhancing the natural environment, paragraph 170, states that ‘planning policies and decisions should contribute to and enhance the natural and local environment by:

- ‘protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)’;
- ‘recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services ± including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland’;
- ‘maintaining the character of the undeveloped coast, while improving public access to it where appropriate’; and
- ‘minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; preventing new and existing development from contributing to,

⁴ Para. 127, *National Planning Policy Framework*, Ministry of Housing, Communities & Local Government, 2019 [www.gov.uk/guidance/national-planning-policy-framework/12-achieving-well-designed-places]

being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.’⁵

Local Planning Policy

- 8.10. The application sites are both within the administrative area of Bolton Metropolitan Borough Council [abbr: Bolton MBC], which is itself a district council of Greater Manchester Combined Authority [abbr: GMCA].
- 8.11. The relevant statutory development plan for the proposed development and application sites is the Local Plan published by Bolton Council which provides guidance for development in Bolton and is the main consideration in determining planning applications.
- 8.12. Relevant policies taken from the adopted local plan (found within the council’s Core Strategy document) are noted below relating to landscape and visual matters and the proposed development.

Bolton Local Plan

- 8.13. Within the Bolton’s Core Strategy (adopted 2011) a series of challenges are identified that are thought to affect growth within the borough. These are included at Chapter 2: Spatial Portrait and issues, which also notes the importance of ensuring:

*‘... [T]he protection of Bolton’s network of sites important for biodiversity and geodiversity beyond the designated sites, and the conservation and enhancement of landscape character and quality’.*⁶

- 8.14. Chapter 3 Spatial Vision and Objectives sets out 16 Strategic Objectives for Bolton. Within the chapter, Bolton MBC establishes its ‘spatial vision’ for the borough, and notes that:

‘The high quality visual environments of the outer areas of the borough will be protected and enhanced. There will continue to be smaller scale developments within the urban area for a range of uses where the character of the area and the existing infrastructure allows it. In the rural areas of the borough there will be constraints on most forms of development, either because they are in the Green Belt or will continue to be areas of

⁵ Para. 170, *National Planning Policy Framework*, Ministry of Housing, Communities & Local Government, 2019 [www.gov.uk/guidance/national-planning-policy-framework/15-conserving-and-enhancing-the-natural-environment]

⁶ Para. 2.39, Pp.15-16, *Local Development Framework: Bolton’s Core Strategy Development Plan Document*, Bolton Council, 2011

Protected Open Land'. Within this description is also mention of the area of Little Lever and inclusion of 'the open land between these built up areas'⁷

- 8.15. Strategic Objective 11, under the heading a 'Cleaner and Greener Bolton' aims 'to conserve and enhance the best of Bolton's built heritage and landscapes, and improve the quality of open spaces and the design of new buildings⁸'.
- 8.16. Using Bolton MBC's online Allocation Plan/Policies Map, planning policies were identified that would apply to either site and its immediate environs. Those policies identified in the allocations map of relevance to this chapter are included in the following paragraphs.
- 8.17. Area listed as 'Canals: Manchester, Bury and Bolton Canal' are covered within Policy OA6, which states action should be taken to:
- 'Concentrate sites for new housing within the existing urban area'
 - 'Maintain current Green Belt boundaries'
 - 'Conserve and enhance the character of the existing physical environment'; and
 - 'Respect and enhance the built form and pattern of existing development'⁹.
- 8.18. Areas listed on the policies map including those listed as: Green Belt, Landscape Areas (Urban Valleys), Local Nature Reserves, Sites of Biological Importance, and the Croal Irwell Valley, are all covered within Cleaner Greener Policy CG1.
- 8.19. Protection of landscape character is covered within Policy CG1 and states that '*the council and its partners will*':

'Safeguard and enhance the rural areas of the borough from development that would adversely affect its biodiversity including trees, woodland and hedgerows, geodiversity, landscape character, recreational or agricultural value; or its contribution to green infrastructure, reducing flood risk and combating climate change'¹⁰.

- 8.20. This requirement is further reflected in Policy CG3, which states that, the council will:

'Maintain and respect the landscape character of the surrounding countryside and its distinctiveness. Any soft landscaping and landscape enhancement schemes should

⁷ P.19, *Local Development Framework: Bolton's Core Strategy Development Plan Document*, Bolton Council, 2011

⁸ Para. 3.33, P.22, *Local Development Framework: Bolton's Core Strategy Development Plan Document*, Bolton Council, 2011

⁹ P.91, *Local Development Framework: Bolton's Core Strategy Development Plan Document*, Bolton Council, 2011

¹⁰ P.41, *Local Development Framework: Bolton's Core Strategy Development Plan Document*, Bolton Council, 2011

*enhance biodiversity and be compatible with the nearby landscape character types identified by the Landscape Character Assessment'*¹¹

- 8.21. Within the Creams Mill Site, there is land which has been allocated for potential housing, 'Cream Paper Mill', Strong and Confident Policy SC1. This established that the council deems this site as appropriate of this type of future development subject to details and review for its release from the Green Belt.

Public Rights of Way

- 8.22. Bolton MBC is responsible for the Public Rights of Way [PRoW] and definitive map across the local authority area¹².
- 8.23. According to the council website, there are no PRoW at the Hall Lane site. The Creams Mill Site includes 1no. public footpath, which partially follows the route of the Manchester, Bolton & Bury Canal towpath. This is listed as 'LIL038'.
- 8.24. Within the study area there are 3no. nationally recognised routes (National Trails, Registered Ways and Long-Distance Footpaths). The closest of which is the 'Rotary Way', which follows the Manchester, Bolton & Bury Canal towpath through the Creams Mill Site.

Conservation Areas

- 8.25. Neither site is within a Conservation Area. The closest conservation area to both sites is listed as 'Ringley Fold', and is located at approximately 700m south of the Creams Mill Site, and 1.7km south east of the Hall Lane Site.

Listed Buildings

- 8.26. The Hall Lane Site includes 1no. Grade II listed building, which is titled 'Manchester Bolton and Bury Canal Post Approximately 220 Metres East of Hall Lane' [List Entry No.: 1067304]. This listed building is formed of a pair of Milestones, either side of the canal (for visual reference refer to: Figure 7 – Landscape & Visual Constraints). The listing is located to the western-most edge of the Hall Lane Site, adjacent to the Canal.
- 8.27. The Canal Milestone has been retained as part of the proposed development.

Scheduled Monuments

- 8.28. There are no scheduled monuments on the site. There are scheduled monuments in the study area, the nearest to the site is titled 'Ringley Old Bridge' [Ref. no.: 1001957], and is located at approximately 1.2km south east of the Creams Mill Site.

¹¹ P.47, Local Development Framework: Bolton's Core Strategy Development Plan Document, Bolton Council, 2011

¹² A digital copy of the register can be accessed through the council's online mapping tool, at: maps.bolton.gov.uk/residents/myBolton.aspx

Environmental Protected Designations

8.29. There are nature conservation designations in the wider landscape beyond either site boundaries. These include:

- 2no. Local Nature Reserves [abbr: LNR], including the 'Moses Gate (LNR)', at approximately 35m south and west of the Hall Lane Site, and the 'Nob End (LNR)' located to the south of the study area, at approx. 550m south east of the Hall Lane Site, and 540m south west of the Creams Mill Site; and
- 2no. Sites of Special Scientific Interest [abbr. SSSI], both titled 'Ashclough' [Reference numbers. 1011432 & 1056204]. Both SSSIs are located to the south of the River Irwell and the Creams Mill Site, and are at a distance of approximately 50m south and 300m south east, respectively.

Section Summary

8.30. Neither site, nor the landscape of the wider study area is highly constrained by statutory designations and therefore is considered to be of local level importance. There are local planning policies that are relevant to the application site and surroundings which will be taken into account by limiting effects on the environment through careful design and in making recommendations for any landscape mitigation.

8.31. From conducting this review of planning policy and landscapes or landscape features that are protected under national statute, the following observations have been made:

- Both application sites are located to the edge of settlements and are influenced both by their proximity to the urban area
- The distinct characteristics of both sites, therefore, straddle the transition from urban fringe to semi-natural, parkland (country parks) and woodland between built-up areas;
- That local planning policy puts an emphasis on the preservation and safeguarding of natural features, alongside the diverse elements that comprise the character of the landscape;
- That neither site is constrained by PRow or statutory designations, (although its immediate environs are); and
- The presence of heritage designations and environmentally protected sites within wider study area highlights former historic industrial nature of the site/s and their immediate environs, as well as the value attributed to these semi-natural, green landscapes between the settlement edge.

Methodology and Scope

Methodology Used for Assessment

Introduction to the Methodology

8.32. The Landscape and Visual Impact Assessment [LVIA] considers the potential effects of the development on:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

8.33. A detailed methodology has been included within the Technical Report submitted with the application.

Distinction between Landscape and Visual Impacts

8.34. Landscape and visual effects are two distinct but related areas, which are assessed separately in accordance with the approach outlined below. Landscape and visual impacts do not necessarily coincide and can be beneficial or adverse. A clear distinction will be drawn between landscape and visual impacts as follows:

- Landscape impacts relate to the effects of the proposal on the physical and other characteristics of the landscape and its resulting character and quality; and
- Visual impacts relate to the effects on views experienced by visual receptors (e.g. residents, footpath users, tourists etc.) and on the visual amenity experienced by those people.

Guidance

8.35. The LVIA of the proposed scheme has been undertaken by a Landscape Architect with experience of similar types of development. The assessment has been prepared in accordance with best practice outlined in published guidance, below:

- *Guidelines for Landscape and Visual Impact Assessment*, Landscape Institute and the Institute for Environmental Management and Assessment, 3rd Edition [2013];
- *Landscape Character Assessment Guidance for England and Scotland*, The Countryside Agency and Scottish Natural Heritage [2002]; and
- *Guidelines for Environmental Impact Assessment*, Institute for Environmental Management and Assessment [2004].

LVIA Methodology

8.36. The LVIA has been undertaken in the following stages:

- Baseline data collection via desk-top, consultation and fieldwork;
- Description of the baseline landscape character and visual amenity of the site and surrounding area which identify the relevant landscape and visual receptors [including representative viewpoints] and determine their sensitivity to change;
- Description of the magnitude of change in the landscape and visual amenity as a consequence of the proposal;
- Description of the potential landscape and visual impacts arising from the proposal; and
- Development of strategic mitigation proposals to assist in reducing adverse landscape and visual effects or provide compensation where unavoidable, and

where possible enhance and safeguard beneficial effects.

- 8.37. Baseline information regarding landscape features and sensitive visual receptors, and the likely change in the landscape character and visual amenity of the site and its surroundings, has been used to identify potential impacts and inform the final scheme as appropriate.
- 8.38. Strategic mitigation measures have been developed in tandem with the proposal to minimise adverse impacts as part of an iterative design process. Options for screening various components of the scheme will be investigated and adopted as mitigation measures where appropriate.
- 8.39. Criteria thresholds for assessing the degree of change as a result of the scheme are established as part of the EIA process and the final layout of the scheme will be reviewed to ascertain the magnitude of change in the landscape and in views.

Study Area

- 8.40. For the purposes of this assessment, a 2.5km radius was measured from the centre of each site and combined to form a singular 'Study Area'. This combined radius of 2.5km has been used as starting point to assess and identify potential effects. 2.5km was used in acknowledgement of the scale of the proposals, the nature of the local topography and the extent of vegetation cover and urban development within the immediate environs.

Visual Envelope and Zones of Theoretical Visibility

- 8.41. The visual envelope of a scheme defines the broad area from within which it may be possible to see the whole, or part of, the proposed development and helps to establish the potential for sensitive visual receptors. The development is not considered to be visible outside this area or would be very difficult to perceive, except from occasional higher elevations. However, there will still be pockets within the visual envelope from which there are no views of the study area, due to the local screening effects of vegetation and topography or other features such as buildings. Landscape features, which form visual barriers and restrict views towards parts of the study area, such as landform, settlements and woodland, can then be evaluated and significant barriers identified to refine the baseline visibility of the proposals.
- 8.42. Zones of Theoretical Visibility (ZTV) mapping is a computer-based tool used in defining visual envelopes. This is typically used a starting point to consider the potential extent of visibility the study area for field survey and to establish appropriate viewpoints for assessment.
- 8.43. The programme then renders a digital model taken from topographic survey data to represent where the proposed development/s is visible from, and is then set to a specified distance [2.5km] in every direction radiating out from the centre of each development. The rendered model is coloured to highlight where views may 'theoretically' be achieved.
- 8.44. Two ZTV assessments were produced for this study. The first uses topographic point data to produce a 'bare earth' ZTV, and the second takes prominent visual obstructions into

consideration (such as woodland, hedgerows, and/or large areas of built form). This area was then coloured to represent the likelihood of visibility, which was rated from 'low' to 'high'.

Representative Viewpoints

- 8.45. Within the extent of the visual envelope, it would not be practical to illustrate the visual impact on every individual visual receptor affected by a scheme. Therefore, representative viewpoints will be used to assess the impacts on the different range of views towards the site. Viewpoints will be illustrated photographically using a 50mm lens digital SLR camera and the site location and significant features will be identified together with landmarks and features in the surrounding area. All photography carried out as part of this assessment is in accordance with LI Advice Note 01/11 [March 2011].
- 8.46. The selection of viewpoints and consultation with public stakeholders has been described within the Consultation section of this chapter.

Temporal Scope

- 8.47. The baseline data for the site and surrounding landscape was gathered in 2020, this is used as the baseline year considering effects of the proposed development. Effects are predicted for the proposed development on completion (Year 1) assumed to be 2021. Residual effects are considered at Year 15, operational year which also assumes that the proposed will include restoration of the 1936 Canal Breach (not inclusive of this application) has been implemented.

Magnitude of Impact

- 8.48. The magnitude of impact has been assessed against the following significance criteria. These have been summarised in table 1, below:

Magnitude of impact	Definition
Substantial	Total loss or major alternation to key elements/features of the baseline conditions such that post development character/composition of baseline conditions will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Slight	Minor shift away from baseline condition. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the predevelopment situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation

Table 1: Magnitude of Impact used in assessment.

- 8.49. The full methodology for determining landscape & visual sensitivity, magnitude of change and significance of landscape/visual impacts, have been included within the technical document.

Cumulative Impact

- 8.50. Cumulative impacts describe the ways in which the proposed development will have additional impacts on both the existing landscape character and visual amenity when considered together.
- 8.51. Two types of cumulative landscape character effects assessed, are:
- On the physical fabric of the landscape, such as when two or more developments affect landscape components, such as woodland or hedgerows; and
 - On the landscape character, such as when two or more developments introduce new features into the landscape, which would change the overall character or value.
- 8.52. Two types of cumulative visual amenity effects will be assessed, are:
- Combined: This occurs when the viewer is able to see two or more developments from one viewpoint. Combined visibility may either be in combination, where several developments are within the viewer's arc of vision at the same time, or in succession, where the viewer has to turn to see the various developments; and
 - Sequential: This occurs when the viewer has to move to another viewpoint to see different developments. Sequential effects occur along regularly used routes like major roads or paths. Sequential effects may range from frequent [appear regularly and with short time lapses, depending on speed of travel and distance between viewpoints] to occasional [long time lapses between appearance as the viewer is moving slowly and/or there are large distances between the viewpoints].

Consultation

- 8.53. Consultation as part of undertaking this LVIA has included undertaking EIA Scoping with the LPA. A request was made to the LPA for a scoping opinion in September 2020 and the LPA published its scoping opinion on October 13th 2020. The scoping opinion contained comments from the Canal and Rivers Trust stating that "*there would be occasionally sequential (visual) impact*" between viewpoints points 10 and 20 from the viewpoints location map provided with the Scoping Request and that this should be given consideration in the LVIA. Enzygo reviewed this in relation to site survey and ZTV and has reported the findings in the LVIA.

Limitations and Assumptions

- 8.54. This assessment has assumed that the restoration of the 1936 Canal Breach will be implemented, and that construction works and stockpiling of materials will be associated. By the same token, this chapter presumes that by bringing the canal in to water will improve the quality of the remaining water course (limiting algae build-up, present within the remaining extent of the Manchester, Bolton & Bury Canal).
- 8.55. The landscape and visual chapter is based on views from publicly accessible locations. Where impacts to residential and other receptors on private land (for example commercial occupiers) these have been estimated based on assessment of views from the nearest public locations and any limitations noted.

- 8.56. There are also limitations in preparing ZTV assessment. When using a ‘bare earth’ ZTV assessment, a ZTV is generated from topographical data only and does not take any account of vegetation or the built environment, which often screen views of a development. As such, a bare earth ZTV poses a ‘worst case’ scenario and over-emphasises the actual visibility of the scheme. In reality trees, hedges and buildings may make views of the proposed impossible from many of the areas included within a given area. The inclusion of the screening devices within the ‘ZTV with visual barriers’ has been shown to an approximate degree, though given the scale of the survey, it is impractical to assess each individual visual obstruction.
- 8.57. Both ZTV assessments provide a broad evaluation of presumed visibility of any given assessment, although should not be relied upon to provide an absolute representation of views, which is best achieved through a full Landscape and Visual Impact Assessment, including desk-based review and field surveys.

Baseline Conditions

- 8.58. The following sections describe the baseline landscape and visual conditions at the site and in the surrounding area in order to make judgements measured against these, included later in the report.

Published Landscape Character Assessment

National Landscape Character Profile

- 8.59. The application site/s are all located within the Manchester Pennine Fringe National Character Area (NCA) 54, as defined by Natural England. NCA 54 occupies ‘the transitional zone between the open moorlands of the Dark Peak and Southern Pennines, and the densely populated urban conurbation of Manchester’¹³.
- 8.60. The NCA Profile 54 describes the landscape [sic: countryside] as being ‘... influenced by recreational use from adjacent urban areas and also by the diversification of farmland’. The description goes on to state that natural features, such as ‘river valleys, upland hinterland and proximity of urban development all contribute to the area’s distinct Pennine fringe character’.
- 8.61. The NCA includes ‘Statements of Environmental Opportunity’ [SEO]. These are:
- SEO 1: ‘Manage, enhance and expand the network of green infrastructure (such as rivers, woodlands, restored industrial sites, parklands and canal routes) within the urban areas, to increase biodiversity, strengthen access and recreational use, and increase understanding of the area’s rich industrial heritage, natural heritage and geodiversity’;
 - SEO 2: ‘Sustainably manage and enhance the distinctive features of the Pennine fringe landscape, including the predominantly pastoral agricultural land use, the mosaic of farmland and upland fringe habitats, the clough woodland, the drystone walling and the gritstone buildings, to strengthen the landscape character, and

¹³ P.3, *National Character Area Profile 54. Manchester Pennine Fringe*, Natural England, 2013

improve habitat condition and connectivity, bringing benefits for water quality and reduced soil erosion’;

- SEO 3: ‘Manage and continue to enhance Manchester Pennine Fringe’s characteristic watercourses, such as the fast-flowing rivers and restored canals; conserve and extend the associated riparian habitats, to strengthen their role, extend and link habitats, manage flood risk, improve water quality and reduce soil run-off, and provide opportunities for recreation.’; and
- SEO 4: ‘Manage existing woodlands and community forests, and extend broadleaved woodland cover in appropriate locations, to help mitigate the effects of climate change, improve biodiversity, reduce the impact of new development, and provide access to nature and green infrastructure links into urban areas.’¹⁴

8.62. Key characteristics for NCA 54 were also provided, and generally describe the area as being a ‘transitional zone’ from elevated, open moorland, to densely populated urban areas on the low levels. The descriptions further emphasises the presence of woodland and steep river valleys within the low-land, as well as extensive views that can be made from higher elevations.

8.63. A full list of key characteristics relevant to this assessment has been included in the technical document.

Local Landscape Character

8.64. The ‘Greater Manchester Landscape Character and Sensitivity Assessment’, August 2018 [abbr: Greater Manchester LCSA] is the relevant source of published local landscape character assessment. The report was commissioned on behalf of all ten of the local authorities within the Greater Manchester Combined Authority [abbr: GMCA], replaces the earlier landscape character assessments for each of the respective Metropolitan Boroughs.

8.65. According to the Greater Manchester LCSA, the proposed development sites are within the Landscape Character Type ‘Incised Urban Fringe Valleys’. Each site, however, are within close range of urban areas (such as Little Lever) and do not form part of the land classifications in the Greater Manchester LCSA.

8.66. The Greater Manchester LCSA report describes the characteristics for this particular Landscape Character Type under the following terms, those which are of relevance include:

8.67. Topography, geology and drainage:

- ‘Typically narrow, incised valleys cutting through rolling hills which include the Pennine and Dark Peak foothills (where the enclosing landform rises to around 300m AOD).’;
- ‘Upstream the rivers and tributaries are typically narrow and fast flowing, forming steep sided V-shape valleys and gorges. Further downstream the rivers widen and

¹⁴ P.4, *National Character Area Profile 54. Manchester Pennine Fringe*, Natural England, 2013

meander across flatter valley bottoms.’;

8.68. Land use and field patterns:

- ‘Small to medium pastoral fields and horse paddocks on the valley sides and areas of wet grassland and scrub along the valley floor. Some arable fields are found on the drier, flatter ground on the valley floors.’;
- ‘A significant amount of the land with the valleys is used for recreation with amenity grassland associated with golf courses, frequent playing fields and Country Parks.’;

8.69. Semi-natural habitats and woodland cover

- ‘Valleys typically traced by riparian woodland with banks of dense broadleaved woodland (some ancient), distinctive moss-covered trees and a wildflower-rich understorey.’;
- ‘Woodland and areas of parkland create important wildlife corridors between densely populated urban areas, with significant areas designated as Sites of Biological Importance (SBIs) and managed as Local Nature Reserves (LNRs).’;
- ‘SSSI-designated habitats found at Nob End and Ashclough in the Irwell Valley...’;
- ‘Post-industrial and reclaimed land at various stages of regeneration, with locally valued mosaics of scrub, herbaceous vegetation and reedbeds’ which ‘... includes the [LNR] at ‘Moses Gate Country Park’.’;

8.70. Archaeology and cultural heritage:

- ‘The valleys have a long industrial heritage as a power source for the 19th and 20th century cotton industry. Rivers are often flanked by large, sometimes derelict, mills built of gritstone or red brick tall chimneys forming distinctive skyline features.’;
- ‘Other industrial relics include canals, railways, weirs, cobbled roads, and scheduled sites’ such as ‘... Ringley Old Bridge (Bolton).’;
- ‘Landmark viaducts and aqueducts’ including ‘Darcy Lever (Bolton)’ which is a Grade II listed viaducts.’;

8.71. Settlement, road pattern and rights of way:

- ‘The valleys are typically overlooked adjacent urban areas, with some redevelopment sites for housing located on exposed ridges, emphasising their close proximity to densely populated areas.’;
- ‘Major rail and road routes, including the M60, M66, M67 and M6 cross and run partly though some of the valleys. These linear features incorporate extensive cuttings, embankments, bridges and junctions.’;
- ‘Networks of footpaths criss-cross the valleys. Some are formal public rights of way; others simply desire lines running from the surrounding urban areas.’;
- ‘Numerous long-distance footpaths and cycle routes run through the valleys and

along canals’, including ‘... Midshires Way, Rotary Way and Irwell Sculpture Trail.’;

8.72. Views and perceptual qualities:

- ‘Views are typically contained by the steep valley sides and woodland. From the more elevated locations along the valley sides there are views to the surrounding Pennine uplands (including the Peak District National Park) and over Greater Manchester.’;
- ‘While proximity to urban areas, transport and other infrastructure can significantly affect their character, the narrow valley landforms and often dense woodland cover provide a sense of seclusion and tranquillity.’; and
- ‘Major transport infrastructure can sever the valleys’ visual unity, influence local views and break perceptions of tranquillity and the small landform scale. Large pylons frequently dominate views’¹⁵.

