

W&S WASTE MANAGEMENT LTD

BLANDFORD WASTE MANAGEMENT CENTRE

ENVIRONMENTAL RISK ASSESSMENT

Part 1



Version 5.0
Feb 2024

INTRODUCTION

Background

W&S Waste Management Ltd have won the contract to operate the Blandford Waste Management Centre (WMC). This facility is being construction by Dorset Council and it is anticipated that the Site will become operational in 2022/3. The Site is located on the outskirts of Blandford at National Grid Reference ST 890 082 (see Drawing no L257 Appendix 1).

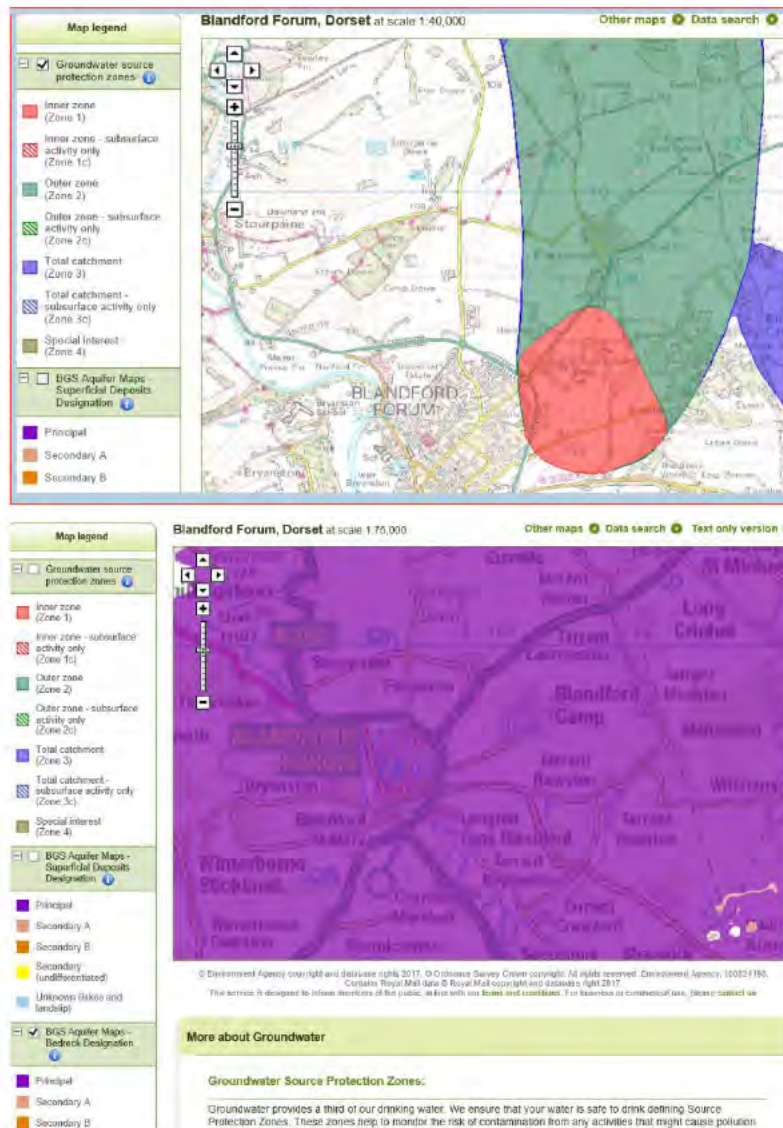
Summary of Environmental Setting

The Site is approximately 2.74ha in size and is located to the north east of Blandford Forum in Dorset. The Site is currently in arable use. It is adjacent to the Sunrise Business Park and is bounded to the south by the A350 (Blandford bypass). To the north and east of the Site is open agricultural land. The Site is located within a wider arable field which is approximately 4.7ha and is bounded by mature hedgerows and a band of young establishing woodland trees to the north and east. The proposed Site will sit within a context of a mixture of industrial, commercial, residential and agricultural land. The A350 connects Poole in the south to the M4 and provides a bypass around Blandford Forum.

The Site, it is not crossed by any public rights of way or watercourses. There are no European, National or Locally designated sites within the Site, the closest European designated site is the Fontmell and Melbury Down Special Area of Conservation (SAC), approximately 8km to the north. The Site is located within the Cranborne Chase AONB. The Bryanston SSSI is located approximately 2km to the south west of the proposed Site and the Milldown, Site of Nature Conservation Interest (SNCI), is approximately 600m to the southwest. In addition, there are a number of Ancient Woodland sites around Blandford but the nearest of these is over 1.6km to the south west of the Site.

The closest residential properties to the proposed Site are those located on Kites Corner and Bracewell Close, off Gurkha Road. The properties on Kites Corner are approximately 175m southwest of the closest operational element of the WMC and those on Bracewell Close are approximately 230m to the south east (see Drawing no. CEC/BWMC/001 in Appendix 2).

The Site is underlain by a Principal Aquifer of the White Chalk Subgroup. The Site is not located within a designated groundwater Source Protection Zone, although the boundary of a SPZ is located approximately 500m east of the Site and the proposed drainage system extends into Zone 1 of the SPZ. Groundwater level is predicted to be at depth (>10.0mBGL) within the White Chalk Subgroup. See below:



During consultations with the Environment Agency and Wessex Water, at the planning stage of this development, the possibility that this SPZ will be extended has been discussed and a Hydrogeological Risk Assessment has been undertaken which addresses this possibility (see Appendix 3).

There are no known private drinking water abstractions within 100m of the Site.

The Site lies within Flood Zone 1, where the risk of flooding from fluvial and tidal sources is less than 1 in 1000 (0.1%) in any year

The closest surface water features to the Site are the River Stour and the Pimperne Brook (a tributary of the River Stour) located approximately 1.2km to the south-west and east of the Site, respectively. Both watercourses are classified as main rivers.

Document Scope

This document assesses the potential environmental risks posed by the operation of this facility and the measures to be employed to mitigate against those risks.

Various documents have been prepared as part of the planning application for the Site including an Environmental Statement (ES) (see ES Non Technical Summary in Appendix 4), a Water Flood Risk and Drainage Assessment (ES Chapter 9 Appendix 5) and a Hydrogeological Risk Assessment (See Appendix 3). In addition, an Ecological Impact Assessment (EclA) has been prepared as part of the planning application and provides a management framework for the conservation and enhancement of the Site's ecology and landscape during construction and operation (See Appendix 6).

On-going management of the woodland, the retained hedgerows and all newly created wildlife habitats are detailed within a Landscape and Ecological Management Plan (LEMP) (Appendix 7). The rationale behind this plan is to formulate a management regime that is in the interest of protecting and enhancing the ecology of the Site to produce and maintain a net gain in biodiversity as a result of the development.

The elements assessed by these documents will not be reassessed in this risk assessment.

Site

The Site, in relation to nearby sensitive receptors, is shown on Drawing No. CEC/BWMC/001 (Appendix 2) .

Nature of Site

The proposal is for a waste management centre comprising of 2 elements :

- a) waste transfer station (WTS)
- b) household recycling centre (HRC)

The Centre will accept a wide variety of household waste and recyclates and will receive and bulk up materials collected from Dorset Council's kerbside collections and also from Dorset Council's commercial waste collections.

It is proposed to accept a limited range of domestic hazardous wastes at the Site such as waste oils, asbestos and WEEE, along with the usual household waste types ie mixed household and separate recyclables along with rubbles, green waste, metals etc (see the 'Waste Types List' document which forms part of this application for details).

Assessment Procedure

An assessment of the risks posed by the WMC must assess the relevant hazards posed by such a site (the inherent potential of a substance or physical situation to cause harm), the potential receptors which could be effected by the hazard, pathways between the hazard and the receptors and the risk those hazards pose to the receptors i.e. an estimation of the likelihood of that potential being realised within a specified period or in specified circumstances and the consequence.

As a result of this assessment, mitigating factors have been built into the design and operation of the proposed facility to reduce the risk to the receptors.

Methodology

An estimate of the unmitigated probability of incidents occurring on the Site which could result in environmental pollution, harm to human health or loss of amenity, needs to be made. Therefore, a simple relative scoring system of low, medium and high has been used to produce a qualitative risk assessment. The qualitative risk assessment, including hazard – pathway – receptor analysis, is detailed in Part 2 of this document.

Hazard Identification

The potential *unmitigated* hazards posed by the Blandford Waste Management Centre are identified in Part 2.

Receptors

The main potential receptors near to the Site are shown on Drawing No CEC/BWMC/001 and consist of local residents, commercial businesses, the local highways and the Milldown SNCI which is approximately 600m to the southwest of the Site. The groundwater is also a receptor.

Receptor list

Receptor reference (see Drawing No CEC/BWMC/001 and groundwater maps above)	Land use e.g. house, school, hospital, commercial	Direction from Site (North, South, East, West)	Approximate distance to Site boundary (m)
1	Closest residential property on Kites Corner	Southwest	175m
2	Closest residential property on Bracewell Close	Southeast	230m
3	Closest residential property on Gurkha Road	Southeast	280m
4	Closest commercial and industrial properties off Wendal Road (Lidl and Glenmore Business Park)	Southwest	120m
5	Capers Pre-School	North	290m
6	Crazy Monsters Soft Play	Northwest	130m
7	Closest commercial retail properties within Sunrise Business Park	North	40m
8	Closest residential property on Letton Close	Southeast	610m
9	Hammetts Farm	Northeast	650m
10	Hammetts Farm Cottage	Northeast	800m
11	A mixed-use development to include residential dwellings is being brought forward on land adjacent to the Site. The layout plan identifies that the land immediately adjacent to the Site will be used for allotments and a recreation ground. The closest high sensitivity receptor will be the proposed primary school approximately	Southeast	350m

	350m southeast of the Site boundary		
12	Closest point representing proposed residential dwellings on land adjacent to Site	Southeast	810m
13	Camp Down Farm	Northwest	200m
14	Milldown SNCI	Southwest	600m
See maps above	Groundwater SPZ	Southeast	500m

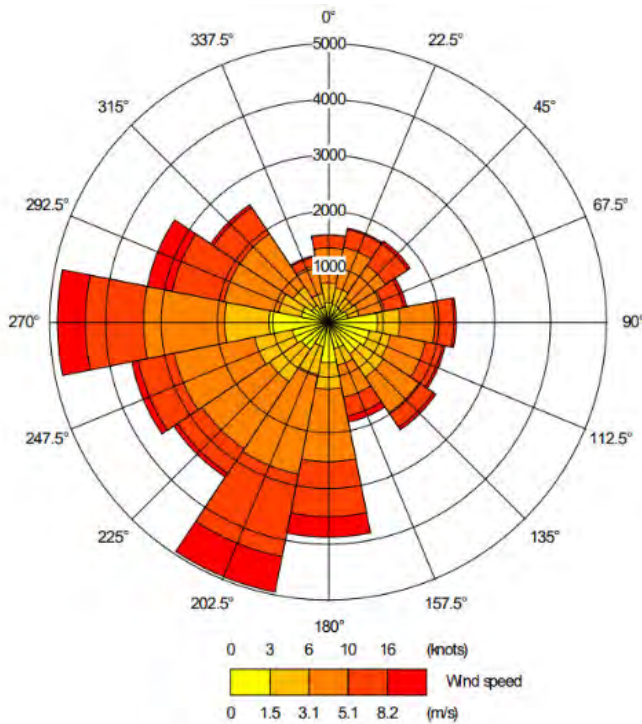
Pathways

The pathways for the hazards can be identified as either the air (eg litter/odour/noise) or access via land (eg vermin, mud) or via the drainage system to groundwaters (eg spillages/fire).

There are no surface waters nearby which could act as pathways.

The Yeovilton Windrose (2015-2019) shows that the prevailing wind direction is from the southwest and the west.

(source : WSP Environmental Statement Blandford Waste Management Centre Appendix 11.3)



With the prevailing wind direction from the southwest this will take emissions such as dust, odour and noise away from most the sensitive receptors, just leaving :

9	Hammetts Farm	North east	650m
10	Hammetts Farm Cottage	North east	800m

upwind of the Site but at some distance.

The risk assessment undertaken in Part 2 identifies the unmitigated hazards and risks posed by the Site and details how the risks will be mitigated. This can be done by reducing the risk at source or by interrupting the pathways between source and receptor via various engineering controls and containment systems. As the drainage system and infrastructure are critical components which interrupt these pathway this infrastructure is discussed below :

Engineering and controls

Drainage system

There is the potential to generate contaminated run off at the Site, from either waste accepted at the site or from an accidental spillage. As part of the planning process a Hydrogeological Risk Assessment has been undertaken to assess the worst-case scenario risk posed by the Site to the nearby SPZ and a detailed drainage system for the facility has been designed in accordance with the SuDS principle (see Drainage Plan drawing no 7007688-WSP-00-XX-DR-C-206 in the Fire Prevention Plan).

In order to protect the groundwater features the Site is constructed so that there are impermeable surfaces (concrete) on the operator's yard areas and also within the Barn and there are pollution control systems within the drainage design, as detailed below :

Containment and Runoff

Zone	Surface option	Discharge / treatment Options during normal operations	Discharge during fire event
Public turning/stopping area	- Tarmac	- Via pipe to vortex separator unit and then to SuDs system basin with automatic penstock cut off before final outfall	- via pipe to to vortex separator unit and then to SuDs system basin with automatic penstock cut off before final outfall

Waste Outside yard area	- Concrete	A proprietary (SDS Aqua-swirl) vortex separator, followed by a proprietary (SDS down-flow Aqua filter) filter will intercept the initial flows; Flow will then pass through 20 m of trench which will percolate through an engineered soil layer (Aqua-exchange); Flow will then pass in to the forebay of the upstream SuDS Basin 1 with gabion baffles incorporating a geofabric style filter;	- automatic penstock within yard will cut off usual discharge and fire water will be diverted to underground tank
WMC buildings -roof	- Roofing	- Roof to SuDs system with automatic penstock cut off before final outfall	- Via pipe to SuDs system with automatic penstock cut off before final outfall
Site access road	- Tarmac	- Via pipe to vortex separator unit and then to SuDs system basin with automatic penstock cut off before final outfall	- Via pipe to vortex separator unit and then to SuDs system basin with automatic penstock cut off before final outfall
Transfer Barn	- Concrete	Underground tank	Underground tank

The proposal for the drainage is, therefore, as follows:

Open yard area: to drain via yard gullies to a proprietary vortex separator then a proprietary down flow filter, then via an engineered soil trench system, then to basin 1 (upstream of 3 basins). Flow will continue through a combination of 2 other basins/swales and filter drains before discharging to the existing highway filter drain which is an infiltration trench extending to the Salisbury Road roundabout some 700m east.

The open yard area gully chamber will have an automatic penstock to close the stormwater outlet in the event of a fire and flows will then discharge at higher level to the sealed fire suppression water tank; which will be emptied by tanker as needed.

Other areas: to drain via gullies to proprietary vortex separators then to basin 3.

Barn: The Barn is a sealed system, with any water (including spillages or fire water) discharging to the loading bay and then to the sealed fire suppression water tank.

All SuDs basins will have impermeable liners (bentonite clay or HDPE/butyl) to prevent infiltration prior to discharge.

An automatic closing penstock will be provided at the final exit to the Site to shut the entire storm system in the event of an unforeseen pollution event. It should be noted that this is a secondary/fall back containment measure and not a primary containment measure.

In addition, there will be reactive control systems within the EMS such as Spillage Control Procedures.

Operator's yard

The waste and recycling skips will be located in the yard adjacent to the public area but at a lower level. This skip area will be partially protected from the rain by a canopy. The household oil and WEEE waste storage collection units will be fully bunded within buildings.

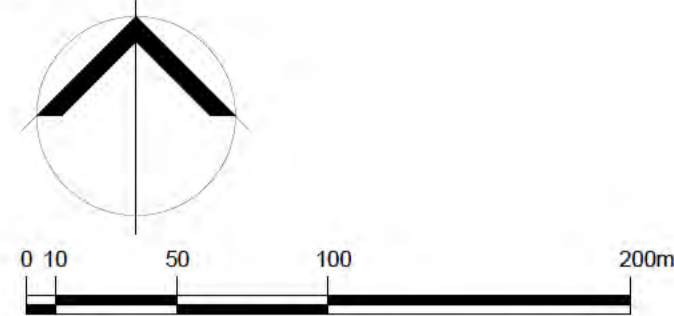
Waste Transfer Station Barn floor and Loading Bay floor

These are fully enclosed spaces within the building and therefore the only liquids in this area will be from moisture in the imported waste and from wet vehicles entering and exiting the building. The floor will be scraped and brushed to keep it serviceable. Any water, including spillages or fire water, within the Barn area will flow via oversized drainage channels to the loading bay and then on to the underground tank where it will be fully contained. This tank will have an alarm on it so that it will be emptied, when needed, to maintain its capacity for a fire event. The contents will be removed by tanker to a suitably authorised facility.

Conclusions

It can be concluded that the proposed development at the Blandford Waste Management Centre should not adversely affect local receptors in respect of the issues addressed in this risk assessment (see Part 2), provided that the Site is developed and operated in accordance with this application and the EMS for the Site. It should be noted that the emphasis at the design stage of the development has been to prevent pollution and other emissions to the environment.

Appendix 1 Drawing no L257

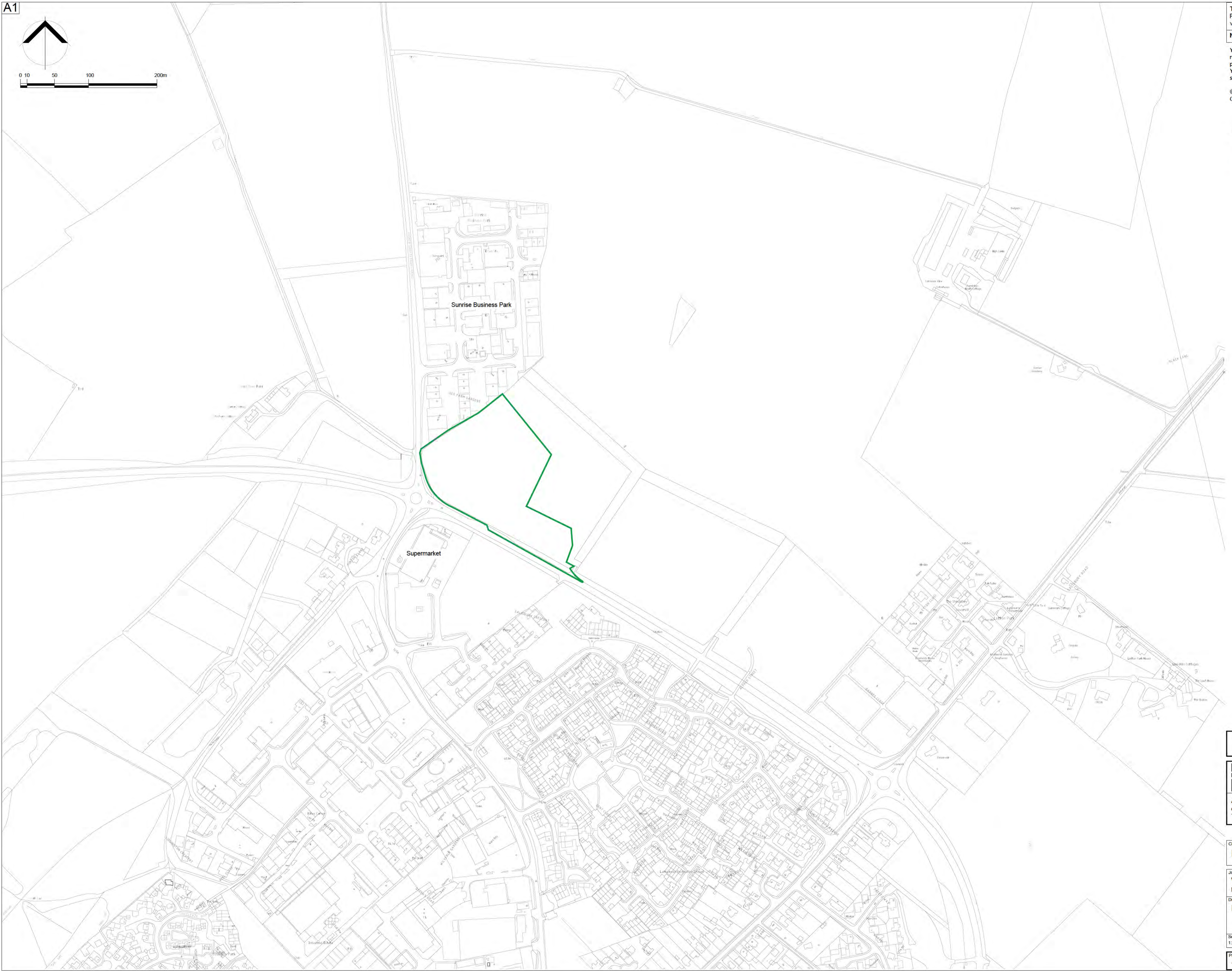


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KEY:

— Permit Boundary



PERMIT APPLICATION



Assets and Property
County Hall, Colliton Park, Dorchester, Dorset DT1 1XJ
Telephone: 01305 225200 Facsimile: 01305 224835

www.dorsetcouncil.gov.uk/dorsetproperty

Client
Dorset Council waste team

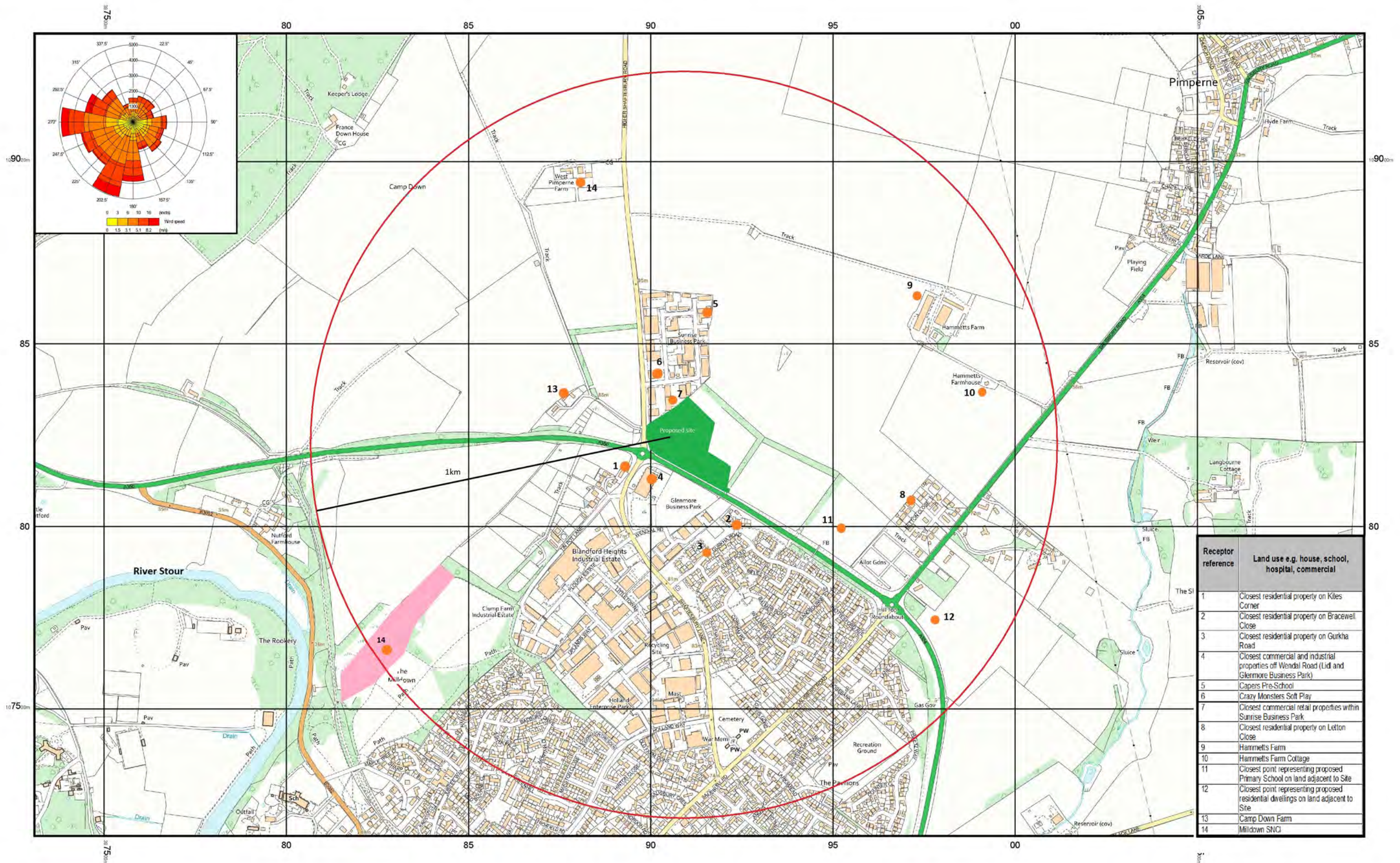
Job Title
**Waste Management Centre
Blandford**

Drawing Title
Environmental Permit Boundary

Scale 1:2500	Date January 2022	Drawn By MK	Filename 005882 L257
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Property Ref. 4522	Plan No. 005882	Drawing No. L257	Revision
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Appendix 2 Drawing No. CEC/BWMC/001



Receptor reference	Land use e.g. house, school, hospital, commercial
1	Closest residential property on Kiles Corner
2	Closest residential property on Bracewell Close
3	Closest residential property on Gurkha Road
4	Closest commercial and industrial properties off Wendal Road (Lidl and Glenmore Business Park)
5	Capers Pre-School
6	Crazy Monsters Soft Play
7	Closest commercial retail properties within Sunrise Business Park
8	Closest residential property on Letton Close
9	Hammetts Farm
10	Hammetts Farm Cottage
11	Closest point representing proposed Primary School on land adjacent to Site
12	Closest point representing proposed residential dwellings on land adjacent to Site
13	Camp Down Farm
14	Milldown SNCI



Appendix 3 Hydrogeological Risk Assessment



Dorset Council

BLANDFORD FORUM WASTE MANAGEMENT CENTRE

Hydrogeological Risk Assessment





Dorset Council

BLANDFORD FORUM WASTE MANAGEMENT CENTRE

Hydrogeological Risk Assessment

VERSION 3 CONFIDENTIAL

PROJECT NO. 70076888

OUR REF. NO. HRA001

DATE: MARCH 2022

WSP

The Forum
Barnfield Road
Exeter, Devon
EX1 1QR

Phone: +44 1392 229 700

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
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Date	February 2022	February 2022	March 2022	
Prepared by	Ana Jimenez	Ana Jimenez	Ana Jimenez	
Signature				
Checked by	Thomas Eckhardt	Thomas Eckhardt	Thomas Eckhardt	
Signature				
Authorised by	C Uzzell	C Uzzell	C Uzzell	
Signature				
Project number	70076888	70076888	70076888	
Report number	HRA001	HRA001	HRA001	
File reference	Hydrogeological Risk Assessment Report	Hydrogeological Risk Assessment Report	Hydrogeological Risk Assessment Report	

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1 INTRODUCTION

1.1 BACKGROUND

Following a request for a Hydrogeological Risk Assessment (HRA) by the Dorset Council (DC) flood officer, WSP has developed a qualitative HRA based upon the proposals for the Waste Management Centre (WMC) and the downstream drainage paths to inform any impact on a source protection zone (SPZ) some 500 m to the east.

The WMC site is located to the north east of Blandford Forum, Dorset, as shown in Figure 1-1. The proposed site comprises access roads, buildings and an open service yard where domestic waste containers are moved from public disposal areas to the covered barn (Figure 1-2). Kerbside refuse trucks will enter the barn directly.

Figure 1-1 - Site Location Plan

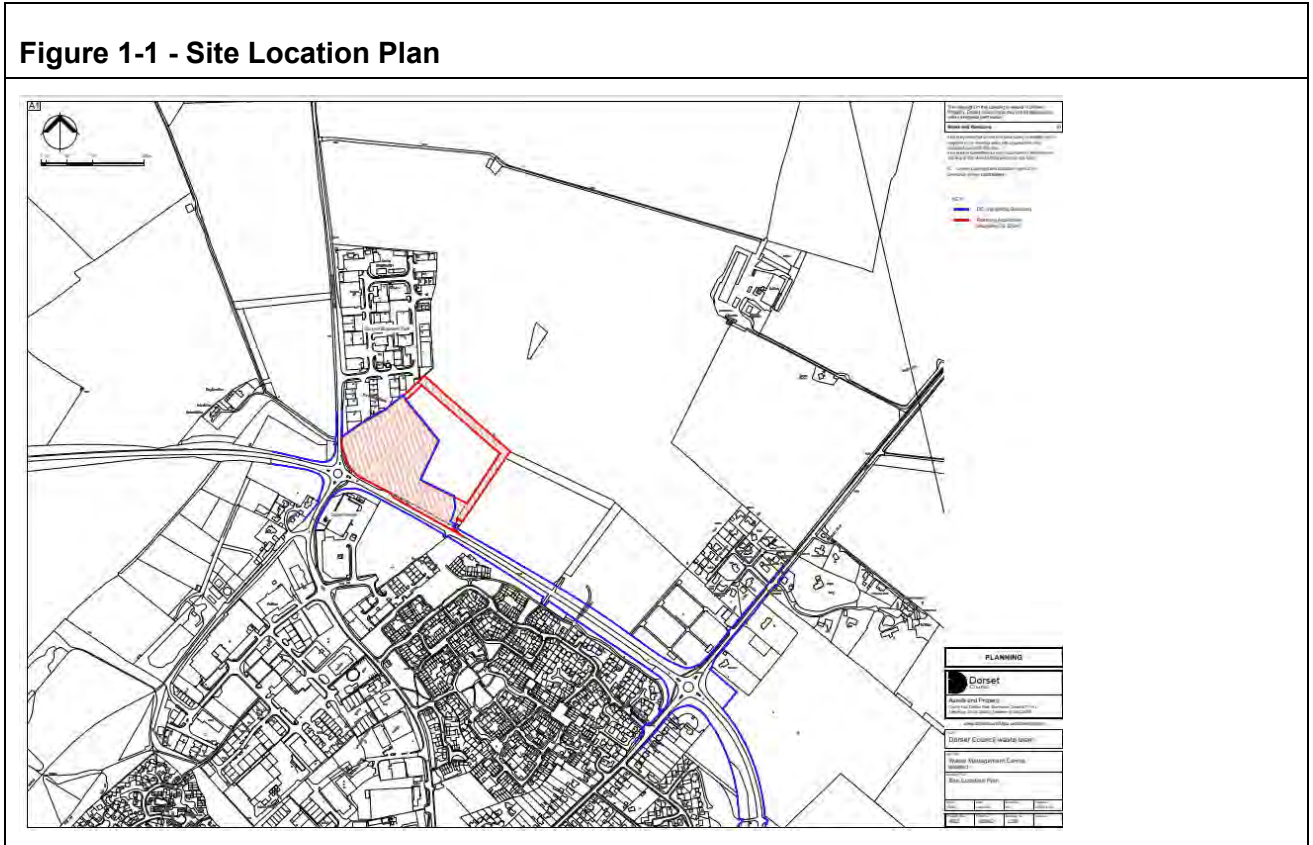
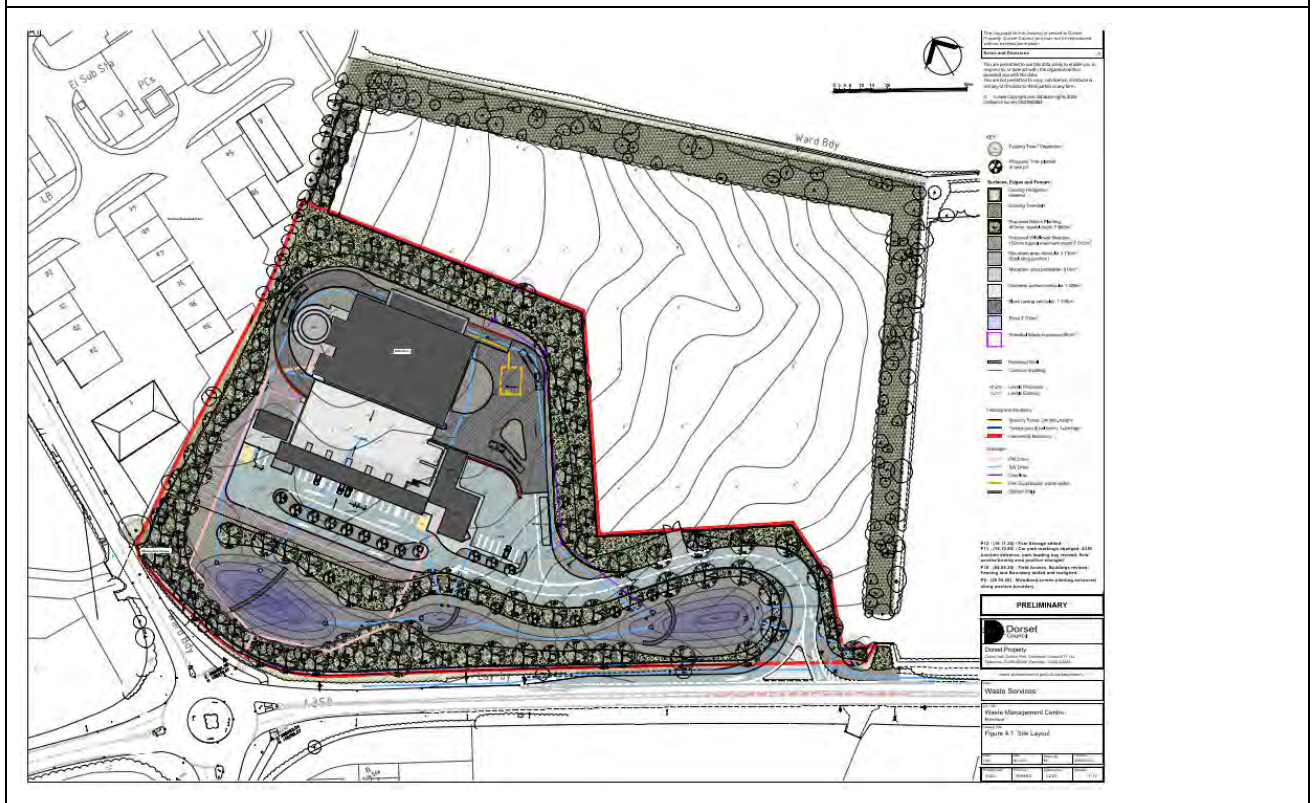


Figure 1-2 - Site Layout



1.2 OBJECTIVES AND SCOPE

This report aims to assess the potential risks posed by the proposed WMC drainage discharge leaving site via an existing highways drainage system towards the SPZ1 located 500 m east from site.

The site comprises a comprehensive treatment system in place (Refer to Section 2.1) and discharged water at the site boundary is designed to be free of contamination or with very limited potential contaminants of concern (CoC). Nonetheless this assessment evaluates the worst-case scenario (e.g. failure of the treatment system due to poor maintenance) risk posed to the groundwater abstraction from discharged water potentially directly entering the A350 soakaway located within its SPZ1.

The following scope of works has been undertaken to meet the objectives:

- Describe on site drainage and treatment system including potential contaminants of concern and site discharge details;
- Provide a summary of the hydrogeological setting and proposed upgrades of the offsite discharge route;
- Undertake a hydrogeological risk assessment based on worst-case scenario considerations; and
- Provide a summary and recommendations.

1.3 DATA SOURCES

The following public sources of information have been used in the production of this assessment:

- BGS, Geoindex [1]
- BGS Geological maps [2]
- BGS Hydrogeological maps [3]

In addition, the following previous reports have also been consulted:

- Blandford Forum Waste Management Centre. Preliminary Sources Study Report, WSP, 2017. Ref: 70029189-PSSR01 [4];
- Blandford Forum Waste Management Centre. Ground Investigation Report, WSP 2018. Ref: 70029189-GIR-001 [5]
- Blandford HWRC Project - Knights Brown Construction Ltd. Factual Report. ACS 2019 [6]
- ACS Testing Ltd., "A350, Blandford Forum - Site Investigation," 2020. [7]

2 ON SITE DRAINAGE

2.1 ON SITE DRAINAGE PROPOSALS

The drainage system for the site (Refer to planning drawing 500-001 in Figure 2-1) will drain buildings and trafficked areas which primarily discharge via a piped system via vortex separators to a series of three attenuation basins. It also includes a 1,500 m² open service yard, which is considered to be the higher risk area for contamination, which will be served as follows:

- A proprietary (SDS Aqua-swirl) vortex separator, followed by a proprietary (SDS down-flow Aqua-filter) filter will intercept the initial flows (Figure 2-2);
- Flow will then pass through 20 m of trench which will percolate through an engineered soil layer (Aqua-exchange; Figure 2-3);
- Flow will then pass in to the forebay of the upstream SuDS Basin 1 (Figure 2-1), with gabion baffles incorporating a geofabric style filter;

The combined runoff from the buildings, trafficked areas and open service yard will discharge as follows:

- Flows will pass through the 3 basins, all with gabion forebays and baffles before leaving the site at a maximum rate of 2 l/s;
- The basins will be grassed, with basin 1 and 3 having permanent water bodies (ponds), with an approximate total water volume of 475 m³ (basin 1 392 m³ and basin 3 83 m³), (based on water levels shown in Drawings 70076888-WSP-00-V-XX-DR-C-235 and 236, within Appendix A)
- The attenuated volume on site for a 1:100 year storm, including 40% climate change, is some 1200 m³;
- The basins and swales on site are intended to be lined to reduce potential contamination bypassing the treatment systems;
- An automatic emergency cut-off penstock is proposed at the site limit which can be controlled from the control room;
- A chamber at the outlet from the site will also serve as a sampling chamber (Figure 2-1, also included in Appendix A);
- Flows will then pass into an existing French drain along the north verge of the A350, which is to be rebuilt. This is an existing infiltration trench also capturing highway runoff;
- Weir chambers are proposed every ~100 m in the A350 verge French drain to maximise infiltration;
- The French drain runs some 500 m east before meeting the edge of the SPZ close to the Salisbury Road roundabout. It continues north along the Salisbury Road;
- A maintenance manual will be issued to the site operator for the drainage systems.

Further details of the three proprietary units are summarised below. Note that these units are taken as an example and other similar systems may ultimately be adopted.

Aqua-Swirl vortex separator

Based on NJDEP protocol has a 50% removal efficiency of TSS. These units also have hydrocarbon storage capacity. An AS-3 unit is proposed which should have a minimum treatment rate of 31 l/s.

Aqua-Filter down flow filter

This unit is designed to work with the Aqua-Swirl units.

For the particle size distribution specified by the NJDEP Filtration protocol, the Aqua-Filter will demonstrate 80% TSS removal efficiency.

Under bench scale laboratory testing, the Aqua-Filter filter media will demonstrate >60% dissolved Copper and Zinc removal efficiency.

Aqua-Xchange engineered soil

While there is capacity to capture TSS though its integration in a filter trench, Aqua-Xchange is designed to capture soluble metals.

Based on a trench width of 0.5 m and depth of 0.25 m, a 1 m length will treat a 50 m² area with treatment efficiency as below. 20 m is proposed for the yard area.

Figure 2-1 - Proposed Drainage Layout

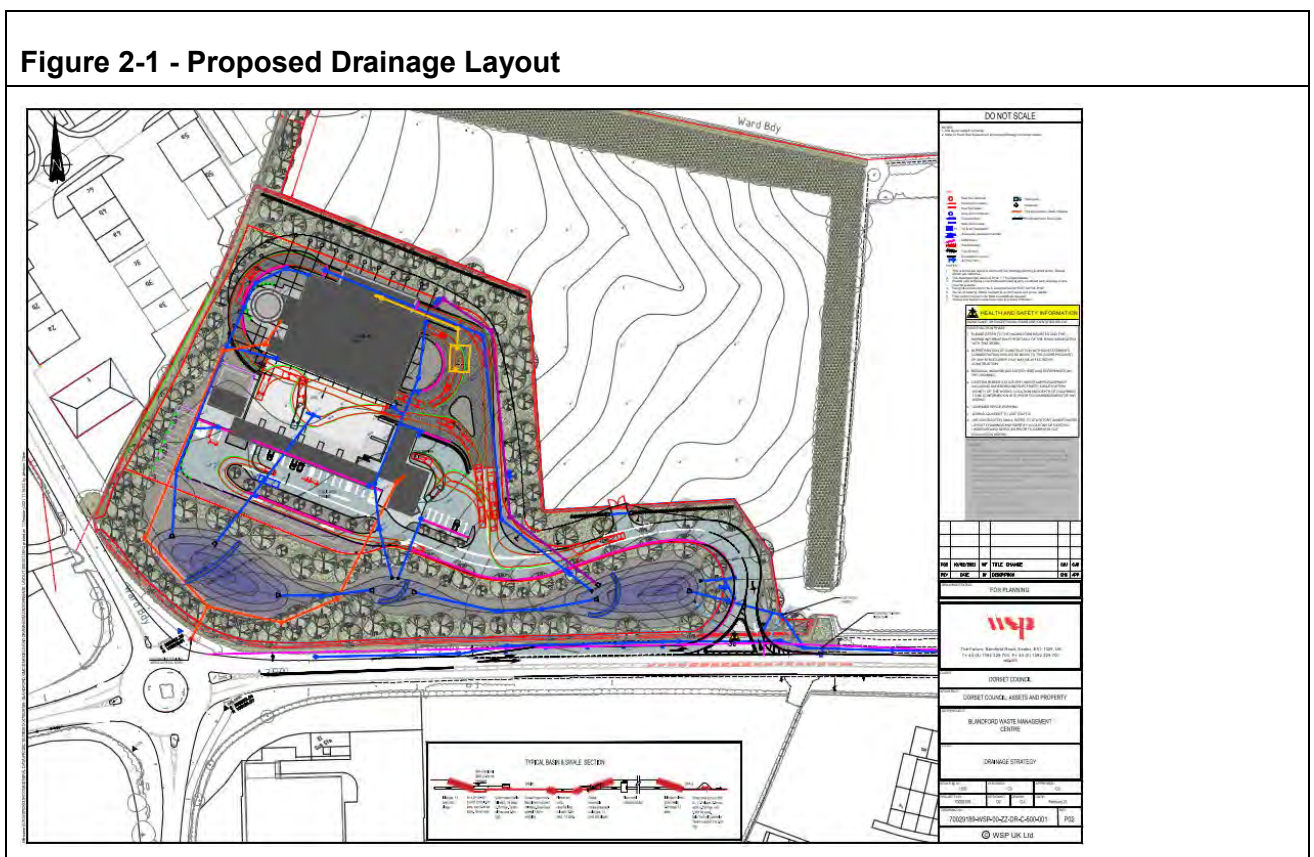


Figure 2-2 - Vortex Separator Unit and Down-Flow Filtration Unit

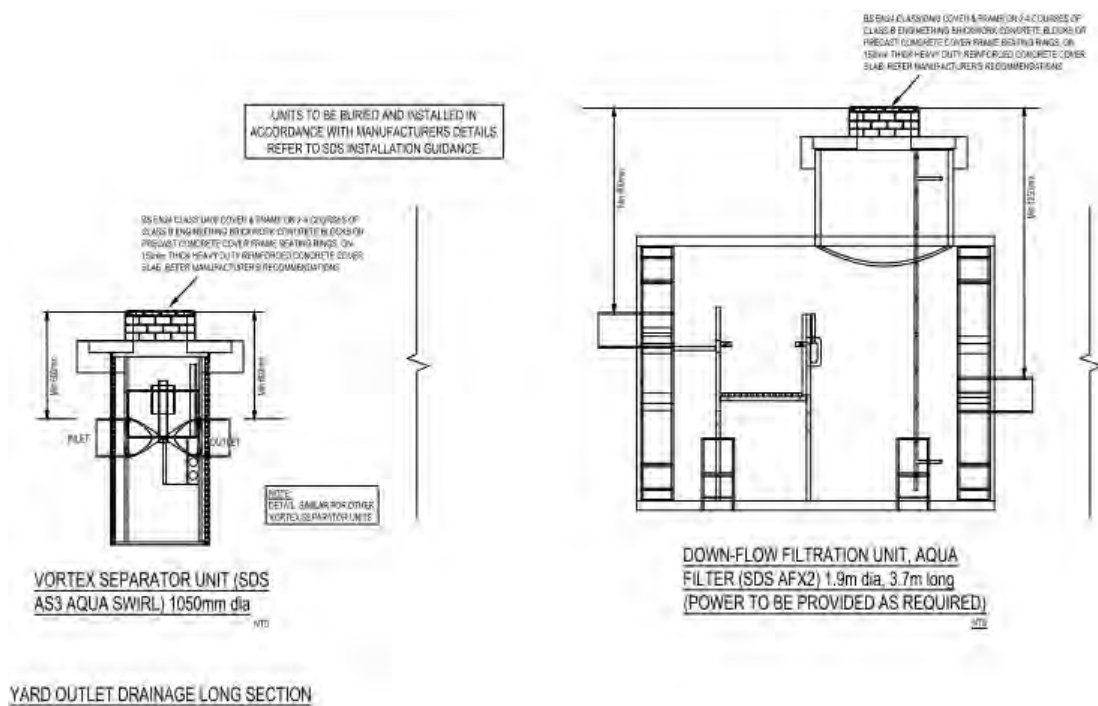
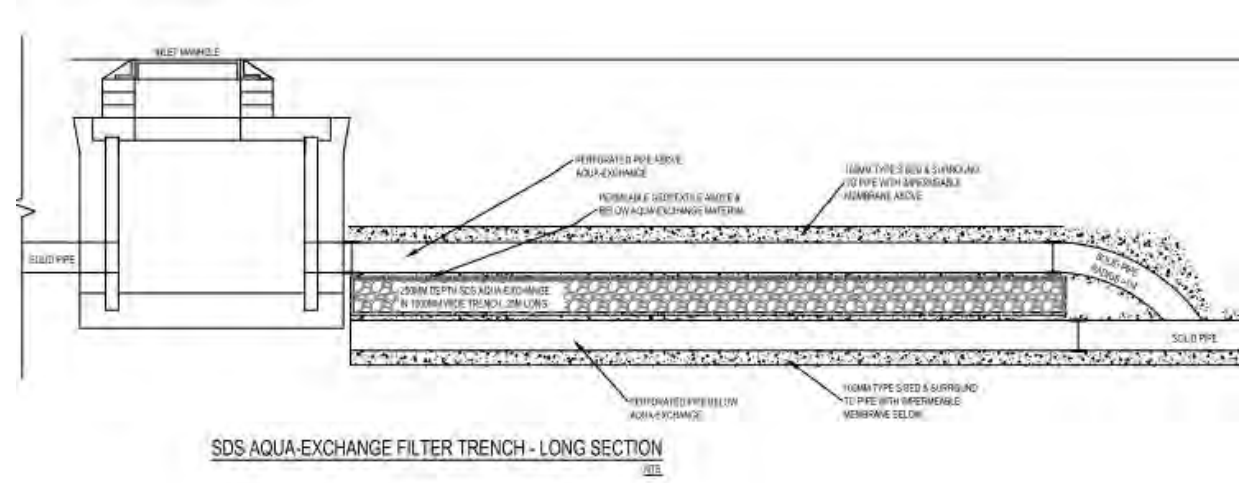


Figure 2-3 - SDS Aqua Exchange Filter





Additional Drainage System Options

Additional drainage options are being considered to further increase the system attenuation potential. However, these options, listed below, are unlikely to be required.

- Option A – a first flush of 10 mm rainfall over the 1500 m² yard to be taken to foul at 2 l/s and 15 m³ volume attenuated on site. Surplus flows above the first 10 mm of rain would bypass back to the attenuation basins.
- Option B - the entire 1500 m² yard taken to foul at 1 to 2 l/s and some 35 m³ volume attenuated on site.

2.2 POTENTIAL CONTAMINANTS OF CONCERN

Potential contaminant sources on site are related to stored waste or leaks or spillages from machinery and vehicles used on site. Potential Contaminants of Concern (CoCs) from those sources are described below. It should be noted however, that the robust onsite treatment systems is designed to mitigate potential contamination leaving the site (see Section 2.1).

Waste

The DoE Industry Profile [8] does not include a specific list of potential contaminants for waste management facilities because as a group they may include a large range of substances. Contaminants on a specific site will largely depend on the processes and range of waste handled and could be restricted to a limited range of substances.

The proposed WMC will only store household waste prior to transfer to a treatment site. Only inert and non-hazardous waste will be permitted, therefore any run-off generated on site from the waste itself is unlikely to be contaminated or carry only minor loadings of pollutants (e.g. inorganic/metals).

Leaks and spillages

Accidental spillages could occur involving plant machinery or vehicles on site. In this case petroleum hydrocarbons would be the most likely contaminants of concern that could migrate off site. This one-time event would create a sporadic and discrete source. The drainage system on site will be fully lined, i.e. discharges to ground are only permitted after the site discharge point.

