The Old Sawmill, Sandsend, North Yorkshire Car Park Proposals

Preliminary Ecological Assessment Report

Report for The Mulgrave Estate

November 2020

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SUMMARY

Enviroscope were commissioned by Mulgrave Estates Ltd to prepare a Preliminary Ecological Appraisal Report (PEAR) at the Old Sawmill site, Sandsend, North Yorkshire.

A desk study, Extended Phase 1 Ecology Survey and Preliminary Ecological Appraisal were undertaken by Enviroscope.

The site is centred on an active timber yard and comprises riparian habitats of the lower reaches of East Beck watercourse, riparian woodland and scrub. An existing car park forms the entrance of the site off the main Sandsend to Whitby road.

The proposed development involves the resurfacing of the existing forestry track to reach the site of the proposed 150 space car park in the timber yard. The proposals include the creation of a new vehicle road bridge over East Beck to access the timber yard. A new informal pedestrian route is also proposed between the car park and East Row on the south side of the river.

Based on the desk study and field survey, potential for the following protected and priority species to be affected by the development has been assessed; with potential mitigation and the need for further survey work as follows:

- Otter – habitat protection measures and other mitigation measures required to maintain continued and undisturbed use of the beck by otters during construction. Pre-construction survey of habitat is recommended to re-assess otter status,
- Badger – pre-construction survey of habitat is recommended to re-assess badger status. Precautionary working method to be adopted during construction to avoid disturbance to badger,
- Bats – habitat protection measures and specific mitigation measures required to ensure continued use of site by foraging and commuting bats during construction, and measures also required to avoid post construction impacts on bats. A precautionary approach to the felling of riparian trees is required,
- Reptiles – Mitigation measures will be required to avoid harm to reptiles during construction; and measures to avoid post construction impacts are to include provision of new foraging and sheltering habitats,
- Breeding birds – habitat protection measures and mitigation measures for vegetation clearance is required; plus habitat replacement in the form of nesting boxes and replacement tree planting,
- Hedgehog – precautionary working methods to be adopted to minimise harm,

- European eel and sea/brown trout – pollution prevention guidelines to be implemented throughout construction,
- Great crested newt – no adverse impacts anticipated,
- Water vole – no adverse impacts anticipated.

Potential impacts of the proposed development on the above species / groups have been considered in this report, and recommendations for avoidance and mitigation measures are set out. Given the number of protected species at the site, it is recommended that a Construction Environment Management Plan (CEMP) is prepared which will provide full details of the measures to be implemented, and the programming of measures to avoid, minimise and mitigate the potential environmental effects of the works.

There are opportunities for biodiversity gain as part of this development, and proposals are outlined in this report for further consideration for inclusion as part of the project.

1. INTRODUCTION

1.1 Overview

Enviroscope were commissioned to prepare a Preliminary Ecological Appraisal Report (PEAR) of proposals to construct a 150-space car parking facility at the Old Sawmill site, Sandsend, North Yorkshire; together with associated vehicle and foot bridge construction and access route upgrading. The study relates to the boundary shown in Figure 1 and includes an overview of adjoining areas.

This report is based on an ecology survey and desk study undertaken in October 2020. The report identifies the likely ecological constraints associated with the project, potential impacts posed by the project, and avoidance and mitigation measures likely to be required. Proposals for biodiversity gain have also been outlined in this report, for consideration by the project team.

The PEAR and its recommendations are intended for the use of the Client and members of the project team in developing the proposal. It is also intended to support the planning application's submission to inform the Local Planning Authority's (LPA's) determination of the scheme. Refinement of the assessment of impacts, mitigation proposals and habitat enhancements may be required if the final scheme changes, or to address potential environmental impacts. Discussions with the LPA on specific ecological issues may be beneficial prior to submitting the planning application. We understand the client's expectation is that the report's recommendations for mitigation are attached to any planning consent as pre-commencement conditions, as set out under the National Planning Policy Framework (NPPF): Conserving and Enhancing the Natural Environment, 2012.

1.2 Scope of Study

The scope of works comprises:

- an ecological desk study of the site and immediate area,
- an Extended Phase 1 Habitat Survey of the site,
- a Preliminary Ecological Appraisal Report which brings together desk based and field-based knowledge of the site's ecological interest, management practices and any identified threats or constraints to site management or development.
- Advice on potential avoidance / mitigation measures, protected species licensing requirements and opportunities for biodiversity gain as part of the project.

The desk study, field work and report are to the standards set out in current good practice guidelines including *Handbook for Phase 1 Habitat Survey*[1] *and Guidelines for Preliminary Ecological Assessment Appraisal*[2]*.*

1.3 Personnel

The survey was carried out by Claire Leather. Claire is a fully qualified, experienced and practising field ecologist, Chartered Environmentalist (CEnv) and full professional member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). She holds Natural England protected species survey licences for great crested newt, barn owl and freshwater white-clawed crayfish, and is experienced in nature conservation and planning. She has the knowledge, skills and practical experience as set out in CIEEM Technical Guidance Series publication *Competence for Species Survey*[3] for surveys relevant to this project.

1.4 Limitations

The field survey provides an ecological baseline reflecting the flora and fauna observed at the time of the survey. Species may change through the seasons in terms of species presence, population size and distribution. Species which may be present at other times of the year may not have been observed during the survey. However, effort to predict the potential for species to occupy throughout the seasons has been made.

No specialist fauna surveys were undertaken. Specialist botanical survey, including National Vegetation Classification (NVC) surveys, were not commissioned.

The ecological survey undertaken constituted a Preliminary Ecological Appraisal to identify major habitats, key species and to identify potential for notable and protected species. The survey did not include an exhaustive survey and did not include detailed species surveys. However, recommendations for these have been made following the walkover survey, where they are considered of likely value to the future management of the site.

[1] *Handbook for Phase 1 Habitat Survey − A Technique for Environmental Audit*, Joint Nature Conservation Committee, 2010

[2] *Guidelines for Preliminary Ecological Assessment Appraisal, Second Edition* Chartered Institute of Ecology and Environmental Management, 2017

[3] *https://cieem.net/resource/competencies-for-species-survey-css/*

1.5 Principle Legislation & Policies

Nature conservation policies and legislation which may be relevant to the proposed site and development are listed as follows:

- Wildlife & Countryside Act 1981 (as amended)
- EC Habitats Directive (92/43/EEC)
- EC Birds Directive (79/409/EEC)
- Conservation of Habitats and Species Regulations 2017
- Countryside and Rights of Way Act 2000
- Protection of Badgers Act 1992
- UK Biodiversity Action Plan
- Natural Environmental and Rural Communities Act (NERC), 2006 − Biodiversity Duty
- Hedgerow Regulations 1997
- National Planning Policy Framework (NPPF)

2. SITE DESCRIPTION

2.1 Site Location & Overview

The site is the location of an active sawmill belonging to the Mulgrave Estate, and includes the vehicle access route to the former sawmill. The Old Sawmill site is located at OS grid reference NZ 858 123.

The site is located alongside East Beck which flows eastwards through riparian woodland and the hamlet of East Row before joining the sea at Sandsend.

The area covered by this report includes the red line boundary plan for the planning application as shown in Figure 1 below. As such it extends from the point where the A174 passes over East Beck on the sea front, runs alongside the left bank of East Beck before crossing over to the right bank of East Beck to the site of the Old Sawmill. The site includes two crossings of the beck on the line of proposed vehicle and pedestrian bridges.

The site lies within both Scarborough District Council (east section) and North York Moors National Park Authority (west section).

Fig 1: Plan showing the site boundary.

3. METHODOLOGIES

3.1 Desk Study

An ecological desk study was carried out to gather existing information on the site's habitat and species interest, together with the surrounding area.

The context of the site in the wider landscape was established through analysis of aerial photography accessed on Google Earth[4].

The desk study included a search for designated site information, both statutorily designated sites and non-statutorily designated sites. Information on the boundaries of these sites, and their distance and connectivity to the site, was also gathered. This information is important in determining whether these sites could be impacted by the proposed development.

Species records were also collated, including for protected and priority species on the site and in a search area around the site. This data is important in a. determining whether

[4] *Google Earth*, accessed 16 September 2020

these species may be present on the site, therefore triggering the need for further species surveys, and b. understanding the importance of the species population locally and the potential importance of the site to the species, and the potential for the proposals to impact the species.

Web-based sources of open access data were consulted to gain information about the site and surrounding area and included a search of the UK government's MAGIC database[5] in England and the National Biodiversity Network (NBN) Atlas[6].

Existing records for protected and priority species and information on non-statutory designated sites was obtained from the Local Environmental Records Centre (LERC)[7].

Where relevant to the site other data sources have been consulted to obtain specialist data.

The results of the desk study, together with findings of the Phase 1 Habitat Survey, have been interpreted in the context of the project under consideration, and have influenced the scope and recommendations for further species surveys and assessments.

3.2 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was carried out in October 2020. The survey assessed and classified the ecological features of the site using the standard Extended Phase 1 Habitat Survey (hereafter referred to as Phase 1) methodology[8].

Phase 1 Habitat Survey plans provides a rapid visual assessment of the extent and distribution of natural, semi-natural and artificial habitat types according to a standardised methodology. The Phase 1 Habitat Survey Plan maps the habitat types present and incorporates Target Notes which describe features of note.

A description of plant communities present and abundance of plant species was made, together with comment on habitat condition and management practices. Uncommon / rare plants should be recorded and mapped, and potential for such species should be noted and further survey recommended if appropriate.

[5] *magic.defra.gov.uk, accessed 6 October 2020*

[6] *data.nbn.org.uk, accessed 6 October 2020*

[7] *North East York Ecological Data Centre, received 1 October 2020*

[8] *Handbook for Phase 1 Habitat Survey – a technique for environmental audit*, Joint Nature Conservation Committee, 2010

The potential for the site to support protected species[9] or priority species[10] was assessed based on the known range of the species/species group and the suitability of habitats at the site. The likely importance of habitat features for such species was also assessed.

Signs of otter and water voles were searched for up and downstream within the site. A second visit to survey further for otters was undertaken once otter presence had been established in the initial survey. This second survey entailed searching for signs of otter 100m up and downstream of the site and, suitable habitats within 30m of the watercourses were also surveyed. The survey adopted current best practice survey guidelines[11].

This more extensive survey was undertaken to gain information on likely density and frequency of use by otter, and in particular to determine if any otter holts or resting places were present. The following signs were recorded and mapped:

- Spraints
- Footprints
- Feeding remains
- Slides
- Holts and resting places
- Commuting routes

A search was made for invasive non-native species (INNS) such as Japanese knotweed, and Himalayan balsam, and any stands of non-native invasive plant species were mapped[12].

[9] *Protected species protected under Wildlife and Countryside Act (as amended) 1981, Conservation of Habitats and Species Regulations 2010, the EC Directive on the Conservation of Wild Birds (79/409/EEC), and the Protection of Badgers Act 1992.*

[10] *Priority species identified as national priority for conservation under Section 41 NERC Act, 2006. , listed as priority for conservation in national or local Biodiversity Action Plan (UKBAP), Red Listed under International Union for the Conservation of Nature (IUCN) criteria (eg. Species of Conservation Concern Red List) or listed in a Red Data Book, listed as Near Threatened or Amber Listed, listed as Nationally Rare or Scarce in Species Status Project Review or Nationally Notable, endemic to country or geographic location*

[11] *Design Manual for Roads and Bridges,* Volume 10, Section 4, Nature Conservation Advice in Relation to Otters, Highways Agency, 1999

[12] INNS are defined as species included in Schedule 9 of the Wildlife & Countryside Act (19811) as amended.

Trees were assessed for their potential to support roosting bats based on a visual survey. Features of roosting value were looked for, such as:

- Holes and cavities
- Cracks, splits and bark flakes
- Epicormic growth
- Dense ivy

Any evidence of bat presence was also noted, eg. Dropping, scratch marks, staining on bark. Trees potential to support roosting bats was categorised using best practice guidelines[13] and trees with low – high potential were noted.

The survey did not involve detailed assessment of crevices or cracks or bat activity surveys, to determine presence.

A Habitat Suitability Index assessment[14] of the millpond north of the site was attempted using the scoring system devised by Lee Brady and used as standard for the purpose[15]. This was to assess the potential of the ponds to support great crested newts (GCN). Whilst this assessment cannot determine whether GCN are present or not, it can assess the potential for the species to be present based on a range of factors.

The site was assessed for its potential to support reptiles, with reference to current best practice guidelines[16].

Other incidental sightings of protected or priority species, or field signs indicating their presence, were recorded as part of the survey.

3.3 Preliminary Ecological Assessment

Based on the information gathered through the desk study and Extended Phase 1 Survey a preliminary ecological assessment was conducted. This comments on:

- the likely importance of the habitats present, determining whether protected or notable habitats are present,

[13] *Bat Surveys for Professional Ecologists: Good Practice Guidelines,* Bat Conservation Trust (3rd Edition), 2016.

[14] *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus),* Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Herpetological Journal 10(4), 143-155.

[15] *GCN HIS*, Amphibian and Reptile Club UK Advice Note 5, May 2010

[16] Gent. T & Gibson S (eds), *Herpetofauna Workers' Manual*, revised 2003, JNCC

- the known or likely presence of protected or priority species, which could be affected by the project,
- identified ecological constraints[17] to the project proposals, and likely significant effects,
- set out requirements for detailed species and habitat survey, including timing constraints and survey objective,
- outline possible avoidance measures through careful scheme design,
- outline requirements for possible mitigation measures and protected species licensing,
- outline opportunities for biodiversity gain as part of the project.

All comments above are made within the constraints of the desk study and survey carried out to date.

4. DESK STUDY RESULTS

4.1 Contextual Information

This is a linear site tucked away in the wooded East Row Beck and located within metres of Sandsend beach at its eastern end. East Row Beck and its riparian features are central to the site, bounded predominantly by woodland, the active sawmill and the hamlet of East Row to the south. The site is connected to the wider landscape through the riparian system and surrounding woodland.

[17] Here constraints are defined as an ecological feature which may ultimately represent a constraint to the design / layout of the project

4.2 Designated Sites

The site itself, or any site within a 2km radius of the site, is not designated as a statutory site for nature conservation at a national or international level.

The western part of the site falls within the North York Moors National Park. The aims and purposes of National Parks are set out in law by the National Parks and Access to the Countryside Act, 1949 and The Environment Act, 1995[18].

Part of the eastern extent of the site falls within Local Wildlife Site *NZ 81-04 East Row Beck and Woodlands*; and is therefore designated as a non-statutory site for nature conservation.

There are three other Local Wildlife Sites within the vicinity of the site, but none of these are connected to the site. These are:

- NZ81-05 Raithwaite Gill/Dunsley Beck (grid reference NZ 868120)
- NZ81-01 Upgang Beck to Sandsend Cliff (grid reference NZ 868121)
- NZ81-03 Sandsend, Hardcliff (grid reference NZ 859130)

4.3 Habitat Designations

Natural England's Ancient Woodland Inventory shows identifies the woodland north of the track to the Sawmill as Ancient Semi Natural Woodland (ASNW) and woodland to the south of East Beck as Planted on Ancient Woodland Sites (PAWS) woodland.

The woodland bordering East Beck and within the site is not identified as ASNW or PAWS. It is identified as Deciduous Woodland on Natural England's Priority Habitat Inventory.

It is noted on the OS Landranger 1:50000 scale map that there is a pond (apparently a mill pond on a mill race) in the woods north of East Beck.

[18] The Environment Act sets out two statutory purposes for National Parks: 1. Conserve and enhance the natural beauty, wildlife, and cultural heritage and 2. Promote opportunities for understanding and enjoyment of the species qualities of national parks to the public. There is a further duty to seek to foster the economic and social wellbeing of local communities within the parks.

4.4 Natural Character Areas

Natural Character Areas (NCAs)[19] describe England in terms of a combination of features -landscape, biodiversity, geodiversity, cultural and economic activity. The profiles provide guidance for a more sustainable future, describing ecosystem services in each Character Area and opportunities for positive environmental improvements.

The Old Sawmill site is located within NCA 25: North York Moors and Cleveland Hills. In summary the Character Area is an upland area of sandstone geology, incised by valleys, many of which are enclosed, narrow and wooded and contrast with the large moorland plateau.

The NCA describes opportunities to strengthen the networks of semi-natural habitats, particularly wetlands, native woodland and species-rich grassland.

Statements of Environmental Opportunities (SEO) relevant to the site are summarised:

- Conserve, enhance and promote special qualities of the coast. Manage the development and recreational needs of coastal settlements,
- Protect and improve access to and quiet enjoyment of the countryside,
- Positively manage woodlands, trees for their contribution to the landscapes of the area, the priority habitats and species they support.

4.5 Protected & Priority Species Records

The desk study revealed flora and fauna records, with protected and priority species records pertinent to the site summarised below. It should be noted that absence of records does not indicate absence of a species on the ground. The lack of records may be down to lack of recording and / or reporting effort.

The records below are of protected and priority species recorded since year 2000, and recorded on the site itself, or considered to have the potential to occur on the site.

[19] *Natural Area Profile*, English Nature, 1997

Species	Date of Record	Location	Distance from site centroid	Species Status
Common toad	2005	Sandsend	Unknown (4-fig grid ref)	England_NERC_S.41; WACA-Sch5_sect9.5a
Common frog	2005	Sandsend	Unknown (4-fig grid ref)	Scar_LBAP; WACA-Sch5_sect9.5a
Palmate newt	2005	Sandsend	Unknown (4-fig grid ref)	As above
Smooth newt	2005	Sandsend	Unknown (4-fig grid ref)	HabDir-A5; WACA-Sch5_sect9.5a
Tawny owl	2016	Rathwaite	1km SE	Bern-A2; Bird-Amber; Bird_RedList_GB_post2001-NT_Breeding; ECCITES-A
Barn owl	2016	Rathwaite	1km SE	Scar_LBAP; Bern-A2; ECCITES-A; WACA-Sch1_part1
European eel	2000	Sandsend Sawmill	On site	Priority species under NERC Section 41, IUCN (2001) Endangered
Brown/ sea trout	2000	Sandsend Sawmill	On site	Priority species under NERC Section 41,
Good King Henry	2008	South of East Beck nr. Sawmill	On site	IUCN (2001) - Vulnerable[20]
Bluebell	2004	East Row Beck and Woodlands - Sandsend	On site	WACA-Sch8
Wood sorrel	2004	East Row Beck and Woodlands	On site	RedList_ENG_post2001-NT

[20] A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future.

Species	Date of Record	Location	Distance from site centroid	Species Status
Sanicle	2004	East Row Beck and Woodlands	On site	As above
Slow worm	2020	Sawmill, Sandsend	On site	Scar_LBAP; England_NERC_S.41; WACA-Sch5_sect9.1; WACA-Sch5_sect9.5a
Common lizard	2005	Sandsend	Unknown	As above
Water vole	1999	Sandsend Bridge	NZ861128	Scar_LBAP; England_NERC_S.41; RedList_GB_post2001-EN; WACA-Sch5_sect9.4a; WACA-Sch5_sect9.4b
Serotine bat	2016	Rathwaite Hall	1km SE	Bern-A2; CMS_A2; HabDir-A4; HabReg-Sch2; RedList_GB_post2001-VU; WACA-Sch5_sect9.4b; WACA-Sch5_sect9.5a
Daubenton's bat	2016	Rathwaite Hall	1km SE	As above
Noctule bat	2016	Rathwaite Hall	1km SE	As above
Common pipistrelle bat	2016	Rathwaite Hall	1km SE	As above
Brown long-eared bat	2016	Rathwaite Hall	1km SE	As above
Hedgehog	2005	Rathwaite Hall	1km SE	England_NERC_S.41; RedList_GB_post2001-VU

There are a number of badger setts known to be present in the vicinity of the site, but not within 100m of the site itself (pers. com. Mulgrave Estate, October 2020).

Canadian goldenrod, Japanese knotweed and Himalayan balsam – all invasive non-native species - are recorded in the data search area.

5. ECOLOGY SURVEY RESULTS

5.1 Extended Phase 1 Habitat Survey

Throughout this section, refer to Appendix A for the Extended Phase One Habitat Plan.

The following habitat types were recorded within the site boundary.

Phase 1 Habitat Type	Phase 1 Code
Woodland – semi-natural woodland	A1.1.1
Scrub - dense	A2.1
Grassland - amenity	B1
Cultivated / disturbed land - ephemeral / short perennial	J1.3
Tall Herb and fern - bracken	C1.1
Tall Herb and fern - tall ruderal	C3.1
Running water	G2
Buildings	J3.6
Bare ground	J4

Woodland & Trees

The riparian woodland is an extension of a larger area of similar woodland growing on the steep bank to the north of East Beck and the track. The riparian woodland is also highly connected to an extensive area of woodland within the East Beck valley to the west.

The riparian woodland comprises established broad-leaved semi-natural woodland dominated by alder, with occasional sycamore. Some of the alders have a dense ivy cover. The understorey is of elder and younger alder and sycamore regeneration. Ground flora comprises dog's mercury, male fern, red campion, ivy, herb Robert, wood avens, ground ivy, false wood brome and alexanders. In spring the woodlands support dense vernal growth including bluebell and wild garlic, neither being visible at the time of the survey.

Linked to the linear riparian woodland is an area of more extensive woodland to the north. This comprises established sycamore with occasional ash growing on steep ground; and

includes a row of beech trees planted along the south edge of the wood alongside the track. The woodland has a scattered understorey comprised mainly of sycamore regeneration. Within drier areas ground flora is dominated by ivy and dog's mercury, with wood avens, hairy violet, common dog violet and false wood brome also being present. Wetter areas of the woodland, associated with a former mill leat and pond, are dominated by dense pendulous sedge with male fern, hartstongue fern and greater wood rush on the bank of the leat.

A row of early mature sycamore and alder are growing alongside the amenity grassland, above the river in the car park.

Scrub

There is a deep and steep bank of blackthorn dominated scrub on the south side of the timber yard. Other woody species include hawthorn, hazel, elder, wych elm, with occasional sycamore and dog rose. This scrub has been coppiced in the last 3 – 5 years, possibly due to the presence of High-Voltage Wires over this boundary. The scrub is well connected to an area of offsite scattered scrub, rank grassland and tall bracken to the south and woodland beyond.

Within this bank of scrub there are a number of large and long left logs which are being engulfed by bramble scrub and cleavers; several support deadwood fungi and mosses.

Within tall herb areas along the right-hand bank of the river bank, there are scattered patches of goat willow, elder, hawthorn and sycamore scrub.

Grassland

Grassland at the site is limited to amenity grassland alongside the carpark at the entrance to the site. This comprises a tightly mown sward with low species interest.

Tall Herb & Fern

There are several areas of bracken on the southern boundary and associated with the steep bank of scrub. The bracken adjoins the tributary flowing into East Beck from the designated SINC woodland to the south, providing continuous habitat between the river and adjoining habitats.

On the right-hand bank of the river east of the jet workshops is an area of tall herb comprising butterbur, cow parsley, hogweed, nettle, rosebay willowherb and rank grasses. This combines with scattered scrub of goat willow, elder, hawthorn sycamore and bramble.

On the edge of the sawmill yard this vegetation is characterised by rosebay willowherb and cow parsley, with ranker areas supporting common bent, tufted hairgrass, yarrow, nettle, hogweed, burdock, knapweed, valerian and creeping thistle.

Disturbed Land & Ephemeral & Short Perennial Vegetation

The sawmill is a large area of hardstanding, with a mosaic of ephemeral and short perennial vegetation comprising short and patchy growth of broadleaved plantain, creeping buttercup, coltsfoot and ragwort. This merges into tall herb habitats described above.

There are occasional areas of concrete rubble, with field wood rush, herb Robert and creeping cinquefoil.

The southern and northern edges of the yard supports a number of temporary timber stacks, which are continually created and moved as part of the timber processing work and sales underway at the sawmill.

Running Water

The river channel is 8-10m wide, with water depth being 0.2–0.5m at the time of survey, with occasional deep pools of >1m depth. The riverbed is comprised of a coarse gravel and cobble base, with some areas of bare fine gravel and berms; creating riffles and runs in the water. Boulders are frequent along the river.

Bank height is typically 0.7-2m high, with bedrock in evidence in places, and liverwort growth is dense. In some sections, the earth banks are eroding.

Channel vegetation is absent, with the exception of an occasional clump of yellow flag iris and soft rush at the eastern end of the river. Tall grass and herbs are growing on the banks with woodland character and comprising frequent pendulous sedge, giant bellflower, herb Robert, woundwort, bugle, angelica, tufted hairgrass, dog's mercury, hart's tongue fern, butterbur male fern, ivy and bramble.

Riparian trees of early mature alder and sycamore are frequent and exposed tree roots common at the water's edge. The bankside vegetation is quite sparse, with little dense scrub.

In the section of watercourse alongside the carpark, the riverbank is protected by stone walling. This is tall in places and prevents access or egress from the water in these sections.

Buildings

The traditional buildings used as workshops alongside the right-hand bank of the river are brick built with corrugated iron roofs; and are overhung by ivy on some aspects. These have not been subject to a preliminary bat roost assessment, as the buildings are not within the proposals. However, the buildings are considered likely to have moderate to high potential to support roosting bats, given their nature and location. If works are proposed to these buildings, then a preliminary bat roost assessment would be required. The buildings are in occupation and the roof spaces appear to be well sealed, with no access points for barn owl.

The two modern and open barns in the sawmill yard are considered to have negligible potential to support roosting bats. The buildings are open draughty and lack crevices and roosting spaces. No further surveys of these buildings for bats is considered necessary. The buildings are also not considered suitable for barn owls, and no evidence of the species was noted. The buildings are in constant use, and large and noisy sawmill machinery creates a highly disturbed environment, which is not optimal for barn owl occupation.

5.2 Faunal Observations

Mammals

Although no signs were noted during the site visit, it is likely that the site is used by a range of common and widespread mammals including small mammals, stoats, weasels and hedgehogs.

Bats - None of the trees at the site were noted to have cavities or cracks which have potential to support roosting bats. Some of the riparian trees have a cover of ivy which can provide roosting opportunities for bats, although the potential is considered low. Although deadwood is present in some of the trees, no potential roosting features were noted in the small timber.

The buildings associated with the site have been discussed in relation to bats in Section 5.1 above.

Reptiles

The site is considered to offer high quality reptile habitat in the form of sheltering habitats (log piles, boulders and rubble around the perimeter of the sawmill car park) and foraging habitats (tall herb and scrub). There is a reasonable extent of bare ground habitat and exposed rubble and boulder material which, in combination with the general mosaic of natural habitats at the site, provides suitable basking habitats for reptiles.

No reptiles were noted during random searches, but slow worms are reported to be present at the site (Mulgrave Estate pers.com.).

Great Crested Newt

The mill pond shown on the OS map was found to be infilled. A Habitat Suitability Assessment was therefore not carried out.

Breeding Birds

Birds recorded during the site visit included blackbird, chaffinch, great tit, blue tit, robin, wren, carrion crow, , long-tailed tit, herring gull and house sparrow. A dipper was recorded on the stream.

Mallard were noted to be gathering in number at the eastern extent of the river, where it flows into the sea.

The buildings associated with the site have been discussed in relation to barn owls in Section 5.1 above.

Fish

As part of river survey work, no fish were incidentally noted or caught during sampling.

Invasive Non-Native Species

No invasive non-native species were recorded at the site.

6. EVALUATION & RECOMMENDATIONS

6.1 Introduction

This section comprises an evaluation of the desk study and field survey; provides recommendations for next steps based on potential impacts arising from the proposed development works.

Given the quality of habitats present, and the number of protected and notable species recorded, a Construction Environment Management Plan (CEMP) should be prepared for this project. This will set out how construction activities will be controlled and programmed to avoid, minimise and mitigate the potential environmental effects of the works. The CEMP should detail the construction approach and mitigation details and any protected species licensing; including method statements.

A Habitat Management Plan (HMP) is also proposed which will set out how retained and created habitats at the site will be managed over a five year period post construction. This would detail appropriate mowing regimes for retained and created grassland, rotational management of scrub and tall herb habitats, and after care of newly planted trees. The

HMP recommendations will reflect the specific habitat requirements of the protected species known to be present at the site.

6.2 Designated Sites

The western section of the site falls with the North York Moors National Park and the Park Authority are to be consulted on proposals at the planning stage. The site does not have any other statutory nature conservation designations, and none lie within the vicinity of the site.

No impacts on statutory sites for nature conservation are considered likely.

Part of the site is within the Local Wildlife *Site - East Row Beck and Woodlands*. Non statutory sites for nature conservation are a material consideration in planning application process and all local authorities have a legal duty to conserve biodiversity under the Natural Environment and Rural Communities Act (2006).

Without mitigation, there is potential for the LWS, and the features it is designated for, to be negatively impacted by the proposed development. Mitigation measures to minimise habitat loss and disturbance, and to ensure proportionate habitat replacement are proposed to avoid negative impacts on the LWS, and these are integrated into the habitat and species-specific mitigation proposals below.

6.3 Habitats

Broad habitat impacts are discussed below, with species-specific issues included in Section 6.4 below.

Trees

There is potential for loss of a small number of trees along the river edge, to accommodate the construction of the vehicle bridge over East Beck.

This will be mitigated by:

- trees removed will be replaced on a two to one basis. Where possible, trees felled will be allowed to regrow from the cut stem,
- minimum of six bird nesting boxes - Schwegler Nest Box 1B – entrance hole 32mm and 26mm - to be placed in a north to south elevation, or southerly facing if shaded, at a height of 3-4m. Manufacturer's guidelines for erection of the boxes to be followed,

- minimum of three bat roosting boxes - 2FN Schwegler Bat Boxes - to be installed on nearby riparian trees. The boxes to be installed in line with manufacturer's instructions, avoiding north facing elevations and 3-5m above ground level.

Details of tree species, planting and after care, and a specification for habitat boxes and their erection and maintenance, should be included in the CEMP.

Watercourse

The bridge construction works have potential to damage riverbank and riverbed habitats in the location where the bridge crossing is proposed, and post construction impacts on habitats are possible if unmitigated.

This will be mitigated by:

- minimising the footprint of the works by creating a construction stage Environmental Protection Zone within which construction cannot impinge. This should be defined in the CEMP; and be delineated by temporary fencing for the duration of construction,
- adoption of Environment Agency's Pollution Prevention Guidelines,
- avoiding in-channel works by working from either side of the bank,
- designing the new bridge to allow the natural riverbank and riverbed to be retained,
- avoiding the culverting of the watercourse,
- incorporating bio-engineering techniques in to bank engineering where possible, or gabions or boulders in preference to hard concrete,
- providing space for otters to pass under the bridge at times of high flow, by retention of natural riverbank or provision of ledges,
- pre-construction checks for badger, otter and nesting birds.

Scrub, Tall Herb & Ephemeral Vegetation

Removal of areas of scrub, tall herb and ephemeral vegetation are proposed accommodate car parking spaces and to construct a proposed pedestrian route on the right hand bank of the river.

This will be mitigated by:

- minimising vegetation removal,
- replacing any trees removed on a two to one basis,
- adoption of post construction management of habitats as set out in HMP,
- pre-construction checks for badger, otter and nesting bird.

Buildings

The traditional buildings alongside the river are not proposed for removal or any works as part of the development. Therefore, as long the mitigation relating to artificial lighting and bats set out in Section 6.4 is implemented, no impacts are considered likely. Nesting birds are also not considered at risk, as no works are proposed in the immediate vicinity of the buildings.

The modern barns which house the sawmill's machinery are not proposed for removal or any works as part of the development. They are not considered suitable for roosting bats, or nesting barn owls, and no further checks are required in this regard.

The legal protection of bats and nesting birds is detailed in Section 6.4 below. Barn owls are Schedule 1 species under the Wildlife & Countryside Act 1981 (as amended), and as such it is an offence to intentionally and recklessly disturb barn owls at an active site with eggs or young or before eggs are laid, or to disturb the dependent young.

6.4 Protected & Notable Species

Breeding Birds

The site's watercourse, woodland, scrub and tall herb habitats have the potential to support nesting birds, and a range of birds have been recorded at the site including some UK and district BAP Priority species, including house sparrow and wren.

All wild bird species, their eggs and nests are protected by law[21]. To avoid impacts of construction on breeding birds any tree and vegetation removal should take place outside of the birds nesting season (February – August inclusive). Where this is not possible an Ecologist should be brought to site to carry out a nesting bird check prior to any tree or scrub removal. Works over the watercourse should be preceded by a check for nesting birds.

Section 6.2 should be referenced with regards to impact and mitigation relating to breeding birds in buildings.

Mitigation of habitat loss has been discussed in Section 6.3 above.

