TI’R ISHA EMPLOYMENT SITE

Flood Consequence Assessment

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Ti’r Isha Employment Site
1
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Quality Management

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1 INTRODUCTION

1.1 RPS was commissioned to prepare a Flood Consequence Assessment (FCA) and Conceptual Surface water drainage strategy for an outline planning application for a site located at Land at Junction 35 of the M4, near Bridgend.

1.2 The aim of the FCA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk.

1.3 The report has been prepared in accordance with the guidance detailed in the Planning Policy Wales and Technical Advice Note 15 (TAN15): Development and Flood Risk. Reference has also been made to the Bridgend County Borough Council Preliminary Flood Risk Assessment (PFRA) and Local Flood Risk Management Strategy (LFRMS).

1.4 The Conceptual Surface Water Drainage will provide details regarding the management of surface water runoff from the proposed development. This report is not intended to provide formal details of the final drainage design for the development. However, it provides information regarding the capabilities of the conceptual surface water drainage strategy to meet the requirements of national and local policy.

1.5 This report has been prepared in consultation with the Natural Resource Wales (NRW) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage District (IDD) District.

1.6 The desk study was undertaken by reference to information provided / published by the following bodies:

- NRW;
- Bridgend County Borough Council (BCBC);
- British Geological Survey (BGS);
- Ordnance Survey (OS); and
- Welsh Water.

2 PLANNING POLICY

National Planning Policy

Technical Advice Note (TAN) 15: Development and Flood Risk

2.1 TAN 15 provides technical guidance to supplement the policy set out within Planning Policy Wales in relation to development and flooding. The guidance relates to sustainability principles and provides a framework to allow risks arising from river flooding, coastal flooding and additional run off from developments to be assessed.

2.2 In relation to flood risk, TAN 15 indicates that the Assembly has a duty to ensure that development is sustainable and does not create problems for future generations. Managing flooding has an important role to ensure sustainable development by: guiding developments to locations with little or no risk from river, tidal or coastal flooding, managing consequences of flooding where developments can be justified and making provision for climate change.

2.3 TAN 15 confirms that each planning authority in Wales must prepare a Development Plan for its area. The development plans provide locational guidance for development, detailed site-specific policies, and identification of proposals for development. Catchment Flood Management Plans aim to take a holistic approach to flood management at a catchment scale and can provide guidance on managing risk to future developments. The information provided in local development plans and catchment flood management plans will aid with the application of the Justification Test.

Requirements of TAN 15

2.4 A FCA, to support a development application, should be proportionate to the risk and appropriate to the scale, nature and location of the development. The following will need to be considered;

- The consequences of flooding on the development, the consequences of the development on flood risk elsewhere and if appropriate mitigation measures can be incorporated into the design.
- Mechanisms of flooding, including sources of floodwater, how floodwater enters and flows across a site, height, and speed of floodwaters.
- Uncertainties in estimating flood events including use of historical records and forecasting.
- Security of proposed developments over their lifetime and ensuring those using the development have an awareness of the potential risks from flooding.
- Description of consequences under a range of extreme events including: mechanisms, sources, depths, speed, rate of rise, overland flood routes, velocity, access and egress, impacts on natural heritage, impact on flood risk in surrounding areas.
- Structural adequacy of defences to contain flows and withstand overtopping and if required the suitability of implementing a buffer zone adjacent to defences.
- Measures required to ensure flooding is managed to acceptable levels and ensure that the impact upon flood risk elsewhere in the flood plain is managed.

Emerging TAN15

2.5 In December 2021, the Welsh Government released a new TAN15 which is due to become adopted policy advice on 1 June 2023. This new national strategy is set to recognise the degrees of flooding in the present day and in the future.

2.6 Although the emerging TAN15 is yet to be adopted, reference has been made and the new mapping has been included throughout this FCA.

Planning Policy Wales Edition 12, 2024

2.7 Planning Policy Wales Edition 12 sets out the land use planning policies of the Welsh Government. Chapter 6 – Distinctive and Natural Places outlines the Welsh Government's objectives in terms of addressing water and flood risk.

2.8 Section 6.6 of Planning Policy Wales addresses water and floor risk. The relevant guidance is summarized below:

- The planning system should:
  - protect and improve water resources and quality by promoting and encouraging increased efficiency and demand management of water as part of new developments;
  - ensure that the infrastructure networks, including nature based solutions on which communities and businesses depend is adequate to accommodate proposed development, and takes into consideration the impacts of climate change, so as to minimise risk to human health and the environment and prevent pollution at source;
  - ensure sustainable drainage systems are an integral part of design approaches for new development; and
  - ensure the protection of the quantity and quality of surface and ground water supplies is taken into account as part of development proposals.
- Water resources and quality must be taken into account from an early stage in the process of identifying land for development and redevelopment.
- Ensuring the implementation of nature based solutions through green infrastructure provision is a key preference and protecting river corridors should be maximised. The identification of managed wetland and riparian buffer zones should be a key output of assessments to improve water quality, by reducing pollution and securing a net benefit for biodiversity and improving the attributes of ecosystem resilience.
- New development should be located and implemented with sustainable provision of water services in mind, using design approaches and techniques which improve water efficiency and minimise adverse impacts on water resources, including the ecology of rivers, wetlands and groundwater and thereby contributing towards ecological resilience.
- Planning authorities should secure better management of drainage and surface water so as to tackle these issues by:
  - ensuring sustainable drainage systems are incorporated into development enabling surface water to be managed close to or at source; and
  - ensuring connection to the sewer in sewered areas and by minimising the proliferation of private sewage systems.
- New developments of more than one dwelling or where the area covered by construction work equals or exceeds 100 square metres also require approval from the SuDS Approval Body (SAB) before construction can commence. This will ensure that SuDS infrastructure is properly maintained and functions effectively for its design life.
- The provision of SuDS must be considered as an integral part of the design of new development and considered at the earliest possible stage when formulating proposals for new development.
- Planning authorities should adopt a precautionary approach of positive avoidance of development in areas of flooding from the sea or from rivers. Surface water flooding will affect choice of location and the layout and design of schemes, and these factors should be considered at an early stage in formulating development proposals.

- Development should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development site itself. The priority should be to protect the undeveloped or unobstructed floodplain from development and to prevent the cumulative effects of incremental development.
- In areas of flood plain currently unobstructed, where water flows in times of flood, built development should be wholly exceptional and limited to essential transport and utilities infrastructure.
- Development should not cause additional run-off, which can be achieved by controlling surface water as near to the source as possible by the use of SuDS.
- The ability of emergency services to respond to flood events should be taken into account when considering if a development in a flood risk area is appropriate. This may involve consultation with emergency planners, local resilience forums and other professional partners such as fire rescue, police and ambulance services.

2.9 Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). TAN15 provides technical guidance on development and flood risk.

Flood and Water Management Act 2010

2.10 Schedule 3 of the Flood and Water Management Act (FWMA) 2010 requires surface water drainage for new developments to meet national standards for sustainable drainage, including CIRIA 753: The SuDS Manual.