2.3 DISCHARGE CHARACTERISATION

The drainage system contains a series of mitigation measures that include attenuation basins and vortex separators. The higher risk service yard also has filters and engineered soils that are designed to further reduce the potential migration of pollution into the site discharge. Therefore, water quality of the site discharge should be uncontaminated throughout site operation.

Basins 1 and 3 are designed to be permanent water features with a minimum volume of water of 475 m³ and a maximum capacity of up to 1200 m³ that accounts for a 1:100 years (plus 40% climate change) storm event.

The site discharge rate is limited to a maximum of 2 l/s.

3 HYDROGEOLOGICAL SETTINGS

3.1 GENERAL SITE DESCRIPTION

The site is located immediately north of the A350, east of Higher Shaftsbury Road, south of the Sunrise Business Park with National Grid Reference (NGR) 389144 (E) 108247 (N).

The site is currently an area of agricultural land of approximately 46,396 m². The topography is generally flat and has an approximate elevation of 90.0 m AOD. The construction area is limited to the south western section of the plot.

3.2 HYDROLOGY

No surface water features are recorded within 1 km of the site. The closest feature is the River Stour, located 1.2 km south west of the site and flowing south bordering the town. The Pimperne Brook, tributary of the River Stour, is located 1.2 km east of the site.

3.3 GEOLOGY & HYDROGEOLOGY

Geology

Geological information from public sources [1] indicates that the site is underlain by the Clay -with- Flint formation (drift), described as unbedded and heterogeneous sandy clay with abundant nodules and rounded pebbles of flint. The drift is in turn underlain by the Seaford and Newhaven Chalk Formation (undifferentiated) consisting of firm to smooth flinty chalk with marl and flint seams.

Information from previous ground investigation [5] indicates that the site is underlain by reworked ground mainly comprising sandy slightly gravelly clay to a maximum depth of 1 m bgl. Clay-with flint deposits were encountered in limited locations to a maximum depth of 1.2 m bgl. The underlying bedrock comprised structureless Chalk (recovered as silty sandy gravel and slightly sandy gravelly silt followed by structured Chalk to the end of the boreholes at 10 m bgl.

Hydrogeology

The Seaford and Newhaven Chalk Formation is classified by the Environment Agency as a Principal Aquifer whilst the overlying drift deposits are unproductive.

Groundwater was not encountered during the previous ground investigation [5]. According to the BGS Hydrogeological map of the Chalk [3], groundwater level at the site area is approximately 35 m AOD (55 m bgl), with a regional groundwater flow towards the south east.

According to the Envirocheck report included in the PSSR study [4] a groundwater abstraction licence exists at 674 m north east of the site. Further water abstractions are located to the east more than 1 km away from the site. A potable water abstraction operated by Wessex Water (WW) Services is located approximately 1.2 km east of the site.

The site is not within a source protection zone (SPZ), However an SPZ 1 (Inner source protection zone) related to the WW potable abstraction is located approximately 500 m from the site.

Infiltration testing

A series of infiltration tests were undertaken during the 2019 ground investigation [5] at the site. Infiltration test results indicate a range of values between 1.5 E-6 m/s and 3.1 E-5 m/s, which were found to be insufficient for onsite soakaway systems.

A series of off site infiltration tests were undertaken in February 2020 by ACS Testing [7]. The tests were located along the A350 drain, between the site discharge point and the A350 soakaway. The tests aimed to evaluate the infiltration capacity of the highway drainage system. Tests results provided a range of infiltration values between 1.18 x10⁻⁶ m/s and 3.05 x10⁻⁴ m/s with a geometric mean of 7.57 x10⁻⁶ m/s.

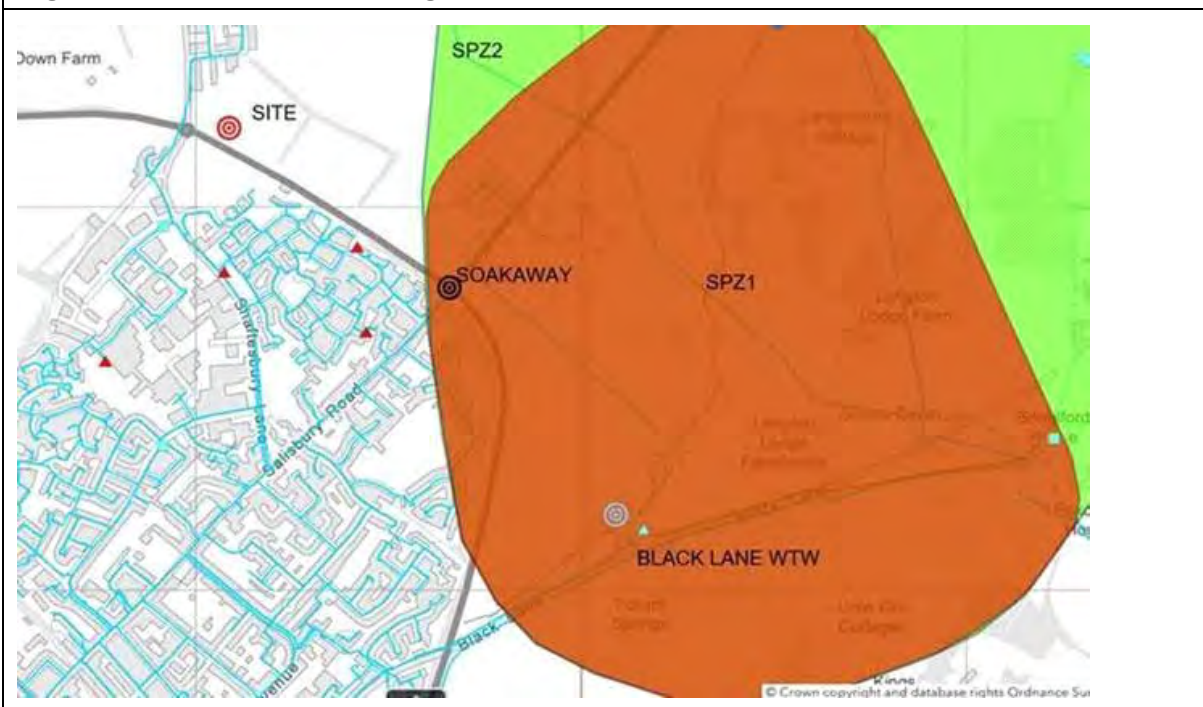
3.4 SOURCE PROTECTION ZONE DETAILS

Currently an SPZ 1 is located approximately 500 m east of the site. The SPZ is related to a series of WW potable abstractions. The total catchment of the abstractions expands to the north leaving the site and the 500 m highways drainage section outside the catchment (Figure 3-1).

According to the Wastewater Treatment & Supply [9], WW operates three boreholes at its Black Lane Water Treatment Works in Blandford, Dorset, with a daily licensed abstraction of 10.5 MI/d (10,500 m³/d).

The SPZs are currently under review and may be amended in the coming months. However, details of the changes as well as the time frame are yet unknown. This report is based on currently defined SPZ but also considers potential changes in the sensitivity analysis.

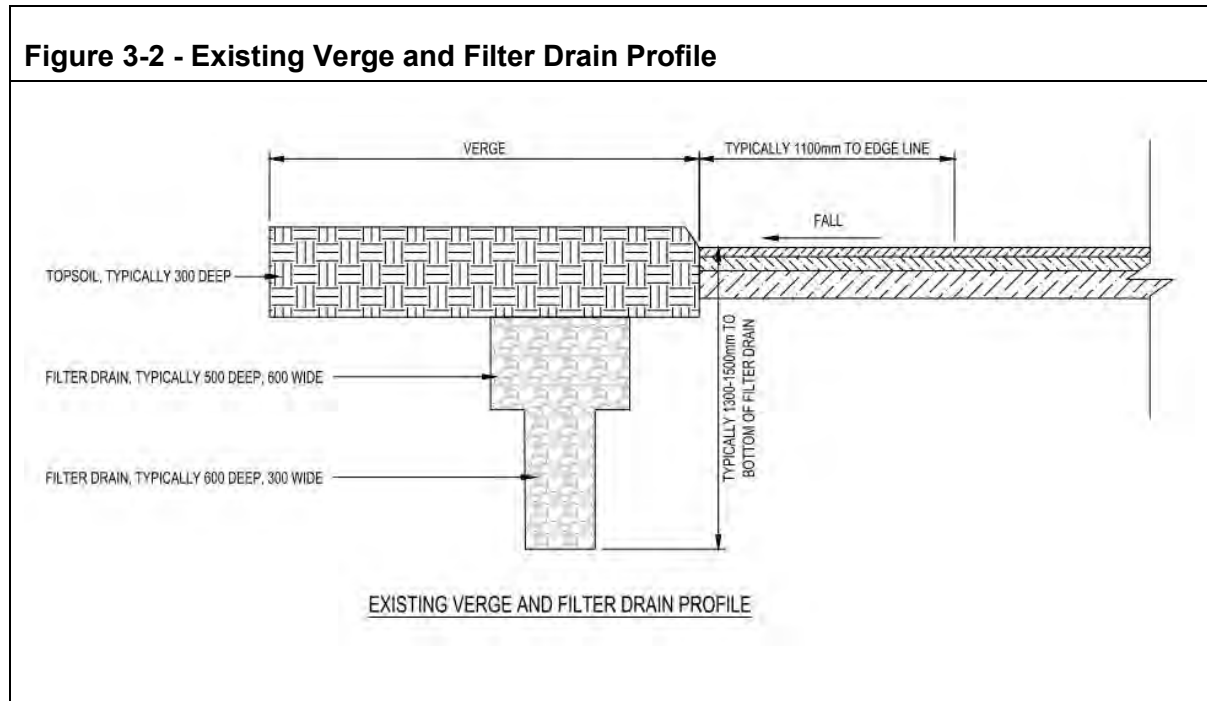
Figure 3-1 - Current SPZ designation (June 2020)



3.5 HIGHWAYS DRAIN BETWEEN SITE AND SOAKAWAY

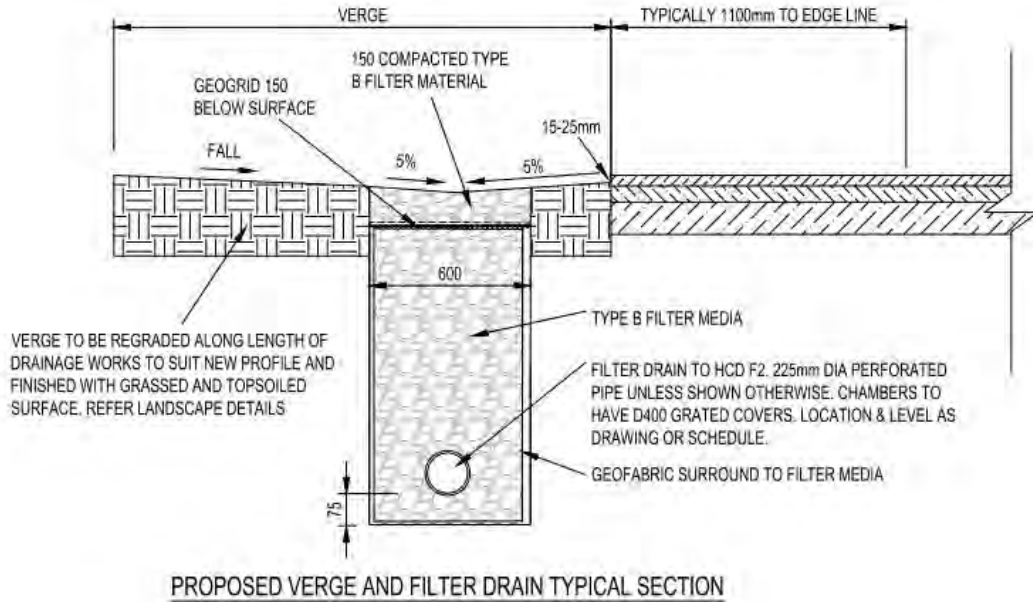
The A350 highways drain will receive discharge from the site drainage system (Figure 2-1) and the road. It runs to the north of the A350 and discharges to a soakaway located within the SPZ1 (Figure 3-1) over 500 m from the site.

The current A350 drain is a verge French drain as presented in Figure 3-2. The length of the drain from site to the SPZ1 is approximately 500 m and the minimum width is currently 0.3 m, providing an approximate minimum infiltration area of 150 m² (assuming base area only)



An update to the A350 verge French drain is proposed to improve its current condition and to maximise infiltration. Weir chambers are proposed approximately every 100 m. This update will increase the drain dimensions, extending the width to 0.6 m, as per the below Figure 3-3. The total infiltration area will then increase to 300 m², i.e. double the current area.

Figure 3-3 - Proposed Verge and Filter Drain Profile



4 CONCEPTUAL SITE MODEL

4.1 INTRODUCTION

A preliminary Conceptual Site Model (CSM) has been created based on the hydrogeological settings and the drainage system proposed for the site. The CSM has been reviewed on a quality basis using a Source Pathway Receptor (SPR) assessment approach. A summary of the preliminary CSM is presented in Table 4-1.

4.2 SOURCE-PATHWAY-RECEPTOR

Contaminant linkages (i.e. the relationships between a potential contaminant source, the migration or exposure pathway linking potential contaminants to a receptor) have been identified in the CSM

Source

- Stored waste leachate. Potential for a constant source of unknown CoCs at low concentrations.
- Accidental fuel spillage from machinery or vehicles within the open service yard. Potential for discrete source of relatively elevated hydrocarbon concentrations.

Pathway

- Run off into the ponds, discharge from site and flow along the A350 drain directly into the soakaway (within the SPZ1). This (conservatively) ignores the treatment train on site which is designed to prevent pollution migration.

A percentage of discharged water will infiltrate through the A350 drain which is outside the total catchment SPZ of the groundwater abstractions (albeit within the regional aquifer). For that reason, water infiltrating the A350 drain is not considered to pose a risk to the groundwater abstractions.

Receptor

- SPZ1 located 500 m from the site with associated groundwater abstractions.

The Principal aquifer itself is also a receptor but focus of this report is on the potable water abstraction.

Table 4-1 – Contaminant Linkages

Source	Pathway	Receptor	Comment
Stored waste leachate	Run off, discharge and migrations to SPZ1 soakaway	SPZ and associated abstractions	Leachate concentrations from the stored waste are expected to be low. Drainage system on-site will attenuate leachate concentrations to very low or negligible concentrations
Accidental fuel (or similar) spillage	Run off, discharge and migrations to SPZ soakaway	SPZ and associated abstractions	An accidental spillage can occur creating a source of high hydrocarbon concentrations

5 HYDROGEOLOGICAL RISK ASSESSMENT

5.1 METHODOLOGY

The assessment has been undertaken in line with the UK guidance including:

- UK CIRIA report C552 (Contaminated and Risk Assessment: A Guide to Good Practice, 2001) [10];
- Environment Agency, 2020. Land Contamination Risk Management (LCRM). (Formerly CLR11) [11];
- Environment Agency, 2017. Groundwater protection guides covering: requirements, permissions, risk assessments and controls (previously covered in GP3) [12]; and
- 'prevent and limit' approach of the Groundwater Directive (2000/60.EC) [13].

Regulations require that Hazardous Substances are prevented from entering groundwater and Non-Hazardous Pollutants must also be limited as not to cause local pollution. In terms of risk assessment this would equate to target criteria for hazardous substances set at the minimum reporting value (MRV) for an assessment point at the base of the unsaturated zone (after dilution in the aquifer). For Non-Hazardous Pollutants appropriate water quality standards (WQS) include:

- UK Drinking Water Quality Standards (DWS) from The Water Supply (Water Quality) Regulations 2000 (amended 2004)
- World Health Organisation Guidelines for Drinking Water Quality, Fourth Edition, Volume 1, (2011)
- World Health Organisation (WHO) Petroleum Products in Drinking Water (2008)

In order to develop a reasonable worst-case scenario with the assumption that the treatment measures on site do not function, the risk from the discharged water has been assessed based on a semi quantitative approach, estimating the total dilution of a potential contaminant loading entering the aquifer and a comparison with the appropriate WQS.

From the two potential sources identified the accidental fuel spillage presents the highest potential risk. As both sources follow the same pathway, it is considered that the assessment of risk from a steady, but low loading, waste leachate is covered within the risk assessment of the fuel spillage. The assessment considers that the fuel spillage occurs within the waste management area (i.e service yards or west area of the site) that drains into basin 1.

The assessment has a high degree of conservatism as it includes the following assumptions:

- No biodegradation and sorption have been considered throughout the pathway from the source to the receptor. In reality natural attenuation is likely to occur within the system and within the SPZ itself;
- A failure of the treatment system due to poor maintenance or human error is assumed. Hence the effects of the attenuation features included in the drainage system design (filters and separators) are not accounted for, only the dilution potential of the ponds;
- The accidental spillage scenario is based on a volume of 100 Litres of gasoline (worst case), which is unlikely to run off completely to the ponds. Normal site maintenance would detect an incident of that proportion and likely limit the volume of spillage reaching the ponds and the site discharge. In addition, the vortex separators have a 600 L oil capacity.

5.2 POTENTIAL CONTAMINANT SCENARIOS

Based on the hydrogeological settings and the drainage system proposed for the site, two contaminant scenarios are considered. A theoretical accidental spillage of 100 L of fresh fuel has been selected as the baseline contaminant scenario, which can be considered representative also of other types of contaminants (including inorganics as biodegradation has not been accounted for). This has then been tested under different rainfall conditions resulting in site discharge rates at 1 l/s and 2l/s (max. outflow rate). It is considered unrealistic that a higher contaminant mass gets released on site at a specific time. Concentrations of an ideal mixture of unleaded Non Aqueous Phase Liquid (NAPL) fuel source are presented in Appendix B.

SCENARIO 1 – DRY CONDITIONS

Two of the onsite ponds will permanently be maintained as wet surface water features. During relatively dry conditions (low flow conditions) any spillage that occurs on site runs off into the attenuation ponds and gets diluted. Discharge from the site is very limited (<2 l/s) and mostly infiltrates through the A350 drain. To assess the risk from this scenario the following assumptions have been applied:

- The pollutant source is a leak of 100 L of pure gasoline.
- Onsite ponds are at their minimum volume, 475 m³, (see Section 2.1)
- Site discharge rate is at 1 l/s, i.e. half the maximum rate of 2 l/s .

Table 5-1 presents the calculation of the potential flow reaching the soakaway. Results indicate that during relatively dry conditions discharged water completely infiltrates through the A350 drain and does not reach the soakaway. Therefore, during dry conditions discharged water is unlikely to pose a risk to the SPZ and associated abstractions.

Table 5-1 – Scenario 1 - Flow calculations

Parameters	Value	Comment
A - Discharge from site	1 l/s	Half of the maximum discharge rate allowance from site under normal conditions (2 l/s)
B - Infiltration rate along the A350 drain (current dimensions)	1.14 l/s (1.14 E-3 m ³ /s)	Based on current verge design (area 150 m ²) and geomean of soil infiltration tests undertaken on trial pits located between the site and the SPZ limit (7.57 E-6 m/s). See Section 3.5
C - Flow reaching the SPZ1/soakaway C = A - B	None	Difference between discharge from site and infiltration along A350 drain

SCENARIO 2 – VERY WET CONDITIONS

Under wet and extremely wet conditions, (i.e. maximum considering a 1:100 year event), any onsite spillage runs off into the attenuating ponds, dilutes and discharges into the A350. Part of the discharged water infiltrates through the A350 drain and the remaining discharged water runs along the drain, reaches the SPZ1/soakaway and mixes with groundwater in the aquifer.

Throughout this process potential contaminants dilute within the attenuation ponds and subsequently within the aquifer. The assessment has been done applying the following assumptions:

- The pollutant source is a leak of 100 L of pure gasoline.
- On site ponds volume is 475 m³ (minimum)
- Site discharge occurs at 2 l/s, maximum allowed

Table 5-2 – Scenario 2 - Flow and dilution calculations

Parameters	Value	Comment
A - Discharge from site	2 l/s	Maximum discharge rate from site
B - Infiltration rate along the A350 drain (current dimensions)	1.14 l/s (1.14 E-3 m ³ /s)	Based on current verge condition (area 150 m ²) and geomean of soil infiltration tests undertaken on trial pits located between the site and the SPZ limit (7.57 E-6 m/s). See Section 3.5
C - Flow reaching the SPZ1/soakaway C = A - B	0.86 l/s	Difference between discharge from site and infiltration along A350 drain
D - Pond volume	475 m ³ 475,000 L	Based on minimum water levels and volume of ponds (conservative). Taken from Drawings 235 and 236 (Appendix A).
E - Assumed leak volume	100 L	100 L of pure gasoline
F - Ponds Dilution Factor F = (D+E) / E	4751	Minimum dilution factor based on minimum pond volume and 100 L source discharge into the ponds.
G - WW abstraction rate	1.05 E+7 l/d 1.22 E+2 l/s	Maximum abstraction rate from WW (10.5 Ml/d). Indicates the aquifer has the capacity to abstract that volume, therefore that is an indicative minimum aquifer storage.
H - Aquifer Dilution factor H = (G+C) / C	142	Minimum dilution factor based on a groundwater abstraction rate of 10.5 Ml/d (G) and the volume that gets into the SPZ (C).
I - Total Dilution I = H * F	673,104	Total dilution of the leak contaminants from pond and aquifer (dilution in the ponds and the aquifer)

According to the above calculations, leak concentrations from a theoretical 100 L gasoline spillage dilute by a factor of at least 673,104 (6.73E+05) before reaching the abstractions.

Assuming a pure gasoline leak, contaminant concentrations equate to the effective solubilities (Ideal mixture concentrations included in Appendix B). The following table presents the effective solubilities of pure gasoline compounds, the diluted concentrations and the relevant water standard. None of the calculated diluted concentrations exceed the water quality standards, which means that such a

pollution incident should not result in an unacceptable increase of pollutant concentrations in the water supply.

Table 5-3 – Diluted concentrations compared to quality standards

Contaminant	Effective Solubility (mg/l)	Dilution Factor	Diluted Concentration (mg/l)	DWS/ MRV (mg/l)
MTBE	715	6.73E+05	0.00106	0.015 ¹
Benzene	79	6.73E+05	0.000117	0.001 ²
Toluene	75.3	6.73E+05	0.000112	0.004 ²
Ethylbenzene	3.44	6.73E+05	5.11E-06	0.001 ²
xylenes	21.3	6.73E+05	3.16E-05	0.003 ²
Aliphatics EC5-6	11.7	6.73E+05	1.74E-05	0.01 ²
Aliphatics EC>6-8	0.373	6.73E+05	5.53E-07	0.01 ²
Aliphatics EC>8-10	0.0687	6.73E+05	1.02E-07	0.01 ²
Aliphatics EC>10-12	0.00158	6.73E+05	2.35E-09	0.01 ²
Aliphatics EC>12-16	1.68E-06	6.73E+05	2.50E-12	0.01 ²
Aliphatics EC>16-35	6.52E-10	6.73E+05	9.69E-16	0.01 ²
Aromatics EC>8-10	3.98	6.73E+05	5.91E-06	0.01 ²
Aromatics EC>10-12	0.897	6.73E+05	1.33E-06	0.01 ²
Aromatics EC>12-16	0.0108	6.73E+05	1.60E-08	0.01 ²
Aromatics EC>16-21	7.36E-05	6.73E+05	1.09E-10	0.01 ²
Aromatics EC>21-35	3.41E-07	6.73E+05	5.06E-13	0.01 ²
Naphthalene	0.121	6.73E+05	1.80E-07	0.00001 ³

1 Non Hazardous pollutant – WHO 2011 used

2 Hazardous Substant – MRV used

3 Non Hazardous pollutant – limit of detection used as DWS is not available

5.3 POTENTIAL SPZ UPDATE

As stated in Section 3.4, the EA is considering changes to the SPZs. The new dimensions are still unknown, however as a worst-case scenario the assessment of risks has been also undertaken

assuming the inner source protection zone (SPZ 1) of the WW abstractions gets extended to beneath the site.

In such a scenario, the discharge characteristics from the site remain the same, i.e. maintaining the same dilution potential within the on-site ponds and discharge rates. There are no below ground chemical storage tanks, the drainage system onsite is fully lined and therefore onsite infiltration of potentially polluted waters is not a realistic scenario. However, infiltration of site run-off into the SPZ1 would start from the site discharge point into the A350 drain. The dilution effect of the aquifer therefore decreases compared to the scenarios described above.

The assessment of risk for this scenario has been undertaken applying normal wet conditions (as per Scenario 2) but removing the infiltration through the A350 drain (i.e. equal to a theoretical scenario that takes all site discharges into a soakaway in SPZ1). The following assumptions have been applied:

- The pollutant source is a leak of 100 L of pure gasoline;
- On site ponds volume is 475 m³;
- Site discharge occurs at 2 l/s, maximum allowed;
- Discharge infiltrates directly into the aquifer and SPZ adjacent to the site.

Table 5-4 presents the calculation of the water flow into the aquifer and associated dilution factor.

Table 5-4 – Revised SPZ worst case scenario - Flow and dilution calculations

Parameters	Value	Comment
A - Discharge from site and into the SPZ directly	2 l/s 172,800 l/d	Maximum discharge rate from site under normal conditions
D - Pond volume	475 m ³ 475,000 L	Based on minimum water levels and volume of ponds (conservative). Taken from Drawings 235 and 236.
E - Assumed leak volume	100 L	100 L of pure gasoline
F - Ponds Dilution Factor F = (D+E) / E	4,761	Minimum dilution factor based on minimum pond volume and 100 L run off into the ponds.
G - WW abstraction rate	10,500 m ³ /d 10,500,000 l/d	Maximum abstraction rate from WW (10.5 MI/d). Indicates the aquifer has the capacity to abstract that volume, therefore that is an indicative minimum aquifer storage.
H - Aquifer Dilution factor H = (G+A) / A	62	Minimum dilution factor based on a groundwater abstraction rate of 10.5 MI/d and 100% discharge infiltration rate
I - Total Dilution I = H * F	293,440	Total dilution of the leak contaminants from pond and aquifer

According to the above calculations, the dilution factor is slightly lower than in Scenario 2 due to increased infiltration into the aquifer in SPZ1. Hence diluted concentrations reaching the aquifer in this scenario increase. Nonetheless none of the calculated diluted hydrocarbon concentrations exceed the WQS (Table 5-5).

It should be noted that an extension of SPZ 1 to the site area is very unlikely. SPZ1 is defined based on a 50-day groundwater travel time to the abstraction point. This would occur assuming highly transmissive fracture zones typically associated with dry valley features and/or fault zones in the Chalk. Onsite ground investigation has shown a deep water table and relatively low Chalk permeabilities typical of interfluvial and weathered chalk which make fast flowing groundwater very unlikely. Should the SPZ 2 or SPZ 3 be extended towards the site, travel times are much longer. Not to consider natural attenuation processes, which lead to reduction of contaminant concentrations in the groundwater, would become unrealistic, hence the approach presented above would become overly conservative.

Table 5-5 – Diluted concentrations compared to quality standards

Contaminant	Effective Solubility (mg/l)	Dilution Factor	Diluted Concentration (mg/l)	DWS/ MRV (mg/l)
MTBE	715	2.93E+05	0.0024	0.015 ¹
Benzene	79	2.93E+05	2.69E-04	0.001 ²
Toluene	75.3	2.93E+05	2.57E-04	0.004 ²
Ethylbenzene	3.44	2.93E+05	1.17E-05	0.001 ²
xylenes	21.3	2.93E+05	7.25E-05	0.003 ²
Aliphatics EC5-6	11.7	2.93E+05	3.99E-05	0.01 ²
Aliphatics EC>6-8	0.373	2.93E+05	1.27E-06	0.01 ²
Aliphatics EC>8-10	0.0687	2.93E+05	2.34E-07	0.01 ²
Aliphatics EC>10-12	0.00158	2.93E+05	5.40E-09	0.01 ²
Aliphatics EC>12-16	1.68E-06	2.93E+05	5.72E-12	0.01 ²
Aliphatics EC>16-35	6.52E-10	2.93E+05	2.22E-15	0.01 ²
Aromatics EC>8-10	3.98	2.93E+05	1.36E-05	0.01 ²
Aromatics EC>10-12	0.897	2.93E+05	3.06E-06	0.01 ²
Aromatics EC>12-16	0.0108	2.93E+05	3.67E-08	0.01 ²
Aromatics EC>16-21	7.36E-05	2.93E+05	2.51E-10	0.01 ²
Aromatics EC>21-35	3.41E-07	2.93E+05	1.16E-12	0.01 ²

Contaminant	Effective Solubility (mg/l)	Dilution Factor	Diluted Concentration (mg/l)	DWS/ MRV (mg/l)
Naphthalene	0.121	2.93E+05	4.13E-07	0.00001 ³

1 Non Hazardous pollutant – WHO 2011 used

2 Hazardous Substant – MRV used

3 Non Hazardous pollutant – limit of detection used as DWS is not available

5.4 POLLUTION INCIDENT OUTSIDE OF THE SERVICE YARD AREA

A particular scenario has also been considered in line with scenario 2 but where an incident occurs east of the main service yard and outside of the waste storage areas. This area drains directly into basin 3, hence dilution would be limited to the basin 3 dilution potential.

It should be noted that this scenario is not applicable to assess the risk from site waste leachate.

To assess the risk from this particular scenario the following assumptions have been applied:

- The pollutant source is a leak of 100 L of pure gasoline.
- Run off discharges directly to basin 3
- Basin/pond 3 is at its minimum volume, 83 m³, (see Section 2.1)
- Site discharge rate is at 2 l/s

Table 5-6 – Incident Outside of Waste Storage Area - Flow and dilution calculations

Parameters	Value	Comment
A - Discharge from site	2 l/s	Maximum discharge rate from site
B - Infiltration rate along the A350 drain (current dimensions)	1.14 l/s (1.14 E-3 m ³ /s)	Based on current verge condition (area 150 m ²) and geomean of soil infiltration tests undertaken on trial pits located between the site and the SPZ limit (7.57 E-6 m/s). See Section 3.5
C - Flow reaching the SPZ1/soakaway C = A - B	0.86 l/s	Difference between discharge from site and infiltration along A350 drain
D - Pond volume	83 m ³ 83,000 L	Based on all run off discharging to basin 3 at minimum water levels (conservative). Taken from Drawings 235 and 236 (Appendix A).
E - Assumed leak volume	100 L	100 L of pure gasoline
F - Ponds Dilution Factor F = (D+E) / E	831	Minimum dilution factor based on minimum basin 3 volume and 100 L source discharge into the ponds.
G - WW abstraction rate	1.05 E+7 l/d 1.22 E+2 l/s	Maximum abstraction rate from WW (10.5 Ml/d). Indicates the aquifer has the capacity to abstract that volume, therefore that is an indicative minimum aquifer storage.

Parameters	Value	Comment
H - Aquifer Dilution factor $H = (G+C) / C$	142	Minimum dilution factor based on a groundwater abstraction rate of 10.5 Ml/d (G) and the volume that gets into the SPZ (C).
I - Total Dilution $I = H * F$	117,733	Total dilution of the leak contaminants from pond and aquifer (dilution in the ponds and the aquifer)

According to the above calculations, leak concentrations from a theoretical 100 L gasoline spillage dilute by a factor of at least 117,733 (1.17E+05) before reaching the abstractions.

As shown in Table 5-7 none of the calculated diluted concentrations exceed the water quality standards, which means that an incident outside the service yard should not result in an unacceptable increase of pollutant concentrations in the water supply.

Table 5-7 – Diluted concentrations compared to quality standards

Contaminant	Effective Solubility (mg/l)	Dilution Factor	Diluted Concentration (mg/l)	DWS/ MRV (mg/l)
MTBE	715	1.18E+05	0.0061	0.015 ¹
Benzene	79	1.18E+05	6.69E-04	0.001 ²
Toluene	75.3	1.18E+05	6.38E-04	0.004 ²
Ethylbenzene	3.44	1.18E+05	2.92E-05	0.001 ²
xylene	21.3	1.18E+05	1.80E-04	0.003 ²
Aliphatics EC5-6	11.7	1.18E+05	9.91E-05	0.01 ²
Aliphatics EC>6-8	0.373	1.18E+05	3.15E-06	0.01 ²
Aliphatics EC>8-10	0.0687	1.18E+05	5.81E-07	0.01 ²
Aliphatics EC>10-12	0.00158	1.18E+05	1.34E-08	0.01 ²
Aliphatics EC>12-16	1.68E-06	1.18E+05	1.42E-11	0.01 ²
Aliphatics EC>16-35	6.52E-10	1.18E+05	5.52E-15	0.01 ²
Aromatics EC>8-10	3.98	1.18E+05	3.37E-05	0.01 ²
Aromatics EC>10-12	0.897	1.18E+05	7.59E-06	0.01 ²
Aromatics EC>12-16	0.0108	1.18E+05	9.11E-08	0.01 ²
Aromatics EC>16-21	7.36E-05	1.18E+05	6.24E-10	0.01 ²

Contaminant	Effective Solubility (mg/l)	Dilution Factor	Diluted Concentration (mg/l)	DWS/ MRV (mg/l)
Aromatics EC>21-35	3.41E-07	1.18E+05	2.89E-12	0.01 ²
Naphthalene	0.121	1.18E+05	1.03E-06	0.00001 ³

1 Non Hazardous pollutant – WHO 2011 used

2 Hazardous Substant – MRV used

3 Non Hazardous pollutant – limit of detection used as DWS is not available

5.5 DRAIN IMPROVEMENT MEASURES (UPGRADED DRAIN)

Proposed upgrade of the A350 drain verge

As per Section 3.5, changes to the A350 verge French drain are proposed to improve its performance and to maximise infiltration by increasing the infiltration area and slowing down the flow through the drain by the weir chambers. If the proposed update is undertaken the infiltration through the A350 drain is expected to exceed the maximum site discharge rate of 2 l/s. That means discharge from the site should not reach the SPZ1/soakaway, see calculations summarised in Table 5-8.

Table 5-8 – Infiltration with updated A350 verge drain

Parameters	Value	Comment
A - Discharge from site	2 l/s 172,800 l/d	Maximum discharge rate from site
B - Infiltration rate along the A350 drain (proposed dimensions)	2.27 l/s (2.27 E-3 m ³ /s)	Based on current verge design (area 300 m ²) and geomean of soil infiltration tests undertaken in trial pits located between the site and the SPZ1 limit (7.57 E-6 m/s). See Section 3.5
C - Flow reaching the soakaway C = A - B	None	Difference between discharge from site and infiltration along A350 drain

6 SUMMARY

6.1 SUMMARY

A HRA has been undertaken to assess the risks posed by the proposed WMC to the SPZ 1 located 500 m from the site. The drainage system proposed for the site comprises a series of separators, filters and attenuation basins that will significantly attenuate any potential contaminated site run off, effectively preventing pollutants from leaving the site. The water from the site drainage system will be discharged at a maximum rate of 2 l/s to the offsite A350 infiltration drain that runs to the north of the road and overflows/discharges into a soakaway located within the SPZ 1. This assessment evaluates residual long-term risks from the site discharge to the SPZ and related Wessex Water groundwater abstractions taking into account a potential failure of the onsite treatment systems, e.g. due to the lack of long-term maintenance.

Based on the environmental settings and the site drainage design a Conceptual Site Model was developed. Realistic worst-case scenarios were established and assessed based on a theoretical accidental fuel spillage and different rainfall conditions: relatively dry (1 l/s discharge from the site) and high rainfall conditions (up to 1:100 years plus 40% climate change storm event, creating a 2 l/s discharge). The assessment included the following series of assumptions based on the environmental settings and the drainage system design:

- The source is a 100 L fresh gasoline spillage (reasonable worst case also representing other potential pollutants);
- The pollution incident occurs within the service yard areas that drain into basin 1;
- Attenuation ponds remain constantly wet with a minimum volume of 475 m³ and a maximum of 1,200 m³;
- Maximum site discharge rate is 2 l/s;
- Discharged water infiltrates through the A350 drain with an infiltration rate estimated based on the drain current dimensions and available soil infiltration test results;
- Attenuation within the system, the vertical pathway and within the SPZ1 are not accounted for in the assessment; and
- Filters and other attenuation features within the drainage system on site are not accounted for, only the dilution potential of the ponds.

Based on the above assumptions, the rate of discharge water reaching the soakaway and subsequent dilution in the aquifer was calculated. Results indicated the following:

- Under relatively dry conditions all water discharged from the site infiltrates through the A350 drain removing the risks to the SPZ; and
- During wet conditions (i.e. constant discharge at 2 l/s), dilution in the ponds and subsequently in the aquifer reduces the fuel spillage concentrations to below the Water Quality Standards, hence a theoretical 100 L fuel spillage on site would not pose a risk to the SPZ and the groundwater abstractions (i.e. would not cause a significant increase in groundwater concentrations at the abstraction points). This scenario also represents a constant low pollution loading release from waste leachate, which was identified as the other type of long-term pollution risk (other than accidental spillage).

With the proposed enhancement measures (upgrade) of the highways drain, infiltration rates outside the SPZ will be further enhanced. With the proposed dimensions all water discharged from the site

(up to 2 l/s) should percolate into the ground prior to reaching the SPZ1 and therefore further reduce the risks. It should be noted that the highways drain also receives run-off from the road, which is not part of this assessment, but which should benefit from the proposed upgrade. Groundwater levels adjacent to the site are deep and the enhanced infiltration should improve overall groundwater recharge rates.

A scenario where an incident occurs outside the service yard area and run off discharges directly into basin/pond 3 was also assessed. Also, in this case despite the reduced dilution capacity of pond 3, the discharge concentrations from the site do not pose a risk to the SPZ and the groundwater abstractions.

The presented assessment also shows that a potential re-definition of the SPZs that in the worst-case could extend the SPZ 1 beneath the site, is unlikely to change the outcome of the HRA, i.e. the proposed development is not posing a risk to the aquifer and the groundwater abstractions.

6.2 RECOMMENDATIONS

Even if the HRA does not identify a risk to the SPZ 1 and related Wessex Water abstractions, it is fundamental that the site drainage system with its individual treatment elements is regularly checked and maintained throughout its operational lifecycle. To check the performance of the onsite treatment system bi-annual sampling of the site discharge water is recommended, including basic laboratory analysis (e.g. pH, electrical conductivity or Total Dissolved Solids, metals, chloride, sulphate and Total Petroleum Hydrocarbons).