8.73. The Greater Manchester LCSA further identifies ‘Landscape Character Areas’ as a sub-set within the Landscape Character Types. Both sites forming the proposed development and application site are in the Landscape Character Area 16: River Irwell (south Bury) and River Croal.

8.74. The Greater Manchester LCSA defines each area has having it analysis of their ‘Sensitivity’, derived through evaluation of assessment criteria, including: physical character (including topography and scale), natural character, historic landscape character, form, density and setting of existing settlement/development, views and visual character including skylines, access and recreation and perceptual and experiential qualities.

8.75. These ‘Landscape and Visual Sensitivity Assessment Criteria’ are rated from low – high. The report considers each of these ratings against a particular ‘development scenarios’, which includes either: 2-3 storey residential housing developments, or commercial/industrial developments.

¹⁵ Pp.58-59, *Greater Manchester Landscape Character and Sensitivity Assessment*, Greater Manchester Combined Authority, 2018

- 8.76. The 'overall sensitivity' of the Landscape Character Area 16 for housing development is Medium. The following evaluation of 'overall landscape sensitivity' for the River Irwell and River Croal area is shown in image 1 [below].

Notes on any variations in landscape sensitivity, by Landscape Character Area					
LCA 16: River Irwell and River Croal, LCA 25: River Roch, LCA 36: River Tame					
2-3 storey residential housing developments			M		
Commercial/industrial developments				M-H	
Explanation for variance in sensitivity from overall LCT scores: These LCAs areas judged to be of moderate-high sensitivity to commercial / industrial developments and moderate sensitivity to 2-3 storey residential housing developments. They contain existing large development, such as electricity substations, water treatment works and industrial complexes, as well as being crossed by motorways, such as the M60, M66 and M67. The surrounding urban areas also have a strong influence, detracting from the rural qualities and naturalistic character of the valleys. This results in lower sensitivity judgements than the LCT as a whole.					

Image 1: extract from Greater Manchester LCSA, overall assessment of landscape sensitivity for River Irwell and River Croal.

- 8.77. The Greater Manchester LCSA report sets out a series of management guidelines, under the heading 'Guidance and opportunities for future development and landscape management/enhancement', affecting proposed development.
- 8.78. This guidance has been used to form the mitigation measures (see: Mitigation section of this chapter), as well as the landscape design input resultant from this chapter.
- 8.79. A full list of 'Guidance and opportunities' taken from the Greater Manchester LCSA has been included within the technical document supporting this chapter.

Landscape Overview

- 8.80. The following descriptions have been prepared with reference to the findings of desk based study along with observations made by the assessor during field studies.

Existing Land Use and Land Cover

- 8.81. The study area has a mixed character which takes in a range of land uses and features combining a more rural and countryside setting and parkland in the river valleys together with an urbanised character on higher elevations/valley sides. The landscape between the settlements on the edge of Bolton and Bury combine a mix of parkland (country parks and nature reserves), as well as a network of canals and natural watercourses. Between the urban areas to the north and west of the study area, land use and landcover is more wooded and

dedicated to parkland. These gradually give way to increasingly open, agrarian landscapes to the east of the study area, between Prestolee, Little Lever and Radcliffe.

- 8.82. In between the urban areas land cover is represented by large and consolidated blocks of broadleaved woodlands, and a mix of riparian woodland and scrub, as well as wetlands and river corridors to the valley floor.
- 8.83. Woodland and mature tree belts are a defining feature throughout the study area, which are located in between Little Lever, the Canal and the valley below and cover the Moses Gate Country Park, before adjoining onto the settlements of Moses Gate, Prestolee and Kearsley.
- 8.84. Land use within these areas to the east of the study area between the conurbations is pastoral in nature. These are typically limited to the stretches along the Manchester, Bolton & Bury Canal and the river corridor. Field patterns are generally of a medium-large size and are bordered by a mix of hedgerows and tree belts. The majority of the study area takes in the urban areas of Bolton and Bury, and land use in these is predominantly dedicated to residential development
- 8.85. As noted within the NCA Profile 54, the periphery of the study area gradually gives way to open and exposed moorland and heath, with pasture-based agriculture, villages and satellite towns to its lower slopes.
- 8.86. The main land cover for the Hall Lane Site and Upper Creams Mill Site (Land off Mytham Road) is self-colonising grassland. Neither site is utilised for agriculture and remains undisturbed, aside for informal, permissive paths that have formed over time. All sites are benefit from existing, established tree belts where they reach the canal-side. The Lower Creams Mill (Former Creams Mill/Housing Allocation) Site is largely wooded along its steepest reaches, which gives way to low-growing, self-colonising vegetation across the former mill site.
- 8.87. All sites show evidence of previous development, which includes areas of disturbed ground, unnatural patterns of vegetation (signally the presence of underground structures and building foundations) as well as large areas of ruins from the abandoned Creams Mill.

Landform

- 8.88. The study area is defined by a shifting valley/foothill topography, which reaches from an elevation of >180m towards the edge of the study area (defined as the foothills of the Pennines) and descends to as low as 30-40m AOD within the valley floor.
- 8.89. The topography is defined by drainage features that cut the landscape and create 'deeply incised' and 'V-shaped' valleys and gorges. Tributaries and major waterways feeding into the River Croal and the River Irwell extend from the north western edge of the study area, and continue in a north-west to south east direction, through the centre of the study area.

- 8.90. These valleys formed by the rivers range in elevation from >90m AOD to around 30-40m AOD, and represent an often steep incline before reaching the river corridors.
- 8.91. Urban development and man-made water features (e.g. the Manchester Bolton and Bury Canal), are found on the upper edge of the valley sides, with an occasional steep drop before reaching the river.
- 8.92. Both sites are represented as following this ridgeline that extends around the south of Little Lever, with the Hall Lane Site and the Upper Creams Mill Site located on gently sloping land between the urban area and the canal.
- 8.93. The Lower Creams Mill (Former Creams Mill/Housing Allocation) Site is located to the south of the canal, and includes a steeply falling landform, before reaching a gentler incline and level areas towards its southern edge, closest to the River Irwell.

Drainage

- 8.94. The wider study area around both sites is heavily influenced by the presence of water (both man-made and natural), and the effect this had on the topography. These are present within the study area, as evidenced by the pattern of naturally occurring landform and drainage that changes from smaller, more abundant tributaries and streams descending from the foothills of the Pennines, towards larger water courses that cut through the landscape (including the River Croal, to the north and west of the study area, and the River Irwell to the east and south).
- 8.95. Introduced, or man-made water courses are also present between the rivers, and form a network of water courses that often follow ridgelines around or in between the settlement edges.

Settlement Pattern

- 8.96. Both sites are bordered by the urban edge of Little Lever, Bolton along their northern boundaries, which comprises an extensive area of suburban development.
- 8.97. The study area broadly defines a 'green corridor' of semi-natural landscapes between the outer settlement edges of Bolton and Bury. The settlement patterning across all the northern edge of Greater Manchester gradually takes in large corridors of urban and commercial development between these towns, which extend southwards and combine with the Manchester/Salford city areas.
- 8.98. The settlements within the study area would generally be described as either suburbs of Bolton and Bury, or satellite villages skirting the Pennine foothills. On the outer reaches of these two large towns, the settlement pattern becomes more clustered and nucleated, allowing for stretches of rural landscapes to intersect between. This defines the settlement pattern seen throughout the study area.

8.99. Within the study area, the larger settlements/areas of Bolton include: Brightment to the north, Little Lever (located roughly centrally, and bordering either site), Moses Gate to the West, Farnworth to the south and south west and Prestolee and Kearsley to the South.

8.100. Little Lever surrounds both sites to the north and combines with Radcliffe, in Bury, to the east.

Visual Baseline

Visual Envelope

8.101. The visual envelope of the site is limited by factors including:

- The varying nature of the river valley – which forms a deep incision through the landscape, only allowing for views across when looking over the valley side;
- The presence of intervening landscape features along the course of the valley floor (woodland, tree belts, built development) which screen views from below;
- Extensive built-form to the north of each site, covering the urban area of Little Lever;
- Built form and urban development on higher ground – to the edge of the river valley and on the upper elevations of the study area;
- Substantial distance between open landscapes on the edges of the study area (foothills of the Pennines, agricultural land to the west of Radcliffe) which are screened by built form and woodland; and
- Extensive woodland cover and mature tree belts in the vicinity of each site and along the course of the Manchester, Bolton & Bury Canal.

Visual Receptors

8.102. The principal groups of visual receptors identified within the study area include:

- Residents of nearby houses;
- Users of PROWs and Long-distance Footpaths
- Pedestrians and users of permissive footpaths and local roads;
- Users of the Manchester, Bolton & Bury Canal Towpath; and
- Visitors to local attractions within the study area including: users of long-distance footpaths, National Trails and Registered Ways, visitors to Local Nature Reserves and nearby Country Parks.

Baseline Views

8.103. The baseline views largely describe the visibility of the site/s, presented within the visual envelope [see: Para. 8.98, for descriptions of the limiting factors that define the visual envelope].

8.104. Although occupying differing receiving environments, both application sites share several common qualities:

- Each site is bordered by extensive suburban development along their northern

boundaries;

- Are within close range of the Manchester, Bolton & Bury Canal (bordering the Hall Lane Site and Upper Creams Mill Site (Land off Mytham Road) sites to the south, and Lower Creams Mill Site to the north); and
- Are situated within heavily wooded areas, where consolidated blocks of trees often screen views.

8.105. The frequency of these views was noted during the field studies and were considered using the definitions provided within the GLVIA [3rd Edition]¹⁶, whereby views along a route can either be considered as 'frequent', 'occasional' or, if not visible 'negligible'.

8.106. The effects upon views for both sites are therefore either limited to viewpoints within close-range of either site – such as along the Manchester, Bolton & Bury Canal towpath, or glimpsed at between adjacent residential properties, and those seen at a distance away from the site boundaries, where the site is not visible.

8.107. To illustrate the regularity of views towards from either site, as part of our assessment we mapped these 'sequential visual effects', which were considered when travelling along nearby routes.

8.108. For viewpoints where the site is visible, elements of the proposed which may be seen are:

- View/s of access road, particularly at site entrances;
- Partial view across parts of the site in close-proximity of the viewpoints; and
- Filtered view/s where either small glimpses may be seen (such as through the canopies of trees, or hedgerows) and/or where the landform allows for glimpses of taller elements within the development, such as roof peaks or the upper storeys of proposed properties.

8.109. The assessment of viewpoints and the effects of the proposed has been considered within the technical document.

Representative Viewpoints

8.110. Representative viewpoints have been selected to exemplify views experienced by receptors in the area surrounding the proposed development.

8.111. These are identified in Table 2, below:

Viewpoint No.	Location	Receptor
1	Junction of Newbury Road and Ascot Road, looking between residential properties towards north of Hall Lane Site	Residents, road users, pedestrians

¹⁶ Table 7.1, para. 7.36, *Guidelines for Landscape & Visual Impact Assessment*, Third Edition, Landscape Institute & Institute of Environmental Management and Assessment, 2013

Viewpoint No.	Location	Receptor
2	Entrance of Little Lever School, looking down A6503/Hall Lane, towards Hall Lane Site	Residents, road users, pedestrians, pupils of school
3	Entrance to permissive footpath, located off A6053/Hall Lane, looking south towards Hall Lane Site	Road users, pedestrians
4	Atop hill along permissive footpath, north of Viewpoint 3, looking downhill along path towards Hall Lane Site	Users of footpath
5	Manchester, Bolton & Bury Canal Towpath, looking towards western edge of Hall Lane Site	
6	Manchester, Bolton & Bury Canal Towpath, south east of Hall Lane Site	
7	Manchester, Bolton & Bury Canal Towpath, south east of Hall Lane Site	
8	Meccano Bridge, adjacent to Prestolee Locks and Prestolee Road	Road users, pedestrians, users of footpath and national trail, locally important attraction, visitors to nature reserve
9	Prestolee Road, descending hill towards Nob End Local Nature Reserve	Road users, pedestrians, users of footpath, visitors to heritage asset, visitors to nature reserve
10	On top of Hill along Rotary Way, close to Oak Hill Farm	Users of footpath and national trail
11	Manchester, Bolton & Bury Canal Towpath, adjacent to northern edge of Prestolee Village	Residential properties, users of footpath.
12	Adjacent to Mytham Road Canal Bridge, along Manchester, Bolton & Bury Canal Towpath, adjacent to entrance of Lower Creams Mill Site	Road users, pedestrians, users of footpath
13	Mytham Road, adjacent to Boscow Nurseries Garden Centre, looking towards Northern edge of Upper Creams Mill Site	Users of footpath.
14	Manchester, Bolton & Bury Canal Towpath adjacent to Lower Creams Mill Site and drained canal basin	Residents, road users, pedestrians.
15	Junction of Cedar Avenue and Beech Avenue, looking through gap between residential properties towards Upper Creams Mill Site	Residents, road users, pedestrians.
16	Within Ladyshore Recreation Area	Visitors to park
17	Adjacent to picnic area and duck pond within Moses Country Park	Visitors to Country Park.
18	Path within Moses Gate Country Park, ascending hill towards Farnworth Cemetery	Visitors to Country Park, users of footpath.
19	Atop hill within Farnworth Cemetery	Visitors to cemetery.
20	Prestolee Road adjacent to Ash Clough and Oakhill Barn Farm	Road users, pedestrians, users of footpath.
21	Prestolee Road, looking through field gate	
22	Public Footpath and farm track, leading north from Prestolee Road, close to Shore Top Farm	
23	Junction between A38/Bury New Road and A665/Radcliffe Moor Road, close to Radcliffe Masonic Hall	

Viewpoint No.	Location	Receptor
24	Junction between A38/Bury New Road and Bradley Fold Road	Residential properties, road users, pedestrians

Table 2: Representative Viewpoints & Receptors

Assessment of Effects

Identification and Evaluation of Key Impacts

8.112. This section provides a general description of the relevant aspects of the proposed development that could affect landscape character and visual amenity and provides evaluation commentary regarding those effects.

The Proposed Development

8.113. This chapter has assessed the landscape and visual impacts based on the detailed layouts provided by the developers and noted within the introductory chapters to this Environmental Statement.

8.114. The proposed development is described at chapter 2 of the ES, which entails:

- Residential development on land at former Creams Mill site alongside land off Mytham Road with associated internal access, landscaping and infrastructure including a new two-way bridge at the former Creams Mill site and provision of two woodland walks;
- Residential development on land south of Hall Lane and west of Newbury Road with new access from Hall Lane and associated landscaping, internal access and infrastructure including path along the canal frontage and path linking Moses Gate Country Park; and
- Repair to the canal breach alongside wider restoration works and re-lining of the Manchester, Bolton and Bury Canal including restoration of Canal towpath.

8.115. The elements of the proposed that have potential to affect landscape character and views include:

- New buildings: proposed heights to be between 2 and 3 storeys;
- Temporary construction activities including aspects such as site clearance, movement of vehicles plant and machinery, installation of site compounds and materials storage;
- Construction work in order to restore the Canal Breach; and
- The loss of trees and vegetation on site e.g. peripheral canal side trees which would

open up views directly into the site.

8.116. The assessment has been based upon a maximum height for the properties as being up to 3 storeys (<9m). The vast majority of the proposed properties will be of a lesser height than this, standing at 2 storeys.

8.117. Building heights and site layout were based upon plans prepared by TADW Architects Ltd. in 2020 (Dwg. No. 021295 12P1 - Proposed Site Plan, Hall Lane and Dwg. No. 021294 10 P7 – General Arrangement Site Plan, Creams Mill).

Landscape Effects

Landform

8.118. The steep valley landform is a defining characteristic throughout the study area and within the immediate context of both sites. The strong and distinctive attributes of this varying topography is regarded as being sensitive to change, as evidenced during the desk-based review and through study of the published landscape character (see: Baseline Conditions section of this chapter).

8.119. The landform in the immediate surrounding area around both sites forms part a deeply incised river valley, commencing near to the Hall Lane Site, with the settlement edge and canal skirting a ridgeline around the top of the valley.

8.120. Changes to the landform across both sites are not easily perceived within the wider study area and the development proposals have sought to incorporate existing ground levels wherever possible.

8.121. Site levels will not be changed dramatically from present conditions across the Hall Lane Site and the Upper Creams Mill Site. Both of these sites represent a gently sloping topography which could generally be incorporated and utilised within the development proposals.

8.122. Extensive levelling would be required for the Lower Creams Mill (Former Creams Mill/Housing Allocation) Site. The topography south of the canal slopes steeply before levelling off towards the River Irwell and on the former footprint of Cream Paper Mill, which would require a greater degree of alteration to ensure the proposed development is safely constructed.

8.123. Changes to the landform within the Lower Creams Mill Site would likely require a degree of cut and fill or terracing for properties across the slope to form a level platform for development. The access road in and out of the site and development covering the former footprint of the mill, would be of a lesser extent and generally utilises the existing topography (subject to detail design).

8.124. Whilst on-site earthworks would be required in order to modify the slope within the Lower Creams Mill Site, the end result would nevertheless fit with the valley landform, with any proposed cut-and-fill forming terraces which follow the general slope.

8.125. The impact upon this receptor arising from the proposed development is expected to be slight.

Land Use, Land Cover, Trees and Hedgerows

8.126. The majority of the land cover for both the Hall Lane Site and the Upper Creams Mill Site is predominantly open grassland, enclosed by hedges, mixed scrub and trees and mature tree belts bordering the edges of the Manchester, Bolton & Bury Canal (entire in the case of the Upper Creams Mill Site, partial for that of the Hall Lane Site).

8.127. The Lower Creams Mill Site represents a more varied pattern of vegetation and (former) land use – combining stretches of mature broadleaved woodland, former, historic industrial development, hardstanding and grassland/wetland towards the River Irwell.

8.128. The removal of existing trees on all sites is predicted and the land use would invariably be changed to residential development. Trees within the Hall Lane site would be removed along the northern boundary, in creation of the access road into the site, and to the southern corner of the site.

8.129. For the Upper Creams Mill Site (Land off Mytham Road) Site, the loss of trees would be limited, and focused on the boundaries of the site/s to create pathways and selective removal to form the proposed road link with the Manchester, Bolton and Bury Canal, and the Southern Site.

8.130. As a large proportion of the Lower Creams Mill Site is established as woodland, particularly across its northern reaches, the loss of trees would be increased. Generally, the proposed site layout has retained large blocks of tree within this area and has incorporated these into the residential scheme.

8.131. For the Hall Lane Site and the Upper Creams Mill Site, landcover and land use is primarily grassland with areas of scrub, which now be established as an extension to the adjoining residential area/s.

8.132. Again, in the case of the Lower Creams Mill, the changes to landcover and land use would be greater. These would involve changing former historic industrial area into a new residential estate. Largely, the proposed site layout for the Lower Creams Mill Site follows previously developed land, and/or develops over grassland and disturbed ground close to the river corridor.

8.133. The development of housing on both sites will be a noticeable change in land use and land cover – through converting open grassland into urban, residential development. From the observations made during the field studies, the effect of the proposed development on landcover in the context on its wider surroundings (urban fringe, to the edge of an existing residential area) will be less notable and can easily integrate the proposed. The overall impact on land use, land cover, trees and hedgerows is determined to be slight.

Overall Effects on Landscape Character

- 8.134. As described in the Baseline Conditions section of this chapter, at a local level the site and surrounding areas are placed by the Greater Manchester LCSA, within the Landscape Character Type: Incised River Valleys, and described as being within the Landscape Character Area: River Irwell and River Croal.
- 8.135. All sites share some of the key characteristic elements that are described in the Greater Manchester LCSA, principally in relation to the combination of topography and drainage, woodland, access to parkland, agricultural land (east of the study area) and the historic nature of industry and settlement in the area (including the presence and influence of the Canal network).
- 8.136. In addition to the descriptions with the Greater Manchester GCSA, In the context of all sites, it is of note that these share a direct relationship with the adjoining residential areas as well as historic industrial development that serviced, or helped establish these urban areas (such as the Manchester, Bury & Bolton Canal).
- 8.137. For both the Hall Lane Site and the Upper Creams Mill Site, the northern boundaries of each about the existing urban area of Little Lever. For landscapes directly south of the Manchester, Bolton & Bury Canal, the character shifts abruptly from suburban, predominantly residential areas, to a more rural and tranquil setting, combining large areas of parkland and nature reserves, as well as extensive woodland cover following the course of the River Corridors.
- 8.138. When considering the wider study area, the Landscape Character Type – Incised River Valleys, forms a wide tracts that intersect between existing urban areas in Bolton, including Farnham and Prestolee. The site and surroundings differ from other areas in the LCT in that they share a direct correspondence with the townscape surrounding them.
- 8.139. The Hall Lane Site, this is represented through existing residential development to the north, as well as to the east, which continues along the Manchester, Bolton & Bury Canal, such as where the rear gardens of existing properties on the edge of Little Lever face onto the waterway.
- 8.140. For the Upper Creams Mill Site, the land is also within close range of the residential area of Mytham in Little Lever and is only separated from existing built-up edge by a broadly triangular patch of land utilised for Community Allotments
- 8.141. The Lower Creams Mill Site shares a more direct and noticeable relationship with the Greater Manchester LSCA and combines a steeply descending topography between the Manchester, Bolton & Bury Canal and the river, which incorporates a former mill site with mature woodland.
- 8.142. The overall proposed pattern of development within both sites is typical in the broader context of the landscape and will extend along the ridgeline of the valley and follow

established settlement patterning, or cover areas of former development (Creams Paper Mill), which are generally well concealed within the landscape.

8.143. It is unlikely that an extension to these urban areas will be considered as having a noticeable effect upon wider landscape character, although may be prominent within the localised areas directly adjacent to the site/s.

8.144. The distinctive quality of the landscape has a tranquil quality and its positioning - nestled between extensive urban areas, would consider the landscape character as having a high significance. Whilst some localised change may be noticeable as a result of the proposed, it is clear that the surrounding landscape has abundant features (including visual containment caused by landform and woodland cover) that these can easily be integrated with little effect on the wider landscape character.

8.145. In light of this, the significance of impact on the general landscape character of the area will be considered as generally moderate to slight, when considered at a close distance. However, the visual containment of the sites, when considered from a distance, or when appreciating the landscape character overall, could however, be considered as neutral and negligible.

Visual Effects

8.146. The identification of effects is considered during construction, at Year 1 [Opening Year] following implementation of any proposed landscape mitigation but prior to its establishment and at Year 15 where mitigation planting is established and is maturing.

8.147. The visual envelope of the proposed development is described at within the Baseline Conditions of this chapter. This has been used to inform the choice of viewpoints which aids in the assessment of visual effects.

8.148. As outlined in the Baseline Conditions, the visual envelope for both sites is limited to a 'close-range' of either site boundary, and the assessment of visual effects for all sites, can generally be grouped into two categories, based upon the availability of views.

8.149. The findings of the field studies showed that beyond a close-range of the site/s, it was not possible to obtain views of the proposed development, and that the visual envelope would not extend beyond an extent greater than 100m. The assessment of visual effects has therefore grouped these into 'Representative Viewpoints Where the Site/s Are Visible', and those where these are not. These locations broadly describe the visual envelope and could otherwise be described as being either 'in close range of the site' or viewed 'from the wider study area'.

8.150. Viewpoints in close range of the Hall Lane Site include viewpoints 1-5, and when considering the Creams Mill Site/s includes viewpoints 11-15.