Local Planning Policy

Local Development Plan

2.11 The BCBC Local Development Plan 2018-2033 was adopted in March 2024. Policies relevant to this assessment are included below:

Policy SP4: Mitigating the Impact of Climate Change

'All development proposals must make a positive contribution towards tackling the causes of, and adapting to the impacts of Climate Change. Means of achieving this may include:

1. *Having a location and layout which reflects sustainable transport and access principles, thereby reducing the overall need to travel (active travel);*
2. *Having low / zero carbon energy requirements by reducing energy demand, and promoting energy efficiency;*
3. *Utilising low carbon, local materials and supplies (adopting circular economy principles);*
4. *Encouraging the development of renewable and low/zero carbon energy generation;*
5. *Having a design, layout and landscaping which:*
    - *(i) helps wildlife and habitats to adapt to the changing climate;*
    - *(ii) assists cooling of the urban environment, including the use of passive building techniques where appropriate;*
6. *Using resources more efficiently, including averting waste generated from demolition and minimising waste water use and pollution;*
7. *Directing development away from flood risk areas, and avoiding development that increases the risk of flood and coastal erosion, including through the deployment of sustainable urban drainage systems where relevant.'*

'[…] The Policy seeks to steer highly vulnerable development away from flood risk areas, to assess the implications of development in areas at risk of flooding and to ensure that new development does not increase the risk of flooding elsewhere. The Flood Map for Planning accompanying TAN 15 includes climate change information to show how this will affect flood risk extents over the next century, along with the potential extent of flooding assuming no defences are in place. The Flood Map for Planning has been supplemented by a Strategic Flood Consequences Assessment for Bridgend County Borough. This information has influenced the siting and type of development allocations within the Replacement LDP, and will also inform policies on flood risk whereby subsequent development proposals can be assessed. A new SPG will also be prepared to set the framework for a local approach to flood risk management within Bridgend Town Centre.[..]'

Policy DNP9: Natural Resource Protection and Public Health

'Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to:

1. *Air pollution;*
2. *Noise pollution;*
3. *Light pollution;*
4. *Water pollution;*
5. *Contamination (including invasive species);*
6. *Land instability;*
7. *Sustainable development of mineral resources;*
8. *Sustainable waste management;*
9. *Any other identified risk to public health or safety.*

Development in areas currently subject to the above will need to demonstrate mitigation measures to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level. The use of construction phase Pollution Prevention Plans are encouraged, where appropriate, to demonstrate how proposals can prevent development water run-off from causing pollution of the water environment. All proposals within HSE consultation zones must also demonstrate the acceptability and need for development. All development in flood risk areas must be supported by a Flood Consequences/Risk Assessment and incorporate any mitigation measures required to avoid or manage increased flood risk.'

'The improvement of environmental quality as a result of development is positively encouraged. This can be achieved, for example, through: the remediation of contaminated land as part of redevelopment; the use of SuDS which can achieve betterment in the reduction of surface water run-off and ultimately reduce flood risk; or replacing existing obtrusive lighting with a low level scheme.'

Preliminary Flood Risk Assessment

2.12 A Preliminary Flood Risk Assessment (PFRA) was produced in 2011 by BCBC. The PFRA is aimed at providing high level overview of flood risk from all sources of flooding within the local area, including consideration of surface water, groundwater and ordinary watercourses. Relevant information has been referenced throughout this report.

Strategic Flood Consequence Assessment

2.13 The BCBC Strategic Flood Consequence Assessment (SFCA) was updated in October 2020 and is supported by the SFCA Site Screening Update published in 2022. The SFCA aims to understand the risks of various flooding sources that Bridgend may face, take proactive steps to mitigate these risks, raise awareness across communities and prepare for any such event. Local flood risk is any flood risk that derives from surface runoff, groundwater, or ordinary watercourses. Relevant information has been referenced throughout this report.

Climate Change Allowances

2.14 The TAN15 states that when considering new development proposals, it is necessary to take account of the potential impact of climate change over the lifetime of development. A lifetime of 75 years is assumed for non-residential developments. To ensure future development can provide a safe and secure living and /or working environment throughout its lifetime, national planning policy requires proposals in areas of high flood risk to be accompanied by an assessment of flooding consequences to and from the development, taking into account the impacts of climate change.

2.15 In line with TAN15, the climate change allowances have been informed by latest available information on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere. Allowances are provided for different epochs (periods) of time over the next century. This guidance will be reviewed when more up-to-date climate change research is available.

2.16 Supplementary guidance published by the Welsh Government provides climate change allowances for different epochs (periods) of time over the next century. This guidance will be reviewed when more up-to-date climate change research is available. It is recommended that the 2080s changes are used when considering any time beyond 2115.

2.17 **Table 1** presents both the central and upper end estimates for climate change associated with rainfall intensity.

Table 1. Change to extreme rainfall intensity compared to a 1961-90 baseline

Applies across all of Wales	Total potential change anticipated for '2020s' 2015- 39)	Total potential change anticipated for '2050s' (2040- 2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

[1] Welsh Government Climate Change Allowances - www.gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf

3 CONSULTATION

Natural Resource Wales

3.1 The FCA has been prepared in consultation with the Partnership and Strategic Overview Team at NRW. NRW provided the Aberkenfig (2014) and Bridgend (2018 and 2022) flood models, which RPS extracted and processed. As the 2022 Bridgend model was more up to date it was carried forward in the assessment. The information provided by NRW is included as **Appendix A** and is summarised in Section 6.

Internal Drainage District

3.2 The site is not located within an IDD District.

Bridgend County Borough Council

3.3 BCBC was consulted on the site, a response was received on the 6th December 2024, the response is included in **Appendix B** and is summarised below:

- BCBC holds no drainage information for the site but suggests it may be possible the site receives highway discharges from both the A4063 and the M4.
- It is advised a greenfield runoff rate would be a suitable restriction rate when considering any drainage design.
- The minor watercourse crossing the site would be classed as an ordinary watercourse, alterations to this will require Flood Defence/Land Drainage Consent, any proposal to culvert this would generally be refused apart from small lengths for access purposes.

4 SITE DESCRIPTION

4.1 The site is located at National Grid Reference SS 90250 82909, is roughly rectangular in shape and occupies an area of approximately 4.16 hectares (ha). The site location is presented in **Figure 1**.

