Volume 2

ON BEHALF OF
Satnam Millennium Ltd

IN RESPECT OF

Outline application for a new residential neighbourhood including C2 and C3 uses; local employment (B1 use); local centre including food store up to 2000m², A1-A5 (inclusive) and D1 use class units of up to 600m² total (with no single unit of more than 200m2) and family restaurant/ pub of up to 800m2 (A3/A4 use); site for primary school; open space including sports pitches with ancillary facilities; means of access and supporting infrastructure at Peel Hall, Warrington

AT PEEL HALL, WARRINGTON

ENVIRONMENTAL STATEMENT

July 2016

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1.0 ENVIRONMENTAL STATEMENT PROJECT TEAM

1.1 The Peel Hall Environmental Statement was prepared on behalf of Satnam Millennium Limited by a project team comprising of Architects, Planners, Drainage and Hydrology Consultants, Ecologists, Environmental Consultants, Landscape Architects and Transportation Consultants.

1.2 The following disciplines were commissioned;

Appletons	Environmental Statement co-ordination, Site Context, Project Description, Landscape Masterplanning, Landscape and Visual Amenity, and Ecology
Satnam Planning Ltd	Planning Policy Context
Nathaniel Lichfield and Partners	Socio-economics, Demographic Modelling and Social Infrastructure
3D Reid	Masterplanning and Block Design
Transport Planning Associates	Hydrology, Drainage and Flood Risk
Highgate Transportation Ltd	Transportation and Highways
Nexus Heritage Ltd	Archaeology
Hawkins Environmental	Air Quality and Noise

2.0 INTRODUCTION

2.1 Purpose and Approach

2.1.1 Satnam Millennium Ltd propose to develop the land at Peel Hall, Warrington. The proposed new residential neighbourhood would include up to 1200 houses with new access, a neighbourhood centre, an employment area, ecological enhancement and public open space. This Environmental Statement has been prepared after consultation with the Local Planning Authority, Warrington Borough Council, and their EIA Regulation 13 Scoping Opinion issued on the 28th November 2014 (**Appendix APP 4**).

2.1.2 The purpose of this Environmental Statement (ES) is to set out the assessment of the potential effects of the proposed development undertaken as part of the Environmental Impact Assessment process.

2.1.3 This Environmental Statement meets the requirements of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 as amended. It is intended to be used by Warrington Borough Council to aid their consideration of the application for the development.

2.1.4 The relevant determining factors are:

A) Is the site within a **sensitive area**?

and

B) Would there be any **significant effects** on the environment?

2.1.5 The ES has been prepared on the basis of the scale of the development proposed and the requirement for the inclusion of mitigation where necessary to minimise any potential adverse impacts identified at both the construction and operational phases. The safe and efficient delivery of good quality housing in Warrington Borough is a major objective at this time due to the Borough not being able to provide sufficient homes to meet its OAN. The Borough is unable to demonstrate a 5 year (plus buffer) housing land supply.

2.1.6 The preparation of the ES has utilised guidance within the following documents: *Preparation of Environmental Statements for Planning Projects that require Environmental Assessment: a Good Practice Guide* (DoE 1995) and Department of the Environment Circular 02/99 *Environmental Impact Assessment*.

2.1.7 This ES has been prepared on the basis of the following documents:

- Parameters framework plan (**Appendix APP 6**) prepared by Appletons, landscape architects

and environmental consultants, including areas for landscape retention, ecological features and proposed planting screen planting (not or approval at this stage).

- Access point plans (**Appendix T 6**) prepared by Highgate Transportation Ltd. (for approval at this stage).
- Site Location Plan (for approval at this stage).

2.2 Environmental Statement Format

This Environmental Statement consist three volumes;

2.2.1 Volume 1 – Non Technical Summary

This is a summary of results of the Environmental Statement in non-technical language.

2.2.2 Volume 2 – Environmental Statement

This is the main section of the Environmental Statement and in summary comprises of the following;

- Description of the Proposals
- Planning Policy and Designations
- Assessment of Impacts
- Identification of Mitigation
- Mitigation Proposals
- Identification of Residual Impacts
- Assessment of Cumulative Impacts

2.2.3 Volume 3 – Appendices

This volume is a compilation of all the evidential and illustrative material to support the text in Volumes 1 and 2.

2.3 Scope

2.3.1 A Scoping Study was undertaken during the initial stages of the Environmental Impact Assessment process, in order to define the terms of reference. A Scoping Report was prepared by The Appleton Group and submitted to Warrington Borough Council on the 23rd October 2014. A copy of the letter is set out at **Appendix APP 3** and has been agreed in principle with Warrington Borough Council in a letter dated 28th November 2014. The Scoping Study identified the main areas for consideration within the ES as: -

- Highways and transportation
- Hydrology, drainage and flood risk

- Ecology and Nature Conservation
- Landscape and Visual Impact
- Archaeology/historic environment
- Noise pollution
- Air quality
- Social Infrastructure
- Waste generation
- Cumulative impacts
- Planning context and alternative sites.

2.4 Consultations

Consultations on the content of individual elements of the Assessment were undertaken by Warrington Borough Council as follows.

Environment Agency

Highways Agency

Public Health

HSE

Natural England

Coal Authority

Greater Manchester Ecology Unit

WBC Highways Department

Environmental Protection

Cheshire Archaeology Planning Advisory Service

Flood Risk Officer

Sport England

2.5 The Development Proposals

Description

2.5.1 The proposals subject of this ES are for the construction of a new residential neighbourhood comprising up to 1200 houses. The location of the site is shown on **Appendix APP 1**.

2.5.2 **Appendix APP 6** is a landscape parameters plan not for approval at this stage. The parameters plan shows the main constraints and opportunities for development such as vegetation to be retained together with proposed new planting and areas of open space. Formal approval for vehicular access to the site is also sought, based on the submitted plans (**Appendix T 6**). As part of the EIA process the proposed layout has undergone various amendments in response to baseline information gathered. The proposed layout is therefore that which would inherently minimise some of the potential impacts identified especially in respect of habitats, protected species, visual amenity and landscape character. This is reflected in the parameters plan.

The Housing

2.5.3 The proposed residential development will consist of a mixture of apartments that will be 3-4 storeys high and houses 2-3 storeys high. The field patterns and existing landscape features have provided a strong driver to the layout of the outline scheme. The houses and apartments would be of high quality design and details of a typical design approach for buildings are set out in the design and access statement.

Other Uses

2.5.4 A local centre for retail and services also forms part of the application. This will comprise of a food store of up to 2000m2 and other ancillary stores and food outlets of up to 600m2. There is scope within the local centre for additional uses such as healthcare and local services. Small scale employment facilities of up to 7500m2, a primary school site and public open space also form part of the proposals.

2.5.5 Formal open space for sports is provided in two way, firstly as a replacement for the Mill Lane playing fields and secondly as a significant upgrade of the council owned facility at Radley Common.

Access

2.5.5 The proposed vehicular access to the site would be taken off a number of roads around the perimeter of the site including Poplars Avenue to the South, Birch Avenue to the west and Blackbrook Avenue and Mill Lane to the east. Pedestrian access will be from footpath links from adjacent residential areas to the south, east and west as well as from new footpaths alongside the vehicular access ways. The associated highways work will form a main spine road through

the development allowing access via secondary roads into the various phases of residential development and employment uses. A separate vehicular access for the employment zone would be provided from Poplars Avenue.

Landscape Scheme

2.5.6 The proposed landscape scheme for the site includes the retention of existing features of amenity, ecological and character importance, the siting of landscape mounds parallel to the northern boundary against the M62 motorway with extensive screen planting, and the creation of amenity areas with the planting of native species of local providence. Surface water retention ponds would be created within the northern buffer zones and would be designed and managed for wildlife. Both the outline landscape scheme and the master plan have been guided by baseline information gathered as part of the design process.

2.5.7 Fences and planting will form new boundaries to the site where required and the main spine road through the site will be in the form of a boulevard. External lighting will be kept to a minimum throughout the site.

Construction Phasing and Timescales

2.5.8 Before the commencement of any works on site, including preparation work, areas identified for exclusion will be marked out on site with access restricted.

Year One

2.5.9 In year one the construction of the new access points and roads, internal roads to phase 1 housing parcels, initial internal roads, associated drainage, screen mounds and screen planting would take place. The mounds would be constructed from excavated material from site and to form a maximum height of 5m.

Subsequent Years

2.5.10 After this period the proposed new access roads would be extended into the site and it is anticipated that within 12-14 years, construction of the development of 1200 houses will be completed.

Phasing

2.5.11 It is envisaged that the site would be phased in a series of separate development parcels from each of the access points so as to achieve the organic growth of this residential neighbourhood.

Onsite Operations

2.5.12 The site compound required in year 1 will be located to take advantage of existing screening features on the site.

2.5.13 All operations on site would be undertaken in accordance with 'Best Practice' procedures and would be subject to control by other relevant legislation and normal environmental controls.

2.5.14 Works would be undertaken in accordance with mitigation recommended in the following chapters and with any statutory requirements.

2.5.15 It is envisaged that no specialist machinery or plant other than that required for normal engineering and construction works would be required to undertake the works onsite.

3.0 THE SITE IN CONTEXT

3.1 Introduction

3.1.1 The extent of the site boundary together with local context is shown on **Appendix APP 1**. An aerial photograph of the site forms **Appendix APP 2**.

3.2 Site Location and Adjacent Land uses

3.2.1 The proposed site is located in north Warrington at a distance of 1.2 kilometres from the town centre of Warrington. Other settlements are Newton Le Willows, at 5.0 kilometres to the North West, Padgate, at 2.5 kilometers to the South East, Birchwood at 4 kilometres East, Winwick at 0.75 kilometers to the North and Houghton Green (Mill lane) directly to the east.

3.2.2 The site lies to the south of the M62 Motorway, which runs the entire length of the northern boundary. It is the main route between Manchester to Liverpool with links to the M6 and M57. The northern boundary to the site is formed by a 1.4 metre high timber fence and a band of vegetation that forms a barrier to the M62 motorway. Part of the boundary runs in cutting to the north east adjacent to semi mature trees. Beyond the motorway lies farmland continuing northwards towards the A49 Winwick Link Road and the village of Winwick.

3.2.3 The eastern boundary of the site is made up of residential properties of Mill Lane (Old Road) and Lockerbie Close / Ballater Drive with a recreation ground linking through to Mill Lane, beyond which lies Houghton Green and the Warrington suburb of Cinnamon Brow. The majority of the north east boundary is formed by hedgerow vegetation and timber panel fences approximately 1.8 metres in height that forms the curtilage to modern residential properties.

3.2.4 The south to south eastern boundary is well vegetated with trees and scrub vegetation forming the edge of Radley Common, Radley Farm and Radley Plantation. This area includes an existing play area and Radley Common Community Centre. Beyond this and for the majority of the south to south western boundary to the site there exists the rear gardens of houses forming the residential suburb of Hulme, part of Warrington.

3.2.5 The residential properties of Hulme continue along the western boundary with the site surrounding the Fairhaven Young Peoples Unit at the Alders which is run by 5 Boroughs Partnership NHS Foundation Trust. West of Hulme is the A49 Winwick / Newton Road at Junction 9 of the M62 with Winwick Quay Industrial Estate beyond.

3.2.6 A single public right of way passes through the site from Mill Lane to the North East, along Peel Cottage Lane and crosses the motorway on an over-bridge.

3.3 Site Description

3.3.1 The site is generally open grassland and scrub vegetation with mature hedges and trees along field boundary drains. (**Appendix APP 5**) There is a small woodland coppice with further mature vegetation surrounding sports pitches towards the eastern boundary. A detailed assessment of the habitats and vegetation within the site is set out in section 6 of the ES.

3.3.2 The highest point of the site is to the east of Peel Hall at 20.57 metres A.O.D. From that point the land falls to the North West boundary at 17.4 metres A.O.D and to approximately 10 metres A.O.D along the Southern boundary. The general visual impression gained on site is that it is predominantly flat without major undulations.

3.3.3 Buildings on Site

Peel Cottage and Peel Hall are both located on Peel Cottage Lane which is located to the north west of the site. Peel Cottage and Peel Hall are not included in this application.

3.3.4 Vegetation

Detailed information in respect of vegetation, habitats and species found on the site is contained within Chapter 6.0 of this Volume.

3.3.5 Geology

The site lies within an area comprised of Triassic sandstones and mudstones.

3.4 Agricultural land Quality

3.4.1 The agricultural land classification of the site is assessed by DEFRA as Grade 2, 3a, 3b and 4. Soil quality on the site is indicated on **Appendix APP 7** and is based on Natural England's interactive 'Magic Map' data. The National Planning Policy Framework (NPPF) states that Local Planning Authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a high quality. In the Warrington area most of the agricultural land is of high quality. Current guidance therefore places the responsibility on the Local Planning Authorities but there is no policy dealing with Agricultural Land Quality in the Warrington Core Strategy 2014. It should be noted that the land no longer forms part of an agricultural holding and has not been actively farmed for over 20 years. It is also remote from any other farm holding and subject to urban pressures.

3.5 Flood risk assessment

A flood risk assessment is included in section 7 of this report prepared by Transport Planning Associates. The Environment Agency (EA) Indicative Flood map, confirms that the site is located in Flood Zone 1 and is not at risk of fluvial flooding. Areas located in Flood Zone 1 have less than 0.1% chance of flooding in any given year. Only a 1 in 1000 year flood event puts this site at risk from fluvial and tidal events.

4.0 DEVELOPMENT ALTERNATIVES

4.1 Introduction

4.1.1 This section describes the main alternatives that were assessed in the consideration of the scheme and development of the proposals.

4.2 Alternative Options

4.2.1 The site has no direct allocation for any purpose within the development plan, it is land with no notation. There is an urgent need for the construction of housing within Warrington to maintain the required 5 year (plus buffer) statutory supply of housing land. No other suitable sites have been identified in the locality that can either individually or collectively meet the outstanding need for new homes.

4.2.2 The following options have been considered as part of the Environmental Impact Assessment process:

Do nothing scenario

4.2.3 Under this option no development would take place on the site.

4.2.4 If the development of housing does not occur on the site the land would continue to be un-used as it does not form part of an agricultural holding. Housing needs in Warrington under this do nothing scenario would remain unmet. It is likely under this scenario that other areas located in the greenbelt would be subject to pressure for release for housing. Many of these areas are not as well placed as peel hall is for housing.

4.3 Alternative Layouts

4.3.1 As part of the design process the proposed layout has undergone various amendments in response to baseline information gathered. The proposed layout therefore would inherently minimise some of the potential impacts identified especially in respect of biodiversity, ecological features, visual amenity and landscape character.

4.4 Conclusion

4.4.1 The proposed site is an optimal location for housing.

5.0 PLANNING POLICY CONTEXT

5.1 Introduction

5.1.1 Primary legislation for England is the Planning and Compulsory Purchase Act 2004 and the Town and Country Planning Act 1990. Planning applications must be determined in accordance with the National Planning Policy Framework and the provisions of the relevant Development Plan unless material considerations indicate otherwise (Section 38(6) of the Planning and Compensation 2004 Act and section 70(2) of the Town and Country Planning Act 1990).

5.1.2 The process of Environmental Impact Assessment is governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

5.2 National Planning Guidance

5.2.1 Planning Policy

Current land use planning policy for England is contained within National Planning Policy Framework. The policies contained therein provide a strategic framework for the preparation of development plans, which may be considered in the determination of individual planning applications as material consideration.

5.2.2 NPPF sets out the achievement of sustainable development are a central objective of the Government's aims and this has economic, social and environmental aspects. The NPPF states (paragraph 12) "*that the Development Plan is the starting point for decision making and development that accords with an up to date Local Plan should be approved, and proposed development that conflicts should be refused, unless other material considerations indicate otherwise"*. Paragraph 13 confirms that *"NPPF is a material consideration in the determination of planning applications".*

5.2.3 Paragraph 14 states that,

"*at the heart of the NPPF is a presumption in favour of sustainable development which should be seen as a golden thread running through both plan making and decision taking"*….

For decision taking this means,

- *Approving development proposals that accord with the Development Plan without delay; and*
- *Where the Development Plan is absent, silent or the relevant policies are out of date, granting permission unless;*
- *Any adverse impact of doing so would significantly and demonstrably out-weigh the benefits when assessed against the policies in this framework taken as a whole; or*

- *Specific policies in this framework indicate development should be restricted*".

5.2.4 Paragraph 47 relates to housing development and requires local authorities "*to boost significantly the supply of housing and to maintain 5 years' worth of housing sites (plus an appropriate buffer) at all times".* Paragraph 49 of NPPF states that "*housing applications should be considered in the context of the presumption in favour of sustainable development".*

5.2.5 Further, and with specific reference to Warrington (which does not have a minimum 5 year plus buffer supply of housing land) paragraph 49 states in relation to the requirement for local authorities to maintain a 5 year (plus buffer) supply of housing sites that,

"*Relevant policies for the supply of housing should not be considered up to date if the local planning authority cannot demonstrate a 5 year supply of deliverable housing sites*".

5.2.6 Guidance regarding landscape designations is set out at paragraph 115 and this refers to national designations which states that,

"*Great weight should be given to conserving landscape and scenic beauty in the National Parks, The Broads and Areas of Outstanding Natural Beauty which have the higher status of protection in relation to landscape and scenic beauty*".

5.2.7 Further, paragraph 116 confirms that,

"*Planning permission should be refused for major developments in these designated areas*". There are no national or local designations in the context of this proposal.

5.2.8 Local Planning Policies

The Development Plan for Warrington comprises the Core Strategy adopted in July 2014. The housing requirement and allocation policies of this plan have been quashed by a ruling of the High Court in February 2015.

5.3 The Local Plan Core Strategy July 2014

Designations

5.3.1 The site is not within any area which is nationally or locally designated because of its historical, architectural or archaeological interest as set out in NPPF. The site is not afforded any international, national or local designations in respect of nature conservation or geological importance. The site is not proposed or notated for any use in the current Development Plan. The application site does not lie within a designated Green Belt, Green Wedge, Area of Separation or other open land designation in the Development Plan.

5.3.2 It is important to consider potential indirect impacts that may arise due to proposed developments. Within the vicinity of the site there are no European, National, or locally designated sites that can be effected by the scheme.

Housing Supply

5.3.3 There are 2 issues relevant to the supply of housing in Warrington Borough. Firstly, as a direct result of the high court quashing the part of the plan relating to housing requirements there is no housing requirement or target for Warrington against which supply can be measured. As such, there is not able to be a 5 year supply of housing land within Warrington Borough. Therefore the Local Authority needs to "*identify a supply of specific deliverable sites, sufficient to provide 5 years' worth of housing against their housing requirements with an additional buffer in line with NPPF advice*". Secondly, the council has commissioned consultants to prepare a SHMA to derive the OAN for housing in the borough. This report concludes that a figure of 840 houses is required each year in Warrington. Judged against this requirement figure Warrington cannot demonstrate a 5 year supply (plus buffer).

5.3.4 In the light of this shortfall the advice in paragraph 49 that "*relevant policies for the supply of housing should not be considered up to date*" applies.

5.3.5 Furthermore since the site is agreed to be regarded as a sustainable location, the housing element of this scheme should be considered in the context of the presumption in favour of sustainable development (paragraph 49 and paragraph 14 of NPPF).

5.4 Sustainability

5.4.1 The site and the development is able to be regarded as sustainable. There is a policy presumption in favour of the approval of substantial development set out in NPPF (paragraph 14).

5.4.2 The site is in close proximity to and is within walking distances of local transportation routes, including buses and cycle routes, shopping and other everyday facilities, recreational areas. The proposals include the provision of a primary school and employment uses, and a local centre is proposed in the early phases of this development to increase opportunities to shop and seek local facilities within walking distance.

5.4.3 The application proposals create no unacceptable environmental harm or concerns.

5.4.4 The application for development will bring employment opportunities and large scale investment to an area needing such employment creation and investment.

5.4.5 Thus, the three requirements of sustainable development are met by the scheme.

5.5 Conclusion

Overall the proposed development complies with relevant national and development plan policy. It aids the fulfillment of objectives and strategies within non-statutory assessments and publications (such as the provision of market and affordable housing, local employment and creating investment).

6.0 ECOLOGY AND NATURE CONSERVATION

6.1 Introduction

6.1.1 This chapter deals with ecological and nature conservation issues in relation to the proposed development. It considers both direct and indirect ecological effects and mitigation. The survey follows a comprehensive study undertaken in 2013, which was re-evaluated to determine if any of the surveys required updating in 2015. The survey was carried out by Ian Ryding, a consultant ecological surveyor working for Appletons. The basic objective of the survey was to obtain information on sensitive wildlife habitats or species that may be affected by the development of the site. To achieve this objective the survey identified the following:

- The presence of any statutory wildlife sites. (SSSI/LNR etc)
- The presence of any non-statutory sites. (SBIs)
- The presence/potential presence of species with statutory protection.
- The presence of species with non-statutory protection e.g. County Red Data Book/Section 41 Species.
- Identify any species or habitats that require special consideration during the development.

6.1.2 Survey objectives and re-evaluation of existing data

The 2013 study was re-evaluated to identify where surveys needed to be updated or repeated. The following requirements were established:

- The Phase 1 Habitat Survey - updated evaluation required.
- Breeding bird survey - updated evaluation required.
- Great crested newt survey - updated evaluation required.
- Badger survey - updated survey required.
- Water vole - updated survey required.
- Ecological data search - new search required.

A bat survey has also been undertaken as part of this study by a specialist surveyor; the findings are presented in this section as a separate bat survey report.

6.1.3 Location

The survey focussed on a large area of abandoned farmland and adjacent woodlands next to the M62 on the north-eastern edge of Warrington, Cheshire. The site is known as Peel Hall and is located immediately west of Houghton Green.

6.1.4 Constraints

Vegetation

The site was surveyed in June 2013 an optimum time to undertake vegetation surveys. There were no constraints. The habitats were re-evaluated in July 2015 when some of the grasslands had been recently cut, however there was sufficient vegetative material present to effectively re-evaluate the habitats without constraint. The hedgerows on the site were surveyed using The Hedgerow Regulations (1997) methodology

Birds

The bird survey was undertaken on 21st June and 7th July 2013, which is at the end of the survey season. However birds that have bred on site earlier in the season would still expected to be resident and thus a moderate constraint to survey was assumed.

Badger

The badger survey was undertaken in August 2015 which is an optimum time to search for signs of badger above ground therefore no constraints applied. However, locally dense vegetation prevented effective searches for badger setts in specific areas. Given the absence of any badger activity elsewhere on the site the constraint here is considered to be minor-moderate.

Water Vole

The water vole survey was undertaken on the 13th and 14th August 2015 an optimum time for water vole survey, however major constraints to survey applied to the whole of Spa Brook, where dense bank-side and in-channel vegetation prevented visual access.

Ponds

No constraints applied to the ponds.

6.2 SURVEY RESULTS

6.2.1 Desk Based Study

A request for ecological data from RECORD the Biodiversity Information System for Cheshire, Halton, Warrington and Wirral was submitted in August 2015. The extent of the data search area was based on the area of red overlay (the site) as shown on **Appendix APP 1**. The search was also extended to include all areas within 500m of the site.

6.2.2 Results of Data Search

The data search returned an extensive list of species from the search area specified (**Appendix ECO 4**). However, out of all the species records returned, a total of three species were attributable to the site. Another seventeen species recorded related to the 1km square SJ6191 which covers most of the site but also includes extensive areas of land outside of the site boundary.

6.2.3 Evaluation of Data

Most of the species recorded are common throughout the county and beyond, however the record of crane is incidental and of a transitory rather than resident bird.

The following designations apply.

Section 41 Species (NERC Act)

Lapwing
Dunnock
House sparrow
Corn bunting
Starling
Skylark
Song thrush
Hedgehog

6.2.4 Wildlife & Countryside Act 1981 (as amended)

All bird species are offered varying levels of protection under the Wildlife & Countryside Act. Hedgehog is listed under Schedule 6 of the Act in England.

Several records of water vole were returned, however these were at considerable distance from the site boundary and the species would be unable to travel from those sites to the Peel Hall site due to major barrier effects.

6.3 EXTENDED PHASE ONE HABITAT SURVEY

6.3.1 Methodology

The survey has been adapted from the standard Phase 1 Habitat Survey methodology. The aim of this survey is to record all habitats that occur on the site together with a full list of higher plant species that occur within each habitat. Each plant recorded is given an abundance score i.e. Dominant, Abundant, Frequent, Occasional or Rare.

These values can be prefixed by Very or Locally, to provide more subtle biogeographical data.

6.3.2 Full species lists and abundance scores are given in the form of Target Note descriptions. Detailed habitat maps have been produced and should be used in conjunction with the Target Notes. The map included as **Appendix ECO 3**.

Nomenclature follows *Stace. C.* New Flora of the British Isles 2nd Edition.

6.3.3 The general description below provides and updated broad profile of the vegetative characteristics of the site. The Target Notes provided are largely unchanged since 2013 except where notable changes were recognised during the 2015 survey.

6.4 General Description

6.4.1 The study area is approximately 69ha in extent and is composed of large abandoned/unused/improved/arable fields sub-divided by ditches and largely fragmented hedgerows. Other habitats present include a small stand of mature broad-leaved plantation woodland and several small ponds. Substantial linear stands of immature broad-leaved plantation woodland occur on the southern boundary of the site.

6.4.2 The open fields have been ploughed and left to grow rank and are now composed of a mixture of coarse grasses and tall ruderal herbs. The lack of management is also allowing scrub saplings to establish here and in certain areas the cessation of management has also allowed the development of dry stands of common reed to occur.

6.4.3 In areas outside of the normal cultivation zone, complex/dense mosaics of coarse grassland, tall ruderal herb and scrub of varying maturity and density occur.

6.4.4 Reference to online aerial images indicate that non-agricultural habitats were present in 2009. The presence of regenerating scrub and semi-improved poor grasslands reflect the past status of these areas prior to clearance. In contrast to the rest of the site, the eastern most part of the

site includes a recreational area with playing fields and formal footpaths. This area has been landscaped by the provision of immature broad-leaved woodland and stands of broad-leaved shrubs.

6.4.5 The northern boundary is largely formed by the M62 while to the south, west and east the land is predominantly residential housing, the exception being Radley Wood and the grounds and houses at the end of Radley Lane

6.4.6 The survey in August 2015 revealed that most of the open grassland area had been recently mown. However examination of the cut stems indicates that the grassland had been uncut since before the survey in 2013. This is due to the high levels of rankness in the sward and the localised predominance of tall ruderal herb and colonising scrub saplings. The grasslands were visually assessed at several points across the site, and it can be reasonably determined that significantly higher levels of rankness prevail on site since the survey in 2013. There is a clear natural successional trend towards the development of tall ruderal herb and scrub communities generated by a lack of regular management on the site. In addition there is a likelihood that the stands of common reed might have increased, however as the site had been cut this was very difficult to determine from the remaining vegetation.

A series of photographs showing the general characteristics of the habitats on the site are provided in **Appendix ECO 1**.

6.4.7 Detailed Target notes, referenced from the Phase 1 habitat survey are provided in **Appendix ECO 3.**

6.5 HEDGEROW REGULATIONS SURVEY

Survey Details and Results

6.5.1 The hedgerows on the site were surveyed using The Hedgerow Regulations (1997) methodology. The full survey methodology is explained at length in document *The Hedgerow Regulations 1997 – A Guide to the Law and Good Practice (Department of the Environment, Transport and the Regions),* further information is provided in the 1997 Act No. 1160 The Hedgerow Regulations 1997, Schedules 1 - 3. The survey data presented here only relates to the Wildlife and Landscape criteria as detailed in (Part II Criteria of Schedule 1) of the above act.

6.5.2 All of the native hedgerows, excluding those defining the boundaries of adjacent domestic properties were surveyed. It should be noted that there are certain features on the site that appear to be hedgerows, in that they are linear stands of immature willow species that may or

may not mark the line of a former field boundaries. However based on field survey, these features are not hedgerows in the traditional sense and are therefore not included in this study, although some are mapped as hedgerows on the Phase 1 habitat maps.

6.5.3 Five hedgerows in total were subject to survey, each are briefly described below. Whilst the hedgerows were examined during the Phase 1 Survey, most were not target-noted due to their innate lack of 'quality'. The locations of the hedgerows surveyed are shown on the Phase 1 Habitat Maps in **Appendix ECO 2**. In addition, photographs showing the general conditions in each hedgerow are provided in **Appendix ECO 1**.

Hedgerow 1:

6.5.4 A hawthorn dominated hedge on the eastern side of Radley Lane that is defunct and species poor.

Hedgerow 2:

6.5.5 A defunct/gappy and species-poor hawthorn-dominated hedge south-east of Peel Hall Kennels. The hedge has an associated ditch.

Hedgerow 3:

6.5.6 An overgrown and highly fragmented hedgerow on the western boundary of woodland south of the kennels. The hedgerow is species-poor and has an associated ditch. (See Target Note 25)

Hedgerow 4:

6.5.7 The Phase 1 recorded this as two separate defunct hedgerows at opposing ends of a field ditch boundary. However for Hedgerow Survey purposes the whole feature is treated as a single hedgerow. (See Target Note 15)

6.5.8 It should be noted that surveying each opposing portion of the hedge individually doesn't significantly affect the results of the survey.

Hedgerow 5:

6.5.9 This is a defunct species-poor hedgerow with an associated ditch. A very short (<10m) opposing hedge composed entirely of hawthorn occurs next to it which was not surveyed as it was obvious that it could not qualify as important in respect of the Regulations. (See Target Note 4)

6.5.10 The findings of the survey are presented on the standard hedgerow survey forms below.

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 1	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 100m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 1

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Hawthorn, holly, hazel.

Average Woody Sp. = 3

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: N/A

Other species recorded; Common nettle, cleavers, bramble, red campion, cow parsley.

Total Woodland Ground Flora Species = 0

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	0
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	0
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	2m
Bank or Wall ≥ ½ Length		N	Average Width:	1.2m
Ditch ≥ ½ Length		N	Laid (Past or recent):	Yes (past)
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	70%
Adjacent to significant ROW	Y		Additional Fencing:	No

OTHER COMMENTS:

Very poor hedgerow in woody and floristic composition. Poor structure and adjacent to gardens locally.

It should be noted that only a small section of this hedge forms a boundary with the site. The whole hedge was surveyed to comply with the methodology.

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 2	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:**140m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 2

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Hawthorn, elder, ash.

Sample 1: Hawthorn.

Average Woody Sp. = 2

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Male-fern, Hart's-tongue.

Other species recorded: Creeping soft-grass, red campion, ivy.

Total Woodland Ground Flora Species = 2

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	0
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	2
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	4m
Bank or Wall ≥ ½ Length		N	Average Width:	1.5m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	70%
Adjacent to significant ROW		N	Additional Fencing:	Yes

OTHER COMMENTS:

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 3	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 136m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 2

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Hawthorn, (sycamore), goat willow.

Sample 2: Hawthorn, goat willow.

Average Woody Sp. = 2

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler-fern.

Other species recorded: Common nettle, red campion.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	6m
Bank or Wall ≥ ½ Length		N	Average Width:	3m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	80%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 4	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 267m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 3

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Osier, grey willow, goat willow

Sample 2: Crack willow, grey willow, goat willow

Sample 3: Osier, grey willow, hawthorn

Average Woody Sp. = 3

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler-fern

Other species recorded; Reed canary-grass, bramble, common nettle.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	4m
Bank or Wall ≥ ½ Length		N	Average Width:	2.5
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	90%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 5	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 40m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 1

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Hawthorn, holly.

Average Woody Sp. = 2

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler fern.

Other species recorded: Ivy, bramble, common nettle, dock sp.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	0
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	3.5m
Bank or Wall ≥ ½ Length		N	Average Width:	3m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m	Y		Gaps in Bottom (Approx %) :	90%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

The holly recorded in the sample is a single sapling only.

Survey Conclusions

6.5.11 The following section considers the hedgerow in respect of the Hedgerow Regulations 1997, the qualifying criteria for important hedgerows in respect of Schedule 1 are not included here. The five hedgerows where the survey was applied to are in poor condition, being fragmented and open in structure. To qualify, the hedgerows must have at least 4 woody species and also have several other qualifying criteria as defined by Schedule 1 of the Regulations. The hedgerows surveyed only have an average between 1 and 3 species and have few other 'qualifying' associated features.

6.5.12 Based on the survey undertaken, the hedgerows on the site are very poor and fail to meet the qualifying criteria for important hedgerows under the Hedgerow Regulations 1997.

6.6 BADGER SURVEY

6.6.1 Survey Details and Results

The badger survey was undertaken August 2015 and employed standard techniques to establish if badgers are present on site, or use the site for foraging/commuting. See **Appendix ECO 5** for extent of survey.

The following searches were undertaken.

- Searches for setts on site.
- Searches for foraging signs and pathways.
- Boundary searches for runs, pathways and latrines.

The survey results are outlined below.

Desk Study Search

The ecological desk study (**Appendix ECO 4**) identified two records of badger within the local area, both of which were identified as dead badgers on roads. No records of setts were identified by the desk study.

Sett Search

The survey found no setts on site and while most of the land was accessible and composed of open grassland, several small areas of dense scrub and woodland are present, which prevented an effective search of those areas due to restricted physical and visual access. Therefore, whilst it can be concluded that there are no badger setts on most of the site, searches of small densely vegetated areas of the site proved inconclusive.

Search for Foraging Signs and Pathways

The site was thoroughly searched for badger pathways or signs of foraging. No obvious sign of badger activity was found therefore it can be concluded that the species is not using this area for foraging or commuting.

Boundary Search

All of the boundaries of the site, where accessible, were walked and examined for potential runs, pathways and latrines. The search found no evidence to suggest badger activity along any of the site boundaries. The absence of any obvious means of ingress indicates that badgers are not entering the site. The absence of latrines indicates a lack of territorial activity in the near vicinity of the site.

6.6.2 Survey Conclusions

In common with the 2013 study, the survey found no evidence of historic, recent or current use of the site by badgers for foraging, commuting or occupation, and whilst it is likely that the species is absent, dense vegetation prevented a full sett search locally. This constraint is the same as that which applied during the 2013 study. Areas where sett searches were constrained are shown on **Appendix ECO 5**.

6.7 WATER VOLE

6.7.1 Survey Details and Results

The water vole surveys were undertaken following the methodology outlined in the *Water Vole Conservation Handbook 2nd Edition.* Strachan & Moorhouse (2006), and included examination of all ditches and ponds for the presence of burrows, feeding stations, latrines and runs. The survey was undertaken in August 2015 during the optimum period for water vole survey, however serious constraints applied to the survey of Spa Brook where dense bank-side and in-channel vegetation prevented visual and physical access to the channel. No constraints to survey applied to the survey of any of the ponds. With the exception of the areas where constraints apply, the survey revealed no evidence of current or historical occupation by water vole.

A description of each waterbody surveyed is provided below and the locations shown on **Appendix ECO 6**. Photographs of each water body are provided in **Appendix ECO 1**.

6.7.2 Pond 1

This is a small linear pond located on the edge of an abandoned arable field. The pond has degraded significantly since 2013 and is now completely shaded by immature willow scrub that has closed the canopy above the pond. The stands of bulrush previously present have now

died back, and common duckweed covers the whole of the pond's surface. In 2013 the pond was considered to be moderately suitable for water vole although the species was found to be absent. However in 2015 the conditions have deteriorated to such an extent that water vole suitability is very poor and the species was found to be absent.

6.7.3 Pond 2

A heavily-shaded and very shallow pond surrounded by alder and dense stands of grey willow and bramble scrub. Aquatic vegetation is absent and marginal species are restricted to locally frequent bittersweet and occasional common water-plantain, soft-rush, creeping buttercup and Indian balsam. No evidence of water vole occupation was found and the habitats are considered poor for the species. The 2015 survey found no overall change in vegetative cover, however the pond was completely dry and appeared to have been so for some time, and no sign of water vole occupation was found. Therefore, based on the conditions observed the pond is now considered incapable of sustaining a viable population of water vole.

6.7.4 Pond 3

A semi-shaded pond that lies partially within the site on the southern boundary. The pond has a virtually complete surface cover of fringed water-lily, common duckweed and ivy-leaved duckweed. Outside of the site emergent bulrush and branched bur-reed are localised. The pond has a well-developed marginal/emergent flora including creeping bent, floating sweet-grass, yellow iris, soft-rush and creeping buttercup. Great willowherb and Indian balsam are present on the banks and in the marginal zone. No evidence of water vole occupation was found in 2013, although the habitats are considered good for water vole. Disturbance by dogs (potential predators) could be a limiting factor. The 2015 survey revealed no significant change in the general conditions at the pond, except that its depth appears to have reduced and silt increased. No evidence of water vole occupation was found. Evidence of current disturbance by dogs was present during the 2015 survey.

6.7.5 Spa Brook

The brook is approximately 500m long and the survey in 2013 revealed that the brook had only localised areas of open water in its northernmost section where very slow running water with a localised surface cover of common duckweed is present. The central and southern sections of the brook were dry/seasonally wet in 2013 and the channel choked with a dense mixture of bulrush, common reed and reed canary-grass, whilst the banks were dominated by tall coarse grasses, tall herbs and developing scrub communities. The 2015 survey revealed that conditions in the brook have deteriorated with a marked increase in emergent vegetation in areas of former open water, and a distinct reduction in the area of open water and consequent reduction in depth. The bank-side vegetation has increased significantly and all of the banks and channel throughout the reach are now overgrown. On the northernmost section, the channel is completely overgrown with bank-side vegetation, however localised patches of fool's

water-cress were noted occasionally. There is some shallow standing water on this section which is approximately 0.2m deep. There is no discernible flow.

The bank-side vegetation is dominated by a mixture of coarse grasses and tall herbs including false oat-grass, cock's-foot, reed canary-grass, great willowherb, common nettle, creeping thistle, rosebay willowherb and wild angelica. The lack of management is allowing transition to scrub communities characterised by a localised abundance of bramble with more occasional willow sp. The central and southernmost sections are in a more advanced successional stage than was observed in 2013. These sections were dry during the survey and at most are only ever seasonally wet. The channel is dominated by a complex mixture of common reed, bulrush, great willowherb and reed canary grass. The lack of water also allows easier access for predatory terrestrial mammals such as mink, foxes and stoats which readily prey on water voles. The banks are very coarse and composed of a mixture of creeping thistle, false oat-grass, common nettle and great willowherb and other common forbs including occasional meadowsweet. There is an established successional trend towards scrub here with locally high occurrence of bramble with grey willow, dog rose and hawthorn. No evidence of water vole occupation was found, although survey was very difficult and serious constraints applied to virtually the whole of the brook. In 2013 the brook was evaluated as having moderate – poor potential for water voles. However the reach surveyed is now considered to have poor - negligible potential only due a combination of the prevailing on-site conditions and lack of connectivity to areas outside of the site.

6.8 BREEDING BIRD SURVEY

6.8.1 Survey Details and Results

The breeding bird survey was not repeated in 2015 as the species recorded were considered representative of the type of habitats found on the site. However the site has been subject to revised evaluation in 2015 based on the changes to the site since 2013. Additional study areas have been included in 2016. The survey method was adapted from the British Trust for Ornithology (BTO) Common Bird Census and Breeding Bird Survey methodologies. Two visits were undertaken on the morning of 21st June and the 7th July 2013. The site was surveyed on foot with transect routes designed to allow full survey coverage of the site in order to detect all bird activity on the site.

On each visit the site was surveyed using the same predetermined transects and listening points, from which all bird activity was recorded. This information was plotted on to a site map, a separate map was produced for each of the site visits. See Appendices ECO 7, 8, 13 and 14. Criteria to determine whether birds were breeding or not follows 'The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991.

The criteria are as follows

Present: Birds observed, or heard, but with no evidence of breeding.

Recorded in potential breeding habitat in the breeding season.

Male bird singing.
Breeding: Birds proved to be breeding and those likely to be breeding although proof was lacking:
A bird or pair of birds apparently holding territory.
Courtship display.
Visiting possible nest site.
Nest building.
Adults agitated suggesting probably presence of nest or young.
Used nest or shells found.
Distraction display.
Recently fledged young.
Adults indicating occupied nest.
Adults carrying food, young or faecal sac.
Nest with eggs or young seen or heard.
Bird sitting.

6.8.2 SUMMARY OF BIRD SURVEY VISITS

A brief account of each site visit recording time and date of survey, detailing survey conditions and comments on birds recorded. is provided in **Appendices ECO 7, 8, 13 and 14.**

6.8.3 Observations Undertaken in 2015

The study undertaken in 2015 indicates that the site has become increasingly rank/coarse, thus reducing breeding potential for ground-nesting species skylark and possibly meadow pipit. As natural succession advances towards tall herb and scrub communities, the less suitable it becomes for those species which require shorter open grassland habitats for nesting. Tall swards with a high instance of tall herb/scrub habitats are avoided due to the birds inability to see ground predators. Foraging potential is also adversely affected, or the other species recorded on site in 2013, the site remains as suitable as it was in 2013. The only additional species recorded incidentally during 2015, was of a pair of grey partridge. As the pair didn't form part of a 'covey', it is possible that the birds were either barren or a brood had been attempted but predated or lost to adverse weather conditions. The site is potentially suitable for grey partridge to nest in, but the current overall successional trends towards tall rank vegetation and scrub, will ultimately reduce the breeding potential for this species. Grey partridge is a Section 41 and Local Biodiversity Action Plan Species.

6.8.4 Observations Undertaken in 2016

The survey was extended in 2016 to include a triangular piece of abandoned arable land between Mill Lane and the M62, and the amenity/play area adjacent to Grasmere Avenue. The sites were visited on the morning of 24th June, and a survey undertaken to determine if those sites had any ornithological value above that identified by surveys undertaken in 2013 and 2015 as outlined in Section 6.7.3 above.

The survey confirmed the presence of very low numbers of common bird species on the land adjacent to Grasmere Drive, these include blackbird, magpie and woodpigeon. Breeding habitat here is very restricted and the site overall has negligible nesting bird interest.

The survey of the land north of Mill Lane returned a record of reed bunting only, which was present in suitable breeding habitat during the nesting season. The land at this site has degraded considerably since the previous survey and the tall grasslands now have a very high proportion of tall ruderal herb species. Consequently, this habitat has very limited value to nesting birds overall.

Based on the site visit undertaken and the very limited number of birds observed, it can be confirmed that the inclusion of the two sites surveyed, has not had a measurable effect on the sites value to breeding birds at the Peel Hall site. No increase in ornithological value has been identified as the number of species recorded (4) was low, and all were recorded during surveys in 2013 and 2015.

6.9 BARN OWL AND BAT EVALUATION

Methodology

6.9.1 An evaluation of barn owl activity/potential was undertaken using a combination of a survey for potential on-site nesting locations, the findings of the 2013 bird survey and the dusk bat surveys undertaken in 2015. The timing of these two surveys coincides when barn owls, if present and/or using the site, would expected to be active and observable.

6.9.2 The breeding bird survey in 2013 was undertaken in June and July, with two early morning site visits by two surveyors between 06.00 and 09.30 on each visit. Conditions were good on each visit.

6.9.3 The bat survey was undertaken at dusk, where four dusk visits were employed on the 28th July, 24th August, 17th September and 23rd September 2015. Survey time for each visit was 1.5hrs,

3hrs, 2.5hrs and 1.75hrs respectively. A team of four surveyors was deployed relative to the location, size and nature of the site. Surveyors initially adopted static strategic positions across the site (See Fig. 2 in the bat survey report). The positions varied over the four surveys in accordance with the prescribed transect routes (See Fig. 3 in the bat survey report) and amounted to a total of 9 static observations posts. Observations continued for approximately 20 minutes after sunset to allow for the identification of any bat commuting route into the site following roost emergence. Walked transects were then conducted that, collectively between the surveyors over the four surveys, covered the entire study area.

Results

Bird Survey (Note: Bat Survey results are within a separate report)

6.9.4 No barn owls were observed or heard on site in the two early morning visits during the bird survey in 2013. In addition, the extensive bat survey undertaken at dusk during the barn owl breeding season, returned no aural or visual records of barn owl activity on the site throughout 8.75 hours of dusk observation. The timing, level and extent of survey applied at the site are considered sufficient to be able to identify barn owl activity, if the species was present on the site.

Foraging Areas

6.9.5 The site potentially provides good foraging habitat for barn owls in the form of open coarse grasslands with good small mammal populations. The site had been mown in 2015, which increased the area of foraging by reducing the level of dense ruderal herb vegetation and bramble scrub on the site.

Nest Site Search On-Site

6.9.6 The whole of the site was walked over to identify any feature that might possibly be used as a nest site by barn owls. The survey revealed that there are no potential nest sites on the site.

Nest Site Search Off-Site

6.9.7 Whilst the search for potential nest sites in the study area revealed an absence of any building that barn owl might use for nesting, the presence of potentially suitable habitat on the site means that properties off site also need to be considered in respect of their value to barn owls.

6.9.8 Examination of online aerial images and a site visit revealed a derelict and roofless building at a property at the end of Radley Lane. The building is on private land, therefore could not be

inspected internally, however the building could be viewed from the adjacent land and was evaluated as having negligible potential due to an absence of a roof. (See Photograph A below)

6.9.9 In addition to this structure, the house located to the east of it has a kestrel nest box fitted to the northern elevation next to the chimney breast. The nest box had some faecal splashing next to it, however this building also couldn't be accessed, therefore closer examination wasn't possible. The box has limited potential for barn owl being very exposed and closely overlooking the formal gardens of the property. Human disturbance in this location would be expected to moderate-high. (See Photograph B below)

Photograph A: Roofless building.

Photograph B: Kestrel nest box on gable end of house.

6.9.10 The land to the south, west and east of the site is extensively urban/residential and therefore it was not feasible to inspect all of those properties. Therefore a general evaluation was made from the roadsides locally, combined with the examination of online aerial images. Based on the evaluation outlined above, these residential areas to the south, east and west of the site, provide no features traditionally used by breeding barn owl.

6.9.11 The land to the north is largely agricultural and composed of arable land and grass leys with associated occasional farmsteads. The farms were not visited but it is assumed that at least some of the buildings are potentially suitable to some degree for nesting barn owl.

6.9.12 It should be noted that the desk based study returned a single record of barn owl approximately 1km north-west of the site at Winwick Hospital in 2011. The exact location is not known as only a 1km² grid reference (SJ6092) was provided.

6.9.13 In addition a photographic record that appears to be of a barn owl roosting in a garden tree on Mill Lane was provided by a local resident.

Barrier and Hazard Effects

6.9.14 The M62 forms the entire northern boundary of the site, with extensive residential areas present east, west and south of the site, apart from a linear golf course beyond which lies the M6/M62 interchange. Therefore the site is isolated from any barn owl population that might occur off site.

6.9.15 The M62 represents a very serious hazard to barn owls attempting to cross it due to the high risk of collision. The adverse effect of such features on barn owls through collision with vehicles is well documented, with the Barn Owl Trust the leading organisation issuing advice in respect of development and the species.

6.9.16 The 15-year research project undertaken by David J Ramsden for the Barn Owl Trust* provides the following statement.

'*Major roads cause the complete absence of breeding Barn Owls within 0.5 km either side of the road, severe depletion of their population within 0.5 - 2.5 km of the road and some depletion within 2.5 - 8 km of the road. It is not until 25 km from a road that no effect of its presence on Barn Owl populations can be detected. Since, almost the entire area of lowland Britain lies within 25 km of a major road it is highly probable that almost the entire British Barn Owl population is to some extent suppressed by the presence of major roads.*'*

**Barn Owls and Major Roads*. David J Ramsden - Barn Owl Trust.

6.9.17 Based on the above research, the current advice provided by the Barn Owl Trust is as follows.

- *Do not* encourage Barn Owls to live near unscreened major roads.
- *Do not* erect a Barn Owl nest box within 1 km of a major road, unless the road has continuous screens on both sides.

6.9.18 The M62 section adjacent to Peel Hall doesn't have a continuous screen along both sides of the road, and much of the road is more or less at the same level as the surrounding land. (See Photograph C below) Therefore for any barn owl population present in the farms north of the road to use the Peel Hall site, a very hazardous barrier would have to be crossed.

Photograph C: Showing one of the extensive and hazardous crossing points imposed by the M62.

6.9.19 The more dependant owls are on the site, the more times they would have to cross the road to forage due to an absence of potential nest sites south of the M62. Therefore the risk of collision rises to such a degree that sustainability of any barn owl population locally is considered to be remote.

Conclusions

6.9.20 Whilst the foraging habitat on the site is potentially suitable for barn owl, surveys undertaken on the site returned no record of the species despite being undertaken at the optimum time for barn owl activity during the main breeding period.

6.9.21 There are no potential nesting sites on the site.

6.9.22 Nest sites adjacent to the site south of the M62 are limited to a single kestrel nest box attached to the side of an occupied house. Potential is limited due to the box's exposed position in relation to the garden where moderate-high disturbance levels are predicted. Potential nest sites might exist in farmsteads north of the M62.

6.9.23 Research undertaken by the Barn Owl Trust show localised extinctions of barn owls within 0.5km of major roads, and severe depletion of populations at a distance between 0.5 -2.5 km.

6.9.24 Based on the above, the combined presence of the M62 and the absence of appropriate nest sites south of the motorway, has effectively removed any reasonable possibility that a resident

population of barn owls on the site is sustainable, despite the presence of potentially suitable foraging habitat.

6.10 GREAT CRESTED NEWT EVALUATION

6.10.1 Survey Details and Results

A Habitat Suitability Index (HSI) survey was undertaken on the 13th and 14th August 2015, to assess general suitability for the species in the ponds on and adjacent to the site. HSI cannot be used instead of standard 'Presence/Absence' survey, however it is a useful tool for assessing the likelihood of GCN being present in a pond and whether or not further surveys are required. It should be noted that the ponds were surveyed to full presence/absence level in 2012 which revealed an absence of GCN. A desk-base study of the site and surrounding area revealed that the site is isolated from all other waterbodies by major barrier effects, therefore the survey has not been repeated. Instead, the HSI has been used to assess pond suitability and to determine if there has been any notable change in the pond environment since 2012. The pond has been evaluated by a licensed (WML-CL08) amphibian surveyor*, using a combination of ecological skill in evaluating GCN issues and the application of the Habitat Suitability Index (HSI) Survey.

*28 years experience in ecological survey and great crested newt mitigation and licensing.

6.10.2 Habitat Suitability Index (HSI) Survey

A HSI Survey was undertaken in the ponds on and adjacent to the site and the results presented in the table below.