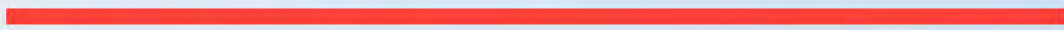
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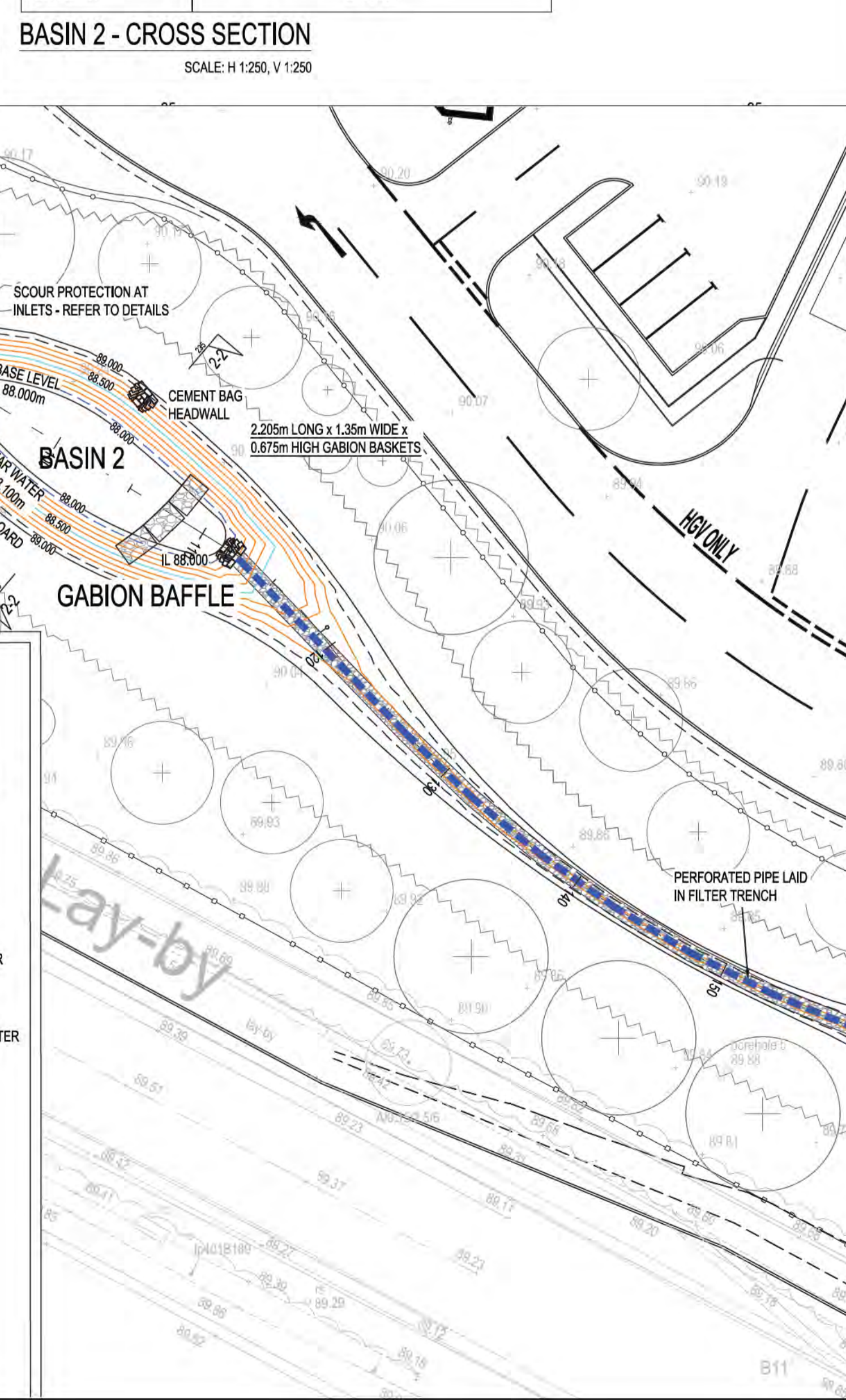
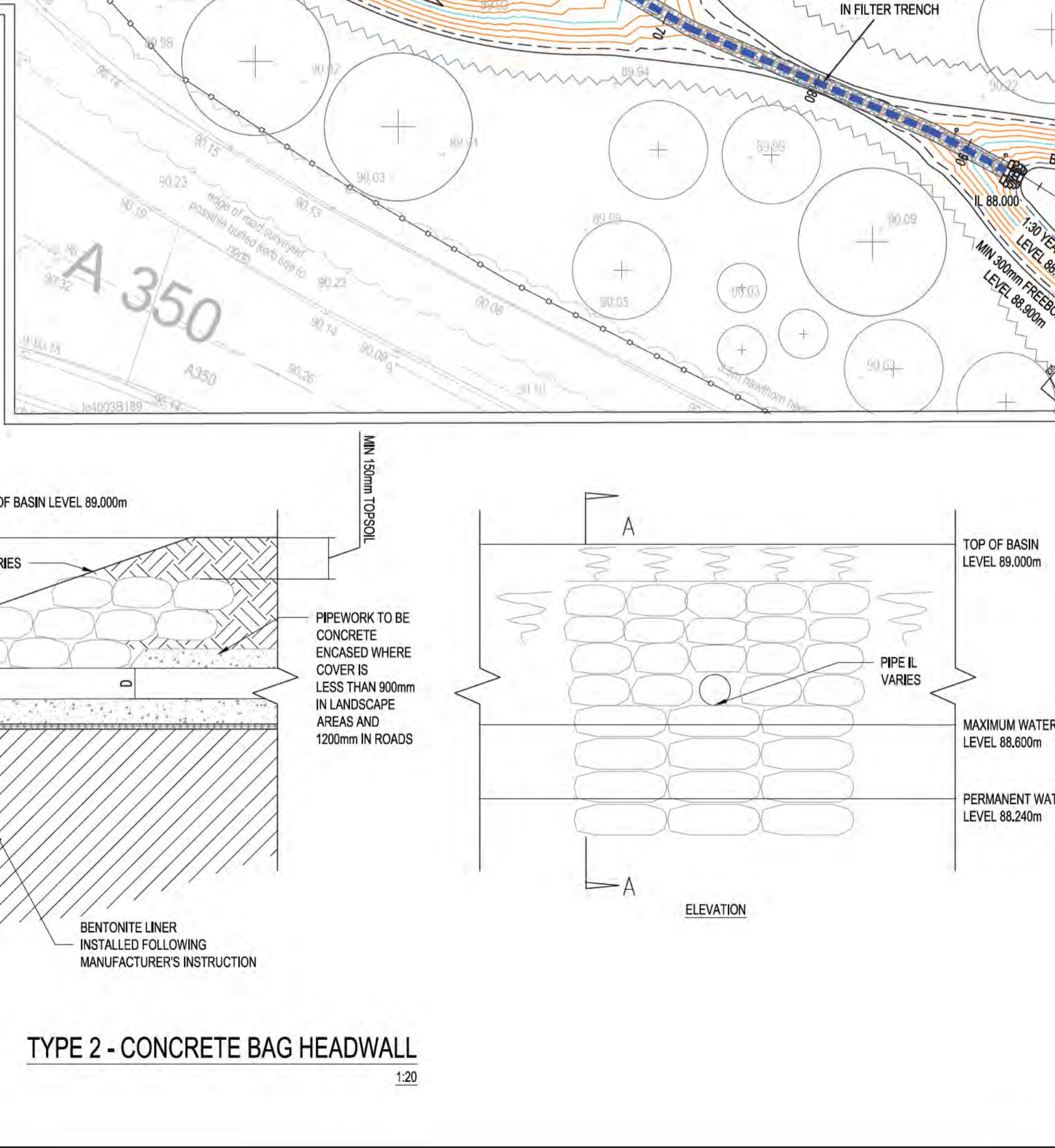
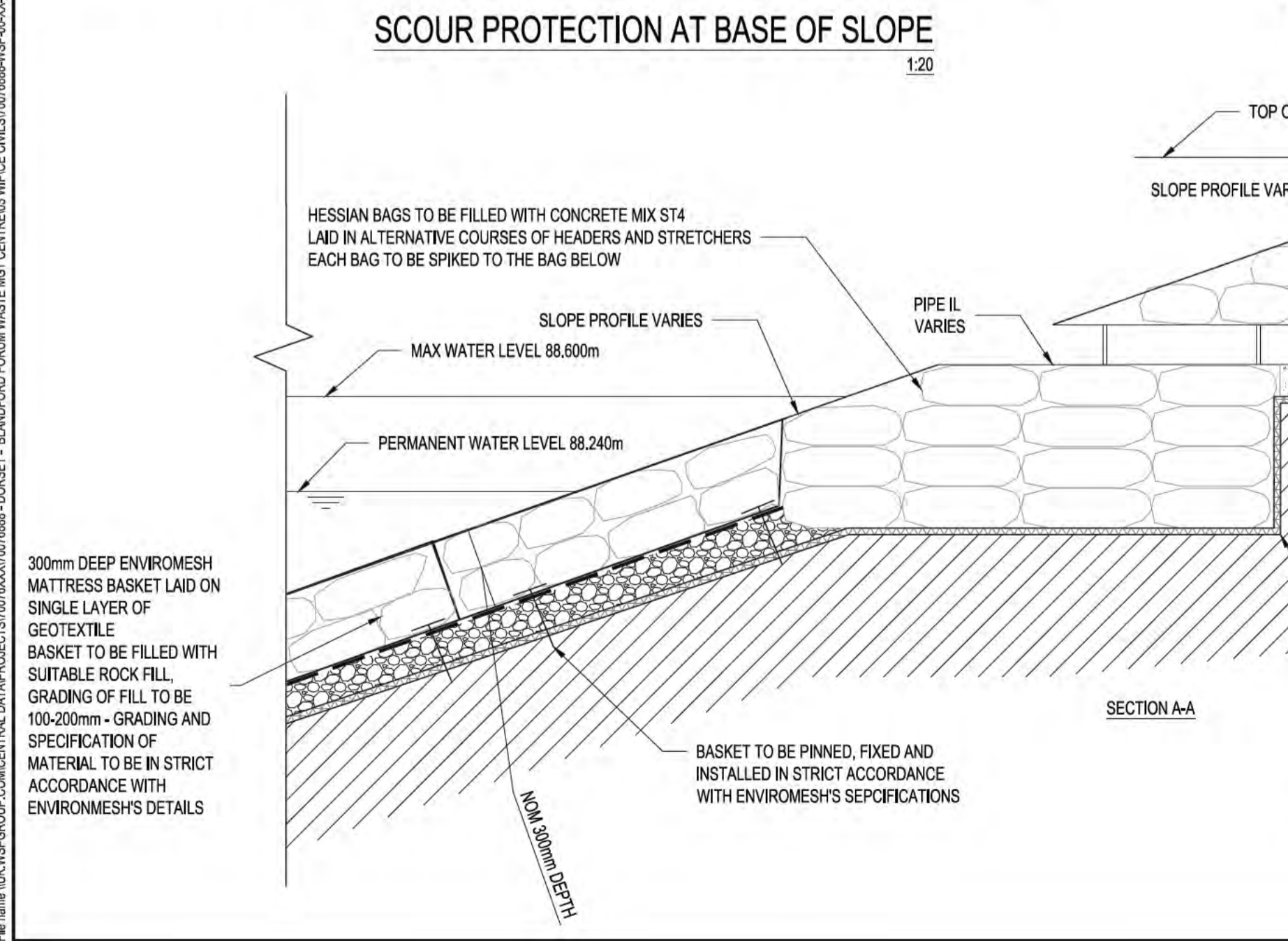
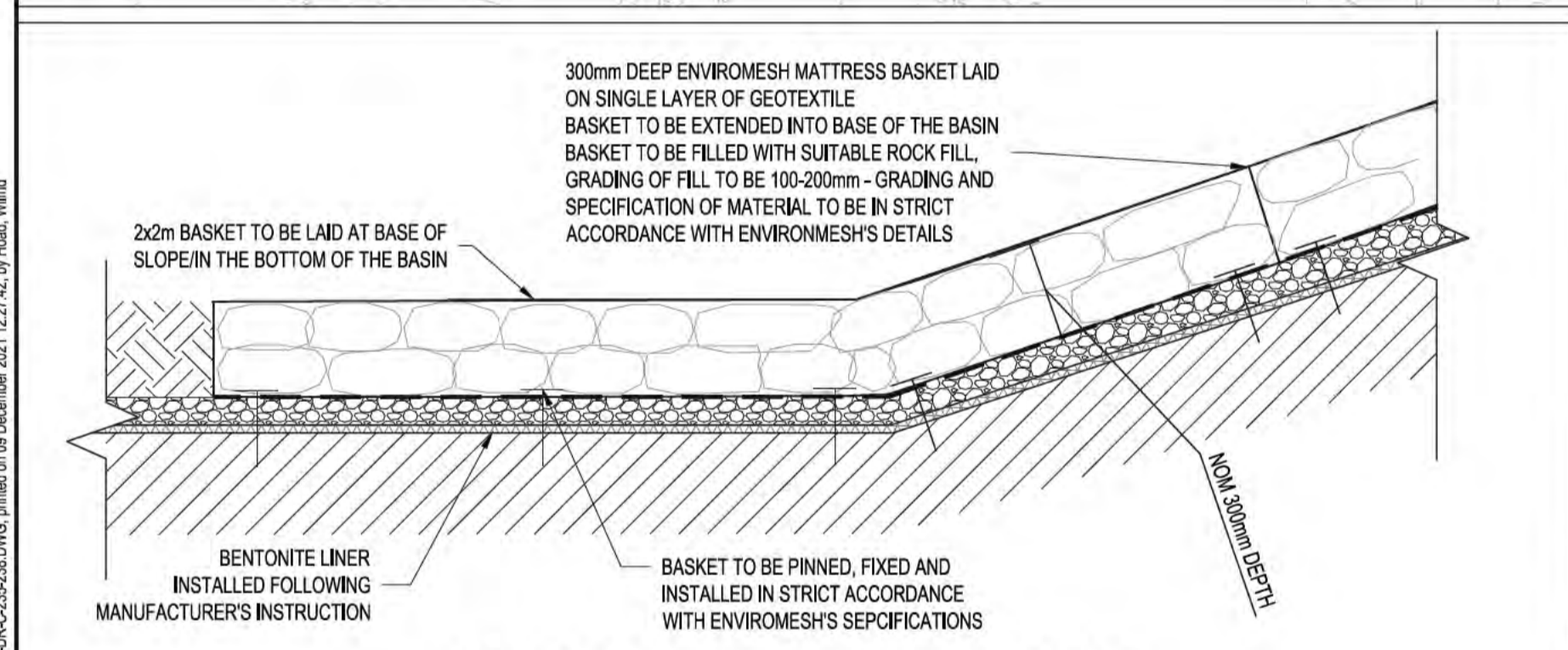
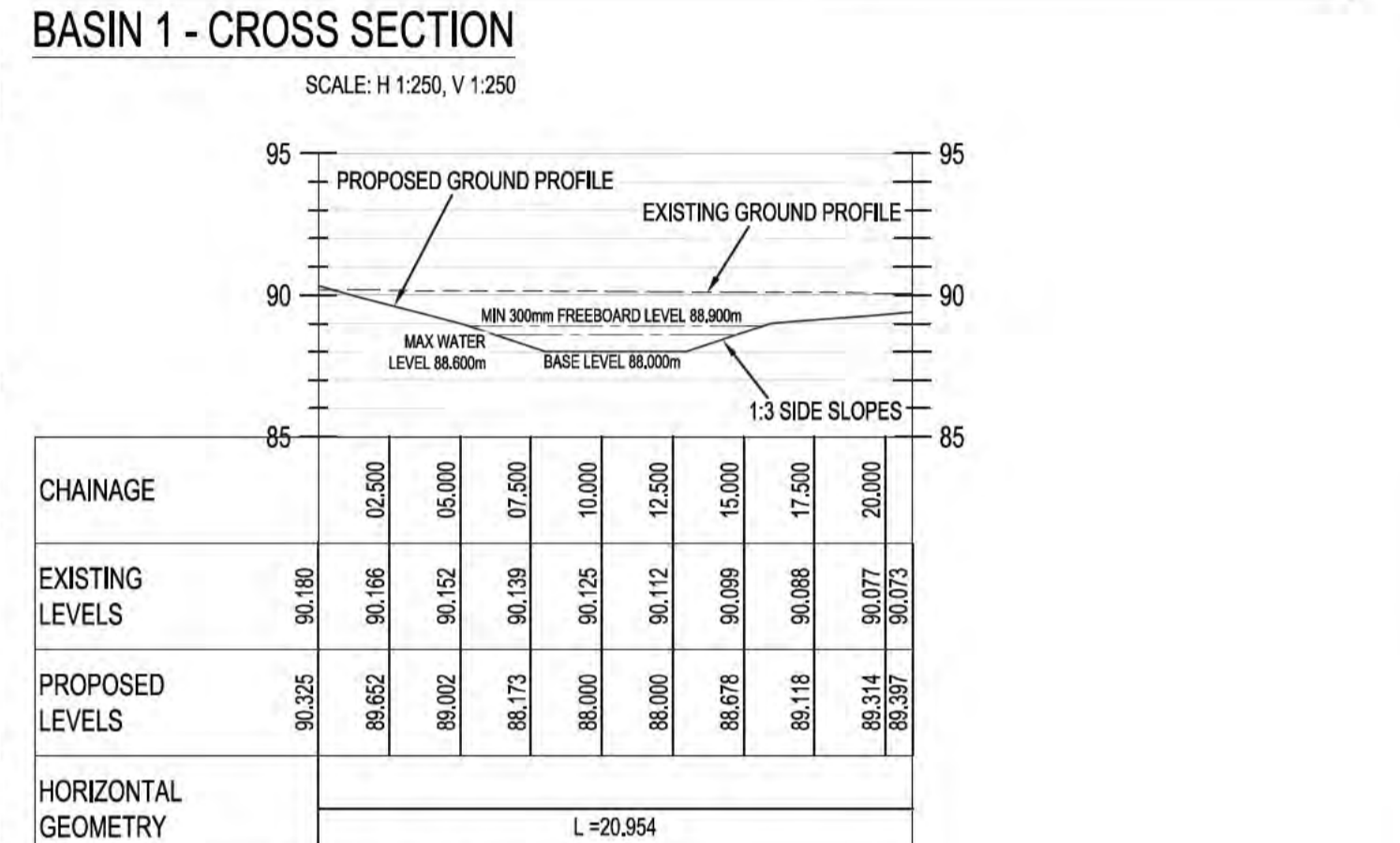
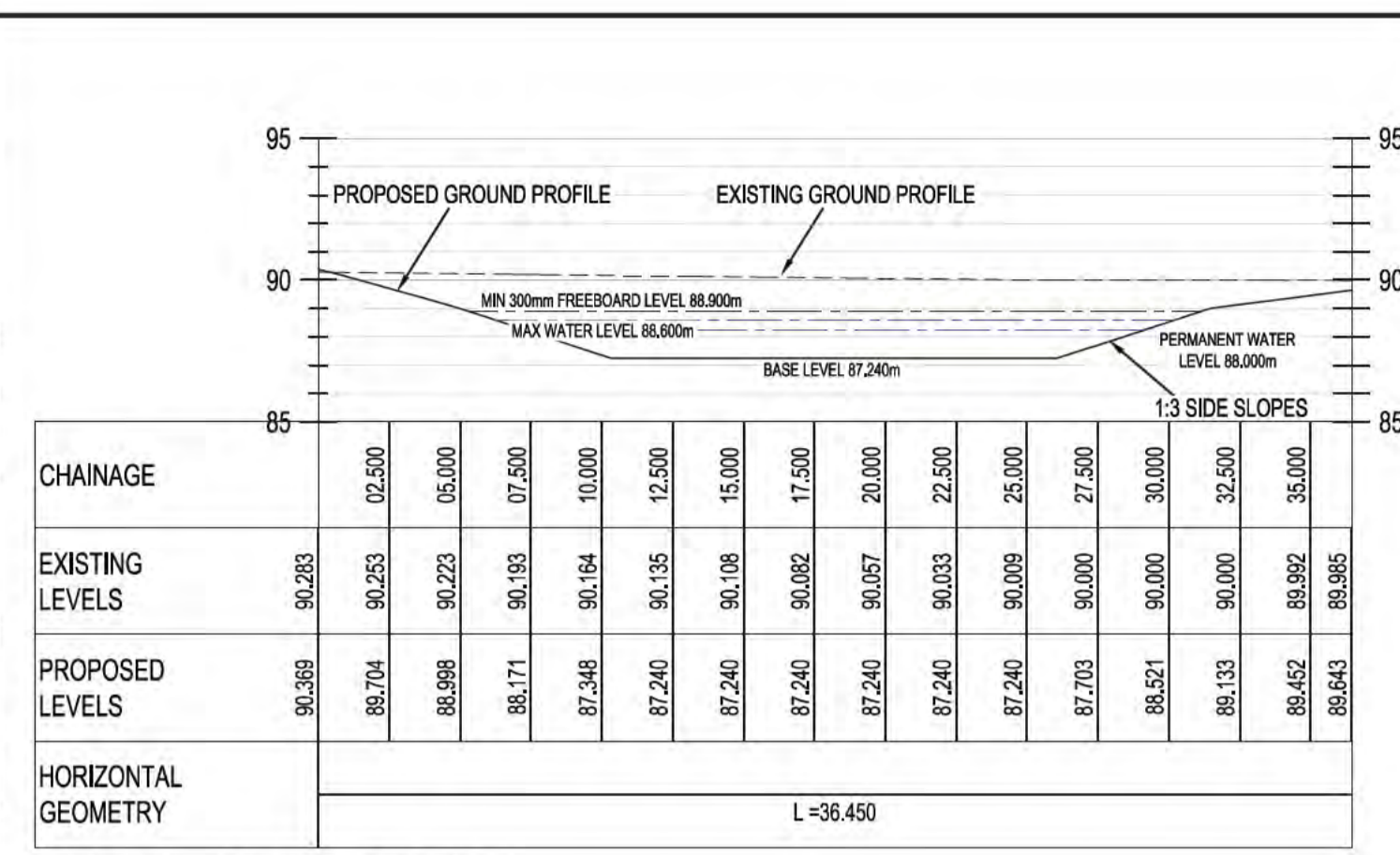
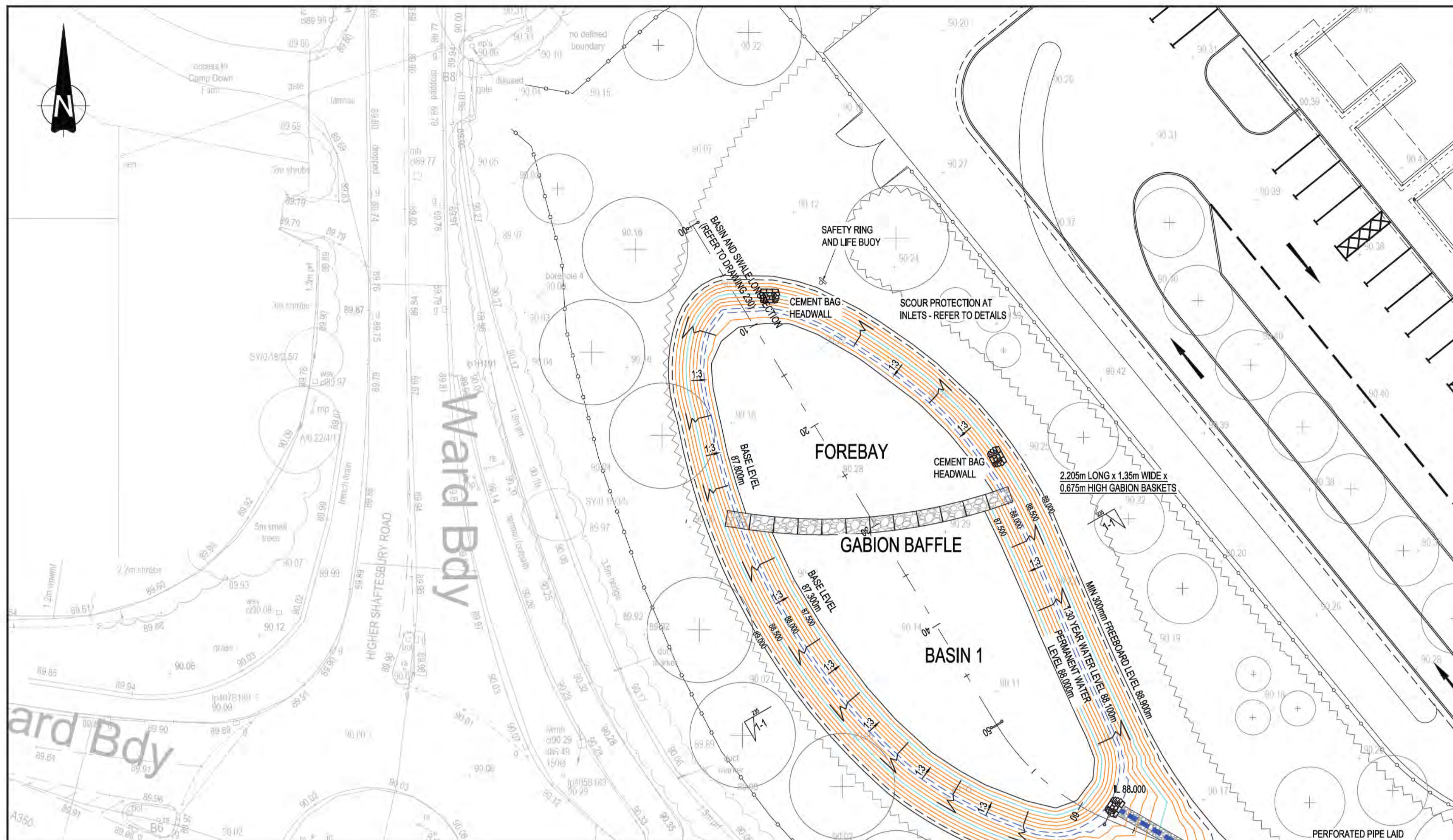
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Appendix A

DRAWINGS





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NO	DATE	BY	DESCRIPTION	CHK	APP
P01	03/11/2021	WH	FIRST ISSUE	JH	JK
REV	DATE	BY	DESCRIPTION	CHK	APP

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ARCHITECT:

SITE PROJECT: **BLANDFORD FORUM WASTE MANAGEMENT CENTRE**

TITLE: **PROPOSED BASIN PLAN, SECTIONS AND DETAILS**

SHEET: **1**

SCALE @ A1: 1:250

PROJECT NO:	DESIGNED:	DRAWN:	DATE:
70076888	JH	MT	December 21

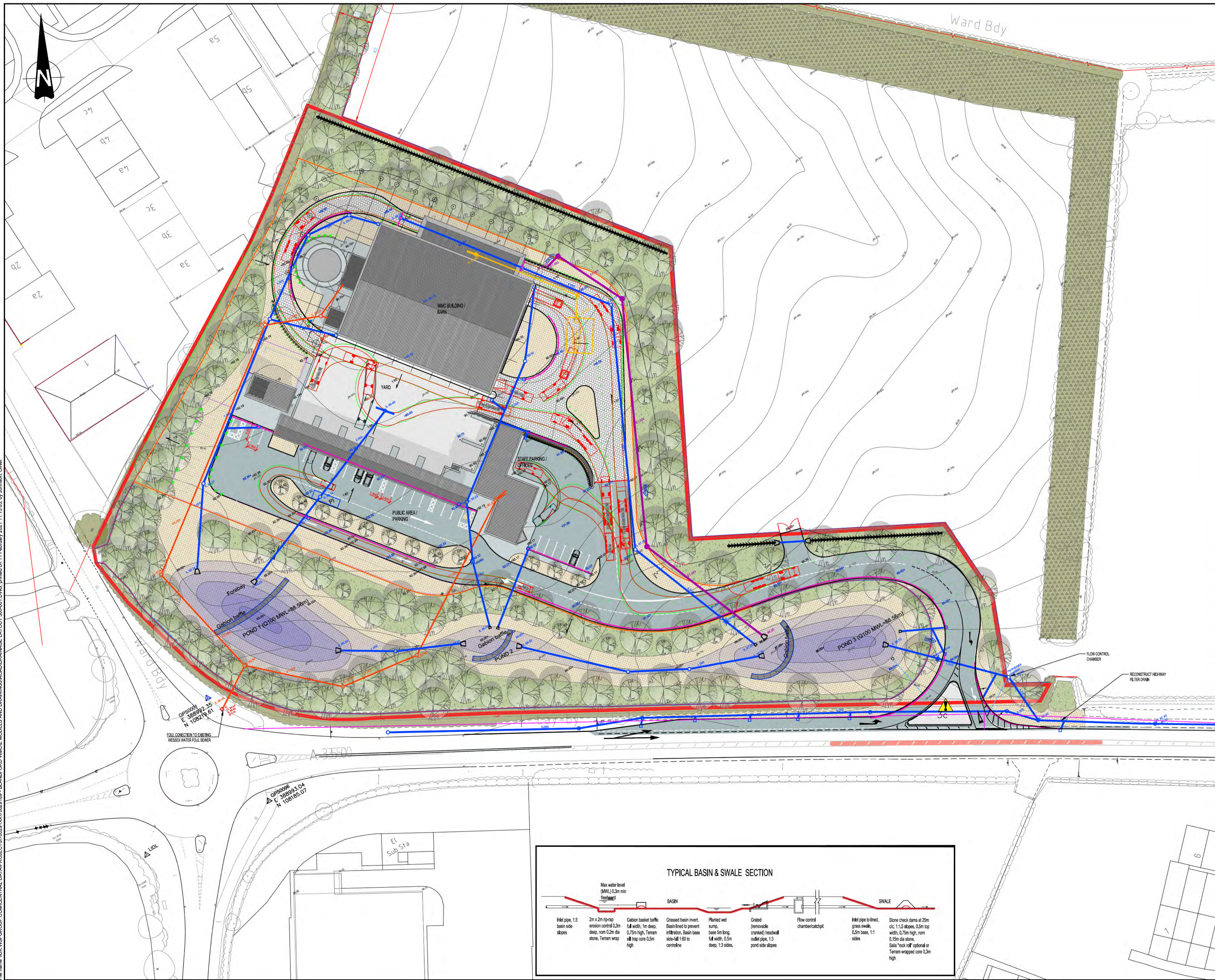
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1:250	JH	JH

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DO NOT SCALE

NOTES:
 1. Site layout subject to change
 2. Refer to Flood Risk Assessment & Drainage Strategy for further details

KEY:

— New foul manhole	G Road gully
— Existing foul sewer	◇ Headwall
— New foul sewer	— Fire suppression water drainage
— New storm manhole	— Combined Kerb Drain units
— Channel drain	
— New storm sewer	
— PI Oil & silt interceptor	
— Automatic penstock chamber	
— Kerb drains	
— Site boundary	
— Cut-off ditch	
— Exceedance culvert & Flow Path	

NOTES:
 1. This is a concept layout of storm and foul drainage pending finished levels. Details shown are indicative.
 2. The developed site area is 2.8 Ha, 1.1 Ha impervious.
 3. Road & yard surfaces to be drained with kerb & gully, combined kerb drainage or slot channel systems.
 4. Design & construction to be in accordance with SFAT and HE SHW.
 5. Survey of existing utilities required to confirm levels and prove viability.
 6. Flow control devices to be fitted to outfalls as required.
 7. Swales and basins on-site to be level to prevent utilization.

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 - CONFINED SPACE WORKING
 - WORKS ADJACENT TO LIVE TRAFFIC
- THE CONTRACTOR SHALL REFER TO STATUTORY UNDERTAKERS LAYOUT DRAWINGS AND IDENTIFY LOCATIONS OF EXISTING UNDERGROUND SERVICES PRIOR TO CARRYING OUT EXCAVATION WORKS.

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 - CONFINED SPACE WORKING
 - WORKS ADJACENT TO LIVE TRAFFIC

P02	10/02/2021	WF	TITLE CHANGE	CJU	CJU
REV	DATE	BY	DESCRIPTION	CHK	APP

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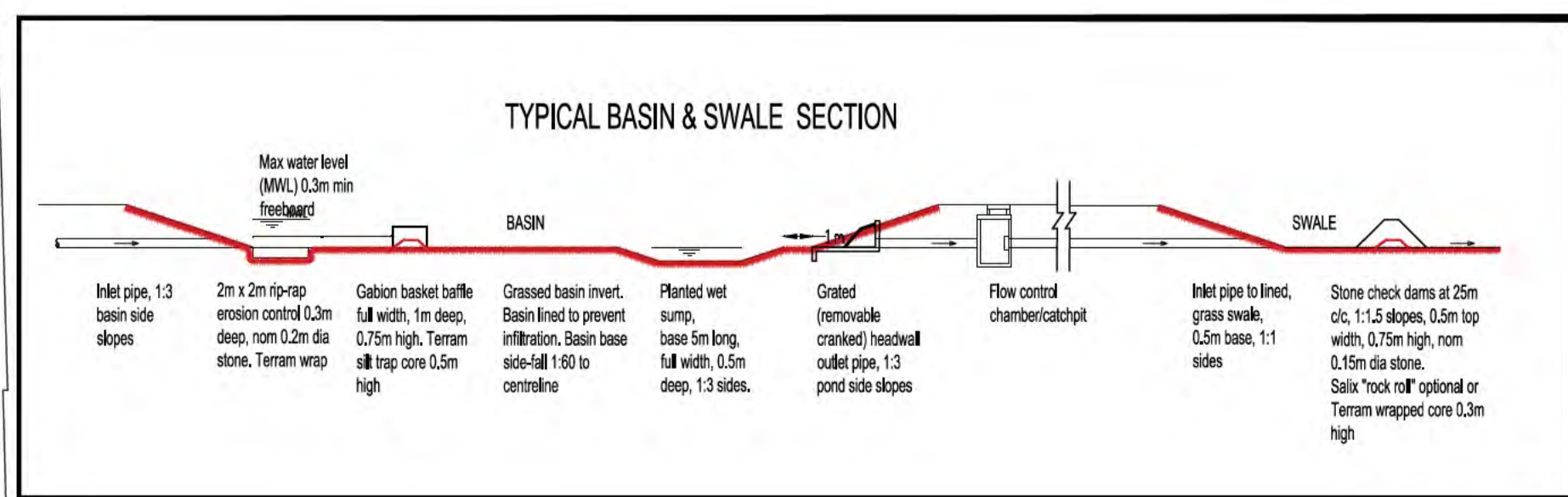
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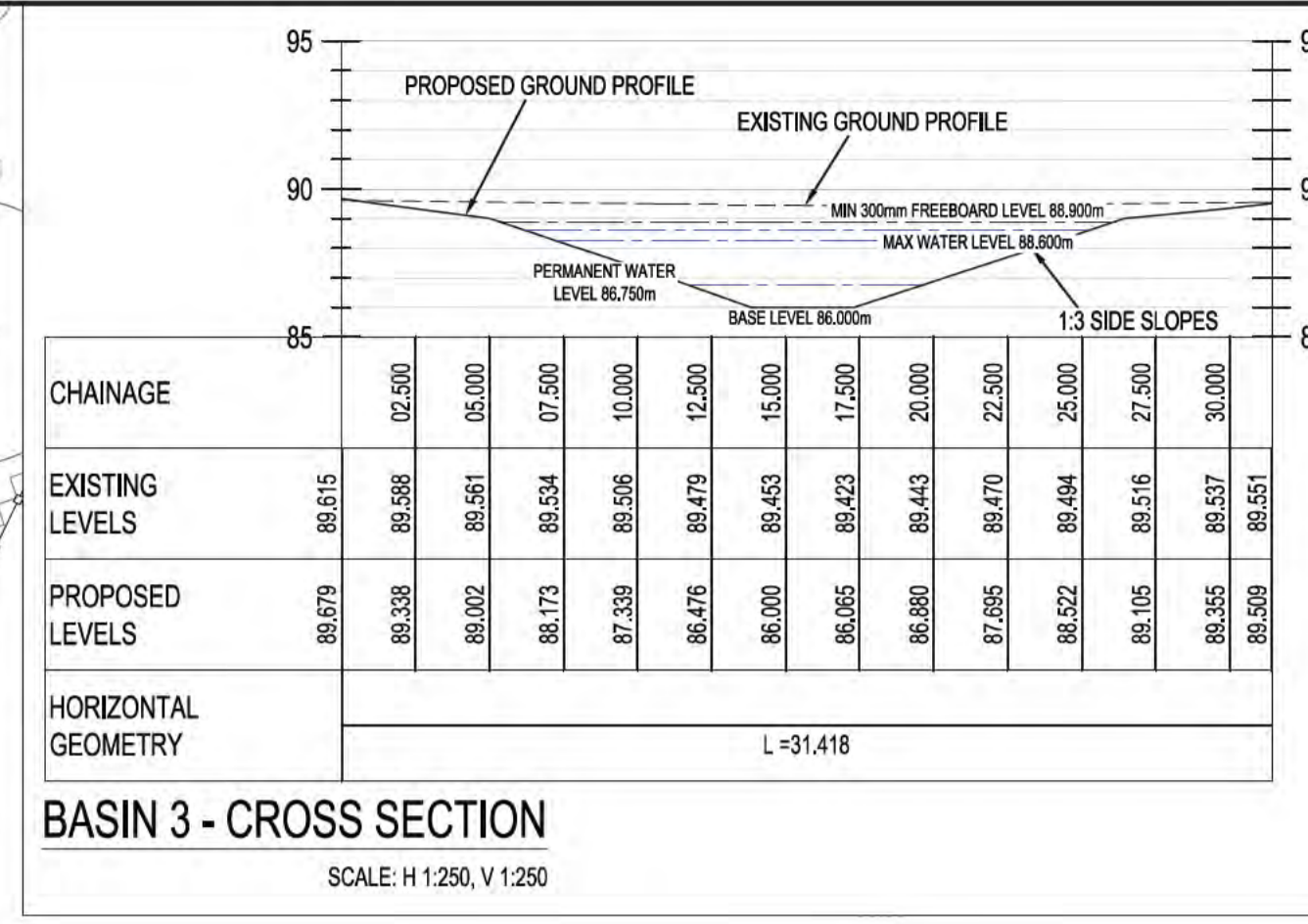
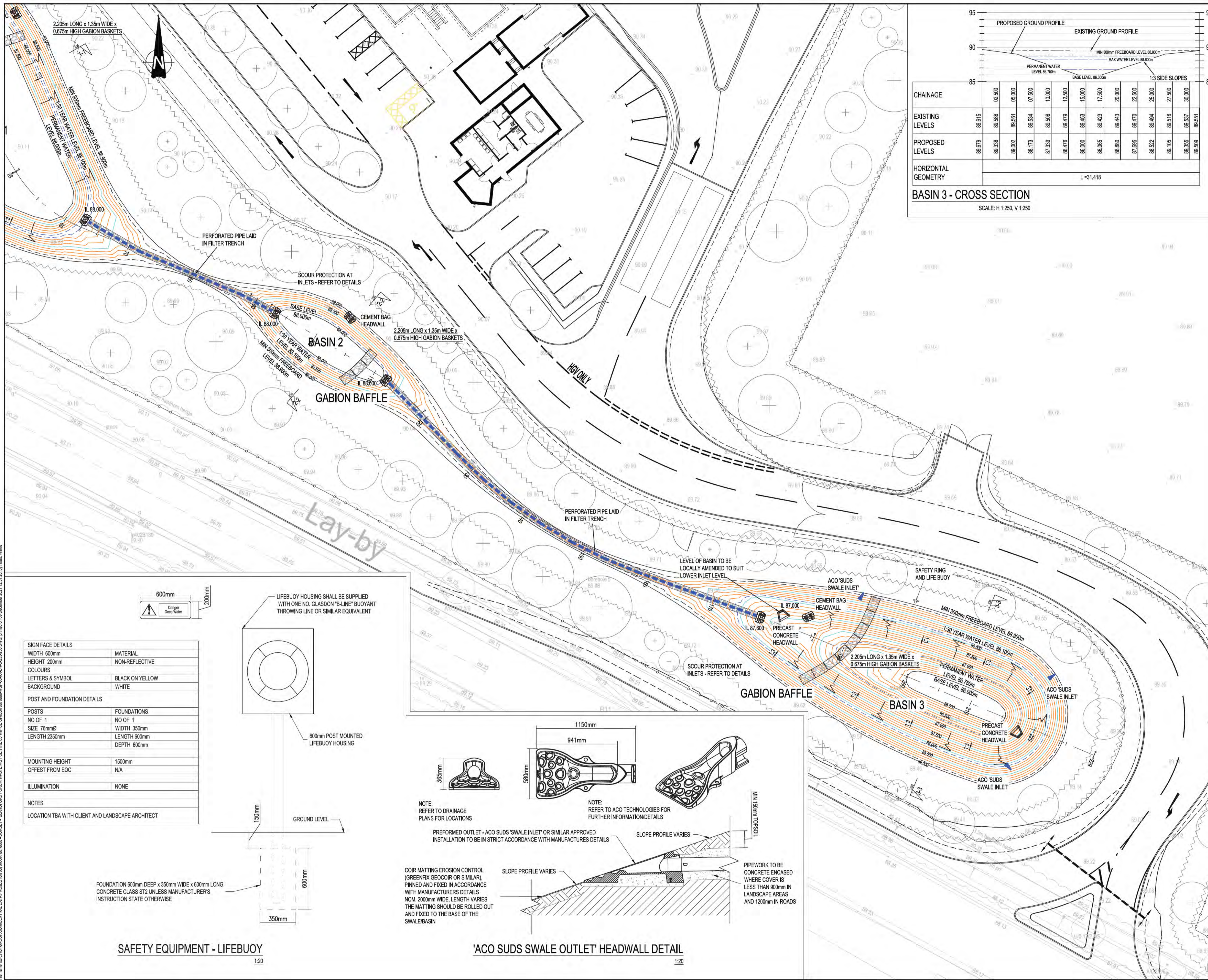
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TITLE: **DRAINAGE STRATEGY**

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PROJECT NO: 70029189	DESIGNED: CJ	DATE: February 21
DRAWING NO: 70029189-WSP-00-ZZ-DR-C-500-001	REV: P02	

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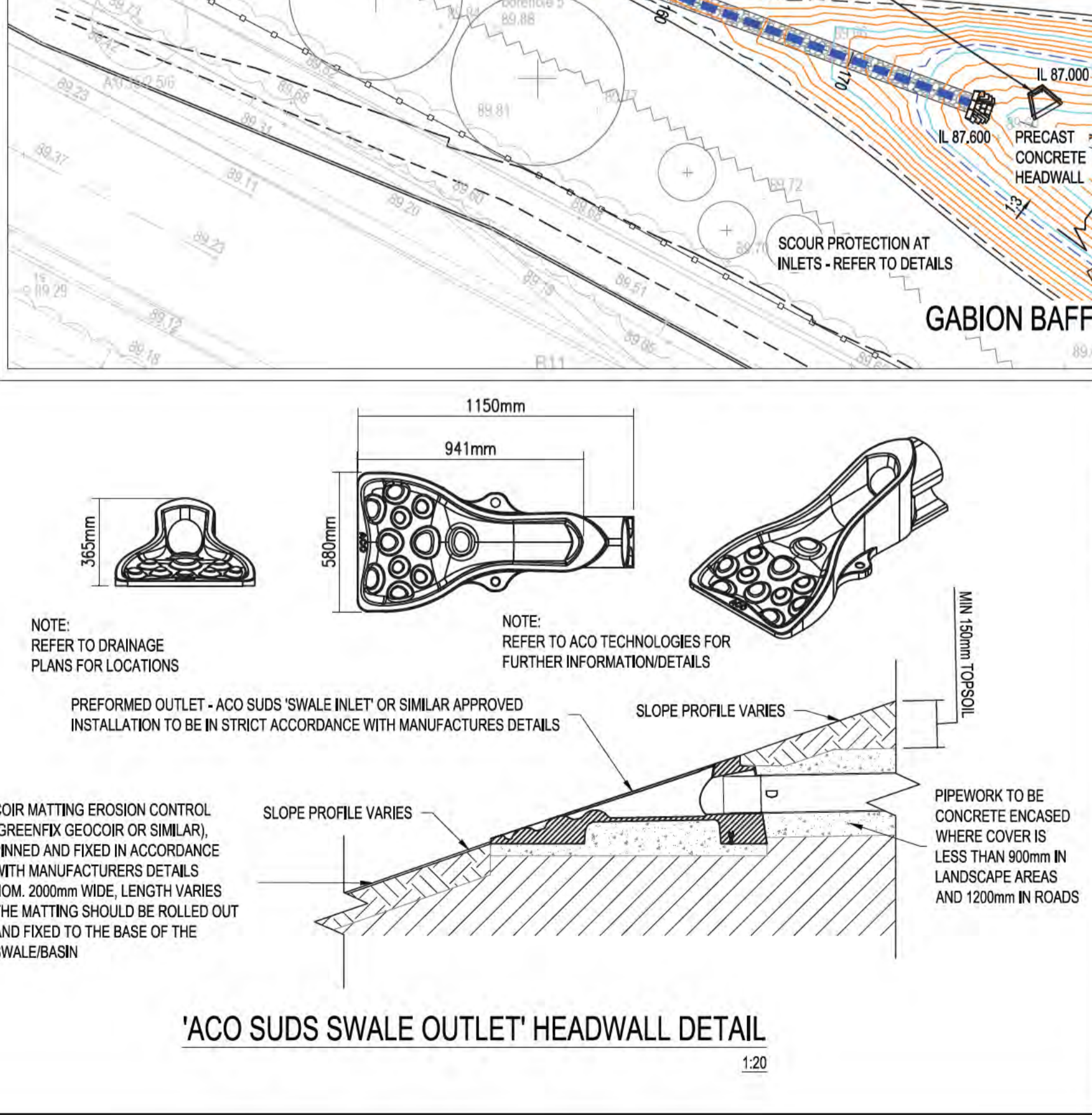
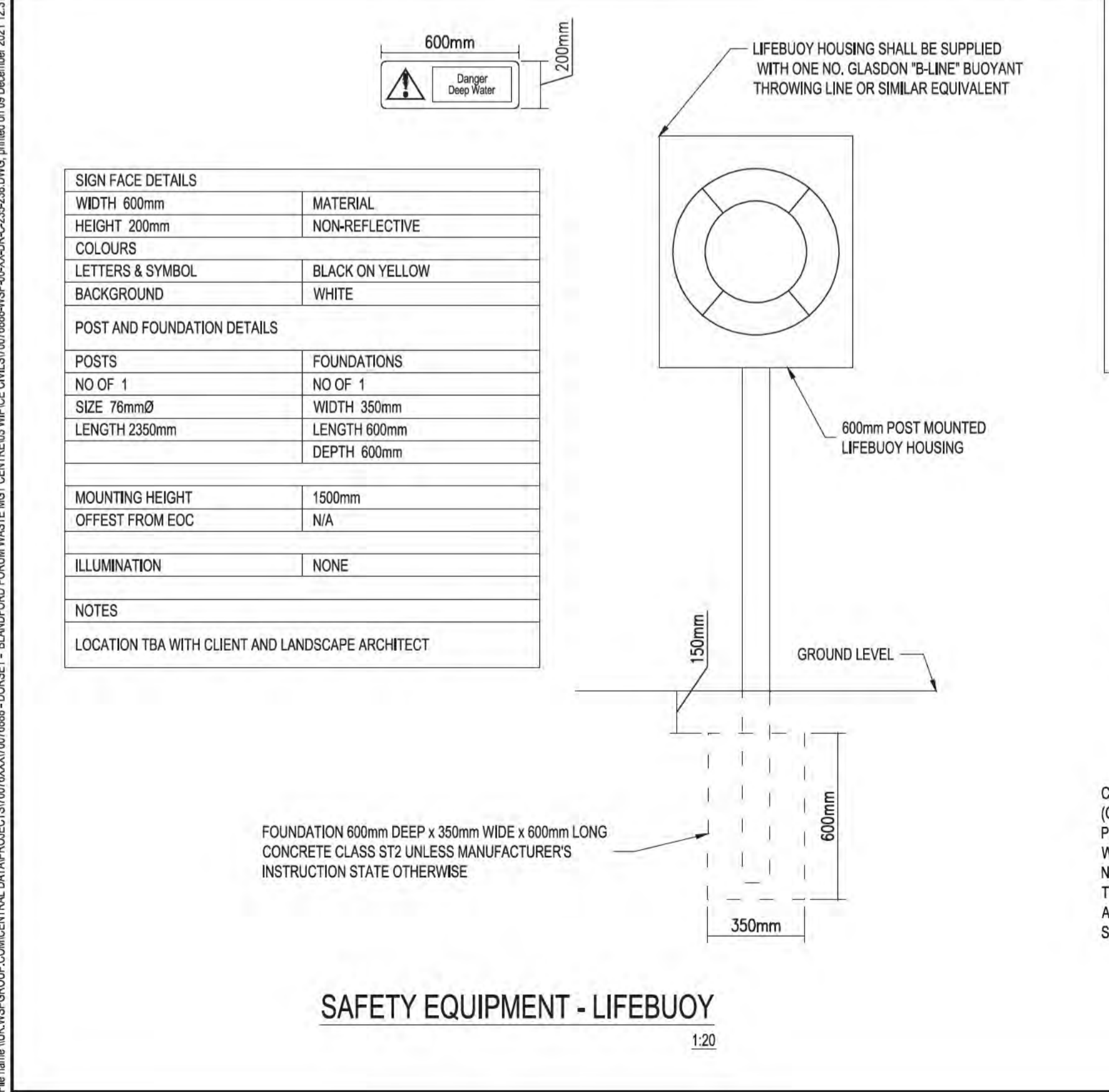
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ARCHITECT:

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TITLE: **PROPOSED BASIN PLAN, SECTIONS AND DETAILS SHEET 2**

DRAFT

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DRAWING NO: 70076888-WSP-00-XX-DR-C-236	REV: P01	

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Appendix B

EFFECTIVE SOLUBILITIES - IDEAL MIXTURE



Effective Solubility Calculator V1
Ideal Mixtures e.g. A FRESH SPILL

WSP UK LTD

October 2019

Author
Checked

A Lee
M Riding

Site Name	Blandford Forum
Borehole Number	IDEAL MIXTURE SHEET
Date	03/02/2021

	Average NAPL Molecular Weight (g mol-1)
Unleaded	105
Super Unleaded	111
Diesel	230
Kerosene	165

Notes

This sheet does not take account of field data it assumes a fresh Spill

Choose NAPL SOURCE
Unleaded

Box 4.1. Raoult's Law

The aqueous solubility of the various substances within an ideal hydrocarbon mixture in contact with water depends on their proportion (mole fraction) within the mixture and their pure phase solubility. In an analogy to Raoult's Law, which describes partitioning between gas and liquid phases, the solubility of the hydrocarbon mixture can be estimated according to the relationship:

$$C_i = x_i C_i^0$$

where:

C_i = effective solubility of compound i (in mixture) at equilibrium (mg/l);
 x_i = mole fraction of i in the mixture;
 C_i^0 = aqueous solubility concentration of the pure compound (mg/l).

The mole fraction, x_i , is defined as:

$$x_i = MF_i \times \left(\frac{MW_o}{MW_i} \right)$$

where:

MF_i = mass fraction of compound i in hydrocarbon mixture;
 MW_i = molecular weight of compound i ; (g/mole);
 MW_o = approximated molecular weight of the hydrocarbon mixture (g/mole).

Larger hydrocarbon molecules (naphthalene and above) within a mixture can have a higher effective solubility than predicted by Raoult's Law. This reflects the fact that some compounds in their pure state would be solids at normal environmental temperatures. When a more accurate estimate of their effective solubility is required, a liquid/solid fugacity factor should be included in the above equation (Brown *et al.*, 2006).

Taken from:

CL:AIRE 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' v1.1 March 2017

Contaminant	Molecular Weight (g mol -1)	Pure Phase solubility mg /l (So) Supercooled	NAPL Molecular Weight (g mol -1) CHOOSE FROM DROP DOWN LIST ABOVE	% Weight Mass Fraction (MFi)	Mol Fraction (Xi)	Effective Solubility (mg/l) (Ci)
MTBE	88.15	43000	105	0.0125	0.014889393	640.2439024
Benzene	78.11	1780	105	0.033	0.044360517	78.96172065
Toluene	92.14	590	105	0.112	0.127631865	75.30280009
Ethylbenzene	106.17	180	105	0.0229	0.022647641	4.076575304
xylenes	106.17	200	105	0.108687	0.107489263	21.4978525
TPH EC5-6 aliphatics	81.00	36	105	0.250686	0.324963333	11.69868
TPH EC>6-8 aliphatics	100	5.4	105	0.0657	0.068985	0.372519
TPH EC>8-10 aliphatics	130	0.43	105	0.197687	0.159670269	0.068658216
TPH EC>10-12 aliphatics	160	0.034	105	0.071	0.04659375	0.001584188
TPH EC>12-16 aliphatics	200	0.00076	105	0.00421	0.00221025	1.67979E-06
TPH EC>16-35 aliphatics	270	0.000003	105	0.000559	0.000217389	6.52167E-10
TPH EC>8-10 aromatics	120	65	105	0.07	0.06125	3.98125
TPH EC>10-12 aromatics	130	70.689	105	0.0444	0.035861538	2.535016292
TPH EC>12-16 aromatics	150	85.96	105	0.00265	0.001855	0.1594558
TPH EC>16-21 aromatics	190	11.77	105	0.000205	0.000113289	0.001333417
TPH EC>21-35 aromatics	240	0.42	105	0.000118	0.000051625	2.16825E-05
Naphthalene	128.17	32.9	105	0.0045	0.00368651	0.121286182

Sum				1.000802	1.022476632	1.000802
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Appendix 4 ES Non Technical Summary



Environmental Statement Non-Technical Summary

Blandford Forum Waste Management Centre

March 2021



**Dorset
Council**

NICHOLAS PEARSON ASSOCIATES

ENVIRONMENTAL DESIGN | LANDSCAPE ARCHITECTURE | ECOLOGY | VISUALISATION

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1. Introduction

- 1.1 An Environmental Statement (ES) has been prepared on behalf of Dorset Council waste team to accompany a planning application for a proposed Waste Management Centre (WMC) in Blandford Forum, Dorset. The application has been submitted to Dorset Council (DC). It constitutes an Environmental Statement under Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended.
- 1.2 The ES sets out the findings of the Environmental Impact Assessment (EIA) work undertaken by the applicant and their team, and forms part of the environmental information to be used by DC to determine the planning application. This is a summary of the ES.
- 1.3 The EIA / ES has been prepared by Nicholas Pearson Associates Ltd, a Corporate Member of the Institute for Environmental Management & Assessment (IEMA). Each topic assessment has been undertaken by a competent expert.



Figure 1: Site location (prepared by Nicholas Pearson Associates)

2. The Site and its Surroundings

- 2.1 The Site of the Proposed Development has been allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan 2019 as the preferred choice for the location of the Blandford WMC. The Site is approximately 2.75ha in size and is located to the north east of Blandford Forum (**Figure 1**). The Site sits within a wider arable field bounded by mature hedgerows and a band of young establishing woodland trees (**Figure 2**). The Site is currently accessed via a gateway off the A350 which runs parallel to the southern boundary of the Site. The Sunrise Business Park is located to the north west of the Site.
- 2.2 The whole of the Site is located within the Cranborne Chase Area of Outstanding Natural Beauty (AONB) which was also designated an International Dark Sky Reserve in 2019.
- 2.3 The closest residential properties lie to the south beyond the A350 on Kites Corner and Bracewell Close, and the closest commercial properties include those on the Sunrise Business Park, and the Lidl supermarket and Glenmore Business Park to the south.
- 2.4 There is currently no public access to the Site, it is not crossed by any public rights of way (PRoW) or watercourses and lies within Flood Zone 1. There are no European, National or Locally designated sites within the Site, the closest European designated site is the Fontmell and Melbury Down Special Area of Conservation (SAC), approximately 8km to the north.
- 2.5 Previous archaeological surveys undertaken on site have revealed evidence for an enclosed Iron Age farmstead with adjacent field system. A number of archaeological features suggest the Site was continually occupied into the Romano-British period, so the Sites occupation may span c. 100BC to AD300. Features found on site include boundary ditches, grain storage pits, working areas and several human burials. No surface remains are visible due to ploughing of the Site over an extended period.



Figure 2: Site photograph (taken by Dorset Council)

3. Alternatives and Design Evolution

- 3.1 The Proposed Development is required to replace the existing Household Recycling Centre (HRC) and Waste Transfer Station (WTS) facilities in Blandford Forum which are small, inefficient and not accessible to everyone. They also cause nuisance to local businesses. The new facility will be a purpose-built efficient modern facility that is safe, efficient, accessible.

The Existing WTS and HRC

- 3.2 The existing WTS and HRC are located on the Blandford Heights Industrial Estate to the north of the town centre.
- 3.3 The existing WTS is an adapted grain store. The site is small and in poor condition with no fire suppression system and inadequate drainage. Due to the footprint and the layout of the WTS with a single point of access, there is no opportunity to separate the delivery and bulker transfer vehicles which results in restrictions on delivery and collection and therefore causes inefficiencies in waste collection. Vehicles arriving outside of their delivery slots are required to wait on the access road or surrounding roads causing disruption. The WTS is at capacity and has no resilience for unexpected events. Over the last few years, the site has had to accommodate changes to the collection service. Overcrowding in the barn has led to different waste streams contaminating each other, which in some cases leads to loads being rejected at treatment facilities. Waste is also diverted to other sites due to the restricted size of the Blandford WTS.
- 3.4 Access to the existing HRC is shared with the WTS which results in congestion when WTS vehicles are parked on the access road. The HRC is forced to close for up to 30 minutes to remove and replace full containers, and this can occur several times a day. Due to lack of space it is not possible to bulk up the waste from the HRC at the WTS. Waste is deposited at the HRC in skips accessed via steps making the facility inaccessible to some members of the public.

The Do-Nothing Scenario

- 3.5 The Do-Nothing scenario would see the site continue to be used as an arable field with the landowner free to pursue other developments outside of the Waste Plan allocation. If a new facility is not provided and the lease on the existing site is not renewed beyond 2021, Blandford Forum and much of North Dorset would be left without a local recycling facility. If the lease were extended beyond 2021 and the existing WTS and HRC remain in their current location, the existing issues with the facilities, as set out above would continue.

Alternatives Considered

- 3.6 As the Site has been allocated in the Waste Plan (2019) potential alternative sites have not been considered as part of the ES. The ES has however considered:

Alternative layouts;

- alternative layouts included different orientations of the WTS building and HRC yard and different internal road layouts, landscaping, and locations for the ponds.

Alternative access options;

- alternative access options included considering access to the Site via the A350 and through the Sunrise Business Park.

Alternative drainage strategies;

- alternative drainage options included discharging to a channel 200m to the west, discharging to the Pimperne Stream to the east, and discharging to the A350 highways drains.

- 3.7 The various alternative options have been considered in consultation with Dorset Council officers, the Cranborne Chase AONB team, the Environment Agency and Wessex Water.

- 3.8 The need for a combined facility, the possibility

of providing separate facilities, redeveloping the existing facility and the potential to extend the existing facility were explored through a background report submitted as part of the Waste Plan process.

Combined facility

- There are both environmental and financial benefits of a combined facility. Environmentally, two separate facilities would result in wider environmental impacts and cumulative impacts, for example, on the local AONB's, ecologically designated sites and on air quality. By locating the facilities together on one site, the materials deposited at the HRC can be bulked up on site in the WTS into larger tonnages ready for transportation to treatment sites.
- Financially, the capital cost of the build and the ongoing operational costs of equipment and site management can be shared across the site providing better value for money. Operating two separate facilities would have a higher cost as additional staff and plant would be required.

