

For and on behalf of **Onward Holdings Ltd**

SUBMISSION TO THE EXAMINATION OF THE NORTH LINCOLNSHIRE HOUSING AND EMPLOYMENT LAND ALLOCATIONS DPD

Matter 3 - Housing Allocations

Land at The Glebe, Scunthorpe (SITE REF: SCUH-3)

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1.0 INTRODUCTION

- 1.1 This Statement has been prepared by DLP Planning Ltd on behalf of Onward Holdings Ltd, the owners of the land at The Glebe, Scunthorpe, as representations to the Examination in Public of the North Lincolnshire Housing and Employment Land Allocations (HELA) document.
- 1.2 The site has been proposed as an allocation for housing under reference SCUH-3. This allocation is supported by Onward Holdings, who are committed to delivering residential development at the site.
- 1.3 This Statement addresses the Inspector's questions in respect of the site, as set out in Matter 3 of the Examination Hearings Programme & Inspector's Issues and Questions, and responds to matters raised by other parties at the previous consultation stage in April-June 2014 on the Revised Submission draft of the Plan.



2.0 Matter 3: Housing Allocations: Land at The Glebe, Scunthorpe (SCUH-3)

Q: What mitigation measures will be necessary to address the rich biodiversity at this site?

- 2.1 An Extended Phase I Habitat Survey has been undertaken by Andrew McCarthy Associates in January 2009. Although the Report was submitted to the Local Planning Authority at the time, this is resubmitted as part of these representations (see Appendix 1) for the benefit of the Inspector and other parties.
- 2.2 The report assessed the site in respect of its potential for habitats, great crested newts, bats, flora and nesting birds, and concluded that the site has limited ecological value.
- 2.3 The site has been maintained since the report and it is considered unlikely that the biodiversity of the site has increased since that time. Indeed, it is not considered that the biodiversity at the site could be described as 'rich'. Nevertheless, at the time of a planning application a revised assessment would be provided if necessary to update the information contained within the 2009 report and any required mitigation measures complied with.
- 2.4 The following recommendations for mitigation measures were given in the 2009 report in respect of future residential development at the site:

Habitats:

- i. The use of calcareous grassland species to achieve biodiversity gain;
- ii. The use of native trees and scrubs within any landscaping plan. Recommended species include those which bear fruit/nuts or flowering plants which produce large amounts of nectar.
- iii. If Japanese Knotweed is removed, any contaminated soil or plant material would be classified as 'controlled waste' and a method statement would be required for its eradication.

• Fauna:

- i. That any landscaping involves planting of trees and scrub species which would attract invertebrates to maintain the foraging resources for bats.
- ii. Leave some areas of unlit landscaping / minimal lighting / downward, cowled lighting to encourage use by bats.
- iii. Any removal of scrub or trees should be undertaken outside of the bird-breeding season (March-August inclusive). Habitats with potential to support bird nests that require removal/clearance should be checked by a qualified ecologist immediately prior to works. If a nest or a nest in construction is found, work within the vicinity should halt until the nesting attempt is complete. Provision for replacement for any trees or scrub lost is recommended.
- iv. To increase the number of invertebrate species, landscaping proposals could include a variety of nectar producing herbs and shrubs.



2.5 In conclusion, the biodiversity value of the site is low, with no ecological constraints identified which would prevent development. However, the above mitigation measures are considered sufficient should any important habitats or species be found during development. Further details can be found in the full Extended Phase I Habitat Survey report included at Appendix 1.

Other Matters Raised

- 2.6 This Statement will also refer to matters raised by Firecrest Land Ltd and Tata Steel UK Ltd in their comments on the proposed allocation of the site in the Revised Submission draft consultation. These included the following matters:
 - The environment of the site in respect of air quality and noise from neighbouring land uses:
 - The deliverability of the site, in light of the fact that the site has not yet been developed and its market area.

Environment

- 2.7 A number of surveys have been commissioned at the site and have previously been submitted to the Council in support of its allocation for housing. These include:
 - i. Air Quality Assessment (April 2009);
 - ii. Flood Risk Assessment (October 2009);
 - iii. Phase I & II Environmental Assessment (November 2008)
 - iv. Hydrogeology and Hydrology Study (April 2009);
 - v. Noise Impact Assessment (December 2009);
 - vi. Dust and Odour Assessment (December 2010).
- 2.8 These assessments are resubmitted with this Statement (Appendices 2-7) to reconfirm the site's suitability for development in respect of the above matters.
- 2.9 The reports concluded that the site is suitable for residential development in terms of air quality, flood risk, noise and odour. Although the Environmental Assessment identified there being a low likelihood of the site being considered as contaminated, the report includes recommendations for a suitable remediation strategy to address any potential contamination.
- 2.10 The site therefore remains suitable for residential development in respect of its environment.

Deliverability

- 2.11 Representors also made comments on the site's deliverability, citing the fact that the site has not yet been delivered for housing, together with its local market area, as evidence of its undeliverability.
- 2.12 It is noted that the site is currently allocated as employment land within the adopted Local Plan. A planning application at this stage would therefore be considered contrary to the development plan and there is no certainty that planning permission would be granted for residential development whilst this allocation remains.



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2.13 Nevertheless, Onward Holdings remain committed to delivering residential development at the site, and supports the proposed housing allocation in the HELA document. The extent of the consultants reports already commissioned at the site illustrates this commitment and belief in the site's viability, as does Onward Holdings' continued promotion of the site through the development plan process.

Five Year Supply of Housing Land

- 2.14 Other representations have been submitted by parties including DLP Planning in relation to other sites within North Lincolnshire, which raise concerns in respect of the ability of North Lincolnshire Council to demonstrate a deliverable five year supply of housing land as required by paragraph 47 of the National Planning Policy Framework.
- 2.15 In light of the site's suitability, availability and deliverability it is therefore particularly important that the site is retained as an allocation to contribute towards meeting the 5 year supply. The site is considered suitable, available and deliverable and the landowners are committed to delivering housing at the site.



3.0 CONCLUSION

- 3.1 This Statement has been prepared by DLP Planning Ltd on behalf of Onward Holdings Ltd, the owners of Land at The Glebe, Scunthorpe (Ref. SCUH-3), in response to Matter 3 of the Inspector's Questions prior to the Examination in Public of the HELA document.
- 3.2 The Statement supports the proposed allocation of the site for housing in the emerging Plan as a suitable and deliverable site for housing.
- 3.3 A number of supporting surveys and reports had previously been submitted to North Lincolnshire Council in support of the site's allocation for residential development and are presented again now for the benefit of the Examination hearings. These reports assess the site's suitability for residential development in respect of ecology, air quality, noise, flood risk, and ground contamination and stability.
- 3.4 The reports conclude that the site is suitable for residential development in respect of these matters, provided remediation work is undertaken to address a low likelihood of site contamination. A number of mitigation measures are identified which may be undertaken should any constraints emerge during development, detailed in full in the Appendices.
- 3.5 These representations reiterate Onward Holdings Ltd's commitment to delivering housing at the site, which is considered viable and deliverable for residential development. The site forms an important part of North Lincolnshire's 5 year supply of housing land and should be retained in the plan.
- 3.6 <u>The proposed allocation SCUH-3 of the Land at Glebe Road, Scunthorpe for housing is therefore supported.</u>



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APPENDICES

Appendix 1: Phase 1 Habitat Survey (Andrew McCarthy Associates, 2009)

Extended Phase 1 Habitat Survey The Glebe, Scunthorpe

Client: Onward Holdings Ltd Project Number: 1196.S Revision: 00 Issue Date: 12 January 2009

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Disclaimer

This document has been prepared by Andrew McCarthy Associates for Onward Holdings Ltd solely as an extended Phase 1 Habitat Survey Report in support of a planning application. Andrew McCarthy Associates accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

NON-TECHNICAL SUMMARY

Andrew McCarthy Associates was commissioned to undertake an 'extended' Phase 1 Habitat survey of an area of land off Glebe Road, Scunthorpe. The site proposed for residential development consisted of one building, hard-standing, ephemeral/short perennial grassland, tall ruderals, semi-improved grassland and scattered trees and scrub.

Habitats

None of the habitats within the site boundary were assessed as being of significant intrinsic conservation value in terms of their botanical composition. However, some plants found within the site are indicative of calcareous grasslands and it is recommended that any landscaping incorporates calcareous species into proposals as an enhancement measure. In addition, the semi-mature trees and scrub have some intrinsic nature conservation value and it is recommended that where possible they are retained or, should they need to be removed, that they are replaced where possible with native species.

Great Crested Newts

There are no water bodies present on site. Great crested newt is known to occur in ponds located some 800m of the site boundary, within a large wetland complex associated with a mineral extraction site. At it's nearest point, the wetland area is located approximately 500m from the site boundary and is separated from the site by existing industrial development and the A1029. It is therefore considered unlikely that great crested newt would be a constraint to development.

Bats

The building on site was assessed as having low potential to support bats and none of the trees contained suitable roosting features. The site does have some value as foraging habitat and in order for this resource to remain it is recommended that plants attractive to invertebrates are used within soft landscaping proposals and lighting is placed to leave some areas relatively unlit or, where used, it is cowled to decrease light spillage into others areas.

Flora: Japanese knotweed

Stand of Japanese knotweed, an invasive plant, was identified in the west of the site. If the area within 7m of the plants is to be subject to ground works the Environment Agency's guidance on control of Japanese knotweed should be followed.

Nesting Birds

Removal of any tall grassland, scrub or trees should, if possible, be undertaken outside of the bird-breeding season (which is generally taken to extend between March and August inclusive). Alternatively, habitats and buildings with potential to support nests that require removal/clearance during this period should first be checked by a suitably qualified ecologist; should any of these features be found to support an active nest then work within its vicinity should cease until the nesting attempt is complete.

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1 INTRODUCTION

Andrew McCarthy Associates was commissioned by Onward Holdings Ltd to undertake an 'extended' Phase 1 Habitat Survey of The Glebe, Scunthorpe (SE 896 119approximate central OS grid reference) in response to a planning application to erect residential dwellings.

In addition to Phase 1 Habitat mapping, the 'extended' Phase 1 Habitat survey included a search for protected species and species of conservation concern, or their field signs, or habitats that may support such species. A desk study was also undertaken to search for archive data on protected sites and species, as well as other sites and species of local conservation importance and Regionally Important Geological and Geomorphological Sites (RIGS), in the vicinity of the site.

2 METHODOLOGY

2.1 Desk Study

Lincolnshire Environmental Records Centre (LERC) was contacted for archive data on legally protected sites and species, as well as notable species (e.g. Biodiversity Action Plan priority species, Red Data Book species, Red or Amber listed bird species, nationally rare or scarce species), sites of local wildlife conservation importance and RIGS, within a 2 km radius (4 km for bats) of the proposed development site. All received data can be found in Appendix 1.

The Multi-Agency Geographic Information for the Countryside (MAGIC) website was searched to find details of statutory sites of nature conservation (SSSI's, SPA's, SAC,s Ramsar sites and AONB) within 2km of the site and the 'Nature on the Map' website, maintained by Natural England, was searched for details of Local and National Nature reserves or areas of priority habitats listed in the UK Biodiversity Action Plan within 1km of the proposed works.

2.2 Field Survey

2.2.1 Flora

2.2.1.1 Habitats

The habitat survey was carried out by Rebecca Dollery (Senior Field Ecologist, AIEEM), ecologist with Andrew McCarthy Associates, on 19 November 08, using the standard Phase 1 Habitat assessment methodology, as recommended by Natural England (Anon, 1993; Anon, 1995). This involved a systematic site walkover to classify and map all of the habitats on site. Target notes were used to record habitats and features of particular interest. After completion of the survey, the field map was digitised using MapInfo v.9.0.

The results of the Phase 1 Habitat Survey are presented in the form of a colour-coded, digitised plan (Figure 1, Appendix 2) with Target Notes and potential protected species issues listed in Table 1 (Appendix 3). All of the plant species observed during the survey are listed (with DAFOR ratings for each habitat) in Appendix 4.

2.2.1.2 Species

In addition to general habitat classification, a list was compiled of all observed plant species¹. The abundance of each species was estimated for each habitat respectively using standard 'DAFOR' codes:

D = Dominant

A = Abundant

F = Frequent

O = Occasional

R = Rare

(Prefixed by 'L' if only locally dominant, abundant or frequent).

2.2.2 <u>Fauna</u>

During the habitat survey, particular emphasis was placed on identifying habitats and features capable of supporting protected and notable wildlife species. All habitats and features with such species potential, as well as any evidence to suggest or confirm the presence of those species, were recorded using target notes. The methodologies employed to assess the site for particular protected fauna are outlined below.

2.2.2.1 Bats

The following actual and potential bat supporting features were noted:

- Roosts mature trees, buildings, bridges, caves etc;
- Foraging areas parkland, water bodies, woodland edges, hedgerows etc;
- Commuting routes linear features such as hedgerows.

The potential of these features to support bats was then assessed, taking into consideration any physical evidence of bat activity (e.g. droppings and staining in the vicinity of a roost), the quality of the potential bat feature(s) (e.g. the number and approximate depth of cavities on a tree), the context of the site (i.e. the nature of the surrounding landscape and the degree of connectivity with other suitable bat habitats) and the results of the desk study.

2.2.2.2 Badger

The following evidence of badger *Meles meles* activity was searched for, both on site, and within 30 m of the boundary² (access permitting):

Feeding scrapes and scratching posts;

² Any development works within 30 m of a badger sett would require a licence from Natural England.

¹ Botanical nomenclature follows Stace (1997).

- Latrines often located near setts, at territory boundaries or adjacent to favoured feeding areas;
- Tracks and pathways;
- Hairs often caught on fencing;
- Setts usually distinguishable from other mammal holes by the size of entrance hole and spoil heap, the presence of hairs in the spoil and/or bedding material in the entrance.

2.2.2.3 Birds

All birds observed during the field survey were recorded, as were features capable of supporting nesting birds (e.g. trees, scrub, woodland and hedgerows). The site potential to support bird species of special conservation concern (i.e. Schedule 1, Biodiversity Action Plan and Red List species) was assessed, taking into consideration the bird species assemblage observed during the survey, the habitats present on and around the site, the context of the site in the wider landscape and the results of the desk study.

2.2.2.4 Reptiles

An assessment of the site potential to support reptiles was made, based upon the abundance of suitable habitats on site (e.g. rough, tussocky grassland adjacent to scrub or refuges such as wood piles, rubble or compost heaps), the context of the site in the wider landscape and the results of the desk study.

2.2.2.5 Great Crested Newt

All water bodies on site and within 500 m of the site boundary³ (where accessible) were recorded and described to indicate their potential to support great crested newt *Triturus cristatus*. The potential to support great crested newt was also assessed for all terrestrial habitats on site within 500 m of any potential great crested newt supporting water body.

2.2.2.6 Invertebrates

All identifiable invertebrate species observed during the field survey were recorded. The site's potential to support invertebrate species of special conservation concern (i.e. Schedule 5, Biodiversity Action Plan and Red Data Book species) was assessed, taking into consideration the invertebrate species assemblage observed during the

8

³ Any development works on potential great crested newt habitat within 500 m of a great crested newt colony may require a European Protected Species licence from Natural England.

survey (although this is only likely to be a small fraction of those present), the habitats present on and around the site and the results of the desk study.

2.3 Limitations

2.3.1 Desk Study

The data provided by LERC was not exhaustive. It is therefore possible that protected species not included in the data search occur within the vicinity of the proposed development site.

2.3.2 Field Survey

The optimal time for bat surveys to be undertaken is between the months of May to August. Bat surveys undertaken outside this period, and especially in winter, are mainly limited to providing information about the potential of certain features on buildings and trees (such as damaged roof or ridge tiles and rot holes on trees) to support roosting sites. Bats may use several roost sites during the course of a year and features that are found to be suitable may not necessarily be occupied or show signs of previous occupation at the time of survey.

Vegetation surveys are best carried out between the months of May and September. Surveys undertaken outside of this period may provide only a limited indication of the conservation interest present. In this case, it was considered that the vegetation was sufficiently visible to determine the value of habitats and assess their potential to support protected species.

2.4 Quality Assurance & Environmental Management

All ecologists employed by Andrew McCarthy Associates are members of, or are under application for, membership of the Institute of Ecology and Environmental Management (IEEM) and follow the Institute's code of professional conduct when undertaking ecological work.

3 RESULTS

3.1 Desk Study

3.1.1 Protected Sites

3.1.1.1 Statutory Sites

There were five local nature reserves found within 2km of the site boundary. These were:

- Atkinson's Warren, an area of grassland, heath and woodland 1.3km west;
- Sawcliffe 1km north east which is a mixed woodland;
- Phoenix Parkway, a heathland site which was part of Atkinson's Warren prior to a road being built and separating the two, 1.5km north west;
- Frodingham, a railway cutting supporting a range of wildflowers and invertebrates, 1.5 km south west;
- Brumby Wood, a mixed ancient semi-natural woodland, 1.7km south west.

3.1.1.2 Non-Statutory Sites

There are three records of non-statutory sites within 2km of the proposed site; two potential Local Wildlife Sites (pLWS) which are awaiting survey and assessment to determine whether they are designated Local Wildlife Sites and gain local planning policy protection and two previously known Sites of Nature Conservation Interest (SNCI) which are awaiting assessment to be re-classified as a LWS.

The SNCI's are Berkley East Gullet and Winterton Road Pits. The former site is situated approximately 1.7km north and contains a mosaic of grassland, scrub and bare rock habitat. Winterton Road Pits is situated 550m east and comprises a large water body formed from previous ironstone workings.

The two pLWS comprise Cottage Beck Road Grassland which comprises amenity and semi-improved grassland and trees located 1.2km south east and Rowland Road grassland which is located 900m south east.

3.1.2 Protected Species

3.1.2.1 Mammals

LERC hold record of common pipistrelle *Pipistrellus pipistrellus* within Atkinson's Warren LNR 1.3km west. Brown hare is are also reported in the Crosby Warren area, over 800m east.

3.1.2.2 Birds

A number of bird records were provided by LERC all associated with the designated areas of Brumby Wood LNR, Frodingham Railway Cutting LNR, Winterton Road Pits SNCI and Cottage Beck Road Grassland pLWS.

3.1.2.3 Reptiles & Amphibians

There were three records of great crested newts reported by LERC within the Crosby Warren area located to the east of the site. A survey of one of the ponds within Crosby Warren in 2006 found a large population (104 adults observed by torchlight). Common toads *Bufo bufo* were also found within Crosby Warren in 2006.

3.1.2.4 Invertebrates

There were several records of butterflies, moths and beetles that are either nationally notable or listed on the UK Biodiversity Action Plan within 2km of the site. These were mainly associated with the designated sites.

3.1.2.5 Flora

Bluebells *Hyacinthoides non-scripta* were recorded at Brumby Woods LNR, Phoenix Parkway LNR and Winterton Road Pits SNCI. The pernicious weed Japanese knotweed *Fallopia japonica* was recorded within Corus steelworks 1km south east and plants which were listed on the UK Biodiversity Action Plan or as endangered were recorded within Atkinson's Warren LNR and Frodingham Railway Cutting LNR.

3.2 Field Survey

3.2.1 Landscape & Habitats

The site is located within the north eastern area of Scunthorpe abutting residential areas to the south and west and industrial areas to the north and east. There is an area containing water features, scrub, grassland and trees to the north east of the site. The site comprised an area of land enclosed by Warren Road to the north, Glebe Road to the south, Winterton Road to the east and Normandy Road to the west all with associated industrial and commercial outlets along them.

The site appeared to have been in use in the recent past with areas of hard-standing and ephemeral vegetation enclosed by fences. It is thought that part of the land has been previously land filled and restored. The habitats found within the site included buildings and hard-standing ephemeral/short perennial grassland, semi-improved grassland, tall ruderals, scrub and trees.

3.2.1.1 Ephemeral/short perennial grassland

The majority of the site comprised ephemeral/short perennial grassland established over areas of hardstanding or bare ground (Target Note 3 and Plate 1). Species included annual meadow-grass *Poa annua*, ribwort plantain *Plantago lanceolata*, common ragwort *Senecio jacobea* and mosses including the species *Grimmia pulvinata*, *Bryum capillare* and *Pohlia nutans*.



Plate 1: Ephemeral/short perennial grassland across the majority of the site.

3.2.1.2 Semi-improved Grassland

Areas of the site, mainly restricted to the boundaries and isolated islands, comprised semi-improved grassland containing common, pioneer species such as annual meadow-grass, creeping bent *Agrostis stolonifera*, perennial rye-grass *Lolium perenne*, ribwort plantain, common ragwort and creeping thistle *Cirsium arvense* (Plate 2). The area also contained abundant viper's bugloss with occasional weld *Reseda luteola* and carline thistle *Carlina vulgaris*. These species are indicative of calcareous grasslands indicating that the underlying geology is that of Lincolnshire limestone and cover sands.



Plate 2: Semi-improved grassland at the boundaries of the site.

3.2.1.3 Tall Ruderals

At the boundaries of the site and acting as a transition habitat between the semi-improved grassland the scrub was areas of tall ruderals (Plate 3). The dominant species found were rosebay willowherb *Chamaerion angustifolium*, common hogweed *Heracleum sphondylium*, teasel *Dipsacus fullonum* and common burdock *Articum nemorosum*.



Plate 3: Tall ruderal transition habitat

3.2.1.4 Scrub and Scattered trees

There are areas of scattered trees and scrub across the site (Plate 4 and Target note 1). The trees were all young to semi-mature and included species such as silver birch *Betula pendula*, sycamore *Acer pseudplatanus* and pedunculate oak *Quercus robur*. The scrub was dominated by bramble *Rubus fruticosus* agg. and dog rose *Rosa canina*.



Plate 4: Scrub and scattered trees

3.2.1.5 Buildings and Hard-standing

There was one building within the site boundary which was a red brick garage style building with a metal roof situated within the north western edge of the proposed development site. The building was a relatively new structure with well sealed brick work and window frames. Associated with the building and to the south of the site were areas of hard-standing which were either still in use or had been used recently as car parking space or similar.

3.2.1.6 Water features

The site contained a dry ditch which was located at the boundary of the site (Target Note 2). It was a 'v' shape ditch that had no evidence of containing water in the recent past due to the extent of rank grassland plants found growing in the channel (Plate 5).



Plate 5. Dry ditch within site boundary

3.2.2 Protected Species

3.2.2.1 Mammals

None of the trees within the site had features which would be suitable as roosting habitat for bats as they were all young to semi-mature. A semi-mature sycamore tree was inspected but found to have low potential for roosting bats due to a lack of features such as cracks in the stem and loose bark (Target Note 5). The single building on site was assessed for its potential to support bats and found to be of low potential due to the lack of suitable features (Target Note 7). The site as a whole may be of use to any foraging bats within the area providing an open green space with scrub areas.

There were no signs of any other protected mammals within or adjacent to the site. However, it was evident that rabbits extensively used the site.

3.2.2.2 Birds

There were six birds recorded on site. These were greenfinch *Carduelis chloris*, carrion crow *Corvus corone*, magpie, *Pica pica*, blackbird *Turdus merula*, goldfinch

Carduelis carduelis and herring gull Larus argentatus. All of these birds, with the exception of the herring gull, are listed on the green list within the RSPB's Population Status of Birds in the UK: Birds of Conservation Concern 2002 - 2007 publication stating that there are no identified threats to the population status of these species. The herring gull is listed on the amber list which states that there has been a moderate decline in the population status in the last 25 years.

3.2.2.3 Reptiles & Amphibians

The site has some potential to be used by reptiles due to the diversity of areas offering basking habitat in the open areas, foraging habitat in the longer grass and shelter in the scrub.

The relevant OS map shows that there are three water bodies within a 500m radius of the site. None of the ponds could be directly accessed during the survey to assess their suitability for great crested newts *Triturus cristatus*. However, from observing them on aerial photographs the following descriptions were gleaned:

- Pond 1; this waterbody is situated 250m north of the site within an industrial
 estate on the opposite side of Warren Road. It comprises a concrete sided
 interceptor with no aquatic or marginal vegetation and appears to be
 regularly maintained by pumping;
- Pond 2; a large pond located 450m east of the site and part of the wetland complex associated with Crosby Warren;
- Pond 3; a large pond located 500m east of the site and part of the wetland complex associated with Crosby Warren;

3.2.2.4 Invertebrates

Although the former industrial site offers a mosaic of habitat, it has not yet developed the amount of leaf litter/debris and habitat niches required to be of interest for invertebrates of conservation concern.

3.2.2.5 Flora

Areas of the grassland contained plants which would usually be found in calcareous soils as discussed in paragraph 3.2.1.2. However, the species found are common and widespread within a national and local framework and combined with the rank nature of the rest of the grassland areas do not constitute a typical or high quality example of a calcareous grassland habitat.

There were three stands of Japanese knotweed *Fallopia japonica* identified within the site (Plate 6 and Target notes 4 and 7). All stands were well established and not being treated at the time of survey.



Plate 6: Stand of Japanese knotweed.

4 RELEVANT LEGISLATION & POLICY⁴

4.1 Legislation

The two principal pieces of legislation concerning the conservation of wildlife in England are the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006, and the Conservation (Habitats &c.) (Amended) Regulations 2007.

The Wildlife and Countryside Act 1981, as amended, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive). One way in which the Act offers wildlife protection is via the notification of Sites of Special Scientific Interest (SSSI). These are sites designated by the Statutory Nature Conservation Organisation (Natural England in England) based on their flora, fauna, geological or physiographical features. The Act also offers various forms of protection at the species level by making it an offence (subject to exceptions) to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with exception to species listed under Schedule 2 of the Act);
- Disturb any bird species listed under Schedule 1 of the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 of the
 Act (these species include water vole Arvicola terrestris, otter Lutra lutra,
 dormouse Muscardinus avellanarius, all native bats, all native reptiles and
 great crested newt Triturus cristatus);
- Pick or uproot any wild plant listed under Schedule 8 of the Act.

The Act also contains measures to prevent the establishment of non-native species by prohibiting the release or planting of animals and plants listed under Schedule 9.

The Conservation (Habitats &c.) (Amendment) Regulations 2007 implement Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive). The Regulations offer further wildlife protection to the Wildlife and Countryside Act 1981, as amended, via the designation of Special Areas of Conservation (SAC), which are sites important for either habitats or species (listed

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⁴ Please note that this legal information is a summary and intended for general guidance only. The original legal documents should be consulted for definitive information. Web addresses providing access to the full text of these documents are given in the References & Bibliography section.

under Annexes I and II of the Habitats Directive respectfully), and by making it an offence to do any of the following to any wild animal listed under Schedule 2 of the Regulations:

- · Deliberately capture or kill;
- Deliberately disturb;
- Damage or destroy a breeding site or resting place.

Schedule 2 species include all bats, otter, dormouse, great crested newt, sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*. In addition, it is an offence to deliberately pick, collect, cut, uproot or destroy any wild plant listed under Schedule 4 of the Regulations. Any activity that would result in a contravention of the Regulations would require a licence from Natural England to avoid committing an offence.