Pond ref	Pond 1	Pond 2	Pond 4	Pond 5	Pond 6
SI1 - Location	1	1	1	1	1
SI2 - Pond area	0.1	1	1	0.7	0.7
SI3 - Pond drying	0.9	0.1	0.1	0.9	0.1
SI4 - Water quality	0.33	0.01	0.33	0.67	0.01
SI4 - Shade	0.2	0.2	0.2	0.8	0.2
SI6 - Fowl	1	1	1	1	1
SI7 - Fish	1	1	1	0.33	1
SI8 - Ponds	1	1	1	1	1
SI9 - Terr'l habitat	1	1	1	1	1
SI10 - Macrophytes	0.1	0.1	0.1	0.9	0.1
HIS	**0.48**	**0.34**	**0.48**	**0.79**	**0.33**

The categorisation of HSI scores is shown below.

The HSI score for Ponds 1, 2, 3 and 6 are 0.48, 0.34, 0.48 and 0.33 respectively, all of which rate as 'poor' in the HSI. Pond 5 scores 0.79 which is at the higher end of 'good'. Pond 3 wasn't subject to survey as the feature is considered to be no longer viable as potential GCN breeding habitat. Since 2012 there has been a notable reduction in quality of all of the ponds except for Pond 5 which has remained consistent. Pond 1 is now completely over-shaded by dense willow scrub to the extent that it has resulted in the loss of all emergent vegetation. Water quality and invertebrate values have also reduced due to the combined effects of cold/dark shaded conditions and eutrophication. Ponds 2, 4 and 5 were completely dry during the survey and the conditions observed indicate that these features had been dry for some time. Drying in the mid-late summer period can have a very adverse effect on developing GCN larvae, which at that time are dependent on the pond holding water. Based on conditions observed in 2015, those ponds would not be capable of supporting a successful breeding population in 2015.

Categorisation of HSI scores:

HSI Pond suitability

<0.5	= poor
0.5 – 0.59	= below average
0.6 – 0.69	= average
0.7 – 0.79	= good
> 0.8	= excellent

6.10.3 Barrier Effects

The spatial relationship between the ponds on and adjacent to the site, and those off-site was studied by reference to Ordnance Survey maps and online aerial images. The study revealed the following information.

- The M62 forms the northern boundary to the site.
- There are three off-site ponds north of the M62 located approximately 120m, 330m and 410m from the site.
- Extensive residential areas occur on the western, southern and eastern boundaries.
- There is a single pond on Poulton Park Golf Course approximately 430m east of the site.
- There are no other known ponds within 500m of the site.

There are obvious barrier to amphibian movement generated by the presence of the motorway and the residential areas. The barrier effects have been evaluated thus.

- Barrier effects generated by the M62 are of major magnitude.
- Barrier effects generated by extensive residential/developed areas to the west and south are of major magnitude.
- Barrier effects generated by extensive residential areas and Delph Lane to the east are of moderate-major magnitude.

6.10.4 Based on the above the 'lowest' barrier effect is on the eastern side of the site where linear greenspace links to the site. There is a pond on the golf course in this area which is approximately 430m from the site. However there is extensive good supporting terrestrial habitat in close proximity to this pond, therefore due to the combined presence of this terrestrial habitat and the barrier effects, the possibility of GCN (if present) travelling to the site is considered to be remote. The M62 to the north is a complete barrier to GCN movement from those ponds present in the farmland to the north. It should also be noted that the county data search returned no records of GCN within 500m of the study area. Consequently, taking all of the above issues into consideration, the likelihood of GCN colonising the site since the 2012 survey is considered to be highly remote. Therefore adverse effects on GCN or its habitats are not predicted, and further survey is not advised. Great Crested Newt Surveys were undertaken in 2012 by the Appleton Group which found the species to be absent. Potential for colonisation of these ponds from external waterbodies is considered to be remote due to significant major barrier effects.

Other Survey Information

6.10.5 A GCN survey and evaluation of waterbodies on the site was also undertaken by Mott Macdonald on behalf of the Highways Agency in relation to off-site engineering works. The survey was undertaken between April and May 2015 and covered several waterbodies in the north of the site.

6.10.6 The scoping survey identified six waterbodies for survey including ponds and seasonally wet ditches, where a HSI survey was carried out. However presence/absence survey was only applied to two waterbodies as the HSI indicated that conditions in the others were unsuitable for GCN.

6.10.7 The survey returned no record of GCN, however very low numbers of smooth newt and common frog were recorded in one pond only. Smooth newt was recorded in low numbers in the same pond during the 2012 survey.

No further surveys are recommended.

6.9 BATS

Introduction

6.11.1 As part of a proposed development at Peel Hall, Warrington, a comprehensive ecological evaluation was undertaken by Appleton's Landscape Architects and Environmental Consultants, on behalf of their client, and was conducted in June 2013. Due the time lapse since 2013 the study site was re-evaluated to determine in any of the species-specific surveys would require updating in 2015. As part of the ecological update the Appleton's undertook dusk activity surveys, relative to bats, during the 2015 bat activity season. Additional surveys of Radley Common sports pitches are currently being undertaken in the 2016 bat activity season.

Figure 1: Site extent

Bat Conservation Good Practice Survey Guidelines include reference to activity surveys in relation to the level of survey effort that is required relative to the size, nature an projected development costs of a given site, from the daytime site visit the site habitat is classified as Medium (Table 1) notwithstanding this guidance the extract below is relevant when decisions are made regarding the formulating of survey effort.

The guidance should be interpreted and adapted on a case-by-case basis, according to the expert judgement of those involved. There is no substitute for knowledge and experience in survey planning, methodology and interpretation of findings, and these guidelines are intended to support these. Where examples are given they are descriptive rather than prescriptive.

6.11.2 **Bats and their Requirements**

All British bats and their **roosts are afforded protection under the 1981 Wildlife & Countryside Act (as amended) and are listed in Schedule 2 of the Conservation of Habitats & Species Regulations 2010 (as amended). When dealing with cases where a European Protected Species (all UK bats) may be affected, a planning authority is a competent authority within the meaning of the Regulation 7 of the 2010 Regulations and therefore has a statutory duty to have due regard to the provisions of the Regulations in the exercise of its functions.

6.11.3 The National Planning Policy Framework (NPPF) has replaced the existing Planning Policy Guidelines (PPG's). In relation to wildlife PPG 9 was one of the documents to which Planning Authorities referred to, particularly where a specially protected species is or may be present and will be affected by a development for which a Planning application seeks consent. The aims of the NPPF in relation to species and habitats are that it places a clear responsibility on Local Planning Authorities to conserve and enhance biodiversity and to encourage on the consideration that should be given to Protected Species where they may be affected by development. The Office of the Deputy Prime Minister (ODPM) Circular 06/2005 provides

administrative guidance on the application of the law in relation to planning and nature conservation.

6.11.4 This is supported by a guide to good practice entitled 'Planning for Biodiversity and Geological Conservation: Building in Biodiversity' in which paragraphs 5.34 and 5.35 identify that species such as bats are highly dependent upon built structures for survival and that roosts can be easily incorporated into existing and new developments/conversions to benefit these species. When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

6.11.5 **Use of Buildings/Trees by Bats**

a) Summer breeding roost.
b) Hibernation.
c) Transitional or temporary roost.

**Roost selection is often closely correlated to suitable foraging habitat within a reasonable commuting distance from the roost and different sites are used depending upon insect densities and abundance, climatic conditions can also affect their ability to successfully forage. All British bats are insectivorous. The term roost is generically referred to as a place that bat/s use for the any of the above reasons, however it should be noted that under the Conservation of Habitats & Species Regulations 2010 (Regulation 41) the term roost is not used but refers to "a breeding site or resting place of such an animal" and is afforded legal protection. The roost, breeding site or resting place of bats, which ever terminology is used is legally protected whether or not bats are in occupation.

6.11.6 Habitat use by Bats

The frequency that bats are encountered during habitat surveys will depend upon several factors, 1) Number of roosts within or in close proximity to the survey area and the number of individuals in the roost, 2) The availability of quality foraging habitat and the distance to which it is located from a roost. 3) The quantity and diversity of invertebrates. Where an abundance of quality or similar habitat is present then the distribution of bats tends to be greater, which will avoid competition for food and the frequency that bats are encountered may be reduced, which can give the impression that bat populations are low. Furthermore, although there is often an overlap of species at some feeding sites there can be a slight variation in actual foraging by each species, which is often subtle and the peak feeding time is generally up to two hours post emergence and approximately an hour before dawn. The use of foraging places will vary at

different times of the year and will depend upon insect densities which in turn can be affected by climatic conditions both within the general and localised area; for example, around ponds which receive partial or no shelter at all or around woodland edge. Therefore, the optimum time to undertake habitat surveys for bats is May – August which covers the main activity period. Many small-medium bat species rely upon linear features, such as hedgerow, for commuting from roosts to favoured foraging areas, but Pipistrelle (*Pipistrellus*) bats, which is the most frequently occurring species in the UK and in Merseyside, will regularly fly over open spaces, some of which appear to be quite hostile for a small mammal.

6.11.7 Daytime/Dusk Survey Methodology

The re-evaluation of the study site was conducted in July 2015 by Mr Ian Ryding. During the re-evaluation the site was assessed relative to its value in supporting foraging bats and if any obvious commuting features exist; also assessed was the possible presence tree roost potential. Although built structures exist within the site boundaries, the survey commission did not include these features per se, but a general reference is made of buildings within and outside of the site boundaries in context with roost potential and use of the site by bats. As part of the re-evaluation a data search was obtained from RECORD, which included bat records; the extent of the data search covered the study site (**Appendix APP 1**) and also extended to include all areas within 500m of the site boundaries. Based on the collective experience, knowledge and judgement within Appleton's and the nature/size of the site, i.e. the most favourable habitat is by and large concentrated in specific locations of the site; four dusk habitat surveys were undertaken within four distinct but connected compartments, which were considered to be an adequate level of survey effort relative to the classification of the site. Surveys were conducted by a team of four highly experienced bat ecologists; each survey was completed by two or three of that team depending on the nature of the devised transects, of which 6 in total were completed. The undertaking of dawn surveys was not considered to be relevant for the purpose of the survey for the following reasons:-

- By and large foraging activity post dusk emergence tends to be greater than dawn
- Commuting activity into a site can adequately be determined during dusk emergence surveys
- The high value habitat relative to bats is localised and does not cover the whole site
- Dawn surveys are more useful relative to locating roosts by "back tracking" bats to a roost rather than assessing use of habitat for foraging & commuting purposes
- Some species return unseen to roosts whilst conditions prior to dawn are still dark

Table 1

	Bat habitat quality		
	Low habitat quality	**Medium habitat quality**	**High habitat quality**
Large sites, proposed for major infrastructure developments • **Site area[4] >15ha (or 5ha for brownfield sites)** • **Project value >£20M**	**Transect surveys**		
	One visit per transect each season (spring, summer and autumn)	One visit per transect each month (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two visits per transect each month may be requested (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.

The dusk habitat surveys were undertaken on 28th July, 24th August, 17th September and 23rd September 2015 respectively to cover a broad range of the bat active season. The team of surveyors who undertook the surveys comprised the following:

- Mr S Irwin (Class 2 Natural England Bat license: 13604)
- Ms K Wilding (Class 2 Natural England Bat license: 14227)
- Mr J Thomson (Class 2 Natural England Bat license: 14226)
- Mr H Green (Class 2 Natural England Bat license: 03290)

The number of surveys / surveyors was adequate relative to the location, size and nature of the site and the level of survey effort was established by the judgement of the lead surveyor Mr S Irwin who has over thirty years' experience of bat surveying. Surveyors initially adopted static positions (**Figure 2**), which varied over the four surveys in accordance with the prescribed transect routes (**Figure 3**) and amounted to a total of 9 static observations posts (SP) to locate commuting activity/routes into the site; static positions were selected relative to their proximity to buildings that may offer roost potential. Observations continued for approximately 20 minutes after sunset to allow for the identification of any bat commuting route into the site following roost emergence. Walked transects were then conducted that, collectively between the surveyors over the four surveys, covered the entire study site with particular focus on areas considered most valuable to foraging/commuting bat (e.g. woodland edge and field margin habitats). In addition and for survey variation "stopping" points over a 3 minute time period were incorporated into some transects. Surveyors were aided with hand held Anabat electronic bat detectors, to locate and record the high frequency calls that are emitted by bats. Recorded echolocation calls were then analysed with computer software to verify field results.

6.11.8 Constraints

Due to the presence of foliage a detailed inspection of trees for bat roost potential that may include woodpecker, natural holes, splits, loose bark or cavities for such features was not achievable. No constraints relative to access or weather were experienced during the dusk habitat surveys that would prevent the gathering if information on which to base conclusions in relation to how bats are using the site.

6.11.9 Survey Results

6.11.10 The site is located within the northern limits of Warrington, Cheshire, at approximately 3.2 kilometres north from Warrington town centre (SJ 61601 91689), and is surrounded by a mix of urban residential dwellings, industrial estate, road infrastructure (major and minor), arable land, and other open green space (e.g. golf course). Broadly, the study area comprises large abandoned improved grass/arable fields, which are subdivided by hedgerow and ditches; other habitats include mature and immature broad-leaved woodland and a number of small ponds.

6.11.11 The site covers a total approximate area of 69 hectares and possesses an irregularly shaped boundary; it extends from northern residential areas of Warrington (i.e. Hulme and Padgate) to the M62 motorway in the north; the eastern boundary is framed by housing and public green space along Mill Lane, whereas the western extent is also delineated by residential development along Winwick Road.

6.11.12 When assessing the site in its entirety, it is considered to provide potentially high value foraging resource for bat species that typically inhabit such rural areas with direct connectivity to urban-residential environments – i.e. the Pipistrelle bat – as it provides ample foraging/commuting resource within range of varied and numerous roost potential. The broad habitats described in section 6.1 support other more subtle sub-elements that will undoubtedly attract a range of invertebrate prey species for foraging bats; such elements would include dense/scattered scrub and other ruderal vegetation, and damp areas including swamp.

6.11.13 During the June 2015 survey trees were broadly assessed for bat roost potential that may include woodpecker, natural holes, splits, loose bark or cavities. However due to the presence of foliage a detailed inspection for such features was not achievable although one tree was identified as containing roost potential. Most of the woodland/linear tree is represented by young and early-mature trees with an under-story of scrub and common flowering plant species; whilst early-mature trees can often contain roost potential, they are not as productive relative to tree roosts as mature–over mature specimens.

6.11.14 Within the urban connotations surrounding the site it is anticipated that ample opportunity for roosting Pipistrelle bats will be present, which is supported by a data search within 500m radius

of, and including, the site provided by RECORD; the data search resulted a record for Common pipistrelle (*Pipistrellus pipistrellus*) at approximately 148 metres north-west of the site (i.e. at Dundee Close); this record concurs with the commuting activity that was identified during the static observations at Survey Point 1, mapped within **Figure 2** to this report.

6.11.15 As a result of the static observations, C. pipistrelle bats were identified commuting from nearby roosts into the site at four locations; commuting was from the east and from the south (**Figure 4**) although numbers were not notably greater for any one observation point. No activity was recorded that would suggest the presence of tree dwelling species typically the Noctule bat. (*Nyctalus noctula*) Throughout the transect surveys, including the "stopping points", C. pipistrelle bats were found to forage predominantly in central and southern areas of the study site, specifically where woodland edge/linear tree and scrub/hedgerow is present. Other areas where such habitats are absent or sparse, i.e. the east and north-west, did not feature the same level of foraging activity; deviation into these areas was occasionally noted (**Figure 5**). Other than C. pipistrelle, no other bat species were recorded during static observations or transects.

Figure 2: Static observation points (SP)

Figure 3: Combined transect route (yellow).

Figure 4: Commuting activity (Common pipistrelle)

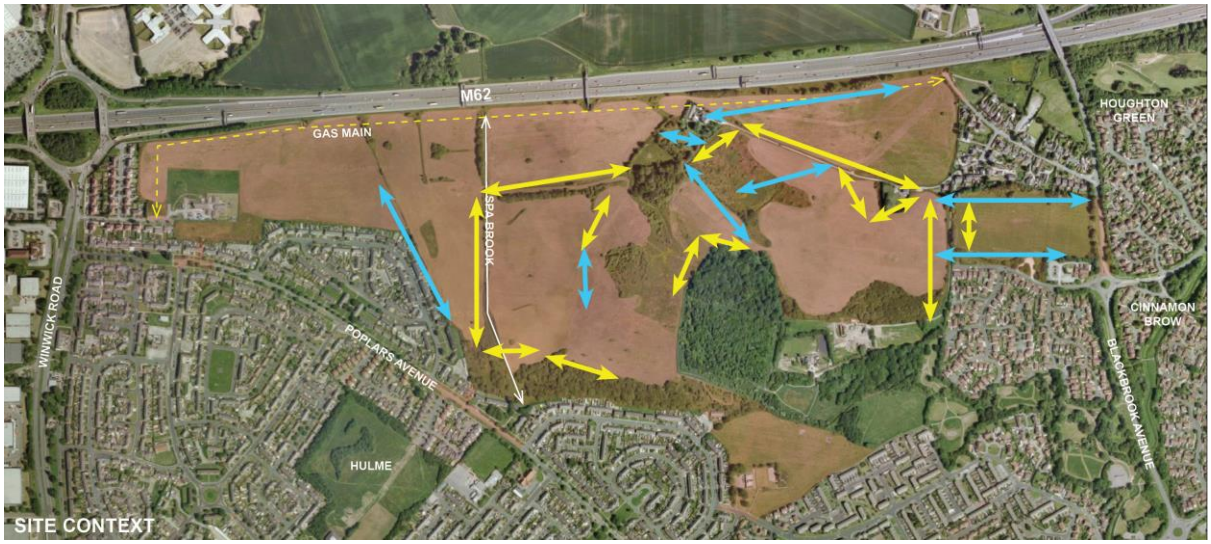

Figure 5: Foraging activity of Common pipistrelle bats

↔ General foraging

6.12 Dusk Survey Conclusions

From the four dusk surveys it can be concluded that parts of the study area are considered as being of high value for Common pipistrelle bats within the localised environment, i.e. Pipistrelle bats roosting in structures within the sites boundaries, and those roosting within nearby buildings in adjacent areas of residential settlement. Those parts of the study site that are concluded to be of high value for bats collectively form a favourable mosaic comprising woodland/woodland edge, scrub, tall grass/ruderal, hedgerow, sheltered lanes/paths, freshwater habitats such as running water (i.e. Spa Brook) and areas swamp. Although only one species (C. pipistrelle) has been identified as using the site for foraging/commuting purposes, it should be noted that use of the site by other species e.g. Noctule at different times of the year should not be ruled out; such is its size and suitability for bats. Throughout the site lighting is largely absent within which mosaic of habitats provides a non-illuminated environment for bats.

6.12.1 Common pipistrelle bats were not observed commuting into the site in relatively large numbers from any of the static observation points, either generally or from one direction. This is not to say that a maternity roost is not present locally, as when considering the number of C. pipistrelle bats observed during the transect surveys, it is highly likely that the site does support a local maternity colony through provision of ample and relatively diverse foraging resource; maternity colonies often alternate between roosts over the course of a breeding season, as result numbers of bats, commuting activity and dispersal into and over large tracts of habitat will alternate accordingly. Instances of individual or small numbers of C. pipistrelle bats commuting into the site or from the direction of buildings within the site boundaries (i.e. Peel Hall and Peel Cottage) demonstrates that bats from a number of separate roosts in the locality are using the site for foraging purposes; the survey results suggest that bats commute into the study site from possibly four roosts. Foraging activity by C. pipistrelle bats occurs predominantly in the central area extending from Peel Hall in the north to the woodland along the southern boundary; Radley Lane is also used consistently by C. pipistrelle bats, although not exclusively for foraging as it acts as an important avenue of dispersal for commuting bats. Collectively the aforementioned areas and their comprising semi-natural elements form a valuable local resource for Pipistrelle bats.

6.12.2 Other areas where such habitats are absent or sparse, i.e. the east and west of the study area where the environment becomes more open and homogenous, hold considerably less value, although deviation in foraging activity was observed into these areas over the course of the four surveys; no activity was observed in the extreme west of the study site. Certain sections of site boundaries, notably the south and east, feature woodland and/or linear tree that not only provide foraging/commuting areas around the study site, but also connectivity to properties that exist outside its boundaries where, as no doubt, a percentage of those properties will have the capability of supporting bat roosts; the combination of high value foraging habitat in close proximity to roosts is a fundamental factor in roost selection and population survival.

Fragmentation or loss of valuable foraging/commuting habitat is one of the key factors in relation to the decline of bat species. Furthermore the aforementioned habitat can be degraded by the implementation of lighting schemes that have the effect of altering the illumination levels and in doing so can lead to a disproportionate impact upon invertebrates; i.e. some species will reduce whilst others that attracted to light will increase and as result the species diversity will be lost.

6.12.3 The 2015 habitat surveys demonstrate that the highest level of activity is consistent with the peak time of the breeding season; whereby female bats generally forage in close proximity to the roost as they often return to tend dependant young; high activity during later times of the year usually diminishes as maternity roosts disperse, which along with a reduction of invertebrates can result in a reduction of bat numbers, which was identified during the fourth and final survey during late September. Whilst the buildings, i.e. Peel Hall and Peel Cottage, within the site boundaries were not included within the survey remit, and it is understood that they will remain intact, no categorical evidence of emerging bats was recorded during the static observations that were undertaken in close proximity to these structures. However, the presence of bats foraging within immediate proximity to these structures during the emergence period (i.e. sunset to 20 minutes after), suggests the likelihood that each of these buildings supports roosting C. pipistrelle bats.

6.13 Indicative Impact

6.13.1 **Construction/Development Period:** If those habitats identified as being of high value to commuting and foraging Pipistrelle bats, particularly those which form the central area (see section 7 for full details), are to be lost as part of the proposed scheme, then the proposed construction/development has the potential to remove foraging habitat and fragment commuting routes. The survey results demonstrate that any future construction/development has the potential to impact upon bats from up to four roosts distributed both within the site boundaries and the nearby locality. Impact would be at a Local level only, although the site can be considered as being locally important.

6.13.2 **Operational Period:** Apart from minor light spillage into the site from contiguous infrastructure/settlement, the study site is mainly unaffected by artificial illumination; the area most affected by light spillage is at the north motorway boundary. Any future development at the site will inevitably feature a lighting scheme; without mitigation impact could occur at what foraging habitat and commuting routes that may remain or any landscape features that are included as part of the development could be affected by way of an inappropriate lighting scheme. See **Appendix Eco 10 and 11 Indicative Recommendations**

6.13.3 At the time of report writing the details of site proposals is not known therefore indicative recommendation can only be produced. Due to the identified use of the site by C. pipistrelle

bats it will be productive relative to the conservation of the species if any development at Peel Hall farm is designed around existing semi-natural features – particularity those in the central area and in places where connectivity across the site is apparent by way of features such as linear tree lines and drainage ditches, all of which have been described in this document as being of high value to bats; retention of such habitats would help to preserve a foraging resource and continuity of commuting features relative to nearby roosts.

6.13.4 In addition to habitat retention/continuity and functionality for foraging/commuting bats across the site can be achieved through provision of access between newly erected units/housing, which could be formed by elements such as residential garden with associated tree/shrub, tree lined roads/pedestrian pathways. If required, low level lighting could be implemented where habitat is retained and/or created; lighting should be avoided or only installed when absolutely necessary and avoid woodland/linear tree that currently forms site boundaries. Moreover, at woodland edges a degree of retained rough grassland/tall ruderal and/or scrub/shrub will be beneficial in as much as it will provide a combined and suitable habitat for invertebrates, which in turn will provide a food resource for bats.

6.13.5 An assessment of trees for bat roost potential should be undertaken at a time when foliage is absent; the information gathered will be used to inform whether or not any additional surveys are required if tree roost potential is identified and will also be used to inform decision making relative to any tree removal/pruning or lighting in close proximity to such potential. As part of Cheshire Biodiversity Action Plan opportunities for bats could be incorporated into the development and suggestions for that purpose can be provided by Appletons.

6.14 ASSESSMENT OF ECOLOGICAL IMPACTS

6.14.1 Determining the Ecological Receptors

The ecological surveys undertaken on the site have identified several ecological features on the site. These are known as the 'Ecological Receptors' and include all habitats and species that could potentially be adversely affected by the proposals. Once identified, it is important to determine how the effects of the development on the 'receptors' will be assessed. The methodology used is outlined below.

6.14.2 Methodology for Assessment of Effects

A means of assessing the 'quality' of the ecological receptors and determining the predicted level of impact on the receptors was required for this study.

6.14.3 Therefore the assessment is based standard guidance from the following sources, the Institute of Ecology and Environmental Management's (IEEM) Guidelines for Ecological Impact Assessment, the *Environment Impact Assessment; guide to procedures* (DCLG 2000) and

Biodiversity and Environmental Impact Assessment: A Good Practice Guide for Road Schemes (RSPB et al 2000).

6.14.4 The above sources were consulted in order to provide the Planning Authority and the developer with clear and concise information about the likely significant ecological effects associated with the project. The methodology applied in respect of the assessment of the predicted effects on the ecological receptors is provided in **Appendix ECO 15**.

6.14.5 A detailed assessment has been undertaken which collates the existing baseline information through field surveys, that will reasonably predict the significant effects of the proposals on the Ecological Receptors.

6.14.6 Where significant adverse effects are predicted, then wherever possible mitigation measures are provided to reduce the effect of the development to a sustainable level.

6.14.7 Geographic Frame of Reference:

The value or potential value of an ecological receptor should be determined within a defined geographical context. The geographic frame of reference used to determine the predicted value of the ecological receptors is as follows.

International	
UK	
National	(England)
County	(Cheshire)
District	(Unitary Authority or Borough)
Local	(Parish)
Site	(Within confines of the site)

It should be noted that at Peel Hall the receptor values range only between 'District' and 'Site'. The value of habitats and species has been measured against published selection criteria which for example include the following.

- Guidelines for the selection of biological SSSIs.
- Local Wildlife Site Selection Criteria for the Cheshire Region.
- UK Biodiversity Action Plans and Section 41 Species and Habitats of Principle Importance in the UK. (NERC Act).
- Countryside and Rights of Way (CROW) Act 2000.
- Any relevant Red Data List/Book species and Nationally Scarce species not covered by the above, or any other lists / schedules of species rarity or importance.

The legislative requirements of key species and habitats are also considered in this assessment and include the following:

- Wildlife and Countryside Act 1981 (as amended).
- Conservation of Habitats and Species Regulations 2010.
- Protection of Badgers Act 1992.

6.14.8 Evaluation of the Ecological Receptors:

All of the habitats recorded on the site are evaluated below using the Geographic Frame of Reference as outlined above.

The site is large, therefore the evaluation also considers the 'collective value' of the habitats on the site. A statement of overall value is provided in **Table 1.**

6.14.9 Habitats - Woodland:

The woodlands on the site are predominantly immature and less than 30 years old. A small, single stand of mature plantation approximately dating from the latter half of the 19th century is also present. The woodlands are of **Local** value and have no attributable NVC affiliation.

Radley Plantation is located directly adjacent to the site and whilst outside of the proposal area, it is notable as it is a Cheshire Local Wildlife Site (LWS) and is therefore of County importance. (See Radley Plantation & Pond WA047)

6.14.10 Habitats - Hedgerows:

Native Hedgerows are restricted to five sections of species-poor hedge. None display any great age and none of the hedgerows are 'important' as defined by the Hedgerow Regulations, but are S41 habitats. With the exception of a willow dominated hedge, the native hedgerows broadly conform to the **W21** *Crataegus monogyna - Hedera helix* scrub community of the NVC. The willow hedge has no NVC affiliation.

The native hedgerows are S41 habitats and Cheshire Local Biodiversity Action Plan Habitats (LBAP) and are of **Site - Local** value only.

6.14.11 Habitats - Streams/ditches.

Spa Brook and the other ditches on the site are significantly modified and lack typical geomorphological features. There are no notable associated plant communities and no affiliation with the S41 category 'Rivers', on account of the prevailing poor/modified conditions. The streams/ditches are considered to be of **Site - Local** value.

6.14.12 Habitats - Grassland (including derelict arable land):

The grasslands are predominantly rank, abandoned/disturbed arable and improved land. Other grasslands include formal amenity grasslands used as sports pitches and for informal public recreation. The coarse grasslands have some broad affinity with the **MG1** *Arrhenatherum* elatius community of the NVC, however due to the level of disturbance atypical communities also occur.

The playing fields/amenity grasslands are composed of a sown mix of robust grass species and have no NVC association.

Surveys undertaken on site indicate that the grasslands fail to meet the appropriate guidelines for selection as Local Wildlife Sites (LWS). Therefore the grasslands are considered to be of **Site - Local** value only.

Small areas of semi-improved grassland and a small area of marsh with low floristic significance also occur and are of **Site** value only.

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6.14.13 Habitats - Ponds:

There are two ponds located on the site. The ponds are S41 habitats and Cheshire Local Biodiversity Action Plan Habitats (LBAP), however they fail to meet the qualifying criteria for LWS and are of **Site - Local** value only.

Three other ponds are located adjacent to the site boundary but off-site within Radley Plantation, and form part of the LWS. (See Radley Plantation & Pond WA047). The LWS is of **County** importance.

6.14.14 Other Habitats:

Other habitats of the site include secondary scrub, tall ruderal herb and bracken. Several small secondary dry reed beds have developed due to the cessation of farming activity. The habitats are not typical of those associated with S41, being permanently dry. The other habitats are of **Site - Local** value only.

6.14.15 Species - Birds:

The site supports a range of common nesting birds, in addition several other species also use the site for foraging but nest off-site. These birds include species listed in Section 41, and also include LBAP species. The bird fauna of the site is considered to be of **Local-District** value.

The bird populations fail to meet any of the Local Wildlife Site Selection Criteria for the Cheshire Region.

6.14.16 Species - Bats:

The areas affected by the proposal contain no buildings or trees with bat roost potential. Foraging potential is of high value for common pipistrelle along woodland edges and linear features. Foraging is largely restricted to land east of Spa Brook.

The foraging areas on the site are considered to be of **District** value for common pipistrelle bats.

6.14.17 Species - Badger:

N/A. No evidence of badger occupation on site and very low possibility of colonisation due to major barrier effects imposed by the M62 and extensive residential areas.

6.14.18 Species: Water Vole:

N/A. No evidence of water vole occupation on site and very low possibility of colonisation due to negligible-poor habitat conditions, and lack of connectivity beyond the site boundary.

6.14.19 Species - Great Crested Newt:

N/A. Formal surveys indicate 'absence' in all waterbodies on site. Extensive/major barrier effects prevent colonisation of the species.

6.15 Summary Evaluation of the Ecological Receptors:

A summary of the nature conservation value of each of the ecological receptors is provided in **Table 1** below.

Table 1: Ecological Receptors - Nature Conservation Value.		
Ecological Receptor	**Associated Species and Habitats**	**Nature Conservation Value**
Habitats:		
Radley Plantation & Pond LWS	Woodland and Ponds. Off-site feature located immediately adjacent to the proposal site.	County
Woodland	Mature plantation woodland >100 years old. Immature plantation woodland <30 years old.	Local
Hedgerows	Native hedgerows. (Low diversity)	Site-Local
Stream	Modified channel in Spa Brook and ditches with no significant plant communities.	Site-Local
Grassland	Coarse improved/semi-improved grassland communities and amenity grassland.	Site-Local
Arable	Derelict, abandoned arable fields with low-diversity coarse grassland.	Site-Local
Ponds	Two on-site ponds with no significant plant communities.	Site-Local
Other Habitats	Secondary scrub Tall ruderal herb and bracken Dry reed beds (secondary)	Site Site Site-Local
Collective Evaluation of Habitats	Extensive mosaic of all of the semi-natural habitats listed above. (Excluding Radley Plantation & Pond LWS)	Local-District
Species:		
Birds	Assemblages of common birds that are typical of the area.	Local-District
Bats	Woodland-edge foraging areas only. No roosts affected.	District
Badger	No evidence of occupation and very low possibility of colonisation due to major barrier effects.	Not applicable.
Water Vole	No evidence of occupation and very low possibility of colonisation due to negligible-poor habitat conditions.	Not known.
Great crested newt	Formal surveys indicate 'absence' in all waterbodies on site. Extensive/major barrier effects prevent colonisation of the species.	Not applicable.

6.16 Assessment of Potential Impacts:

6.16.1 The evaluation of the Ecological Receptors has shown that the effects of the development will affect areas of immature woodland, coarse-low-diversity grassland, amenity grassland, hedgerows, tall ruderal herb, secondary scrub and secondary stands of dry reed bed. The individual habitats affected within the application boundary are at most of **Site - Local value** only. However the site is large and when evaluated collectively the habitats are considered to be of **Local - District** value.

In addition, the collective faunal interest of the site is of **Local - District** value.

The habitats within Radley Plantation and Pond LWS (off-site) are of **County value** and will not be directly affected by the proposals.

The predicted effects of construction are summarised on **Table 2**, and predicted impacts of operation on **Table 3** below.

Table 2: Assessment of Potential Impacts - Construction			
Ecological Receptor	**Nature Conservation Value**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Habitats:			
Radley Plantation & Pond LWS	County	The LWS is located off-site and there are no proposals that will affect the site. Therefore the essential qualifying features and integrity of the LWS will be maintained.	No Effect.
Woodland	Site-Local	Loss of approx 2.74ha of immature woodland <30 years old during construction. Impact is reversible through provision of approx. 5.06ha of new woodland habitat buffering the M62 to the north.	Negligible Medium term effect
Hedgerows	Site-Local	The hedgerows will be retained with very limited sections directly affected.	Negligible Medium term effect
Stream	Site-Local	No effect	No effect
Grassland	Site-Local	Loss of approx. 33.7ha of low diversity grassland during construction. Partially reversible impact by provision of approx. 8.89ha of amenity grassland.	Negligible Medium term effect
Arable	Site-Local	Loss of 17.16ha of abandoned arable land with coarse low diversity plant communities	Negligible Medium term effect
Tall ruderal herb & bracken	Site	Area insignificant & un-measurable. Poor habitat - reversibility not applicable.	Negligible
Dry/secondary reed beds	Site-Local	Loss of approx. 0.8ha of secondary reed bed on abandoned farmland. Partial reversibility possible through provision of four attenuation ponds.	Negligible Medium term effect
Collective evaluation of all habitats	Local-District	Very high impacts on a large area of semi-natural habitat. Partial reversibility possible.	Moderate Adverse Medium term effect

Table 2: Assessment of Potential Impacts - Construction *Continued*			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Species:			
Birds	Local-District	Loss of extensive areas of nesting/foraging habitat for a range of common birds of Local-District value. Partially reversible impact.	Moderate adverse Medium term effect
Bats	Local-District	Loss/modification of bat foraging routes only. There are no roosts affected by the proposal. There is a reversible impact of any possible effect through the provision of new foraging areas within the landscape plan.	Moderate adverse Medium term effect
Badger	Not applicable	No effect	No effect
Water vole	Not known	No effect predicted as watercourses and buffer zones will be maintained.	No effect
Great crested newt	Not applicable	No effect	No effect

Table 3: Assessment of Potential Impacts - Operation			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Habitats:			
Radley Plantation & Pond LWS	County	The LWS is located off-site and there are no predicted adverse operational effect on the site.	No effect.
Woodland	Site-Local	Any losses of woodland will have occurred during the construction phase. No operational effects are predicted.	No effect
Hedgerows	Site-Local	Any losses of hedgerow will have occurred during the construction phase. No operational effects are predicted.	No effect
Stream	Site-Local	No effect	No effect
Grassland	Site-Local	Any losses of grassland will have occurred during the construction phase. No operational effects are predicted.	No effect
Arable	Site-Local	Any losses of arable land will have occurred during the construction phase. No operational effects are predicted.	No effect
Tall ruderal herb & bracken	Site	Area insignificant & un-measurable. No operational effects predicted.	No effect
Dry/secondary reed beds	Site-Local	Any losses of reed bed will have occurred during the construction phase. No operational effects are predicted.	No effect
Collective evaluation of all habitats	Local-District	The collective loss of habitat will have occurred during the construction phase. No operational effects are predicted.	No effect

Table 3: Assessment of Potential Impacts - Operation *Continued*			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Species:			
Birds	Local-District	Disturbance to nesting birds due to increased pedestrian use and general development. Partially reversible though provision of barriers and buffer zones.	Negligible - Low. Medium term effect
Bats	Local-District	Impact on bat foraging areas through site lighting. There is a reversible impact of any possible effect through the provision of an appropriate lighting plan.	Negligible - Low. Medium term effect
Badger	Not applicable	No effect	No effect
Water vole	Not known	No effect predicted as watercourses and buffer zones will be maintained.	No effect
Great crested newt	Not applicable	No effect	No effect

6.16.2 The evaluation of the predicted effects has shown that a **Moderate Adverse** effect is predicted on the site as a whole through the loss of common but extensive semi-natural habitats during construction. These effects are short-term and partially reversible through restoration and provision of new habitats. There will be **No Effect** on the adjacent LWS Radley Plantation and Pond.

6.16.3 Critical to a moderate adverse effect being predicted, is the overall low diversity and rankness of the plant communities on the site, and artificial nature of the woodlands affected by the proposal. Whilst the site is large and losses extensive and of a very high magnitude, the individual habitats affected are essentially poor.

6.16.4 With the exception of bats, and possibly breeding birds, a general lack of substantial faunal interest on the site was also observed.

6.16.5 Impacts of operation are **Negligible-Low** and are partially reversible through appropriate mitigation.

6.17 References

DEFRA (2006) Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 - Habitats and Species of Principal Importance in England. DEFRA/Natural England

English Nature (2004) *Bat Mitigation Guidelines,* English Nature.

English Nature, (2001) *Great Crested Newt Mitigation Guidelines.* English Nature.

Gilbert G, Gibbons D.W. & Evans J. (1998) *Bird Monitoring Methods.* RSPB et al.

Hundt, L. (2012) *Bat Surveys: Good Practice Guide. 2nd Edition*. Bat Conservation Trust.

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Preston, C.D, Pearman, D.A, & Dines, T.D. (2002) *New Atlas of the British & Irish Flora* Oxford University Press.

Rodwell et al. (1992) *British Plant Communities Volume 1, Woodlands and scrub.* Cambridge University Press.

Rodwell et al. (1992) *British Plant Communities Volume 3, Grasslands and montane communities.* Cambridge University Press.

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Rodwell, J. S. (2006) *National Vegetation Classification Users' Handbook.* JNCC.

Roper, T. J, (2010) *Badger*. New Naturalist Library – Collins.

Rose, F. (1981) *The Wildflower Key*. Warne.

Stace, C., (1997) *New Flora of the British Isles (Second edition)*.
Cambridge University Press.

Strachan, R. & Moorhouse, T. (2006) *Water Vole Conservation Handbook Second Edition* Wildlife Conservation Research Unit.

Web Sites:

Biodiversity Planning Toolkit - Association of Local Government Ecologists (ALGE) et al.
Cheshire Region Biodiversity Partnership website.
Google Earth.
DEFRA – Magic map

7.0 HYDROLOGY, DRAINAGE AND FLOOD RISK ASSESSMENT

7.1 This section considers the risk of flooding at the application site and assesses any impact to the surrounding catchment resulting from proposed developments. This document sets out the design principles and indicative detail for surface and foul water drainage to serve the proposed development.

7.2 Site Description

7.2.1 The topographical survey confirms that the site falls from east to west with levels ranging from approximately 10.32m AOD to the west and 17.97m AOD to the east. A high point is located to the north east with levels at approximately 20.69m AOD. Refer to topographical survey within **Appendix HYD 1**. A desk top ground study was prepared for the site by Environmental Management Solution Limited. Refer to **Appendix HYD 1**. According to this study the application site is underlain by Glaciofluvial deposits comprising sand and gravel. The British Geological Survey (BGS) records indicate that the bedrock geology at the development is formed of Chester Pebble Beds Formation which comprises sandstone. The BGS borehole logs confirm that clay gravel and sand form the superficial strata at the application site.

7.2.2 Existing Drainage Networks and Water Supply

Sewer maps provided by United Utilities confirm an existing clean water supply pipe runs adjacent to Peel Cottage Lane and runs to Peel Hall. According to this mapping there are also existing public sewers crossing the western end of the application site. Existing foul and surface water sewers are located to the east at Mill Lane and to the west within the existing residential development at Poplars Avenue. Refer to **Appendix HYD 2**.

7.2.3 River and Watercourses

The Environment Agency (EA) flood maps and topographical surveys confirm that there are a series of minor watercourses, including the Spa Brook, located within the application boundary. The nearest major watercourse to the development is the Cinnamon Brook which is located approximately 125m to the east of the site.

7.3 Flood Risk

7.3.1 The Environment Agency (EA) Indicative Flood map in **Figure 1** below, confirms that the site is located in Flood Zone 1 and is not at risk of fluvial flooding. Areas located in Flood Zone 1 have less than 0.1% chance of flooding in any given year. Only a 1 in 1000 year flood event puts this site at risk from fluvial and tidal events. The NPPF classes residential development as 'More Vulnerable' to the risk of flooding.

7.3.2 The topographic survey shows that the site falls from east to west. The application site is bounded by the M62 to the north, existing residential development at Mill Lane and recreational grounds to the east. Existing residential development at Birch Avenue and Newhaven Road is located to the west and existing residential development at Windermere and Woodside Farm is located to the south.

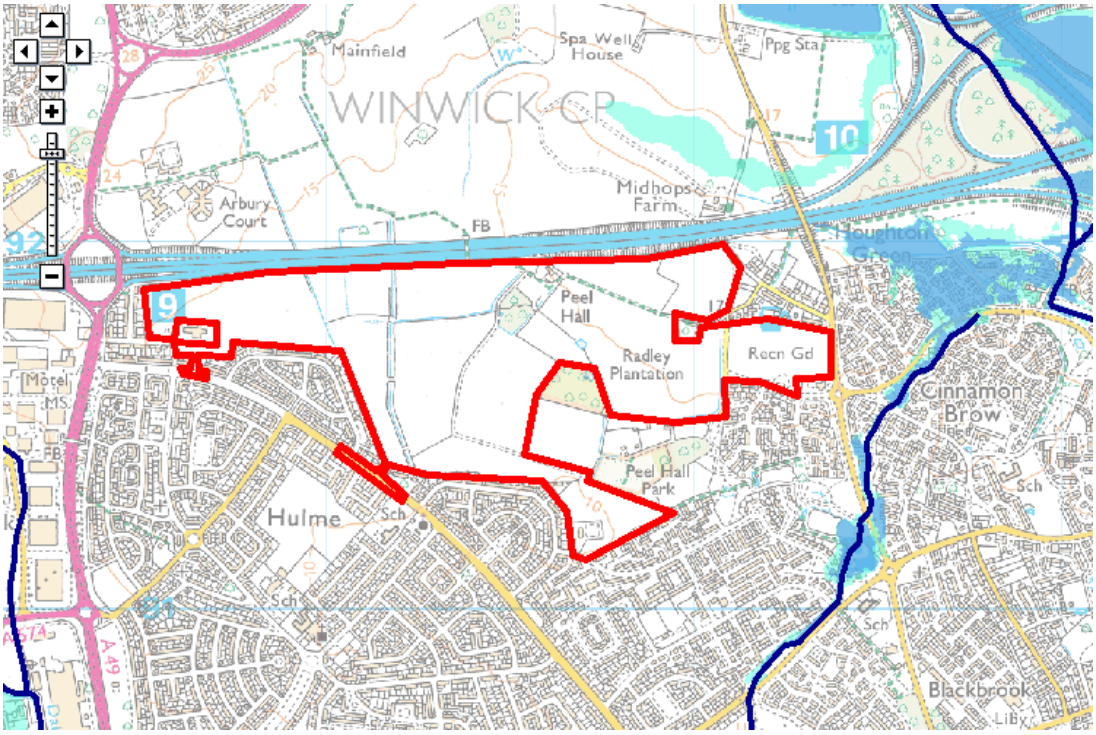

Figure 1 – EA indicative Flood Map – Peel Hall Farm

Warrington Borough Council Strategic Flood Risk Assessment (SFRA) and Flood Risk Management Strategy (FRMS)

7.3.3 A Strategic Flood Risk Assessment (SFRA) was prepared by Jeremy Benn Associates (JBA) in 2011 for Warrington Borough Council. A Flood Risk Management Strategy was also prepared by the Environment Agency (EA) in March 2011, in which sub-catchments have been identified as areas at risk and how flooding can be managed. The application site is not located within any of these areas and is not identified within the SFRA as being at risk of flooding.

7.3.4 **Tidal and Fluvial Flooding**

The SFRA confirms that the main sources of flooding in Warrington are the River Mersey and its 5 key tributaries (Sankey, Padgate, Spittle, Penketh and Whittle Brooks). The development is not within the vicinity of any of these sources. According to the EA map the nearest major watercourse is the Cinnamon Brook, this is approximately 125m from the development. There are minor watercourses and ponds located within the application boundary however according to the EA map these do not pose a risk to the site.

7.3.5 **Groundwater Flooding**

The EA indicative flood map confirms that the application site is located within a Zone 3 groundwater source protection zone. This is described by the EA as:

'Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75. There is still the need to define individual source protection areas to assist operators in catchment management;'

7.3.6 The Envirocheck report within the desk top study for Phase 1 of the development, that the drinking water source itself is located approximately 560m to the north of the site. The sites groundwater is also assumed to be moderately to highly susceptible to groundwater contamination.

7.3.7 According to the EA groundwater maps the application site is underlain by secondary A aquifers, which are described as:

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

7.3.8 Overland Flooding

As previously mentioned the site falls from east to west and bounded by the M62 to the north and existing residential development at Mill Lane to the east which will act as a cut off preventing overland flow from reaching the development. Due to topography, any overland flow from the south and west will flow away from the development. Surface water from the development will be managed on-site and will be restricted to Greenfield run-off rate; therefore the risk of overland flooding causing by the development is negligible.

7.3.9 Sewer Flooding

The United Utilities DG5 records are provided within the SFRA. These records show a data set of all properties that have been previously flooded by a drainage system. The application site is not highlighted on this plan as being at risk of flooding from the existing sewerage network and therefore flood risk due to sewers is considered to be low. Areas to the north east and south are also highlighted as low risk and the area to the west is considered as medium risk. Refer to **Appendix HYD 3**.

7.3.10 Surface Water Flooding

According to the EA flood maps, the application site is at low risk of surface water flooding. According to the SFRA there are certain locations within Warrington that are at risk of surface water flooding. The critical drainage map within the SFRA confirms that development does not fall within a critical drainage area. However land to the east south and west are within critical drainage areas, according to the SFRA there are a number of culverts through the area which if unmaintained could increase flood risk. Surface Water from the development will be managed on-site via attenuation and will be restricted to the existing run-off rate.

7.3.11 Reservoir Flooding

The EA flood maps confirm that the site is not at risk from flooding from reservoirs. Refer to **HYD 3**.

7.4 Proposed Surface Water Drainage Strategy

7.4.1 Existing Surface Water Drainage

The United Utilities maps confirm there are no public surface water sewers crossing the development site. An existing domestic kennels and dwelling are located within the development but do not form part of the application boundary. The site is currently Greenfield; it is proposed that discharge from the proposed development will be restricted to the existing QBAR as calculated using the HR Wallingford IH124 Greenfield run-off calculation. QBAR has been calculated as 334.8 l/s, refer to **Appendix HYD 4**.

7.4.2 Proposed Surface Water Drainage Strategy

The hierarchy of surface water disposal stated within The Building Regulations approved document Part H is as follows:

- An adequate soakaway/infiltration system
- A watercourse
- A sewer

The proposed options of surface water discharge include the following:

- SuDS

7.4.3 It is proposed that surface water from the development is restricted to the QBAR rate of 334.8l/s

7.4.4 The desk top study prepared by Environmental Management Solution Ltd indicates that the superficial strata at the site is formed from gravel and sand, therefore infiltration drainage may be feasible at the development, however the site is also located within a groundwater source protection zone and therefore discussions with Environment Agency as the design progresses will need to be undertaken in order to agree what areas could be utilised for soakaway drainage but at the same time protect the groundwater from contamination.

7.4.5 Due to this reason and to avoid causing any contamination to groundwater soakaways we would need to make sure areas that go to a soakaway are areas that do not generate or have a risk of generating contamination to groundwater.

7.4.6 **Watercourses**

There are existing ponds and minor watercourses located within the application site including the Spa Brook. It is proposed that surface water from the development will discharge to these minor watercourses at the restricted run off rate. The Spa Brook is located to the west of the application site and appears to be culverted to the rear of the existing properties at Poplars Avenue. United Utilities records suggest that this drains to Mill Brook behind the Alban Retail Park. It is assumed that flows from the site restricted to the Greenfield rate will be able to discharge into this surface water system with a system of onsite attenuation as proposed. Further modeling of this pipe may be requested.

7.4.7 In addition to Spa Brook, there appears to be a drainage ditch located within the application boundary. This ditch is connected to Dallam Brook via a large diameter culvert which runs via Densham Avenue and Northway.

7.4.8 The area to the north west of the site which will comprise the employment space and residential units falls to the North West. It is proposed that surface water from the development will discharge to the watercourses at the restricted rate, attenuation will be used to achieve this. Discharge to this existing drainage ditches and watercourse will require consent from the Local Authority and may require discharge consent.

7.4.9 The QBAR for the whole development has been calculated as 334.8 l/s. This will be pro rata'd per sub-catchment and the storage requirement will be based on this restricted rate. These areas have been broken down as follows:

Pond Reference	Sub-catchment Area (ha)	Percentage of Sub-catchment (%)	QBAR for sub-catchment (l/s)	55 % Impermeable Area (ha)	Volume requirement – Q100+30% (m^3)
A	4.336	6.81	22.80	2.38	1373
B	5.26	8.27	27.68	2.89	1668
C	5.48	8.61	28.83	3.01	1736
D	5.64	8.87	29.69	3.1	1788
E	4	6.29	21.06	2.2	1270
F	2.91	4.57	15.32	1.6	924
G	0.83	1.31	4.39	0.45	266
H	4.6	7.23	24.22	2.53	1459
I	2.92	3.97	13.32	1.61	930
J	4.08	6.4	21.48	2.24	1291
K	2.54	4	13.42	1.40	808

7.4.10 **Water Quality**

Due to the application site being located within a groundwater protection zone, groundwater quality needs to be controlled to limit any contamination from the development. It is proposed that a two stage treatment will be provided, initially using lined permeable paving with this discharging to the designated ponds and secondly via the ponds themselves. The commercial areas in particular will require use of permeable paving and oil separators where appropriate.