Separate facilities utilising the existing site

- The existing site is not large enough to allow for the development of a modern HRC or WTS therefore it would not be feasible to redevelop the site and locate one facility elsewhere.

Expansion of the existing facility

- Two expansion options were considered for the existing site however the relevant landowners were not willing to sell, therefore these options were not feasible.

3.9 Following the consideration of the above, the Proposed Development is set out in **Figure 4**. Access is via the A350, drainage is via the A350 highways drains and the orientation of the buildings has been agreed to best suit the location in terms of, for example, the neighbouring Sunrise Business Park, the AONB designation and the International

Dark Sky designation.

3.10 The following mitigation measures (overleaf) have been incorporated into the design of the Proposed Development.

Mitigation Measures	Relevant Topic/s	Reason for Mitigation
Existing tree/hedge belts on the field boundaries will be retained, maintained and enhanced in accordance with Arboricultural advice and best practice.	Landscape Character and Visual Impacts	To ensure that existing screening is retained, to help integrate the Proposed Development into its landscape.
New native planting of tree belts, woodland and hedgerows.	Landscape Character and Visual Impacts	To help integrate the Proposed Development into its landscape and to provide links between existing planting and new landscape features.
Formation levels are set as low as practically possible and larger structures are set back from the A350.	Landscape Character and Visual Impacts	To minimise visual appearance of building height, form, mass through location, site levels and site layout.
The WTS building and the fire suppression tank are set back from the A350 as far as is practical.	Landscape Character and Visual Impacts	To reduce the visibility of these structures from the road and to limit the change in existing character of the A350 bypass. Also provides additional space between the road and buildings for screening planting.
The orientation of the Proposed Development is arranged with the WTS building furthest away from the roundabout.	Landscape Character and Visual Impacts	To avoid visual crowding of the area around the traffic island and help to maintain an open rural character.
The location and orientation of the elements of the Proposed Development are designed to occupy the smallest footprint area possible.	Landscape Character and Visual Impacts	To retain the maximum amount of green open space in the remaining part of the field.
The WTS building, sprinkler tank housing and pump house, are designed to be varying heights.	Landscape Character and Visual Impacts	To disaggregate the overall form and mass and create a varied composition of structures.
A parapet wall system is incorporated into the WTS building to disguise the roof behind it and to allow a lower pitched roof.	Landscape Character and Visual Impacts	To reduce the overall height of the building, reducing visual impact.
Choice of materials, colours and textures; using natural materials, natural colours and avoiding shiny or reflective surfaces.	Landscape Character and Visual Impacts	To minimise visual effects and help integrate buildings into the landscape.
Elevations are designed to be simple. Avoidance of details that would cast raking or longitudinal shadows.	Landscape Character and Visual Impacts	To minimise visual effects and help integrate buildings into the landscape. To reflect a rural context similar to modern agricultural barns.
Self-coloured grey concrete is proposed at low level on the WTS building with natural untreated timber cladding at higher levels.	Landscape Character and Visual Impacts	To minimise visual effects and help integrate buildings into the landscape.
External lighting will be the minimum necessary to achieve security and safety, designed to have the minimum possible effect on the CCAONB International Dark Sky Reserve.	Landscape Character and Visual Impacts	To minimise visual effects in the CCAONB.
Landform and landscape is designed to create a natural, smooth flowing appearance with gentle gradients.	Landscape Character and Visual Impacts	To help integrate the Proposed Development into its receiving landscape; to avoid unnatural shapes and forms.
Hard surfaced pavement areas are designed to cover the minimum area necessary to achieve operational efficiency for the facilities required.	Landscape Character and Visual Impacts	To retain as much soft, green space as possible.
Planting is incorporated within the development to break up and soften larger areas of hard surfacing.	Landscape Character and Visual Impacts	To help screen the Proposed Development and reduce visual impacts.
Creation and linking of new and existing wildlife habitats and establish new woodland, meadow, wetland and hedgerows.	Landscape Character and Visual Impacts	To strengthen and enhance existing planting and habitats in accordance with the CCAONB Management Plan.

Table 1: Summary of Mitigation Measures Incorporated into the Design

Mitigation Measures	Relevant Topic/s	Reason for Mitigation
Site drainage proposals and balancing ponds will provide opportunities for habitat creation; wetland, marginal and aquatic habitats and grassland	Landscape Character and Visual Impacts	To enhance the Site's biodiversity and to help integrate the Proposed Development into its landscape.
Site access junction design includes deceleration lane, left-in, left out design, new and appropriately positioned signage and lining on public highway.	Traffic and Access	Ensuring safe and suitable access
Internal traffic circulation will be designed to remove the potential for queuing vehicles backing up onto the A350	Traffic and Access	To reduce the risk of queuing onto public highway.
The separation of the public and operational functions	Traffic and Access	HGVs will not pass members of the public. To reduce conflicts.
Drainage System	Water, Flood Risk and Drainage	To remove pollutants prior to discharge and control the discharge rate.
Monitoring chamber at Drainage Outfall	Water, Flood Risk and Drainage	To enable routine monitoring of water quality to be undertaken.
Regular inspection and maintenance of the drainage systems.	Water, Flood Risk and Drainage	To ensure system are working effectively and silt is periodically removed.
A specification for odour control which will be assessed and agreed with the Environmental Health Department by the applicant based on best practice measures to date.	Odour	To reduce any potential odour emission impact on relevant receptors within the study area.
Retention, protection and enhancement of the existing tree belts and hedgerows.	Odour	Will provide a buffer and help to filter against any potential odour impacts.
Minimising the quantities of materials required to construct the Proposed Development.	Air Quality	To reduce any potential impacts to sensitive receptors.
Using locally-sources materials where available and practicable to minimise the distance materials area transported from source to site	Air Quality	To reduce any potential impacts to sensitive receptors.
Using innovative construction methods to reduce plant use	Air Quality	To reduce any potential impacts to sensitive receptors.
Using more efficient construction plant and delivery vehicles, and/or those powered by electricity from alternative/lower carbon fuels.	Air Quality	To reduce any potential impacts to sensitive receptors.
Production of a CEMP to reduce the potential impacts during the construction phase including dust suppression and appropriate materials management and construction mitigation (i.e. use of geotextiles) during the construction phase.	Air Quality	To reduce any potential impacts to sensitive receptors.
Retain, protect and enhance existing tree belts and hedgerows which will provide a buffer and help to filter against any potential air quality impacts.	Air Quality	To reduce any potential impacts to sensitive receptors.
A new vehicular access is proposed to provide access to the development site off the A350 bypass and internal traffic circulation will be designed to remove the potential for queuing vehicles backing up onto the A350.	Air Quality	To reduce any potential impacts to sensitive receptors.
Photo-voltaic cells will be installed on the roof of the re-use building and will provide the projected energy required on site.	Climate – Greenhouse Gas Emissions	To reduce the potential impacts on climate.
Through the design process, the relative compactness of the design reduces the land take to the minimum required	Agriculture, Land and Soil	The relative compactness of the design reduces the area of land, and subsequently soil resource, to be disturbed

4. The Proposed Development

- 4.1 A new WMC is proposed on the Site to the north east of Blandford Forum. The WMC is a combination of two facilities, a Household Recycling Centre (HRC) and a Waste Transfer Station (WTS) and will serve Blandford Forum and North Dorset. The WTS will receive the waste and recyclables from collections by Dorset Council waste team, for bulking up and onward transportation and the HRC will accept all forms of household recycling.
- 4.2 There will be potential to allow commercial customers from the surrounding area to deposit waste at the facility, and this will provide a valuable service to areas lacking such outlets. The facility would also offer sufficient capacity to act as a contingency for waste from the East Dorset, the Purbeck area and neighbouring authorities.

Access

- 4.3 The Site is currently accessed via a field gate set back from the A350. Access to the WMC will be via a new access off the A350 in the form of a left turn in/left turn out junction leading to a tarmacadam single carriageway road (**Figure 3**). There would be no right turn in to or out of the WMC. Cars travelling westbound would be required to use the Sunrise Roundabout to return eastbound to enter the Site. Those wishing to travel to the west on exiting the Site would be required to use the Hilltop Roundabout to return westbound.
- 4.4 The access road will split before reaching the facility to allow for the separation of the public and operational vehicles. Members of the public will not be able to access the operational area of the HRC or the WTS. The access road has been designed to accommodate 40 cars without causing queues onto the A350.
- 4.5 There is no existing public access to the Site, via foot, cycle or public transport.

Layout

- 4.6 The design for the WMC has been developed by Dorset Council's Building Projects team and was based initially on the Bridport WMC model. Through consultations with operators and managers at the Bridport WMC the most successful elements have been retained in the design for the Blandford WMC.
- 4.7 Several layouts have been considered for the Site and these have been informed by the Site's constraints and discussions with the Dorset Council Planning Officer and the CCAONB Landscape and Planning Advisor. The largest elements of the design have been positioned as far from the Sunrise Roundabout and Higher Shaftesbury Road as possible to avoid visual crowding of the roundabout and to maximise the screening potential of the existing and proposed trees and vegetation (**Figures 4, 5 and 6**).
- 4.8 The operations will be supervised by staff from office accommodation situated close to the point of separation of public vehicles and HGVs. It is proposed to include a small re-use building within the HRC which should generate a higher diversion of waste away from disposal.
- 4.9 Native planting will be designed to integrate the Proposed Development into the landscape, to soften the development and to increase site biodiversity. Existing hedgerows and tree belts will be retained and enhanced. DC will retain operational, management and maintenance control of the hedgerow and tree belts along the northern and eastern field boundaries.

Waste Transfer Station

- 4.10 The WTS includes a covered building in which the kerbside collections will be deposited and bulked up onto larger HGVs ready for onward transportation to processing facilities. The delivery and off-loading of waste and recycling materials will be undertaken inside the building.
- 4.11 The WTS building will be 46.5m x 34.7m and 11.45m tall, with a separate, lower level, covered loading

bay 6.0m wide and 11.85m tall along the north east facing façade. The building will be constructed using reinforced concrete walls and untreated timber cladding. Other buildings which form part of the WTS are:

- A timber clad fire suppression tank and associated plant room on the north west side of the WTS building;
- A single storey staff welfare / electrical switch room and fuel store will be located on the north west facing façade; and
- A site office with staff car park will be located near to the entrance of the HRC. The Site office will be vertical timber clad to complement the main building.

- 4.12 A small segregated trade/ operational collection area will access the hazardous waste store from the south east and a re-use facility will be located at the north western end of the main unloading .

Household Recycling Centre

- 4.13 The HRC is the public element of the facility and is covered by a canopy. The facility is split level with the publicly accessible section raised above the operational section. This allows people to drop their recycling into the skips from jetties at a more comfortable height rather than having to walk up steps. The skips will be housed in large bays in the lower level operational element of the HRC. The pedestrian walkways and containers will be covered by a low level canopy, approximately 3.7m above the public area. Due to the split level, the containers will be emptied via the operational element of the HRC and therefore there will be no mixing of public and operational vehicles.
- 4.14 Waste Electrical and Electronic Equipment (WEEE), a banded hazardous waste store, and a public re-use sales area will be located at either end of the recycling container bays, for public access from a pedestrian walkway surrounding the yard.



Figure 4: Site Layout (prepared by Dorset Council)



Figure 5: Proposed Elevations (prepared by Dorset Council)

Drainage

4.15 Surface water runoff from the Site will be accommodated in newly formed ponds along the south western boundary. These will be permanent waterbodies and will support aquatic plants and wetland grasses. Water will be filtered before entering the ponds and will be discharged off site via the existing highway drainage system. An automatic penstock will be incorporated into the system prior to offsite discharge in the event of emergency pollution control situations.

Construction

4.16 The construction phase is anticipated to commence in 2021 and is expected to last approximately 18 months. The construction works would be undertaken between the core hours of 07:00 and 18:30 Monday to Friday and between 08:00 and 13:00 hours on a Saturday. Outside of these hours, night closures will be necessary for the surfacing of access roads from the A350. There will be no construction works on a Sunday or a Bank Holiday. The construction compound and parking for contractors will be accommodated within the Site boundary. Light vehicles, for example cars and vans, and HGVs will be required during the construction phase and the anticipated number of each per day would be 8 light vehicles and 10 HGVs

4.17 A Construction Environmental Management Plan (CEMP) would be in place during the construction. The CEMP is written by the contractor and sets out any potential impacts and the control required to mitigate them. The CEMP remains live during the construction phase and the Site manager has overall responsibility for implementing the controls.

4.18 Archaeological excavation, archiving and reporting, in the form of a Written Scheme of Investigation (WSI) will be undertaken in advance of construction to record the archaeological interest on the Site.

4.19 Suitable material excavated from the Site will be reused to create the split level facility and the earth bunds on site. Surplus excavated material

will be taken off site and disposed of at the nearest available waste acceptance site.

Operation

4.20 The WTS will receive inert wastes, putrescible household and commercial waste and dry recyclables, the bulk of which will be delivered to Site by refuse collection and recycling vehicles. Waste will be stored in designated areas in the WTS building until they are bulked up onto articulated bulker vehicles. These will be sheeted to prevent windblown debris on exit. Putrescible waste will be removed daily to prevent nuisance. There will be no waste treatment on site, only temporary storage.

4.21 Internal and external lighting will be designed and installed to minimise light spill to the surrounding area and the AONB, which is an International Dark Sky Reserve.

4.22 The separation of the public and operational vehicles at the HRC, due to it being split level, means there would be uninterrupted access throughout the day. Staff on site will be on hand to provide assistance if required. Materials delivered to the HRC will also be bulked up through the WTS.

The WTS will operate within the WMC opening hours of 07:00-19:00 every day except Christmas Day, Boxing Day and New Year's Day.

The HRC will be open to the public every day except Christmas Day, Boxing Day and New Year's Day between the following times:

- 1 April – 30 September 09:00 to 18:00;
- 1 October – 31 March 10:00 to 16:00.

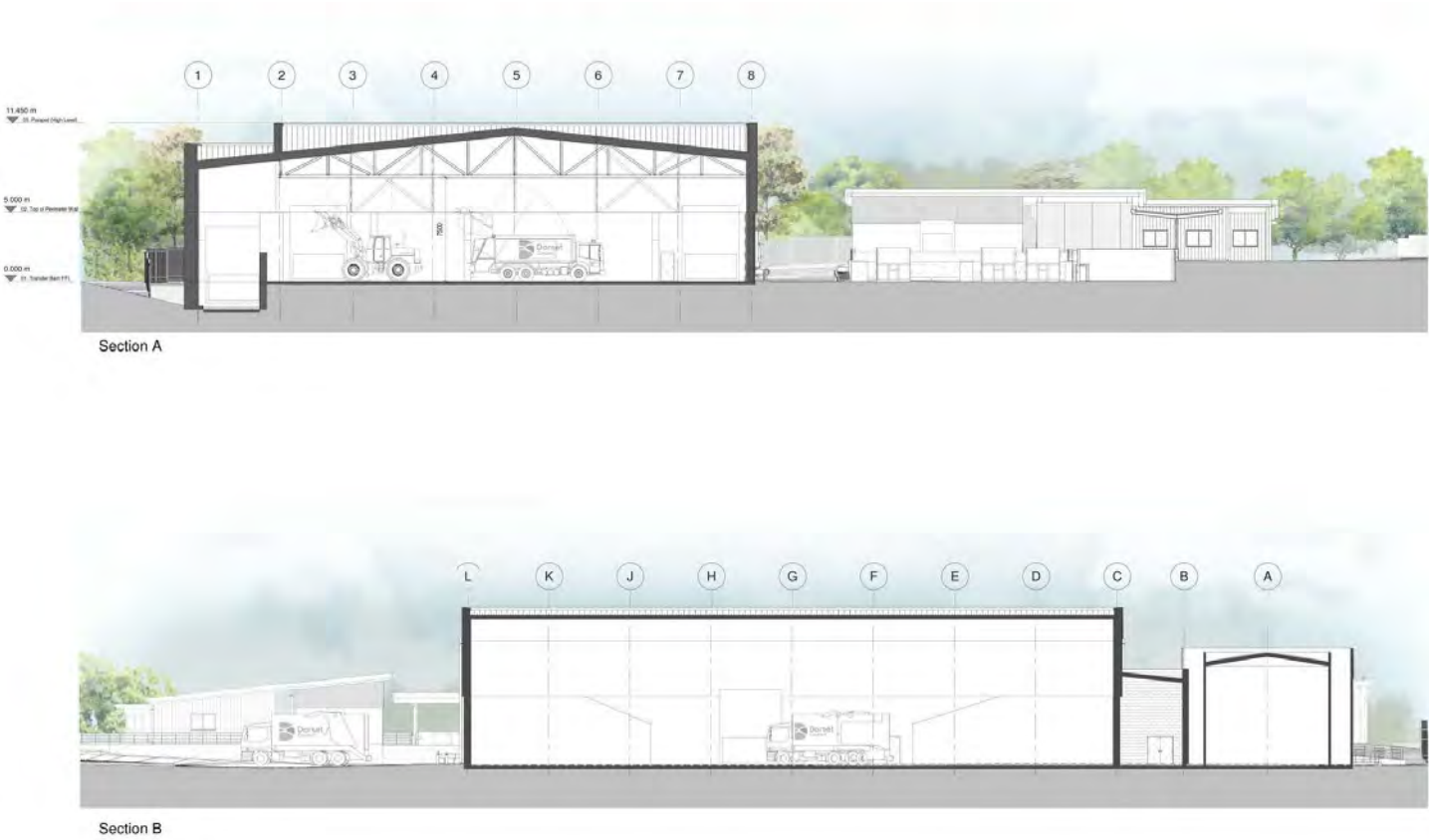


Figure 6: Proposed Sections (prepared by Dorset Council)

Landscape and Ecological Mitigation and Enhancement

- 4.23 A comprehensive Landscape and Ecological Management Plan (LEMP) will be prepared to cover the establishment phase for the landscape works and the longer term, on-going management and maintenance. Existing vegetation will be enhanced and reinforced with suitable planting and the loss of existing hedgerow for the new access road and junction will be minimised. Significant lengths of new hedgerow will be planted along the new access road and field boundaries. Pre grown instant hedging will be used in areas where instant screening is required.
- 4.24 A structured native tree and shrub planting scheme will be provided using trees and plants of appropriate size for screening and integration in keeping with landscape character. Existing tree/hedge belts on the field boundaries will be retained, maintained and enhanced.
- 4.25 External soft landscape areas will provide significant net gains in biodiversity by incorporating new wildlife habitats including woodlands, wetlands, wildflower meadows and verges.
- 4.26 The ponds will create new wildlife habitats and corridors including wetland habitat with aquatic marginal planting, wet grassland and native wet woodland margins. These will form links between existing vegetation and wildlife corridors.
- 4.27 The ecological mitigation and enhancement measures set out in the Ecological Impact Assessment that accompanies this planning application will be detailed in a Biodiversity Mitigation and Enhancement Plan as part of the Dorset Biodiversity Appraisal Protocol. Measures include bird and bat boxes, protection of retained hedgerows during construction, breeding bird checks during hedgerow removal and the creation of wildflower meadow areas.

Sustainability and Renewable Energy Provision

- 4.28 In order to reduce energy use on Site:
- The reuse and office building will be insulated beyond the requirements of building regulations;
 - The appliances and light fittings will be low energy and their use restricted; and
 - Natural ventilation is to be used on the office and reuse buildings and where this is not possible low energy ventilation units will be used.
- 4.29 The generation of renewable energy will be provided through the installation of Photo-voltaic cells on the roof of the re-use building which will be sized to match the electrical consumption of the site.

5. EIA Scope and Methodology

5.1 A Scoping Report and a request for a Scoping Opinion were submitted to Dorset Council on 8th April 2020. The report outlines the environmental issues proposed to be included in the ES and those which could be scoped out. A Scoping Opinion was received from the Council on the 19th May 2020.

5.2 The environmental issues scoped into the ES are as follows: Landscape Character and Visual Context;

- Landscape Character and Visual Context;
- Historic Environment;
- Traffic and Access;
- Water, Flood Risk and Drainage;
- Odour;
- Air Quality;
- Climate – Greenhouse Gase Emissions;
- Agriculture, Land and Soils.

5.3 The environmental issues scoped out of the ES, and the reasons for this, are as follows

- Ecology: A Preliminary Ecological Appraisal (PEA) was submitted with the Scoping Report which stated that the Proposed Development would not have significant ecological impacts. An assessment of the potential impacts on the Fontmell and Melbury Downs SAC is being included as part of the Air Quality assessment in the ES. Dorset Council Planning confirmed that Ecology could be scoped out of the ES. An Ecological Impact Assessment accompanies the planning application.
- Noise: A Noise Assessment was submitted with the Scoping Report which stated that the potential noise impacts from the Proposed Development and traffic travelling to the facility would not have significant noise impacts. Dorset

Council Planning agreed that noise could be scoped out of the ES, the Noise Assessment accompanies the planning application.

- Ground Conditions and Contaminated Land: No significant pollutant linkages have been identified at the Site. The potential for significant impacts is considered unlikely and the construction phase will be managed through the implementation of a CEMP.
- Socio-economic Effects and Population and Human Health: Dorset Council agreed that any potential socio-economic impacts are unlikely to be significant. Potential impacts in terms of Population and Human Health are considered within other chapters in the ES (e.g. odour and air quality) and other planning application documents (e.g. Noise Assessment).
- Climate Resilience: Climate resilience has been integrated into the scheme design and through measures included within the CEMP. Flood risk in relation to climate change has been considered fully within the Flood Risk Assessment (FRA). The potential impact from greenhouse gases has been scoped into the ES.
- Material Assets: No material assets would be affected by the Proposed Development.
- Waste: Waste arising from the construction and operation of the Proposed Development is not expected to be out of the ordinary and will be managed as part of good practice construction methods. Dorset Council Planning stated that the *proposal is likely to give rise to positive impacts in relation to the management of waste.*
- Accidents and Natural Disasters: The Water, Flood Risk and Drainage chapter and the FRA consider the potential risk of flooding to and from the Site. No other accidents or natural disasters were anticipated that would require consideration through the EIA process.

- 5.4 Section 6 below summarises the results of those environmental issues scoped into the ES.

Cumulative Impacts

- 5.5 Through discussions with Dorset Council Planning it was agreed that the only development to be considered in the ES as part of the cumulative impact assessment is the proposed Wyatt Homes development immediately to the east of the Site. The site is proposed as an allocated site through the Blandford+ Neighbourhood Plan which is due to have a local referendum in 2021. If adopted, it will become the Neighbourhood Plan for Blandford Forum. An application for the Wyatt Homes development was submitted to Dorset Council in October 2020. The development includes up to 600 dwellings, a primary school, retirement living, a community health and well-being centre, local shops and a café. The ES has assessed the potential cumulative impacts of the proposed development and the Wyatt Homes development.

Public Engagement

- 5.6 Due to the Government Coronavirus pandemic restrictions, it was not possible to run an event in person, therefore online public engagement was undertaken via the DC website. Information was provided at:

<https://www.dorsetcouncil.gov.uk/your-council/consultations/find-a-consultation.aspx>

- 5.7 People were asked to respond with comments via an online survey. The feedback from the public consultation is summarised in the ES and a response is provided as to where the feedback has been addressed within the planning application documents. The public's main concerns centred around ease of use of the new facility, unsuitable location, traffic disruptions, increased noise, dust and pollution, odour and pests, the impact on the environment and CCAONB.

6. Landscape Character and Visual Context

- 6.1 The landscape and visual assessment involved desk and field study to identify the likely potential landscape and visual effects of the Proposed Development.
- 6.2 The Site is located within an area covered by four landscape character area assessments, both national and local. The Site lies entirely within the Cranborne Chase Area of Outstanding Natural Beauty (CCAONB) (**Figure 7**), and recently designated International Dark Sky Reserve. The CCAONB Integrated Landscape Character Assessment describes the area as 'Southern Downland Belt' of the Open Chalk Downland landscape character type. It is closely associated with the Chalk Escarpments landscape character type also.
- 6.3 These areas fit within the National Character Area 134: 'Dorset Downs and Cranborne Chase' as defined by Natural England. These are described as strongly rural and agricultural landscapes.
- 6.4 Overall, the character of the Site's context is one of an assortment of mixed arable and pastoral fields, mainly contained by hedgerows, with blocks of deciduous and coniferous woodland, tree belts, small settlements and miscellaneous farm buildings. The Site is defined on two boundaries by busy transport corridors and a roundabout junction.
- 6.5 Although the Site is wholly located within the AONB, its landscape elements are not considered to be exemplary within the wider character areas. It is strongly influenced by the urban effects of adjacent land uses; Sunrise Business Park, a supermarket and north Blandford Forum residential and industrial developments, which have led to an erosion of the quality of the landscape at this peripheral location in the AONB.
- 6.6 Visually, the Site is reasonably well contained by the surrounding boundaries of tree belts and hedgerows, the A354 Blandford Forum bypass and the Higher Shaftesbury Road. These limit views to a small number of local vantage points, mostly along public rights of way, from the adjacent highway, as well as a couple of more some distant views from elevated ground. It is acknowledged that although the available views from the highway are relatively short term in duration, many receptors may only experience the AONB whilst travelling in a vehicle on the road networks.
- 6.7 The CCAONB designation is recognised and heightens the sensitivity of a number of viewpoints, especially those where wide panoramas over the surrounding countryside are available, from both the CCAONB (**Figures 8 and 9**) and the Dorset AONB to the south and west. Typically, though, the site itself is not prominent in these distant views and greater impacts are anticipated from the selected closer viewpoints, from the east, south and north of the site.
- 6.8 The proposed development is not considered to have an effect on the overall tranquillity of the AONB.
- 6.9 The potential landscape and visual impacts from the Proposed Development include the construction of a new building with associated structures and facilities on an existing undeveloped site; the loss of a section of roadside hedgerow to accommodate a new access junction on the A350; signage and road markings associated with the new junction. The beneficial effects of the development include new woodland planting and hedgerows; strengthening of existing tree belts and hedgerows; creation of grassland, meadow, attenuation ponds and associated wetland margins.
- 6.10 Construction phase impacts ranging from moderate adverse to neutral, including groundworks, plant movements, vegetation clearance and building activities are also recognised.
- 6.11 The design has been developed to avoid, minimise and eliminate potential adverse impacts through the careful siting and layout of the facility, through consideration of scale, massing, proposed finished levels and the selection of proposed external finishes and materials. External lighting has been designed

to comply with the most stringent requirements for lighting within an International Dark Sky Reserve, such that night-time effects will be negligible, and seen in the context of nearby existing lighting.

6.12 The combination of creation of new landforms, extensive planting, formation of new wetland habitats and careful selection of building materials, the design seeks to integrate the Proposed Development with the existing landscape character elements, which are often seen in the context of the Sunrise Business Park and the A350, and reduce the visual prominence of the new built elements of the scheme.

6.13 The overall impacts on visual context range from Minor Adverse to Neutral, following mitigation. The impacts on landscape character range from Low to Minor Beneficial following mitigation. These include the addition of deciduous woodland planting, new hedgerows and wildlife habitats, which are recognised as making a positive and beneficial contribution to visual experience.

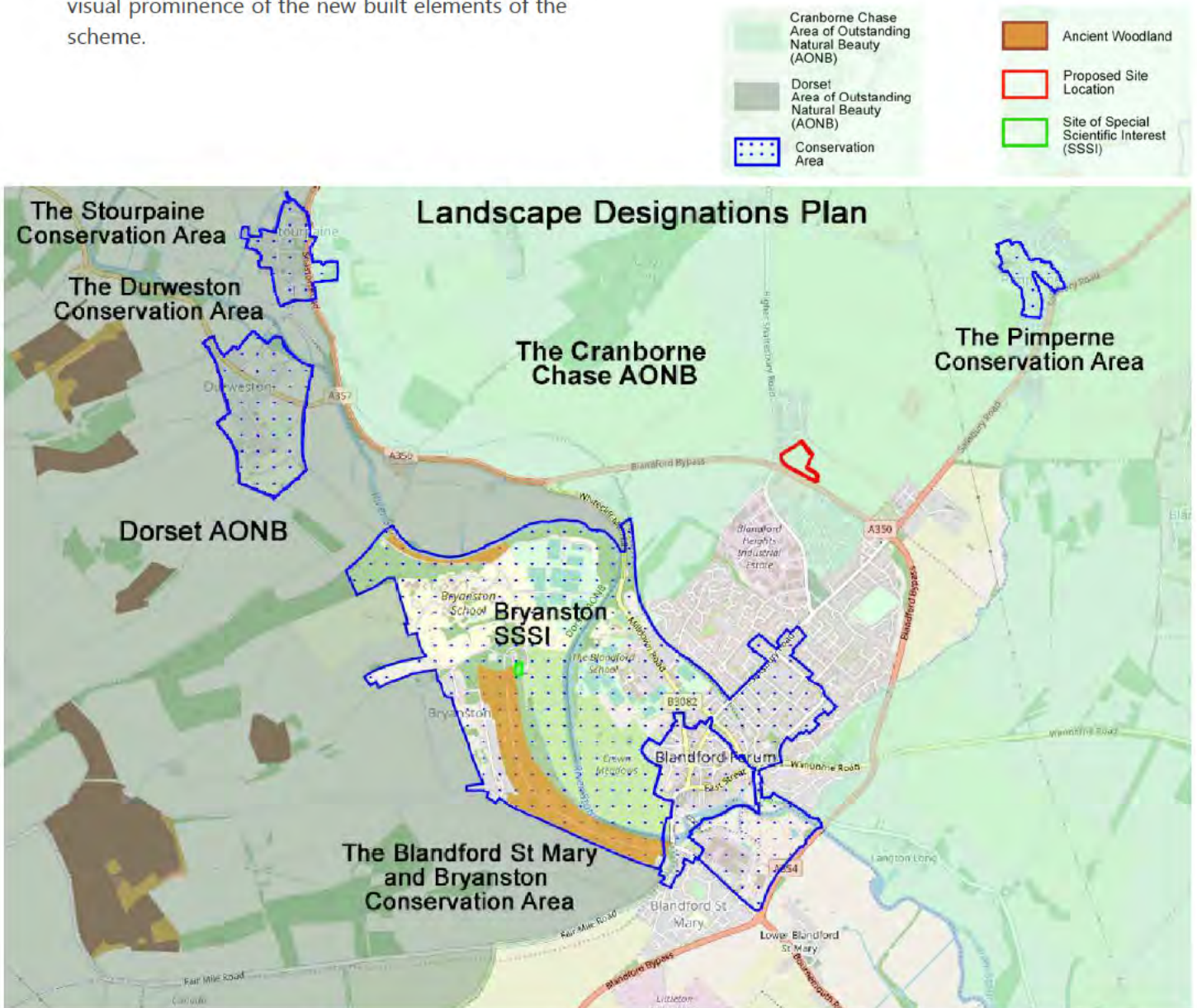


Figure 7: Landscape Designations Plan



Figure 8: Viewpoint 12 Existing - Public Footpath E24/8, off Black Lane near Blandford Camp (taken by Dorset Council)*

**Not shown at original scale - see ES Chapter 6 Figures for correct image enlargement.*

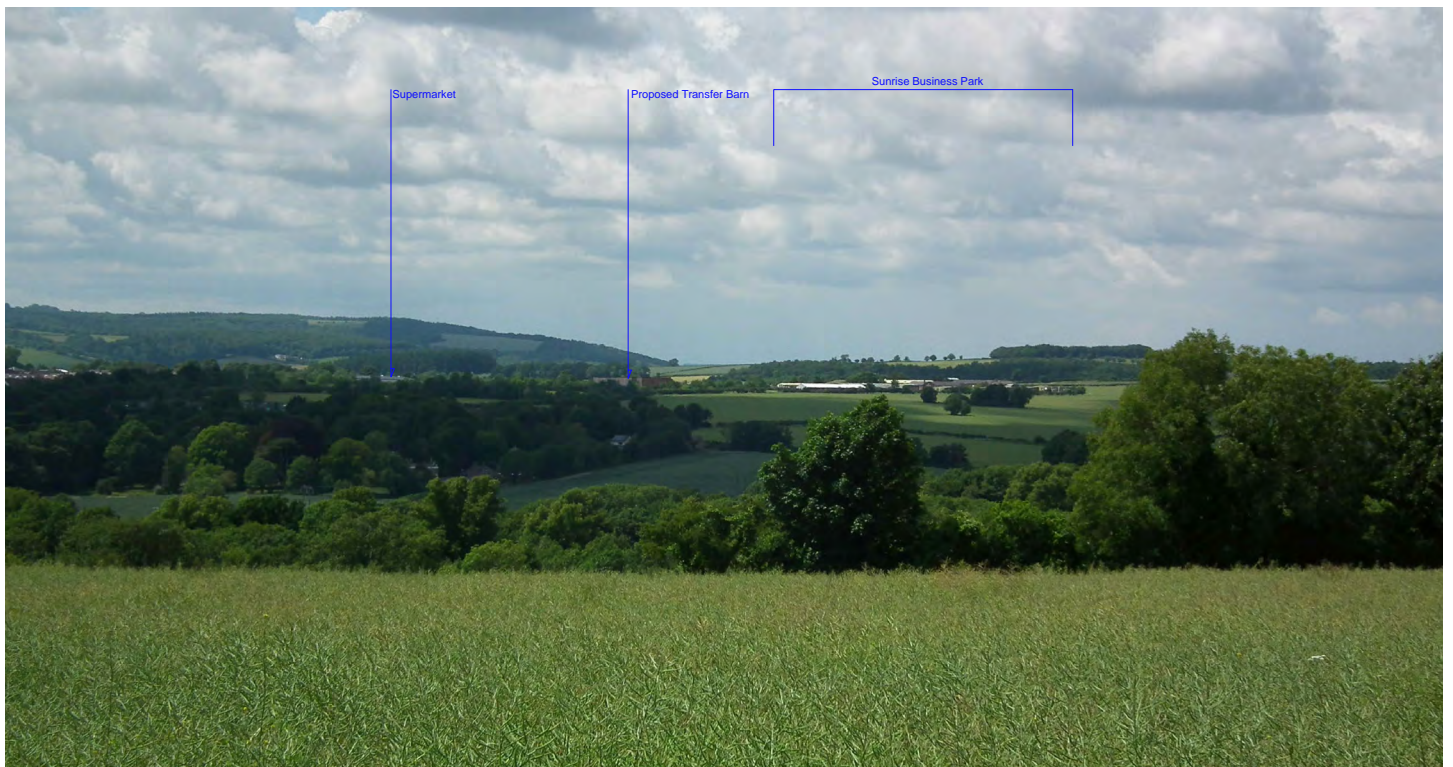


Figure 9: Viewpoint 12 Proposed - Public Footpath E24/8, off Black Lane near Blandford Camp (prepared by Dorset Council)*

7. Historic Environment

- 7.1 The proposed site for the Waste Management Centre at Blandford Forum has been assessed for potential effects on the historic environment, formerly referred to as Archaeology and Cultural Heritage. The assessment has followed Historic England, and other national, guidance. Individual components of the historic environment are referred to as heritage assets and includes archaeological remains, buildings, designed landscapes, wrecks and battlefields; in fact, any location or structure that has archaeological or historic interest. Many of these sites are of such importance that they are statutorily protected, known as designated heritage assets (**Figure 10**), such as scheduled monuments, listed buildings, registered parks and gardens etc. All others have a degree of protection, proportionate to their significance, in national planning guidance and local plan policies.
- 7.2 An extensive search of existing archaeological and historical databases has been undertaken to identify any heritage assets that might be affected by the WMC's construction and use. This study has considered the possible direct physical harm caused to any archaeological remains on the site itself and any indirect harm, to the setting of any other local heritage assets, such as listed buildings or conservation areas.
- 7.3 The WMC site has been investigated by a geophysical survey and archaeological trial trenching which has revealed the presence of an Iron Age and Romano-British settlement, spanning the period of perhaps 50BC to AD50. The settlement has been levelled by ploughing over the centuries, but buried remains of enclosure ditches, field boundaries and storage pits have been shown to exist – as well as several human burials. This site is therefore of some significance within the county. Most of the archaeological deposits will be disturbed by the proposed development, so the Dorset Council waste team are proposing to undertake a detailed professional archaeological excavation of the site ahead of development.
- 7.4 A detailed assessment of the possible effects on the settings of scheduled monuments, listed buildings, conservation areas or other historic assets in the areas, has also been undertaken. The setting of a heritage asset is the way in which people experience it and can add to the significance of an asset. This experience can be diminished by modern structures interrupting important views to or from an asset, but can also be affected by noise, light pollution, smell or other environment changes. The assessment has concluded that the proposed WMC will not have any adverse effects on the setting of local conservation area or listed buildings which lie at least a kilometre from the WMC site.

Key

- ■ ■ ■ Conservation Area
- Scheduled Monument
- Grade I and II* Listed Building
- Grade II Listed Building
- Zone of theoretical visibility (ZTV)
- ▭ Development Site Boundary

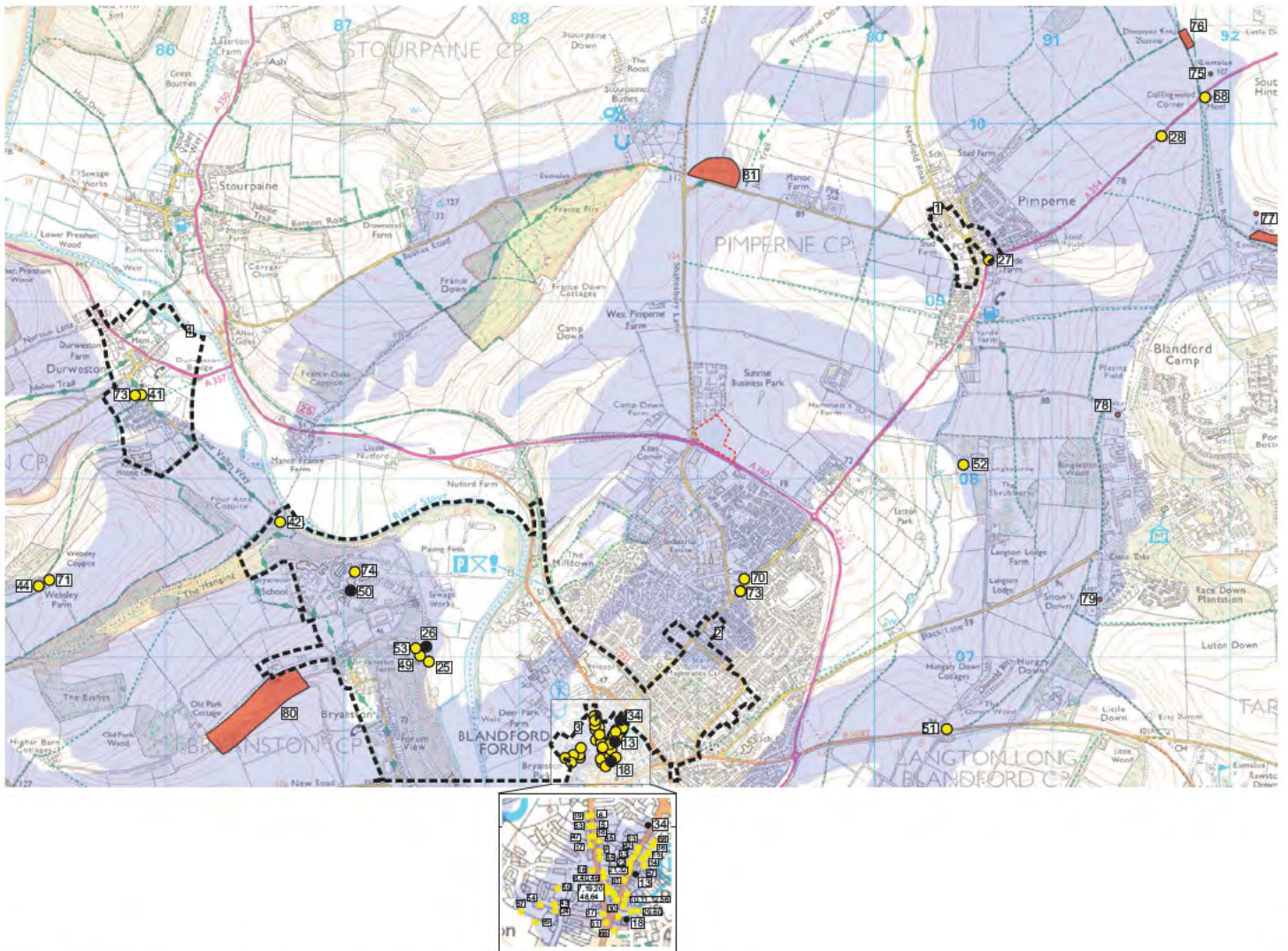


Figure 10: Designated Heritage Assets (prepared by AC Archaeology)

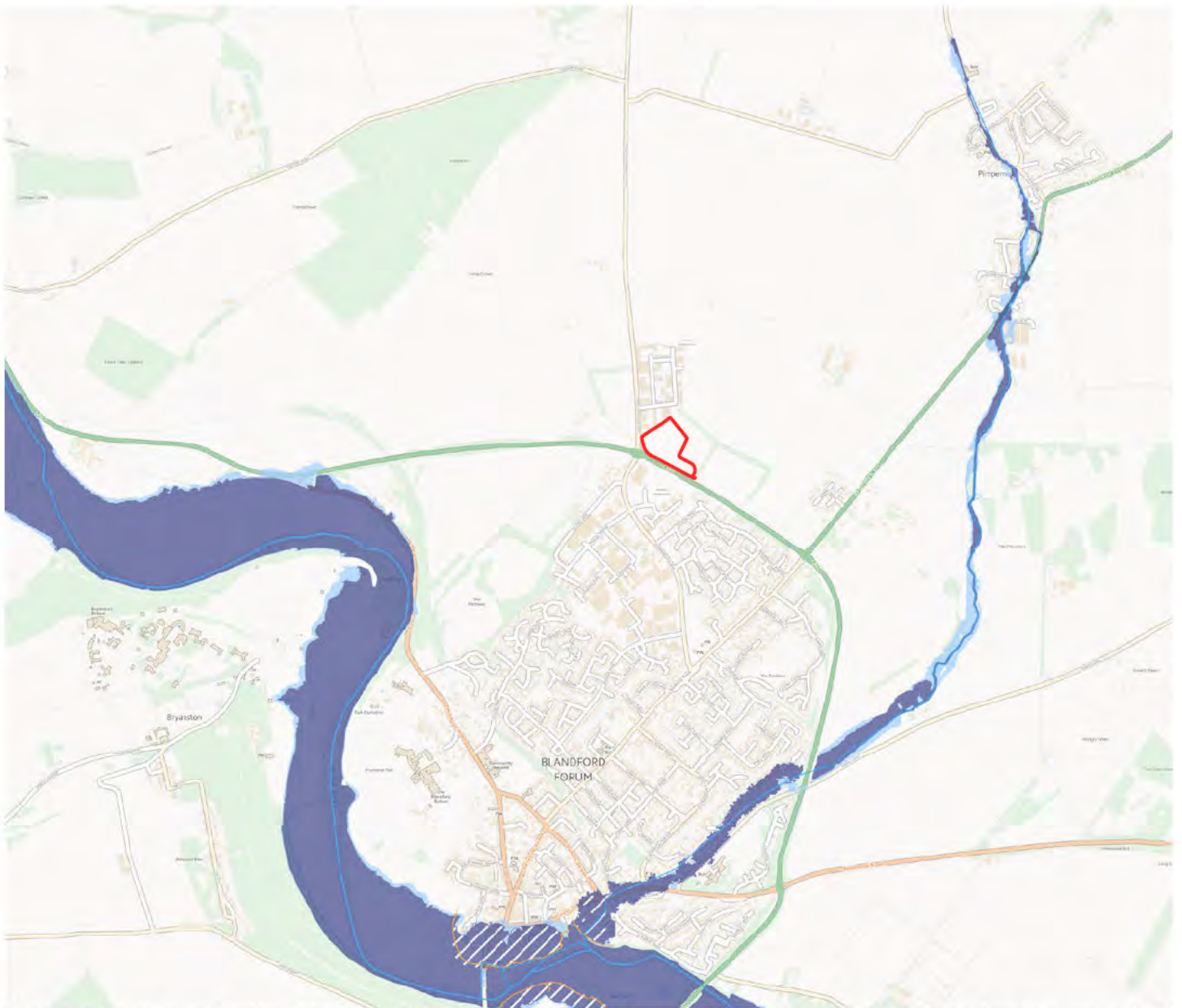
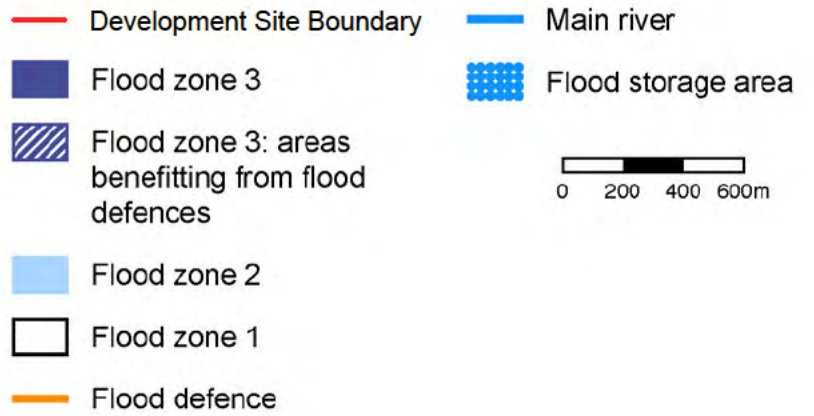
8. Traffic and Access

- 8.1 The Traffic and Access Chapter has considered the potential impacts on the local road network during the construction and operational phases of the Proposed Development. A Transport Assessment accompanies the planning application.
- 8.2 The study area has considered the highway network in the vicinity of the Proposed Development. The Site is currently accessed via an informal gate on the A350, 220m east of the Sunrise Roundabout (A350/Higher Shaftesbury Road/Shaftesbury Lane). To the east, the Hill Top Roundabout links the Site to the A354 Salisbury Road. Both of these junctions have been considered as part of the traffic impact assessment.
- 8.3 The highway safety of the local network has been assessed. This showed that no unusual patterns or clusters of collisions within the vicinity of the Site were identified relating to issues with existing highway design.
- 8.4 There is currently no pedestrian access to the Site and no footways are present on the A350 in the vicinity of the Proposed Development. Footways are provided on the eastern side of Higher Shaftesbury Road, and on the eastern side of Shaftesbury Lane.
- 8.5 Bus stops are located on Shaftesbury Lane to the south of Sunrise Roundabout.
- 8.6 The site will be accessed via a new left-in/left-out junction onto the A350. This site access will provide access to public visitors, commercial users of the facility and staff employed at the facility. Car parking/unloading areas will be provided for public use (21 unloading bays) and staff (nine parking spaces).
- 8.7 The potential impacts on traffic and access during construction and operation were considered to be:
- Severance;
 - Driver and Pedestrian Delay;
 - Pedestrian amenity;
- Fear and Intimidation;
 - Hazardous loads.
- 8.8 Detailed capacity assessments have been undertaken at the Sunrise and Hill Top Roundabouts and at the Site access junction. The following scenarios were modelled at Sunrise and Hill Top Roundabouts:
- 2020 Base;
 - 2025 Base + Committed Development;
 - 2025 Base + Committed Development + Proposed Development;
 - 2025 Base + Committed Development + Proposed Development + Sensitivity Test (Wyatt Homes)
- 8.9 The Wyatt Homes development was included as a sensitivity test in order to consider the potential cumulative impacts of the development and the Proposed Development.
- 8.10 All construction impacts are negligible, temporary in nature and of short duration. The operational impacts have been assessed to be negligible and the junctions assessed will continue to operate within theoretical capacity for all of the assessment scenarios.
- 8.11 The additional mitigation measures proposed to address identified impacts are:
- Production of a Construction Traffic Management Plan detailing the timing of works and the routes for construction traffic to take to access the Site
 - Production of a Framework Travel Plan to support the future employees of the Proposed Development in travelling by sustainable modes to the Site wherever possible and reducing the reliance on single occupancy vehicles to access the Site. This will form part of the Site Management Plan.

8.12 There are not anticipated to be any significant residual impacts on the local highway network caused by the Proposed Development. The impacts on the local highway network in the vicinity of the site have been assessed and shown to be negligible.