- 8.151. Viewpoints 1-4 have been taken to the south west of Little Lever, and generally describe visual amenity around the boundaries of the Hall Lane Site, when considered from the urban area of Little Lever. Within these viewpoints, it was established that visual containment from existing built-form and mature trees, combined with a generally flat topography atop the ridgeline above the Manchester, Bolton & Bury Canal, would be sufficient in limiting views beyond a distance of >100m.
- 8.152. Viewpoints 1 & 2 show that views of the proposed development would be experienced by the residents of properties directly facing towards the site. For viewpoints 3 & 4, the view describes visibility of the site on approach from Moses Gate Country Park.
- 8.153. Generally, for all viewpoints listed above, the change in view would be consistent with that of its receiving environment and could be considered as a limited, small-scale extension to the existing urban area of Little Lever.
- 8.154. Views from the canal to the south of the Hall Lane Site were also considered, and it was determined that only viewpoint 5, towards the entrance of the Manchester, Bolton & Bury Canal towpath, would be affected and that the visual envelope recedes following viewpoint 6.
- 8.155. The view would consist of a new residential estate, which when compared with present conditions, would be a noticeable change. This view would be considered alongside sympathetic development seen throughout the route along the towpath – where newly built properties face directly onto the canal, such as those featured within viewpoint 6.
- 8.156. The receptors of these views, which include users of the towpath, would consider this alongside the existing visual conditions along the route, and again, the proposed would be treated as a small-scale extension to the existing context.
- 8.157. When considering the Creams Mill Site, a similar visual envelope was established – whereby viewpoints looking directly towards the site are contained to either – along the towpath, where site boundaries adjoin the Manchester, Bolton & Bury Canal, or when traveling towards the Mytham area, to the South of Little Lever.
- 8.158. For the Upper Creams Mill (Land off Mytham Road) Site, these include viewpoints 13 & 15, and for the Lower Creams Mill Site, include viewpoints 12 & 14. With the exception of viewpoint 15, these also describe the visual envelope and do not exceed a distance of more than 50m from the site boundaries.
- 8.159. The Upper Creams Mill Site is well visually contained from the Manchester, Bolton & Bury Canal towpath, and is separated by a band of mature, broadleaved trees. These would limit views towards the proposed, even during the winter months. For viewpoint 13, which is located at the entrance to the Upper Creams Mills Site, receptors would experience similar visual conditions described as those in Viewpoint 1 – whereby adjoining properties to the site,

or observers from the surrounding road would see directly into the site western portion of the site, through a small window between surrounding properties.

8.160. When travelling along the adjacent roads on the edge of the residential area adjoining the site, it was not possible to obtain a view from publicly accessible land (see: viewpoint 15), due to visual containment of existing built-form and the buffering effect that the adjacent community allotments creates.

8.161. For the Lower Creams Mill Site, an observer experiences a differing set of visual conditions – and all viewpoints would only be considered from the Manchester, Bolton & Bury Canal towpath. Views of the proposed development from these locations would be limited to development along the upper reaches of the topography (north of the site) and would be filtered through existing mature broadleaved trees. These viewpoints would experience a greater change in effect from present conditions, although these would be towards only the closest reaches of the site.

8.162. The experience of visual receptors (users of the Manchester, Bolton & Bury Canal towpath, pedestrians and road users in Little Lever and properties close to the sites) would at worst have a moderate effect. These receptors would include 9no. viewpoints of the 24no. total assessed (viewpoints 1-5 for the Hall Lane Site, and viewpoints 11-14 for the Creams Mill Site) but are overall considered to be no more than slight.

Views from the Wider Study Area

8.163. Views from the wider study area cover a wide range of different landscapes and visual conditions throughout the study area. These range from upland moors and Pennine fringe villages to the north of the study area, to extensive suburban development, as well as wooded, incised river valleys shifting towards open agricultural land.

8.164. During the field studies it was not possible to obtain views towards either site, nor intervisibility between the separate development sites.

8.165. The visual envelope describes a greatly varying topography, which has extensive woodland cover following the river valley. The urban area of Little Lever also further limits views towards the site/s.

8.166. Even when considering viewpoints from elevated positions throughout the study area, which could theoretically afford a view of the site (see: Section 2 for description of ZTVs, and Section 10 for methodology used), it was not possible to see either site, due in part, or in whole, to either the presence of built form, or due to intersecting bands of woodland.

8.167. These viewpoints have been grouped together within the assessment tables as ‘Summary of viewpoints from where the site is not visible’ (see: Section 10), and would result in effects that are negligible.

Summary of Visual Effects

- 8.168. The visual envelope of the proposed development is limited by the intervening landscape features such as: mature broadleaved trees and woodland, built form and a greatly varying topography.
- 8.169. Opportunities to view the proposed development openly are anticipated to be limited to those locations in close proximity to the site such as from Manchester, Bolton & Bury Canal towpath, or adjacent to the site and from neighbouring residential properties on the southern edge of Little Lever.
- 8.170. The most notable effects will, therefore, be experienced by receptors at these nearby locations close to the boundaries of either site. These receptors would experience, at most, a moderate adverse effect on views.
- 8.171. However, when assessed against the wider, receiving landscape (i.e. on the very edge of an extensive urban area, with a limited and localised visual envelope) a slight effect would be predicted. As a result of this, the visual presence of either site is not perceived beyond close range of the site boundaries. For the remainder of the study area (not including viewpoints 1-5, nor 11-14) then the visual effects would be negligible.

Mitigation

Mitigation Generally

- 8.172. Mitigation is required where there is a need to reduce effects resulting from impacts associated with development. Mitigation can be 'built-in' to the project which is an ideal way to minimise environmental effects known as inherent (or primary mitigation). Inherent mitigation includes methods such as careful siting, avoidance, and retention of sensitive features. Secondary mitigation is in addition and is necessary to reduce unavoidable effects of the development. In some cases, the need for secondary mitigation may be avoided if inherent mitigation is effective and sufficient.

Inherent Mitigation

- 8.173. The proposed development would involve changes to both sites involving the conversion of open grassland into proposed residential areas, and in the case of the Lower Creams Mill Site, developing a former industrial site, set within woodland, into residential properties. Both sites consist of previously developed land (former mill site, mining), and contain few landscape features that cannot be replaced, or easily retained as part of the development proposals (including trees and woodland).
- 8.174. Both developments are bordered by areas of established suburban development, and sites are visually well-contained. Consequently, the visual presence of the proposed development would be limited, should screening devices (existing woodland blocks and tree belts) be retained and enhanced.

- 8.175. In the case of the Hall Lane Site, the proposed would continue the vernacular of the adjacent urban form. The siting of the proposed houses can be achieved so that adjacent trees to the south east of the site bordering the Manchester, Bolton & Bury Canal, can be retained. Any loss of trees along the boundary with the canal will be replaced.
- 8.176. The Upper Creams Mill benefits from an existing tree belt extending from the canal. This too can be retained, and the siting of proposed residential properties can be handled so that these existing trees can be kept. The site boundaries of the Upper Creams Mill Site also follow the line of an adjacent community allotments, along its northern edge. This boundary can be enhanced through secondary mitigation (proposed hedgerows and trees), although benefits the siting of the development by providing a buffer between existing residential area and the proposed.
- 8.177. The Lower Creams Mill Site contains a substantial degree of woodland cover. The retention of woodland blocks, particularly to the north of site, should be achievable which would lessen the impact of the proposed when considered from nearby receptors (canal towpath, for example).
- 8.178. Introduced elements such as the access road, largely follows previous development (spine road to former mill complex, or road bridge across the Manchester, Bolton & Bury Canal) and across the footprint of the former mill complex.
- 8.179. The layout can be designed to avoid the need to affect perimeter trees which screen either site, even if the loss of woodland within the site interior (Lower Creams Mill Site) may occur. Where practical, the retention of consolidated blocks of trees would thereby retain features that currently are of benefit for screening.

Secondary Mitigation

- 8.180. The proposed development would result in some adverse effects on views, although these would only be experienced within a short distance from either site boundary. To some extent, these are limited by the nature of the existing environment which is mixed in character and is peripheral to urban areas and existing suburban development.
- 8.181. Secondary mitigation for the Hall Lane Site is designed to respond to the setting with the following principles:
- The retention of the existing vegetation (tree belt to south and south west of the site) on site or to boundaries;
 - The inclusion of amenity tree planting to any green spaces in key locations to the interior of the development for filtering views;
 - The use of garden trees, proposed for properties whose rear curtilage faces onto the surrounding, existing properties, in order to filter views;
 - The use of large-growing tree species, where practical and appropriate, to green

spaces – which would ultimately provide filtering in views and ‘break up’ the appearance of rooflines across the site

- Tree planting and/or specimen shrubs to front curtilages of properties, where practical (allowing for appropriate distances from buildings and windows);
- Enhancements to facilitate public access to the country park and canal; and
- Use of indigenous tree and shrub species for public areas, which are typically found in the site and surrounding area.

8.182. Secondary Mitigation for the Upper Creams Mill Site is designed to adhere the following principles:

- Retention and enhancement of existing vegetation, particularly to the southern boundary shared with the Manchester, Bolton & Bury Canal, and along the western boundary, bordering Mytham Road, and to the south of the proposed access road;
- The use of hedgerows and scattered hedgerow trees to properties along the northern boundary, shared with the community allotments, to further filter residual views of the proposed seen from existing properties, and better integrate with the adjacent allotments;
- The inclusion of amenity tree planting to any green spaces in key locations to the interior of the development for filtering views;
- The use of large-growing tree species, where practical and appropriate, to green spaces – which would reach an eventual height above the surrounding residential properties;
- Tree planting and/or specimen shrubs to front curtilages of properties, where practical (allowing for easements to building foundations account for root spread); and
- Use of indigenous tree and shrub species for public areas, which are typically found in the site and surrounding area.

8.183. Proposed Secondary Mitigation for the Lower Creams Mill Site should utilise the following principles:

- Retention and enhancement of woodland blocks along the northern boundary, shared with the Manchester, Bolton & Bury Canal;
- Gap-filling of areas where woodland blocks may allow for glimpsed views to the proposed, when seen from the Manchester, Bolton & Bury Canal Towpath;
- Proposed development (access road) to follow the line of the previous road, and any trees affected during remedial works to be re-planted with appropriate native species;
- Retention of trees within woodland blocks to the interior of the site, where practical, to form a green spine through the development, and filter or screen views to

proposed properties to the south (shared with the river corridor);

- Native tree planting and replacement within green spaces through the interior of the development;
- The inclusion of amenity tree planting to any green spaces in key locations to the interior of the development for filtering views;
- Enhancements to facilitate public access linking the Creams Mill Site with the Manchester, Bolton & Bury Canal, the nearby Nob End Nature Reserve, and the proposed; and
- Use of indigenous tree and shrub species for public areas, which are typically found in the site and surrounding area, with consideration for integrating the proposed with the surrounding, established woodland.

8.184. Further mitigation measures may be included and subject to detailed design. For example, these can include the appropriate selection of colours and materials that fit with the local architectural vernacular and avoiding paler shades to building side elevations where they are predominantly viewed against a darker wooded background. The use of matt finishes to avoid reflection may be utilised to minimise effects.

Cumulative Impacts

8.185. Cumulative impacts describe the ways in which the proposed development will have additional impacts on landscape character and visual amenity when considered together (i.e. more than one site within an application), or when considered alongside other projects of a similar type, which may result in additional impacts.

8.186. The proposed development covers two distinct application sites, which are separated from each other by an approximate distance of 1.2-1.4km.

8.187. During the field studies it was determined that neither proposed residential development site could be viewed together (seen 'in combination') or would be visible successively when travelling along a route (seen 'sequentially').

8.188. The reinstatement of the Manchester, Bolton & Bury Canal along the course of the 1936 canal breach, would be visible along the route of the towpath. Elements of the proposed development would be seen in combination with this, such as a proposed pedestrian bridge and access road leading to the Lower Creams Mill Site. However, where these proposed elements span both the canal breach and the Creams Mill site, these are correlative with the present conditions and would replace existing elements (the bridge and road) with new.

8.189. Reference has been made to any developments (typically similar in scale and nature to the proposed development) proposed within the vicinity of the project which could lead to significant effects cumulatively when combined with effects of the proposed development.

8.190. The EIA scoping request to the Local Planning Authority (abbr: LPA) listed developments proposed to be considered as part of cumulative impact assessment for the project. These included:

- **Lever** Gardens, Little Lever, Bolton (Application reference - 08816/20): Erection of Extra Care units comprising 62 Apartments and 6 bungalows with Bistro, Staff Facilities, Communal Areas, Ancillary Accommodation, Parking and Landscaping. Pending determination. Lever Gardens was previously home to a 24 unit sheltered housing scheme which was declared not fit for purpose; and
- Land at Victory Road, Little Lever, Bolton (04748/18): 22 dwellings with associated parking, landscaping and re-routing of existing public right of way. Approved 29 March 2019.

8.191. From the projects listed above, none is considered to have potential for cumulative landscape and or visual effects in conjunction with the proposed development, for reasons including:

- Both 'Little Lever Gardens' and 'Land at Victory Road' are located within the urban area of Little Lever at approximately 650-850m and 950m from both application sites, respectively. The surrounding urban environment provides a sufficient foil to limit any inter-visibility with either application site, and has enough distance between the centre of the townscape and its outer edge to limit any sense of visual connectivity or continuity with the proposed;
- The relatively flat nature of Little Lever, coupled with screening from woodland and built form along the Manchester, Bolton & Bury Canal, means that neither of the (above) projects would overshadow the proposed developments, and neither project nor application site is visible within distanced views; and
- The lack of inter-relationship between 'Little Lever Gardens' and 'Land at Victory Road' alongside the proposed, would result in no significant changes to the existing views or character of the area.

8.192. Both projects are included within the urban area of Little Lever, and neither development is within 500m of the application sites. As with the application site/s, both schemes have also been constructed on previously developed land.

8.193. The methodology for assessing cumulative impacts upon landscape and visual amenity has been included within the technical document.

8.194. A summary of cumulative impacts, based upon the (above) mention planning applications, has been included in table 3, below:

Summary description of the identified impact	Significance of potential impact	Nature of the impact	Mitigation	Residual effect	Confidence Level
Cumulative Impacts on Landscape					
Effects on landscape/townscape character	Neutral	Lever Gardens, Little Lever, Bolton Extra care facility within urban area, approximately 650m (to Hall Lane) and 850m (Creams Mill) No perceived change in character of the existing urban fabric and or prominent landscape features.	None required	Neutral	High
	Neutral	Land at Victory Road, Little Lever, Bolton Housing development within urban area, approximately 950m (to both sites)	None required	Neutral	High
Cumulative Impacts on Visual Amenity with reference to representative viewpoints used in the assessment see Section 11					
Effects on views of the separate parts of the site in combination (intra project effects, including both application sites)	Neutral	Hall Lane and Creams Mill application sites are distanced by 1.2-1.4km and cannot be seen in combination, nor sequentially in the wider landscape. The canal breach and replacement bridge replaces existing, and would not result in a significant alteration to existing views. Intervisibility between application sites or elements of the proposed is not possible within the surrounding landscape, due to screening by woodland, built-form and/or level changes within the topography.	None required	Neutral	High
Effects on views of proposed development/s in combination with extra care facility development at Little Lever Gardens	Neutral	Little Lever Gardens is distanced from either application site. The scheme is located within the Little Lever and is enclosed by existing development in the urban area. Distanced views do not include Little Lever Gardens alongside the proposed, which are	None required	Neutral	High

		<p>screened by woodland, built form and changes in landform.</p> <p>It is not possible to experience views of the developments together.</p> <p>Effects are negligible in this context, visual changes as a result of both developments (Little Lever Gardens and the proposed) will not be perceived in views from the surrounding area.</p>			
Effects on views of proposed development/s in combination with extra care facility development at Land at Victory Road	Neutral	<p>Land at Victory Road is located approximately 100m north of Little Lever Gardens.</p> <p>Description given for Little Lever Gardens also apply for development on Land at Victory Road, whereby – intervening landscape features in the surrounding area screen views towards the scheme.</p>	None required	Neutral	High

Residual Effects

Residual Effects Generally

8.195. Residual landscape and visual effects are considered fifteen years after opening [year 15/design year] to allow sufficient time for any specific mitigation planting and other landscape works to mature and achieve their intended effect.

Residual Landscape Effects

Landform

8.196. There is no anticipated further change in landform at year 15 and therefore the significance of landscape effects on landform will be the same as year 1, slight.

8.197. During construction and at year 1 land use and landcover will undergo substantial change. There is no anticipated further change in landcover and use at year 15 beyond that already undertaken by year 1.

Land Use, Landcover, Trees and Hedgerows

8.198. New planting areas will be laid out as part of the development and mitigation strategy at year 1 and will have established by year 15 however this does not alter the scale of change in respect of these aspects on the site or the overall effect judged to be slight.

Overall Landscape Character

8.199. The receiving landscape, although of medium sensitivity, has enough visual containment that the proposed could be successfully incorporated into the landscape without any detrimental,

or lasting effect upon landscape character. As the presence of either, or both, sites are visually limited to a close reach of the site, a noticeable effect on landscape character would not generally be felt. Both sites are equally affected by their proximity and relationship with their surrounding context – influenced by the built-up edge of Little Lever and the established suburban setting. Physical limits are placed on both developments, which are limited by the physical barrier that the Manchester, Bolton & Bury Canal (and in the case of the Lower Creams Mill Site) the River Irwell presents. As such, the residual effect of the proposed upon landscape character would be limited.

8.200. At Year 15, following establishment of landscape mitigation the site would be reasonably integrated into the wider setting of the surrounding landscape which comprises buildings set within woodland blocks on the upper slopes of the valley landform (Lower Creams Mill Site) and as a small-scale extension to the residential areas of Little Lever (Hall Lane Site and Upper Creams Mill Site).

8.201. The existing baseline landscape character of the study area is mixed and comprises various elements that are typical of urban fringe areas and an abrupt transition to countryside. The site is in an area that has previously been affected by historic industrial development, or is adjacent to existing suburban areas. The overall sensitivity of these landscapes was considered by the Greater Manchester LCSA as being ‘moderately’ sensitive to 2-3 storey residential development. However, based upon findings established during the field studies – the limited presence of either site would probably warrant a lower rating of sensitivity and is more accepting of the proposed change.

8.202. The proposed development is will inevitably result in some adverse effects on landscape character as the development involves a change from present conditions and the extension of the urban area. However, the scale and overall effect of this in the context of the Incised River Valley landscape character type is limited and predicted to be slight at close range, with negligible effects on landscape character of the wider study area.

Residual Visual Effects

8.203. By year 15 views of the proposed development will be largely screened by existing, retained trees and/or additional planting and/or other built form (representative viewpoint 1-4, and 13). The main residual visual effects of the development will relate to the visibility of residential properties, which will be present from year 1 and, when considered amongst the surrounding urban form, and the limited visual envelope around both sites, this will be of slight impact. As mentioned previously, the most notable changes will be observed from towpath closest to the site/s (representative viewpoint 5, 12 & 14).

8.204. From these locations, effects will range from moderate to slight with the greater levels of effects relating to relatively short sections of the towpath, and therefore, should be regarded as being part of a ‘journey’ which features a series of views along the route, often corresponding to the visual conditions caused by the proposed. Adjacent residential

properties overlooking the site would also experience a residual effect, present at year 15. These can be limited further by mitigation planting to the rear curtilages of the proposed properties, which would at this stage, lessen any views to glimpses, seen filtered through the trees.

- 8.205. In the majority of locations views throughout the study area the proposed development is screened, resulting in negligible effects. From locations further from the site, the proposed would not be visible, or at worst, would be filtered to such an extent that it would be considered as only a small and insignificant feature within the view.

Assessment Summary

Summary of Effects on Landscape Character

- 8.206. The landscape around the site is, according to the Greater Manchester LCSA, is of 'moderate' sensitivity to 2-3 storey residential development. It is acknowledged that the landscape character type in which the site/s sit, is also affected by its proximity to the urban areas of Bolton and Bury on either side of the River Irwell and River Croal Valley.
- 8.207. There are strong and distinctive characteristic elements noted in the landscape character assessment which can be found in the immediate surroundings of the proposed development, and it is noted for its distinctive 'natural' and scenic qualities, which range in sensitivity from 'moderate to high) to 'high'.
- 8.208. The effects on landscape features as a result of the proposed are, however, limited to minor alterations to land use, and/or change in land use to residential development, considered as an extension to an already existing urban area, with both sites being sharing more of a 'urban fringe' character, than with the wider landscape character type defined by the Greater Manchester LCSA.
- 8.209. By and large, these changes are only apparent within a small geographical range and would not be noticeable from the wider area.
- 8.210. With the proposed mitigation, the proposed development can be integrated as far as reasonably practical to the receiving landscape, which has capacity to accommodate alteration without causing a substantial impact. The lasting impact from the proposed development will be slight on the local landscape character on approach to the site, and negligible overall.

Summary of Effects on Views

- 8.211. The locations from where visual receptors will experience higher levels of effect are those on the Manchester, Bolton & Bury Canal towpath nearest to the site, or from properties directly facing onto the site/s.

- 8.212. These locations show a limited visual envelope overall, and do not exceed beyond a small portion of a route along the Manchester, Bolton & Bury Canal, or in and amongst a perceivably suburban, residential area.
- 8.213. Receptors are of medium sensitivity but will only experience a medium to slight changes in views from those locations nearest the site. From other parts of the towpath, or when looking across the valley from higher elevations the development would not be visible and therefore the overall experience of the PRoW users are generally unaffected, except for those at a short in duration and is seen within the context of other similar views.
- 8.214. Changes in views will be notable from nearby residential properties. Receptors are of high sensitivity and will experience notable changes in views but these will not be significant overall (moderate) and will be minimised over time with the inclusion of the proposed mitigation measures resulting in potential to reduce effects further (moderate/slight).
- 8.215. Mitigation planting once established will filter screen views to a great extent for those seen at close range and will supplement the existing broadleaved woodland, and would be over time, considered as slight.
- 8.216. The vast majority of the study area, beyond a close range of the site/s, where the visual envelope recedes, would not experience any change to views, and the impact would be considered negligible.

Tabular Summary of Impacts

8.217. A tabular summary of landscape effects has been included below:

Nature of Effect	Significance of Impact	Magnitude of Impact	Duration	Mitigation	Residual	Level
Landscape Effects in Operation						
Landform	Moderate	Slight	Permanent	Hall Lane: Minor alteration to levels utilising and maintaining the existing site landform.	Slight	Local
Land Use	Slight	Slight	Permanent	Inherent mitigation	Slight	Local
Land Cover	Slight	Slight	Permanent	Soft landscaping proposed, replacement planting	Slight	Local
Trees and Hedges	Moderate	Moderate	Permanent potential for reversing effects in long term and enhancement	Soft landscaping proposed, replacement planting and retention of woodland and boundary trees wherever possible	Slight	Local
Landscape Character Area: (Local) Landscape Character Area 16:	Moderate	Negligible	Permanent	Inherent mitigation and soft landscaping proposed	Negligible	Local

River Irwell and River Coral						
Overall Landscape Character	Moderate	Negligible	Permanent	Inherent mitigation and soft landscaping proposed	Negligible	Local

8.218.A tabular summary of visual effects has been included below.