Sites and species protected by other statutes include:

- Special Protection Areas (SPAs) classified under Article 4 of the Birds
 Directive, for rare and vulnerable bird species listed under Annex I of the
 Directive, as well as regularly occurring migratory bird species.
- Ramsar Sites wetlands of international importance, designated under the Ramsar Convention.
- Areas of Outstanding Natural Beauty (AONB) designated under the National Parks and Countryside Act 1949, as amended, to conserve natural beauty, including wildlife and physiographic features.
- National Nature Reserves (NNRs) sites containing the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain, designated under the National Parks and Countryside Act 1949 and the Wildlife and Countryside Act 1981.
- Local Nature Reserves (LNRs) nature conservation areas declared by local authorities under the National Parks and Countryside Act 1949.
- Badger under the Protection of Badgers Act 1992, it is illegal to kill, injure
 or take a badger or to intentionally or recklessly interfere with a badger sett.
 Sett interference includes disturbing badgers whilst they are occupying a sett
 or obstructing access to it. A licence must be obtained from Natural England
 in order to undertake any activity that would result in a contravention of the
 Protection of Badgers Act 1992.

Sites with non-statutory protection include:

- Wildlife Sites Various designations such as County Wildlife Site (CWS) and Local Wildlife Site (LWS) assigned by local authorities on the basis of a site's local conservation importance.
- Regionally Important Geological and Geomorphological Sites (RIGGS) equivalent to Wildlife Sites for sites containing features of geological and geomorphological interest.

Whilst these sites do not have statutory protection, consideration of their importance is an integral part of the planning process.

The Natural Environment and Rural Communities Act 2006 places a duty on authorities to have due regard for biodiversity and nature conservation during the course of their operations.

4.2 Policy

Planning Policy Statement 9 and its accompanying document ODPM 06/2005 sets out government policy on biodiversity and nature conservation and places a duty on planners to make material consideration to the effect of a development on legally protected species when considering planning applications. PPS9 also promotes sustainable development by ensuring that developments take account of the role and value of biodiversity and that it is conserved and enhanced within the development.

The UK Biodiversity Action Plan (UKBAP) (Anon, 1995), organised to fulfil the Convention on Biological Diversity in 1992, to which the UK is a signatory, has produced a national priority species list with all species included having Species Action Plans. Regional and local BAPs have also been organised to develop plans for species of nature conservation importance at regional and local levels. The Lincolnshire BAP lists 23 species and 19 habitats. The relevant action plans for species and habitats which were either observed or have the potential to be found on site and recorded within the area include calcareous grassland, parks and open spaces, song thrush and bats.

5 DISCUSSION & RECOMMENDATIONS

5.1 Habitats/plant communities

5.1.1 <u>Statutory Sites</u>

The statutory sites, which are all either woodland, heathland or grassland sites, are all too distant from the site to be affected by the development with the closest being 1.2km.

5.1.2 Non-statutory Sites

All non-statutory sites are too distant to be affected by development proposals with the closest site being the Winterton Road Pits which are 550m north and separated from the site by the industrial areas and roads.

5.1.3 Habitats

The proposed development site is dominated by species poor ephemeral/short perennial and semi-improved grassland which has limited ecological value. All of the plants on site are common and widespread throughout the county as stated in The Flora of Lincolnshire⁵. However, some of the plants are indicative of calcareous grassland which is a habitat listed on the local BAP. Therefore, it is recommended that where any landscaping is proposed, calcareous grassland species are used to achieve biodiversity gain within any proposed development.

The trees found within the site offer limited intrinsic nature conservation value being young with only one tree assessed as semi-mature. However, the trees and scrub on site represent habitat and foraging for birds and invertebrates and it is, therefore, recommended that within any landscaping plan, native trees and scrub are introduced where possible. Species which could be used are those which bear fruit / nuts or flowering plants which produce large amounts of nectar to provide a food resource.

Stands of Japanese knotweed have been identified on site. Under the Wildlife and Countryside Act 1981 it is an offence 'to plant or otherwise encourage' the growth of Japanese knotweed and this can include cutting the plant or roots and disturbing surrounding soil. If the development involves affecting the area of Japanese knotweed (area defined as a 7m radius from the plant in the Environment Agency's guidance) any contaminated soil or plant material would be classed as 'controlled

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⁵ Gibbons, E. (1975) *The Flora of Lincolnshire*. Keyworth and Fry Ltd, Lincoln.

waste' and, therefore, a method statement would be required for its eradication in accordance with the Environment Agency's guidance (Environment Agency, 2006).

5.2 Fauna

5.1.4 Bats

None of the trees or buildings surveyed provided suitable features for roosting bats. However, the grassland and scrub areas may provide suitable foraging for any bats found in the surrounding environment. It is therefore recommended that any landscaping involves planting of tree and scrub species which would attract invertebrates to maintain the foraging resource. In addition, some areas of landscaping could remain largely unlit, or with minimal lighting to encourage use by bats. If lighting is essential, the use of downward, cowled lighting should be considered.

5.1.5 Birds

The scrub and trees present on site offer suitable nesting habitat for a range of passerine birds. To prevent potential damage or destruction of active bird nests, activities which involve removal of any scrub and trees should, if possible, be undertaken outside of the bird-breeding season (March – August inclusive). Alternatively, habitats with potential to support nests that require removal/clearance during this period should first be checked by a suitably qualified ecologist immediately prior to works. Should any of these features be found to support an active nest or nest in construction then work within its vicinity should cease until the nesting attempt is complete. As a precaution we recommend the creation of a clearly marked buffer zone around the active nest site of at least 3m radius. As part of any proposed post development landscaping some provision for replacement of any trees and scrub lost is recommended.

5.1.6 Invertebrates

The site does not offer suitable habitat for protected species of invertebrates but may offer habitat for common species. The main area of interest would be the grassland and scrub areas. To increase the amount of invertebrate species within the site, it is recommended that any landscaping proposals enhance the biodiversity of the grassland areas by planting a variety of nectar producing herbs and shrubs.

5.1.7 Amphibians and reptiles

The site does offer basking and foraging habitat for reptiles with the scrub areas providing shelter. However, the lack of desk study data from this area and the fact that the site is an island of vegetation within a built-up area enclosed by roads indicates that it is unlikely to provide optimal habitat and attract migrating reptiles. In addition, there is much more suitable habitat to the east and north of the site.

There are three waterbodies within 500m of the site, the closest being a concrete sided balancing pond 250m north which comprises a regularly pumped concrete interceptor and is considered unlikely to support great crested newt.

Two other ponds are located approximately 450-500m east of the site and form part of a wetland complex which is known to support a large population of great crested newt. It is possible that these ponds support great crested newt; however, they are separated from the site by existing industrial development and the A1209 which comprise extensive areas of hardstanding and likely to form a barrier to migration of this species.

The risk of great crested newt being found within the site is, therefore, considered to be very low given the distance from the site, a lack of suitable habitat and dispersal routes and the availability of large areas of suitable habitat associated with the wetland areas to the east. No detailed survey or mitigation for great crested newt is considered necessary in this case in conjunction with the proposed development.

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Planning Policy Statement 9:

www.communities.gov.uk/documents/planningandbuilding/pdf/147408

APPENDIX 1 – DESK STUDY DATA

APPENDIX 2 – EXTENDED PHASE 1 HABITAT MAP

APPENDIX 3 – TARGET NOTES

Table 1: Target Notes

Number	Note				
1	Area of saplings including elm, Lombardy poplar and ash.				
2	Dry 'v' shaped ditch which was completely grassed over and showed				
	no signs of holding water in the recent past.				
3	Hardstanding covered in ephemeral/short perennial vegetation which				
	comprised mainly mosses, annual meadow-grass, ribwort plantain and				
	common ragwort. There was extensive evidence of rabbits using the				
	area.				
4	Japanese knotweed stand approximately 12m long and 2m wide				
	against a fence at the boundary of the site.				
5	Semi-mature sycamore tree with no visible cracks and crevices				
	suitable of supporting a bat roost. Assessed as having low potential				
	for bats.				
6	Two stands of Japanese knotweed, one 5m x 7m and approximately				
	5m from another stand 10m x 2m. Both stands comprise well				
	established plants.				
7	Red brick building, approximately 5 years old with corrugated metal				
	roof. No visible cracks and crevices suitable of providing a bat roost				
	and assessed as having low potential.				

APPENDIX 4 – BOTANICAL SPECIES LIST

Plants Recorded

Common Name	Scientific Name	DAFOR
Annual meadow-grass	Poa annua	Dominant
Apple	<i>Malus</i> sp	Rare
Ash	Fraxinus excelsior	Occasional
Autumn hawkbit	Leontodon autumnalis	Rare
Black medick	Medicago lupulina	Rare
Bramble	Rubus fruticosus agg.	Occasional
Bristly ox-tongue	Picris echoides	Occasional
Broad-leaved dock	Rumex obtusifolius	Occasional
Burdock	Arctium sp.	Occasional
Butterfly-bush	Buddleja davidii	Occasional
Canadian fleabane	Conyza canadensis	Rare
Carline thistle	Carlina vulgaris	Rare
Cherry	Prunus sp.	Rare
Cleavers	Galium aparine	Occasional
Cock's-foot	Dactylis glomerata	Occasional
Colt's-foot	Tussilago farfara	Occasional
Common bent	Agrostis capillaris	Abundant
Common nettle	Urtica dioica	Occasional
Common ragwort	Senecio jacobaea	Frequent
Cotoneaster	Cotoneaster sp.	Rare
Creeping cinquefoil	Potentilla reptans	Rare
Daisy	Bellis perennis	Occasional
Dog rose	Rosa canina agg.	Occasional
Dove's-foot crane's-bill	Geranium molle	Rare
Elder	Sambucus nigra	Rare
Elm sp.	<i>Ulmus</i> sp.	Rare
European gorse	Ulex europaeus	Rare
Evening-primrose	<i>Oenothera</i> sp.	Rare
False oat-grass	Arrhenatherum elatius	Occasional
Field bindweed	Convolvulus arvensis	Occasional
Groundsel	Senecio vulgaris	Rare
Hawthorn	Crataegus monogyna	Occasional
Hedge mustard	Sisymbrium officinale	Occasional
Hogweed	Heracleum sphondylium	Occasional
Honesty	Lunaria annua	Rare

Japanese knotweed	Fallopia japonica	Occasional
Lombardy poplar	Populus nigra var.italica	Rare
Mugwort	Artemisa vulgaris	Occasional
Oxford ragwort	Senecio squalidus	Occasional
Pedunculate oak	Quercus robur	Rare
Pampas-grass	Cortaderia selloana	Rare
Perennial rye-grass	Lolium perenne	Occasional
Poplar	Populus sp.	Rare
Red clover	Trifolium pratense	Occasional
Red fescue	Festuca rubra	Occasional
Red valerian	Centranthus ruber	Rare
Ribwort plantain	Plantago lanceolata	Occasional
Rosebay willowherb	Chamerion angustifolium	Occasional
Scentless mayweed	Tripleurospermum inodorum	Occasional
Selfheal	Prunella vulgaris	Occasional
Silver birch	Betula pendula	Rare
Spear thistle	Cirsium vulgare	Occasional
Sycamore	Acer pseudoplatanus	Rare
Teasel	Dipsacus spp.	Occasional
Viper's bug-loss	Echium vulgare	Frequent
White dead-nettle	Lamium album	Rare
White campion	Silene latifolia	Rare
Wild mignonette	Reseda lutea	Occasional
Wild cabbage	Brassica oleracea	Rare
Yorkshire fog	Holcus lanatus	Occasional



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Appendix 2: Air Quality Assessment (Air Quality Consultants, April 2009)



Air Quality Assessment of Residential Development at The Glebe, Scunthorpe





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1 Introduction

- 1.1 This report describes the potential air quality impacts associated with the proposed residential development at The Glebe, Scunthorpe. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Onward Holdings Limited.
- 1.2 The proposed development site is located approximately 400 m north of Scunthorpe town centre. It lies to the north of Glebe Road, to the east of Normanby Road, south of Warren Road, and west of Winterton Road. Currently the site is undeveloped open space, which has in the past been used for waste disposal. The area has mixed uses with residential properties to the west of the site, retail, commercial and industrial uses to the north and east, and commercial and residential uses to the south.
- 1.3 The proposed development would provide 276 residential dwellings, comprising 187 houses and 89 flats, associated car parking and open space. The development would lead to a change in traffic flows on the local roads, which may impact on air quality at existing residential properties. The new residential properties would also be subject to the impact of road traffic emissions from the adjacent road network. The main air pollutants of concern related to traffic emissions are nitrogen dioxide and fine particulate matter (PM₁₀ and PM_{2.5}). In addition, North Lincolnshire Council have expressed concern regarding the potential for dust and odour nuisance issues relating to waste management activities which take place at sites alongside Winterton Road, and which are located near to the eastern boundary of the proposed development site.
- 1.4 There is also the potential for the construction activities to impact upon both existing and new properties. The main pollutants of concern related to construction activities are dust and fine particulate matter (PM₁₀).
- 1.5 This report describes existing local air quality conditions, and the predicted air quality in the future assuming that the proposed development does, or does not proceed. The assessment of traffic-related impacts focuses on 2011, which is the anticipated first year of operation. The assessment of construction dust impacts focuses on the anticipated duration of the works.
- 1.6 This report has been prepared taking into account all relevant local and national guidance and regulations.



2 Policy Context and Assessment Criteria

Air Quality Strategy

2.1 The Air Quality Strategy (Defra, 2007) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Planning Policy

- 2.2 National policy on air quality and planning is set out in Planning Policy Statement 23 (PPS23) (ODPM, 2004). This contains advice on when air quality should be a material consideration in development control decisions. Existing, and likely future, air quality should be taken into account, as well as the presence of any AQMAs. PPS23 notes that the findings of local authority air quality reviews and assessments will be important, as they will identify local air pollution problems, which may in turn influence the siting of certain types of development. The need for compliance with any statutory environmental quality standards or objectives, including the air quality objectives prescribed by the Air Quality Regulations 2000 (Stationery Office, 2000) and Amending Regulations 2002 (Stationery Office, 2002), will also be a factor in determining whether air quality is a material consideration.
- 2.3 Further emphasis is given to the importance of air quality objectives and AQMAs in the Appendices to PPS23. The impact of a development on air quality is likely to be particularly important:
 - where the development is proposed inside, or adjacent to an AQMA;
 - where the development could in itself result in the designation of an AQMA; and



- where to grant planning permission would conflict with, or render unworkable, elements of a LA's air quality action plan.
- 2.4 PPS23 states clearly that not all planning applications for developments inside or adjacent to AQMAs should be refused, even if the development would result in a deterioration of local air quality, as such an approach could sterilise development.

Local Policies

2.5 The North Lincolnshire Local Plan was adopted in May 2003. The Plan has no specific policies relating to air guality, however Policy H5, Part L states that:

All new housing developments should meet the following criteria:-

- I) adjacent land uses will not result in annoyance or detract from the residential amenity which residents of the proposed dwellings could expect to enjoy
- 2.6 Recent changes to the planning legislation require the Council to replace the Local Plan with a Local Development Framework (LDF). This portfolio of planning documents, individually known as Local Development Documents, will deliver the spatial development strategy for North Lincolnshire and build upon existing local and regional strategies and initiatives.

Assessment Criteria

Health Criteria

2.7 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality Regulations 2000 (Stationery Office, 2000) and the Air Quality (England) (Amendment) Regulations 2002 (Stationery Office, 2002). The air quality objectives are provided in Table 1.



Table 1: Air Quality Objectives

Pollutant	Time Period	Objective	To be achieved by
Nitrogen	1-hour mean	200 μg/m ³ not to be exceeded more than 18 times a year	2005
Dioxide	Annual mean	40 μg/m³	2005
Fine Particles	24-hour mean	50 μg/m³ not to be exceeded more than 35 times a year	2004
(PM ₁₀) ^a	Annual mean	40 μg/m³	2004
	15-minute mean	266 μg/m³ not to be exceeded more than 35 times a year	2005
Sulphur Dioxide	1-hour mean 350 μg/m³ not to be exceeded more than 24 times a year		2004
	24-hour mean	125 μg/m³ not to be exceeded more than 3 times a year	2004
Benzene	Running annual mean	16.25 μg/m³	2003
Delizelle	Annual mean	5 μg/m³	2010
1,3 Butadiene	1,3 Butadiene Running annual mean 2.25 μg/m³		2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 μg/m³	2003
Lood	Annual mean	0.5 μg/m ³	2004
Lead	Annual mean	0.25 μg/m³	2008

^a Measured by the gravimetric method.

- 2.8 Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below $60 \, \mu g/m^3$ (Laxen and Marner, 2003). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.
- 2.9 The European Union has also set limit values for nitrogen dioxide and benzene to be achieved by 2010, and for PM₁₀, carbon monoxide, sulphur dioxide and lead which were to be achieved by 2005 (Stationery Office, 2007). Achievement of these values is a national obligation rather than a local one. The objectives are the same as, or more stringent than, the limit values, thus it is appropriate to focus the assessment on the objectives
- 2.10 More recently, new health criteria have been introduced for PM_{2.5} and these are shown summarised in Table 2. The 2007 Air Quality Strategy (Defra, 2007) sets out both an exposure-



reduction approach and a "backstop" annual mean objective for $PM_{2.5}$. The former is an objective focused on reducing average exposures across the most heavily populated areas of the country, and is not directly applicable to individual schemes. It is supported by the "backstop objective" or concentration cap to ensure a minimum environmental standard. These $PM_{2.5}$ objectives have not been included in Regulations.

2.11 A new air quality directive (2000/50/EC) was adopted in May 2008, and includes a national exposure reduction target, a target value and a limit value for PM_{2.5}. The UK Government will need to transpose the requirements of this new directive into national legislation by 11 June 2010.

Table 2: Relevant Air Quality Criteria for PM_{2.5}

	Time Period	Objective/Obligation	To be achieved by
	Annual mean	25 μg/m³	2020
UK objectives	3 year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020
	Annual mean	Target value of 25 μg/m ³	2010
	Annual mean	Limit value of 25 μg/m ³	2015
European	Annual mean	Stage 2 indicative Limit value of 20 µg/m ³	2020
obligations	3 year Average Exposure Indicator (AEI) ^a	Exposure reduction target relative to the AEI depending on the 2010 value of the 3 year AEI (ranging from a 0% to a 20% reduction)	2020
	3 year Average Exposure Indicator (AEI)	Exposure concentration obligation of 20 μg/m ³	2015

^a The 3 year running annual mean or AEI is calculated from the PM_{2.5} concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

Construction Dust Criteria

2.12 There are no formal assessment criteria for dust. In the absence of formal criteria, a set of distance based criteria has been developed (Table 3). These criteria are based on the professional experience of the consultants, drawn from many years of involvement with assessments of different types of project, together with discussions with practitioners in the field, and consideration of a range of published reports.



Table 3: Assessment Criteria for Dust from Construction Activities, with Standard Mitigation in Place

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	Description	Soiling	PM ₁₀ ^a	Vegetation effects
Major	Large construction sites, with high use of haul routes	100 m	25 m	25 m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50 m	15 m	15 m
Minor	Minor construction sites, with limited use of haul routes	25 m	10 m	10 m

^a Significance based on the 2004 objective, which allows 35 daily exceedences/year of 50 μg/m³

2.13 There is also the possibility of dust being tracked out of the site along roads. Table 4 sets out the assessment criteria in terms of distance from the site to which significant dust may be tracked out and the potential distance from the roadside for significant effects.

Table 4: Assessment Criteria for Construction Dust Track-Out with Standard Mitigation in Place.

Source		Potential Distance from roadways for Significant Effects (Distance from edge of road)		
Scale	Distance along roadways that dust might be tracked	Soiling	PM ₁₀	Vegetation effects
Major	250 m	50 m	15 m	15 m
Moderate	100 m	25 m	10 m	10 m
Minor	25 m	15 m	5 m	5 m

Significance Criteria

2.14 There is no official guidance in the UK on how to define the magnitude of air quality impacts or their significance. Criteria have therefore been developed by Air Quality Consultants to define 'impact magnitude' and 'overall impact significance'. The definition of impact magnitude is solely related to the degree of change in pollutant concentrations. Impact significance takes account of the impact magnitude and of the absolute concentrations and how they relate to the air quality objectives or relevant standards. These criteria have been adopted by the Irish National Roads Authority in its 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (NRA, 2006). They are also set out as an example in the National Society for Clean Air guidance document 'Development Control: Planning for Air Quality' (NSCA, 2006). The criteria describing the magnitude of change due to the scheme are set out in Table 5, while Table 6 sets out the significance criteria, which relate the magnitude of change to the air quality objectives.



Table 5: **Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations**

Magnitude of Change	Annual Mean NO ₂ / PM ₁₀	Days PM ₁₀ >50 ³		
Very large	Increase/decrease > 25%	Increase/decrease > 25 days		
Large	Increase/decrease 15-25% Increase/decrease 15-25			
Medium	Increase/decrease 10-15%	Increase/decrease 10-15 days		
Small	Increase/decrease 5-10%	Increase/decrease 5-10 days		
Very Small	Increase/decrease 1-5% Increase/decrease 1-5			
Extremely Small	Increase/decrease <1%	Increase/decrease <1 days		

Table 6: **Air Quality Impact Significance Criteria**

Absolute			Change in Concentration				
Concentration in Relation to Objective	Extremely Small	Very Small	Small	Medium	Large	Very Large	
		Decreas	e with Schen	ne			
Above Objective with Scheme	slight beneficial	slight beneficial	substantial beneficial	substantial beneficial	very substantial beneficial	very substantial beneficial	
Above Objective in Do-min, Below with Scheme	slight beneficial	moderate beneficial	substantial beneficial	substantial beneficial	very substantial beneficial	very substantial beneficial	
Below Objective in Do-min	negligible	slight beneficial	slight beneficial	moderate beneficial	moderate beneficial	substantial beneficial	
Well Below Objective in Do- min	negligible	negligible	slight beneficial	slight beneficial	slight beneficial	moderate beneficial	
		Increas	e with Schem	ne			
Above Objective in Do-min	slight adverse	slight adverse	substantial adverse	substantial adverse	very substantial adverse	very substantial adverse	
Below Objective in Do-min, Above with Scheme	slight adverse	moderate adverse	substantial adverse	substantial adverse	very substantial adverse	very substantial adverse	
Below Objective with Scheme	negligible	slight adverse	slight adverse	moderate adverse	moderate adverse	substantial adverse	
Well Below Objective with Scheme	negligible	negligible	slight adverse	slight adverse	slight adverse	moderate adverse	

^{&#}x27;Do-min' = future baseline condition in the assessment year

^{&#}x27;Below Objective' = 75-100% of the objective level 'Well Below Objective' = < 75% of the objective level.



3 Assessment Approach

Existing Conditions

- 3.1 Existing sources of emission within the study area have been defined using a number of approaches. A site visit has been carried out to identify existing sources from a visual inspection of the area. Industrial and waste management sources that may affect the area have been identified using the Environment Agency's website 'what's in your backyard' (Environment Agency, 2009). Local sources have also been identified through examination of the Council's air quality Review and Assessment reports and discussions with the air quality officer.
- 3.2 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment. The background concentrations across the study area have been defined using the national pollution maps published by Defra (Defra, 2009a). These cover the whole country on a 1x1 km grid.

Road Traffic Impacts

Sensitive Locations

- 3.3 Concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} have been predicted at a number of worst-case locations both within, and close to, the proposed development. Receptors have been selected to represent these worst-case locations. Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc.. When selecting these receptors, particular attention has been given to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links.
- 3.4 Three existing properties which represent residential exposure have been identified as receptors for the assessment. Three additional receptor locations have been identified within the new development, which represent worst-case exposure to existing sources. These locations are described in Table 7 and shown in Figure 1. In addition, concentrations have been modelled at the diffusion tube monitoring site located outside The Hollies on Normanby Road (DT2), in order to verify the modelled results (see Appendix 1 for verification method).



Table 7: Description of Receptor Locations

Receptor	Description					
	Existing properties					
Receptor 1	Grandmore, Normanby Road					
Receptor 2	Newton House, 3 Normanby Road					
Receptor 3	2 Normanby Road					
	Proposed properties					
Receptor 4	Closest proposed property to site access from Normanby Road					
Receptor 5	Closest proposed property to site access from Glebe Road					
Receptor 6	Closest proposed property to Normanby Road and Glebe Road					

3.5 Figure 1 also shows the location of Part B Installations within 500 m of the proposed development site boundary. The coloured areas refer to the following Part B Installations:

Nationwide Crash Repair Centres Ltd - Pink

Stoneacre Motor Group - Red

Murco Petroleum Ltd - Orange

Lafarge Aggregates Ltd - Blue

Thompsons Metals Ltd - Green

Stoneledge (Southbank) Ltd - Purple



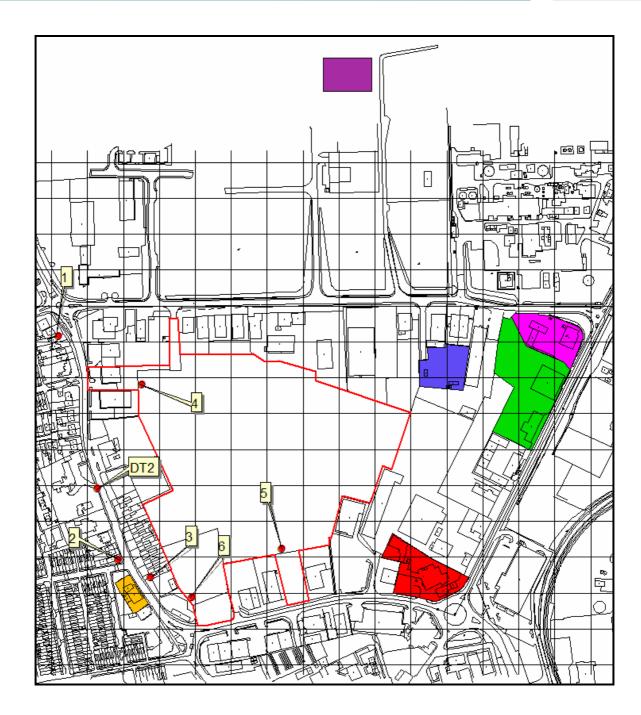


Figure 1: Receptor Locations and Location of Part B Installations. © Crown copyright. All Rights Reserved. Licence number 100046099.

Impact Predictions

3.6 Predictions of nitrogen dioxide and PM_{10} concentrations have been carried out for a base year (2008), and the anticipated first year of scheme completion (2011). For 2011, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme).



- 3.7 Predictions have been carried out using the Design Manual for Roads and Bridges (DMRB) model v1.03c (Highways Agency, 2007). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of heavy duty vehicles (HDVs), the distance of the road from the receptor, and the vehicle speed. It is also necessary to input background pollutant concentrations. These have been derived from the national maps, as discussed in the section on Existing Conditions.
- 3.8 AADT flows have been provided by DLP Transportation Limited, determined from ATCs carried out between 21st and 27th November 2008. Traffic speeds have been estimated from local speed restrictions and take account of the proximity to a junction. The traffic flow assumptions are summarised in Table 8.

Table 8: Summary of AADT Traffic Data used in the Assessment.