[21] *Wildlife and Countryside Act 1981 (as amended)*

Adoption of avoidance and mitigation measures will ensure no short or long term impacts occur as a result of the works. Mitigation standards and approaches should be detailed in the CEMP.

Bats

The site and surroundings offer high quality habitat for bats. The works will not entail the destruction of any known bat roosts. However riparian trees with ivy cover are considered to have low potential to support roosting bats and a precautionary approach to tree felling is proposed because of this.

This precautionary approach will entail carrying out the tree works in September/October if possible, to avoid the seasons when bats are most vulnerable to disturbance. A soft felling technique will be employed, where tree limbs are cut and left grounded over night to allow any bats to make their way out[22]. Any sections of the tree identified as having low bat roost potential will be lowered particularly carefully to ground level using ropes. Each section will be laid on the ground with holes and cracks facing upward for as long as possible to give any bats a chance to vacate the tree. Cutting through ivy growth will be avoided.

Habitats surrounding the site will be unchanged by the development and limited loss of vegetation on site will be mitigated as set out in Section 6.3 above. Therefore, post construction impacts on the local bat population are not anticipated due to habitat loss.

However, without mitigation there is potential for impacts on the behaviour of commuting and foraging bats both during and post construction, as result of the introduction of artificial lighting.

This will be mitigated by:

- preparation of a lighting plan which incorporates minimal exterior lighting, with low level and low Lux lighting, carefully designed[23] to prevent unnecessary light spill into the woodland and landscaped areas,
- during construction no artificial lighting will be employed in the vicinity of the watercourse and no night working will take place.

[22] Bats and Trees, Bat Conservation Trust, updated Jan 2018

[23] *Bats and Lighting in the UK,* Bat Conservation Trust & Institute of Lighting Engineers, 2008

It is important to take into consideration potential impacts on bats as bats are protected by European and UK legislation[24]. Combined, these laws make it an offence to kill, injure, capture or disturb bats or obstruct access to, damage or destroy bat roosts. Adoption of avoidance and mitigation measures will ensure no short term or long term impacts occur as a result of the works.

Section 6.2 should be referenced with regards to potential for impacts on roosting bats in buildings.

Adoption of avoidance and mitigation measures will ensure no short or long term impacts occur as a result of the works. Mitigation standards and approaches should be detailed in the CEMP; and be in line with current good practice guidelines for bats.

Great Crested Newts

No impacts on GCN are anticipated. There is no waterbody on site suitable for breeding, and whilst terrestrial habitats are high quality the nearest record of GCN to the site is 10km south.

Reptiles

The site offers high quality habitat for reptile foraging and sheltering. The site is not isolated, being well connected to similar high-quality habitats in the landscape.

Slow worms are known to be present at the site. Slow Worms are known to occur at the site and are recorded along this section of the coastal slopes[25].

As species protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended), it is an offence to intentionally kill or injure any native reptile. This means that works such as land clearance, vegetation removal, removal of wood and rubble and other construction activities have the potential to result in killing or injury. Avoidance and mitigation measures are therefore required as part of this development to avoid contravention of the legislation.

The proposed development will not result in fragmentation of the site from other suitable reptile habitats and so the population, with appropriate mitigation, is unlikely to be

[24] *Schedule 2 of the Conservation of Habitats and Species Regulations 2010* and under *Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)*

[25] *www.scarborough.gov.uk/biodiversity-action-plan*

impacted in the long term. However, there is potential for limited temporary habitat loss resulting from relocation of timber stacks, and removal of vegetation.

The timber stacks are temporary and are subject to regular building up and taking down as timber is processed, and so disturbance to the habitat and slow worms using it is already taking place. However, there is potential for harm to slow worms resulting from clearance and construction operations associated with the development, and reasonable precautions are therefore required to avoid harm. Retention of the population on and adjoining the site is the preferred strategy, thereby avoiding translocation of the population. This is a workable approach at this site given the extent of adjoining habitats and land ownership and management considerations.

In broad terms impacts will be mitigated by:

- minimising loss of reptile habitats through considered positioning of the car parking,
- adopting a sensitive approach to site clearance and construction to avoid harm,
- providing and safeguarding sufficient quality, quantity and connectivity of habitats to accommodate the slow worm population in the long term,
- provision of permanent and undisturbed sheltering habitats in the form of relocated timber stacks,
- Adoption of a long-term management regime of foraging habitats (tall herb and scrub) sensitive to reptile requirements. This is to be specified in the HMP, guiding management over a five-year period post construction.

It is proposed that the CEMP incorporates the details of the avoidance and mitigation measures, set out in a method statement. This describes how site clearance works and construction will proceed in relation to slow worms, detailing the:

- early creation of new timber stacks immediately beyond but connected to the development site, and surrounded by tall herb and grassland habitats,
- timing and phasing of the vegetation clearance works – this is to set out the early cutting back of tall herb and grassland habitats (<50mm height) in order to encourage dispersal into more favourable retained habitats, immediate removal of arisings,
- timing and phasing of timber stack and relocation/removal – this is to set out the gradual and careful deconstruction of the timber stacks to avoid harm to slow worms. This will be carried out under a watching brief, with an Ecologist present

throughout the works, to advise and rescue any slow worms found during the works,

- relocation of rubble – where this cannot be retained in situ it is to be relocated to the closest possible location,
- minimise the footprint of the works by creating a construction stage Environmental Protection Zone within which construction cannot impinge. This should be delineated by temporary fencing for the duration of construction. No heavy machinery should enter this zone,
- retention of existing deadwood and logs in locations where possible.

The Landscaping Plan for the development will set out any landscaping required to ensure that retained and new habitat will be linked.

The HMP will set out a programme for the management of retained and created habitats over a five-year period post construction.

[26] *Fifth Otter Survey of England 2009- 2010,* Environment Agency, 2011

[27] *Bats and Lighting in the UK,* Bat Conservation Trust & Institute of Lighting Engineers, 2008

Water voles

No impacts on water voles are anticipated. No evidence of the species was found, and the species has not been noted in the area for some years.

[28] *The Wildlife & Countryside Act 1981 (as amended)*

[29] *Conservation of Habitats and Species Regulation 2017 (as amended)*

[30] Nature Conservation Advice in Relation to Otters, Volume 10, Section 4, Design Manual for Roads and Bridges, February 2001, Highways Agency

Fish

East Beck is known to support European eel and brown/sea trout, both of which are Priority Species, with the former being an endangered species.

The proposed bridge construction, and resurfacing works to the road and car park have the potential to result in sediment run-off into the watercourse. This may reduce water clarity, raise silt levels and result in short term water pollution, which has the potential to make conditions difficult for aquatic life, including fish. These short-term impacts can be avoided through adoption of The Environment Agency's Pollution Prevention Guidelines (PPGs) during construction. Although these guidelines have been withdrawn, they are still considered best practice in the industry.

A working zone should be established beyond which vehicles, equipment, storage and Contractors cannot enter. Sediment fencing and accident procedures should be in place throughout construction. These measures will safeguard against indirect impacts such as pollution, run-off and dust deposition on habitats.

Retention of the existing depth of natural vegetation between East Beck and the road / car park will provide a buffer and protect against erosion of sediment from the hard surfacing into the watercourse.

In river structures such as culverts, weirs and other barriers may cause problems for migratory fish species, and it is advised that these are not installed as part of the bridge works.

The natural riverbed should be retained and protected against disturbance and damage by avoiding in-channel working. Heavy plant should be restricted to the banks of the river.

Adoption of avoidance and mitigation measures will ensure no short or long term impacts occur as a result of the works. Mitigation standards and approaches should be detailed in the CEMP; and be in line with current good practice guidelines.

Hedgehogs

Hedgehog are a priority species and likely to be present in the vicinity, and may forage, breed and hibernate within the habitats found at the site.

Care should be taken when clearing vegetation such as long grass, scrub; and also brash and logs. A thorough check should be made for hedgehogs, and if found, they should be placed within appropriate habitats.

Fires should be avoided, unless they are checked first to determine presence / absence of hedgehogs.

Hedgehog are only partially protected under the Wildlife & Countryside Act 1981 (as amended), however numbers of the species have declines dramatically over the last twenty years, and the species is being considered for a higher level of protection in law.

7. BIODIVERSITY GAIN

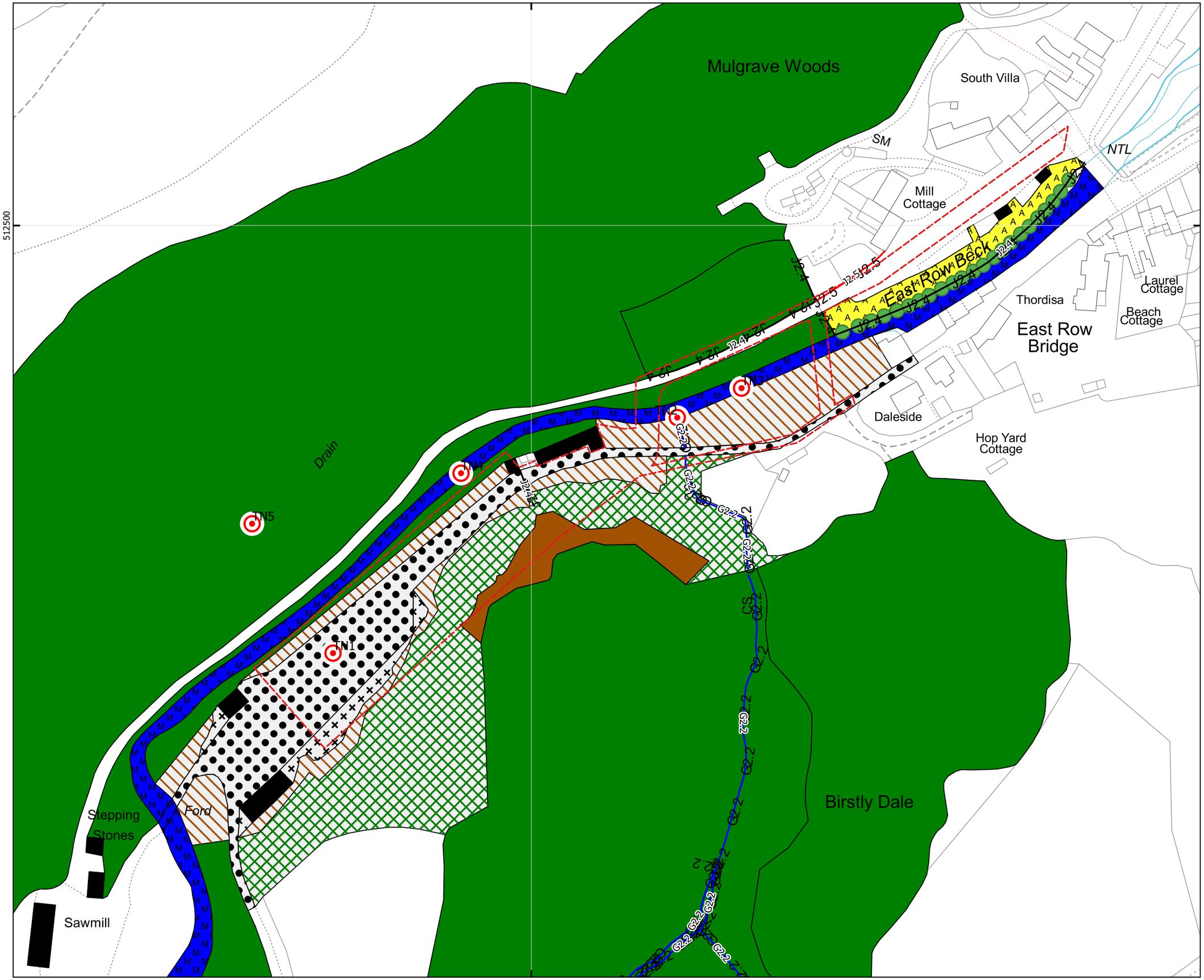
Drawing on the site's current ecological interest and potential the following nature conservation enhancements are proposed.

To demonstrate commitment to the environmental enhancement works, it is good practice to prepare a Habitat Management Plan (HMP); or to commit to its production and implementation.

A HMP sets out how any new habitats are to be created and maintained, and how existing habitats will be managed and enhanced. The HMP would include:

- programme for management of tall herb and scrub habitats,
- programme for management of new tree planting,
- programme for creation of additional reptile sheltering and foraging habitats, with a programme for ongoing management,
- additional bird and bat boxes.

APPENDIX A – PHASE ONE ECOLOGY PLAN



Legend

- Target Notes (see table)
- A1.1.1 - Broadleaved woodland semi-natural
- A2.1 - Scrub - dense/continuous
- A3.1 - Broadleaved scattered trees
- C1.1 - Bracken - continuous
- C3.1 - Tall herb & fern - ruderal
- G2.2 - Running water - mesotrophic
- J1.2 - Amenity grassland
- J1.3 - Cultivated/disturbed land - ephemeral/short perennial
- J2.4 - Fence
- J2.5 - Wall
- J3.6 - Buildings
- J4 - Bare ground
- Site Boundary

Target Notes

Number	Notes
TN1	Timber stacks
TN2	Otter spraint
TN3	Otter spraint
TN4	Otter spraint
TN5	Dry mill leat & pond

Enviroscope consulting

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Client: Mulgrave Estae
Map: The Old Sawmill, Sandsend
Car Park Proposals - Extended
Phase 1 Habitat Survey Plan

Sheet: 1

Scale: 1:1,000 @A3
Map No.: 711/01

Date: 06/11/2020
Map Status: Issue

The Old Sawmill, Sandsend, North Yorkshire Car Park Proposals

Tree Survey Report

Report for The Mulgrave Estate

November 2020

Enviroscope Consulting Ltd
York Science Park, Innovation Centre, Innovation Way, York, YO10 5DG

Arboriculture | Ecology | Forestry

Document Control

Project:	The Old Sawmill, Sandsend - Car Park Proposals	
Client:	The Mulgrave Estate	
Project Number:	711	
Document:	Tree Survey Report	
Document Review		
Prepared By:	Guy Morrison	
Reviewed By:	Claire Leather	
Date:	10 November 2020	
Issue Number:	V1	
Status:	Issue	

CONTENTS

1. INTRODUCTION

1.1 Scope & Brief

Enviroscope were commissioned to carry out a tree survey in relation to a proposed 150 space car parking facility at the Old Sawmill site, Sandsend, North Yorkshire.

This report is based on a tree survey carried out in accordance with BS5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'[1]. Recommendations in this Arboricultural Report are in full compliance with BS5837.

Enviroscope were commissioned to assess the impact of the proposal on the trees. An Arboricultural Impact Assessment will be carried following finalisation of the development layout.

1.2 Surveyor & Report Author

Guy Morrison, Principal Arboriculturist and Director of Enviroscope Consulting Ltd, carried out the tree survey and prepared this report. He is a Chartered Forester and Registered Consultant with the Institute of Chartered Foresters. He is also a professional member of the Arboricultural Association and hold the Royal Forestry Society Professional Diploma in Arboriculture.

1.3 Report Limitations

Trees were inspected in accordance with BS5837 in relation to proposed development of the site. A detailed tree risk assessment was not made and any observations on structural integrity are incidental only.

Trees were assessed visually from ground level. No climbed inspection, detailed investigation of decay or sub-soil investigations were made. These may be recommended in the report where required.

Tree condition can change significantly over a relatively short period of time, and therefore the results and recommendations of this survey can only be held to be valid for a period of 18 months following the survey date. The trees should be re-inspected at this time by a competent person.

[1] *BS5837:2012. Trees in Relation to Design, Demolition and Construction – Recommendations*, British Standards Institute, 2012

2. SITE DESCRIPTION

2.1 Site Location & Description

The site is the location of a sawmill belonging to the Mulgrave Estate, and includes the vehicle access route to the sawmill. The Old Sawmill site is located at OS grid reference NZ 858 123.

The site is located alongside East Beck which flows eastwards through woodland and the hamlet of East Row before joining the sea at Sandsend.

The area covered by this report comprises the red line boundary plan for the planning application as shown in Figure 1 below. As such it extends from the point where the A174 passes over East Beck on the sea front, runs alongside the north bank of East Beck before crossing over the beck to the Old Sawmill site. The site includes proposed vehicle and pedestrians crossings of the beck.

Fig 1: Plan showing the site boundary.

The site lies within both Scarborough District Council (east section) and North York Moors National Park Authority (west section).

2.2 Geology & Soils

The British Geological Survey 'Geology of Britain' map[2] shows that the site is underlain by sedimentary rock of the Whitby Mudstone Formation. Superficial deposits of till are recorded.

The Cranfield Soil and Agrifood Institute Soilscapes map[3] describe soils in the area as free-draining, slightly acid, loamy soils.

2.3 Statutory Protection & Designation

Tree Preservation Order & Conservation Area

None of the trees at the site are protected by Tree Preservation Order (TPO)[4]:

The east section of the site which lies with Scarborough District Council's jurisdiction is within the Sandsend Conservation Area. Within Conservation Areas there is a requirement to serve the LPA with six weeks' notice of the intention to carry out the felling or pruning of trees (with a stem diameter exceeding 7.5cm at 1.5m height), subject to various exemptions. The LPA may place a TPO on the tree during this period.

It is an offence to fell, prune, kill or damage a tree protected by TPO or Conservation Area without consent unless exemptions apply. There is an exemption from the requirement to obtain consent where the work is required to implement a scheme that has received full planning permission.

Felling Licences

Tree felling on non-residential land is controlled by the need to obtain a Felling Licence from the Forestry Commission before felling more than five cubic metres of timber (or two cubic metres if the timber is sold) per three month period, subject to various exemptions[5]. Tree felling is exempt from the requirement to obtain a Felling Licence where it is carried out to facilitate development that has obtained full planning permission.

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[2] *http://mapapps.bgs.ac.uk/geologyofbritain/home*

[3] *www.landis.org.uk/soilscapes/*

[4] *www.scarborough.gov.uk/home/planning/trees/tree-preservation-orders* and *www.northyorkmoors.org.uk/planning/planning-applications/application-search-map,* checked September 2020

[5] *www.forestry.gov.uk/england-fellinglicences*

Protected Species

Trees and scrub provide habitat for a wide range of species, some of which are protected. These include all nesting birds and their nests, and all bats and their roosts. Birds listed under Schedule 1 of the Wildlife and Countryside Act 1981 and all bat species are also protected from disturbance when using nesting or roosting sites.

Veteran Trees

None of the trees on and adjacent to the site are recorded on the Woodland Trust's Ancient Tree Inventory[6].

Ancient Woodland

Natural England's Ancient Woodland Inventory[7] shows identifies the woodland north of the track to the sawmill (group G4 in this survey) as Ancient Semi Natural Woodland (ASNW) and woodland to the south of East Beck beyond the survey area as a Planted Ancient Woodland Site (PAWS).

3. TREE SURVEY

3.1 Methodology

The site was visited in October 2020 to carry out a survey and assessment in accordance with BS5837:2012.

Trees were surveyed across the site including within and adjacent to the proposed car park, along the route of the existing vehicular track along East Beck and along the proposed pedestrian route to the south of the beck.

A topographical survey plan was provided showing the location of trees and this forms the base of the Tree Constraints Plan (Appendix C).

The following information was collected for each tree: species, age class, height, stem diameter at 1.5m above ground level, crown spread in the four cardinal directions and height of the crown above the ground (excluding basal sprouts and epicormic branches).

[6] *https://ati.woodlandtrust.org.uk/tree-search/* checked October 2020

[7] *https://magic.defra.gov.uk/MagicMap*

The trees' overall quality and value for retention was assessed in accordance with BS5837:2012 Table 1 (Appendix B). This was dependent on the trees' physiological and structural condition, safe useful life expectancy and arboricultural, landscape, cultural, ecological value and amenity value (as a function of size, prominence, attractiveness and screening).

The Root Protection Area (RPA) radius and area for each tree was also calculated in accordance with BS5837:2012. The RPA is the minimum area of ground that will provide sufficient soil rooting volume to ensure the continuing health and survival of the tree.

3.2 Survey Results

The survey assessed 57 individual trees and nine groups of trees. The full survey results are given in the survey schedule in Appendix A and the trees are shown on the Tree Constraints Plan.

Tree Species

The diagram below provides an illustration of tree diversity and frequency.

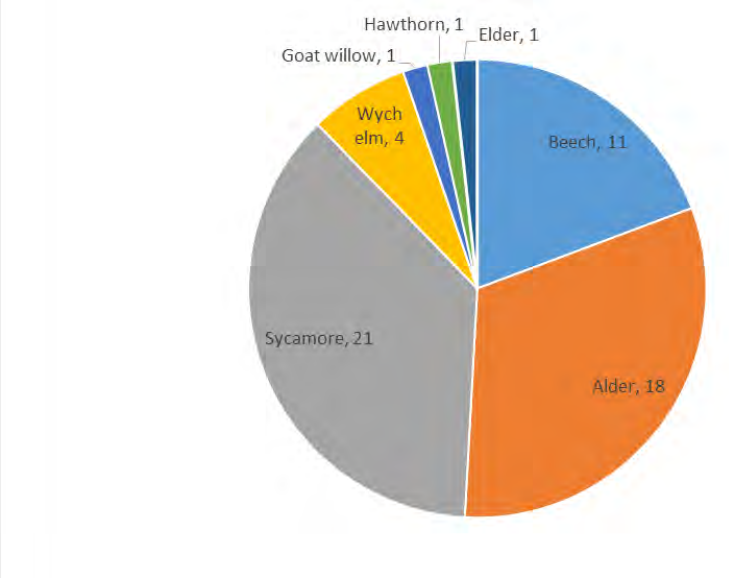


Fig 1: Species recorded for individually surveyed trees.

Tree Age

The diagram below provides an illustration of the profile of tree age at the site.

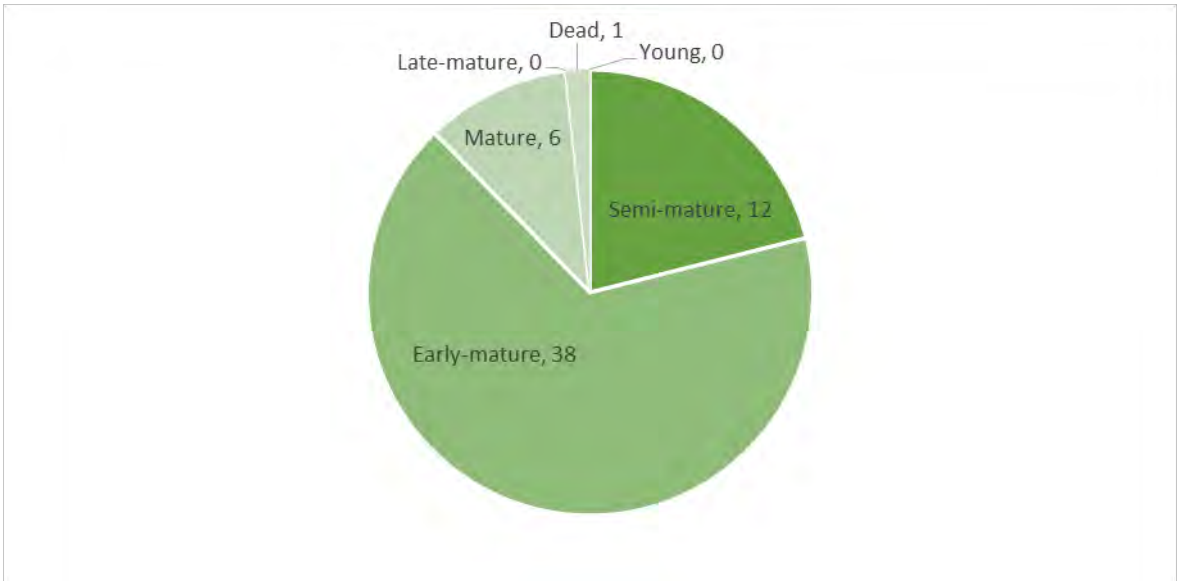


Fig 2: Age distribution of individually surveyed trees.

Quality & Value Categories

The following table provides a summary of trees by BS5837 tree quality and value category.

Table 1: Tree Retention Categories

	Individual Trees	Groups of Trees
Category A *Trees of high quality and value*	1	2
Category B *Trees of moderate quality and value*	20	3
Category C *Trees of low quality and value*	30	4
Category U *Trees unsuitable for retention*	6	0
Total	*57*	*9*

Individually surveyed trees at the site are predominantly of moderate (B category) and low (C category) quality and value, with 20 trees assigned to Category B and 30 trees assigned to Category C. A single individually surveyed tree is identified as high quality and value (A category). Six individually surveyed trees are considered unsuitable for retention (U category).

The trees surveyed as groups naturally fell into eight distinct groups. Two of these was assigned to the high quality and value category (A category), three to the moderate quality and value category (B category) and four to the low quality and value category (C category).

Category A Trees

The site's single tree of high quality is T12, a mature sycamore growing within woodland along the edge of the track running parallel to East Beck.

The two group of trees which was assigned to Category A are G4 and G9. G4 is a woodland group is located on the north side of the track to the sawmill. The woodland is growing on steep ground and extends to a line of beech trees at its edge. The woodland is mixed age and is dominated by sycamore, with occasional ash. The ground flora reflects a long-established woodland, including species such as dog's mercury, violets and false wood brome. G9 is an area of woodland on a bank and ridge to the south of the site. It has an overstorey of sycamore and ash, with a patchy understorey dominated by blackthorn.

Category B Trees

The Twenty trees of moderate quality and value (B category) include nine early mature beech trees (T2-10) which are growing along the track which runs parallel to East Beck. Seven sycamore trees also fall into Category B and comprise one early mature tree (T23) which is growing close to the river, and seven mature sycamore trees (T23, T26, T28, T30, T33, T41 and T45) which are growing between East Beck and the sawmill site. Also assigned to Category B are four early-mature alder trees growing alongside East Beck (T17, T39, T44 and T54).

In terms of groups of trees, three groups have been assigned to Category B. These comprise G1, G2 and G3. G1 is a line of sycamore and alder trees growing above East Beck and adjoining the existing roadside carpark. These trees are largely multi-stemmed due to previous coppicing; and provide some screening of the carpark. G2 comprises a line of mature riverside alder trees on the north side East Beck, with some elder growing as understorey. G3 consists of an area of sycamore and hawthorn forming an extension of the bankside woodland growing on the north side and close to the roadside carpark.

Category C Trees

The thirty trees of low value and quality comprise all early mature trees associated with the river corridor. They comprise 13 riverside alder trees (T13-16, T19, T37, T40, T42, T42, T43, T46 and T51-53), nine sycamore (T18, T20, T29, T32, T38 and T47-50), four wych elm (T27, T31, T34 and T35), two beech (T1 and T11), and single goat willow (T25) and elder T56).

The four groups assigned to Category C comprise scrubby tree growth including G5, G6, G7 and G8. G5 is located between the sawmill and East Beck and comprises semi-mature and early-mature elm, alder and sycamore. G6 and G7 are growing on the southern edge of the sawmill and comprise scrubby growth of hawthorn, blackthorn, hazel and wych elm. G8 is located close to the jet workshops and is an area of scrubby hawthorn, sycamore and young wych elm.

Category U Trees

Trees considered unsuitable for retention (U category) include three trees (T21, T22 and T24) which have been recently felled as part of line clearance work, as the trees are located under high voltage electricity wires at the southern edge of the sawmill site. The other trees in this category are a dead riverside alder (T36), a hawthorn in decline (T55) and a decayed sycamore (T57) on the bank to the south of the site.

Photo 1. View looking east along track with the bankside woodland G4 to the left and riverside alder trees G2 to the right.

Photo 2. View looking east along track with beech trees T1-7 in view on the edge of the bankside woodland G4.

Photo 3. View from south side of East Beck of the riverside alder trees G2 and scrub G8.

Photo 4. View looking south-east across sawmill site, with fringing scrub G6 and G7 in view.

Photo 5. View looking north west across sawmill site, with riverside alder and sycamore trees T39-42 and G5 in view.

Photo 6. View looking east across roadside carpark and with streamside row of alder and sycamore G1 in view.

Tree Condition

The majority of the trees are in good condition and require no intervention.

Tree T20 an early-mature sycamore which was noted to have low crown vigour. This tree is recommended for monitoring to identify any reduction in crown vigour, and identify remedial tree works if necessary.

Trees T21, T22 and T24 are three sycamores which have been previously been felled during line clearance work and are now coppicing back. These trees below the overhead electricity cable are managed by the electricity distribution company. It is recommended that stumps are treated to prevent regrowth when they are next cut.

Further investigation of decay in the sycamore T38 is recommended if it is proposed to be retained within the car park scheme. The trees has a large stem cavity at 2m.

It was not possible to assess the condition of the riverside alder tree T42 dues to dense ivy and scrub. It is recommended that this tree is reinspected following removal of the ivy if it is retained in the car parking scheme.

4. RECOMMENDATION

4.1 Tree Retention

This report does not assess the impacts of the development proposals on the trees to determine the requirements for tree removal, or the impacts of the proposed development works on retained trees. These will be considered in an Arboricultural Impact Assessment which will be produced following finalisation of the development layout.

4.2 Construction Tree Protection

It is recommended that all retained trees on or immediately adjacent to the site are protected by protective fencing during any demolition and construction work. This construction exclusion zone should protect the RPA and ensure that trees to be retained and their essential rooting zone is not damaged during the works.

It is recommended that a Tree Protection Plan is produced once the detailed design of the scheme has been finalised. This would show the location and detailing of protective fencing and other measures that are necessary to protect the trees during site clearance and construction works. It is recommended that an Arboricultural Method Statement is produced if it is proposed to carry out any demolition or construction works within the RPA of retained trees.

4.3 Arboricultural Works

Recommendations for tree works at this site have been made in the interest of maintaining a high quality tree stock. It is recommended that the schedule is revised once the layout is finalised to include felling and pruning works necessary to accommodate the proposed development.

All works carried out should comply with BS3998:2010 'Tree Work – Recommendations'[8].

It is recommended that wherever possible works are carried out between September and February to avoid impacting on nesting birds. It is recommended that an ecologist is consulted to advise on suitable precautions if it is necessary to carry out work during spring and summer.