VP No.	Viewpoint Location	Significance of Impact	Magnitude of Impact	Duration	Mitigation	Residual
Visual Effects						
1.	Junction of Newbury Road and Ascot Road	Moderate	Moderate	Permanent	Inherent mitigation and soft landscaping proposed	Slight
2.	Entrance of Little Lever School	Moderate (Residential properties in urban area - oblique views)	Moderate/Slight Adverse	Permanent	Inherent mitigation and soft landscaping proposed	Moderate/Slight Adverse
3.	Entrance to permissive footpath, located off A6053/Hall Lane	Slight	Slight Adverse	Permanent	Inherent mitigation and soft landscaping proposed	Slight Adverse
4.	Atop hill along permissive footpath, north of Viewpoint 3, looking downhill along path towards Hall Lane Site	Moderate	Slight Adverse	Permanent	Inherent mitigation and retention of trees	Negligible
5.	Manchester, Bolton & Bury Canal Towpath, looking towards western edge of Hall Lane Site	Substantial	Moderate	Permanent	Inherent mitigation and soft landscaping proposed	Slight
6.	Manchester, Bolton & Bury Canal Towpath, south east of Hall Lane Site	Substantial	Negligible	Permanent	None, no view to either site	Negligible
7.	Manchester, Bolton & Bury Canal Towpath, south east of Hall Lane Site	Substantial	Negligible	Permanent	None, no view to either site	Negligible
8.	Meccano Bridge, adjacent to Prestolee Locks and Prestolee Road	Substantial	Moderate - Slight	Permanent	Restoration of canal breach	Slight
9.	Prestolee Road, descending hill towards Nob End Local Nature Reserve	Substantial	Negligible	Permanent	None, no view to either site	Negligible
10.	On top of Hill along Rotary Way, close to Oak Hill Farm	Substantial	Negligible	Permanent	None, no view to either site	Negligible

11.	Manchester, Bolton & Bury Canal Towpath, adjacent to northern edge of Prestolee Village	Substantial	Negligible	Permanent	None, no view to either site	Negligible
12.	Adjacent to Mytham Road Canal Bridge, along Manchester, Bolton & Bury Canal Towpath, adjacent to entrance of Lower Creams Mill Site	Substantial	Moderate – Slight	Permanent	Soft landscaping proposed, restoration of canal breach and retention of trees	Moderate – Slight
13.	Mytham Road, adjacent to Boscow Nurseries Garden Centre, looking towards Northern edge of Upper Creams Mill Site	Substantial	Moderate – Slight	Permanent	Inherent mitigation and soft landscaping proposed	Moderate – Slight
14.	Manchester, Bolton & Bury Canal Towpath adjacent to Lower Creams Mill Site and drained canal basin	Moderate	Moderate – Slight	Permanent	Soft landscaping proposed, restoration of canal breach and retention of trees	Slight
15.	Junction of Cedar Avenue and Beech Avenue, looking through gap between residential properties towards Upper Creams Mill Site	Moderate	Negligible	Permanent	None, no view to either site	Negligible
16.	Within Ladyshore Recreation Area	Moderate	Negligible	Permanent	None, no view to either site	Negligible
17.	Adjacent to picnic area and duck pond within Moses Country Park	Substantial	Negligible	Permanent	None, no view to either site	Negligible
18.	Path within Moses Gate Country Park, ascending hill towards Farnworth Cemetery	Substantial	Negligible	Permanent	None, no view to either site	Negligible
19.	Atop hill within Farnworth Cemetery	Low	Negligible	Permanent	None, no view to either site	Negligible
20.	Prestolee Road adjacent to Ash Clough and Oakhill Barn Farm	Moderate	Negligible	Permanent	None, no view to either site	Negligible
21.	Prestolee Road, looking through field gate	Moderate	Negligible	Permanent	None, no view to either site	Negligible
22.	Public Footpath and farm track, leading north from Prestolee Road, close to Shore Top Farm	Moderate	Negligible	Permanent	None, no view to either site	Negligible

23.	Junction between A38/Bury New Road and A665/Radcliffe Moor Road, close to Radcliffe Masonic Hall	Slight (Road users and pedestrians) Moderate (Residential properties)	Negligible	Permanent	None, no view to either site	Negligible
24.	Junction between A38/Bury New Road and Bradley Fold Road	Slight (Road users and pedestrians) Moderate (Residential properties)	Negligible	Permanent	None, no view to either site	Negligible

8.219. The summary tables have been upon the findings within the technical document.

Conclusion

8.220. National and local level planning policy encourages sustainable development in suitable locations that do not have significant effects on the landscape. The proposed development supports this in that it is on a site on which landscape and visual effects can be minimised, and is included within a wider setting whereby either, or both, sites would not be perceived. It is considered that the site has capacity to accommodate the proposed development without significant residual, adverse effects on the landscape and visual amenity of the area.

9. Traffic and Transport

Introduction

- 9.1. This Chapter of the Environmental Statement (ES) has been prepared by SCP and addresses the likely significant effects of the Proposed Development, located on land to the south of the A6053 Hall Lane and on the Former Creams Mill site in Little Lever, Bolton, on transport during both the construction and operational phases.
- 9.2. It describes the methods used to assess the effects; the baseline conditions; the mitigation measures required to prevent, reduce or offset any substantial adverse effects; and the likely residual effects after these measures have been adopted.
- 9.3. This Chapter is supported by a Transport Assessment and Travel Plan which are submitted under separate cover as part of this planning application.

Legislation

- 9.4. No legislation has been used in the assessments within this chapter.

Methodology and Scope

Study Area

- 9.5. The study area for the Transport Assessment and the assessment presented within this chapter of the ES has been agreed with Bolton Council (BC) during scoping discussions and comprises the following junctions:
 - Proposed A6053 Hall Lane site access;
 - A6053 Market Street / A6053 High Street / Mytham Road
 - A6053 Church Street / Redcar Road
 - A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street
- 9.6. NB – it has been agreed with BC that the proposed development would not have a material impact on this junction in capacity terms and junction capacity modelling has not been undertaken. No results for delay are therefore provided.

Baseline Surveys

- 9.7. Traffic flow survey data for the A6053 Market Street / A6053 High Street / Mytham Road and the A6053 Church Street / Redcar Road junctions has been obtained from the TA associated with a planning application (Application Reference: 97139/16) for 95 dwellings on the former Creams Mill site.
- 9.8. Manual classified turning count traffic flow surveys have been obtained from TfGM for the A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street signal-controlled junction. Further details on the count information are provided in the Transport Assessment.

Method of Assessing Significance

- 9.9. This chapter has been conducted in line with the above and the following:
- Design Manual for Roads and Bridges, Volume 11, Environmental Assessment (DMRB); and
 - Guidelines for the Environmental Assessment of Road Traffic, Institute of Environment Assessment, 1993 (IEA).
- 9.10. To assess the likely significant effects of the Proposed Development and its traffic, the initial stages are:
- to determine the existing and opening year traffic levels and characteristics (baseline);
 - to determine the time periods and year for assessment;
 - to identify the geographical boundaries of assessment (i.e. the study area); and
 - once this information is established, the predicted impacts are assessed, along with measures to mitigate any negative impact.
- 9.11. In accordance with IEA guidelines, the environmental impact of the development should be assessed for the year of opening of the development, or the first full year of its operation. This ES has adopted a 2025 first full year of operation, as agreed with BC.
- 9.12. The Transport Assessment assesses the impact of the Proposed Development on the highway network during the weekday AM and PM peak periods.
- 9.13. IEA guidelines also state that the greatest environmental change will generally be when the development traffic is at the largest proportion of the total flow, which, may not be during the highway network peak hours. Therefore, this ES examines likely effects based on Annual Average Daily Traffic (AADT) flows.
- 9.14. The baseline AADT flows have been calculated from the peak period traffic data at existing and opening year levels using factors derived from local automatic traffic count data. The flows are included at Appendix 10.

Magnitude of Effect

- 9.15. To assess the overall significance of an effect it is necessary to establish the magnitude of the effect occurring i.e. the changes to the existing baseline conditions as a result of the Proposed Development, and the sensitivity or importance of the receiving environment or receptor.
- 9.16. The magnitude of potential effects (both beneficial and adverse) on environmental baseline conditions has been identified through the detailed consideration of the Proposed Development taking into account the following:

- Relevant legislation, policy or guidelines;
- The degree to which the environment is potentially affected for example, whether the quality is enhanced or impaired;
- The scale or degree of change from baseline conditions as a result of the Proposed Development;
- The duration of the effect for example, whether it is temporary or permanent and whether it is short, medium or long term; and
- The reversibility of the effect.

9.17. The scale of effects is assessed for both the construction and operation phases using the criteria given in **Table 9.1** which have been established with reference to the various guidance noted above and/or through professional experience and judgement.

Table 9.1

Level of Magnitude	Effect On	Definition of Magnitude
Substantial	Driver Delay	Over 4 minute increase, averaged over all arms at a junction.
	Public transport users	Over 4 minute increase in delay along bus routes in vicinity of PDS.
	Pedestrian delay	Over 4 minute increase in delay for pedestrians at crossing point.
	Pedestrian amenity	Doubling of traffic flow where the footway width is sub-standard (versus current design standards).
	Fear and intimidation	Change in degree of hazard from moderate to extreme.
	Severance	Over 90% increase in traffic flows on relevant links
	Accidents and road safety	Over 50% increase in traffic flows at locations with existing adverse accident record (blackspot).
Moderate	Driver Delay	Between 3 – 4 minute increase in delay, averaged over all arms at a junction.

	Public transport users	Between 3 – 4 minute increase in delay along bus route in vicinity of PDS.
	Pedestrian delay	Between 3 - 4 minute increase in delay for pedestrians at crossing point.
	Pedestrian amenity	Between 50%-100% increase in traffic flow where the footway width is sub-standard.
	Fear and intimidation	Change in degree of hazard from great to extreme.
	Severance	Between 60%-90% increase in traffic flows on relevant links.
	Accidents and road safety	30%-50% increase in traffic flows at location with accident rate above DMRB default for junction type.
• Slight	Driver Delay	Between 2 - 3 minute increase in delay, averaged over all arms at junction.
	Public transport users	Between 2 - 3 minute increase in delay along bus route in vicinity of PDS.
	Pedestrian delay	Between 2 - 3 minute increase in delay for pedestrians at crossing point.
	Pedestrian amenity	Doubling of traffic flow where the footway width is satisfactory or up to 50% increase where the footway width is sub-standard.
	Fear and intimidation	Change in degree of hazard from moderate to great.
	Severance	Between 30%-60% increase in traffic flows on relevant links.
	Accidents and road safety	10%-30% increase in traffic flows at location with accident rate above DMRB default for junction type.
Negligible	Driver Delay	Less than 2 minute increase in delay, averaged over all arms at a junction.

	Public transport users	Less than 2 minute increase in delay along bus route in vicinity of PDS.
	Pedestrian delay	Less than 2 minute increase in delay for pedestrians at crossing point.
	Pedestrian amenity	Less than doubling of traffic flow where the footway width is satisfactory.
	Fear and intimidation	No change in degree of hazard.
	Severance	Less than 30% increase in traffic flows on relevant links.
	Accidents and road safety	Less than 10% increase in traffic flows at location with accident rate above DMRB default for junction type.

9.18. This criteria refers to adverse effects only and where beneficial effects are identified, their magnitude is based on the corresponding positive effect for the same quantum, for example over a 4 minute decrease in delay would be beneficial with a substantial level of magnitude.

Sensitivity of Receptors

9.19. Receptors will comprise drivers, pedestrians, cyclists and public transport users within the study area affected by increased traffic levels resulting from the Proposed Development.

9.20. The sensitivity of receptors, based on professional judgment and experience, is as follows in **Table 9.2**.

Table 9.2

Sensitivity of Receptor	Development Receptors
Very High	Drivers and public transport users at the A6053 Market Street / A6053 High Street / Mytham Road roundabout (Junction 2).
High	Drivers and public transport users at the A6053 Church Street / Redcar Road roundabout (Junction 3).

Moderate	Drivers and public transport users at the A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street signal-controlled junction (Junction 4) and drivers at the A6053 Hall Lane site access junction.
Low	Non-motorised users on the A6053 Hall Lane and Mytham Road
Negligible	Where there are no issues present

Duration of Effect

9.21. The duration of effects has been assessed based on the following criteria in **Table 9.3**.

Table 9.3

Timescale	Definition
Short Term	0 to 5 years including the construction period and on completion
Medium Term	5 to 15 years including establishment of proposed landscaping
Long Term	15 years onwards for the life of the Proposed Development

Significance of Effect

9.22. The following matrix shown in **Table 9.4** will be used to assess the significance of effects:

Table 9.4

Sensitivity of receptor	Magnitude of impact			
	Substantial	Moderate	Slight	Negligible
Very High	Major	Major-intermediate	Intermediate	Minor
High	Major intermediate	Intermediate	Intermediate-minor	Neutral
Medium	Intermediate	Intermediate	Minor	Neutral
Low/negligible	Intermediate-minor	Minor	Minor-neutral	Neutral

9.23. Major effects on driver and bus user delay are considered to be significant in terms of the EIA Regulations.

9.24. A minor effect on road safety will be considered significant in terms of the EIA Regulations.

- 9.25. Effects on pedestrian/cycle/horse-rider delay and amenity, fear and intimidation and severance that are moderate will be considered to be significant in terms of the EIA Regulations.

Cumulative Effects

- 9.26. The traffic generated by committed developments in the area has been included within both the baseline and proposed assessments. The committed development taken into account includes the former Creams Mill site which benefits from extant planning permission for 95 dwellings (Application Reference: 97139/16).

Proposed Mitigation and Residual Effects

- 9.27. This section of the ES Chapter sets out the means by which any likely significant environmental impacts identified in the assessment of construction and operation phase impacts is to be mitigated. The purpose of the mitigation measure will be to prevent, reduce or offset any likely significant environmental effects.
- 9.28. Consideration is also given to the provision of any measures of environmental enhancement over and above required mitigation.
- 9.29. This final stage of assessment identifies any residual environmental effects and their significance taking account of the application of the mitigation measures outlined above based on the significance matrix.

Consultation

- 9.30. Consultation has taken place with BC regarding the specific scope of the Transport Assessment and study area.

Limitations and Assumptions

- 9.31. The assessments of effects are based on projections based on various sources of information, which are considered appropriate based on professional experience.
- 9.32. The distribution (direction by proportion) of traffic has been derived using travel to work data from the 2011 Census as detailed in the Transport Assessment.
- 9.33. Trip generation has been calculated using the nationally recognised database TRICS database.
- 9.34. Future year traffic growth has been calculated using locally adjusted TEMPRO figures.
- 9.35. This methodology has been discussed and broadly agreed with BC.

Baseline Conditions

Existing and Predicted Baseline

- 9.36. A detailed description of the local highway network and existing infrastructure is provided within the Transport Assessment.

9.37. This includes an assessment of personal injury road traffic accident records for the most recent five-year period available at junctions / links within the study area, which is summarised as follows in **Table 9.5**:

Table 9.5

Junction	Fatal	Serious	Slight	Total
A6053 Market Street / A6053 High Street / Mytham Road	0	0	2	2
A6053 Church Street / Redcar Road	0	0	1	1
A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street	0	0	7	7
A6053 Church Street / A6053 Market Street / Ainsworth Road / Lever Street	0	0	4	4
Link - Mytham Road	0	0	1	1
Link – A6053 Market Street between A6053 Market Street / A6053 High Street / Mytham Road and A6053 Church Street / A6053 Market Street / Ainsworth Road / Lever Street	0	0	1	1
Link – A6053 between A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street and A6053 Church Street / A6053 Market Street / Ainsworth Road / Lever Street	0	1	11	12

9.38. A study of the recorded personal injury accidents (PIA) in the latest five-year period has been undertaken and concluded that there is no inherent PIA issues associated with the local highway network, that are a material concern in the context of the proposals. This is detailed further in the Transport Assessment.

9.39. The 2019 and 2025 Baseline AADT Traffic Flows are shown in Table 9.6 for the links within the study area. The 2025 Baseline flows include background traffic growth and local committed development as detailed in the Method of Assessing Significance section but exclude traffic flows from the Proposed Development.

9.40. The location of these links are indicated in **Appendix 10**.

Table 9.6

Reference Point	Road Name	2019 AADT	2025 AADT
1	Mytham Road	4993	5967
2	A6053 Market Street	12818	14465
3	A6053 Stopes Road	12870	14148
4	Redcar Road	2084	2306
5	A6053 Church Street	13340	15028
6	A6053 Hall Lane	14340	16132
7	A6053 Loxham Street	19174	20899
8	A575 Manchester Road (South)	24737	26576
9	A575 Manchester Road (North)	26895	29090
10	Ivanhoe Street	417	446

9.41. Based on the Department for Transport traffic growth factors it is predicted that traffic flows will increase by approximately 7% in the area of the site between the period 2019 – 2025. However, given the current COVID-19 pandemic, travel patterns have inevitably changed with many people working from home, reducing the number of people traveling to work in peak hours. Whilst it is not possible to accurately predict future travel patterns, it is reasonable to assume that there will be a reduction in future traffic growth, making it unlikely that this level of growth will be realised.

Assessment of Construction Phase Effects

9.42. Subject to the granting of permission the project is intended to commence construction in 2021.

9.43. The point of construction access will be subject to approval and agreement with the Local Authority and facilities within the site will be provided for construction workers including car parking, loading and unloading of plant and associated construction materials. However, it is anticipated that the construction accesses will be provided in the location of the future permanent accesses off the A6053 Hall Lane and Mytham Road.

9.44. Wheel wash facilities will be provided at a position to be agreed with the Local Authority to reduce the incidence of transfer of mud or loose materials onto the public highway and general sweeping of the adjacent road system will be undertaken by mechanical road sweeper during both the construction of site accesses and works within the site itself.

9.45. Based on data from comparable developments, it is estimated that the additional development will generate a maximum 9 light vehicles and 3 heavy goods vehicles per day during the construction period.

9.46. A Construction Environment Management Plan will be prepared following any grant of planning permission and will define the routes for the larger construction delivery vehicles, however, the main routes will generally be via the most direct route to the wider classified road network.

Effect on Traffic Flows

9.47. The daily baseline 'without development' HGV numbers throughout the study area at 2019 and 2025 levels are provided in **Table 9.7**.

Table 9.7

Reference Point	Road Name	2019 Daily HGVs	2025 Daily HGVs
1	Mytham Road	144	154
2	A6053 Market Street	702	752
3	A6053 Stopes Road	713	764
4	Redcar Road	39	41
5	A6053 Church Street	851	912
6	A6053 Hall Lane	868	930
7	A6053 Loxham Street	844	904
8	A575 Manchester Road (South)	1546	1656
9	A575 Manchester Road (North)	1546	1656
10	Ivanhoe Street	0	0

9.48. The Guidelines for the Environmental Assessment of Road Traffic note that highway links should be assessed where total traffic flows or the number of HGVs increase by more than 30%, or 10% in specifically sensitive areas.

9.49. Therefore, the increase in HGV movements of 3 vehicles per day during the construction phase, in comparison to the baseline HGV flows on the network (Table 9.7 above), would be less than 10% on all links local to the development sites, which will decrease further once distributed on the wider highway network.

9.50. The increase in total traffic movements as a result of the construction stage would not exceed 10% on any link based on the traffic flows shown in **Table 9.6**.

Assessment of Effects

9.51. The traffic flow increase as a result of the construction effect would not meet the levels of percentage increase requiring assessment in accordance with the Guidelines for the Environmental Assessment of Road Traffic and would be significantly lower than during the operational phase. Therefore, the corresponding effect on the following would also be lower:

- Driver delay
- Public transport users
- Pedestrian delay
- Pedestrian amenity
- Severance
- Accidents and road safety

Fear and Intimidation

9.52. Given that HGVs could have an effect on Fear and Intimidation this has been considered. The Guidelines for the Environmental Assessment of Road Traffic recognise that there are no commonly agreed thresholds for the measurement of fear and intimidation, but suggests thresholds based on total traffic flows, number of HGV's and traffic speeds as set out in **Table 9.8** below.

Table 9.8

Degree of Hazard	Average Traffic Flow over 18 hour day (vehicles / hour)	Total 18 hour heavy goods vehicle flow	Average speed over 18 hour day (mph)
Extreme	1800+	3000+	20+
Great	1200 – 1800	2000 – 3000	15-20
Moderate	600 - 1200	1000 - 2000	10-15

9.53. None of the links along the proposed construction routes have HGV flows of over 2000 and therefore the degree of hazard would be less than moderate and would not increase as a result of the construction phase.

9.54. With the exception of the A575 Manchester Road and A6053 Manchester Road links, none of the links along the proposed construction routes exceed 1200 vehicles per hour and therefore the degree of hazard would be less than moderate and would not increase as a result of the construction phase.

9.55. Whilst the traffic flows on the Manchester Road north and south links exceed 1200, the impact on pedestrians in terms of fear and intimidation will be negligible when having regard to the level of HGV traffic, likely pedestrian movements to/from the site as well as the high quality pedestrian infrastructure along these routes.

- 9.56. The magnitude of effect is therefore considered to be negligible on a moderate level of sensitivity; so overall there would be no magnitude of effect on this link.

Assessment of Operation Phase Effects

Effect on Traffic Flows

- 9.57. The 2025 traffic flows including the addition of traffic generated by the operational phase of the Proposed Development is detailed in **Table 9.9**, together with the percentage increase in flows relative to the 2025 baseline traffic flows.

Table 9.9

Reference Point	Road Name	2025 Baseline	2025 Proposed	% Impact
1	Mytham Road	5967	6398	7.2%
2	A6053 Market Street	14465	14870	2.7%
3	A6053 Stopes Road	14148	14255	0.7%
4	Redcar Road	2306	2306	0%
5	A6053 Church Street	15028	15442	2.7%
6	A6053 Hall Lane	16132	16546	2.5%
7	A6053 Loxham Street	20899	21618	3.4%
8	A575 Manchester Road (South)	26576	26728	0.5%
9	A575 Manchester Road (North)	29090	29657	1.9%
10	Ivanhoe Street	446	446	0%

- 9.58. The 2025 traffic flows including the additional traffic generated by the operational phase of the Proposed Development is detailed in Table 9.9, together with the percentage increase in flows relative to the 2025 baseline traffic flows.

- 9.59. These increases together with the capacity assessment results detailed in the Transport Assessment have been used to assess the various transport effects.

Multi-Modal Trip Generation

- 9.60. The total number of additional trips generated by the Proposed Development for each of the primary available modes of transport is shown in **Table 9.10**;

Table 9.10

Multi-Modal Additional Trips Associated with the Proposed Development						
Mode	Weekday AM Peak Hour (08:00 to 09:00)		Weekday PM Peak Hour (17:00 to 18:00)		Daily Trips	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures

Vehicles	22	67	60	26	408	412
Cyclists	2	3	2	2	12	13
Pedestrians	5	11	7	4	69	69
Public Transport	0	5	2	0	18	18

9.61. The destinations for the majority of pedestrian trips are likely to be Little Lever town centre and Moses Gate railway station and therefore the assessment of pedestrian based effects focusses on the routes to these destinations.

Assessment of Effects

Cumulative Effects

9.62. The traffic generated by committed developments identified earlier has been included within both the 2025 baseline and proposed assessments.

9.63. The 2025 Base scenarios assessed in the following paragraphs include baseline traffic flows, background traffic growth and the traffic flows generated by the committed development identified earlier, whilst the 2025 Proposed scenarios include the baseline traffic flows, the traffic flows generated by the committed development and the additional traffic flows generated by the Proposed Development.

Driver Delay

9.64. The increase in average driver delay (in minutes) experienced by each vehicle at the junctions within the study area during the network peak hours, averaged over each arm has been taken from the capacity modelling results included in the Transport Assessment and is summarised in Table 9.11 as follows:

Table 9.11

Junction	2025 Base Delay Average - AM	2025 Base Delay Average - PM	2025 Proposed Delay Average - AM	2025 Proposed Delay Average - PM
A6053 Market Street / A6053 High Street / Mytham Road	0-1	0-1	0-1	1-2
A6053 Church Street / Redcar Road	0-1	0-1	0-1	0-1

9.65. The sensitivity magnitude of effect and significance of effect at each junction is summarised in **Table 9.12** as follows:

Table 9.12

Junction	Magnitude of Effect		Significance of Effect	
	AM	PM	AM	PM
A6053 Market Street / A6053 High Street / Mytham Road	Negligible	Negligible	Minor	Minor
A6053 Church Street / Redcar Road	Negligible	Negligible	None	None

9.66. Therefore, the Proposed Development would have a minor adverse or no effect on delay at all junctions within the TA study area.

9.67. A minor effect is not considered significant in EIA terms for driver delay.

9.68. A major effect is considered significant in terms of the EIA regulations.

Public Transport Users

9.69. Existing bus services route through the majority of junctions within the study area, however, as detailed earlier, the Proposed Development would have a minor adverse or no effect on delay at all junctions within the TA study area.