Road Link	2008	2011 (Without Scheme)	2011 (With Scheme)
Glebe Road	5,942 (5.2%)	6,161 (5.2%)	t.b.c
Normanby Road	Normanby Road 4,126 (3.7%)		t.b.c
Warren Road	Warren Road 1,351 (16.8%)		t.b.c
Winterton Road	3,486 (14.4%)	3,615 (14.4%)	t.b.c

t.b.c - to be confirmed

3.9 At this stage, there are no vehicle emissions factors for PM_{2.5} within the Design Manual for Roads and Bridges (DMRB) database. It is thus necessary to calculate PM_{2.5} emissions from the PM₁₀ data. The Airborne Particles Expert Group (1999) suggested a ratio of PM_{2.5} to PM₁₀ of 0.8 for non-catalyst petrol vehicles and 0.9 for all other vehicles. The DMRB database predicts that non-catalyst petrol vehicles made up approximately 4% of the vehicle fleet in 2008¹; gradually falling thereafter. It is not practicable to apply these PM_{2.5} to PM₁₀ ratios to each vehicle type independently. The worst-case approach of applying a ratio of 0.9 to all vehicles. Thus, in order to calculate PM_{2.5} concentrations, the road component of PM₁₀ (i.e. the total predicted concentration minus the background concentration) has been multiplied by 0.9 and then added to the background PM_{2.5} concentration

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¹ This includes the predicted fraction of the fleet with failed catalysts.



Construction Impacts

- 3.10 Locations sensitive to dust emitted during construction will be places where members of the public are regularly present. Residential properties and commercial operations close to the site will be most sensitive to construction dust. Any areas of sensitive vegetation or ecology that are very close to dust sources may also be susceptible to some negative effects.
- 3.11 It is very difficult to quantify emissions of dust from construction activities. It is thus common practice to provide a qualitative assessment of potential impacts, making reference to the assessment criteria set out in Table 3 and Table 4.

4 Site Description and Baseline Conditions

- 4.1 The proposed development site is located approximately 400 m north of Scunthorpe town centre. It lies to the north of Glebe Road, to the east of Normanby Road, south of Warren Road, and west of Winterton Road. Currently the site is undeveloped open space, which has in the past been used for waste disposal. The area has mixed uses with residential properties to the west of the site, retail, commercial and industrial uses to the north and east, and commercial and residential uses to the south.
- 4.2 A search of the Environment Agency's 'what's in your backyard' website identified two active waste management sources (Scunthorpe Works around 200 m east of the site and Crosby Warren Landfill around 500 m east of the site), as well as the Corus (around 1 km east of the site) and Koppers UK (around 400 m south east) industrial installations. The site itself was formerly a landfill site.
- 4.3 The Council also provided information relating to all Part B installations within 500 m of the proposed development site. There are six Part B installations which are described in Table 9, the locations of which are shown in Figure 1.



Table 9: Part B Installations within 500 m of the Development Site Boundary.

Name	Address	Process	Emissions ^a	Distance (m) ^b	
Nationwide Crash	Winterton Rd,	Vehicle	PM, Isocyanates,	190	
Repair Centres Ltd	DN15 3LD	Respraying	VOCs	190	
Stoneacre Motor	Winterton Rd,	Vehicle	PM, Isocyanates,	56	
Group	DN15 6AH	Respraying	VOCs	30	
Murco Petroleum	Normanby Rd,	Petrol Station	Petrol Vapour	51	
Ltd	DN15 6AJ	relioi Station	Felioi Vapoui	31	
Lafarge	Warren Rd,	Cement	PM	45	
Aggregates Ltd	DN15 6XH	Batching	FIVI	43	
Thompson Metals	Winterton Rd,	Mobile Stone	PM	123	
Ltd	DN15 0BA	Crusher	FIVI	123	
Stoneledge	Bessemer Way,	Mobile Stone	PM	400	
(Southbank) Ltd	DN15 8XE	Crusher	I IVI	400	

^a PM – Particulate Matter

- 4.4 North Lincolnshire Council has investigated air quality within its area as part of its responsibilities under the local air quality regime. It has declared an AQMA for exceedences of the daily mean PM₁₀ objective as a result of emissions from the industrial installations (including the Corus site) and is currently investigating potential exceedences of the annual mean at Low Santon. For all other pollutants, it was not considered necessary to proceed to a detailed assessment, and there are no AQMAs for any other pollutant. The proposed development site lies outside of the existing PM₁₀ AQMA boundary, and there are existing residential properties which lie closer to the AQMA boundary than the proposed development site.
- 4.5 North Lincolnshire Council measures nitrogen dioxide and PM₁₀ at a number of automatic monitoring sites throughout Scunthorpe. During 2007, it measured nitrogen dioxide at five locations. It also measures nitrogen dioxide concentrations using diffusion tubes prepared and analysed by South Yorkshire Laboratory (50% TEA in acetone). Nitrogen dioxide monitoring data for 2007 for the four closest automatic monitors, and for the five closest diffusion tubes to the proposed development, are summarised in Table 10.

^b Between Development Site Boundary and Part B Installation Site Boundary



Table 10: Summary of Nitrogen Dioxide (NO₂) Concentrations in 2007 (μg/m³)

Site Ref	Location	Site Type	Annual Mean
	Automatic Mo	nitoring ^a	
Scunthorpe Town	Rowland Road	Urban Industrial AURN	17.8
Gallagher Retail Park	Doncaster Road	Roadside	24.6
Kingsway House	Ashby Rd / Lloyds Ave	Roadside	31.6
Low Santon	Low Santon Dawes Lane Urban Industrial		21.8 ^b
	Diffusion Tube I	Monitoring ^c	
DT1	Frodingham Road Roadside		27.3
DT2	Normanby Road	Roadside	28.0
DT8	Doncaster Rd / Royal Hotel	Roadside	26.4
DT10	DT10 Oswald Road		29.7
DT30 Station Road / Brigg Rd		Roadside	25.8
	Objective		40

^a Data taken from North Lincolnshire Council Progress Report 2008 (North Lincolnshire, 2008).

- 4.6 Concentrations measured at all sites presented were below the objective in 2007. At all but one of the monitoring sites, measured concentrations were well below the objective.
- 4.7 PM₁₀ is measured at a number of monitoring locations within North Lincolnshire's area. Concentrations for the five sites closest to the proposed development site are presented in Table 11. Concentrations measured at all but the Low Santon site were below the objectives in 2007. The Low Santon site, which lies to the east of the steelworks, measured significant exceedences of both objectives. Concentrations measured at the Allanby Road site, which is the closest to the proposed development site, were well below the objectives in 2007. North Lincolnshire Council did not monitor PM_{2.5} during 2007.

b Low data capture (51.7%).

^c Raw diffusion tube data have been taken from the North Lincolnshire Air Quality Online website (www.nlincsair.info). Data have been bias adjusted using the national bias adjustment factor taken from the database of factors provided on the Review and Assessment Helpdesk website for 2007 of 0.88 (spreadsheet version 11/08).



Table 11: Summary of PM₁₀ Monitoring for 2007^a

Site	Site Type	Annual Mean (μg/m³)	No. Days >50 μg/m³
Allanby Street	Urban Background	24.1	11
Scunthorpe Town	Urban Industrial AURN	25.0	18
East Common Lane	Urban Industrial	27.5	34
Low Santon	Urban Industrial	51.1	133
Lincoln Gardens	Urban Background	22.8	14
Obj	ectives	40	35

^a Gravimetric equivalent. Concentrations presented measured using a TEOM. Data taken from the 2008 Progress Report (North Lincolnshire, 2008).

4.8 Sulphur dioxide concentrations are measured at three locations by North Lincolnshire Council. The numbers of exceedences of each of the three objectives measured at the two closest monitoring sites to the proposed development in 2007 are presented in Table 12. There were no measured exceedences of any of the objectives at either site during 2007.

Table 12: Summary of SO₂ Monitoring for 2007^a

Site	Site Type	No. 15-mins >266 μg/m³	No. 1-hours >350 μg/m³	No. 24-hours >125 μg/m³
Scunthorpe Town	Urban Industrial AURN	0	0	0
Low Santon	Urban Industrial	0	0	0
Obj	ectives	35	24	3

^a Data taken from 2008 Progress Report (North Lincolnshire, 2008).

4.9 In addition to these locally measured concentrations, estimated background concentrations of nitrogen oxides, PM₁₀ and PM_{2.5} in the study area have been obtained from the national maps (Defra, 2009a). Background concentrations within the study area for the base year (2008) and assessment year (2011) are presented in Table 13.



Table 13: Estimated Annual Mean Background Pollutant Concentrations in 2008 and 2011 (μg/m³)

Year	NOx NO ₂ PM ₁₀		PM ₁₀	PM _{2.5}
2008	25.0 – 29.7	18.3 – 21.0	19.2 – 19.7	12.1 – 12.2
2011	2011 22.1 – 26.5		18.6 – 19.1	11.6 – 11.7
Objectives	-	40	40	25

4.10 The model has been used to predict baseline concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} at each of the existing receptor locations identified in Table 6. The results, cover both existing baseline and future year baseline (Without Scheme), are set out in Tables 14 and 15.

Table 14: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide (µg/m³)

Location	Annua	l mean
	2008	2011
Receptor 1	25.8	23.0
Receptor 2	27.0	24.6
Receptor 3	27.2	24.7
Objective	40	40

Table 15: Modelled Baseline Concentrations of PM₁₀ and PM_{2.5} (µg/m³)

	PM ₁₀				PN	I _{2.5}
Location	Annual mean No. D			>50 μg/m³	Annua	l mean
	2008	2011	2011 2008 2011			2011
Receptor 1	21.9	20.8	6	5	12.7	12.1
Receptor 2	20.9	20.0	5	3	12.6	12.1
Receptor 3	21.0	21.0 20.1		4	12.7	12.1
Objective	40	40	35	35	-	25



4.11 The predicted annual mean concentrations of nitrogen dioxide are well below the objective at all receptors in both 2008 and 2011. Predicted concentrations of PM_{10} and $PM_{2.5}$, and the number of days with PM_{10} concentrations above 50 μ g/m³ are also well below the objectives at all receptor locations in both 2008 and 2011.

5 Impact Assessment

Road Traffic Impacts

5.1 Predicted annual mean concentrations of nitrogen dioxide and PM_{10} and days with $PM_{10} > 50 \mu g/m^3$ are set out in Table 16, for both the "Without Scheme" and "With Scheme" scenarios.

Table 16: Predicted Concentrations of Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ in 2011 - Annual Mean ($\mu g/m^3$) and Number of Days with $PM_{10} > 50 \ \mu g/m^3$

	2011 "Without Scheme"				2011 "With Scheme"			
Location	NO ₂ PM ₁₀ PM _{2.5}		NO ₂	NO ₂ PM ₁₀		PM _{2.5}		
	Annual Mean	Annual Mean	Days	Annual Mean	Annual Mean	Annual Mean	Days	Annual Mean
Receptor 1	23.0	20.8	5	12.1				
Receptor 2	24.6	20.0	3	12.1				
Receptor 3	24.7	20.1	4	12.1				
Objectives	40	40	35	25	40	40	35	25



Table 17: Change in Predicted Concentrations Between "With Scheme" and "Without Scheme" Conditions in 2011^a

Location	NO ₂	PM ₁₀		PM _{2.5}
	Annual Mean	Annual Mean	No. Days >50µg/m³	Annual Mean
Receptor 1				
Receptor 2				
Receptor 3				

^a Based on un-rounded values

Impacts of Existing Sources on the Development

Road Traffic Impacts

5.2 The impact of the existing traffic sources on air quality conditions for residents occupying the new residential units in the proposed development can be assessed from the model results for Receptors 4 to 6 (Table 18).

Table 18: Predicted Concentrations of Nitrogen Dioxide (NO₂), PM₁₀ and PM_{2.5} in 2011 for New Receptors in the Development Site - Annual Mean (μ g/m³) and Number of Days with PM₁₀ > 50 μ g/m³.

	2011 "With Scheme"				
Location	NO ₂	PM ₁₀		PM _{2.5}	
	Annual Mean	Annual Mean	Days	Annual Mean	
Receptor 4					
Receptor 5					
Receptor 6					
Objectives	40	40	35	25	



Part A/B Installations and Other Industrial Sources

Fugitive Odour and Dust Impacts

- 5.3 There are a number of Part A and B installations, and other industrial sources, within 500 m of the proposed development site boundary. A number of these installations have the potential to cause dust or odour nuisance for future residents of properties within the development site boundary. In terms of potential odour impact, these include the respraying activities at Nationwide and Stoneacre, and the waste transfer activities at both the Thompson Metals Limited site and the Bell Waste Control site, which lies around 340 m north east of the proposed development site. During the site visit, a faint odour was apparent adjacent to the Thompson Metals Limited on Winterton Road. There were no other obvious odours.
- The Lafarge Aggregates site has open stockpiles of (what appeared to be) sand and other constituents which make up the cement. These were enclosed within bunkers. The Thompson Metals Limited and Stoneledge (Southbank) Limited installations have Part B permits due to the use of mobile stone crushers. These stone crushers are mobile, and hence are used off-site. The Thompson Metals Limited site does however deal with aggregates and soil, and a large stockpile of (what appeared to be) soil/aggregates was visible from Warren Road during the site visit. The stockpile appeared to contain large particles, which would therefore not be windblown. A certain proportion of the stockpile could however be finer particles, which may be resuspended by stronger winds, and given the height of the stockpile, there is a possibility of some fugitive dust emissions from the site. The Scunthorpe Works and Crosby Warren Landfill sites are located 200 and 500 m east of the proposed development site, respectively. Both are regulated by the Environment Agency.
- In order for dust or odour from activities being carried out at Part A and B installations in Winterton Road, Warren Road and beyond to impact on properties within the proposed development site, dust-raising or odour generating activities will have to take place at the same time as the proposed development site is upwind of these installations. This will occur when winds blow between 50 and 170 degrees. Based on the meteorological data for Robin Hood Airport, Doncaster in 2007 (Figure 2), these wind directions only occurred for 18.8% of the year. If it is assumed that all dust-raising or odour generating activities occur at these installations between the hours of 8 am and 6 pm, the maximum occurrence of potential nuisance activity and a wind direction blowing towards properties within the proposed development site is reduced to 7.3% of the year. This assumes that activities potentially occur 7 days a week. Odour and dust concentrations rapidly decline with distance from the source. The distances presented in Table 9 are to the site boundary. The closest proposed property within the development to the boundary of the Lafarge site is over 125 m, whilst the



closest proposed property to the Stoneacre site is over 90 m. Given the distances between the installations and the proposed properties within the development, and the frequency of winds from between 50 and 170 degress, the likelihood of impacts is considered to be very low.

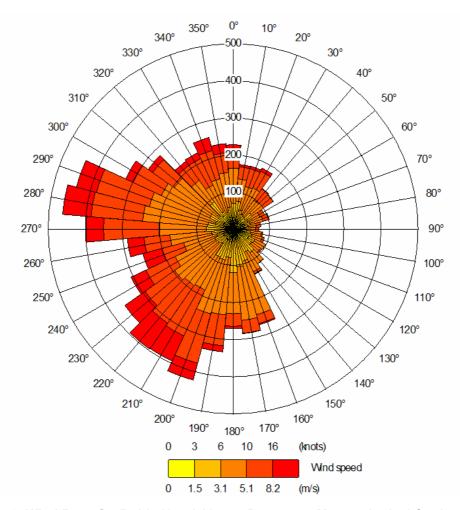


Figure 2: Wind Rose for Robin Hood Airport Doncaster Meteorological Station in 2007

Petrol Stations

Guidance (LAQM.TG(09); Defra, 2009b) states that there is evidence that petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. The criteria for Detailed Assessment of petrol stations requires a petrol station with an annual throughput of more than 2 million litres per annum, without a Stage 2 recovery system fitted, adjacent to a road with more than 30,000 vehicles per day, with relevant exposure within 10 m of the pumps. The throughput of the petrol station and the fitting of a Stage 2 recovery system is unknown, however the flows on Normanby road are significantly lower than the 30,000 required for assessment. The proposed residential properties also lie 50 m or more from the petrol station boundary. The impact of the petrol station does not therefore require further investigation.



Construction Impacts

- 5.7 The site is currently undeveloped open space, and there will be no extensive demolition works required. The greatest potential for construction impacts is likely to be from the initial phase of earth moving and site preparation, and from the passage of vehicles travelling across unpaved ground during periods of dry weather. There is also the potential for dust emissions during the handling of dusty materials and the cutting of stone/concrete. Dust may also be tracked out of the site onto the adjoining road network. Construction on site will be phased between 2011 and 2014. Any impacts would be of a localised and temporary nature.
- 5.8 The construction activities are judged to be "Major" in scale based upon the criteria defined in Table 3. Thus, assuming that standard mitigation measures are applied, significant dust-soiling impacts could occur within a distance up to 100 m from the source, whilst PM₁₀ impacts could extend out to 25 m.
- 5.9 A number of light industrial, retail and residential properties in Warren Road, Winterton Road, Glebe Road, Normanby Road (including Baytree Court Care Home), Diana Street, Grange Avenue, Sheffield Street East, Berkeley Street and Wells Street, and additionally a number of vehicle rental sites and car showrooms (Car Supermarket; Stoneacre Fiat) lie within 100 m of the site boundary and are therefore at risk of dust soiling during construction. Of these, sixteen residential properties on Normanby Road lie within 25 m of the construction activities, and are therefore at risk of elevated PM₁₀ concentrations.
- In addition, any new properties occupied prior to completion of construction, which lie within 100 m or 25 m of construction activities, will also be at risk of dust-soiling and increased PM_{10} concentrations, respectively.
- 5.11 Dust can be tracked out of construction sites onto neighbouring roads. This can then be raised as airborne dust by passing vehicles. With mitigation, it is considered that there is a potential for significant dust to be found along off-site roads up to 250 m from the site entrance, with dust-soiling impacts potentially extending up to 50 m either side of these roads.
- 5.12 A number of additional retail and residential properties on Old Crosby, Wells Street and Winterton Road lie within 50 m of roads up to 250 m from either of the site access roads. These properties are therefore at risk of occasional dust-soiling impacts from trackout. Around 30 additional properties on Old Crosby, Normanby Road and Wells Street lie within 15 m of the road within 250 m of the site access roads, and along which dust trackout may occur. These properties are thus at risk of experiencing elevated PM₁₀ concentrations from time to time.



- 5.13 There are no areas of sensitive vegetation within 25 m of the site boundary, and any significant impacts can be discounted.
- 5.14 Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. Such conditions would only arise occasionally during the construction period, further limiting the potential for any impacts.

6 Mitigation

Road Traffic Impacts

6.1

Construction Impacts

- Measures to mitigate dust emissions would be required during the construction phase of the development in order to reduce impacts upon nearby residential properties. Guidance is available from the Building Research Establishment on controlling dust from construction sites (BRE, 2003). This reflects best practice experience of dust controls and has been used, together with the professional experience of the consultant, to draw up the following set of measures that should, where practicable, be incorporated into the specification for the works. Mitigation should be straightforward, as most of the necessary measures are routinely employed as 'good practice' on construction sites. The measures are likely to include:
 - Water-suppression to minimise dust during demolition activity;
 - Phasing the development so that at any one time, construction activity is largely confined to relatively small portions of the site, away from occupied premises;
 - Use of water-sprays to ensure that any unpaved routes across the site are maintained in a damp condition when in use;
 - Use of consolidated surfaces close to residential areas;
 - Imposition and enforcement of a 5mph speed limit on unpaved ground;
 - Hard surfacing of the proposed new access road at an early stage of the works;
 - Minimising any dust generating activities on very dry or windy days;



- Sheeting of all lorries carrying materials on and off site;
- Locating and/or covering of stockpiles as far from sensitive locations as possible, and provision of appropriate hoardings;
- Wherever practicable, off-road plant to use Ultra-Low Sulphur Diesel and be equipped with exhaust after-treatment;
- Regular cleaning of all paved areas on-site;
- Use of a jet-spray vehicle and wheel wash for all vehicles leaving the site;
- Regular use of a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site; and
- Use of water suppression during any cutting of stone or concrete.
- 6.3 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

7 Summary and Conclusions

- 7.1 The air quality impacts associated with the construction and operation of the proposed residential development at The Glebe, Scunthorpe have been assessed. The proposed development lies in close proximity to the Scunthorpe AQMA declared by North Lincolnshire Council for exceedences of the daily mean PM₁₀ objective as a result of industrial sources.
- 7.2 The operational impacts are principally those associated with road traffic emissions. The impacts of traffic emissions due to the development have been assessed. Concentrations have been modelled for three worst-case receptors, representing existing properties where impacts are expected to be greatest. In addition, the impacts of traffic emissions from local roads on the air quality for future residents have been assessed at three worst-case locations within the proposed development itself.

7.3

7.4 North Lincolnshire Council expressed concern that waste transfer activities located adjacent to the eastern boundary of the proposed development site on Winterton Road may result in annoyance or loss of amenity for future residents of the site through odour and dust nuisance. This assessment



has shown that dust or odour impacts from any of the Part A and B installations located to the east of the proposed development site is likely to be infrequent given the frequency of winds from between 50 and 170 degrees, and the requirement for winds of this direction to coincide with dust or odour generating activities.

7.5 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. Even with these measures in place, there remains a risk that a number of existing off-site properties might be affected by occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective.

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9 Glossary

Standards A nationally defined set of concentrations for nine pollutants below which health

effects do not occur or are minimal.

Objectives A nationally defined set of health-based concentrations for nine pollutants, seven of

which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based

objectives for sulphur dioxide and nitrogen oxides.

Exceedence A period of time when the concentration of a pollutant is greater than the

appropriate air quality objective. This applies to specified locations.

AQMA Air Quality Management Area

DMRB Design Manual for Roads and Bridges

PM₁₀ Small airborne particles, more specifically particulate matter less than 10

micrometers in aerodynamic diameter.

NO₂ Nitrogen dioxide.

NO Nitric oxide.

NOx Nitrogen oxides (taken to be $NO_2 + NO$).

 μ g/m³ Microgrammes per cubic metre.

HDV Heavy Duty Vehicles (> 3.5 tonnes)

ATC Automatic Traffic Count



10 Appendix 1 - Model Verification

Nitrogen Dioxide

- 10.1 Most nitrogen dioxide (NO₂) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO₂). The model has been run to predict the annual mean road-NOx concentration during 2008 at the diffusion tube monitoring site located outside The Hollies, Normanby Road (DT2). The 2007 measured concentration at this monitoring site was projected forwards to 2008, using factors published by Defra (2009b).
- The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx, where the 'measured' road-NOx contribution is calculated as the difference between the total NOx and the background value. Total measured NOx for the diffusion tube was calculated from the measured NO₂ concentration using the recently updated NOx from NO₂ calculator² available on the Air Quality Archive website (Defra, 2009a).
- 10.3 An adjustment factor was determined as the ratio between the 'measured' road-NOx value and the modelled road-NOx (Table A1). This factor was then applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations. The appropriate background concentration was then added to these concentrations to determine the adjusted total modelled NOx concentrations. The total annual mean nitrogen dioxide concentrations were then determined using the NOx to NO₂ calculator³:

Table A1: Calculation of Adjustment Factor

	Measured Road NOx	Modelled Road NOx	Primary Adjustment Factor (Measured / Modelled)
DT2	14.4	4.3	3.39
Background	29.7		-

10.4 The factor implies that the model is under-predicting the road-NOx contribution. This is a common experience with this and most other models.

_

² http://www.airquality.co.uk/archive/laqm/tools/no2tonox8_ja_b.xls

http://www.airguality.co.uk/archive/lagm/tools/no2tonox8_ja_b.xls



PM₁₀

10.5 There is no PM₁₀ monitoring carried out alongside any of the roads within the study area with which the model could be verified. Therefore, the adjustment factor determined for the nitrogen dioxide verification was applied to the modelled road-PM₁₀ concentration for each receptor to provide an adjusted modelled road-PM₁₀ concentration. The appropriate background concentration was then added to these concentrations to determine the adjusted total modelled PM₁₀ concentration.



dynamic development solutions $^{\mathsf{TM}}$

Appendix 3: Flood Risk Assessment (EWE Associates Ltd, October 2009)

Onward Holdings Ltd
Proposed Development Off Glebe Road Scunthorpe Lincolnshire Flood Risk Assessment
October 2009
DRAFT REPORT

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REVISION HISTORY

Revision Ref./	Amendments	Issued to
Date Issued		
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CONTRACT

This report describes work commissioned by Onward Holdings Ltd following instruction by their representative on 25th November 2008. Onward Holdings Ltd representative for the contract was Nicola Howarth of DLP. Donna Metcalf and Lea Favill of EWE Associates Ltd carried out the work.

Date:	6 th October 2009		
Prepared	by:		 Donna Metcalf Senior Engineer
Reviewed	i by:	J	 Lea Favill Director
Approved	l by:	Gh-	 Lea Favill Director

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment for Onward Holdings Ltd. EWE Associates Ltd accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

EXECUTIVE SUMMARY

Executive Summary

The site presently consists of an area of undeveloped scrubland, formerly used as a quarry, allotment gardens and more recently as a licensed landfill site. The proposed development is presently accessed via gated entrances from Glebe Road and Warren Road. The site is located centrally within the town of Scunthorpe and covers a total area of 9.1 Hectares. It is considered that the existing site is 100% permeable due to the negligible areas of hardstanding within the site. The topographical survey and observations made during the site visit confirm that the existing site is not positively drained.

The site lies at levels between 43.46mAOD at the site entrance from Warren Road in the northern part of the site, and 32.25mAOD within the north east area of the site. There are existing residential dwellings along the south west boundary, with commercial and industrial development surrounding the remaining boundary.

The proposed development is to comprise residential development. It is anticipated that 7.449 Hectares within the site is to be set aside for the residential development, with the remaining area utilised for planting and accommodation for a dry balancing pond. For the purposes of this report, it is assumed that the impermeable area of the residential development area will be increased to 65%, hence 4.84 Hectares. This equates to an overall increase in impermeability across the site of 53%.

The development site is shown to lie wholly within Zone 1 of the Environment Agency Flood Map (version 2.8.2), being the zone with little or no annual probability of flooding from rivers of less than 1 in 1,000 years (<0.1%).

The development will increase the drained impermeable area at the site and the runoff will need to be managed to minimise the impact of this runoff on the development and the surrounding environment. A drainage strategy is included within this report which involves two different drainage options. The first option incorporates the conveyance of surface water runoff via a piped network to a dry balancing pond/infiltration basin situated within the north east part of the site. In general ground conditions within the Glebe Road area indicate that disposal of surface water from the development via infiltration methods may be suitable, and although the site was formerly used for landfill, site investigation indicates that contamination is not considered to present a problem. This option also has an added benefit of providing public open space during dry conditions. CRM Stormflow calculations indicate that the required dimensions of the infiltration basin is estimated to be 45.3 x 45 x 1, with the depth of the basin increasing to 45.3 x 45 x 1.3 during the 1 in 100 year plus climate change event.

The second drainage option involves discharge of surface water runoff from the development to the 600mm diameter public combined sewer located within Glebe Road. Severn Trent Water have been unable to provide details regarding a suitable discharge rate to the public sewer, and as such should this method of surface water disposal from the site be the only available option, then a feasibility study will need to be carried out by Severn Trent Water's Sewer Modelling Section. The feasibility study will be utilised to determine an allowable discharge rate from the site, the extent of any required improvements within the public system, and attenuation requirements.

For calculation purposes within this report, surface water runoff from the development has been limited to 20l/s. Flows in excess of this will need to be attenuated on site prior to discharge into the public sewer system along Glebe Road. Based upon the current drainage strategy and using the Modified Rational Method, storage volumes within the pond for the 1 in 2 year, 30 year, 100 year and 100 year plus climate change events have been calculated as $607m^3$; $2143m^3$; $2971m^3$ and $4155m^3$ respectively. The invert level of the existing 600mm diameter public combined sewer within Glebe Road is 34.936mAOD and is therefore elevated above the calculated invert level into the pond. Consequently, outflow from the balancing pond to the public sewer will need to be directed via a small pumping station. Flow from the pond will therefore be regulated by the pumping station.