9. Water, Flood Risk and Drainage

- 9.1 The Water, Flood Risk and Drainage chapter considers the potential impacts of the Proposed Development on the water environment during the construction and operational phases. The assessment is based on the methodology and principles set out in the Design Manual for Roads and Bridges (DMRB) LA 113. The scope of potential impacts considered impacts to the quality of surface water receptors and groundwater receptors associated with routine runoff, spillage risks and below ground structures during construction and operation, and increased flood risk associated with an increase in impermeable surface and increase in the rate and volume of surface water runoff during construction and operation.
- 9.2 The Proposed Development lies in an area of low flood risk (**Figure 11**) and no surface water features are identified within 1km of the Site. The Site is underlain by Principal Aquifer of the White Chalk Subgroup. The Site is not located within a designated groundwater Source Protection Zone, although the boundary of a SPZ is located approximately 500m east of the Site and the proposed drainage system extends into Zone 1 of the SPZ. Surface water runoff from the Proposed Development will be discharged to the adjacent and existing A350 highway filter drain system that will infiltrate runoff to ground. The Proposed Development will incorporate a robust surface water drainage system that will include appropriate pollution control measures. The strategy has been approved in principle by the Environment Agency, Dorset Council as Lead Local Flood Authority (LLFA) and Wessex Water. However, a residual risk will remain to groundwater quality during operation associated with the discharge of site-generated surface water runoff to ground.
- 9.3 Surface water runoff from the Proposed Development will be attenuated to a peak rate of approximately 2l/s. This rate has been agreed in principle with the Environment Agency and Dorset Council (LLFA). Review of site topography indicates that runoff from the current undeveloped site will naturally fall towards the existing A350 highway drainage system and therefore the proposed discharge of surface water runoff to this system will mimic the current situation. Furthermore, the Proposed Development will include reconstruction of the existing drainage system to improve capacity and performance. The Proposed Development is therefore considered to pose negligible flood risk.
- 9.4 Potential impacts to water quality and flood risk during construction will be managed through the implementation of a Construction Environmental Management Plan that will set out how construction activities would be undertaken in accordance with appropriate good practice guidance. It is also recommended that a construction-stage drainage strategy is developed to manage the potential increase in runoff and control sediment that could reduce the capacity of existing drainage systems.



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Figure 11: Environment Agency Flood Map

10. Odour

- 10.1 A qualitative assessment has been completed to assess the potential for impacts at sensitive locations within the study area due to fugitive odour emissions from the operation of the WMC.
- 10.2 The main sources of fugitive odour emissions associated with the operation of the WMC will be the handling and storage of the waste before transfer from the Site. This will include the handling of putrescible household and commercial wastes within the WTS and the handling and storage of green waste in the HRC.
- 10.3 The impact assessment considered the potential for odour nuisance at the closest existing and proposed sensitive receptors to the Site. It was concluded that the overall magnitude of odour effects from the operation of the WMC would be negligible. This takes into account that the WTS will be within a ventilated building and the proposed HRC will be covered with a canopy and that best practice measures will be in place to reduce the potential for odorous emissions to occur. An Odour Management Plan will be produced and monitored as part of the application and permitting of the Site.

11. Air Quality

- 11.1 A qualitative assessment has been completed to assess the potential for impacts on local air quality from construction activities. This identified that there is a Medium Risk of dust soiling impacts during earthworks and construction activities and a Low Risk during trackout (the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network). There will be a Low Risk of increases in particulate matter concentrations due to construction activities on human health receptors. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and PM10 (particulate matter with an aerodynamic diameter of less than 10 micrometres) releases would be significantly reduced. The residual effects of dust and PM10 generated by construction activities on air quality are therefore considered to be insignificant. The residual effects of emissions to air from construction vehicles and plant on local air quality will be negligible.
- 11.2 In addition, a qualitative assessment of the potential impacts during the operation of the Proposed Development was also completed. This considered baseline conditions within the study area, the proposed increase in traffic as a result of the development, in relation to the ecological receptors (**Figure 12**), the impacts of the Proposed Development alone and 'in-combination' were included. It is considered that the Proposed Development will have a negligible impact on local air quality once operational in terms of both the human health and ecological receptors.
- 11.3 The cumulative impacts of the Wyatt Homes development, to the south-east of the Site, were considered. The results of the screening exercise imply that there will be a negligible impact on local air quality concentrations in relation to human health and an insignificant impact on the ecological receptors in the study area. It should be noted, however, that these conclusions are based on a simple screening exercise using traffic data produced for a sensitivity test rather than explicitly for the Wyatt Homes development, therefore a certain element of caution should be applied to the results.

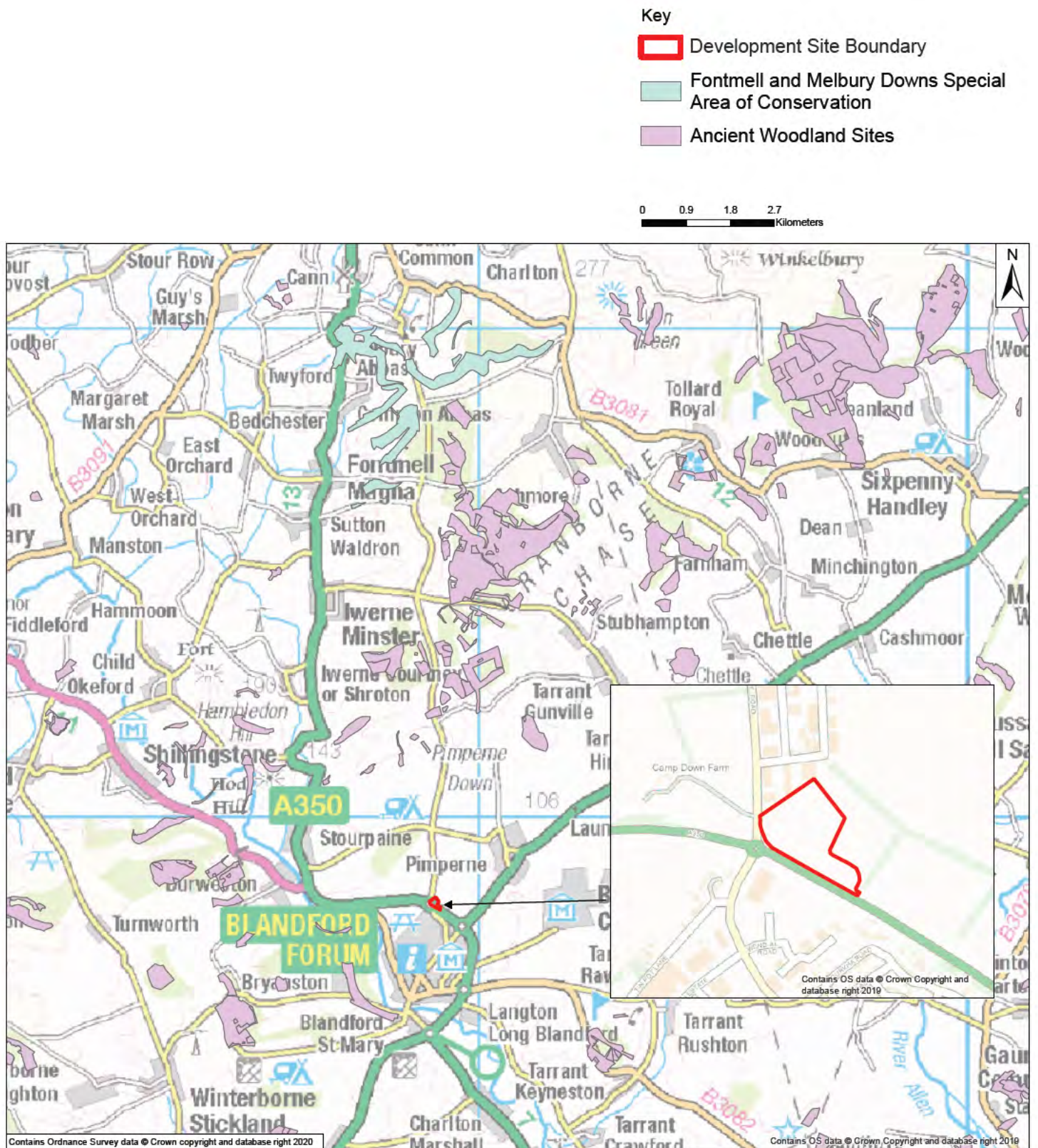


Figure 12: Ecological Designations (prepared by WSP)

12. Climate - Greenhouse Gas Emissions

12.1 The Climate – Greenhouse Gas Emissions chapter has considered the impact of the Proposed Development on climate during construction and operation.

beneficial effect in relation to the generation of GHG emissions during the construction and operational phases.

12.2 Emissions were calculated throughout the Project Reference Lifespan (2021-2082) for the construction and operational phases. The following emission sources have been scoped into the assessment:

Construction, including emissions generated by:

- Product stage (manufacture and transport of raw materials to suppliers)
- Transport of materials to site
- Plant use on site

Operation, including emissions generated by:

- Replacement
- End-user traffic flows
- Operational electricity consumption
- Operational water consumption

12.3 The magnitude of emissions has been contextualised against the UK Carbon Budgets, and along with professional judgement, this has been used to determine the significance of emissions due to the Proposed Development.

12.4 Emissions from construction are considered Moderate Significant (adverse) and emissions from operation are considered Moderate Significant (adverse).

12.5 It is expected that good working practices will be employed on the Proposed Development, and where possible practical, mitigation measures will be implemented. The implementation of mitigation measures, such as reducing the quantity of construction materials, is anticipated to have a

13. Agriculture, Land and Soils

- 13.1 A detailed soil survey was undertaken on the 3rd March 2020 in accordance with the standard Agricultural Land Classification (ALC) survey methodology as described in Natural England's Technical Information Note 49 (TIN049).
- 13.2 The soils within the Site are predominantly fine textured, silty clay soils of the Andover 1 Soil Association.
- 13.3 These soils are prone to moderate waterlogging due to the combination of the silty clay topsoil texture and the relatively high number of field capacity days.
- 13.4 The agricultural land within the Site was classed as Subgrade 3b (non-BMV (Best and Most Versatile agricultural land), limited by soil wetness.
- 13.5 The preparation of a suitable Landscape Habitat Management Plan, considering the available soil resource will facilitate the successful landscaping of the Site, maximising the sustainable re-use of the soil resource.
- 13.6 The Site will undergo a permanent land use change from agriculture to non-agricultural land use. As the scale of loss is below 20 ha and the Grade of ALC land is non-BMV, as determined from the soil survey, the 20 ha BMV significance criteria cannot be triggered, therefore, the loss of agricultural land at the construction and operation phase has been scoped out of the assessment.
- 13.7 It was concluded that there would be no significant effect on agricultural land or soils during the construction and operation phase.

14. Schedule of Mitigation

14.1 This chapter provides a schedule of all of the mitigation set out in the ES.

15. Comments

15.1 The ES is available to view online at **www.dorsetcouncil.gov.uk** and at the offices of Dorset Council (subject to Government Coronavirus restrictions being eased). Any person wishing to make representations about the ES or the planning application should submit these in writing to Dorset Council.

15.2 Copies can be purchased, on request, from:

Gary Hedges
Project Manager
Assets and Property Dorset Council
County Hall
Colliton Park
Dorchester
Dorset
DT1 1XJ

15.3 A charge of £50.00 will be made for a hard copy to cover the costs of reproduction. A digital version (PDF) is available free of charge. Further copies of this Non-Technical Summary are also available free of charge.

NICHOLAS PEARSON ASSOCIATES

ENVIRONMENTAL ASSESSMENT | LANDSCAPE ARCHITECTURE | ECOLOGY | VISUALISATION



Appendix 5 Water Flood Risk and Drainage Assessment

9.0 Water, Flood Risk and Drainage

9.1 Introduction

9.1.1 The Water, Flood Risk and Drainage chapter considers the potential impacts of the Blandford Waste Management Centre (WMC) (herein referred to as the 'Proposed Development') on the water environment during the construction and operational phases. Mitigation measures are identified in relation to any potentially significant effects and, where practicable, these are embedded within the design of the Proposed Development. The assessment is based on the methodology and principles set out in the Design Manual for Roads and Bridges (DMRB) LA 113¹.

9.1.2 This assessment should be read in conjunction with the project description in Chapter 4 the Proposed Development and other documents which provide an assessment of effects on the water environment, namely the Flood Risk Assessment (FRA) and Drainage Strategy (WSP-FRA-001).

9.1.3 This chapter has been prepared by WSP. The Chapter has been authored by consultants with appropriate experience in the assessment and management of surface water, groundwater and flood risk; and approved by an appropriately qualified and chartered member of the Chartered Institution of Water and Environmental Management.

9.2 Scope and Methodology

Scope

9.2.1 The scope of potential impacts considered within this chapter comprises:

- Impacts to the quality of surface water receptors and groundwater receptors associated with routine runoff, spillage risks and below ground structures during construction and operation; and
- Increased flood risk associated with an increase in impermeable surface and increase in the rate and volume of surface water runoff during construction and operation.

9.2.2 The chapter describes:

- The assessment methodology;
- The baseline conditions at the Site and in the surrounding area;
- The embedded mitigation incorporated into the design of the Proposed Development;

¹ Design Manual for Roads and Bridges LA 113 Road drainage and the water environment

- A summary of the likely significant effects; and
- Further mitigation measures proposed to avoid, prevent or reduce any residual significant adverse effects, and the likely residual effects after these measures have been employed.

9.2.3 No or negligible cumulative impacts have been identified with regards to water, flood risk and drainage. This is set out in Chapter 5.

Study Area

9.2.4 The study area adopted for the assessment of potential impacts of the Proposed Development on the water environment includes a buffer area of 1km around the redline boundary of the Proposed Development and any sensitive receptors which have a positive hydraulic connection with the Site.

Methodology

9.2.5 The assessment has broadly followed the principles of assessment set out within DMRB LA 113 as the approach promoted within this document is considered broadly applicable to other non-highway schemes such as this. The DMRB LA 113 promotes the following approach:

- Estimation of the importance of the attribute;
- Estimation of the magnitude of the impact; and
- Assessment of the significance of the effect based on the importance of the attribute and magnitude of the impact.

9.2.6 The estimation of the importance of the attribute and magnitude of the impact adopted in this assessment is qualitative and based on professional judgement. The DMRB LA 113 promotes the use of the HEWRAT (Highways England Water Risk Assessment Tool) and Simple Index Approach (SiA) for the assessment of risks to water quality. The HEWRAT method is not considered appropriate to the nature of this development and traffic flows predicted, therefore the SiA has been applied in accordance with the approach detailed in The SuDS Manual².

9.2.7 Table 9.1 and Table 9.2 outline the criteria that have been adopted in this assessment for assessing the importance of water environment attributes and the magnitude of potential impacts.

² CIRIA C753 The SuDS Manual, 2015

Table 9.1: Criteria for estimating the importance of water environment attributes

Importance	Criteria	Example	
Very High	Nationally significant attribute of high importance	Surface water	Watercourse having a WFD classification shown in a RBMP and Q95 \geq 1.0 m ³ /s. Site protected/designated under EC or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water)/Species protected by EC legislation.
		Groundwater	Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK Legislation. Groundwater locally supports GWDTE SPZ 1
		Flood Risk	Essential infrastructure or highly vulnerable development
High	Locally significant attribute of high importance	Surface water	Watercourse having a WFD classification shown in a RBMP and Q95 < 1.0m ³ /s. Species protected under EC or UK legislation.
		Groundwater	Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports GWDTE. SPZ 2.
		Flood Risk	More vulnerable development.
Medium	Of moderate quality and rarity	Surface water	Watercourses not having a WFD classification shown in a RBMP and Q95 > 0.001m ³ /s.
		Groundwater	Aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ 3.
		Flood Risk	Less vulnerable development.
Low	Lower quality	Surface water	Watercourses not having a WFD classification shown in a RBMP and Q95 \leq 0.001m ³ /s.
		Groundwater	Unproductive strata.
		Flood Risk	Water compatible development.

Table 9.2: Criteria for estimating the magnitude of impact

Magnitude	Criteria	Example
Major Adverse	Results in loss of attribute and / or quality and integrity of the attribute	<p>Surface water</p> <ul style="list-style-type: none"> – Loss or extensive change to a fishery. – Loss of regionally important public water supply. – Loss or extensive change to a designated nature conservation site. – Reduction in water body WFD classification <p>Groundwater</p> <ul style="list-style-type: none"> – Loss of, or extensive change to, an aquifer. – Loss of regionally important water supply.

Magnitude	Criteria	Example
		<ul style="list-style-type: none"> – Potential high risk of pollution to groundwater from routine runoff. – Loss of, or extensive change to Groundwater Dependent Terrestrial Ecosystems (GWDTE) or baseflow contribution to protected surface water bodies. – Reduction in water body WFD classification. – Loss or significant damage to major structures through subsidence or similar effects. <p>Flood Risk</p> <ul style="list-style-type: none"> – Increase in peak flood level (> 100mm).
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Surface water</p> <ul style="list-style-type: none"> – Partial loss in productivity of a fishery. – Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. Contribution to reduction in water body WFD classification. <p>Groundwater</p> <ul style="list-style-type: none"> – Partial loss or change to an aquifer. – Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff. – Partial loss of the integrity of GWDTE. – Contribution to reduction in water body WFD classification. – Damage to major structures through subsidence or similar effects or loss of minor structures. <p>Flood Risk</p> <ul style="list-style-type: none"> – Increase in peak flood level (> 50mm).
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability	<p>Surface water</p> <ul style="list-style-type: none"> – Minor effects on water supplies. <p>Groundwater</p> <ul style="list-style-type: none"> – Potential low risk of pollution to groundwater from routine runoff. – Minor effects on an aquifer, GWDTEs, abstractions and structures. <p>Flood Risk</p> <ul style="list-style-type: none"> – Increase in peak flood level (> 10mm).
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	<p>Surface water</p> <p>No risk identified to water supplies.</p> <p>Groundwater</p> <ul style="list-style-type: none"> – No measurable impact upon an aquifer and/or groundwater. <p>Flood Risk</p> <ul style="list-style-type: none"> – Negligible change to peak flood level ($\leq \pm 10$mm).

9.2.8 The overall significance of a potential impact is determined by consideration of the importance of the receptor and the magnitude of change, as summarised in Table 9.3.

Table 9.3: Significance matrix

	Magnitude of Impact					
		No Change	Negligible	Minor	Moderate	Major
Importance of attribute	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Legislation, Policy and Guidance

9.2.9 The coordination of legislation and policy for the water environment is managed by the UK Government. Many flood risk and water quality requirements are set at European level, which are then transposed into UK law. The Environment Agency has a strategic overview regarding the management of the water environment and all sources of flooding, and an operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and tidal sources. Lead Local Flood Authorities (LLFAs) are responsible for managing the risk of flooding from local sources, comprising surface water, groundwater and ordinary watercourses. Dorset Council are the relevant LLFA for this area.

Legislation

9.2.10 The applicable legislative framework is summarised as follows:

- Water Framework Directive (2000/60/EC);
- Groundwater Directive (2006/118/EC);
- Flood and Water Management Act 2010;
- Land Drainage Act 1991;
- Environmental Permitting (England and Wales) Regulations 2016.

Water Framework Directive (2000/60/EC)

- 9.2.11 The overall objective of the Water Framework Directive (WFD) is to bring about the effective co-ordination of water environment policy and regulation across Europe. The main aims of the directive are to ensure that all surface water and groundwater reaches 'good' status (in terms of ecological and chemical quality and water quantity, as appropriate), promote sustainable water use, reduce pollution and contribute to the mitigation of flood and drought.
- 9.2.12 The WFD also contains provisions for controlling discharges of dangerous substances to surface waters and groundwater and includes a 'List of Priority Substances'. Various substances are listed as either List I or List II substances, with List I substances considered the most harmful to human health and the aquatic environment. The purpose of the directive is to eliminate pollution from List I substances and reduce pollution from List II substances.

Groundwater Directive (2006/118/EC)

- 9.2.13 The Groundwater Directive aims to set groundwater quality standards and introduce measures to prevent or limit pollution of groundwater, including those listed with the 'List of Priority Substances'. The Directive has been developed in response to the requirements of Article 17 of the WFD, specifically the assessment of chemical status of groundwater and objectives to achieve 'good' status.

Flood and Water Management Act 2010

- 9.2.14 The Flood and Water Management Act created the role of the Lead Local Flood Authority (LLFA) to take responsibility for leading the co-ordination of local flood risk management in their areas. In accordance with the Flood and Water Management Act, the Environment Agency (EA) is responsible for the management of risks associated with main rivers, the sea and reservoirs. LLFAs are responsible for the management of risks associated with local sources of flooding such as ordinary watercourses, surface water and groundwater. The Act is also guiding the role of the LLFA in the review and approval of surface water management systems, leading to LLFAs reviewing and commenting on significant development in regard to the Non-Statutory Technical Standards for Sustainable Drainage Systems (2015). The LLFA relevant to the Proposed Development is Dorset Council.

Land Drainage Act 1991

- 9.2.15 Local Authorities and Internal Drainage Boards have additional duties and powers associated with the management of flood risk under the Land Drainage Act 1991. As the Land Drainage Authorities,

consent must be given for any permanent or temporary works that could affect the flow within an ordinary watercourse under their jurisdiction to ensure that local flood risk is not increased. The Environment Agency has a similar role for any permanent or temporary works that could affect the flow within a main river (discussed below).

9.2.16 The Land Drainage Act also sets out the maintenance responsibilities riparian owners have to reduce local flood risks. Riparian owners, who are landowners with a watercourse either running through their land or adjacent to, have the responsibility to ensure that the free flow of water is not impeded by any obstruction or build-up of material within the watercourse.

Environmental Permitting (England and Wales) Regulations 2016

9.2.17 Under the Environmental Permitting Regulations, it is an offence to cause or knowingly permit a water discharge activity, including the discharge of polluting materials to freshwater, coastal waters, relevant territorial waters or groundwater, unless complying with an exemption or an environmental permit (obtained from the EA). The EA sets conditions which may control volumes and concentrations of particular substances or impose broader controls on the nature of the effluent, taking into account any relevant water quality standards from EC Directives. The Environmental Permitting Regulations also manage works that have the potential to affect a watercourse under the jurisdiction of the EA. Any works in, under or near a main river require permission from the EA to ensure no detrimental impacts on the watercourse.

Policy

9.2.18 The applicable policy framework is summarised as follows:

- National Planning Policy Framework, 2019;
- Bournemouth Christchurch Poole and Dorset Waste Plan 2019;
- North Dorset District Local Plan January 2016 and North Dorset District Wide Local Plan 2003.

National Planning Policy Framework, 2019

9.2.19 The NPPF sets out the Government's planning policies for England and provides a framework which allows Local Authorities to produce their own plans that better reflect the specific needs of their communities. Planning Practice Guidance (PPG) has been published alongside the NPPF to provide guidance on the implementation of planning policies, including those relating to flood risk, climate

change and water quality. The PPG's are updated regularly to respond to changes in guidance and best practice.

9.2.20 The NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by preventing development from contributing to unacceptable risk of water pollution. The NPPF also states that development should, wherever possible, help to improve local environmental conditions such as water quality, taking into account relevant information such as river basin management plans.

9.2.21 The NPPF also sets out the requirements for a site-specific FRA to be undertaken and states that development should not increase flood risk elsewhere and take into account the long-term implications of climate change. The NPPF requires that inappropriate developments in areas of flood risk should be avoided by directing development away from high risk areas. When development is necessary, projects should look to make schemes safe without increasing flood risk elsewhere. The sequential test is used as the principal step to identify preferred locations, i.e. those not exposed to risk of flooding. Then, if development is deemed necessary in a flood zone, an exception test can be conducted through an appraisal of risk, and appropriate reduction and management measures can be implemented.

9.2.22 The NPPF also promotes the use of sustainable drainage systems (SUDS) and states that the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.

Bournemouth Christchurch Poole and Dorset Waste Plan 2019

9.2.23 The new Bournemouth, Christchurch, Poole and Dorset Waste Plan identifies sites for new waste management facilities to meet the county's needs. It provides the policy framework for determining planning applications for waste management facilities up to 2033. The following policies are relevant to this assessment:

9.2.24 Policy 16 - Natural resources: The policy states that proposals for waste management facilities will be permitted where it can be demonstrated that the quality and quantity of water resources (including

ground and surface waters) would not be adversely impacted and/or would be adequately mitigated; and ground conditions are shown to be suitable.

9.2.25 Policy 17 – Flood risk: The policy states that proposals for new waste management facilities should demonstrate that they have applied the Sequential Test in areas known to be at risk from flooding, and that proposals within Flood Zones 2 and 3 and of one hectare or greater within Flood Zone 1 must be accompanied by a FRA, taking into account cumulative effects with other existing or proposed developments and climate change. The policy also states that proposals for waste management facilities will be permitted where all of the following criteria are met: they would not be at significant risk of flooding; mitigation measures are provided, where a risk of flooding is identified, so that there would not be an increased risk of flooding on the Site or elsewhere; they are compatible with Catchment Flood Management Plans and/or Shoreline Management Plans and the integrity of functional floodplains is maintained; appropriate measures are incorporated or provided to manage surface water run-off including, where appropriate, the use of sustainable drainage systems (SUDS); and they would not have an unacceptable impact on the integrity of flood defences or impede access for future maintenance and improvements of such defences.

North Dorset District Local Plan January 2016 and North Dorset District Wide Local Plan 2003

9.2.26 The North Dorset Local Plan was adopted on 15 January 2016, superseding the North Dorset District – Wide Local Plan 2003. The Local Plan sets out the Council's approach to managing planning development in the district. Although the LP1 replaces many of the policies from the District-Wide Local, some policies from the older local plan have been saved. The following policies are relevant to this assessment:

9.2.27 Policy 3 - Climate Change: The policy states that development should seek to minimise the impacts of climate change through avoidance of areas at risk of flooding from all sources and the incorporation of measures to reduce flood risk overall. The preamble to the policy also stresses the importance of protecting groundwater resources and managing pollution from runoff from urban areas.

9.2.28 Policy 13 – Grey infrastructure: The policy stresses the importance of surface water drainage stating that sustainable drainage solutions appropriate to the development and underlying ground conditions should be incorporated into all new development.

Guidance

9.2.29 The following guidance documents have been used during the preparation of this Chapter:

- Non-Statutory Technical Standards for Sustainable Drainage Systems (2015);
- Environment Agency Groundwater Protection Guides (2017);
- Design Manual for Road and Bridges (DMRB) LA 113 (2019).

Non-Statutory Technical Standards for Sustainable Drainage Systems (2015)

9.2.30 The Non-Statutory Technical Standards set out the core technical standards for sustainable drainage systems (SuDS) proposed within England. These standards should be used in accordance with the NPPF and PPG. The standards include guidance on controlling flood risk within a development boundary and elsewhere, peak flow and runoff volume control, and the structural integrity of SuDS.

Environment Agency Groundwater Protection Guides (2017)

9.2.31 The EA is the statutory body responsible for the protection and management of groundwater resources in England. The groundwater protection guides published in March 2017 set out the framework for the EA regulation, and replace Groundwater Protection: Principles and Practice GP3. In summary, Section C sets out the EA's position statements and approach to managing and protecting groundwater in relation to infrastructure developments.

DMRB LA 113 Road drainage and the water environment

9.2.32 The assessment has been undertaken in accordance with the principles of the methodology promoted within DMRB LA 113 (formerly HD 45/09) This section of the DMRB sets out the recommended approach to the assessment of road schemes on the water environment. Guidance is provided on determining the sensitivity of receptors and the likely magnitude of effects. Specifically, the DMRB provides a framework for assessing risks associated with polluted surface water runoff, accidental spillages, impacts to hydromorphology and hydrogeology, and flood risk, and provides guidance on mitigation to manage these risks.

Consultation

9.2.33 **Error! Reference source not found.**Table 9.4 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 9.4 Summary of consultation

Body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Environment Agency	Email Consultation, 23 October 2017	Planning proposal that introduced the scheme and presented three options for the proposed drainage on the Site.
Environment Agency	Email Consultation, 6 November 2017	Response to planning proposal and surface water drainage strategy that has been modified after discussion with our Groundwater team.
Environment Agency	Email consultation, 14th April 2020	Updated planning proposal based on the latest design iteration of the scheme and presented three options for the proposed drainage of the Site.
Environment Agency	Email consultation, 4th of May 2020	Response to the updated planning proposal outlining the three drainage options provided by WSP. The EA provided additional mitigation requirements for flood risk and groundwater.
Environment Agency	Letter dated 15 May 2020	EA confirm no further comments following confirmation from WSP to limit discharge to 2l/s and only discharge to the highways drain.
Local Lead Flood Authority (Dorset Council)	Email consultation, 15 May 2020	Approval in principle for the proposed development and drainage design to discharge surface water runoff to the existing A350 drain.
Wessex Water	Email consultation, 08 June 2020	WW confirmed no comment if surface water discharged to the existing A350 drain.

9.3 Baseline Conditions

9.3.1 Baseline conditions within the identified Study Area and of relevance to the Proposed Development have been established to inform the assessment of potential environmental risks. Current conditions were ascertained through a desk-based assessment utilising publicly available data as listed below:

- Environment Agency's online Flood Map for Planning³;
- Environment Agency's online Flood Risk from Surface Water map⁴;
- Environment Agency's online Flood Risk from Reservoirs map⁵;

³ Environment Agency (2020) Flood Map for Planning available online: <https://flood-map-for-planning.service.gov.uk/>

⁴ Environment Agency (2020) available online: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

⁵ Environment Agency (2020) available online: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

- Environment Agency's Catchment Data Explorer⁶;
- Multi-Agency Geographic Information for the Countryside (MAGIC) online mapping⁷;
- British Geological Survey (BGS) Geology of Britain Viewer⁸;
- Blandford Forum Waste Management Centre Preliminary Sources Study Report August 2017⁹ including Envirocheck report (2017) in Appendix A. This report is provided in Appendix 9.1 of this chapter;
- The BGS Hydrogeological Map of the Chalk and associated minor aquifers of Wessex¹⁰;
- Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Strategic Flood Risk Assessment (February 2008)¹¹.

Site location

- 9.3.2 The Proposed Development is located on agricultural land 1.5km to the north-east of Blandford Forum town centre at approximate National Grid Reference (NGR) 389144 (E) 108247 (N).
- 9.3.3 The Site is located immediately north of the A350, east of Higher Shaftsbury Road, south of the Sunrise Business Park.
- 9.3.4 The wider field area is approximately 4.6 hectares. The Site lies within the south-western section of the wider field and is approximately 2.68ha. The area has a generally flat topography and an approximate elevation of 90.0mOD. A variation of approximately 1.0m is observed between the highest point (along the north west boundary of the Site) and the lowest point (along the southern boundary of the Site).
- 9.3.5 To the immediate north of the Site lies the Sunrise Business Park, comprising a small complex of warehouses and businesses. Higher Shaftsbury Road, which borders the west of the Site, extends

⁶ Environment Agency (2020) available online: <https://environment.data.gov.uk/catchment-planning/>

⁷ DEFRA (2019) available online: <https://magic.defra.gov.uk/MagicMap.aspx>

⁸ British Geological Survey (2020) available online: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

⁹ Blandford Forum Waste Management Centre Preliminary Sources Study Report August 2017, provided in Appendix 9.1

¹⁰ The BGS Hydrogeological Map of the Chalk [last accessed June 2020]. Available at: <http://www.largeimages.bgs.ac.uk/jip/mapsportal.html?id=1003978>

¹¹ Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Strategic Flood Risk Assessment [last accessed June 2020]. Available at: <https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/north-dorset/local-plan-part-1/submission/local-plan-evidence-base/pdfs/strategic-flood-risk-assessment/strategic-flood-risk-assessment-final-report.pdf>

further north, intersecting large agricultural fields. The village of Pimperne is located 1.7km north-east of the Site.

- 9.3.6 To the south of the Site, beyond the A350, lies another industrial estate of large warehouses and associated car parking. Housing with associated gardens and green park areas extend south towards Blandford Forum town centre.

Surface Water

- 9.3.7 Review of OS mapping indicates that the closest surface water features to the Site are the River Stour and the Pimperne Brook (a tributary of the River Stour) located approximately 1.2km to the south-west and east of the Site, respectively. Both watercourses are classified as main rivers under the jurisdiction of the EA.

Surface Water Quality

- 9.3.8 The ecological and chemical quality of the watercourses are assessed by the EA in accordance with the objectives of the WFD. The most recently published results (Cycle 2, 2016) are presented in Table 9.5 below. The River Stour is split into two monitored reaches upstream and downstream of its confluence with the Pimperne Brook therefore both reaches are presented for information.

Table 9.5: WFD Surface Water Classifications (Cycle 2, 2016)

Reach name and ID	Ecological classification	Chemical classification	Overall status
River Stour (Middle upstream of Pimperne Brook) GB108043016051	Moderate	Good	Moderate
River Stour (Middle downstream of Pimperne Brook) GB108043016052	Moderate	Good	Moderate
Stour Tributary (Pimperne Brook) GB108043016020	Moderate	Good	Moderate

- 9.3.9 There are no surface water related Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within 1km of the Site.

Surface Water Abstractions

- 9.3.10 The Envirocheck report (2017) (Appendix 9.1) states that there are no licensed surface water abstraction consents within the Study Area.

Surface Water Discharge Consents

- 9.3.11 The Envirocheck report (2017) (Appendix 9.1) states that there are no licensed surface water discharge consents within the Study Area.

Groundwater

Hydrogeology and Aquifer Status

- 9.3.12 The main characteristics of the geology (superficial and bedrock) that underlies the Site are described in the Blandford Forum Waste Management Centre Preliminary Sources Study Report (Appendix 9.1) and considers both published information and the findings of the historical Ground Investigation (GI) completed in 2018.
- 9.3.13 Superficial deposits comprising Clay with Flints Formation are designated *Unproductive Strata* by the EA. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The 2018 GI confirmed a total thickness of 0.5m across the Site.
- 9.3.14 The White Chalk Subgroup (Chalk Group) is a major aquifer and designated a *Principal Aquifer* by the EA. Principal aquifers are deemed capable of supplying water supplies at a regional scale meaning they usually provide a high level of water storage that may also support water supply and/or river baseflow on a strategic scale. The 2018 GI confirms that the White Chalk Subgroup underlies the Site and was proven to a depth of 10.0mBGL (meters below ground level). The total thickness of the White Chalk Subgroup was not confirmed in the GI.
- 9.3.15 The Groundwater Vulnerability Map available via MAGIC shows the vulnerability of groundwater to a pollutant discharged at ground level on the hydrological, geological and hydrogeological properties within a single square kilometre. The Clay with Flints Formation are classified *Medium – High* vulnerability and the White Chalk Subgroup is classified *High* vulnerability. This means that these units are relatively unprotected from potential pollution incidents at the surface.

Groundwater Level and Flow

- 9.3.16 Groundwater level data is available from the historic 2018 GI. Six (6 no.) groundwater monitoring rounds were also completed at five (5 no.) boreholes on Site between September 2017 and November 2017. The boreholes were screened in the White Chalk Subgroup, to an average depth of 10.0mBGL, and did not intercept the underlying groundwater table. No groundwater was recorded in any of the boreholes screened in the superficial deposits over the duration of monitoring. This suggests that groundwater level is at depth (>10.0mBGL) within the White Chalk Subgroup.
- 9.3.17 British Geological Survey (BGS) historical boreholes, available from the BGS GeoIndex interactive map, provide some indication of groundwater level surrounding the Site. ST80NE75, approx. 400m north-west of the Site, recorded groundwater level in the Chalk at 46.93mBGL (47.25mOD) and ST90NW14, approximately 2.80km south-east of the Site, recorded groundwater level in the Chalk at 33.52mBGL (31.48mOD).
- 9.3.18 The BGS Hydrogeological Map of the Chalk and associated minor aquifers of Wessex provides groundwater contour data for the Chalk and confirms that groundwater level can be expected at depth of approximately 50mOD and 40mOD for the wider study area and is roughly 40.0mBGL and 50mBGL for the Site.
- 9.3.19 The source of local groundwater recharge to the superficial deposits is predominantly from rainfall. Due to the low permeability of soil and superficial deposits, groundwater recharge in the area is considered to be low, and run-off and evaporation relatively high.
- 9.3.20 The White Chalk Subgroup is a regional aquifer that receives recharge from multiple sources (in particular rainfall infiltration over a large area) within the wider catchment. Regional groundwater flow is likely to occur in the deep bedrock aquifer. Locally, groundwater flow direction in the White Chalk Subgroup is expected to be to the south towards the River Stour.
- 9.3.21 Groundwater flow may also be influenced locally by the large abstraction identified to the south-east at approximately NGR ST 90402 06674. This is discussed further below.

Aquifer Permeability

- 9.3.22 Based on the geological description, most of the ground underlying the Site is characterised by low permeability Chalk. Soakaway tests were completed in six (6 no.) trial pits (TP01, TP02, TP03, TP04, TP05 and TP08) locations to a depth of 3.2mBGL within the White Chalk Subgroup. No in-situ permeability

tests i.e. falling head and rising head tests have been completed for borehole locations on Site, although this is not considered necessary given the proposed drainage strategy to discharge to the existing A350 highway drainage system (discussed below).

9.3.23 For the six (6 no.) trial pits listed above, records of infiltration in the White Chalk Subgroup vary between 1×10^{-6} m/s (for TP03) to 1×10^{-5} m/s (for TP01) indicating generally low permeability Chalk. The majority of these locations recorded no groundwater level and were dry. This implies that the Chalk typically exhibit low permeability and transmissivity.

Groundwater Abstractions and Source Protection Zones

9.3.24 The Site is not located within a designated Source Protection Zone (SPZ) however, SPZ Inner Protection Zone 1 exists for a large abstraction at Hungry Down approximately 2.80km south-east. The boundary for the SPZ extends northwards up to approximately 500m east of the Site.

9.3.25 Data provided within the Envirocheck report (2017) (Appendix 9.1) for the Site have identified eight (8 no.) groundwater abstractions located within a 2.0km radius of the Site. Two (2 no.) are located within 0.70km of the Site notably towards the north-east at NGR ST 89800 089700. Abstraction license information is summarised in Table 9.6 below. It is assumed that these abstractions are targeting the regional Chalk Aquifer.

9.3.26 Outside of the Study Area licensed abstractions relating to Wessex Water Services Ltd have also been identified within the Envirocheck report (2017) (Appendix 9.1).

9.3.27 WSP are not aware and therefore do not hold any definitive information of any unlicensed groundwater abstractions within the Study Area.

9.3.28 There are no groundwater related SSSI's, SAC's or SPA's within the Study Area of the Site.

Table 9.6: Groundwater abstraction licences within the wider study area

Licence No.	Licence Holder	Distance from Site (km)	Abstraction Limit		Purpose	Status
			m3/d	m3/yr		
13/43/034/G/259*	Wessex Water Services Ltd	1.22	1500	138,000	Water Supply Related	Unknown
13/43/034/G/119**	Taymix Transport & D W Taylor (Holdings) Ltd	0.67	~	~	Industrial & Transport	Unknown
13/43/034/G/307**	Taymix Transport & D W Taylor (Holdings) Ltd	0.67	~	~	General Farming & Industrial	Unknown
13/43/034/G/286	Governors of Bryanston School Inc	1.46	~	~	Sports Grounds/Facilities:	Unknown

Licence No.	Licence Holder	Distance from Site (km)	Abstraction Limit		Purpose	Status
			m3/d	m3/yr		
					Spray Irrigation - Direct	
13/43/034/G/283	Blandford Forum Town Council	1.47	~	~	Sports Grounds/Facilities: Spray Irrigation - Direct	Unknown
13/43/034/G/103	Messrs A G Lukin	1.66	~	~	General Farming And Domestic	Unknown
13/43/034/G/255	Messrs A G Lukin	1.88	~	~	General Farming And Domestic	Unknown
13/43/034/G/125	T Ridout & Son	1.92	~	~	General Farming And Domestic	Unknown
Table notes: * Wessex Water licence No associated to approx. 12 well locations assumed to be related to their water supply network. Details provided above relate to one (1 no.) well location on the network ** Licence appears to be shared amongst two (2 no.) owners and comprises multiple licenses ~ identifies no information provided on abstraction limit relating to specific license number						

Groundwater WFD Bodies

9.3.29 The EA classifies the onsite aquifers to be within the Upper Dorset Stour groundwater waterbody, as shown on the Catchment Data Explorer interactive webtool. The groundwater water body underlies the entire Site and the River Basin Management Plan (RBMP) classifications and objectives, as defined by the WFD, of the waterbody are presented in Table 9.7.

Table 9.7: WFD groundwater classifications (Cycle 2, 2016)

Waterbody ID	GB40801G804500	Waterbody Name	Upper Dorset Stour
Waterbody Type	Groundwater Body	Groundwater Area	472.463 km ²
National Grid Ref.	ST9173707562		
Description	The groundwater waterbody underlies the entire Study Area.		
Overall Status	Poor	Status Objective	Good 2027
Overall Quantitative Status	Good	Status Objective	Good 2015
Overall Chemical Status	Poor	Status Objective	Good 2027
Protected Area Designation	Nitrates Directive (NVZ12GW011510), Safeguard Zone (GWSGZ0259), Drinking Water Protected Area (UKGB40801G804500)		
Reason for not achieving Good status	Groundwater Abstraction; Agricultural and Rural Land Management		
Waterbody Measures	N/A		

Groundwater Water Quality

9.3.30 Groundwater water quality data was not recorded in the 2018 GI due to the depth of the groundwater level.

Flood Risk

9.3.31 All potential sources of flooding relevant to the Proposed Development have been assessed in detail within the associated FRA and Drainage Strategy (WSP-FRA-001) and summarised below.

Fluvial and Tidal Flooding

9.3.32 Review of the EA's Flood Map for Planning (Rivers and Sea) indicates that the Site is located within the low risk Flood Zone 1, where the risk of flooding from fluvial and tidal sources is less than 1 in 1000 (0.1%) in any year (see Figure 9.1).

Surface Water Flood Risk

9.3.33 Review of the EA's Flood Risk from Surface Water Map indicates that the Site is not at risk of flooding from surface water.

Flooding Due to Rising Groundwater

9.3.34 From the geology and groundwater section above, groundwater is considered to be sufficiently deep to not pose flood risk to the Site.

Flooding from Infrastructure/Sewer Failure

9.3.35 The risk of significant runoff from adjacent sites is considered to be very low due to the surrounding topography. The Sunrise Business Park to the north could contribute some flows in extreme events that may overwhelm the Site's drainage system but will be managed by local landscaping of the Proposed Development to avoid any flooding of the new facilities.

9.3.36 The existing site has no formal drainage management; it is considered that any rainwater falling on the percolates into the soil for most rainfall events. Any extreme rainfall events exceeding the natural infiltration rate will generate some runoff. This runoff will follow the natural topography of the area to the south towards the A350.

9.3.37 Dorset Council has advised that the highway drainage system in the A350 is an infiltration system which is some 20 years old and unlikely to have any spare capacity. There is some development to the south

of the A350 and Wessex Water asset plans suggest soakaways in the stormwater systems. These systems are located at a lower elevation and are not considered to pose risk to the site.

Reservoir Failure

9.3.38 The EA provides maps showing the area that may be affected by flooding as a result of the breach of a large, raised reservoir (i.e. capable of storing over 25,000 m³ of water above the natural level of any part of the surrounding land). Review of the EA's Flood Risk from Reservoirs Map indicates that the Site is not at risk of flooding as a result reservoir breach.

9.3.39 Review of OS mapping indicates that there is an unnamed covered reservoir located approximately 1.4km to the east of the Site boundary, just to the south of Pimperne. This is not considered to pose risk to the Site.

Historical Flood Events

9.3.40 Consultation with Dorset Council and review of the SFRAs indicate no known historic flood risk that has occurred within the Site.

9.4 Proposed Development

9.4.1 The Site has been allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan 2019 as the preferred choice for the location of the Blandford WMC. The Proposed Development comprises the following key aspects:

- Local widening of the A350 for a left-in, left-out junction with a deceleration lane and vehicular access into the Site; incorporating public unloading bays, circulatory roads for waste and recycling vehicles and parking for site staff;
- An open operator's yard (HRC), open to rain, for reception of public household waste;
- A waste management barn (WTS), not open to rain, for sorting of waste;
- Associated small out buildings for hazardous waste and site staff;
- Extensive landscaping with ponds to provide treatment and attenuation of water quality and quantity as well as provide amenity and biodiversity benefits.

Onsite Drainage

9.4.2 The sustainable management of runoff from the Proposed Development has been developed in consultation with the EA, LLFA and Wessex Water (WW) with due regard to the risks that the Proposed

Development could pose to water quality and flood risk if not appropriately managed. Infiltration rates within the Site boundary are considered too low to support an infiltration-based solution. The proposed strategy is therefore to discharge runoff at an attenuated rate to the highway drainage system that serves the A350 to the south of the Site that in turn will infiltrate runoff to ground in soils that are deemed to be have a better infiltration rate. The system has no connectivity to surface water features.

9.4.3 Robust treatment is proposed along with limiting the peak discharge rate and increasing the capacity and performance of the existing highway drainage system. A detailed description of the drainage strategy is provided in the FRA and Drainage Strategy report (WSP-FRA-001), which accompanies the planning application, and is shown in Appendix 4.2. In summary this is as follows:

- Roof and paving runoff from all areas of the Proposed Development with the exception of the open operator's yard (HRC) and access roads will be conveyed by pipes to the proposed ponds;
- Runoff from the higher risk open operator's yard (HRC) (where waste collection will occur) will be conveyed by pipes via a petrol and silt interceptor to the proposed ponds;
- Runoff from the access roads will be conveyed by pipes via a vortex separator to the proposed ponds;
- The ponds will be lined and have a gabion baffle forming a forebay to slow flows and encourage greater settlement of silts. The ponds will be connected in series by filter drains that will add further treatment to water quality;
- An automatic penstock will be incorporated at the Site boundary (prior to off-site discharge) for emergency pollution control situations;
- A flow control device will be installed downstream of the ponds to regulate flows to the existing highway drainage system to a peak discharge of approx. 2l/s for all storm events up to the 1:100-year storm + 40% climate change allowance.

9.4.4 Waste that is disposed of by users of the Site will be taken from the open operator's yard (HRC) into the covered WTS building. The WTS building will include a sprinkler system in the event of fire. All runoff from within the WTS building will be retained and tankered off site; no discharge from the WTS building will be made to either the surface water or foul water drainage networks.

9.4.5 The proposed drainage strategy will also include reconstruction of the existing drainage system serving the A350 between the Sunrise Business Park and the Salisbury Road Roundabout in the east to improve the capacity and performance of the system.

9.4.6 The Proposed Development includes widening of the A350, but existing road drainage will continue to discharge as it currently does to verge filter drains and no amendments are proposed.

9.5 Impact Assessment

9.5.1 The predicted significance of effects in relation to surface water features, flood risk and groundwater resources has been based on the importance of the relevant attribute and the magnitude of impact as discussed in Section 9.2.

Construction Phase Impacts

Risks to surface water and groundwater quality

9.5.2 Construction works can introduce risk of spillage of harmful substances such as fuels, oils and cement-laden washdown water, particularly from construction compounds. Poor maintenance of construction plant can also cause pollution through leaks and drips. Furthermore, during construction all areas of the existing Site will be stripped of topsoil or covering surfaces. This will lead to exposure of subsoils, which when subjected to rainfall will have the potential to mobilise and flow downhill. Any embodied contaminants within this material will also follow as they are emulsified by the flowing water. Storage areas can also pose a significant source of contaminants which when subjected to rainfall can cause mobilisation into sensitive receptors; e.g. attenuation and infiltration features.

9.5.3 Careful consideration will be required to control this flow as waters polluted with either silts or contaminants will not be permitted to be passed off the Site, particularly where the receptor is to the ground. Bunding may be required to control the flow. The bunding should be designed to allow removal of sediments, and where relevant any contaminants with the soil. It is envisaged that appropriate soil testing will be undertaken prior to the detailed design that confirms the levels of contaminants present within the soil and therefore any mitigation measures required.

9.5.4 These types of risks and proposed mitigation measures are best managed through the implementation of the Construction Environmental Management Plan (CEMP) that will set out how construction activities would be undertaken in accordance with appropriate good practice guidance, such as CIRIA's

Control of Water Pollution from Construction Sites (C532). A Draft CEMP accompanies the planning application.

- 9.5.5 There are no surface water features within 1km of the Site and the adjacent drainage system serving the A350 has no connectivity to surface water features. **No change** to surface water features is expected and a **neutral** significance of effect is assigned.
- 9.5.6 Construction activities could pose risk to the quality and quantity of underlying groundwater resources. Deep excavations could also pose risk to groundwater levels and flows. The Proposed Development directly overlies the Clay with Flints Formation deemed to have **low** sensitivity where designated *Unproductive Strata*. The White Chalk Subgroup underlies the Clay with Flints Formation and is deemed to have a **very high** sensitivity where designated a *Principal Aquifer*.
- 9.5.7 As described in Section 9.3, groundwater is considered to be at depth with no groundwater levels recorded in the Clay with Flints Formation and White Chalk Subgroup within boreholes screened at depths to 10mBGL. The BGS local historical boreholes also provided information on depth to groundwater level in the White Chalk Subgroup and indicate that groundwater occurs at depths of >40mBGL. Furthermore, the 2018 GI considered the White Chalk Subgroup to comprise low permeability deposits that also typically exhibit low transmissivity.
- 9.5.8 The scheme does not include any significant earthworks (i.e. foundation piling at depth) however, some excavations are proposed to accommodate attenuation basins (as part of the drainage strategy) and the waste transfer loading bay to the north of the Site. The current ground level across the Site is relatively flat and ranges between 90.0mOD to the south to 90.8mOD to the north of the Site. The three (3 no.) proposed attenuation basins located to the south of the Site will be excavated to a depth of 85.0mOD (5.0mBGL). The waste transfer loading bay will be excavated to an approximate depth of 88.85mOD (1.95mBGL).
- 9.5.9 Provided correct working procedures and practices proposed within the CEMP are adopted to avoid pollution risk and taking into consideration the likely depth to groundwater and shallow depth of proposed excavations, construction works are assessed to pose **no change** to the quality and quantity of the underlying Principal Aquifer (White Chalk Subgroup). On this basis, a **neutral** significance of effect is assigned.