Pedestrian Delay

9.70. The destinations for the majority of pedestrian trips are likely to be Little Lever town centre and Moses Gate railway station and therefore the assessment of pedestrian based effects focusses on the routes to these destinations.

9.71. Pedestrian delay to cross a link is calculated using peak hour traffic flows on the link as presented in the TA and Figure 1 of DMRB Volume 11 Section 3 Part 8. This indicates that the existing delays to cross each of the roads on the pedestrian desire routes to the above destinations will be less than five minutes in both the base and proposed scenarios, and the increase in delay as a result of the proposed scenario is less than 2 minutes.

9.72. Therefore, the magnitude of effect would be negligible and the significance of effect would be none in EIA terms for the majority of routes, although minor for routes across the A6053 Market Street / A6053 High Street / Mytham Road and A6053 Church Street / Redcar Road junctions.

Pedestrian Amenity

9.73. Amenity is defined in the DMRB as the relative pleasantness of a journey for pedestrians and others. This is mainly influenced by the volume and type of traffic on an adjacent link. Other key contributory factors are the standard and width of footways/cycleways, the street furniture provided, planting and landscape etc.

9.74. Footways are provided along both sides of the pedestrian desire routes between the PDS site and the aforementioned primary destinations, with the exception of a circa 350m section of the A6053 Hall Lane along the sites frontage/west of the site, that only benefits from a footway on the northern side of the road. Also, the footway on the eastern side of Mytham Road, to the north of the site, is narrow. A wide footway is provided on the opposite side of the carriageway in this location and the speed limit is 20mph. The sensitivity is therefore considered to be low.

9.75. The increase in flows (see Table 9.9 earlier) equates to a negligible magnitude of effect for all routes and therefore, the significance of effect would be none/minor in EIA terms.

Fear and Intimidation

9.76. A further effect that traffic may have on pedestrians and cyclists is described as 'fear and intimidation'. This is influenced by the volume of traffic, HGV content and, in the case of pedestrians, the width of the footpath. Again, the Guidelines for the Environmental Assessment of Road Traffic recognise that there are no commonly agreed thresholds for the measurement of fear and intimidation, but suggests thresholds based on total traffic flows, number of HGV's and traffic speeds as set out in **Table 9.13** below.

Table 9.13 – Degree of Hazard

Degree of Hazard	Average Traffic Flow over 18 hour day (vehicles / hour)	Total 18 hour heavy goods vehicle flow	Average speed over 18 hour day (mph)
Extreme	1800+	3000+	20+
Great	1200 – 1800	2000 – 3000	15-20
Moderate	600 - 1200	1000 - 2000	10-15

9.77. None of the links within the study area have HGV flows of over 2000 and therefore the degree of hazard would be less than moderate and would not increase as a result of the proposed development.

- 9.78. With the exception of the A575 Manchester Road, A6053 Manchester Road and A6053 Loxham Street links, none of the links within the study area exceed 1200 vehicles per hour and therefore the degree of hazard would be less than moderate and would not increase as a result of the proposed development.
- 9.79. Whilst the traffic flows on the A6053 Loxham Street and Manchester Road north and south links exceed 1200, the impact on pedestrians in terms of fear and intimidation will be negligible when having regard to the level of HGV traffic, likely pedestrian movements to/from the site as well as the high quality pedestrian infrastructure along these routes. However, it should be noted that the A6053 Loxham Street link experiences an increase from 1161 vehicles per hour in the base scenario to 1201 vehicles per hour in the with development scenario, resulting in a change in degree of hazard from moderate to great, albeit only exceeding the threshold by a single vehicle movement.
- 9.80. The magnitude of effect is therefore considered to be negligible on a moderate level of sensitivity for the Manchester Road links and slight on a moderate level of sensitivity for the A6053 Loxham Street link. Therefore, the overall significance of effect would be none on Manchester Road and minor on the A6053 Loxham Street.

Severance

- 9.81. The destinations for the majority of pedestrian trips are likely to be Little Lever town centre and Moses Gate railway station and therefore the assessment of pedestrian based effects focusses on the routes to these destinations.
- 9.82. The concept of severance is a perceived division that occurs when a traffic link separates part of an existing community. This can occur when a road becomes too heavily trafficked, making crossing the road a problem, or when a new route physically divides existing land. It is particularly relevant to situations where access to an essential amenity is impaired.
- 9.83. The Guidelines for Environmental Assessment of Road Traffic note that the term severance is used to describe a complex series of factors. It goes on to state that:
- 9.84. “the measurement and prediction of severance is extremely difficult. The correlation between the extent of the severance and the physical barrier of a road is not clear and there are no predictive formulae which give simple relationships between traffic factors and levels of severance.”
- 9.85. A number of factors are identified in the Guidelines for the Environmental Assessment of Road Traffic to assess new severance relating to new routes, including road width, traffic speeds, crossing facilities, and existing crossing provision. Three main indicators for the assessment of separation have been formulated from studies of changes in traffic flow on observed links and are discussed in the Guidelines for Environmental Assessment of Road Traffic. It should be noted that these are intended as guidelines only and are highly dependent upon ambient traffic levels. The following indicators are set out in the Guidelines:

- <30% flow increase – negligible separation effects
- 30% flow increase – slight separation effects;
- 60% flow increase – moderate separation effects; and
- 90% flow increase – substantial separation effects.

9.86. The increase in flows (see **Table 9.9** earlier) equates to a negligible magnitude of effect for all routes and therefore, the significance of effect would be none in EIA terms.

Accidents and Road Safety

- 9.87. A detailed review of the accident records within the study area for the most recent five-year period available is included within the Transport Assessment and does not identify any material concerns with regard to the Proposed Development.
- 9.88. None of the junctions within the TA study area experienced 5 or more accidents (average of 1 accident per year) during the most recent five-year study period, except the A575 Manchester Road / A6053 Loxham Street / Ivanhoe Street junction which experience 7 'slight' severity accidents which is not considered to be an unusual frequency for a major junction of this type.
- 9.89. It is therefore considered that all junctions within the TA study area would have a negligible magnitude of effect.
- 9.90. The significance of effect would therefore be minor adverse or none at all junctions within the TA study area.

Mitigation

Construction Phase

- 9.91. As detailed previously the traffic flow increase as a result of the construction phase would not meet the levels of percentage increase requiring assessment and would be significantly lower than during the operational phase.
- 9.92. It was also identified that there would be a significance of effect of none on Fear and Intimidation.
- 9.93. A Construction Environment Management Plan will be prepared following any grant of planning permission to ensure that the site access arrangements during the construction phase are carefully designed and agreed with BC to ensure that they do not present a danger to highway safety. The Construction Environment Management Plan will also detail the proposed construction traffic routes.
- 9.94. During construction appropriate measures will be put in place to limit any secondary effects on transportation. This could include the following measures:
- Limiting HGV hours such that, wherever possible, no movements take place within

the sensitive periods.

- Ensuring that wheel-washing of construction vehicles and other appropriate cleaning is carried out prior to departing the sites, and that all loads are properly secured; and
- Ensuring that where works effect the 'live' public highway appropriate temporary works and diversions for vehicular and non-vehicular traffic are put in place.

Operational Phase

- 9.95. A ghost island right turn lane is proposed into the site which will increase the capacity at the A6053 Hall Lane junction and minimise the impact / delay to through traffic on the A6053 Hall Lane, whilst a carriageway narrowing traffic feature is proposed on Mytham Road, which will improve road safety.

Residual Effects

Construction Phase

- 9.96. Effects on transport during the construction phase of the Development are below the level requiring assessment and would be lower than the effects of the operational phase. The effect on Fear and Intimidation resulting from heavy goods vehicles during the construction phase was assessed, concluding that there would be no effect.

Operational Phase

- 9.97. As detailed earlier, there are no mitigation measures proposed at any off-site junctions as part of the development proposals. Therefore, there are no residual effects to assess.

Assessment Summary

- 9.98. The effects of the Proposed Development are detailed in Table 9.14 below:

	Sensitivity	Magnitude of Effect	Significance of Effect	Residual Effect
Driver Delay	High	Negligible	Neutral	Neutral
Public Transport Users	High	Negligible	Neutral	Neutral
Pedestrian Delay	Low	Negligible	Neutral	Neutral
Pedestrian Amenity	Low	Negligible	Neutral	Neutral
Fear and Intimidation	Low	Negligible/Slight	Minor-Neutral	Minor-Neutral
Severance	Moderate	Negligible	Minor	Minor

Accidents and Road Safety	High	Negligible	Neutral	Neutral
---------------------------	------	------------	---------	---------

Conclusion

9.99. This ES Chapter assesses the likely effects of the Proposed Development on the environment with respect to transport.

9.100. Assessments of the effects were undertaken during both the construction and operational stages of the Proposed Development using a study area agreed with Bolton Council (as the local highway authority) on the following:

- Driver delay
- Public transport users
- Pedestrian delay
- Pedestrian amenity
- Fear and intimidation
- Severance and;
- Accidents and road safety

Construction Phase

9.101. Effects on transport during the construction phase of the Development are below the level requiring assessment and would be lower than the effects of the operational phase. The effect on Fear and Intimidation resulting from heavy goods vehicles during the construction phase was assessed, concluding that there would be no effect.

9.102. A Construction Environment Management Plan will be prepared following any grant of planning permission to ensure that the site access arrangements during the construction phase are carefully designed and agreed with BC to ensure that they do not present a danger to highway safety. The Construction Environment Management Plan will also detail the proposed construction traffic routes which will be briefed-out to contractors and suppliers to instruct traffic associated with the construction of the Proposed Development to use the most appropriate routes.

9.103. Facilities within the site will be provided for construction workers including car parking, loading and unloading of plant and associated construction materials. A wheel wash area will be provided at a position to be agreed with the Local Authority to reduce the incidence of transfer of mud or loose materials onto the public highway.

Operational Phase

9.104. The adverse residual effects on transport during the operational phase will be minor.

10. Socio Economic

Introduction

- 10.1. This chapter, prepared by Hatch, presents an assessment of the likely significant socio-economic effects of the proposed development. In particular, consideration is given in the assessment to employment generation during construction, the number of residential units and associated estimated population yield, and the effects of the new residents upon existing social and community infrastructure.
- 10.2. This chapter provides a description of the methods used in the assessment. This is followed by a description of the relevant baseline conditions of the site and its surrounding area, together with an assessment of the likely potential effects of the development during the construction phase and once the development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described. It also considers significant cumulative effects based on the schemes listed in Chapter 3.

Methodology and Scope

Overview

- 10.3. There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a development. However, there are a series of commonly used methodologies for quantifying economic effects both during the construction of a development and following its completion. Other established qualitative techniques are frequently adopted to assess the social effects of a development.
- 10.4. The following sections outline the approach used to conduct this assessment. Where possible, the likely significant socio-economic effects are quantified, but where this is not feasible, a qualitative assessment is provided using professional judgement and experience.

Establishing the Baseline Condition

- 10.5. A baseline of existing socio-economic characteristics of the site and its surrounds is presented later in this chapter. Data used to establish the relevant baseline conditions for the assessment was drawn from the following sources:
 - 2011 ONS Census data
 - 2019 ONS Mid-Year Population Estimates
 - 2018 ONS Population Projections – national and local authority based by single year

of age

- 2018 ONS Business Register and Employment Survey
- Department for Education (2020) data covering school's capacity and pupil numbers¹⁷
- NHS Digital (2020): General Practice Workforce, 30 June 2020
- NHS (2020) 'Find services near you'¹⁸

10.6. The following policy and strategy documents have also been considered and reviewed:

- The National Planning Policy Framework (NPPF) (adopted February 2019)
- Bolton Council Core Strategy (adopted 2011)
- Bolton Council Affordable Housing SPD (adopted 2013)
- Bolton Council Housing Test Delivery Action Plan (August 2020)
- Bolton Council Infrastructure and Planning Contributions SPD (adopted 2016).
- Bolton Council Open space, Sport and Recreation Assessment (2007)
- Bolton Council Open space, Sport and Recreation Strategy and Action Plan (2007)

Study Area for Socio-Economic Assessment

10.7. Socio-economic effects are experienced across a range of different geographies. A number of different spatial scales have been used to assess the current baseline conditions. These are defined as follows:

- The Local Impact Area (LIA) shown in Figure 1 - defined for use with the baseline datasets as the Middle Layer Super Output Area (MSOA)¹⁹ / Lower Layer Super Output Areas (LSOA's)²⁰ that most closely aligns to Little Lever (hereafter referred to as the 'Little Lever LIA').
- Borough - defined as the Bolton Council (Bolton) local authority administrative area in which the proposed development sites are situated.

10.8. Figure 10.1 shows the location of the development sites and the Little Lever Local Impact Area (LIA) and the local authority boundaries.

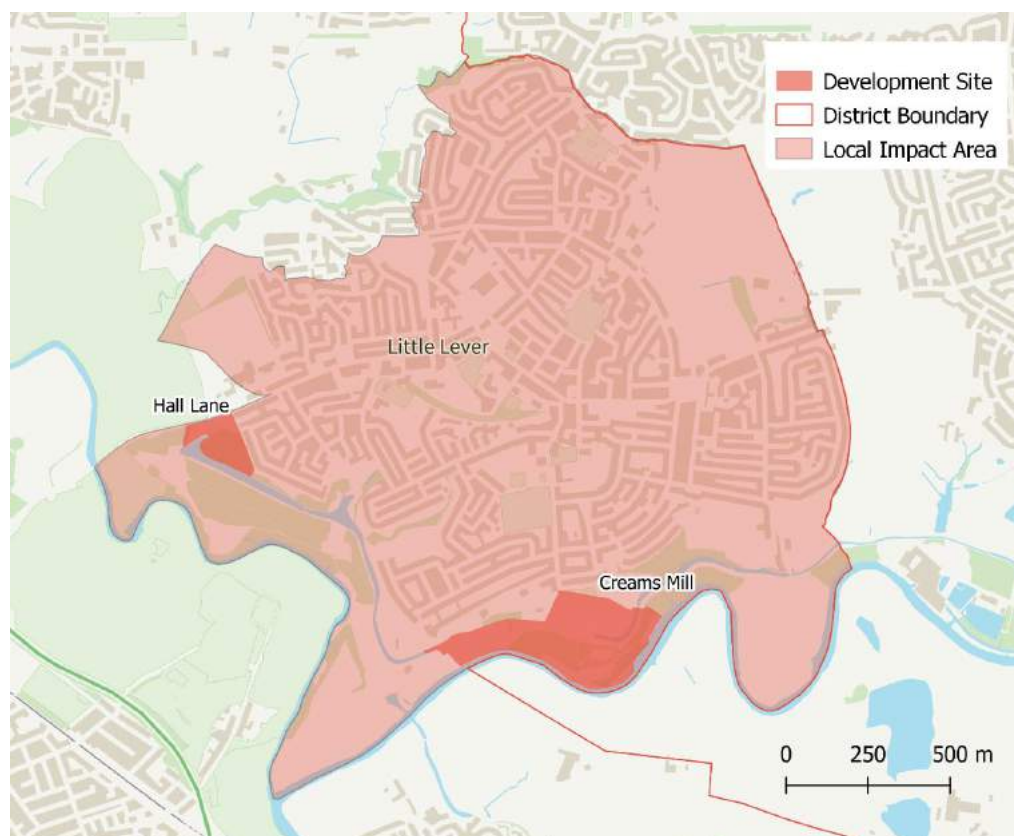
¹⁷ <https://get-information-schools.service.gov.uk>

¹⁸ <https://www.nhs.uk/service-search>

¹⁹ LIA MSA based definition - Name, (code) = Bolton 024, (E02001007)

²⁰ LIA LSOA based definition - Names, (codes) = Bolton 024A, (E01004911), Bolton 024B, (E01004912), Bolton 024C, (E01004913), Bolton 024D, (E01004914), Bolton 024E, (E01004915), Bolton 024F, (E01004916), Bolton 024G, (E01004918),

Figure 10.1 Little Lever Local Impact Area (LIA)



Source: Base map contains OS data © Crown copyright and database right 2020.

10.9. In addition to the above spatial scales, the identified social and community infrastructure (SCI) facilities are assessed according to a number of 'catchment' areas. These are summarised as follows:

- Primary Healthcare Facilities - within 2 miles of the proposed development sites;
- Primary Schools - within 2 miles²¹ of the proposed development sites;
- Secondary Schools – within 3 miles of the proposed development sites.

10.10. The assessment of open spaces is based on a review of the guidance within the Bolton Council Open Space, Sport and Recreation Assessment and the Strategy and Action Plan (2007). These are the most recent audit and analysis available and broadly cover the Little Lever Impact Area.

²¹ Section 444(5) of the Education Act 1996 suggests a maximum walking distance of 2 miles (3.2 km) for a child under the age of eight. This is used as the upper bound for determining eligibility for free school transport. As this guidance applies to children under the age of eight, the distance of 2 miles (3.2 km) is used to assess primary provision.

Impact Assessment

10.11. For the purposes of the assessment, the receptors are the local economy and population in Little Lever (the LIA) and in Bolton (the borough), together with the social and community infrastructure within the immediate local area of the proposed development since these are the locations that will primarily meet the demand it generates.

10.12. Given the nature of socio-economic assessment, these are broad based receptors. Therefore, a set of socio-economic indicators is necessary to identify each receptor in more specific terms and for the development's effect on them to be measured. The specific receptors with which this chapter is concerned, and the indicators relevant to them, are now described (both temporary and permanent effects associated with the proposed development):

- The effects that may arise from construction, e.g. the temporary construction employment associated with the proposed development of new housing and infrastructure.
- The change in the local area's population base (i.e. increase in number of residents, supply of labour, household expenditure effects), and the supply and capacity of local social and community infrastructure (including education and health services).
- Housing stock in the local area. This evaluates the current housing stock in Little Lever and Bolton, including the provision of affordable housing and will estimate the increase in stock as a result of the proposed development.

Significance Criteria

10.13. There are no formalised technical guidelines or criteria for assessing the significance of socio-economic effects. Likely effects are therefore assessed by considering the following factors, using professional judgement:

- the sensitivity of each receptor affected; and
- the magnitude of change to the receptor brought about by the proposed Development.

10.14. The sensitivity of each receptor is evaluated as being high, medium, low or negligible based on a review of the baseline position of each receptor together with consideration of the importance of the receptor in policy terms. This can be summarised as follows:

Table 10.1 Sensitivity of Receptors

Sensitivity	Definition
High	Evidence of direct and significant socio-economic challenges relating to receptor. May be given a high priority in local, regional or national economic and regeneration policy
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium

	priority in local, regional and national economic and regeneration policy.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is given a low priority in local, regional and national economic and regeneration policy.
Negligible	Very low importance and rarity with little or no priority even at local scale.

10.15. The magnitude of change to a receptor is determined by considering the estimated deviation from baseline conditions, both before and, if required, after mitigation. The criteria used for the assessment of the magnitude of socio-economic effects (both beneficial and adverse) are shown in Table 10.2 below

Table 10.2: Magnitude of Impact

Magnitude	Definition
High	The proposed development will cause a large change (>10%) to the quality and/or integrity of the receptor when compared with existing socio-economic conditions.
Medium	The proposed development will cause a moderate change (5-10%) to the quality and/or integrity of receptor when compared with existing socio-economic conditions
Low	The proposed development will cause slight change (1-5%) to the quality and/or integrity of the receptor when compared with existing socio-economic conditions
Negligible	No discernible change (<1%) to the baseline socio-economic conditions

10.16. Both beneficial and adverse effects of the proposed development have been reported. In reporting the likely significance of the effects, with respect to both the construction phase and the completed development, the assessment contextualises both the sensitivity of the receptor and the magnitude of the change as a result of the proposed development. The matrix used to determine the significance of socio-economic effects is presented in Table 10.3.

Table 10.3: Significance of Effects

Sensitivity of Receptor	Magnitude of Change			
	Negligible	Low	Medium	High
Negligible	Insignificant	Insignificant	Minor	Minor
Low	Insignificant	Minor	Minor	Moderate
Medium	Minor	Minor	Moderate	Major
High	Minor	Moderate	Major	Major

Key Housing & Economic Policies and Strategies

National Planning Policy

10.17. The National Planning Policy Framework (NPPF²²) outlines the Government's planning policies and is a cornerstone of the Government's reforms to the planning system, seeking to make planning more accessible. Fundamental to the framework is the achievement of sustainable development. There are three dimensions of sustainable development defined by the NPPF in setting out the role of the planning system:

- Economic: the planning system plays an economic role by ensuring that sufficient land of the right type is available in appropriate locations at appropriate times to support growth and innovation,
- Social: the planning system plays a social role by supporting strong, vibrant, and healthy communities, which it does by ensuring sufficient supply of housing for the needs of present and future generations alongside accessible local services, reflecting the community's needs and supporting its health, social, and cultural well-being, and
- Environment: the planning system plays an environmental role by protecting and enhancing natural, historical, and built environments.

10.18. The NPPF notes that these roles are mutually dependent and therefore should not be undertaken in isolation: "to achieve sustainable development, economic, social, and environmental gains should be sought jointly and simultaneously through the planning system" (para 8).

10.19. Particularly relevant to the assessment of socio-economic effects of the Proposed Development are the positive improvements identified by the NPPF which the planning system should seek to achieve (para 9).

Widening the choice of high-quality homes

10.20. Local planning authorities should "proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure, and thriving local places the country needs" (para 17).

Economic Sustainability

10.21. The following element of economic sustainability is particularly relevant to the Proposed Development and its generated impacts:

- "Building a strong, competitive economy: the planning system is expected to encourage rather than impede sustainable growth and significant weight should be given to supporting economic growth. Planning policies should address barriers to

²² National Planning Policy Framework (2019), Department for Communities and Local Government

investment including housing” (para 21).

Social Sustainability

10.22. The NPPF highlights the need to support “strong, vibrant, and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social, and cultural well-being” (para 7).

10.23. The following components of social sustainability are particularly relevant in this regard:

- Delivering a wide choice of high-quality homes: this should be achieved through ensuring that the Local Plan sets the right quantum of housing to be delivered to meet affordable and market housing need and identifying key sites crucial to the delivery of this housing.
- Promoting healthy communities: planning policies and decisions should support the development of healthy and inclusive communities, including planning positively for the provision and use of shared space, community facilities, and other local services. Importantly, this means guarding “against the unnecessary loss of valued facilities and services, particularly where this would reduce the community’s ability to meet its day-to-day needs,” and ensuring that “established shops, facilities and services are able to develop and modernise in a way that is sustainable, and retained for the benefit of the community.” This is reinforced by the obligation for planning authorities to “ensure an integrated approach to considering the location of housing, economic uses, and community facilities and services” (para 70).

General Housing Policy

10.24. Section 5 of the NPPF notes “a sufficient amount and variety of land can come forward where it is needed, that the needs of groups with specific housing requirements are addressed and that land with permission is developed without unnecessary delay.” (Para 59)

10.25. Local planning authorities should identify and update annually a supply of specific deliverable supply of sites to provide a minimum of five years of housing against their housing requirement as out in their development plan policies or against their local housing need where the strategic policies are more than five years old (Para 73) .

10.26. To maintain the supply of housing, local planning authorities would need to monitor the progress of building out sites which have permission. Where the Housing Delivery Test indicates delivery has fallen below 95% of the local planning authority’s housing requirement, they should prepare an action plan to assess the cause of the under delivery and where delivery can be increased in future years (Para 75).