It is considered that the runoff from the existing site currently percolates into the made ground and then flows eastward off site as perched ground water. As such none of the runoff is likely to enter the Severn Trent Sewer system and any permitted discharge into the public sewer is likely to be small. The Environment Agency has concerns regards the proposed development polluting the ground water source. As such it is recommended that at this stage that the roof water is discharged to the basin or individual soakaways whilst the more polluted highway drainage is discharged to the public sewer.

Onward Holdings Ltd Proposed Development off Glebe Road, Scunthorpe – Flood Risk Assessment Draft Report – October 2009 Reference:

Discussions with Severn Trent have indicated that pursuance of this option may be problematic, due to capacity and pollution problems within the public sewer network. Therefore, in this instance it is highly recommended that further discussion is carried out with Severn Trent Water regarding allowable discharge rates into the public sewer, prior to the detailed design stage.

If a discharge to the public sewer can not be agreed then the highway drainage may need to pass through several levels of treatment, which will remove the majority of the pollutants, before entering the basin. The system of pollutant removal will need to be agreed with the Environment Agency.

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1 INTRODUCTION

1.1 Terms of Reference

This report was commissioned by Onward Holdings Ltd to support a planning application for a residential development located off Glebe Road. The site is within the town of Scunthorpe in North Lincolnshire and can presently be accessed directly from both Glebe Road and Warren Road. The location of the site is shown on Table 2.1.

The development site is shown to lie wholly within Zone 1 of the Environment Agency Flood Map (version 2.8.2), being the zone with little or no annual probability of flooding from rivers of less than 1 in 1,000 years (<0.1%). The overall size of the development is greater than 1 hectare.

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

1.2 Approach to the Assessment

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

The River Trent is located approximately 4km to the west of the proposed development site. The river is defended by earth embankments, with the residential areas of Crosby and Old Crosby lying between the site and the river. The existing site is elevated in excess of 25m above the river. The Environment Agency indicative flood plain maps show that the site is outside of the River Trent 1 in 1,000 year flood envelope. It is therefore considered that there is a low risk of flooding from the River Trent and this mechanism has not been considered further.

The proposed development will increase the amount of drained area; therefore, surface water runoff will be significantly increased at the site. Peak discharges from the development must not exceed the discharge from the existing site; therefore, surface water management will need to be considered further.

A walk over survey of the site was conducted by Mr Lea Favill, principal engineer and Miss Donna Metcalf, senior engineer on 21st November 2008; during the visit a photograph survey of the site was also undertaken. A topographic survey of the development site was undertaken in March 1999 by Stamford Geomatics Limited, drawing ref. 0859/001. The original survey was calibrated to Survey Station ST1 value 100.00 and has subsequently been adjusted to Ordnance Datum.

The requirements for flood risk assessments are generally as set out in Annex E of PPS25. The detail and complexity of the study required should be appropriate to the scale and potential impact of the development. For the purposes of this study, the following have been considered:-

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

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

1.3 Application of Sequential & Exceptions Test

The development site is shown to lie wholly within Zone 1 of the Environment Agency Flood Map (version 2.8.2) being the zone with little or no annual probability of flooding from rivers of less than 1 in 1,000 years (<0.1%).

The proposed development is residential in nature and as such, is considered to be more vulnerable. As such, Table 1.1 below indicates that the proposed development is appropriate within the existing site.

Table 1.1: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Vulnera	Risk bility	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
classific	ation		·			
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b	Exception Test required	✓	×	×	×

[✓] Development is appropriate

[➤] Development should not be permitted

DETAILS OF THE SITE

Site Details 2.1

2

Table 2.1: Development Location

Glebe Road, Scunthorpe
Residential development
Former Landfill Site
SE 897 119
England
Lincolnshire
North Lincolnshire Council
Not Applicable
Not Applicable

Location Plan:



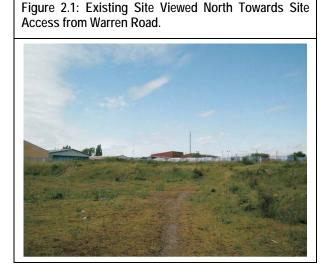
2.2 Site Description

The site presently consists of an area of undeveloped scrubland, formerly used as a quarry, allotment gardens and more recently as a licensed landfill site. The proposed development is presently accessed via gated entrances from Glebe Road and Warren Road. The site is shown below in Figure 2.1 and overleaf in Figure 2.2, 2.3 and 2.4. The extent of the proposed development site is shown at Appendix A of this report. The site is located centrally within the town of Scunthorpe.

The site covers a total area of 9.1 Hectares. It is considered that the existing site is 100% permeable due to the negligible areas of hard standing within the site. The topographical survey and observations made during the site visit confirm that the existing site is not positively drained.

The site lies at levels between 43.46mAOD at the site entrance from Warren Road in the north part of the site, and 32.25mAOD within the north east area of the site. The ground levels within the site are illustrated at Appendix A of this report. There are existing residential dwellings along the south west boundary, with commercial and industrial development surrounding the remaining boundary.

The proposed development is to comprise residential development. Detailed layout and floor plans for the proposed development are not yet available; however a concept masterplan indicating the proposals for the site is included within Appendix B of this report. It is anticipated that 7.449 Hectares within the site is to be set aside for the residential development, with the remaining area utilised for planting and accommodation for a dry balancing pond. For the purposes of this report, it is assumed that the impermeable area of the residential development area will be increased to 65%, hence 4.84 Hectares. This equates to an overall increase in impermeability across the site of 53%.



EWE Associates Ltd

Figure 2.2: Existing Site Viewed West Towards Existing Residential Development.



Figure 2.3: Existing Site Viewed South Towards Glebe Road.



Figure 2.4: Existing Site Viewed North West.



3 INITIAL ASSESSMENT

3.1 Past Flooding History

A search on the British Hydrological Society Chronology of British Hydrological Events website¹ found no record of past flooding within the Scunthorpe area. There have been numerous previous flood events within the River Trent valley; however, the site was not affected during these events.

Undertaking an internet based search for flooding in the area provided no further information.



Figure 3.1: Environment Agency Flood Zones

http://www.dundee.ac.uk/geography/cbhe/

3.2 Possible Flooding Mechanisms

Table 3.1: Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason	
Fluvial	No		
Tidal/Coastal	No	River Trent	
Pluvial (urban drainage)	Yes	Existing site has no positive drainage.	
Groundwater	No		
Overland flow	No No adjacent areas significantly higher.		
Blockage	No		
Infrastructure failure	No		
Rainfall Ponding	No	No depressed areas within the site which could encoura ponding.	

The proposed development site is situated within Flood Zone 1 and is therefore deemed to be at low risk of fluvial flooding. As there is only one significant source of flood risk – surface water runoff – it is necessary to determine flood water levels at the site for the desired return periods emanating from this source.

It is considered that the proposed development will significantly increase the paved and roofed area within the site resulting in an increase in surface water runoff from the development. As such the existing method of draining the site will be appraised. Therefore further consideration will need to be given to the existing drainage route and the drainage characteristics in order to evaluate the impact surface water runoff from the site will have on the site and elsewhere.

The existing site is generally elevated at similar levels to the adjacent areas and slopes gently westwards, towards a low point in the north east part of the site. As there are no significantly elevated areas adjacent to the site, no further consideration has been given to overland flow.

The topography of the existing site is predominantly flat with no depressions which may promote ponding. As such, no further consideration has been given to ponding within the development site.

4 QUANTATIVE FLOOD RISK ASSESSMENT

4.1 Requirements of the Environment Agency

The Environment Agency, as part of its development control procedures, generally require finished floor levels within residential development to be set above the 1% AEP plus 20% for climate change flood water level at the site.

The development is residential in nature and as such, it is considered that access and egress from the site will be essential during times of extreme floods.

4.2 Increase Run-off due to the Development

The total area within the site boundary equates to 9.1 Hectares and is considered to be 100% permeable as the site was previously used as a quarry, allotment gardens and more recently as a licensed landfill site.

A drainage statement provided by Severn Trent Water Limited recommends consideration of soakaways as the primary method of disposal of surface water from the proposed development. On the day of the site visit there were no signs of ground water ponding within the site. This could indicate that the underlying soils could be adequate for soakaways.

From the FEH CD, the catchment descriptors for the area containing the proposed development site exhibit an SPRHOST (standard percentage runoff) of 19%, which may indicate that the development is suitable for drainage via infiltration methods. In addition, the Flood Studies Report Soil Maps show Scunthorpe to lie within WRAP Class 2 (Winter Rainfall Acceptance Potential), which consists of one of the following:

- Very permeable soils with shallow groundwater.
- Permeable soils over rock or fragipan, commonly on slopes in western Britain, associated with smaller areas of less permeable wet soil.
- Moderately permeable soils, some with slowly permeable sub soils.

A geotechnical and environmental investigation has been carried out for the development by WSP Environmental UK during 2004/05, which indicates that the site is underlain by Frodingham Ironstone, a ferruginous crystalline limestone, within the Scunthorpe Mudstone Group. The investigation also specifies that the strata beneath the site are classified as a minor aquifer.

The site investigation report concludes that there are no significant pollutant linkages within the development boundary and also the site is not likely to be designated as contaminated in accordance with Part IIA of the Environmental Protection Act (1990).

During the site investigation the suitability for infiltration via percolation tests was not determined. As such, Geo2 Remediation Ltd where instructed to undertaken percolation tests within the site during April 2009. A total of 28 boreholes were drilled within the site and infiltration tests undertaken within each. The findings have been used within this report.

Should infiltration methods prove to be unviable within the proposed development, the alternative option is to drain surface water runoff from the development into the existing 600mm diameter public combined sewer located within Glebe Road.

Severn Trent Water have been unable to provide details regarding a suitable discharge rate to the public sewer, and as such should this method of surface water disposal from the site be the only available option, then a feasibility study will need to be carried out by Severn Trent Water's Sewer Modelling Section. The feasibility study will be utilised to determine an allowable discharge rate from the site, the extent of any required improvements within the public system, and attenuation requirements.

Further consultation with Jim Borrington of Severn Trent Water's Sewer Modelling Section indicated that such a feasibility study would cost approximately £1,500 - £2,000, with a timescale of 6-10 weeks for completion following placement of a work order. However, it was also intimated during these discussions that due to capacity and pollution issues, it would be unlikely that Severn Trent Water would allow any surface water discharge into this sewer network.

Option 1: Discharge to Infiltration Basin (Dry Balancing Pond)

A drainage strategy for the proposed development is currently being undertaken by EWE Associates Limited. The first option involves the possibility of draining the site via gravity to an infiltration basin, located in the north east part of the development site. It is anticipated that surface water will be freely discharged into the pond, where it will be attenuated.

From the site investigation carried out by Geo2 Remediation Ltd, 28 boreholes were drilled within the site and 3 were drilled within the vicinity of the proposed infiltration basin indicates that the ground comprises the following:

- Made ground (0-0.35m) dark grey brown sand and gravel with frequent cobbles and boulders. Sand is fine to coarse, gravel is angular to sub angular fine to coarse of clinker.
- 3.50-3.80m Orange brown slightly clayey fine sand. Trial pit abandoned at 3.50m.
- Groundwater encountered at about 3.2m within the made ground above the clay layer.

The ground investigation works and infiltration tests show that the site is predominantly made ground to a depth of 3.5m above clay. The runoff within the site currently percolates through the made ground to the clay layer where some water infiltrates the clay, however, the majority of the water flows towards the east along the top of the clay layer. This has been confirmed by the infiltration tests completed by Geo2 which were taken within the surface of the clay layer. Boreholes 9, 10 and 11 were drilled close to the location of the proposed basin and it was found that the a 300mm depth of water within the borehole reduced to zero in an average time of 2.69 hours (9,674 sec), hence an infiltration rate of 0.11m/hour $(3 \times 10^{-5} \text{ m/s})$. Whilst a single test was completed within the made ground it was found that the water reduced from 300mm to zero in 129 seconds. The relevant information extracted from the Geo2 Remediation Ltd report is provided at Appendix G of this report.

Following development it is anticipated that the impermeable area within the site boundary will be increased to 4.84 Hectares, which is approximately 65% of the developable area. Storage volumes required to attenuate surface water flow from the development to accommodate the required 1 in 100 year event have been calculated using CRM Stormflow (CIRIA 3D Method) and in order to acknowledge a required increase in storage volume due to climate change in the future, calculations have also been carried out for the 1 in 100 year plus climate change event.

If the results of such tests indicate that the permeability of the soil is very low (less than 1 x 10^{-6} m/s), it will be impractical to rely on infiltration drainage to dispose of the stormwater runoff from the site. In such an event it will be necessary to further discuss the option of surface water discharge to the existing 600mm diameter public combined sewer located within Glebe Road, with Severn Trent Water. In this case the average infiltration rate is 3 x 10^{-6} m/s which is greater than 1 x 10^{-6} m/s as such infiltration should be practically possible at the site.

Attenuation volumes have been estimated based on the average infiltration rate of 3 x 10^{-5} m/s as shown below in Table 4.1. The outputs from CRM Stormflow using the CIRIA 3D Method are provided at Appendix E of this report. It is highlighted that these are based on average test results adjacent to the proposed basin. Further details of this drainage option are provided within Appendix F of the report.

Table 4.1: Size of Infiltration Basin During the 1 in 100 year event

Infiltration Rate (m/s)	Infiltration Rate (m/hr)	Attenuation Volume for the 1 in 100 year event (m³)	Required Infiltration Basin Dimensions (m)
3 x 10 ⁻ 5	0.11	2038.5	45.3 x 45 x 1

Table 4.2: Size of Infiltration Basin During the 1 in 100 year plus climate change event

Infiltration Rate (m/s)	Infiltration Rate (m/hr)	Attenuation Volume for the 1 in 100 year +CC (m³)	Required Infiltration Basin Dimensions (m)
3 x 10 ⁻ 5	0.11	2650.1	45.3 x 45 x 1.3

It is highlighted that the volume balance requirements should be established to a greater accuracy during the detailed design stage to reflect the actual development proposal, the extent of impermeable areas and associated runoff generated. Preliminary calculations for infiltration basin sizes have made no allowance for any additional storage available in the storm water sewer network & manholes.

Option 2: Discharge to Existing 600mm Diameter Combined Sewer within Glebe Road

The second option involves directing surface water runoff from the development to the 600mm diameter public combined sewer located within Glebe Road, to the south of the site.

As previously indicated, Severn Trent Water has been unable to provide details regarding a suitable discharge rate to this public sewer. Through discussions with Severn Trent Water, it has been intimated that they are likely to oppose any discharge into the sewer, due to capacity and pollution problems within the existing sewer network.

The site is considered to be 100% permeable and in order to assess the attenuation requirements, should the Client wish to pursue this drainage option, it would be usual to limit surface water runoff from the development to the nominal greenfield runoff rate of 5l/s/ha, hence a total discharge rate of 45.5l/s. However, Jim Borrington from the Severn Trent Water Sewer Modelling Section advised that owing to a general lack of capacity within the sewer network, it was unlikely that a discharge rate from the site of 45.5l/s would be accepted. Therefore, for calculation purposes, a restricted discharge rate of 20l/s has been utilised. Flows in excess of this will need to be attenuated on site prior to discharge into the public sewer system along Glebe Road.

Using the Wallingford Procedure, Modified Rational Method the volume to be attenuated has been calculated for the 1 in 2 year, 30 year, 100 year and 100 year plus 30% climate change events. The peak discharge rate for all four events was set at 20l/s. Reference should be made to Appendix D where the spreadsheet is provided which was used to calculate the volumes to be stored for each return period. The volumes have been tabulated below in Table 4.3.

 Return Period
 Balance Volume (m³)

 1 in 2 year
 607

 1 in 30 year
 2143

 1 in 100 year
 2971

 1 in 100 year + 30% climate change
 4155

Table 4.3: Balance Volumes

For this drainage option, attenuation of flows on site via a balancing pond situated within the north east part of the site is proposed. It is also proposed that outflow from the pond will be governed by a Hydrobrake or similar flow control device, and further detail is provided within Appendix F of this report.

It is highlighted that the volume balance requirements should be established to a greater accuracy during the detailed design stage to reflect the actual development proposal, the extent of impermeable areas within the development and associated runoff generated, and the location of the proposed pond. Preliminary calculations have made no allowance for any additional storage available in the storm water sewer network & manholes, hence providing a 'worst case' scenario.

4.3 Foul Drainage

Proposed

It is proposed that the foul drainage from the proposed development will be directed towards the existing 600mm diameter combined sewer located within Glebe Road to the south.

Severn Trent Water has confirmed that foul flow from the development can be directed, without restriction into this sewer.

The invert level of the existing 600mm diameter public combined sewer within Glebe Road is 34.936mAOD. The area within the north east part of the development site is fairly low lying, with a ground level of approximately 35.00mAOD. Therefore, directing foul flow via gravity to the public sewer is not feasible and consequently will need to be directed via a pumping station, south towards Glebe Road.

5 MITIGATION MEASURES

5.1 Raising Floor Levels/Land Raising

The River Trent is located approximately 4km to the west of the proposed development site. The existing site is elevated in excess of 25m above the river and as such lies within Flood Zone 1 of the Environment Agency Flood Map (version 2.8.2). Consequently the risk of flooding from the River Trent is considered to be very low.

It is considered therefore, that land raising is not required within the existing site. However, it is recommended that the internal ground floor level of the proposed residential units is elevated a minimum of 150mm above the adjacent external finished ground level to mitigate against any localised flooding which may be caused by heavy rainfall.

5.2 Emergency Access and Egress

Proposals for the site comprise wholly of residential development and as such, it is considered that dry access and egress from the development site will be essential during extreme flood events.

Vehicular access into the proposed residential development will be via Glebe Road and Normanby Road. It is considered that these access points are sufficiently elevated to enable dry access and egress from the site at all times.

5.3 Flood Compensation

The development site is shown to be elevated above the 1 in 100 year plus climate change flood levels at the site and as such, it is considered that flood storage compensation measures are not required.

5.4 Control of Runoff

Option 1: Discharge to Infiltration Basin (Dry Balancing Pond)

Severn Trent Water Limited recommends consideration of soakaways as the primary method of disposal of surface water from the proposed development. As such, Option 1 of the current drainage strategy being undertaken by EWE Associates Ltd involves draining the site via gravity to an infiltration basin, where flow will be attenuated. The draft flood risk assessment report was forwarded to the Environment Agency for comment. The letter dated 25th March 2009 is shown at Appendix G and the comments are limited to the use of infiltration drainage within the site. The Environment Agency initially recommends that non-infiltration techniques are used, unless it can be demonstrated that they will not cause pollution to controlled waters. The site is located above a minor aquifer and both site investigation reports consider that there is limited contamination within the made ground present within the site.

Impermeability of the ground at the location of the proposed basin has been estimated at 3 x 10⁻⁵ m/s. Storage volumes required to attenuate surface water flow from the development to accommodate the required 1 in 100 year event have therefore been calculated. In order to acknowledge a required increase in storage volume due to climate change in the future, calculations have also been carried out for the 1 in 100 year plus climate change event.

Table 5.1: Size of Infiltration Basin During the 1 in 100 year event

Infiltration Rate (m/s)	Infiltration Rate (m/hr)	Attenuation Volume for the 1 in 100 year event (m³)	Required Infiltration Basin Dimensions (m)
3 x 10⁻5	0.11	2038.5	45.3 x 45 x 1

Table 5.2: Size of Infiltration Basin During the 1 in 100 year plus climate change event

Infiltration Rate (m/s)	Infiltration Rate (m/hr)	Attenuation Volume for the 1 in 200 year event (m³)	Required Infiltration Basin Dimensions (m)
3 x 10 ⁻ 5	0.11	2650.1	45.3 x 45 x 1.3

Option 2: Discharge to Existing 600mm Diameter Combined Sewer within Glebe Road

The second option involves directing surface water runoff from the development to the 600mm diameter public combined sewer located within Glebe Road, to the south of the site.

Severn Trent Water have been unable to provide details regarding a suitable discharge rate to the public sewer, and as such should this method of surface water disposal from the site be the only available option, then a feasibility study will need to be carried out by Severn Trent Water's Sewer Modelling Section. The feasibility study will be utilised to determine an allowable discharge rate from the site, the extent of any required improvements within the public system, and attenuation requirements.

The site is considered to be 100% permeable and in order to assess the attenuation requirements, should the Client wish to pursue this drainage option, it would be usual to limit surface water runoff from the development to the nominal greenfield runoff rate of 5l/s/ha, hence a total discharge rate of 45.5l/s. However, Jim Borrington from the Severn Trent Water Sewer Modelling Section has advised that due to a general lack of capacity within the sewer network, it was unlikely that a discharge rate from the site of 45.5l/s would be accepted. Therefore, for calculation purposes, a restricted discharge rate of 20l/s has been utilised. Flows in excess of this will need to be attenuated on site prior to discharge into the public sewer system along Glebe Road.

Using the Wallingford Procedure, Modified Rational Method the volume to be attenuated has been calculated for the 1 in 2 year, 30 year, 100 year and 100 year plus 30% climate change events.

 Return Period
 Balance Volume (m³)

 1 in 2 year
 607

 1 in 30 year
 2143

 1 in 100 year
 2971

 1 in 100 year + 30% climate change
 4155

Table 5.3: Balance Volumes

5.5 SUDS

The impermeable area within the site will be increased following development. There will therefore be an increase in surface water runoff from the site when it is developed. The drainage strategy indicates two possible options for disposing of surface water from the development site. The first option involves disposal of surface water via an infiltration basin, to be located within the north east part of the site. Alternatively, the second option involves directing surface water runoff off-site towards the existing 600mm diameter public combined sewer within Glebe Road.

The Environment Agency requires that adequate pollution control is incorporated into the proposed drainage system in order to prevent deterioration of the quality of the water environment. However, this is only applicable for surface water originating from access roads and communal parking areas, which needs to be passed through a petrol/oil interceptor or equivalent system prior to discharge into the existing surface water sewer or infiltration system. It is noted however, that this will not apply to surface water originating from roof drainage.

To reduce the impact of surface water runoff from the development in accordance with the requirements of the Environment Agency and Local Authority, the employment of SUDS techniques to limit runoff volumes and rates from the site are recommended. SUDS techniques can also be used to provide an appropriate level of treatment to the runoff.

It is normal practice to ensure that the 1 in 30 year event is maintained within the drainage system and the 1 in 100 year is permitted to flood the surface as long as there is no flooding to buildings and the flood volume is contained within the site boundary in specific areas proposed for this purpose. However, it is proposed that the new balancing ponds will be of adequate size to accommodate flows up to and including the 1 in 100 year plus 30% climate change event.

The following section will provide some possible SUDS techniques which could be employed on the site to balance flows in excess of the 1 in 30 year event. SUDS techniques will also provide treatment to the runoff to remove a proportion of the pollution and protect the quality of the downstream watercourses. Following guidance from CIRIA Report C522 the following levels of treatment will be provided:

- Roofs 1 level
- Driveways 1 level
- Roads and communal parking areas 2 levels.

The level of treatment indicates the number of SUDS techniques that will be used to treat pollution. For example if two levels are required the runoff may enter a filter drain that leads to a basin or pond before outfall. It is recommended that source control techniques are used. In practice there will be little outflow from these techniques for a 1 in 2 year storm as most of the rainfall will be held within the system and will disperse via evapotranspiration. Further detail of the potential to use SUDS within this site it provided below within Table 5.4. The precise combination of methods used will be dependent upon the site constraints identified at the final design stage.

With regards to the potential for infiltration methods of disposal of surface water from the development, the FEH catchment descriptors for the area containing the proposed development site which provides an SPRHOST (standard percentage runoff) of 19%, indicating that the ground potentially has good permeability. This is further confirmed by the infiltration tests completed by Geo2 Remediation Ltd.

Table 5.4: SUDS Techniques and Suitability of Use

Method	Description	Potential for use at site	
Filter drains	Drainage trench filled with gravel and provided with a pipe	May be suitable for roof drainage only.	
Swales	Shallow grass ditch	May be considered suitable for conveying surface water runoff along the site boundaries, preventing migration outside of the site boundary and onto the adjoining commercial and residential property.	
Permeable surfaces	Pavement surfaces that allow water to pass through into underlying storage in sub base e.g. permeable concrete block paving or porous asphalt.	Unlikely to be suitable unless incorporated with other source control methods.	
Ponds and basins	Open areas that are used to store and treat rainwater. Ponds are permanent bodies of water and basins are generally dry and occasionally store water.	Drainage Option1: A shallow infiltration basin. Suitability is to be determined following soakaway tests. Drainage Option 2: Open water balancing pond, discharge to public sewer restricted via hydrobrake.	
Green roofs	Roof system that is vegetated with plants (note sedum plants rather than grass so no mowing is required)	Suitability is dependent on design of buildings.	
Infiltration devices	Methods that allow rainwater to soak into the ground, e.g. soakaways.	May be suitable for roof drainage only.	
Storage tanks	Underground tanks that temporarily store water in the drainage system.	These will be used as a last resort on this site if dictated by site constraints.	

5.6 Conclusion

It is concluded that there is a low risk of fluvial flooding at the proposed development site. However, the development will increase the drained impermeable area at the site and the runoff will need to be managed to minimise the impact of this runoff on the development and the surrounding environment. Severn Trent Water recommends the serious consideration of infiltration drainage as the primary method of surface water disposal from the proposed development.

It is considered that the runoff from the existing site currently percolates into the made ground and then flows eastward off site as perched ground water. As such none of the runoff is likely to enter the Severn Trent Sewer system and any permitted discharge into the public sewer is likely to be small. The Environment Agency has concerns regards the proposed development polluting the ground water source. As such it is recommended that at this stage that the roof water is discharged to the basin or individual soakaways whilst the more polluted highway drainage is discharged to the public sewer.

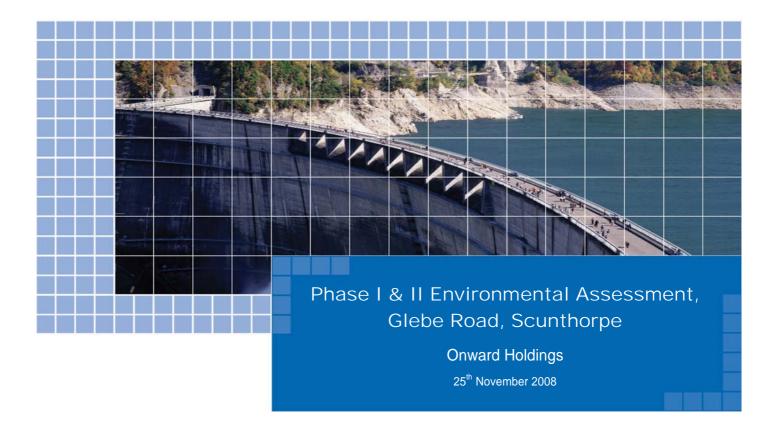
Discussions with Severn Trent have indicated that pursuance of this option may be problematic, due to capacity and pollution problems within the public sewer network. Therefore, in this instance it is highly recommended that further discussion is carried out with Severn Trent Water regarding allowable discharge rates into the public sewer, prior to the detailed design stage.

If a discharge to the public sewer can not be agreed then the highway drainage may need to pass through several levels of treatment, which will remove the majority of the pollutants, before entering the basin. The system of pollutant removal will need to be agreed with the Environment Agency.