7.4.11 **Attenuation Features**

Potential use of SuDS have been considered for the attenuation of surface water on-site and are listed below, infiltration drainage cannot be used at the site due to the development being located within in groundwater protection zone. Water quality has also been considered when proposing the following attenuation features:

7.4.12 **Attenuation Ponds**

It is proposed that surface water from the development will discharge to attenuation ponds which in turn will discharge to the existing watercourses and ditches within the site. The discharge into these watercourses will be restricted to QBAR rates listed above in **Table 1**.

7.4.13 **Permeable Paving**

Further attenuation can be provided using permeable paving for private drive areas. Permeable paving would be beneficial as it allows for a reduction of the occurrence of runoff flooding. Permeable paving would also improve water quality by filtration through the pavement as they are an effective initial method of removing total suspended solids, heavy metals and hydrocarbons from runoff.

7.5 Proposed Foul Water Drainage Strategy

Existing Foul Flow

7.5.1 An existing dwelling and kennels are located within the site but these do not form part of the application boundary, therefore the site is considered to be greenfield.

Proposed Foul Flow

7.5.2 The proposed development will comprise up to circa 1300 new residential dwellings, commercial areas and a school. Based upon Sewers for Adoption 7th Edition and British Water Flows and Loads the foul flow has been calculated as: 64.52 l/s. This flow has been based on the following assumptions, refer to Foul Flow calculations within **Appendix HYD 5**:

Commercial Area:	Employment zone comprising approximately 150 members of staff and Supermarket comprising 80 members of staff
School:	Comprising approximately 180 pupils and 25 members of staff
Retirement Housing:	Comprising approximately 60 residents

7.5.3 **Proposed Foul Water Drainage Strategy**

Foul networks are located to the east at Mill Lane, to the west at Windermere Lane and to the west within the site boundary. Any sewers located within the application site will require easements either side. The sewer sizes have been confirmed as a maximum of 225mm on the existing site so assuming that these are laid at no deeper than 3m cover to invert then a 3m easement will need to be provided for these pipes in line with the statuary requirement defined by the statuary undertaker. United Utilities have not given a preference for a point of connection but have no objection with foul flows communicating with their sewers, preferably via a gravity connection. Refer to correspondence within **Appendix HYD 5**.

7.6 Conclusions and Recommendations

7.6.1 This report concludes that the development is not at risk of fluvial, tidal, overland or groundwater flooding and will not increase flooding to surrounding catchments.

7.6.2 It is proposed that surface water from the development will be restricted to the existing Greenfield run-off rate of 334.8l/s.

7.6.3 The site is located within a groundwater source protection zone and therefore to prevent any contamination, surface water infiltration drainage will need to be subject to Environment Agency confirmation. Areas contributing to soakaways will need to be carefully designed and selected so they do not pose any risk of contamination to groundwater

7.6.4 It is proposed that surface water from the development will discharge to the watercourses at the restricted rate; attenuation will be used to achieve this. Discharge to this existing drainage ditches and watercourse will require consent from the Local Authority and may require discharge consent.

7.6.5 CCTV has been carried out to determine the nature and condition of onsite drainage features.

7.6.6 Due to the application site being located within a groundwater protection zone, groundwater quality needs to be controlled to limit any contamination from the development.

7.6.7 United Utilities have not given a preference for a point of connection but have no objection with foul flows communicating with their sewers, preferably via a gravity connection.

7.6.8 Foul capacity has been confirmed at a rate of 64.52l/s.

7.6.9 A minimum of 3m easements are required for all existing on site drainage owned by United Utilities in line with the statuary requirement.

8.0 LANDSCAPE AND VISUAL AMENITY IMPACT ASSESSMENT

8.1 Introduction

This section provides a systematic assessment of the potential effects of the proposed development on landscape resources and character and the visual amenity of the site, its surroundings and the people who use it.

Prediction Methodology

8.2 Potential impacts

The potential landscape and visual effects of development can include:

- The direct loss of the elements of the existing physical landscape and the introduction of new landscape features;
- Changes to the landscape character of the site, its surroundings, and spatial organisation;

and

- Changes in respect of visual effects and amenity for visual receptors.

Information Sources

8.3 Desk top study

8.3.1 A review of National, Regional and Local Planning policies related to landscape and the environment generally was undertaken and in addition landscape policies specific to the site and its environs were identified.

8.3.2 A search for landscape character assessments on both a regional and local basis was made and the relevant teams working within the Borough Council were contacted.

8.3.3 Mapping on both local and a wider area was obtained in order to evaluate topography, vegetation and land use and to identify public rights of way and potential viewpoints into the site. Aerial Photographs were also obtained to supplement the mapping. The land-use both within and adjacent to the site was plotted from Ordnance Survey maps and air photographs.

8.3.4 This assessment should be read in conjunction with the following drawings produced by Appletons:

Appendix APP 6 Parameters Plan

Appendix LND 1 Indicative Landscape Components Plan

Field Survey

8.3.5 Field studies were undertaken in July 2015 and May 2016 to verify and supplement information. A photographic survey of views into the site and its surroundings was undertaken using a camera with a 50mm focal length, which is that closest to the human eye.

8.3.6 The site was walked to establish land use and landscape characteristics. Footpaths were walked to identify views into, out of and through the site. The local road network was driven and local settlements visited to identify other potential viewpoints, and the character of the adjacent landscape.

8.3.7 Principal representative public vantage points were identified, adjacent land-uses verified, viewpoints towards and into the site recorded (public and potential private) and a zone of visual influence (ZVI) determined. 'Sensitive' receptors were identified.

8.4 Methodology

8.4.1 The following summary has been based on the detailed methodology (GLVIA 3 2013) as detailed in **Appendix LND 6**.

8.4.2 The assessment was undertaken in accordance with established and accepted methodologies including those within the 'Guidance for Landscape and Visual Impact Assessment', third edition, published April 2013 jointly by The Landscape Institute and The Institute of Environmental Management and Assessment.

8.4.3 The 'baseline' conditions of the site and surrounding area were established by both desk top-top studies and field surveys. This assessment has been based on the baseline conditions at the time the surveys were undertaken.

8.4.4 The assessment covers two phases, firstly assessing the effects during construction, which effectively views the development at its transient phase. Secondly, the effect of the development is assessed after completion and when the site is operational. Within each of these phases the potential effects and mitigation have been assessed.

8.4.5 Predictions and assessments of effects were made in the context of the proposed development set out by Appletons drawings **Appendix APP 7 and LND 1.**

8.4.6 Visual impact analysis was conducted through the assessment of photographic surveys, field study, mapping and establishment of a Zone of Visual Influence of the proposed scheme.

8.5 Significance of Impacts

8.5.1 The significance of impacts has been determined by both the previous experience of the authors and other examples as set out in 'The Guidelines for Landscape and Visual Impact Assessment'.

8.5.2 An assessment of the significance of potential impacts of the proposed development was made using the following criteria. Full details of Methodology and Criteria Tables are supplied in **Appendix LND 6 and 7**.

DESCRIPTORS OF THE SIGNIFICANCE OF LANDSCAPE EFFECTS CATEGORIES

Significance Category	Typical Descriptors of Effect
Major beneficial (positive) effect	The project would provide an opportunity to enhance the landscape because: • It fits very well with the scale, landform, pattern and appearance of the landscape. • There is potential, through mitigation or design, to create or enable the restoration of characteristic features and elements partially lost or diminished as the result of changes resulting from inappropriate management or development. • It enables a sense of place to be enhanced through good design and/or well designed mitigation measures. • It facilitates national and local policy objectives to regenerate degraded countryside or urban areas.
Moderate beneficial (positive) effect	The project would provide an opportunity to enhance the landscape because: • It fits very well with the scale, landform and pattern of the landscape. • There is potential, through mitigation, to enable the restoration of characteristic features and elements, partially lost or diminished as the result of changes resulting from intensive farming or inappropriate development. • It will enable a sense of place to be restored or enhanced through beneficial mitigation and sensitive design. • It furthers national and local policy objectives to regenerate degraded countryside or urban areas.
Minor beneficial (positive) effect	The project would: • Fit well with the scale, landform and pattern of the landscape by maintaining or enhancing the existing character. • Enable some sense of place to be restored through well designed mitigation measure. • Maintain or enhance existing landscape character. • Avoid conflict with national and local policy towards protection of the countryside or protection/enhancement of urban areas.
Negligible effect	The project would: • Complement the scale, landform and pattern of the landscape. • Incorporate measure for mitigation to ensure that the project will blend in well with surrounding landscape features and elements. • Avoid having an adverse effect on the current level of tranquillity of the landscape. • Maintain existing landscape character and enable a sense of place to be retained though beneficial and sensitive design. • Avoid conflict with national and local policy towards protection of the countryside or protection/enhancement of urban areas.
Minor adverse (negative) effect	The project would: • Not quite fit the landform, scale and pattern of the landscape. • Be unable to be completely mitigated because of the nature of the project itself or the character of the landscape. • Affect an area of recognized landscape quality. • Conflict with local authority policies for protecting the local character of the countryside of the protection/enhancement of urban environments.
Moderate adverse (negative) effect	The project would: • Be out of scale with the landscape or conflict with the local pattern and landform. • Be unable to be fully mitigated (i.e. mitigation will not prevent the scheme from damaging the landscape in the longer term). • Have an adverse impact on a landscape of recognized quality or on vulnerable and important character feature or elements. • Be in conflict with national and local policies to protect open land and nationally recognized countryside, or to protect/enhance the urban environment.
Major adverse (negative) effect	The project would be very damaging to the landscape because it: • Is at considerable variance with the landform, scale, pattern and appearance of the landscape. • Is likely to degrade, diminish or even destroy the integrity of a range of characteristic features and elements. • Will be substantially damaging to a high quality or highly valued landscape, causing it to change and be considerable diminished in quality. • Cannot be adequately mitigated. • Is in serious conflict with national and local policy for the protection of nationally recognized countryside or for the protection/enhancement of the urban environment.

DESCRIPTORS OF THE SIGNIFICANCE OF VISUAL EFFECT CATEGORIES

Significance	Typical Criteria
Major Beneficial	The project would lead to a major improvement in a view from a highly sensitive receptor.
Moderate Beneficial	The proposals would cause obvious improvement to a view from a moderately sensitive receptor, or perceptible improvement to a view from a more sensitive receptor.
Minor Beneficial	The project would cause limited improvement to a view from a receptor of medium sensitivity, but would still be a noticeable element within the view, or would cause greater improvement to a view from a receptor of low sensitivity.
Negligible Beneficial	The project would not significantly change the view but would still be discernible, and the effect would be beneficial.
Neutral/Non	No change in the view.
Negligible Adverse	The project would not significantly change the view but would still be discernible, and the effect would be adverse.
Minor Adverse	The project would cause limited deterioration to a view from a receptor of medium sensitivity, or cause greater deterioration to a view from a receptor of low sensitivity, and would be a noticeable element in the view.
Moderate Adverse	The project would cause obvious deterioration to a view from a moderately sensitive receptor, or perceptible damage to a view from a more sensitive receptor.
Major Adverse	The project would cause major deterioration to a view from a highly sensitive receptor, and would constitute a major discordant or dominant element in the view.

Baseline Environment

8.6 Location and Context

8.6.1 The proposed site is located in north Warrington 1.2 kilometers from the southern outskirts of Winwick village to the north of the town centre. Other settlements are Newton Le Willows, 5.0 kilometres to the North West, Padgate, 2.5 kilometers to the South East and Birchwood at 4 kilometres due East. A location and context Plan forms **Appendix APP 1** and an aerial photograph of the Site forms **Appendix APP 2.**

8.6.2 The site lies to the south of the M62, which is the main route from Manchester to Liverpool with links to the M6, M60 and M57. To the west is the A49 which is a key arterial route running northwards out of Warrington linking to the M62 and Winwick village beyond.

8.6.3 To the north of the site beyond the M62 is open farmland with the settlement of Winwick located beyond to the North West. To the East and West the predominantly land use is residential, as is the south, though with areas of open space and playing fields.

8.7 The Physical Characteristics of the Site

The characteristics of the Site are indicated on **Appendix LND 2**. The site itself is generally a flat plane of former farmland. A detailed description of the site is given at section 3 of this assessment.

8.8 Landscape Designations

No statutory or non-statutory landscape designations apply to the site or its surroundings.

8.9 Landscape Character Assessment

The following text sets out the baseline information available in respect of Landscape Character Assessments undertaken by various bodies and the authors' commentary on the baseline situation of the site. Assessment and analysis of the potential Landscape Character impacts are contained within subsequent sections of this report.

8.10 Regional Assessment – Landscape Character Areas

The 'Character of England' is a nationwide assessment of landscape character prepared by the then Countryside Commission in 1998. The proposed site falls within the National Landscape Character Area 60, the Mersey Valley (see **Appendix LND 8**). The broad description within the National Assessment states that:

- *A very distinctive river valley landscape focusing on the Mersey, its estuary and associated tributaries and waterways, although the Mersey itself is often obscured.*

- *A range of landscape types, including salt marshes around the estuary, remnants of semi-natural mosslands and pockets of basin peats towards Manchester, with the broad river valley in between.*
- *Broad linear valley with large scale, open, predominantly flat farmland supporting substantial bands of mixed agriculture.*
- *Trees and woodland are scarce and are mainly associated with settlements.*
- *Field pattern is regular and large scale, often defined by degraded hedgerows.*
- *Large scale highly visible industrial development, particularly at the river crossings of Runcorn, Widnes and Warrington.*
- *The valley has a dense communication network with motorways, roads, railways and canals producing a large number of bridge crossings. Power lines are also prominent along this corridor.*
- *Distinctive cultural landscape with major towns of Runcorn, Warrington and Widnes having much in common in relation to past and existing development pressures.*

8.11 Local Assessment

Warrington Borough Council published a more detailed landscape assessment in 2007. In that study the site falls within character area Type 1: Undulating Enclosed Farmland 1C - Winwick, Culcheth, Glazebrook and Rixton. Section 1C of the assessment is located in **Appendix LND 9**. In general terms key characteristics which can be identified on site include:

- *Medium to large-scale mainly arable fields*
- *Lack of hedgerow trees*
- *Hedgerows between fields often fragmented*
- *Deciduius wooded backdrops*

8.12 Site Character Assessment

8.12.1 The landscape character of the site is generally consistent with the Warrington BC assessment. It is currently unused open land previously used for agriculture though this use has now ceased. The land includes a small plantation of trees and unmanaged hedgerows, though the land is generally open in character. A network of ditches is present on the site. Within the site three distinct sub-zones can be identified as follows:

8.12.2 *Western Zone*

The land to the west of the site is distinctly urban fringe in character strongly influenced by the adjacent urban development. The previous farmland appears neglected and there is little vegetation apart from unmanaged grassland.

8.12.3 *Central Zone*

The central area of the site is more open. It is heavily influenced both in visual terms and audibly by the M62 motorway which is at grade at this point. The motorway is illuminated and the lighting columns and traffic using the motorway dominate.

8.12.4 *Eastern Zone*

The eastern zone is by contrast with the other two, smaller in scale due to the size of redundant field parcels and enclosure given by tree and hedge cover. The motorway is in cutting at that point and traffic noise and visual intrusion is less obvious. The adjacent residential areas influence the character of the site at that point.

8.13 The Character of Adjacent Landscape

The character of land immediately to the north beyond the M62 is semi-rural farmland influenced by urban features including the settlement of Winwick at a distance of 1.2 kilometres and the motorway itself, which is illuminated and at grade with the adjacent landform. To the south, west and east the predominant land use is residential though with areas of public open space.

8.14 The Impact of the Proposed Development on Landscape Character

The character of the Site itself would obviously change significantly from open farmland to predominantly residential development. In terms of the impact on the character of land to the north this is considered to be negligible due to the lack of inter-visibility and the dominant presence of the M62 motorway which forms a visual and physical barrier between the two. The impact on the character of the existing development to the east, south and west is also considered to be negligible since again the site is not prominent in views from the public domain and in any event the proposed land use would be similar.

8.15 Visual Amenity and Prominence

Topography and Existing Screening Features

8.15.1 The topographical survey shows an average level of approximately 25m AOD throughout the site. The lowest part of the site is in the south west corner where the levels here are generally 10m AOD. The highest part of the site is in the north east portion of the site, with a level of 28m AOD. Overall, however the land appears relatively flat, particularly in the central area where the site is at grade with the M62 Motorway. To the west and east of the site the motorway is in cutting and this provides screening form views further north.

Zone of Visual Influence of the site

8.15.2 Based on desk top mapping and confirmed by field study a predicted zone of visual influence (ZVI) of the site has been prepared. The ZVI is shown on **Appendix LND 3.** The ZVI is indicative of the part of the landscape from which views of the site might be gained. It does not imply that views would be possible from all points within the area delineated, nor does it indicate that all the development might be seen. As can be seen from the ZVI due to topography and context the site's visual prominence is assessed as **modertate to minor**.

8.16 Identification of Important Features and Potential Sensitive Receptors

8.16.1 The above assessment of the baseline conditions has highlighted the following as important features and sensitive features.

Landscape Features

8.16.2 The existing landscape elements of the site and its ecological value are described in Section 6 of this report. In summary the major vegetation type is unmanaged grassland and former arable land. Other features consist of ditches, remnant and grown out hedgerows and isolated pockets of woodland. There are no significant landscape or architectural features present.

Potential Sensitive Receptors

8.16.3 From the baseline studies and identification of the (baseline) ZVI the following sensitive receptors are identified. Their inclusion does not mean that an adverse impact may occur as a result of the proposals but rather that any potential for impacts to occur have been assessed due to their sensitivity.

- Footpaths; it is considered that users of footpath are sensitive, as changes in views have the potential to be more perceivable. Any views gained from these locations would be of a slow passing nature and more sensitive than vehicle users who are travelling at speed.

- Private properties in close proximity to the site may gain views of a static nature and therefore changes would be more readily perceivable, however any assessment in this regard must consider that there is no right to a view within planning law.

8.16.4 An assessment on the potential impacts on those identified above is contained within the subsequent sections.

8.17 Baseline Projection

If the proposed development was not undertaken then it is likely that it would remain as it is during the short term. Changes to vegetation due to the colonisation by scrub and then woodland would occur over time without management intervention.

8.18 Impact Assessment and Evaluation

Due to the phased nature of the development and its scale, the construction and operational phases of development would run in parallel. In that context there would be an overlap of impacts and for certain issues they are considered in tandem below.

8.19 Construction Phase

Phasing

The nature of the construction phase is described in section 2.5 and the assessment of impacts below has been based on that information. For the purpose of this assessment the construction phase will commence in Year 1 of development with the construction of access to the site and the provision of services. After this period the proposed new access roads would be opened and construction of buildings would commence. It is anticipated that the development would take 12-15 years to complete though this would depend on the housing market, and thus there would be an overlap of construction and operational phases.

8.20 Mitigation Measures - General

8.20.1 The construction phase would bring about changes to the landscape and visual amenity. Whilst some of these are inevitable, and of a temporary nature, it would be beneficial to provide mitigation.

8.20.2 The phasing of onsite operations would ensure that proposed screening and assimilation features, such as mounds and tree planting to the northern boundary to give visual screening to the motorway would be undertaken at the earliest practicable opportunity and within year 1 of commencement of the construction phase. The physical construction of the proposed 1200 houses and associated development over 12-15 years would also allow the establishment of the screen mounds and planting prior to the entire site being operational. It is anticipated that detailed mitigation proposals would be subject to planning conditions imposed on Reserved Matters planning applications for individual development parcels, but in general terms the following principles would apply.

a) The sensitive location of storage areas and the utilisation of existing screening afforded by vegetation would be utilised to mitigate any potential short term adverse effects of the storage of materials, plant and machinery.

b) To ensure protection of those features appropriate protection and management of existing vegetation during the construction phase would be undertaken in line with recognised best practice.

8.21 Residual Impacts for the Construction/Operational Phases

Character of the Site and Adjacent Land

8.21.1 The character of the Site itself is considered to be urban fringe. The predominant use and character to the south, east and west of the site is residential. The land to the north beyond the M62 is rural in character. There would be **neutral** impact on the character of the residential areas. The impact of the development on land to the north, which is already visually influenced by the M62 motorway would be mitigated by screen mounds and planting undertaken during the early stages of development and would be **negligible adverse.**

Landscape features (Construction Phase)

8.21.2 There would be a loss of agricultural land which would be irreversible. In that respect the loss of best and most versatile agricultural land can be considered to be **'minor to moderate' adverse**. It is considered however that this loss would be balanced by the planning benefits of housing provision in accordance with current policy contained within the NPPF. The land is no longer farmed however, and in mitigation and in accordance with current Government Guidance a soil conservation strategy would be put in place to maximise the re-use of top soil resources and protect it from consolidation and/or contamination during the construction phase of development. In terms of other landscape features such as watercourses and vegetation they would be retained and enhanced. The residual impact for those features would be therefore **neutral.**

Visual Impact (Construction/Operational Phases)

8.21.3 A theoretical Zone of Visual Impact (ZVI) forms **Appendix LND 3** of this assessment. The ZVI is indicative of the part of the landscape from which views of the proposed operational development might be gained. It does not imply that views would be possible from all points within the area delineated. Nor does it indicate that all the development might be seen.

8.22 Visual Receptors

Highways

8.22.1 Users of the M62 motorway would be aware of construction works to the central area of the northern part of the site, where it is at grade and where clear views are possible for the period of the formation of screen mounds. Such works would be short term (9-12 months depending on weather conditions and build out rates). However motorists and their passengers would be travelling at speed and would have oblique views. In any event views from roads are not considered to be 'sensitive'. There are no other significant views from highways into the body of the site though construction works to form vehicular access points into the site would be obvious. The residual impact on highway users is considered to be **minor** prior to mitigation and **negligible** after the construction of the screen mounds.

Users of the Public Footpath to the North of the Site

8.22.2 There is no authorised pedestrian access to the main body of the site other than the public right of way which crosses the motorway and follows Peel Cottage Lane in the north eat corner. Views of the site from the pedestrian over-bridge to the M62 motorway are panoramic of the whole the site (**Appendix APP 5 Photographs 1 and 2**). These views would be very difficult to screen. This would be a short experience of a longer route, however. In the section leading the southern base of the motorway footbridge the track is well screened from the main body of the site and views are limited. The adjacent vegetation would be retained. Beyond the motorway to the north possible views of the site diminish with distance. (**Appendix LND 4 Photographs 15, 16, 17, 18 and 23**). Views of the site from that direction are restricted to the central area of the site. To the east and west the site is screened by motorway embankment and mature trees within the curtilage of the motorway itself. After the screen mounds have been constructed views from the north would be obscured. It is considered that the residual visual impact on public footpaths would be **minor.**

Users of the Amenity Space/Playing Fields to the East and South of the Site

8.22.3 Users of open space and playing fields are considered to be sensitive visual receptors. Views into the site from the existing playing fields to the east are well screened by boundary vegetation. (**Appendix APP 5 Photograph 7**) Views from the playing field to the south east are again screened by boundary vegetation and by the Radley Plantation. The residual impact on users of amenity open space is considered to be neutral, and in any event it is possible that these playing fields may be relocated as part of the overall proposals.

Views from Private Properties

8.22.4 Views from private properties may be gained from the following locations: They are mostly from the rear elevations and or gardens.

West
Elm Road 14
Birch Avenue 2
Poplars Avenue 18

Central
Newhaven Road 82
Windermere Avenue 44
(24 would overlook proposed open space)

East
Lochabie Close 4 (gable on)
Radley Lane 4 + Peel Hall
Ballater Drive 15 + 1 gable on

8.22.5 Any necessary mitigation in the form of a landscape scheme and implementation/phasing of works would be agreed at the reserved matters stage of detailed planning applications and would include the establishment of appropriate stand-off zones, the detailed design and orientation of new dwellings and boundary screen planting.

8.23 Residual Impacts

As landscape and amenity mitigation methods have been incorporated within the proposed scheme the previous assessments of impact significance remain valid.

8.24 Post Development Monitoring

8.24.1 The implementation of the landscape schemes would be subject to planning conditions imposed by the LPA at the reserved matters stage.

8.24.2 It is envisaged that the implementation of open space and landscaping will be undertaken in conjunction with a management plan. This plan would cover the establishment period of new planting and the maintenance of any existing planting and future maintenance of all planting and would include programmed checks.

8.25 Cumulative impacts

8.25.1 There are no other proposed developments adjacent to the site or within its zone of visual impact that would lead to a cumulative impact arising. Land to the north beyond the motorway is green belt land with major constraints on development. Land to the east, west and south is existing

residential development. The proposed development and its screening would obscure the existing views and reduce the impact from adjacent viewpoints such as the public footpath.

8.26 Conclusion

8.26.1 Subject to the mitigation proposed there would not be any overall significant adverse impact in landscape, character and or visual terms.'

8.27 Summary

8.27.1 The assessment was undertaken in accordance with established and accepted methodologies including those within the 'Guidance for Landscape and Visual Assessment', third edition, published jointly by The Landscape Institute and The Institute of Environmental Management and Assessment (2013).

8.27.2 A review of all relevant mapping aerial photography, policy and other documents has been undertaken together with field studies to establish the baseline situation in terms of landscape and visual amenity.

8.27.3 The site is urban fringe in nature and generally lies at a similar level, localised undulations are present. A mix of dense scrub and grazed grass covers the site. Typically for the location, there are few established trees present. There are no individual features of landscape amenity value.

8.27.4 Due to topography and context the site's visual prominence is assessed as limited. Aspects of the site are visible in places. However, in conclusion it is assessed that the development as proposed subject to the long term mitigation as set out in this document and on the parameters plan prepared by Appletons **Appendix APP 6** would result in there not being any overall, significant, adverse impact in landscape and visual amenity terms.

There is no cumulative impact on the green belt to the north.

9.0 TRANSPORATION AND HIGHWAYS

9.1 Introduction

9.1.1 This chapter focuses on the effects that the proposed development will have on access and transport during the construction phase as well as when the development is fully operational. It draws on the detailed analysis and mitigation measures set out in the Transport Assessment prepared by Highgate Transportation.

9.1.2 Discussions outlining the approach and methodology were held with Warrington Borough Council (WBC) in its role as the local highway authority and with Highways England as the strategic highway authority. This set out how the development would be accessed, how its impact would be assessed and the type of sustainable transport measures that could support the development. The Transport Assessment is being prepared in two parts. The first part deals with the site access junctions and the sustainable transport measures proposed to support the development. An addendum Transport Assessment will be prepared that assesses the impact on the wider highway network once Highways England's VISSIM model has been expanded to cover the Peel Hall study area. At the same time an addendum ES chapter will be prepared to cover the wider area and any sensitivity tests arising. It is possible that some of the assumptions used in the initial assessments will be modified following the completion of the VISSIM model.

9.1.3 The Transport Assessment considers all modes of travel and the demands that the proposed development will place on transport infrastructure. The study area covers a large part of the local transport network including pedestrian and cyclist links to the surrounding areas as well as public transport services and facilities. Plans showing the overall study area, the existing highway network within the study area, the existing bus network and the existing pedestrian network are contained in **Appendices T1**, **T2**, **T3** and **T4** respectively.

9.1.4 In transport terms the guiding principles in the development of the scheme have been to encourage the use of sustainable modes of transport and to contain trips within the development as far as possible. **Appendix T5** contains an illustrative plan showing the proposed road network within the development. In terms of vehicular access each site access will generally provide access to a specific area of the overall development and the plan in **Appendix T5** also shows the amount of development from each access.

9.1.5 It is proposed that the main vehicular accesses to the development will be provided from the Mill Lane arm of the Blackbrook Avenue/Ballater Drive/Mill Lane/Enfield Park Road roundabout junction and from Poplars Avenue. Additional access is provided from Mill Lane, Birch Avenue and a second access on Poplars Avenue to serve the employment area. Access to the sports pitches will be from Grasmere Avenue. Plans showing these accesses are contained in **Appendix T6**.

9.1.6 The bus network will be enhanced and a plan showing the proposed alterations is contained in **Appendix T7**. During the construction phase it is proposed that existing services will be extended into the site and during the operational phase a new service will be introduced to serve the site. **Appendix T8** contains the proposed pedestrian and cycle linkages. The plan outlining the proposed construction and phasing of development is contained in **Appendix T9**.

9.2 Transport Policy and Guidance

9.2.1 Throughout the development of the scheme, account has been taken of both national and local transport related policy and guidance.

9.2.2 National transport policy and guidance is set out in:

i. National Planning Policy Framework (2012).
ii. DCLG Planning Practice Guidelines (2014).
iii. Interim Advice Note 125/09 – Supplementary Guidance for users of DMRB Vol 11 "Environmental Assessment".
iv. Guidance on Transport Assessment (2007) published by DfT and DCLG.
v. DfT Circular 02/2013 - Strategic Road Network and the Delivery of Sustainable Development (2013).
vi. The Strategic Road Network - Planning for the Future (2015) published by Highways England.
vii. Manual for Streets (2007) and Manual for Streets 2 (2010) published by DfT.
viii. DMRB Volume 11 Section 3 Part 8: Pedestrians, Cyclists, Equestrians and Community Effects (1993).
ix. DMRB Volume 11 Section 3 Part 9: Vehicle Travellers (1993).
x. Institute of Environmental Assessment – Guidelines for the Environmental Assessment of Road Traffic (1993).

9.2.3 Local transport policy and guidance is set out in:

i. Local Plan Core Strategy (policies CS1, CS4, MP1, MP3, MP4, MP7, MP10, QE3, QE6 and QE7) adopted in July 2014.
ii. Warrington Local Transport Plan 3 (policies AT3 and PT4) – 2011 to 2030 (2011).
iii. WBC's Design Guide - Residential and Industrial Estate Roads (2008).
iv. WBC's Standards for Parking in New Development (2015).
v. WBC's SPD on Travel Plans (2005).
vi. WBC's SPD on Planning Obligations (2007) and WBC's CIL Preliminary Draft Charging Schedule Consultation (October 2015).
vii. WBC's SPD on Design and Construction (2010).

9.2.4 The thrust of these policies and guidance is to encourage development that will be safe and accessible to all, and that will be sustainably located or can be made to be sustainably located by the introduction of mitigation measures.

9.3 Prediction Methodology

Potential Impacts

9.3.1 The anticipated impacts on access and transport relate to:

i. Nuisance, disruption and severance arising from the construction of the development.
ii. The use of and implications for public transport in the area.
iii. The effect on walking and cycling opportunities in the area.
iv. The vehicular traffic impact resulting from the occupation of the development.

Sources of Information

9.3.2 Data from the following sources have been used in the assessment:

i. Traffic flows derived from manual and automatic surveys carried out by independent specialist surveyors.
ii. Development trip rates derived from the TRICS database.
iii. Traffic growth derived from the TEMPRO database.
iv. Trip distribution based on the gravity model.
v. Trip Assignment initially based on a manual assignment and then on the VISSIM model once available.
vi. Highway record and public right of way information supplied by WBC.
vii. Site-wide topographical surveys carried out by independent specialist surveyors.

Methodology

9.3.3 The methodology used in this assessment is to assess the magnitude of change and significance of impact for drivers, bus passengers, pedestrians and cyclists both during the construction phase and the operational phase.

Magnitude of Change and Significance of Impacts

9.3.4 In terms of significance of impacts the following terminology has been adopted:

i. Negligible - equals no impact on the local highway network.
ii. Minor - some increase in traffic flows but not leading to congestion or delays.
iii. Moderate - Increase in traffic flows capable of mitigation by traffic engineering or sustainable transport measures.
iv. Major - significant impact on the local highway network leading to delays and reduced traffic flows, not possible to mitigate.

9.4 Baseline Environment

Baseline Conditions – Existing Network

9.4.1 The Peel Hall site is located on the northern edge of Warrington, adjacent to the existing residential areas of Hulme, Blackbrook, Cinnamon Brow and Houghton Green. It is bounded by the M62 to the north, Mill Lane to the east, Poplars Avenue to the south and Birch Avenue and Elm Road to the west.

9.4.2 Baseline conditions have been identified by reviewing the existing highway, bus, rail, pedestrian and cyclist networks.

9.4.3 Existing traffic flows have been obtained from survey work. Plans showing the study area, the existing highway network within the study area and the existing bus network are contained in **Appendices T1, T2** and **T3** respectively.

Existing Highway Network

9.4.4 The existing traffic flows during the AM and PM peak hour are summarised in **Table 9.4.1**.

Table 9.4.1: Existing traffic flows during the AM and PM peak hour

Road	Year	Peak Hour Two-Way Flow			
		AM		PM	
		Total Flow	HGVs	Total Flow	HGVs
Poplars Avenue	2015	522	39	566	23
Mill Lane (Blackbrook Avenue - site access)	2015	903	2	724	1
Mill Lane (Radley Lane - Delph Lane)	2015	41	0	99	0
Mill Lane (site access - Delph Lane)	2015	903	2	724	1
Delph Lane	2015	892	2	649	1
Blackbrook Avenue (Mill Lane - Capesthorne Road)	2015	741	77	633	61
Blackbrook Avenue (Capesthorne Road - Insall Road)	2014	810	12	824	7
Blackbrook Avenue (Insall Road - Birchwood Way)	2014	937	21	834	7
Birch Avenue	2014	45	0	50	0
Cotswold Road	2014	172	10	204	13
Cleveland Road	2014	373	8	451	9
Sandy Lane West	2014	943	17	1192	15
Sandy Lane	2014	410	17	399	12
Winwick Road (M62 - Sandy Lane West)	2014	3022	266	3205	146
Winwick Road (Sandy Lane West - Hawleys Lane)	2014	3070	239	3271	125
Winwick Road (south of Hawleys Lane)	2014	2943	222	2789	93
Capesthorne Road	2014	917	16	930	13
Enfield Park Road	2016	582	2	569	3

Crab Lane	2015	790	33	921	32
Birchwood Way (A50 - Blackbrook Avenue)	2015	1325	32	1346	10
Birchwood Way (Blackbrook Avenue - Crab Lane)	2014	1371	42	1383	9
Howson Road	2014	302	7	306	2
Birchwood Way (Crab Lane - Birchwood Interchange)	2016	1547	32	1385	14
A50 Long Lane	2014	1218	53	1229	20
Statham Avenue	2015	181	2	168	0
Northway	2014	288	14	285	12
Hilden Road	2014	533	19	614	6
Insall Road/Fernhead Lane	2014	630	23	652	11
Cromwell Avenue	2014	373	124	451	72
Myddleton Lane	2016	203	1	205	0
Winwick Link Road	2014	1495	135	1518	50
Winwick Road (north of M62)	2014	2462	180	3117	80
M62 west	2014	8259	1460*	10655	1005*
M62 west off-slip	2014	897	194*	980	121*
M62 west on-slip	2014	798	204*	1011	99*
M62 east	2014	7825	1383*	10513	1090*
M62 east off-slip	2014	787	140*	705	137*
M62 east on-slip	2014	474	181*	1142	168*

* All traffic minus car traffic to give an approximate HGV figure

9.4.5 At times during the peak periods congestion can occur along the main corridors in the area including M62, Winwick Road, Sandy Lane West, Long Lane, Blackbrook Avenue and Birchwood Way, as well as elsewhere.

Existing Bus Network

9.4.6 The existing bus services that currently operate close to each of the proposed site accesses are as follows:

i. Mill Lane and Blackbrook Avenue Roundabout
Services 23 and 23A; 25A; 26 and 26E; 27 and 27E

ii. Poplars Avenue Central Access
Services 20 and 20A; 21, 21A and 21E; 25 and 25A; 26 and 26E; 27

iii. Poplars Avenue West
Services 19; 20 and 20A; 21, 21A and 21E; 22; 329 and 360

iv. Birch Avenue
Services 19; 20 and 20A; 21, 21A and 21E; 22; 329 and 360

v. Grasmere Avenue
Services 20 and 20A; 21, 21A and 21E; 25 and 25A; 26; 27

9.4.7 All services connect this part of Warrington with the town centre. Services 25, 26, 26E and 27 provide access to Birchwood Station and Birchwood Park in the east. Services 23, 23A, 27 and 27E stop around 800 metres from Padgate Station. Information regarding the existing bus network is contained in **Appendix T3**.

9.4.8 At peak times these routes are busy, especially closer to the centre of Warrington. Existing journey times by bus from the site to key locations are set out in **Table 9.4.2**.

Table 9.4.2: Existing bus journey times from closest bus stop to key locations

From Existing Bus Stop Closest to Proposed Site Access	Key Locations – Journey Time					
	Town Centre	Birchwood Station	Birchwood Park	Warrington Business Park & Collegiate	Warrington Campus University of Chester	Orford Jubilee Hub
Poplars Ave west	15-18min	-	-	6min	-	8min
Poplars Ave central	14-20min	23min	15min	10min	8min	12min
Mill Lane/ Blackbrook Ave	17-22min	17-20min	9-10min	9-10min	3min	7min*

* Monday-Saturday Evenings, Saturdays

Existing Rail Network

9.4.9 Existing rail stations that serve Warrington are:

i. Warrington Central - on the Manchester to Liverpool line.
ii. Warrington Quay - on the West Coast Mainline.
iii. Birchwood - on the Manchester to Liverpool Line.
iv. Padgate - on the Manchester to Liverpool Line.

9.4.10 A summary of the railway services is as follows:

i. Manchester - 4 per hour, 20 minute journey time.
ii. Liverpool - 4 per hour, 22 minute journey time.
iii. Preston - 2 per hour, 22 minute journey time.
iv. Birmingham - 4 per hour, 1.5 hour journey time.
v. London - 2 per hour, 2.5 hour journey time.

Existing Pedestrian Network

9.4.11 Existing pedestrian access into the site is from Mill Lane, Radley Lane and Peel Cottage Lane in the east; Birch Avenue and Elm Road in the west; Grasmere Avenue and Windermere Avenue in the south. There is a footbridge across the M62 to the north of the site, which forms part of PRoW number 2 and links with A49 and Winwick to the north of the site via Public Rights of Way (PRoW) 1, 1a, 3 and 5. The Peel Hall site currently attracts dog walkers and recreational walkers using the PRoW. A plan showing the local PRoW is contained within **Appendix T4**.

Existing Cycle Network

9.4.12 Local cycling facilities comprise off-road segregated cycleways and footways along the A49 Winwick Road from the junction with Long Lane to the town centre. On-road cycleways and advanced stop lines are also provided, for example at Winwick Road junction with A50 Long Lane and the A49 junction at the Warrington Wolves Halliwell Jones Stadium.

Baseline Projection – Proposed Accesses and Internal Transport Network

9.4.13 **Appendix T5** contains an illustrative plan showing the proposed road network within the development and the amount of development off each access. It is proposed that the main vehicular accesses to the development will be provided from the Mill Lane arm of the Blackbrook Avenue/Ballater Drive/Mill Lane/Enfield Park Road roundabout junction and this will connect with a second main access from Poplars Avenue via a new 7.3 metre wide local distributor road. To prevent this road becoming a bypass for through traffic a bus gate will be introduced. Additional access to specific areas of development will be provided from Birch Avenue to the west, Mill Lane to the north-east and an additional location on Poplars Avenue to serve the employment area. Access to the sports pitches and ancillary facilities will be from Grasmere Avenue.

9.4.14 The plan showing the proposed access from the Mill Lane arm of the Blackbrook Avenue/Ballater Drive/Mill Lane/Enfield Park Road roundabout junction is contained in **Appendix T6**. This access road comprises a 7.3 metre wide carriageway from a proposed 36 metre diameter three-arm roundabout junction with associated facilities for pedestrians and cyclists and is expected to serve up to 700 dwellings.

9.4.15 The plan showing the proposed access from Mill Lane is also contained in **Appendix T6**. This access has been created by extending Mill Lane north-westwards into the site and is expected to serve up to 150 dwellings.

9.4.16 The plan showing the proposed access from the central part of Poplars Avenue, which is located between its junctions with Newhaven Road and Windermere Avenue, is also contained in **Appendix T6**. This access road comprises a 7.3 metre wide carriageway from new a priority junction with ghost right turn lane. It includes associated pedestrian, cycle and relocated and improved bus stop facilities. It is expected to serve up to 330 dwellings.

9.4.17 The plan showing the proposed access from the western part of Poplars Avenue, which is located between its junctions with Cotswold Road and Newhaven Road, is also contained in **Appendix T6**. This access comprises a simple priority junction with a 7.3 metre carriageway and associated pedestrian and cycle facilities and will serve the employment land.

9.4.18 The plan showing the proposed accesses from Birch Avenue is also contained in **Appendix T6**. These accesses comprise a simple priority junction with 4.8 metre wide carriageway and footways on both sides. One access is located to the west of the Health Centre, and the second access forms a continuation of Birch Road to the immediate south of the Health Centre which will

becomes a 5.5 metre wide shared surface road. In total these accesses will serve up to 20 dwellings.

9.4.19 The plan showing the proposed access to the sports pitches from Grasmere Avenue is also contained in **Appendix T6**. The proposal is to modify the existing access that serves local recreational facilities.

9.4.20 Because of the introduction of the bus gate on the local distributor road it is important that the local centre car park can be accessed without residents having to leave the development. Therefore, this car park has been designed to be split in two, with two points of vehicular access, but designed so that a through route that could allow traffic to bypass the bus gate has not been created. The local centre car park is also expected to be used as a drop off facility for the primary school.

9.4.21 Alterations to bus services will comprise extensions to existing services 20/21 and 23/23A during construction phases until the distributor road is fully constructed. Once the distributor road is completed a new bus service will be introduced that connects the site with the town centre to the south and Birchwood to the east. Proposed bus alterations are considered in detail in **paragraphs 9.5.6** to **9.5.9** and **paragraphs 9.6.12** to **9.6.14** and the relevant service diagrams are contained in **Appendix T7**.

9.4.22 The proposed pedestrian and cycle linkages within the development will generally be in line with the WBC guidance, with shared cycleway-footway facilities separated from the carriageway by a verge. A high level of connectivity for pedestrians and cyclists will be provided through the site and connections will be made to the existing pedestrian routes around the site and enhanced by the additional accesses at Poplars Avenue and Mill Lane/Blackbrook Avenue. This is shown on the illustrative plan contained within **Appendix T8**.

9.4.23 Car and cycle parking will generally be provided to reflect WBC's guidelines.

Baseline Projection – Trip Distribution

9.4.24 The trip distribution for the proposed land use has been derived from the gravity model, which is summarised in **Table 9.4.3** below.

Table 9.4.3: Trip distribution derived from the gravity model

Direction/Destination	AM	PM
M62 west	5%	6%
M62 east	2%	5%
Town Centre	8%	1%
South Warrington	18%	30%
Callands	10%	9%
Hulme	20%	17%
Birchwood	14%	11%
Fearnhead	4%	5%
Winwick	10%	14%
A49	9%	2%
Total	100%	100%

Baseline Projection – Development Trips Arising

9.4.25 The number of development trips associated with each use has been calculated using the TRICS database. Many of the trips will be contained within the development and will not impact on the wider transport network.

9.4.26 The number of external development trips using each of the proposed site accesses during the AM and PM peak hour is set out in **Tables 9.4.4** and **9.4.5** below.

Table 9.4.4: External development trips at each site access AM peak hour

Access	Units/sqm	Total Trips	
		Arrival	Departure
Mill Lane	150 Dwellings	34	79
Mill Lane/ Blackbrook Avenue	700 Dwellings	126	293
	Primary School (up to 420 pupils)	28	20
Poplars Ave. *(Central)*	330 Dwellings	59	138
	Food Store (2,000sqm)	37	24
	Local Centre (600sqm)	9	9
	Family Pub/ Restaurant (800sqm)	-	-
	100-Bed Care Home	7	7
Poplars Ave. *(West)*	Employment (7,500sqm)	69	39
Birch Avenue	20 Dwellings	5	11
Grasmere Avenue	Sports Pitches and Community Facilities	10	5
	Total	384	625
		1,009	

Table 9.4.5: External development trips at each site access PM peak hour

Access	Units/sqm	Total Trips	
		Arrival	Departure
Mill Lane	150 Dwellings	74	46
Mill Lane/ Blackbrook Avenue	700 Dwellings	278	172
	Primary School (up to 420 pupils)	10	14
Poplars Ave. *(Central)*	330 Dwellings	130	81
	Food Store (2,000sqm)	72	76
	Local Centre (600sqm)	11	12
	Family Pub/ Restaurant (800sqm)	17	11
	100-Bed Care Home	8	11
Poplars Ave. *(West)*	Employment (7,500sqm)	20	47
Birch Avenue	20 Dwellings	10	6
Grasmere Avenue	Sports Pitches and Community Facilities	7	8
	Total	637	484
		1,121	

Baseline Projection – Background Traffic Growth and Committed Development

9.4.27 Background traffic growth has been calculated using the TEMPRO database and this has been applied to existing traffic flows to give background traffic flows for the agreed assessment year of 2019.

9.4.28 The committed developments within the local area to be included in the modelling have been agreed with WBC highway officers and added to the network.

Baseline Projection – Forecast Traffic Flows

9.4.29 The background traffic flows from **Table 9.4.1** have been growthed to the design year of 2019 and combined with committed development traffic flows, to give base forecast traffic flows in the design year and this information is summarised in **Table 9.4.6** below.

Table 9.4.6: 2019 base forecast traffic flows (AM and PM peak hours)

Road	AM Peak Hour			PM Peak Hour		
	Two-Way Flow	Com. Devel.	Total	Two-Way Flow	Com. Devel.	Total
Poplars Avenue	557	25	582	604	35	639
Mill Lane (Blackbrook Avenue - site access)	903	78	981	773	68	841
Mill Lane (Radley Lane - Delph Lane)	44	2	46	106	0	106
Mill Lane (site access - Delph Lane)	903	72	975	773	68	841
Delph Lane	952	72	1024	693	63	756
Blackbrook Avenue (Mill Lane - Capesthorne Road)	791	89	880	676	89	765
Blackbrook Avenue (Capesthorne Road - Insall Road)	869	30	899	884	5	889
Blackbrook Avenue (Insall Road - Birchwood Way)	1005	0	1005	895	2	897
Birch Avenue	48	0	48	54	0	54
Cotswold Road	184	0	184	219	0	219
Cleveland Road	400	4	404	484	0	484
Sandy Lane West	1011	10	1021	1279	1	1280
Sandy Lane	440	4	444	428	0	428
Winwick Road (M62 - Sandy Lane West)	3241	16	3257	3438	15	3453
Winwick Road (Sandy Lane West - Hawleys Lane)	3292	16	3308	3509	19	3528
Winwick Road (south of Hawleys Lane)	3156	6	3162	2992	10	3002
Capesthorne Road	983	55	1038	998	65	1063
Enfield Park Road	610	128	738	597	163	760
Crab Lane	828	149	977	966	195	1161
Birchwood Way (A50 - Blackbrook Avenue)	1414	85	1499	1437	39	1476
Birchwood Way (Blackbrook Avenue - Crab Lane)	1470	150	1620	1484	73	1557
Howson Road	324	0	324	328	5	333
Birchwood Way (Crab Lane - Birchwood Interchange)	1622	275	1897	1453	307	1760
A50 Long Lane	1306	11	1317	1318	22	1340
Statham Avenue	193	5	198	179	12	191
Northway	309	0	309	306	4	310
Hilden Road	572	26	598	659	0	659
Insall Road/Fernhead Lane	676	56	732	699	10	709
Cromwell Avenue	775	65	840	1070	59	1129
Myddleton Lane	213	59	272	205	42	247
Winwick Link Road	1603	12	1615	1229	17	1246
Winwick Road (north of M62)	2640	34	2674	3344	13	3357
M62 west	8856	19	8875	11430	13	11443
M62 west off-slip	962	16	978	1051	3	1054
M62 west on-slip	856	3	859	1085	10	1095
M62 east	8391	22	8413	11277	16	11293

Road	AM Peak Hour			PM Peak Hour		
	Two-Way Flow	Com. Devel.	Total	Two-Way Flow	Com. Devel.	Total
M62 east off-slip	844	20	864	756	6	762
M62 east on-slip	508	2	510	1222	10	1232

9.5 Impact Assessment – Construction Phase

Predicted Impacts – Phasing of Development

9.5.1 The Peel Hall site will generate construction traffic throughout its development period and this will have an impact on the local highway network, especially in the immediate vicinity of each site access. In reality each access and associated area of development will have its own timetable and impact, although there will be overlapping.

9.5.2 It is anticipated that the development will come forward in 12 phases over a 12 year period with typically around 100 residential units being constructed each year; with the relocated sports pitches in year 1, the local centre and care home opening at the end of year 2, and the primary school by the end of year 10. **Table 9.5.1** below sets out indicatively how the development may be phased and the accompanying plan is contained in **Appendix T9**.

Table 9.5.1 – Indicative Phasing Table

Year End	Number of Residential Units off Each Access								Cumulative Total	Indicative Phasing (number of properties sold at year end)
	Distributor Road Blackbrook Ave		Distributor Road Poplars Ave		Mill Lane		Birch Ave			
	New	Cum.	New	Cum.	New	Cum.	New	Cum.		
1	0	0	0	0	50	50	0	0	50	Phase 1a **50** Relocated sports pitches
2	70	70	0	0	30	80	0	0	150	Phase 2a **30** Phase 2b **70** Temporary emergency link to be via Radley Lane (north). Need first part of distributor road from east and turning area for bus service. Local Centre and Care Home off Poplars Ave.
3	105	175	0	0	0	80	20	20	275	Phase 3a **12** Phase 3b **93** Phase 3c **20** Employment Land off Poplars Ave (west).
4	30	205	0	0	70	150	0	20	375	Phase 4a **70** Phase 4b **30** Requires a temporary emergency link through to Peel Cottage Lane.