Affordable Housing

10.27. The NPPF makes numerous references to the requirement and mechanisms for the delivery of affordable housing.

- 10.28. The NPPF notes that development plans should set out the contributions expected from development, including the levels and types of affordable housing provision (Para 34).
- 10.29. Where there is a need for affordable housing required, planning policies should specify the types of affordable housing required and expect this to be met on site, unless either an off-site provision or financial contribution can be robustly justified and the agreed approach contributes to the objective of creating mixed and balanced communities (Para 62).
- 10.30. Provision of affordable housing should not be sought for residential developments that are not major developments, other than designated rural areas where policies can set out a lower threshold of 5 units or fewer. To support the re-use of brownfield land, where vacant buildings are being reused or redeveloped – any affordable housing contribution can be reduced to a proportionate amount (Para 63).
- 10.31. Paragraph 64 notes that major developments that involve the provision of housing, planning policies and decisions should expect at least 10% of the dwellings to be available for affordable home ownership, unless this would exceed the levels of affordable housing required in the area or prejudice the ability to meet this need of specific groups affordable housing needs.
- 10.32. A local planning authority should regard the construction of new buildings as inappropriate in the Green Belt. Exceptions to this include limited affordable housing for local community needs under policies set out in the development plan and contribute to meeting an identified housing need within the area without causing substantial harm to the openness of the Green Belt (Para 145).

City Region Planning Policy

Greater Manchester Spatial Framework

- 10.33. The Greater Manchester Spatial Framework (GMSF)²³ sets out an ambition for Greater Manchester to be ‘one of the best places to grow up, get on and grow old’. As part of this, the strategy identifies the need to provide residents with good quality housing and job opportunities while also attracting investment and talent into the region.
- 10.34. There are several key priorities identified in the strategy that the proposed development will directly support:
- SO1: Meet our housing need – through providing a diverse mix of housing and increasing net additional dwellings in Bolton, as well as, increasing the number of affordable homes
 - SO2: Create neighborhoods of choice – through creation of a neighbourhood that encourages a mix of housing and sustainable modes of travel, such as walking and

²³ Greater Manchester Spatial Framework (2019), Greater Manchester Combined Authority

cycling.

- SO8: Improve the quality of the natural environment and access to green spaces – through improving the quality of the Manchester, Bolton & Bury Canal and new walking and cycling routes

Greater Manchester Housing Strategy 2019-2024

10.35. The Greater Manchester Housing Strategy supports the overarching Greater Manchester strategy and aims to provide ‘safe, decent and affordable housing’ for residents that ‘fit the needs and aspirations of current and future citizens’. It recognises that improvements to housing can help tackle broader issues in Greater Manchester’s economy, such as health, carbon reduction, tackling homelessness, providing skills and training to residents and economic growth.

10.36. The most relevant priority to the development is Priority B: Delivering the homes we need. It sets out the following objectives, to:

- Ensure supply of sufficient appropriate sites for the delivery of at least 201,000 new homes by 2037.
- Work with partners to develop additional sources of new and accelerated housing development and investment to complement ‘business as usual’ market delivery and affordable homes programmes.
- Encourage and support the shift to modern methods of construction, increased innovation, and the expansion and reskilling of the construction sector and supply chain to raise productivity and the quality and pace of delivery of new homes, and to assist in achieving our target that all new buildings in Greater Manchester will be net zero carbon by 2028.
- Drive better targeting of investment to improve access to affordable housing provision. Meeting the Greater Manchester Spatial Framework commitment to deliver at least 50,000 additional affordable homes by 2037, with at least 30,000 being for social rent or affordable rent.

Local policies

10.37. The Bolton Development Plan currently comprises of the Bolton Core Strategy (adopted 2011)²⁴ and the Bolton Site Allocations Plan (adopted 2014)²⁵. These documents are supported by several Supplementary Planning Documents (SPDs) that provide additional steer to the policies contained within the Development Plan. The relevant SPDs for this development are the Affordable Housing SPD²⁶ (adopted 2013) and the Infrastructure and

²⁴ Bolton Council, Bolton’s Core Strategy Development Plan Document - <https://www.bolton.gov.uk/downloads/file/666/core-strategy>

²⁵ Bolton Council, Bolton’s Allocation Plan - <https://www.bolton.gov.uk/downloads/file/671/allocations-plan-written-statement>

²⁶ Bolton Council, Affordable Housing SPD - <https://www.bolton.gov.uk/downloads/file/857/affordable-housing#:~:text= Bolton's%20Core%20Strategy%20Policy%20SC1,and%2025%25%20for%20intermediate%20housing.>

Planning Contributions SPD (adopted 2016)²⁷. Sitting separately from the development plan, Bolton's Economic Strategy (2016-2030)²⁸ sets out the economic vision for Bolton for 2030 and several strategic objectives which outline how to achieve the vision.

Bolton Core Strategy

10.38. The Core Strategy sets out the policies for Bolton's future development up to 2026. The following strategic objectives are of particular relevance to the socio-economic assessment of the Site development:

- S01 - Healthy Bolton - maximise access to recreation facilities, especially for those living in the most deprived areas, and to increase opportunities for walking and cycling,
- S02 - Achieving Bolton - provide everyone in Bolton with the chance to learn,
- S05/6 - Prosperous Bolton - ensure that Bolton takes full economic advantage of its location in the Greater Manchester City Region and ensure that transport infrastructure supports all the aspects of the spatial vision, and that new development is in accessible locations and makes the best use of existing infrastructure, and
- SO11 - Cleaner and Greener - conserve and enhance the best of Bolton's built heritage and landscapes and improve the quality of open spaces.

10.39. In addition to the overarching strategic objectives, the Core Strategy also includes the following relevant policy which is specific to housing development in Bolton:

- Policy SC1 of the Bolton Core Strategy highlights the annual housing requirement for the plan period between 2008 and 2026 (694 dwellings per annum). Part of the development is allocated for 96 dwellings through this policy. The allocation is referenced '56SC' in the supporting Bolton Site Allocations Plan.
- Policy OA6 (Little Lever and Kearsley) notes the Council will concentrate sites for new housing within the existing urban area (OA6.3).
- Policy IPC1 notes that the Council will seek to ensure that developer's provision or contribution towards the cost of appropriate social, physical, and green infrastructure required by the proposed development and/or to mitigate the impact of said development.

Local Economic Strategy

10.40. Bolton's Economic Strategy²⁹ (2016-2030) seeks to promote investments into opportunities which will continue Bolton on a path of growth and improve prosperity for all. The vision for

²⁷ Infrastructure and Planning Contributions SPD - <https://www.bolton.gov.uk/downloads/file/864/infrastructure-and-planning-contributions>

²⁸ Bolton Council, The Bolton Economy, Our Strategy for Growth, 2016-2030 <https://www.bolton.gov.uk/downloads/file/1099/bolton-economic-strategy#:~:text=The%20Economic%20Strategy%20aligns%20directly,build%20on%20Bolton's%20economic%20success.>

²⁹ Bolton Council, The Bolton Economy, Our Strategy for Growth, 2016-2030 <https://www.bolton.gov.uk/downloads/file/1099/bolton-economic-strategy#:~:text=The%20Economic%20Strategy%20aligns%20directly,build%20on%20Bolton's%20economic%20success.>

2030 includes for Bolton to have the right mix of affordable, high quality homes in the right locations and cultural and leisure attractions that attract people to live and work in Bolton.

10.41. There are six strategic objectives within the economic strategy. These objectives underpin the economic vision and drive the outcomes that the strategy seeks to achieve. The following objectives are particularly relevant to this development:

- S01 - Strong, resilient and hard-working - Improving the overall resilience of the local economy by improving economic activity, employment and raising productivity
- S04 - Distinctive, attractive, and competitive - Development and regeneration to maximise assets and opportunities and provide the homes, environment and cultural offer to make Bolton competitive
- S05 - Healthier, wealthier and more prosperous - Support residents to have a better quality of life that reduces the demand for public services in the long-term.

Consultation

10.42. The EIA Scoping Opinion received from Bolton Council on 13th October 2020 did not provide any comment on the socio-economic assessment. Bolton Council's Capital Programme and Pupil Place Manager, Ged Kelly, was contacted in relation to this assessment and the issue of the proposed development's impact on local school capacity was discussed. Ged Kelly will, in line with all applications Bolton Council receives, make a formal response in due course.

Limitations and Assumptions

10.43. The assessment of effects is carried out against a benchmark of current socio-economic baseline conditions prevailing in the area local to site. As with any dataset, baseline data will change over time. The most recent published data sources were used in this assessment.

10.44. Data used in this assessment is secondary information derived from a variety of sources. Data has been sourced from official government datasets or the most reliable alternative, where appropriate, to maximise accuracy. The assumption is made that this data, as well as that derived from other secondary sources, is accurate.

10.45. All demand for social and community infrastructure within this report is assumed additional and therefore the worst-case scenario. However, given the mix of affordable and market housing, it could be the case that some residents may locate to the proposed development from within the same local impact area or the borough. For example, a resident may already be using local schools and healthcare services.

10.46. The estimated construction costs for the proposed development have been provided by the applicant and are used to assess the potential temporary construction employment impacts.

Baseline Conditions

Land Use and Spatial Context

- 10.47. The proposed development includes two sites located approximately 1.4km from one another. The sites are adjacent to the disused section of the Manchester, Bolton and Bury Canal and are located on the western edge of Little Lever, within the administrative boundary of Bolton Council. The combined area of the development is 13.45 ha.
- 10.48. Creams Mill is the larger of the two sites, occupying 11.55 ha. The development site occupies two large areas of land, divided in two by the Manchester, Bolton and Bury Canal. All the site is located within the Green Belt. The 'top site' comprises a large area of open undeveloped land, bounded by residential development on Cedar Avenue to the north, trees to the east and south, with the canal beyond and Mytham Road to the west. The top site is largely flat, with the land falling away steeply through the trees to the canal. The 'lower' site is densely populated with trees and has a steep gradient down to the area of land along the waterfront, which was previously occupied by Creams Mill. The mill has not been in use since 2004 and was demolished in 2011 following a fire and vandalism.
- 10.49. Hall Lane development site occupies an area of 1.9 ha. There are existing established informal footpaths across the north of the site leading to the woodland and the footpath network to the south of the canal, which will be retained as part of the development. The site slopes from Newbury Road down to the canal, with a large crater in the middle of the site. The site was previously mined, and the crater is the remnants of the mining shaft access.

Population and Demographic Characteristics

- 10.50. According to ONS mid-year population estimates for 2019³⁰, there are 9,930 people living within the Local Impact Area (LIA). This represents 3.5% of Bolton's population of 287,600. The Little Lever LIA population was estimated to be 10,230 in 2014, indicating a decrease of 300 people, or a 3% decline in the local population over five years. Over the same period, Bolton's population grew by 6,760 (2%).
- 10.51. Table 10.4 shows that 58% of the LIA's residents are of working-age (aged between 16 and 64 years), which is slightly lower than the borough (61%) and regional (62%) proportions. There is a higher proportion of older people living in the Little Lever LIA (25% of residents are aged 65 and above) compared to Bolton (17%). The fall in overall population within the LIA in the last five years may be, in part, explained by the area's above average older and ageing population in comparison to the rest of the borough and across the wider Greater Manchester area.

³⁰ Office for National Statistics (2019): Mid-Year Population Estimates

Table 10.4 Population & Age Profile

	Little Lever LIA		Bolton		Greater Manchester		North West	
	2019 No.	% Share	2019 No.	% Share	2019 No.	% Share	2019 No.	% Share
Total Pop	9,933		287,550		2,835,686		7,341,196	
0-15	1,710	17%	61,687	21%	581,722	21%	1,405,707	19%
16-64	5,751	58%	176,041	61%	1,803,177	64%	4,560,378	62%
16-45	3,123	31%	106,707	37%	1,148,710	41%	2,742,100	37%
65+	2,472	25%	49,822	17%	450,787	16%	1,375,111	19%

Source: Mid-Year Population Estimates, Office for National Statistics, 2019

10.52. Population projections³¹ show that the population of Bolton is projected to grow by approximately 14,000 people (4.9%) between 2018 and 2043. During this period, the population aged 16-64 is projected to show marginal growth of approximately 230 (0.1%), while the population aged 65+ is projected to increase by 14,900 (30%). The issue of an ageing population is relevant nationally. The elderly population (aged 65 and over) in England is expected to increase by 45% between 2018 and 2043. In comparison the 16-64 population is nationally projected to increase by 3.8%.

Housing Stock and Supply

10.53. Little Lever LIA has a population density of 33.9 persons per hectare, which is higher than the average for Bolton as a whole, which is 20.6 persons per hectare.

10.54. Census data showed that in 2011 there were around 4,500 households within the LIA and 120,800 households within Bolton. More recent data contained in the Department of Housing, Communities and Local Government's live tables on dwelling stock show that the number of

³¹ Office for National Statistics (2018): Sub-national population projections.

dwelling in Bolton has increased to over 124,400. However, this data is not available at the smaller geographical scale of the LIA.

10.55. Census data shows that in 2011 the housing stock in the Little Lever LIA mainly consisted of houses (detached, semi-detached and terraced) at 89% of accommodation. Bolton had a slightly lower proportion of houses (86%) and a greater proportion of flats and apartments (14%) compared to the LIA. Across the North West, 83% of the housing stock were houses, compared to 16% flats and apartments.

10.56. The data also showed that social rented households represented just over 20% of the tenure split in Bolton, which is just lower than the share across Greater Manchester (22%) and a higher proportion than the tenure split across the North West (18%). However, within the LIA the proportion of social rented accommodation is significantly lower at 13% of all dwellings. Shared Ownership housing made up 0.7% of housing in the LIA, which is in line with the average for Bolton and East of England (both 0.5%).

Table 10.5 Housing Profile - Type and Tenure Table

	Little Lever LIA	Bolton	Greater Manchester	North West
Total Households	4,506	120,802	1,170,929	3,143,898
Dwelling Type				
Detached/Semi	73.7%	50.8%	50.3%	53.4%
Terraced	15.6%	34.9%	30.3%	30.0%
Flats/Apartments	10.7%	14.2%	19.4%	16.4%
Other	0.0%	0.1%	0.1%	0.3%
Tenure				
Owned	76.0%	63.7%	60.1%	64.5%
Shared Ownership	0.7%	0.5%	0.5%	0.5%
Social rented	12.7%	20.5%	21.9%	18.3%
Private rented	9.6%	13.7%	16.1%	15.4%
Rent free	1.0%	1.6%	1.4%	1.3%

Source: Census 2011

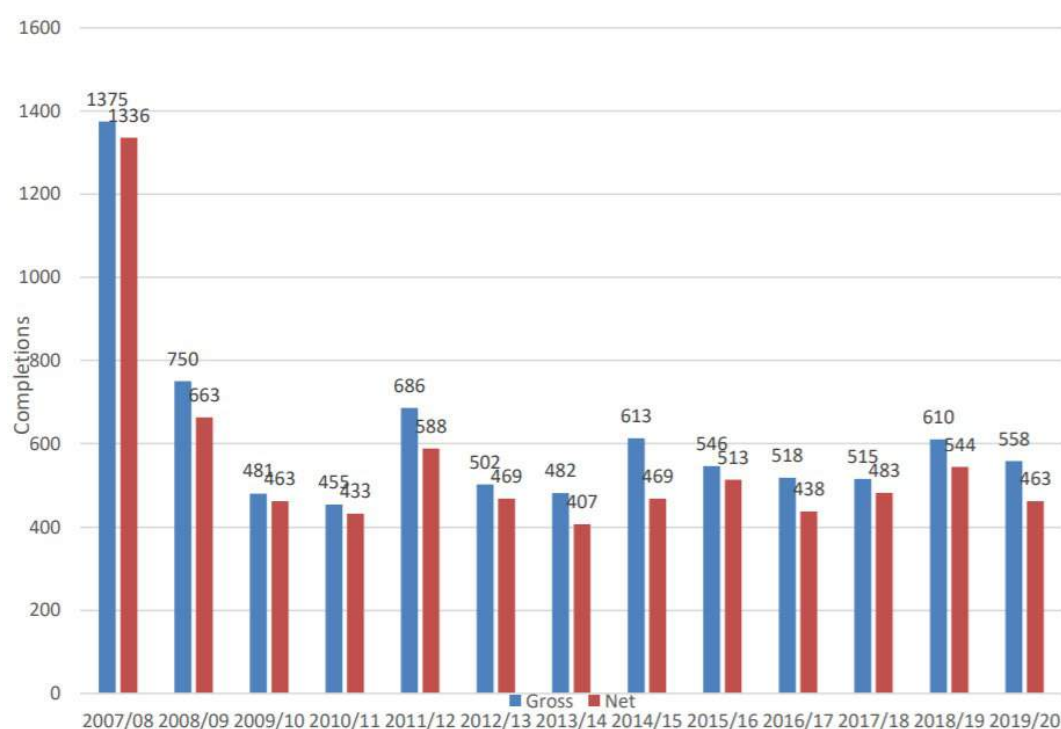
10.57. Bolton's Core Strategy³² planned for an average of 694 additional dwellings per annum between 2008 and 2026, an overall total of 12,492 additional dwellings. However, the current target for Bolton based on the local housing need figure developed using the MHCLG

³² Bolton Council (2011): Bolton's Core Strategy Development Plan Document Adopted 2 March 2011

methodology requires Bolton to deliver 776 new homes each year. The overall 5-year requirement for 2020-2025 is therefore 4,896 dwellings³³.

10.58.MHCLG data on net additional dwellings shows that Bolton delivered 5,262 net additional dwellings between 2008/09 to 2018/19. This is an average delivery rate of over 200 dwellings per annum short of the target set out in the local plan. Most recently there were 463 net housing completions in 2019/20. This indicates that there has been a decrease in net housing completions in the last year. The current rate of completions continues to sit below the MHCLG target of 776 dwellings per annum. Although the data collected by the Local Authority is different to MHCLG data, the trend of Bolton's consistent delivery below its housing targets is repeated in local authority monitoring data shown in Figure 10.1.

10.59.Figure 10.2 Bolton's Housing Delivery



Source: Bolton Council. Housing Delivery Test Action Plan. 2020.

10.60.The draft Greater Manchester Spatial Framework (GMSF) launched in January 2019 has a target to deliver 200,980 new homes across Greater Manchester by 2037. 50,000 homes will be affordable and 30,000 designated as social housing.

10.61.Bolton's Core Strategy stipulates that all developments which incorporate open market housing with a capacity for 15 or more dwellings should ensure provision of affordable

³³ Bolton Council (2020): Housing Delivery Test Action Plan

housing. On previously developed land 15% of the total provision should be affordable, and in the case of Greenfield 35%. A lower proportion and/or a different tenure split may be permitted where it can be clearly demonstrated that development would not be financially viable and affordable housing provision is being maximised. Bolton's Housing Delivery Plan³⁴ states that without intervention, new homes will be developed at approximately the same rate as the previous ten years (450 homes per year) 20% affordable. A complex model recommended by the government, using a number of data sources including household survey data, estimates that there is a net annual supply/need imbalance of 416 affordable dwellings across the borough.

Employment & Local Economy

10.62. There are around 1,125 jobs in the Little Lever LIA according to the latest ONS Business Register and Employment Survey (BRES). This represents approximately 1% of Bolton's overall work-place based employment. Employment in the Little Lever LIA has largely remained at the same level since 2009, as shown in the table below. This is considerably lower than the employment growth seen in Bolton (7%), Greater Manchester (14%) and the North West of England (10%), and reflects the area's predominantly residential characteristics.

Table 10. 6 Total Employment Change, 2009-2018

	Little Lever LIA	Bolton	Greater Manchester	North West
2009	1,125	107,500	1,194,000	3,118,500
2018	1,125	115,000	1,364,000	3,431,500
% Change	0%	7%	14%	10%

Source: ONS Business Register and Employment Survey, 2009-2018

10.63. The largest employment sectors within the Little Lever LIA are the wholesale and retail sector, education sector and human health and social work sector, making up 20% (230 jobs), 18% (200 jobs) and 16% (180 jobs) of total employment respectively. This proportion is above the average proportion of employment for Bolton, Greater Manchester and the North West of England for all three sectors. This reflects the role of retail and public services serving the Little Lever population.

10.64. The construction sector accounts for 13% of total jobs (125 jobs) within the LIA. In Bolton and the North West, the proportion of jobs within the construction sector is lower than the LIA, both with 5% of total employment (6,000 jobs). In Greater Manchester the construction sector accounts for 4% of total employment (61,000 jobs).

³⁴Bolton Council (2019): Housing Delivery Plan July 2019.

Table 10.7 Workplace based Employment by Sector

	Little Lever LIA	Bolton	Greater Manches ter	North West
Agriculture, forestry and fishing	0%	0%	0%	1%
Mining and quarrying	0%	0%	0%	0%
Manufacturing	2%	12%	8%	9%
Electricity, gas, steam and air con	0%	1%	1%	1%
Water supply	0%	1%	1%	1%
Construction	13%	5%	4%	5%
Wholesale and retail trade	20%	19%	17%	17%
Transportation and storage	6%	7%	6%	5%
Accommodation and food	5%	5%	6%	7%
Information and communication	2%	2%	3%	3%
Financial and insurance	1%	3%	3%	3%
Real estate	1%	3%	2%	2%
Professional, scientific and technical	3%	7%	9%	8%
Administrative and support service	6%	7%	10%	9%
Public administration and defence	0%	3%	4%	4%
Education	18%	8%	8%	8%
Human health and social	16%	13%	12%	13%
Arts, entertainment and recreation	2%	2%	2%	2%
Other service activities	1%	2%	2%	2%

Source: ONS Business Register and Employment Survey, 2018

Social & Community Infrastructure (SCI)

Education: Primary Schools

10.65. There are 98 primary schools across Bolton. Table 10.8 sets out capacity data for the 35 primary schools that fall within two miles (3.2 km) of either site. Seven of the primary schools within 2 miles of either site are located in the Bury local authority area, while one primary school is located in Salford. For completeness, these schools are included in the baseline assessment.

10.66. The latest available DfE data for 2020 indicates that, in headline terms, schools within 2 miles of the site have capacity to accommodate a further 540 pupils. However, the data also indicates that 16 of the 35 primary schools within the catchment of the sites are currently operating at over capacity, with more children on roll than the stated school capacity. A further 9 schools fall below the DfE recommended vacancy allowance of 5%. Therefore, there are 10 schools within the two-mile catchment who are operating under capacity and above

the 5% threshold. These schools, all within the Bolton borough area, currently have 497 primary school places available. It should be noted the data reflects the total surplus within each school and is not reflective of capacity issues that may be apparent within individual year groups.

10.67. Figure 10.3 shows there are five primary schools located within the LIA. These are Bowness Primary School, St Teresa's RC Primary School, Mytham Primary School, St Matthew's CofE Primary School and Masefield Primary School.

10.68. All of these primary schools are within 1 mile of both Creams Mill and Hall Lane development sites. Within the LIA, Bowness and Mytham primary schools have the largest surplus capacity (42 and 44 surplus places respectively). Whereas St Matthew's and Masefield primary schools are currently over capacity (by 5 and 9 pupils respectively). St Teresa's RC Primary School has capacity for 21 places. Within the 3 closest primary schools there is capacity of 107 pupil places.