[8] *BS3998:2010 Tree Work – Recommendations.* British Standards Institute, 2010

APPENDIX A – TREE SURVEY SCHEDULE

Tree ID	Common Name	*Latin Name*	Maturity	Measurements Estimated	Height (m)	Height & Direction of 1st Significant	Stem Diameter (cm)	Spread - N (m)	Spread - E (m)	Spread - S (m)	Spread - W (m)	Crown Condition	Stem Condition	Basal Area Condition	Life Expectancy	Category	Physiological Condition	Comment	Work Recommendations	RPA Radius (m)	RPA Area (m^2)
T1	Common Beech	*Fagus sylvatica*	Early-mature	No	14	6	240 140 80	2	1	3.5	2	Good	Ivy	Good	>40	C2	Good	Part of a row of beech (T1-11) along the southern edge of woodland G4.		3.47	38
T2	Common Beech	*Fagus sylvatica*	Early-mature	No	14	6	470	4	2.5	4	3.5	Good	Ivy	Good	>40	B2	Good			5.64	100
T3	Common Beech	*Fagus sylvatica*	Early-mature	No	14	5	380	2.5	2	5.5	3	Good	Ivy	Good	>40	B2	Good			4.56	65
T4	Common Beech	*Fagus sylvatica*	Early-mature	No	15	5	530	5	5	8	3	Good	Good	Good	>40	B2	Good			6.36	127
T5	Common Beech	*Fagus sylvatica*	Early-mature	No	15	5	670	5.5	2.5	8	8	Good	Good	Good	>40	B2	Good			8.04	203
T6	Common Beech	*Fagus sylvatica*	Early-mature	No	14	4.5	460	3	5.5	8.5	2.5	Good	Good	Good	>40	B2	Good			5.52	96
T7	Common Beech	*Fagus sylvatica*	Early-mature	No	15	5	540	4	3	7.5	4.5	Good	Good	Good	>40	B2	Good			6.48	132
T8	Common Beech	*Fagus sylvatica*	Early-mature	No	16	8	360 270 240	2	2	7	3.5	Good	Good	Good	>40	B2	Good			6.12	118
T9	Common Beech	*Fagus sylvatica*	Early-mature	No	16	5.5	360 370	4	4.5	9	4.5	Good	Good	Good	>40	B2	Good			6.19	121
T10	Common Beech	*Fagus sylvatica*	Early-mature	No	16	3.5	430 280	3	3	8.5	4	Good	Good	Good	>40	B2	Good			6.16	119
T11	Common Beech	*Fagus sylvatica*	Early-mature	No	12	5.5	270	1	2	7.5	1	Good	Good	Good	>40	C2	Fair	Tree suppressed by surrounding trees.		3.24	33
T12	Sycamore	*Acer pseudoplatanus*	Mature	No	20	6	750	6	6	9	6	Good	Ivy	Good	>40	A2	Good	One of the larger trees within woodland G4.		9.00	254
T13	Common Alder	*Alnus glutinosa*	Early-mature	No	13	7	550	0	3	9	2	Good	Ivy	Good	>40	C2	Fair			6.60	137
T14	Common Alder	*Alnus glutinosa*	Early-mature	No	12	6	380 220	5	3	5	2	Good	Ivy	Good	>40	C2	Fair			5.27	87
T15	Common Alder	*Alnus glutinosa*	Early-mature	No	14	4	540	2	3	7	2	Good	Ivy	Good	>40	C2	Fair			6.48	132
T16	Common Alder	*Alnus glutinosa*	Early-mature	Yes	13.5	3	500	6	1	6	6	Good	Ivy	Good	>40	C2	Fair			6.00	113
T17	Common Alder	*Alnus glutinosa*	Mature	No	12.5	4	900	1	4.5	8	4	Good	Ivy	Good	>40	B2	Fair			10.80	366
T18	Sycamore	*Acer pseudoplatanus*	Semi-mature	No	14	2.5	210	2.5	2.5	2.5	3	Good	Good	Good	>40	C2	Good			2.52	20
T19	Common Alder	*Alnus glutinosa*	Early-mature	No	11	4	210	2.5	2	2.5	3	Good	Good	Good	>40	C2	Good			2.52	20
T20	Sycamore	*Acer pseudoplatanus*	Semi-mature	No	12	2	340	5	3	1	4	Good	Good	Good	>40	C2	Fair	Low crown vigour. Monitor tree.		4.08	52

Tree ID	Common Name	*Latin Name*	Maturity	Measurements Estimated	Height (m)	Height & Direction of 1st Significant	Stem Diameter (cm)	Spread - N (m)	Spread - E (m)	Spread - S (m)	Spread - W (m)	Crown Condition	Stem Condition	Basal Area Condition	Life Expectancy	Category	Physiological Condition	Comment	Work Recommendations	RPA Radius (m)	RPA Area (m^2)
T21	Sycamore	*Acer pseudoplatanus*	Semi-mature	Yes	4	0	80*10	1.5	1.5	1.5	1.5	Good	Good	Good	<10	U	Good	Coppice regrowth from tree felled below overhead electricity cables.	Tree adjacent to cables managed by electricity company.	3.04	29
T22	Sycamore	*Acer pseudoplatanus*	Semi-mature	Yes	5	0	80*10	1.5	1.5			Good	Good	Good	<10	U	Good	Coppice regrowth from tree felled below overhead electricity cables.	Tree adjacent to cables managed by electricity company.	3.04	29
T23	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14	2	410	4.5	5	6	2	Good	Good	Good	>40	B2	Good			4.92	76
T24	Sycamore	*Acer pseudoplatanus*	Semi-mature	Yes	3	0	80*10	1.5	1.5			Good	Good	Good	<10	U	Good	Coppice regrowth from tree felled below overhead electricity cables.	Tree adjacent to cables managed by electricity company.	3.04	29
T25	Goat Willow	*Salix caprea*	Early-mature	No	5	0	80*10	3	8	3	3	Good	Fair	Good	20-40	C2	Fair	Large stem removed previously.		3.04	29
T26	Sycamore	*Acer pseudoplatanus*	Early-mature	Yes	13.5	1	590 550	6	5.5	6	7	Good	Good	Good	>40	B2	Good			9.68	294
T27	Wych Elm	*Ulmus glabra*	Semi-mature	No	11	3	210 210 190	2	7.5	6	2	Good	Ivy	Good	20-40	C2	Good			4.23	56
T28	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14	3	520	5	6	6	7	Good	Ivy	Good	>40	B2	Good	Dense ivy crown stem and crown.		6.24	122
T29	Sycamore	*Acer pseudoplatanus*	Semi-mature	No	13	2	380	2	5	6	2	Good	Ivy	Good	20-40	C2	Good	Tree growing relatively close to building.		4.56	65
T30	Sycamore	*Acer pseudoplatanus*	Early-mature	No	17	1	380 370 310	6	4.5	7	5	Good	Ivy	Good	>40	B2	Good	Dense ivy growth on stem.		7.37	171
T31	Wych Elm	*Acer pseudoplatanus*	Semi-mature	No	13	1.5	250 210 180	8	2	7	6	Good	Good	Good	20-40	C2	Good			4.47	63
T32	Sycamore	*Acer pseudoplatanus*	Semi-mature	No	12	2	160	2	2	1	1	Good	Ivy	Good	>40	C2	Good			1.92	12
T33	Sycamore	*Acer pseudoplatanus*	Early-mature	No	17.5	2	650	6	5.5	5	7	Good	Ivy	Good	>40	B2	Good			7.80	191
T34	Wych Elm	*Ulmus glabra*	Semi-mature	No	9	1.5	280 160	5	5	6.5	5	Good	Good	Good	20-40	C2	Good			3.87	47
T35	Wych Elm	*Ulmus glabra*	Semi-mature	No	11	1	270 220	5	3.5	5	6.5	Good	Good	Good	20-40	C2	Good			4.18	55
T36	Common Alder	*Alnus glutinosa*	Dead	Yes	9	1	260	2	4	1	2	Poor	Poor	Fair	N/A	U	Dead	Small dead tree.	Retain as habitat feature.	3.12	31
T37	Common Alder	*Alnus glutinosa*	Early-mature	No	11	1	280	3	3	3	4	Good	Good	Good	>40	C2	Good			3.36	35

Tree ID	Common Name	*Latin Name*	Maturity	Measurements Estimated	Height (m)	Height & Direction of 1st Significant	Stem Diameter (cm)	Spread - N (m)	Spread - E (m)	Spread - S (m)	Spread - W (m)	Crown Condition	Stem Condition	Basal Area Condition	Life Expectancy	Category	Physiological Condition	Comment	Work Recommendations	RPA Radius (m)	RPA Area (m^2)
T38	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14	5	600	7.5	6	3	6.5	Good	Poor	Good	20-40	C2	Fair	Previously crown lifted. Located further from beck. Large stem cavity at 2m.	Carry out further investigation on extent and implications of decay if retained close to car park.	7.20	163
T39	Common Alder	*Alnus glutinosa*	Mature	No	12.5	1.5	470 370 330	7	7	8	8	Fair	Ivy	Good	20-40	B2	Fair	Dense ivy growth on stem and within crown. Low branches to S.		8.20	211
T40	Common Alder	*Alnus glutinosa*	Early-mature	No	15.5	1	430	3	4	6	5.5	Good	Ivy	Good	>40	C2	Good			5.16	84
T41	Sycamore	*Acer pseudoplatanus*	Early-mature	Yes	18	1	540 500	5	4.5	5.5	7	Good	Ivy	Good	>40	B2	Good			8.83	245
T42	Common Alder	*Alnus glutinosa*	Early-mature	Yes	14	6	400	3	3	4	2	Good	Ivy	Good	>40	C2	Fair	Dense ivy, bramble and streamside position restricts inspection.	Cut ivy at base and reinspect if retained adjacent to car park.	4.80	72
T43	Common Alder	*Alnus glutinosa*	Early-mature	No	14	6	380	2	2	4	3.5	Good	Ivy	Good	>40	C2	Good			4.56	65
T44	Common Alder	*Alnus glutinosa*	Mature	No	14.5	5	480 460 190	4	2	4	6	Good	Ivy	Good	>40	B2	Good	Dense ivy growth on stem.		8.30	216
T45	Sycamore	*Acer pseudoplatanus*	Early-mature	No	18.5	2	610 300	6	6.5	4	6	Good	Good	Good	>40	B2	Good			8.16	209
T46	Common Alder	*Alnus glutinosa*	Mature	No	12	4	430 340 340 280	6	3	7	7	Fair	Fair	Good	>40	C2	Fair			8.44	224
T47	Sycamore	*Acer pseudoplatanus*	Early-mature	No	12	5	340	4	5	7	0	Good	Ivy	Good	>40	C2	Good			4.08	52
T48	Sycamore	*Acer pseudoplatanus*	Semi-mature	No	5	1	160	0	4	5	4	Fair	Fair	Good	>40	C2	Fair	Suppressed tree.		1.92	12
T49	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14	5	340	4.5	3	5.5	2	Good	Good	Good	>40	C2	Good			4.08	52
T50	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14	5	380 260 140	5	2	7	7	Good	Good	Good	>40	C2	Good			5.77	105
T51	Common Alder	*Alnus glutinosa*	Early-mature	No	11	4	370 260 250	3	3	7	4	Fair	Fair	Good	>40	C2	Fair	Several dead branches over beck.		6.20	121
T52	Common Alder	*Alnus glutinosa*	Early-mature	No	11	3	190	1	2	3	1	Fair	Good	Good	>40	C2	Fair			2.28	16
T53	Common Alder	*Alnus glutinosa*	Early-mature	No	12	2	410	5.5	2	5	2	Fair	Good	Good	>40	C2	Fair	Large dead branch over beck.		4.92	76

Tree ID	Common Name	*Latin Name*	Maturity	Measurements Estimated	Height (m)	Height & Direction of 1st Significant	Stem Diameter (cm)	Spread - N (m)	Spread - E (m)	Spread - S (m)	Spread - W (m)	Crown Condition	Stem Condition	Basal Area Condition	Life Expectancy	Category	Physiological Condition	Comment	Work Recommendations	RPA Radius (m)	RPA Area (m^2)
T54	Common Alder	*Alnus glutinosa*	Early-mature	No	12	3	460	4.5	6	7	7	Fair	Good	Good	>40	B2	Fair	Several dead branches over beck.		5.52	96
T55	Common Hawthorn	*Crataegus monogyna*	Mature	No	5	0.5	170	2	2	0	2	Poor	Fair	Good	>40	U	Poor	Upper crown dead.	Fell tree in decline.	2.04	13
T56	Common Elder	*Sambucas nigra*	Early-mature	No	5.5	0.5	110 60	2	1	1	4.5	Good	Fair	Good	>40	C2	Fair			1.50	7
T57	Sycamore	*Acer pseudoplatanus*	Early-mature	No	14.5	2	510	3	3	5	6	Good	Poor	Fair	>40	U	Fair	Large stem removal wound with significant associated decay on lower stem.	Fell decayed tree.	6.12	118

Tree ID	Common Name	*Latin Name*	Maturity	Measurements Estimated	Height (m)	Height & Direction of 1st Significant	Stem Diameter (cm)	Spread (m)	Crown Condition	Stem Condition	Basal Area Condition	Life Expectancy	Category	Physiological Condition	Comment	Work Recommendations	RPA Area (m^2)
G1	Sycamore, Alder	*Acer pseudoplatanus, Alnus glutinosa*	Semi-mature	No	10-12	>0	120-350	2-6	Good	Good	Good	>40	B2	Good	Line of sycamore and alder on river bank. Some multi-stemmed. Trees screen car park.		Crown spread
G2	Alder	*Alnus glutinosa*	Mature	No	10-14	>0	150-550	3-7	Good/ Fair	Good	Good	>40	B2	Fair	Line of mature alder on river bank. Elder in understory.		Crown spread
G3	Sycamore, Hawthorn	*Acer pseudoplatanus, Crataegus monogyna*	Early-mature/ Mature	Yes	10-12	>0	15-40	4-6	Good	Good	Good	>40	B2	Good	Extension to woodland on bank. Hedge of Lonicera and hawthorn to front.		Crown spread
G4	Beech, Sycamore, Ash	*Fagus sylvatica, Acer pseudoplatanus, Fraxinus excelsior*	Early-mature/ Mature	No	14-22	>0	250-750	4-9	Good	Good	Good	>40	A2	Good	Mixed age woodland on bank. Line of beech on edge. Sycamore with occasional ash behind.		Crown spread
G5	Wych Elm, Alder, Sycamore	*Ulmus glabra, Alnus glutinosa, Acer pseudoplatanus*	Semi-mature	No	3-10	>0	80-260	2-5	Good	Good	Good	>40	C2	Good	Line of smaller trees on river bank.		Crown spread
G6	Blackthorn, Hazel, Wych Elm, Goat Willow	*Prunus spinosa, Corylus avellana, Ulmus glabra, Salix caprea*	Semi-mature	No	3-4	>0	N/A	2-4	Good	Good	Good	>40	C2	Good	Scrub on edge of sawmill hardstanding. Coppiced below overhead electricity cables.	Trees adjacent to cables managed by electricity company.	Crown spread
G7	Blackthorn, Hazel, Wych Elm, Goat Willow	*Prunus spinosa, Corylus avellana, Ulmus glabra, Salix caprea*	Semi-mature	No	3-4	0	N/A	2-4	Good	Good	Good	>40	C2	Good	Scrub on edge of sawmill hardstanding. Coppiced below overhead electricity cables. Trees adjacent to cables managed by electricity company.	Trees adjacent to cables managed by electricity company.	Crown spread
G8	Sycamore, Wych Elm, Hawthorn, Elder	*Acer pseudoplatanus, Ulmus glabra, Crataegus monogyna, Sambucus nigra*	Semi-mature	No	4-9	0	100-200	2-5	Good	Good	Good	20-40	C2	Good	Scrub below and adjacent to overhead electricity cables.	Trees adjacent to cables managed by electricity company.	Crown spread
G9	Sycamore, Ash, Blackthorn, Hawthorn, Elder, Field Maple, Crab Apple	*Acer pseudoplatanus, Fraxinus excelsior, Prunus spinosa, Crataegus monogyna, Sambucus nigra, Acer campestre, Malus sylvestris*	Early-mature/ Mature	No	14-18	>0	250-750	4-9	Good/ Fair	Good/ Fair	Good	>40	A2	Good/ Fair	Woodland on bank and ridge to south of site. Overstorey of sycamore and ash, with patchy understorey of blackthorn, with occasional hawthorn, elder, field maple and crab apple.		Crown spread

APPENDIX B – TREE QUALITY & VALUE CATEGORIES

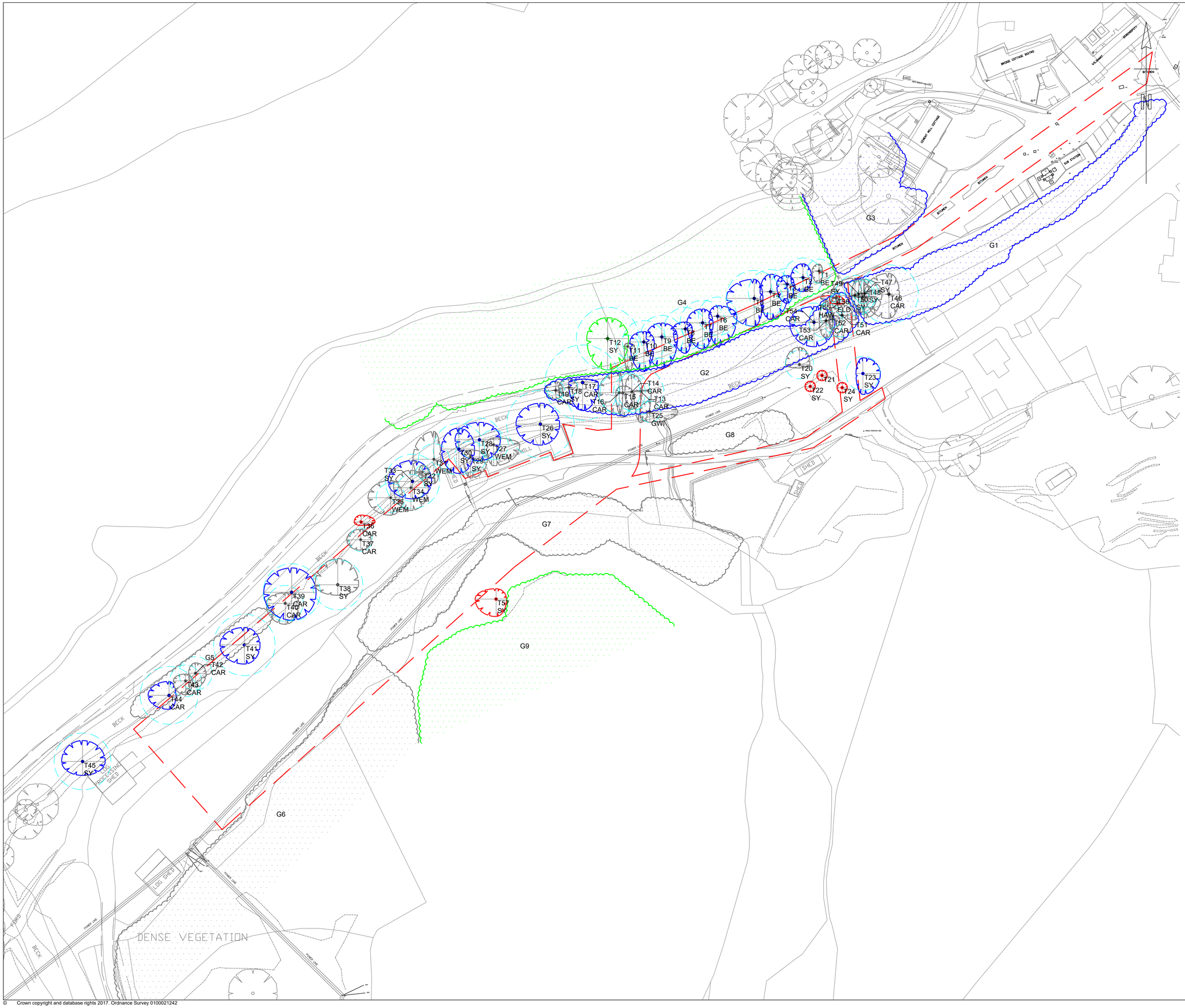
TREE QUALITY & VALUE CATEGORIES

(from BS5837:2012, Table 1 – 'Cascade chart for tree quality assessment')

Category and definition	*Criteria (including subcategories where appropriate)*			*Plan colour*
TREES UNSUITABLE FOR RETENTION				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve*			Dark red
TREES TO BE CONSIDERED FOR RETENTION				
	1. Mainly arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation	
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light green
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	Mid blue
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	Grey

APPENDIX C – PLANS

- *Tree Constraints Plan*



Key

- Tree of high quality & value (Category A)
- Tree of moderate quality & value (Category B)
- Tree of low quality & value (Category C)
- Tree unsuitable for retention (Category U)
- Root Protection Area (RPA) (Individual trees Category A-C only)
- Groups of trees & shrubs of high quality & value (Cat. A)
- Groups of trees & shrubs of moderate quality & value (Cat. B)
- Groups of trees & shrubs of low quality & value (Cat. C)
- Groups of trees & shrubs unsuitable for retention (Cat. U)
- Tree location taken from topographical survey /Tree location plotted by arboriculturist
- Site Boundary

Notes

1. Survey carried out according to BS5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.
2. Refer to accompanying arboricultural report for full survey details.

Species

BE - Beech (*Fagus sylvatica*)
CAR - Common Alder (*Alnus glutinosa*)
ELD - Elder (*Sambucus nigra*)
GWI - Goat willow (*Salix caprea*)
HAW - Hawthorn (*Crataegus monogyna*)
SY - Sycamore (*Acer pseudoplatanus*)
WEM - Wych elm (*Ulmus glabra*)

Rev:	Change:	Date:
-	-	-

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Client:

The Mulgrave Estate

Project:

The Old Sawmill, Sandsend,
Car Park Proposals

Drawing:

Tree Constraints Plan

Scale:	Date:	Drawn:	Checked:
1:500 @A1	10/11/2020	GM	CL
Project No.:	**Drawing No.:**	**Revision:**	
711	02	-	

FLOOD RISK ASSESSMENT

Sandsend,
Whitby

Reference	RO/FRA/18165.1
Date	October 2020
Version	1

19 & 20 Brenkley Way
Seaton Burn
Newcastle Upon Tyne
NE13 6DS

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CONTENTS

APPENDICES

CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

The Mulgrave Estate

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of RWO Associates Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	Draft Issue – for client comment	21.10.2020

1.0 EXECUTIVE SUMMARY

This assessment has looked at the implications of the proposed commercial development, as a car park, in relation to the flood risk and surface water management in accordance with the Planning Practice Guidance.

The site is in Flood Zone 1, 2 & 3 based on the published flood maps. The published flood maps seem to contain an error and as such the extent of flood zone has been realigned with the watercourse for this assessment. Based upon this exercise the area of the proposed development in flood zone 2 & 3 is a landscaped strip with the rest of the car park being in flood zone 1.

The two proposed bridges will need to be a clear spanning structure above the flood water level. An assessment by the bridge engineer will be required to ensure that a risk of blockage is not introduced.

All other sources have been reviewed and where required recommendations have been made. These mainly relate to the risk of surface water flooding and affording properties protection whilst maintaining flow routes.

The surface water drainage hierarchy has been reviewed and a discharge to watercourse is deemed suitable.

The recommendation of this report will minimise the risk of damage to existing properties and ensure the safety of residents along with users of the car park, as far as is practicable within the limitations of the proposed development site.

2.0 INTRODUCTION

RWO Associates have been commissioned by The Mulgrave Estate to prepare a Flood Risk Assessment for a planning application relating to a proposed new car park and associated access including two new bridges over Sandsend Beck. A location plan is included in Appendix A.

This document reviews the risks of flooding in accordance with current guidance and identifies the risk of flooding along with proposed mitigation.

3.0 THE SITE

The site is located at Sandsend, Whitby. Figure 1 below shows the site location.

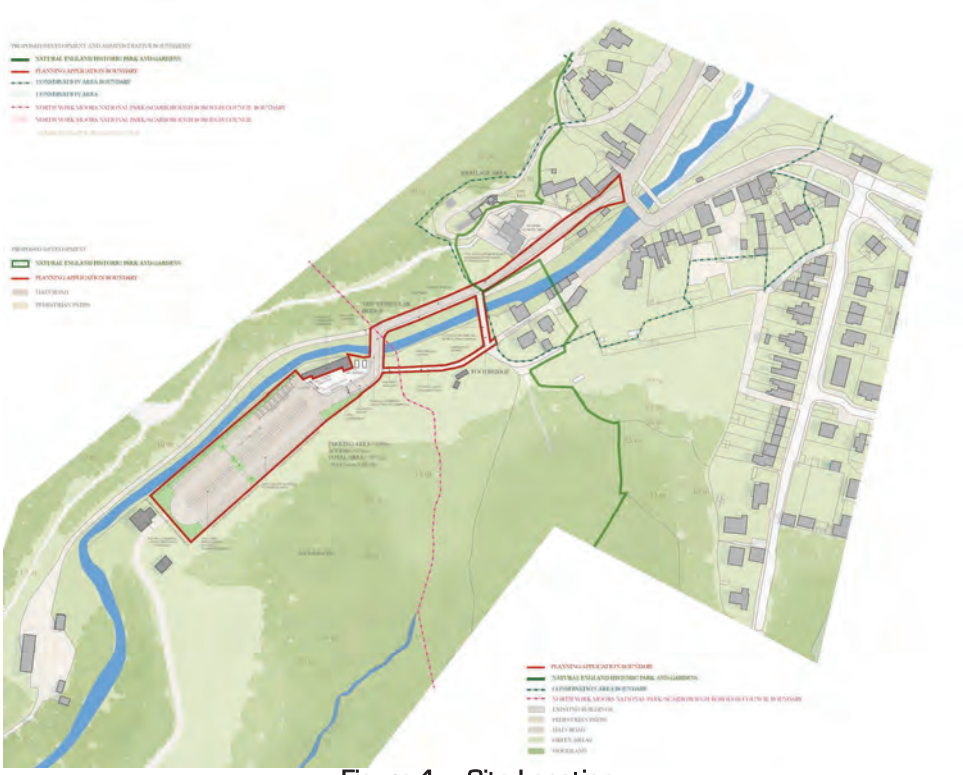


Figure 1 – Site Location

The site has a grid reference of 485984, 512306 with developable areas being located around the proximity of this location as identified in Appendix A. An indicative layout is included in Appendix B.

The proposed use of the site falls under the 'less vulnerable' classification as defined in the NPPF Technical Guidance document, 'Table 2: Flood risk Vulnerability', which is included below;

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind Turbines.
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunication installations required to be operational during flooding. • Emergency disposal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*
Less vulnerable • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agricultural and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals workings and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewerage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of defence installations. • Ship building, repairing, dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water based recreation (excluding sleeping accommodation). • Lifeguard and coastal stations. • Amenity open space, nature conversation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to specific warning and evacuation plan.*

Table 1 – 'Table 2: Flood risk Vulnerability'

The development area is shown on the Environment Agency online flood maps as being in flood zone 1, 2 & 3.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Table 2 – 'Table 3: Flood risk Vulnerability Classification'

The proposed site usage falls within the 'less vulnerable' category as identified in Table 2: Flood Risk Vulnerably classification, within the Planning Practice Guidance. Based upon the usage being 'less vulnerable' the development is appropriate as defined in Table 2: Flood Risk Vulnerably classification. The planning flood maps are however extremely inaccurate with regards to the line of Sandsend Beck, which has the line of flooding approximately 5 -15m from the watercourse, with the watercourse being shown in Flood Zone 1. On this basis the data needs to be carefully considered as to accuracy.

	Flood Zone	Flood risk vulnerability classification	Suitability
Retail/POS (south of beck)	1, 2 & 3	Less vulnerable	Suitable

Table 3 – Development flood risk zones and suitability

Taking into account the inaccurate line of the flood zones it is assumed that the flood zones should be realigned with the watercourse. This placing the northern most extent of the proposed car park within flood zone 2 & 3 and the rest of the development flood zone 1.

Figure 2 – Environment Agency Flood Map Extract (05.10.2020)

As can be seen in Figure 2 above the level of accuracy in flood maps is somewhat questionable. Therefore, the extent of flood zones will be assumed as being 5m either side of the watercourse which ties into the overall extent of the flood zone.

4.0 PROPOSED DEVELOPMENT

It is proposed to develop the site for car parking purposes with an upgraded access road and construct two bridges over the Sandsend Beck. The new development will require associated infrastructure such as roads, drainage and utilities. The car park will be constructed of a granular permeable surface therefore ensuring treatment and mimicking the Greenfield flows from the proposed development.

The proposed development site is in Flood Zone 1, 2 & 3, as defined in table 3 of this report.

A topographical survey is included in Appendix B.

5.0 ROLES & RESPONSIBILITIES

The table below covers roles & responsibilities and is for information purposes only;

Body/Authority	Responsibility
Environment Agency (EA)	• Predicting flooding from statutory main rivers and the sea including the location, timing and magnitude • Issuing of Flood Warnings to partner agencies and ensuring that the public are warned and informed • Maintenance and operation of sea and river flood defences. Check defences and undertake essential repairs as required. • Monitor and clear blockages of culverts and repair breaches of defences • Support the Police and Local Authority by providing materials, equipment and manpower as far as resources and other duties permit. • Advisory role in dealing with pollution issues following flooding
Local Authority	• Providing support to the emergency services • Mitigation of the effects of an emergency on people, including emergency feeding, accommodation and welfare. • Co-ordination of the voluntary sector response • Information services to the public and media • Flood alleviation measures where possible • Environmental health advice • Review of surface water drainage proposals • Lead Local Flood Authority
Police	• Co-ordination of the emergency services at a major flood event, as well as helping to save lives and protect property • Establishment of cordons where practical to facilitate the work of the emergency services • In conjunction with other emergency services, to evacuate people from properties at risk, if necessary • Collation and dissemination of casualty information
Fire & rescue	• Saving life and rescuing trapped persons • Provide monitoring procedures in respect of health and safety of those persons operating within an established cordon • Carry out essential damage control measures including pumping out flood water and salvage work • Rendering humanitarian services in support of the local authority
Utility Companies	• In the event of a flood, will secure their services and equipment to ensure continuity of supply • Repair services disrupted by flood • Provide alternative means of supply during service disruption if life and death health risks are identified
Met Office	• The Met office issues the severe warnings for heavy rain, snow, severe gales etc. These warnings are delivered directly to local Authorities, the emergency services and the media.

Table 4 – Role & Responsibilities

6.0 FLOOD RISK

It is worth noting that the Environment Agency have been contacted for flood level information and none is available for the site location.

All flood risk data is included in Appendix C.

PARKING (SOUTH OF BECK)

The area identified for parking, along with associated infrastructure has been assessed with regards to flood risk;.

	Flood Zone	RoFRaS Rating	Historic flooding	Surface water flooding	Groundwater flooding	Reservoir/Canal failure
Risk/Zone	1, 2 & 3	low	N/A	Low - Significant	Potential at surface	N/A
Further assessment required	Yes	No	N/A	Yes	No	N/A

Table 5 – Food/retail (North of Beck) flood risk

The planning flood risk maps have been reviewed and identify that the proposed development site is in flooding 1, 2 and 3 with a risk of flooding from the Sandsend Beck. Due to inaccuracies in the published flood maps, the extent of flooding is assumed as being 5m either side of the actual watercourse location. This would place the flood zone 2 & 3 within the landscaped strip associated with the car park and not pose a risk of flooding to the car park itself. Leaving the car parking and associated infrastructure in flood zone 1. Within the 5m margin at the top of the watercourse embankment existing levels should not be altered to ensure the flood zones are not impacted upon.

Surface water has been identified as potential risk; this is associated with the watercourse on the boundary. As such it is recommended that the existing levels be maintained as far as practicable to maintain the overland flow routes. The online Environment Agency flood maps have been reviewed and identify flows are less than 300mm in depth. It is however noted that the area at potential risk is not part of the formal parking and is within the landscaped strip.

To ensure the risk is minimised and given potential overland flows on the southern boundary, it is recommended appropriate warning signs be erected to warn people leaving their car of the potential risk of flooding to the northern boundary.

BRIDGE

Two new bridges are proposed as part of the development and will need to be clear spanning structures which do not impact upon the existing watercourse. An assessment by the bridge engineer will be required to ensure that a risk of blockage is not introduced, and this will be best managed by ensuring the bridges maintain a suitable level above the existing watercourse to allow any debris to be free flowing.

The design and construction of the bridge will be subject to relevant consents and approvals.

7.0 SURFACE WATER DISCHARGE

As required under Building Regulations Part H a hierarchy as to the discharge of surface water needs be considered;

1. Discharge to soakaway or infiltration system,
2. Discharge to watercourse, subject to relevant approvals,
3. Where other forms of outlet are not practicable, a discharge could be made to sewer.

A discharge to infiltration has been excluded based on the anticipated ground conditions which have been identified as being predominantly clay based on the supply borehole logs. A copy of the borehole logs is included in Appendix D.

Given the proximity of the watercourse it is recommended that the proposed developments discharge to watercourse. As this section of watercourse is tidal a free discharge will be acceptable under current guidance which will avoid attenuation measures. It is proposed to allow the water to be conveyed by the below ground strata to watercourse and not to install a formal surface water drainage system.

As part of the detailed surface water design consideration to water quality will be required.

8.0 CONCLUSION

This assessment has looked at the implications of the proposed commercial development, as a car park, in relation to the flood risk and surface water management in accordance with the Planning Practice Guidance.

The site is in Flood Zone 1, 2 & 3 based on the published flood maps. The published flood maps seem to contain an error and as such the extent of flood zone has been realigned with the watercourse for this assessment. Based upon this exercise the area of the proposed development in flood zone 2 & 3 is a landscaped strip with the rest of the car park being in flood zone 1.

The two proposed bridges will need to be a clear spanning structure above the flood water level. An assessment by the bridge engineer will be required to ensure that a risk of blockage is not introduced.