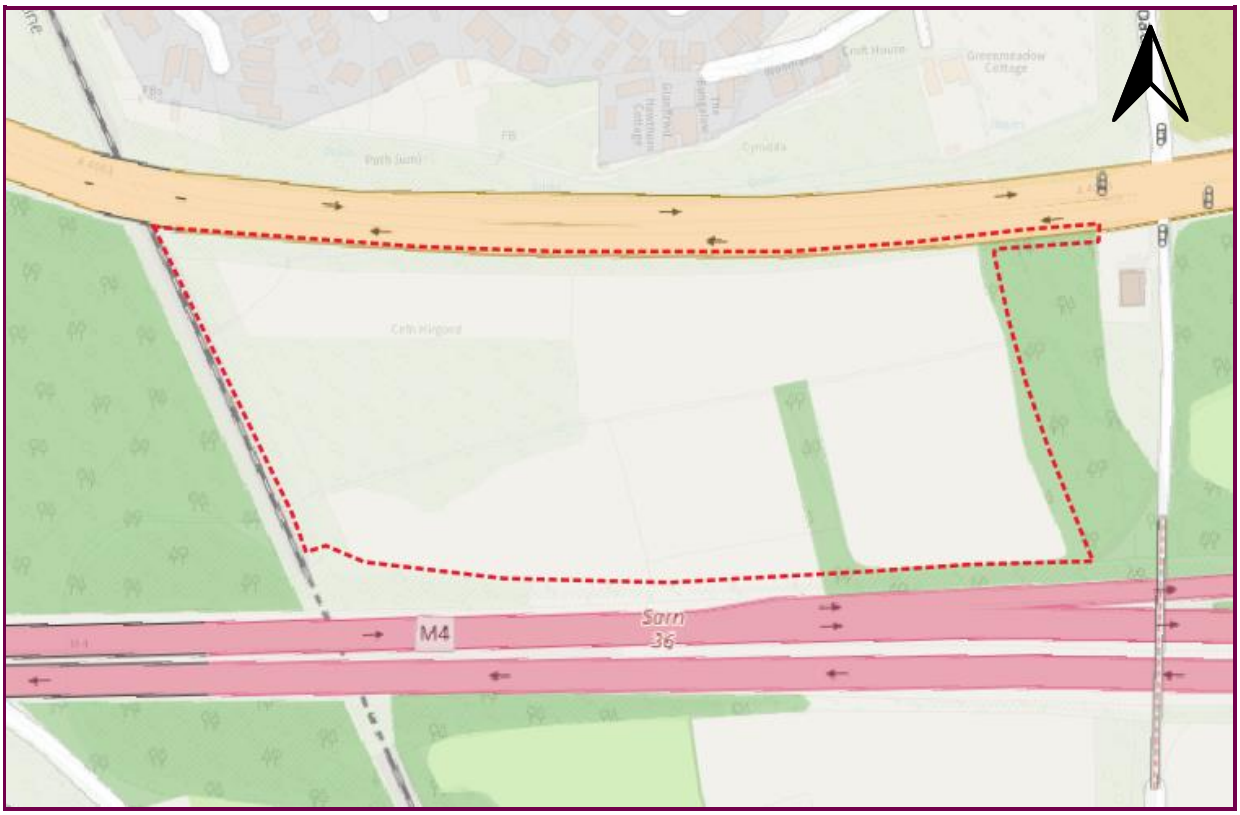


Figure 1. Site Location Plan

4.2 Aerial imagery indicates that the majority of the sites currently comprises vegetated fields and mature trees/hedgerows. An ordinary watercourse bisects centre of the site from east to west.

4.3 Access to the site is from the north via the A4063.

Surrounding Land Uses

4.4 The M4 motorway runs along the southern boundary of the site, with the Bridgend Designer Outlet, small businesses and some residential dwellings beyond. The A4063 runs along the northern boundary of the site, with residential dwellings beyond and Sarn Park Services to the east of the site. Woodland is located to the east and west of the site, with Ogmore River being seen approximately 140m southwest at its closest point.

4.5 There are no designated sensitive areas (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) or Site of Special Scientific Interest (SSSI)) within close proximity to the site.

Topography

4.6 In lieu of a topographic survey, LiDAR has been used to estimate levels on site, it indicates that site generally slopes from east to west. The highest elevations of around 64 metres above ordnance datum (mAOD) are located in the southeast corner, with levels falling to around 42 mAOD in the west. The LiDAR data is presented in **Appendix C**.

4.7 It should be noted that LiDAR data contains an error margin of +/- 150mm.

5 PROPOSED DEVELOPMENT

5.1 The site is allocated in the LDP under ENT 1 and 2 for Business use, it is proposed to apply for outline permission for the construction of an employment unit. Post development it is expected the site will be approximately 75% hardstanding, comprising 1 large unit with 3no. floors made up of employment uses and are shown in **Appendix D**.

5.2 The proposed development will require the diversion of the onsite ordinary watercourse. The diversion will be subject to land drainage consent by BCBC.

5.3 Vehicular / pedestrian access to the site is proposed to be from the northeast corner via a new junction taken from the A4063.

5.4 Due to the site sloping to the west, the lower ground floor is proposed in the western half of the building where the ground levels are approximately 7m lower. The ground floor will be built level with the ground in the east, with the first floor proposed above this. An internal access road enables vehicular and pedestrian access to the ground floor and lower ground floor.

5.5 According to Table 2 in Section 5 of TAN15, general employment and industry sites are classified as ‘Less Vulnerable’.

5.6 Surface water runoff is anticipated to pass to the existing drain on site, following its diversion to the south.

5.7 The potential to provide surface water attenuation, including the use of Sustainable Drainage Systems (SuDS), has been considered as part of the preliminary design process (see Section 10 – Surface Water Management).

6 HYDROLOGICAL SETTING

Nearby Watercourses

6.1 OS mapping indicates a small drain is present running in a westerly direction through the centre of the site.

6.2 The River Ogmore is present approximately 140m southwest of the site at its nearest point and flows south. The ordinary watercourse on site is culverted beneath the railway tracks to the west and discharges into the River Ogmore approximately 155m from the site.

6.3 No significant artificial watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site.

Published Flood Zone

6.4 The Welsh Assembly Government produces Development Advice Maps (DAM) to accompany TAN 15. These maps show the degree of flood risk which is to be applied to the site for the planning process and thus establish the suitability of the site for development. These maps are based upon the NRW flood maps and similarly they can be modified through the presentation of data (i.e. hydraulic modelling) to illustrate that a site is within a different flood zone. The DAM is presented in **Figure 2**, below.

6.5 The DAM indicates that the site is located within Zone A. Zone A is described in TAN15 as those areas "considered to be at little or no risk of fluvial or coastal/tidal flooding".