***Subject to detailed phasing plan to be submitted at Reserved Matters stage**

Table 9.5.1 Continued…

Year End	Number of Residential Units off Each Access								Cumulative Total	Indicative Phasing (number of properties sold at year end)
	Distributor Road Blackbrook Ave		Distributor Road Poplars Ave		Mill Lane		Birch Ave			
	New	Cum.	New	Cum.	New	Cum.	New	Cum.		
5	100	305	0	0	0	150	0	20	475	Phase 5a **50** Phase 5b **50**
6	45	350	55	55	0	150	0	20	575	Phase 6a **45** Phase 6b **55**
7	0	350	100	155	0	150	0	20	675	Phase 7a **10** Phase 7b **90**
8	90	440	15	170	0	150	0	20	780	Phase 8a **75** Phase 8b **15** Phase 8c **15**
9	94	534	0	170	0	150	0	20	874	Phase 9a **74** Phase 9b **20** Need to complete distributor road for full bus service. Temporary emergency access through to employment land/Elm Road.
10	110	644	0	170	0	150	0	20	984	Phase 10a **80** Phase 10b **30** Primary School

***Subject to detailed phasing plan to be submitted at Reserved Matters stage**

Table 9.5.1 Continued…

Year End	Number of Residential Units off Each Access								Cumulative Total	Indicative Phasing (number of properties sold at year end)
	Distributor Road Blackbrook Ave		Distributor Road Poplars Ave		Mill Lane		Birch Ave			
	New	Cum.	New	Cum.	New	Cum.	New	Cum.		
11	56	700	56	226	0	150	0	20	1,096	Phase 11a **56** Phase 11b **35** Phase 11c **21**
12	0	700	104	330	0	150	0	20	1,200	Phase 12a **104**

***Subject to detailed phasing plan to be submitted at Reserved Matters stage**

9.5.3 It is intended that most excavated material will be retained on site, however, there will be a need for building materials to be brought to the site. During the construction phase each site access junction is expected to have HGV construction traffic associated with it as set out in **Table 9.5.2**. It should be noted that there will be an overlap for some phases as construction will take longer than one year, whereas other phases may take less.

Table 9.5.2 – Anticipated Peak HGV movements per day

Year End	Peak HGV Movements/Day					Total Daily HGV
	Residential				Non-Residential	
	Distributor Road Blackbrook Ave	Distributor Road Poplars Ave	Mill Lane	Birch Ave		
1	0	0	8	0	Relocated Sports Pitches = **2**	10
2	11	0	5	0	Local Centre and Care Home off Poplars Ave = **16**	32
3	17	0	0	3	Employment Land off Poplars Ave (west) = **8**	28
4	5	0	11	0	-	16
5	16	0	0	0	-	16
6	7	9	0	0	-	16
7	0	16	0	0	-	16
8	14	2	0	0	-	16
9	15	0	0	0	Remaining Sports Pitches and Ancillary Facilities = **2**	17
10	18	0	0	0	Primary School = **8**	26
11	9	9	0	0	-	18
12	0	17	0	0	-	17

9.5.4 From the above table it can be seen that:

i. Mill Lane in the vicinity of the new access will have a maximum of 11 HGVs per day while the 150 dwellings proposed for Mill Lane are being constructed. This is likely to result in an average of two HGV movements per hour compared with typically zero HGV movements.

ii. Birch Avenue will have a maximum of 3 HGVs per day while the 20 dwellings proposed are being constructed. This is likely to result in an average of one HGV movement per hour compared with typically zero HGV movements.

iii. Poplars Avenue will have a maximum of up to 17 HGVs per day during the various construction phases. This is likely to result in an average of three HGV movements per hour. During existing peak hours Poplars Avenue has between 25 and 42 HGV movements.

iv. Blackbrook Avenue/Mill Lane in the vicinity of the new access junction will have a maximum of up to 26 HGVs per day during the various construction phases. This is likely to result in up to six HGV movements per hour. During existing peak hours Blackbrook Avenue has up to 23 HGV movements.

9.5.5 At this stage it is anticipated that construction traffic will access the site via M62 Junction 9, A49 Winwick Road, A50 Long Lane, Birchwood Way, then either Poplars Avenue or Blackbrook Avenue and Mill Lane. Birch Avenue will be accessed from A49 Winwick Road.

9.5.6 In order to assess the HGV movements on the wider construction route the two highest years in terms of construction traffic i.e. years 2 and 3 have been identified (60 HGVs) and added to this network and compared with forecast 2019 HGV levels. This is shown in **Table 9.5.3** below for 120 HGV movements per day i.e. 12 movements per hour assuming 0800-1800 working.

Table 9.5.3 – Anticipated 2019 HGV percentage increase

Road	AM Peak Hour			PM Peak Hour		
	Existing HGV	Proposed HGV	% Increase	Existing HGV	Proposed HGV	% Increase
Winwick Road	285	12	4%	157	12	8%
Long Lane	57	12	21%	22	12	55%
Blackbrook Avenue	23	12	52%	8	12	150%
Birchwood Way	34	12	35%	11	12	109%

* All traffic minus car traffic

Predicted Impact – Highway Network

9.5.7 Construction traffic will be controlled by means of a Construction Management Plan which will form one of the mitigation measures. It is assumed that as the M62 already carries a significant amount of HGV traffic, HGV traffic from the development will have a minor impact.

9.5.8 It is expected that during the construction phase there will be at times disruption on the local highway network for all users including public transport and there may be temporary restrictions placed in order to construct the new accesses at Poplars Avenue and Mill Lane/Blackbrook Avenue. However, the magnitude of change is considered to be small given the level of HGV traffic set out in **Table 9.5.2** above. Therefore the impact is expected to be of **minor adverse significance**.

Predicted Impact – Bus Passengers

9.5.9 During the first nine years services 20/21 and 23/23A will be extended into the site with temporary turning facilities and bus stops provided as appropriate. During the peak periods service 20/21 will be provided at a frequency of 8-10 buses per hour, and 23/23A will be provided at a frequency of 2 buses per hour, this will include for the provision of extra buses on each route. Therefore for existing bus users there will be an increase in capacity and for future residents a regular bus service will be available from year 2.

9.5.10 Services 23/23A will be extended into the site on weekdays, Saturdays and Sundays in line with the existing level of service (but without a Sunday evening extension). Services 20/21 will be extended in line fully with the existing level of service. These service extensions will return to their current routes once the distributor road is open.

9.5.11 During the construction phase bus routes will at times be affected by the disruption that occurs on the highway network as described above.

9.5.12 Overall it is anticipated that the magnitude of change during the construction phase will be small to medium given the potential for increased journey time. Therefore the impact is expected to be of **minor beneficial significance**.

Predicted Impact – Pedestrians and Cyclists

9.5.13 The changes likely to be noticed by most pedestrians and cyclists during the construction period will be firstly when the new accesses at Poplars Avenue and Blackbrook Avenue/Mill Lane are being built, which will be confined to specific time periods, and secondly the increase in daily HGV traffic on the local highway network.

9.5.14 It is considered that construction of the main accesses will likely result in a small to medium magnitude of change at these locations, which is expected to be of **minor adverse significance**.

9.5.15 It is anticipated that there will be a reduction in the amenity value for pedestrians and cyclists associated with the increase in HGV movements and as such the magnitude of change will be small to medium depending on location. However, as set out in **Table 9.5.3** the percentage increase on most links is low and therefore the impact generally is expected to be of **minor adverse significance** on the majority of links.

9.5.16 On Birch Avenue and Mill Lane the percentage increase is high, resulting in a medium magnitude of change, but the time period involved is relatively short. It is therefore considered that the impact on these roads will be of **moderate adverse significance**.

9.5.17 On Poplars Avenue the percentage of HGV increase is high and the period of construction vehicles using this route will be for the majority of the 12 year construction period. As such the anticipated magnitude of change will be medium. However, generally the footways are set back from the carriageway by a wide grassed verge. It is therefore considered that the impact on this road will be of **moderate adverse significance**.

Mitigation Measures

9.5.18 In order to ensure that appropriate controls will be implemented to protect safety and the environment, it is proposed that one of the planning conditions will require a Construction Management Plan to be agreed. This will cover each phase of the development and include details of lorry routing and hours of site operation, as well as maximum size of vehicles.

9.5.19 When required, traffic management will be introduced to ensure the safety of road users.

9.5.20 It is also anticipated that there will be a planning condition to provide a programme of temporary footpath closures or diversions and opening of new routes during the construction period.

The Residual Impacts

9.5.21 The sensitivity of existing and future drivers, bus passengers, cyclists and pedestrians to any long term residual effects of the construction phase is expected to have a **minor adverse significance**.

9.5.22 The sensitivity of the existing local community to the long term effects of any severance that occurs during the construction phase is expected to have a **minor adverse significance**.

9.6 Impact Assessment – Operational Phase

Predicted Impacts

9.6.1 The development will give rise to an overall increase in travel demand in the area increasing traffic flows on the surrounding highway network, increasing demand for public transport, increasing the use of walking and cycling routes and increasing the potential for road traffic accidents. Without the development there will be an increase in traffic flow generally on the highway network due to natural growth.

9.6.2 It is predicted, as set out in **Tables 9.4.4** and **9.4.5** that show the level of vehicular trips generated at each access, that when fully operational the development will result in the order of 1,009 vehicle movements per hour external to the site during the weekday morning peak period and 1,151 vehicle movements during the weekday evening peak period.

9.6.3 There will be an increase in the use of the bus, pedestrian and cycle networks in the area for a variety of purposes including employment, shopping, educational and recreational related trips.

Predicted Impact – Highway Network (Links)

9.6.4 The new development will result in additional traffic throughout the local area. **Table 9.4.6** sets out the base forecast two-way traffic flow for the design year of 2019, the forecast level of development traffic in the peak hours is set out in **Tables 9.4.4** and **9.4.5**, and this has been distributed as set out in **Table 9.4.3**. This information is summarised for the highway links at the site access junctions in **Table 9.6.1** below, with the percentage increase. The wider highway network will be assessed in the addendum ES once the VISSIM model is available.

Table 9.6.1: 2019 forecast traffic increase (AM and PM peak hours)

Road	AM Peak Hour			PM Peak Hour		
	2019 Base Flow	Devel. Trips	% Increase	2019 Base Flow	Devel. Trips	% Increase
Mill Lane (Radley Lane - Delph Lane)	46	113	285%	106	120	113%
Poplars Avenue	582	290	50%	639	440	69%
Birch Avenue	48	16	33%	54	16	30%

9.6.5 Although the percentage increase in traffic is high, these road links are within their design capacity.

9.6.6 It can be seen from the table above that the change of magnitude varies. However, in terms of significance, it is considered that the development impact will be overall **moderate to minor adverse significance**, given that the changes do not result in any of the links being over capacity.

Predicted Impact – Highway Network (Junctions)

9.6.7 **Table 9.6.2** below summarises the impact of development traffic at key junctions.

Table 9.6.2 – Junction capacity of 2019 base traffic with development traffic

Junction	Max RFC	Max Queue Length	Max Delay
Site Access – Mill Lane/Blackbrook Avenue	0.72	7.4	9.84
Site Access – Poplars Avenue (central)	0.35	2.5	13.16
Site Access – Poplars Avenue (west)	0.13	0.5	10.04
Site Access – Mill Lane/Delph Lane	0.34	2.2	18.63
Birch Avenue/Winwick Road	0.11	0.5	11.44

9.6.8 From the above table it can be seen that the junctions work within capacity and therefore in terms of significance it is considered that the impact overall will be of **minor adverse significance**.

Predicted Impact – Bus Passengers

9.6.9 A new bus service is proposed to be introduced in year 10 to serve the development between Birchwood and Warrington town centre utilising the distributor road and proposed bus stops through the Peel Hall site. This new bus route will provide a comprehensive level of service on weekdays and Saturdays with peak enhancement resulting in a frequency of 6 buses per hour.

9.6.10 The new bus service will provide increased modal choice for existing residents travelling eastwards towards Birchwood and will also increase capacity of the bus services available between the site and the surrounding area and Warrington town centre to the south. Therefore it is considered that the provision of this new service will result in a medium to high magnitude of change. A diagram provided by Network Warrington showing the route of the new service is contained in **Appendix T7**.

9.6.11 Compared to the existing situation the new bus service represents a significant increase in the level of bus accessibility. In terms of impact it is considered to be **major beneficial significance**.

Predicted Impact – Pedestrians and Cyclists

9.6.12 The site currently attracts dog walkers and recreational walkers using the PRoW. The proposed development will provide significant new pedestrian and cycle routes through the site which will link into the existing network. Within the development there are proposals for open space and the pedestrian routes will be designed to provide access to this for residents of the surrounding area as well as future residents of the Peel Hall site.

9.6.13 It is considered that the magnitude of change will be medium as the footway and cycleway network will be enhanced across the site. Therefore the significance of impact will be of **moderate beneficial significance**.

The Mitigation Measures

9.6.14 As well as the proposed alterations to bus services, additional measures such as the introduction of travel plans for the various land uses will be provided and this is expected to include, for example, subsidised bus travel and cycle purchase discounts.

The Residual Impacts - Existing Residents and Users of the Local Area

9.6.15 The local residents will have access to a new local centre and primary school, as well as better access to bus services to and from Birchwood and improved cycle and footway networks. However, there will be more traffic on the local highway network as a result of the Peel Hall development. Therefore there is likely to be a direct permanent long term residual effect on future users of the Peel Hall site.

9.6.16 It is therefore considered that there will be a medium to high magnitude of change for existing residents and users of the local area, resulting in a **moderate beneficial significance** of impact overall.

The Residual Impacts - Future Residents

9.6.17 It is considered that for future residents of the Peel Hall site there will be a **major beneficial significance** of impact due to the range of facilities that will be on site and the range of sustainable transport choices available.

9.7 Summary

9.7.1 The Peel Hall site is located on the northern edge of Warrington, adjacent to the existing residential areas of Hulme, Blackbrook, Cinnamon Brow and Houghton Green. It is bounded by the M62 to the north, Mill Lane to the east, Poplars Avenue to the south and Birch Avenue and Elm Road to the west. At times during the peak periods congestion can occur along the main corridors in the area including M62, Winwick Road, Sand Lane West, Long Lane, Blackbrook Avenue and Birchwood Way, as well as elsewhere.

9.7.2 The Transport Assessment is being prepared in two parts. The first part deals with the site access junctions and the sustainable transport measures proposed to support the development. An addendum Transport Assessment will be prepared that assesses the impact on the wider highway network once Highways England's VISSIM model has been expanded to cover the Peel Hall study area. At the same time an addendum ES chapter will be prepared to cover the wider area and any sensitivity tests arising. It is possible that some of the assumptions used in the initial assessments will be modified following the completion of the VISSIM model.

9.7.3 The site is served by existing bus services and at peak times these routes are busy, especially closer to the centre of Warrington. The site is also served by existing PRoW and currently attracts mainly dog walkers and occasional recreational walkers. Facilities for cyclists in the vicinity of the site are limited to shared footways/cycleways and advance stop lines at traffic signals.

9.7.4 It is proposed that the main vehicular accesses to the development will be provided from the Mill Lane arm of the Blackbrook Avenue/Ballater Drive/Mill Lane/Enfield Park Road roundabout junction and from Poplars Avenue. Additional access is provided from Mill Lane, Birch Avenue and a second access on Poplars Avenue to serve the employment area. Access to the sports pitches will be from Grasmere Avenue.

9.7.5 It is also proposed that existing bus services will be diverted into the site during the construction phase. Once the distributor road through the site is completed a new bus service will be provided that will connect the development with the town centre to the south and with Birchwood to the east.

9.7.6 A high level of connectivity for pedestrians and cyclists will be provided through the site and connections will be made to the existing pedestrian routes around the site, and enhanced by the additional accesses at Poplars Avenue and Mill Lane/Blackbrook Avenue.

9.7.7 During the construction phase each site access junction is expected to have HGV construction traffic associated with it. The anticipated route for construction traffic is expected to be via M62 Junction 9, A49 Winwick Road, A50 Long Lane, Birchwood Way, then either Poplars Avenue or Blackbrook Avenue and Mill Lane. Birch Avenue will be accessed from A49 Winwick Road.

9.7.8 During the construction phase the predicted impact is expected to be:

i. Highway – minor adverse significance.
ii. Bus – minor beneficial significance.
iii. Pedestrians and Cyclists - minor to moderate adverse significance.
iv. Residual - negligible to minor adverse significance.

9.7.9 During the operational phase the predicted impact is expected to be:

i. Highway Links Adjacent to Site – moderate to minor adverse significance.
ii. Site Access Junctions – minor adverse significance.
iii. Bus – major beneficial significance.
iv. Pedestrians and Cyclists - moderate beneficial significance.
v. Residual - moderate to major beneficial significance.

10.0 CULTURAL HERITAGE AND ARCHAEOLOGY

10.1 Introduction

10.1.1 This chapter has been prepared by Nexus Heritage. It assesses the likely and significant environmental effects in relation to cultural heritage and archaeology associated with the proposed development. Archaeology is the the study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains. Cultural heritage is the legacy of physical and intangible attributes of a group or society that are inherited from past generations. For the purposes of this assessment archaeological assets can be considered as buried remains in the forms of deposit, structures and artefacts and cultural heritage can be considered as upstanding attributes such as historic buildings, moments, hedgerows, historic landscapes and battlefields.

10.1.2 The structured cultural heritage and archaeological assessment herein provided is derived from a full and comprehensive examination of data related to designated and undesignated archaeological sites and monuments, historic landscape, hedgerows, historic buildings, historic parks and gardens, Conservation Areas, Registered Battlefields and World Heritage Sites and benefits from asset mapping drawn from detailed on-site observations, documentary research and on-site investigations. The assessment is based on the description of the proposed development as set out at Section 2.5 of this report and as shown on the Parameters Plan. The approach has been adopted in the spirit of the EIA Directive[2], to aid decision making and to ensure that members of the public concerned are able to participate.

10.1.3 The Assessment Site is located between the M62 and Poplars Avenue. The following sections provide a summary on the legislation, policy and guidance that is of relevance to the assessment of cultural heritage and archaeology.

10.2 Legislation

10.2.1 At an international level there are two principal agreements concerning the protection of the cultural heritage and archaeological resource – the UNESCO *Convention Concerning the Protection of World Cultural and Natural Heritage*[3] and the *European Convention on the Protection of the Archaeological Heritage*[4], commonly known as the Valetta Convention. The latter was agreed by the Member States of the Council of Europe in 1992, and also became law in 1992. It has been ratified by the UK, and responsibility for its implementation rests with Department for Culture Media and Sport.

10.2.2 At a national level the principal legislation governing the protection and enhancement of archaeological assets is the *Ancient Monuments and Archaeological Areas Act*[5] 1979. The 1979 Act provides

[2] Council of Europe, 1985, Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment

[3] UNESCO, 1972, *Convention Concerning the Protection of the World Cultural and Natural Heritage*

[4] Council of Europe, 1992, *European Convention on the Protection of the Archaeological Heritage*

[5] Great Britain. *Ancient Monuments and Archaeological Areas Act* Elizabeth II. Chapter 46, (1979) London: The Stationery Office.

protection to Scheduled Ancient Monuments. The consent of the Secretary of State for Culture, Media and Sport is required for works of demolition, destruction to or damage to a Scheduled Ancient Monument. With respect to the cultural heritage of the built environment the *Planning (Conservation Areas and Listed Buildings) Act*[6] *1990* applies. The Act sets out the legislative framework within which works and development affecting listed buildings and conservation areas must be considered. This states that:-

"In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses" (s66(1))

Other known sites of cultural heritage/archaeological significance can be entered onto county-based Historic Environment Records under the *Town and Country Planning Act*[7] *1990.*

10.3 National Planning Policy

10.3.1 The treatment of cultural heritage and archaeology within the planning system is governed by the *National Planning Policy Framework*[8] (NPPF). Various principles and polices related to cultural heritage and archaeology are set out in the NPPF which guide local planning authorities with respect to the wider historic environment.

The following paragraphs from NPPF are particularly relevant and are quoted in full:

"In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation." Para 128

"Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal." Para. 129

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[6] Great Britain. *Planning (Conservation Areas and Listed Buildings) Act.* Elizabeth II.(1990), London: The Stationery Office

[7] Great Britain. *Town and Country Planning Act.* Elizabeth II.(1990), London: The Stationery Office

[8] Department for Communities and Local Government, 2012, *National Planning Policy Framework*.

"In determining planning applications, local planning authorities should take account of:
the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation; the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and the desirability of new development making a positive contribution to local character and distinctiveness." Para. 131

"When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional."* Para. 132
"The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset." Para. 135

10.4 Local Planning Policies

10.4.1 At the local level, planning considerations are guided by Policy QE 8 (Historic Environment) of Warrington's Local Plan Core Strategy[9] (adopted 2014) which states:

The Council will ensure that the fabric and setting of heritage assets, as set out below, are appropriately protected and enhanced in accordance with the principles set out in National Planning Policy.
Scheduled Monuments
Listed Buildings
Conservation Areas
Areas of Known or Potential Archaeological Interest
Locally Listed Heritage Assets

The Council and its partners will aim to recognise the significance and value of historic assets by identifying their positive influence on the character of the environment and an area's sense of place; their ability to contribute to economic activity and act as a catalyst for regeneration; and their ability to inspire the design of new development.

[9] Warrington Borough Council, 2014, *Local Plan Core Strategy*

Heritage Assets such as buildings, structures and sites which are valued as good examples of local architectural styles or for their historic associations, are included on a local list produced by the Council. The buildings, structures and sites included on this list are detailed in Appendix 4.

To be included on the local list, an asset should be substantially unaltered and retain the majority of its original features and either:

1. *Be a good example of a particular local asset type, craftsmanship, architectural quality, style or detailing, or*
2. *Display physical evidence of periods of local economic, technical or social significance, well-known local people or historic events*

Development proposals which affect the character and setting of all heritage assets will be required to provide supporting information proportionate to the designation of the asset which;

- *adopts a strong vision of what could be achieved which is rooted in an understanding of the asset's significance and value, including its setting;*
- *avoids the unnecessary loss of and any decay to the historic fabric which once lost cannot be restored;*
- *recognises and enhances the asset's contribution to the special qualities, local distinctiveness and unique physical aspects of the area;*
- *fully accords with the design principles outlined elsewhere within the Local Planning Framework;*
- *includes suitable mitigation measures, including an appropriate desk-based assessment and where necessary field evaluation and publication, for areas with known or potential archaeological interest.*
- *ensures the knowledge and understanding of the historic environment is available for this and future generations. The evidence arising from any investigations should be publicly accessible through the Historic Environment Record and the local museum.*

Applications for new development will also be required to take all reasonable steps to retain and incorporate non-statutorily protected heritage assets contributing to the quality of the borough's broader historic environment.

10.5 Guidance

The relevant guidance for this assessment includes *Guidelines for Environmental Impact Assessment*[10], the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment*[11], *Standard and Guidance for Archaeological Geophysical Survey*[12] and *Standard and Guidance for Archaeological Field Evaluation*[13].

10.6 Methodology

10.6.1 Assessment Approach Methodology

The overall objective of the cultural heritage and archaeology assessment is to provide a realistic assessment of likely and significant effects with reference to cultural heritage and archaeological assets and to allow for an informed decision-making process.

Directive is enacted in England and Wales by the *Town and Country Planning (Environmental Impact Assessment) Regulations*[14] 2011, as amended. The requirements of the Regulations form the basis of the assessment work undertaken throughout the ES.

10.6.2 The aim of the assessment is to:

- Identify all known and potential designated and non-designated cultural heritage and archaeological assets within and in the vicinity of the proposed development that may be affected by the proposed development and evaluate their significance;
- Outline any likely environmental impacts of the proposed development on cultural heritage and archaeological assets, likely to be affected, assessing the magnitude of any identified impacts;
- Assess the effects of the proposed development upon those cultural heritage and archaeological assets, categorising the scale of effect against significance;
- Identify where relevant any mitigation measures and assess the likely residual impact after such mitigation on the identified cultural heritage and archaeological assets

10.7 Assessment Site and Assessment Area

10.7.1 All designated and non-designated cultural heritage and archaeological assets, both within the proposed development (the Assessment Site) and within approximately 500m of the Assessment Site boundary of the proposed development (the Assessment Area) have been identified. The cultural heritage and archaeological assets in the Assessment Area have been identified and considered in order that the known and potential cultural heritage and archaeological assets of the Assessment Site can be placed in the broader context of the known knowledge-base of the area and a 500m

[10] Chartered Institute of Environmental Management and Assessment, 2004, *Guidelines for Environmental Impact Assessment*
[11] Chartered Institute for Archaeologists, 2014, *Standard and Guidance far Historic Environment Desk-Based Assessment*
[12] Chartered Institute for Archaeologists, 2014, *Standard and Guidance for Archaeological Geophysical Survey*
[13] Chartered Institute for Archaeologists, 2014, *Standard and Guidance for Archaeological Field Evaluation*
[14] Great Britain, 2011, *Town and Country Planning (Environmental Impact Assessment) Regulations*

assessment buffer assessment area is considered adequate for assessment purposes. However, certain assets which, although located beyond the Assessment Area, have also been taken into account and have been considered during this assessment process using professional judgment and discrimination. It is considered that the assessment process, whilst it needs to be conducted with reference to a framework defined by geographical limits, should not be rigidly constrained by such a framework and particular archaeological and cultural heritage assets should not be omitted from the assessment solely on a consideration of distance from the Proposed Development. With this in mind certain designated heritage assets beyond the Assessment Area have been taken into account.

10.7.2 The proposed development extends over approximately 63ha of land to the north of Warrington, with the Site centered at approximately Ordnance Survey grid reference SJ 61438 91723, mainly within the civil parish of Winwick. The Assessment Site is aligned east-west and lies between 10 and 15m AOD sloping from the north towards Warrington. The site comprises rough, unmanaged pasture, field boundaries and some woodland. The northern boundary of the Site is provided by the M62 motorway, to the south-west the boundary is formed by the suburb of Hulme. To the south the Site is bounded by development on Windermere Avenue and to the east the Site is bounded by the built environment of Houghton Green. There are two enclaves surrounded by the Assessment Site which are not included within the planning application area – Peel Hall Farm and Peel Cottage.

10.7.3 The British Geological Survey Geological [15] records for this area superficial deposits of glacio-fluvial deposits of Devensian date – sand and gravel – formed up to 2 million years ago in the Quaternery Period in a local environment dominated by ice age conditions. The bedrock geology for the north-western half of the Site is mapped as Chester Pebble Beds – a pebbly gravelly sandstone formed approximately 246-251 million years ago in the Triassic Period, in a local environment formed by rivers. The bedrock underlying the south-eastern half is the Wilmslow Sandstone Formation – a sandstone sedimentary bedrock formed in the same period and same environment.

10.8 Surveys

10.8.1 The baseline conditions have been established from a range of sources, which include a comprehensive walk-over of the Site, a desk-based assessment[16], and an archaeological evaluation by means of trial trenching[17].The impacts of the assessment scheme on that baseline are then assessed and the significance of these impacts is expressed. Consideration of mitigation is explained and the existence of any residual impacts and their significance are also assessed. Consideration is given to whether the impacts are short term or long term; permanent or temporary; and whether they will occur in the construction or operational phases of the development. The methodology focuses on the details of a cultural heritage and archaeology assessment and the detailed methodology is

[15] *http://www.bgs.ac.uk/data/mapViewers/home.html*

[16] CPM Environmental Planning and Design, 1999. *Desk-Based Assessment - Land at Peel Hall, Warrington, Cheshire.*

[17] Lancaster University Archaeological Unit, 2001, *Peel Hall, Warrington, Cheshire – Evaluation Report*

provided below. This chapter has been prepared by Gerry Wait, Director of Nexus Heritage and Member of the Chartered Institute for Archaeologists and Anthony Martin, a Director of Nexus Heritage and Member of the Chartered Institute for Archaeologists.

10.9 Data Collection and Review

10.9.1 In order to identify and examine the cultural heritage and archaeological assets within the Assessment Site and the wider Assessment Area a preliminary survey of source material was undertaken by means of consultation with a variety of data holders. The results of the desk study were complemented by further elements of work – a walk-over survey in order to examine the ground surface within the Site for evidence of cultural heritage and archaeological features and previous impacts to the land which may have compromised, disturbed or removed archaeological assets and a geophysical survey and a trial trench evaluation. The walk-over survey also included perambulations in the wider Assessment Area to establish general lines of sight towards, from and across a variety of locations which form the setting of the cultural heritage and archaeological assets. The results of all elements of work have been used to prepare this chapter.

10.9.2 The Cheshire Historic Environment Record (CHER) was consulted to obtain the latest information on known sites and features of archaeological interest within the Assessment Site and the Assessment Area. The CHER is the recognised regional repository of archaeological data. The CHER data has been supplemented and cross-referenced by means of examination of historic mapping of the assessment area, aerial photographs of the Assessment Site and published works such as archaeological/historic journals issued by learned societies and reference books on the archaeology and history of the area. Searches were also made of data in the Cheshire Record Office (CRO), the Lancashire Record Office (LRO), Warrington Museum & Art Gallery (WM&AG), Warrington Library (WL) and a number of on-line sources such as the Heritage Gateway database, the National Heritage List, and the National Monuments Record's *PastScape* historic environment database. A comprehensive map-regression exercise was undertaken and the historic maps identified for reproduction are provided in **Appendices ARC 5 to 15** inclusive.

10.9.3 The Historic Environment Records Officer and the Development Control Archaeologist of Cheshire Archaeology Planning Advisory Service (CAPAS) of Cheshire Shared Services were consulted with respect to information on archaeological and cultural heritage assets within the Assessment Area and to discuss the likely effect of the development on any of these assets and possible mitigation measures which would be suitable.

10.10 Assessing the Value of Cultural Heritage and Archaeological Assets

10.10.1 Cultural heritage and archaeological assets may be valued for a number of reasons: based on criteria such as rarity or degree of preservation and the EIA process identifies this value as 'importance'. The detailed outcome of the assessment of importance is provided below for the Assessment Site. Some resources, not remarkable in terms of rarity or state of preservation terms, may nonetheless be considered to have value for a particular community, especially if they are accessible and contribute to local distinctiveness, identity or economy. For the purposes of this assessment, archaeological assets have been considered principally with reference to their value to the quality and understanding of England's history, as set out in national, legislation priorities and frameworks. However, the international, regional and local perspective has also been taken into account. Identified archaeological assets are characterised according to their intrinsic importance. A six-fold scale based on the *Design Manual for Roads and Bridges*[18] has been utilised in order to characterise the value of identified archaeological assets, incorporating any relevant designations or best-practice, so that any identified sites can be gauged according to these and assigned a value level as defined in **Table 1.**

[18] Highways Agency, 2009, *Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment*

Value	Equivalence
Very High	World Heritage Sites (including nominated sites). Archaeological sites or buildings or historic areas of acknowledged international importance Historic landscapes of international value, whether designated or not. Extremely well preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s).
High	Scheduled Ancient Monuments Undesignated archaeological assets of designable quality and importance. Grade I and Grade II* Listed Buildings Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade Conservation Areas containing very important buildings Undesignated structures of clear national importance Grade I and Grade II* Registered Parks and Gardens Undesignated historic landscapes of outstanding interest high quality and importance, and of demonstrable national value exhibiting considerable coherence, time-depth or other critical factor(s)
Medium	Archaeological remains of regional/county importance. Grade II Listed Buildings Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations. Conservation Areas containing buildings that contribute significantly to its historic character. Grade II Registered Parks and Gardens Undesignated historic landscape character areas of regional interest averagely well-preserved with reasonable coherence, time-depth or other critical factor(s) Important hedgerows Historic townscape or built-up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).
Low	Archaeological remains of district/local importance and/or those sites compromised by poor preservation and/or poor survival of contextual associations undesignated historic landscapes of local relevance Undesignated parks and gardens of local relevance Historic landscapes the value of which is limited by poor preservation and/or poor survival of contextual associations and hedgerows Locally Listed Buildings Historic (unlisted) buildings of modest quality in their fabric or historical association. Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures). Robust undesignated historic landscapes with importance to local interest groups. Undesignated historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	Assets which have been damaged or destroyed to the extent that they have very little or no surviving archaeological interest or assets of no historic/architectural note. Landscapes of little or no historic interest. Buildings of no architectural or historical note; buildings of an intrusive character.
Unknown	Assets for which insufficient information is available to identify importance or assets with little or no significant historic, architectural, archaeological or artistic interest

Table 1: Factors for Assessing the Value of Heritage Assets (based on DMRB, Vol. 11 Environmental Assessment, Section 3, Part 2, HA 208/7, Cultural Heritage)

10.10.2 **Identifying Impact Criteria**

A direct impact is a physical effect on an asset arising at the same time as and occurring as a consequence of physical changes to the asset. For example, groundworks associated with construction directly disturbing archaeological remains. With respect to archaeological assets the pathway of a direct impact usually leads to a predictable outcome – a greater or lesser physical impact

which is detrimental to the preservation and survival of a part or whole of an asset. However, the impact pathway is nevertheless significant because pathways lend themselves to varying approaches to mitigation such as elimination, prevention, control, compensation and offsetting (see below). With respect to cultural heritage assets and archaeological assets impacts can also be indirect, in that the setting of an asset, within or beyond the boundaries of a proposed development can be affected by the proposed development. In addition impacts are considered beneficial or adverse; reversible or irreversible; short, medium or long term; and temporary or permanent.

10.10.3 **Identifying the Magnitude of Direct Impacts to Cultural Heritage and Archaeological Assets**

For the purposes of assessing direct impacts to cultural heritage and archaeological assets the pre-eminent characteristic of the impact is the scale to which the impact alters the asset. This can be gauged by cross-referencing the potential impact activities with each known asset. In addition, the type of impact is judged in order to arrive at a magnitude. The scale ranges from negligible, through minor and moderate to major and the type of impact can be beneficial or adverse. A matrix can be completed which provides a rating based upon the scale and type of impact and extent or components of the assets affected. The magnitude of impact to individual assets is a matter of professional judgment and is based on a five-fold scale (major, moderate, minor, negligible and no change) based on the *Design Manual for Roads and Bridges*[19]. The range of impact magnitude is explained in **Table 2**.

Impact Magnitude	Description
Major Adverse	Total loss of asset
Major Beneficial	Comprehensive improvement to the asset through restoration or enhancement,
Moderate Adverse	Partial loss of or detrimental modification to the asset, but integrity of majority of asset remains
Moderate Beneficial	Improvement to asset condition/preservation through enhancement or protection,
Minor Adverse	Some measurable depreciation to the attributes and quality of asset
Minor Beneficial	Some measurable improvement to the attributes and quality of asset
Negligible Adverse	Very slight loss or detrimental alteration to asset
Negligible Beneficial	Very slight benefit to condition/preservation of asset
No change	No loss or alteration of asset, no discernible impact either adverse or beneficial

Table 2: Factors in the Assessment of Magnitude of Impact to Archaeological Remains (based on DMRB, Vol. 11 Environmental Assessment, Section 3, Part 2, HA 208/7, Cultural Heritage)

[19] Highways Agency, 2009, *Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment*

10.10.4 Determining the Significance of the Effect on Assets

The significance of the effect on assets is a combination of the importance of the assets and the magnitude of the impact. The significance of the effect is expressed using a nine-fold scale (Very Large, Large/Very Large, Moderate/Large, Moderate, Moderate/Slight, Slight/Moderate, Slight, Neutral/Slight and Neutral) based on the *Design Manual for Roads and Bridges*[20]. The required combination for identified remains has been undertaken with the aid of a matrix, as shown in **Table 3**, in order to assist judgements regarding importance and impact magnitude in order that a reasonable and balanced assessment of effect significance (either negative or positive) can be reached.

IMPORTANCE OF ASSET						
	Very High	Neutral	Slight	Moderate/Large	Large/Very Large	Very Large
	High	Neutral	Slight	Moderate/Slight	Moderate/ Large	Large/Very Large
	Medium	Neutral	Slight/ Neutral	Slight	Moderate	Moderate/ Large
	Low	Neutral	Neutral/ Slight	Slight/Neutral	Slight	Slight/ Moderate
	Negligible	Neutral	Neutral	Neutral/Slight	Slight/Neutral	Slight
	Unknown	Neutral	Neutral	Neutral/Slight	Slight/Moderate	Moderate/ Large
		No change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT TO ASSET				

Table 3: Effect Significance Matrix for Assets (based on DMRB, Vol. 11 Environmental Assessment, Section 3, Part 2, HA 208/7, Cultural Heritage)

10.10.5 Limitations

The assessment of the cultural heritage and archaeological assets has been undertaken in the knowledge of the uncertainties that arise when trying to assess impacts on a resource that is not wholly known and is often poorly understood. It is acknowledged that there have been some previous recorded archaeological and historic assessments and surveys undertaken for certain locations within the Assessment Area, but such enquiries do not result in a comprehensive audit of all cultural heritage and archaeological assets in the area and there are weaknesses in the available information. It should be noted that the assessment is based in large part on information held in source repositories and published data, augmented by a walk-over survey, a geophysical survey and a trial trench evaluation. The source repositories and published data do not represent exhaustive sources of information on the presence/absence of cultural heritage and archaeological assets. With the exception of the walk-over survey, geophysical survey and trial trench evaluation there has been no project specific archaeological field work undertaken on the Assessment Site. However, from the data available it is

[20] Highways Agency, 2009, *Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment*

possible to quantify and qualify the known archaeological assets and to determine the potential for as yet unknown assets to be present. These factors have been taken into consideration during this Assessment. This information has in turn been considered against the pre-existing impacts to the Site which may have compromised the survival of any archaeological assets on the site. In order that reliable conclusions can be drawn from the categorisation of the impacts and effects, the data used to establish the nature of the impact has been reviewed with respect to the following criteria:

Confidence - how reliable is the data from a scientific and statistical perspective,

Assumptions - were any assumptions made in identifying potential impacts and if so what were they,

Limitations - what are the limitations of the data that could have an influence on the confidence and the description of the nature of the impacts?

With respect to the baseline data and the assessment process there is a high confidence level that the data upon which the work is based is of high quality. The baseline data is generated and maintained by regional or national agencies with a proven track record of data capture and duration and the attributes of the data in terms of veracity and impartiality can be considered to be high.

A number of assumptions have, however, been made as to the fact of and degree to which any archaeological remains may survive on the Assessment Site. The precautionary principle has been adopted in which it is assumed that there are some archaeological remains on the Site.

There are some compromising limitations on the data that could have an influence on the confidence and the description of the nature of the impacts. There were no limitations on the desk-based data collection exercise, other than the inherent weaknesses of the data set. For example, the actual identity and character of some of the archaeological assets identified by the CHER remain unknown or unproven and so assessing value and impacts becomes problematic. There were some limitations on the coverage of the archaeological trial trench evaluation undertaken in 2001, such as the exclusion of some areas of the Site due to ecological constraints. It should also be noted that the Site boundaries which defined the programme of archaeological evaluation undertaken in 2001 do not correspond with the boundaries of the current Assessment Site, which is larger and includes additional land parcels to the west and east which were not subject to evaluative trial trenching.

There is no meaningful limitation on the assessment of impacts represented by the proposed development as the impacts are derived from consideration of a proposal involving orthodox and previously used design and construction techniques.

10.11 Baseline Conditions

10.11.1 A total of 95 cultural heritage archaeological assets has been identified within the Assessment Site, the Assessment Area and in close proximity to the Assessment Area. Indices of these assets are maintained by a variety of organisations and in order to simplify reporting the entire asset group has been brought together in a gazetteer, with each asset receiving a unique gazetteer number. The location and distribution of the assets can be seen on **Apendices ARC 1 to 4** inclusive and the key data for each asset is provided in the Gazetteer Table at **Appendix ARC 17**.

10.12 Archaeology

10.12.1 A total of 34 undesignated heritage and archaeological sites (also known as monuments but identified as archaeological assets for the purpose of reporting) were identified for the purpose of assessment. Several of these assets are wholly or partially within the Assessment Site.

Gaz. No. 11 – Peel Hall Manor House and Moat – specifically the moat and the footprints of now-demolished buildings is within the Assessment Site. The current building at Peel Hall itself is out with the Assessment Site in an enclave, but the location of the moat and some now–demolished ancillary outbuildings are within the Assessment Site.

Gaz. No. 32: Cottage and Garden

Gaz. No. 33: Trackway

Gaz. No. 34: Marl Pits/Ponds/Turbary Pits

10.12.2 A total of nine archaeological events was identified within the Assessment Area – these are archaeological investigations and surveys and of these two are intimately associated with the Assessment Site – an archaeological desk –based assessment conducted in 1999 and an archaeological trial trench evaluation conducted in 2001. It should be noted that the Site is not wholly or partly within an Area of Special Archaeological Potential, an Area of Archaeological Potential or an Area of Archaeological Importance as recorded by the CHER.

Further details of the identified archaeological assets are provided in **Appendix ARC 1** and **ARC 19.**

10.13 Baseline Conditions

Historic Landscape Character

10.13.1 A total of 14 individual Historic Landscape Character parcels was identified for the purpose of assessment. The vast majority of the Assessment Site is identified as an expanse of a single Character parcel recorded as 20th century field systems (Gaz. No.84), with a small area identified as post-medieval woodland plantation (Gaz. No. 78).

Details of the identified historic landscape character are provided in **Appendix ARC 3 and ARC 17.**

10.14 Historic Buildings and Structures

10.14.1 A total of 17 Listed Buildings was identified for the purpose of assessment. None of these buildings is within the Assessment Site. A total of 14 Locally Listed Buildings was identified for the purpose of assessment. None of these buildings is within the Assessment Site.

Details of the identified historic buildings and structures are provided in **Appendix ARC 2 and ARC 17**.

10.14.2 Hedgerows

The internal hedgerows have been assessed against the criteria included within the *Hedgerow Regulations*[21], 1997, including their age, their relationship to boundaries between parishes existing before 1850, their relationship to archaeological features of a site that is noted on the CHER and their relationship to boundaries of pre-1600 estates or manors or field systems pre-dating the Enclosure Acts.

10.14.3 The ecological aspects of hedgerow habitat are detailed in Chapter 6 – Ecology. However, hedgerows have a historic and archaeological dimension as emphasised in *The Hedgerow Regulations*[22] 1997. There are two internal hedgerows within the Site (**Appendix ARC 3**) of particular interest. Both of these extend approximately north-south across the Site. Gaz. No. 89 is a length of hedgerow defining the relict boundary between the historic Townships of Arbury and Houghton and Gaz. No. 90 is a hedgerow defining the relict boundary between the historic Townships of Arbury and Winwick. Details of the identified hedgerows are provided in **Appendix ARC 17.**

10.14.4 The determination of a hedgerow as important under the *Regulations* includes consideration of archaeological and historic criteria. The identified hedgerows within the Assessment Site mark the boundary, or part of the boundary, of two historic (pre-1850) townships. There is no confirmatory evidence that the hedgerows on the Assessment Site mark the boundaries of the Manors of Winwick, Arbury and Houghton (which qualify as pre-1600 AD manors, but the hedgerows would be consistent with manorial boundaries which evolved into Township boundaries. The hedgerows do not incorporate an archaeological feature which is Scheduled Ancient Monument or a site recorded on the CHER. The hedgerows are not recorded in any document held at CRO or LRO as an integral part of a field system pre-dating the Inclosure Acts and are not part of or related to any building or feature associated with a field system pre-dating the Inclosure Acts.

10.14.5 On the basis that these two hedgerows have existed for longer than 29 years and mark part of the boundaries, of at least three historic townships, then they qualify as important. Together with the Moat at Peel Hall they are plotted on the parameters plan

[21] Great Britain, 1997, The Hedgerow Regulations, Statutory Instrument 1160, London: The Stationery Office
[22] Great Britain, 1997, The Hedgerow Regulations, Statutory Instrument 1160, London: The Stationery Office

10.15 Scheduled Ancient Monuments, Conservation Areas, Registered Battlefields, Registered Historic Parks and Gardens, UNESCO World Heritage Sites

10.15.1 There are a number of other designated heritage assets outside the Assessment Area and for the benefit of the Environmental Statement the neatest Scheduled Ancient Monument, Conservation Area, Registered Battlefield, Registered Park/Garden and UNESCO World Heritage Site have also been identified and mapped and details can be found in the and in **Appendix ARC 4** and **ARC 17.**

10.16 Importance of the Assets

10.16.1 Each asset has been reviewed, its importance established and the importance rating is provided in and **Appendix ARC 17**. The nature and character of archaeological assets at the Site has been previously investigated, and some archaeological remains are known to exist but the fact of and degree of any archaeological remains in those portions of the Assessment Site not evaluated in 2001 remains unknown. There is a likelihood for disturbance to archaeological remains at the Assessment Site from ploughing. On balance it is probably safe to assume the survival of archaeological assets within the Assessment Site will be variable. The physical condition and state of preservation of any as yet unknown archaeological assets at the Site is unknown.

10.16.2 The known and potential archaeological assets within and in the vicinity of the Site relate to local and possibly regional traditions associated with Cheshire's development and with respect to the prehistoric period relate to national traditions of agricultural production, consumption and settlement. The known and potential archaeological assets within and in the vicinity of the Site are also representative of local and regional information associated with knowledge about communities, economy and culture in the broader prehistoric period.

10.16.3 The archaeological and cultural heritage assets in and around the Site have demonstrable historical association with known events relating to the political, economic, industrial, social, and cultural history on a local and regional scale. On the basis of the desk-based research, walk-over survey, and trial trench evaluation it is concluded that the Site has an archaeological potential, but as a consequence of ploughing, the potential of the Site is lessened for archaeological remains pre-dating the 20th century. Any remains, should they be present, would be of local and possibly regional significance.

10.17 Potential Effects

Potential Impacts

10.17.1 Potential impacts to cultural heritage and archaeological assets may arise from the construction and operation of the proposed development and this assessment has been undertaken in order to examine the direct and indirect impacts to known and potential cultural heritage archaeological assets.

Impacts fall into both direct and indirect temporary and permanent categories:

Temporary (Indirect)

- Site clearance, demolition and accommodation works
- Movement and presence of associated construction vehicles and plant
- Compounds, site offices and welfare facilities
- Earthworks and construction of drainage infrastructure
- Earthworks and formation of practical development platforms/foundations
- Highways improvements and access from the site
- Emerging built form of residential units and primary school buildings
- Emerging landscaping measures

Permanent (Indirect)

- Completed highways realignment and access points;
- Completed built form including the residential units, primary school buildings, employment and local centre etc.
- Completed infrastructure and lighting
- Completed landscaping measures

Temporary (Direct)

- None

Permanent (Direct)

- Site clearance, demolition and accommodation works
- Ground works for compounds, site offices and welfare facilities
- Earthworks and construction of drainage infrastructure
- Earthworks and formation of practical development platforms/foundations
- Highways improvements and access to/from the Site

10.18 Project Design

10.18.1 Mitigating responses are not proposed for any of the archaeological assets within the Assessment Area upon which no direct impact is predicted. For the archaeological assets on the Assessment Site upon which a direct impact is predicted a suite of mitigation actions are recommended.

10.18.2 For those archaeological and cultural heritage assets for which an indirect impact to setting has been predicted no formal mitigation is recommended as the magnitude of the impacts to settings and significance of the effect is marginally adverse and there is inherent mitigation in the quality of the design and layout of the proposed development. Details of the proposed development design are

addressed in detail in the ES Parameters Plan (**Appendix APP 6**) and also in Section 2.5: Development Proposals. This sets out the more general information on inherent mitigation such as the quantum of uses, mix, and distribution and also the areas of open space and landscaping.

10.18.3 The proposals will incorporate the following mitigation in respect of heritage issues

- Re-instating the former alignment of important hedgerows where appropriate.
- Setting back of the development envelope in the parts of the site which would provide separation from the immediate settings of designated cultural heritage assets to ensure that potential impacts are minimised.

10.18.4 The landscape strategy set out in Section 8 above forms an integral part of the proposed development. Therefore, for the purposes of the assessment, an integrated approach to developing mitigation for impacts to settings of cultural heritage assets form a considered and deliberate aim of the proposed development.

10.18.5 The direct impacts identified for cultural heritage and archaeological assets represent impacts to the cultural heritage and archaeological resource with respect to the spirit and intent of *NPPF*[23]*.* Therefore, it is proposed that, a detailed programme will be prepared for mitigation works for the known and potential cultural heritage and archaeological assets that would be directly impacted upon as part of the process of discharge of conditions accompanying any planning permission. Its implementation could be secured by means of appropriately worded conditions applied to any planning permission for the proposed development. The proposed mitigation for the cultural heritage and archaeological assets on which impacts have been identified has been configured with reference to archaeological best practice and the relevant standards and guidance published by the Chartered Institute for Archaeologists. The impacts for which mitigation is proposed are direct impacts and it should be noted that there is no ability to mitigate (*sensu strictu*) for the direct loss of or disturbance to cultural heritage and archaeological assets, as such assets would not be able to return to their original state once disturbed. However, archaeological investigation reporting, publication and archiving may compensate for the loss of cultural heritage and archaeological assets where the proposed development affects them.

10.18.6 Where unavoidable direct impact to a cultural heritage or archaeological asset is considered acceptable by the local planning authority, policy allows that authority to direct the developer to record and advance understanding of the significance of the asset before it is lost, using planning conditions or other obligations as appropriate. The extent of the requirement should be proportionate to the nature and level of the asset's significance and this has been taken into account in the recommendations below.

[23] Department for Communities and Local Government, 2012, *National Planning Policy Framework*.

10.18.7 The recommended mitigation for the proposed development takes the form of an archaeological excavation and/or watching brief on areas where historic data, the walk-over survey and the trial trench evaluation have indicated the presence or likely presence of archaeological remains. This would be followed by analysis of the findings, publication and dissemination of the results and deposition of the archive in line with archaeological practice. The archaeological excavation would be configured with reference to the standard and guidance published by the Chartered Institute for Archaeologists[24] with a contingency to respond to findings.

10.18.8 The recommended mitigation responses for cultural heritage and archaeological assets would not diminish the direct, physical impact upon the assets. However, they do ameliorate the impact by the creation of information and knowledge of public benefit and the implementation of investigations and recording operations are considered to be appropriate mitigation which would assuage the effect on cultural heritage and archaeological assets. The recommended mitigation responses are in line with guidance provided in NPPF[25] in that the facility exists for Local Planning Authorities to require developers to –'*record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible.'* NPPF, para. 141

10.19 Assessment of Effects

10.19.1 Direct Impacts

Impacts to cultural heritage archaeological assets would arise from the proposed development so it is important to briefly describe the key aspects of the proposals. This proposed development is for housing with open space and associated infrastructure and access. In basic terms the development consists of activities such as ground preparation, modification and improvement, and the construction of new buildings, services and vehicle/pedestrian access and circulations routes and landscaping.

10.19.2 Previous Impacts

Previous activities at the Assessment Site need to be considered with respect to potential pre-existing impacts to archaeological assets before a discussion on the potential impacts to the archaeological assets represented by the proposed development. The most significant impact to the archaeological resource has been long-duration arable cultivation across much of the site. Plough action is acknowledged as a vector of detrimental impacts to sub-surface archaeological remains. There are acknowledged methodological approaches to test for plough interaction with sub-surface layers that would contain archaeological remains. However, determining how active the interaction is or the rate at which it is taking place are more difficult estimations. No previous attempts to test for plough interaction at the Assessment Site has been undertaken and so the fact of and degree of plough interaction is unknown.