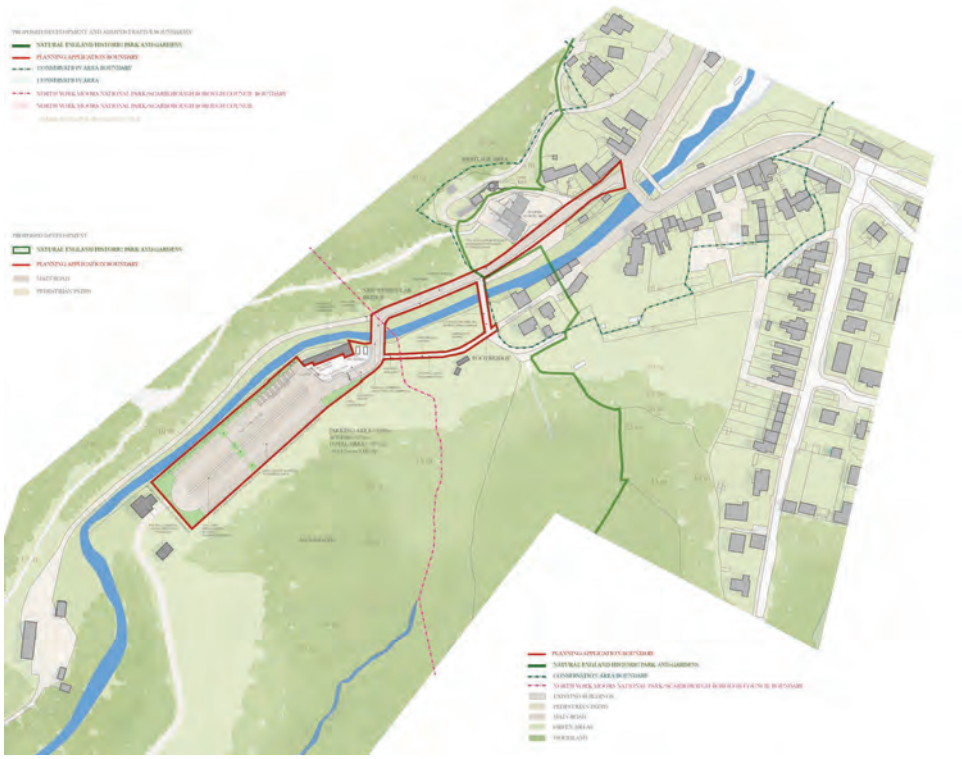
All other sources have been reviewed and where required recommendations have been made. These mainly relate to the risk of surface water flooding and affording properties protection whilst maintaining flow routes.

The surface water drainage hierarchy has been reviewed and a discharge to watercourse is deemed suitable.

The recommendation of this report will minimise the risk of damage to existing properties and ensure the safety of residents along with users of the car park, as far as is practicable within the limitations of the proposed development site.

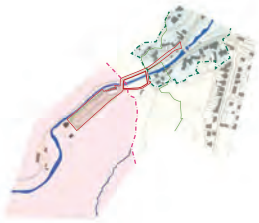
Ross Oakley
For and behalf of RWO Associates Limited
October 2020

Appendix A Site Location Plan



Location Map	
Site	Proposed Development, Sandsend
Client	Mulgrave Property
Job Number	18165
Scale	NTS

Appendix B Site Layout

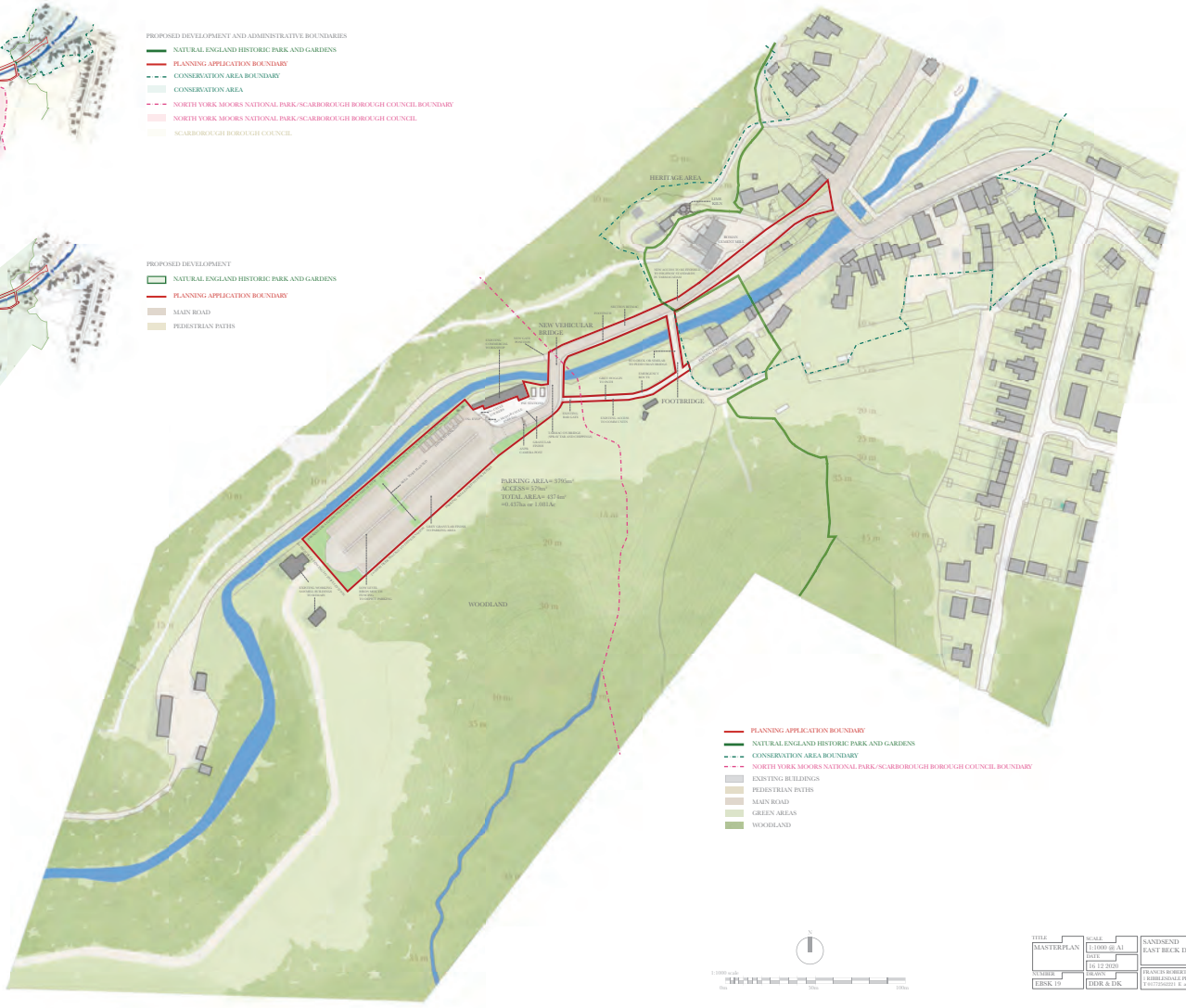


PROPOSED DEVELOPMENT AND ADMINISTRATIVE BOUNDARIES

- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- PLANNING APPLICATION BOUNDARY
- CONSERVATION AREA BOUNDARY
- CONSERVATION AREA
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL BOUNDARY
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL
- SCARBOROUGH BOROUGH COUNCIL

PROPOSED DEVELOPMENT

- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- PLANNING APPLICATION BOUNDARY
- MAIN ROAD
- PEDESTRIAN PATHS

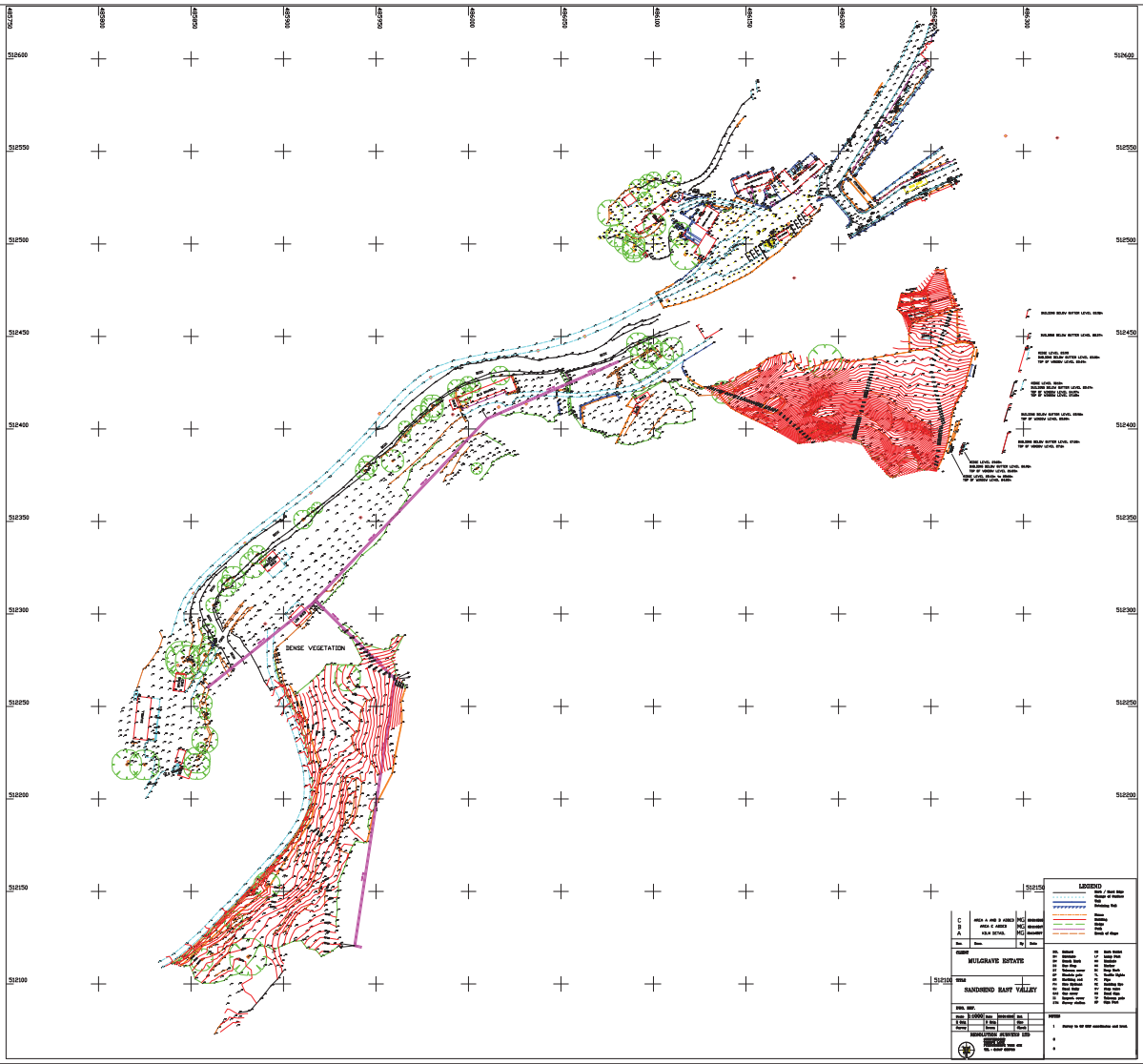


- PLANNING APPLICATION BOUNDARY
- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- CONSERVATION AREA BOUNDARY
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL BOUNDARY
- EXISTING BUILDINGS
- PEDESTRIAN PATHS
- MAIN ROAD
- GREEN AREAS
- WOODLAND

1:1000 scale
0m 50m 100m

TITLE: MASTERPLAN	SCALE: 1:1000 @ A1	SANDSEND EAST BECK DEVELOPMENT
	DATE: 16.12.2020	
NUMBER: EBSK 19	DRAWN: DDR & DK	FRANCIS ROBERTS ARCHITECTS 1 RIBBLESDALE PLACE, PRESTON PR1 3NA T: 01772565221 E: architects@francisroberts.com

Appendix C Topographical Survey


DENSE VEGETATION
LEGEND
MULGRAVE ESTATE
SANDSMEND HAFF VALLEY

Appendix D Centre Maps Live Flood Data

Report Reference: CMAPS-CM-768406-31982-070119

Client Reference: 31982

Report Date 7 Jan 2019

Report Delivery Method: Email - pdf

Client Email:

Flood Insight

Address: sandsends, YO21 3SY

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Flood Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
Groundsure Floodinsight

Flood Insight

Address:	**sandsends, YO21 3SY**
Date:	**7 Jan 2019**
Reference:	**CMAPS-CM-768406-31982-070119**
Client:	**CENTREMAPS**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	23-Aug-2015
Grid Reference:	485984,512306
Site Size:	5.25ha

Contents Page

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed.

Section 1: Environment Agency/Natural Resources Wales Flood Zones	
1.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	Yes
1.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes
1.3 Are there any Flood Defences within 250m of the study site?	No
1.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
1.5 Are there any Proposed Flood Defences within 250m of the study site?	No
1.6 Are there any areas used for Flood Storage within 250m of the study site?	No

Section 2: Risk of Flooding from Rivers and the Sea (RoFRaS)	
2.1 What is the Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating for the study site?	High

Section 3: Historic Flood Events	
3.1 Has the site been subject to past flooding as recorded by the Environment Agency/Natural Resources Wales?	No

Section 4: JBA Surface Water (Pluvial) Flood	
4.1 Is the site or any area within 50m at risk of Surface Water (Pluvial) Flooding?	Yes

Section 5: Surface Water Features	
5.1 Are there any surface water features within 250m of the study site?	Yes

Section 6: Groundwater Flooding	
6.1 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.2 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: BGS Geological Indicators of historic flooding	
7.1 Are there any geological indicators of historic flooding within 250m of the study site?	Yes

Section 8: JBA Reservoir and Canal Data	
8.1 Is the property located in an area identified as being at potential risk in the event of a reservoir failure?	No
8.2 Is the property located in an area identified as being at potential risk in the event of a canal break?	No

Additional Matters

Riparian ownership

If your land abuts a river, stream or ditch, you may have responsibility to maintain this watercourse, even if Title Deeds show the property boundary to be adjacent to the watercourse. This includes the responsibility for clearing debris and obstructions which may impede the free passage of water and fish, and also includes the responsibilities to accept flood flows through your land, even if these are caused by inadequate capacity downstream. There is no duty in common law for a landowner to improve the drainage capacity of a watercourse. Please contact Groundsure if you need further advice on riparian ownership issues relating to this property.

Sewerage Flooding

Extreme rainfall events may overwhelm sewerage systems and cause local flooding. The water and sewerage companies within the UK are required to maintain 'DG5 – At Risk Registers' which record properties that have flooded from sewers and/or are considered to be at risk of flooding from sewers in the future. If your property is on the 'At Risk' Register, this may be recorded within a standard CON29 Drainage and Water search.

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

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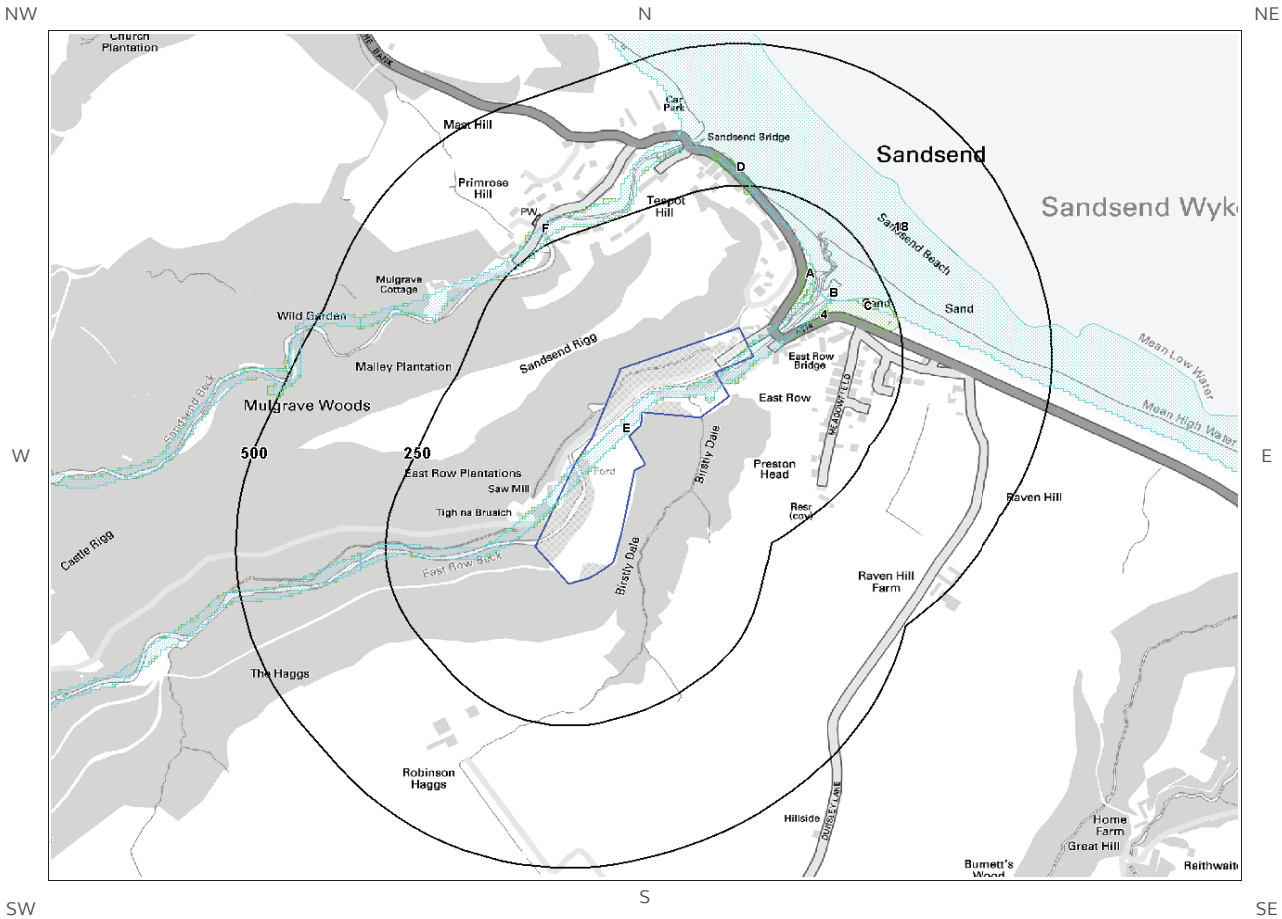
1. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



Environment Agency/Natural Resources Wales Flood Map for Planning Legend

1. Environment Agency/Natural Resources Wales Flood Zones

1.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? Yes

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1E	0.0	On Site	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
2A	98.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
3A	111.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
4	119.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
5A	141.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
6	143.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
7C	145.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
8B	150.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
9B	154.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
10C	175.0	NE	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
11D	235.0	N	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
12F	242.0	NW	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
13D	243.0	N	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)

1.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Flood Map for Planning.

The following floodplain records are represented as green shading on the Flood Map (1):

ID	Distance (m)	Direction	Update	Type
17E	0.0	On Site	12-Oct-2018	Zone 3 - (Fluvial Models)
18	141.0	NE	12-Oct-2018	Zone 3 - (Fluvial Models)
19F	244.0	NW	12-Oct-2018	Zone 3 - (Fluvial Models)

1.3 River and Coastal Flood Defences

Are there any Flood Defences within 250m of the study site ? No

This search consists only of flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Any relevant data is represented on Map 1 – Flood Map for Planning.

Database searched and no data found.

1.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

Any relevant data is represented on Map 1 – Flood Map for Planning.

1.5 Areas of Proposed Flood Defences

Are there any Proposed Flood Defences within 250m of the study site? No

* This illustrates the number of households that move from 'very significant' or 'significant' to 'moderate' or 'low' probability of flood risk bands if the proposed flood scheme is to be implemented.

Any relevant data is represented on Map 1 – Flood Map for Planning.

Guidance: This search consists only of proposed flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Please note that proposed flood defence schemes will not influence the current RoFRaS ratings for the site.

1.6 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

Flood Storage Areas are considered part of the functional floodplain, and are areas where water has to flow or be stored in times of flood. Technical Guidance to the National Planning Policy Framework states that only water-compatible development and essential infrastructure should be permitted within flood storage areas, and existing development within this area should be relocated to an area with a lower risk of flooding. Any relevant data is represented on Map 1 – Flood Map for Planning.

Notes on Flood Zone Data:

This data relates solely to flooding from rivers or the sea. The Environment Agency/Natural Resources Wales estimate that over 2.5 million properties are at risk of flooding within England and Wales. River flooding occurs when a watercourse cannot cope with the water draining into it from the surrounding land. This can happen, for example, when heavy rain falls on an already waterlogged catchment. Coastal flooding results from a combination of high tides and stormy conditions. If low atmospheric pressure coincides with a high tide, a tidal surge may happen which can cause serious flooding.

The Groundsure Flood Insight Report comments upon whether a property lies in proximity to Environment Agency/Natural Resources Wales Zone 2 and Zone 3 floodplains. The Government's Technical Guidance to the National Planning Policy Framework explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and potential loss of life. The Government looks to planning authorities to ensure that flood risk is properly taken into account in the planning of developments to reduce the risk of flooding and the damage which floods cause.

Flood Zones enable planning authorities to apply the sequential test (see Technical Guidance to the National Planning Policy Framework) for development proposals and prevent inappropriate development.

Technical Guidance to the National Planning Policy Framework defines the flood zones as: -

Zone 1 – little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1%

Zone 2 – low to medium risk with an annual probability of flooding of 0.1-1.0% from rivers and 0.1-0.5% from the sea.

Zone 3 – high risk with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

Flood Zone 3b/Flood Storage Areas - very high risk with the site being used as part of the functional flood plain or as a Flood Storage Area.

The flood zones are the main constraint map underpinning decisions on development and flood risk.

Existing Flood Defences

Flood defences seek to reduce the risk of flooding and to safeguard life, protect property, sustain economic activity and the natural environment. Flood defences are designed to protect against flood events of a particular magnitude, expressed as risk in any one year. For example, defences in urban areas may be built to provide protection against flood events of a size which might occur on average once in one hundred years or less.

Proposed Flood Defences

This information is taken from the Environment Agency/Natural Resources Wales's database of Areas to Benefit from New and Reconditioned Flood Defences under the Medium Term Plan (MTP). The dataset contains funding allocation for the first financial year (from April). Funding for the following four financial years is not guaranteed, being only indicative, and will be reviewed annually. Projects within the Medium Term Plan qualify for inclusion in this dataset if:

- the investment leads to a change in the current standard of protection (change projects);
- the investment is a replacement or refurbishment in order to sustain the current standard of protection (sustain projects);
- the project has an initial construction budget of £100,000 or more; and
- the project is included within the first five years of the MTP

The data includes all the Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the equivalent schemes for all Local Authority and Internal Drainage Boards. The number of households and areas of land contributing to DEFRA's Outcome Measures (OM) are also attributed i.e. could benefit from major work on flood defences.

These data also contain Intermittence Flood Maintenance Programme that show the annual maintenance programme of work scheduled to be carried by the Environment Agency/Natural Resources Wales, Local Authority or Internal Drainage Board on flood defences. Data details routine maintenance as well as intermittent work that has been funded for the coming year. The data contains a start and end coordinate defining the relevant river section where work is planned.

Information Warning

Please note that the maps show the areas where investment is being made to reduce the flood and coastal erosion risk and are not detailed enough to account for individual addresses. Individual properties may not always face the same risk of flooding as the areas that surround them. Also, note that funding figures are indicative and any use or interpretation should account for future updates where annual values may change.

Every possible care is taken to ensure that the maps reflect all the data possessed by the Environment Agency/Natural Resources Wales and that they have applied their expert knowledge to create conclusions that are as reliable as possible. The Environment Agency/Natural Resources Wales consider that they have created the maps as well as they can and so should not be liable if the maps by their nature are not as accurate as might be desired or are misused or misunderstood, despite their warnings. For this reason, they are not able to promise that the maps will always be accurate or completely up to date.

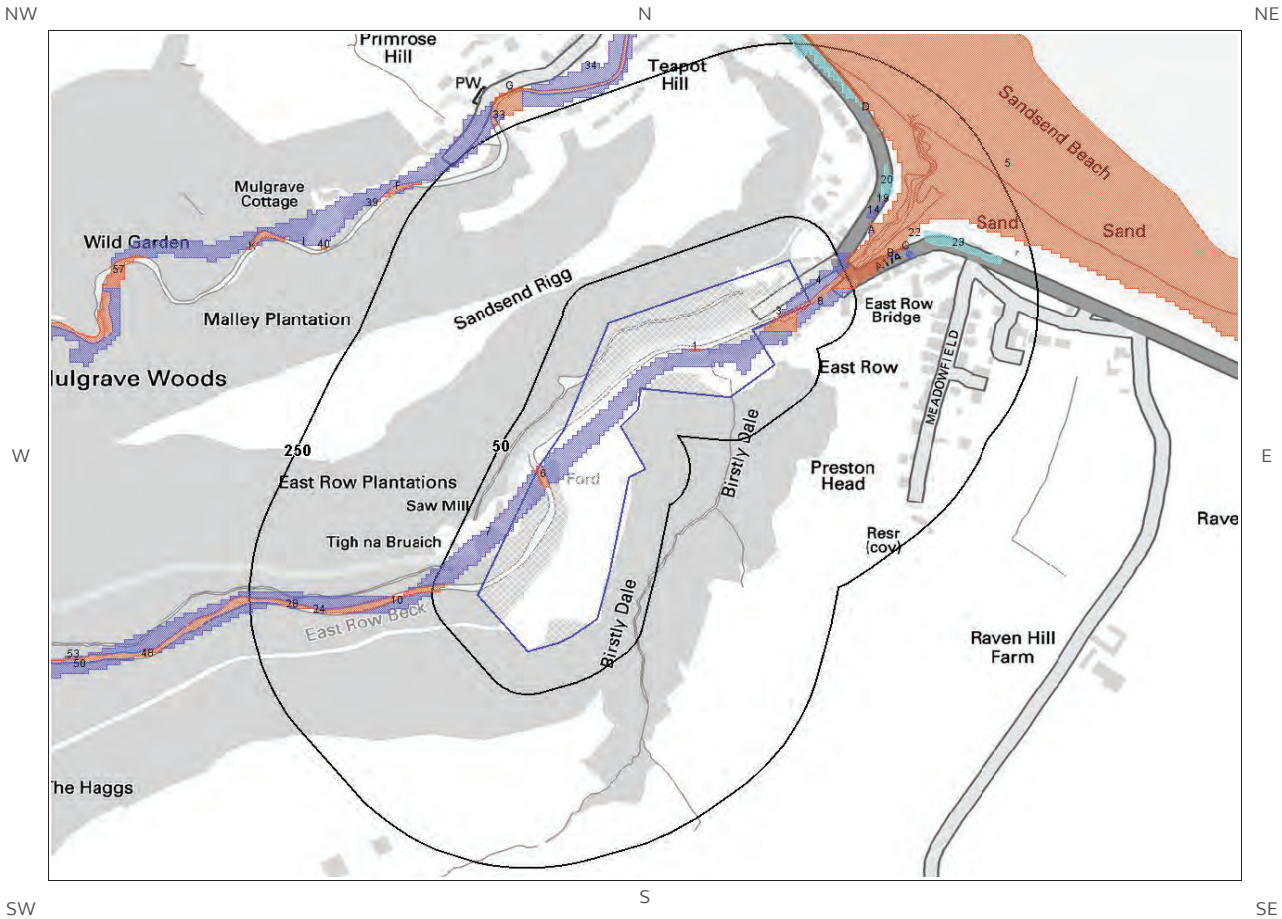
This site includes mapping data licensed from Ordnance Survey used for setting the Environment Agency/Natural Resources Wales's data in its geographical context. Ordnance Survey retains the copyright of this material and it can not be used for any other purpose.

Flood Storage Areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval.

A flood storage area may take the form of a wet or dry reservoir. A wet reservoir is a water storage facility in which storage can be effected by allowing water levels to rise during flood times. A dry reservoir is typically adjacent to a river and comprises an enclosed area that accepts water only at peak times. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and the Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

2. Environment Agency/Natural Resources Wales RoFRaS Flooding Map



Environment Agency/Natural Resources Wales RoFRaS Flooding legend

Site Outline

Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

2. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS)

2.1 Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating (River and Coastal)

What is the highest risk of flooding onsite? High

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS Flood Risk
1	0.0	On Site	High
2	0.0	On Site	Medium
3	0.0	On Site	Medium
4	0.0	On Site	Medium
5	0.0	On Site	High
6	0.0	On Site	High
7	0.0	On Site	Medium
8	1.0	SE	Medium
9H	38.0	W	High

Notes on RoFRaS data:

This information is based on the very latest Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) data. This data has been created by dividing the flood plain into 50m squares, or smaller areas where a square if intersected by a river or coastline. These are called impact cells. The method then calculates the likelihood that the centre of each impact cell will start to flood using a number of different flood scenarios.

A number of insurance companies providing cover for flood risk use this data as the basis of their risk model, although they may also utilise additional information such as claims histories, which may further influence their decision. Where a high risk of flooding is identified flood risk insurance may be difficult to obtain without further work being undertaken. Property owners of sites within Low and Medium risk areas are still considered to be at risk of flooding and insurance premiums may be increased as a result. Owners of properties within Low, Medium and High risk areas are advised to sign up to the Environment Agency/Natural Resources Wales's Flood Warning scheme. The probability estimates for RoFRaS risk bands are as follows:

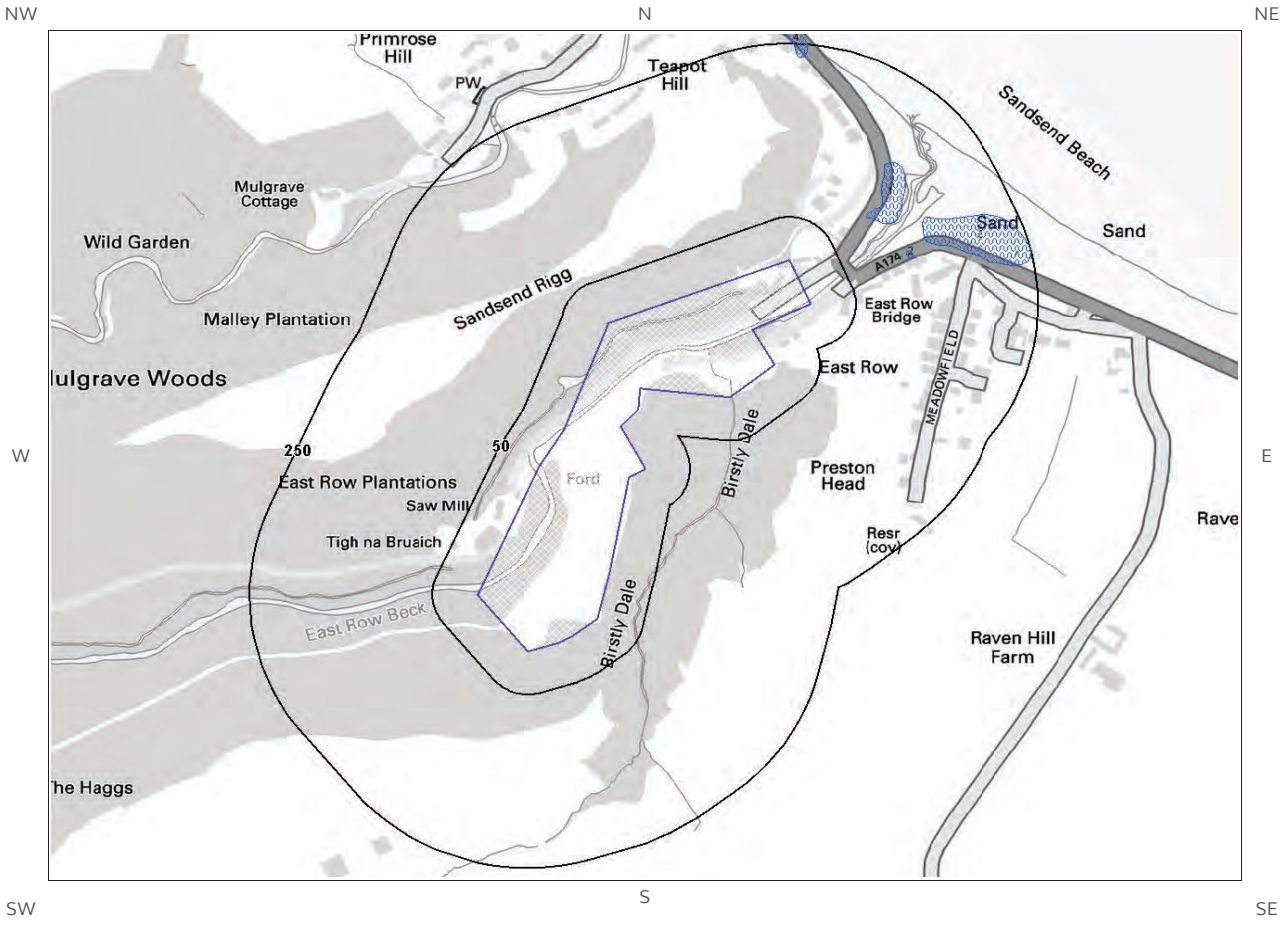
Very Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 1000 (0.1%) in any given year.

Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) in any given year.

Medium – the chance of flooding from rivers or the sea is considered to be less than 1 in 30 (3.3%) but greater than 1 in 100 (1%) in any given year.