Flooding associated with temporary works

- 9.5.10 During the construction phase of the Proposed Development there would be a gradual increase in impermeable areas and site generated runoff until the development (and associated drainage strategy) is complete. The Proposed Development also has the potential to generate sediment-laden runoff from construction materials such as aggregate and stockpiles of topsoil that could reduce the capacity of existing drainage systems (namely the highway drainage system serving the A350) and increase flood risk.
- 9.5.11 Without regulation, the consequential increase in surface water runoff would result in overloading of the off-site receiving drainage infrastructure and a modest increase in flood risk to property downstream from the Site that is considered to have **high** sensitivity. This potential impact is assessed as having a **minor** magnitude, combining as **slight** significance of effect. The impact is considered short-term and temporary. Surface water runoff will be appropriately treated and controlled once the operational drainage system is complete. Whilst increased sedimentation may have a permanent effect on the capacity of existing drainage systems, these are intended to be replaced as part of the Proposed Development and therefore capacity will be restored.

Operation Phase Impacts

Risks to surface water and groundwater quality

- 9.5.12 During operation, surface water runoff from the Proposed Development has the potential to contain silts, hydrocarbons, heavy metals and other harmful substances that are washed off hard paved areas.
- 9.5.13 Surface water drainage from the Proposed Development will be mitigated by a proposed surface water drainage system as outlined in the FRA and Drainage Strategy (WSP-FRA-001) and as summarised in Section 9.4. This will include appropriate pollution control measures in the form of attenuation ponds that will treat all discharge from the Proposed Development, supplemented by a petrol and silt interceptor serving the higher risk open operator's yard (HRC) area and a vortex separator serving the access roads. No discharge from the WTS building will discharge to the surface water drainage system, with all runoff from this area retained and tankered off site. An automated penstock will also be included in the event of spillage. Surface water runoff from the Site will be discharged to the adjacent A350 highway filter drain system that will infiltrate runoff to ground. The strategy has been approved in principle by the EA, LLFA and WW. The design of the strategy also applied the SiA to assess the effectiveness of proposed treatment methods against the predicted hazard rating and concluded that

the mitigation outweighed the hazard. This is detailed further in the FRA and Drainage Strategy (WSP-FRA-001).

9.5.14 There are no surface water features within 1km of the Site and the adjacent drainage system serving the A350 has no connectivity to surface water features. **No change** to surface water features is expected and a **neutral** significance of effect is assigned.

9.5.15 SPZ Inner Protection Zone (Zone 1) exists for a large abstraction approx. 2.80km south-east of the Proposed Development. The boundary of SPZ Zone 1, deemed **very high** sensitivity, is 0.50km east of the Proposed Development. Concerns arise around pollutant risks relating to runoff from a waste management centre infiltrating to ground within SPZ Zone 1 where parts of the receiving highways drainage features are located. As discussed above, groundwater levels are deep (>40mBGL) and the superficial deposits offer some protection (albeit very minimal) to the underlying Principal Chalk Aquifer, characterised as low permeability deposits. With the inclusion of the proposed drainage strategy it is considered highly unlikely that any significant contaminant loading would find its way into the SPZ Zone 1. The magnitude of impact associated with pollution risk is therefore considered **negligible** resulting in a **slight** significance of effect. The impact is considered to be permanent.

9.5.16 As runoff is proposed to be infiltrated to ground, the Proposed Development is considered to result in **no change** with regards to groundwater recharge quantities and a **neutral** significance of effect is assigned.

Increased rates and volumes of surface water runoff

9.5.17 Surface water runoff from the Proposed Development will be discharged at a peak rate of approx. 2l/s for all storm events up to the 1:100-year storm + 40% climate change allowance. This rate has been agreed in principle with the EA and LLFA. Review of site topography also indicates that runoff from the current greenfield site will naturally fall towards the existing A350 highway drainage system and therefore the proposed discharge of surface water runoff to this system will mimic the current situation. Furthermore, the Proposed Development will include reconstruction of the existing drainage system between the Sunrise Business Park and the Salisbury Road Roundabout in the east to improve capacity and performance. The Proposed Development is therefore considered to pose **no change** to flood risk elsewhere with **neutral** impact significance.

9.6 Secondary Mitigation Measures and Residual Effects

- 9.6.1 The proposed mitigation discussed above has been taken into consideration in the assessment of potential effects, most notably the implementation of a CEMP to manage risks during construction and a robust drainage strategy to manage risks during operation.
- 9.6.2 Development of a construction-stage drainage strategy is recommended to manage risks associated with unattenuated and sediment-laden runoff that may be discharged into the existing drainage system serving the A350, posing increased flood risk elsewhere. A construction-stage drainage strategy will also provide further mitigation for the management of risks to water quality. With this additional mitigation in place, increased flood risks are considered **negligible**.
- 9.6.3 A residual risk will remain to groundwater quality associated with the discharge of site-generated surface water runoff to the existing drainage system serving the A350, that in turn will infiltrate runoff to ground. The drainage strategy incorporates robust treatment measures and has been agreed in principle with the EA, LLFA and WW, however a negligible risk will remain that is assigned a slight significance of effect given the high sensitivity of the Principal Aquifer (White Chalk Subgroup) and SPZ. It is therefore recommended that a sampling chamber is provided upstream of the proposed outfall to the A350 drainage system to allow routine monitoring of water quality to be undertaken. Regular inspection and maintenance of the proposed treatment systems, including the petrol and silt interceptor, will also be important to maintain the level of treatment required.

9.7 Summary

- 9.7.1 The Proposed Development lies in an area of low flood risk and no surface water features are identified within 1km of the site. The Site is underlain by Principal Aquifer of the White Chalk Subgroup. The Site is not located within a SPZ, although a SPZ Inner Protection Zone 1 exists for a large abstraction at Hungry Down approximately 2.80km south-east and the boundary for the SPZ extends northwards and is approximately 500m east of the Site. Groundwater level is predicted to be at depth (>10.0mBGL) within the White Chalk Subgroup.
- 9.7.2 Surface water runoff from the Proposed Development will be discharged to the adjacent and existing A350 highway filter drain system that will infiltrate runoff to ground. Part of the drainage system extends to within the SPZ Zone 1. The Proposed Development will incorporate a robust surface water drainage system that will include appropriate pollution control measures in the form of attenuation ponds that will treat all discharge from the Proposed Development, supplemented by a petrol and silt

interceptor serving the higher risk open operator's yard (HRC) area and a vortex separator serving the access roads. No discharge from the WTS building will discharge to the surface water drainage system. An automated penstock will also be included in the event of spillage. The strategy has been approved in principle by the EA, LLFA and WW. However, a residual risk will remain to groundwater quality during operation associated with the discharge of site-generated surface water runoff to ground. It is therefore recommended that a sampling chamber is provided upstream of the proposed outfall to the A350 drainage system to allow routine monitoring of water quality to be undertaken.

- 9.7.3 Surface water runoff from the Proposed Development will be attenuated to a peak rate of approximately 2l/s for all storm events up to the 1:100-year storm + 40% climate change allowance. This rate has been agreed in principle with the EA and LLFA. Review of Site topography also indicates that runoff from the current greenfield site will naturally fall towards the existing A350 highway drainage system and therefore the proposed discharge of surface water runoff to this system will mimic the current situation. Furthermore, the Proposed Development will include reconstruction of the existing drainage system to improve capacity and performance. The Proposed Development is therefore considered to pose negligible flood risk.
- 9.7.4 Potential impacts to water quality and flood risk during construction will be managed through the implementation of a CEMP that will set out how construction activities would be undertaken in accordance with appropriate good practice guidance, such as CIRIA's Control of Water Pollution from Construction Sites (C532). It is also recommended that a construction-stage drainage strategy is developed to manage the potential increase in runoff and control sediment that could reduce the capacity of existing drainage systems.

Appendix 6 EclA

Land adjacent Sunrise Business Park, Blandford Forum

Ecological Impact Assessment Report

prepared on behalf of Assets & Property, Dorset Council
by Nikki Taylor MCIEEM, Nature Conservation Officer, Dorset Council

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Prepared by	Checked by
Nikki Taylor NCO	Dr Annabel King NET Leader

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Summary

This report has been prepared by Nikki Taylor, Nature Conservation Officer on behalf of Assets & Property, Dorset Council. It provides an assessment of the potential ecological impacts associated with a planning application for the development of a new waste management centre within an arable field and updates a preliminary ecological appraisal conducted in 2019 (Dorset Council Natural Environment Team). The development proposals fall under the Environmental Impact Assessment (EIA) although on the advice of Natural England ecology has been scoped out of the EIA. The scope of this Ecological Impact Assessment (EclA) is therefore limited to the potential significant effects from the development to on-site ecological receptors.

An updating desk study and Phase 1 habitat and protected species survey of the application site and wider field within which it is situated were carried out in July 2020. A review of the validity of the initial survey and assessment was also included in the study. It was concluded that no significant changes to the originally recorded baseline conditions have occurred since 2019.

The field is located to the north of the town of Blandford Forum, adjacent to a business park and alongside the Blandford bypass (A350). The River Stour is situated on the opposite side of the town. The Fontmell and Melbury Downs Special Area of Conservation (SAC) lies 8.4km to the north; the Bryanston Site of Special Scientific Interest (SSSI) is 2km to the west and The Milldown Site of Nature Conservation Interest (SNCI) is approximately 600m to the south-west. Additionally, the site is within the Cranborne Chase Area of Outstanding Natural Beauty (AONB) which is a designated Internal Dark Sky Reserve.

A wildlife data search for the area within 2km of the proposed development returns records for badger, hedgehog, bats, otter, Hazel dormouse and barn owl. Due to the proximity of the Bryanston SSSI which is designated primarily for its function as a maternity and hibernation roost for bats, particularly the greater horseshoe bat, a Core Sustainance Zone study is included in this EclA. The open farmland characteristic of the fields adjacent to the development site are recognised on Defra's 'Magic Map' as being important for corn bunting and grey partridge and the site itself for lapwing.

The in-tact, mature hedgerows that form the south-west and north-west boundaries have intrinsic ecological merit but would not be classified as 'important' under the Hedgerows Regulations 1997, according to the Wildlife and Landscape criteria. The hedgerows will be retained except for a section along the south-west boundary which will be removed to create access. Mitigation measures including replacement planting is necessary for the hedge removal and for the protection of the remaining hedgerow against potential impacts from the works as recommended in section 4 of this report.

The north-east and south-east boundaries of the wider field are formed of a continuous plantation woodland strip varying in width from approximately 12m to 18m and consisting of maturing trees with patches of dense bramble scrub and open areas with longer grasses. The woodland boundaries will be retained and are outside of the development footprint being approximately 10m from the development boundary at the nearest point. The woodland contains a variety of trees including native and fruiting species.

The hedgerows, trees and scrub of the woodland offer no roosting opportunities for bats but are likely to be used by bats for foraging and commuting. These areas provide habitat suitable for nesting wild birds including ground nesting species and, whilst considered sub-optimal,

Hazel dormice may be present. Mitigation is therefore recommended in section 4 of the report. The woodland belt along both boundaries will be retained and managed for wildlife in the long-term and precautionary mitigation is recommended to safeguard the woodland during construction.

At the time of the 2020 survey a wheat crop was growing in the field to the base of the hedges with marginal areas limited to the northern and eastern small corners bordering the woodland belt. No presence of ground nesting bird species within these areas was noted during the survey however, several swallows were recorded foraging over the field.

No evidence of badgers using the site was found during the 2019 or 2020 surveys. Habitat suitable for reptiles and amphibians is limited to terrestrial habitat within the woodland and at the base of the hedgerows. Some debris was found along the border to the business park which would provide shelter but there is no standing water for breeding within the development site or wider field. They are not likely to be present within the development area and the field is considered unlikely to be of particular value for any other species or groups.

The proposed development is confined to the south and west of the field and is assessed as having a low, short-term impact on the site's ecological receptors. Artificial lighting must be designed to avoid impacts on bats, taking particular account of commuting greater horseshoe bats, and other wildlife. Most of the habitats will be retained and protected during the works. The removal of part of the south-west boundary hedgerow will require mitigation and the landscape design additionally includes the creation of areas of wildflower meadow and native planting along with two new ponds and a swale all of which will be designed and managed to benefit wildlife. On-going management of the woodland, hedgerows and all newly created wildlife habitats must be detailed within a Landscape and Ecological Management Plan (LEMP).

Whilst the development falls under the Environmental Impact Assessment Regulations (2017) and therefore would not normally trigger the criteria of the Dorset Biodiversity Appraisal Protocol (DBAP), it is recommended that the mitigation and biodiversity net gain measures described in this report are secured by way of an approved DBAP Biodiversity Plan.

Assuming effective implementation of the recommendations within this report the proposed development is in accordance with relevant planning policies in relation to nature conservation and relevant wildlife legislation.

1. Introduction

Background

1.1 The scope of this study was to undertake an Ecological Impact Assessment (EclA) of a field to the north-east of the town of Blandford Forum and provide an assessment of the likely ecological impacts from the proposed Blandford Waste Management Centre development. The area considered by this assessment includes the entire field, beyond the development area, and its boundaries (Appendix 2). This report presents the findings and conclusions of the EclA with a set of recommendations to inform the scheme in order to: a) mitigate the potential impacts of the development on the site's identified ecological interests and b) to describe biodiversity net gain provisions, as commissioned by Dorset Council's Assets and Property division. This report replaces the previous *Preliminary Ecological Appraisal Report Land adjacent Sunrise Business Park, Blandford Forum* (Dorset Council Natural Environment Team, March 2019).

1.2 The objectives of the survey were to search for and identify protected species and habitats within the site that will be affected by the development, as well as identify any ecological interests in the immediate vicinity which may have a bearing on the proposed development.

1.3 A number of species and habitats are afforded protection under UK and European wildlife legislation. Protected species are a material consideration under planning law and local authorities are expected to consider species and habitats listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006), in their decision making where there may be impacts on the protected species or habitats. A summary of the relevant wildlife legislation and planning policy is given in Appendix 1.

1.4 Following the survey, recommendations have been made based on the mitigation hierarchy as set out within the National Planning Policy Framework (NPPF), (2019): to avoid impacts where possible, to mitigate against impacts if they cannot be avoided, and provide compensation if mitigation is not possible.

1.5 Potential enhancements are also recommended so that the works are compliant with the latest Dorset Biodiversity Appraisal Protocol guidance; the Dorset Pollinators Action Plan 2019-2024 and the NPPF (2019) which identifies how the planning system should contribute to and enhance the natural and local environment including by '*minimising impacts on biodiversity and providing net gains in biodiversity*' (Paragraph 170), and to take account of the principles of biodiversity net gain (Defra, July 2019) and the provisions for such set out in the draft Environment Bill.

Site description and context

1.6 The site is 3.55ha and consists of a field located just to the north of Blandford Forum. It sits south of the Sunrise Business Park and to the north-east of the Blandford bypass (A350) from which there is an existing gated entrance. The land is used for agriculture and is bounded by mature hedgerows and a plantation woodland belt. The nearest watercourse is the River Stour which is situated on the opposite side of the town. The nearest European designated site is Fontmell and Melbury Downs Special Area of Conservation (SAC) 8.4km to the north, the nearest UK wildlife site is Bryanston Site of Special Scientific Interest (SSSI) 2km to the west and the nearest County wildlife site is The Milldown Site of Nature Conservation Interest (SNCI) approximately 600m to the south-west. Additionally, the site is within the Cranborne Chase Area of Outstanding Natural Beauty (AONB) which is a designated International Dark Sky Reserve.

Description of the proposals

1.7 The proposed development involves a full planning application to construct a household recycling centre and waste transfer station comprising a self-contained 'barn' designed to contain all waste management activity along with associated traffic circulation route; parking areas and a landscaping scheme. Access will be created by removing a section of hedge along the south-west boundary with the A350.

1.8 The indicative layout of the development allows the impacts on the site's ecology to be minimised by:

- appropriate environmental protection and mitigation measures that are fully integrated into the project to ensure that impacts on key ecological receptors are avoided where possible;
- retention of most the site's boundary features;
- retention of the plantation woodland belt along the north-east and south-east boundaries of the wider field
- a dark skies strategy.

1.9 The proposals do not involve the demolition of any structures.

2. Methodology

2.1 This EclA followed the steps within *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (2019), CIEEM and summarised in Table 1:

Table 1. EclA steps (detailed in CIEEM 2019)

Step	Description
Scoping	Determining the matters to be addressed in the EclA to ensure the most effective input to defining the scope. Scoping is an ongoing process; the scope of the EclA may be modified following further ecological survey /research and during impact assessment.
Establishing the baseline	Collecting information and describing the ecological conditions in the absence of the proposed project, to inform the assessment of impacts.
Important ecological features	Identifying important ecological features (habitats and species) that may be affected, with reference to a geographical context in which they are considered important.
Impact assessment	An assessment of whether important ecological features may be subject to potential impacts and characterisation of these impacts and their effects. Assessment of potential residual ecological impacts of the project remaining after mitigation and the significance of their effects, including cumulative effects.
Application of the mitigation hierarchy (avoidance; mitigation; compensation) and biodiversity net gain	Incorporating measures to avoid, reduce and/or compensate potential ecological impacts, and the provision of ecological enhancements.
Monitoring	Monitoring impacts of the development and evaluation of the success of proposed mitigation, compensation and net gain measures.

Desk study

2.2 A desktop study review was carried out in July 2020 using information from the Dorset Environmental Records Centre (DERC) for protected and notable species and priority habitats; including non-statutory designated nature conservation sites (based on the likely zone of influence (CIEEM, 2019) of such features). The study included records for the site and its surroundings to 2km for protected wildlife and species of conservation concern and 8km for Annex II (Habitat and Species Directive) listed species from the site's central grid reference. Statutory designated sites within 5km and sites of local wildlife interest with 2km of the site were included in the study. The search parameters were selected to include the likely zone of influence of effects upon designated sites and protected and notable species.

2.3 In addition, information relating to statutory designated nature conservation sites within 10km of the site was obtained from Defra's 'MAGIC Map' and 'Nature on the Map' websites and Ancient Woodland Inventory data from within 1km of the site.

Zone of influence

2.4 The zone of influence is the area over which ecological features may be subject to significant effects as a result of the proposed development and associated activities. The zone of influence will vary with different ecological features, depending on their sensitivities to an environmental change. In line with CIEEM guidelines (2019), professionally accredited or published studies have been used to determine zone of influence for different habitat and fauna species e.g. Natural England's mapped SSSI Impact Risk Zones. For the purposes of this EclA, the zones established are detailed as set out above.

2.5 The results of professionally accredited or published studies have been used and referenced, where available, to establish the spatial and temporal limits of the biophysical changes likely to be caused by specific activities, and to justify decisions about the zone of influence.

Consultation and reference documents

2.6 Natural England's initial consultation response (29th April 2020) stated that ecological assessment should be included under the Environmental Impact Assessment (EIA) and included the following specific advice:

- identification of key ecological receptors and provision of advice on scheme design to ensure that potential impacts on same are avoided where at all possible;
- completion of any required habitats/species specific surveys which have seasonal restrictions;
- to avoid if possible, adverse impact on sensitive areas for wildlife within the site, and if possible, provide opportunities for overall wildlife gain;
- the requirement for survey and impact assessment on protected species and Habitats and Species of Principle Importance (S41 of the Natural Environment and Rural Communities (NERC) Act 2006);
- field survey(s) and report preparation carried out by appropriately qualified and experienced ecologist(s) and that the relevant experience of consultant ecologists should be presented within the report and in accordance with CIEEM Guidelines for Impact Assessment in the UK and Ireland (2019);
- the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement;
- consideration of the Bryanston SSSI and the core sustenance zone (of greater horseshoe bats) surrounding the roost to be considered as functionally linked land under the Habitat Regulations 2017 for the purposes of the EIA. The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within this site and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects;
- the Environmental Statement should include an assessment of the likely impacts on the wildlife and geodiversity interests of regionally and locally important sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures.

2.7 Since their initial response, Natural England revised their opinion and concluded that these ecological considerations can be addressed outside of the EIA framework (*Scoping Opinion of Dorset Council*, May 2020). Therefore, the above listed specific advice is taken into account in this EclA.

2.8 Two further key reference documents were reviewed to inform the EclA with particular regard to the site's likely importance to the Bryanston SSSI greater horseshoe bat colony. These are *Ecological Report for Blandford School*, 27th April 2012 undertaken by Dorset County Council Natural Environment Team (DCC NET) and *Ecological Survey Report for Blandford School*, 17th October 2012, incorporating targeted phase 2 bat activity and reptile surveys, also carried out by DCC NET.

Approach to air pollution

2.9 An Air Quality Assessment, to evaluate the potential for effects, either alone or in-combination, with specific regard to nitrogen oxides and nutrient nitrogen, on the Fontmell and Melbury Downs Special Area of Conservation (SAC), will be included within the Environmental Statement. Pollution effects from the proposed development are therefore outside of the scope of this EclA based on advice from Natural England that ecological impacts can be scoped out of the Environmental Statement. European sites are not considered further in this report.

Impact assessment

2.10 Significance has been determined by the geographic frame of reference recommended for EclA by CIEEM (2019). The geographic frame of reference provides a good fit to assessments of biodiversity impacts because it allows clear judgements to be made about the scale of significance, with reference to published estimates for the population size of a given species at county, national and/or international scales or areas of habitats at such scales.

2.10 Also in accordance with the CIEEM (2019) EclA guidelines, likely potential impacts were characterised by considering the parameters shown in Table 2 below. Potential impacts may occur during construction or operation of a development and may be indirect as well as direct. Direct impacts are directly attributable to an action associated with a development. Indirect impacts are often produced away from a development, or as a result of other initial impacts. More than one potential impact acting on a receptor simultaneously may have a cumulative impact that is greater than when the same impacts act in isolation. Cumulative impacts may entail the assessment of all the impacts of the scheme upon a feature such as impacts at the construction and operation stage taken together, or the combined impacts from other schemes that would affect the same area.

Table 2. Characteristics of ecological impacts (adapted from CIEEM, 2019)

Potential impact parameter	Description
Type of change	Potential impacts can have a <i>positive</i> or <i>negative</i> effect on the environment.
Magnitude	Magnitude can be measured in many ways such as the spatial or geographical area over which the impact may occur, or the size of a population impacted.
Duration	Effects may be described as temporary, short, medium, long-term or permanent. This is both in terms of loss of habitat and level of impact on a particular species.
Frequency and timing	The number of times an activity occurs will influence the resulting effect. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bird nesting season.
Significance	Potential impacts are either significant or non-significant.

Field survey

2.12 The updating Phase 1 habitat and protected species survey was carried out by Nikki Taylor (MCIEEM) during July 2020 in good weather conditions. The survey identified the dominant habitat types using methodology recommended by Natural England (Joint Nature Conservation Committee, 2010). The main species of plants and trees and their abundance were noted using the DAFOR (Dominant; Abundant; Frequent; Occasional; Rare (and Local used as a prefix) botanical scale. Trees were surveyed for features defining ancient, veteran and notable (Fay. N, 2007) and (The Woodland Trust, 2008) and hedges for the classification as 'important' under the Hedgerow Regulations (1997).

2.13 Habitat with intrinsic value and the potential for protected species was searched for along with protected species and signs of their presence. The methodology used to search this site and assess its ecological features is consistent with relevant best practice guidance such as *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd ed.* (2016) The Bat Conservation Trust; *Valuing Bats in Ecological Impact Assessment*, Wray et al, (2010) and in consideration of the relevant wildlife legislation such as the Protection of Badgers Act (1992), Wildlife and Countryside Act (as amended) (1981) and the Conservation of Natural Habitats and Species Regulations 2017 (EU Exit 2019).

2.14 Trees were inspected for evidence of use by bat and nesting birds and trees were further assessed for their potential to support roosting bats. The value of the site's features for foraging and commuting bats and ground nesting birds was also appraised.

2.15 Hedges were assessed for their suitability to support Hazel dormice and a targeted search for badger setts and evidence of badgers was performed.

2.16 The survey also included the assessment of the site's potential use by reptiles, amphibians, wild birds, other mammals and invertebrates.

2.17 Phase 2 surveys for bats and targeted survey for Hazel dormice and reptiles were not undertaken based upon the conclusions from the desk study review of previous Phase 2 bat surveys in the area and the development's predicted low level of impact.

Quality assurance

2.17 All ecologists in the Natural Environment Team are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Code of Professional Conduct (2019) published by CIEEM when undertaking ecological work.

2.18 This report has been prepared in accordance with the relevant British Standards: BS4020:2013 *Biodiversity: Code of Practice for Planning and Development*.

Survey limitations

2.19 Surveys offer only a single 'snapshot' of a site and take no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time, a lack of signs of any particular species does not confirm its absence but merely that there was no indication of its presence during the survey.

2.20 Bats are very small creatures, capable of hiding themselves in extremely small spaces and it is possible that these animals, or their signs, might have been missed during the survey if they are normally present opportunistically or in small numbers for a short period each year.

2.21 Not all features in trees or buildings suitable for use by bats are visible from the ground and there can be no external evidence of use of features by bats; consequently, it is only possible to make a best effort when carrying out such a survey.

2.22 The survey was conducted within the optimal period for habitat and botanical assessment however, some earlier flowering species may not have been evident.

2.23 This report is valid for twelve months from the date of the report, after which the findings of this survey should be reviewed and may need to be updated. Changes to the development design will also trigger the requirement to re-assess the potential impacts and requirement for mitigation. After three years, the findings will be out of date and the full survey and EclA should be repeated.

3. Results describing the baseline ecological conditions

Desk study

3.1 The results of the DERC data search and internet resources are presented below.

Designated nature conservation sites

3.2 There are no designated nature conservation sites covering any part of the site or immediately adjacent to its boundaries.

3.3 There are no Natura 2000 designated sites within 5km of the site. The nearest is Fontmell and Melbury Downs Special Area of Conservation (SAC) which is just over 8km to the north.

3.4 Bryanston Site of Special Scientific Interest (SSSI) is just under 2km to the west and therefore, the site is within the 10km Bryanston SSSI DC NET consultation zone.

3.5 There are three Site of Nature Conservation Interest sites within 2km. The nearest, approximately 600m to the south-west, is The Milldown which is an area of unimproved chalk grassland and semi-improved neutral grassland measuring 13.36ha. Approximately 800m to the south-east is Blandford Bypass which is 0.8ha of roadside verge with botanical interest. Further to the west by approximately 2km is Bryanston Wood which is 3.4ha of semi-natural deciduous woodland.

3.6 These designations are described, within their respective zones of influence, along with their geographic context of importance in Table 3 below:

Table 3. Statutory and non-statutory designations within data search radii

Site name & designation	Distance & direction from survey area	Brief description of site designation
Internationally Important Statutory Designations within 5km		
Fontmell & Melbury Downs SAC	c.8km north	The sites lie within the Cranborne Chase AONB protected landscape and annotated within the Integrated Landscape Character Assessment as <i>Open Chalk Downland</i> , Character Area: 2B <i>Southern Downland Belt</i> within that type. This area adjoins the Melbury to Blandford Chalk Escarpment Landscape Character Area. Qualifying habitats: <ul style="list-style-type: none"> • H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>). Qualifying Species: <ul style="list-style-type: none"> • S1654. Early gentian (<i>Gentianella anglica</i>)
Nationally Important Statutory Designations within 2km		
Bryanston SSSI	c.2km west	The SSSI is designated primarily for its use by breeding and hibernating bats and in particular greater horseshoe (<i>Rhinolophus ferrumequinum</i>) (listed on Annex II of the Habitats Directive) bats.
Non-statutory County important designation sites within 2km		
The Milldown SNCI & Local Nature Reserve (LNR)	c.600m south-west	A remnant of unimproved chalk grassland and semi-improved neutral grassland.
Blandford Bypass SNCI	c.800m south-east	Road verge noted for neutral and acid grassland plant species.
Bryanston Wood SNCI	c.2km west	Semi-natural deciduous woodland.

Importance

3.7 Further consideration (3.11 below and in section 4) has been given to Bryanston SSSI, notified for breeding greater horseshoe bats.

3.8 Due to lack of habitat connectivity, distance and absence of public rights of way between the application site and the identified non-statutory sites within the search criteria, significant adverse ecological impacts are not expected upon these sites and they are not considered further in this report.

Notable flora records

3.9 The DERC search returned records for four Nationally Scarce lichens one of which; *Thelopsis rubella* is a Dorset Notable plant species however it does not occur in habitats that are within the development area. Three further records for Dorset Notable plants species were also returned; bluebell (*Hyacinthoides non-scripta*), wild pansy (*Viola tricolor*) and wood-sorrel (*Oxalis acetosella*). Whilst the records indicate potential for these species to be present on-site, none of these were recorded during the survey.

Protected and notable species records

3.10 DERC returned the following (Table 4) protected and notable species records within 2km of the site for the last ten years. Records of greater horseshoe bats are from an 8km radius from the site.

Table 4. Protected and notable species record summary within the data search radii

Common name	Scientific name	Status	Location
Amphibians and reptiles			
Common lizard	<i>Zootoca vivipara</i>	Schedule 5: Wildlife & Countryside Act (WCA) 1981. S41 Natural Environment & Rural Communities Act (NERC) 2006. UK Biodiversity Action Plan (UK BAP)	1 record within 2km
Common toad	<i>Bufo bufo</i>	Sch. 5 WCA; S41 NERC, UK BAP	1 record within 2km
Slow worm	<i>Anguis fragilis</i>	Sch. 5 WCA, S41 NERC, UK BAP	2 records within 2km
Bats			
Long-eared sp.	<i>Plecotus sp.</i>	Schedule 2 Conservation of Habitats and Species Regulations 2017 (Habs Regs), Conservation Sch. 5 WCA; S41 NERC, UK BAP	1 record within 2km
Brown long-eared	<i>Plecotus auritus</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	2 records within 2km
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	4 records within 2km
Leisler's	<i>Nyctalus leisleri</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	1 record within 2km
Natterer's	<i>Myotis nattereri</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	1 record within 2km
Noctule	<i>Nyctalus noctula</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	4 records within 2km
Serotine	<i>Eptesicus serotinus</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	2 records within 2km
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	3 records within 2km
Annex II (Habitat & Species Directive 1992) bat			
Greater horseshoe	<i>Rhinolophus ferrumequinum</i>	Habs Dir, Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	5 records within 8km
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	Habs Dir, Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	3 records within 8km
Bechstein's	<i>Myotis bechsteinii</i>	Habs Dir, Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	2 records within 8km
Barbastelle	<i>Barbastella barbastellus</i>	Habs Dir, Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	1 record within 8km

Common name	Scientific name	Status	Location
Other mammals			
Eurasian badger	<i>Meles meles</i>	Protection of Badgers Act, 1992	5 records within 2km
European otter	<i>Lutra lutra</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	4 records within 2km
Hazel dormouse	<i>Muscardinus avellanarius</i>	Sch. 2 Habs Regs, Sch. 5 WCA, S41 NERC, UK BAP	1 record within 2km
Western European hedgehog	<i>Erinaceus europaeus</i>	Sch. 5 WCA, S41 NERC, UK BAP	55 records within 2km
Birds			
Barn owl	<i>Tyto alba</i>	Sch. 1 WCA, Birds of Conservation Concern Green listed	1 record within 2km
Kestrel	<i>Falco tinnunculus</i>	Sch. 1 WCA, BoCC Amber	1 record within 2km
Linnet	<i>Linaria cannabina</i>	Sch. 1 WCA, S41 NERC, BoCC Red	1 record within 2km
Song thrush	<i>Turdus philomelos</i>	Sch. 1 WCA, S41 NERC, BoCC Red	1 record within 2km
Swift	<i>Apus apus</i>	Sch. 1 WCA, BoCC Amber	1 record within 2km
Yellowhammer	<i>Emberiza citrinella</i>	Sch. 1 WCA, S41 NERC, BoCC Red	1 record within 2km

3.11 In addition to the above, numerous records for invertebrates were returned from the search, most notably the endangered barberry carpet moth (*Pareulype berberata*). Records of butterflies included white-letter hairstreak (*Satyrrium w-album*); white admiral (*Limenitis Camilla*) which is a Dorset Notable species; and small heath (*Coenonympha pamphilus*). All four species are listed as Species of Principle Importance under the NERC Act. It is considered unlikely that the site is of value to these species given the lack of suitable tree and plant species and habitats they require within the development area and none are therefore considered further in this assessment.

3.12 The records of protected and notable species listed in Table 4 above, highlight the increased likelihood of them being present within the site where suitable habitat has been identified, this is however, confined to the hedgerows and woodland belt.

Great horseshoe bat Core Sustenance Zone study and foraging and commuting habitat evaluation

3.13 The proximity of Bryanston SSSI is highlighted by the data search which also returned a number of records for a range of other bat species. The SSSI is designated for its bat interest, in particular the site supports both breeding and hibernating colonies of greater and lesser horseshoe bat species. Numbers of greater horseshoe have increased at the site with a peak count of 200 adults and approximately 100 young in 2009.

3.14 As the development site is within 2km of Bryanston SSSI a Core Sustenance Zone (CSZ) assessment for greater horseshoe bats has been undertaken. The assessment includes the conclusions of bat activity surveys conducted in 2012 by DC NET as part of an ecological assessment for a new synthetic sports pitch in the grounds of Blandford School which is within 500m of the Bryanston SSSI bat roost and just 150m from the River Stour. In summary, the surveys recorded just two passes of greater horseshoe bat over the entire survey period. The survey report (*Ecological Survey Report for The Blandford School*, October 2012) concludes that as the species is strongly associated with woodland and cattle-grazed pasture the lack of recorded passes could be afforded to the species preference for the nearby wooded river corridor. Other species, notably pipistrelle, were recorded using the school field. The assessment noted the geographic proximity of other sites likely to be of particular value to foraging bats, namely The Milldown Local Nature Reserve and the North Dorset Trailway, in addition to the riparian corridor.

3.15 The Bat Conservation Trust survey guidelines (2016) state that the CSZ for greater horseshoe bats is 3km with a 'moderate' confidence level based on the number of studies conducted. Other published guidance varies from this and for this CSZ assessment the technical guidance (*Guidance on Development Version 1.2*, March 2018) for the North Somerset and Mendip Bats Special Area of Conservation (SAC) has been used. The research underpinning this guidance indicates that suitable foraging habitat within 2.2km (referred to as Zone A) of a maternity greater horseshoe bat roost is of high importance; that foraging habitat up to 4km (Zone B) is also key and foraging habitat up to 8km (Zone C) supports breeding populations.

3.16 The development site is closest to the Bryanston greater horseshoe maternity roost at its south-west boundary which is 1.98km. This places the development site within range of the most important foraging zone for greater horseshoe bats from the Bryanston roost (Figure 1).

3.17 A further four records for non-breeding roosts are within 10km of the site, the nearest being 4.87km to the south-west. CSZs are also relevant to non-breeding roosts however these extend to foraging grounds within 2.4km. The other records, all being at least 4km distant, have therefore been scoped out of the CSZ study.

3.18 In addition to the CSZ study, a methodology (Wray *et al*, 2010) for considering the importance of foraging grounds and commuting routes for all bat species has been applied as part of this EclA. The methodology uses a range of factors such as the species and numbers of bats; presence of nearby roosts and the characteristics of habitats to produce a score indicating the level of importance. This scoring system defines the level of importance as:

- 0-10 = not valuable
- 11-20 = locally valuable
- 21-30 = important at county level
- 31-40 = important at regional level
- 41-50 = nationally important

- >50 = internationally important

3.19 The value of the site as bat foraging and commuting habitat using the scoring system (Wray *et al*, 2010) is set out in tables 5 and 6 and assumes individual greater horseshoe bats as recorded during the 2012 survey of the school grounds much closer to the Bryanston SSSI maternity roost and the number of bat records returned from the data search for other species:

Table 5. Score for commuting habitat

Species	No. of bats	Roosts/potential roosts nearby	Commuting habitat characteristics
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number (10)	Moderate number/ not known (4)	Walls, gappy or failed hedgerows, isolated well-grown hedgerows and moderate field sizes (3)
-	-	Large number or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)
Rarest (20)	Large number (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and river/streams
20	5	5	4 Total score for GHS = 34
2	10	4	4 Total score for other bats = 20

Table 6. Score for foraging habitat

Species	No. of bats	Roosts/potential roosts nearby	Commuting habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without vegetation (1)
-	-	Small number (3)	Urban areas or intensive arable land (2)
Rarer (5)	Small number (10)	Moderate number/ not known (4)	Isolated woodland patches, less intensive arable land and small towns/villages (3)
-	-	Large number or close to a SSSI for the species (5)	Larger connected woodland blocks, mixed agriculture and/or small villages/hamlets (4)
Rarest (20)	Large number (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)
20	5	5	2 Total score for GHS = 32
2	10	4	3 Total score for other bats = 19

Importance

3.20 The scores above indicate that the foraging and commuting habitat of the development site to be 'locally valuable' for bats generally and of 'regional importance' for greater horseshoe bats. However, it is the more suitable habitat surrounding the Bryanston SSSI roost that is actually considered to be regionally important rather than the habitat associated with the development site. Whilst the woodland belt is not currently subject to artificial lighting, the development site is located across the town from the Bryanston SSSI roost and the two hedgerows are adjacent to lit urban and industrial environments and transport routes. The interior of the field is an intensive single arable crop offering restricted foraging. The development site and area lost to the development is therefore, considered to be of 'local' value for feeding and navigating greater horseshoe and other bat species. The majority of the hedgerows and all of the woodland belt will be retained and enhanced. The woodland will remain unaffected by lighting which will be subject to a restricted lighting regime in order to comply with the AONB dark sky requirements.

Field survey

3.21 The results of the updating field survey are presented below and illustrated in a Phase 1 habitat map which shows the habitats recorded during the survey and highlights areas of particular ecological interest with 'target notes' in Appendix 2. The site comprises mostly arable land (Target note 1) with hedgerows and a plantation broadleaved woodland belt (Target note 2).

Plants and habitats

3.22 At the time of the survey, the field had a wheat crop cultivated to the base of the hedgerows. Small areas of longer improved grass and bare ground occur at the entrance to the field and its northern and eastern corners (Appendix 2). Plants recorded within the improved grassland are reproduced in the table below:

Table 7. Species recorded within the improved grassland areas

Common name	Scientific name	Abundance	Status
Grasses, sedges, rushes and ferns			
Perennial ryegrass	<i>Lolium perenne</i>	D	Common & widespread
False oat grass	<i>Arrhenatherum elatius</i>	F	Common & widespread
Creeping bent	<i>Agrostis stolonifera</i>	F	Common & widespread
Wild oat-grass	<i>Avena fatua</i>	R	Common & widespread
Smooth meadow-grass	<i>Poa pratensis</i>	O	Common in dry grasslands, roadsides & waste places
Herbaceous plants			
Charlock	<i>Sinapis arvensis</i>	R	Common in field borders and arable land
Burdock	<i>Arctium minus</i>	R	Common & widespread
Groundsel	<i>Senecio vulgaris</i>	R	Common & widespread
Field bindweed	<i>Convolvulus arvensis</i>	R	Common & widespread
Field forget-me-not	<i>Myosotis arvensis</i>	R	Common & widespread
Nipplewort	<i>Lapsana communis</i>	R	Common & widespread
Scentless mayweed	<i>Tripleurospermum</i>		Common, bare &

	<i>inodorum</i>		disturbed ground
Scarlet pimpernel	<i>Anagallis arvensis</i>	O	Common, disturbed ground
Common poppy	<i>Papaver rhoeas</i>	R	Common, disturbed ground
Common field speedwell	<i>Veronica persica</i>	R	Common, cultivated ground
Smooth sow-thistle	<i>Sonchus oleraceus</i>	R	Common & widespread; disturbed ground
Sun spurge	<i>Euphorbia helioscopia</i>	R	Common in cultivated & waste grounds

Importance

3.23 Given its heavy management and lack of botanical species diversity, the arable land and small areas of improved grassland are considered to have negligible ecological value.

3.24 Additionally, plants were recorded within poor semi-improved grassland of the road verge; between the south-west boundary hedgerow and the A350 (Appendix 2), which will be impacted by the proposal to create access, and these are reproduced in the table below:

Table 8. Species recorded within the road verge

Common name	Scientific name	Abundance	Status
Grasses, sedges, rushes and ferns			
Perennial ryegrass	<i>Lolium perenne</i>	D	Common & widespread
False oat grass	<i>Arrhenatherum elatius</i>	F	Common & widespread
Cock's-foot	<i>Dactylis glomerata</i>	O	Common & widespread
Yorkshire fog	<i>Holcus lanatus</i>	R	Common & widespread
Smooth meadow-grass	<i>Poa pratensis</i>	O	Common in dry grasslands, roadsides & waste places
Herbaceous plants			
Broadleaf plantain	<i>Plantago major</i>	O	Common & widespread
Common hogweed	<i>Heracleum sphondylium</i>	R	
Cleavers	<i>Galium aparine</i>	O	Common & widespread
Common ragwort	<i>Senecio jacobaea</i>	O	Common & widespread
Common vetch	<i>Vicia sativa</i>	R	Common & widespread
Fat hen	<i>Chenopodium album</i>	R	Common & widespread
Field bindweed	<i>Convolvulus arvensis</i>	R	Common & widespread
Fool's parsley	<i>Aethusa cynapium</i>	O	Common & widespread in cultivated ground
Red campion	<i>Silene dioica</i>	R	Common, disturbed ground
Ribwort plantain	<i>Plantago lanceolata</i>	O	Common & widespread
Yarrow	<i>Achilla millefolium</i>	R	Common & widespread

Importance

3.25 The poor semi-improved grassland consists of common grasses and herb species. No particular trophic conditions have been identified and the notable species present within the calcareous and neutral sward of the Blandford Bypass SNCI (approximately 800m along the A350 to the south-east), were not recorded during the survey. Given the small extent of the grassland and limited species diversity, the grassland present within the verge would not meet the criteria for any Section 41 Priority Habitat, nor would it meet the selection criteria for County wildlife sites in Dorset. This habitat is therefore not considered to be of significant ecological importance. Nevertheless, the loss of a section of the verge is discussed in section 4.

Hedgerows

3.26 The development site is bordered by fenced species-poor, managed native hedgerows on two boundaries. The hedgerows tend to be dominated by hawthorn (*Crataegus monogyna*) with occasional sycamore (*Acer pseudoplatanus*) and field maple (*Acer campestre*) and an ash (*Fraxinus excelsior*) and introduced species. Hedgerows have been numbered within the Phase 1 habitat map (in Appendix 2).

3.27 Hedgerow 1 runs along the south-west perimeter and is an in-tact, species-poor mature hedge managed to approximately 3m high, 2m wide and 300m long. This hedge comprises mostly native species; a list of which including plants associated with the hedge base, together with abundances, are provided in the table below:

Table 9. Species recorded associated with H1

Common name	Scientific name	Abundance	Status
Grasses, sedges, rushes and ferns			
Perennial ryegrass	<i>Lolium perenne</i>	D	Common & widespread
False oat grass	<i>Arrhenatherum elatius</i>	F	Common & widespread
Woody shrubs and trees			
Hawthorn	<i>Crataegus monogyna</i>	D	Common & widespread
Ash	<i>Fraxinus excelsior</i>	R	Common & widespread
Field maple	<i>Acer campestre</i>	R	Common & widespread
Sycamore	<i>Acer pseudoplatanus</i>	R	Common & widespread
Walnut	<i>Juglans regia</i>	R	Non-native
Herbaceous plants			
Common hogweed	<i>Heracleum sphondylium</i>	R	Common & widespread
Bramble	<i>Rubus Fruiticosus agg.</i>	F	Common & widespread
Dog rose	<i>Rosa canania</i>	R	Common & widespread
Cleavers	<i>Galium aparine</i>	O	Common & widespread
Garlic mustard	<i>Alliaria petiolata</i>	R	Common & widespread
Hedge mustard	<i>Sisymbrium officinale</i>	R	Common & widespread
Hedge bindweed	<i>Calystegia sepium</i>	R	Common & widespread
Fool's parsley	<i>Aethusa cynapium</i>	O	Common & widespread in cultivated ground
Ivy	<i>Hedera helix</i>	F	Common & widespread

Nettles	<i>Urtica dioica</i>	R	Common & widespread
Bittersweet	<i>Solanum dulcamara</i>	R	Common & widespread
Spear thistle	<i>Cirsium vulgare</i>	R	Common & widespread

3.28 Hedgerow 2 forms the north-west boundary and is approximately 3m high rising to 5m at the eastern end; 2m wide and 197m long. The hedge is in-tact and mature and comprises native and non-native species as listed below:

Table 10. Species recorded associated with H2

Common name	Scientific name	Abundance	Status
Grasses, sedges, rushes and ferns			
Perennial ryegrass	<i>Lolium perenne</i>	D	Common & widespread
False oat grass	<i>Arrhenatherum elatius</i>	O	Common & widespread
Woody shrubs and trees			
Hawthorn	<i>Crataegus monogyna</i>	D	Common & widespread
Field maple	<i>Acer campestre</i>	R	Common & widespread
Horse chestnut	<i>Aesculus hippocastanum</i>	R	Non-native
Sycamore	<i>Acer pseudoplatanus</i>	R	Common & widespread
Elder	<i>Sambucus nigra</i>	R	Common & widespread
Holly	<i>Ilex aquifolium</i>	R	Common & widespread
Herbaceous plants			
Common hogweed	<i>Heracleum sphondylium</i>	R	Common & widespread
Bramble	<i>Rubus Fruiticosus agg.</i>	F	Common & widespread
Burdock	<i>Arctium minus</i>	R	Common & widespread
Dog rose	<i>Rosa canania</i>	R	Common & widespread
Cleavers	<i>Galium aparine</i>	O	Common & widespread
Fool's parsley	<i>Aethusa cynapium</i>	O	Common in cultivated and waste grounds
Lords-and-ladies	<i>Arum maculatum</i>	R	Common, mostly on calcareous or richer soils
Snowberry	<i>Symphoricarpos albus</i>	R	Non-native
Ivy	<i>Hedera helix</i>	F	Common & widespread
Nettles	<i>Urtica dioica</i>	F	Common & widespread
Buddleia	<i>Buddleia sp.</i>	R	Non-native
Honeysuckle	<i>Lonicera sp.</i>	R	Common & widespread
Periwinkle	<i>Vinca sp.</i>	R	Non-native
Montbretia	<i>Crocsmia x crocosmiiflora</i>	R	Non-native Schedule 9 invasive species

Importance

3.29 Due to a lack of native species and other features, neither hedgerow would qualify as 'important' under Wildlife and Landscape criteria of the Hedgerows Regulations 1997. However, hedgerows are a Dorset Biodiversity Action Plan priority habitat; listed as a Habitat of Principle Importance in England under section 41 of the NERC Act (2006) and as the site

hedgerows are largely native, are a UK BAP habitat. As such, the hedgerows are considered to be of moderate ecological value and likely to support a range of wildlife. Recommendations for the removal of part of the hedgerow on the south-west boundary are therefore made in section 4.

Plantation woodland (Target note 2)

3.30 Beyond the development area but within the zone of influence, the field features a plantation woodland belt along its north-east and south-east perimeters. Maturing broadleaved trees stand above open areas of tussocky grass and small patches of dense bramble scrub. There are no ancient, veteran or notable trees present within the plantation woodland belt. The woodland strips are fenced with posts and wire. Species recorded within this habitat include: field maple (*Acer campestre*), silver birch (*Betula pendula*), goat willow (*Salix caprea*), ash, beech (*Fagus sylvatica*), white poplar (*Populus alba*), plum (*Prunus* sp.), sweet chestnut (*Castanea sativa*), aspen (*Populus tremula*), rowan (*Sorbus aucuparia*) and oak (*Quercus robur*).

Importance

3.31 The plantation woodland comprises a range of maturing common and widespread native species. Given that it adds habitat structure to the site, it is considered to be of moderate ecological value, which is likely to increase and has the potential to be enhanced through sympathetic management. Recommendations are set out in section 4.

3.32 There are no ditches or standing water and the site does not support wetland vegetation.

3.33 The habitat features described are illustrated by the Phase 1 habitat map in Appendix 2.

Bats

3.34 There are records for 12 species of bat within 2km of the site and the use of the site by navigating and foraging bats is discussed in 3.20 above. There are no known roosts within or directly adjacent to the site. The trees within the hedgerows and woodland belt lacked Potential Roost Features suitable for use by roosting bats and there are no structures on-site to support bat roosts. Mitigation to avoid impacts to bat activity are given in section 4.