[24] Chartered Institute for Archaeologists, 2008, *Standard and Guidance for Archaeological Excavation*

[25] Department for Communities and Local Government, 2012, *National Planning Policy Framework*.

10.19.3 Predicted Impacts to Cultural Heritage and Archaeological Assets (Pre-Construction)

Geotechnical investigations in the form of window sampling and boreholes have the potential to disturb archaeological remains – but the results of such investigations also provide valuable information on the sub-surface properties of use with respect to archaeology. The type, number and location of any intrusive geotechnical investigations have not yet been determined, however, the following cultural heritage and archaeological assets maybe impacted upon.

Gaz. No. 11: Peel Hall Manor House and Moat
Gaz. No. 32: Trackway
Gaz. No. 33: Cottage and Garden
Gaz. No. 34: Marl Pits/Ponds/Turbary Pits
Gaz. No. 89: Hedgerow
Gaz. No. 90: Hedgerow

10.19.4 Predicted Impacts to Cultural Heritage and Archaeological Assets (Construction)

The construction stage will include activities associated with a typical construction programme sequence. The following cultural heritage and archaeological assets will be Impacted upon.

Gaz. No. 11: Peel Hall Manor House and Moat
Gaz. No. 32: Trackway
Gaz. No. 33: Cottage and Garden
Gaz. No. 34: Marl Pits/Ponds/Turbary Pits
Gaz. No. 89: Hedgerow
Gaz. No. 90: Hedgerow

10.19.5 Predicted Impacts to Archaeological Assets (Operation)

There is scope for some direct impacts to archaeological assets during the use of the development as archaeological remains may be disturbed during building operations for extensions or further new buildings, roads and services. However, these impacts would be dealt with by means of the operation of the planning process at the time the permissibility of those operations is determined.

10.19.6 The Scale and Type of Impact

The proposed development requires activities such as ground preparation and improvement, landform modification, contamination remediation, landscaping and the construction of new buildings, services and vehicle/pedestrian access and circulations routes. All of these activities would have an impact on archaeological remains (should they be present). The impact would be permanent, irreversible and direct.

10.19.7 Indirect Impacts

The effect of development on the significance of the setting of heritage assets is a material consideration in determining a planning application and NPPF advises Local Planning Authorities that they should require an applicant to provide a description of the significance of the heritage assets affected and the contribution of their setting to that significance. The methodological approach to assessing setting and potential impacts to the significance of cultural heritage and archaeological assets and the outcome of the setting assessment is provided in **Appendix ARC 20**. The assessment of impact to setting has been advanced in collaboration with assessment of the landscape and visual impact, which is reported upon in Section 8.

10.20 Residual Effects

10.20.1 Residual Impacts

The residual effects are the effects that remain on the cultural heritage and archaeological assets, once mitigation has been completed. The effects upon cultural heritage and archaeological assets for which a significant effect has been identified, will be reduced through the completion of the mitigation measures and the residual effect will be less significant, or will have been suitably compensated for, than would be the case in the absence of mitigation.

10.20.2 The recommended mitigation responses for direct impacts to cultural heritage and archaeological assets would not diminish the direct, physical impact upon the assets. However, they do ameliorate the impact by the creation of information and knowledge of public benefit and the implementation of cultural heritage and archaeological investigations and recording operations is considered to be appropriate mitigation which would assuage the effect on the cultural heritage and archaeological assets.

10.20.3 The mitigation measures and the advancement of understanding compensates for the loss of any cultural heritage and archaeological assets. With respect to the Assessment Site the investigation and recording of any cultural heritage and archaeological assets would lead to an overall residual adverse effect that is Slight Adverse /Neutral for all directly impacted assets.

11.0 NOISE & VIBRATION

11.1 Introduction

11.1.1 This section has been prepared by Hawkins Environmental Limited assesses noise and vibration levels for the proposed redevelopment of Peel Hall.

11.1.2 The following areas would normally be considered as part of an ES:

- The impact of the changes in road traffic flows on the noise levels at nearby sensitive receptors;
- The impact of proposed plant on the noise levels at nearby sensitive receptors;
- The impact of construction noise and vibration at nearby sensitive receptors; and
- The constraints that the existing noise and vibration environment has on the proposed scheme, including details of mitigation to ensure suitable noise levels both internally and at outdoor amenity space.

11.1.3 All noise measurements were conducted in accordance with BS 7445-2: 1991 ‘Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use’, with the assessment methodology used to assess noise ingress into the proposed development conducted in accordance with BS 8233: 2014 ‘Guidance on sound insulation and noise reduction for buildings’, and the National Planning Policy Framework.

11.2 Planning Policy

The Nature, Measurement and Effect of Noise

11.2.1 Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

11.2.2 The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

11.2.3 When related to changes in noise, a change of ten decibels from say 60 dB(A) to 70 dB(A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB(A) to 60 dB(A) would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible[26]. Table 2.1 details typical noise levels.

Table 2.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

[26] Communities & Local Government (1994). Planning Policy Guidance 24: Planning & Noise.

The Nature, Measurement and Effect of Vibration

11.2.4 When two objects come into contact through movement (such as the wheels of a car and a road), the mechanical energy from the movement causes vibrations in the vicinity of the two objects. Vibrations in the air causes sound, but some vibrations can be felt through the ground or through structures, especially when large amounts of energy are exerted, such as the passage of heavy goods vehicles.

11.2.5 Groundborne vibration, especially within structures, has a number of affects both to people and to the structures themselves.

11.2.6 The effects of groundborne vibration on buildings are dependent upon a whole range of factors, not least the magnitude and duration of the vibration, the structure of the soil, the properties and quality of the building materials, the design of the structure, as well as the general condition and age of the structure. In extreme cases, vibration can cause severe structural damage, but most vibration damage manifests itself in minor cosmetic damage such as cracks in rendering and roof tiles slipping, which in turn can cause other problems such as damp. Groundborne vibration on buildings is measured using the Peak Particle Velocity (PPV) expressed in mm/s. This is the maximum instantaneous velocity of a particle at a point during a given time interval.

11.2.7 Human exposure to vibration can cause annoyance, but in some cases can also cause health problems, especially from the stress and anxiety of prolonged annoyance. Humans are known to be very sensitive to vibration, with a threshold of perception typically in the particle velocity range of 0.15 mm/s to 0.3 mm/s at frequencies between 8 Hz and 80 Hz. Human exposure to vibration is measured using a Vibration Dose Value (VDV) expressed in $m/s^{1.75}$. This measures the overall dose of vibration that a person might receive over a given time period.

The National Planning Policy Framework

11.2.8 In March 2012, the National Planning Policy Framework (NPPF) was published to replace the thousands of pages of national planning policy guidance, including guidance on noise. The intention was to let councils decide their own priorities though their Local Plans and reduce the amount of "red tape" to enable growth and development. Amongst many other documents, the NPPF replaces the 1994 document Planning Policy Guidance Note 24 (PPG 24) 'Planning and Noise' published by the then Department of Environment, which is now officially withdrawn as official government guidance.

11.2.9 The NPPF includes 12 core planning principles which include:

- Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of buildings;

- Take account of the different roles and character of different areas, promoting the vitality of the main urban areas, protecting the Green Belts around them, recognising the intrinsic beauty of the countryside;
- Contribute to conserving and enhancing the natural environmental and reducing pollution; and
- Take account of and support local strategies to improve health, social and cultural wellbeing for all.

11.2.10 It also states that the planning system "should contribute to enhance the natural environment, by... preventing both new and existing development from contributing to or being put at risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution…To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location".

11.2.11 Section 123 of the NPPF talks specifically about noise stating that "Planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

11.2.12 The purpose of the NPPF is for Local Planning Authorities to determine for themselves whether a "new development is appropriate for its location" or how to determine what constitutes "a good standard of amenity for all…future occupants of buildings".

Noise Policy Statement for England

11.2.13 The Noise Policy Statement for England(NPSE)[27] provides further guidance on the interpretation of Section 123 of the NPPF and states that: "Within the context of sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible contribute to the improvement of health and quality of life."

[27] The Noise Policy Statement for England, March 2010, Defra.

11.2.14 NPSE introduces established concepts originally from the field of toxicology that are now being applied to noise impacts. They are:

- **NOEL – No Observed Effect Level** - This is the level of noise below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- **LOAEL – Lowest Observed Adverse Effect Level** - This is the level of noise above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level** - This is the level above which significant adverse effects on health and quality of life occur.

11.2.15 NPSE goes on to state that "it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

National Planning Practice Guidance on Noise

11.2.16 The NPPG provides more guidance on the assessment of noise for planning purposes and builds on the concepts of NOEL, LOAEL etc introduced in NPSE to establish whether noise is a factor that needs to be taken into account. It states: "Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

11.2.17 However, it goes into more detail about the subjective nature of noise and how the results of any assessment must be treated flexible and pragmatically. The guidance states: "The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise (ie whether or not the noise contains particular high or low frequency content) and the general character of the noise (ie whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
- In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.
- Where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra's website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas.
- The effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Further information may be found on Defra's website. Particular consideration should be given to noisy development affecting designated sites.
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.
- The potential effect on an existing business of a new residential development being located close to it should be carefully considered as the existing noise levels from the business may be regarded as unacceptable by the new residents and subject to enforcement action. In the case of an established business, the policy set out in the third bullet of paragraph 123 of the Framework should be followed.

- Some commercial developments including fast food restaurants, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity."

Local Policy

11.2.18 Policy QE 6 of Warrington Borough Council's Local Plan Core Strategy (Adopted July 2014) states that "The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration the following: … Noise… the effect and timing of traffic movement to, from and within the site and car parking including impacts on highway safety."

11.3 Assessment Criteria

BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'

11.3.1 Originally published in 1999, the 2014 edition of BS 8233 significantly updates the guidance in light of the policy changes as a result of the advent of the NPPF and the withdrawal of PPG 24. The 2014 edition of BS 8233 sees a change in the title of the Standard, moving from a 'Code of Practice' to 'Guidance', as the text 'largely comprises guidance that does not support claims of compliance'.

11.3.2 BS 8233:2014 indicates that to control external noise ingress into a proposed development, a number of planning stages should occur as follows:

"a) Assess the site, identify significant existing and potential noise sources, measure or estimate noise levels, and evaluate layout options.

b) Determine design noise levels for spaces in and around the building(s).

c) Determine sound insulation of the building envelope, including the ventilation strategy".

11.3.3 BS 8233:2014 suggests design noise levels for various types of building. The recommended noise levels for dwelling houses, flats and rooms in residential use (when unoccupied) can be seen in **Table 3.1** below. This is replicated from Table 4 of Section 7.7.2 of BS 8233:2014. The guidance suggests that "In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values". The noise levels in **Table 3.1** are marginally different to those published in BS 8233:1999 'Sound insulation and noise reduction for buildings –Code of practice', but are based on the existing guidance from the current World Health Organisation (WHO) "Guidelines on Community Noise".

Table 3.1: Summary of Noise Criteria: BS8233:2014

Activity	Location	07:00 to 23:00	23:00 to 0700
Resting	Living room	35 dB $L_{Aeq.16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq.16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq.16hour}$	30 B $L_{Aeq.8hour}$

11.3.4 When considering the noise level criteria considered in **Table 3.1**, the following points should be noted:

1. BS 8233: 2014 suggests that the above criteria should be adopted flexibly and that "where development is considered necessary or desirable... the internal target level may be relaxed by up to 5 dB and reasonable internal conditions still achieved".
2. The noise levels quoted above are annual averages and "do not need to be achieved in all circumstances" e.g. New Years Eve or fireworks night.

3. The noise levels in **Table 3.1** are "for steady external noise sources" such as traffic noise or plant noise. This is a departure from the 1999 version of BS 8233, where the recommended internal noise levels were irrespective of the external noise source and therefore included the suggestion that in order to achieve "reasonable" noise levels within bedrooms at night, L_{AFmax} noise levels should not exceed 45 dB. Whilst this has been omitted from the 2014 version of BS 8233, it does state that "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values." Therefore, at sites which may be affected by individual noise events, it is more appropriate to use the guidance contained within the WHO "Guidelines on Community Noise" which suggest that good sleep will not generally be affected if internal levels of L_{AFmax} 45 dB are not exceeded more than 10-15 times per night.
4. BS 8233:2014 notes that if the design of the building is "relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the facade insulation or resulting noise level".
5. BS 8233 provides guidance for noise in gardens and outdoor amenity space. It suggests that "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments." The guidance does go on to say that these guideline values are not achievable in all circumstances and in some areas, "such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

World Health Organisation Guidelines

11.3.5 BS 8233 is based upon the current World Health Organisation (WHO) guidance "Guidelines on Community Noise". A summary of the noise criteria can be seen in Table 3.2.

Table 3.2: Summary of Noise Criteria: WHO

Residential Environment	Critical Health Effect(s)	L_{Aeq}	L_{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00

Residential Environment	Critical Health Effect(s)	L_{Aeq}	L_{AFmax}	Time Base
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

BS 4242: 2014 'Methods for rating and assessing industrial and commercial sound'

11.3.6 British Standard BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'' provides a method for the measurement and rating of industrial noise or noise of an industrial nature and background noise levels outside dwellings in mixed residential and industrial areas. The rating level (defined in the BS) is used to rate the industrial noise source outside residential dwellings (this is defined as the "specific noise source").

11.3.7 The procedure defined in BS 4142 for predicting the likelihood of complaints is based on establishing the difference between the rating level and the background level outside the residential property of interest. The greater the difference the greater the likelihood of complaints and more specifically:

- "A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

11.3.8 The guidance goes on to state that "where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night." Consequently, when considering the impact within a BS 4142 assessment, it is often also necessary to consider the absolute noise levels experienced at the receptor location within relation to BS 8233 and World Health Organisation guidelines.

IEMA Guidelines for Environmental Noise Assessment

11.3.9 The 2014 IEMA Guidelines for Environmental Noise Assessment address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognises that the effect associated with a particular noise impact will be dependent on a number of factors including but not limited to the sensitivity of the receptor, frequency and duration of the noise source and time of day. However, it stops short of providing specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site by site basis with reference to relevant national and local standards. However, it does provide descriptors used to describe noise impacts, which can be used to assess the impact of changes in traffic flow. The scale can be seen in **Table 3.3** below.

Table 3.3: Classification of magnitude of noise impacts

Criteria for Extent of Noise Impact	Noise Impact Magnitude
> 10 dB	Severe
5 to 10 dB	Substantial
3 to 5 dB	Moderate
1 to 3 dB	Slight
< 1 dB	No Impact

11.3.10 Table 7.7 of the 2014 IEMA Guidelines also presents the relationship between noise impact magnitude, the noise effect and the evaluation of the effect significance. However, the guide does stress that the evaluation of significance is subjective and down to professional judgement taking into account of range of factors including impact magnitude, sensitivity of the receptors and duration of impact. **Table 3.4** summarises this guidance.

Table 3.4: Noise Impact Magnitude, Description and Significance

Magnitude		Description	Significance
Substantial	**Beneficial**	**Receptor Perception = Marked Change** Causes a material change in behaviour and/or attitude; e.g. people begin to engage in activities previously avoided due to noise conditions.	**More Likely to be Significant**
Moderate		**Receptor Perception = Noticeable Improvement** Improved noise climate resulting in small changes in behaviour and/or attitude, e.g. opening windows.	⇕
Slight		**Receptor Perception = Just Noticeable Improvement** Improved noise climate resulting in small changes in behaviour and/or attitude, e.g. turning down volume on television; speaking more quietly; opening windows.	**Less Likely to be Significant**
Negligible		**N/A = No noticeable effect on the receptor**	**Not Significant**
Slight	**Adverse**	**Receptor Perception = Just Noticeable Improvement** Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. closing of windows.	**Less Likely to be Significant**
Moderate		**Receptor Perception = Just Noticeable Improvement** Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television. Potential for sleep disturbance.	⇕
Substantial		**Receptor Perception = Disruptive** Causes a material change if behaviour and/or attitude, e.g. avoided certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep.	**More Likely to be Significant**
Severe		**Receptor Perception = Physical Harm** Significant changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening and medically definable harm.	**Significant**

11.3.11 It should be noted that to bring the noise chapter of the ES in line with the other ES chapters, the magnitude impacts will be described as Negligible, Minor, Moderate and Major. For the purposes of this report, these terms are seen as interchangeable to Negligible, Slight, Moderate and Substantial/Severe.

"Possible Options for the Identification of SOAELs and NOAELs in Support of the NPSE"

11.3.12 This Defra Research Project prepared by AECOM attempts to give values to the concepts of SOAELs and NOAELs, introduced by the NPSE. After the withdrawal of PPG24: Planning and Noise in 2012, which included Noise Exposure Categories, with specific numerical boundaries, the NPSE was heavily criticised for having no specific numerical guidance. Whilst the NPSE and NPPF encourages the

development of location specific criteria, in the context of the specific environment, the absence of guidance meant the implementation of the NPSE was difficult. Consequently, the project identifies both specific possible values and possible ranges of values for SOAELs and NOAELs for different noise sources. These values can be seen in **Table 3.5**.

Table 3.5: Possible Values & Range of Values for LOAEL & SOAEL

Source	Effect	LOAEL	SOAEL
Road	Annoyance (Daytime)	**56** *(53-59)*	**66** *(64-68)*
	Sleep (Night-time)	**46** *(43-52)*	**56** *(51-64)*
Rail	Annoyance (Daytime)	**63** *(61-66)*	**72** *(70-74)*
	Sleep (Night-time)	**55** *(52-63)*	**68** *(61-77)*
Air	Annoyance (Daytime)	**52** *(50-54)*	**60** *(58-62)*
	Sleep (Night-time)	**41** *(40-49)*	**53** *(47-60)*

Assessment Criteria for Impact of Vibration on Humans

11.3.13 The assessment criteria for the impact of vibration on humans is based upon the Vibration Dose Value (VDV) and the criteria is given in **Table 3.6** below. This guidance is given in BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting.

Table 3.6: Summary of Vibration Criteria: BS6472-1: 2008

Place and time	Low probability of adverse comment ($m/s^{1.75}$)[1]	Adverse comment possible ($m/s^{1.75}$)	Adverse comment probable ($m/s^{1.75}$)[2]
Office buildings 16hr day	0.4 to 0.8	0.8 to 1.6	1.6 to 3.2
Residential buildings 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6

Place and time	Low probability of adverse comment ($m/s^{1.75}$)[1]	Adverse comment possible ($m/s^{1.75}$)	Adverse comment probable ($m/s^{1.75}$)[2]
Residential buildings 8hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

1) Below these ranges adverse comment is not expected

2) Above these ranges adverse comment is very likely

Assessment Criteria for Impact of Vibration on Buildings

11.3.14 People who are exposed to perceptible levels of vibration often believe that the vibration they can feel is capable of causing damage to the building they occupy. Humans, however, are relatively sensitive to vibration whereas buildings are not. Consequently, vibration levels at which the onset of building damage occurs are substantially greater than thresholds of perceptibility.

11.3.15 Table 3.7 gives the limits above which cosmetic damage could occur for transient vibration. Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 3.7, and major damage to a building structure can occur at values greater than four times the tabulated values. These values only relate to transient vibration. If there is a continuous vibration the guide values given in Table 3.7 might need to be reduced by up to 50%. This guidance is reproduced from BS 5228-2:2009 and BS 7385-2:1993.

Table 3.7: Transient vibration guide values for cosmetic damage

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4Hz to 15Hz	**15Hz and above**
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4Hz and above	50mm/s at 4Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	15mm/s at 4Hz increasing to 20mm/s at 15Hz	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4Hz and above	50mm/s at 4Hz and above

11.4 BASELINE CONDITIONS

Noise Measurement Overview

11.4.1 In order to determine the extent to which the site is affected by noise and how noise may change as a consequence of the proposed development, a detailed noise measurement study has been carried out at the proposed development site and its environs.

11.4.2 Noise monitoring was conducted over several days in September, October and December 2014. All survey work was supervised by Nick Hawkins of Hawkins Environmental Limited. Nick is a Member of the Institute of Acoustics and holds the Institute of Acoustic's Certificate of Competence in Environmental Noise Measurement.

11.4.3 All noise monitoring was conducted using two Norsonic 140 sound level meters, which both conform to BS EN IEC 61672 as a Class 1 precision measurement system. A Norsonic 1251 field calibrator was used before and after the measurement periods in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB). All of the equipment used has current certificates of calibration.

11.4.4 All noise monitoring has been conducted in accordance with the guidance set out in BS 7445-2: 1991 'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use'. This standard details information that should be recorded in addition to the actual measured levels such as meteorological data, and a description of the noise source itself. The following statistical parameters were recorded during the survey: L_{Aeq}, L_{Amax}, L_{A10}, L_{A50}, L_{A90}. During all monitoring periods, the weather conditions were conducive to successful monitoring, with no rainfall and windspeeds of less than 3 m/s.

11.4.5 The monitoring positions could broadly be placed in two categories:

1. Locations representative of new dwellings within the proposed development (i.e. on-site measurements); and
2. Locations representative of sensitive receptors that could be affected by the proposed development (i.e. off-site measurements).

11.4.6 Noise monitoring data from Category 1 sites would be used to determine the whether the noise environment of the site constrains the development of the site, whereas Category 2 sites would be used to determine the impacts of the proposed development on surrounding sites. **Appendix NI 1** shows a site location plan displaying the locations of the noise monitoring positions.

Off-Site Measurements

11.4.7 To assess the impact of changes in road traffic as a consequence of a development, it is common to use the $L_{A10, 18hr}$ noise descriptor as this is used to describe daytime road traffic noise levels. As an alternative to conducting eighteen-hour noise surveys at each sensitive receptor, it is possible to use a shortened measurement procedure for road traffic dominated sites. The Calculation of Road Traffic Noise (CRTN) describes the shortened measurement procedure, which requires L_{A10} noise levels to be measured during three consecutive hours between 10:00 and 17:00. The shortened measurement procedure requires that the measured L_{A10} noise levels to be arithmetically averaged to provide an assumed $L_{A10.3hr}$ noise level, from which the $L_{A10.18hr}$ can then be estimated. Using the shortened measurement procedure from CRTN it has been possible to estimate the $L_{A10, 18hr}$ for the locations representative of sensitive receptors likely to experience a change in traffic flows as a consequence of the proposed development. The noise measurement data is summarised in Table 4.1 below.

Table 4.1: Summary of Off Site Noise Measurements

Receptor Location	$L_{A10, 18hr}$*
Rear of Bowling Green Farm, Mill Lane	50.8
334-338 Poplars Avenue	54.9
460 Poplars Avenue	53.9
11 Sandy Lane West	66.3

* = Noise measurements, where appropriate, have been corrected in accordance with CRTN so that all measurements are displayed as freefield noise levels.

On-Site Measurements

11.4.8 To determine whether a site is suitable for housing and to determine whether additional mitigation is required to ensure a good level of amenity for the future residents of the proposed development, extensive noise monitoring has been conducted on the site, to determine the existing noise climate of the area.

11.4.9 Noise monitoring was conducted at eight locations across the proposed development site. Long term noise measurements were conducted at a location in the centre of the site (Location F) to characterise the diurnal pattern of noise on the site. Short duration noise measurements were conducted at the other seven locations during the daytime utilising the shortened measurement procedure contained within the Calculation of Road Traffic Noise (CRTN). In order to characterise night time noise at these locations, the Hawkins Approximation of night time noise measurement has been utilised (Hawkins, NC. (2015) 'The use of short duration night-time noise measurements to estimate $L_{Aeq.8hour}$.' Proceedings of Acoustics 2015, Harrogate, UK. The Institute of Acoustics. Vol. 37. Pt. 2.). The Hawkins Approximation determines that for sites where noise is primarily attributed to road traffic

noise, the $L_{Aeq.11pm-1am}$ is a very accurate approximation to determine the night time $L_{Aeq.8hour}$. Comparisons show that on average this approximation over predicts $L_{Aeq.8hour}$ by just 0.6 dB, yet the instances of under prediction are reduce to less than 10% of noise measurements, ensuring that this Approximation is a valid alternative when full unattended night time noise measurements are not possible.

11.4.10 **Table 4.2** summarises the noise measurements conducted on the proposed development site. Figure 4.1 summarises the noise measurements conducted at the long term monitoring location (Location F). **Figure 4.2** shows the reduction in measured noise levels plotted against distance from the M62. **Appendix NI 1** shows the location of these noise monitoring locations.

Table 4.2: Summary of On Site Noise Measurements

Receptor Identifier	Distance from the M62	$L_{Aeq, 16hr}$* Daytime	$L_{Aeq, 8hr}$* Night Time
A	35m	65.5	60.9
B	240m	43.3	38.7
C	390m	43.9	39.3
D	55m	62.5	57.9
E	155m	52.3	47.7
F	188m	52.6	48.0
G	440m	46.2	41.6
H	53m	59.8	55.2

* = Noise measurements, where appropriate, have been corrected in accordance with PPG 24/BS 8233 so that all measurements are displayed as freefield noise levels.

Figure 4.1: Location F Noise Monitoring

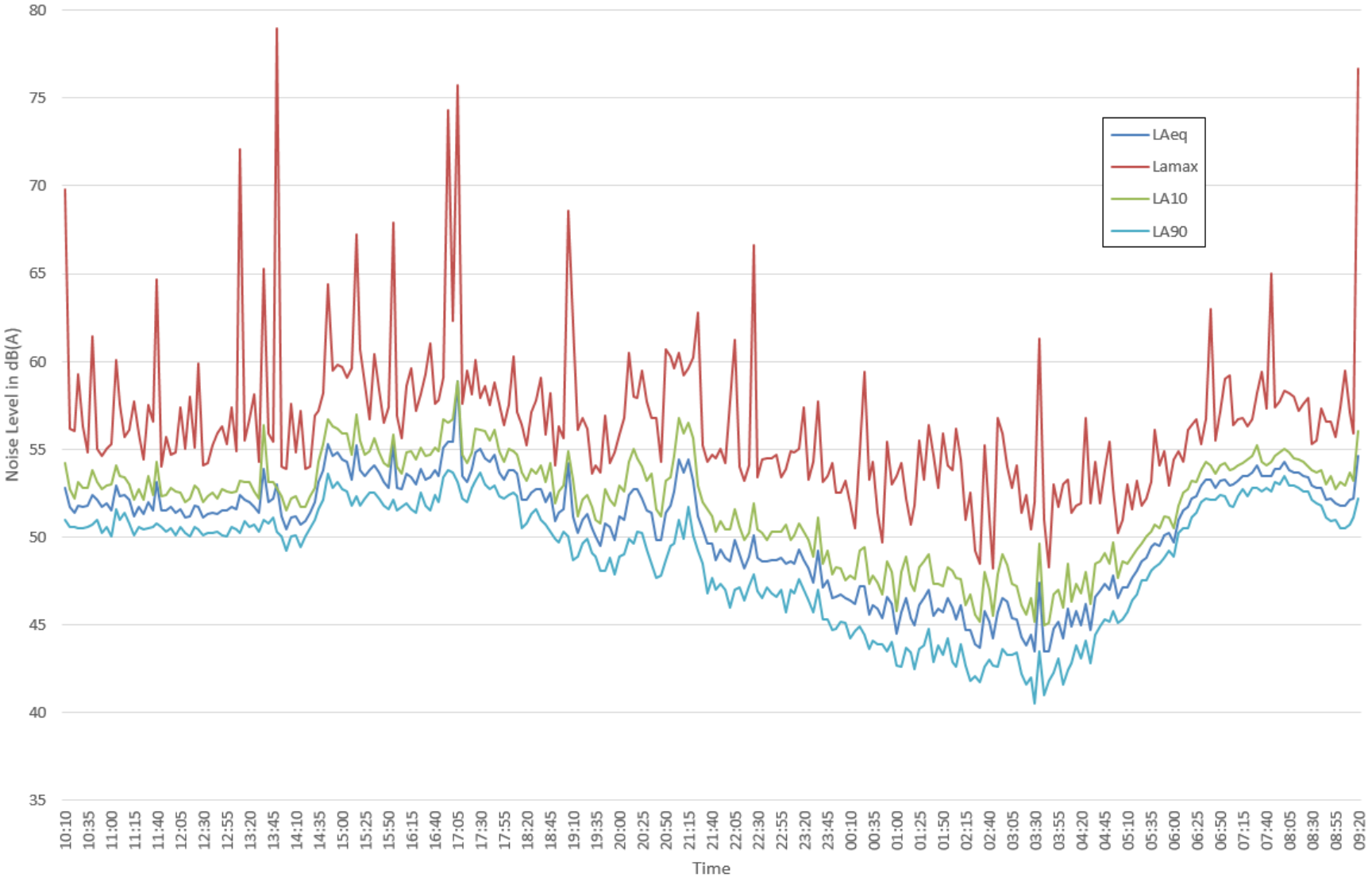


Figure 4.2: Measured Noise Levels Against Distance From the M62 - Daytime

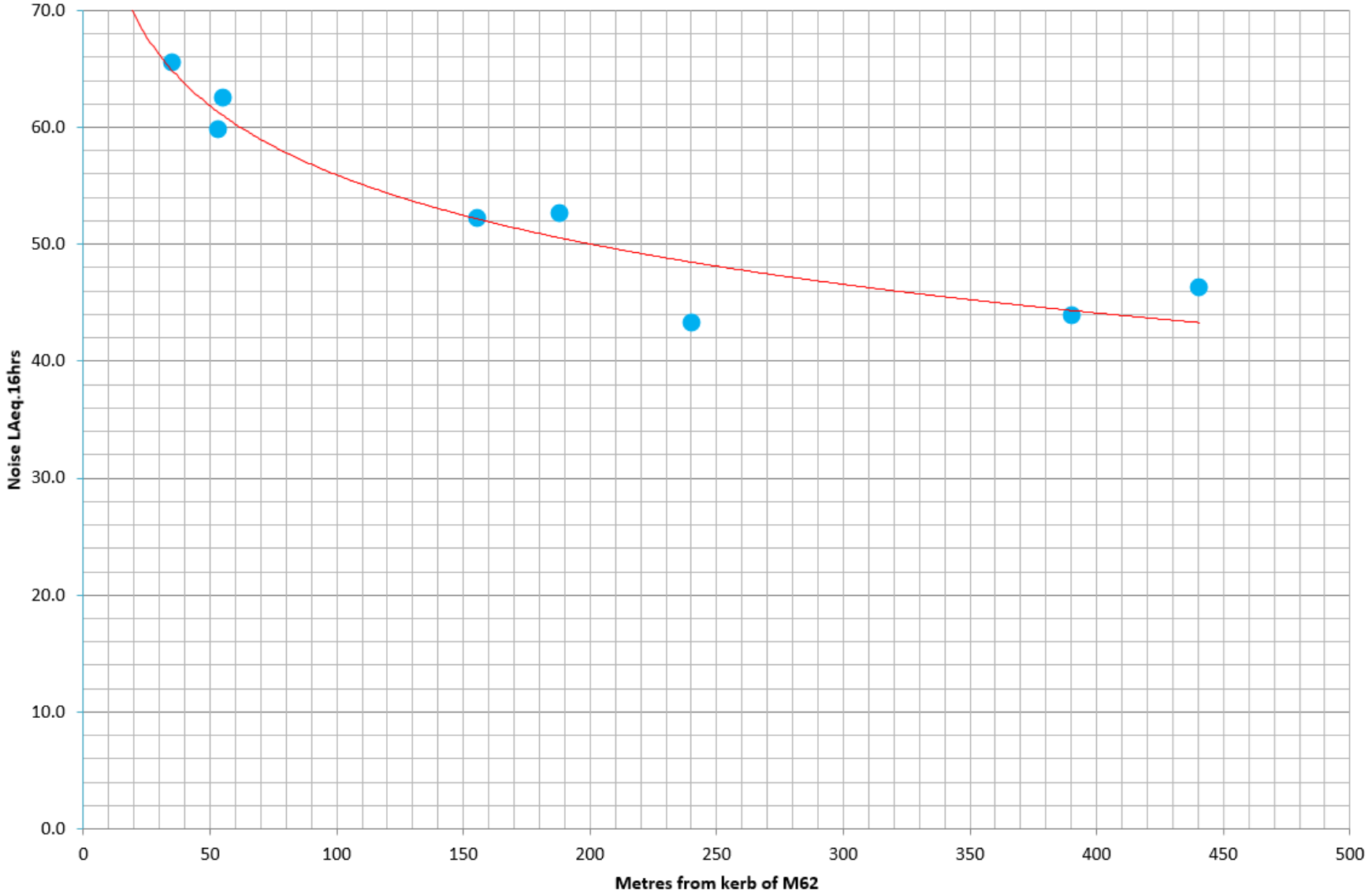
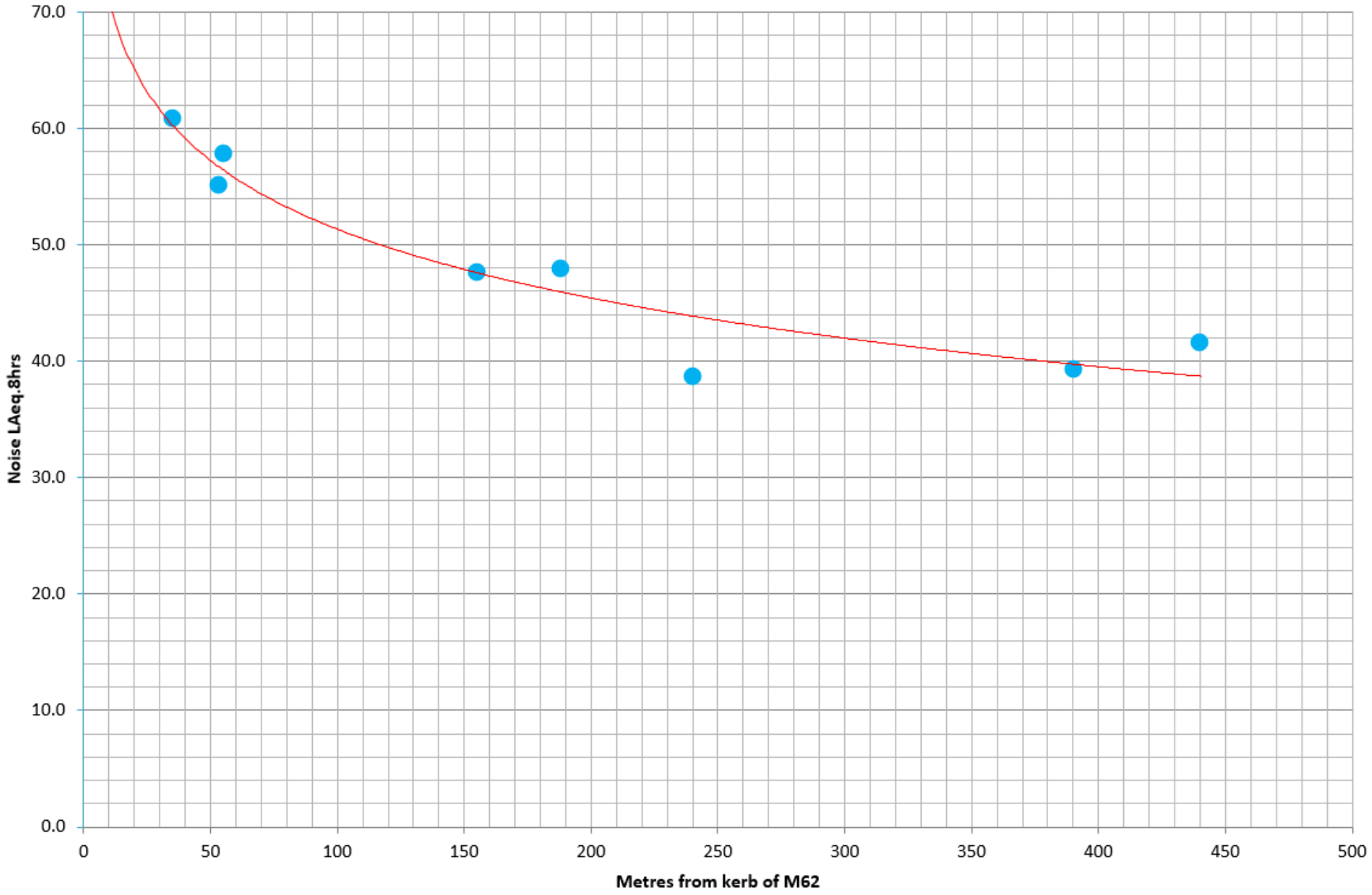


Figure 4.3: Measured Noise Levels Against Distance From the M62 – Night-time



Overview of the Noise Environment

11.4.11 The proposed development site is characterised mainly by road traffic noise, primarily from the M62 which bounds the proposed development site to the north. To the east, south and west of the site, the noise environment is also characterised by noise from surrounding roads; however generally, the M62 remains the dominant source across the whole site and is ever present.

11.4.12 Noise from aircraft is also at time audible on the proposed development site.

Overview of the Vibration Environment

11.4.13 A site walk over survey was conducted to determine whether vibration requires consideration in connection with this Environmental Statement. The development site was visited on a number of occasions between September and December 2014. Due to the separation distances proposed between dwellings and the M62, vibration was not perceptible on the development site. Whilst it is always important to ensure that buildings are designed such that vibration and the propagation of vibration is kept to a minimum, it is not anticipated that vibration is a concern and therefore does not require any more consideration in this Environmental Statement.

11.5 Impacts of the Local Area on The Development

11.5.1 Since the development site is situated close to a number of existing noise sources, noise ingress into the proposed dwellings on site is a significant consideration in the assessment of the site. The assessment of the noise ingress into the proposed rooms for residential purposes and the determination of the facade noise insulation has been assessed using BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'.

11.5.2 The noise measurement survey determined the noise levels to be used in the BS 8233 assessment, which are displayed in **Table 3.1**.

11.5.3 Since the withdrawal of PPG24, the guidance from NPSE regarding NOEL, LOAEL and SOAEL has been used to assess the overall level of likely impact of noise on a proposed development site, albeit without specific noise levels. Unless local policy dictates otherwise, in the absence of further detailed research on levels of noise impact, Hawkins Environmental use the guideline levels contained within "Possible Options for the Identification of SOAELs and NOAELs in Support of the NPSE", as demonstrated in **Table 5.1** for road traffic noise, the dominant noise source at this site.

Table 5.1: Noise Impact Levels

	NOEL $L_{Aeq.T}$	**LOAEL $L_{Aeq.T}$**	**SOAEL $L_{Aeq.T}$**
07:00 to 23:00	<56	56 – 66	>66
23:00 to 0700	<46	46 - 56	>56

11.5.4 By comparing the noise levels in **Table 5.1** to those in **Table 4.2** and **Figure 4.2** it has been possible to calculate the distance from the M62 at which the action levels of NOEL and SOAEL occur. The results of this assessment can be shown in **Table 5.2**.

Table 5.2: Location of NOEL & SOAEL Contours from the M62

	NOEL	SOAEL
07:00 to 23:00	100m	30m
23:00 to 0700	185m	56m

11.5.5 **Table 5.2** shows that the NOEL is considered to be 100m from the M62 during the daytime and 185m from the M62 at night-time. At these distances, there will be no detectable effect on health and quality of life due to the noise. The SOEAL is considered to be 30m from the M62 during the daytime and 56m from the M62 at night-time. At locations closer than these distances to the M62, significant adverse effects on health and quality of life could occur. Between these distances (i.e. between 30m and 100m from the M62 during the day and between 56m and 185m from the M62 during the night), adverse effects on health and quality of life can be detected.

11.5.6 It is clear from **Table 5.2** that any proposed dwellings to be located at a distance greater than 185m from the M62 will be acceptable in terms of noise and no further mitigating measures will be required. However, for dwellings proposed closer than 185m from the M62, they may require additional mitigating measures to ensure that suitable internal noise levels are achieved.

Outdoor Amenity Space

11.5.7 BS 8233 provides guidance for noise in gardens and outdoor amenity space. It suggests that "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments." The guidance does go on to say that these guideline values are not achievable in all circumstances and in some areas, "such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

11.5.8 At this development site, the locations of the 55dB and 50dB $L_{Aeq.16hour}$ contours have been calculated and determined to be at 110m and 200m from the M62 respectively. It is proposed that only apartments with mechanical ventilation would be situated between 40m and 50m from the M62 and these would have no amenity space other than balconies facing away from the M62.These balconies are likely to benefit from the barrier effects of the proposed apartment blocks and are likely to benefit from noise

levels of around 15 dB lower than the front façade of the apartments blocks depending on the mass and size of the proposed apartment blocks. Consequently, any dwellings situated between 40m and 50m from the M62 are likely to benefit from amenity space with noise levels of less than 55 dB(A) due to the barrier effects of themselves.

11.5.9 Dwelling houses with gardens are proposed at distances from the M62 of 50m or more. At distances of between 50m and 110m, gardens may experience noise levels in excess of the “upper guideline value of 55 dB $L_{Aeq,T}$”.

11.6 Impacts of The Development on The Local Area

11.6.1 It has been identified in the scoping phase of the Environmental Impact Assessment, that the following aspects of the proposed development may have an impact on the surrounding environment:

- The impact of the changes in road traffic flows on the noise levels at nearby sensitive receptors;
- The impact of proposed plant on the noise levels at nearby sensitive receptors; and
- The impact of construction noise and vibration (including traffic movements) at nearby sensitive receptors.

The Impact of Changes in Traffic Flow

11.6.2 The proposed development will see traffic generation on the surrounding road network. The transport consultants for the scheme (Highgate Transportation) have provided traffic data for surrounding roads both with and without the proposed development in place, for the proposed opening year of 2019. The traffic data was provided in AADT flows, but have been converted for purposes of the noise assessments to an 18-hour traffic flow (6am to midnight) using conversion factors derived from local traffic count data. Flows with and without other committed development has also been provided in order to assess the cumulative impact of the proposed development. **Table 6.1** summarises the traffic data used in the assessment.

Table 6.1: Summary of Traffic Data

Road	18-hour Flow – 2019			Change
	Base Flow	Base + Committed	Base + Committed + Development	
Poplars Avenue	6827	7179	11472	60%
Mill Lane (Blackbrook Av - site access)	9855	10713	16052	50%
Mill Lane (Radley Lane - Delph Lane)	882	894	2264	153%
Mill Lane (site access - Delph Lane)	9855	10678	12430	16%
Delph Lane	9673	10466	12089	16%
Blackbrook Av (Mill Ln - Capesthorne Rd)	8626	9673	14847	53%

Road	18-hour Flow – 2019			Change
	Base Flow	Base + Committed	Base + Committed + Development	
Blackbrook Av (Capesthorne Rd - Insall Rd)	10308	10513	13359	27%
Blackbrook A (Insall Rd - Birchwood Way)	11172	11184	14188	27%
Birch Avenue	600	600	788	31%
Cotswold Road	2370	2370	3322	40%
Cleveland Road	5198	5221	6227	19%
Sandy Lane West	13465	13530	15494	15%
Sandy Lane	5104	5127	5398	5%
Winwick Road (M62 - Sandy Ln West)	39273	39455	40813	3%
Winwick Rd (Sandy Ln W - Hawleys Ln)	39990	40196	40713	1%
Winwick Road (south of Hawleys Lane)	36150	36244	36838	2%
Capesthorne Road	11648	12354	13659	11%
Enfield Park Road	7097	8808	10419	18%
Crab Lane	10549	12571	14059	12%
Birchwood Way (A50 - Blackbrook Av)	16764	17493	18322	5%
Birchwood Way (Blackbrook Av - Crab Ln)	17370	18681	19175	3%
Birchwood Way (Crab Ln - Birchwood)	18081	21503	22291	4%
Howson Road	3834	3863	4516	17%
A50 Long Lane	15429	15623	16893	8%
Statham Avenue	2187	2287	2852	25%
Northway	3616	3640	4004	10%

Road	18-hour Flow – 2019			Change
	Base Flow	Base + Committed	Base + Committed + Development	
Hilden Road	7238	7391	9220	25%
Insall Road/Fernhead Lane	8085	8473	8620	2%
Cromwell Avenue	10849	11578	12954	12%
Myddleton Lane	2458	3052	4392	44%
Winwick Link Road	16652	16823	17487	4%
Winwick Road (north of M62)	35186	35462	36344	2%
M62 west	119282	119470	120011	0%
M62 east	11837	11856	11910	0%
M62 west on slip	11409	11427	11478	0%
M62 east	115648	115871	116500	1%
M62 east off slip	9409	9424	9467	0%
M62 east on slip	10191	10207	10254	0%

11.6.3 Using the changes in traffic flow, the changes in noise levels have been calculated using the methodology contained within the Calculation of Road Traffic Noise (CRTN). **Table 6.2** summarises the results of these calculations for thirteen representative receptor locations. Locations of the thirteen representative receptors can be seen in **Appendix NI 2**.

Table 6.2: Summary of Traffic Noise Impacts at Representative Receptor Locations

Receptor Location	Change in $L_{A10, 18hr}$
61 Mill Lane	0.8
2 Mill Lane	0.2
15 Colstream Close	1.1
112 St Bridgets Close	1.2

Receptor Location	Change in $L_{A10, 18hr}$
132 Capesthorne Road	0.4
2 Birch Avenue	1.2
36 Cotswold Road	1.5
21 Sandy Lane West	0.6
83 Myddleton Lane	1.6
71 Statham Ave	1.0
150 Poplars Ave	2.0
312 Poplars Ave	2.0
358 Poplars Avenue	2.0

11.6.4 **Table 6.2** shows that in general, the increase in traffic noise levels are less than 2 dB(A) $L_{A10,18hr}$. A change of less than 3 dB(A) is normally considered to be imperceptible. The greatest change would be observed on Poplars Avenue. **Table 6.3** shows the Noise Impact Magnitude, based on the criteria contained within the 2014 IEMA Guidelines for Environmental Noise Assessment.

11.6.5 **Table 6.2** shows that at worst, a number of properties close to the road network are likely to experience "Slight" impacts as a consequence of the propose development. It should be noted that the worst affected properties along Mill Lane, where there is a 153% increase in traffic flow predicted, there will be no impact as the noise created by the increased traffic will still be below the level of noise generated by the M62.

Table 6.3: Summary of Traffic Noise Impact Magnitude

Receptor Location	Noise Impact Magnitude
61 Mill Lane	Negligible
2 Mill Lane	Negligible
15 Colstream Close	Slight/Minor
112 St Bridgets Close	Slight/Minor
132 Capesthorne Road	Negligible

Receptor Location	Noise Impact Magnitude
2 Birch Avenue	Slight/Minor
36 Cotswold Road	Slight/Minor
21 Sandy Lane West	Negligible
83 Myddleton Lane	Slight/Minor
71 Statham Ave	Slight/Minor
150 Poplars Ave	Slight/Minor
312 Poplars Ave	Slight/Minor
358 Poplars Avenue	Slight/Minor

Cumulative Impacts for Traffic Noise

11.6.6 It is understood that there are a number of other committed developments in the area that have been consented that will contribute to increased traffic flow in the area. Whilst the increase in traffic flow direct attributed to the proposed development is unlikely to have a significant impact, the cumulative impact of the other proposed developments combined with the proposed traffic generation from the Peel Hall development has been assessed to determine the cumulative impact from all development.

11.6.7 The committed developments under consideration are as follows:

- Land at Benson Road, Birchwood (ref: 2015/26220).
- Birchwood Shopping Centre (ref: 2015/25880).
- Birchwood Park (ref: 2015/26044, 2014/23358 and 2008/12744).
- Calver Park (ref: 2015/26685 and 2013/22533).

11.6.8 In order to assess the impact of the proposed development, previously the changes in noise level as described in **Table 6.2**, and **Table 6.3** have been modelled both with and without the proposed development, including all committed development traffic. However, in **Table 6.4** and **Table 6.5**, the noise level with the proposed development and all other committed development is compared to noise levels without either the proposed development or other committed development, to determine the cumulative impact of all development in the area.

Table 6.4: Summary of the Cumulative Traffic Noise Impacts at Representative Receptor Locations

Receptor Location	Change in $L_{A10, 18hr}$
61 Mill Lane	0.9
2 Mill Lane	0.2
15 Colstream Close	1.4
112 St Bridgets Close	1.6
132 Capesthorne Road	0.7
2 Birch Avenue	1.2
36 Cotswold Road	1.5
21 Sandy Lane West	0.6
83 Myddleton Lane	2.5
71 Statham Ave	1.2
150 Poplars Ave	2.3
312 Poplars Ave	2.3
358 Poplars Avenue	2.3

Table 6.5: Summary of Traffic Noise Impact Magnitude

Receptor Location	Noise Impact Magnitude
61 Mill Lane	No Impact
2 Mill Lane	No Impact
15 Colstream Close	Slight
112 St Bridgets Close	Slight
132 Capesthorne Road	No Impact
2 Birch Avenue	Slight
36 Cotswold Road	Slight
21 Sandy Lane West	No Impact

Receptor Location	Noise Impact Magnitude
83 Myddleton Lane	Slight
71 Statham Ave	Slight
150 Poplars Ave	Slight
312 Poplars Ave	Slight
358 Poplars Avenue	Slight

11.6.9 The results in **Table 6.4** and **Table 6.5** show that the impact of the increase in traffic flow is still very small at the worst affected sensitive receptors and although the impact is greater when considering all development together, the cumulative impact is still considered to be "Slight" or less at all receptor locations.

The Impact of Plant Noise

11.6.10 The proposed development will see the creation of employment space, a local centre and a new school. All of these land uses could potentially require plant that could make a noise that could cause an impact to new or existing residents of the area. At this stage in design process, the noise output of specific items of plant have yet to be determined and the design, exact location and layout of these building and land uses have yet to be determined; therefore, it is not possible to provide a full and detailed assessment of the likely impact of plant noise.

11.6.11 Whilst some background noise monitoring has been conducted on the site, it is unlikely to be representative of the potentially worst-affected properties. Consequently, it is seen as premature to set environmental noise limits for plant in accordance with BS 4242: 2014 'Methods for rating and assessing industrial and commercial sound'.

11.6.12 Given the type of land uses proposed that may give rise to plant noise, it is unlikely to be a significant constraint upon the development of the site and it is likely that plant noise could easily be mitigated in the design phase. Therefore, it is recommended that when the sites come forward for detailed applications, plant noise can be addressed at this stage.