High – the chance of flooding from rivers or the sea is considered to be greater than or equal to 1 in 30 (3.3%) in any given year.

3. Environment Agency/Natural Resources Wales Historic Flooding Events Map



Environment Agency/Natural Resources Wales Historic Flooding Events legend

Site Outline

125
250
Search Buffers (m)

Historic Flood Events

3. Environment Agency/Natural Resources Wales Historic Flooding Events

3.1 Historic Flood Outlines

Has the site or any area within 250m been subject to historic flooding as recorded by the Environment Agency/Natural Resources Wales? Yes

This database shows the individual footprint of every flood event recorded by the Environment Agency/Natural Resources Wales and previous bodies.

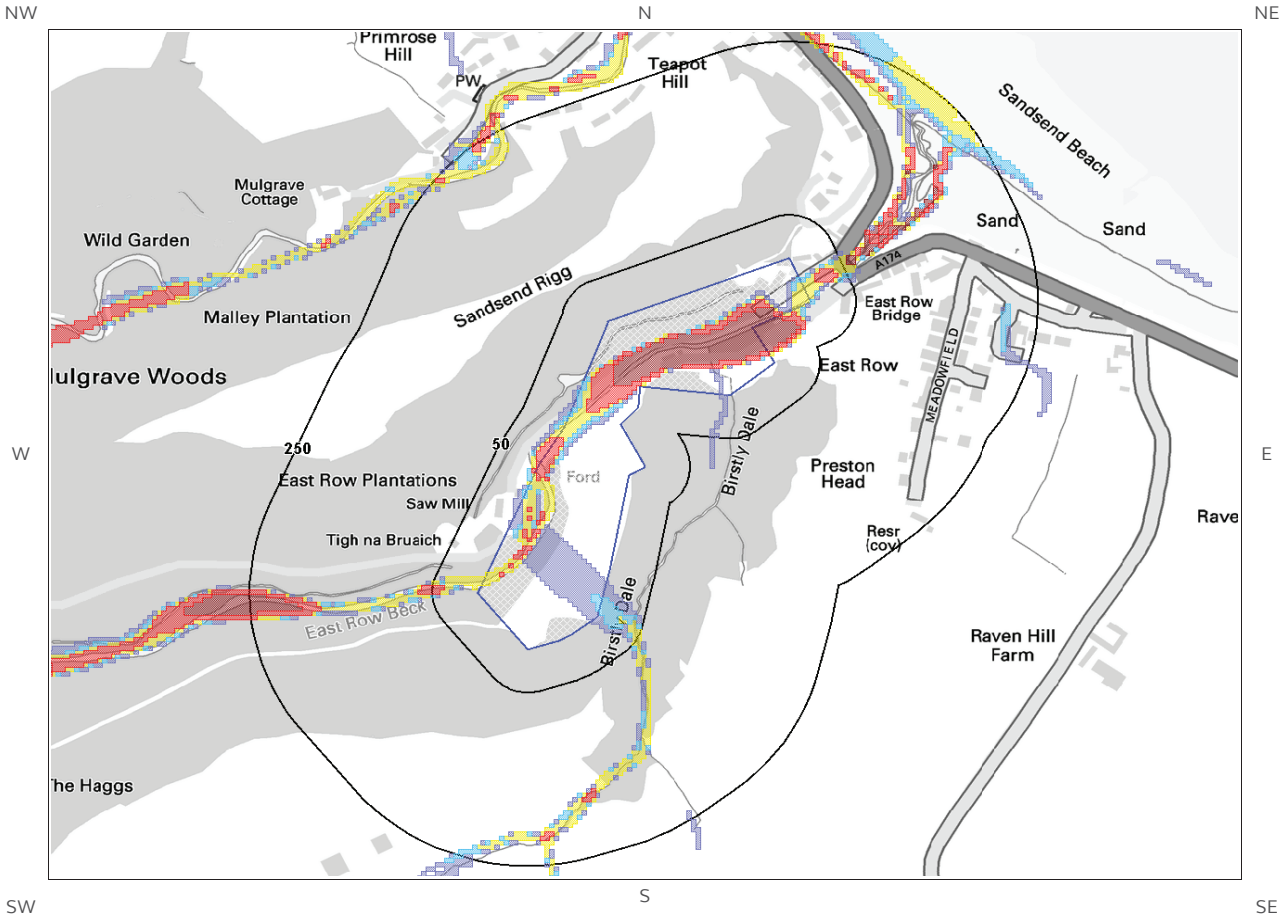
Any records found within the search radius are displayed on Map 3 – Historic Flooding Events.

ID	Distance	Direction	Event Name	Date of Flood	Flood Source	Flood Cause	Type of Flood
1	98.0	NE	East Coast Tidal Event January 2017	Start Date: 13-01-2017 End Date: 15-01-2017	Sea	Other	Coastal
2	120.0	NE	East Coast Tidal Event January 2017	Start Date: 13-01-2017 End Date: 15-01-2017	Sea	Other	Coastal
3	146.0	NE	East Coast Tidal Event January 2017	Start Date: 13-01-2017 End Date: 15-01-2017	Sea	Other	Coastal
4	235.0	N	East Coast Tidal Event January 2017	Start Date: 13-01-2017 End Date: 15-01-2017	Sea	Other	Coastal

Notes on Historic Flooding data:

Over 21,000 separate events are recorded within this database, dating back to 1947. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that the Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

4. JBA Surface Water (Pluvial) Flood Map



JBA Surface Water (Pluvial) Flood Legend

4. JBA Surface Water (Pluvial) Flooding

Surface Water (pluvial) flooding is defined as flooding caused by rainfall-generated overland flow before the runoff enters a watercourse or sewer. In such events, sewerage and drainage systems and surface watercourses may be entirely overwhelmed.

Surface Water (pluvial) flooding will usually be a result of extreme rainfall events, though may also occur when lesser amounts of rain falls on land which has low permeability and/or is already saturated, frozen or developed. In such cases overland flow and 'ponding' in topographical depressions may occur.

What is the risk of pluvial flooding at the study site? Highly Significant

Guidance: The site or an area in close proximity has been assessed to be at Highly Significant Risk of surface water (pluvial) flooding. This indicates that this area would be expected to be affected by surface water flooding in a 1 in 75 year rainfall event to a depth of greater than 1m.

The following pluvial (surface water) flood risk records within 50m of the study site are shown on the JBA Surface Water Flooding Map:

Distance	Direction	Risk
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High

Distance	Direction	Risk
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	High
0.0	On Site	Highly Significant
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low

Distance	Direction	Risk
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
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0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate

Distance	Direction	Risk
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	On Site	Low to Moderate
0.0	NW	Low to Moderate
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
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0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant
0.0	On Site	Significant

Distance	Direction	Risk
0.0	On Site	Significant
0.0	On Site	Significant
1.0	NW	Low
1.0	SE	Low to Moderate
2.0	NW	High
2.0	W	Low to Moderate
2.0	SE	Significant
4.0	NW	Low to Moderate
5.0	NW	High
6.0	NW	High
6.0	NE	Low
6.0	NW	Low
6.0	NE	Significant
7.0	W	Low
7.0	NW	Low
7.0	NE	Low to Moderate
8.0	NW	High
8.0	NE	Low to Moderate
9.0	NW	Low
9.0	NW	Low to Moderate
10.0	NE	High
10.0	NW	Low
11.0	SE	High
12.0	NW	Low
13.0	SE	Low
13.0	NE	Low
13.0	NE	Significant
14.0	NE	Low
14.0	NE	Significant
17.0	W	Low
18.0	NE	High
21.0	E	High
21.0	NE	Low
21.0	NE	Low
22.0	W	Low to Moderate
22.0	SE	Significant
24.0	SE	Low to Moderate
24.0	NE	Significant
25.0	NE	Low to Moderate

Distance	Direction	Risk
25.0	SE	Significant
26.0	E	Low to Moderate
27.0	SE	High
27.0	W	Low
28.0	NE	High
29.0	NE	High
32.0	NE	High
34.0	E	High
36.0	NE	Low to Moderate
37.0	NE	Low to Moderate
37.0	SE	Low to Moderate
37.0	W	Significant
38.0	W	Low to Moderate
40.0	W	Low
40.0	SE	Low
40.0	S	Low
41.0	E	Low
41.0	NE	Low
42.0	W	Low
42.0	NE	Low
43.0	W	High
43.0	NE	Low to Moderate
43.0	E	Low to Moderate
47.0	W	Low to Moderate
49.0	NE	Low
50.0	SE	Low to Moderate

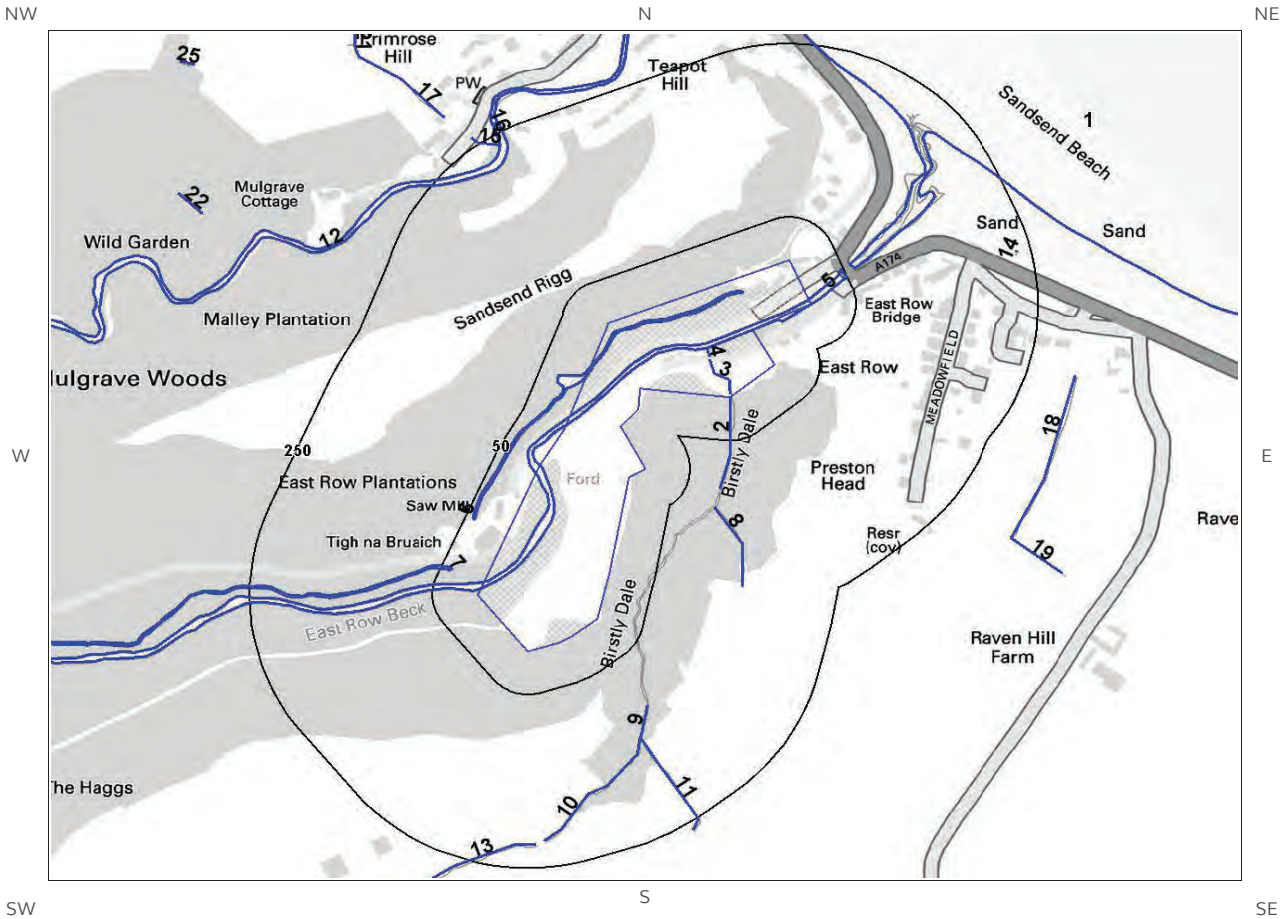
Notes on Surface water (Pluvial) Flooding data:

JBA Consulting surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or "pluvial" flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

The model provides the maximum depth of flooding in each 5m "cell" of topographical mapping coverage. The maps include 7 bands indicating areas of increasing natural vulnerability to surface water flooding. These are:-

- **Less than 0.1m in a 1 in 1000 year rainfall event** - Negligible
- **Greater than 0.1m in a 1 in 1000 year rainfall event** - Low
- **Between 0.1m and 0.3m in a 1 in 200 year rainfall event** – Low to Moderate
- **Between 0.3m and 1m in a 1 in 200 year rainfall event –** Moderate
- **Greater than 1m in a 1 in 200 year rainfall event** – Moderate to High
- **Between 0.1m and 0.3m in a 1 in 75 year rainfall event** – High
- **Between 0.3m to 1m in a 1 in 75 year rainfall event** - Significant
- **Greater than 1m in a 1 in 75 year rainfall event** – Highly Significant

5. Surface Water Features map



Surface Water Features legend

Site Outline

Surface Water Feature (wider than 5m)

50
250
Search Buffers (m)

Surface Water Feature (narrower than 5m)

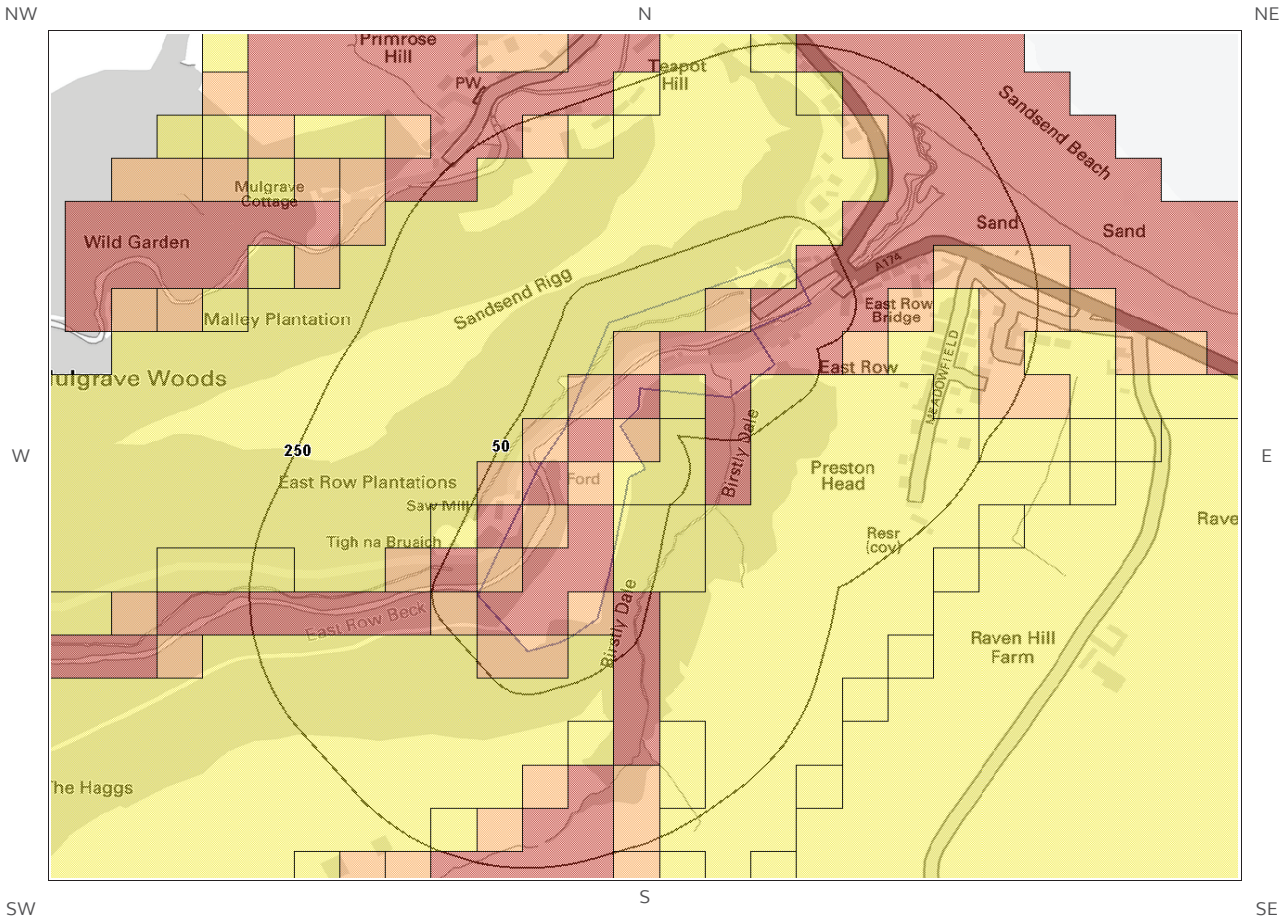
5. Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are represented on mapping:

ID	Distance (m)	Direction
1	58.0	NE
2	0.0	On Site
3	0.0	On Site
4	0.0	On Site
5	0.0	On Site
6	0.0	On Site
7	39.0	NW
8	88.0	SE
9	112.0	SE
10	138.0	SE
11	138.0	SE
12	216.0	NW
13	223.0	S
14	233.0	E
15	237.0	NW

6. BGS Groundwater Flooding Map



BGS Groundwater Flooding legend

Site Outline

50
250
Search Buffers (m)

Limited potential for groundwater flooding to occur

Potential for groundwater flooding of property below ground level

Potential for groundwater flooding to occur at surface

6. Groundwater Flooding

6.1 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site? Yes

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions? Potential for groundwater flooding at surface

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.2 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? High

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

Notes on Groundwater Flooding data:

The BGS Susceptibility to Groundwater Flooding hazard dataset identifies areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface.

Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

The susceptibility data is suitable for use for regional or national planning purposes where the groundwater flooding information will be used along with a range of other relevant information to inform land-use planning decisions. It might also be used in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information, to establish relative, but not absolute, risk of groundwater flooding at a resolution of greater than a few hundred metres. The susceptibility data should not be used on its own to make planning decisions at any scale, and, in particular, should not be used to inform planning decisions at the site scale. The susceptibility data cannot be used on its own to indicate risk of groundwater flooding.

7. BGS Geological Indicators of Flooding

Are there any geological indicators of flooding within 250m of the study site? Yes

This dataset identifies the presence of superficial geological deposits which indicate that the site may be, or have been in the past, vulnerable to inland and/or coastal flooding. This assessment does not take account of any man-made factors such as flood protection schemes, and the data behind the report are purely geological.

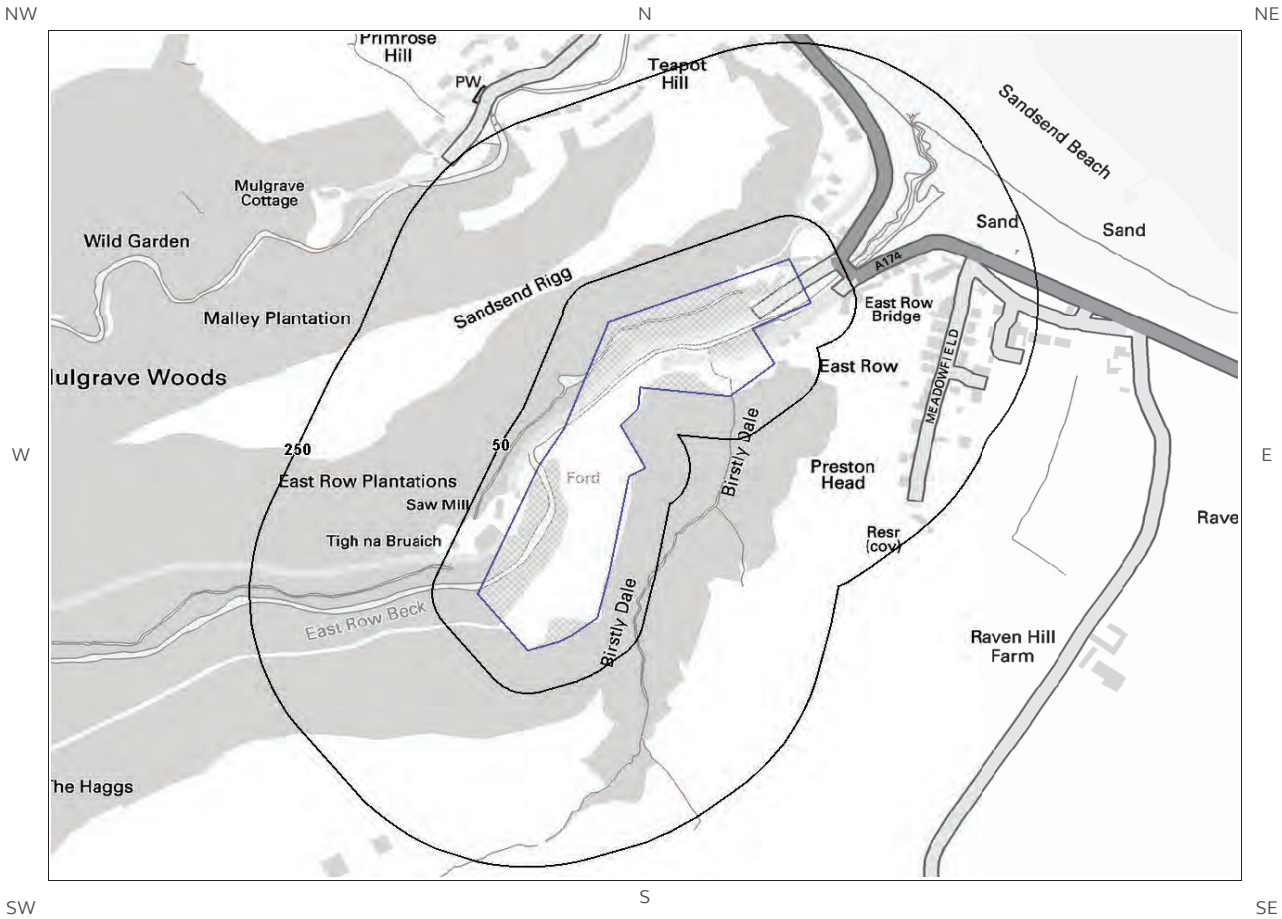
Distance	Direction	Description
210.0	NE	Higher flood potential from the sea: the first areas to experience the effects of coastal flooding.

Notes on BGS Geological Indicators of Flooding data:

The BGS Geological Indicators of Flooding (GIF) data set is a digital map based on the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50). It was produced by characterising Superficial (Drift) Deposits on DiGMapGB-50 in terms of their likely vulnerability to flooding, either from coastal or inland water flow. These Superficial Deposits are considered 'recent' in geological terms, most having been formed in the later parts of the Quaternary geological period (i.e. within the last few tens of thousands of years). Observations made during recent major inland and coastal flooding events have demonstrated that the erosion and deposition of these recent geological sediments have produced subtle topographical variations, resulting in landforms such as fluvial and coastal floodplains. The mapping of these landforms, in conjunction with the fluvial and/or coastal deposits that underlie them, has in turn determined the extent of previous coastal and inland flooding.

On this basis, the floodplains which are at greatest risk from flooding can be both visualised and defined by Superficial Deposits as depicted on geological maps. These include deposits such as river alluvium and lacustrine (lake) alluvium, as well as the First River Terrace or 'Floodplain terrace' (raised flat areas adjacent to or within floodplains, which represent the level of the floodplain prior to the most recent episode of down-cutting). Older and higher river terraces have been excluded as they lie outside the geologically defined floodplain. Areas at risk from coastal inundation are similarly characterised by a range of estuarine or marine deposits that include, for example, tidal flats.

8. JBA Canal Break map



JBA Canal Break legend

Site Outline

50
250
Search Buffers (m)

Areas at risk from Canal Breach

8. JBA Reservoir and Canal Data

8.1 JBA Reservoir Failure Impact Modelling

Is the property located in an area identified as being at potential risk in the event of a reservoir failure? No

JBA consulting have modelled the flooding impact from 1,700 reservoirs in England and Wales, should there be a catastrophic failure of a reservoir wall or embankment. This data is not displayed on mapping.

Guidance: None required

Notes on Reservoir Failure Impact data:

This dataset identified areas that are most likely to flood following the sudden catastrophic failure of a reservoir and is provided by JBA Consulting. JBA has identified over 1,700 reservoirs that pose a risk to people and property. These maps identify properties that would flood in the unlikely event of the failure of the reservoir's dam or embankment. Empirical methods were used to predict the flow that would result from the failure which was then modelled onto high resolution Digital Terrain Models (DTM) using JBA's advanced 2D hydraulic modelling techniques. The model provides the maximum depth of flooding in each cell of the DTM.

8.2 JBA Canal Break Modelling

Is the property located within 500m of an area identified as being at potential risk in the event of a canal break? No

Database searched and no data found.

Notes on Canal Break modelling data

Canal failure mapping includes two types of failure:

- Breach of raised canal embankments - failure of the embankment due to weaknesses; these are typically caused by erosion or animal burrowing but can also arise from poor maintenance.
- Aqueduct failure - an aqueduct is where the canal passes over infrastructure such as roads, railways and subways, or over other canals and rivers. Failures of these are typically caused by the collapse of the underlying culvert.

A length of over 1,700km of canal covering England, Wales and Scotland was modelled. The canal modelling is restricted to the areas where LIDAR is available as the raised embankments are more defined in the LIDAR than in the Photogrammetry data. Each canal is categorised as part of the Merchant Shipping Notice (MSN 1776 (M)). The majority of the modelled canals are categorised as A, with a few exceptions, which fell under category B.

- Category A: narrow rivers and canals where the depth of water is generally less than 1.5m.
- Category B: wider rivers and canals where the depth of water is generally 1.5m or more and where the significant wave height could not be expected to exceed 0.6m at any time.
- Category C: tidal rivers and estuaries and large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2m at any time.
- Category D: tidal rivers and estuaries where the significant wave height could not be expected to exceed 2m at any time.

The canal map provides flood extent data only and show flooded areas with a depth greater than 0.1m.

Contact Details

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British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG

Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre, PO Box 544

Email: enquiries@environment-agency.gov.uk

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SO16 0AS

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Authority: Scarborough Borough Council

Web: http://www.scarborough.gov.uk/
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
https://www.groundsure.com/terms-and-conditions-may25-2018

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Prepared on behalf of

NYMNPA

23/12/2020

The Mulgrave Estate

Proposed Car Park
The Mulgrave Estate
Sandsend

Transport Assessment

VAT No. GB 873219218
Company No. 3235830
Registered Office
Sanderson House, Jubilee Way
Grange Moor WF4 4TD

IHE

Acknowledgements:

National Geographic Society Interactive MapMaker has been used to create figures within this report.

Accident data has been obtained from www.crashmap.co.uk

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

Any information provided by third parties and referred to herein has not been checked or verified by Sanderson Associates (Consulting Engineers) Ltd, unless otherwise expressly stated within this report.

This report was checked and approved on the 21 December 2020 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

Copyright

Report Ref:	11613/001/02		
Author:	Brett Littlewood		
Checked & Approved:	Karen Smith MIHE	**Date:**	December 2020

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Appendices

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APPENDIX B

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APPENDIX C

Proposed Site Layout

APPENDIX D

Drawing 11613-003 – Access Arrangements

1 Introduction

1.1 Sanderson Associates (Consulting Engineers) Ltd has been appointed by The Mulgrave Estate to advise on traffic and transportation issues surrounding their development proposals within their estate on land of the A174, Sandsend.

1.2 The proposal comprises the development of a 150 space surface level car park with improvements to the existing site access on to the A174 adjacent to East Row Bridge.

1.3 In accordance with the Planning Practice Guidance 'Transport evidence bases in plan making and decision taking' this Transport Assessment addresses key transport issues including:

- the local highway network
- the access arrangements to the proposed development
- the proposed development and its operational facilities
- the impact of the development on the local highway network in terms of highway safety
- accessibility of the site in relation to sustainable transport and local facilities

1.4 The revised National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied.

1.5 NPPF paragraph 108 states that;

"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

a) Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, give the type of development and its location;

b) Safe and suitable access to the site can be achieved for all people; and

c) *Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."*

1.6 Paragraph 109 goes on to say;

"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

1.7 This Transport Assessment seeks to demonstrate that the residual cumulative impacts of the development are note severe in the context of NPPF, and therefore, should not be prevented on transport grounds.

2 Existing Situation

2.1 Site and Surrounding Area

2.1.1 The existing site comprises land within the Mulgrave Estate which is accessed from a simple priority give-way junction with the A174, directly to the north of East Row Bridge. Towards the north-eastern extent of the site is the Bridge Cottage Bistro, a gift shop, holiday cottages and land currently used for 'All Day' car parking. The car park has an approximate capacity for 27 vehicles, plus an additional 6 spaces reserved for use by the bistro and gift shop.

2.1.2 To the rear of the existing parking area is a gated access which provides restricted vehicle access to other properties within the Mulgrave Estate. Public access beyond the gate is available to pedestrians only, with footpaths and nature trails provided throughout the surrounding Mulgrave Woods. Mulgrave woods are open to the public from dawn to dusk on Wednesdays, Saturdays and Sundays throughout the year except for the month of May when the woods are closed for the entire month.

Figure 1 – Site Location ***[NatGeo]***

2.2 Local Highway Network

2.2.1 The A174 is the main coastal route between Teeside and Whitby and serves as the arterial route through Sandsend. Within the vicinity of the site access the A174 is a single carriageway road subject to a speed limit of 30mph.

2.2.2 Approximately midway through Sandsend, adjacent to the site access, the A174 passes over East Row Beck and at this point is known as East Row Bridge. Narrow footways are present on both sides of the bridge, however, in 2017 a separate footbridge was installed adjacent to East Row Bridge to provide an alternative crossing facility for pedestrians and improve highway safety.

2.2.3 In proximity to the site, double yellow lines are present on both sides of the road to prevent on street parking. However, sections of on-street parking are available along the A174 to the north and south of Sandsend. The location and extent of available on-street and off-street car parking facilities are illustrated at **Appendix A**.

2.3 Vehicle Speeds

2.3.1 In order to determine the existing 85th percentile wet weather speeds of vehicles approaching the site access from both directions; 2 Nº Automatic Traffic Counters (ATCs) were installed by Road Data Services Ltd. The ATCs were positioned to the left (approximately 50m north) and to the right (on the centre of the bridge) of the site access. The ATCs were installed on 10/11/2017 for a 7-day period to record the volume and speeds of traffic approaching the existing site access. The results of the ATCs are contained at **Appendix B** and are summarised in the following table:

Table 2.3.1 – ATC summary

REF:	Direction	Average	85th Percentile Wet Weather Speed
ATC 1	South bound	23.1mph	28.1mph
ATC 2	North-westbound	12.1mph	14.7mph

2.3.2 As can be seen from the above table the 85th percentile wet weather speeds for vehicles travelling southbound and north-westbound of the proposed site access are 28.1mph and 14.7mph respectively.

2.3.3 The 85th percentile wet weather speeds are below 37.3mph, the relevant guidance for calculating visibility splays is contained within Manual for Streets 2. In accordance with the 85th percentile wet weather speeds and guidance contained within Manual for Streets 2 the proposed site access would require stopping sight distances (SSDs) of 17.2m to the south and 39.1m to the north.

2.4 Personal Injury Accident Data

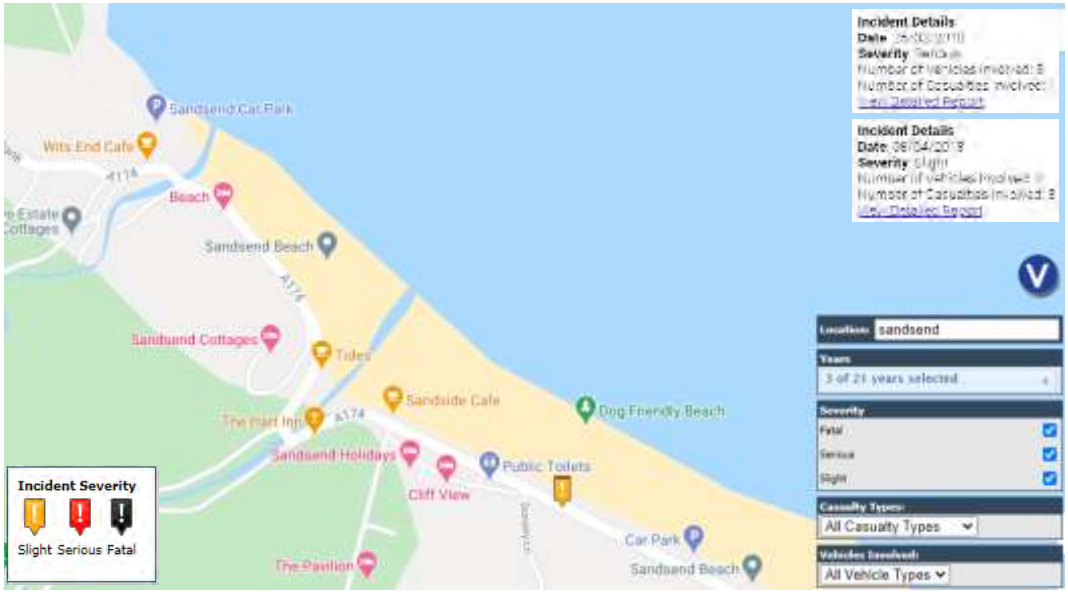
2.4.1 National guidance on Travel Plans, Transport Assessments and Statements states that assessments should include;

"An analysis of the injury accident records on the public highway in the vicinity of the site access for the most recent 3-year period, or 5-year period if the proposed site has been identified as within a high accident area;"

2.4.2 As the site is not considered to be located within a "high accident area", in line with national guidance, this section of the report provides an analysis of the injury accident records on the public highway in the vicinity of the site for the most recent 3-year period.