Hazel dormice

3.35 DERC provided a single record for Hazel dormice (*Muscardinus avellanarius*) from within the search area although none for the site itself. The site's hedgerows are generally species-poor with limited successional food and nesting resources and are consequently considered sub-optimal habitat and therefore unlikely to support Hazel dormice. The hedges do, however, connect to the woodland belt which has greater diversity with patches of bramble. Connectivity with suitable habitat beyond the site boundary is also limited. Precautionary measures are recommended in section 4 for the removal of a section of boundary hedge.

Badgers

3.36 Five records for badger were returned from the data search however only a single small mammal hole was evident during the 2020 survey. This is thought to be from rabbit digging given its shape and dimension and the presence of rabbit droppings near-by. No badger sett entrances, or other evidence of badger activity was found. The site's setting on the urban fringe provides potential for sett excavation and foraging and dispersing badgers within the area. Badgers are protected under the Protection of Badgers Act 1992 and are therefore included in the assessment of effects in the context of this legislation, with precautionary mitigation specified in section 4.

Other mammals

3.37 There are numerous records for west-European hedgehog (*Erinaceus europaeus*) within 2km of the site nearly all of which are associated with Blandford town. No evidence of hedgehog was found during the survey and given the intensive cultivation of the field and high degree of disturbance from the neighbouring business park, there is a lack of foraging and refuge opportunities for this species. Any unidentified populations of hedgehog are unlikely to be of a significant ecological importance and as such fall below the local level. Hedgehog are not considered further in this assessment.

3.38 There is no habitat suitable for otter or water vole within the site; both of which are therefore excluded from this assessment.

Reptiles and amphibians

3.39 There are no records for scarce reptiles within 2km and only a small number for common reptiles. Suitable habitat within the application site is limited to the longer grass within the woodland belt and the bases of the hedgerows. Elsewhere the areas of longer improved grass and the arable crop within the field are not likely to support reptiles.

3.40 There are no desk study records of great crested newts (*Triturus cristatus*) within 2km of the site. There are no records of other amphibian species from the site itself, although common toad (*Bufo bufo*) have been recorded within the 2km search area. However, there are no ponds or other suitable breeding habitat for amphibians within the site boundaries and no such features appear to be present within a 500m radius (based on a review of Dorset Explorer maps). The site is therefore unlikely to support a valuable amphibian assemblage and great crested newts are considered likely to be absent.

Importance

3.41 The limited availability of suitable habitat is considered to fall short of the threshold for significant ecological importance for common reptiles and amphibians. However, as both are protected from killing and injury under the Wildlife and Countryside Act 1981 (as amended), they are included in the assessment of effects in the context of this legislation and recommendations are included within the precautionary mitigation measures in section 4.

Birds

3.42 DERC provided desk study records within 2km of the site including for song thrush (*Turdus philomelos*), linnet (*Linaria cannabina*) and yellowhammer (*Emberiza citrinella*), all of which are Red listed Birds of Conservation Concern. Records are also present for barn owl (*Tyto alba*), kestrel (*Falco tinnunculus*) and swift (*Apus apus*) within the search parameter. Defra 'MAGIC' map results show the site is not mapped as being within the Arable Assemblage Farmland Birds (England) target area for rare and declining farmland and/or woodland birds. However, the adjacent fields are mapped as being important for corn bunting (*Emberiza calandra*) and grey partridge (*Perdix perdix*) and the site itself is within an area mapped as important for lapwing (*Vanellus vanellus*).

3.43 Whilst the site has no wetland habitat for species such as snipe, it may support small numbers of breeding and over-wintering birds within the woodland boundaries along with other typical species of conservation concern, such as yellowhammer and bullfinch. Given the limited extent of the suitable habitat within the application site, it is considered unlikely to support significantly valuable populations of any such species. Within the wider site boundaries, all trees and hedgerows provide opportunities for nesting and foraging birds.

3.44 There are no suitable nest sites for barn owls within the field or its boundaries, and there is a limited amount of valuable foraging habitat for this species which is restricted to the few small open grassland areas within the woodland belt. This site is therefore unlikely to be of particular importance for barn owls.

3.45 Wild birds, their active nests and their eggs are protected under the Wildlife and Countryside Act 1981 (as amended) and therefore birds are incorporated in the assessment of effects in the context of this legislation and recommendations for precautionary mitigation included in section 4.

Invertebrates

3.46 The hedgerows, grassland and trees of the site provide habitat for invertebrates and are likely to support a range of terrestrial species. However, there is no indication that the site would support a particularly large or notable assemblage. The arable land within the field is likely to support a restricted range of common terrestrial invertebrate species.

Invasive species

3.47 Montbretia has been recorded on the site which is listed on *Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)*. In addition to this buddleia (*Buddleja davidii*), was also recorded on the site and while not listed on *Schedule 9* this species can become invasive if left unmanaged. Further recommendations have been provided in section 4.

Summary of ecological features

3.48 Table 11 below summarises all important or legally protected ecological features identified within their respective zones of influence, along with their geographic context of importance and/or protection status:

Table 11. Summary of important ecological features and their geographic context

Ecological feature	Geographic context of importance/ protection status
Bryanston SSSI	National
Plantation woodland	Local
Hedgerows	Local
Poor semi-improved grassland	Local
Bats	European Protected Species: Wildlife and Countryside Act (as amended) 1981 and Conservation of Habitats and Species Regulations 2017 (EU Exit 2019)
Hazel dormice	European Protected Species: Wildlife and Countryside Act (as amended) 1981 and Conservation of Habitats and Species Regulations 2017 (EU Exit 2019)
Reptiles and amphibians	Protected species: Wildlife and Countryside Act (as amended) 1981 and Conservation of Habitats and Species Regulations 2017 (EU Exit 2019)
Nesting birds	Protected species: Wildlife and Countryside Act (as amended) 1981
Badgers	Protected species: Protection of Badger Act 1992

4. Assessment of impacts and recommended mitigation

4.1 A number of potential ecological constraints and opportunities have been identified in relation to the development. The development proposals include the following:

- construction of a Waste Management Centre (WMC) comprising a covered Waste Transfer Station (WTS) and a Household Recycling Centre (HRC);
- access formed via a new single carriageway road off the A350 necessitating the removal of a maximum of 50m of the south-west boundary hedgerow which will also incur a loss of approximately 634m² of the poor semi-improved grassland verge, to be replaced with 7,980m² of new native hedge and tree planting contiguous with existing hedge and tree boundary features and 7,512m² of species rich wildflower meadow;
- the existing access to the field from the A350 will be closed and new hedgerow of 10m will be planted across the former field gated entrance;
- creation of a series of ponds amounting to 2,700m² to the south-west of the facility. The ponds will maintain a permanent body of water flanked by marginal and aquatic plants and wetland grasses;
- all other existing boundary woodland, hedges and trees will be retained; enhanced and reinforced with management in line with arboricultural advice and appropriate native planting;
- 980m of new native species diverse hedgerow will be planted along the new access road and field boundaries;
- the native tree, hedgerow and shrub planting scheme and external soft landscape areas (as quantified above) will provide net gains in biodiversity by incorporating new wildlife habitats including woodlands, wetlands, wildflower meadows and verges;
- management and maintenance of all retained and newly created habitat features will be provided in a Landscape and Ecological Management Plan (LEMP);
- provision of a lighting scheme designed to prevent impacts to nocturnal wildlife (please refer to section on mitigation measures for bats below) and to prevent light pollution and minimise energy consumption.

European Union Habitats Directive

4.2 The 'Habitats Directive' (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity in England and is translated into UK legislation by the Conservation of Habitats and Species Regulations (as amended) (EU Exit 2019). The Habitats Directive lists habitats and species that must be protected within Special Areas of Conservation (SAC) on Annexes I and II respectively. The Habitats Directive additionally identifies plant and animal species on Annex IV which are subject to strict protection anywhere they occur. The Habitats Directive sets out the protocol for the protection and management of SACs. However, as stated in section 2, European sites have been scoped out of this EclA report.

Potential impacts during development phases

4.3 In the absence of mitigation measures, the proposed development could have a range of potential impacts upon the identified ecological features during construction and/ or operation phases. Significant potential impacts to biodiversity from development of the site include habitat loss, noise and visual disturbance to hibernating, breeding or feeding populations of fauna species. A number of factors influence the potential significance of impacts, including the particular features affected, the time of year when potential impacts occur and the potential for unforeseen events such as extreme weather, or introduction of new invasive species not present pre-construction. A summary of the types of potential construction phase impacts is provided in the table below:

Table 12. Type of potential construction phase impacts

Type of potential impact	Duration	Direct (D) indirect (I)	Potential significance of impacts
Habitat damage and loss	Medium term to permanent depending on establishment time and provision of landscape planting.	D	Depends on ecological value of the habitat, the area of habitat lost, whether it is a temporary or permanent loss, and whether the habitat can be restored or recreated (mitigated by compensatory planting).
Damage to breeding or resting sites of protected species / habitat disturbance	Duration of population-scale impacts undetermined due to absence of scientific data for many protected species.	D (I from vibration)	Depends on the ecological value and estimated population sizes of protected species using habitats subject to disturbance.
Noise and visual disturbance to protected species	Temporary to short-term.	I	Typically limited to local levels unless there are particularly sensitive features present (e.g. breeding or resting sites of European protected species such as bats).
Air quality and dust deposition impacts to habitats	Temporary to short-term.	I	Typically limited to local levels where a CEMP is implemented.
Artificial lighting impacts to protected species (particularly bats)	Short-term.	I	Depends on the ecological value and estimated population sizes of protected species (particularly foraging bats) using individual habitat features.
Introduction or spread of invasive species by construction activity	Medium to long-term subject to control success.	D / I	Subject to habitats affected.

Protections inherent in the proposed development

4.4 Importantly, potential impacts should be assessed by following protection measures inherent within the design of the proposed development and detailed in a Construction Environmental Management Plan (CEMP) which will be binding on the appointed contractor throughout construction and which specifies site-specific pollution control, and other measures to ensure full implementation of mitigation such as control of invasive plant species, physical demarcation of Root Protection Areas of trees and address any mitigation conflicts for example the seasonal clearance requirements for breeding birds.

4.5 Operational impacts consider the future impacts of the proposed development site throughout the lifetime of the proposed development (i.e. >30 years and permanent). Potential impacts to habitats and protected species are most significant throughout the initial years of operation prior to maturity of planting mitigation, before the establishment of breeding and/ or non-breeding populations of protected species in landscaped areas. A summary of the types of potential operational phase impacts at the proposed development site are outlined in the table below:

Table 13. Type of potential operational phase impacts

Type of potential impact	Duration	Direct (D) indirect (I)	Potential significance of impacts
Noise and visual disturbance to protected species from traffic and pedestrians	Long-term to permanent.	I	Depends on the ecological value and estimated population sizes of protected species using retained and new habitats.
On-site air quality and dust deposition impacts (those arising from traffic movement is considered within the Environmental Statement)	n/a	I	Likely negligible; given the design of the new facility.
Artificial lighting	Long-term to permanent.	I	Depends on the ecological value and estimated population sizes of protected species using landscaped and retained habitats.

Designated sites

4.6 The site falls within the Impact Risk Zone (IRZ) of Bryanston SSSI; designated for greater horseshoe bats and is discussed further below.

4.7 Given their locations and reasons for designation none of the three non-statutory designated nature conservation sites identified in the desk study are considered likely to be detrimentally affected by the proposed development.

Habitats

4.8 The arable land is considered to be of negligible value and therefore the loss of approximately 28,874m² is not significant. The arable land should however continue to be ploughed until site clearance to avoid its ecological interest from establishing.

Plantation woodland belt

Predicted effects

4.9 The development proposals allow for the retention of the woodland belt which is largely distant from the development zone except at the south-east corner of the site where the development boundary is approximately 10m from the woodland edge. The woodland habitat is vulnerable to damage during the construction phase, such as through ground compaction and damage to roots and limbs. In the absence of mitigation, a significant adverse effect on this section of the woodland belt is predicted at the 'local' level.

Mitigation measures

4.10 Protection of retained trees will be implemented through suitable tree protection in accordance with British Standards Institute (2012) *Trees in Relation to Design, Demolition and Construction – Recommendations BS5837:2012*, secured by planning condition.

Residual effects

4.11 Through the implementation of the above mitigation measures, no significant adverse effects are predicted. Additionally, remedial works to trees within the woodland belt will provide a long-term positive effect.

Hedgerows and trees

Predicted effects

4.12 A new access route off the A350 with additional visibility splay will require the clearance of a maximum of 50m of hedgerow on the south-west boundary to facilitate vehicular access. This will also include the loss of 226m² of poor semi-improved grass verge and two hedgerow trees. The effect of this clearance is not considered to be ecologically significant, as when viewed in context, the boundary is unlikely to constitute a significant wildlife corridor.

4.13 All other areas of boundary hedgerow and trees are to be retained alongside the development, however insensitive construction methods could result in damage to retained habitats.

Mitigation measures

4.14 The proposals also include embedded mitigation by way of strengthening retained hedgerows and providing additional native hedgerow and tree planting enclosing the development and connecting to existing boundaries amounting to 7,980m² and creation of 7,512m² of wildflower meadow. On-going management of new and retained hedgerows will be set out in a Landscape and Ecology Management Plan (LEMP) at the detailed design stage.

4.15 Construction methods will accord with British Standard BS5837:2012 (as referred to above) to ensure that retained vegetation is adequately protected from accidental damage during construction.

Residual effects

4.16 Following the enhancement of retained hedgerows and the adoption of biodiversity-friendly management prescriptions, no residual adverse effects are anticipated to result from the proposed development with respect to hedgerows and hedgerow trees.

Protected and notable species

Bats

Predicted effects

4.17 Bats and their roosts are legally protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (EU Exit 2019).

4.18 Collectively the site habitats are of 'local' value for foraging and commuting bats, including the rare Annex II greater horseshoe bat due to the Bryanston SSSI located within

2km of the site. No Potential Roosting Features (PRFs) were identified on trees which have potential to support roosting bats.

4.19 The loss of a small area of grassland verge, two trees and partial removal of the hedgerow on the south-west boundary, is not anticipated to significantly impact foraging resources or navigational aids for bats.

4.20 The introduction of additional artificial lighting during the construction and operation of the development has the potential to result in disturbance to foraging and navigating bats, in particular the greater horseshoe bat which is highly sensitive to light spill. As the site is considered to be of limited value for bat activity, this effect is considered to be significant at no more than 'local' level.

4.21 The proposed development is not anticipated to impact on any bat roosts.

Mitigation measures

4.22 The extensive newly created wildlife features and retained habitats are anticipated to mitigate for the minimal loss of any foraging.

4.23 The lighting regime must accord with the Institute of Lighting Professionals & Bat Conservation Trust guidance (*Bats and artificial lighting in the UK. Bats and the built environment series 2018*) to ensure no interruption in bat activity by use of varied techniques:

- use of soft white LED lights with directional baffles as required (LED light lacks a UV element) and minimise insect migration that could reduce insect availability from neighbouring foraging areas
- use of landscaping and planting to create dark corridors and areas within the site and retain the dark quality of the woodland belt
- use of SMART glass where appropriate
- use of internal lighting design solutions to minimise light spill from windows

Residual effects

4.23 As much of the development area is arable land with the habitats of most value to bats being largely retained, buffered and enhanced by new screening and buffer planting, it is considered that, subject to completion and successful establishment of these measures and the adoption of a sensitive lighting strategy, no significant residual effects are anticipated with respect to bat species. Long-term, the new and enhanced habitats are expected to deliver a net gain for bats.

Hazel dormouse

Predicted effects

4.24 The on-site habitats are sub-optimal for this species and as the removal of habitat is restricted to a section of the south-west boundary hedgerow (H1) a targeted survey was not deemed necessary. This hedgerow is considered to be of limited value to dormice however, it is connected to the north-west hedgerow (H2) and the plantation woodland forming the other site boundaries. The reduction in length of hedgerow H1 is considered unlikely to have an adverse effect on dormice in the long-term, however, mitigation is recommended below as a precaution for the construction phase.

Mitigation measures

4.25 The partial removal of hedgerow H1 should be preceded by a fingertip search for dormouse nests and/or hibernation sites, dependent on the time of year of the works. Ideally, the vegetation will be cut to a height of approximately 10cm during the winter months (November to February inclusive) to avoid the period when dormice could be active, and to

avoid the bird nesting season; the roots would then be grubbed out between May and September, thus avoiding the period when dormice could be hibernating on the ground.

4.26 Given the low likelihood of dormice being present within this feature, it would be possible to undertake works outside of these times after a fingertip search has confirmed the absence of dormice.

Residual effects

4.27 New habitat areas are expected to include species of benefit to Hazel dormice however it is likely to take approximately 10-15 years for the new planting to mature and become valuable for dormice. However, the remaining hedgerows will continue to connect to the woodland belt and enhancements for dormice are recommended in section 5 below.

4.28 Assuming the implementation of effective mitigation, as described above, the proposed development would not be expected to give rise to any residual adverse effects on dormice.

Nesting Birds

Predicted effects

4.29 Wild birds, their active nests, and their eggs are protected under the Wildlife and Countryside Act 1981 (as amended) from killing. During the nesting bird season (mid-February to August, inclusive) there is the risk of killing and injuring nesting birds, damaging their nests or eggs, as a result of vegetation/hedge clearance on the south-west boundary.

4.30 Significant adverse effects on birds are not anticipated given the intended retention of the woodland belt and north-west boundary hedgerow; the extent of the planned development and that any species present are likely to be widespread in the local area. The remainder of the field will continue to offer arable habitat for birds such as lapwing.

Mitigation measures

4.31 To avoid committing an offence under the legislation, any vegetation clearance must take place outside of the bird nesting period (i.e. outside of mid-February to August inclusive) or failing that, following confirmation by a suitably qualified ecologist that nesting birds are absent from the habitats to be cleared. Vegetation should thereafter be maintained at ground level to deter birds from nesting until the works are complete.

4.32 To mitigate for the loss of nesting habitat by the removal of the hedge, bird nest boxes should be installed on suitable trees within the woodland belt.

Common reptiles and amphibians

Predicted effects

4.33 These species are protected from killing and injury under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (EU Exit 2019).

4.34 Potentially suitable habitat was recorded within the plantation tussocky grassland, hedgerow bases and limited grassland areas. A small area of suitable habitat associated with the base of hedgerow H1 and roadside verge will be lost to site clearance. As such there is risk of killing and injury of common reptiles and amphibians which could result in offences being caused.

Mitigation measures

4.35 To avoid committing an offence, a precautionary approach to vegetation clearance should be adopted to minimise the risk of killing or injury of reptiles. This would include phased strimming during the active reptile period (i.e. outside of the hibernation period of October to end-February inclusive) to encourage the movement of reptiles to habitats off-site

to the retained areas. Any reptiles or amphibians found during clearance works should be moved to areas of retained hedgerow H2 or woodland or to suitable adjoining grassland habitat. All clearance should be supervised by a suitably qualified ecologist.

Residual effects

4.36 With the implementation of the above mitigation measures no residual effects are anticipated.

Badger

Predicted effects

4.37 Badgers are protected under the Protection of Badgers Act (1992). Killing or injury of a badger or interference with a sett is prohibited.

4.38 No badger setts were noted within the site or surrounding habitats and the survey found no evidence of badger activity. No badger setts are understood to be present within the adjoining areas.

Mitigation measures

4.39 It is not anticipated that the development poses significant risks to badgers and provided a further search for any subsequent uptake of the site by badgers is undertaken no more than one month prior to the commencement of construction, there is no anticipated risk of killing or injury, and therefore no risk of legal infringement.

Other wildlife

4.40 No significant effects on other species are predicted.

Cumulative Effects

4.41 An assessment of potential cumulative effects has not been undertaken due to the consideration of such under the wider EIA.

Residual loss of habitat

4.42 No significant residual effects to, or loss of, important ecological features are anticipated to result from the proposed development. Embedded mitigation in the form of new native tree, hedgerow and shrub planting; wildflower meadow creation and new ponds will mitigate for potential adverse effects from the removal of a stretch of hedgerow H1 and roadside verge and for the associated loss of opportunities for bats and birds. Therefore, no specific off-site compensation measures or financial contributions are proposed.

4.43 Currently, the Dorset Biodiversity Appraisal Protocol (DBAP) Compensation Framework does not take account of arable land. Therefore, no requirement for financial compensation is likely to be required and it is considered that the newly created biodiversity features described above will deliver net benefits for wildlife, including foraging bats, once established.

Biodiversity net gain

4.44 In accordance with policy guidance, development schemes should deliver biodiversity net gain where possible. The following additional enhancements are designed to provide net gain in addition to the habitat enhancement and creation described above and can be incorporated within the development design:

- plant shrubs that includes native species of local provenance such as hazel, field maple, oak, ash, goat willow, dogwood, spindle, hawthorn, honeysuckle and fruit trees;

- use of rich wildflower seed mixes of local provenance and cut infrequently (annually in the autumn) to provide undisturbed habitat for small mammals, invertebrates and birds;
- management of hedgerows to provide dark commuting corridors and perching opportunities for greater horseshoe bats;
- the creation of new ponds and the use of native marginal and aquatic plants in new ponds;
- ensure new habitats flow into existing retained features to create contiguous wildlife areas and linked ecological networks;
- provide roosting opportunities for bats in the form of bat boxes within the new buildings or on suitably mature retained trees;
- provide nesting opportunities for birds in the form of bird boxes on the new buildings or suitably mature retained trees;
- install dormouse nest boxes on trees within the woodland belt;
- create loggeries from timber from any on site tree-felling to provide important egg laying and larval habitat for invertebrates and refugia and for foraging by small mammals, amphibians and reptiles.

5. Conclusions

Biodiversity Plan

5.1 The development falls under the Environmental Impact Assessment Regulations (2017) which applies to installations for the disposal of waste where the area of development exceeds 0.5ha (Schedule 2), and therefore would not normally trigger the criteria of the Dorset Biodiversity Appraisal Protocol (DBAP). However, noting the advice from Natural England that ecology could be screened out of the EIA process, an EclA has been undertaken to assess impacts that could be addressed by way of the DBAP. It is therefore recommended that the mitigation and net gain measures within this report are detailed within a standard form known as a Biodiversity Plan (BP) and submitted to the Natural Environment Team for review and approval under the DBAP. Under this scheme the planning authority will make the BP a condition of the grant of permission.

5.2 This recommendation is in keeping with policy 12.94 of the Adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019) which states that impacts on biodiversity will be assessed under the DBAP.

5.3 Assuming the implementation of effective mitigation measures, as detailed in section 4, no significant adverse effects on any ecological receptors are predicted as a result of the proposed development for a new waste management centre. The biodiversity net gain measures described above will be expected to deliver an ecological gain at the local level. The proposed development is therefore in accordance with relevant national planning policies in relation to nature conservation and wildlife legislation, as set-out in Appendix 1.

6. Acknowledgements

6.1 Tess Alison, Lead Landscape Architect; Gary Hedges, Project Manager and Marian Zvara, Senior Landscape Architect with Dorset Council kindly provided location plans and background documents and information.

7. Contact information

7.1 The Natural Environment Team can provide further advice, surveys and assessments as well as providing licenced and qualified ecologists (CSCS card holders) to act as Ecological Clerk of Works. In the first instance please contact the survey report author: Nikki Taylor, Nature Conservation Officer, [REDACTED]

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Appendix 1

Summary of planning policy & wildlife legislation

Planning policy and biodiversity - England

The National Planning Policy Framework (NPPF), issued in March 2012 and revised in 2018 and 2019, superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005).

The NPPF simplifies and collates a number of previous planning documents and outlines the Government's objective towards biodiversity.

The NPPF identifies how the planning system should contribute to and enhance the natural and local environment (Paragraph 170), including:

- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils;
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- minimising impacts on biodiversity and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 175) by applying the mitigation hierarchy:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused

The UK Government published a white paper '*The Natural Choice: securing the value of nature*' in June 2011. This document sets out a series of commitments relating, in particular, to the protection and improvement of the natural environment, the development of a green economy, and strengthening the connection between people and nature. Many of the commitments and principles identified in the white paper are of particular relevance to this proposed development, including:

- The creation / use of urban green infrastructure with green spaces managed to provide a diverse range of functions, benefitting people and wildlife, by delivering ecosystem services;
- Re-connecting people to nature through education, by providing neighbourhood access to nature and the countryside, and encouraging voluntary participation in nature conservation activities.

North Dorset Local Planning Policy

This sets out the strategic planning policies for North Dorset. It gives guidance on how proposals for development will be considered and is the main basis for making decisions on planning applications. It forms part of the development plan for an area and all planning decisions must be made in accordance with the development plan unless material considerations indicate otherwise. The Local Plan shares the same principles as the NPPF including sustainable development.

Local Sites (including Sites of Nature Conservation Interest (SNCIs) and Local Nature Reserves (LNRs))

These are a network of sites designated for their nature conservation in a local context. Although they are not afforded legal protection they contribute towards local and national biodiversity. Where such development is permitted, the local planning authority will use conditions and/or planning obligations to minimise their damage and provide compensatory and site management measures where appropriate.

Biodiversity Action Plans (BAPs)

BAPs set out policy for protecting and restoring priority species and habitats as part of the UK's response as signatories to the Convention on Biological Diversity. BAPs operate at both a national and local level with priority species and habitats identified at a national level and a series of Local BAPs that identify ecological features of particular importance to a particular area of the country. The requirement to consider and contribute towards BAP targets was strengthened through the *Countryside and Rights of Way Act 2000*. Habitat and Species Action Plans that may be of relevance include: Hedgerow (UKBAP)

Bournemouth, Christchurch, Poole and Dorset Waste Plan 2019

This Waste Plan sets out objectives and spatial strategy for the development of waste management facilities across Dorset up to 2033. The plan establishes a set of policies and site allocations to guide development based upon a set of evidence documents such as Habitats Regulations Assessment. The plan includes the site as an allocated site in Appendix 3. The plan also states that impacts on biodiversity will be assessed under the Dorset Biodiversity Appraisal Protocol & Compensation Framework.

Dorset Biodiversity Appraisal Protocol (DBAP)

The DBAP is a local requirement (Part 2, *Dorset Council Planning Application Requirements* validation checklist) and is the authority's preferred approach to address wildlife impacts at the pre-application stage in the form of appropriate survey(s) and the production of a templated Biodiversity Plan (BP). The DBAP is administered by Dorset Council Natural Environment Team (DC NET) and is designed to meet Natural England's Standing Advice for protected species. BPs must set out how any negative impacts will be avoided, mitigated or compensated for, include enhancement features and demonstrate biodiversity net gain. The DBAP incorporates a Compensation Framework (see 4.43 above) to address any residual loss of habitats from development.

The scheme applies to all development sites of 0.1ha or greater in size or where there are known protected species or important habitats / habitat features. A BP covers habitat as well as protected species interests. Where this applies a BP must be reviewed and approved by DC NET in advance of a planning application being registered by the planning authority.

Mitigation of ecological impacts is a hierarchical process set out in the National Planning Policy Framework (2019) and the DBAP technical guidance:

- Avoidance: by adjusting a scheme layout to miss a valuable species or habitat.
- Mitigation: which is the process by which harmful effects can be reduced to a negligible level, for example by timing work to avoid sensitive periods in a species lifecycle.
- Compensation: where a loss will be incurred to a habitat or species roosting or nesting place then an off-site compensation measure will be required. Compensation must be viewed as a last resort and for designated and priority habitats such as those legally protected, is usually unacceptable. The DBAP Compensation Framework is used where residual loss of habitat is unavoidable to calculate a financial contribution to

compensatory habitat creation and restoration using metrics to assess the loss and the costs of replacement and management.

- Biodiversity net gain: the NPPF 2019 and the 2020 Environment Bill sets out clearly the need for sustainable development to include net gains for biodiversity; the provision of additional enhancement features and creation/ enhancement of habitats, measuring a minimum of 10% on the existing ecological baseline, likely to increase opportunities for wildlife secured for the long-term.

All of which is captured through the DBAP process.

The measures detailed in a BP are secured by way of a planning condition requiring the implementation of and compliance with the BP.

Legislation summary

The following pieces of legislation are of particular relevance to this assessment:

Conservation of Natural Habitats and Species Regulations 2017 (EU Exit 2019), which provides legislative protection for certain species including bats, great crested newts and Hazel dormice. The Regulations also provide protection for certain designated sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).

Wildlife and Countryside Act 1981 (as amended, including by the Countryside and Rights of Way Act 2000), provides legislative protection for certain species (including widespread reptile species and nesting birds) and prohibits the spread of invasive plant species. The Act also provides the mechanism for the designation and protection of Sites of Special Scientific Interest (SSSIs).

Natural Environment and Rural Communities (NERC) Act (2006), places a duty upon public bodies to consider enhancement of biodiversity within all of their actions. In addition, this Act provides for those species identified within the UK Biodiversity Action Plan (UK BAP) and the relevant Local Biodiversity Action Plans (LBAPs) to be considered as biodiversity conservation priorities.

Protection of Badgers Act 1992, which consolidates the legislation specific to badgers.

Hedgerows Regulations 1997, which provide a framework for the protection of hedgerows of value in terms of various criteria, including the Wildlife and Landscape criteria which relate to ecological features.

Otters, great crested newts, Hazel dormice, water voles, and all bat species are fully protected under section 9 (5) of the Wildlife and Countryside Act 1981 (as amended).

Under this act it is an offence to:

- Intentionally capture, kill or injure one of these animals
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used by one of these animals for shelter or protection
- Intentionally or recklessly disturb an animal whilst it is using this place
- Sell, offer for sale or advertise for one of these animals live or dead

Designated as European Protected Species' **otters, great crested newts, Hazel dormice, and all bat species** receive additional protection from the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations 2017) which transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and elements of Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) in the United Kingdom. In accordance with this act, it is an offence to:

- Deliberately capture or kill a European Protected Species
- Deliberately disturb a European Protected Species
- Damage or destroy the breeding site or resting place of a European Protected Species

Bat roosts

Under UK law a bat roost is '*any structure or place which any wild [bat]...uses for shelter or protection*'. As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time.

Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also require a licence.

Licences are granted by Natural England to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

Birds

Wild birds, their active nests, eggs and young are all protected under the Wildlife and Countryside Act, 1981 (as amended). Some birds are afforded special protection under Schedule 1 of this act and a licence would be needed from Natural England to enable disturbance of these species (for example barn owl).

Common reptiles and amphibians

All native reptilian species are all protected under the Wildlife and Countryside Act, 1981 (as amended). For smooth snake, all parts of Section 9 of the Act apply. This prohibits the intentional killing, injuring or taking (capture etc); possession; intentional disturbance whilst occupying a '*place used for shelter or protection*' and destruction of these places; sale, barter exchange transporting for sale and advertising to sell or to buy.

All species of reptile are afforded protection from intentional killing and injuring and trade (i.e. sale, barter, exchange, transporting for sale and advertising to sell or buy) and all are Biodiversity Action Plan Priority Species and as such are included within Section 41 the duty to conserve within the Natural Environment and Rural Communities Act 2006.

The four, widespread species of amphibian: the smooth and palmate newts, the common frog and common toad, are protected only by Section 9(5) of the Wildlife and Countryside Act 1981. This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. Collection and keeping of these widespread amphibian species is not an offence.

Badgers

Badgers and their setts are protected under the Protection of Badgers Act, 1992 which makes it illegal to kill, injure or take badgers or to interfere with a badger sett. Sett interference includes damaging or destroying a sett, obstructing access to it or disturbing a badger whilst it is occupying a sett.

If badger setts are identified, licences from Natural England may be required to disturb the setts or close them, as appropriate, before works commence.

Local authorities are expected to consider biodiversity in their decision-making, in respect of the Natural Environment and Rural Communities Act 2006. Therefore, it is important to conduct protected and priority biodiversity action plan species surveys to adequately inform the planning authority in reaching its decisions.

Ecological enhancements and biodiversity net gain

The Natural Environment and Rural Communities (NERC) Act 2006 states that a public authority must *'in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'*.

In England, the National Planning Policy Framework (NPPF), reissued in July 2018, states that the planning policies and decisions should contribute to and enhance the natural and local environment by *'minimising impacts on biodiversity and providing net gains in biodiversity'* (Para 170). It also states that *'opportunities to incorporate biodiversity improvements in and around developments should be encouraged especially where this can secure measurable net gains for biodiversity'* (Para 175).

Appendix 2
Phase 1 habitat map

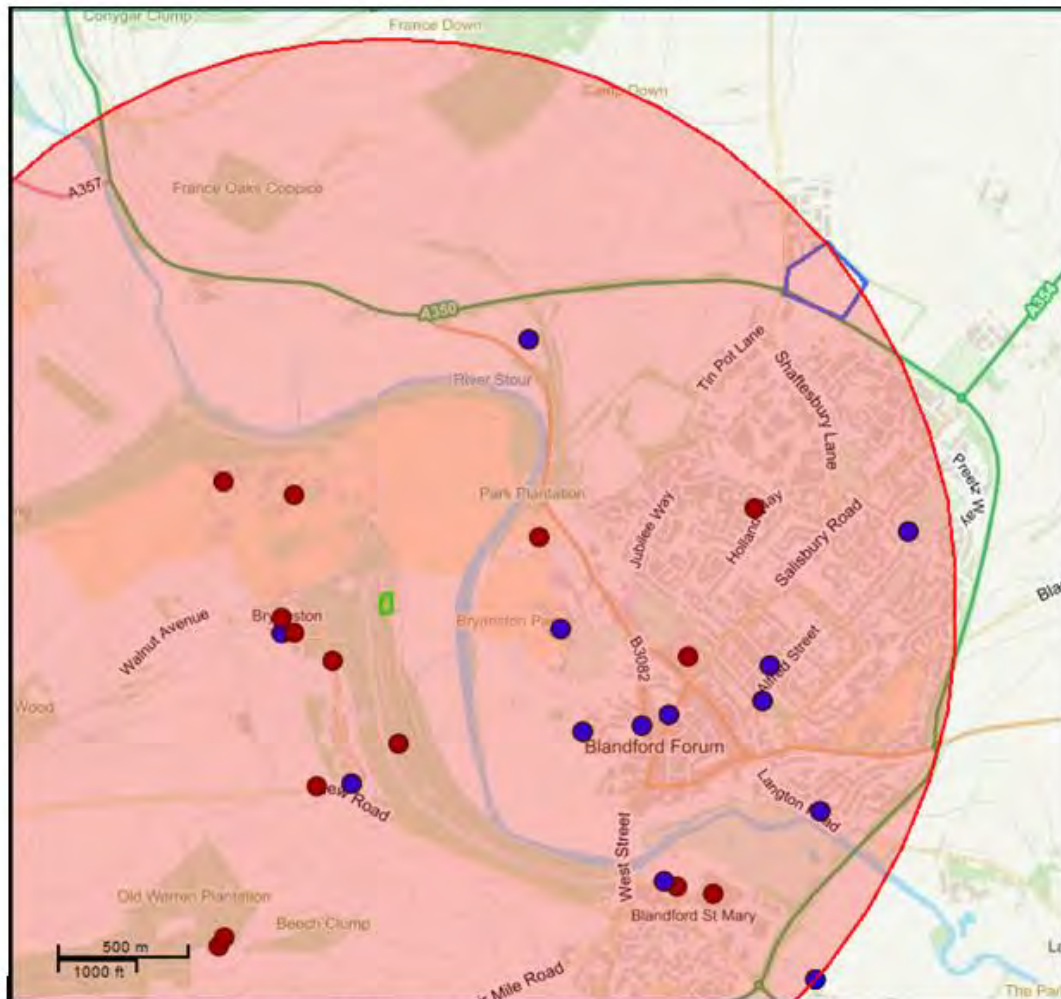
Phase 1 habitat map



Key	
Survey area	
Arable	A
Hedgerow	
Plantation woodland	
Mown verge (outside of site boundary)	
Trees within hedgerows	
Fence	
Hedgerow reference	H1
Target note	

Target notes	
No.	Description
T1	Arable fields comprising a single crop species.
T2	Areas of plantation woodland comprising young trees and rough grassland. Tree species comprise silver birch, beech, ash, cherry and elder. Grass and herbaceous species comprise cock's foot, bramble, smooth meadow grass, ivy, hawthorn, oak, willow, bristly ox-tongue and dandelion.

Figure 1 Greater horseshoe bat Core Sustenance Zone map



▲ N	
Key	
	Site boundary
	Bryanston SSSI
	Bat record pre 2000
	Bat record post 2000
	Zone A (2.2km)
Project: Blandford Waste Management Centre	
Date: July 2020	

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Appendix 7 LEMP



LINDSAY CARRINGTON
ECOLOGICAL SERVICES

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

WASTE MANAGEMENT CENTRE
BLANDFORD FORUM
DORSET

MARCH 2021

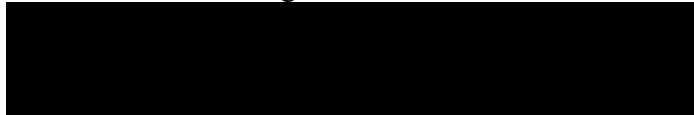
ON BEHALF OF
DORSET COUNCIL



LINDSAY CARRINGTON ECOLOGICAL SERVICES

The Old Squash Court,
Rempstone Hall,
Rempstone,
Corfe Castle,
Wareham,
Dorset,
BH20 5JQ

www.ecological-services.co.uk



Authorisation

	Name	Date
Report prepared by	APD / AC	05.03.2021
Report checked and authorised by:	LC	07.03.2021

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SUMMARY

1. Lindsay Carrington Ecological Services Limited were commissioned by Dorset Council to produce a Landscape and Ecological Management Plan for the proposed Waste Management Centre on land adjacent to Sunrise Business Park, Blandford Forum, Dorset, nearest post code DT11 7FT (central grid reference ST 890 082).
2. This management strategy will cover the prescriptive management of the habitats that will be present post development for a minimum period of five years. This will include the habitats created as enhancement and mitigation measures. Implementation of the measures outlined within this report will be undertaken by Dorset Council.
3. The management outlined within this report includes:
 - Management of newly created wildflower meadows, woodland glades, hedgerows, tree planting and wetland areas.
 - The installation and management of a wide variety of habitat enhancement features, including bat, bird and dormouse boxes, log piles and annual dung heaps.
 - Creation of specific enhancement features for endangered invertebrate and bat species of national and regional importance.

1.0 INTRODUCTION

Lindsay Carrington Ecological Services Limited were commissioned by Dorset Council to produce a Landscape and Ecological Management Plan for the proposed Waste Management Centre (WMC) on land adjacent to Sunrise Business Park, Blandford Forum, Dorset, nearest post code DT11 7FT (central grid reference ST 890 082). The site layout has been provided in appendix I. This includes a household recycling centre and waste transfer station comprising a self-contained barn designed to contain all waste management activity; an associated traffic circulation route; parking areas and a landscaping scheme. A section of hedgerow will be removed along the south-western boundary with the A350 to create suitable access to the site.

The site is 3.55 hectares in size and is located to the north of Blandford Forum, to the immediate south of the Sunrise Business Park and to the north-east of the Blandford bypass (A350). Prior to development the site comprised an arable field bounded by mature hedgerows and a plantation woodland belt. The site is located within the Cranborne Chase Area of Outstanding Natural Beauty (AONB) which is a designated International Dark Sky Reserve. Fontmell and Melbury Downs Special Area of Conservation (SAC) is located 8.4 kilometres to the north, Bryanston Site of Special Scientific Interest (SSSI) is located 2 kilometres to the west and The Milldown Site of Nature Conservation Interest (SNCI) lies 0.6 kilometres to the south-west.

This management strategy covers a period of five years, and includes the habitat creation, enhancement and management of habitats within the site boundary.

The management outlined within this report includes the following:

- Management of newly created wildflower meadows, woodland glades, hedgerows, tree planting and wetland areas.
- The installation and management of a wide variety of habitat enhancement features, including bat, bird and dormouse boxes, log piles and annual dung heaps.
- Creation of specific enhancement features for endangered invertebrate and bat species of national and regional importance.

Baseline ecological information for the site is provided in section 2 of this report, section 3 sets objectives and targets, section 4 covers mitigation and enhancement measures and section 5 details proposed habitat creation and management prescriptions.

2.0 BASELINE INFORMATION

Design proposals for the site are presented in appendix I and the locations of the habitats to be managed are presented in appendix II.

The baseline information is based on survey information gathered during the Ecological Impact Assessment (EcIA) to accompany the planning application (Dorset Council, July 2020). The EcIA also included a desk study which obtained protected species records within a two kilometre radius of the site from the Dorset Environmental Records Centre (DERC), and these have also been used within the baseline information and to inform management of the site.

2.1 Habitats

The pre-development site comprised arable land (with a wheat crop at the time of the survey in July 2020), semi-improved grassland along the road verge, hedgerows and a plantation woodland belt. Brief descriptions of these are provided below, whilst the full detail is provided in the EcIA (Dorset Council, July 2020).

Arable land

This was the dominant habitat within the site in July 2020 and was being actively farmed with a wheat crop at that time. The crop was being grown right up to the hedgerows and therefore field margins were not present. Small areas of longer improved grassland and bare ground were present around the entrance to the field and within its northern and eastern corners. Perennial rye-grass (*Lolium perenne*) was the dominant species in these areas with frequent false oat-grass (*Arrhenatherum elatius*) and creeping bent (*Agrostis stolonifera*). All other species had an occasional or rare distribution and were all either common and widespread species or typical of disturbed land or arable margins. Species recorded included charlock (*Sinapis arvensis*), lesser burdock (*Arctium minus*), groudssel (*Senecio vulgaris*), field forget-me-not (*Myosotis arvensis*), common poppy (*Papaver rhoeas*) and common field-speedwell (*Veronica persica*).

One Dorset notable species, wild pansy (*Viola tricolor*), which is associated with arable or disturbed land was returned by DERC in the desk study. This was not recorded during the survey in July 2020.

Semi-improved grassland along the road verge

This habitat occupied the verge between the south-western boundary hedgerow and the A350, and an area of this habitat was lost to landtake for the entrance to the WMC. Perennial rye-grass was the dominant grass species with frequent false oat-grass with occasional and rare occurrences of species associated with semi-improved grassland such as hogweed (*Heracelum sphondylium*), common ragwort (*Senecio jacobea*), red campion (*Silene dioica*), yarrow (*Achillea millefolium*) and ribwort plantain (*Plantago lanceolata*).

All species in this habitat were common and widespread. The data request from DERC did not return any notable species associated with this habitat.

Hedgerows

Species-poor native hedgerows bordered the site on two boundaries. Neither of these hedgerows qualified as ‘important’ under the Hedgerow Regulations 1997, however, hedgerows are a Dorset Biodiversity Action Plan (BAP) habitat and are listed as habitats of principal importance under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The hedgerows on the site are composed of more than 80% native species and are therefore qualify as UK BAP hedgerows. Brief descriptions of the hedgerows are provided below, whilst greater details can be obtained from the EcIA (Dorset Council, July 2020).

- The hedgerow along the south-western boundary of the site was mature, intact and managed to a height of approximately 3 metres, a width of 2 metres and it was 300 metres in length. Hawthorn (*Crataegus monogyna*) dominated the hedgerow with rare occurrences of ash (*Fraxinus excelsior*), field maple (*Acer campestre*), sycamore (*Acer pseudoplatanus*) and walnut (*Juglans regia*). The ground flora was dominated by perennial rye-grass, with frequent false oat-grass, bramble (*Rubus fruticosus* agg.) and ivy (*Hedera helix*), and occasional or rare occurrences of common and widespread species such as common nettle (*Urtica dioica*), hogweed, cleavers (*Galium aperine*), garlic mustard (*Alliaria petiolata*), hedge mustard (*Sisymbrium officinale*), hedge bindweed (*Calystegia sepium*) and fool’s parsley (*Aethusa cynapium*).
- The hedgerow along the north-western boundary of the site was mature, intact and managed to a height ranging between 3 and 5 metres, a width of 2 metres and it was 197 metres in length. It is composed of a mixture of native and non-native species with hawthorn being the dominant species with rare occurrences of native species field maple, sycamore, elder (*Sambucus nigra*) and holly (*Ilex aquifolium*) and non-native horse chestnut (*Aesculus hippocastanum*). The ground flora was dominated by perennial rye-grass, frequent ivy, bramble and common nettle, and occasional false oat-grass, cleavers and fool’s parsley, and rare occurrences of species such as hogweed and lord’s-and-ladies (*Arum maculatum*). A number of non-native species were also present in this hedgerow including snowberry (*Symphoricarpos albus*), butterfly-bush (*Buddleja davidii*), periwinkle (*Vinca* sp.) and Montbretia (*Crocsmia x crocosmiiflora*) which is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

The desk study returned two species of Dorset notable plant species that could potentially have been present within the hedgerows, bluebell (*Hyacinthoides non-scripta*) and wood sorrel (*Oxalis acetosella*). However, neither of these species were recorded during the survey.

Plantation woodland

A belt of maturing plantation woodland forms the north-eastern and south-eastern boundaries of the arable field in which the WMC is proposed although it is outside the development zone itself. Tree species include field maple, silver birch (*Betula pendula*), goat willow (*Salix caprea*), ash, beech (*Fagus sylvatica*), white poplar (*Populus alba*), plum (*Prunus sp.*), sweet chestnut (*Castanea sativa*), aspen (*Populus tremula*), rowan (*Sorbus aucuparia*) and oak (*Quercus robur*). Tussocky grassland is present within the ground flora in open areas beneath the maturing canopy. The plantation woodland belts are fenced with post and rail fences.

The desk study returned two species of Dorset notable plant species that could potentially have been present within the plantation woodland belts, bluebell (*Hyacinthoides non-scripta*) and wood sorrel (*Oxalis acetosella*). However, neither of these species were recorded during the survey.

2.2 Species

Bats

There are no confirmed bat roosts on the site, and the trees within the site do not hold any potential bat roosting features. The Dorset Environmental Records Centre (DERC) holds records of 12 species of bat within 2 kilometres of the site. These include long-eared species (*Plecotus sp.*), brown long-eared (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Leisler's (*Nyctalus leisleri*), Natterer's (*Myotis nattereri*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), soprano pipistrelle (*Pipistrellus pygmaeus*), greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), Bechstein's (*Myotis bechsteinii*) and barbastelle (*Barbastella barbastellus*). In addition to this, Bryanston Site of Special Scientific Interest (SSSI) lies approximately two kilometres to the west of the site, and this is designated on account of its use by breeding and hibernating bats, in particular the Annex II¹ species greater horseshoe.

Birds

The site has potential to support small numbers of breeding and over-wintering birds within the woodland boundaries and hedgerows. DERC hold records for six notable species of bird within 2 kilometres of the site. These include linnet (*Linaria cannabina*), song thrush (*Turdus philomelos*) and yellowhammer (*Emberiza citrinella*) which are listed on section 41 of the Natural Environment and Rural Communities Act 2006 and listed as red on the Birds of Conservation Concern (Eaton *et al*, 2015²); kestrel (*Falco tinnunculus*) and swift (*Apus apus*) which are listed as amber on the BoCC, and barn owl (*Tyto alba*) which is

¹ Conservation of Habitats and Species Regulations 2017 (as amended)

² Eaton *et al* (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746

afforded extra protection under Part 1, Section 1(5) of the Wildlife and Countryside Act 1981. The adjacent fields to the site are mapped as being important for corn bunting (*Emberiza calandra*) and grey partridge (*Perdix perdix*) and the site itself is within an area mapped as important for lapwing (*Vanellus vanellus*).

Hazel dormice

No evidence of hazel dormouse (*Muscardinus avellenarius*) has been recorded on the site itself although it does provide some, albeit sub-optimal, habitat for this species in the form of species-poor hedgerows and plantation woodland. DERC holds a single record for this species within 2 kilometres of the site.

Reptiles and amphibians

Reptiles have not been recorded on the site although it does hold some limited areas that are suitable for common reptile species, in particular slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*), in areas of taller grass within the woodland belt and at the bases of the hedgerows. DERC also holds records for these two species within 2 kilometres of the site.

The site does not support any aquatic habitat for amphibians and holds limited terrestrial habitat. DERC holds a record of common toad (*Bufo bufo*) within 2 kilometres of the site.

Other mammals

DERC holds numerous records of the section 41³ species hedgehog (*Erinaceus europaeus*) within 2 kilometres of the site, although no evidence of this species has been recorded on the site itself.

Invertebrates

The site provides habitat for a range of terrestrial invertebrates within the grassland, hedgerows and woodland belt, however, this is sub-optimal and is unlikely to support a large or wide range of species of conservation importance.

However, DERC hold records of a number of notable species within 2 kilometres of the site including the endangered barberry carpet moth (*Pareulype berberata*), the Dorset notable species of butterfly white admiral (*Limenitis camilla*), and white-letter hairstreak (*Satyrrium w-album*) and small heath (*Coenonympha pamphilus*). All four species are listed on section 41 of the NERC Act 2006.