The Impact of Construction Noise

11.6.13 Given the site's location close to a number of existing dwellings, including a small number of dwellings where the development will actually surrounding the existing dwellings, the potential impact of noise and vibration from construction activities will need to be considered. However, given that a detailed program of works, including identification of all plant to be used and the location and duration of the use of this plant, has yet to be prepared, a quantitative construction noise and vibration assessment has not been carried out. Instead a qualitative assessment focussing on best practicable means has been completed. In general the construction works with the greatest potential to generate noise are demolition works and the piling of foundations. Building construction itself generally results in lower noise levels. Only limited demolition is expected to occur and at this stage no details are available on whether piling of foundations will be require. If piling is not required there is no potential for significant vibration impacts.

11.7 EVALUATION OF SIGNIFICANCE

Impacts of the Local Area on the Development

11.7.1 Noise measurements have indicated that for dwellings up to 185m from the M62 and for gardens up to 110m from the M62, unmitigated noise levels will exceed the recommended maximum internal and external noise levels respectively. However, given that no dwellings are proposed at distances less than 40m from the M62 and only flats are proposed between 40m and 50m from the M62, it is anticipated that through suitable detailed design, taking into account the noise constraints of the site, both suitable internal and external noise levels can be achieved and therefore road noise this is not considered to be a significant constraint upon the development of the site.

Impacts of the Development on the Local Area

11.7.2 The evaluation of key impacts has shown that providing suitable precautions are made in the planning and execution of the construction phase of the development, significant impacts can be avoided. Similarly, provided the Rating noise level from plant remains below the advised levels, significant impacts from plant noise should not occur to either existing or proposed sensitive receptors.

11.7.3 The increase in noise levels as a consequence of changes in traffic flow associated with the proposed development can be seen in **Table 6.4** and **Table 6.5**. The results show that the magnitude of the impact would be considered to be “Slight” or “Minor”. The IEMA Guideline suggest that a “Slight” impact is less likely to be considered significant. Given that the greatest impacts are no greater than 2.0 dB(A), which generally is not perceptible to general population, plus the fact that the main impacts are situated away from the M62, where off-site noise measurements have indicated that the $L_{Aeq.16hours}$ noise levels are below the NOEL level of 56 dBA(A) (as a guide, the $L_{Aeq.16hours}$ noise levels is approximately 2 dB(A) lower than the $L_{A10.18hour}$ noise level), it is anticipated that in terms of noise, an increase of up to 2 dB(A) is unlikely to change behaviour or have any consequence in terms of quality of life; therefore the impact is not considered to be significant.

11.8 MITIGATION

Impacts of the Local Area on the Development

11.8.1 This Environmental Statement accompanies an outline planning application which identifies the number of dwellings that will be constructed within certain areas on the proposed development. Consequently, detailed layouts of how the dwellings will be arranged on the site or how the dwellings will be orientated has not been decided and will not be specified until the detailed application stage, which will follow once planning consent has been gained for the site as a whole. Site layout, dwelling layout and dwelling orientation have a significant impact of the level of mitigation required to ensure suitable internal noise levels. Since these factors have yet to be determined, it will not be possible to assess in detail the level of mitigation required at different areas of the site.

11.8.2 It has been determined that the closest (and therefore worst-affected) dwellings to the M62 will be apartments with mechanical ventilation situated no closer than 40m from the M62. It has been extrapolated from the onsite noise measurement data that flats at 40m from the M62 will have a daytime $L_{Aeq.16hrs}$ of 64 dB(A) and a night-time $L_{Aeq.8hrs}$ of 59 dB(A). Based on these external noise levels, it is possible to calculate the worse-case level of mitigation using the methodology contained within BS 8233. Section 6.7 of BS 8233 provides a rigorous calculation method for determining the internal noise levels within a proposed development. **Figure 8.1** shows the published calculation procedure.

Figure 8.1: BS 8233:2014 External to Internal Noise Level Calculation Method

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{ne}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3 \quad \text{(G.1)}$$

where:

$L_{eq,ff}$ is the equivalent continuous sound pressure level outside the room elements under consideration;

NOTE 3 It is the free-field sound level (i.e. in the absence of the facade), measured or estimated at the intended position of the element under consideration. It is related to the level $L_{eq,1}$ measured within a few millimetres of the actual facade by the relation $L_{eq,ff} \approx L_{eq,1} - 6$, and to the level $L_{eq,2m}$ measured 2 m away from the facade by the relation $L_{eq,ff} \approx L_{eq,2m} - 3$.

NOTE 4 The calculation method assumes the source is traffic noise and a facade shape correction factor is not required. BS EN 12354-3 provides a more detailed calculation method where these assumptions are not valid.

A_0 is a reference absorption area of 10 m² and is independent of frequency;

S_f is the total facade area in square metres (m²) of the room in question;

S_{wi} is the area in square metres (m²) of the windows of the room;

S_{ew} is the area in square metres (m²) of the external wall of the room;

S_{rr} is the area in square metres (m²) of the ceiling of the room;

S is the total area in square metres (m²) of elements through which sound enters the room, i.e. $S_f + S_{rr}$;

$D_{n,e}$ is the insulation of the trickle ventilator measured according to BS EN ISO 10140;

NOTE 5 Where more than one ventilation unit is required to achieve the background ventilation, the $D_{n,e}$ of the combined ventilators should be used in the calculation.

R_{wi} is the sound reduction index (octave band value) of the window (see Annex C);

R_{ew} is the sound reduction index (octave band value) of the external wall (see Annex C);

R_{rr} is the sound reduction index (octave band values) of the roof/ceiling (see Annex C);

A is the equivalent absorption area of the receiving room being considered (see Annex C);

3 is a correction factor.

11.8.3 Using the equation in **Figure 8.1**, it is possible to calculate the internal noise levels based on typical construction details and typical room dimensions and therefore calculate the minimum R_w for the windows. It is widely known that a masonry wall will have a R_w of at least 50 dB, sometimes as high as 55 to 60 dB. The R_w of individual glazing solutions will vary considerably. However, typical double glazed window systems will have a R_w of 31 to 33 dB.

11.8.4 **Table 8.1** shows the results of the calculations based on a daytime $L_{Aeq.16hrs}$ of 64 dB(A) and a night-time $L_{Aeq.8hrs}$ of 59 dB(A) at 40m from the M62. The calculations show that a double glazed window system with a R_w of 34 dB or more, with a mechanical ventilation system, would achieve noise levels less than the recommended maximum levels contained within BS 8233. Windows with a lower R_w of 30 dB would be suitable for living rooms and all other non-bedrooms. Measurements at 35m from the

M62 (i.e. marginally closer than the proposed dwellings) indicate that L_{Amax} noise levels rarely exceed 78 dB at this location. A double glazed window system with a R_w of 34 dB or more in the bedrooms would ensure internal L_{Amax} noise levels would not exceed 45 dB.

11.8.5 Since the calculations of internal noise levels at dwellings 40m from the M62 have indicated that suitable internal noise levels can be achieved, providing bedroom windows have a minimum R_w of 34 dB and all other rooms have a minimum window R_w of 30, it can be concluded that the rest of the proposed development site would also benefit from suitable internal noise levels providing the glazing meets these minimum criteria. For comparison, a typical double glazed window systems will have a R_w of 31 to 33 dB. It should be noted that dwellings further from the M62 would benefit from lower noise lowers due to both distance and the screening effects of other buildings between those dwellings and the M62, the characteristics of which have yet to be determined. Therefore, it is likely that by the second or third line of houses from the M62, a typical double glazed window systems with a R_w of 31 to 33 dB would be sufficient in all rooms.

Table 8.1: Summary of BS 8233 Calculations and Minimum Window R_w – Flats at 40m from the M62

Room Type	Day L_{Aeq}				Night L_{Aeq}				Minimum Window R_w	Ventilation Required?
	External	Internal			External	Internal				
		BS 8233 Max.	Windows Closed	Windows Open		BS 8233 Max.	Windows Closed	Windows Open		
Living room	64	35	34.3	49	-	-	-	-	30	Yes
Bedroom	64	35	30.4	49	59	30	25.4	44	34	Yes

Outdoor Amenity Space

11.8.6 Dwelling houses with gardens are proposed at distances from the M62 of 50m or more. At distances of between 50m and 110m, gardens may experience noise levels in excess of the "upper guideline value of 55 dB $L_{Aeq,T}$". However, as with the apartment blocks situated between 40m and 50m from the M62, dwelling houses between 50m and 110m from the M62 could be arranged such that the dwellings themselves act as a noise barrier to the gardens behind the dwellings. Similarly, if the apartment blocks or the first line of dwelling houses are sufficiently tall enough and form a continuous barrier, they may provide significant protection to gardens behind, such that noise levels in all gardens could be below the "upper guideline value of 55 dB $L_{Aeq,T}$". Consequently, it is recommended that at the detailed application stage, detailed calculations are conducted to ensure that noise levels in gardens between 50m and 110m from the M62 do not exceed the "upper guideline value of 55 dB $L_{Aeq,T}$" and the design of the site is orientated to facilitate this, or alternative mitigation is put in place to ensure suitable external noise levels.

Changes in Traffic Flow

11.8.7 Mitigation to control additional traffic noise as a consequence of the proposed development is not required as the impact would be considered "Slight/Minor" and not considered to be significant.

The Impact of Plant Noise

11.8.8 Depending on the location and sound pressure output of the proposed plant, mitigation may also be required to reduce noise levels below the Rating level as described earlier in this chapter. However, mitigation for both plant and construction noise should be routine and could be specified at a later date.

The Impact of Construction Noise

11.8.9 Mitigating measures are likely to be required to control construction noise. It is proposed that to minimise construction noise impacts, all construction work should take place in standard construction hours, which are:

- Monday – Friday: 08:00 – 18:00
- Saturdays: 08:00 - 13:00; and
- Sundays and Public Holidays: No construction

11.8.10 It is recommended that the contractor would be required to follow Best Practicable Means to reduce the noise impact upon the local community including the following:

- Operating hours should be adhered to, with local residents being notified of any changes to the operating hours of the site;
- All construction plant and equipment should comply with EU noise emission limits;
- Where practicable, design and use of site hoardings and screens to provide acoustic screening of noise emitting equipment;
- Proper use of plant with respect to minimising noise emissions and regular maintenance. All vehicles and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers and should be maintained in good efficient working order;
- Selection of inherently quiet plant where appropriate. All major compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- Plant and equipment such as flat bed lorries, skips and chutes should be lined with noise attenuating materials. Materials should be handled with care and be placed, not dropped. Materials should be delivered during normal working hours;
- All ancillary plant such as generators, compressors and pumps should be position so as to cause minimum noise disturbance, i.e. furthest from receptors or behind close boarded noise barriers. If necessary, acoustic enclosures should be provided and/or acoustic shielding;
- Making positive contact with local residents and providing information on the construction can be the most effective method of reducing the impact of construction noise on sensitive receptors. If appropriate, the above measures can be incorporated into a construction environmental management plan;
- Construction contractors should be obliged to adhere to the codes of practice for construction working given in BS 5228 and the guidance given therein regarding minimising noise emissions from the site; and
- Reference should be made to the Building Research Establishment, BRE 'Pollution Control' guidelines, Parts 1-57.Noise Monitoring.

11.9 Conclusions

11.9.1 A detailed noise measurements survey and assessment has been carried out in accordance with BS 7445-2: 1991 'Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use', with the assessment methodology used to assess noise ingress into the proposed development conducted in accordance with BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings', and the National Planning Policy Framework.

11.9.2 The assessment shows that proposed development site is characterised mainly by road traffic noise, primarily from the M62 which bounds the proposed development site to the north. To the east, south and west of the site, the noise environment is also characterised by noise from surrounding roads; however generally, the M62 remains the dominant source across the whole site and is ever present.

11.9.3 The constraints of the proposed development site show that suitable internal noise levels in accordance with BS 8233 can be achieved through the provision of suitable glazing. At distances of between 50m and 110m from the M62, gardens may experience noise levels in excess of the "upper guideline value of 55 dB $L_{Aeq,T}$". However, the exact site layout is not yet known, which will have a significant impact on the barrier effects that the proposed buildings may have on their associated gardens. It is recommended that detailed modelling of garden noise is carried out for distances up to 110m from the M62 when detailed planning applications are submitted and appropriate mitigation is implemented accordingly.

11.9.4 The impacts of the proposed development have been assessed. The impacts of construction noise and vibration will need to be carefully considered and managed and appropriate site specific mitigation implemented. Traffic generation is likely to increase noise levels on surrounding roads. However, the assessment has shown that at worst, the impact of the increase in traffic noise levels will be less than 2 dB(A) $L_{A10,18hr}$. A change of less than 3 dB(A) is normally considered to be imperceptible. According to the criteria contained within the 2014 IEMA Guidelines for Environmental Noise Assessment, this level of impact would be considered to be "Slight" (or "Minor") and as such, the impact is considered to be not significant.

11.9.5 Since it has been shown that the proposed development meets the guidance contained within the 2014 IEMA Guidelines for Environmental Noise Assessment and BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings', it is considered that the proposed development adheres to the principles of the National Planning Policy Framework since the new development will not be "put at risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution". Since it has been shown that in terms of noise, the proposals adhere to local and national planning policy, it is considered that noise should not be a constraint on the proposed residential development.

12.0 AIR QUALITY

This section has been prepared by Hawkins Environmental Limited assesses the overall levels of nitrogen dioxide (NO_2) and particulates (PM_{10} and $PM_{2.5}$) in the vicinity of the site. A glossary of terms is detailed in **Appendix AI 1.** The constraints which existing air quality may have on the proposed development have been considered and forms part of this assessment. However, the impacts of the development on the air quality of surrounding properties have also been considered.

12.1 Planning Policy

The National Planning Policy Framework

12.1.1 In March 2012, the National Planning Policy Framework[28] (NPPF) was published to replace the thousands of pages of national planning policy guidance, including guidance on air quality. Amongst other documents, the NPPF replaces the 2004 document Planning Policy Statement 23 (PPS 23) 'Planning and Pollution Control' [29] published by the Office for the Deputy Prime Minister, which is now officially withdrawn as official government guidance. PPS 23 provided planning policy on all types of pollution control, including air quality.

12.1.2 The NPPF includes 12 core planning principles which include:

- "Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of buildings;
- Take account of the different roles and character of different areas, promoting the vitality of the main urban areas, protecting the Green Belts around them, recognising the intrinsic beauty of the countryside; and
- Contribute to conserving and enhancing the natural environmental and reducing pollution"

12.1.3 It also states that the planning system "should contribute to enhance the natural environment, by... preventing both new and existing development from contributing to or being put at risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution…To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location".

12.1.4 The NPPF briefly talks specifically about air quality stating that "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from

[28] http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf
[29] Planning Policy Statement 23: Planning & Pollution Control (2004). Office for the Deputy Prime Minister .

individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

National Planning Practice Guidance on Air Quality

12.1.5 The NPPG "Provides guiding principles on how planning can take account of the impact of new development on air quality". The Guidance provides signposts as to how to address air quality in planning application and highlights the importance of local plans.

12.1.6 The Guidance states that "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values" and "It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit". The Guidance goes on to say that "Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".

12.1.7 The Guidance identifies the content of an air quality assessment, stating clearly that "Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality" and that "Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".

Local Policy

12.1.8 Policy QE 6 of Warrington Borough Council's Local Plan Core Strategy (Adopted July 2014) states that "The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration the following: … Air quality… the effect and timing of traffic movement to, from and within the site and car parking including impacts on highway safety."

12.2 Assessment Criteria

Impacts of the Local Area on the Development

12.2.1 The Limit Values and National Air Quality Objectives[30] (NAQO's) are derived from air quality standards set to protect health and are set out at Schedule 2 of the Air Quality Standards Regulations 2010. The Limit Values address social and economic factors as well as the health standards.

12.2.2 For the purposes of this development proposal, the National Air Quality Objectives and their Limit Values will form the basis of the air quality assessment. The NAQO's are based on an assessment of the effects of each pollutant on public health. Therefore, they are a good indicator in assessing whether, under normal circumstances, the air quality in the vicinity of a development is likely to be detrimental to human health. In determining whether air pollutant levels may constrain development, the results of the study have been compared against the acceptability criteria. The Air Quality Standards are displayed in Table 3.1 below.

Table 3.1: Air Quality Standards

Pollutant	Averaging Period	NAQO Limit Value
Sulphur Dioxide	One Hour	350 µg/m3 Not to be exceeded more than 24 times per calendar year
	One Day	150 µg/m3 Not to be exceeded more than 3 times per calendar year
Nitrogen Dioxide	One Hour	200 µg/m3 Not to be exceeded more than 18 times per calendar year
	Calendar Year	40 µg/m3
Benzene	Calendar Year	5 µg/m3
Lead	Calendar Year	0.5 µg/m3
PM_{10}	One Day	50 µg/m3 Not to be exceeded more than 35 times per calendar year
	Calendar Year	40 µg/m3
$PM_{2.5}$	Calendar Year	25 µg/m3
Carbon Monoxide	Maximum daily running 8 hour mean	10 mg/m3

[30] http://www.legislation.gov.uk/uksi/2010/1001/contents/made

Impacts of the Development on the Local Area

12.2.3 To determine the impact of the proposed development on surrounding local sensitive receptors, the impact magnitude has been derived from Land-Use Planning & Development Control: Planning for Air Quality, jointly published by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) in May 2015. Table 3.2 identifies the Advice given in the IAQM/EPUK Guidance regarding describing the impacts.

Table 3.2: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentrations Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

12.2.4 The guidance goes on to offer the following explanation:

1. "AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. .less than 0.5% will be described as Negligible.
3. The Table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it."

12.2.5 It should be noted that to bring the noise chapter of the ES in line with the other ES chapters, the magnitude impacts will be described as Negligible, Minor, Moderate and Major. For the purposes of this report, these terms are seen as interchangeable to Negligible, Slight, Moderate and Substantial.

12.2.6 Land-Use Planning & Development Control: Planning for Air Quality, takes extensively about assessing significance in air quality assessments. As described in the guidance, the "assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect, but there will be other influences that might need to be accounted for. The impact descriptors set out in [Table 3.2 of this report] are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances." The guidance goes on to say that any significance needs to be assessed using a certain amount of professional judgement and should take into account "the existing and future air quality in the absence of the development; the extent of current and future population exposure to the impacts; and the influence and validity of any assumptions adopted when undertaking the prediction of impacts".

12.3 Construction Dust Impact Assessment

12.3.1 The Institute of Air Quality Management published in 2014[31] a complex risk based assessment methodology to determine the significance of an air quality impact arising from the construction of a new development, based on the magnitude of change. The methodology provides a five Step approach to determining the significance:

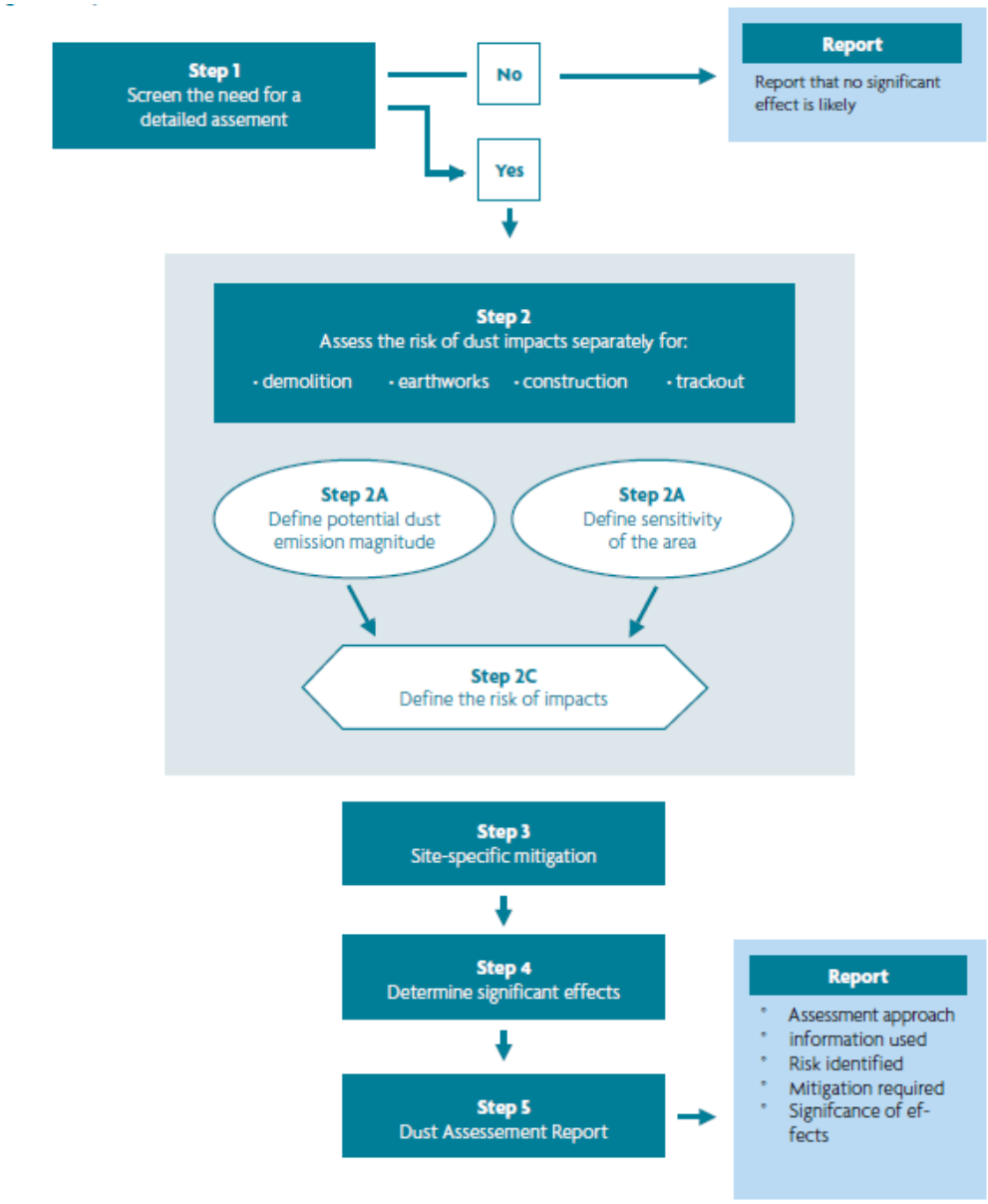
- **"STEP 1** is to screen the requirement for a more detailed assessment. No further assessment is required if there are no receptors within a certain distance of the works.
- **STEP 2** is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition; earthworks; construction; and trackout) and takes account of:
    - the scale and nature of the works, which determines the potential dust emission magnitude (STEP 2A); and
    - the sensitivity of the area (STEP 2B).

  These factors are combined in STEP 2C to give the risk of dust impacts.
  Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.
  Based on the threshold criteria and professional judgement one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.
- **STEP 3** is to determine the site-specific mitigation for each of the four potential activities in STEP 2. This will be based on the risk of dust impacts identified in STEP 2. Where a local authority has issued guidance on measures to be adopted at demolition / construction sites, these should also be taken into account.
- **STEP 4** is to examine the residual effects and to determine whether or not these are significant.
- **STEP 5** is to prepare the dust assessment report."

12.3.2 Figure 3.1 shows a schematic diagram of the assessment process, reproduced from the IAQM guidance.

[31] Holman *et al* (2014). *IAQM Guidance on the assessment of dust from demolition and construction,* Institute of Air Quality Management, London. www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

Figure 3.1: Schematic Diagram of the Construction Dust Assessment Process



12.4 Scoping

Overview

12.4.1 The National Planning Practice Guidance on Air Quality is explicit in stating that "Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality". This is reiterated in Land-Use Planning & Development Control: Planning for Air Quality, jointly published by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) in May 2015, which provided guidance on screening as to whether an air quality assessment is required and what needs to assessed.

Impacts of the Local Area on the Development

12.4.2 The IAQM/EPUK Guidance suggests that whether an assessment of the impacts of the local area on the proposed development is required is a matter of judgement, but should take into account:

- "the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;
- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO2), that would cause unacceptably high exposure for users of the new development; and
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development."

Impacts of the Development on the Local Area

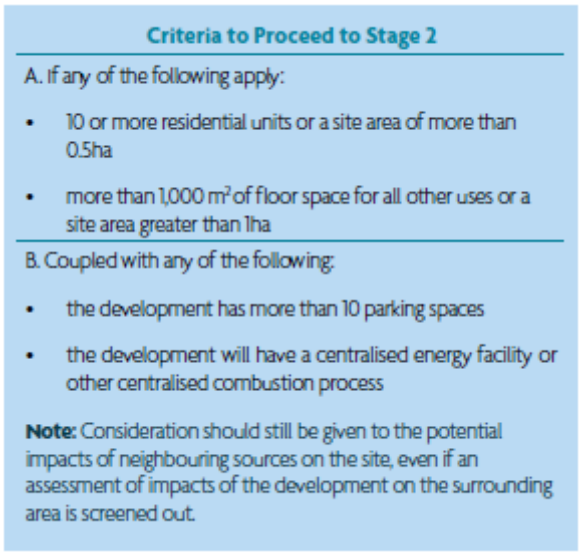
12.4.3 To determine whether an assessment of the impacts of the development on the local environment is required, the IAQM/EPUK Guidance suggests a two stage approach. The guidance states that "The first stage is intended to screen out smaller development and/or developments where impacts can be considered to have insignificant effects. The second stage relates to specific details regarding the proposed development and the likelihood of air quality impacts."

12.4.4 Figure 4.1 reproduces Stage 1 of the IAQM/EPUK Guidance' two stage approach. In order to proceed to Stage 2, development needs to meet both one of the criteria in "A", and one of the criteria in "B". If the development fails to meet these criteria, then an air quality assessment looking at the impacts of the development on the local area will not be required.

12.4.5 Figure 4.2 reproduces Stage 2 of the IAQM/EPUK Guidance' two stage approach. If the development meets the criteria contained within Stage 1, "more specific guidance as to when an air quality assessment is likely to be required to assess the impacts of the proposed development on the local

area." If the development then meets any of the eight criteria in Stage 2, an assessment of the impacts of the proposed development on the surrounding environment will be required.

Figure 4.2: IAQM/EPUK Guidance – Stage 1 Criteria



Criteria to Proceed to Stage 2

A. If any of the following apply:

- 10 or more residential units or a site area of more than 0.5ha
- more than 1,000 m² of floor space for all other uses or a site area greater than 1ha

B. Coupled with any of the following:

- the development has more than 10 parking spaces
- the development will have a centralised energy facility or other centralised combustion process

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

Figure 4.3: IAQM/EPUK Guidance – Stage 2 Criteria

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment [a]
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight)	A change of HDV flows of - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor Coupled with the car park having more than 100 movements per day (total in and out)
7. Have one or more substantial combustion processes	Where the combustion unit is: - any centralised plant using bio fuel - any combustion plant with single or combined thermal input >300kW - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year)
8. Have a combustion process of any size	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.

Site Specific Scoping Assessment

12.4.6 The proposed development site is bounded to the north by a known Air Quality Management Area, which extends 50m from the kerb of the motorway into the development site and therefore, it is possible that exceedances of the National Air Quality Objective for NO_2 could occur within the development site; therefore an assessment of the impacts of the local area on the development is required**.**

12.4.7 The proposed development consists of up to 1200 new dwellings plus car parking; therefore Stage 1 "A" and "B" criteria are both met. Although no combustion processes are proposed, since there could be increasing in pollutant concentrations, an assessment of the impacts of the development on the local area will be required**.**

12.5 Methodlogy

12.5.1 In order to determine the extent to which air quality issues will affect the development of the site and its environs, the study has considered the following:

Baseline Conditions

- Conduct a review of the most recent progress reports on air quality carried out by the Local Authority for the area, as submitted to the Department for the Environment, Food and Rural Affairs (Defra);
- Determine whether the site is situated within a designated Air Quality Management Area;
- Conduct local air quality monitoring within the area of the development site (details of which can be seen in **Appendix AI 3**);
- Review the Environment Agency's register of industrial sites under the EC Integrated Pollution Prevention and Control Directive (IPPC) to determine whether industrial sources of air pollution could be affecting the site;
- Review the Local Authority's list of registered Part A2 and Part B permitted premises under the PPC Regulations determine whether any other sources of air pollution could be affecting the site;
- Using the methodology described in the Breeze Roads Detailed Dispersion Model (details of which can be seen in **Appendix AI 4**, utilising data described in **Appendix AI 5**), predict concentrations of air pollutants onsite within the baseline year.

Impacts of the Local Area on the Development

- Using the methodology described in the Breeze Roads Detailed Dispersion Model (details of which can be seen in **Appendix AI 4**, utilising data described in **Appendix AI 5**), predict concentrations of air pollutants onsite within proposed opening year;
- Determine whether future residents within the proposed development are likely to be expose to levels of air pollution in excess of the National Air Quality Objectives;

Impacts of the Development on the Local Area

- Predict of changes in air pollutant concentrations in the vicinity of the site as a consequence of changes in traffic, including the cumulative impacts of the proposed development;
- Comment upon the likelihood on impacts arising from combustion emissions from onsite plant;
- An assessment of the likelihood of issues relating to dust emissions during the construction phase of the project.

12.6 Baseline Conditions

Air Quality Review and Assessment

12.6.1 Local Authorities have been required to carry out a review of local air quality within their boundaries to assess areas that may fail to achieve the NAQO's. Where these objectives are unlikely to be achieved, local authorities must designate these areas as Air Quality Management Areas (AQMA's) and prepare a written action plan to achieve the NAQO's.

12.6.2 The review of air quality takes on several prescribed stages, of which each stage is reported. Following Warrington Borough Council's initial review of air quality within the Borough in 2001, it showed that the National Air Quality Objectives for nitrogen dioxide (NO_2) would be complied with in the vast majority of the Warrington, within the exception of the Motorway network; therefore a 50m strip either side of the carriageway was therefore formally designated as an AQMA in 2001. Subsequent assessments have identified additional alternative areas within the Borough experiencing marginal exceedances of the Objective levels.

12.6.3 It is understood through discussions with Warrington Borough Council that although the AQMA remains in place up to 50m from the carriageway, recent improvements in air quality results in exceedances up to distances significantly less than 50m from the carriageways and any exceedances are very marginal. Currently, there are around 40 properties around the motorway network within the AQMA where exceedances of the NAQO would be expected.

12.6.4 Recent air quality monitoring to the west of the proposed development site at the junction of Winwick Road and Long Lane indicate marginal exceedances of the NAQO due to the presence of queuing traffic. Although the area has not been declared an AQMA, Warrington Borough Council is continuing to assess the situation.

Industrial Emissions

12.6.5 Both the Environment Agency's register of industrial sites under the EC Integrated Pollution Prevention and Control Directive (IPPC) and the Local Authority's list of registered Part A2 and Part B permitted premises under the Pollution, Prevention and Control Act 1999 and the Environmental Permitting (England and Wales) Regulations 2010 have shown that there are no sites within close proximity of the development site that could be affecting air pollutant levels.

Baseline Onsite Pollution Concentrations

12.6.6 Since Warrington Borough Council did not have any air quality monitoring equipment on or in the vicinity of the proposed development site, it was considered that there was no suitable data that could be used for verification purposes, or that would be representative of the development site. As a

consequence, this air quality assessment was accompanied by four months Nitrogen Dioxide monitoring. **Appendix AI 3** describes the air quality monitoring process, with **Appendix AI 2** showing the locations of the air quality monitoring.

12.6.7 Table 6.1 shows the seasonally adjusted and bias corrected results of the diffusion tube survey for 2014 and shows that adjacent to the M62, concentrations of NO_2 are around the NAQO level, which concurs with the AQMA designation. However, the results show that there has been an improvement in air pollution, such that by 100m from the carriageway, concentrations of NO_2 are around background levels.

Table 6.1: Bias Adjusted Results of the NO_2 Diffusion Tubes

Location	**NO_2 ($\mu g/m^3$)**
	Seasonally Adjusted Bias Corrected Annual mean
End of Mill Lane	25.70
Footpath Sigh, Radley Lane	28.09
Footbridge M62*	30.53
Transect - M62 boundary	39.34
Transect - 50m	24.73
Transect - 100m	22.99
Transect - 150m	24.96
1st/14th Warrington West Scout Hut	17.70
Adjacent to wood in middle of site	20.86
NAQO	**40**

*= Based on only two months of data – use with caution

12.7 Impacts of the Local Area on the Development

Annual Mean Concentrations

12.7.1 To characterise the air quality at development site when constructed, predictions of air pollutant concentrations at the development site have been made using the air quality model for proposed year of occupation (2019). **Appendix AI 4** provides a description of the methodology used within the assessment, including the method to calculate NO_2 from NO_x. **Appendix AI 5** outlines the input data, including traffic data, background concentrations and emission factors. In addition, details of the verification factor applied to the predicted concentrations of NO_x can also be found in **Appendix AI 5**.

12.7.2 Concentrations have been calculated for nineteen representative points across the development site. The nine diffusion tube locations have been modelled, plus 10 additional locations through the centre of the site at 10m intervals from the M62 to more accurately predict the reduction in NO_2 due to distance from the M62. The traffic flows used for the predictions in Table 7.1 include 2019 baseline flows, plus development related traffic and al committed development traffic flows.

12.7.3 The locations of these receptor locations can be seen on the site plan in **Appendix AI 2**. The results of these predictions can be seen in Table 7.1.

Table 12.7.1: Predicted Future Air Quality Concentrations 2019 – Development Site

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual mean	Annual mean	Days >50 µg/m^3	Annual mean
End of Mill Lane	27.91	18.31	1.65	14.20
Footpath Sigh, Radley Lane	27.12	18.20	1.56	14.13
Footbridge M62*	32.56	18.93	2.21	14.62
Transect - M62 boundary	33.69	19.08	2.37	14.72
Transect - 50m	28.32	18.36	1.69	14.24
Transect - 100m	27.41	18.24	1.59	14.16
Transect - 150m	26.90	18.18	1.54	14.12
1st/14th Warrington West Scout Hut	25.92	18.05	1.44	14.03
Adjacent to wood in middle of site	26.45	18.11	1.49	14.07
Centre of Site – 10m from M62	31.75	18.81	2.11	14.54
Centre of Site – 20m from M62	30.36	18.63	1.93	14.42
Centre of Site – 30m from M62	29.44	18.50	1.82	14.33
Centre of Site – 40m from M62	28.91	18.43	1.76	14.29
Centre of Site – 50m from M62	28.50	18.38	1.71	14.25
Centre of Site – 60m from M62	28.18	18.34	1.68	14.22

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual mean	Annual mean	Days >50 µg/m^3	Annual mean
Centre of Site – 70m from M62	27.94	18.31	1.65	14.20
Centre of Site – 80m from M62	27.74	18.28	1.63	14.19
Centre of Site – 90m from M62	27.57	18.26	1.61	14.17
Centre of Site – 100m from M62	27.43	18.24	1.60	14.16
NAQO	**40**	**40**	**35**	**25**

12.7.4 If pollutant concentrations in Table 7.1 are compared to the National Air Quality Objectives, it can be seen that on the development site during the opening year, concentrations of NO_2, PM_{10} and $PM_{2.5}$ are all below the National Air Quality Objectives.

12.7.5 The results appear to show much lower pollutant concentrations than originally thought, considering an AQMA has been declared 50m either side of the M62. The most northern 30-40m of the proposed development site would be sited within an AQMA and therefore it should be expected that exceedances of the NAQO for NO_2 could occur in the area of the development site closest to the M62. It is understood that at the time of declaration in 2001, exceedances of the NO_2 Objective could occur up to around 50m from the Motorway, hence the designation up to 50m from the Motorway; however, it is also understood that pollutant concentrations in the area have decreased since 2001, and therefore the area experiencing exceedances of the Objective are now likely to be less than 50m from the carriageway. Table 7.1 shows that this area will have decreased in size sufficiently by 2019 such that none of the development site would be situated in an area where exceedances could occur.

12.7.6 Although exceedance of the NAQOs are not expected on the proposed development, a precautionary approach has been adopted to safeguard the amenity of the future residents. Consequently, early in the design process it was decided that no development of sensitive land uses (e.g. dwellings, educational/healthcare uses) would be situated within the AQMA (i.e. all would be greater than 50m from the Motorway). The exception to this would be to allow apartment developments with mechanical ventilation to be positioned in the zone 40-50m from the Motorway, within the AQMA but within the zone where it is expected that exceedances of the NAQOs no longer occur. The positioning of barrier blocks of this kind will have potentially significant benefits in terms of noise levels across the development site.

12.7.7 Given that the closest dwellings are likely to be greater than 40m from the M62 and the closest naturally ventilated dwellings will be greater than 50m from the M62, even assuming a degree of error in the measurements and calculations, it is not expected that any new dwellings will be situated in an area where exceedances of the NAQOs are likely to occur.

NO_2 1-hour Exposure

12.7.8 According to research conducted in 2003[32], there is only a risk that the NO_2 1-hour objective (200 µg/m^3) could be exceeded if the annual mean nitrogen dioxide concentration is greater than 60 µg/m^3. At the development site, the worst case annual mean is 33.69 µg/m^3, therefore hourly exceedances are not expected to occur.

[32] Analysis of Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites, Laxen and Marner, 2003.

12.8 Impacts of the Development on the Local Area

Traffic Related Emissions

12.8.1 To assess the impact of a proposed development on local air quality, the methodology from Land-Use Planning & Development Control: Planning for Air Quality, jointly published by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) in May 2015 has been implemented.

12.8.2 A transport assessment was prepared for the planning application by Highgate Transportation which indicates the number of vehicle movements generated by the proposed development. It should be noted that the traffic data used in these assessments does include all committed development.

12.8.3 To characterise the change in air quality as a consequence of the proposed development, predictions of air pollutant concentrations at sensitive receptors have been carried out for the proposed opening year of the development (2019) both with and without the proposed development traffic. **Appendix AI 4** provides a description of the methodology used within the assessment, including the method to calculate NO_2 from NO_x. **Appendix AI 5** outlines the input data, including traffic data, background concentrations. In addition, details of the verification factor applied to the predicted concentrations of NO_x can also be found in **Appendix AI 5**.

12.8.4 Concentrations have been calculated for thirteen sensitive receptors at locations likely to be most affected by changes in both relative and absolute traffic flows. The locations of these receptor locations can be seen on the plan in **Appendix AI 5**. The results of these predictions can be seen in Table 8.1 and Table 8.2, for without with development related traffic flows respectively.

Table 8.1: Air Quality Concentrations 2019 – Without Development Related Traffic

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual mean	Annual mean	Days >50 µg/m^3	Annual mean
61 Mill Lane	26.29	18.10	1.48	14.07
2 Mill Lane	27.19	18.21	1.57	14.14
15 Colstream Close	26.13	18.09	1.47	14.06
112 St Bridgets Close	26.04	18.09	1.47	14.05
132 Capesthorne Road	26.14	18.12	1.50	14.07
2 Birch Avenue	26.49	18.15	1.52	14.09
36 Cotswold Road	26.08	18.09	1.47	14.06
21 Sandy Lane West	26.02	18.09	1.47	14.05
83 Myddleton Lane	26.16	18.08	1.47	14.05
71 Statham Ave	25.82	18.05	1.44	14.03
150 Poplars Ave	25.96	18.08	1.46	14.04
312 Poplars Ave	26.16	18.11	1.49	14.07
358 Poplars Avenue	26.19	18.11	1.49	14.07
NAQO	**40**	**40**	**35**	**25**

Table 8.2: Air Quality Concentrations 2019 – With Development Related Traffic

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual mean	Annual mean	Days >50 µg/m^3	Annual mean
61 Mill Lane	26.46	18.15	1.52	14.09
2 Mill Lane	27.26	18.23	1.58	14.15
15 Colstream Close	26.23	18.12	1.49	14.07
112 St Bridgets Close	26.12	18.11	1.49	14.07
132 Capesthorne Road	26.20	18.14	1.51	14.08
2 Birch Avenue	26.51	18.16	1.53	14.10
36 Cotswold Road	26.13	18.11	1.48	14.06
21 Sandy Lane West	26.06	18.10	1.48	14.06
83 Myddleton Lane	26.22	18.09	1.48	14.06
71 Statham Ave	25.86	18.06	1.44	14.03
150 Poplars Ave	26.10	18.11	1.49	14.06
312 Poplars Ave	26.35	18.16	1.53	14.09

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual mean	Annual mean	Days >50 µg/m^3	Annual mean
358 Poplars Avenue	26.39	18.16	1.53	14.09
NAQO	**40**	**40**	**35**	**25**

12.8.5 The results of these predictions can be used to identify the increase in pollutant concentrations as a consequence of the proposed traffic generation. These calculations can be seen in Table 8.3. The results show that the impact of the increase in traffic flow is very small at the worst affected sensitive receptors, such that the percentage change in concentrations relative to AQAL is just under 0.5%, which is imperceptible at all receptor locations. Consequently, the proposed development will not have an impact on the air quality of the local area and the impact is considered to be “negligible”.

Table 8.3: Assessment of the Impacts of the Increases in Traffic Flow

Receptor	NO_2 (µg/m^3) Annual mean		% Change in Concentrations Relative to Air Quality Assessment Level (AQAL)	Long Term Average Concentration at Receptor in Assessment Year	Impact Descriptor
	Without Development	With Development			
61 Mill Lane	26.29	26.46	0.425	66% of AQAL	*Negligible*
2 Mill Lane	27.19	27.26	0.175	68% of AQAL	*Negligible*
15 Colstream Close	26.13	26.23	0.25	66% of AQAL	*Negligible*
112 St Bridgets Close	26.04	26.12	0.2	65% of AQAL	*Negligible*
132 Capesthorne Road	26.14	26.2	0.15	66% of AQAL	*Negligible*
2 Birch Avenue	26.49	26.51	0.05	66% of AQAL	*Negligible*
36 Cotswold Road	26.08	26.13	0.125	65% of AQAL	*Negligible*
21 Sandy Lane West	26.02	26.06	0.1	65% of AQAL	*Negligible*
83 Myddleton Lane	26.16	26.22	0.15	66% of AQAL	*Negligible*
71 Statham Ave	25.82	25.86	0.1	65% of AQAL	*Negligible*
150 Poplars Ave	25.96	26.10	0.35	65% of AQAL	*Negligible*
312 Poplars Ave	26.16	26.35	0.475	66% of AQAL	*Negligible*
358 Poplars Avenue	26.19	26.39	0.5	66% of AQAL	*Negligible*
NAQO	**40**	**40**	**-**	**-**	**-**

12.9 Cumulative Impacts

12.9.1 It is understood that there are a number of other committed developments in the area that have been consented that will contribute to increased traffic flow in the area. Whilst the increase in traffic flow direct attributed to the proposed development is unlikely to have a significant impact, the cumulative impact of the other proposed developments combined with the proposed traffic generation from the Peel Hall development has been assessed to determine the cumulative impact from all development.

12.9.2 The committed developments under consideration are as follows:

- Land at Benson Road, Birchwood (ref: 2015/26220).
- Birchwood Shopping Centre (ref: 2015/25880).
- Birchwood Park (ref: 2015/26044, 2014/23358 and 2008/12744).
- Calver Park (ref: 2015/26685 and 2013/22533).

12.9.3 In order to assess the impact of the proposed development, previously the air pollutant concentrations as described in Table 8.1, Table 8.2 and Table 8.3 have been modelled both with and without the proposed development, including all committed development traffic. However, in Table 8.4, the air pollutant concentrations with the proposed development and all other committed development is compared to air pollutant concentrations without either the proposed development or other committed development, to determine the cumulative impact of all development in the area.

12.9.4 The results in Table 8.4 show that the impact of the increase in traffic flow is still very small at the worst affected sensitive receptors and although the impact is greater when considering all development together, the cumulative impact change in concentrations relative to AQAL is still under 0.5%, which is imperceptible at all receptor locations. Consequently, the cumulative impact of the proposed development and all committed development will not have an impact on the air quality of the local area and the impact is considered to be “negligible”.

Table 8.4: Assessment of the Cumulative Impacts of the Increases in Traffic Flow

Receptor	NO_2 ($\mu g/m^3$) Annual mean		% Change in Concentrations Relative to Air Quality Assessment Level (AQAL)	Long Term Average Concentration at Receptor in Assessment Year	Impact Descriptor
	Without Development	With Development			
61 Mill Lane	26.27	26.46	0.475	66% of AQAL	*Negligible*
2 Mill Lane	27.18	27.26	0.2	68% of AQAL	*Negligible*
15 Colstream Close	26.11	26.23	0.3	66% of AQAL	*Negligible*
112 St Bridgets Close	26.02	26.12	0.25	65% of AQAL	*Negligible*
132 Capesthorne Road	26.12	26.2	0.2	66% of AQAL	*Negligible*
2 Birch Avenue	26.48	26.51	0.075	66% of AQAL	*Negligible*
36 Cotswold Road	26.08	26.13	0.125	65% of AQAL	*Negligible*
21 Sandy Lane West	26.02	26.06	0.1	65% of AQAL	*Negligible*
83 Myddleton Lane	26.14	26.22	0.2	66% of AQAL	*Negligible*
71 Statham Ave	25.82	25.86	0.1	65% of AQAL	*Negligible*
150 Poplars Ave	25.96	26.1	0.35	65% of AQAL	*Negligible*
312 Poplars Ave	26.16	26.35	0.475	66% of AQAL	*Negligible*
358 Poplars Avenue	26.19	26.39	0.5	66% of AQAL	*Negligible*
NAQO	**40**	**40**	**-**	**-**	**-**

Combustion Emissions from Onsite Plant

12.9.5 At the proposed development, neither CHP plants nor biomass boilers are proposed and therefore plant emissions are unlikely to be a significant factor. The dwellings within the proposed development will each have heating and hot water, which are likely to be provided by high efficiency condensing combination boilers. A typical boiler will emit less than 75 mg/kWh of NO_x and conform to BS EN 483:1999 Gas-fired central heating boilers. Type C boilers of nominal heat input not exceeding 70 kW, although many now emit less than 40 mg/kWh of NO_x. Since emissions from individual condensing boilers are not normally a cause for concern in terms of air quality due to the very low emissions, their sporadic and staggered use over the day and their typically wide geographical spacing, a detailed assessment of the impacts of these boilers have not been undertaken.

12.10 Construction Dust Impact Assessment

Overview

12.10.1 The main air quality impacts that may arise during construction activities are:

- Dust deposition, resulting in the soling of surfaces;
- Visible dust plumes; and
- An increase in concentrations of airborne particles (e.g. PM_{10}, $PM_{2.5}$) and nitrogen dioxide due to exhaust emissions from site plant and traffic that can impact adversely on human health.

12.10.2 The most common impacts are dust soiling and increased ambient PM_{10} concentrations due to dust arising from the site. Most of this PM_{10} is likely to be in the $PM_{2.5-10}$ fraction, known as coarse particles.

12.10.3 It is very difficult to quantify emissions of dust from construction activities. It is therefore common practise to provide a qualitative assessment of potential impacts. The Institute of Air Quality Management's Guidance on the assessment of dust from demolition and construction (February 2014) contains a complex methodology for determining the significance of construction impacts on air quality. The following sections outline the steps outlined in the IAQM methodology.

Step 1 – Screening the Need for a Detailed Assessment

12.10.4 The IAQM guidance states that:

"An assessment will normally be required where there is:

- a 'human receptor' within:
    - 350 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- an 'ecological receptor' within:
    - 50 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s)."

12.10.5 There are existing receptors within 350m of the boundary of the development site and within 50m of the route used by construction vehicles on the public highway. Therefore, a detailed assessment is required to determine potential dust impacts.

Step 1 Summary:

A detailed assessment is required to determine potential dust impacts.

Step 2 – Assess the Risks of Dust Impacts

12.10.6 The IAQM guidance states that:

"The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk.
A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (STEP 2A); and
- the sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium or high sensitivity .

These two factors are combined in STEP 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction and trackout). More than one of these activities may occur on a site at any one time."

Step 2a – Dust Emission Magnitude

12.10.7 The first step (Step 2a) is therefore to assess the magnitude of the anticipated works. Table 9.1 summarises the dust emission magnitude for each activity. Given that the structures on site to be demolished are every small, the dust emission magnitude is considered to be "small". Significant earthworks are expected to be required given the site of the site and the dust emission magnitude is therefore considered to be "large". The combined size of all buildings to be constructed on site will be large and therefore the dust emission magnitude is considered to be "large". Regarding trackout, there could be at times up to 15 lorry movements per hour; and sections of unpaved roads could be long considered the size of the site; therefore the dust emission magnitude is expected to be "large"

Table 0.1: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	**Small**
Earthworks	**Large**
Construction	**Large**
Trackout	**Large**

Step 2b – Sensitivity of the Area

12.10.8 The next step (Step 2b) is therefore to assess the sensitivity of the area that could be affected by the anticipated works. Table 9.2 summarises the sensitivity of the area for each activity.

12.10.9 There are a number of existing dwellings in the area that are considered to be high sensitivity receptors. There are greater than 100 high sensitivity receptors within 20m of the site boundary; therefore the sensitivity to dust soiling effects on people and property is "high" for all activities.

12.10.10 The annual mean concentration of PM_{10} is less than 24 µg/m^3; given the number of high sensitivity receptors outlined above, this results in a "medium" sensitivity of the area to human health impacts for all activities.

12.10.11 There are no ecological receptors that are considered to be anything greater than low sensitivity receptors within 50m of the site; this results in a "low" sensitivity of the area to ecological impacts for all activities.

Table 0.2: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium
Ecological	Low	Low	Low	Low

Step 2c – Define the Risks

12.10.12 The next step (Step 2c) is to assign the level of risk for each activity, based on the receptor sensitivity and the dust emission magnitude. Table 9.3 summarises the dust risk for each activity.

Table 0.3: Summary Dust Risk Table to Define Site-Specific Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	High	High	High
Human Health	Low	Medium	Medium	Medium
Ecological	Negligible	Low	Low	Low

Step 2 Summary:

- *Dust Emission Magnitude is "Large" for earthworks, trackout, and construction, and "Small" for demolition.*
- *The Sensitivity of the area of "High" for dust soiling, "Medium" for human health and "Low" for ecological impacts*
- *The site is considered a "High Risk Site" is respect of construction, trackout and earthworks.*

Step 3 – Site Specific Mitigation

12.10.13 Stage 2 determines that the site is a "High Risk Site" in respect of construction, trackout and earthworks.

12.10.14 The IAQM guidance provides a 51 point list of potential mitigation measures and suggests where these measures are highly recommended, desirable or not required based upon the risk of the site. All 51 points are shown in detail in **Appendix AI 5**. For all sites that are a "Medium Risk Site" or higher, a Dust Management Plan is highly recommended and should incorporate the mitigation measures recommended based on the site risk. Since this site has been designated a "High Risk Site", a Dust Management Plan would be essential and it would be recommended that all 51 points shown in detail in **Appendix AI 5** should be incorporated into the Plan.