2.4.3 **Figure 2**, overleaf, is an extract from the Crashmap databased which identifies the location and injury severity of all recorded incidents that have occurred within the latest three year period (1st Jan 2017 – 31st Dec 2019).

Figure 2 – Crashmap extract



2.4.4 The Crashmap database shows that throughout Sandsend, two incidents resulting in personal injury have been recorded; one 'slight' in severity and one 'serious'. Both incidents occurred in 2018 and both took place in relative proximity to the bus stops adjacent the A174 / Dunsley Lane junction (approximately 400m from the site access).

2.4.5 Based on the available information it is considered that there are no material accident trends on the local highway network that are likely to be exacerbated by the proposed development.

3 Proposed Development

3.1 Overview

3.1.1 The proposal comprises the development of a 150 space surface level car park with improvements to the existing site access on to the A174 adjacent to East Row Bridge. The parking comprises of 140 Standard spaces, 8 disabled spaces and 2 electric charging spaces. In addition to car parking the facility will provide 2 motorcycle spaces and 8 cycle bays. The car park will be operate a pay on foot system and will be controlled by ANPR cameras. A copy of the proposed site layout is included at **Appendix C**.

3.1.2 Vehicle access will be via an improved access to the north of the East Row Bridge, whilst pedestrian access to the wider Sandsend area will be via an existing footpath (public right of way) which provides a pedestrian connection to the south of the East Row Bridge. Pedestrians will be directed to use this route via the use of signage. An internal footpath connection will be provided to the Lime Kiln Facility and the existing uses within the site.

3.2 Access and Highway Improvements

3.2.1 Drawing 11613-003 at **Appendix D** shows the proposed improved access arrangement which provides visibility splays, from an x-distance of 2.4m, of 33m to the right (south-east) of the access and 66m to the left (north). Based on the results of the 7-day ATC survey detailed in Section 2.3, the available visibility splays are considered to be adequate in relation to the recorded 85th percentile speeds of approaching vehicles in either direction.

3.2.2 The access features a 6.0m wide carriageway and has a 6.0m junction radius on the south side of the access and an 8.0m radius on the north side of the access.

3.2.3 Through consultation with the local highway authority it was noted that efforts should be made to discourage the generation of any pedestrian movements across East Row Bridge. Pedestrians will be directed to use the existing footpath (public right of way) which provides a pedestrian connection to the south of the East Row Bridge.

4 Accessibility by Sustainable Travel

4.1 As part of the Transport Assessment process, it is usual practice to consider the accessibility of the site by sustainable travel modes such as walking, cycling and public transport; so as to identify opportunities to reduce the number of vehicle trips generated by the proposal and reduce the traffic impact on the local highway network. However, due to the nature of the proposal, a car park, its users are all expected to arrive and depart the site by car or motor cycle. Provision for cyclists is also provided.

4.2 Notwithstanding the above, it is acknowledged that upon arrival, people are likely to continue their journey on foot and may wish to access public transport services connecting to other local destinations such as Whitby. Therefore, a brief audit of the existing pedestrian infrastructure (and the proposals to improve it) and public transport services is provided below.

4.3 Accessibility by Walking

4.3.1 Department for Transport guidance 'Building Sustainable Transport into New Developments' (2008) gives the following advice:

"Walkable neighbourhoods are typically characterised as having a range of facilities within 10 minutes walking distance (around 800m). However, the propensity to walk or cycle is not only influenced by distance but also the quality of the experience; people may be willing to walk or cycle further where their surroundings are more attractive, safe and stimulating."

4.3.2 The site is centrally located within Sandsend, as such, all of the main facilities and attractions are available within the site's 'walkable neighbourhood'. These include;

- Bus stops along the A174
- Entrances to Sandsend Beach
- Public Toilets
- Sandsend Stores, Wild Hart Gift Shop and Serendipity Gift Shop
- The Hart Inn and Bridge Cottage Bistro

- Sandside Café, Tides Café and Wits End Café

4.3.3 Footways are present along the extent of the A174 and a dedicated pedestrian footbridge is provided over East Row Beck.

4.4 Accessibility by Public Transport

4.4.1 The location of bus stops in proximity to the site are shown on **Figure 3**. These stops provide access to service numbers X4 and X4a which are operated by Arriva and run every 30 minutes (60 minutes on an evening) between Middlesbrough and Whitby via Loftus.

Figure 3 – Location of Bus Stops

4.5 Accessibility Summary

4.5.1 It is considered that the existing pedestrian infrastructure, will be sufficient to accommodate the volume of pedestrian movement generated by the proposed car park. Furthermore, the site is suitably located in terms of providing access to local public transport services.

5 Parking Demand

5.1 This section of the report provides an analysis of existing car parking demand within Sandsend based on ticket sales data obtained from Scarborough Borough Council and a parking survey undertaken by Sanderson Associates on Sunday 6th September 2020.

5.2 Overview of Existing Parking Facilities in Sandsend

5.2.1 A mixture of on-street and off-street parking is provided throughout Sandsend, with seasonal Pay & Display charges applicable from 01 March – 31 October. A limited number of unrestricted on-street parking spaces are also available along the A174 towards the northern extent of the village. The plan at **Appendix A** illustrates the location, extent and capacity of the available parking facilities. For reference, a summary is provided within the table below:

Table 5.2 – Sandsend Parking Summary

SA Zone	Description	Charges	Capacity
A	Sandsend car park	P&D	98
B	On-street (A174 - North of E Row Bridge)	Free	11
C	On-street (A174 - North of E Row Bridge)	Free	12
D	Mulgrave Estate	P&D	28
E	Land adj. Dunsley Lane	Free	17
F	On-street (A174 - South-east of Dunsley Lane)	P&D	53
G	On-street (A174 - South-east of Dunsley Lane)	P&D	24
H	On-street (A174 - South-east of Dunsley Lane)	P&D	22

5.2.2 It should be noted that the capacity of Zone B and C is based on on-site observations and equates to 5.0m per vehicle. These spaces are located directly outside residential / hospitality properties and, as such, the available parking is predominantly utilised by the occupants and the spaces are occupied throughout the day.

5.2.3 Zones D and E are both informal off-street parking areas, without any marked bays; as such, the capacities have been estimated based on on-site observations and satellite imagery.

5.2.4 Zones F, G and H are all parking layby's along the A174. These facilities are more commonly utilised by tourists and are occupied by a wider range of vehicles, including cars with trailers, camper vans and ice cream vans, etc. The capacity for these zones has been estimated based on 6.0m per vehicle.

5.3 Parking Survey

5.3.1 A parking stress survey was undertaken by Sanderson Associates on Sunday 6th September 2020 between the hours of 10am – 4pm, with car parking occupancies recorded at 30 minute intervals throughout the survey period. The results of the survey are summarised below:

Table 5.3 – Sandsend Parking Survey Results

Zone	A = 98		B = 11		C = 12		D = 28		E = 17		F = 53		G = 24		H = 22		Total = 265	
Time	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%
10:00	50	51%	10	91%	10	83%	4	14%	14	82%	30	57%	4	17%	2	9%	**124**	**47%**
10:30	56	57%	10	91%	11	92%	7	25%	11	65%	44	83%	13	54%	10	45%	**162**	**61%**
11:00	73	74%	11	100%	12	100%	10	36%	12	71%	47	89%	22	92%	19	86%	**206**	**78%**
11:30	82	84%	11	100%	11	92%	22	79%	13	76%	49	92%	22	92%	20	91%	**230**	**87%**
12:00	98	100%	10	91%	11	92%	24	86%	13	76%	48	91%	21	88%	19	86%	**244**	**92%**
12:30	99	101%	11	100%	11	92%	25	89%	14	82%	48	91%	25	104%	20	91%	**253**	**95%**
13:00	90	92%	11	100%	11	92%	27	96%	12	71%	48	91%	22	92%	19	86%	**240**	**91%**
13:30	89	91%	11	100%	10	83%	24	86%	15	88%	49	92%	23	96%	20	91%	**241**	**91%**
14:00	87	89%	11	100%	10	83%	21	75%	12	71%	45	85%	21	88%	20	91%	**227**	**86%**
14:30	91	93%	8	73%	11	92%	20	71%	10	59%	45	85%	21	88%	18	82%	**224**	**85%**
15:00	95	97%	11	100%	11	92%	14	50%	11	65%	46	87%	19	79%	19	86%	**226**	**85%**
15:30	73	74%	11	100%	11	92%	10	36%	10	59%	44	83%	16	67%	14	64%	**189**	**71%**
16:00	64	65%	9	82%	11	92%	7	25%	9	53%	41	77%	15	63%	12	55%	**168**	**63%**

5.3.2 From the information above, the maximum occupancy (95%) was recorded at 12:30hrs, however, there was a sustained period of greater than 90% occupancy between 12:00hrs and 13:30hrs.

5.3.3 Again, it should be noted that the on-street parking capacities have been calculated based on an allowance of 6.0m per vehicle. In instances where there are a higher proportion of larger vehicles, or where people reserve themselves additional space to manoeuvre in / out of their spaces; the utilisation of space is less efficient and the practical capacity of each area is reduced.

5.3.4 Conversely, if the spaces are predominantly occupied by cars, and they are efficiently parked, then the practical capacity of each area could increase. This explains the instances whereby the recorded parking stress is greater than 100%.

5.3.5 Based on our site observations, during the peak period, vehicles were seen to experience difficulty finding a space, in particular within Zones F, G and H where vehicles did not efficiently use the available space. This resulted in vehicles effectively 'crawling' and causing delay to other vehicles, and also performing U-turn manoeuvres in the road.

5.4 Council Parking Data

5.4.1 Parking ticket sales data has been obtained from Scarborough Council for various Pay & Display machines throughout Sandsend. The data identifies the number of tickets sold, time of purchase and paid duration of stay.

5.4.2 Following analysis of the data, it was determined that it was not possible to provide a reliable conclusion for the on-street parking as a number of the machines appear to have been inactive / out of order for significant periods of the year. Nevertheless, a full set of data was available from the main off-street Sandsend Car Park (98 spaces). An analysis of this data is provided as follows:

Table 5.4.1 – Average Ticket Sales by Time of Day and Day of Week

Start	End	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Weekday Ave	Weekend Ave
06:00	09:30	4	3	3	3	4	7	10	4	8
09:30	10:00	4	4	4	5	4	6	8	4	7
10:00	10:30	6	7	6	7	7	9	12	7	10
10:30	11:00	8	10	9	9	8	11	14	9	13
11:00	11:30	8	10	9	10	8	11	14	9	13
11:30	12:00	9	8	9	9	8	11	12	9	12
12:00	12:30	8	8	8	8	7	10	12	8	11
12:30	13:00	7	7	8	7	7	9	11	7	10
13:00	13:30	7	7	6	7	6	8	10	7	9
13:30	14:00	6	6	6	6	5	8	10	6	9
14:00	14:30	6	5	6	7	7	9	9	6	9
14:30	15:00	6	6	6	6	5	8	8	6	8
15:00	15:30	5	4	5	5	5	8	6	5	7
15:30	16:00	4	3	4	3	4	7	5	4	6
16:00	16:30	3	3	3	3	3	6	5	3	5
16:30	17:00	2	1	2	2	3	3	3	2	3
17:00	17:30	1	1	1	1	1	2	1	1	1
17:30	18:00	1	0	0	0	1	1	1	0	1

Table 5.4.2 – Average Total Ticket Sales Day of Week

Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Weekday Ave	Weekend Ave
96	92	95	100	90	132	151	95	141

5.4.3 From the above, it is clear that Sunday is typically the busiest day of the week in terms of ticket sales. Furthermore, the peak periods are consistent with those observed in Sanderson's Parking Survey on Sunday 6th September 2020.

5.4.4 To see how Sanderson's survey date compares with other Sundays, ticket sales data for Sandsend Car Park was obtained from Scarborough Council. This data identified a total of 195 ticket sales on 6th September 2020. Table 5.4.3 (overleaf) provides a comparison between the 2020 survey and all Sundays between the 1st March 2019 and 31st October 2019.

5.4.5 Table 5.4.3 shows that the survey day ranks as the 75th percentile amongst all Sundays in 2019 with 195 ticket sales. The lowest ticket sales occurred on 6th October 2019 (25 sold) and the greatest number of ticket sales occurred on 18th August 2019 (221 sold).

5.4.6 It is therefore considered that the observations made during Sanderson's survey are relatively robust, and are representative of typical activity throughout the year.

5.4.7 From this it can be concluded that Sandsend regularly experiences issues with car parking stress and would benefit from an increased provision of parking.

Table 5.4.3 – Comparison of Sunday Ticket Sales Data

Date	Tickets Sold
07 April 2019	113
14 April 2019	119
21 April 2019	207
28 April 2019	96
05 May 2019	150
12 May 2019	100
19 May 2019	149
26 May 2019	146
02 June 2019	162
09 June 2019	167
16 June 2019	157
23 June 2019	185
30 June 2019	189
07 July 2019	165
14 July 2019	155
21 July 2019	221
28 July 2019	173
04 August 2019	199
11 August 2019	170
18 August 2019	221
25 August 2019	211
01 September 2019	187
08 September 2019	214
15 September 2019	137
22 September 2019	149
29 September 2019	41
06 October 2019	25
13 October 2019	54
20 October 2019	74
27 October 2019	205

06 September 2020	195

Lowest	25
Highest	221
75th %ile	195

6 Trip Generation Assessment

6.1 From the ticket sales data provided by Scarborough Council, it is clear that activity during the week during the typical network peak periods of 08:00 – 09:00hrs and 17:00 – 18:00, is particularly low and would have no discernible impact on the operation of the local highway network. Nevertheless, the following analysis provides an estimation of the likely traffic generations throughout the day for the proposed 150 space car park.

6.2 The average paid duration of stay recorded throughout 2019 was 2hr 44 minutes. However, it is acknowledged that many people are likely to depart prior to their parking ticket expiring and have a tendency to over-estimate their expected duration of stay. Therefore, for the purpose of providing a robust assessment, an average 2hr duration of stay for all vehicles has been assumed.

Table 6.2 – Predicted Vehicle Trips

Time Period		Weekday Ave			Weekend Ave		
Start	End	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
00:00	09:30	6	0	6	13	0	13
09:30	10:00	6	0	6	11	0	11
10:00	10:30	11	0	11	15	0	15
10:30	11:00	14	0	14	20	0	20
11:00	11:30	14	6	20	20	13	33
11:30	12:00	14	6	20	18	11	29
12:00	12:30	13	11	24	17	15	32
12:30	13:00	11	14	25	15	20	35
13:00	13:30	11	14	25	14	20	34
13:30	14:00	9	14	23	14	18	32
14:00	14:30	9	13	22	14	17	31
14:30	15:00	9	11	20	13	15	28
15:00	15:30	8	11	18	11	14	25
15:30	16:00	6	9	15	9	14	23
16:00	16:30	5	9	14	8	14	22
16:30	17:00	3	9	12	5	13	18
17:00	17:30	2	8	10	2	11	13
17:30	23:59	0	15	15	2	24	26

6.3 Based on the information in Table 6.2 the development peak, if full, would be 12:30 – 13:30 on a weekend, at which time it could generate in the order of 69 vehicle movements (two-way). This equates to ~ 1 vehicle movement per minute.

6.4 The car park is proposed to accommodate surplus demand for car parking within Sandsend, and whilst the vehicle movements may be new to the site access there will be no perceivable increase in traffic throughout Sandsend.

6.5 As stated in Para 5.3.2: *"during the peak period, vehicles were seen to experience difficulty finding a space. This resulted in vehicles effectively 'crawling' and causing delay to other vehicles, and also performing U-turn manoeuvres in the road".* The proposed car park will help to reduce the incidence of these poor manoeuvres / driver behaviours.

6.6 It is, therefore, considered that the development is unlikely to adversely impact on highway capacity, during either network or development peak periods.

7 Summary and Conclusions

7.1 Sanderson Associates (Consulting Engineers) Ltd has been appointed by The Mulgrave Estate to advise on traffic and transportation issues surrounding their development proposals within their estate on land of the A174, Sandsend.

7.2 The proposal comprises the development of a 150 space surface level car park with improvements to the existing site access on to the A174 adjacent to East Row Bridge. The parking comprises of 140 Standard spaces, 8 disabled spaces and 2 electric charging spaces. In addition to car parking the facility will provide 2 motorcycle spaces and 8 cycle bays. The carpark will be operate a pay on foot system and will be controlled by ANPR cameras.

7.3 Vehicle access will be via an improved access to the north of the East Row Bridge, whilst pedestrian access to the wider Sandsend area will be via an existing footpath (public right of way) which provides a pedestrian connection to the south of the East Row Bridge. Pedestrians will be directed to use this route via the use of signage. An internal footpath connection will be provided to the Lime Kiln Facility and the existing uses within the site.

7.4 It is considered that the existing pedestrian infrastructure, will be sufficient to accommodate the volume of pedestrian movement generated by the proposed car park. Furthermore, the site is suitably located in terms of providing access to local public transport services.

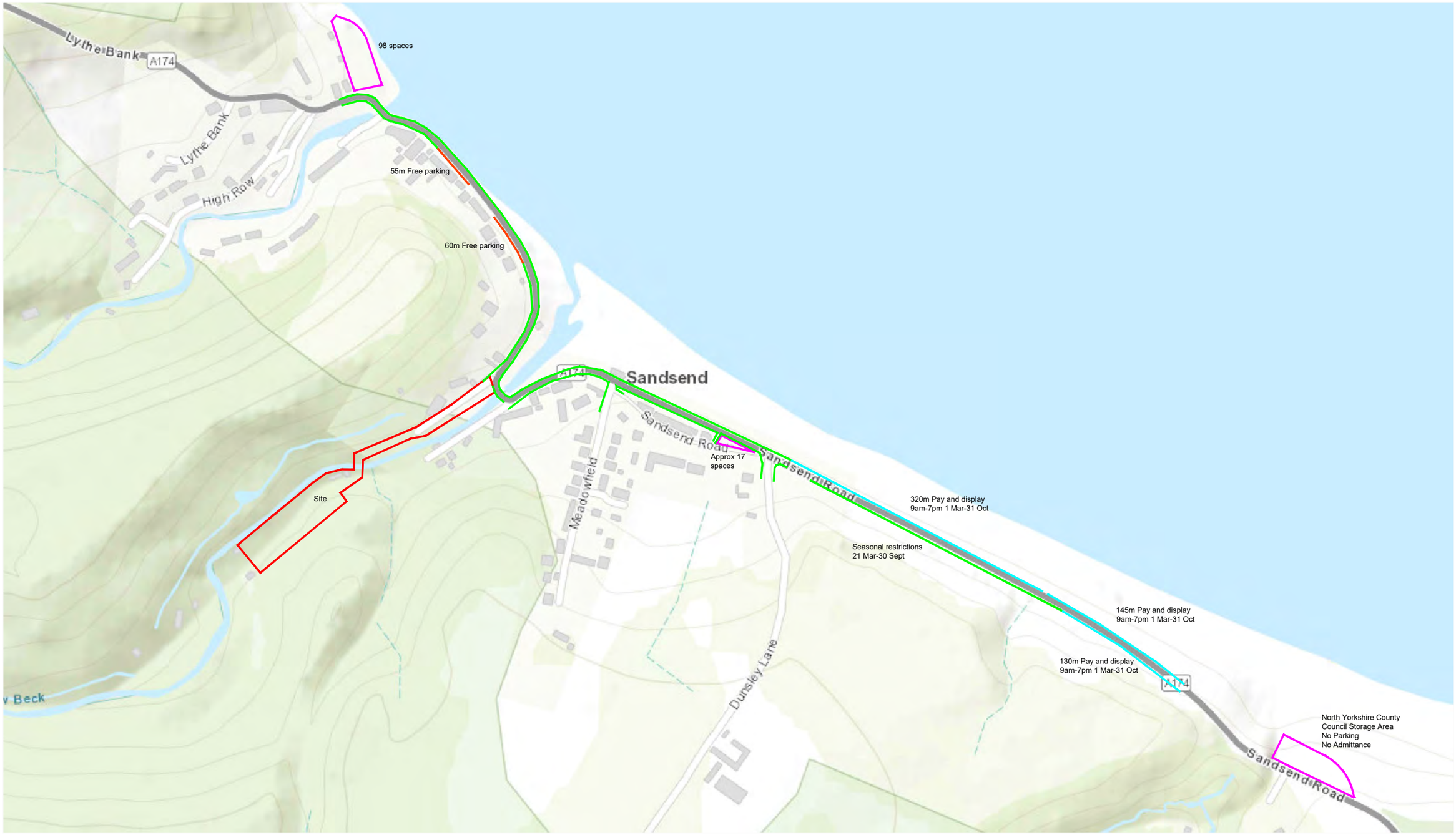
7.5 The development peak if the car park was full would be 12:30 – 13:30 on a weekend, at which time it could generate in the order of 69 vehicle movements (two-way). This equates to ~ 1 vehicle movement per minute.

7.6 The car park is proposed to accommodate surplus demand for car parking within Sandsend, whilst the vehicle movements may be new to the site access there will be no perceivable increase in traffic throughout Sandsend. It is therefore considered that the development is unlikely to adversely impact on highway capacity, during either network or development peak periods.

7.7 With reference to the National Planning Policy Framework it is considered that the residual cumulative impacts of the development on the road network would not be severe and should therefore not be prevented on highways grounds.

APPENDIX A

Existing Parking Plan



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The Mulgrave Estate Car Park
Eastbeck, Sandsend

Sandsend Parking Areas

Rev	Amendment	Drawn	Date	Checked

Scale NTS	Drawn By CH
Drawing Size A3	Checked By SB
Date September 2020	Approved By KS
Drawing Number Figure ?	Rev -

FILE REF:

APPENDIX B

Speed Survey Results

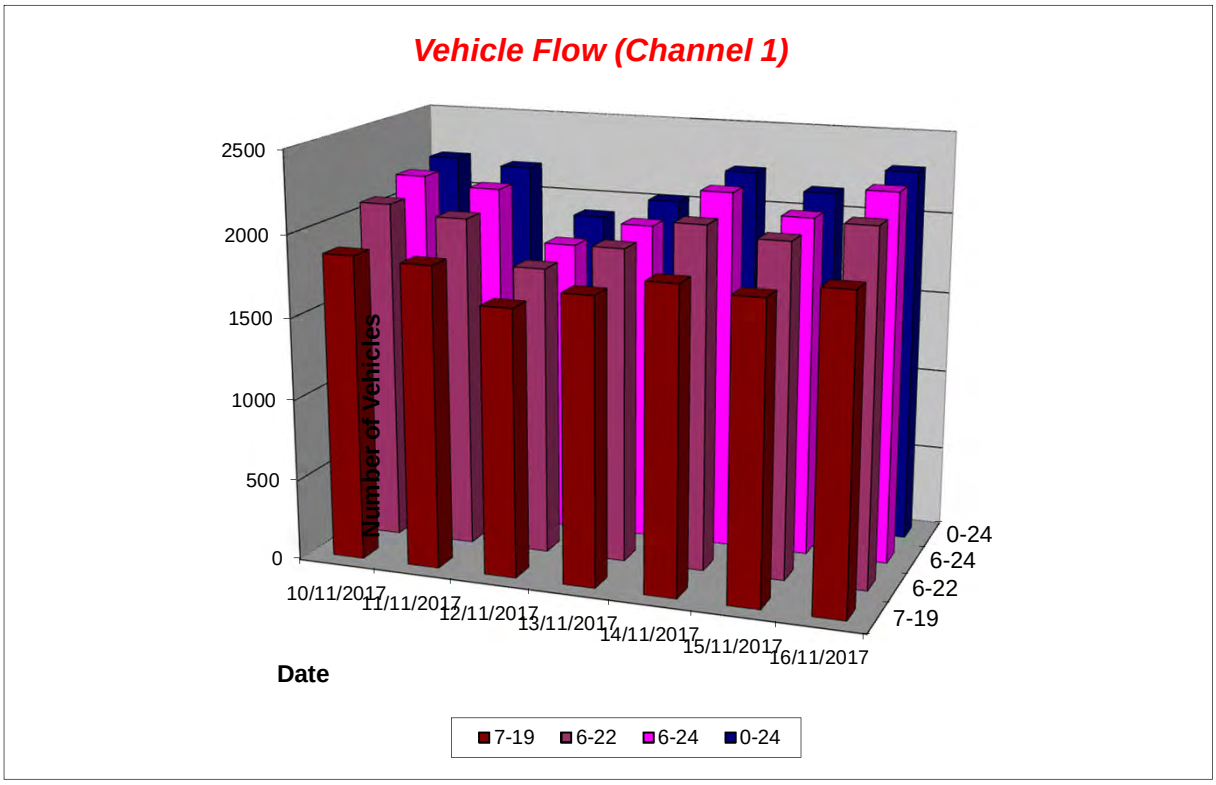
Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Vehicle Flow** | **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday	5 Day Ave	7 Day Ave
1	6	22	40	13	10	9	12	10	16
2	2	9	14	5	2	5	2	3	6
3	0	3	10	3	1	4	2	2	3
4	1	6	11	4	1	4	1	2	4
5	3	6	1	8	7	11	4	7	6
6	27	10	9	29	18	28	14	23	19
7	29	12	10	29	38	24	45	33	27
8	86	40	28	106	98	104	91	97	79
9	118	59	30	125	139	129	148	132	107
10	143	95	93	147	126	156	128	140	127
11	142	160	177	140	137	134	143	139	148
12	158	167	181	166	153	168	163	162	165
13	163	188	213	131	162	129	170	151	165
14	167	221	198	131	163	139	158	152	168
15	202	211	178	177	194	181	187	188	190
16	222	224	212	203	224	211	244	221	220
17	211	227	155	177	204	199	202	199	196
18	159	151	102	166	148	165	148	157	148
19	100	107	70	83	110	103	119	103	99
20	80	70	39	59	88	63	93	77	70
21	55	54	49	39	52	61	63	54	53
22	54	46	30	43	60	69	55	56	51
23	60	54	31	34	66	26	67	51	48
24	30	41	16	8	36	17	38	26	27

7-19	1871	1850	1637	1752	1858	1818	1901	1840	1812
6-22	2089	2032	1765	1922	2096	2035	2157	2060	2014
6-24	2179	2127	1812	1964	2198	2078	2262	2136	2089
0-24	2218	2183	1897	2026	2237	2139	2297	2183	2142



Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound **Average Speed** **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	24.7	27.4	24.8	25.7	27.6	26.2	27.4
2	30.0	27.0	26.7	25.2	26.3	24.4	24.4
3	-	25.3	26.8	30.7	25.3	30.0	29.1
4	27.6	26.6	25.5	25.4	26.8	25.0	27.7
5	28.7	30.1	25.9	25.3	24.3	25.1	24.8
6	27.3	28.2	25.0	26.5	26.4	26.7	26.1
7	25.5	24.0	23.8	25.9	25.0	25.3	25.1
8	23.7	24.0	25.0	24.6	23.8	24.6	24.0
9	24.3	23.4	23.6	24.0	23.2	23.6	23.4
10	23.6	23.5	22.4	23.8	23.7	23.3	23.7
11	22.0	21.6	21.7	22.7	22.4	22.6	22.6
12	23.0	22.1	21.9	22.9	22.9	22.5	22.8
13	22.9	22.5	21.4	22.2	23.3	22.2	23.0
14	22.8	21.9	21.0	22.8	23.1	22.6	22.9
15	22.6	22.8	21.6	22.2	22.7	21.9	22.6
16	22.8	22.4	22.3	23.1	22.3	22.6	22.7
17	23.5	23.2	23.0	23.4	23.1	23.2	23.2
18	24.2	23.5	23.8	24.3	23.8	23.8	24.3
19	24.5	23.3	24.3	24.3	24.6	25.2	24.7
20	25.0	24.1	25.0	24.2	24.4	25.3	24.4
21	24.7	23.3	24.7	25.0	25.8	23.9	25.7
22	24.9	25.8	24.6	25.7	25.2	24.8	24.9
23	25.1	23.9	23.8	26.6	25.0	26.2	24.8
24	25.4	25.3	25.3	29.7	25.5	26.3	25.4
10-12	22.5	21.9	21.8	22.8	22.7	22.5	22.7
14-16	22.7	22.6	21.9	22.7	22.5	22.3	22.6
0-24	23.6	23.0	22.5	23.6	23.5	23.4	23.5

Average	23.3

Channel 1 - Northbound **85th Percentile**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	28.6	32.7	28.4	29.8	32.0	30.3	33.8
2	33.3	28.5	30.1	29.3	27.1	27.8	26.6
3	-	27.6	29.5	33.9	-	33.0	29.4
4	-	28.9	29.9	27.5	-	28.7	-
5	30.6	34.0	-	29.5	27.5	28.8	27.0
6	31.2	30.7	28.0	29.0	28.8	29.4	28.9
7	29.1	29.0	28.9	29.8	27.9	29.8	28.6
8	27.4	28.3	29.5	28.1	27.7	28.2	27.3
9	27.2	26.3	27.2	27.5	27.1	26.9	27.8
10	27.3	26.9	25.5	28.2	27.2	27.4	27.5
11	26.4	24.8	24.9	25.9	25.8	26.4	25.4
12	27.1	25.6	25.5	26.4	25.7	25.6	25.8
13	26.3	25.7	25.1	25.1	26.8	25.4	26.3
14	26.7	24.7	24.6	26.3	26.5	25.7	26.5
15	25.7	25.7	25.1	25.6	25.7	25.5	25.5
16	25.9	25.3	25.4	26.2	25.3	26.1	25.8
17	27.0	26.3	26.1	27.1	26.5	26.6	26.8
18	28.1	26.3	27.0	27.9	27.6	27.8	28.2
19	27.6	25.7	28.4	27.6	28.5	28.6	28.7
20	29.3	27.4	28.6	27.7	27.3	28.6	27.3
21	27.8	27.2	29.0	28.7	29.4	28.5	29.2
22	28.6	30.2	28.0	30.2	29.7	28.7	27.9
23	27.9	27.8	27.9	29.6	29.3	29.8	27.6
24	29.4	27.8	27.4	33.5	28.4	31.9	28.3
10-12	26.7	25.3	25.3	26.2	25.8	26.2	25.6
14-16	25.9	25.6	25.4	25.9	25.5	25.8	25.6
0-24	27.4	26.3	26.3	27.5	27.2	27.3	27.3