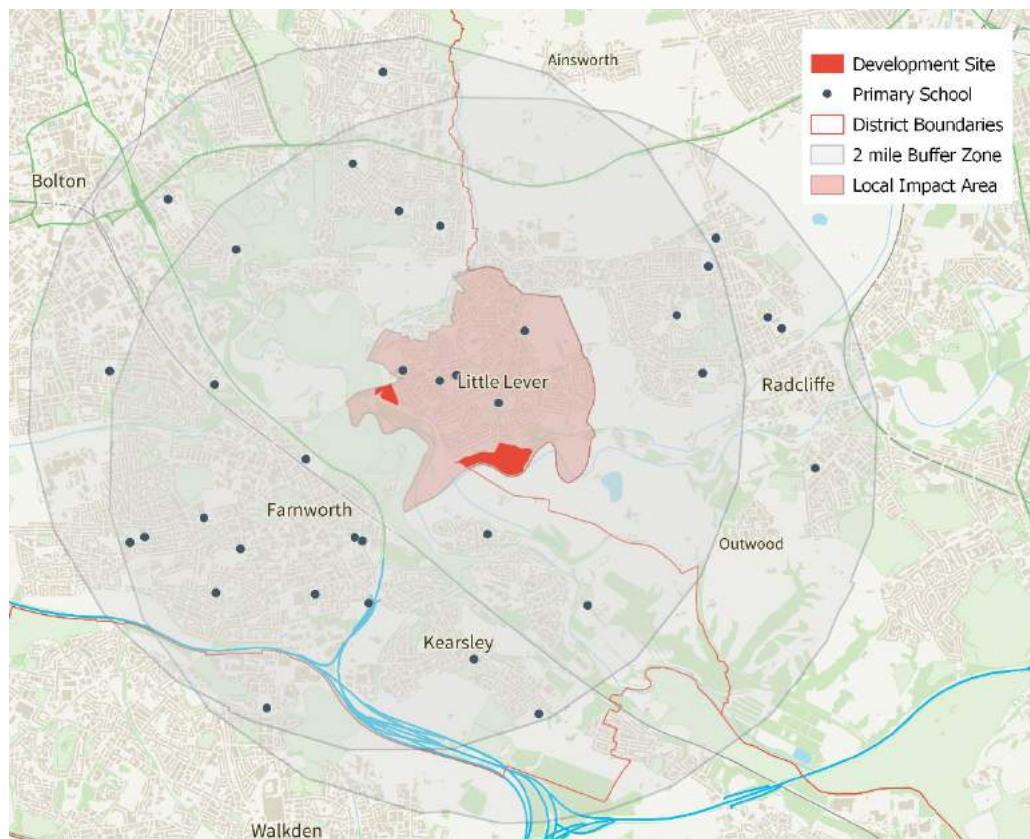
Table 10.8 Primary Schools within 2 miles of either site

School	District school is located	Distance from Creams Mill (miles)	Distance from Hall Lane (miles)	Capacity	Pupil Roll	Surplus
Bowness Primary School	Bolton	0.8	0.2	156	114	42
St Teresa's RC Primary School	Bolton	0.6	0.3	161	140	21
Mytham Primary School	Bolton	0.3	0.6	452	408	44
St Matthew's CofE Primary School, Little Lever	Bolton	0.5	0.4	210	215	-5
Prestolee Primary School	Bolton	0.4	1.0	210	277	-67
All Saints CofE Primary School	Bolton	1.1	0.6	294	257	37
Masefield Primary School	Bolton	0.8	0.9	280	289	-9
St Gregory's RC Primary School, A Voluntary Academy	Bolton	1.0	0.8	210	202	8
St John CofE Primary School, Kearsley	Bolton	0.9	0.9	210	192	18
St Saviour CofE Primary School, Ringley	Bolton	1.0	1.7	210	209	1
St Michael's CofE Primary School, Great Lever	Bolton	1.7	1.0	475	506	-31
Blackshaw Primary School	Bolton	1.4	1.0	209	239	-30
SS Osmund and Andrew's R.C. Primary School	Bolton	1.5	1.1	330	380	-50
Kearsley West Primary School	Bolton	1.1	1.2	262	236	26
St Stephen and All Martyrs' CofE School, Lever Bridge	Bolton	1.9	1.2	210	205	5
St Peter's CofE Primary School	Bolton	1.3	1.2	420	415	5

School	District school is located	Distance from Creams Mill (miles)	Distance from Hall Lane (miles)	Capacity	Pupil Roll	Surplus
Queensbridge Primary School	Bolton	1.6	1.2	210	240	-30
Cams Lane Primary School	Bury	1.3	1.8	210	205	5
The Ferns Primary Academy	Bolton	1.7	1.3	450	440	10
Radcliffe Primary School	Bury	1.3	1.7	410	286	124
Leverhulme Community Primary School	Bolton	1.9	1.3	522	448	74
Spindle Point Primary School	Bolton	1.5	2.0	210	232	-22
St James CofE Primary School, Farnworth	Bolton	1.8	1.5	362	365	-3
St Stephen's CofE Primary School	Bolton	2.1	1.6	210	207	3
Ss Simon & Jude CofE Primary School, Bolton	Bolton	2.3	1.6	420	474	-54
Wesley Methodist Primary School	Bury	1.6	2.0	295	308	-13
Our Lady of Lourdes RC Primary School	Bolton	2.1	1.6	210	227	-17
Bolton Parish Church CofE Primary School	Bolton	2.4	1.7	210	242	-32
Highfield Primary School	Bolton	2.2	1.7	420	420	0
St Mary's Roman Catholic Primary School, Radcliffe	Bury	1.7	2.5	472	447	25
Gorsefield Primary School	Bury	1.8	2.3	432	346	86
St Andrew's Church of England Primary School, Radcliffe	Bury	1.8	2.1	210	237	-27
St John's Church of England Primary School, Radcliffe	Bury	1.8	2.5	210	212	-2
Red Lane Primary School	Bolton	2.3	1.9	420	502	-82
North Walkden Primary School	Salford	2.0	1.9	236	228	8
Total within 2 miles				10,418	10,350	542 (497)

Source : DfE (2020) Edubase search tool - <https://get-information-schools.service.gov.uk>. Please note, the distances in this table are measured from the midpoint of the sites to the school's postcode point location. The schools are ordered by proximity to the nearest site, with the school listed first being the closest.

Figure 10.3 Map of primary schools within 2 miles of either site



Source: DfE (2020) Edubase search tool - <https://get-information-schools.service.gov>. Please note, the buffer zone in the map is measured from the site perimeter. Base map contains OS data © Crown copyright and database right 2020

Education: Secondary Schools

- 10.69. There are 20 secondary schools across Bolton. Table 10.9 **Error! Reference source not found.** sets out capacity data for the 14 secondary schools that fall within 3 miles (4.8 km) of either site. Four of the secondary schools within 3 miles of either site are located outside of Bolton, in Bury and Salford. For completeness, these schools data has been included in the baseline assessment, but excluded from the following assessment of available capacity.
- 10.70. The latest available DfE data for 2020 indicates that four of the 10 Bolton secondary schools within the catchment of the sites are currently over capacity. Three other Bolton schools fall below the DfE recommended vacancy allowance of 5%. Overall, amongst schools within the three-mile catchment in Bolton, and above a 5% vacancy allowance, there are approximately 928 places available. As for primary schools, it should be noted the data reflects the total surplus within each school and is not reflective of capacity issues that may be apparent within individual year groups.

10.71. Figure 10.4 shows that there is one secondary school located in the LIA, Little Lever School.

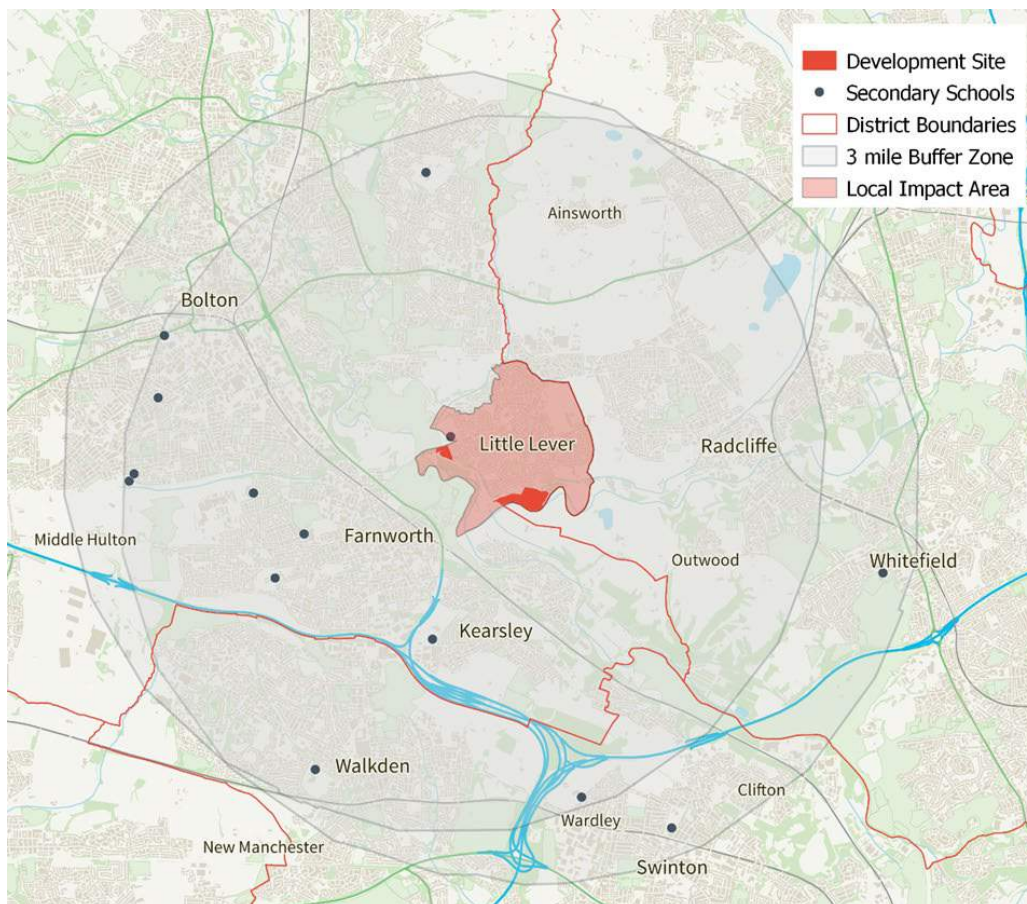
This is the only secondary school within 1 mile of either site. Little Lever School has a current surplus capacity to only accommodate 10 pupils and therefore the school is at near capacity. The next closest schools lie to the south and west in Kearsley (Kearsley Academy) and Farnworth (Harper Green). These two secondary schools have a combined surplus capacity of 386 pupil places.

Table 10.9 Secondary Schools within 3 miles of either site

School	District	Distance from Creams Mill (miles)	Distance from Hall Lane (miles)	Capacity	Pupil Roll	Surplus
Little Lever School	Bolton	0.8	0.1	1050	1040	10
Harper Green School	Bolton	1.8	1.3	1400	1327	73
Kearsley Academy	Bolton	1.4	1.5	950	637	313
Mount St Joseph	Bolton	2.2	1.6	900	908	-8
St James's Church of England High School	Bolton	2.1	1.7	1050	1071	-21
Bolton St Catherine's Academy	Bolton	2.7	2.2	1186	1134	52
Bolton Muslim Girls School	Bolton	3.1	2.3	600	614	-14
University Collegiate School	Bolton	3.2	2.4	600	167	433
St Ambrose Barlow RC High School	Salford	2.4	3.0	1050	1041	9
King's Leadership Academy Bolton	Bolton	3.2	2.5	360	178	182
Essa Academy	Bolton	3.2	2.5	900	980	-80
Harrop Fold School	Salford	2.8	2.7	1200	939	261
Co-op Academy Swinton	Salford	2.9	3.5	1075	829	246
Philips High School	Bury	2.9	3.6	880	866	14
Total				13,201	11,731	1,593 (928)

Source: DfE (2020) Edubase search tool - <https://get-information-schools.service.gov.uk/>. Please note, the distances in this table are measured from the midpoint of the sites to the school's postcode point location. The schools are ordered by proximity to the nearest site, with the school listed first being the closest.

Figure 10.4 Map of secondary schools within 3 miles of either site



Source: DfE (2020) Edubase search tool - <https://get-information-schools.service.gov.uk/>. Please note, the buffer zone in the map is measured from the site perimeter. Base map contains OS data © Crown copyright and database right 2020.

Healthcare

10.72. There are 3 GP surgeries located within the Little Lever LIA, all of which are within 1 km (0.62 miles) of both development sites shown in Figure 10.5 - Little Lever Health Centre 1 & 2 (located at the same postcode) and Spring View Medical Centre. Together these surgeries have a patient cohort of 12,372 and 5.4 Full-time equivalent (FTE) GPs. As such, they have a total of 2,308 patients per FTE GP, which is above the Bolton Clinical Commissioning Group (CCG) average of 1,587 patients per FTE GP³⁵.

10.73. Table 10.10 shows that when surgeries within two miles (3.2km) of the site are considered, the average number of patients per FTE GP is 1,742, indicating greater GP capacity outside the

³⁵ The available data for Spring View appears to be inaccurate with less than 1 FTE GP for over 5,000 patients.

LIA but within 2 miles of both sites. However, the level of patients per GP is still above the Bolton CCG average, but below the benchmark list size of 1,800 patients per FTE GP.

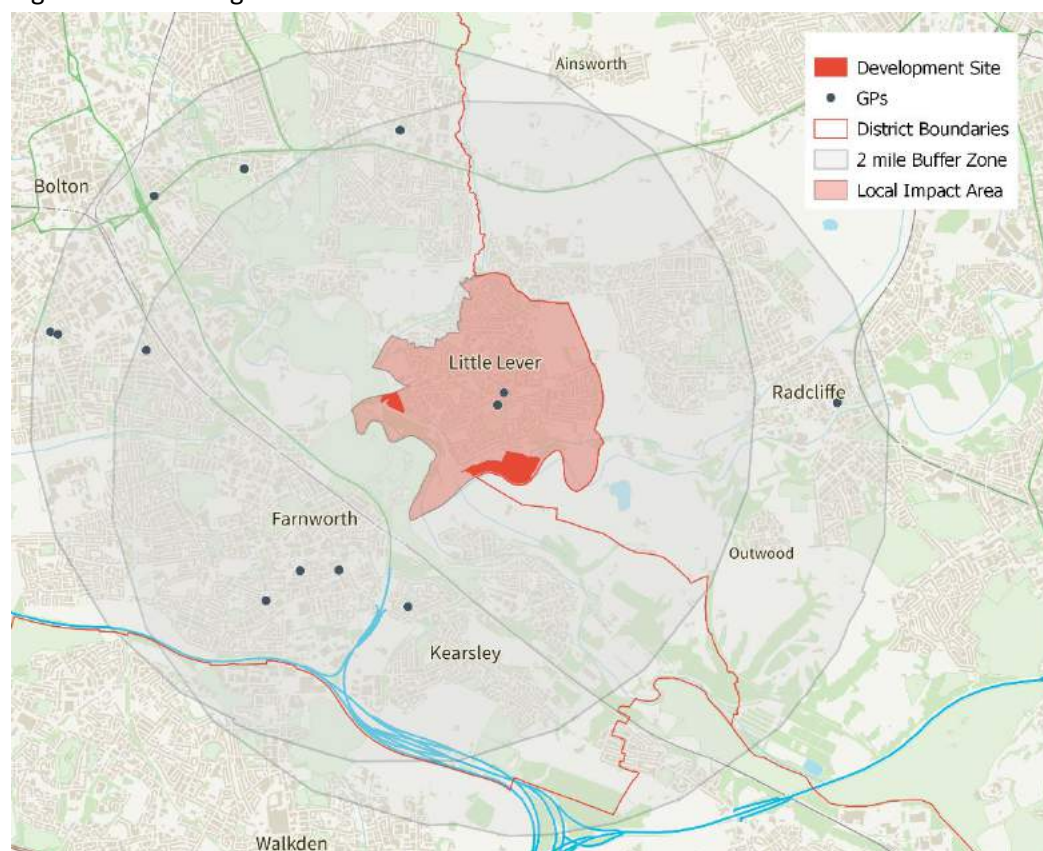
10.74. Table 10.10 GP provision within 2 miles of either site

GP	Within 2 miles of either site	Bolton CCG
No. of GP surgeries	17	49
No. of GPs (FTEs)	63	199
Registered patients	109,686	316,238
Patients per FTE GP	1,742	1,587

Source: NHS Digital (2020): General Practice Workforce, 30 June 2020

10.75. The map in Figure 10.5 shows GP surgeries within the LIA and within the 2 mile catchment. There are very few GP's located outside of the borough in Bury. Significant GP provision is found to the South West of the sites in Farnworth and Kearsley and to the North West of the sites towards Bolton.

Figure 10.5 GP Surgeries within 2 miles of either site



Source: NHS Digital (2020): General Practice Workforce, 30 June 2020. Please note, some GPs are located at the same postcode, therefore one GP point on the map may represent two GP surgeries. Also note the buffer zone in the map is measured from the site perimeter. Base map contains OS data © Crown copyright and database right 2020.

10.76. To put the GP data presented above into context, a widely used capacity benchmark is for 1,800 patients per FTE GP. Using this benchmark indicates that within Bolton and within 2 miles of the site there is capacity with GP practices for accommodating new patients. However, most of this capacity exists outside the Little Lever Local Impact Area.

10.77. NHS data indicates that there are 16 dentist practices within 2 miles of either development site, 9 of which are not accepting any new adult patients (although 3 dentists are accepting NHS patients by referral only). The other 7 do not state if they are accepting new patients. Based on the lack of data it is difficult to assess capacity amongst local dental practices. As a number of practices are not accepting new adult patients and the ones that are, can only accept by referrals.

10.78. The nearest hospital is the Royal Bolton Hospital, which is located in Farnworth, approximately 2.5 miles from the development sites. It is one of the busiest NHS hospitals in the North West. The hospital has a wide range of services and is a centre of excellence for maternity and children's services, with new central delivery suite, special care, neonatal intensive care and children's unit. It has A&E facilities onsite.

Open Space

10.79. There are opportunities for Bolton residents to access the countryside with the north of the Borough being dominated by open moorland forming part of the West Pennine Moors. Past industrial activities in the Borough have left a variety of sites that are now valued for their biodiversity, such as canals.

10.80. Desk based analysis of the local area within and surrounding Little Lever shows strong provision of green spaces and blue infrastructure. The following open space provisions are found within Little Lever:

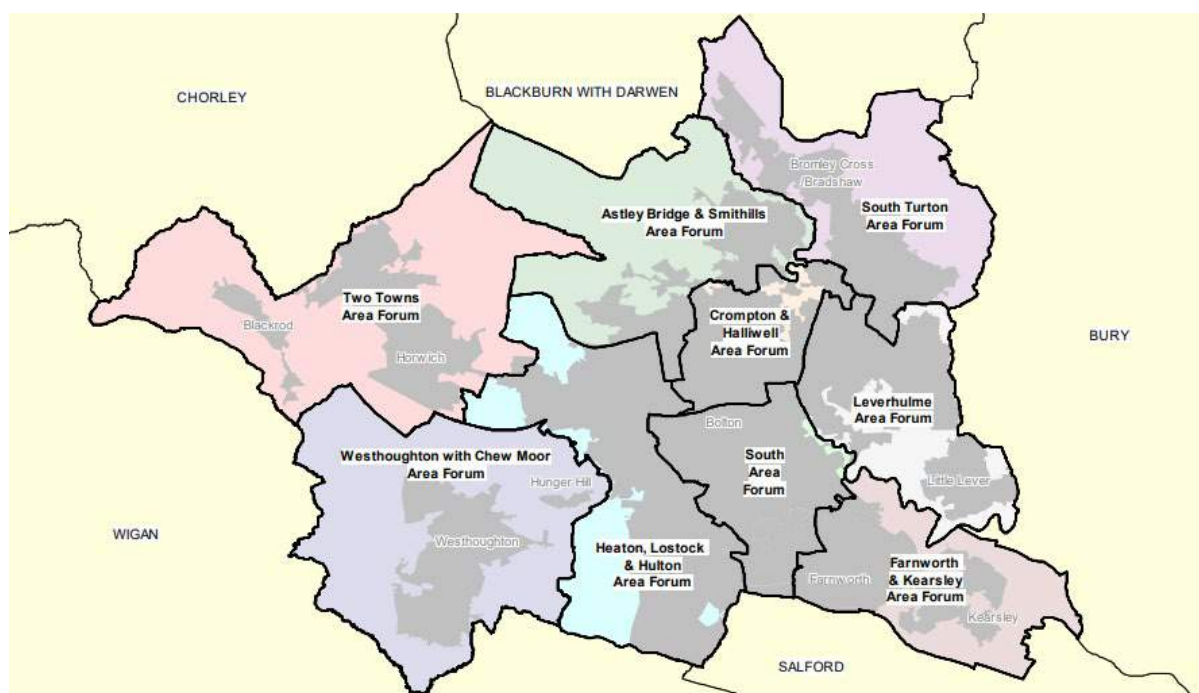
- Mytham Park - the town's main park which includes a play area, a bowling green and a multi-use games area
- The River Croal - a tributary of the River Irwell and flows eastwards through Bolton.
- The River Irwell - a tributary of the River Mersey, after passing to the south of Little Lever it flows to the south east and through the city centre of Manchester.
- The Manchester, Bolton & Bury Canal – When fully opened, the canal was 15 miles in length and ran north from Salford to Prestolee, near Little Lever. Here it split into two: the main line continued to Bury, while a branch headed north-west to Bolton. A major breach occurred close to Little Lever in 1936 and was never repaired, it presents a significant gap in the canal's route.
- Nob End SSSI (8.8 Ha) - located to the southern fringe of Little Lever, in between the River Croal - River Irwell confluence and the disused Manchester Bolton & Bury Canal. The site was used around 1850-70 as a tip for toxic alkaline waste from the production of sodium carbonate. The surface of the waste has since weathered down to calcium carbonate, and vegetation has colonised the site. As natural

limestone grassland does not occur in the local area, many of the species found are rare in the area.

- Moses Gate Country Park - features lakes and nature trails, it is located to the west of Little Lever.
- Darcy Lever Gravel Pits - Located to the North of Mosses Gate Country Park and to the South is Farnworth Cemetery. Several ponds in the pits are now home to nationally important species like the great-crested newt.
- Leverhulme Park – Located to the north of Little Lever, a large area of parkland with walking routes and a playground.
- New House Farm Playing Fields – Located close to Leverhulme park to the north of Little Lever.

10.81. The latest assessment of open space for Bolton was completed in 2007. For the baseline assessment, the local impact area most closely aligns with the 'Leverhulme area forum' defined in the study. This covers the entire Local Impact Area as well a significant area to the north of Little Lever, making the area considerably larger than the LIA. The area is identified within the map in Figure 10.6.

Figure 10.6 Open Space analysis areas in Bolton



Source: Bolton Council, 2007, Open Space, sport & recreation study

10.82. The assessment identified a strong supply of open space across the Leverhulme area forum and very few catchment gaps. Table 10.11 below shows the provision of open space across Leverhulme, this compares favourably to other areas within Bolton.

Table 10.11 Open Space Provision within the Leverhulme Area Forum location

Type	Number	Size (ha)	No. High Quality	No. High Value	Catchment Gap?
Parks and Gardens, Total	10	211.50	1	10	No
<i>Local Park</i>	5	4.64	-	-	-
<i>District park</i>	3	11.79	-	-	-
<i>Borough park</i>	2	195.06	-	-	-
Natural and semi-natural greenspaces	4	53.40	1	23	No
Green Corridor	0	0	0	0	-
Amenity Greenspace	20	59.61	0	18	No
Allotments, community gardens and city farms	5	1.95	2	3	Yes
Cemeteries	3	14.91	1	1	No
Civic space	1	0.06	0	1	-

Source: Bolton Council, 2007, Open Space, sport & recreation study

10.83. The 2007 assessment outlines how Bolton Council seeks the conservation and reinstatement of the district's canals, where necessary, and to promote their use for recreation. It is recognized that improvements to the provision of the cycleway network through the upgrade of canal towpaths to cycleways, where possible, would also increase the quality and quantity of provision.

Assessment of Effects

Temporary Construction Related Employment

10.84. The construction works associated with the proposed Creams Mill & Hall Lane Development would generate employment within the construction industry, both on-site and off-site and across a range of occupations. The level of employment would fluctuate throughout the course of the construction period which is estimated at 3 years.

10.85. Construction expenditure for the proposed development, including construction of new housing, site infrastructure and canal restoration works, was estimated by the applicant. Based upon this level of expenditure approximately 240 construction workers per year on average would be supported³⁶. These are jobs both on and off site, including those directly involved with the construction process and indirectly in the supply of goods and services to

³⁶ The estimates are based on labour coefficients for residential development and the number of workers a year per £1m of construction spending. Homes and Communities Agency (2015) Calculating Cost Per Job: Best Practice Note, (3rd Edition)

support the scheme. The precise quantity of employment would depend on the phase of construction and the activity taking place at a given point in time.