Step 3 Summary:

The site is considered a "High Risk Site" overall and a Dust Management Plan is recommended incorporating a number of specific mitigation measures based on the site specific risks.

Step 4 – Determining Significant Effects

12.10.15 The site is considered a "High Risk Site" overall and if appropriate mitigation measures are put in place, as identified in Step 3, significant effects on receptors are unlikely to occur. Considering both the construction details and the specific characteristics of the site, it is anticipated that effective mitigation will be possible and residual effects will not be considered significant.

Step 4 Summary:

With risk appropriate mitigation, residual effects will not be considered significant.

Step 5 – Dust Assessment Report

12.10.16 The final step of the guidance is to produce a dust assessment report, which Section 8 of this report summarises.

Step 5 Summary:

Dust and other pollutant emissions from the construction, demolition, earthworks and trackout phases of the construction of the proposed development will see the site designated a "High Risk Site". However, with risk appropriate mitigation, residual effects will not be considered significant.

12.11 Evaluation of Significance

Impacts of the Local Area on the Development

12.11.1 Predictions of pollutant concentrations show that in 2019, the opening year of the development, the whole development site will experience concentrations of all pollutants below the National Air Quality Objective levels; therefore, onsite pollutant concentrations are not considered to be a significant constraint upon the development of the site for residential purposes.

Impacts of the Development on the Local Area

12.11.2 The evaluation of key impacts has shown that providing suitable precautions are made in the planning and execution of the construction phase of the development, significant impacts can be avoided. The assessment has shown that any increases in pollutant concentrations as a consequence of the proposed development will be considered to be “negligible” and therefore would not be considered to be significant.

12.12 Mitigation

12.12.1 As a consequence of the proposed development, there will not be a significant increase in pollutant concentrations and therefore mitigation is not seen to be necessary, other than those routinely used to control construction dust, as detailed in the previous section. Similarly, concentrations of all pollutants are below the National Air Quality Objectives at the development site and therefore it is not necessary to implement mitigation to reduce the exposure from NO_2 or any other pollutant to future occupiers of the proposed development.

12.13 Conclusions

12.13.1 An air quality assessment has been undertaken in accordance with the Department of Environment, Food and Rural Affairs' (Defra) current Technical Guidance on Local Air Quality Management (LAQM) (TG09) and addresses the effects of air pollutant emissions from traffic using the adjacent roads, and emissions associated with the development of the site. In addition, a risk based assessment of the likely impact of construction on the air quality of the local environment has been conducted in accordance with the Institute of Air Quality Management's 2014 edition of the Guidance on the assessment of dust from demolition and construction.

12.13.2 Baseline pollutant concentrations on site have been investigated using both existing monitoring data and through predictions using the Breeze Roads Detailed Dispersion Model methodology. At present, and in the opening year of the proposed development (2019), concentrations of all pollutants are below the National Air Quality Objectives, although marginal exceedances of the National Air Quality Objectives were expected in the baseline year closest to the M62. However, given that the closest dwellings are likely to be greater than 40m from the M62 and the closest naturally ventilated dwellings will be greater than 50m from the M62, even assuming a degree of error in the measurements and calculations, it is not expected that any new dwellings will be situated in an area where exceedances of the NAQOs are likely to occur and therefore no new residents would be exposed to levels of air pollution prejudicial to health or amenity.

12.13.3 In order to assess the impact of the proposed development on local air quality, the IAQM/EPUK Guidance Land-Use Planning & Development Control: Planning for Air Quality has been utilised. The assessment has shown that due to limited traffic generation onto already highly trafficked roads, the impact of new vehicle emissions from the proposed development is consider to be "negligible".

12.13.4 With regards to the impacts of construction on air quality, dust and other pollutant emissions from the construction and demolition phases of the construction of the proposed development will see

the site designated a “High Risk Site”. However, with risk appropriate mitigation, residual effects will not be considered significant.

12.13.5 Since it has been shown that the proposed development meets the guidance contained within Technical Guidance on Local Air Quality Management (LAQM) (TG09), IAQM/EPUK’s Land-Use Planning & Development Control: Planning for Air Quality and IAQM’s Guidance on the assessment of dust from demolition and construction, it is considered that the proposed development adheres to the principles of the National Planning Policy Framework since the new development will not be “put at risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution”. Since it has been shown that in terms of air quality, the proposals adhere to local and national planning policy, it is considered that the air pollution should not be a constraint on the proposed residential development.

13.0 SOCIO-ECONOMIC ASSESSMENT

Introduction

13.1.1 This section has been prepared by Nathaniel Lichfield & Partners [NLP] to summarise the impact of the proposed development in social and economic terms.

13.1.2 The assessment principally focuses on the impacts of the development on the local population, supply of housing, provision of education, health and community facilities in the local area. The local employment and labour supply impacts generated by the proposed development are also considered.

13.1.3 The main socio-economic issues covered in this section include the following:

1 Extent of the local impact area of the proposed development;

2 Prevailing socio-economic and labour market conditions, and provision of open space, sport and recreation facilities, within relevant impact areas;

3 Temporary construction employment likely to be generated by the proposed development;

4 Direct employment likely to be associated with the proposed development;

5 Impacts on the local population and labour market arising from the proposed development;

6 Contribution of the scheme to local housing provision; and

7 The effect of the development on the provision of open space, sport and recreation facilities, education, health and community facilities within the local impact area.

13.1.4 The proposed development site comprises approximately 69 hectares of open land to the south of the M62. The land has an urban fringe character, and has previously been used for agriculture purposes.

The Location

13.1.5 The site has good links to the strategic highway network, both local and national routes. It has easy access by foot and cycle to nearby facilities such schools, healthcare facilities and sport and recreation venues. It is well placed to take advantage of local bus routes into Warrington town centre and further afield. The two mainline railway stations within the town centre are accessible by bus from within the local area. Local train services are available from Padgate station, approximately 1m from the site, with regular services to Liverpool and Manchester. This topic is addressed in greater detail within Section 9.0 of this report (Transportation and Highways).

The Application Proposals

13.1.6 Within the scheme there are the following matters that are considered to impact positively on social infrastructure in the locality of the site. These include:

1 Market Housing, to cater for the shortfall in supply locally;

2 Affordable housing, to cater for the shortfall in supply locally;

3 A Local Centre, with opportunities for convenience retail provision, restaurants, takeaways, health care, nursery etc.

4 Employment facilities;

5 Retirement/elderly accommodation;

6 A Primary school, provided either on-site or via a financial contribution towards expanding a suitably located schools nearby (or a combination of the two) and enhacements to existing secondary schools in the area;

7 Open Space, formal and informal recreation land;

8 A subsidised bus route into the site for the life of the development; and,

9 Localised road improvements to assist in the free flow of traffic in the general area.

13.2 Planning Policy

National Planning Policy

13.2.1 The Framework confirms that the Government is committed to securing economic growth in order to create jobs and prosperity, and that planning should therefore operate to encourage and not act as an impediment to sustainable growth. Significant weight should be placed on the need to support economic growth through the planning system [§19].

13.2.2 It is clear that the Government's key housing objective is to significantly increase the delivery of new homes. LPAs should ensure that their Local Plan meets the full requirements for market and affordable housing in the housing market area, including identifying key sites which are critical to the delivery of the housing strategy over the plan period.

13.2.3 The Framework also states that to deliver a wide choice of high quality homes, widen opportunities for home ownership and create sustainable inclusive and mixed communities, local planning authorities should plan for a mix of housing based on current and future demographic trends, market trends and the needs of different groups in the community [§50].

Warrington Core Strategy (2014)

13.2.4 The Warrington Core Strategy, adopted in July 2014, sets out the Council's vision, aims and strategy for the Borough, including the overarching planning policies that will guide growth during the period to 2027. However, in February 2015 the High Court[81] quashed parts of the Warrington Local Plan Core Strategy, specifically:

1 Policy W1 and Policy CS2, and specifically to "delivering sufficient land for housing to accommodate an annual average of 500 dwellings (net of clearance) between 2006 and March 2027, and a minimum of 10,500 over the whole period"[82]; and,

2 Paragraph 6.38 relating to the delivery of "1,100 new homes as a sustainable urban extension to West Warrington."

13.2.5 The Council is currently reviewing its Objectively Assessed Need for Housing as a result of this decision. All other policies within the plan remain unaltered. The following policies are relevant to the socio-economic assessment:

1 Core Strategy Policy CS1 promotes and encourages development proposals that are sustainable and accord with national and local planning policy frameworks;

2 Core Strategy Policy CS2 identifies up to 277 ha of employment land to support the growth of the local and sub-regional economy;

3 Core Strategy Policy CS9 identifies Inner Warrington as a strategic location which could accommodate housing growth in the longer term to avoid the need to release Green Belt land for development;

4 Core Strategy Policy PV3 supports developments which assist in strengthening the boroughs workforce and enhance training opportunities for its residents. It specifically seeks to secure local employment opportunities associated with the construction and subsequent operation of new development;

5 Core Strategy Policy SN1 sets out the distribution and nature of new housing across Warrington Borough;

6 Core Strategy Policy SN2 requires a mixture of housing types and tenures to be provided through the delivery of new homes in order to help secure mixed and inclusive neighbourhoods;

7 Core Strategy Policy SN4 states that provision for retailing within the Borough will be based on the need to safeguard and enhance the vitality and viability of a hierarchy of centres;

[81] [2015] EWHC 370 (Admin)
[82] High Court Judgement Order, Appendix (Available online at: https://www.warrington.gov.uk/download/downloads/id/8613/local_core_plan_strategy_court_order_feb_2015.pdf)

8 Core Strategy Policy SN 5 directs retail and leisure uses towards District, Neighbourhood and Local Centres where the development is of a scale and nature appropriate to the area served by the centre;

9 Core Strategy Policy SN 6 seeks to assist the continued viability and growth of the local economy and support the sustainability of local communities;

10 Core Strategy Policy SN 7 seeks to ensure that planning helps to promote healthy lifestyles across all of the Borough's communities;

11 Core Strategy Policy QE3 encourages partners to develop and adopt an integrated approach to the provision, care and management of the borough's Green Infrastructure;

12 Core Strategy Policy MP10 aims to ensure that Warrington's future growth is supported and enhanced through the timely delivery of necessary transport, utility, social and environmental infrastructure required to support strategic and site specific proposals as set out in the Infrastructure Delivery Plan.

13.3 Assessment Methodology & Significance Criteria

13.3.1 The purpose of this sub-section of the Environmental Statement [ES] is to set out the significant socio-economic effects of the Peel Hall development that could occur during the development's construction and operation.

Assessment Criteria

13.3.2 The assessment first establishes the development's area of impact, defining the baseline position of the impact area in terms of its economic and labour market conditions, before examining the potential impacts of the various elements of the proposed development. Opportunities for the mitigation of any adverse effects, and the enhancement of positive effects, are then examined, taking into consideration any built-in mitigation elements of the scheme (e.g. social infrastructure facilities).

13.3.3 An assessment will be made of both direct employment associated with the scheme and likely indirect employment generation. The implications of the employment provided on the site for the economic and social well-being of the area will be assessed in the context of the ES.

Sources of Information

13.3.4 This assessment draws upon published Government and local authority statistics and economic strategy documents relating to the area. The latest available data from the 2011 Census, the 2013 Business Register Employment Survey [BRES], the 2014 Annual Population Survey [APS] and

other published national statistics have been used. At a local level consideration has been given to the Warrington Core Strategy (2014) alongside the Peel Hall Masterplan.

13.3.5 As well as these data sets, existing data sources have been drawn on, alongside discussions with planning officials. These sets include the following:

- Warrington Borough Council for education;
- NHS Choices for healthcare;
- Warrington Borough Council's evidence base for community facilities; and,
- Sport England for sports facilities.

Estimating Additional Effects

13.3.6 It is important to recognise that not all of the employment, housing, retail and other impacts of the proposed development will necessarily be additional to the local economy. In this case consideration has been given to a combination of supplier related effects (additional jobs generated by local firms that provide goods and services to the construction of Peel Hall) and income multipliers (additional rounds of spending generated by those employed at Peel Hall). Employment multipliers for this assessment are based on the English Partnerships' Additionality Guide[83] and those used for similar facilities elsewhere, taking account of local economic conditions.

13.3.7 Following the derivation of the gross direct employment figures for the proposed development, the net additional employment impacts of the scheme are estimated taking account of these factors.

Significance Criteria

13.3.8 In the absence of any generally accepted criteria for assessing the significance of socio-economic impact, the scale of any impacts is assessed in relation to the magnitude of change against the sensitivity of the baseline position. In some case this cannot be quantified or measured, so the nature and context of the impact is considered more generally. Impacts are identified as either positive (beneficial) or negative (adverse).

13.3.9 Essentially, the significance of socio-economic impacts results from the inter-play between two factors: the sensitivity of the receptor, and the magnitude of the effect.

13.3.10 In terms of the sensitivity of the receptor receiving the environmental change/effect, these have been defined on the basis of high, medium, low or negligible, depending upon the nature of that receptor. The sensitivity will be determined by a number of factors, for example the size of the local resident population, its proximity to the effect; its value and/or its importance. This includes the following considerations:

[83] English Partnership (2008) Additionality Guide: Third Edition

a High – high importance and/or rarity, in close proximity to the impact with very limited potential for avoidance/substitution;

b Medium – medium importance or scale, some potential for avoidance/substitution;

c Low – low importance and at a more localised scale, opportunities to avoid/substitute;

d Negligible – very low importance and generally insensitive to the impact in question.

13.3.11 In terms of the second factor, whilst there will remain an element of subjectivity given the nature of the assessment, in general the magnitude has been defined on the basis of the following considerations:

a Major – very significant, large scale effects on matters of acknowledged importance;

b Moderate – significant, minor effects on matters of acknowledged importance, or more large scale effects on matters of local importance;

c Minor – slight impact, barley perceivable effects on matters of acknowledged importance or minor effects on matters of local importance;

d Negligible – very slight impact, effects of insignificance or not perceivable.

Table 13.1 Matrix for Determining the Significance of Impacts

		Sensitivity of Receptor/Receiving Environment to Change/Effect			
		High	Medium	Low	Negligible
Magnitude of Change/Effect	High	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Low	Minor to Negligible	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

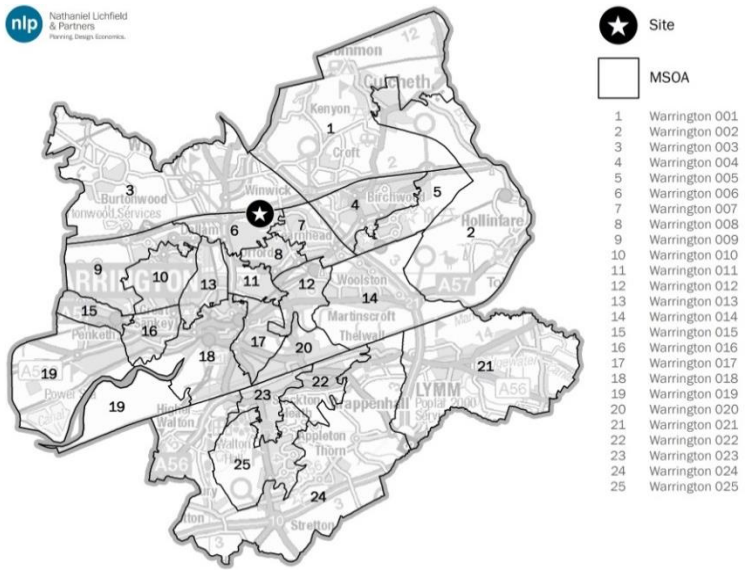
Cumulative Impacts

13.3.12 The applicant considers that there are no other local schemes which have the potential to create cumulative socio-economic impacts. The only other notable scheme is the residential development proposed at Omega, which is too remote from the Peel Hall site to be of significance from a socio-economic perspective.

Area of Impact

13.3.13 The proposed development is located in Warrington's Middle Layer Super Output Area (MSOA) #006, towards the north of Warrington Borough. maps all of Warrington's MSOAs mapped, along with the position of Peel Hall within MSOA #6.

Figure 13.1 MSOAs within Warrington Borough and the site location of Peel Hall



Source: NLP Analysis

13.3.14 Due to prevailing economic linkages and travel-to-work flows, some effects of the proposed development will be distributed beyond the boundaries of this MSOA. In order to see where the main impacts of the development will be focused, the impact area must be defined (i.e. the area where Peel Hall's MSOA draws the majority of its workforce from and where Peel Hall's MSOA residents travel to work). In defining the local impact area for the proposed development, the 2011 Census data on travel-to-work flows for Peel Hall's MSOA was examined. This is shown in Table 13.2 and 13.3.

Table 13.2 Place of Employment for Peel Hall's MSOA 006 Residents in Warrington, 2011

Rank	Warrington MSOA	Total	%	Cumulative %
1	018	519	17.6%	17.6%
2	013	237	8.0%	25.7%
3	014	223	7.6%	33.2%
4	004	174	5.9%	39.1%
5	017	167	5.7%	44.8%
6	**009**	**158**	**5.4%**	**50.2%**
7	006	147	5.0%	55.1%
8	011	123	4.2%	59.3%
9	008	74	2.5%	61.8%
12	010	48	1.6%	63.5%
13	005	43	1.5%	64.9%
14	012	37	1.3%	66.2%
15	007	35	1.2%	67.4%
34	016	9	0.3%	67.7%
Local Impact Area		**1,994**	**67.7%**	**67.7%**

Source: Census 2011 / NLP Analysis

Table 13.3 Place of Residence for Peel Hall's MSOA Workers in the Local Impact Area, 2011

Rank	Warrington MSOA	Total	%	Cumulative %
1	**006**	**147**	**5.4%**	**5.4%**
2	011	102	3.7%	9.1%
3	017	98	3.6%	12.7%
4	008	88	3.2%	15.9%
5	013	76	2.8%	18.7%
7	016	60	2.2%	20.9%
8	018	59	2.2%	23.0%
9	010	55	2.0%	25.0%
10	007	49	1.8%	26.8%
12	020	39	1.4%	28.3%
15	009	34	1.2%	29.5%
16	012	32	1.2%	30.7%
17	014	32	1.2%	31.8%
19	005	31	1.1%	33.0%
38	004	11	0.4%	33.4%
Local Impact Area		**913**	**33.4%**	**33.4%**

Source: Census 2011 / NLP Analysis

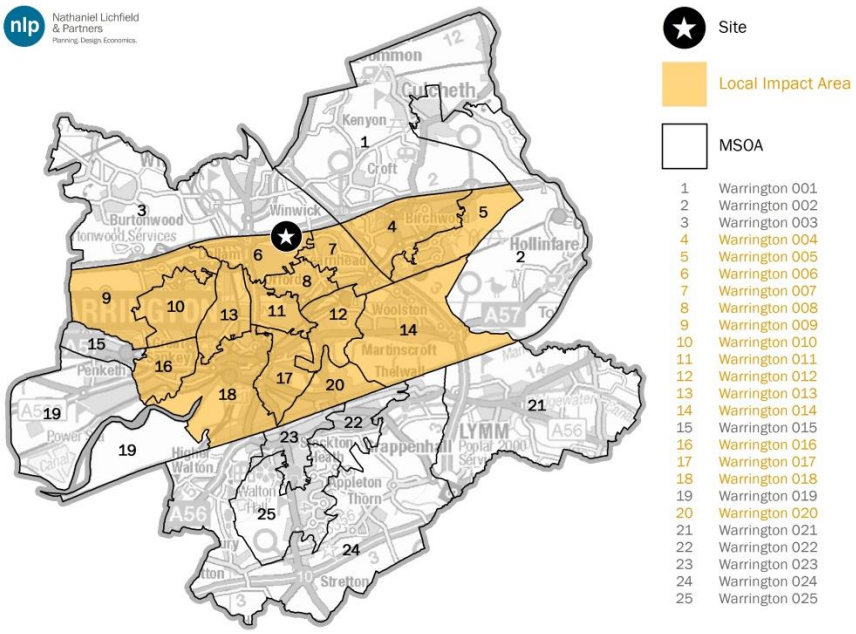
13.3.15 147 (5%) of employed residents in Peel Hall's MSOA both live and work within the MSOA itself. Although a percentage of the MSOA's working residents travel outside of Warrington Borough for work (such as to Halton or St Helens) the majority stay within the Borough. The out-commuting rate of Peel Hall's MSOA (#6) employees in Warrington is 76% (i.e. the 25 MSOAs that constitute Warrington are the place of employment for 76% of all those workers living in MSOA #6), whereas the equivalent in-commuting rate is 42% (nearly half of all those who work in MSOA #6 are from wards within Warrington Borough). Whilst this figure may seem low, the additional commuters not captured in the local impact area are dispersed and as such are unlikely to have a significant impact on any one particular area.

13.3.16 As such the principal labour catchment area, and therefore the local impact area for the proposed development, is identified as the following MSOAs located within Warrington Borough, illustrated in :

- Warrington 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20

13.3.17 Whilst it may appear at first unusual that either MSOA 1 or 3 are located within the local impact area, this is primarily because these areas, which both lie north of the M62, are not densely developed or urbanised and hence do not provide many jobs or homes for the residents of the local area.

Figure 13.2 Local Impact Area for the Peel Hall development



Source: NLP analysis

13.4 Baseline Conditions

Introduction

13.4.1 This section sets out the economic context and main socio-economic features of the local area relating to the proposed development site at Peel Hall. This includes a summary of the current socio-economic conditions, and provision of local community infrastructure, within the local area.

Economic Characteristics

Economic, Employment and Labour Market Factors

13.4.2 The key economic features and trends within Warrington have been reviewed to provide a context in which any socio-economic impacts of the proposed development can be assessed. This local authority area represents the wider impact area for the scheme in economic terms. The key points of this review are summarised below:

1 The resident population within Warrington Borough grew from 191,080 to 202,228 between the 2001 and 2011 Censuses, equating to a 5.8% rise. This is higher than the regional average (4.8%) but lower than the national average (7.9%). According to the 2012 Sub-National Population Projections the population is set to increase to 225,552 by 2027, the end of the Plan period. This equates to an 11.5% increase on the 2011 Census figure.

2 The number of workforce jobs in Warrington Borough equated to around 121,000 jobs in 2013, representing an increase of 4.3% since 2009. This rate of increase in workforce jobs was greater than both the North West (0.3%) and England & Wales as a whole (1.9%).[84]

3 Warrington's job density, (the ratio of total jobs to population aged 16-64, often used as a measure of labour demand), as of 2013 was 1.02, higher than both the regional figure of 0.77 and the national figure of 0.80.[85]

4 The largest sectors of employment in Warrington are: Financial & Other Business Services (28.5%); Public Admin, Education & Health (20.7%); and Wholesale & Retail (15.8%). The proportion of workforce jobs attributed to each of these sectors, relative to the North West and the UK, is slightly higher in Financial & Other Business Services whilst slightly lower in Public Administration, Education & Health and Wholesale & Retail.[86]

5 The number of businesses created in the wider impact area of Warrington increased by 38% between 2009 and 2012,[87] lower than the regional (48%) and national level (47%).[88]

[84] ONS (2013) Business Register and Employment Survey
[85] ONS (2012) Job Density
[86] ONS (2013) Business Register and Employment Survey
[87] ONS (2012) Business Demography
[88] Ibid.

6 The level of claimant unemployed seeking Job Seekers Allowance [JSA] in December 2015 equated to around 0.9% of the working age population in Warrington Borough. This level of claimant unemployed is lower than in both the North West (1.3%) and the UK (1.5%).[89]

7 When compared with the Claimant count, alternative measures of unemployment (such as the modelled rate derived from the Annual Population Survey) paint Warrington in a less favourable light, with a higher rate of unemployment at 4.5% (although this is still lower than regional (6.4%) and national (6.0%) levels).[90]

8 The economic activity rate in Warrington Borough (as a percentage of the total population) equated to some 80.5% in 2014-2015. This compares more favourably with the economic activity rates of 74.7% across the region and 77.4% across the country as a whole.[91]

9 The median gross weekly earnings by workplace in Warrington Borough were £416 in 2013, higher than the North West (£386) and the UK (£415) averages. The median gross weekly earnings by residence were also slightly higher in the Borough, at £418, comparing well with both the regional and national averages (£388 and £415 respectively).[92]

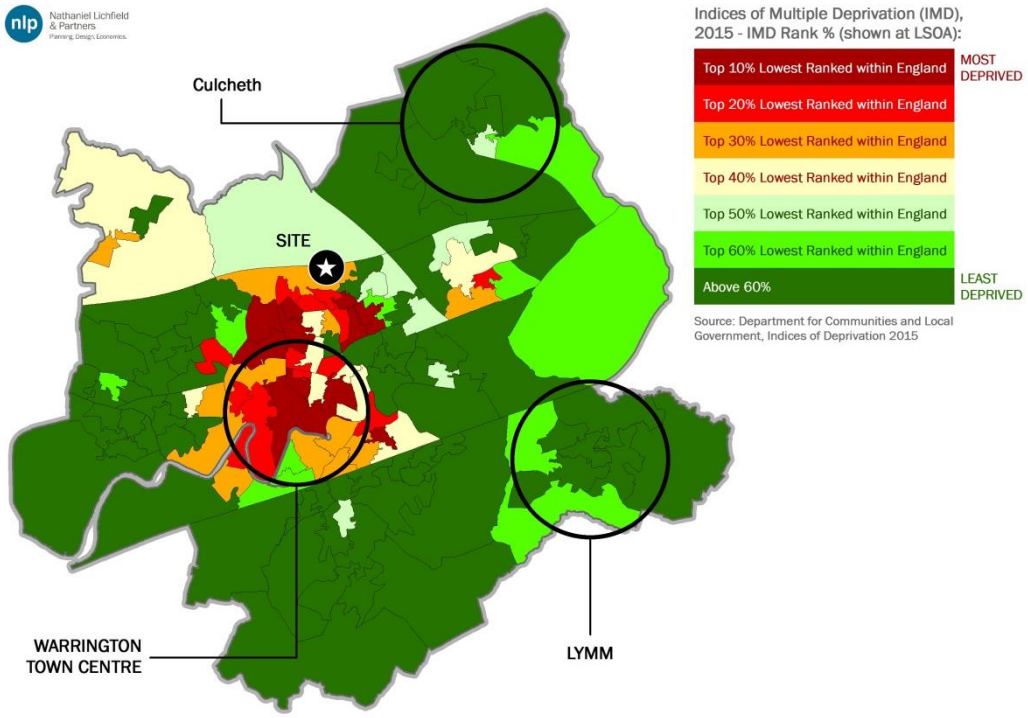
10 House price affordability is a key issue in the Borough. The average house price in Warrington (as of 2014) was £157,000, compared to the national average of £195,000[93]. The ratio of house prices to incomes in Warrington in 2014 as 5.4 – higher than neighbouring authorities of St Helens (4.76), Wigan (4.78) or Halton (4.07), although lower than the national average (6.88)[94].

Deprivation

13.4.3 The English Indices of Deprivation [IMD] 2015 provides a measure of multiple deprivation at the small-area level, based on indicators such as income, employment, health, education and crime. Of the 326 local authorities in England, Warrington is ranked 147th. As can be seen in the MSOA in which the Peel Hall site is located is a deprived area, whilst in and around Warrington town centre there are highly deprived areas. Other parts of the local impact area and the Borough as a whole, on the other hand, contain some of the least deprived areas in the country.

[89] ONS (2014) Claimant Count
[90] ONS (2015) Annual Population Survey
[91] ONS (2014) Annual Population Survey
[92] ONS (2013) Annual Survey of Hours and Earnings
[93] CLG Live Table 586/Land Registry
[94] National Housing Federation (2014) Home Truths 2013/14: North West

Figure 13.3 Deprivation Map of Warrington Borough

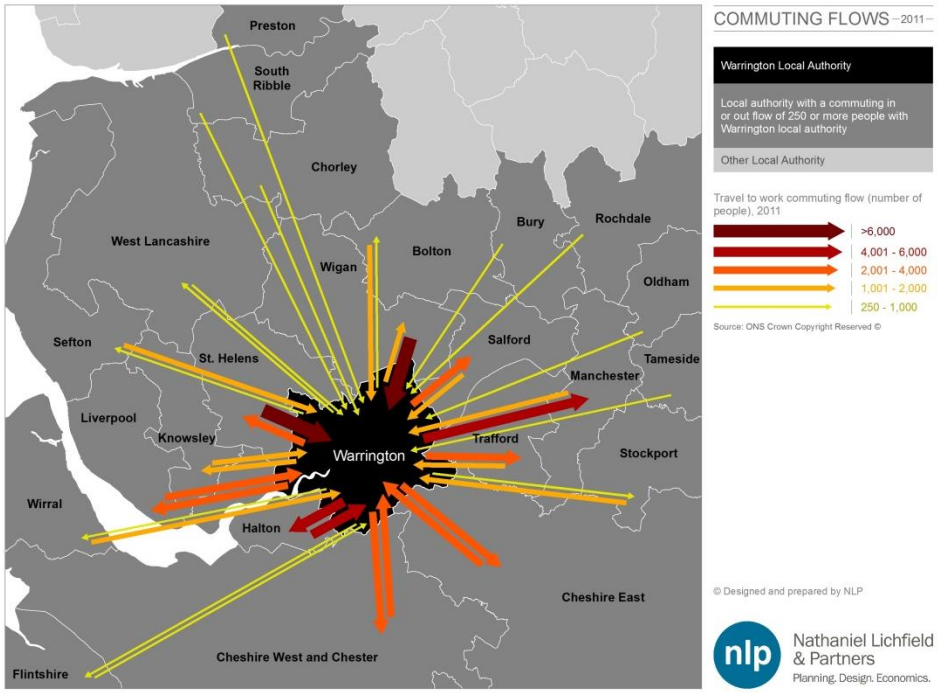


Source: Indices of Multiple Deprivation 2015 / NLP analysis

Commuting

13.4.4 Commuting data from the 2011 Census has been analysed (). Of the 101,235 Warrington residents in employment, 66,242 (65.4%) both work and live in the Borough. This means that 34.6% commute outside of the Borough. It is clear that Warrington has strong economic linkages with Halton in terms of commuting, with over 4,600 people travelling from Warrington to Halton to work and 5,700 commuting in the opposite direction. Further to this Warrington also shows significant in-commuting linkages with St Helens and Wigan, and significant out-commuting linkages with Manchester. With 49,224 inward commuters and 34,993 outward commuters overall the Borough has a net inflow of 14,231 and so is a net importer of labour.

Figure 13.4 Commuting Map for Warrington Borough, 2011



Source: Census 2011 / NLP Analysis

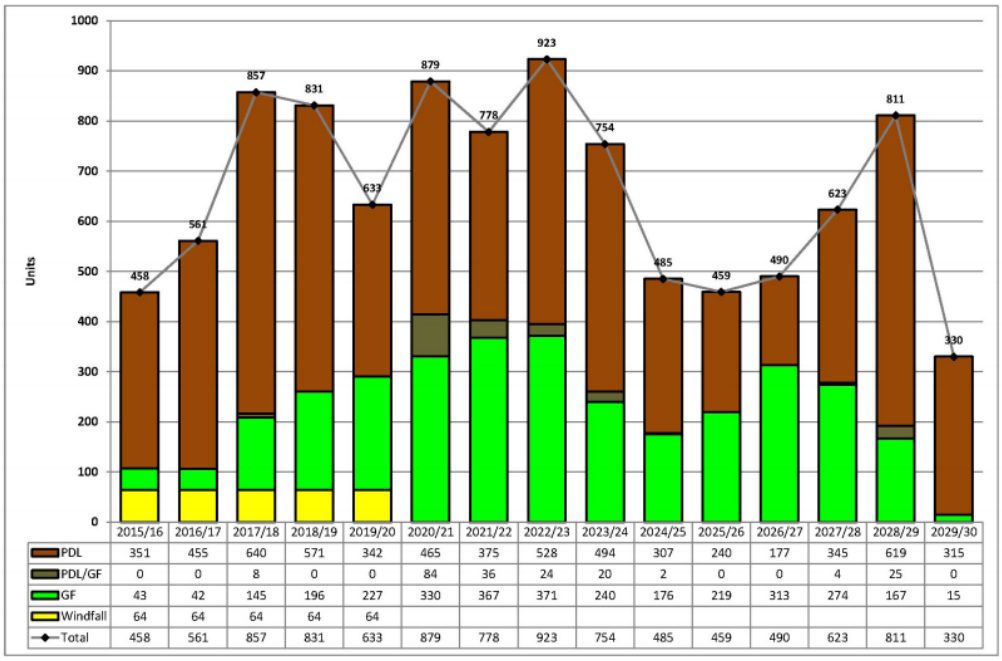
Other Socio-Economic Factors

Housing Provision

13.4.5 At the time of the 2011 Census, a total of 87,943 dwellings were located within Warrington Borough.[95] The Local Plan Core Strategy for Warrington sets out a target for at least 10,500 new dwellings to be constructed within the Borough between 2006 and 2027[96], which is equivalent to an annual average requirement of 500 homes. As mentioned previously, the Core Strategy was the subject of a High Court Decision which resulted in the housing target being rescinded. As such the council has now begun the work necessary to ensure the housing elements of the Plan, such as calculating a new Housing OAN, are revised in line with the ruling and reinstated. plots the Borough's Housing Land Supply as stated in the Borough's 2016 SHLAA[97].

[95] Census (2011) Question QS418EW
[96] Warrington Borough Council (2015) Core Strategy, 9.1
[97] It should be noted that NLP has some concerns with the SHLAA and is producing a Housing Technical Report that, alongside analysing housing need, will appraise the SHLAA's methodology and the extent to which Warrington Borough has a 5-year housing land supply

Figure 13.5 Warrington Borough Housing Land Supply (including Windfall Allowance)



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
PDL	351	455	640	571	342	465	375	528	494	307	240	177	345	619	315
PDL/GF	0	0	8	0	0	84	36	24	20	2	0	0	4	25	0
GF	43	42	145	196	227	330	367	371	240	176	219	313	274	167	15
Windfall	64	64	64	64	64										
Total	458	561	857	831	633	879	778	923	754	485	459	490	623	811	330

Source: Warrington Borough Council (2016) SHLAA

13.4.6 As mentioned previously, affordability is a key issue in the Borough, with the ratio of house prices to incomes in Warrington in 2012 as 5.64, which is higher than the neighbouring authorities of St Helens (4.76), Wigan (4.78) or Halton (4.07). [98]

Education Provision

13.4.7 Any development that generates additional housing demand locally may also have an impact on requirements for education.

13.4.8 Whilst Warrington Borough does not use catchment areas, when assessing capacity for proposed residential developments the standard radius is 2 miles for primary school level and 3 miles for secondary school level. At the primary school level, a total of 6,011 students are currently enrolled in schools within this 2-mile radius of the development (as of 2016/17)[99]. These primary schools currently have a total capacity of 5,960 and therefore have a net shortfall of 51 primary school places. The Council estimates that even without Peel Hall, by 2029/30 (the latest date at which Warrington Borough Council can project pupil numbers[100]), 6,455 pupils will be attending these schools, which will by that point have an estimated capacity of 6,150. There would therefore be a future shortfall of 305 students, or -5% of the total capacity.

[98] National Housing Federation (2014) Home Truths 2013/14: North West
[99] WBC-supplied capacity projections, as quoted in WBC's Pre-Application Advice Letter 26th February 2016
[100] Ibid

13.4.9 At the secondary school level (including sixth form), WBC-provided data indicating that a total of 5,280 students are currently enrolled at the schools within three miles of the proposed development. These schools have a current capacity of 6,370, indicating a current surplus in capacity of 1,090.

13.4.10 However, the Council projects that by 2029/30 these schools (which will by this date have a capacity of 6,300) will have 6,821 students attending. This indicates a shortfall of capacity of 521 places or -8% of the total capacity.

13.4.11 This suggests that whilst there appears to be ample secondary school capacity within the local impact area at present, there is currently a small shortfall of capacity within primary schools in the area. The surplus capacity evident in the secondary schools should be viewed in the context of the recommendations made by the Audit Commission that schools should plan for a surplus of between 7% and 10% to avoid fluctuations in student numbers, and to allow some flexibility and reasonable parental choice. The Council estimates that both primary and secondary will have a shortfall in places by 2021/22 with the situation worsening by 2029/30.

13.4.12 In addition to the provision of primary and secondary education facilities, Fearnhead, a settlement which is located within the local impact area, is home to the Warrington campus of the University of Chester.

13.4.13 The statistics relating to the primary and secondary schools within the scheme's defined catchment area and their capacity levels as provided by the Council are included in **Appendix S 1**.

Health Provision

13.4.14 Any development that generates additional housing and population locally will also have an impact on requirements for health and dental clinics. A review of the NHS Choices Register indicates that there are currently 19 GP surgeries within the local impact area within 5km of the proposed development. A total of 88 Full-Time Equivalent [FTE] GP practitioners are operating within these medical centres, serving 146,201 people. This equates to around 1,660 patients per GP – slightly above the typical provision rate of 1,600 patients per GP[101]. This suggests GP surgeries within the local impact area are already operating at capacity.

13.4.15 The local impact area also accommodates the NHS's Warrington Hospital, which has 500 in-patient beds and is situated around fifteen minutes' drive (6.3km) from the Peel Hall site.

13.4.16 There are also currently 10 dental clinics located within the local impact area. Six of these clinics (containing 23 out of the 41 dental practitioners) indicated that they are currently accepting new

[101] NHS England (2014) The Review Body on Doctors' & Dentists' Remuneration Review for 2014 General Medical Practitioners and General Dental Practitioners, Para 1.15

patients. This suggests that there remains some capacity at existing dental clinics to accept additional patients likely to arise from the proposed development.

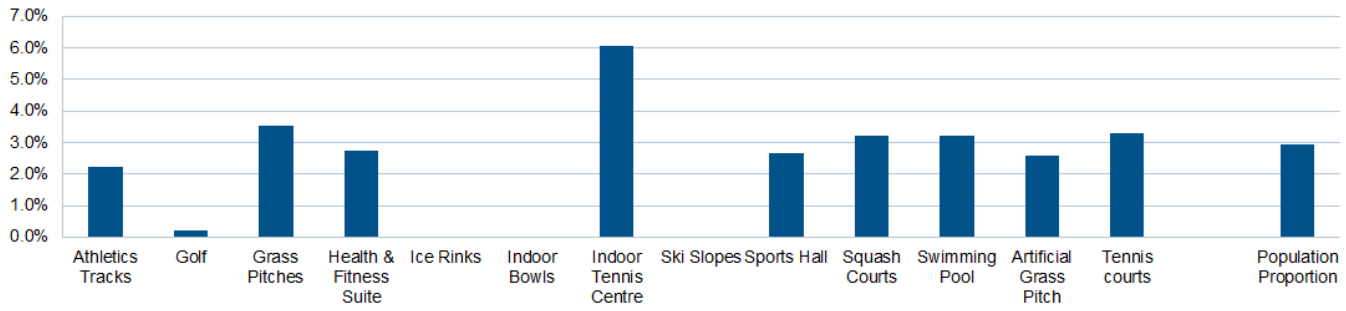
13.4.17 Each of these GP surgeries, hospitals and dental clinics within the local impact area are detailed in **Appendix S 1.**

Sport, Open Space and Recreation

13.4.18 Sport England has compiled a 'Local Sport Profile' of Warrington's Sporting Facilities, the full details of which can be found in Appendix K1. Overall, 3.2% of the North West's facilities are located in Warrington, which is similar to the proportion of the North West's population which is resident in the Borough (2.9%). The proportion of publically owned sports venues in the Borough is higher than the regional average (84% vs 83%), whereas the percentage of privately owned sports facilities is lower than the regional average (16% vs 17%).

13.4.19 As can be seen in , the regional proportion of Indoor Tennis Centres, Grass Pitches and Tennis Courts are higher in Warrington relative to the regional average, whilst the Borough has the same proportion of Squash Courts, Swimming Pools Pitches as are located in the North West. The Borough has a lower proportion of sports halls, health and fitness suites, artificial grass pitches facilities, athletic tracks and golf facilities, whereas there are no ice rinks, indoor bowls and ski slopes located in the Borough.[102]

Figure 13.6 Proportion of the North West's Sports Facilities that are based in Warrington



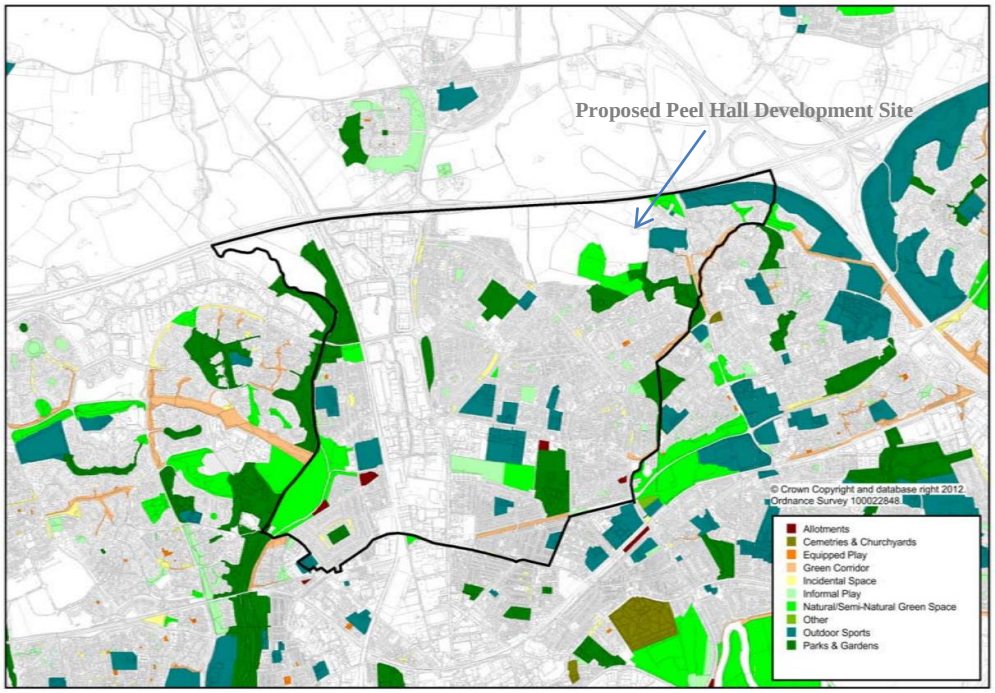
Source: Sport England (2014) Sport Facilities Profile

13.4.20 Supporting the above sports and recreation facilities is the Warrington Borough Council's Open Space Audit Position Statement (2012), which provides evidence on the supply of open space and community facilities in the Borough. The Council's policy approach to open space is to protect, enhance and ensure the timely delivery of new provision where proven as needed to cater for the increased demand placed on such spaces brought about new developments and hence population growth.

[102] Sport England (2014)

13.4.21 **Figure 13.7,** taken from the Council's most recent (2012) Open Space Audit, demonstrates that there is a broad range of Open Space and Sports Facilities in and around the proposed development site, including an Outdoors Sports facility directly to the east of the site; Natural/Semi-Natural Green Space (Radley Plantation) and Parks and Gardens (Peel Hall Park and Radley Common) to the south east of the proposed development.

Figure 13.7 Recorded Open Space by Typology within North Warrington



Source: Warrington Borough Council (2012) Open Space Audit Position Statement, Figure 10.1

13.4.22 Since 2006 there has been a notable net increase (by 7%) in open space provision within the Borough with 1,725 hectares across 903 sites recorded as at 1st April 2012. The amount of available open space which is publicly accessible also increased (by 15%) since 2006 with a relatively even split of this newly accessible space between sites with formal and sites with informal access arrangements. An increasing percentage of land dedicated to outdoor sports in public ownership has also been experienced, although this increase has been more modest (up by 2%).

13.4.23 In general, the quality of open space provision within the Borough appears to be good, with only 12% and 13% of respondents in the 2008 and 2010 Warrington Together Surveys identifying parks and open spaces within their areas as in need of improvement.[103]

[103] Warrington Borough Council (2012) Open Space Audit

13.4.24 Data on the quantity and size of open space and recreation facilities in the Borough are provided within this document, in **Appendix S 1**:

- Allotments;
- Cemeteries & Churchyards;
- Equipped Children's Play;
- Green Corridors;
- Incidental Space;
- Informal Children's Play;
- Natural / Semi Natural Green Space;
- Outdoor Sports; and
- Parks & Gardens;[104]

13.4.25 Demand for other community facilities from the proposed housing development will primarily be observed close to the site. The nearest community centre to the application site is the Greenwood Community Centre, located 1 km from the site. Other community halls/centres within 5 km of the site include:

1 Fearnhead Cross (1.4 km)

2 Radley Common (1.6 km)

3 Padgate (1.9 km)

4 Cape (2.1 km)

5 Cotswold Road (2.3km)

6 Westy (4.2 km)

7 College Close Community House (4.2 km)

8 Dallam Community House (4.3 km)

9 Nora Street Community House (4.7 km)

10 Whitecross (4.8 km)

11 Croft (5 km)

13.4.26 Warrington Borough Council (WBC) lists 21 community centres within the Borough. These centres are listed in **Appendix S 1**, along with each venue's distance from the Peel Hall site in kilometres.

[104] Warrington Borough Council (2012) Open Space Audit

13.5 Potential Effects

Introduction

13.5.1 The development proposes to build up to 1,200 new dwellings, a 60-unit retirement home, employment space, a local centre, a food store and public open spaces.

13.5.2 This section assesses the main socio-economic impacts from this development during both the construction and occupation phases of the proposed scheme

13.5.3 Construction works are due to commence in 2017 and run for 14 years until 2030.

Population Increase

13.5.4 By using data from the 2011 Census the average household size of each house type has been estimated, to provide an indication of the likely population size of the proposed development. This is set out in Table 13.4.

Table 13.4 Population Impact of the Proposed Development

Type of Residential Unit	Number of residential units in the proposed development[105]	Increase in Population
Flat (1 bedroom)	72	91
Flat / House (2 bedroom)	386	711
Semi-detached (3 bedroom)	620	1,524
Detached (4 bedroom)	121	366
Residential Care Home (1 bedroom)	60	60
TOTAL	**1,260**	**2,753**

Source: Census 2011 / Mid-Mersey SHMA (2016) / NLP Analysis

13.5.5 On this basis, the additional resident population that arise from development would amount to 2,693 persons for the 1,200 C3 dwellings, and a further 60 persons from the 60 C2 Care Home units, equalling 2,753 residents in total. Based on data from the 2011 Census, this increase would be equivalent to a 2.2% rise in the population of the local impact area (which had a population of 123,846 at the time of the 2011 Census), and a 1.4% rise in the wider impact area of Warrington Borough (with a population of 202,230 in 2011).

[105] At this stage the dwelling split of the proposed development is not known. In the absence of this information the market housing requirement from the Mid-Mersey (Halton, St. Helen's and Warrington) SHMA (2016) has been used: 1-bed: 6%, 2-bed: 32.2% 3-bed: 51.7%, 4+bedrooms: 10.1%.

13.5.6 This additional population estimate assumes that all residents of the new dwellings would not already be living in the area. However in reality many of the new dwellings will be occupied by existing local residents (e.g. residents buying their first homes, trading up, or residents on the Housing Association/Council waiting lists). It is difficult to estimate what this proportion would be overall, and in any event existing residents relocating in this way could free up existing dwellings for occupation by other new residents, adding to the total population. For the purpose of assessing worst case impacts, and thereby in the interests of providing a robust assessment, all of the population increase is assumed to be additional to the local area.

13.5.7 The implied level of growth in the resident population of the local impact area (2.2%) does not signify a significant change to existing population levels. However the real significance of these impacts will depend on their implications for other socio-economic factors (e.g. health and education provision), largely depending on whether the current availability of community infrastructure can accommodate the additional needs generated by the proposed residential-led scheme. It should be noted that the additional income and expenditure of these new residents within the economy will deliver positive benefits to the local area (e.g. an increase in GVA). These impacts are assessed in detail below.

Impacts during Construction

Construction Costs

Direct Employment

13.5.8 The developer has estimated that the total cost of construction of the proposed mixed-use development (including the residential properties, in addition to the employment space and care home/ assisted living properties) to be approximately £150 million.

13.5.9 This can be used to estimate the amount of construction employment that is likely to be generated by the scheme. ONS Annual Business Survey data indicates that the average ratio of expenditure (i.e. on materials, goods and services) to jobs in the construction industry was £85,180 in 2011.[106]

13.5.10 Applying this ratio to the estimated construction cost outlined above implies the development would be likely to generate 1,667 person-years of construction employment over the duration of the build period. As the proposed development is to be built over the course of 15 years, this would support **111 temporary construction jobs per annum** on average during the construction phase, or **167 FTE construction jobs**.[107] Although national construction firms sometimes use their own permanent workforce on projects (who are likely to be drawn from outside the local

[106] Annual Business Survey, 2011; revised results published in June 2013 provide detailed statistics on construction sector expenditure
[107] Based on HM Treasury assumption that 10 person-years of employment equates to 1 permanent position.

impact area) based on experience elsewhere it is likely that a proportion of these new construction jobs will be taken up by local workers (particularly if measures are in place to encourage local recruitment, such as apprenticeships). This will help to provide employment opportunities for some of the registered JSA claimants in the local area that are seeking work. This number, as of December 2015, was 114.[108]

Indirect and Induced Employment

13.5.11 Housing construction also involves purchases from a range of suppliers who, in turn, purchase from their own suppliers via the supply-chain. The relationship between the initial direct spending and total economic impacts is known as the 'multiplier effect', which demonstrates that an initial investment can have much larger economic benefits as this expenditure is diffused through the economy. The construction sector is recognised to be a part of the UK economy where there is a particularly high domestic benefit in the supply chain. Research from 2009 showed the construction sector imported less than 8% of its supply, while the UK car manufacturing sector imported nearly 28%.[109]

13.5.12 It is anticipated that businesses within Warrington would benefit from trade linkages established during the construction phase of the proposed development. As a result, further indirect jobs would be supported within the area through the suppliers of construction materials and equipment.