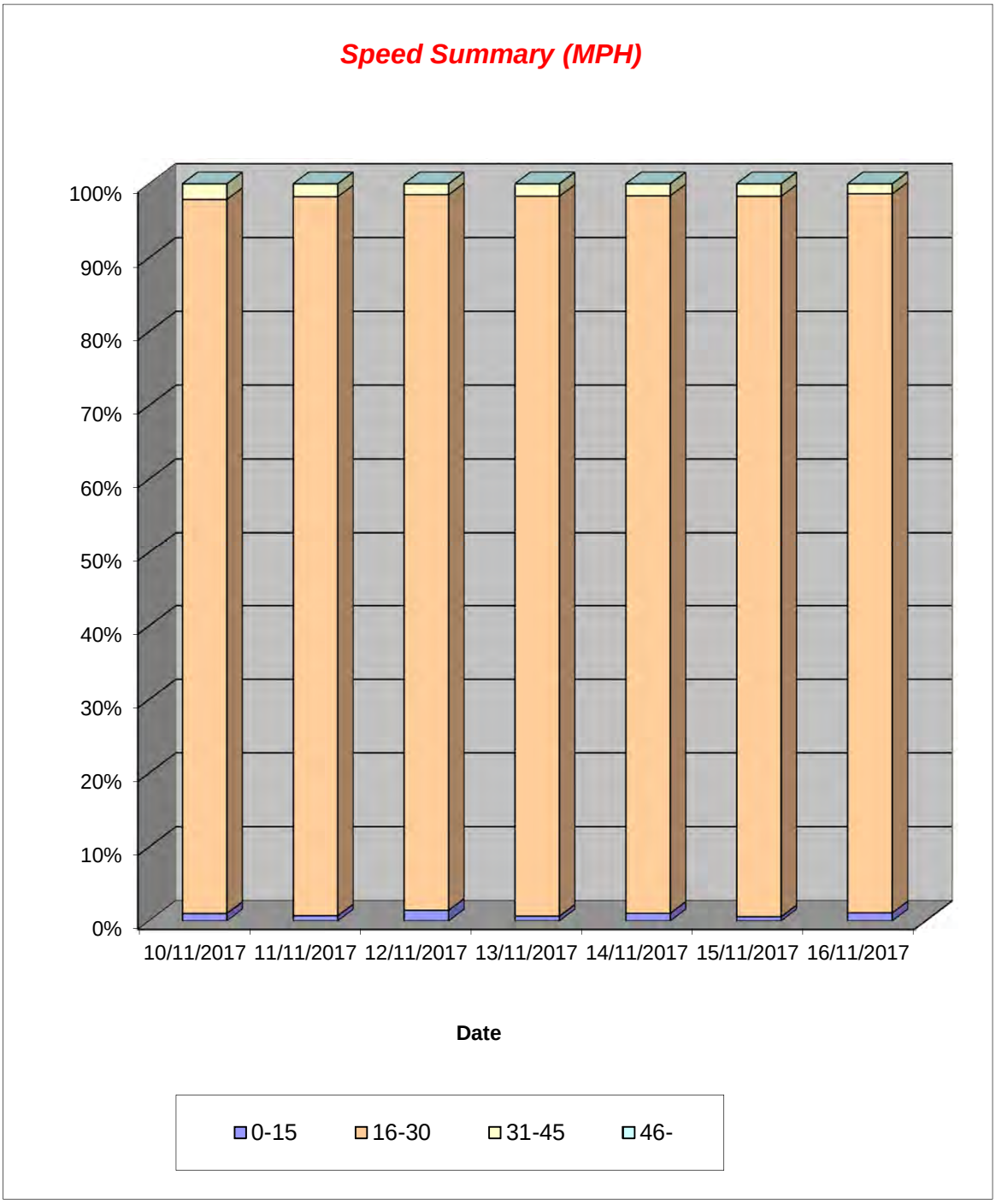
85th %ile	27.2

Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Speed Summary** | **Week 1**

Speed (MPH)	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
0-15	22	15	27	13	23	12	25
16-30	2149	2130	1842	1979	2178	2091	2241
31-45	47	38	28	34	36	36	31
46-	0	0	0	0	0	0	0
TOTAL	**2218**	**2183**	**1897**	**2026**	**2237**	**2139**	**2297**



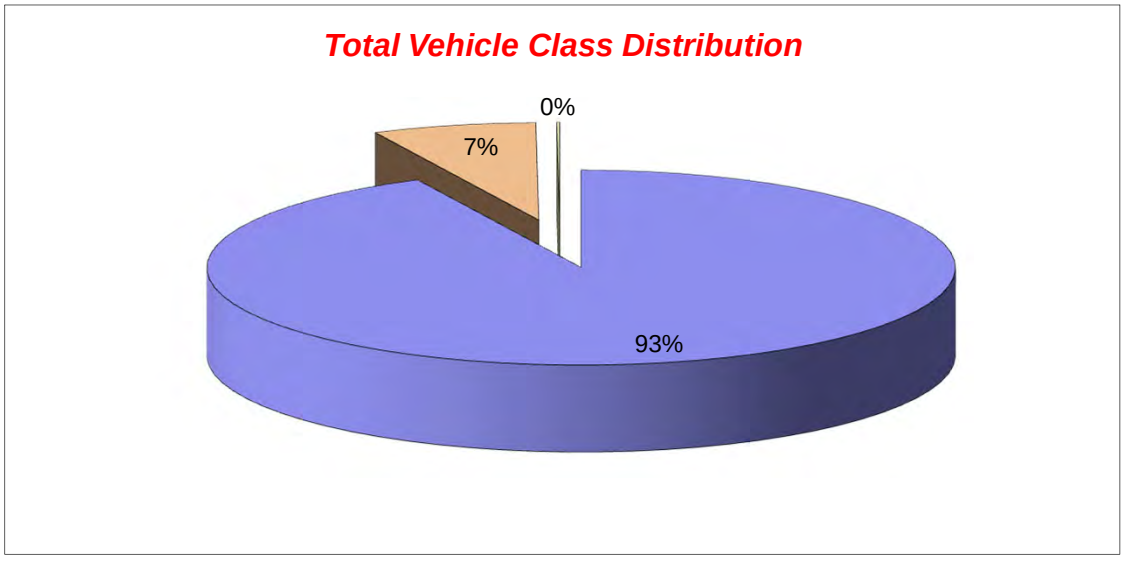
Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Vehicle Class** | **Week 1**

Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
10/11/2017				
7-19	1691	178	2	**1871**
6-22	1896	191	2	**2089**
6-24	1986	191	2	**2179**
0-24	2023	193	2	**2218**
11/11/2017				
7-19	1750	96	4	**1850**
6-22	1921	106	5	**2032**
6-24	2010	112	5	**2127**
0-24	2063	115	5	**2183**
12/11/2017				
7-19	1590	45	2	**1637**
6-22	1713	49	3	**1765**
6-24	1756	53	3	**1812**
0-24	1836	58	3	**1897**
13/11/2017				
7-19	1627	123	2	**1752**
6-22	1787	133	2	**1922**
6-24	1828	134	2	**1964**
0-24	1883	141	2	**2026**
14/11/2017				
7-19	1690	167	1	**1858**
6-22	1913	182	1	**2096**
6-24	2015	182	1	**2198**
0-24	2052	184	1	**2237**
15/11/2017				
7-19	1667	148	3	**1818**
6-22	1870	162	3	**2035**
6-24	1908	167	3	**2078**
0-24	1963	173	3	**2139**
16/11/2017				
7-19	1720	180	1	**1901**
6-22	1960	194	3	**2157**
6-24	2065	194	3	**2262**
0-24	2097	197	3	**2297**

Average				
7-19	1676	134	2	**1812**
6-22	1866	145	3	**2014**
6-24	1938	148	3	**2089**
0-24	1988	152	3	**2142**



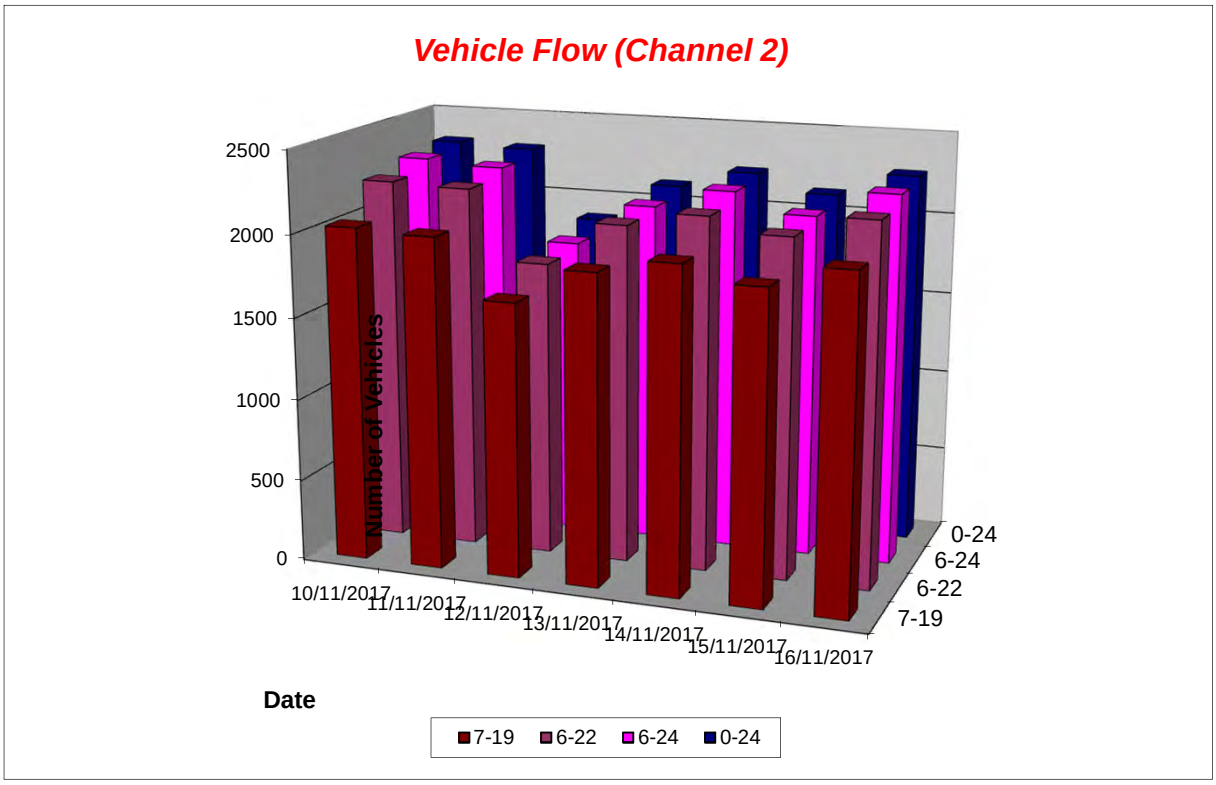
Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound | **Vehicle Flow** | **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday	5 Day Ave	7 Day Ave
1	3	9	27	4	2	3	3	3	7
2	1	6	12	10	1	8	1	4	6
3	1	9	5	3	2	2	2	2	3
4	1	3	6	0	1	0	1	1	2
5	5	1	1	5	4	6	4	5	4
6	21	12	4	19	19	22	14	19	16
7	47	27	15	46	41	56	45	47	40
8	137	71	53	141	134	141	143	139	117
9	225	108	62	209	191	201	202	206	171
10	181	169	128	177	169	167	169	173	166
11	176	174	207	169	182	156	181	173	178
12	178	221	183	149	157	145	163	158	171
13	198	254	220	169	203	161	206	187	202
14	176	228	204	161	172	152	172	167	181
15	170	230	227	150	161	149	156	157	178
16	201	227	143	178	204	200	214	199	195
17	181	158	115	189	184	186	194	187	172
18	109	116	73	109	109	125	102	111	106
19	104	60	53	82	104	93	106	98	86
20	64	78	46	60	60	56	62	60	61
21	43	52	36	41	42	50	44	44	44
22	35	38	27	29	33	22	30	30	31
23	30	30	18	17	26	17	30	24	24
24	33	19	11	5	32	11	29	22	20

7-19	2036	2016	1668	1883	1970	1876	2008	1955	1922
6-22	2225	2211	1792	2059	2146	2060	2189	2136	2097
6-24	2288	2260	1821	2081	2204	2088	2248	2182	2141
0-24	2320	2300	1876	2122	2233	2129	2273	2215	2179



Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Average Speed** **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	30.8	26.7	27.6	27.2	31.4	23.2	32.6
2	24.5	27.9	29.6	24.2	36.1	25.4	38.3
3	27.8	27.7	27.9	23.7	22.3	26.1	27.4
4	28.9	26.0	28.8	-	26.8	-	27.8
5	32.4	34.5	39.0	28.0	24.7	27.3	26.4
6	27.8	27.8	24.3	27.1	27.6	27.7	28.1
7	26.5	27.4	27.9	26.7	26.2	27.3	25.8
8	24.6	26.3	25.6	22.7	24.0	22.8	24.3
9	23.7	25.1	25.2	24.4	24.1	23.9	23.9
10	23.3	23.0	23.5	22.4	23.7	22.2	23.2
11	23.4	22.8	23.0	22.6	23.3	22.7	23.2
12	22.0	22.9	22.0	21.4	22.3	21.4	21.8
13	22.6	21.4	20.8	22.1	22.4	22.4	22.7
14	21.7	21.3	20.4	22.5	21.6	23.2	21.4
15	21.6	20.9	21.7	22.2	21.4	22.3	21.2
16	21.3	20.7	23.1	23.7	21.1	21.9	20.7
17	22.3	22.7	22.9	23.2	22.7	21.5	23.2
18	24.4	22.3	24.9	24.2	23.9	23.1	24.0
19	24.2	26.6	24.1	24.5	23.9	23.8	23.8
20	25.6	23.5	25.6	24.4	26.0	25.1	25.8
21	26.3	24.6	27.1	26.7	26.6	27.0	26.7
22	26.1	25.3	27.5	26.3	26.3	25.6	25.9
23	25.0	26.0	28.2	25.6	24.9	26.7	24.4
24	27.4	26.3	27.4	28.3	26.0	26.5	27.8
10-12	22.7	22.8	22.5	22.0	22.8	22.1	22.5
14-16	21.4	20.8	22.2	23.0	21.2	22.1	20.9
0-24	23.2	22.7	23.0	23.3	23.2	23.0	23.1

Average	23.1

Channel 2 - Southbound **85th Percentile**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	32.0	30.5	30.9	34.3	31.6	28.7	34.0
2	-	31.6	35.4	27.9	-	30.7	-
3	-	33.3	32.2	26.0	22.6	26.4	30.9
4	-	30.6	36.2	-	-	-	-
5	34.8	-	-	30.8	25.7	29.9	28.1
6	30.2	31.3	25.2	31.8	31.0	31.0	31.1
7	29.9	31.1	30.7	30.5	31.1	30.7	30.9
8	29.5	30.3	29.4	28.1	28.5	28.2	28.7
9	28.8	29.6	29.4	28.5	28.7	27.8	28.2
10	29.0	27.7	27.3	26.9	28.6	26.8	28.1
11	27.6	26.9	26.5	27.1	27.1	26.7	27.1
12	27.0	26.8	25.7	26.2	25.6	25.5	25.4
13	27.6	25.3	25.2	25.8	27.5	26.1	27.0
14	25.7	25.5	25.3	25.9	25.7	26.3	25.7
15	26.5	25.2	25.2	26.1	25.6	26.4	25.6
16	25.7	24.8	26.9	26.9	25.9	25.8	25.7
17	26.8	26.0	27.4	28.3	25.9	25.3	27.7
18	29.2	27.2	29.4	28.4	29.1	28.1	28.9
19	28.6	30.7	27.5	29.2	28.3	27.9	28.9
20	29.6	28.4	29.7	28.4	29.7	30.2	29.4
21	30.0	30.3	29.8	29.8	29.7	32.1	30.1
22	29.7	30.3	30.6	30.5	30.6	29.8	28.9
23	28.4	29.1	30.5	29.8	29.3	30.4	27.1
24	30.8	29.9	32.2	31.1	32.5	33.3	33.3
10-12	27.3	26.9	25.9	26.6	26.2	26.1	25.9
14-16	25.8	25.1	25.8	26.5	25.8	25.9	25.7
0-24	28.4	27.5	27.9	28.1	28.2	27.8	27.9

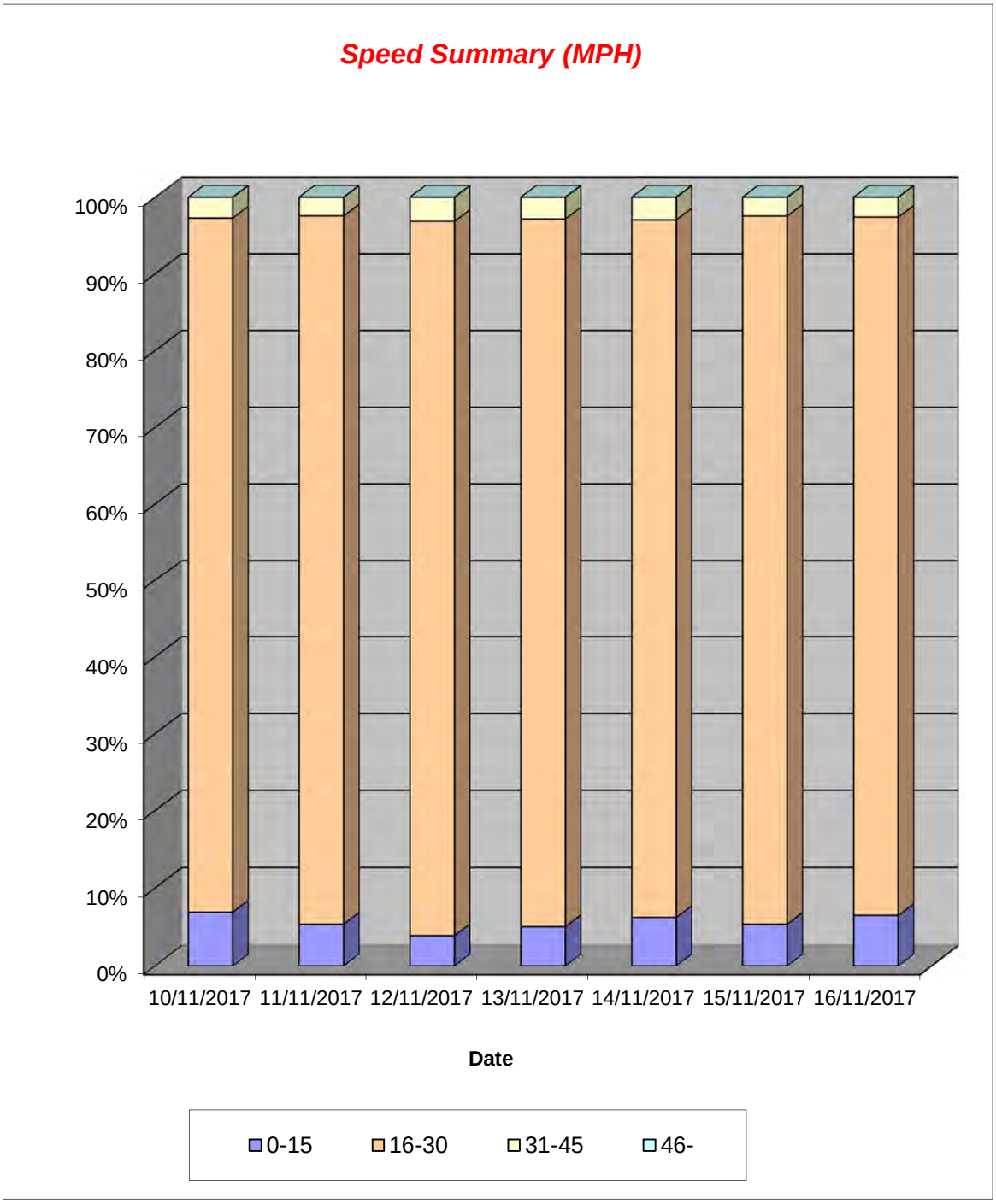
85th %ile	28.1

Whitby ATC 1, A174 (Northern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Speed Summary** **Week 1**

Speed (MPH)	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
0-15	160	123	73	107	139	114	147
16-30	2097	2121	1744	1955	2028	1963	2067
31-45	63	56	59	60	66	52	59
46-	0	0	0	0	0	0	0
TOTAL	**2320**	**2300**	**1876**	**2122**	**2233**	**2129**	**2273**



Whitby ATC 1, A174 (Northern Site)

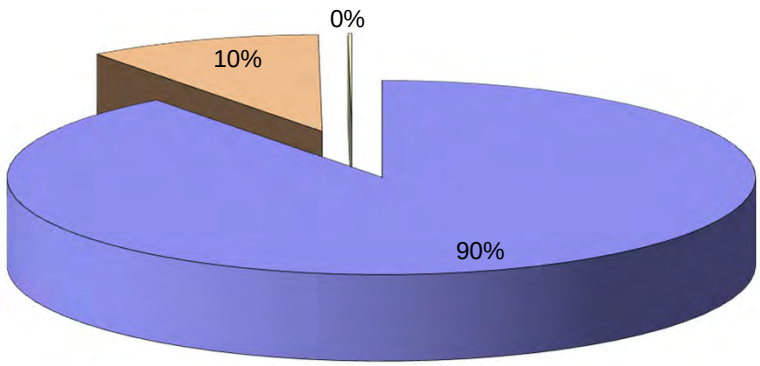
Produced by Road Data Services Ltd.

Channel 2 - Southbound | **Vehicle Class** | **Week 1**

Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
10/11/2017				
7-19	1800	234	2	**2036**
6-22	1970	253	2	**2225**
6-24	2027	259	2	**2288**
0-24	2055	263	2	**2320**
11/11/2017				
7-19	1864	149	3	**2016**
6-22	2043	165	3	**2211**
6-24	2089	167	4	**2260**
0-24	2125	170	5	**2300**
12/11/2017				
7-19	1569	97	2	**1668**
6-22	1680	110	2	**1792**
6-24	1707	112	2	**1821**
0-24	1755	119	2	**1876**
13/11/2017				
7-19	1665	215	3	**1883**
6-22	1823	233	3	**2059**
6-24	1844	233	4	**2081**
0-24	1879	239	4	**2122**
14/11/2017				
7-19	1727	241	2	**1970**
6-22	1883	259	4	**2146**
6-24	1935	265	4	**2204**
0-24	1962	267	4	**2233**
15/11/2017				
7-19	1670	203	3	**1876**
6-22	1841	215	4	**2060**
6-24	1869	215	4	**2088**
0-24	1903	222	4	**2129**
16/11/2017				
7-19	1772	234	2	**2008**
6-22	1932	253	4	**2189**
6-24	1985	259	4	**2248**
0-24	2007	261	5	**2273**

Average				
7-19	1724	196	2	**1922**
6-22	1882	213	3	**2097**
6-24	1922	216	3	**2141**
0-24	1955	220	4	**2179**

Total Vehicle Class Distribution



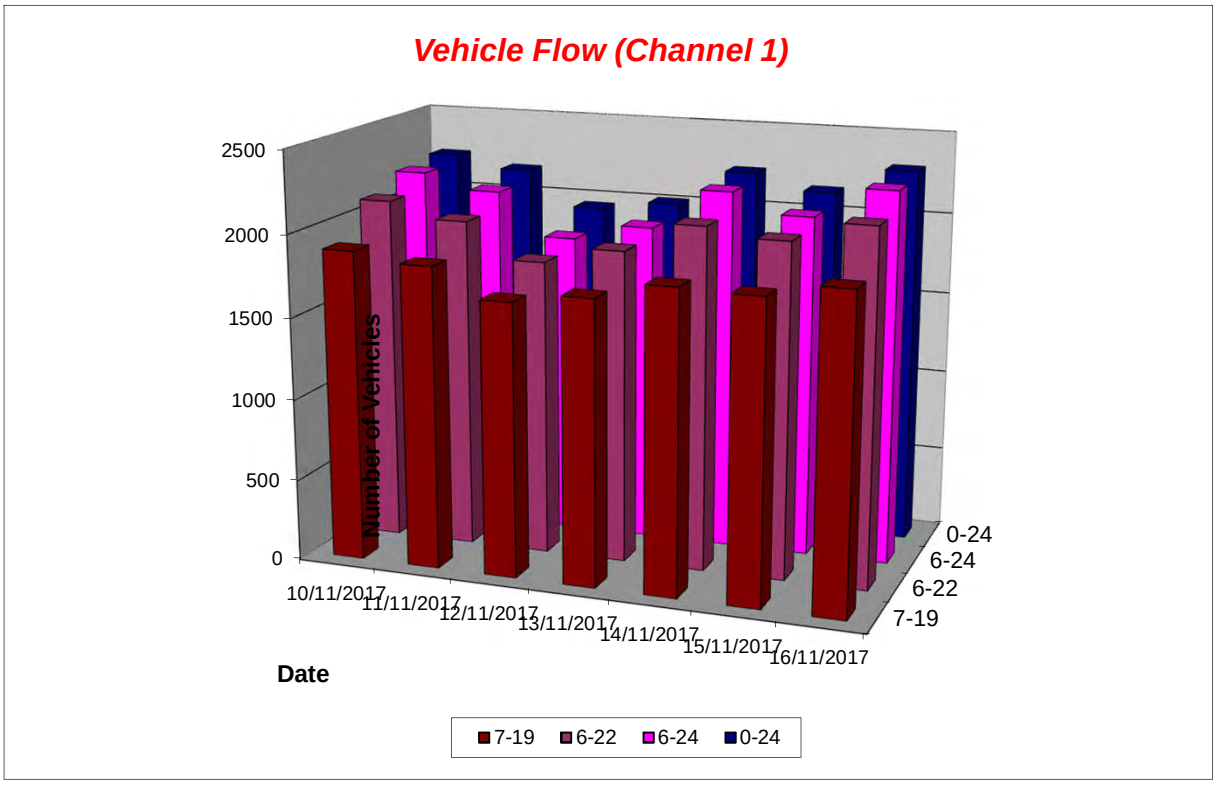
Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Vehicle Flow** | **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday	5 Day Ave	7 Day Ave
1	7	17	47	10	7	8	9	8	15
2	1	14	11	4	2	4	3	3	6
3	1	2	16	2	1	5	3	2	4
4	1	9	15	3	1	4	2	2	5
5	3	6	1	5	9	10	5	6	6
6	23	8	10	33	13	29	10	22	18
7	24	11	4	28	41	21	44	32	25
8	93	31	32	94	106	100	93	97	78
9	122	61	35	121	131	119	139	126	104
10	136	102	108	152	118	162	128	139	129
11	153	155	182	134	134	139	150	142	150
12	170	160	185	160	157	156	158	160	164
13	174	196	214	125	154	131	166	150	166
14	161	218	195	136	163	135	169	153	168
15	192	222	183	178	189	179	173	182	188
16	229	221	195	205	239	226	254	231	224
17	203	216	164	179	213	208	201	201	198
18	156	151	100	169	143	158	153	156	147
19	109	111	79	81	91	112	121	103	101
20	77	65	43	55	84	64	101	76	70
21	59	53	59	42	62	56	55	55	55
22	48	42	25	47	63	69	52	56	49
23	58	54	32	39	70	30	73	54	51
24	36	41	17	7	44	18	40	29	29

7-19	1898	1844	1672	1734	1838	1825	1905	1840	1817
6-22	2106	2015	1803	1906	2088	2035	2157	2058	2016
6-24	2200	2110	1852	1952	2202	2083	2270	2141	2096
0-24	2236	2166	1952	2009	2235	2143	2302	2185	2149



Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound **Average Speed** **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	12.8	11.6	11.9	11.6	12.6	11.6	11.9
2	15.5	12.9	12.3	12.3	10.6	12.0	11.0
3	10.5	12.4	12.3	12.3	15.7	14.4	13.0
4	12.8	13.5	12.3	12.8	10.3	12.9	13.5
5	11.2	13.0	14.5	12.4	12.5	11.8	12.1
6	11.9	10.8	12.1	11.4	13.7	12.0	12.2
7	12.2	12.9	11.7	11.7	11.2	12.3	12.4
8	12.5	12.1	12.1	11.6	12.0	12.2	12.1
9	12.0	12.2	12.6	11.9	12.2	11.7	12.1
10	11.8	12.6	12.5	12.2	11.8	12.0	11.7
11	12.3	12.5	12.7	11.9	11.8	12.5	11.9
12	11.9	12.6	12.2	11.6	12.1	12.0	12.0
13	12.0	12.5	12.8	12.2	12.1	11.8	12.1
14	11.2	12.5	12.2	11.8	12.0	12.2	11.9
15	11.9	12.3	12.2	11.9	11.9	11.8	11.9
16	12.1	12.5	12.2	11.6	12.0	11.8	11.9
17	11.8	12.0	11.9	11.7	12.2	12.1	11.9
18	11.8	12.6	12.5	11.7	12.2	11.9	11.9
19	11.8	12.5	12.1	11.9	12.5	11.6	11.9
20	12.0	12.4	12.3	11.6	11.7	11.6	11.2
21	12.0	12.8	12.2	12.2	11.2	12.1	12.2
22	11.5	12.2	12.9	12.0	12.2	11.9	12.3
23	12.0	12.1	11.8	11.9	11.7	12.0	12.2
24	12.1	12.0	10.7	11.8	12.0	12.2	12.3
10-12	12.1	12.5	12.5	11.7	12.0	12.2	12.0
14-16	12.0	12.4	12.2	11.8	11.9	11.8	11.9
0-24	11.9	12.4	12.3	11.8	12.0	12.0	12.0

Average	12.1

Channel 1 - Northbound **85th Percentile**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	14.7	13.9	14.5	14.4	14.6	12.7	14.5
2	-	14.9	14.1	14.8	12.8	13.9	13.5
3	-	13.3	14.9	13.1	-	17.7	17.7
4	-	16.5	14.7	14.7	-	14.3	14.2
5	12.6	15.3	-	14.6	15.2	14.5	14.7
6	14.8	15.2	14.4	14.4	16.4	14.9	14.0
7	14.4	15.7	13.5	14.7	13.6	15.5	14.7
8	14.9	14.4	14.2	14.4	15.1	15.4	14.9
9	14.8	14.3	14.4	14.3	14.6	14.5	14.6
10	14.5	15.1	14.8	14.6	14.6	14.7	14.6
11	14.8	14.9	14.8	14.6	14.5	14.8	14.4
12	14.8	14.8	14.7	14.7	14.7	14.9	14.8
13	14.6	14.8	15.1	14.5	14.8	14.6	14.6
14	14.2	14.8	14.4	14.4	14.4	14.8	14.6
15	14.7	14.6	14.5	14.6	14.7	14.6	14.4
16	14.8	14.7	14.6	14.6	14.8	14.6	14.7
17	14.8	14.7	14.5	14.5	14.8	14.9	14.6
18	14.9	14.8	15.3	14.5	14.9	14.8	14.5
19	14.6	15.0	14.6	14.7	14.8	14.5	14.6
20	14.7	14.8	14.8	14.3	14.7	14.5	14.4
21	14.5	15.0	14.4	14.4	14.0	14.5	14.7
22	14.4	14.2	15.7	14.9	14.9	14.5	14.5
23	14.6	14.3	14.8	14.5	14.3	14.8	14.8
24	14.6	13.8	13.9	14.4	14.6	14.2	15.3
10-12	14.8	14.9	14.8	14.7	14.6	14.8	14.7
14-16	14.8	14.7	14.6	14.6	14.7	14.6	14.6
0-24	14.7	14.8	14.7	14.6	14.7	14.8	14.6

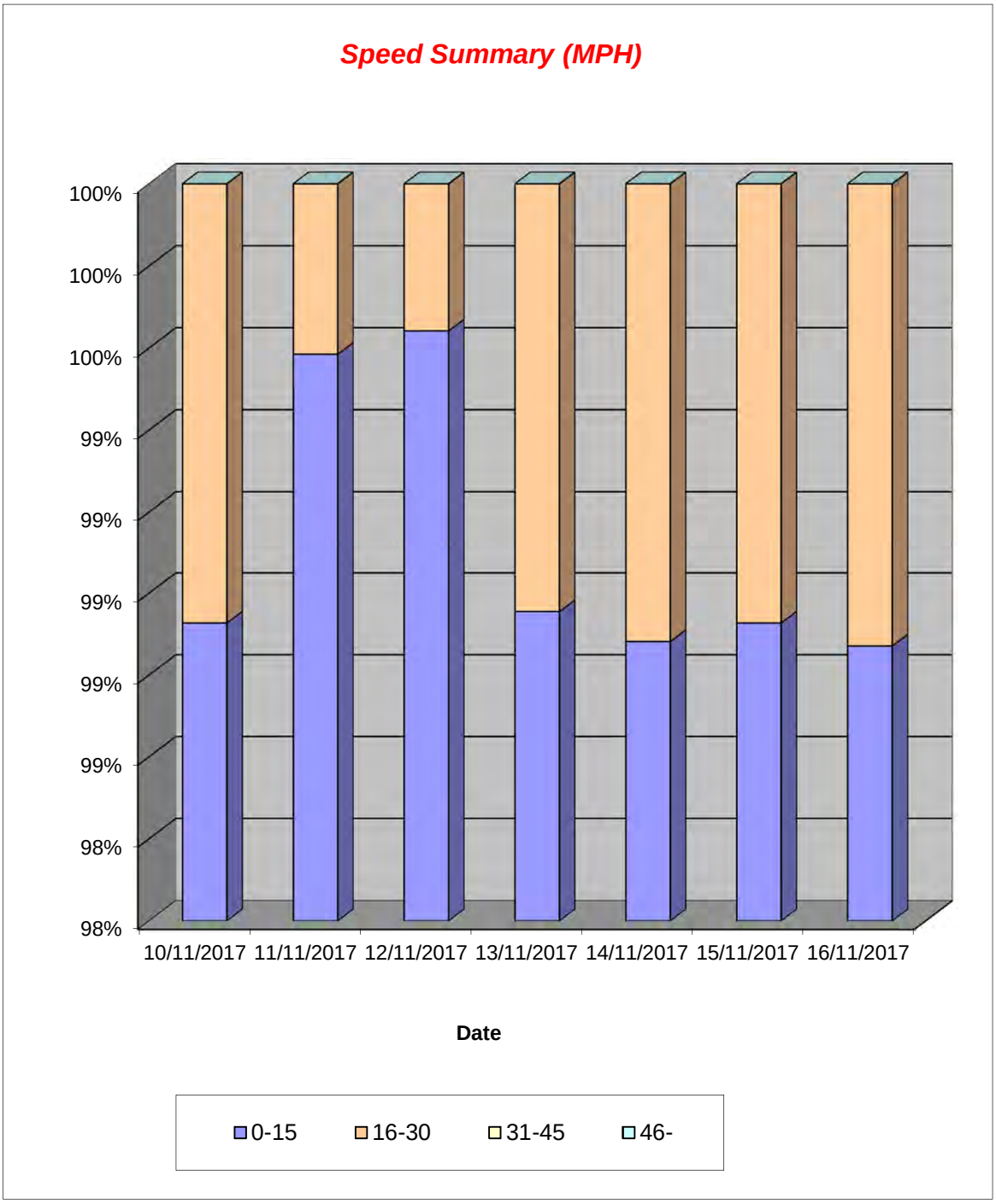
85th %ile	14.7

Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Speed Summary** | **Week 1**