³ NERC Act 2006

Invasive species

Montbretia, a Schedule 9 plant of the Wildlife and Countryside Act 1981 (as amended), was recorded on site. In addition, butterfly-bush (*Buddleja davidii*) was recorded on the site, and although this is not listed on Schedule 9 it can become invasive if left unmanaged.

3.0 AIMS AND OBJECTIVES

3.1 Rationale

The rationale behind this plan is to formulate a management regime that is in the interest of protecting and enhancing the ecology of the site to produce and maintain a net gain in biodiversity as a result of the development.

Management will be based on an ‘*adaptive management*’ principle whereby the effectiveness of management is monitored, assessed and adapted if necessary. This management plan prescribes management for a period of five years, though many of the measures within it can be adopted for the life span of the development. After the conclusion of the five-year plan ecological support should be sought to develop a new management plan for the habitats on site.

3.2 Objectives

The following objectives have been set in order to protect and enhance the ecology on site:

- 1) To maintain existing, and create and manage native, hedgerows, scrub and trees for the benefit of bats, nesting birds, hazel dormouse, reptiles, birds and invertebrates, including barberry carpet moth and white letter hairstreak.
- 2) To create woodland glades within the tree belt and hedgerows to maximise the foraging potential for bat species on the site, in particular greater horseshoe bats, whilst providing habitat for a range of other mammals, reptiles and invertebrates.
- 3) To create and manage species-rich wildflower meadow grassland habitat for the benefit of invertebrates and foraging bats, birds, mammals and reptiles.
- 4) To create and manage wetland habitat for the benefit of invertebrates and a range of other species.
- 5) To create bat roosting habitat within new buildings and existing trees.
- 6) To create dead wood habitat for the benefit of reptiles, invertebrates and hedgehogs.
- 7) To create and maintain bird nesting habitat on the site.

- 8) To create nesting opportunities for hazel dormouse.

4.0 MANAGEMENT PRESCRIPTIONS

4.1 Native hedgerow, scrub and tree planting

Rationale

New native planting of trees, hedgerows and scrub will significantly increase the value of habitats on the site for bats. Planting is specifically designed to account for bats through the creation of “double hedgerow” features that create natural and desirable commuting routes for bats, as illustrated in appendix III. Hedgerows will be specifically managed for greater horseshoe bats by allowing them to grow wide, tall and “overgrown”, to create perch feeding opportunities for this species.

Although no notable or protected invertebrate species were recorded during surveys of the site. The desktop study revealed that barberry carpet moth and white-letter hairstreak were both present within two kilometres. The barberry carpet moth population is the only remaining natural population in Dorset. Back from the brink have reintroduction schemes where barberry (*Berberis vulgaris*) has been planted within 1.5 kilometres of the site. Whilst the habitat creation proposals for the site will increase the value of the site for a wide variety of invertebrate species, specific planting and management will also be included for barberry carpet moth and white-letter hairstreak.

Barberry is the sole larval food plant for this Barberry carpet moth. The planting proposals will include barberry planting in some hedgerows. To prevent the transfer of wheat rust (for which barberry plants are also a host) to arable fields nearby, no barberry should be planted within 20 metres of the surrounding fields. This means that barberry will only be planted in the south-western corner of the site. It is hoped that this planting could be utilised by the endangered moth as local populations increase. Barberry requires careful post planting aftercare in its first five years to establish successfully. All hedgerow features with barberry in should be managed appropriately for the moth, which includes avoiding cutting hedgerow bases where the larvae pupate over winter. This management regime fits well with other species groups considered in this document.

White-letter hairstreak populations declined alongside the spread of Dutch Elm disease in the United Kingdom. This is because elm species are the larval food plant for the butterfly and the widespread loss of elm impacted the white-letter hairstreak alongside it. All elm species are used, however wych elm (*Ulmus glabra*) is preferred. Wych elm will be planted at moderate densities as part of hedgerow planting proposals to increase local availability of food plant sources for this species. The management of hedgerows for greater horseshoe bats at the site will also benefit the butterflies because eggs will not be lost to winter cutting of hedgerows.

Whilst no specific enhancements for white admiral or small heath butterflies are proposed, both species will benefit from the proposed mitigation and enhancement planting. Honeysuckle (*Lonicera periclymenum*) is included in the planting proposals for hedgerows and is the larval food plant for white admiral, whilst small heath rely on a variety of grass species at the larval stage. The woodland glade and wildflower meadow areas will also benefit both species.

The species included within the planting will also provide habitat for dormouse and nesting and foraging birds, as well as for a range of small mammals.

Dark corridors:

The proposed development will seek to maintain connectivity and foraging within the landscape by creating dark corridors through enhanced along boundary features and within created habitat areas for bats within the site. Planting schemes for the site will prevent excess light spill from off-site and on-site sources. Double hedgerows and screen planting of wetland features will ensure permanent dark features are secured as part of the proposals.

Creation

New native hedgerows will be planted along the northern boundary of the proposed development and within landscaping areas in the southern areas of the site. Planting will be designed to form “double hedgerows”, which once established, will form dark corridors for commuting bats throughout the site. The planting design will be fully specified within the planting landscape plan for the site and will include the species and planting density. This is usually below 3 metres. Barberry does not require specialist management and once established should grow well. It is not commonly sold in the UK and usually requires pre-ordering. It is available at the links in the footnotes⁴. Barberry should only be planted in the areas specified in appendix III. Species to be planted, and their planting proportions within the new hedgerows, are summarised in table 1 below. A recommended hedgerow planting pattern is shown in diagram 1 below.

Table 1: Species and planting proportions for new hedgerows

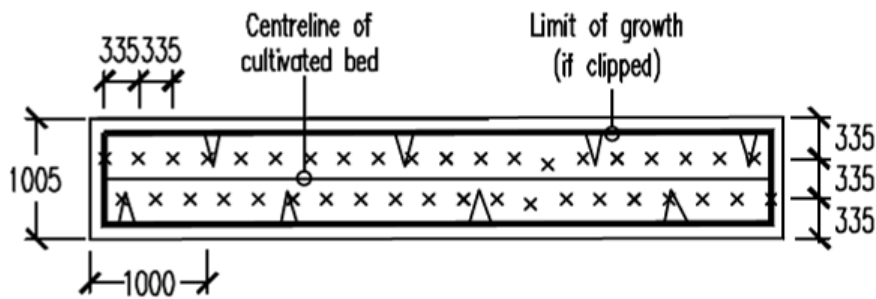
Common name	Latin name	Proportion within hedgerows
Field maple	<i>Acer campestre</i>	5%
Barberry*	<i>Berberis vulgaris</i>	20%
Hazel	<i>Corylus avellana</i>	10%
Hawthorn	<i>Crataegus monogyna</i>	15%
Holly	<i>Ilex aquifolium</i>	5%
Honeysuckle	<i>Lonicera sp.</i>	3%

⁴ <https://www.wildflowers.uk/berberis-c2x17747241>
<https://www.agroforestry.co.uk/product/berberis-vulgaris-2/>

Common name	Latin name	Proportion within hedgerows
Blackthorn	<i>Prunus spinosa</i>	10%
English oak	<i>Quercus rober</i>	5%
Dog rose	<i>Rosa canina</i>	2%
Yew	<i>Taxus baccata</i>	5%
Wych elm	<i>Ulmus glabra</i>	15%
Guelder-rose	<i>Viburnum opulus</i>	5%

*Barberry must only be planted within the prescribed areas shown in appendix III

Diagram 1: Planting Pattern



The recommended hedgerow planting will be undertaken between the months of October and February (inclusive) when the soil is in a friable condition, in line with horticultural best practice, and all planted whips will be appropriately staked and/or protected with tree guards.

Management

The management of these hedgerows will be designed to enhance their biodiversity value. The establishment of the new hedgerows will require maintenance over a longer period than this management plan covers. Any future management plan for the site extending after this initial five-year period should include management of the hedgerows every three years (after year five the newly planted trees and shrubs will require less frequent management).

The following prescriptions will ensure the long-term survival of the newly planted hedgerows and the already established hedgerows:

Years 1-5: Annual inspections will be made for five years following the initial planting of the new hedgerows. Any dead whips that are identified will be removed and replaced with new saplings of the recommended species. Any replacement planting will be undertaken between September and November.

Years 1-2: The planted saplings will be watered fortnightly (more regularly in drought conditions) between May and September. Any weed species naturally colonising the hedgerow planting area will be removed by hand in October.

Years 3-4: No management should be required in this period, although dead and diseased trees will be removed and replaced (as described for years 1-5 above).

Year 5 and onwards: The tree protection tubes will be removed from the established hedgerow saplings to ensure that the main stems are not constricted and can develop fully.

The aim of the recommended management regime, to be implemented on a three-year rotation, is to create a hedgerow of at least 3 metres in width and height, which is maintained tall and overgrown for perching bats. All elms should be maintained at 3 metres in height or below to prevent them reaching the mature stage where the elm bark beetle becomes attracted to them.

Monitoring

Annual monitoring of the native hedgerow, scrub and tree planting will be undertaken. This monitoring will take place annually in June over the course of five years following completion of the planting. Management practices may need to be adjusted if the monitoring identifies that the current management techniques are not resulting in the successful establishment of the habitats on site.

4.2 Woodland glade creation

Rationale

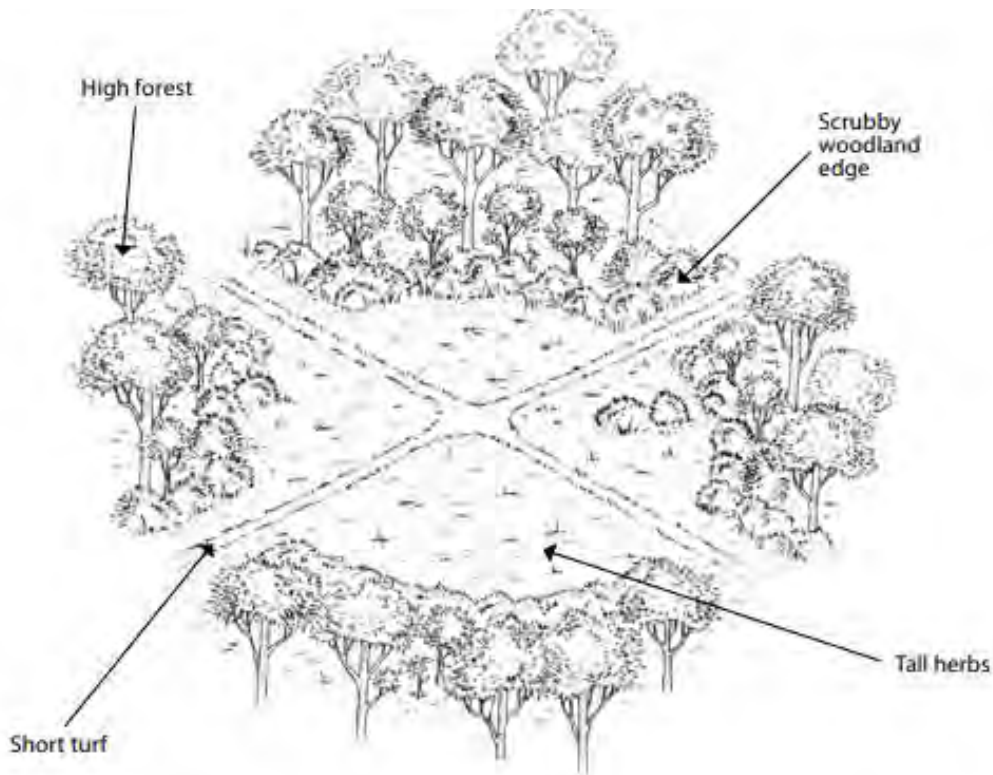
The inclusion of woodland glade-type features on the northern boundary, as illustrated in appendix II, will provide an ideal foraging habitat for bats, in particular the greater horseshoe bat. The inclusion of an annual manure pile within the woodland glades will further enhance these features for foraging greater horseshoe bats and a variety of other species by providing habitat for dung beetles which are a favoured food source of greater horseshoe and other large bat species such as serotine.

The woodland glades will also provide ideal habitat for reptiles by providing edge habitat that offers both shelter and basking sites. Woodland glades also provide excellent habitat for a range of butterfly species, particularly where a scalloped edge is created through management. The principle of the scalloped edge is to provide the following:

- A central zone of short turf.
- A zone of tall herbs and grasses bordering the central zone.
- An outer zone of scrub, allowed to develop into dense thickets in places, grading into the high forest (or maturing trees of the tree belt in this instance).

This is illustrated in diagram 2 below.

Diagram 2: Illustration of scalloped edge



Three south-facing woodland glades will be created by strategically clearing approximately 20 metre-wide, south facing areas at three points along the northern tree belt within the application area. The existing trees and scrub will first be cleared to create the glades (ensuring a tree line is left around the site boundary), after which low native shrub planting of hazel, elder, hawthorn and blackthorn will be included around the entire perimeter of the clearings to create sheltered glade-like conditions. The British Wildflower Seeds mid-Dorset wildflower mix⁵ will be sown within the glades to create wildflower grassland habitat within these clearings and annual dung piles will also be added, these measures will further enhance the glade features as a foraging resource for greater horseshoe bats. Any dung should ideally be sourced specifically from cattle not treated with wide spectrum worming treatments such as avermectin, which kill the important invertebrates beneficial to bats.

Creation

Year 1: Existing maturing trees and shrubs will be cleared from the proposed woodland glade areas. This will be done outside of bird nesting season. Vegetation will be cleared to ground level. The felled wood can be re-used on site for log piles (see section 4.6). Grass

⁵ <https://britishwildflowermeadowseeds.co.uk/collections/wildflower-meadow-seeds/products/mid-dorset-meadow-seed-mix>

and existing undergrowth will then be raked off to expose bare soil patches which will then be oversown with the British Wildflower Seeds mid-Dorset wildflower mix. The wildflower seed mix will be sown at the manufacturers recommended rate in either spring or autumn. No additional ameliorant will be imported for use in ground preparation to prevent additional nutrient enrichment which will encourage the wildflowers seed mix to persist.

Native shrubs will then be planted around the perimeter of the glade, between October and February (inclusive) when the soil is in a friable condition, in line with horticultural best practice. All planted shrubs will be appropriately staked and/or protected with tree guards.

The dung pile will also be established in year one by importing dung and placing the pile at the back of the glade against the retained mature trees and shrubs. The pile should be approximately 3 metres long, two metres in width and 1 metre in height.

Management

Year 2: In year two the grassland in the central zone will be cut in September to a height of 4 to 5 centimetres. Two metres around the edge of the glade will be left to grow into tall grass and herb to form the bordering zone of the scalloped edge. The cuttings will be left where they are cut for a period of two weeks before being raked off. Any weeds will be actively removed.

All new shrub planting will be regularly watered in the first two years during the summer months or periods of extended drought to help ensure successful establishment. Any diseased or damaged trees will be removed and replaced with new saplings.

Years 3-5: The management regime for the grassland areas, as outlined above for year 2, will also be implemented in years 3 to 5 to maintain the desired habitat conditions. Additional sowing of the specified wildflower seed mix will be undertaken in early spring if required where any grassland creation has not established successfully.

The tree guards on shrubs should be adjusted or removed if they are constraining the growth of the saplings. Any dead or diseased shrubs will be replaced as outlined above for years 1 and 2.

The shrubs around the southern perimeter of the glades will be cut and maintained to a height of 1.5 metres to ensure sufficient light penetration into the glades. A pathway into the glades will also be maintained through the scrub along the southern boundary of the glades to allow access for management and monitoring. This will be maintained during the annual mowing regime.

From year 4 onwards, three metre patches of scrub will be cut back around the remainder of the margins of the glades. These will be cut on a three year rotational basis to create a varied edge structure, ensure a constant supply of winter berries for birds and egg laying

habitat for invertebrates such as butterflies. The shrubs will be cut between October and February and arising removed from site.

The dung piles will also be replenished on an annual basis to maintain the specified size.

Monitoring

Annual monitoring of the woodland glades will take place each June over the five-year period after completion of the development. Management practices may need to be altered if the monitoring identifies that the current management techniques are not resulting in the successful establishment of the habitats on site. Monitoring will include the use of the glades as foraging habitat for bats, butterflies and reptiles.

4.3 Wildflower meadow creation

Rationale

New wildflower meadow areas, as illustrated in appendix II, will provide a valuable ecological resource for a range of fauna, including bats, invertebrates, reptiles, amphibians, birds, and foraging/commuting bats. Once established, the management prescriptions will be timed to follow the annual summer growth period for meadow plant species, allowing herbaceous plants to flower and set seed.

Creation

Year 1: The British Wildflower Seeds mid-Dorset wildflower mix (or similar), will be used to seed the new wildflower meadow areas within the development, as illustrated in appendix II. The ground across these areas will be suitably prepared (through removal of existing vegetation and raking) and then sown with the specified seed mixture during early spring (between March and April) as this is an optimal time of year for successful germination and establishment of grass seed mixtures. It is imperative that topsoil is not imported into the areas that are to be sown with wildflower seed mix, and that it is sown on subsoil. It would be preferable that the top layer (minimum of 30cm) is removed, or turned over to expose the sub-soil beneath, due to the high fertility of the soil from arable practices which will inhibit the success of a species-rich grassland developing due to the finer grasses and wildflowers being out-competed by vigorous grasses.

Management

Year 2: The grassland will be cut once per year, in September, to a height of 4 to 5 cm. The cuttings will be left where they are cut for a period of two weeks before being raked off and removed from the site. Weeds will be actively removed.

Years 3-5: The management practices for this site will be undertaken as outlined for year 2. Additional sowing of the specified wildflower seed mix will be undertaken in early spring if required where any grassland creation has not established successfully.

Monitoring

Annual monitoring of the wildflower grassland will take place in June over the five year period following completion of the planting. Management practices may need to be altered if the monitoring identifies that the current management techniques are not resulting in the successful establishment of the habitats on site. This may include an increase or decrease in frequency of cutting.

4.4 Wetland creation

Rationale

Three wetland features, comprising two ponds and a swale, are proposed along the southern boundary of the site. The planting schemes for these includes a mixture of both native marginal and fully aquatic plant species, and such planting will greatly enhance these wetland habitats on site, providing a valuable resource for fauna including amphibians, reptiles and invertebrates.

Creation

Pond margins will be planted up using the Habitat Aid marginal mix⁶, which includes the following species: water mint (*Mentha aquatica*), water forget-me-not (*Myosotis scorpioides*), lesser spearwort (*Ranunculus flammula*), marsh marigold (*Caltha Palustris*), yellow iris (*Iris Pseudacorus*), brooklime (*Veronica beccabunga*) and purple loosestrife (*Lythrum Salicaria*). Native oxygenating plant species, including hornwort (*Ceratophyllum demersum*) and water-crowfoot (*Ranunculus aquatilis*), will also be placed into the ponds (these plants are also available from Habitat Aid⁷). All marginal plants are supplied as plugs, with total numbers of plugs required for the wetland habitats needing to be calculated as part of the planting plan landscape proposals.

Oxygenating species will be placed into the water at a density of two bunches per square metre of open water. The full planting proposals for aquatic vegetation will be detailed in the planting schedule for the site.

Management

Years 1-2: Marginal plants that are not submerged, will be watered fortnightly (or more regularly in drought conditions) between May and September to help ensure that they establish successfully. If any of the planting dies, then these will be removed and replaced

⁶ <https://www.habitataid.co.uk/collections/pond-river-plants/products/aquatic-native-plants-marginals>

⁷ <https://www.habitataid.co.uk/collections/pond-river-plants/products/oxygenating-pong-plants>

with fresh plugs at the earliest opportunity. Any weed species that colonise around the pond margins will be removed unless they are a desirable native aquatic plant species.

Years 3-4: Wetland features are likely to become choked with leaf litter in the autumn which will require removal. The best time to carry out these management tasks is in the autumn and winter when amphibians are least likely to be present and/or breeding within the wetland features.

Monitoring

The wetland habitat monitoring will take place in June and take place every year for five years after the completion of the planting. Management practices may need to be altered as a result of the monitoring if the current management techniques are not resulting in the successful establishment of the habitats on site. The annual inspections will detail the requirement for replacement planting, leaf litter removal and will ascertain how well the planting has established.

4.5 Bat roosting habitat

Rationale

A variety of roosting opportunities will be provided by installing a total of 10 bat boxes onto buildings and suitable existing mature trees within the site boundary to enhance the site for bats. Bat box provision will comprise three twin crevice bat boxes, three large twin crevice bat boxes and four bat chamber boxes. A bat box suitable for hibernation and maternity use by species such as common pipistrelle, soprano pipistrelle, serotine and brown long-eared bat will also be installed.

The non-breeding and hibernating bat boxes will be supplied by Bark Boxes (<https://www.barkboxes.co.uk>) and have been selected as they are durable and suitable for a wide variety of species that may use the site. The bark will also have minimal visual impact as they are designed to blend in with tree bark.

Creation

To ensure the long-term efficacy of these enhancements, the following measures will be followed:

- The bat boxes will be located at a minimum height of five metres with a clear flight path to allow bats to easily enter and exit the box.
- The bat boxes will also be situated away from any artificial light sources, including security lighting to prevent light disturbance. Whilst pipistrelle bats are reasonably light tolerant, it is unlikely that they would occupy a box where the entrance is lit. Strong light can also result in roosts being deserted or a change in bat behaviour e.g. delayed emergence and re-entrance to roosts.

- Flight lines immediately adjacent to roosts must also not be lit and maintained as dark zones so as not to inhibit the movement of bats between the installed bat bricks/boxes on site and nearby foraging areas (BCT, 2007).

Management and monitoring

- Bat boxes will be inspected in October / November. Inspections will involve the monitoring of the bat boxes by a licensed ecologist to ascertain whether the bat boxes are being used by bats. The monitoring will also involve assessing the condition of the bat boxes to ensure they are not damaged. Care should be taken to ensure that the entrance to the bat boxes remain open and unblocked at all times
- Monitoring of the condition of the bat boxes will be undertaken once per year between May and August as bats are more likely to be using the bat boxes between these months.

4.6 Dead wood habitat

Rationale

Ten log piles will be created in a number of suitable locations on site to provide refugia, hibernacula and additional habitat for invertebrates, reptile and amphibians and hedgehogs.

Creation

The log piles will comprise stacked heaps of assorted logs and branches of various shapes and sizes. Some of these heaps will also be positioned within a shallow hole in the ground. The log piles will be created in suitable locations along the site boundaries, adjacent to hedgerows and within the created woodland glades, as shown on the plan in appendix II.

Management

As the wood will decay naturally, the log piles should need no further management. The log piles are likely to support species during the hibernation period between November and March and as such should not be disturbed during this period (and ideally should not be disturbed at any other time during the year unless absolutely necessary).

Monitoring

Monitoring to check that the log piles have not been disturbed or removed will be undertaken in June on an annual basis for a maximum of five years post development.

4.7 Bird nesting habitat

Rationale

Bird boxes will be installed on buildings and suitable existing mature trees within the site boundary in order to increase the amount of breeding habitat available for a range of bird species. The newly created habitat areas on site will offer valuable nesting habitat for birds once established. Outside of the development area, the remainder of the field will continue to offer arable habitat suitable for birds such as skylark (*Alauda arvensis*) and yellowhammer (*Emberiza citronella*).

Creation

Ten bird boxes will be installed on suitable mature trees within the woodland belt, as illustrated in appendix II. These will be a mix of box types, including enclosed boxes for common passerines and specialist boxes, such as open-fronted boxes, for spotted flycatcher (*Muscicapa striata*). Two boxes must be for barn owl (*Tyto alba*). In addition, the new buildings will feature two sparrow terraces, two swift (*Apus apus*) boxes and four double house martin (*Delichon urbicum*) cup boards, which may also be used by swallows (*Hirundo rustica*).

Management and monitoring

The bird nest boxes will be checked annually to ensure that they are still present and have not been damaged. Any used nests will be removed and any damaged or missing boxes will be replaced. A record of evidence of nesting within the boxes will be maintained. The annual monitoring and management will need to take place outside of bird nesting season, therefore between September and February. Where the barn owl boxes are occupied by barn owl a suitably licensed surveyor must conduct the monitoring and any management.

4.8 Hazel dormouse nesting habitat

Rationale

The ecological enhancement strategy for the site has been designed to benefit hazel dormice. The newly-created hedgerows and woodland glade will provide suitable foraging resources and potential nesting opportunities for dormice once they have become well-established and the remaining / existing hedgerows will continue to connect to the woodland belt. A total of 10 dormouse boxes will also be installed within suitable habitat on site in order to increase breeding habitat for this species. The installation, management and monitoring of the dormouse boxes will be conducted under the supervision of an ecologist licensed for hazel dormice.

Creation

A total of 10 dormouse nest boxes will be installed in suitable habitat on site including on trees and within hedgerows around the site boundary, as illustrated in appendix II. The nest boxes will be installed at average human chest height (approximately 1.3 to 1.5 metres above ground) on well-established trees or shrubs, ideally amongst dense shrub or understorey growth and near to food sources such as hazel, hawthorn and bramble. The boxes must be securely fixed to trees or shrubs using a durable metal wire.

Management and monitoring

Post-construction monitoring of the dormouse nest boxes will be undertaken annually for five years to evaluate the outcome of the mitigation measures. The nest boxes will be inspected in September by a licensed ecologist in order to assess the success of the mitigation measures by establishing whether dormice have nested in the dormouse boxes. Any damaged dormouse boxes will be repaired or replaced if they are beyond repair. Dormouse boxes will be cleaned out if they have been used by birds or other small mammals.

5.0 IMPLEMENTATION PLAN SUMMARY

The Management Plan requirements are summarised below.

Habitat type	Area / description	Year	Prescription	Time period
Grassland	Created wildflower meadows	Year 1	<ul style="list-style-type: none"> The grassland will be sown with British Wildflower Seeds mid-Dorset wildflower mix seed mixture in the spring or autumn. Due to the high fertility of the soil from arable practices, the top 20cm will need to be removed, or turned over to expose sub-soil. Weed species should be actively removed through pulling during this time. 	
		Year 2	<ul style="list-style-type: none"> The grassland will be cut in September to a height of 4 to 5 cm. The cuttings will be left where they are cut for a period of two weeks before being raked off and removed from the site. 	This cut will be undertaken in September.
		Year 3-5	<ul style="list-style-type: none"> The management practices for this site will be undertaken as outlined for year 2. 	Cuts will occur in September.
			<ul style="list-style-type: none"> Additional sowing of British Wildflower Seeds mid-Dorset wildflower mix seed mixture will be undertaken following the annual cut if it is required in these years. The additional sowing will be undertaken if the floristic diversity has fallen or unforeseeable damage has occurred to the grassland, such as arson or drought. 	This element will be undertaken in September if required.
Woodland glades	Clearance of vegetation, wildflower sowing and shrub planting. Installation of dung heaps.	Year 1	<ul style="list-style-type: none"> Mature trees and shrubs will be removed in the proposed woodland glade areas. Vegetation will be cleared to ground level. Removed wood can be re-used on site for log piles. Cleared areas will then be raked off of grass and existing undergrowth to expose bare soil patches and oversown with the specified wildflower mix. Native shrubs will then be planted along the perimeters of the glades. Regular watering of new shrub planting should be undertaken in summer months and extended drought periods. Grassland will be cut regularly to a low sward height (4 to 5cm) throughout the first year. It is not expected that the wildflower mix will flower in the first year. The dung pile can also be established in year one by importing dung and placing the pile at the back of the glade against the retained mature trees and shrubs. The pile will be approximately 3 metres long, two metres in width and 1 metre in height. 	<p>Tree and shrub clearance to take place outside of bird nesting season.</p> <p>Wildflower seed mix to be sown in spring or autumn.</p> <p>Native shrubs to be planted between October and February.</p> <p>The dung heap should be installed in the first May.</p>
		Year 2	<ul style="list-style-type: none"> In year two the grassland will be cut in September to a height of 4 to 5 cm. The cuttings will be left where they are cut for a period of two weeks before being raked off. Two metres around the margins will be left to create a tall grass and herb zone between the central zone and the scrub and high forest. All new shrub planting should be regularly watered in the first two years during summer months or periods of extended drought. Diseased or damaged trees should be removed and replaced with new plants. Dung heaps will be replenished in May. 	<p>Grass cutting in September.</p> <p>Any replacement planting between October and February.</p>

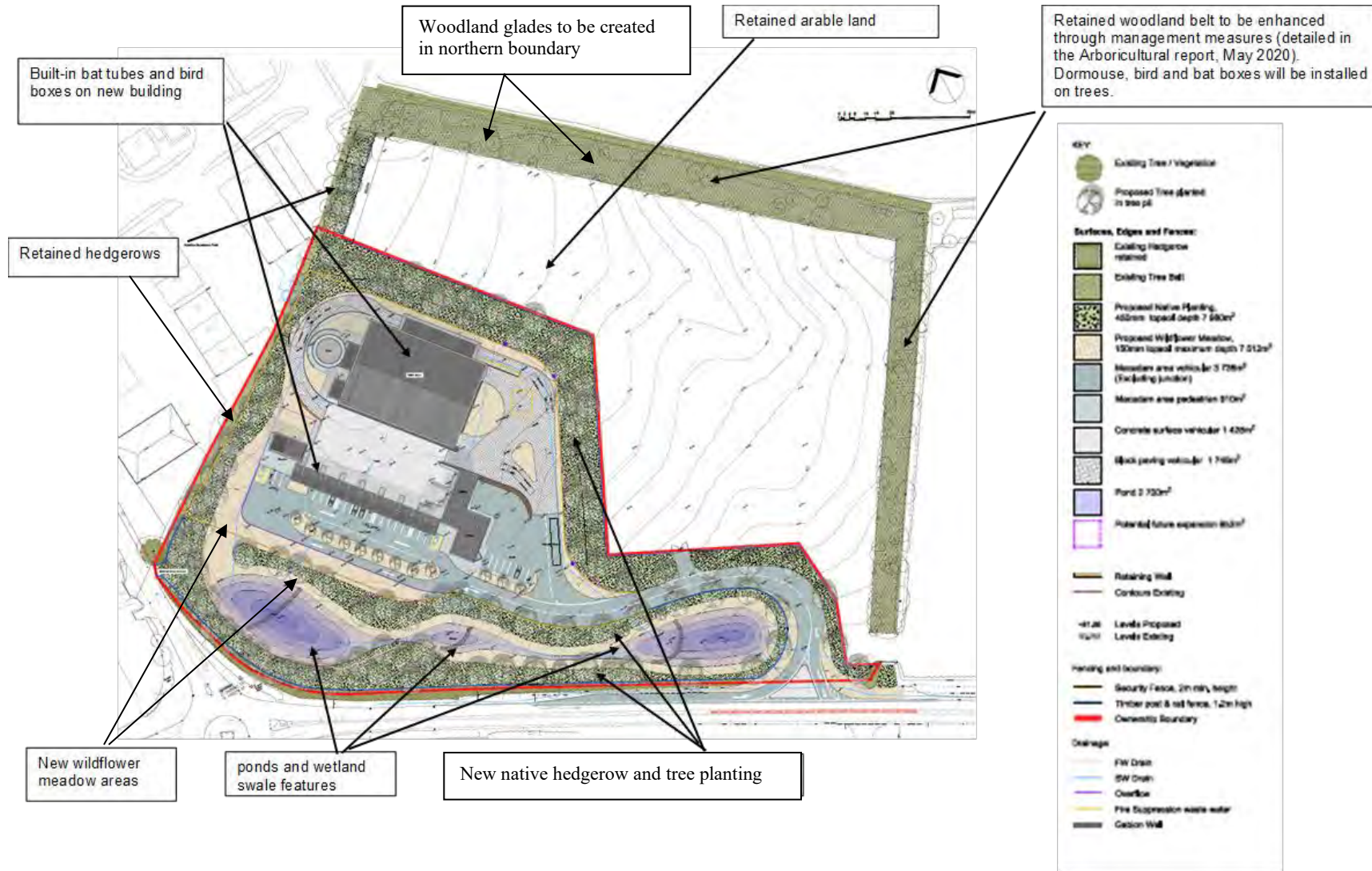
Habitat type	Area / description	Year	Prescription	Time period
		Years 3-5	<ul style="list-style-type: none"> The management practices for the grassland areas will be undertaken as outlined for year 2. Additional sowing of British Wildflower Seeds mid-Dorset wildflower mix seed mixture will be undertaken following the annual cut if it is required in these years. The additional sowing will be undertaken if the floristic diversity has fallen or unforeseeable damage has occurred to the grassland, such as arson or drought. The tree guards on shrubs should be removed if they are constraining growth. Scrub along the southern margins of the glades will be managed to a height of 1.5 metres to ensure plenty of light penetration into the glade. A pathway into the glades will also be made and maintained on each glade. Dead or diseased shrubs should be replaced as outlined between years 1 and 2. From year 4 onwards, three metre patches of scrub will be cut back around the remainder of the margins of the glades. These will be cut on a three year rotational basis to create a varied edge structure, ensure a constant supply of winter berries for birds and egg laying habitat for invertebrates such as butterflies. Arisings will be removed from site. 	<p>This work will be undertaken throughout the years as specified previously.</p> <p>October to March.</p> <p>The shrubs will be cut between October and February.</p>
Hedgerows	Newly planted hedgerows	Year 1-5	<ul style="list-style-type: none"> Annual inspections will be made for five years following planting. 	This work will be undertaken in October to March.
			<ul style="list-style-type: none"> Any gaps that are identified will be planted with new saplings of the species within the hedge. 	This work will be undertaken in October to March.
		Year 1-2	<ul style="list-style-type: none"> Saplings should be watered fortnightly (more regularly in drought conditions) 	This work will be undertaken between May and September.
			<ul style="list-style-type: none"> Weed species and naturally colonising saplings will be removed from the base of the hedgerow by hand 	This work will be undertaken in October.
		Years 3-4	<ul style="list-style-type: none"> No management should be required in this period, although dead and diseased trees should be removed and replaced 	This work will be undertaken when deemed appropriate.
Year 5	<ul style="list-style-type: none"> The tree protection tubes will be removed from the established hedgerow plants to ensure the hedgerow does not develop gaps at the bottom. The success of the management regime will be assessed, and the timing or frequency of cutting will be adapted where necessary. All elms should be kept at 3 metres or below to avoid them reaching the mature stage where the elm bark beetle becomes attracted to the plants. 	This work will be undertaken when deemed appropriate.		
Wetland features	Newly planted pond margins and fully aquatic species.	Years 1-2	<ul style="list-style-type: none"> Marginal plants not submerged, should be watered fortnightly (more regularly in drought conditions). 	This work will be undertaken between May and September
			<ul style="list-style-type: none"> Weed species that establish around the pond should be removed unless they are appropriate aquatic species. Any gaps in planting through plant death should be replanted on review of the efficiency of the original planting plan. 	This work will be undertaken when deemed appropriate.
		Years 3-4	<ul style="list-style-type: none"> If some areas of wetland features have become choked with leaf litter, then this should be removed to ensure optimal water quality. Some staggered clearance of small sections of native weed species through raking may also be required to maintain a diversity of conditions within the ponds for amphibian populations. 	The best time to carry out this work is in the autumn or late spring, when amphibians are least likely to be in the pond and are still active.
Bat roosting habitat	Installation of 10 bat boxes	Year 1	<ul style="list-style-type: none"> Bat boxes installed on buildings and trees away from artificial light. 	No timing restrictions.
		Years 2-5	<ul style="list-style-type: none"> Annual inspections for signs of occupation by a licensed ecologist. Replacement of damaged or missing boxes. 	No timing restrictions.

Habitat type	Area / description	Year	Prescription	Time period
Dead wood habitat	Installation of 10 log piles in woodland glades and along tree belt	Year 1	<ul style="list-style-type: none"> The log piles will comprise stacked heaps of assorted logs and branches of various shapes and sizes. Some of these heaps will also be positioned within a shallow hole in the ground. 	No timing restrictions.
		Years 2-5	<ul style="list-style-type: none"> Monitoring to check that the log piles have not been disturbed or removed will be undertaken in June on an annual basis for a maximum of five years post development. 	Check in June, avoiding hibernation period for reptiles and amphibians.
Bird nesting habitat	Installation of 10 bird boxes on trees	Year 1	<ul style="list-style-type: none"> Bird boxes to be installed on suitable mature trees within the woodland belt, as illustrated in appendix II. 	No timing restrictions
		Years 2-5	<ul style="list-style-type: none"> The bird nest boxes will be checked annually to ensure that they are still present and have not been damaged. Any used nests will be removed and any damaged or missing boxes will be replaced. A record of evidence of nesting within the boxes will be maintained. Where the barn owl boxes are occupied by barn owl a suitably licensed surveyor must conduct the monitoring and any management. 	The annual monitoring and management will need to take place outside of bird nesting season, therefore between September and February.
Dormouse nesting habitat	Installation of 10 dormouse boxes	Year 1	<ul style="list-style-type: none"> A total of 10 dormouse nest boxes will be installed in suitable habitat on site including on trees and within hedgerows around the site boundary, as illustrated in appendix II. 	No timing restrictions
		Years 2-5	<ul style="list-style-type: none"> Monitoring of the dormouse nest boxes will be undertaken annually to evaluate the outcome of the mitigation measures. The nest boxes will be inspected by a licensed ecologist in order to assess the success of the mitigation measures by establishing whether dormice have nested in the dormouse boxes. Any damaged dormouse boxes will be repaired or replaced if they are beyond repair. Dormouse boxes will be cleaned out if they have been used by birds or other small mammals. 	<p>The nest boxes will be inspected in September.</p> <p>Cleaning to take place during hibernation period from November to February.</p>

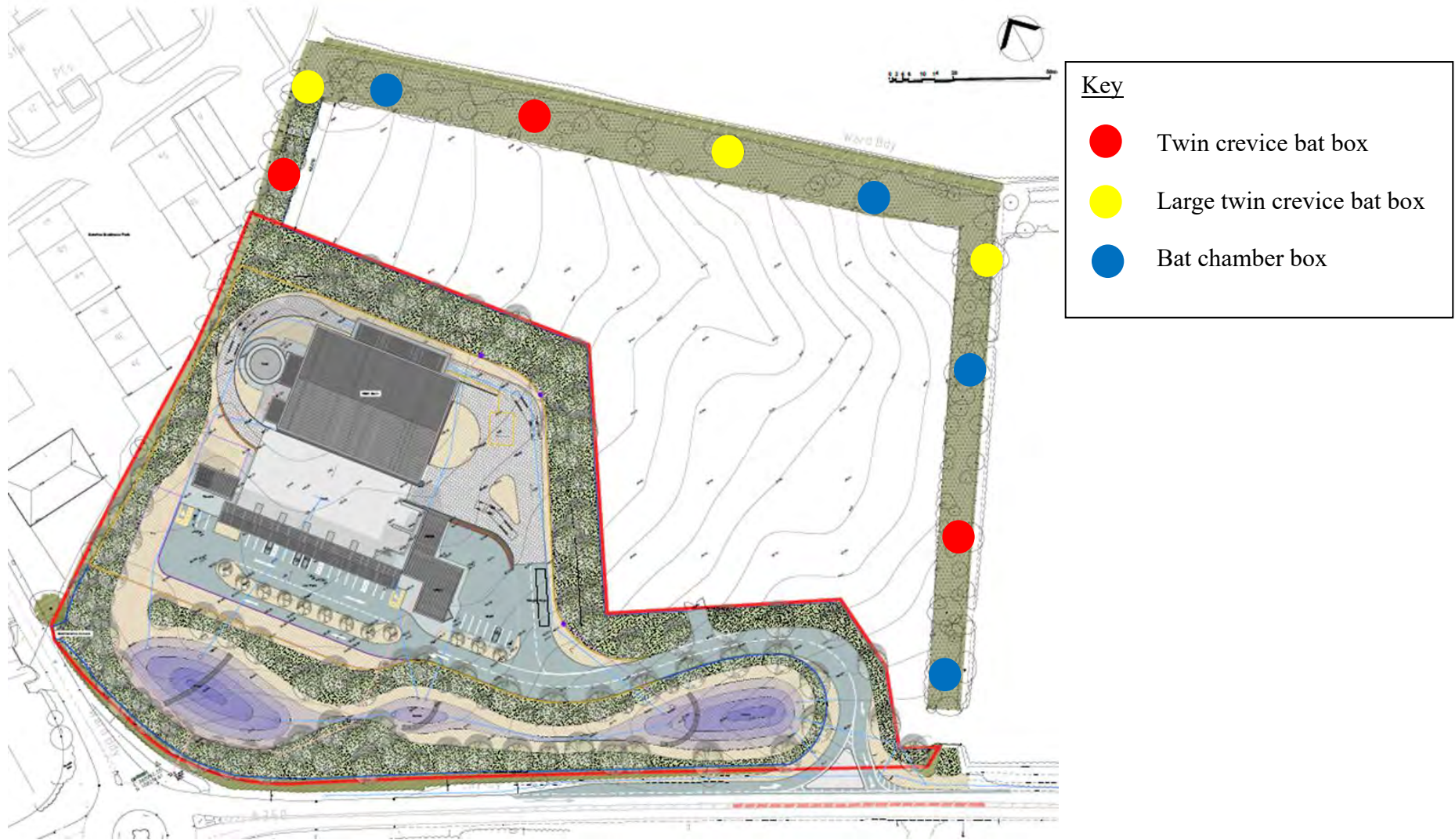
APPENDIX I: Design proposal



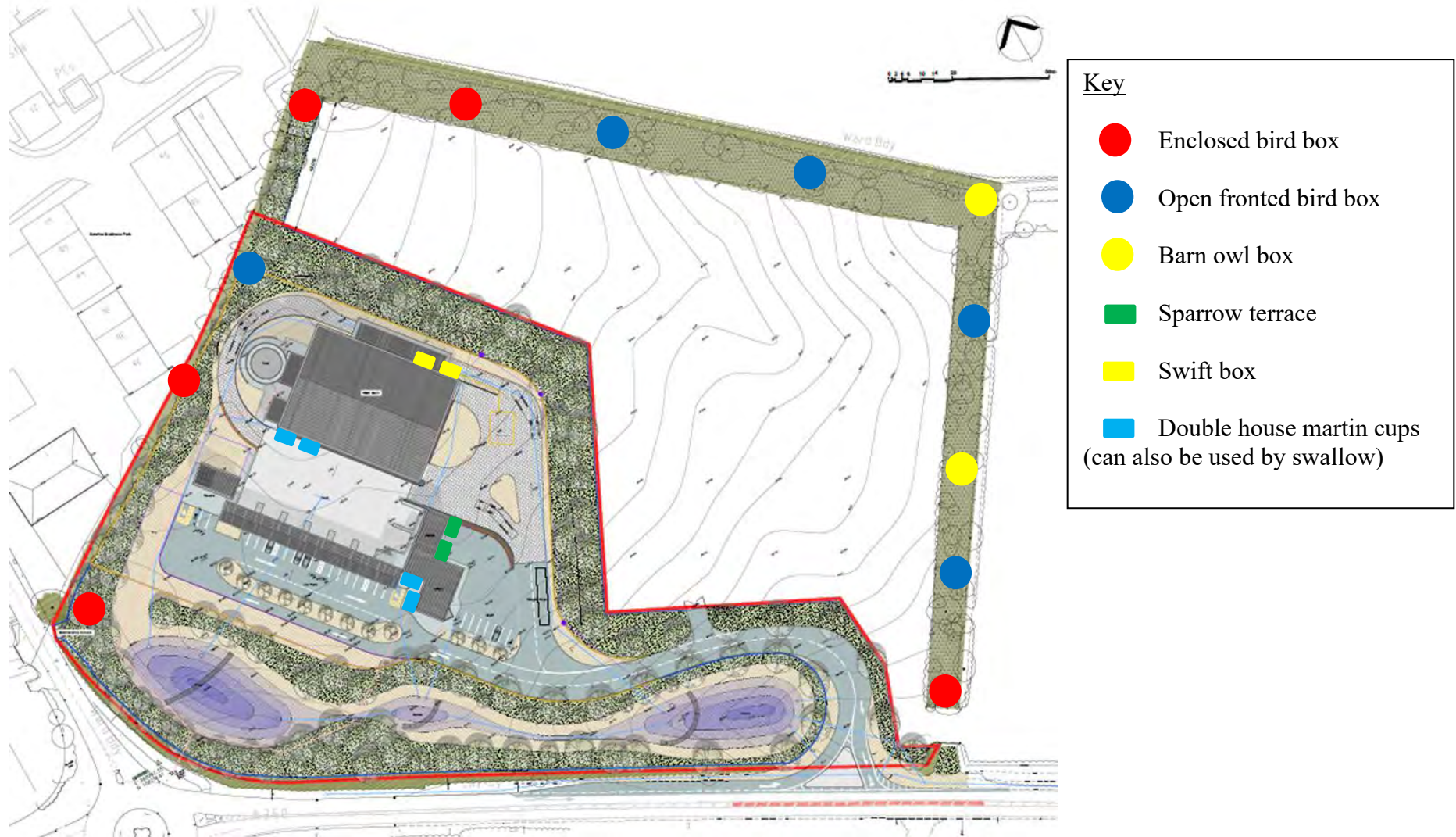
APPENDIX II: Ecological enhancement



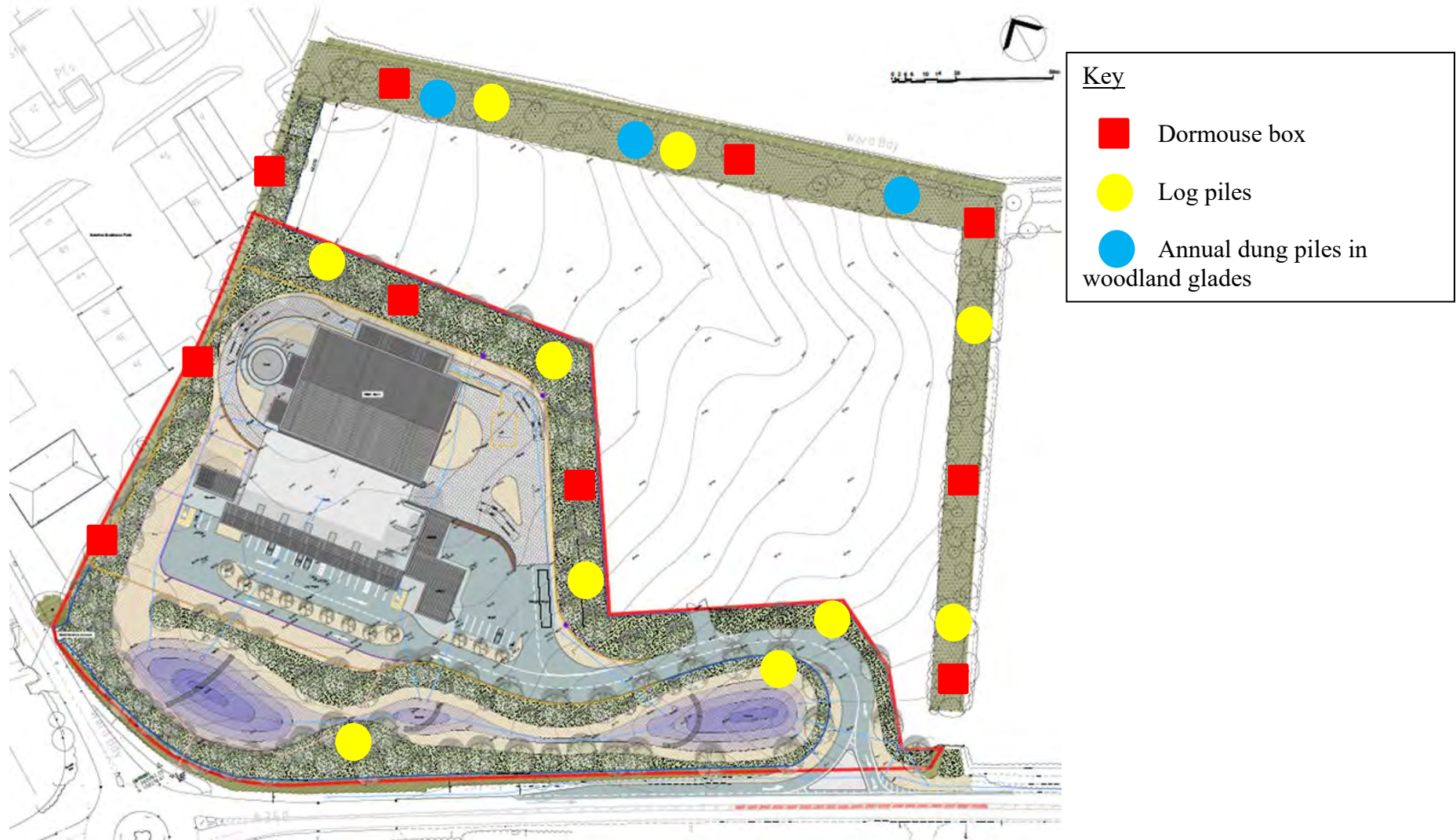
Bat box installation plan



Bird box installation plan



Dormouse box, log piles and dung pile installation plan



APPENDIX III: Habitat features