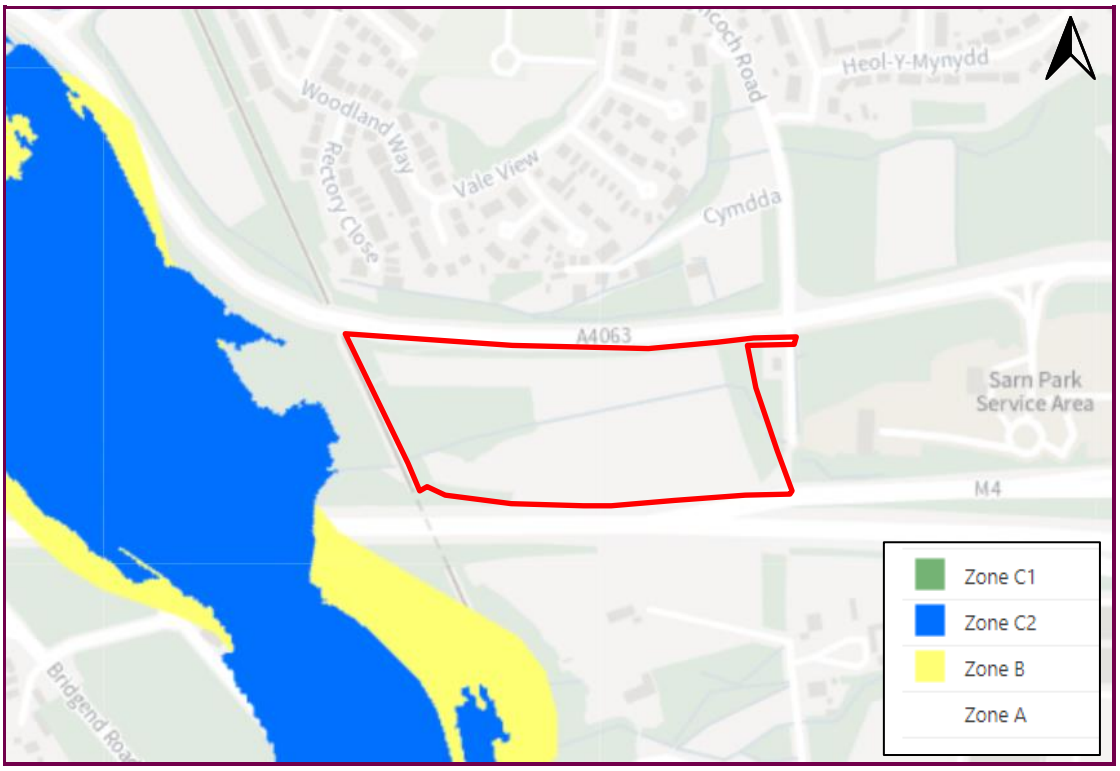


Figure 2. NRW Development Advice Map

6.6 RPS notes that TAN 15 (published in 2004) and TAN 14 (published in 1998) are being replaced by a new TAN 15. The existing documents will both be cancelled, and the current TAN 15 Development Advice Map will be replaced by a new Flood Map for Planning, which is available in advance. Although the Flood Map for Planning has no official status for planning purposes at the time of

writing, the new maps have been referenced and discussed below alongside the current NRW flood mapping.

Tidal Flood Risk

6.7 The current NRW Flood Risk from the Sea map indicates that the site is not considered at risk of sea flooding. Additionally, the new NRW Sea Flood Zones do not encroach the site boundaries.

Fluvial Flood Risk

6.8 The new NRW Flood Map for Planning is included as Figure 3. These Flood Zone classifications are synonymous with Environment Agency Flood Zones and take account of the anticipated impacts of climate change.

6.9 The NRW's new Flood Map for Planning (for rivers and the sea) identifies that the site is classified as the equivalent as Flood Zone 1, whereby the annual probability of flooding is less than 1 in 1,000 (0.1%).

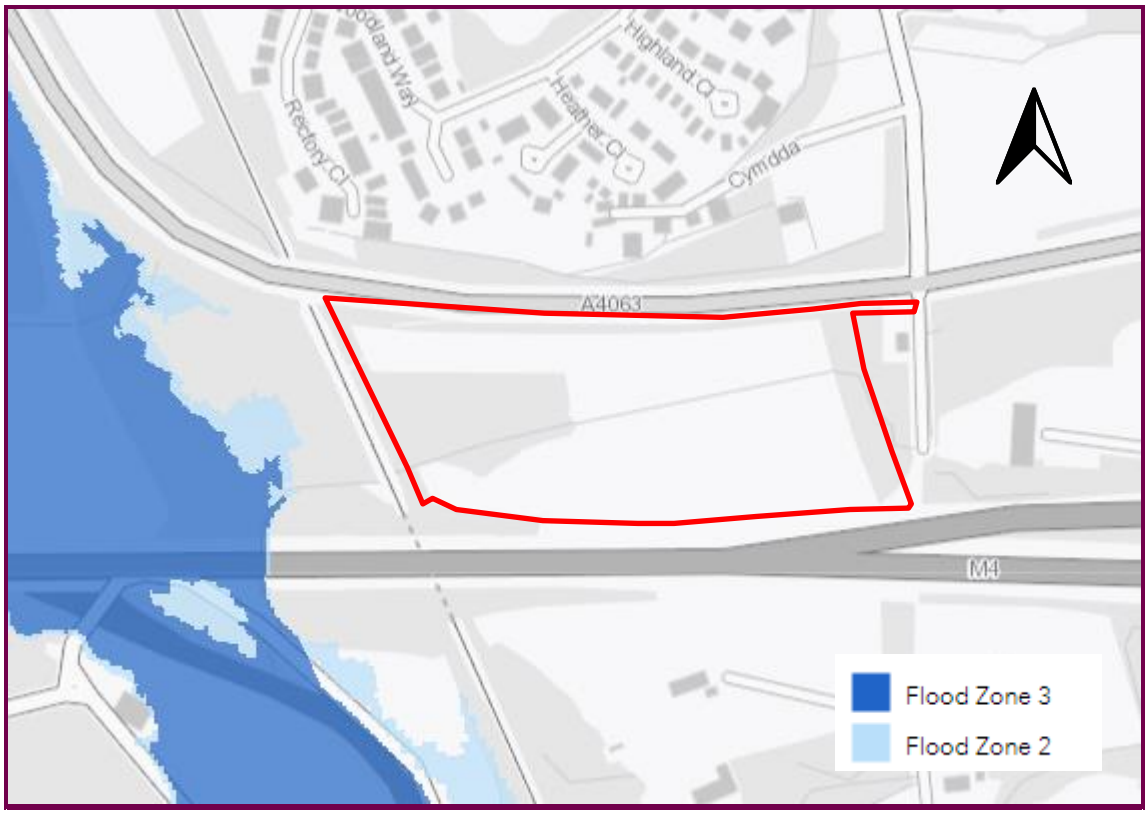


Figure 3. NRW Flood Map for Planning (Rivers and the Sea)

NRW Flood Modelling

6.10 The NRW has been consulted for additional information relating to the fluvial flood risk to the site. The flood models for Aberkenfig (2014) and Bridgend (2022) were provided which RPS extracted and processed. Key information of relevance to this assessment is summarised below and the full mapping outputs are provided in Appendix A.

- In the Aberkenfig (2014) model in both the defended and undefended scenarios, the site is shown to be outside the flood event for the 1 in 100-year, 1 in 100 plus 20% climate change and 1 in 1,000-year events.

- The Bridgend (2022) model provided flood extents for the 1 in 1000 year + climate change event, these extents did not impact the site and remained southwest of the site, south of the M4 motorway.