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Appendix 4: Phase I & II Environmental Assessment (WSP, November 2008)





QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Final			
Date	25 th November 2008			
Prepared by	Richard Howarth			
Signature	7			
Checked by	Catherine Wesley			
Signature	C. Wastay			
Authorised by	Chris Everitt			
Signature	7-25-			
Project number	12111704			
File reference	12111704_PII_F			

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1 General Information

Site name	Glebe Road	Location	Scunthorpe, DN15 6AF.		
NGR	489620, 411980	Approximate Site Area	9 hectares		
Brief	On the instruction of DJM Waste Management Consultancy, for its client, Onward Holdings, a combined Phase I and Phase II environmental assessment has been carried out by WSP Environmental Limited (WSPE) at the site known as Glebe Road Scunthorpe as per our proposal (12111704_prop) dated 8 th August 2008. The aim of these works was to provide updated desk-based environmental information and additional detail on the near-surface environmental conditions to support the outline planning application that is currently being prepared for the site.				
Site Description	The site comprises vacant and unused land with some scrub vegetation. The site was previously used as a quarry that was subsequently used as a landfill. Access to the site is afforded from Glebe Road and Warren Road. The site is surrounded by a range of mixed use land uses including retail, commercial and residential.				
Proposed use	Residential: The site is being considered for residential end-use. However, at the time of writing no master plan for the development has been produced.				
Previous Reports	Two previous reports are available and are referred to within this report, the executive summaries are provided in Appendix B:				
	1. WSP Environmental Phase II Geotechnical and Environmental Investigation, Glebe Road, Scunthorpe. Ref: 12110675_P2_final, dated September 2004.				
	This report provides information on the general ground, groundwater and ground ga conditions at the site, together with information on potential contamination sources. was understood at this stage that the site would be redeveloped for commercial an light industrial uses.				
	2. WSP Environmental, Completion Report, Glebe Road Landfill, Scunthorpe. Ref 12110735_COMP_FINAL, dated 23rd June 2005.				
	This report reviewed the status of the site to support the surrender of the Management Licence that had been used to regulate the filling of the former site. The report concluded that the undisturbed contents of the landfill were unli cause pollution of the environment or harm to human health. After groundwater monitoring, sampling and laboratory chemical analyses the Licence Surrendered on 10 th January 2008 (see Appendix C).				

2 Environmental Setting

Geology	British Geological map sheet 89 (1:50,000 scale) identifies that the site is underlain by deposits of the Frodingham Ironstone underlain by the Scunthorpe Mudstone. Parts of the site are noted to comprise backfilled opencast workings, quarries or pits.		
		Sensitivity	
Hydrogeology	The Environment Agency's Groundwater Vulnerability map Sheet 12 (Vale of York) indicates that the strata underlying the site (Frodingham Ironstone) are classified as a Minor Aquifer. These deposits are indicated to be overlain by soils of high leaching potential (classified as HU – High Urban). This classification is given because soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) is assumed until proven otherwise.	Moderate	
	The site is not within a currently defined Groundwater Source Protection Zone. Based on the information presented as part of the Landfill Licence Surrender process the Environment Agency considers the condition of the land so far as that condition is the result of the use of the land for the treatment, keeping or disposal of waste (whether or not in pursuance of the licence) is unlikely to cause pollution of the environment (see Appendix C).	Low	
	There are no active groundwater abstractions within the vicinity of the site.	Low	
Hydrology	There are no surface water features on or within the immediate vicinity of the site.	Low	
	There have been 2 recorded pollution incidents to Controlled Waters within 500m of the site. Both were classed as minor incidents and related to the accidental release of oils (diesel) and chemicals (paints and dyes) after road traffic incidents. No pollution incidents are attributed to the study site.	Low	
	There are no recorded surface water abstractions within 500m of the site.	Low	
	There is no discharge consent registered to or within 500 metres of the site.	Low	
	A review of the Environment Agency website indicates that the site is not located within a currently defined flood plain. However, any developer will be required to undertake a PPS 25 Flood Risk Assessment as part of the Planning Process.	Moderate – Low	

Ancillary Information	Waste: The site was utilised as a landfill (Waste Management Licence reference number 55/19/137 [EAWML/43124] dated 8 December 1978 for land at Glebe Pit, Glebe Road, Scunthorpe). The site was generally licensed to accept: Solid, non-hazardous construction and demolition wastes. Solid, non hazardous excavation wastes. Road sweepings. A detailed Licensing and input history for the site is provided in Section 3 of the Completion Report. The Waste Management Licence was surrendered on 10th January 2008.	Moderate – Low
Surrounding Area	North: Commercial and light industrial units fronting onto Warren Road. South: Commercial and light industrial units fronting onto Glebe Road East: Residential and commercial uses fronting onto Normanby Road. West: Commercial and light industrial units.	Moderate – Low
Coal Mining	The Gazetter of The Coal Authority indicates that a mining search (coal and brine) is not required for this site.	Low

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3 Historical Context

Site History

Based on the available historic Ordnance Survey (OS) map information prior to the publication of the 1907 historic OS map extract the site was used as a quarry. Thereafter, the site was used as allotment gardens until the early 1970s when the site was first used as a landfill. The site was first licensed on 8th December 1978. Subsequent revisions to the Licence were made but did not generally alter what could be accepted by the landfill.

The landfill site was formally declared closed on 14th July 2002. The Licence was surrendered on the 10th January 2008. During the period between the closure of the landfill and the waste management Licence surrender the site was vacant.

4 Site Investigation

Ground Investigation Design	Based on previous work the site was considered suitable for commercial or industrial use. However, given the residential end-use proposed further investigation of the status of near surface soils was considered necessary to investigate potential risks to human health. The ground investigation also allowed additional shallow ground gas information to be collected to inform what the nature of ground gas protection measures (if any) that would be required for the proposed residential development. Ground and surface water are not considered at significant risk from the deposits found at the site. Extensive groundwater sampling and analysis was undertaken as part of the Landfill Licence Surrender process and this showed that groundwater was not at significant risk from the deposits placed in the landfill (see Appendix C).
Scope of Investigation	The drilling of twelve boreholes using window sampling techniques to a maximum depth of 5 metres below ground level (mbgl).
	Sampling of soils for laboratory chemical analyses. A number of shallow samples were also randomly collected from across the site to further increase our understanding of the risks posed by the near-surface soils at the site.
General Ground	Ground conditions generally comprised:
Conditions Encountered during Investigation	 Ground level to 3.5 mbgl. Made Ground of brown clayey sandy angular fine to coarse gravel of sandstone, brick, mudstone and concrete, clinker and some tarmacadam. Locally, the Made Ground can deepen to 4 to 5 metres below ground level. Previous investigation has also noted timber, metal, plastic and glass within the Made Ground with Made Ground depths to greater than 7.0 metres. 3.5 m to 4.0 mbgl: Natural ground, brown clayey slightly gravelly SAND. 4.0 to 5.0 mbgl (maximum drilled depth): Natural ground, weathered grey MUDSTONE or Natural ground of sandy clay and gravelly sand (Alluvial Sands and Gravels). All of the boreholes were converted to ground gas monitoring positions. Six rounds of ground gas monitoring were undertaken in the period between 11th September 2008 and the 16th October 2008 through a range of weather conditions.
Obstructions / Structures	A number of window sample boreholes did not achieve the anticipated completion depth. This was generally due to weathered mudstone being encountered with no further progress being possible. However, WS12 refused at 2.2 mbgl and was noted to have refused on concrete.
Groundwater Conditions Encountered	Soils samples were noted as being damp or wet at various locations during the investigation. This was especially the case in the brown clayey slightly gravelly sands found beneath the Made Ground.
	Standing groundwater levels were noted in all the boreholes (between 2.3 – 4.3 m bgl).

Contamination Observations With the exception of Made Ground that can contain a range of potent contaminants no visual or olfactory indications of contamination (e.g. fuel phase contamination and suspected asbestos) were encountered during the investigation.

5 Environmental Assessment

The presence of contaminated materials on a site is generally only of concern if Legislative Framework an actual or potentially unacceptable risk exists. Within the context of current UK Legislation (i.e. Section 57 of the Environment Act 1995), the interpretation of a "significant risk" is termed to be one where: Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property). And / or pollution of controlled waters is being caused. The potential for harm to occur requires three conditions to be satisfied: Presence of substances (potential contaminants/pollutants) that may cause harm (Source). The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora (Receptor). The existence of a linkage between the source and the receptor (Pathway). The site has historically been used as a landfill for the placement of solid non Conceptual Site Model hazardous construction, demolition and excavation wastes and road sweepings in a former quarry. The Environment Agency has accepted the surrender of the Waste Management Licence associated with the site and as such they consider the condition of the land so far as that condition is the result of the use of the land for the treatment, keeping or disposal of waste (whether or not in pursuance of the licence) is unlikely to cause pollution of the environment. Extensive groundwater sampling and analysis was undertaken during the surrender of the Landfill Licence. Ground and surface waters are not considered at significant risk from the materials placed in the landfill. The site was considered suitable for commercial or industrial uses as any contact with potentially contaminated material would be limited through the presence of hardstanding (e.g. roads, parking and buildings) and people spend less time at such sites (e.g. normal working hours). However, risks to future site users if the site is used for a residential (with private gardens) end use need further examination. The Contaminated Land Exposure Assessment (CLEA) model sets out a Assessment statistical basis for the assessment of the analytical results obtained from site Methodology investigation. The premise is to review an entire data set, as opposed to comparing individual results, to a given guidance value. This is because only a limited number of samples are obtained, and therefore, it is necessary to take uncertainty of the underlying sample population into account. The method gives

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confidence that the results are representative of the materials sampled (further details on assessment methodologies and standards is provided in Appendix F). In this case, samples have been randomly collected from across the site and have

been assessed to determine whether there is sufficient evidence that the true mean concentration of the contaminant is less than the critical concentration¹.

Shallow Soils

The chemical analyses results have been compared to appropriate Generic Assessment Criteria (combination of Soil Guideline Values [SGV] and CLEA compliant Risk-Based values) selected as those suitable for a Residential with private garden end use (Table 1, see also Appendix E).

Table 1: Critical Concentration Summary Table

Potential Contaminant	Сс	Mean Conc.	Upper Conf. Limit	Pass / Fail Test	Maximum Conc. Outlier?	No. of samples
Arsenic	20	27.8	68.3	Fail	Yes	28
Cadmium	8	0.82	1.53	Pass	Yes	28
Chromium	130	29.2	45.9	Pass	Yes	28
Nickel	50	20.2	31.3	Pass	Yes	27
Lead	450	73.3	127	Pass	Yes	27
Mercury	8	0.2	0.31	Pass	Yes	28
Selenium	35	0.52	0.66	Pass	No	28
Zinc	2900	64.3	117	Pass	No	27
Total Cyanide	53	<2	-	Pass	No	24
Naphthalene	2.4	0.67	0.98	Pass	No	9
Benzo (a) pyrene	2	34.8	54.2	Fail	No	9
TPH C ₈ – C ₄₀	500	1,290	2,138	Fail	No	7

Notes: Cc, Critical Concentration (Cc); TPH, Total Petroleum Hydrocarbons. All concentrations in mg/kg. Outliers have not been removed from the dataset since there is no logical basis on which to remove individual data points.

Assessment of the laboratory analyses results for soils indicates that concentrations of metals and metalloids (e.g. arsenic) and organics (e.g. benzo[a]pyrene) pose potentially significant risks to future site users.

Copper and zinc are not considered as potential risks to human health but have been included for completeness.

Free phase hydrocarbons can be present at concentrations of TPH of greater than 5,000 mg/kg. Free phase hydrocarbons were not identified during the site works and recorded laboratory chemical analyses results are all below 5,000 mg/kg.

No asbestos or asbestos containing materials was identified in any of the samples

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¹ Guidance on Comparing Soil Contaminant Concentration Data with a Critical Concentration. CIEH & CLAIRE. May 2008.

	sent for analysis. No phenolic compounds were identified in any of the analyses undertaken. Furthermore, no volatile organic compounds (e.g. benzene, ethylbenzene, toluene or xylene) were identified in the samples analysed.			
Controlled Waters	No surface watercourses are present in the vicinity of the site.			
	Extensive assessment of the status of the groundwater environment was undertaken during the surrender process for the Waste Management Licence. This included analyses of concentrations of potential contaminants in eluates derived from site soils and in groundwater to fully understand the risks to the groundwater environment. No significant concentrations of potential contaminants were identified in the previous work undertaken (see Appendix C).			
	Ground and surface waters are not considered at significant risk from the deposits present on site.			
Ground Gas	Six visits to site were undertaken through a range of barometric pressure readings to determine in situ ground gas concentrations (period between 11 th September 2008 and the 16 th October 2008). The gas monitoring data has been assessed using the adopted Tier 1 guidance values of 1%v/v and 5%v/v for methane and carbon dioxide respectively. The significance of the findings has been assessed using the guidance documentation presented in Appendix G. A summary of the ground gas and groundwater monitoring information is also provided in Appendix G. The recorded results have remained reasonably consistent throughout the period of monitoring.			
	The results of the monitoring have been reviewed with respect to recent guidance (see Appendix G), particularly Tables 8.5 and 8.7 of CIRIA Guidance C665 ² . Table 8.7 of this guidance refers directly to low rise residential housing. Table 8.5 is for all other situations. Reference should also be made to BS8485:2007 ³ .			
	Clearly, the landfill materials would pose an obvious source of ground gas generation that may impact future residential development.			
	Given that we have very little information on the masterplan for the site we have assessed the data against both Table 8.5 and 8.7 from guidance document C665.			
	Based on the information available and the potential source of ground gas at the site it is recommended that the site is considered as Characteristic Situation 2 (Table 8.5, CIRIA C665) or Amber 1 (Table 8.7, CIRIA C665). Ground gas protection measures will be required to be chosen to meet the requirements of BS8485: 2007 Tables 2 and 3.			
Radon	Map 16 (Humberside and eastern North Yorkshire) from BR211:2007 has been consulted and indicates that basic radon protection measures are required for new dwellings constructed on site ⁴ .			
Risk Assessment	Based on our understanding of the site it is considered that shallow soils represent a potential source of contamination (e.g. elevated concentrations of metals, PAHs and TPH). In considering this source of contamination the following receptors are considered significant:			
	■ Future Site Users.			
	 Services, specifically potable water supplies. 			
	The impact of potential contaminants on concrete (e.g. within foundations) has not been considered at this stage. Further work will be required once a masterplan			

² Assessing Risks posed by Hazardous Ground Gases to Buildings. CIRIA C665. 2007.

³ Code of Practice for the characterization and remediation from ground gas in affected developments. BS8485:2007.

⁴ Radon: Guidance on protective measures for new building. BR211:2007.

has been developed.

In accordance with CIRIA document C552 (D J Rutland *et. al., Contaminated Land Risk Assessment, A Guide to Good Practice,* London 2001) a qualitative risk assessment has been undertaken.

Future Site Users

The shallow soils contain elevated concentration s of a range of contaminants that may impact future site users through such pathways as dermal contact, inhalation of dusts or ingestion. In accordance with CIRIA C552 (see Appendix F) the classification of consequence is considered medium, the probability is classified as likely leading to a Moderate Risk that is considered significant and will require mitigation measures.

Services (Potable Water)

The shallow soils contain elevated concentrations of total petroleum hydrocarbons hydrocarbons that may impact potable water supplies. The classification of consequence is considered medium, the probability is classified as likely leading to a Moderate Risk that is considered significant and will require mitigation measures.

Additional Information

In accordance with current industry best practice appropriate health and safety risk assessments and controls will be required during any in-ground maintenance or construction works.

6 Conclusions, Recommendations and Further Works

Given the location of the site and its proposed future status (residential) we would suggest that some remediation will be required to make the site suitable for a residential with gardens end-use. These are further described in the Table below.

Table 2: Remedial Actions

Item	Methodology	Commentary
Protection of Future Site Users	Cover System in garden areas, nominally 600 mm cover with geotextile break layer	See BRE465:2004 Cover Systems for Land Regeneration
Protection of Future Site Users	Ground gas and radon protection measures	See report text, further assessment may be required
Protection of Potable Water Supplies	'Clean' Service trenches and composite pipework may be required	Consultation with the local water supply company will be required prior to construction commencing.

A Remediation Strategy will be required to provide an outline scope for the identified remediation measures and methodology for verification of remedial works completed.

Once remediation works have been undertaken a verification report confirming that the requirements of the Remediation Strategy have been complied with will be required. This will serve to discharge anticipated planning conditions and NHBC (or similar) requirements.

Other works will also be necessary to support the development through planning. These include but are not limited to a Flood Risk Assessment, ecological survey, transportation planning and service provision.

We would consider that there is a low likelihood of the site being considered as contaminated under Part 2A of the Environmental Protection Act 1990.

WSP Environmental

Appendix A Drawings

Drawing 101: Site Location Plan

Drawing 102: Exploratory Hole Location Plan

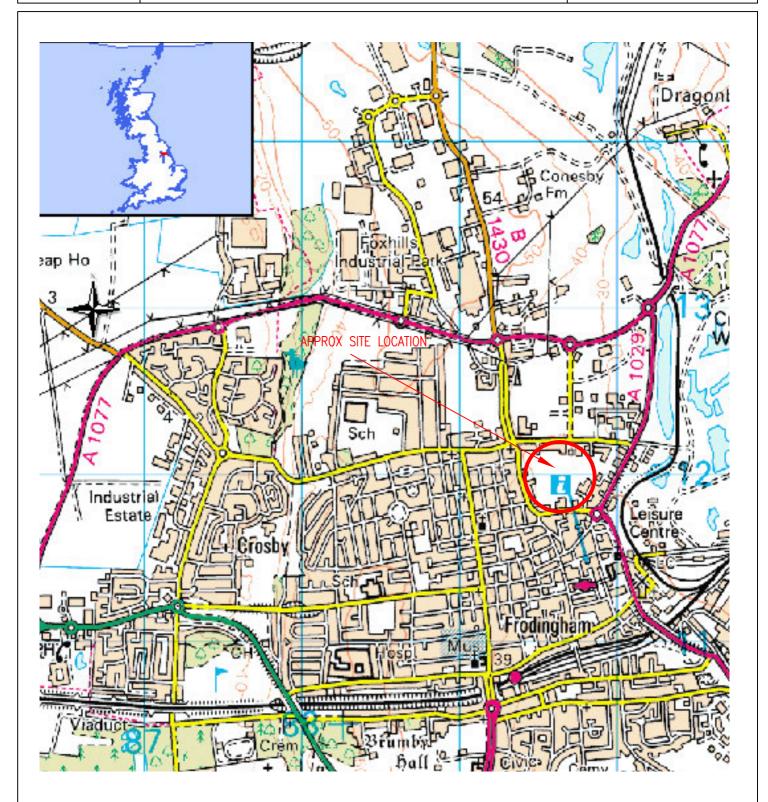
12111704 Glebe Road 12

PROJECT: Gle	be Road, Scunthorpe	SCALE@SIZE: Do Not Scale	CHECKED:	WS
TITLE:		DATE:	DESIGN/DRAWN:	
SI	TE LOCATION PLAN	23.11.08	NJG	Three White Rose Office Park, Millshaw Leeds, LS11 0DL
		CAD FILE:	APPROVED:	Tel: +44 (0) 113 395 6200 Fax: +44 (0) http://www.wspgroup.com
		12111704G001		114,77
PROJECT No:	DRAWING No:		REV:	



) 113 395 6201

FIGURE 1 12111704 © WSP Group plc





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Appendix 5: Hydrogeology & Hydrology Study (Geo2 Remediation Ltd, April 2009)



HYDROGEOLOGY AND HYDROLOGY STUDY

DISUSED LAND GLEBE ROAD SCUNTHORPE

For

Onward Holdings Ltd

April 2009

Geo2 Remediation Limited

Onward Holdings Ltd

Disused Land Glebe Road Scunthorpe Hydrogeology and Hydrology Study

April 2009

Report ref no. 09/0197

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Onward Holdings Ltd

Disused Land Glebe Road Scunthorpe Hydrogeology and Hydrology Study

April 2009

Report ref no. 09/0197

1.0. Introduction

Geo2 Remediation Limited (Geo2) were commissioned by Carol Raynor of Onward Holdings Ltd to conduct a Hydrology Study of an area of disused land at Glebe Road, Scunthorpe, and to conduct a programme of drilling and soak-away tests.

The purpose of the desk study is to assess the site's hydrological conditions, which may be affected by the proposed installation of soakaway drainage at the site. This hydrology study will comprise a review of the site's geology, hydrology and hydrogeology.

In addition, the works also included the drilling of twenty boreholes to around 3.8 metres depth, and the conducting of soak-away tests. The purpose of these works was to provide data that will facilitate the client in determining the suitability of the site for the construction of soak-aways associated with the proposed redevelopment of the site for residential use.

2.0. Site Location

The site is currently an area of disused land, which may be accessed from Glebe Road, running east - west adjacent to the southern boundary of the site. The site is located at grid reference SE 897 118; a location plan is included in the appendices.

The site is surrounded by mainly industrial and commercial properties, with some residential properties to the south west. Glebe Road lies to the south and Normanby Road to the west.

3.0. Site Geology

British Geological Survey (BGS) records indicate that the site is mudstone, ironstone and siltstone underlain by limestone of the Lower Lias Formation. Records show no drift deposits located beneath the site.

The site is not listed as being in an area with any potential coal mining instabilities, records show all other potential geological stability hazards pose low to no risk.



4.0. Site Hydrogeology

The Environment Agency (EA) groundwater vulnerability records classify the ground beneath the site as a minor aquifer. These can be fractured or potentially fractured rocks, which do not have high primary permeability, or other formations of variable permeability, including unconsolidated deposits. Although not producing large volumes of water for abstraction, they are important for local supplies and providing base flow to rivers.

The closest groundwater abstraction points are located 1,869m east of the site and are controlled by Bradken UK Ltd and Firth Rixson Castings Ltd. These are used to supply non-evaporative cooling and process water for metal works, and were licensed by the Environment Agency, Midlands Region. There is no data available for abstraction rates.

5.0. Site Hydrology

According to the data sheets the nearest surface water feature to the site is an unnamed pond, located approximately 400m to the north-east of the site, however, during site works drainage ditches containing water were noted in the north-eastern corner.

There are no active licensed discharge consents identified within 1,000m of the site.

There are no Environment Agency monitoring points within 1,000m of the site.

The site is listed as being at no risk from flooding.

The site is not located within a source protection zone.

6.0. Landfills

The site is listed as being historically used as a landfill site named Glebe Pit, operated by Onward Holdings Ltd. Anecdotal evidence indicates that the landfill received non-hazardous construction and demolition wastes. It is not know when this landfill ceased operation.

In addition, the closest operational landfill site is located 399m northwest, operated by Onward Holdings Ltd and accepts non-contaminated building wastes.

There are other noted historical or dormant landfill sites at 93, 213, 350, 387, 389, 544, 718, 776 and 796m away from the site in all directions.

The nature of the made ground is likely to present variable ground conditions on site, due to the makeup of the construction/demolition wastes.

7.0. Other Receptors

No other potentially sensitive receptors are noted within 1,000m of the site.



8.0 Drilling Works

Geo2 attended the site between 6th and 14th of April 2009 to undertake the installation of twenty boreholes. These works were undertaken using a Beretta T25 drilling rig using 8" solid stem and 13" hollow stem augers.

8.1 Ground conditions

The ground conditions encountered consisted predominantly of loose made ground overlying natural clays and sandy clays. Some boreholes appeared to terminate on bedrock, which is though to consist of limestone and sandstone. The made ground was found to be considerably more difficult to drill than expected due to very large pieces of concrete, kerb stones etc.

Analysis of the desk study data together with anecdotal evidence from site users, suggests that the site was used as a tip for excavation and demolition waste, and this explains the varied and unconsolidated nature of the material and large buried obstacles. As a result, eight boreholes were drilled which did not reach the required depth and were subsequently re-drilled. In addition a number of the boreholes could be progressed using the 8" solid stem auger, but when the larger 13" diameter hollow stem was attempted this refused due to large underground obstacles.

Borehole logs for each of the wells are appended to this report as Appendix B. These give approximate depths to the varying strata encountered, although, due to the disturbed nature of the samples when using this drilling technique and the poor returns generated by the loose, unconsolidated material, depths should be regarded as approximate values.

Geo2 were instructed to undertake the drilling works in the six different areas illustrated in Figure 1, Appendix A. This plan also illustrates the wells which were drilled and refused on underground obstacles, or could not be completed due to the nature of the made ground. A brief summary of the areas is provided below;

Area A

This area consisted of made ground, which was found to overlay natural sandy clays at approximately 3 metres below ground level. Groundwater was also recorded at around this depth, and it may be that groundwater is located in the made ground, perched on the underlying clays. It should be noted that BH1 was progressed to approximately 2.6 metres, but could not be progressed further due to an underground obstacle; however, it was installed with slotted pipe work so that a soak-away test could be undertaken in the made ground.

Area B

Drilling works in this area at BH5 and BH7 encountered natural, or re-worked natural strata. This may be due to the area being used as an access ramp into the site from Warren Road and, as such, it was not subject to historical excavation as the rest of the 'glebe pit' site. Ground conditions in BH7 consisted of stiff, impermeable clays. BH5 could not be progressed further than 0.6 metres due to an underground obstacle.

Ground conditions encountered in BH6 and BH9 consisted predominantly of loose, unconsolidated made ground of sands and gravels.

Area C

Ground conditions encountered in this area were found to consist of loose, unconsolidated gravels and concrete in a loose sandy fill, overlying a wet, loose, sandy clay at around 3.5 metres below ground level. Again, groundwater was also encountered at this point, at it is possible that it is perched on the underlying natural strata.



Area D

Similar conditions were encountered to those at Area C with loose, unconsolidated gravels and concrete in a loose sandy fill, overlying a wet, loose, sandy clay, at around 4.0 metres. In addition, BH12 refused on what appeared to be limestone bedrock at around 4.5metres below surface.

Area E

BH17 at this location refused on a large concrete obstacle at around 1.0 metres below the ground surface. The remaining boreholes recorded loose, unconsolidated gravels and concrete in a loose sandy fill, overlying a wet, loose, sandy clay at approximately 2.5 metres depth. Water was recorded well below the surface of the natural strata, and bedrock was encountered at approximately 3.8 metres below ground surface.

Area F

Drilling works in Area F encountered loose, sandy fill with gravels and concrete, and these were of such a poorly compacted and unconsolidated nature that very few arisings were recovered from the top 2.0 metres. Underlying this was found a layer of furnace slag between 2.0 and 3.0 metres depth. This material broke in to fist sized lumps which drilling augers could not remove from the well, and as such the wells at the front of this area could not be completed. From debris found on the auger teeth bedrock is suspected to be sandstone and located at around 3.0 metres below ground surface.

Drilling works were attempted at various points moving back into the site, until locations were found where three boreholes could be installed; these were BH26, BH27 and BH28. The ground conditions encountered at this point also consisted of poorly compacted and poorly consolidated made ground that yielded very few, or no, arisings. The sandstone bedrock was encountered at between 2.2 and 3.0 metres below ground surface, which prevented further progression of the wells.

9.0. Hydrogeological Gradient

All installed wells were surveyed in so that relative groundwater dips could be used to generate a model of groundwater flow underneath the site.

The results are illustrated in Figure 2, Appendix A and suggest that groundwater flows from a high point located in the north-west corner in an easterly direction.