10.86. Construction employment is relatively mobile and therefore employees will likely be drawn from across Bolton, but also from across the wider Greater Manchester area. For this assessment, the significance of effect has been undertaken at the Bolton borough level.

10.87. The sensitivity of the receptor is assessed as being **low**. Construction employment represents around 5% of total employment in Bolton. In addition, construction employment creation is not currently a specific policy priority for Bolton. The magnitude of change is assessed as being **low** beneficial, given the scale of employment supported and recognising that not all construction related employment and activity will arise within Bolton, but also from across the wider Greater Manchester area. The significance of effect is temporary and is assessed as **minor beneficial**.

10.88. In addition, while the overall significance of effect is assessed as minor beneficial, the applicant has indicated that they set a target of 70% of construction labour and sub-contractor/suppliers to be drawn from within Greater Manchester when working with housing associations.

Population

10.89. Once the proposed development is completed and occupied, it is estimated that the new housing would be home to between 560 and 640 residents³⁷. This scale of population would represent an increase of approximately 6% on the existing Little Lever LIA population and an increase of approximately 0.2% at the Bolton borough level.

10.90. At the LIA level, the sensitivity of the receptor is assessed as high, reflecting that the LIA has seen a decline in population in the last five years and the area has an above average ageing population. At the borough level, the receptor is judged to be low, reflecting the area's population profile is broadly in line with averages across Greater Manchester and nationally, while the overall population has been growing.

10.91. The magnitude of change is assessed as moderate beneficial at the LIA level and negligible beneficial at the borough level. As such, the significance of effect is assessed as major beneficial in the long term at the local level and insignificant beneficial at the borough level.

10.92. These new residents would create demand for community facilities, particularly primary healthcare, education and open space. These receptors are considered in further detail below.

³⁷ The upper end of the range is calculated on the basis of an average occupancy of 2.3 persons per household. This is based upon Census 2011 data for average household sizes within the LIA. The lower end of the range estimate is calculated on the basis of average number of residents for different sized accommodation (by number of beds), sourced from DCLGs Survey of English Housing (2007).

Housing Supply

10.93. The completed development would deliver a total of 274 residential units comprising one- and two-bedroom apartments, as well as a mix of two to four-bedroom houses. The following unit mix, provided by the applicant, has been assumed for the completed development. This assumed mix has been used to calculate the population and pupil yields which have informed the assessments of health, education and open space requirements in the assessment.

Table 10.12 Accommodation Schedule

Type	Creams Mill	Hall Lane	Total
Houses	110	67	177
<i>2 bed</i>	<i>50</i>	<i>29</i>	<i>79</i>
<i>3 bed</i>	<i>51</i>	<i>31</i>	<i>82</i>
<i>4 bed</i>	<i>9</i>	<i>7</i>	<i>16</i>
Apartments	68	29	78
<i>1 bed</i>	<i>26</i>	<i>17</i>	<i>55</i>
<i>2 bed</i>	<i>42</i>	<i>12</i>	<i>23</i>
Total	178	67	274

10.94. The development would deliver around 249 affordable homes (c.90% of all proposed units). The shortage of affordable housing in Bolton is set out in the Housing Market and Needs Survey (2011), which recommends delivery of 377 new affordable units per annum to meet housing needs³⁸. The site would therefore contribute to two-thirds (66%) of the 2011 based annual affordable housing recommendation for the borough.

10.95. Given the strategic and policy position on the need for new housing in Bolton, as well as evidence on the limited supply of new housing coming forward in both Little Lever and across the borough more generally, reflected by on-going under-delivery of new housing (approximately 200 units per year below target levels), the sensitivity of the receptor is assessed as being high at both the LIA and borough level.

10.96. The magnitude of change is assessed as medium beneficial in the LIA, given the 6% increase in overall new housing stock, as well as significant new affordable housing in Little Lever. At the borough level the magnitude of change is assessed as being negligible beneficial, based upon the impact on overall housing stock. However, it is noted that the proposed scheme of 250 affordable homes would deliver around a fifth of all new affordable housing requirements in

³⁸ Bolton Council, Affordable Housing SPD, 2013.

Bolton over a three-year period, based upon an annual borough target of 416 affordable houses.

10.97. The significance of effect is assessed as major beneficial in the long term at the LIA level, and minor beneficial in the long term at the borough level.

Local Economy

10.98. Residents of new housing developments spend money in the local economy which supports local jobs and the sustainability of local businesses. As a result of the proposed development there will be indirect spending benefits in the local economy. The latest data shows that average weekly household spending on comparison and convenience goods in the North West of England is approximately £350 per week³⁹. Therefore, the proposed development of 274 new homes is estimated to generate spending of approximately £4.9 million per year.

10.99. Given the proximity of the site to Little Lever and local shops and services, it would be expected that a proportion of this spending would be captured locally, while further expenditure would also be made in larger retail and service locations in Bolton and outside the local authority area.

10.100. The sensitivity of the receptor (local economy) is assessed as medium at the LIA level, given the importance of local expenditure to the sustainability of local services, and as **low** at the borough level. The magnitude of change in local household expenditure arising within the LIA is assessed as **medium** (at +6%) and **negligible** (at +0.2%) at the borough level. The significance of effect is assessed as **moderate beneficial** in the long term at the LIA level, and **insignificant** in the long term at the borough level.

GP Capacity

10.101. Based upon the upper end of the estimated population arising from the proposed development, 640 residents, and assuming all residents are additional, there will be an increase in demand for GP primary healthcare facilities within two miles. The baseline analysis has shown that two of the main practices within Little Lever have a patient to FTE GP ratio of 1,640, which is below the average benchmark of 1,800 patients per FTE GP⁴⁰. Across the 2 mile radius, GP practices have a patient to FTE GP ratio of 1,742, which is also below the average 1,800 patients per FTE GP benchmark.

10.102. Given the available capacity to accommodate new patients within the 2-mile radius, the sensitivity of the receptor is assessed to be **low**. The magnitude of change arising from new patient demands and the impact which this has on patient to GP ratios is assessed as **negligible** adverse as it only leads to +0.6% change in the patient per FTE GP ratio.

³⁹ ONS Household Expenditure Survey ,2018/19

⁴⁰ Latest data for Spring View medical practice appears inaccurate given the data indicates there is less than 1 FTE GP for over 5,100 patients.

Consequently, the overall significance of effect is assessed as **insignificant adverse** in the long term within 2 miles of the proposed development.

Primary Education

10.103. The completed development of 274 residential units would potentially generate demand for 42 primary school places. This has been estimated based upon Bolton Council's pupil yields for different size dwellings⁴¹.

10.104. As set out in the baseline assessment there are five primary schools within the LIA and three currently have surplus capacity for 107 pupils. Across the 2-mile radius there are 10 schools operating under capacity and above the 5% capacity allowance threshold. These schools, all within the Bolton borough area, currently have 497 places available.

10.105. Based upon the available primary school capacity within the local area, both within the LIA and the 2 mile radius, the sensitivity of the receptor is assessed to be **low**. The magnitude of change arising from new pupil demands is assessed to be **negligible** adverse. This reflects that while the completed development would generate demand for up to 42 places, there is a current total surplus primary school places of nearly 500 places locally. In addition, it is anticipated that demand for primary school places are expected to arise over a 3-4 year period, as dwellings are completed.

10.106. Consequently, the overall significance of effect is assessed as **insignificant adverse** in the long term within 2 miles of the proposed development. While the completed development would place some additional demands on local school places, schools are well placed to accommodate this given the identified available capacity.

Secondary Education

10.107. The completed development of 274 residential units would potentially generate demand for 33 secondary school places. This has been estimated based upon Bolton Council's pupil yields for different size dwellings⁴².

10.108. Within three miles of either site there are 10 secondary schools within the Bolton borough area. Overall, amongst these schools, those that are above a 5% vacancy allowance, have approximately 928 places available. The baseline evidence highlights how the local secondary school, Little Lever School, which is within 1 miles of the sites, is currently operating at or near to capacity. However, the next two closest schools lie to the south and west in Kearsley (Kearsley Academy) and Farnworth (Harper Green). The latest data indicates that these two secondary schools have a combined surplus capacity of 386 pupil places.

⁴¹ This has been calculated based on the pupil yield metrics set out in Bolton's Infrastructure and Planning Contributions SPD <https://www.bolton.gov.uk/downloads/file/864/infrastructure-and-planning-contributions>

⁴² This has been calculated based on the pupil yield metrics set out in Bolton's Infrastructure and Planning Contributions SPD <https://www.bolton.gov.uk/downloads/file/864/infrastructure-and-planning-contributions>

10.109. While capacity is constrained at the local secondary school in Little Lever, based upon the available evidence on the scale of current secondary school capacity within 3 miles of the development, the sensitivity of the receptor is assessed to be low.

10.110. The magnitude of change arising from new pupil demands is assessed to be negligible adverse. This reflects that while the completed development could generate demand for up to 33 places, there is a current total surplus secondary school places locally, including 386 places at Kearsley Academy and Harper Green. In addition, it is anticipated that demand for secondary school places is expected to arise over a 3-4 year period as dwellings are completed.

10.111. Consequently, the overall significance of effect is assessed as **insignificant adverse** in the long term within 3 miles of the proposed development. While the completed development would place some additional demands on local secondary school places, the available evidence indicates that schools have the capacity to accommodate this.

Open Space

10.112. The completed development will support the enhancement and creation of a restored canal, towpath and a network of walking and cycling ways for public enjoyment and recreation. This will benefit both residents of the proposed development, existing local Little Lever residents and visitors to the area.

10.113. The baseline assessment has indicated that the Little Lever area, covered by the Leverhulme Area Forum in the 2007 assessment, already has a strong provision of green spaces and blue infrastructure. In relation to the proposed development site this also reflects that the areas being proposed for improvement are used by local residents and informal walkways already exist. The 2007 assessment also outlined a Council objective on the conservation and reinstatement of canals, where necessary, and to promote their use for recreation. It is recognized that improvements to the provision of the cycleway network through the upgrade of canal towpaths to cycleways, where possible, would also increase the quality and quantity of provision.

10.114. While the LIA is already well served by open spaces, the sensitivity of the receptor is assessed as being medium, reflecting the local needs to restore the canal and to provide improvements to local walking and cycling infrastructure. The magnitude of change is assessed as **high** beneficial, reflecting the reinstatement of the canal and the quality of the proposed improvements to local access to this area of open space. Consequently, the overall significance of effect is assessed as **major beneficial** in the long term within the local impact area.

Summary of Assessment of Effects

10.115. The following table summarises the assessment of socio-economic assessment effects

Table 10.13 Summary of Assessment of Effects

Receptor Effect	Impact Area	Sensitivity	Magnitude of Change	Significance of Effect	Duration
Construction employment	Borough	Low	Low Beneficial	Minor Beneficial	Temporary
Population	LIA	High	Moderate Beneficial	Major Beneficial	Permanent
	Borough	Low	Negligible Beneficial	Insignificant Beneficial	Permanent
Housing Supply	LIA	High	Medium Beneficial	Major Beneficial	Permanent
	Borough	High	Negligible Beneficial	Minor Beneficial	Permanent
Local Economy	LIA	Medium	Medium Beneficial	Moderate Beneficial	Permanent
	Borough	Low	Negligible Beneficial	Insignificant Beneficial	Permanent
GP Provision	2 miles	Low	Negligible Adverse	Insignificant Adverse	Permanent
Primary Education	2 miles	Low	Negligible Adverse	Insignificant Adverse	Permanent
Secondary Education	3 miles	Low	Negligible Adverse	Insignificant Adverse	Permanent
Open Space	LIA	Medium	High Beneficial	Major Beneficial	Permanent

Mitigation

10.116. As no significant adverse effects have been identified in the assessment, no specific socio-economic mitigation measures are required in either the construction or operational phases of the proposed development.

Cumulative Impacts

10.117. In addition to the proposed development, the assessment extends the analysis to include the following cumulative sites:

- **Lever Gardens**, Little Lever, Bolton (Application reference - 08816/20). The construction of Extra Care units comprising 62 apartments and 6 bungalows with Bistro, Staff Facilities, Communal Areas, Ancillary Accommodation, Parking and Landscaping. The application is pending determination.
- Land at Victory Road, Little Lever, Bolton (Application reference 04748/18). This is

for the construction of 22 dwellings with associated parking, landscaping and re-routing of existing public right of way. This application was approved in March 2019.

10.118. Both schemes are relatively small in scale and the Lever Gardens scheme is particularly focused upon the provision of Extra Care accommodation for older persons. Consequently, the assessed socio-economic effects of these schemes, in cumulative terms with the proposed development, are modest and would not alter the professional judgements made on significance of beneficial or adverse effects, nor mitigation in the assessment.

10.119. Many of the receptor effects considered for the socio-economic assessment are temporary (construction) or permanent beneficial effects. Any further development which arises, however modest, would add to the local benefits. For example, the cumulative effects of the two developments would lead to a further 150-200 residents, further new housing supply of extra care accommodation and market housing, local household expenditure, as well as some further temporary construction employment effects.

10.120. Where potential adverse effects are considered for local social and community infrastructure (healthcare, primary and secondary education), the proposed developments' population would lead to some further modest demands on GP provision, as well as education. However, the local FTE GP to patient ratio would only increase by 0.8% compared to 0.6% under the proposed development. It is judged that GP practices within 2 miles have the capacity to meet these further demands. In terms of education, the additional pupil yields from the Victory Road scheme are very modest, with demand potentially arising for a further 5 primary school pupils and 4 secondary school pupils once developed. The evidence on available capacity indicates that local primary and secondary schools could accommodate these demands.

Residual Effects

10.121. Given the outcome of the assessment of likely significant effects, mitigation and cumulative effects, the residual effects are summarized in the following table. As outlined above, the assessment of cumulative effects has not led to any mitigation measures being proposed and there has been no change in assessment of significance of effects.

Assessment Summary

10.122. The following table summarizes the socio-economic assessment and likely significant effects arising from the proposed development.

Table 10.13 Summary of Cumulative and Residual Effects

Summary description of the identified impact	Impact Area	Significance of potential impact	Nature of the impact	Mitigation	Residual effect	Confidence Level
Construction employment	Borough	Minor Beneficial	Temporary	No mitigation required	Minor Beneficial	High
Population	LIA	Major Beneficial	Permanent	No mitigation required	Major Beneficial	High
	Borough	Insignificant Beneficial	Permanent	No mitigation required	Insignificant Beneficial	High
Housing Supply	LIA	Major Beneficial	Permanent	No mitigation required	Major Beneficial	High
	Borough	Minor Beneficial	Permanent	No mitigation required	Minor Beneficial	High
Local Economy	LIA	Moderate Beneficial	Permanent	No mitigation required	Moderate Beneficial	High
	Borough	Insignificant Beneficial	Permanent	No mitigation required	Insignificant Beneficial	High
GP Capacity	2 miles	Insignificant Adverse	Permanent	No mitigation required	Insignificant Adverse	High
Primary Education	2 miles	Insignificant Adverse	Permanent	No mitigation required	Insignificant Adverse	High
Secondary Education	3 miles	Insignificant Adverse	Permanent	No mitigation required	Insignificant Adverse	High
Open Space	LIA	Major Beneficial	Permanent	No mitigation required	Major Beneficial	High

Conclusion

10.123. This section of the Environmental Statement has focused upon the socio-economic effects as a result of the proposed development. The assessment considered both temporary effects arising as a result of the construction phase and the permanent effects which would arise as a result of new residents occupying the housing and access to open space.

10.124. The majority of socio-economic effects described in this ES section are beneficial and permanent in the longer-term. However, the beneficial effects arising from the construction phase are temporary across a three-year construction period.

10.125. Approximately 240 construction workers per year on average would be supported, both on and off site, including those directly involved with the construction process and indirectly in the supply of goods and services to support the scheme. Construction workers are likely be drawn from across Bolton and the wider Greater Manchester area.

- 10.126. The proposed development would deliver 274 new homes, with around 90% being affordable homes and the remainder market housing. New housing in the Little Lever area, particularly affordable housing, will help meet a range of local housing needs and contribute towards addressing the under-supply of new housing in Bolton and in meeting the area's housing targets.
- 10.127. Once the proposed development is completed and occupied, it is estimated that the new housing would be home to between 560-640 residents. This resident population will help to address the local area's fall in population over recent years and, given that the new housing will likely accommodate working-age individuals and couples, as well as families, it will also help to address the area's above average ageing population. Allied to this is the role in which new housing plays in supporting the sustainability of local neighbourhoods through households' expenditure. It is anticipated that Little Lever can capture some of this via local retailers and other businesses.
- 10.128. The assessment has shown that the proposed development would place demands on local school and GP healthcare facilities. However, based upon the scale of likely demands, as well as a review of the available evidence on local capacity, the assessment concludes that these effects are likely to be insignificant adverse. As such, no mitigation measures are considered necessary as a result of the proposed development.
- 10.129. The proposed development also supports the enhancement and creation of a restored canal, towpath and a network of walking and cycle ways, as well as open spaces for public enjoyment and recreation. This will benefit both residents of the proposed development, existing local Little Lever residents and visitors to the area. While the evidence shows that the local area is well served by open spaces, the proposed development would lead to an increase the quality and quantity of local provision.
- 10.130. Considering cumulative effects, the beneficial effects identified within the identified impact areas would be further enhanced through the construction and occupation of the two further developments. While adverse effects were identified with regards to demands placed on local GP health facilities and schools from the proposed development, these were judged to be insignificant adverse. The assessment of the cumulative developments does not change this judgement. Given the modest scale of these demands, existing facilities would have the capacity to accommodate these residents. As such no mitigation measures are considered necessary.

11. Conclusions

- 11.1. This chapter provides the conclusions of the Creams Mill and Hall Lane EIA. The propose of this ES is to provide an objective and subjective account of the significant environmental effects of the proposed development and to assess whether the surrounding area is able to accept the identified impacts.
- 11.2. The preceding chapters have considered the potential for significant environmental impacts affecting the baseline conditions as result of the proposed development. The baseline conditions are defined as the existing state of the environment prior to development.
- 11.3. All assessments have been undertaken in line with best practice guidance published by the relevant professional bodies as detailed in each chapter. Each chapter sets out a clear methodology, the scope and the approach. It then provides the details of the assessment on identified receptors and provides a conclusion regarding the impact of the proposals.
- 11.4. The following paragraphs provide a summary of each of the chapters within the ES.

Drainage and Flood Risk

- 11.5. The drainage and flood risk chapter has considered the potential impacts of the proposed residential developments on the water environment, including appropriate assessments of the possible impacts on surface water, groundwater, and flood risk.
- 11.6. The construction phase mitigation measures would significantly reduce the risks to the identified receptors and the residual significance is assessed to be not significant.
- 11.7. There are no identified adverse residual effects during the operational phases of the development.

Ground Conditions and Contamination

- 11.8. The ground conditions and contamination chapter assess the potential impact on ground conditions and the effects of contamination on human health, flora and controlled waters, buildings and properties, potential instability effects on buildings and infrastructure and also the potential sterilisation of mineral deposits.
- 11.9. Both development sites represent a risk to human health for the intended end us and a risk to controlled waters. The redevelopment includes the remediation of the soil, as well as gas and ground water mitigation measures. The remediation will remove or reduce the source of contamination and breaking contaminant exposure pathways and will bring about major beneficial impacts to both the site and the surrounding local environment.

- 11.10. There is an instability risk across the sites from mineshafts, surface working and shallow underground working. The redevelopment includes treatment stabilisation of the mining features and reduce the risk of instability.

Ecology and Nature Conservation

- 11.11. A full assessment of the impacts of the proposed development on Biodiversity, Ecology and Nature Conservation has been undertaken alongside a separate Preliminary Ecological Appraisal and a range of Phase II ecological surveys.
- 11.12. This assessment has been undertaken in line with best practice guidance and following comments received from Greater Manchester Ecology Unit. It provides an evaluation of the potential ecological receptors in a geographical context.
- 11.13. The assessment identifies potential impacts arising from the proposal, in the absence of mitigation, suggests mitigation measures and identifies the effects of the proposal following the implementation of the mitigation measures.
- 11.14. The assessment has had regard to European statutory nature conservation sites, UK statutory nature conservation sites, non statutory nature conservation sites, habitats and species.
- 11.15. The assessment concludes that there are no sites of international importance within the site boundaries or within 10km of the proposals. Two national important sites are within the zone of influence of the proposals. The geological Ashclough SSSI is unaffected but the Nob End SSSI is impacted but this impacted is significantly reduced through mitigation.
- 11.16. There are two non-statutory designated Sites of Biological Interest within the proposal sites and a further ten within the zone-of-influence. The proposed canal restoration represents a major long-term benefit to the two canal SBIs effectively reconnecting the two and producing a major wildlife corridor improvement.
- 11.17. Some protected, rare or notable fauna species are present on site or at least using the site for transit and foraging. Most significant is the presence of otter in the River Irwell however mitigation allows the impact on this species to be reduced to a point where it is not significant at a population level. Nesting birds are present throughout the sites and will be impacted upon. Landscape enhancements will generate a slight improvement for nesting and foraging birds in the long-term.
- 11.18. The main ecological aspect of the site is its gross contamination by problematic species. Whilst their presence presents challenges the proposals bring about a significant reduction in their presence. Eradication on the Creams Mill site is unlikely but may be achievable at Hall Lane but substantial control will be brought about to the benefit of native biodiversity and in the case of giant hogweed human safety.

- 11.19. The proposals are not considered to generate any substantial or moderate impacts, either direct or indirect, upon ecological receptors after mitigation. Landscaping improvements are likely to generate a minor improvement to the site ecology by providing new niche habitat and foraging opportunity.

Landscape and Visual Impact

- 11.20. National and local level planning policy encourages sustainable development in suitable locations that do not have significant effects on the landscape. The proposed development supports this in that it is on a site on which landscape and visual effects can be minimised, and is included within a wider setting whereby either, or both, sites would not be perceived. It is considered that the site has capacity to accommodate the proposed development without significant residual, adverse effects on the landscape and visual amenity of the area.

Traffic and Transport

- 11.21. The traffic, transport and access related environmental impacts have been assessed in line with guidance from the Institute of Environmental Management and Assessment (IEMA) with particular regard to the impact on the local highway network, pedestrians, cyclists and public transport.
- 11.22. The assessment has found that there will be minor adverse impacts on the environment as a result of the construction and operational phase of the development and the mitigation set out within the Transport Assessment and Travel Plan are sufficient to address these impacts.

Socio Economic

- 11.23. The majority of the socio economic effects described within this ES are beneficial and permanent. The beneficial effects arising from the construction phase are temporary across a three year construction period.
- 11.24. The development will provide a significant contribution towards the Council's housing supply, meeting a range of local housing need and addressing the under supply of new housing in Bolton.
- 11.25. The creation of new households will result in additional expenditure in the area and will place demand on the local schools and healthcare facilities. However, this demand is likely to have an insignificant adverse effect and no mitigation measures are required.
- 11.26. The proposed development also supports the enhancement and creation of a restored canal, towpath and a network of walking and cycle ways, as well as open spaces for public enjoyment and recreation. This will benefit both residents of the proposed development, existing local Little Lever residents and visitors to the area. While the evidence shows that the local area is well served by open spaces, the proposed development would lead to an increase the quality and quantity of local provision.

11.27. Considering cumulative effects, the beneficial effects identified within the identified impact areas would be further enhanced through the construction and occupation of the two further developments. While adverse effects were identified with regards to demands placed on local GP health facilities and schools from the proposed development, these were judged to be insignificant adverse. The assessment of the cumulative developments does not change this judgement. Given the modest scale of these demands, existing facilities would have the capacity to accommodate these residents. As such no mitigation measures are considered necessary.