Surface Water Flood Risk

6.11 The NRW's new Flood Map for Planning includes Flood Zones for surface water and small watercourses with consideration for climate change and how it will affect flood risk extents over the next century and is provided in Figure 4.

6.12 The NRW's new Flood Map identifies that the majority of the site is classified as the equivalent as Flood Zone 1, whereby the annual probability of flooding is less than 1 in 1,000 (0.1%).

6.13 However, there are areas associated with Flood Zone 2 (0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding) and Flood Zone 3 (Areas with more than 1% (1 in 100) chance of flooding) seen in the south of the site. Small, isolated areas of Flood Zone 2 are also seen in the north. The watercourse diversion is proposed in proximity to this flood extent with watercourse diversion to be appropriately designed at detailed design stage following receipt of detailed topographical survey.

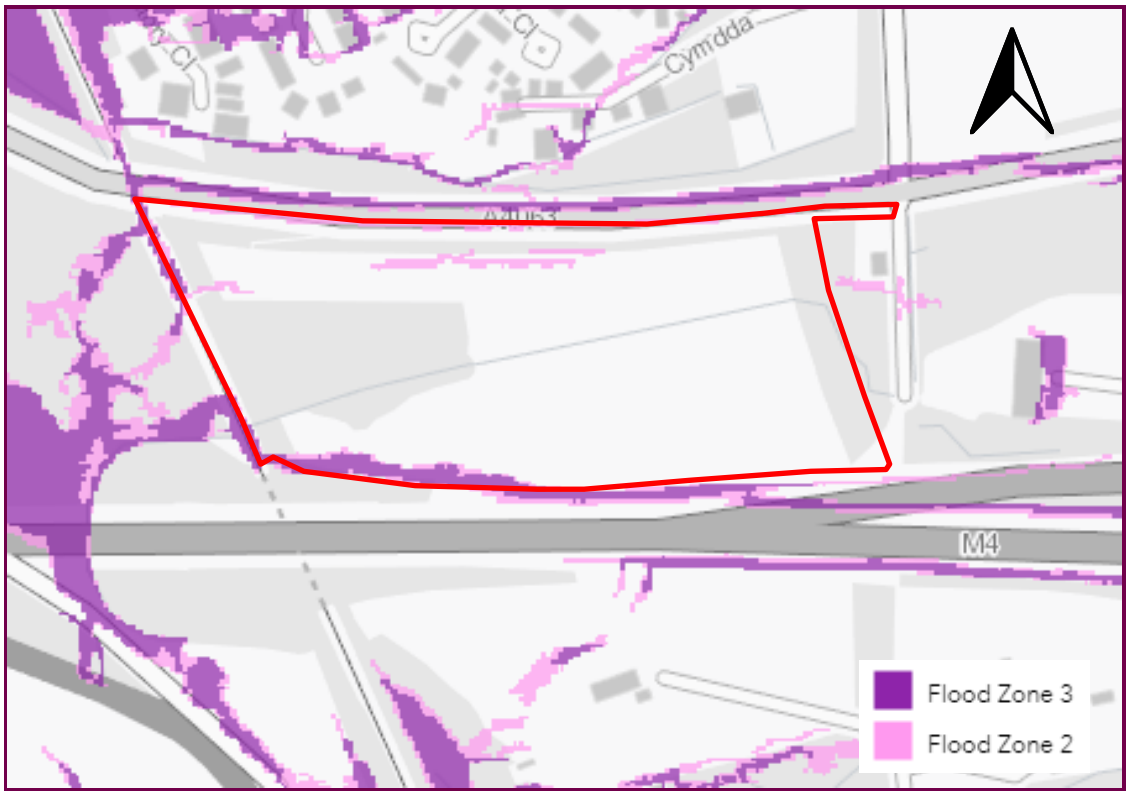


Figure 4. NRW Flood Map for Planning (Surface Water)

Reservoir Flood Risk

6.14 NRW mapping also indicates that the site is not located within an area potentially at risk from reservoir flooding.

Local Authority Flood Consequence Assessment

6.15 The BCBC SFCA was published in October 2020. It provides an overview of flood risk from various sources within the borough. Information relevant to this assessment is summarised below:

- The River Ogmore is a Main River within BCBC;

- One record of historical surface water flooding is shown in the vicinity of the site however the precise location or cause is not given;
- NRW's Historic Flood Map identifies no historic flooding has occurred on the site;
- The PFCA produced in 2011 is referenced and confirms no sewer flooding records are shown to be in proximity of the site.
- Groundwater levels at the site are shown to be between 0.5m and 5m below the ground surface.

7 HYDROGEOLOGICAL SETTING

7.1 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is primarily situated on superficial deposits of Diamicton Till. This is underlain by mudstone, siltstone and sandstone belonging to the Marros Group.

7.2 One borehole has been identified on site. The borehole (BGS reference: SS98SW48) confirms the presence of glacial till and silty clay superficial deposits, underlain by sandstone and siltstone. It is unclear from the record if groundwater was struck. A nearby record, 20m east of the site towards the service station indicated groundwater was encountered at 5.79m below ground level (BGL).

7.3 The majority of soil in the site is described as ‘slowly permeable wet very acid upland soils with a peaty surface’ by the National Soils Research Institute. Along the west boundary, soils are described as ‘freely draining floodplain soils’.

7.4 According to the NRW Aquifer Typology Mapping, the bedrock is classified as a Secondary A Aquifer. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers. The superficial deposits are classified as Secondary Undifferentiated aquifers, these formations have varying characteristics in different locations.

7.5 According to NRW mapping, the site is identified to have ‘Medium’ groundwater vulnerability.

7.6 NRW online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

8 FLOOD RISK AND MITIGATION

8.1 The key sources of flooding that could potentially impact the site are discussed below:

Fluvial/Tidal Flooding

8.2 The DAM indicates that the site is considered to be at little or no risk of fluvial or coastal/tidal flooding.

8.3 The NRW Flood Map for Planning also indicates that the site is located within Flood Zone 1. The annual probability of flooding is classified as less than 1 in 1,000.

8.4 The SFCA indicates that no historical flood records are held at the site.

8.5 TAN15 details the suitability of different land uses within each flood risk classification. The proposed land use is classified as 'less vulnerable' and such uses are generally considered appropriate within Zone A.

Flooding from Sewers

8.6 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity.

8.7 The SFCA shows no sewer flood records in the vicinity at the site.

8.8 No site-specific sewer flood history data was available at the time of writing. In the unlikely event of a sewer surcharging event, flows will be conveyed via gravity and follow local topography. As the site slopes to the north and Welsh Water assets are located to the north, it is considered that water would not flow towards the development.

Surface Water Flooding (Overland Flow)

8.9 Surface water flooding can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems.

8.10 The new NRW Flood Map for Planning, which takes into consideration the effects of climate change, states that the site is predominantly located within Flood Zone 1, with small areas along the southern boundary classified as Flood Zone 2 and Flood Zone 3. It is noted this extent of the site is not subject to any hardstanding development.