Speed (MPH)	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
0-15	2212	2157	1945	1988	2210	2120	2276
16-30	24	9	7	21	25	23	26
31-45	0	0	0	0	0	0	0
46-	0	0	0	0	0	0	0
TOTAL	**2236**	**2166**	**1952**	**2009**	**2235**	**2143**	**2302**



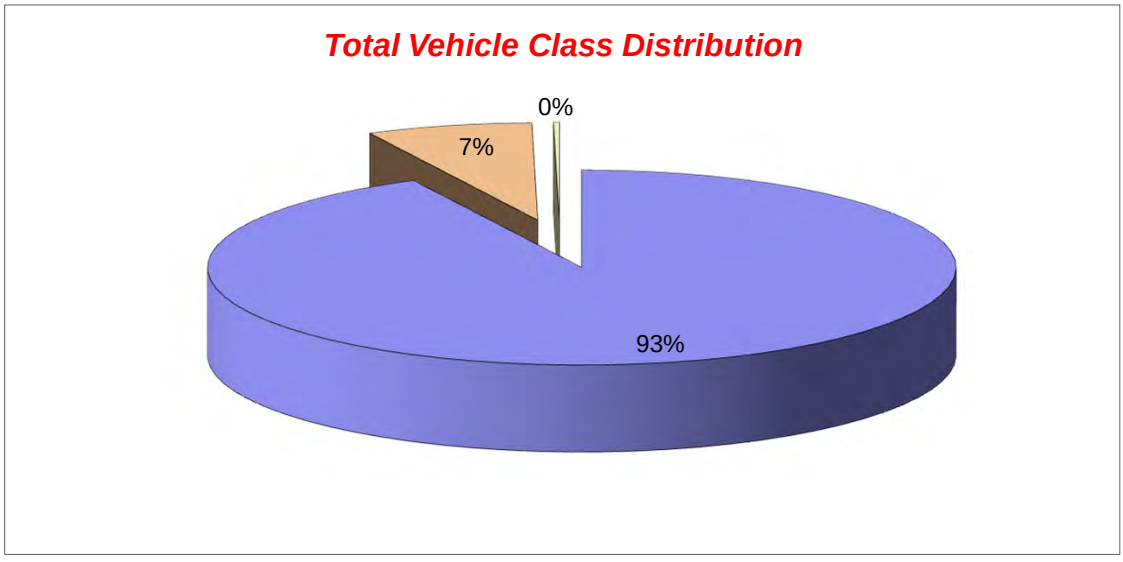
Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 1 - Northbound | **Vehicle Class** | **Week 1**

Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
10/11/2017				
7-19	1710	186	2	**1898**
6-22	1902	202	2	**2106**
6-24	1994	202	4	**2200**
0-24	2027	205	4	**2236**
11/11/2017				
7-19	1742	97	5	**1844**
6-22	1903	106	6	**2015**
6-24	1992	112	6	**2110**
0-24	2045	115	6	**2166**
12/11/2017				
7-19	1629	38	5	**1672**
6-22	1754	41	8	**1803**
6-24	1798	46	8	**1852**
0-24	1892	50	10	**1952**
13/11/2017				
7-19	1602	130	2	**1734**
6-22	1764	140	2	**1906**
6-24	1809	141	2	**1952**
0-24	1858	149	2	**2009**
14/11/2017				
7-19	1667	168	3	**1838**
6-22	1901	184	3	**2088**
6-24	2013	186	3	**2202**
0-24	2044	188	3	**2235**
15/11/2017				
7-19	1667	152	6	**1825**
6-22	1863	166	6	**2035**
6-24	1906	171	6	**2083**
0-24	1959	178	6	**2143**
16/11/2017				
7-19	1725	176	4	**1905**
6-22	1961	190	6	**2157**
6-24	2074	190	6	**2270**
0-24	2101	194	7	**2302**

Average				
7-19	1677	135	4	**1817**
6-22	1864	147	5	**2016**
6-24	1941	150	5	**2096**
0-24	1989	154	5	**2149**



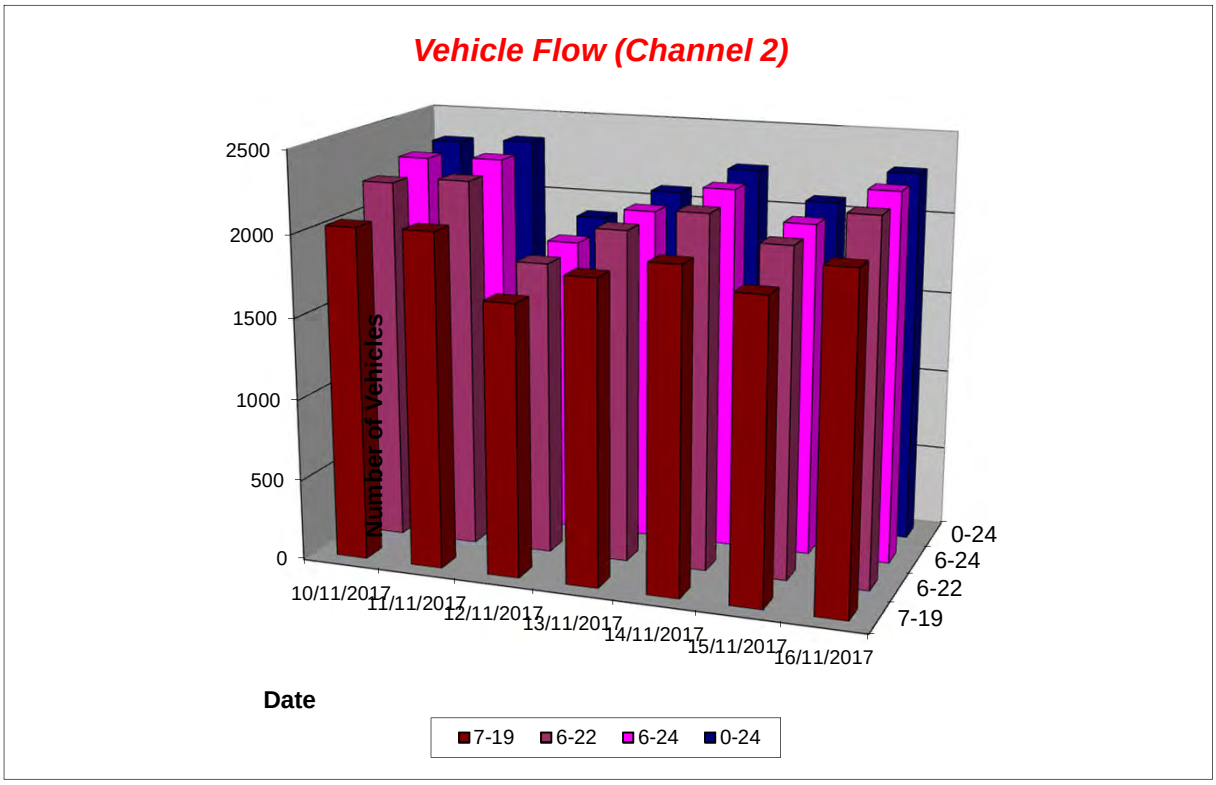
Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Vehicle Flow** **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday	5 Day Ave	7 Day Ave
1	3	6	31	3	2	2	2	2	7
2	1	5	14	8	1	7	1	4	5
3	1	13	7	2	2	1	2	2	4
4	1	3	5	0	1	1	1	1	2
5	6	1	3	4	5	8	3	5	4
6	18	10	5	16	23	23	13	19	15
7	49	28	17	54	48	47	54	50	42
8	142	78	46	141	144	146	136	142	119
9	234	116	53	205	189	196	211	207	172
10	175	178	127	175	174	156	180	172	166
11	161	162	215	158	173	149	181	164	171
12	173	232	190	157	152	147	156	157	172
13	201	270	214	159	195	151	207	183	200
14	181	233	193	169	161	147	164	164	178
15	177	217	223	138	169	144	166	159	176
16	209	219	154	179	220	203	226	207	201
17	178	155	122	179	187	179	195	184	171
18	107	123	80	121	103	121	102	111	108
19	100	65	48	72	99	95	98	93	82
20	62	83	41	57	63	64	63	62	62
21	39	63	41	39	47	47	50	44	47
22	31	36	31	26	38	19	27	28	30
23	36	36	20	17	28	17	27	25	26
24	37	15	11	6	26	12	23	21	19

7-19	2038	2048	1665	1853	1966	1834	2022	1943	1918
6-22	2219	2258	1795	2029	2162	2011	2216	2127	2099
6-24	2292	2309	1826	2052	2216	2040	2266	2173	2143
0-24	2322	2347	1891	2085	2250	2082	2288	2205	2181



Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Average Speed** **Week 1**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	12.6	11.9	12.5	11.8	10.1	12.5	13.9
2	11.7	11.2	12.0	13.1	13.9	11.1	11.5
3	15.9	12.4	11.3	11.8	11.8	13.5	11.3
4	14.9	12.0	12.0	-	12.4	12.8	11.7
5	12.4	14.5	11.6	11.5	11.9	10.8	11.6
6	12.2	11.6	11.1	11.9	12.5	11.7	11.1
7	12.2	11.7	12.5	12.1	11.7	12.3	11.9
8	12.1	12.5	12.3	11.6	11.8	11.6	12.1
9	11.7	12.1	12.5	11.5	12.0	11.9	12.0
10	12.0	12.7	12.0	11.9	11.9	11.5	11.8
11	12.0	12.4	12.0	11.9	11.7	11.9	12.1
12	12.0	12.2	12.2	11.9	11.8	11.6	11.8
13	12.0	12.5	12.5	11.6	11.8	12.0	12.2
14	11.8	12.5	11.9	12.2	11.6	11.8	12.2
15	11.9	12.1	12.0	12.1	12.0	12.0	12.0
16	11.7	12.1	12.0	12.0	12.2	12.0	11.9
17	12.2	12.0	11.9	11.9	11.8	11.8	12.1
18	11.7	12.5	12.3	11.9	12.4	11.6	11.7
19	12.4	12.1	11.8	12.2	11.9	11.7	12.2
20	11.7	12.1	12.8	11.6	12.1	12.0	12.0
21	12.1	12.7	11.6	12.1	12.2	12.1	12.3
22	11.9	11.9	12.7	11.7	11.6	11.5	12.4
23	11.9	12.4	11.6	11.4	12.4	11.5	11.3
24	12.1	12.1	12.2	12.8	11.7	12.7	11.9
10-12	12.0	12.3	12.1	11.9	11.7	11.7	11.9
14-16	11.8	12.1	12.0	12.0	12.1	12.0	11.9
0-24	11.9	12.3	12.1	11.9	11.9	11.8	12.0

Average	12.0

Channel 2 - Southbound **85th Percentile**

Hr Ending	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
1	14.7	13.6	14.7	13.3	12.7	12.8	14.6
2	-	13.7	14.2	15.3	-	12.6	-
3	-	14.6	12.5	12.6	13.0	-	13.5
4	-	13.6	13.9	-	-	-	-
5	14.8	-	13.9	12.9	14.5	15.4	12.4
6	15.3	15.0	12.0	14.2	14.4	14.6	14.7
7	14.7	13.9	14.4	14.8	14.6	14.7	15.0
8	14.8	15.0	14.7	14.7	14.5	14.6	14.8
9	14.5	14.6	14.7	14.4	14.7	14.8	14.8
10	14.7	14.9	14.7	14.5	14.6	14.6	14.6
11	14.5	14.9	14.8	14.7	14.5	14.9	14.8
12	14.7	14.9	15.3	14.8	14.6	14.5	14.6
13	14.8	14.8	14.9	14.3	14.4	14.6	15.2
14	14.5	14.7	14.4	14.7	14.5	14.3	14.9
15	14.4	14.6	14.7	14.6	14.7	14.7	14.7
16	14.5	14.7	14.6	14.5	14.8	14.6	14.8
17	14.5	14.6	14.7	14.7	14.7	14.6	14.7
18	14.6	14.7	14.8	14.5	14.8	14.7	14.3
19	15.1	14.5	14.7	14.6	14.6	14.7	15.1
20	14.4	14.8	14.8	14.4	14.7	14.6	14.4
21	14.6	15.2	14.6	14.6	14.9	14.8	14.8
22	15.2	15.1	15.1	14.6	14.6	13.5	14.8
23	14.8	14.4	14.0	13.9	14.9	14.3	14.6
24	14.3	14.6	14.7	15.6	13.7	14.5	14.4
10-12	14.6	14.9	14.8	14.8	14.5	14.8	14.7
14-16	14.5	14.7	14.6	14.6	14.8	14.6	14.7
0-24	14.7	14.8	14.7	14.6	14.6	14.6	14.8

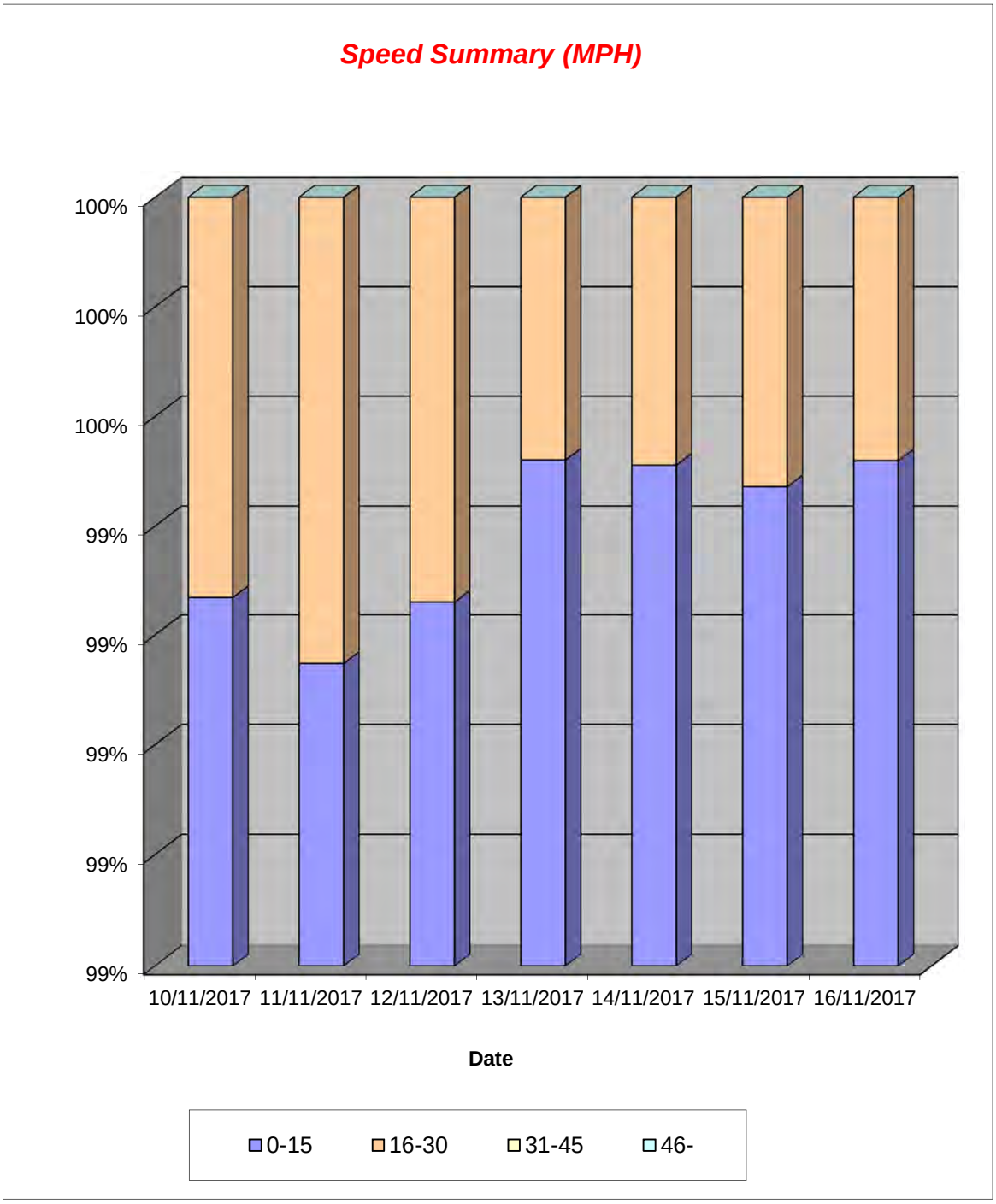
85th %ile	14.7

Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Speed Summary** **Week 1**

Speed (MPH)	10/11/2017 Friday	11/11/2017 Saturday	12/11/2017 Sunday	13/11/2017 Monday	14/11/2017 Tuesday	15/11/2017 Wednesday	16/11/2017 Thursday
0-15	2305	2327	1877	2075	2239	2071	2277
16-30	17	20	14	10	11	11	11
31-45	0	0	0	0	0	0	0
46-	0	0	0	0	0	0	0
TOTAL	**2322**	**2347**	**1891**	**2085**	**2250**	**2082**	**2288**



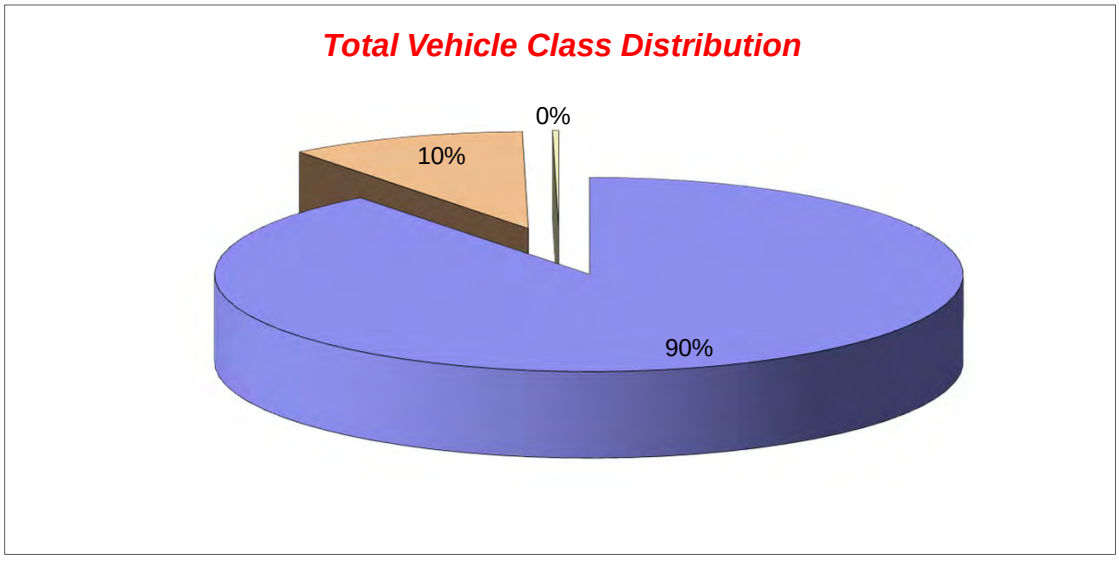
Whitby ATC 2, A174 (Southern Site)

Produced by Road Data Services Ltd.

Channel 2 - Southbound **Vehicle Class** **Week 1**

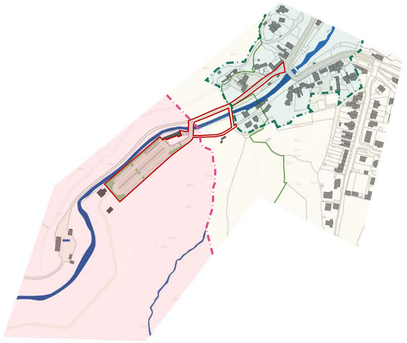
Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
10/11/2017				
7-19	1815	218	5	**2038**
6-22	1973	241	5	**2219**
6-24	2041	246	5	**2292**
0-24	2067	250	5	**2322**
11/11/2017				
7-19	1898	146	4	**2048**
6-22	2087	166	5	**2258**
6-24	2134	168	7	**2309**
0-24	2168	171	8	**2347**
12/11/2017				
7-19	1554	109	2	**1665**
6-22	1665	127	3	**1795**
6-24	1694	129	3	**1826**
0-24	1748	136	7	**1891**
13/11/2017				
7-19	1638	212	3	**1853**
6-22	1793	233	3	**2029**
6-24	1815	233	4	**2052**
0-24	1843	238	4	**2085**
14/11/2017				
7-19	1720	244	2	**1966**
6-22	1892	265	5	**2162**
6-24	1940	271	5	**2216**
0-24	1972	273	5	**2250**
15/11/2017				
7-19	1632	199	3	**1834**
6-22	1799	207	5	**2011**
6-24	1828	207	5	**2040**
0-24	1863	213	6	**2082**
16/11/2017				
7-19	1769	251	2	**2022**
6-22	1941	271	4	**2216**
6-24	1986	276	4	**2266**
0-24	2005	278	5	**2288**

Average				
7-19	1718	197	3	**1918**
6-22	1879	216	4	**2099**
6-24	1920	219	5	**2143**
0-24	1952	223	6	**2181**



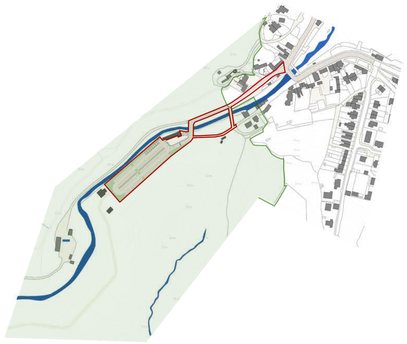
APPENDIX C

Proposed Site Layout



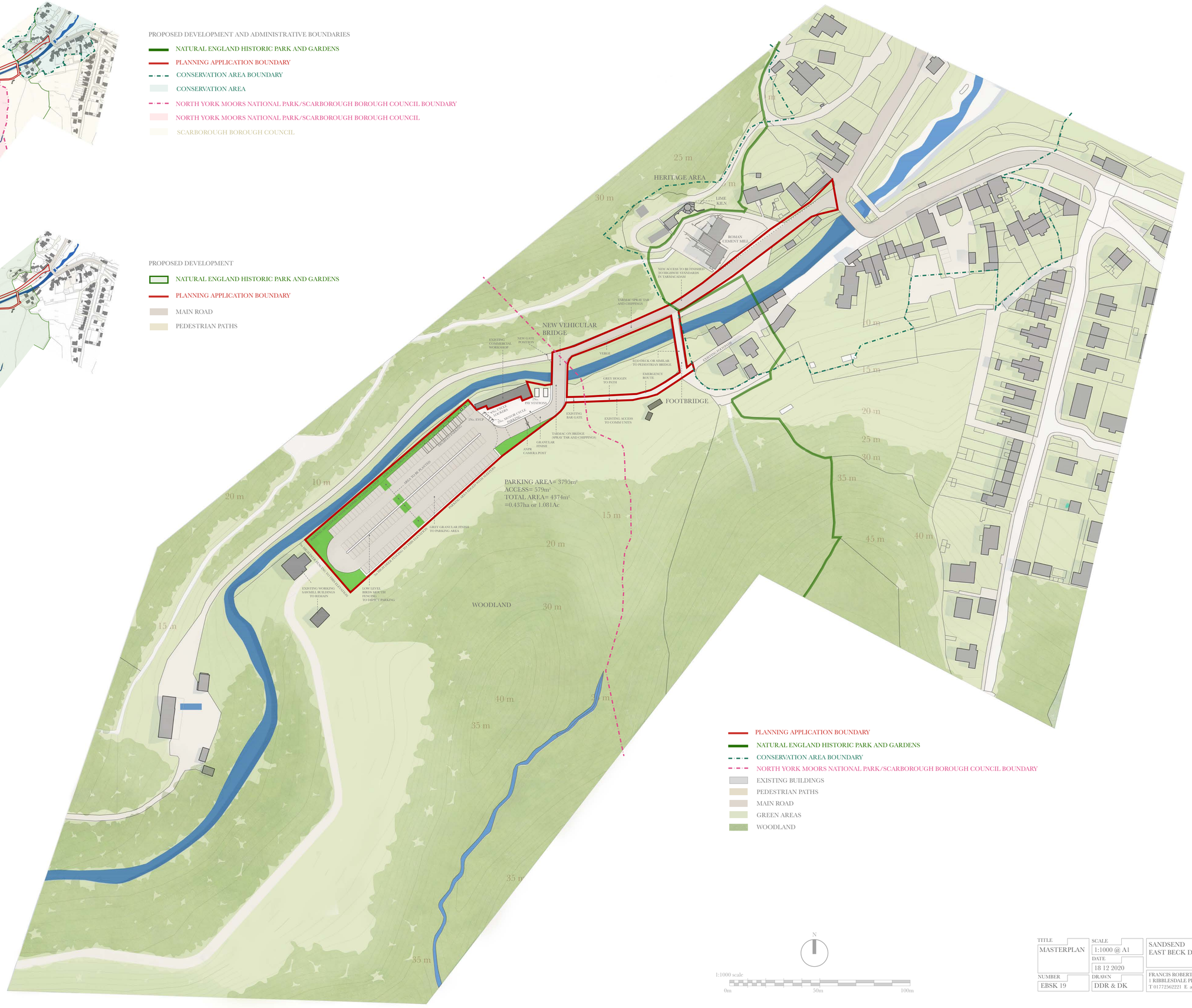
PROPOSED DEVELOPMENT AND ADMINISTRATIVE BOUNDARIES

- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- PLANNING APPLICATION BOUNDARY
- CONSERVATION AREA BOUNDARY
- CONSERVATION AREA
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL BOUNDARY
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL
- SCARBOROUGH BOROUGH COUNCIL



PROPOSED DEVELOPMENT

- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- PLANNING APPLICATION BOUNDARY
- MAIN ROAD
- PEDESTRIAN PATHS



- PLANNING APPLICATION BOUNDARY
- NATURAL ENGLAND HISTORIC PARK AND GARDENS
- CONSERVATION AREA BOUNDARY
- NORTH YORK MOORS NATIONAL PARK/SCARBOROUGH BOROUGH COUNCIL BOUNDARY
- EXISTING BUILDINGS
- PEDESTRIAN PATHS
- MAIN ROAD
- GREEN AREAS
- WOODLAND

N

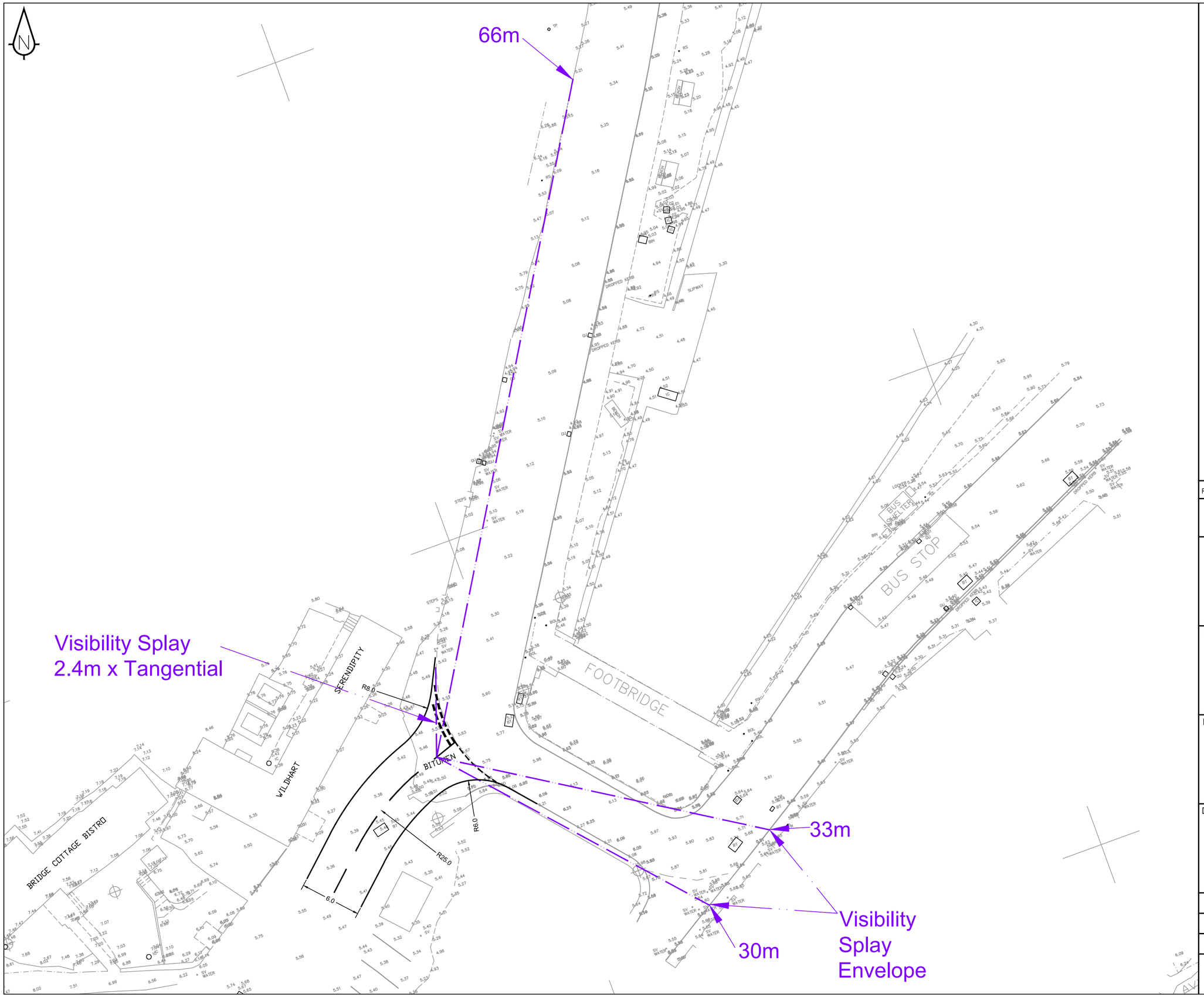
1:1000 scale

0m 50m 100m

TITLE: MASTERPLAN	SCALE: 1:1000 @ A1	SANDSEND EAST BECK DEVELOPMENT	
	DATE: 18 12 2020		
NUMBER: EBSK 19	DRAWN: DDR & DK	FRANCIS ROBERTS ARCHITECTS 1 RIBBLESDALE PLACE, PRESTON PR1 3NA T 01772562221 E architects@francisroberts.com	

APPENDIX D

Drawing 11613-003 – Access Arrangements



Rev	Amendment	Drawn	Date	Checked

sanderson associates (consulting engineers) ltd
Highways | Traffic | Transportation | Water
T 01924 844080 mail@sandersonassociates.co.uk
F 01924 844081 www.sandersonassociates.co.uk

Client

The Mulgrave Estate

Project Title

Sandsend Scheme, Whitby

Drawing Title

Proposed Site Access and Visibility Splays

Scale 1:200 @ A2		Drawn By	LOB
Drawing Size	A2	Checked By	IEL
Date	Dec 2020	Approved By	IEL

	Drawing Number	Rev
	11613/001	