10.0. Soak-away tests

10.1 Methodology

Soak-away data was obtained between 8th and 16th April 2009, and tests were undertaken according to the following methodology;

- 1. The well was filled to 30cm above the base (or above the standing groundwater elevation) and left overnight so that the water in the well returned to its original position.
- 2. The next day the well was again filled to 30cm above the base or standing groundwater level.
- 3. Using a dip meter and stop watch the groundwater level was then monitored as the water soaked into the surrounding ground and returned to rest levels.
- 4. The process was then repeated so that three full sets of data were completed for each of the twenty 3.8metre-deep boreholes.
- 5. The information obtained from these tests has been collated, and graphs summarising the results are appended to this report.



10.2 Results

The time over which the water took to return from 30cm artificial elevation to rest level is summarised in Table 1, below.

	Test 1	Test 2	Test 3	Mean Value
BH1				See Table 2, below
BH2	7,306	7,750	7,091	7,382 (2hr03min.02)
BH3	2,365	2,438	3,779	2,861 (47min.41)
BH4	19,813	20,310	20,800	20,308 (5hr38min.28)
BH5	Well refused			NA
BH6	3,175	3,768	8,940	5,294 (1hr28min.14)
BH7	No reduction in wa	ter level recorded o	ver 24 hours	Test Fail
BH8	2,475	2,382	2,613	2,490 (41min.30)
BH9	4,067	4,035	3,322	3,808 (1hr03min.28)
BH10	6,324	28,942	28,368	21,211 (5hr53min.31)
BH11	4,053	3,919	3,799	3,924 (1hr05min.24)
BH12	3,704	3,980	5,040	4,241 (1hr10min.41)
BH13	615	786	695	699 (11min.39)
BH14	4,729	4,610	3,736	4,358 (1hr12min.38)
BH15	588	573	514	558 (9min.18)
BH16	2,740	3,114	3,710	3,188 (53min.08)
BH17	Well refused			NA
BH18	2,136	2,793	3,240	2,723 (45min.23)
BH19	2,968	4,564	3,525	3,686 (1hr01min.26)
BH20	2,292	2,731	1,426	2,150 (35min.50)
BH21	Well refused			NA
BH22	Well refused			NA
BH23	Well refused			NA
BH24	Well refused		NA	
BH25	Well refused			NA
BH26	20,343	21,371	20,842	20,852 (5hr47min52)
BH27	14,135	25,272	29,323	22,910 (6hr21min.50)
BH28	6,570	8,999	11,036	8,868 (2hr27min.40)

Table 1: Results of Soak-away tests in seconds

The results show very varied results. Several of the wells showed highly permeable soils, with soak away times of less than 15 minutes (BH13 and BH15), two wells showed moderate permeability with soak away times of between 15 and 45 minutes (BH8 and BH20), the majority showed reasonably low permeability with soak away times of between 45 minutes and 2 hours (BH3, BH6, BH9, BH11, BH12, BH14, BH16, BH18 and BH19), and the remaining wells showed poor permeability of between 2 and 7 hours (BH2, BH4, BH10, BH26, BH27). In one well, BH7, no water was initially recorded in the well, however, when water was poured in it did not soak away at any detectable level over 24 hours.

The attached Figure 3 shows the location of the boreholes, and also colour-codes boreholes by their recorded mean permeability.

All boreholes in Areas A, C, E and F were found to have soak-away times in excess of 45 minutes. Boreholes in Areas B and D were found to contain a mixture of higher and lower permeability results.



10.3 Conclusions

Whilst some wells showed rapid soak-away times of less than 15 minutes, the majority were found to take in excess of 45 minutes, with many taking considerably longer. In addition, the wells that displayed short soak-away periods were located in areas that also contained wells displaying much longer periods.

Judging by the appearance of the natural and imported material encountered during drilling it is the opinion of Geo2 that the underlying natural material is considerably less permeable than the overlying made-ground. Many wells were drilled through the made ground into the underlying clays and sandy clays, and the low permeability in many of the wells may be associated with these natural strata.

Whilst Geo2 were commissioned to undertake the drilling and soak-away tests to around 3.8 metres depth (into the natural strata across the majority of the site), an additional well was also installed to 2.6 metres depth at BH1. A soak-away test was undertaken on this well, which terminates in the made-ground well above the groundwater table and underlying clays. The results are summarised in Table 2, below.

	Test 1	Test 2	Test 3	Mean Value	
BH1	154	103	129	129	(2min.09)

Table 2: Results of Soak-away tests in seconds

Whilst this is based on a single well, Soak-away times were found to be the most rapid recorded on the site. In addition, visual inspection of the loose, unconsolidated made ground suggests that this material is likely to be highly permeable.

10.4 Further Works

Should additional tests be required in the made-ground it may be possible to convert the existing boreholes to shallower wells by grouting them with a bentonite clay. This would swell when it comes into contact with water and expand to seal the gravel pack lower in the well. The wells could be filled to approximately 2.5 metres and permeability tests could then be undertaken in the loose made ground, which is likely to have a much more rapid permeability.



11.0 Summary

11.1 Desk Study

The desk study notes that the site has been used as a Landfill site, accepting non-hazardous construction wastes. Ground conditions on the site were predicted to be variable, given useage as a construction/demolition waste landfill.

The site is located on a minor aquifer; however, the nearest abstraction points are for commercial use, not potable water supplies. In addition there is no nearby surface water abstractions.

11.2 Site Works

Drilling works recorded made-ground overlying natural clays over bedrock. Made-ground was found to consist predominantly of a loose sandy fill with gravels, concrete and brick fragments, together with an area of furnace slag in the south west corner of the site. Natural material was found to consist of clays and sandy clays, generally between 3 and 4 metres depth.

Modelling of groundwater elevation suggests that over the majority of the site groundwater flow is from west to east. It may be that the site part drains to the ditches located in the north-eastern corner of the site. Analysis of drilling arisings and well dips suggests that groundwater at the site may be perched in the made ground, on top of the underlying natural strata.

Soak-away tests produced a wide variety of results, with the majority of the wells recording relatively high soak-away times. Some wells recorded rapid soak away times, however, these were located close to wells with much longer results. Based on the results it is likely that the natural ground underlying the site is of relatively low permeability.

It may be that soak-away pits located in the made-ground fill would considerably more permeable, and a test conducted on BH1 (a shallow failed borehole point) recorded very rapid soak-away times. Should additional tests in this material be required it may be possible to convert existing wells rather than undertaking additional drilling.

Consideration should be given to the ultimate destination of water discharged into any future soak-away pit at the site, which modelling suggests is likely to percolate down to the interface between the made ground and the underlying natural strata, and then move towards the east of the site. During site works Geo2 noticed no ill affect associated with rainfall currently falling on the site, suggesting that the site is naturally accepting this volume of water.

Care should be taken when planning and installing any future soak-away due to the highly variable nature of the fill. In addition, consideration should be given to any leachate generated by discharging water to soak-aways that then



An site assessment is a limited investigation of a site. The assessment made is based on information gathered at the time of the investigation at the specific sampling locations selected. Should conditions be encountered during the course of any subsequent works on the site that differ from those given in this report, contact should be made to permit an additional assessment of the extra information.

A portion of this report is based solely upon information provided by third parties. The information has not been independently verified by Geo2. Whilst this report and the opinions given in it are accurate to the best knowledge of Geo2, Geo2 cannot guarantee the completeness or accuracy of any descriptions, opinions or conclusions based solely upon information that has not been independently verified.

This report was prepared by	
Steven Jackson	Date
This report was reviewed by	
Paul Stapleton	 Date





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Appendix 6: Noise Impact Assessment (Hepworth Acoustics, December 2009)



PROPOSED RESIDENTIAL DEVELOPMENT ON LAND AT THE GLEBE PIT, SCUNTHORPE

NOISE IMPACT ASSESSMENT

On behalf of: Onward Holdings Ltd

Report No. 10106.01v4 December 2009

PROPOSED RESIDENTIAL DEVELOPMENT ON LAND AT THE GLEBE PIT, SCUNTHORPE

NOISE IMPACT ASSESSMENT

Report prepared by: Hepworth Acoustics Ltd The Innovation Centre 217 Portobello Sheffield S1 4DP

> On behalf of: Onward Holdings Ltd

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1.0 INTRODUCTION

Hepworth Acoustics Ltd was commissioned by Onward Holdings to carry out an assessment of 1.1

the potential impact of road traffic noise and other noise sources on a proposed residential

development on land at the Glebe Pit, Scunthorpe.

1.2 The noise impact assessment has included:

> i) Daytime and night time (early morning) noise monitoring surveys carried out at the site.

ii) Assessment of the potential industrial noise impact on the proposed residential

development.

iii) Recommendations for outline mitigation measures to appropriately control noise impact.

1.3 The various noise units and indices referred to in this report are described in Appendix I. All

noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of

decibels are imperceptible.

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2.0 DESCRIPTION OF THE SITE AND PROPOSALS

2.1 The proposal is for a residential development and our assessment is based on the Illustrative

Layout drawing (ref: L1180/D/09) provided by DLP Design Ltd.

2.2 The site lies between Normanby Road to the west, Warren Road to the north and Glebe Road to

the south. The majority of the site is separated from the highways by adjacent premises (apart

from along Glebe Road to the south). The site is bounded to the north, east and south by various

commercial and industrial premises with some existing residential properties along the western

boundary. The majority of the business premises are commercial retail operations that have

negligible noise impact on the site, e.g. motor spares, tyre & exhaust centres, plumbing supplies.

To the east are Omega and Kass steel stockholders and LaFarge Scunthorpe Ready-mix Plant.

Some occasional noise from these operations was audible on the site. From discussion with

Robert Vickers at Scunthorpe Environmental Health we understand there has been a complaint

received from nearby flats to the rear of the retail park off Glebe Road which concern noise from

early morning loading/unloading of steel in the open yard at the Kass/Omega premises. To the

north and east there are more distant industrial premises such as BOC Gases, Bell Waste Control

and Recycling and Thompson Recycling.

2.3 The adjacent premises are named on the plan in Figure 1.

2.4 The outline development proposal is shown in Figure 2. The development site is split into four

phases. Phase 4 is a long term proposal which will only be developed when the land becomes

commercially available. The current occupiers have long leases and therefore the phase 4 area is

unlikely to be developed in the short to medium term.

2.5 As only outline proposals for the development available at present the recommendations given in

this report are preliminary and should be reviewed at the detailed design stage.

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3.0 NOISE SURVEYS AND ASSESSMENT

Noise measurements were taken by Hepworth Acoustics during the daytime on Thursday 9th 3.1

October 2008 and during the early morning on Thursday 30th October 2008. Additional noise

measurements were taken during the night time and early morning of Tuesday 10th / Wednesday

11th November 2009. This additional monitoring period was requested by the Environmental

Health Officer, Robert Starbuck, and the times and methodology ere agreed with him in advance

of carrying out the survey work.

3.2 Noise levels were measured at the following locations as shown in Figure 1.

Location 1- NW corner of site, 15m (approx) from site boundary

Location 2- SW corner of site, 15m (approx) from Glebe Road

Location 3- SE corner of site, 10m (approx) from site boundary

Location 4-NE corner of site toward Omega/Kas Steel, 15m (approx) from site boundary

Location 5- Northern boundary near AMF bowling, 20m (approx) from site boundary

Location 6 – Northern boundary near JSH unit, 15m (approx) from site boundary

3.3 The noise measurements were carried out using a Rion NA28 'Type 1' Integrating Sound Level

Meter/Real Time Sound Analyser and a Brüel & Kjær 2260 Investigator Type I integrating sound

level meter. Noise was measured in terms of broadband A-weighted indices and one-third octave

band levels. Frequency analysis was carried out to assist with the design of noise control

measures. Calibration checks were carried out both before and after the measurements with no

variance observed. The sound level meters were fitted with proprietary microphone windshields

and were mounted on tripods at approximate height of 1.5m.

3.4 Road traffic noise from the surrounding streets was audible at all monitoring locations. Some

noise from Omega and Kass steel stockholders was audible at Location 4 and just barely audible

at Location 5 during the daytime survey. This comprised occasional noise from within the

buildings from handling steel and noise from a roof mounted extract which came on during the

daytime survey and then ran continuously for the rest of the daytime survey period. This noise

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was not dominant (when assessed in accordance with the PPG24 annex 1 footnote 3). The steel

handling noise was noted as becoming just audible at a distance of approximately 90m from the

Omega building, i.e. approaching measurement Location 5.

3.5 The LaFarge Scunthorpe Ready-mix Plant was operating during the daytime survey and mixer

truck movements were observed but were not audible. An intermittent high frequency hiss,

assumed to be from a pressure release valve attributed to the LaFarge site, was faintly audible but

was at such level that it could not be accurately measured.

3.6 During the night time, road traffic reduces and there was some general industrial noise noted

from the north east of the site towards BOC gases and Bell Recycling. This distant, continuous

noise was apparent both during the 5-7am survey on Thursday 30th October 2008 and during the

11pm – 4am survey on Tuesday 10th – Wednesday 11th November 2009. During the quieter parts

of the night this distant industrial noise formed the general ambient noise climate in the area, and

it is also experienced at the existing residential properties in the area.

3.7 Following the 2008 surveys Robert Starbuck (Environmental Health Officer) asked why the

background noise levels were generally higher during the night time survey than during the

daytime. This appears to be due to gradual fluctuations in the distant process noise which is

thought to be coming from BOC gases (although no detailed investigation has been made at BOC

gases). During the 2009 survey there were gradual changes in the distant process noise which is

presumably due to different stages in the processing cycle. A range of 5-6 dBL_{A90} can be seen at

a number of the monitoring positions and the greatest range in 7 dBL_{A90}. This was not

particularly noticeable subjectively as there were no abrupt noise changes. The noise was not

particularly intrusive and it is not impulsive.

3.8 During the 5-7am survey in 2008 the readings are generally higher than the night time readings in

2009 both in terms of L_{Aeq} and L_{A90} . This seems to have been mainly due to higher levels of

distant process noise in the 2008 survey (traffic noise would have been higher towards 7am than

earlier in the night but it would not affect the L_{A90} readings to the extent noted).

3.9 The distant process noise during the 5-7am survey in 2008 was subjectively broad band in nature

and an analysis of the frequency spectrum shows no noticeable peaks. The readings taken during

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the 2009 night time survey show a peak in the frequency spectrum at 1kHz and there was a tonal

noise which was noticeable although not particularly intrusive as there was a significant amount

of broad band noise as well. This is a relatively high frequency tone and it is therefore not likely

to be as noticeable within buildings as low frequency tonal noise would be because of the higher

level of attenuation afforded by the building envelope at higher frequencies. The noise levels at

1kHz are similar in the 2 surveys but in the 2008 survey there is more noise across other

frequencies which fills in around the tonal noise and masks it.

3.10 The source of the distant process noise is thought to be around 350-400m from the nearest

proposed residential properties on the site and around 600m from the closest existing residential

properties. (The precise source location is not known but it is thought to be in the BOC site to the

NW of the development site beyond other nearer premises and beyond Warren Road). There was

no noise from any of the premises adjacent to the site during the 11pm -4am 2009 survey.

3.11 The Omega and Kass premises were observed to be operating from around 6am during the 2008

survey; however there was no notable noise impact during this time at the development site. The

site is shielded from the open access yard to the Omega and Kass premises by the buildings

themselves and therefore noise from activity in the yard is well screened. The complaint received

by Scunthorpe Environmental Health concerns noise from steel delivery in the yard impacting on

the blocks of flats off Glebe Road. These flats would have a direct line of sight into the yard and

therefore be directly exposed to noise from activity, particularly brief impulsive noise that can

typically occur during loading/unloading of steel.

3.12 All noise, whether from traffic or other sources, is included in the noise surveys and will be

mitigated by the proposed noise control measures that are set out in Section 4.0.

3.13 As the site is subject to road traffic noise and industrial noise it has been assessed according to

the noise levels given within PPG24 for 'mixed sources'. Therefore, both the daytime and night

time measured L_{Aeq} values have been averaged logarithmically and the resulting values have been

taken as being representative of the daytime $L_{Aeq(16hour)}$ and night-time $L_{Aeq(8 hour)}$ values.

3.14 The results of the noise survey are shown in Appendix II and the daytime $L_{Aeq (16 \text{ hour})}$ and night-

time $L_{Aeq (8 \text{ hour})}$ values at the measurement locations are summarised in Table 1. The night time

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values shown are the logarithmic average of all the readings from both night time surveys. The implications of the results are discussed in section 4.0.

Table 1: Free Field Noise Levels

Location	$Daytime \ L_{Aeq~~(0700\text{-}2300\ hrs)}$	Night time L _{Aeq (2300-0700hrs)}
1. NW corner of site, 15m (approx) from site boundary	52	51
2. SW corner of site, 7.5m (approx) from Glebe Road*	56	58
3. SE corner of site, 10m (approx) from site boundary	52	53
4. NE corner of site toward Omega/Kas Steel, 15m (approx) from site boundary	51	51
5. Northern boundary near AMF bowling, 20m (approx) from site boundary	50	49
6. Northern boundary near JSH unit, 15m (approx) from site boundary	50	49

^{*}For Position 2, a correction of 3dB has been applied to the original measurements taken at 15m from the roadside because the latest plans show properties approximately 7.5m from the roadside (the correction of 3dB is based on line source attenuation for traffic noise).

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Assessment to PPG24

3.15 The noise exposure categories in the Department of the Environment guidance, PPG 24 'Planning and Noise' HMSO, 1994 for mixed sources are set out below:

	Noise Exposure Category (dB L_{Aeq})				
	A	В	C	D	
Daytime (0700-2300 hrs)	<55	55-63	63-72	>72	
Night-time (2300-0700 hrs)*	<45	45-57	57-66	>66	

[* sites where noise events regularly exceed 82 dB L_{Amax} several times in any hour at night should be treated as being in Category C]

- Category A -Noise need not be considered as a determining factor in granting planning permission.
- Category B -Noise should be taken into account and steps taken to ensure an adequate level of protection against noise
- Category C -Planning permission should not normally be granted. Where development is permitted, steps should be taken to ensure a commensurate level of protection against noise.
- Category D -Planning permission should normally be refused.
- 3.16 During the daytime, the site falls into Noise Exposure Category A of PPG 24 apart from location 2 which is just within Noise Exposure Category B due to it's proximity to the road traffic. At night, the site falls into Noise Exposure Category B of PPG 24 apart from location 2 which is just into Noise Exposure category C, again because of it's proximity to the road traffic.
- 3.17 For sites where the noise levels are within Noise Exposure Category A, noise should not be considered as a determining factor in granting planning permission.
- 3.18 Planning permission should normally be granted for Category B sites as long as suitable noise mitigation measures are applied. Most planning authorities also allow development in Noise Exposure Category C as long as suitable noise mitigation measures are applied. In this case only

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a thin strip of phases 2 and 4 alongside the roads is just within the lower part of Noise Exposure

Category C at night. The night time B/C boundary is approximately 10m from the kerbline of

Glebe Road and Normanby Road as indicated on Figure 3.

Assessment Criteria

3.19 In order to protect the future residents against the impact of noise, a sound insulation scheme has

been designed in accordance with the criteria given below. These criteria are based on British

Standard 8233: 1987, 'Code of practice for Sound insulation and noise reduction for buildings'

Inside Bedrooms: 30dB L_{Aeq} (2300 to 0700 hours) [Individual noise events should not normally exceed 45dB L_{Amax} at night]

Inside Living Rooms:

40dB L_{Aeq} (0700 to 2300 hours)

Balconies and sitting out areas 55dB L_{Aeq} (0700 to 2300 hours)

3.20 Our recommended sound insulation scheme is set out in Section 4.0.

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4.0 NOISE CONTROL MEASURES

4.1 The following noise control measures are recommended in order to meet the criteria given in

Section 3.0 above. All recommendations in this report are given for acoustic reasons only and

matters such as structural design and compliance with fire regulations should be checked by

others. As design proposals are at an early stage, recommendations are based on assumed typical

glazing and room sizes and they should be checked at the detailed design stage.

Site Layout

4.2 Although the magnitude of noise impact from the nearby industrial and commercial premises is

low, we understand that single aspect dwellings (up to 3 storeys in height) could be considered

along the boundaries with some neighbouring premises if necessary. This proposal could be

implemented along appropriate sections of the building lines at the northern part of the eastern

boundary near Kass and Omega Steel Stockholders. This would provide screening to the site

from the steel stockholders and other premises in that direction. The proposed site layout also

offers separation of new buildings from the north-east corner by locating the dry balancing pond

in this area.

4.3 Single aspect dwellings may comprise apartments or townhouses constructed so that the roof

ridge line is higher than noise sensitive windows in dwellings at other locations on the site in

order to break the line of sight to the northern and eastern boundaries.

4.4 Single aspect dwellings would have no noise sensitive rooms located on the building elevations

facing towards the steel stockholders. Windows in these elevations would be to non noise

sensitive areas only such as bathrooms, hallways, corridors, stairwells and kitchens (but not

dining kitchens). Alternatively, a design utilising 'through-rooms', i.e. with windows in both

back and rear elevations, could be used which enables opening lights and ventilation openings to

be located on the elevation facing away from the steel stockholders and therefore acoustically

screened.

4.5 Another alternative would be to use bunding / fencing to provide a screen along critical sections

of the boundary. This kind of boundary protection is not normally high enough to provide

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protection to first floor windows and therefore if it is used consideration should be given to

making the dwellings close to the boundary single aspect at first floor and above (single aspect

being as detailed above).

4.6 If fencing is used for barrier screening (either on its own or on top of a bund) is should be close

boarded timber (min 20mm thick) with cover strips to seal gaps between panels and gravel boards

to seal the gap at the base.

4.7 The precise details of any single aspect dwellings or boundary acoustic barriers (bunds or fences)

should be agreed with the local authority at a later stage. If necessary this could be covered by a

suitably worded planning condition.

4.8 It should be noted that the noise levels across the site are generally low. Although a little daytime

steel handling noise was audible at the north-eastern corner the central and southern / western

parts of the site are less exposed to noise from the north and east and would be further screened

from these areas by other buildings dwellings on site. Therefore any layout or screening

agreement would only need to relate to areas near the northern part of the eastern boundary and

would not affect the layout across the majority of the site.

External Walls

4.9 The building envelope of all dwellings should preferably be of cavity masonry construction with

a brickwork outer leaf and a solid dense blockwork inner leaf. If an alternative construction is

proposed for the building envelope the specification should be checked by an acoustic consultant.

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Glazing to Bedrooms in the first row of properties closest to and facing either Glebe Road or Normanby Road (at the South West corner of the site)

4.10 Our assessment has found that glazing systems with the minimum sound reduction indices given in the table below will provide sufficient sound insulation to meet the internal noise level criteria in these rooms.

Required glazing acoustic performance

Minimu	Minimum Sound Reduction Indices (dB) @ Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k	
21	26	22	28	38	41	42	42	

Such performance can typically be expected from the following glazing configuration;

Double glazing comprising one pane of 4mm and one pane of 8mm glass separated by a nominal cavity (e.g. 10-20mm).

Glazing to all other Bedrooms and to all Living Rooms

4.11 Our assessment has found that glazing systems with the minimum sound reduction indices given in the table below will provide sufficient sound insulation to meet the internal noise level criteria in these rooms.

Required glazing acoustic performance

Minimum Sound Reduction Indices (dB) @ Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
17	18	20	25	35	38	35	35

Such performance can typically be expected from the following glazing configuration;

Double glazing comprising two panes of 4mm glass separated by a nominal cavity (e.g. 10-20mm).

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Ventilation to Bedrooms in the first row of properties closest to and facing either Glebe Road or

Normanby Road (at the South West corner of the site)

4.1 We recommend that all noise sensitive rooms on the first row of properties closest to and facing

either Glebe Road or Normanby Road should have acoustic ventilation by one of the following

means:

i. Silavent acoustic air bricks, type A.

ii. Greenwood AAB 4000 Acoustic Airbrick

iii. Greenwood MA3051 Acoustic Wall Ventilator

iv. A fully ducted ventilation system with appropriately designed in-duct silencers

Alternatives to the above list should be checked with an acoustic consultant.

4.2 All other noise sensitive rooms may have standard window frame trickle vents. As detailed

above, any windows facing the boundary in through-rooms in screening properties to the northern

part of the eastern boundary should not have any ventilation openings. These rooms should be

ventilated from the façade facing away from the boundary.

Rooms in the roof space

4.3 If there are to be any rooms in the roof space in the 3 storey town houses or top floor of flats used

as single aspect screening blocks, we recommend that the ceiling construction and inner face of

any timber frame wall sections (if applicable) to the dormers be increased to 2 layers of 15mm

Gyproc SoundBloc plasterboard (or similar) and that a minimum of 100mm mineral wool be used

in the void.

Gardens

4.4 External noise levels across the site are generally below the criterion of 55dB L_{Aeq} during daytime

hours. The daytime noise levels at the proposed dwelling locations closest to Glebe Road /

Normanby Road at the south-western corner of the site are just over the criterion but it is

expected that any sitting out areas associated with these dwellings would be to the rear where

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they would be protected from road traffic noise. Therefore no noise mitigation measures will be required to achieve compliance with the criterion in external garden areas.

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5.0 SUMMARY AND CONCLUSIONS

5.1 A noise assessment has been carried out for a proposed residential development at The Glebe Pit,

Scunthorpe.

5.2 The assessment has been based on the results of a daytime and night time noise surveys at the

site. Two night time noise surveys have been carried out, one towards the end of the night time

period (around 5-7am) in 2008 and one in the earlier part of the night (around 11pm-4am) in

2009. The later survey was carried out at the request of Robert Starbuck in Environmental Health

following initial discussions about the proposed development plans.

5.3 The assessment has addressed the potential impact of surrounding external noise sources on the

proposed residential properties.

5.4 The noise levels across the site have been found to be generally within Noise Exposure Category

A of PPG24 during the day and Category B at night. For sites where the noise levels are within

Noise Exposure Category A, noise should not be considered as a determining factor in granting

planning permission. Planning permission should normally be granted for Category B sites as

long as noise mitigation measures are applied.

5.5 Appropriate noise criteria have been specified and outline noise control recommendations have

been made.

5.6 Although noise from nearby commercial premises is relatively low, concern has been expressed

about the possibility of noise disturbance from the two steel stockholders adjacent to the northern

part of the eastern boundary of the site. There was no significant intrusive noise from these sites

during the night time noise surveys. Nevertheless, consideration can be given to the use of single

aspect dwellings or a bund / barrier to provide some screening from the steel stockholders

premises if necessary. This matter is to be discussed further with the council at the appropriate

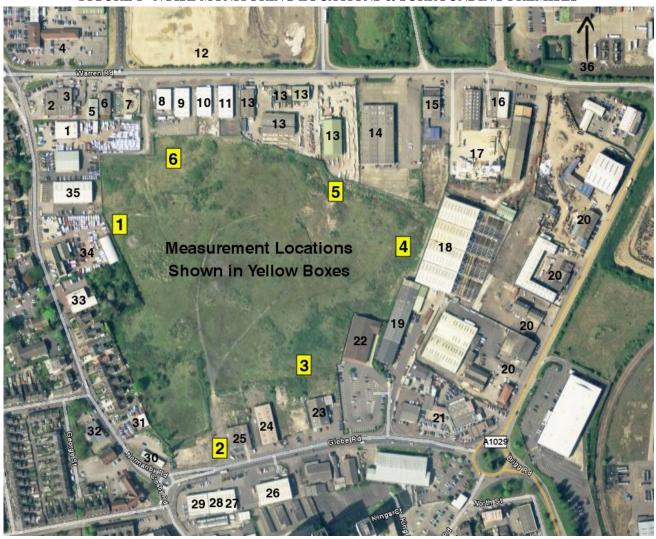
time. If necessary the agreement of a suitable layout and/or boundary screening in this area can

be covered by an appropriately worded planning condition.