8.11 BCBC suggests it may be possible the site receives highway discharges from both the A4063 and the M4.

8.12 The proposed diversion is in proximity to the surface water flood extent. Currently, LiDAR shows these flows are likely to be conveyed via gravity along the base of the motorway embankment which forms the southern boundary of the site.

8.13 Further assessment will be undertaken at detailed design, following receipt of a topographical survey and details of existing site conditions and refined site layout plans.

8.14 Surface water runoff generated as a result of the development is being considered in a conceptual drainage strategy detailed in Section 10, minimising the impact the development will have on surface water at the site.

Groundwater Flooding

8.15 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures. NRW Aquifer Typology Mapping, the bedrock is classified as a Secondary A Aquifer and the superficial deposits are classified as Secondary Undifferentiated aquifers

8.16 The site has a 'medium' groundwater vulnerability on NRW Mapping.

8.17 As no basement levels are proposed within the development at either site, the risk of groundwater flooding can be considered significantly reduced.

Other Sources

8.18 The site is not located within the reservoir flood risk extent. Additionally, the site is not located within an area with potential sources of artificial flooding as noted by the SFCA.

8.19 The risk of flooding associated with reservoirs, canals and other artificial structures is considered to be low given the absence of any such structures in the site vicinity.

9 CONCEPTUAL DRAINAGE STRATEGY

Introduction

9.1 This section provides conceptual details of the proposed surface water drainage strategy for the site. The aim of the strategy is to ensure that the Proposed Development will not adversely affect the surface water regime in the area, and to demonstrate that overall the current situation will be improved.

9.2 For the purposes of this assessment, taking into account the Welsh Government's climate change allowances (published in September 2021)[4], a 40% increase in peak rainfall intensity has been included as climate change allowance, which caters up to the year 2115. No climate change guidance is available beyond 2115.

Greenfield Runoff Rates

9.3 The greenfield nature of the site means that surface water will slowly soak into the ground (infiltrate), be intercepted by vegetation or run off by way of overland flow, according to the soil characteristics and following the topography of the site.

9.4 Greenfield runoff rates for the site's proposed impermeable area (2.26 ha) have been calculated using the (Flood Estimation Handbook) FEH Statistical Method using UkSUDS. The greenfield runoff calculations have been included for reference within **Appendix E** and the outputs are summarised within **Table 2.**

Table 2. Greenfield Runoff Rates (Based on a 2.26ha area)

Return Period	Greenfield Runoff Rate (l/s)
Q1	33.71
QBAR	38.31
Q30	68.19
Q100	83.52

Drainage Hierarchy

9.5 The Welsh Government advises of the following hierarchy for the disposal of surface water:

1. Collected for reuse;
2. Infiltration to ground;
3. Discharge to surface water body;
4. Discharge to a surface water sewer, highway drain or another drainage system;
5. Discharge to a combined sewer.

9.6 The drainage hierarchy has been considered as follows:

Collected for Reuse

9.7 Given the nature of the proposed development and operational requirements, there is considered limited demand for potable water at the site. Therefore, rainwater reuse has not been considered further at this stage.

Infiltration

9.8 As discussed within **Section 7**, the site is underlain by superficial deposits of glacial till and mudstone. It has been assumed at this stage that infiltration based methods of surface water discharge are unlikely to be feasible. It is recommended that infiltration testing is undertaken to inform detailed drainage design and confirm the final drainage strategy.

To a Surface Water Body

9.9 There is a drainage ditch within the boundary which is proposed to be diverted along the boundary in the south, this will be utilised as the surface water outfall for the proposed development, with the activity subject to a land drainage consent.

To a Surface Water Sewer, Highway Drain or Another Drainage System

9.10 As it is proposed to discharge to a surface water body, discharging to a surface water sewer has not been considered.

To a Combined Sewer

9.11 As it is proposed to discharge to a surface water body, discharging to a combined sewer has not been considered.

Drainage Strategy

9.12 The Conceptual Drainage Strategy illustrating drainage proposals based upon a discharge to a nearby drainage ditch is provided within **Appendix F**. The strategy has been designed based upon the following parameters:

- Proposed impermeable area: 2.26 ha
- Restricted discharge rate: 38.31 l/s
- Attenuation requirement for the design storm event: 1507m³

9.13 It is proposed that surface water runoff from the development will be collected via gullies and drainage channels before being stored within an attenuation tank beneath the west carpark/delivery area and a downstream attenuation pond within the western extent of the site. Prior to flows discharging to the attenuation tank, water will pass through a petrol/silt interceptor to filter out pollutants and suspended sediments.

9.14 The attenuation tank is 1.5m deep with 95% void ratio and has a storage capacity of 1,078m^3. The attenuation pond has a depth of 1.5m including a 0.3m freeboard, with a storage capacity of 494m^3. Together, the pond and tank have a storage capacity of 1,572m^3. Causeway Flow calculations are provided in **Appendix G**, demonstrating that sufficient surface water storage has been provided to accommodate flows up to the 1 in 100 year +40% climate change storm event.

9.15 It should be noted that both the Conceptual Drainage Strategy indicated within **Appendix F**, and supporting calculations within **Appendix G**, are preliminary, and as such, subject to further detailed design and approval by the relevant authorities. However, the designs illustrate that surface water arising from the development may be sustainably managed such that it does not pose a flood risk, either to proposed or existing development, to the 1 in 100 year +40% climate change storm event.

Pollution Mitigation

9.16 Surface water run-off should be managed by SuDS that are designed to attenuate flows and to avoid water quality impacts downstream. To demonstrate that surface water arising from the development will be appropriately treated prior to discharge, the Simple Index Approach, as outlined within the SuDS Manual (CIRIA C753) has been followed.

9.17 As stated in the SuDS Manual 2015 (C753), the risk posed by surface water runoff to the receiving environment is a function of:

- the pollution hazard at a particular site (i.e. the pollutant source)
- the effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels, groundwater (i.e. the pollutant pathway)
- the sensitivity of the receiving environment (i.e. the environmental receptor).

9.18 The site consists of commercial yard and delivery areas, therefore the pollution hazard level is 'medium'. The pollutant hazard indices for this type of development are outlined in The SuDS Manual (CIRIA C753) Table 26.2 and **Table 3** below.

Table 3. Pollution Hazard and Mitigation Indices

Land Use / SuDS Feature	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Proposed Land Use			
'Medium' pollution hazard	0.7	0.6	0.7
Mitigation			
Petrol/Silt interceptor*	0.8[T]	0.6[T]	0.9[T]
Attenuation pond	0.7	0.7	0.5
Total Mitigation			
Petrol interceptor and attenuation pond *(latter at 50% efficiency)*	>0.95	0.95	>0.95

9.19 Values for the Petrol/silt interceptor have been obtained from specific products for the purpose of demonstrating that sufficient treatment can be provided. Details of these typical products are provided in **Appendix H**. Note, that these products have been used as examples to demonstrate that these indices can be achieved.