13.5.13 In addition, businesses would also be expected to benefit to some degree from temporary growth in expenditure linked to the direct and indirect employment effects of the construction phase. It would be expected that the local economy would gain a significant temporary boost from the wage spending of workers within local shops, bars and restaurants, and other services and facilities. Such effects are typically referred to as 'induced effects'.

13.5.14 Research undertaken on behalf of the National Housing Federation indicates the construction industry has an indirect and induced employment multiplier of 2.51.[110] Applying this employment multiplier to the 111 direct construction jobs each year derived above indicates an additional **168 jobs could be supported each year of construction**, or 252 FTE jobs, by the proposed development in sectors throughout the UK economy. This is in addition to the 167 FTE jobs discussed earlier.

13.5.15 In summary, it is considered that the impact of the construction employment generated by the proposed development is **beneficial** and of **moderate** magnitude across the local impact area.

[108] Number of JSA claimants seeking employment in the MSOA in which the Peel Hall site is located within (Warrington #06) as registered in December 2015
[109] UK Contractors Group (2009) Construction in the UK Economy: The Benefits of Investment
[110] National Housing Federation, 2013; an employment multiplier of 2.51 implies that for every one direct job generated a further 1.51 indirect and induced jobs are supported in the supply chain.

Occupational and Operational Impacts

Economic Impacts

Direct Employment

13.5.16 Alongside residential uses, the development scheme at Peel Hall will contain some commercial uses that will generate employment and expenditure within the local area (i.e. once the scheme is fully built-out and operational). The non-residential elements of the proposed mixed-use development will include B1(c) light industry space, a retirement home, a retail foodstore and a local centre, all of which are likely to generate employment.

13.5.17 In order to estimate the likely employment supported by these retail and office spaces, the Employment Densities Guide (2010), produced by OffPAT and HCA can be used by applying an average job ratio to their floorspace. On this basis, and as set out in , it is estimated that around 518 jobs (409 FTE) could be directly supported by the proposed development.

Table 13.5 Employment Generation of the proposed employment land

Proposed Use	Proposed New Floorspace (GEA) (sq. m)	Average Employment Density	Average FTE Employment Density	No. Jobs Generated	FTE Jobs Generated
Light Industrial (B1(c))	8,718	1 job per 53.5 sq. m	1 job per 60 sq. m	163	145
Foodstore	2,787	1 job per 15 sq. m	1 job per 22 sq. m	186	127
Local Centre	1,852	1 job per 16 sq. m	1 job per 22 sq. m	116	84
Residential Care Home	60 beds (approx.)	0.875 jobs per bed[111]	0.875 jobs per bed	53	53
Total				**518**	**409**

Source: Satnam / HCA Employment Densities Guide (2015) / NLP Analysis

Net Additional Effects

13.5.18 In order to estimate net employment impacts, the extent to which the proposed development would displace jobs from other existing business in the area is also considered.

[111] Based on NLP experience of an 80 bed care home employing 70 FTE staff, therefore creating 80 / 70 = 0.875 FTE jobs per bed

Loss of Existing Jobs

13.5.19 There are no existing jobs on the site of the proposed development. Therefore no jobs will be lost as a result of the construction stage of the proposed development.

Displacement Effects

13.5.20 Some of the new employment generated on the site may comprise jobs displaced from elsewhere in the local area. Net employment impacts in the local and regional area have been estimated by considering the extent to which the proposed development is likely to displace some jobs from existing local businesses by taking into account typical job displacement factors for these uses.

13.5.21 To take an example, displacement effects can be reduced where an area is already deficient in the space in which the development is providing. For instance, whilst the Warrington Employment Land Review (2012) states that the Borough has a large amount of distribution floorspace, the proportion of factory space has "*diminished dramatically*" since 2005, reflecting "*a number of legacy industrial sites making way for new residential developments*".[112] In addition, the Cheshire & Warrington Rural Workspace Study (2009) quotes research, a key finding of which was that limited provision of light industrial space exists along the M6 corridor.[113]

13.5.22 In terms of retail, the Warrington Retail Study Update (2009) states that there is a "*good network of neighbourhood and local centres*" in the Borough "*with few geographical gaps in provision*".

13.5.23 Because of a relatively low supply of higher quality industrial spaces in Warrington, in addition to the strong network of local centres within the Borough it is considered that any displacement of industrial, retail and leisure jobs will be towards the lower end of any range. A typical low level of job displacement, supported by the English Partnerships Additionality Guide, would be in the order of 25% (i.e. 25% of the new jobs on the site will be relocations from elsewhere in the area).[114]

13.5.24 After allowing for such displacement effects, the total net direct jobs resulting from the proposed development is estimated to be in the order of 388 jobs (307 FTEs) at the local level, as shown in Table 13.6.

[112] Warrington Borough Council (2012) Employment Land Review, pg 15
[113] Cheshire County Council (2009) Cheshire & Warrington Rural Workspace Study
[114] English Partnerships (2008) Additionality Guide Third Edition, table 4.6

Table 13.6 Net Direct Effects on Employment – Displacement

Total Jobs	FTE Jobs	Displacement Factor	Net Additional Jobs – Less Displacement (jobs)	Net Additional Jobs – Less Displacement (FTE)
518	409	25%	388	307

Source: NLP Analysis / English Partnerships (2008) Additionality Guide Third Edition

Multiplier Effect

13.5.25 Some indirect employment will also be supported by the expenditure on goods and services within local businesses by the occupiers of the employment uses. The wage spending by employees of these commercial operations, and also the local businesses supplying these facilities, will support further induced jobs within local shops, services and other businesses.

13.5.26 As with the construction employment detailed above, there will also be a range of indirect jobs that will be supported by the spending on goods, supplies and services directed from the firms which occupy the industrial, retail and leisure uses of the site, as well as the Care Home dwellings. For example, many businesses in the Warrington area would require services such as buildings and gardens maintenance; health and hygiene products; medical prescriptions and pharmacists; food and laundry services etc.

13.5.27 The spending of wages by both employees on the site and of the local firms supplying goods and services to these companies will also support induced employment in other local shops, other services and other firms. These types of employment are normally estimated using employment multipliers derived from research on similar operations elsewhere, with adjustments to reflect the specific characteristics of the proposed development, the amount of spending retained in the local area, and local economic and labour market conditions.

13.5.28 English Partnerships Guidance on calculating the additionality of economic regeneration projects has been used to select a combined employment multiplier (which combines the supply linkage multiplier and the income multiplier) of 1.21 (for the local area) and 1.38 (for the wider region) to estimate both indirect and induced employment for retailing employment space, of which the majority of this scheme's employment is located within.[115]

13.5.29 Using this multiplier level it is estimated that the 388 additional direct jobs (or 307 FTE) produced by the scheme could result in a further 64 'spin-off' FTE jobs within local services and other businesses in the local impact area and 117 FTE jobs within the wider Warrington and North West region.

[115] English Partnerships (2008) Additionality Guide Third Edition

13.5.30 On this basis, it is estimated that, once in operation, the proposed Peel Hall development could support approximately **371 FTE jobs**[116] in total within the local impact area. In summary, it is considered that the impact of the employment generated by the employment use and Care Home parts of the proposed development is **beneficial** and of **moderate** magnitude across the local impact area, and of a minor magnitude across the wider impact area.

Resident Expenditure

13.5.31 The proposed mixed-use development scheme also affords an opportunity to increase local expenditure levels. The scale of these benefits is determined by the spending patterns of local residents, and the extent to which new residents move into the area from elsewhere.

13.5.32 Whilst the residents of the 60 C2 Nursing Home units will, through their spending and patronage, support local shops and services, it may not be of the same magnitude as the residents living in the 1,200 C3 dwellings. As a consequence, and to ensure the results of this ES Chapter are robust, the residential expenditure set out below has been calculated on the basis of the 1,200 C3 dwellings alone and hence represents a 'worse case' scenario.

13.5.33 Recent research suggests that the average homeowner spends approximately £5,000 to make their house 'feel like home' within a year and a half of moving into a property.[117] This money is generally spent on furnishing and decorating a property. This expenditure will generate a range of economic benefits for the local economy by supporting indirect and induced jobs within local businesses.

13.5.34 By applying this average level of one-off spending on household products and services, it is estimated that the new residents of the 1,200 proposed dwellings could generate £6 million of first occupation expenditure. This injection of expenditure within the local economy will help to support local businesses and increase employment prospects in the area.

13.5.35 Analysis of Output Area Classification data indicates that housing areas near Peel Hall are largely dominated by households in the 'Prospering Suburbs' socio-economic classification group[118]. It is anticipated that the new residents of the proposed market housing at Peel Hall would broadly be in the same type of household group, albeit occupiers of the proposed affordable housing component may fall within a different socio-economic classification.

13.5.36 The 2013 ONS Family Expenditure Survey offers data on household spending by household socio-economic classification, indicating average spending levels for households within the Prospering Suburbs' as well as the 'Constrained by Circumstances' group (i.e. those households that are occupying the scheme's affordable housing). Adjustments are made to reflect the fact that spending by North West households are on average lower.

[116] This is a sum of the 307 net additional FTE jobs resulting from the employment uses within the proposed development, in addition to the 64 'spin off' indirect jobs within the local impact area
[117] Planitherm glass (2012) 'When Does a House Turn Into A Home?'
[118] As identified by http://www.maptube.org/map.aspx?mapid=1

13.5.37 Based on these assumptions, it is estimated that residents of the development could generate total gross expenditure of around £26.7 million per annum.

13.5.38 It is recognised that not all residents of the proposed development will be 'new' to the local area as some will relocate from elsewhere within the Borough or the region. National research provides standards on the average distances moved between a head of household's present and previous residential address, which can be used to estimate the proportion of the population of the proposed development that may be 'new' to the local area.

13.5.39 In addition, only a proportion of the gross expenditure by new residents of the proposed housing will be retained within Warrington Borough. Adjustments have been made on the basis of existing shopping patterns and the leakage of spending to other nearby areas such as Liverpool, Chester and Manchester.[119]

13.5.40 Taking these factors into consideration, it is estimated that total net additional expenditure of around **£15.7 million per year** on average will be created by new residents to the area, and be retained within the wider impact area (within a distance of ten miles from the site). This net additional expenditure will support the vitality and viability of local businesses, and could encourage other businesses to relocate to the market. It is also expected that this extra resident expenditure could generate a further 173 local FTE jobs in retail, leisure, hospitality and other service-based sectors. In summary it is considered that the impacts of the increased resident expenditure generated by the proposed development is **beneficial** and of **moderate** magnitude across the local impact area.

Public Revenue and Savings

13.5.41 This section deals with the benefits delivered by the proposed development that accrue to the local authority, and to the wider healthcare system as a whole.

Local Authority Income

13.5.42 In 2010 the Coalition Government introduced an incentive based system to support their plans to increase the supply of new homes in locations that were willing and able to accept the development. The New Homes Bonus matches for a 6 year period the increase in Council Tax income from new homes or homes that have brought back in to use. This additional funding is potentially a major new income stream for local authorities at a time when their finances are being squeezed through the public sector austerity measures. The increased income is non ring-fenced and therefore local authorities have discretion to use the cash in the most beneficial way in support of their communities.

[119] Warrington Borough Council (2009) Retail Study Update Appendices, page 31

13.5.43 The proposal will deliver 1,200 C3 dwellings, alongside residential care homes. Using the standard method of calculation contained within the New Homes Bonus Calculator it is estimated that the C3 residential units would generate approximately £1.7 million of New Home Bonus award following the scheme's completion, which equates to a total of approximately £10.2 million over a 6 year period. Whilst the timetable of construction for the dwellings is planned to be phased, this is the sum of all revenue that will be collected once all the dwellings are constructed. This income would also be enhanced by an additional Council Tax income of approximately £1.5 million per annum in perpetuity following the scheme's completion.

Local Labour Market Impact

13.5.44 Creating an economic activity rate for the entire population of the Borough and applying it to the likely additional population generated by the proposed C3 dwellings gives an indication as to the quantity of people likely to be added to the local labour market. Applying the rate of economically active residents within the Borough (81.5%) and adjusting for the percentage of population aged 16-64 results in an additional 1,414 people likely to be added to the labour market as a result of the proposed development.

13.5.45 An increase of 1,414 economically active people would increase the Borough-wide total to 109,814. This is equivalent to a growth rate of 1.3% of economically active residents within Warrington Borough. However as noted previously, in reality it is likely that the labour market impacts will be lower due to some of the incoming residents already residing within the local area, which subsequently means the number of net additional workers would also likely to be less. New residents of the dwellings may also already work locally, but commute in from elsewhere[120]. As such, and in the absence of further information concerning the origin/destination of those likely to be moving into the proposed development, these calculations represent a 'best case' scenario. However, any increase in economically active people would commensurably grow the available workforce supporting local businesses. Likely commuting impacts are assessed below.

13.5.46 Overall, the total number of jobs likely to be generated by the proposed development should not create any significant pressures on the local labour market and will go some way to improving levels of economic inactivity in Warrington. As such, an increase in economically active persons within both the local and wider impact area can be considered **beneficial** and of **minor** magnitude.

Housing Impacts

13.5.47 After completion, the primary impact of the proposed development on the local housing market will be the addition of around 1,200 new C3 dwellings to the existing stock of 87,943 dwellings (2011) in Warrington, constituting an increase of 1.4%. This development would help to deliver

[120] The impact of the proposed development on commuting is assessed below

6.2% of the requirement of 19,297 dwellings in Warrington between 2014 and 2037 (839 dwellings per annum [dpa]), the housing need identified for Warrington Borough by the Mid Mersey SHMA (2016).

13.5.48 The Housing LIN work undertaken for Warrington Borough states that there is currently a supply deficit of Residential Care units (relative to demand) within the Borough, with a current supply of 540 units set against a current demand of 1,008 units (equivalent to a deficit of 46%). This current demand is projected to increase to 1,690 by 2030, approximately when the proposed development will be almost completed.[121]

13.5.49 Demand for affordable housing within Warrington is outlined within the Mid-Mersey SHMA (2016), which shows a significant shortfall in the supply of affordable homes, estimated at 220 dpa. The SHMA states that a quarter of the identified need for affordable housing (in net terms) could be met through intermediate, equity-based housing products; with the balance requiring social or affordable rented homes. [122]

13.5.50 As stated within Policy SN 2 of Warrington's Core Strategy a development greenfield site of 15 or more dwellings should make provision for 30% affordable housing. Whilst the final mix of this proposed housing is yet to be confirmed and will be subject to negotiations with the Council, it may be assumed the development will provide a range of dwelling types, including around 30% affordable, or 360 dwellings of the 1,200 C3, enhancing the quality of housing choice in the area and going some way to addressing the high level of affordable housing need in the local area. It is worth noting that the 360 affordable dwellings provided as part of the proposed development is more than 50% higher than the Borough's entire annual need for affordable housing (220 dpa).

13.5.51 The impact of the creation of both C3 housing and C2 Care Home units will be to enhance the quality of housing choice in the local market. The impact of market, care and affordable housing is therefore considered to be **beneficial**, and of **major** magnitude in relation to the local impact area and Warrington Borough as a whole.

Deprivation Impacts

13.5.52 Despite the area surrounding the proposed development site at Peel Hall being fairly prosperous (as characterised by the 'Prospering Suburbs' Output Classification Group), the area does still lie within an area that exhibits some deprivation issues. Housing deprivation issues, for instance, are typically the result of high house prices leading to affordability difficulties in the local market (although in other instances such deprivation issues relate to lower quality housing stock). The IMD 2015 indicated that the LSOA in which the proposed site is located within was ranked in the 30% most deprived LSOAs in England in terms of overall deprivation.

[121] Housing Learning and Improvement Network (2014) Strategic Housing for Older People
[122] Warrington Borough Council (2009) Strategic Housing Market Assessment

13.5.53 Moreover, there are other areas of Warrington which contain a high proportion of LSOAs ranked within the top 10% most deprived in England. By delivering greater housing choice and increased employment opportunities the proposed scheme will create significant deprivation benefits to the local area. This would particularly relate to an increased supply of housing and employment land contributing to improving the level of employment in the area (and reducing any deprivation caused by unemployment-based-deprivation). The benefits of the proposed housing-led development scheme could therefore be expected to improve not only the socio-economic outcomes of the area in the immediate vicinity of the site, but improve the prosperity of other areas in the wider impact area (Warrington Borough)

13.5.54 For these reasons, it is expected that the mixed-use development scheme would have a **beneficial** effect of **minor** scale, as it will increase housing supply in Poplars And Hulme (the ward in which the Peel Hall site is located), help to reduce any affordability difficulties that exist within the wider impact area and provide employment opportunities.

Commuting Impacts

13.5.55 As noted earlier, the construction of 1,200 new dwellings is assumed to increase the number of economically active persons within the area by some 1,414. Consideration must therefore be given to potential impacts on commuting patterns arising from the direct permanent jobs which would result from the proposed development.

13.5.56 For the purposes of the assessment, it has been assumed that future commuting patterns for the proposed jobs will broadly reflect commuting patterns seen in the past. If it is assumed that 32% of these new residents were to commute outside of the local impact area - as currently occurs based on the 2011 Census data - the proposed development could produce a further 452 out-commuting trips each day to destinations outside of the local impact area.

13.5.57 While some employment uses are proposed within the mixed-use scheme, it is expected that the actual amount of out-commuting trips created by the scheme will be reasonably close to that projected (i.e. if local recruitment initiatives are not endorsed). However it is also possible that some workers with existing jobs in Warrington, but who currently reside outside the Borough, will become residents of the new housing development, helping to reduce their journey time and the level of commuting within the local impact area.

13.5.58 Therefore this represents a worse-case scenario, as the high quality housing to be provided as part of the proposed development at Peel Hall is likely to help retain local employees as they seek to move up the housing ladder, thus potentially helping to reduce levels of in-commuting to the Borough. The employment floorspace to be provided as part of the Peel Hall scheme is also likely to help attract and retain local workers.

13.5.59 On this basis, the impact of the proposed development on commuting patterns is assessed as being **adverse** but of a **minor** magnitude.

Education Impacts

13.5.60 In assessing the actual requirement for school places in the catchment area, it is necessary to take into account the existing level of school capacity and the local education authority's future plans for growth, and the potential for some students to attend private schools or travel to schools outside of the local area.

13.5.61 The impact of the proposed development on the provision of education in the local impact area will largely depend on the number of additional children of school age that are generated by the housing scheme, and also the existing availability of spare school places in the area.

13.5.62 As mentioned previously, whilst there is currently surplus capacity at secondary school level, there currently exists a small shortfall in current primary education capacity. Furthermore, over the period that the Peel Hall site is constructed the projections of future school capacity which Warrington Borough Council has produced indicate that this shortfall will worsen. The Council's figures indicate that by 2029/30 the primary shortfall of -51 will increase to -305, whilst the secondary school surplus of 1,090 will become a shortfall of -521. These represent shortfalls of -5% and -8% for primary and secondary education respectively, even without the Peel Hall development..

Warrington Borough Council produces an 'education yield'[123] in order to calculate the level of demand for school places resulting from any new housing developments. Using this yield, sets out the calculation of the estimated primary pupil yield from the development.

Table 13.7 Primary School yield

Yield Applied per residential unit	Number of residential units	Primary Yield for this development
0.3	1,200	360

Source: Warrington Borough Council / NLP Analysis

13.5.63 The proposed development is therefore estimated to create the demand for an additional 360 primary school places. This additional demand for school places could equate to a 6% increase in the number of primary school students in the catchment area (relative to 2029/30 levels). The total capacity in 2029/30[124] is 6,150. With a total of 6,455 students projected to be on roll at this date, in addition to the 360 primary school places estimated to be produced by the proposed development, the net shortfall increases to 665.

[123] Calculated by WBC using the most recent Census data, as stated in WBC's Pre-Application Advice Letter dated 26th February 2016

[124] It is recognised that the development may not be completely built out by 2029/30, but for the purposes of this ES chapter we have used this as the end date to assess pupil shortfall. Furthermore the Council's model holds the number on roll and total capacity constant post 2026/27 onwards.

13.5.64 It is considered that the proposed development would have an **adverse, moderate** impact on the primary educational capacity in the area without mitigation.

13.5.65 sets out the calculation of the estimated secondary pupil yield from the development.

Table 13.8 Secondary School yield

Yield Applied per residential unit	Number of residential units	Primary Yield for this development
0.18	1,200	216

Source: Warrington Borough Council / NLP Analysis

13.5.66 The proposed development is estimated to create the demand for an additional 216 secondary school places. This additional demand for school places could equate to a 3% increase in the number of secondary school students (relative to 2029/30 levels).

13.5.67 The total secondary capacity in 2029/30 is forecast to be 6,300. With a total of 6,821 students projected to be on roll at this date, plus the additional 216 primary school places estimated to be produced by the proposed development, the net shortfall increases to 737.

13.5.68 It is considered that the proposed development would have an **adverse, moderate** impact on the educational capacity in the area without mitigation.

Healthcare Impact

13.5.69 As already noted, the gross increase in the resident population created by the additional residential units will amount to an increase of around 2,750 people in the local area. The 19 GP practices within the local impact area (the 15 MSOAs located within Warrington Borough) currently serve approximately 146,201 patients (between 88 Full-Time Equivalent [FTE] GPs this works out to be around 1,623 patients per GP). Growth in the local population resulting from the Peel Hall development (2,753 persons) is likely to increase the average capacity of the 88 FTE GPs accepting new patients to 148,954 (i.e. equal to approximately 31 new patients, or a 1.91% increase, for each accepting FTE GP). Taking into consideration the typical provision rate of 1,600 patients per GP [125], this rise in demand in the local impact area from the development will increase the shortfall in GPs capacity.

13.5.70 Likewise the 10 dental health facilities employing a total of 95 dentists operate within the local impact area, of which eighteen are accepting new patients. These six practices employ 23 out of the 41 dentists. The increase in the local population will increase the number of patients for each of the facilities accepting new patients. Because there exists a slight shortfall with regard

[125] NHS England (2014) The Review Body on Doctors' & Dentists' Remuneration Review for 2014 General Medical Practitioners and General Dental Practitioners, Para 1.15

to the number of GP patient provision, the increased demand resulting from the proposed Peel Hall development is likely to have an **adverse** but **minor** impact.

Open Space & Recreation Impact

13.5.71 As already noted, the gross increase in the resident population created by the new dwellings will amount to an increase of 2,750 people in the local area. The additional residents will create extra demand on existing sports, recreation facilities and open spaces within the local impact area. assesses the proposed development against the Council's requirements as set out in WBC's Open Space and Recreation Provision SPD (2007) and also WBC Officer's Pre-Application Letter dated 26th February 2016.

Table 03.9 Adopted Open Space Provision Standards and On-Site Provision within the Proposed Development

Type of Open Space	Policy Requirement	Peel Hall Development Requirement
Equipped Children's Play Space	0.2 ha / 1,000 pop	0.55 ha
Informal Children's Play Space	0.4 ha / 1,000 pop	1.10 ha
Formal Public Open Space	1.6 ha / 1,000 pop	4.40 ha
Natural and Semi-Natural Greenspace	2 ha / 1,000 pop	5.50 ha
Allotments	0.07 ha / 1,000 pop	0.19 ha

Source: Warrington Borough Council (2007) Open Space SPD, page 7

13.5.72 As outlined above, the development proposals for the application site include the relocation of an estimated 3.2 ha of sports and recreation facilities and public open space from Mill Lane to Windermere Avenue on the site, resulting in no net loss of open space. However, additional provision for formal open space is not being made which would result in an under provision against the development plan requirements. All other forms of open space would meet the requirements with the location and distribution determined through the submission of reserved matters.

13.5.73 There are 12 community venues identified within a 5km radius of the development site itself. Although it is hard to determine to what extent the new residents of the development will use the community venues, it is expected the facilities will be largely able to cope with the additional demand resulting from the increased population the development will bring.

13.5.74 The proposed development, by increasing the demand for local open space, recreation and community facilities, is therefore considered to have an **adverse** but **minor** impact upon open space and recreation provision within the area of impact.

Summary

13.5.75 The significance of the socio-economic impacts identified has been evaluated against the significance criteria matrix. The impacts are assessed as beneficial, neutral or adverse, while their relative magnitude are classified as substantial, moderate, minor or negligible. The significance of the impacts are summarised in below:

Table 13.10 Socio-Economic Impacts against the Baseline Position (without Mitigation)

Socio-Economic Factor	Impact	Magnitude
Construction Employment	**Beneficial**	Moderate
Operational Employment	**Beneficial**	Moderate
Resident Expenditure	**Beneficial**	Moderate
Public Revenue	**Beneficial**	Moderate
Local Labour Market	**Beneficial**	Minor
Housing	**Beneficial**	Major
Deprivation	**Beneficial**	Minor
Commuting	**Adverse**	Minor
Primary Education	**Adverse**	Moderate
Secondary Education	**Adverse**	Moderate
Healthcare	**Adverse**	Minor
Open Space & Recreation	**Adverse**	Minor

Source: NLP Analysis

13.6 Mitigation Measures

Introduction

13.6.1 The proposed mixed-use development at Peel Hall is expected to generate positive impacts to the local area in regards to employment, the local population, the local labour market, housing and deprivation levels, but create some adverse effects on commuting, education, open space, recreation and healthcare provision. Any negative impacts are regarded as being largely minor, so only limited mitigation measures are expected to be necessary.

Construction Mitigation Measures

13.6.2 The creation of 167 FTE construction jobs during the construction phase is in itself a positive impact that will not require any mitigation measures. It should be possible to maximise the socio-economic benefits of constructing the mixed-use scheme by undertaking initiatives that encourage local labour recruitment for new employment opportunities at the site.

13.6.3 Whilst no specific mitigation measures are required, some further initiatives that could be considered in relation to the construction employment generated by the proposed development include encouraging the use of local supply chains, and where practicable, utilise products and services that are procured locally. These measures would be subject to discussions with Warrington Borough Council, and other bodies involved with education and training, to ensure such employment initiatives are realised in the local context.

Operational Mitigation Measures

Employment and Local Labour Market

13.6.4 The proposed development will give rise to a moderate beneficial impact through the development of additional uses and the creation of 307 net additional FTE jobs; the generation of net additional expenditure; and the positive contribution to local authority revenues.

13.6.5 As such, no mitigation measures are required.

Impact on Commuting Patterns

13.6.6 A minor negative impact of the proposed scheme is the potential increase in the level of commuting in the local area. However, the proposed employment generating industrial floorspace and local facilities within the scheme will help minimise commuting levels overall.

13.6.7 Any remaining adverse impacts can be most easily addressed through suitable s106 contributions by the developer, which could include the provision of a new bus service, which

would promote the use of public transport and which would benefit not only the residents moving into the new development, but also the existing residents who live nearby.

13.6.8 In addition to this there are proposals to provide an extensive network of pedestrian and cycle routes within the site and a financial contribution to providing and upgrading facilities outside the site in north Warrington.[126]

13.6.9 These mitigation measures will enable the commuting impacts of the proposed development to be reduced from **adverse**, of **minor** scale, to **neutral**.

Impact on Education Facilities

13.6.10 There currently exists a shortfall of capacity in the primary education infrastructure, which is forecast to increase over the course of the proposed development's build programme even without the proposed Peel Hall development. Whilst WBC figures show that there is currently capacity within the secondary education infrastructure, projections indicate this capacity will turn into a shortfall of secondary school places over the course of the build programme even without the proposed Peel Hall development.

13.6.11 A area of land has been safeguarded as part of the proposed development site for a primary school if, in during the phased development of the site, additional educational infrastructure is required.

13.6.12 A moderate adverse effect of the proposed development scheme relating to the shortfall in secondary school provision could give rise to the need for financial contributions from the developer and specific effects could be subject to appropriate Section 106 contributions which would be agreed in consultation with the Council.

13.6.13 These mitigation measures will enable the primary and secondary education impacts of the proposed development to be reduced from **adverse**, of **moderate** scale, to **neutral**.

Impact on Healthcare Facilities

13.6.14 There currently exists a slight shortfall of capacity in the provision of GPs within the local impact area, relative to typical provision standards.

13.6.15 The Council are in discussion with Warrington Clinical Care Commissioning Group (CCG) and NHS England regarding future options to expand the proposed development's two nearest GP Practices, Fearnhead Medical Centre and Padgate Medical Centre[127]. Any remaining adverse impacts can be most easily addressed through suitable s106 contributions by the developer. Space for healthcare uses is able to be created in the local centre if on-site provision is required.

[126] 3D Reid (2013) Peel Hall Development Concept Document, 5.2
[127] WBC (2016) Pell Hall Pre-Application Advice Letter, 26th February 2016

13.6.16 These mitigation measures will enable the impacts of the proposed development on Healthcare Facilities to be reduced from **adverse**, of **minor** scale, to **neutral.**

Impact on Open Space and Recreation Facilities

13.6.17 The provision of open space will be a Reserved Matter, although it is proposed that the requirement for equipped and informal children's play space and allotments (as set out in) will be provided to WBC policy requirements. A condition will be requested to approve an open space strategy (addressing size, type and location) prior to the Reserved Matter approvals.

13.6.18 The natural and semi-natural informal Greenspace requirement will be catered for within the site itself, with a proposed green network through the centre of the site and along the motorway boundary to the north. This will provide informal areas and the potential for allotments, community orchards etc. Within the development land parcels themselves it is also intended that there will be village green areas, play areas and other recreational facilities incidental to the residential element of the proposed development.

13.6.19 The 3.2ha existing sub-standard sports facilities at Mill Lane that will be lost as a result of the proposed development will be replaced with a similarly-sized facility within the site designed to a significantly higher standard.

13.6.20 In addition, the existing WBC-owned sports field off Windermere Avenue (to the south of the site), which is currently under-utilised, will be substantially improved with facilities that may include new changing rooms, a car park, a Multi-Use Games Area and enhanced football pitches.[128] There will be significant qualitative improvements to the current formal public open space facilities available to existing and future residents.

13.6.21 The proposed development will therefore include suitable on-site open space provision and significant improvements to current sub-standard sports fields to the south of Windermere Avenue, at a significantly higher quality than currently exists. It therefore provides adequate mitigation for the increased demand for open space and recreational areas which the proposed development may incur. Any remaining adverse impacts can be most easily addressed through suitable s106 contributions by the developer.

13.6.22 These mitigation measures will enable the impacts of the proposed development on Open Space and Recreation facilities to be reduced from **adverse**, of **minor** scale, to **neutral**.

[128] 3D Reid (2013) Peel Hall Development Concept Document, 5.1

13.7 Residual Effects

Introduction

13.7.1 This section considers the residual socio-economic effects of the proposed development, taking into account the baseline position and any necessary mitigation measures. As relatively few mitigation measures are assessed as being necessary for the proposed development scheme, the residual effects are, in most cases, the same as the impacts discussed in earlier sections.

During Construction

13.7.2 No significant adverse effects are anticipated during the construction period.

After Completion

13.7.3 Following appropriate developer contributions, any negative impacts on Commuting, Education, Healthcare and Open Space and Recreation will be effectively neutralised.

13.7.4 The scale and significance of these residual impacts (i.e. once the mitigation measures have been implemented) are summarised in Table 13.11 .

Table 13.11 Residual Impacts from the Proposed Development after Mitigation

Socio-Economic Factor	Impact	Magnitude
Construction Employment	Beneficial	Moderate
Operational Employment	Beneficial	Moderate
Resident Expenditure	Beneficial	Moderate
Public Revenue	Beneficial	Moderate
Local Labour Market	Beneficial	Minor
Housing	Beneficial	Major
Deprivation	Beneficial	Minor
Commuting	Neutral	-
Primary Education	Neutral	-
Secondary Education	Neutral	-
Healthcare	Neutral	-
Open Space & Recreation	Neutral	-

Source: NLP Analysis

13.8 Summary & Conclusions

13.8.1 The proposed mixed use development on land at Peel Hall has the potential to deliver up to 1,200 new dwellings, helping to meet Warrington's housing need. The 30% of dwellings allocated as affordable housing will help to increase the mix of housing available within the Borough and improve resident's access to much needed social housing in the area. The Care Home facilities will bring benefits to the increasing proportion of elderly residents who reside in the Borough. It will also release some existing housing that is currently under-occupied into the wider market, and thereby making more efficient use of the existing housing stock.

13.8.2 In addition to this, the development will also have a positive impact on the local economy by creating new construction jobs during the development phase. Moreover the employment land, retail and leisure facilities contained within the development promises to deliver hundreds of new jobs once the development is operational, both directly through the employers based there but also indirectly through the supply chain. The inclusion of community facilities in the site will also help support the infrastructure needs of the local community

13.8.3 Based on this assessment, the most significant socio-economic impacts of the proposed development on the local economy are likely to include:

1 Investment of approximately £150 million over the 15 year development period;

2 Creation of 1,667 person-years of temporary construction work over the duration of the development phase;

3 Provide 307 FTE net additional jobs generated through the employment use and Care Home sections of the proposed development;

4 Delivery of up to 1,200 new C3 dwellings which will help to meet 6.2% of the housing target for the Borough over the plan period, improve the level of housing choice (by increasing the level of affordable housing) within the local area and reduce affordability issues;

5 Provide specially-designed housing for the elderly, alongside creating 53 associated FTE jobs;

6 Improve the socio-economic outcomes of highly deprived areas of the wider impact area by offering new employment opportunities; and,

7 Construction of open spaces as part of the development and improvements to existing poor quality sports facilities that will improve the provision of such facilities within the local area.

13.8.4 The scale of housing and its associated increases in resident population will be relatively minor when viewed in the context of the Borough as a whole. Impacts on demand for education, healthcare, open spaces and community facilities can be addressed by new facilities developed within the scheme, alongside current provisions within the local impact area. The proposed mixed-use scheme represents a significant new capital investment within the local area, and will help to raise the overall level of economic activity and expenditure within the local economy.

14.0 CUMULATIVE IMPACTS

Introduction

14.1 The Chapter provides a summary of the potential cumulative impacts already described in each technical chapter (Chapters 2-8). It highlights where and how other proposed developments may alter and influence the potential impacts already identified, and attempts to indicate whether these impacts are significant or not so that they may be taken fully into account by the planning determination process. In addition, this chapter considers the combined impact of the construction phase on disruptions to local people and communities.

14.2 Regulation 2(1) of the Town and Country Planning (EIA) Regulations 1999 (as amended) emphasises the need for cumulative impacts to be considered at a project level. Cumulative impacts are those new impacts, or enhancements of existing impacts, that occur only because of the interaction of the construction and operation of the proposed development with "other" projects and plans, or from the interaction of different aspects of the proposed scheme. Impacts may occur from the compounding of an issue (e.g. pollution from different sources affecting the same receptor, or different impacts on the life cycle of bats and other fauna) or from changes to the baseline (e.g. future development may change the landscape character and thus the impact of the residential development on the future baseline). Where a particular impact affects different receptors, this is not a cumulative impact but a direct impact which is not considered any further in this Chapter. For example, the adverse impacts from road runoff could have a detrimental impact on both water quality and ecology, as well as contribute to a temporary increase in flood risk by contributing to blockages of small watercourses.

Methodology

14.3 A qualitative assessment of the potential cumulative impacts has been undertaken. Good practice guidelines recommend that an EIA should assess the impacts of the development cumulatively with other developments only when there are likely to be significant impacts. When evaluating the potential for significant impacts there is often considerable uncertainty in the assessment. For example, it is possible that other planning applications are made during the determination of this planning application which are therefore not included in this assessment. The combined impacts on specific resources or receptors have been described, where relevant, in each of the specialist Chapters.

Other developments

14.4 In order to assess cumulative impacts as a result of proposed development in the vicinity of the proposed development has been determined from the Local Planning Authority. Based on experience in similar schemes, only developments within 5km of the proposed bypass have been considered, as beyond this arbitrary study area cumulative impacts are unlikely to occur (please note

that the study area for each environmental discipline is topic specific and is stated in the methodologies described within each technical Chapter).

14.5 Sites under construction are believed to be finalised by the time the construction phase for the proposed development begins. Hence, these may only have a cumulative impact during the operational phase. Sites currently under construction include residential and employment developments. Proposed developments that have been approved or are likely to be approved (i.e. applications awaiting decision, allocated sites, growth point sites and Strategic Housing Availability Assessment (SHAA) sites) can potentially have cumulative impacts with the proposed residential area during construction and operation. These include employment, residential and retail developments. It is accepted that any proposed developments, identified as part of this assessment are likely to alter traffic flows.

Ecology and Nature Conservation (Chapter 2)

14.6 Cumulative impacts will only occur during the construction phase if the construction of nearby projects coincides with that of the proposed residential development.

14.7 If any future development is brought forward it is assumed that appropriate surveys and assessment will be carried out, in consultation with environmental regulators, and mitigation will be included where relevant. For the Peel Hall development it is assessed that there will be no cumulative effects due largely to the barrier effect of the motorway corridor from habitats to the north.

Hydrology, Drainage and Flood Risk

14.8 Cumulative impacts will only occur during the construction phase if the construction of nearby projects coincides with that of the proposed residential development.

14.9 Providing adequate mitigation is in place no significant impacts are anticipated.

Landscape and Visual

14.10 Cumulative impacts will only occur during the construction phase if the construction of nearby projects coincides with that of the proposed residential development. There are no other proposed developments adjacent to the site or within the zone of visual impact that would lead to a cumulative impact arising.

14.11 Land to the north beyond the motorway is green belt land with no major constraints on development. Land to the east, west and south is existing residential development. The new proposed development and its screening with additional landscape would obscure the existing development from any views such as public rights of way. Providing adequate mitigation is proposed and implemented there would not be any overall significant impact in landscape character and/ or visual terms.

Transport and Highways

14.12 Cumulative impacts will only occur during the operational phase if the construction of nearby projects coincides with that of the proposed residential development.

14.13 Traffic volumes and the use of the road network has been assessed within the TIA and there is adequate capacity within the adjacent infrastructure network. No adverse cumulative impacts are expected.

Archaeology and Cultural Heritage

14.14 Cumulative impacts will only occur during the construction phase if the construction of nearby projects impacts directly with that of the proposed residential development.

14.15 Providing adequate mitigation is in place, cumulative impacts are not considered to be significant as there are no known development directly affecting the proposals.

Noise and Air Pollution

14.16 There is greater potential for cumulative noise and air quality with other concurrent projects within the vicinity of the construction and operational stages of the development. However, if each development follows the guidance contained within BS 5288: 2009 'Code of Practice for Control of Noise from Construction and Open Sites' and given the localised nature of noise impacts associated with the construction of any nearby development it is unlikely that cumulative impacts will occur.

14.17 It is considered that the proposed barrier and buffer to the motorway corridor could lead to benefits for existing properties and communities within the area.

Socio-Economic

14.18 Cumulative impacts will only occur during the operational phase if the construction of nearby projects impacts directly with that of the proposed residential development.

14.19 Social infrastructure during the construction phase may have a beneficial impact on existing local communities in terms of providing employment opportunities. Increased populations within the operational phase may have cumulative impacts on healthcare provision, education provision. Recreational opportunities are to be off-set by new and enhanced provision and/ or by commuted sum arrangement with the Local Planning Authority.

Significance of Cumulative Impacts

14.20 It is predicted that there are no significant cumulative impacts on ecology, hydrology, landscape and visual, highways and transport, archaeology, noise and air quality and socio-economic issues. In some cases implementation of good practice mitigation is required.

15.0 SUMMARY OF ADVERSE IMPACT AND MITIGATION
SUMMARY OF PREDICTED RESIDUAL EFFECTS

15.1 This section summarises the adverse impacts and mitigation of the proposed development identified within the various topics (**Table 15.2**). It also summarises residual effect (**Table 15.3**) and analyses the potential for any cumulative impacts that may arise as a result of the proposed development.

Table 15.2 Summary of Adverse Impacts and Mitigation

Aspect	Possible Adverse Impacts	Mitigation of Impacts & General Precautions
Landscape & Visual Amenity	a) Visual impact and loss of amenity to users of the sports pitches/ recreational area. b) Change in character of an open landscape to residential development, industrial uses and infrastructure c) Impact on limited number of local residents who currently have unrestricted views of the site (d) Impact on users of the public footpath to the north east of the site e) Impact on existing habitats- stream courses, existing woodland, hedgerows etc.	a) Provision of new sports pitches and recreational areas prior to loss of existing facilities. b) Change in character inevitable but will be in keeping with development to the south. Mitigated by good design and landscape treatment. Elements of existing vegetation will be retained and enhanced to provide setting and assimilate the proposed development into the surrounding landscape. c) Proposed landscape masterplan will inform the detail of development to provide screening for adjacent residents. d) Footpath routed retained on existing route and screened from adjacent development, new pedestrian routes created through the site, linking areas of existing and proposed open space. e) Stream courses retained, new ponds created with habitat enhancement. Existing features protected with barrier fencing etc.
Highways & Transportation	a) Development traffic will cause congestion. b) Loss of amenity for existing users of the public right of way network through the site. c) Construction operations will result in HGV traffic which could cause congestion and loss of amenity to local residents.	a) Introduce new bus service to be used by existing residents of north Warrington as well as future residents of the Peel Hall site. b) Proposed to have extensive footway and cycleway network through the developed site. c) Have a Construction Management Plan that controls hours of site operation and HGV routes to and from the site.
Hydrology, Flood Risk & Drainage	a) loss of permeable greenfield land b) potential contaminants or particulates seeping into the groundwater and / or river courses from the construction and operation of the site	a) Surface water is proposed to be controlled through attenuation features across the site, limiting the flow of water from the site to the existing run-off rates b) Lined permeable paving and attenuation features provide a two stage filtering process across the site, removing and containing any contaminants or particulates.

Ecology & Nature Conservation	a) Loss, reduction and/or alteration of bat foraging habitat. b) Loss of large areas of derelict agricultural land dominated by coarse grassland with general low floristic values. c) Loss of areas of immature plantation woodland <30 years old. d) Loss of areas of secondary dry reed bed on derelict farmland. e) Loss of minor sections of species-poor hedgerows. f) Loss of nesting bird habitat.	a) Proposed landscape planting to replace lost bat foraging habitat. b) Lighting controls and design to reduce effect on bat foraging patterns. c) Proposed buffer zone and to enhance to recreate semi-natural habitat, e.g. along stream courses. d) Proposed new landscape planting to provide nesting/foraging sites for birds. e) Proposed new attenuation ponds to provide increased aquatic habitat and marginal wetland planting.
Air Quality	a) Increases in dust and particles due to construction, earthworks, trackout and demolition b) Increases in concentrations of NO_2, PM_{10} and $PM_{2.5}$ from increased traffic flows	a) Implementation of a Dust Management Plan to reduce the likelihood of dust escaping beyond the boundary of the proposed development site
Cultural Heritage & Archaeology	a) Direct physical impact to archaeological remains leading to partial or total loss of an archaeological asset b) Indirect impact on the setting of an archaeological or cultural heritage asset leading to a diminution of its significance	a) Archaeological excavation and/or watching brief on areas where the presence or likely presence of archaeological remains is coincident with ground works required for the proposed development. Any archaeological attendances would be followed by analysis of the findings, publication and dissemination of the results and deposition of the archive in line with archaeological practice. The archaeological attendances would be configured with reference to the standards and guidance published by the Chartered Institute for Archaeologists with a contingency to respond to findings. b) For those archaeological and cultural heritage assets for which an indirect impact to setting has been predicted no formal mitigation is recommended as the magnitude of the impacts to settings and significance of the effect is marginally adverse and there is inherent mitigation in the quality of the design and layout of the proposed development.
Noise & Vibration	a) Increase in noise level from construction noise b) Increase in noise from increase in traffic flow c) Increase in noise from plant	a) Implementation of Best Practicable Means and restrictions in working hours to ensure minimal disruption b) Ensure that a detailed assessment of potential plant noise is carried out when the need for plant is identified

Socio-Economics	a) **Commuting:** Increase in the level of commuting within the local area. b) **Primary Education**: Increased demand for primary school places, which are already operating at capacity. c) **Secondary Education:** Increased demand for secondary school places, which are forecast to operate at capacity during the construction of the proposed development. d) **Healthcare:** Increased demand for healthcare facilities, which are already operating at capacity. e) **Open Space & Recreation:** Increased demand for open space and recreational areas.	a) **Commuting:** Employment floorspace within the proposed development will be aimed primarily at the local market. Any remaining adverse impacts can be addressed through suitable planning conditions. b) **Primary Education**: A plot of land has been safeguarded as part of the proposed development site for a primary school if, during the phased development of the site, additional educational infrastructure is required. c) **Secondary Education:** Appropriate Section 106 contributions. d) **Healthcare:** Appropriate Section 106 contributions or the availability of space within the local centre e) **Open Space & Recreation:** On-site open space provision. Any remaining adverse impacts can be addressed through suitable s106 contributions in relation to the improvements proposed to Radley Common fields.
Recreation	a) Loss of Mill Lane Sport Pitches b) Peel Cottage Lane PROW	a) Replacement sports pitches of better quality and quantity with supporting amenities including changing facilities. b) Footpath route to remain. Landscape planting will reduce impact on footpath over time.

Table 15.2 Summary of Predicted Residual Effects

	Construction Phase				Operational Phase			
	Receptor	**Probability**	**Effect**	**Significance**	**Receptor**	**Probability**	**Effect**	**Significance**
Landscape & Visual Amenity	Visual impact for residents of Elm Road, New Haven Road, Windermere Avenue, Delph Lane and Mill Lane.	Certain	Minor	Not significant	Loss of open views for existing residents –in similar locations to the construction phase	Likely	Moderate	Significant (but no right to a private view)
	Visual impact for residents of Ballater Drive	Certain	Moderate	Not significant	As construction phase	Likely	Moderate	Significant (but no right to a private view)
	Impact on character of surrounding landscape	Unlikely	Minor	Not significant	Long distance views	Unlikely	Negligible	Not significant
Highways & Transportation	The sensitivity of existing and future drivers, bus passengers, cyclists and pedestrians, and of the existing local community to the long term effects of any severance that occurs during the construction phase.	Certain	Minor	Adverse significance	Users of the future local highway network.	Certain	Moderate to minor	Adverse significance
					Users of the future bus network.	Certain	Moderate to major	Beneficial significance
					Users of the future cycle and pedestrian network.	Certain	Moderate	Beneficial significance

Hydrology, Flood Risk & Drainage	Loss of permeable greenfield land	Certain	Negligible	Not significant	Loss of permeable greenfield land	Certain	Negligible	Not significant
	Impact on watercourse through construction material contamination	Unlikely	Negligible – Construction Management plans will be in place during construction to control and reduce impact on watercourse	Not Significant	Impact on watercourse through contaminants from operation of site	unlikely	Negligible – controlled and mitigated with Surface Water Management Strategy.	Not significant
Ecology & Nature Conservation	Collective loss of common habitats	Certain	Moderate	Adverse significance	Disturbance to nesting birds from increased pedestrian use and development	Possible	Negligible to minor (unmeasurable)	Not significant
	Loss of breeding bird habitat	Certain	Moderate	Adverse significance	Impact on bat foraging areas through site lighting	Possible	Moderate Controlled and mitigated by appropriate lighting scheme	Adverse significance
	Reduction of bat foraging habitat	Certain	Moderate	Adverse significance	Impacts on water vole and their habitat	Unlikely	No effect	Not significant
	Impacts on water vole and their habitat	Unlikely	No effect	Not significant	Impacts on badger	Unlikely	No effect	Not significant
	Impacts on badger	Unlikely	No effect	Not significant	Impacts on great crested newt	Unlikely	No effect	Not significant

	Impacts on great crested newt	Unlikely	No effect	Not significant				
Air Quality	Dust deposition, resulting in the soling of surfaces	Possible	Negligible	Not significant	Increase in concentrations of NO_2, PM_{10} and $PM_{2.5}$ from increased traffic flows	Possible	Negligible	Not significant
	An increase in concentrations of airborne particles (e.g. PM_{10}, $PM_{2.5}$)	Possible	Negligible	Not significant				
	Impact to Ecological receptors from dust deposition	Possible	Negligible	Not significant				
Cultural Heritage & Archaeology	Damage to or partial/total loss of archaeological or cultural heritage receptors	Certain	Minor	Not significant	Adverse impact on the setting of archaeological or cultural heritage receptors	Certain	Negligible	Not significant

Noise & Vibration	Increase in noise levels due to construction activities	Likely	Negligible	Not significant	Increase in noise levels from increased traffic flows	Likely	Minor (Slight)	Not significant
					Impact of noise from plant	Possible	Negligible	Not significant
Socio-Economics	Employment Resulting from the construction phase	Certain	Moderate	Beneficially Significant	Operational Employment	Certain	Moderate	Beneficially Significant
					Resident Expenditure	Likely	Moderate	Beneficially Significant
					Public Revenue	Certain	Moderate	Beneficially Significant
					Local Labour Market	Likely	Minor	Beneficially Significant
					Housing	Certain	Minor	Beneficially Significant
					Deprivation	Likely	Minor	Beneficially Significant
					Commuting	Likely	Negligible	Not significant
					Primary Education	Likely	Negligible	Not significant
					Secondary Education	Likely	Negligible	Not significant
					Healthcare	Likely	Negligible	Not significant
					Open Space & Recreation	Likely	Negligible	Not significant
Recreation	Loss of amenity for users of the sports pitches/ recreational area	Certain	Moderate	Significant	As construction phase	Unlikely	Minor	Not significant

16.0 CONCLUSIONS

16.1 In conclusion the following topic areas have been addressed and the findings are set out below:

- Planning policy – The proposals are in compliance with National and Development Plan policy, it will provide needed housing provision and the development is considered to be sustainable.

- Ecology and Nature Conservation - There are no significant impacts that cannot be successfully be mitigated and enhancement can be achieved alongside development.

- Hydrology, Drainage and Flood Risk – There are no constraints on the development as proposed arising from these topic areas

- Landscape and Visual Impact - Landscape impacts can be successfully mitigated and visual impacts after mitigation will be negligible (??)

- Transportation and Highways – There is sufficient capacity for vehicles on the local highway network, adequate provision can be made for public transport, cyclists and pedestrians

- Archaeology – There are no significant constraints on development in terms of archaeology building conservation areas or listed buildings.

- Noise pollution – The development itself will not generate noise pollution. Measures can be put in place to successfully mitigate the impact of noise from external sources on future inhabitants

- Air pollution – air pollution will not be an issue arising from either the development itself or constraints imposed by airborne contamination from external sources.

- Social infrastructure – the development will bring about positive benefits in terms of employment provision and the local economy and there will be no adverse impacts on social infrastructure

15.1.2 The overall conclusion of this environmental statement is that any impact that exists can be mitigated against; and that all mitigation matters can be conditioned as part of reserved matters.