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FIGURE 1 -NOISE MONITORING LOCATIONS & SURROUNDING PREMISES



- 1. John Morris Motors
- 2. Ambulance Station
- 3. Truck Force
- 4. Eddie Wright Motors
- 5. Crawshaw Butchers
- 6. M & G Vehicle Hire
- 8. Discount Pet Store
- 9. Rubber Safety Hygeine
- 10. Danton Fireplaces
- 11. Twin Tigers Martial Arts
- 12. Ferrum Court Proposed Office Development

- 13. Howarth Building & Timber Supplies 24. Central Tyre & Exhaust
- 14. AMF Bowling
- 15. Hi-Q Tyre & Exhaust
- 16. Godferry Autoparts
- 17. LaFarge Scunthorpe Readymix Plant
- 7. Fencing & Decking Centre 18. Omega Steel Stockholders
 - 19. Kass Steel Stockholders
 - 20. Various Premises/Workshops off Winterton Road
 - 21. Stoneacre Car Dealership
 - 22. Aldi
 - 23. Plumbing Centre

- 25. Scunthorpe Motor Centre
- 26. Johnston's Decorating Centre
- 27. Truck Force Tyre Service
- 28. Bath Store
- 29. Floors 2 Go
- 30. ARC Car Wash
- 31. Pip Fear Used Cars
- 32. Jet Petrol Filling Station
- 33. Crosby Beaver Workshops
- 34. Ready Rent-a-Van
- 35. EMS Auto Parts
- 36. BOC Gases

FIGURE 2 – PROPOSED SITE PLAN

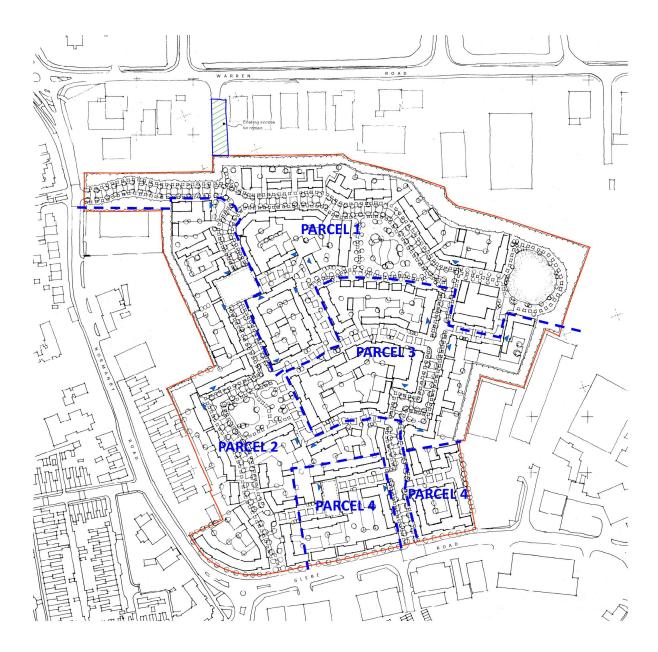


FIGURE 2 – APPROXIMATE NEC BOUNDARY



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Appendix I – Noise Units and Indices

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to

these variations in pressure, producing the sensation of hearing. The ear can detect a very

wide range of pressure variations. In order to cope with this wide range of pressure

variations, a logarithmic scale is used to convert the values into manageable numbers.

Although it might seem unusual to use a logarithmic scale to measure a physical

phenomenon, it has been found that human hearing also responds to sound in an

approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to

describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB

(threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very

important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit

used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as

kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz.

However, the upper frequency limit gradually reduces as a person gets older.

c) Glossary of Terms

When a noise level is constant and does not fluctuate over time, it can be described

adequately by measuring the dB(A) level. However, when the noise level varies with

time, the measured dB(A) level will vary as well. In this case it is therefore not possible

to represent the noise climate with a simple dB(A) value. In order to describe noise

where the level is continuously varying, a number of other indices, including statistical

parameters, are used. The indices used in this report are described below.

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 $L_{\text{Aeq}} \\$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

This is the maximum A-weighted noise level that was recorded during the L_{Amax} monitoring period.

This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is L_{A90} used as a measure of background noise.

This is the A-weighted noise level exceeded for 10% of the time period and is L_{A10} often used in the assessment of road traffic noise.

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Appendix II - Results of Noise surveys

Daytime Measurements

Thursday 9th October, 2008 Date:

Rion NA-28 Type I integrating sound level meter, B&K 2260 Type 1 sound level meter Equipment:

Dry, Slight Breeze <5 m/s Weather:

All readings in dB(A).

Location 1, NW corner of site, 15m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
11:25 11:37	51.5	73.4	46.1	52.0	
12:56 13:07	51.3	70.3	48.5	52.7	Road traffic from Normanby Street
14:16 14:26	51.6	62.8	48.0	54.2	
Average	51.5	-	47.5	53.0	

Location 2, SW corner of site, 15m (approx) from Glebe Road- free-field levels

Ti	me	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
11:47	11:57	51.8	61.5	49.0	53.7	
12:36	12:51	52.5	64.2	50.0	54.2	Road traffic from Glebe Road/ Normanby
14:31	14:42	52.1	61.4	49.4	53.8	Street
15:29	15:44	53.6	71.6	50.6	54.8	
Ave	rage	52.6	-	49.8	54.1	

Note: This location was equivalent to the distance of the proposed development from the road at the time of the survey but the plans subsequently changed to include development closer to the road and therefore the above figures have been corrected by adding 3dB for use in the assessment (as the distance to the road has halved and traffic noise is normally considered as a line source the halving of the distance results in an addition of 3dB).

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Location 3, SE corner of site, 10m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
12:02 12:12	50.6	68.8	47.9	51.4	
13:33 13:44	52.0	76.9	48.8	51.6	Road Traffic from Glebe Road
14:45 14:55	52.4	66.3	48.6	54.4	
Average	51.7	-	48.4	52.5	

Location 4, NE corner of site toward Omega/Kas Steel, 15m (approx) from site boundary - freefield levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
12:23 12:36	47.6	57.5	45.8	49.2	Distant road traffic and industry
13:48 13:59	51.8	60.7	50.2	52.8	Distant road traffic, fan noise and steel
14:59 15:10	52.4	63.5	50.6	53.4	handling noise from Omega/Kas Steel
Average	51.1	-	48.9	52.5	

Location 5, Northern boundary near AMF bowling, 20m (approx) from site boundary - free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
12:39 12:51	48.4	62.2	46.5	49.9	Road traffic on Warren Road, distant industry
14:01 14:11	50.5	58.8	48.8	51.8	Distant road traffic, distant industry, fan
15:12 15:22	51.5	62.9	49.0	53.0	noise from Omega/Kas Steel just audible
Average	50.3	ı	48.1	51.6	

Location 6, Northern boundary near JSH unit, 15m (approx) from site boundary – free-field levels

Tir	ne	\mathcal{L}_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
11:25	11:30	49.4	59.5	46.8	51.4	
15:50	16:00	49.6	59.7	47.8	50.8	Distant Industry and distant road traffic

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Average	49.5 -	47.3 51.1	
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Night Time Measurements

Date: Thursday 30 October 2008

Equipment: NA28 Type 1 Sound Level meter, B&K 2260 Investigator Type I integrating sound level

meter

Weather: Dry and calm

All readings in dB(A). Frequency analysis is available if required.

Location 1, NW corner of site, 15m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
05:10 05:20	55.0	59.7	53.6	56.0	D. L. CC: N. I.
06:09 06:19	55.0	61.2	53.4	56.4	Road traffic on Normanby, distant industry
Average	55.0	-	53.5	56.2	

Location 2, SW corner of site, 15m (approx) from Glebe Road-free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
04:48 04:58	52.8	62.3	51.0	54.2	
05:50 06:00	55.6	63.0	53.6	57.2	Road traffic on Glebe Road / Normanby Road, distant industry
06:47 06:57	55.9	66.6	53.8	57.6	roud, distant industry
Average	55.0	-	52.8	56.3	

Note: This location was equivalent to the distance of the proposed development from the road at the time of the survey but the plans subsequently changed to include development closer to the road and therefore the above figures have been corrected by adding 3dB for use in the assessment (as the distance to the road has halved and traffic noise is normally considered as a line source the halving of the distance results in an addition of 3dB).

Location 3, SE corner of site, 10m (approx) from site boundary – free-field levels

Time	e	\mathbf{L}_{Aeq}	$\mathcal{L}_{\text{Amax}}$	L_{A90}	L_{A10}	Comments
05:31 (05:41	57.2	64.0	55.4	58.6	Road traffic on Glebe Road, distant
06:30	06:40	55.6	68.2	54.0	56.8	industry

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Location 4, NE corner of site toward Omega/Kas Steel, 15m (approx) from site boundary - freefield levels

Time		L_{Aeq}	\mathbf{L}_{Amax}	L_{A90}	L_{A10}	Comments
04:54 05	5:04	53.2	60.1	51.5	54.7	Distant and target a distant in dastern
05:55 06	5:05	54.5	62.2	52.1	56.2	Distant road traffic, distant industry
						Distant road traffic, distant industry, noise
06:41 06	5:51	52.5	58.4	50.5	54.2	from inside Omega Steel just audible
Average	ge .	53.5	1	51.4	55.0	

Location 5, Northern boundary near AMF bowling, 20m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
05:09 05:19	52.9	59.9	50.8	54.4	
06:08 06:18	51.6	59.9	50.3	52.7	Distant road traffic, distant industry
06:54 07:04	51.8	62.0	50.2	53.0	
Average	52.1	-	50.4	53.4	

Location 6, Northern boundary near JSH unit, 15m (approx) from site boundary – free-field levels

Time	${ m L_{Aeq}}$	L _{Amax}	L_{A90}	L_{A10}	Comments
05:36 05:46	54.7	71.1	50.4	54.2	B
06:24 06:34	50.2	69.3	49.0	51.2	Distant road traffic, distant industry
Average	53.0	-	49.7	52.7	

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Tuesday 10th / Wednesday 11th November 2009 Date:

Brüel & Kjær 2260 Investigator Type I integrating sound level meter Equipment:

Weather: Dry and calm

All readings in dB(A). Frequency analysis is available if required.

Location 1, NW corner of site, 15m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
23:45 23:55	43.9	54.8	40.6	45.8	
00:41 00:51	44.9	67.6	41.4	46.8	Road traffic on Normanby Road, distant
01:28 01:38	42.9	61.7	39.0	44.4	industrial noise from BOC direction,
02:21 02:31	43.2	57.2	39.8	44.8	distant road traffic
03:16 03:29	47.3	68.0	44.0	49.0	
Average	44.8	-	41.0	46.2	

Location 2, SW corner of site, 7.5m (approx) from Glebe Road- free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
23:08 23:18	62.8	77.9	45.6	67.4	
00:20 00:30	55.1	74.0	42.4	51.8	Road traffic on Glebe Road / Normanby
01:10 01:20	53.8	74.8	40.6	47.2	Road, distant industrial noise from BOC
02:05 02:15	58.5	78.3	41.6	53.8	direction, distant road traffic
03:00 03:10	57.2	74.4	46.0	56.2	
Average	58.7	-	43.2	55.3	

Note: Monitoring carried out closer to the road than it was in the previous surveys due to a change in the proposed layout plan.

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Location 3, SE corner of site, 10m (approx) from site boundary – free-field levels

Time	${ m L_{Aeq}}$	L _{Amax}	L_{A90}	L_{A10}	Comments
23:21 23:31	47.3	52.2	45.8	48.4	
00:42 00:52	53.3	59.3	51.0	54.8	Road traffic on Glebe Road, distant
01:35 01:45	47.5	58.4	45.4	48.8	industrial noise from BOC direction,
02:29 02:39	47.9	57.1	45.8	49.4	distant road traffic
03:14 03:24	53.4	57.7	51.4	54.8	
Average	50.8	ı	47.9	51.2	

Location 4, NE corner of site toward Omega/Kas Steel, 15m (approx) from site boundary - freefield levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
23:48 23:58	48.9	60.6	47.0	50.2	
01:01 01:11	48.3	53.0	46.4	49.8	
01:56 02:06	50.7	56.4	48.4	52.4	Distant road traffic, distant industrial noise from BOC direction
02:47 02:57	49.5	56.8	46.6	51.8	nom bee direction
03:28 03:38	43.9	50.4	42.2	45.2	
Average	48.8	-	46.1	49.9	

Location 5, Northern boundary near AMF bowling, 20m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
00:07 00:18	41.9	47.9	40.4	43.0	
01:15 02:25	42.9	48.9	40.8	44.4	
02:09 02:19	43.0	58.6	41.2	44.4	Distant road traffic, distant industrial noise from BOC direction
03:01 03:11	45.3	52.3	43.6	46.4	Hom Boe uncerton
03:48 03:58	49.2	54.4	47.4	50.2	
Average	45.4	-	42.7	45.7	

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Location 6, Northern boundary near JSH unit, 15m (approx) from site boundary – free-field levels

Time	L_{Aeq}	L _{Amax}	L_{A90}	L_{A10}	Comments
00:01 00:11	42.7	53.9	40.4	44.2	
00:54 01:04	42.7	60.0	39.4	44.6	
01:42 01:56	45.4	54.1	42.6	47.2	Distant road traffic, distant industrial noise from BOC direction
02:35 02:45	45.1	53.7	41.8	47.2	nom boe uncenon
03:32 03:42	44.6	57.7	41.6	46.4	
Average	44.3	-	41.2	45.9	

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dynamic development solutions $^{\mathsf{TM}}$

Appendix 7: Dust and Odour Assessment (December 2010)



Dust and Odour Assessment: The Glebe, Scunthorpe

December 2010















Experts in air quality management & assessment



Document Control

Client	Onward Holdings	Principal Contact	Nicola Howarth (DLP Consultants)

Job Number	J844
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Report Prepared By:

Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
844/2/F1	10 th December 2010	Final Report	Prof. Duncan Laxen

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1 Introduction

- 1.1 This report describes the potential for dust and odour impacts associated with the proposed residential development at the Glebe in Scunthorpe. The assessment has been carried out by Air Quality Consultants Ltd.
- 1.2 The Glebe development site lies adjacent to Warren Road and Glebe Road and is approximately 0.5 km north of Scunthorpe town centre. The site is currently undeveloped. The proposed Glebe development comprises residential accommodation with associated parking and open space.
- 1.3 The area in which the site is located is currently occupied by mixed uses including residential, commercial and industrial. The industrial processes, located to the north, south and east of the development site pose a potential risk to the development site with respect to impacts of dust and odours. This assessment examines the potential impacts of dust and odours from these processes. A plan of the Glebe site is displayed in Figure 1.

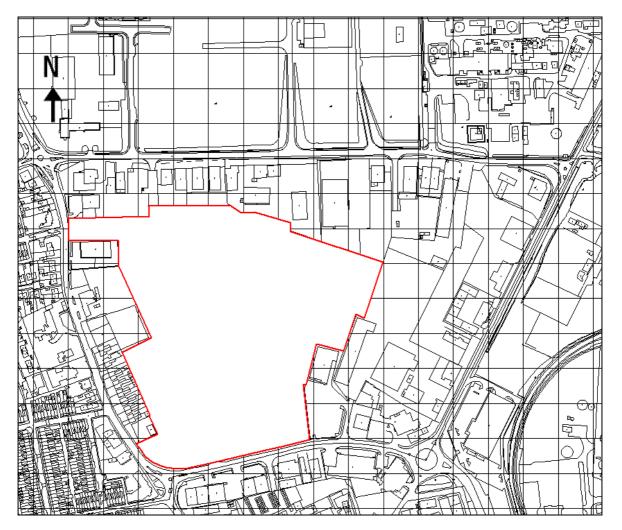


Figure 1 - Development Site



2 Policy Context and Assessment Criteria

Nuisance Criteria

2.1 Dust and odours have the potential to pose a nuisance for residents living near to sources of such emissions. Determination of whether or not dust or odour constitutes a statutory nuisance in these cases is usually the responsibility of the local planning authority or the Environment Agency. The Environmental Protection Act 1990 (Stationary Office, 1990) outlines that a local authority can require measures to be taken where any:

"dust, steam, smell or other effluvia arising on an industrial, trade and business premises and being prejudicial to health or a nuisance..." or

"fumes or gases are emitted from premises so as to be prejudicial to health or cause a nuisance.."

2.2 Environment Agency technical guidance note M9 on ambient air monitoring (EA, 2000) describes assessment criteria for deposited dust and states that:

"The (dust) soiling level can be related to perceived nuisance with less than 10 SU being generally acceptable and greater than 20 SU generally considered unacceptable."

Health Criteria

2.3 The Air Quality Strategy (Defra, 2007) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality Regulations 2000 (Stationery Office, 2000) and the Air Quality (England) (Amendment) Regulations 2002 (Stationery Office, 2002). The Air Quality Regulations include objectives for fine particles (PM₁₀), which is a major constituent part of dust emissions and therefore is considered in this assessment. The relevant objectives for PM₁₀ are provided in Table 1.

Table 1: Air Quality Objectives for PM₁₀

Pollutant	Time Period	Objective
Fine Particles	24-hour mean	50 μg/m³ not to be exceeded more than 35 times a year a
(PM ₁₀)	Annual mean	40 μg/m ³

This is broadly equivalent to 50 μg/m³ as a 90.4th percentile of daily mean PM₁₀ concentrations.



Odour Guidance

- 2.4 The Environment Agency has produced new horizontal guidance on odour assessment and management, H4 (EA, 2009), which is currently undergoing formal consultation. The H4 guidance document is primarily aimed at process operators looking to control and manage the release of odours, but also contains a series of recommended assessment methods, some of which have informed the methodology employed by this assessment.
- 2.5 In addition, in March 2010 Defra published an updated guidance document on odour for local authorities (Defra, 2010). This guidance is designed as a reference document for local authorities, regulators and industry professionals involved in the assessment, prevention and management of odours.

National Planning Policy

- 2.6 Planning Policy Statement 23 (PPS23) (ODPM, 2004) outlines that any consideration of the quality of land, air or water and potential impacts arising from development, possibly leading to an impact on health, is capable of being a material planning consideration.
- 2.7 PPS23 continues to describe that close co-ordination between planning authorities, transport authorities and pollution control regulators is essential to meet the common objective that where development takes place, it is sustainable. Specifically:
 - "Where, for example, new housing is proposed close to a source of potential pollution, the risk of pollution from the normal operation of the process or the potential impacts and the extent to which the proposals address such risks will influence whether or not development should proceed..."
- 2.8 Appendix A of PPS23 contains considerations on taking decisions on individual planning applications and outlines:
- 2.9 "...the need to separate necessary, but potentially polluting and other land uses so as to reduce conflicts..."

Local Policies

2.10 North Lincolnshire Council's draft Local Development Framework Core Strategy contains the following policy relating to the consideration of environmental impacts of proposed developments:

"CS18 Sustainable Resource Use and Climate Change

The council will actively promote development that utilises natural resources as efficiently and sustainably as possible. This will include



10. Ensuring that development and land use helps to protect people and the environment from unsafe, unhealthy and polluted environments by protecting and improving the quality of the air, land and water."

3 Dust Assessment Methodology

Beta Attenuation Particle Monitoring

- 3.1 Ambient levels of PM₁₀ at the proposed development site were monitored over a 3-month period from 3rd August 2010 to 17th November 2010 using a BAM 1020 automatic beta attenuation PM₁₀ analyser.
- 3.2 The BAM1020 automatically measures and records airborne particle concentrations using the principle of beta-ray attenuation. The BAM1020 is widely used for particle monitoring throughout the world and is considered a reliable alternative to use of the TEOM-FDMS system used in the UK Automatic Urban and Rural Monitoring Network (AURN). The BAM1020 is approved by Defra as a 'reference equivalent' instrument after adjustment. The adjustment involves dividing the raw results by 1.211.
- 3.3 The BAM analyser was located at the northern boundary of the site broadly in line with the most easterly facades of the proposed residential units. It is proposed to use the land to the east of this point for community open-space to reduce the potential impact of odour and dust from the industries that border the site to the east. A map showing the location of the BAM analyser is displayed in Figure 2.
- 3.4 Results of the BAM monitoring have been compared to national air quality objectives for PM₁₀. Where episodes of high PM₁₀ concentrations have been measured, these have been investigated to identify whether they are likely to be part of regional particle episodes or due to local sources and influences.
- 3.5 A meteorological mast was co-located with the BAM analyser to measure wind speed and direction. The measured wind data have been used in the analysis of dust episodes measured on glass slides, and have been used in the assessment of potential odour impacts as discussed in paragraph 6.22.



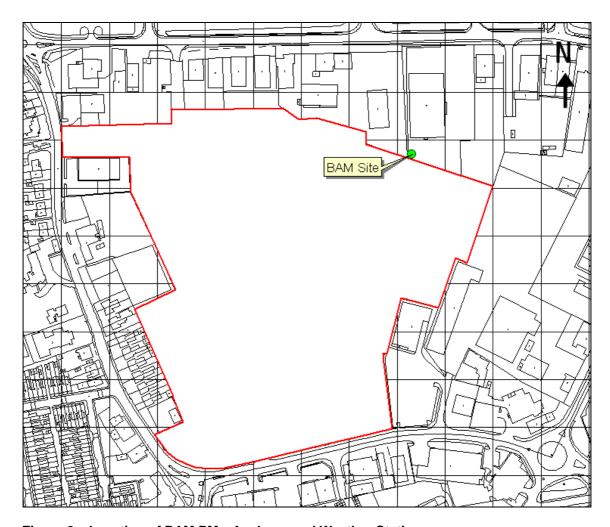


Figure 2 – Location of BAM PM₁₀ Analyser and Weather Station

Glass Slide Dust Monitoring

- 3.6 A programme of dust deposition monitoring was carried out for a 3-month period from 3rd August 2010 to 9th November 2010 using the glass-slide method.
- 3.7 The glass-slide method involves the deployment of small glass slides on flat horizontal surfaces such as posts, rails and walls. Airborne particles are deposited on these slides over the course of a week and the slides are then removed and analysed under laboratory conditions to determine the average amount of dust soiling over the week-long period.
- 3.8 Five glass-slide sites were selected across the Glebe site and slides were deployed and exchanged on a weekly basis for a total of 13 weeks. The glass slides were supplied and analysed by Scientifics, part of the Environmental Scientifics Group. The location of the five glass-slide dust-monitoring sites are shown in Figure 3.



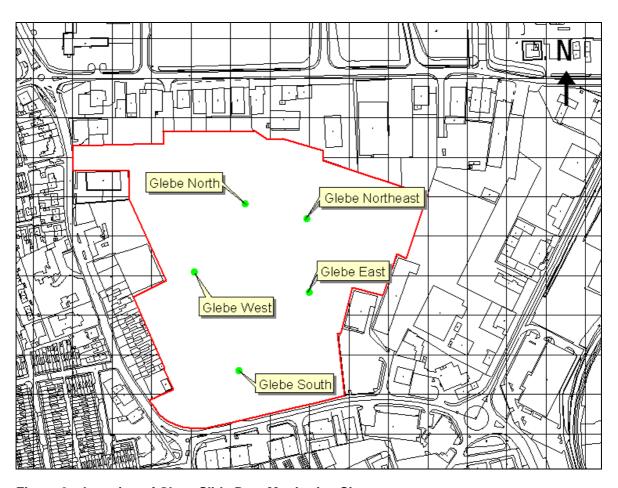


Figure 3 - Location of Glass Slide Dust Monitoring Sites

4 Odour Assessment Methodology

Site Visit and Sniff Tests

- 4.1 A site visit was conducted in order to subjectively identify the impacts of odours from potential sources near to the Glebe site. During the site visit a number of sniff tests were undertaken at eight selected locations around the Glebe site.
- 4.2 The sniff tests conducted during the site visits looked to identify key characteristics of all odours detected, in particular their FIDOL factors (frequency, intensity, duration, offensiveness and location) were recorded, as defined in the Environment Agency H4 guidance and outlined in Table 2.



Table 2: Description of the FIDOL factors

Factor	Description		
Frequency	The frequency with which an odour occurs.		
The degree to which an odour is detectable on a 1-5 scale where: detectable odour; 2 = Faint odour; 3 = Moderate odour; 4 = Strong 5 = Very strong odour.			
Duration	The length an odour episode typically lasts.		
Offensiveness	Also referred to as the Hedonic Tone, this is a rating of how unpleasant an odour is. Odour offensiveness is scored on a scale of +4 to -4 where: +4 = Pleasant odours; 0 = Neutral odours; and -4 = Foul odours.		
Location	The sensitivity of the location where an odour is detected. Places where people eat, sleep, relax or cannot leave are deemed most sensitive.		

Consultation with Local Process Operators

- 4.3 The assessment of odour impacts also involved a consultation with a number of local process operators in order to identify the potential for odours to be emitted and the likely frequency and duration of such episodes.
- 4.4 The following local operators were contacted via email or phone and invited to provide information on their processes and potential odours:
 - Nationwide Crash Repair Centres Ltd;
 - Stoneacre Motor Group;
 - Murco Petroleum Ltd;
 - Lafarge Aggregates Ltd;
 - Thompsons Metals Ltd;
 - Stoneledge (Southbank) Ltd;
 - Koppers International;
 - Corus/Tata Steel;
 - Bells Waste Management; and
 - British Oxygen.
- 4.5 Those operators willing to be consulted on their processes were provided with a pro-forma designed to identify the processes they operate in Scunthorpe, the odour abatement they have in place, and any historical complaints records they hold for their processes.



Analysis of Meteorological Data

4.6 The wind conditions at the proposed development site are important parameters in identifying the potential for odour impacts, as odours will only travel in a downwind direction. Analysis of wind speed and direction data collected during the 3-month PM₁₀ monitoring study, as well as examination of wind speed and direction data from a nearby long-term meteorological station have been used in the assessment of potential odour impacts at the Glebe site.

Historic Complaints Records

4.7 Complaints records for local industrial processes have been obtained from North Lincolnshire Council and from the local process operators themselves. The number, frequency and location of past odour complaints are useful statistics in predicting the potential for impacts of a source at the proposed development site.

5 Dust Assessment

Beta Attenuation Particle Monitoring

- 5.1 Ambient PM₁₀ monitoring using a BAM 1020 automatic analyser was conducted from 3rd August 2010 to 17th November 2010. A weather sensor measuring wind speed and direction was also installed and operated in co-location with the BAM 1020 during this period.
- 5.2 A summary of results of the PM_{10} monitoring undertaken at the Glebe site is displayed in Table 3. The mean results are displayed as raw statistics and as an annualised value. The annualised value is a predicted representative annual average concentrations calculated using the methodology described in Appendix 1. The annualised value is equivalent of the 2009 annual mean concentration.

Table 3: PM₁₀ Monitoring Results at The Glebe, Scunthorpe

	Mean PM ₁₀ (μg/m³)	90.4 th Percentile PM ₁₀ (µg/m ³)
Measured Values (2010)	21.2	35.1
Annualised Values (2009)	22.0	n/a
Objective	40 μg/m ³	50 μg/m³

5.3 The results show that the period mean PM_{10} and the annualised PM_{10} concentrations are both well below the air quality objective of 40 $\mu g/m^3$. The 90.4th percentile of 24hr mean PM_{10} concentrations is also below the objective of 50 $\mu g/m^3$.