9.20 This confirms that surface water arising from the development will receive an appropriate level of treatment in advance of discharge from site. The maintenance and adoption of the SuDS features are described below.

Event Exceedance

9.21 The proposed indicative surface water drainage concept provides underground storage up to the 1 in 100 year plus 40% climate change event. In an event exceeding this magnitude, detailed drainage design will identify mitigation measures to ensure that the resulting above-ground flooding will be

confined to temporary shallow flooding of the on-site road network and will not affect the buildings on site or significantly increase flood risk to off-site locations.

9.22 Event exceedance planning will be undertaken as part of the final design process. Suitable mitigation measures will be incorporated into the development to ensure water is retained on-site should surcharging of on-site drains occur during extreme rainfall events.

Maintenance

9.23 As described in the CIRIA SuDS Manual C753, regular inspection and maintenance will be required following construction to allow effective operation of the proposed surface water drainage network and SuDS features. A SuDS Maintenance Plan for the proposed SuDS features is included as **Appendix I**. A detailed maintenance programme will be required as part of the detailed drainage design for the site.

10 FLOOD RISK VULNERABILITY CLASSIFICATION

Vulnerability Classification

10.1 In accordance with TAN 15, the proposed development is classified as 'Less Vulnerable' development in flood risk terms. The flood risk vulnerability compatibility matrix is presented within **Table 4**.

Table 4. Flood Risk Vulnerability and Zone Compatibility

Flood Risk classification	Emergency Services	Highly Vulnerable	Less Vulnerable	Other
Zone A	Yes	Yes	Yes	Yes
Zone B	Yes	Yes	Yes	Yes
Zone C1	Justification test required	Justification test required	Justification test required	Justification test required
Zone C2	No	No	Justification test required	Acceptability of consequences

Key: **Yes**: Development is appropriate, **No**: Development should not be permitted

Justification Test

10.2 The aim of the Justification Test is to steer new development towards suitable land in Zone A, otherwise to Zone B, where river or coastal flooding would be less of an issue. For developments in Zone C, the Justification Test is required. TAN15 states development will only be justified if it can be demonstrated that:

a. Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or

b. Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

And

c. It concurs with the aim of PPW and meets the definition of previously developed land; and

d. The potential consequences of a flooding event for the particular type of development have been considered.

10.3 As the development is considered 'less vulnerable' and is located in Zone A, it is considered appropriate under TAN15 and the implementation of the Justification Test is not required.

11 SUMMARY AND CONCLUSIONS

11.1 The aim of the FCA is to outline the potential for the site to be impacted by flooding, the potential impacts of the development on flooding both onsite and in the vicinity, and the proposed measures which can be incorporated into the development to mitigate the identified risks. The report has been prepared in accordance with the guidance detailed in TAN15. Reference has also been made to the SFCA and the PFRA and following consultation with NRW.

11.2 The potential flood risks to the site, and the measures proposed to mitigate the identified risks, are summarised in **Table 5**.

Table 5. Proposed mitigation

Source of Flooding	Identified Risk			Mitigation Proposed	Residual Risk		
	L	M	H		L	M	H
Fluvial	✓			No mitigation proposed.	✓		
Tidal	✓				✓		
Sewers	✓				✓		
Surface Water	✓			The proposed diversion is in proximity to the surface water flood extent. Further assessment will be undertaken at detailed design, following receipt of a topographical survey and details of existing site conditions and refined site layout plans.	✓		
Groundwater	✓			No mitigation proposed.	✓		
Other Sources (e.g. reservoirs, water mains)	✓				✓		

11.3 The site is located in DAM mapping Zone A and is outside of all modelled flood extents. The NRW's new Flood Map for Planning (for rivers and the sea) identifies that the site is classified as the equivalent as Flood Zone 1, whereby the annual probability of flooding is less than 1 in 1,000 (0.1%).

11.4 The NRW's new Flood Map for Planning (for surface water) identifies that the majority of the site is classified as the equivalent as Flood Zone 1, whereby the annual probability of flooding is less than 1 in 1,000 (0.1%). However, there are areas associated with Flood Zone 2 (0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding) and Flood Zone 3 (Areas with more than 1% (1 in 100) chance of flooding) seen in the south of the site. Small, isolated areas of Flood Zone 2 are also seen in the north.

11.5 The watercourse diversion is proposed in proximity to this flood extent with watercourse diversion to be appropriately designed at detailed design stage following receipt of detailed topographical survey.

11.6 No other sources of flood risks were identified.

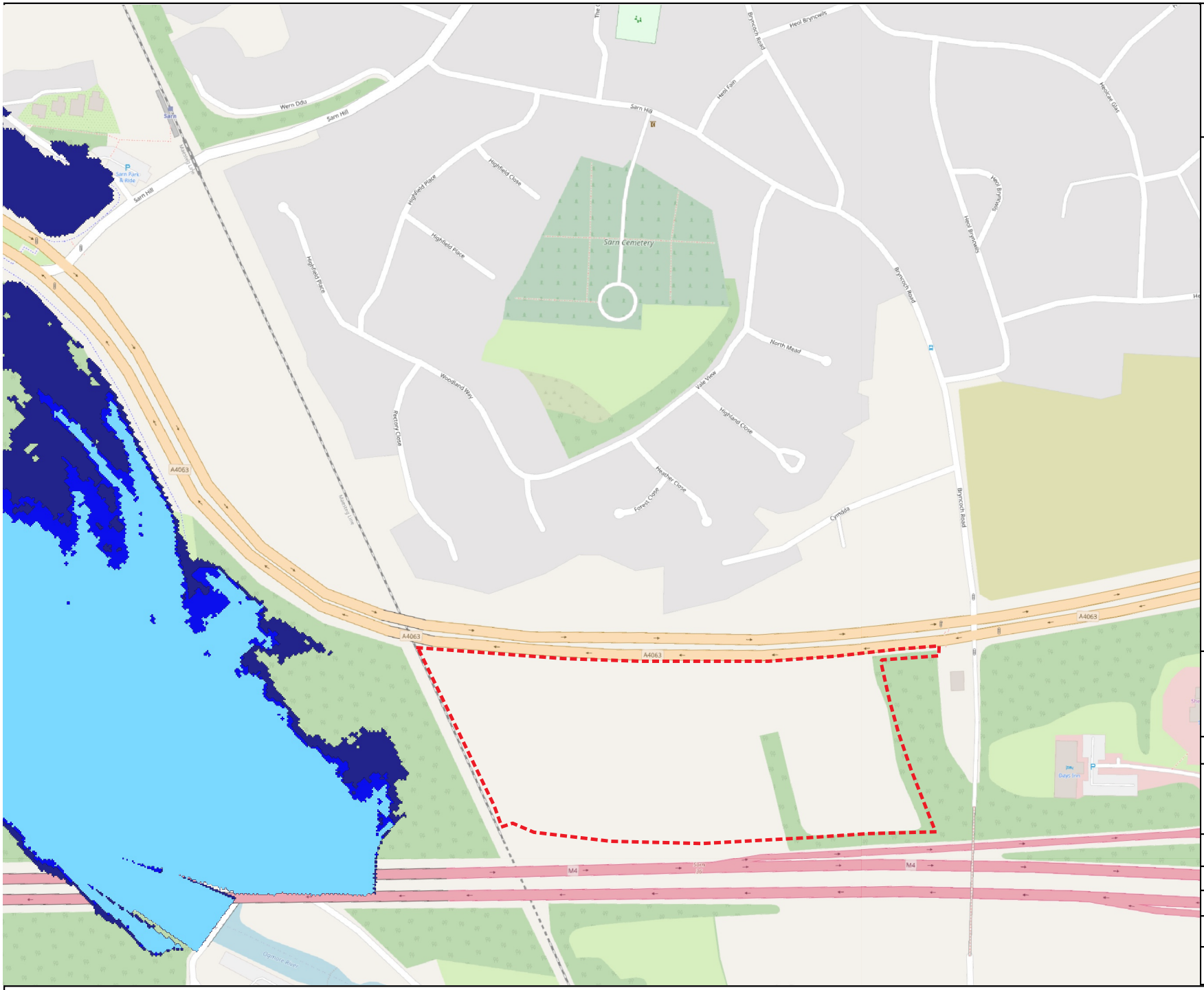
11.7 It has been demonstrated that the development passes the Justification Test.