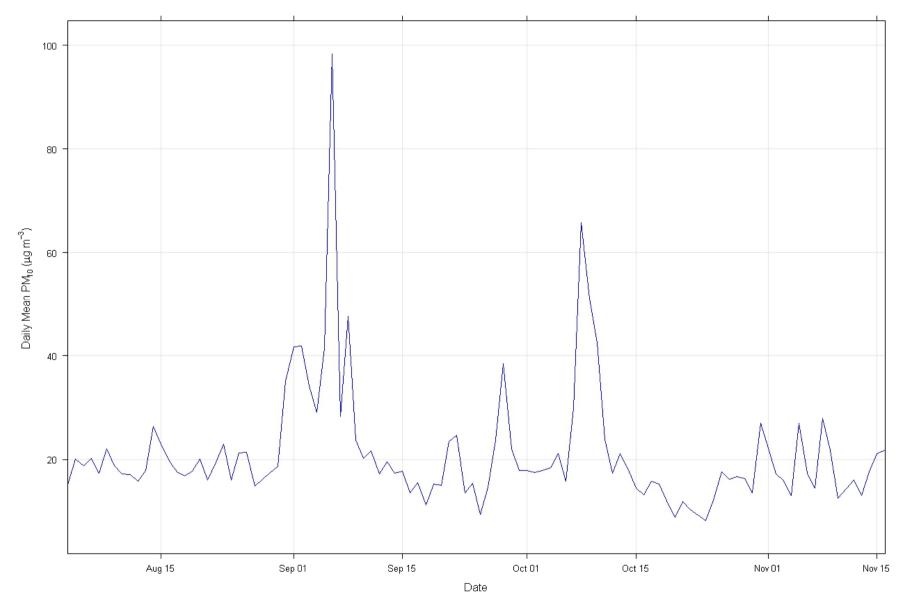


Figure 4 – Daily Mean PM₁₀ Concentrations at The Glebe, Scunthorpe



- A time-plot graph showing the daily mean PM_{10} concentrations measured during the August-November monitoring period is displayed in Figure 4. The daily mean PM_{10} values were typically in the range of 15-25 μ g/m³ during the monitoring period. There were 3 days when daily mean PM_{10} concentrations exceeded 50 μ g/m³, the greatest of which was 113 μ g/m³ on the 6th September.
- In order to assess whether these peaks in PM₁₀ concentrations were due to local or regional sources, data from four air quality monitoring stations in Scunthorpe were downloaded from the North Lincolnshire Air Quality website (N.Lincs, 2010) and analysed. The data were obtained for the period of 3rd August to 17th November from the following sites:
 - Scunthorpe Town AURN (PM₁₀ measured using FDMS);
 - Scunthorpe Redbourne Club (PM₁₀ measured using TEOM (x1.3));
 - Scunthorpe Lincoln Gardens (PM₁₀ measured using TEOM (x1.3)); and
 - Scunthorpe East Common Lane (PM₁₀ measured using TEOM (x1.3)).
- 5.6 Figure 5 shows time-plots of the data from the four long-term monitoring stations in Scunthorpe, and The Glebe BAM monitoring site located off Warren Road. The results show that the peaks in PM₁₀ concentrations occurred at sites throughout Scunthorpe, which suggests that the source of these PM₁₀ peaks was regional and not local to The Glebe site.



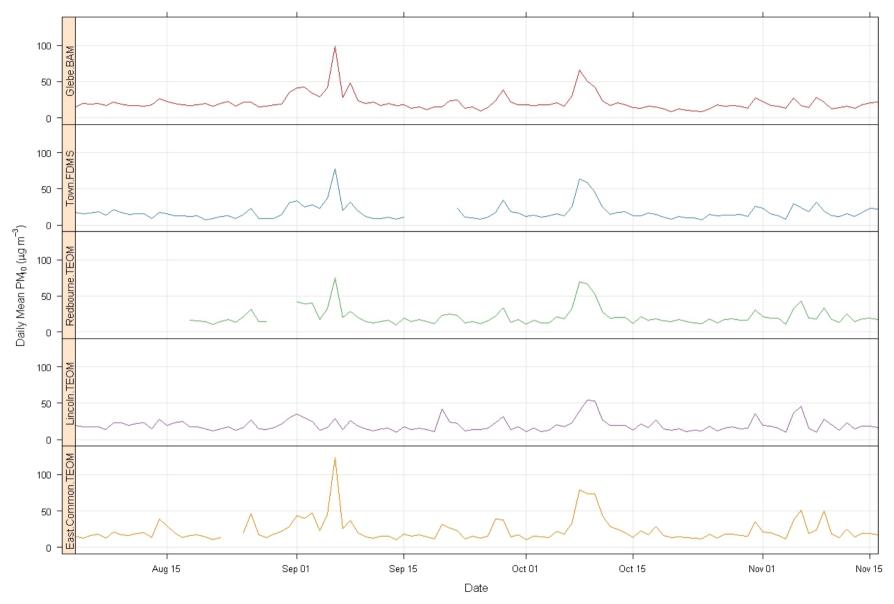


Figure 5 – Daily Mean PM_{10} Concentrations at Monitoring Sites throughout Scunthorpe



Glass Slide Dust Monitoring

- 5.7 Glass slides were deployed and exchanged on a weekly basis from the 3rd August 2010 to the 9th November 2010 and analysed in a laboratory to identify the amount of deposited dust over each week-long period.
- 5.8 Glass slide dust monitoring results are displayed in Table 4. Results are reported in Soiling Units (SU). Environment Agency technical guidance note M9 on ambient air monitoring (EA, 2000) describes dust deposition of greater than 20 SU as generally being considered unacceptable.
- 5.9 Results of glass slide monitoring at the Glebe site show five exceedences of the 20 SU threshold at the Glebe South monitoring location. There were no exceedences of the 20 SU threshold during the study at any of the other glass slide monitoring locations.
- 5.10 Glebe South was located on a 1 m high metal railing near to the southern boundary of the Glebe site. At the end of the railing, a few meters from the slide location, is a well worn dirt track which appears to be a point of access onto the site for children and dog walkers. During visits to the site, members of public were observed to be using the site. It is believed that the site itself constitutes the greatest source of dust deposition at the Glebe South site. This hypothesis is supported by the weekly wind roses displayed in Figure 6. This figure shows a wind rose for each week where the 20 SU dust soiling threshold was exceeded at the Glebe South site (weeks 1, 2, 3, 5 & 6). The wind roses show considerable variance in prevailing wind direction week by week, which is not conducive to determining a single source of the dust deposited on the Glebe South slides. The predominant wind direction in week 2, where dust soiling at Glebe South peaked at 51 SU, was from the north-northwest. In this direction there are no identified sources of dust, other than the Glebe site itself.
- 5.11 If the Glebe site does indeed represent a principal source of the dust deposited on the glass slides, then this would not apply when the site has been developed as the site would be hard-surfaced and therefore far less conducive to the generation of fugitive dust than the bare earth that predominates on the site at present.



Table 4 – Glass Slide Dust Monitoring Results

Glass	Dust Deposition in Soiling Units (SU)														
Slide Site	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Mean
Glebe east	6	5	4	9	13	4	3	9	5	8	3	1	2	3	5
Glebe northeast	-	4	9	4	11	3	2	9	7	17	3	3	10	6	7
Glebe north	-	12	3	3	8	3	1	4	-	8	5	10	13	20	8
Glebe west	-	-	12	6	18	13	2	10	8	3	4	-	4	7	8
Glebe south	21	51	23	5	23	25	5	7	9	17	5	11	10	12	16

^{- =} missing slide.



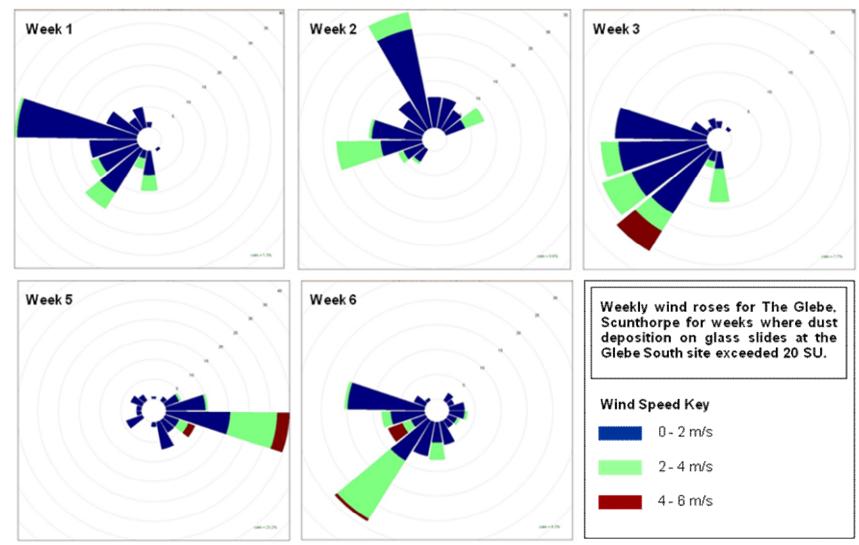


Figure 6 – Weekly Wind Roses for Weeks where Dust Soiling Threshold of 20 SU was Exceeded at Glebe South



6 Odour Assessment

Sniff Tests

6.1 Sniff tests were completed at 8 locations around the Glebe site. Three sniff tests were conducted at each of the 8 locations throughout the site visit day. The sniff test locations are described in Table 5 and displayed in Figure 7.

Table 5 - Odour Sniff Test Locations

Site ID	Location	Nearest Industrial Process	Location Sensitivity
Site 1	Car park at AMF Bowling	Omega Steel	High
Site 2	Junction of Warren Road and Winterton Road	Nationwide Crash Repair / British Oxygen	Low
Site 3	Winterton Road	Thompson Metals	Low
Site 4	Glebe Road opp. Wickes	Stoneacre Group	Low
Site 5	Glebe Road at car wash	n/a	High
Site 6	Glebe Site, SE Corner	Omega Steel/Stoneacre Group	High
Site 7	Glebe Site, W Boundary	n/a	High
Site 8	Warren Road at Site Access	n/a	Medium

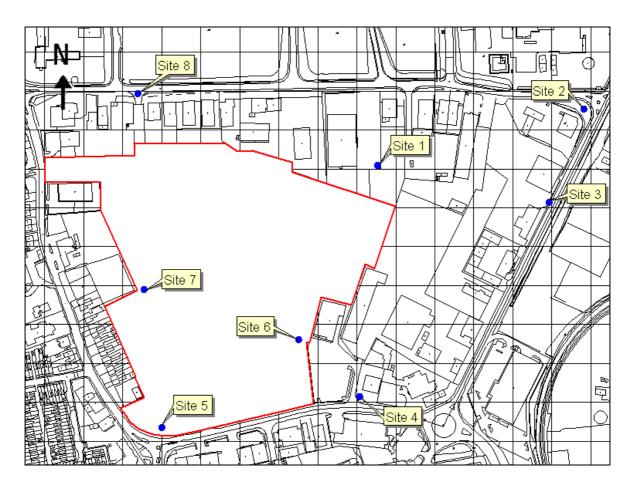


Figure 7 – Odour Sniff Test Locations



- 6.2 The location sensitivities described in Table 5 are an indication of how relevant each site is with respect to exposure to odours. EA H4 guidance describes sites with high sensitivity to odours as being those where people eat, sleep, relax, or cannot leave or sites which are concerned with health. Those sniff test sites located on the Glebe site or at the boundary (Sites 1, 5, 6 & 7) are considered to have "high" sensitivity. Those sites located outside the proposed development site (sites 2, 3, & 4) where members of the public are only likely to be present for very short periods of time are considered to have "low" sensitivity. Site 8 is considered to be of "medium" sensitivity because it is in a location where, if it were affected by odours from industry to the east of The Glebe site, the site would most likely also be affected.
- 6.3 The results of the sniff tests conducted during the site visits are summarised in Table 6. The wind data has been obtained from the meteorological station co-located with the BAM particle analyser.
- Results of the sniff testing show that no odours were detected at sites 1, 4, 5, 6, 7 and 8 during any of the sniff tests at these locations.
- 6.5 There were however odours detected at sites 2 and 3 during the site visit. A chemical odour was detected at site 2 during two of the three sniff tests carried out at that location on 26th October 2010. The source of this odour is uncertain but is thought to be the Nationwide Crash Repair Centre which was a short distance (10-15 m) upwind of Site 2 on the day that the sniff tests were conducted. Odours from the stack at the Nationwide Crash Repair Centre will only occur whilst the vehicle re-spray booths are in use. This may explain the intermittent occurrence of the odour during the sniff testing on 26th October 2010. The odours will only occur on a short-term and irregular basis and have limited potential to impact upon the proposed development site apart from under exceptional circumstances where odour emissions from the process and meteorological conditions conducive to odour transport occur in tandem.
- At Site 3, a landfill odour was detected during all three sniff tests carried out at that location on 26th October 2010. The source of this odour is likely to be Thompson Metals which is located approximately 10 m away from Site 3. Thompson Metals keep a number of stockpiles of mixed waste and materials which, based on observations, provide the most likely source of landfill-type odours. The odours detected, even at 10 m distance were only considered to be moderate in intensity and were rated as a level 3 odour on the odour intensity scale described in Table 1. During the odour sniff tests, activities on the Thompsons Metals site involved the movement of material using heavy machinery. This activity will agitate the stockpiles resulting in a greater release of odours than under normal conditions. Nonetheless the nature of the open stockpiles means that there is a continuous potential for odours from Thompson Metals. The Glebe site is a 115 m from this source at its closest point and any odours would be significantly diluted over this distance.



Table 6 - Odour Sniff Test Results

Site ID	Date	Time	Wind Direction*	Wind Speed (m/s)*	Air Temperature (°C)	Weather	Odour Descriptor	Odour Intensity
	26/10/10	08:42	S	3.0	12	Overcast	n/a	1
Site 1	26/10/10	10:32	S	3.5	12	Rain	n/a	1
	26/10/10	12:10	S	2.0	12	Overcast	n/a	1
	26/10/10	08:54	S	3.0	12	Overcast	Chemical	3
Site 2	26/10/10	10:40	S	3.5	12	Rain	Chemical	3
	26/10/10	12:15	S	2.0	12	Overcast	n/a	2
	26/10/10	09:00	S	3.0	12	Overcast	Landfill	3
Site 3	26/10/10	10:45	S	3.5	12	Rain	Landfill	3
	26/10/10	12:19	S	2.0	12	Overcast	Landfill	3
	26/10/10	09:05	S	3.0	12	Light Rain	n/a	2
Site 4	26/10/10	10:53	S	3.5	12	Rain	n/a	2
	26/10/10	12:27	S	2.0	12	Overcast	n/a	1
	26/10/10	09:15	S	3.0	12	Light Rain	n/a	1
Site 5	26/10/10	11:05	S	3.0	12	Rain	n/a	1
	26/10/10	12:32	S	2.0	12	Light Rain	n/a	1
	26/10/10	09:20	S	3.0	12	Overcast	n/a	1
Site 6	26/10/10	11:12	S	3.0	12	Rain	n/a	1
	26/10/10	12:40	S	2.0	12	Light Rain	n/a	1
	26/10/10	09:25	S	3.0	12	Light Rain	n/a	1
Site 7	26/10/10	11:16	S	3.0	12	Rain	n/a	1
	26/10/10	12:45	S	2.0	12	Rain	n/a	1
	26/10/10	09:35	S	3.0	12	Light Rain	n/a	1
Site 8	26/10/10	11:25	S	3.0	12	Rain	n/a	1
	26/10/10	12:53	S	2.0	12	Rain	n/a	1

^{*} Wind speed and direction taken from meteorological station co-located with the BAM particle analyser.



Consultation with Local Process Operators

6.7 The 10 industrial process operators listed in paragraph 4.4 were all contacted via email or phone and asked to participate in the odour study by providing information on the processes they operate and any known odour releases. The majority of the operators either did not respond to requests for information or did not wish to provide the information requested, however three local operators were willing to discuss their operations with respect to odours.

Nationwide Crash Repair Centre

- 6.8 Nationwide undertake vehicle respray at their Scunthorpe crash repair centre on Winterton Road to the east of the Glebe development site. This process has the potential to produce odours from the single chimney stack located at the centre.
- 6.9 Nationwide use filters on their paint spray booths to abate odours and VOC emissions from the process. These filters are replaced regularly in accordance with their LAPPC permit. The stack is built to 3m above the building ridge height which is also in accordance with their LAPPC permit regulations.
- 6.10 Nationwide carry out daily routing odour checks on their Scunthorpe crash repair centre as a condition of their LAPPC permit for vehicle respray. There are no instances of detectable odours recorded by Nationwide personnel and they have confirmed that there have been no formal complaints made to the company regarding odours.

Tata Steel

- 6.11 Tata Steel operate a large iron and steel-making facility at Brigg Road in Scunthorpe, over 1 km southeast of the Glebe site. The Tata works incorporates a large number of individual permitted processes, each of which is abated for odours if required by the conditions of their PPC permits.
- 6.12 The Tata site occupies approximately 2,000 acres. The vast size of the site helps to reduce the impacts of odours beyond the site boundary due to dilution and dispersion of odours over large distances.
- 6.13 Tata steel do not anticipate odour from their Scunthorpe facility to impact upon future residents at the Glebe due to the distance between the sites.

British Oxygen

6.14 British Oxygen has confirmed that their Scunthorpe facility, located adjacent to Warren Road to the north of the Glebe site, is used for air processing only. This process does not result in the emission of any odours and British Oxygen has not received any complaints regarding odours from their Scunthorpe facility.



Other Processes

6.15 All other operators who were contacted did not reply or did not wish to provide information.

Complaints Records

6.16 North Lincolnshire Council have conducted a search of their records and identified three complaints lodged in recent years regarding odours from premises on Glebe Road, Warren Road and Winterton Road. A summary of these records is displayed in Table 7.

Table 7 – Odour Complaints Registered with North Lincolnshire Council

Date	Complaint	Premises Name	Outcome
02/12/2002	Strong egg smell near BOC roundabout	British Oxygen	Referred to Environment Agency
25/06/2010	Thompsons Metals moving earth with digger and creating foul odour affecting complainant's workshops and offices. Earth damping not seen to have been employed.	Thompsons Metals	Referred to Environment Agency
10/11/2010	Horrible rotting smell from Thompsons Metals. Complainant can smell it in his work building.	Thompsons Metals	Referred to Environment Agency

- 6.17 The first complaint dates back to 2002 and relates to the British Oxygen site on Warren Road to the north of The Glebe development site. This seems to be an isolated complaint. As described in paragraph 6.12 British Oxygen have stated during consultation that their processes at Warren Road do not produce odours during normal operations.
- 6.18 The other two complaints, both lodged in 2010, relate to Thompsons Metals on Winterton Road. This source was also identified as a source of odours during the site visit on 26th October 2010, although only at a short distance down-wind of the Thompsons Metals site.
- 6.19 The exact location of the complaints against Thompsons Metals is not known, but they are likely to be from businesses nearby, including Nationwide Crash Repairs, List Recruitment, Access Panel Co Ltd, Scunthorpe Powder Coating, Siemens VAI, Dale UK, and Lafarge, all of which lie within 50 m of the Thompsons Metals site boundary. In comparison, the Glebe site lies 115 m from the boundary of Thompsons Metals, and the location of any proposed properties at the Glebe is over 180 m from the Thompsons Metals site boundary.
- 6.20 It should be noted that workplaces constitute receptors with respect to nuisance odours as much as residential properties do. The fact that there are so few complaints lodged with North Lincolnshire District Council regarding odours at Warren Road and Winterton Road suggest that



although odourous processes exist in the area, that nuisance odour episodes are both infrequent in occurrence and localised in nature. Odours of moderate intensity, such as those detected during the site visit on 26th October 2010 may be detectable at short-range in outside air, but are far less likely to be of influence inside properties at longer ranges over which atmospheric dispersion will greatly dilute the odours.

Analysis of Meteorological Data

- 6.21 The meteorological data collected in co-location with the BAM analyser between the 3rd August 2010 and 17th November 2010 provides a site-specific indication of wind speed and direction trends. Due to the relatively short-term nature of this data, annual meteorological data collected at the Scunthorpe Town air quality monitoring station has also been analysed. The Scunthorpe Town meteorological data was obtained from the North Lincolnshire Air Quality website (N.Lincs, 2010).
- 6.22 Wind roses summarising the wind speed and direction during the PM₁₀ monitoring period at the Glebe site, and during 2009 at the Scunthorpe Town air quality monitoring station are displayed in Figure 8. The two wind roses show that wind characteristics measured during the PM₁₀ monitoring period at the Glebe site are similar to those measured during 2009 at the Scunthorpe Town station. Winds predominate from the south and west, while winds from the north and east occur less frequently.

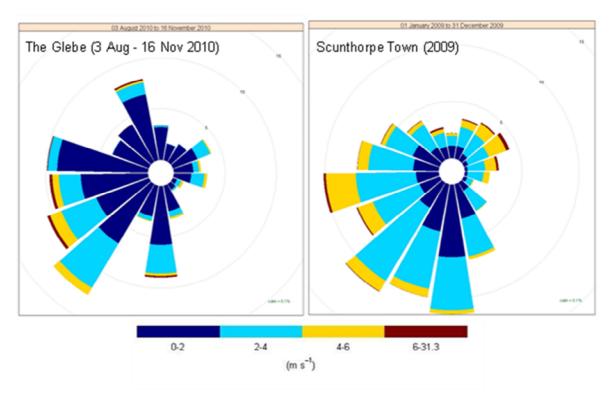


Figure 8: Wind Roses for the Glebe Site and Scunthorpe Town



- 6.23 Odour assessment at the Glebe site has identified potential odour sources to the northeast of the site, namely Thompsons Metals and Nationwide Crash Repairs. Odours from these facilities have the potential to impact upon the Glebe site only when the wind is blowing towards the site from the east and northeast. Analysis of the Scunthorpe Town meteorological data shows that the wind was blowing from the east and northeast for only 13% of the hours during 2009. In analysing the statistics, east and northeast winds have been considered to be all winds occurring between 22.5° and 90°.
- 6.24 Odours from Nationwide Crash Repair will only occur during hours of operation, which are only 52 hours per week (31%). Odours from Thompsons Metals have the potential to occur more continuously, but are likely to be greatest during hours of operation when materials are collected and delivered, and stockpiles are disturbed by machinery use. Odours would have to travel over 180 m from Thompsons Metals and 250 m from Nationwide Crash Repair in order to reach proposed properties at the Glebe site. Over this distance, dispersion of the odours would greatly reduce their intensity when compared to the odours detected at Site 2 and Site 3 during the sniff testing, which were only a few meters from each source.
- 6.25 Considering all of these factors including the prevailing wind conditions, likely frequency of odours at source, the effects of dispersion, and the general absence of complaints over recent years, the overall likelihood of impacts of odours from Thompsons Metals and Nationwide Crash Repair affecting the Glebe site are very low.



7 Summary and Conclusions

- 7.1 The potential impacts of dust and odours from local industrial processes on the proposed residential development at the Glebe adjacent to Warren Road and Glebe Road in Scunthorpe have been assessed.
- 7.2 Dust and PM_{10} have been monitored at the site for three months from August to November 2010, using glass slides and an automatic BAM 1020 particle analyser. Results of the PM_{10} monitoring using the BAM suggest that PM_{10} concentrations at the Glebe site are acceptable and the air quality objectives for PM_{10} are being met at the site.
- 7.3 Results of glass slide monitoring for deposited dust show acceptable levels of dust soiling at four of the five monitoring sites chosen. At a single site (Glebe South), exceedences of the 20 SU dust soiling threshold outlined in the Environment Agency's M9 technical guidance (EA, 2000) were measured during 5 weeks of the 13-week monitoring period. Examination of the location of this site and the exceedences in relation to wind characteristics suggest that the principal source of dust at this site is the Glebe site itself, which currently comprises open ground with bare earth, liable to dust generation on dry or windy days.
- 7.4 Results of the dust and PM₁₀ monitoring suggest that it is unlikely that the Glebe site is being adversely impacted upon by dust soiling and ambient concentrations of PM₁₀.
- 7.5 The assessment of odours has involved sniff testing, a consultation with local process operators, and analysis of local meteorological data and complaints records.
- 7.6 Sniff testing at 8 locations on and around the Glebe site identified the potential for odours from Nationwide Crash Repairs and Thompsons Metals, both located to the northeast of site. Odours were detected at moderate intensity, but only at relatively short-range (within 15 m). The sniff testing did not identify any odours affecting the Glebe site itself.
- 7.7 Analysis of meteorological data suggests that the majority of winds in the area originate from the south, south-west and west, whereas winds from the northeast and east, which have the potential to transport odours from Nationwide Crash Repairs and Thompson Metals towards the Glebe site, only occur for around 13% of the time. This substantially decreases the likelihood of odours from these processes impacting on the site.
- 7.8 Complaint records provided by North Lincolnshire Council identify three complaints lodged in recent years, two of which were lodged in 2010 regarding Thompsons Metals on Winterton Road. Overall, the relative lack of complaints (although additional complaints may have been made to the process operators directly or the Environment Agency) suggests that nuisance odour episodes from Thompsons Metals are both infrequent in occurrence and very localised in their impact. The



- complaints records do not provide strong evidence that nuisance odours may impact upon future residents at the Glebe, who will live over 180 m from Thompsons Metals site boundary.
- 7.9 Consultation with process operators provided limited data as many of the operators did not respond to requests for information. Those that did respond, including Nationwide Crash Repairs did not consider odours to be of concern with respect to their processes.
- 7.10 The assessment of odours has concluded that local industrial processes are unlikely to cause an odour nuisance impact at the Glebe site.
- 7.11 Overall, it is concluded that dust and odours do not provide a constraint to the development of the Glebe site for residential use.



8 References

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9 Glossary

BAM Beta Attenuation Monitor

AURN Automatic Urban and Rural Network

TEOM Tapered Element Oscillating Microbalance -

FDMS Filter Dynamics Measurement System



A1 Appendix 1 - Adjustment of Short-Term Data to Annual Mean

- A1.1 PM₁₀ monitoring at the Glebe site was established on the 3rd August 2010 and operated until the 17th November 2010. The data do not represent a full calendar year, therefore, in accordance with the guidance set out in Box 3.2 of LAQM.TG(09), the data have been adjusted to an annual mean, based on the ratio of concentrations during the short-term monitoring period to those over the 2009 calendar year at three local PM₁₀ monitoring sites operated by North Lincolnshire Council where long-term data are available.
- A1.2 The annual mean PM₁₀ concentrations and the period means for each of the three monitoring sites from which adjustment factors have been calculated are presented in Table A1.1, along with the Overall Factor.

Table A1.1: Adjustment of Short-term PM₁₀ Concentration at The Glebe to Annual Mean

Period Mean Concentration (μg/m³)	Scunthorpe Lincoln Gardens	Scunthorpe East Common Lane	Lincolnshire Appleby Village	Overall Factor
2009	20.9	24.1	21.4	-
3 rd Aug – 17 th Nov 2010	19.6	23.8	20.8	-
Adjustment Factor	1.06	1.01	1.03	1.04