11.8 The conceptual drainage strategy demonstrates that through the use of a below ground attenuation tank and above ground attenuation pond, surface water up to and including the in 100 year + 40% climate change rainfall event can be contained on site. Overall, it can be demonstrated that the development will have positive effects of flood risk and surface water management.

APPENDICES

Appendix A

NRW Detailed Flood Data



Notes

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2. If received electronically it is the recipients responsibility to print to the correct scale. Only written dimensions should be used.

- Defended 1 in 100 year
- Defended 1 in 100 year +CC
- Defended 1 in 1000 year
- Site Boundary

RPS
A TETRA TECH COMPANY
20 Farringdon Street
London, EC4A 4AB
E:rpshydrologyservices@rpsgroup.com

Client: Cenin

Title: NRW Aberkenfig (2014) modelled defended flood extents

Site: T'ir Isha

Date: 02-01-2025

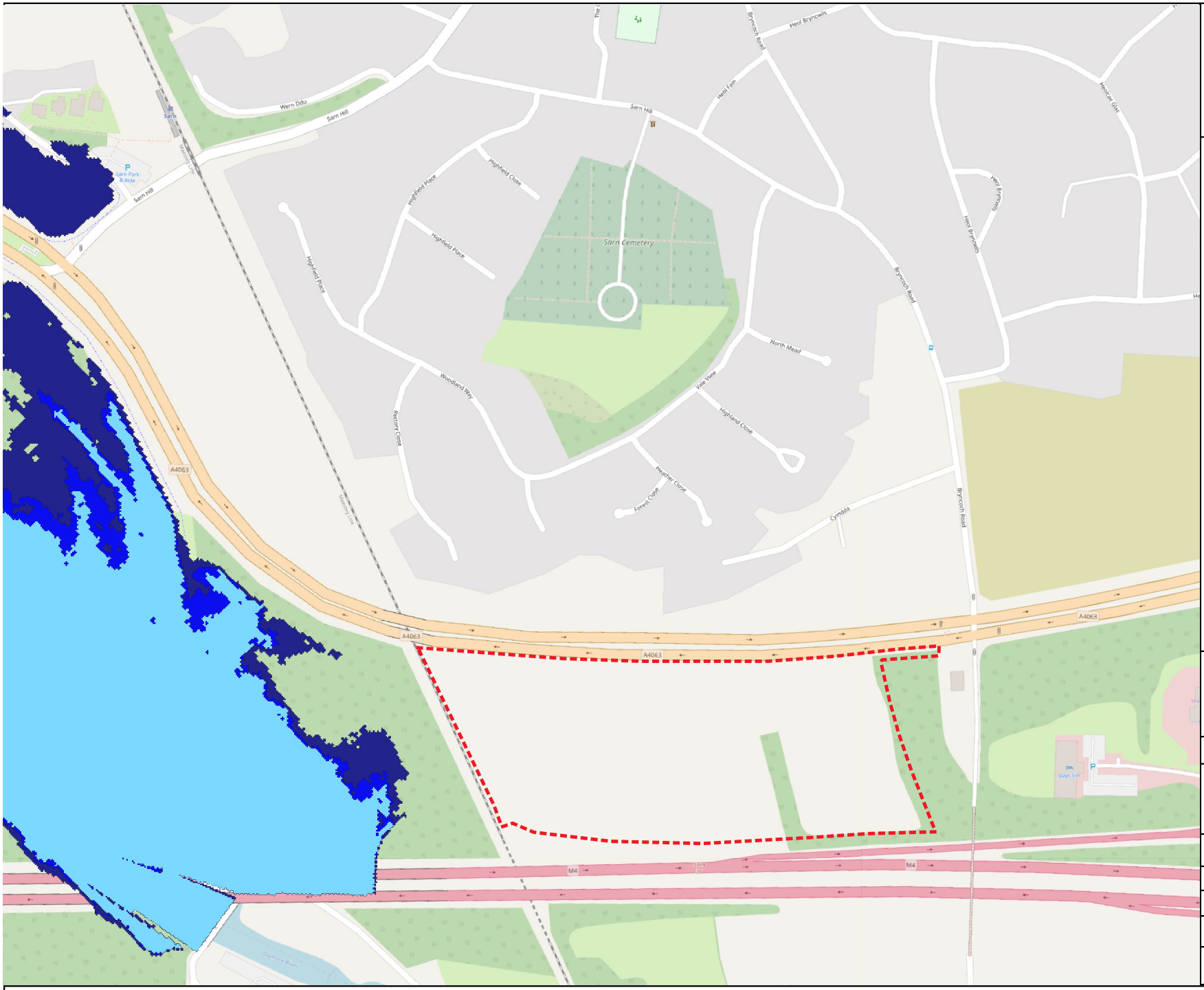
Scale:1:3,752	Size: A4
Job Ref: ENV-21344	Rev: 01

Drawn	Checked	Approved
CE	AM	JM

0 25 50 75 m

N

rpsgroup.com



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- Undefended 1 in 100 year
- Undefended 1 in 100 year +CC
- Undefended 1 in 1000 year
- Site Boundary

RPS
A TETRA TECH COMPANY
20 Farringdon Street
London, EC4A 4AB
E:rpshydrologyservices@rpsgroup.com

Client: Cenin

Title: NRW Aberkenfig (2014) modelled undefended flood extents

Site: T'ir Isha

Date: 02-01-2025

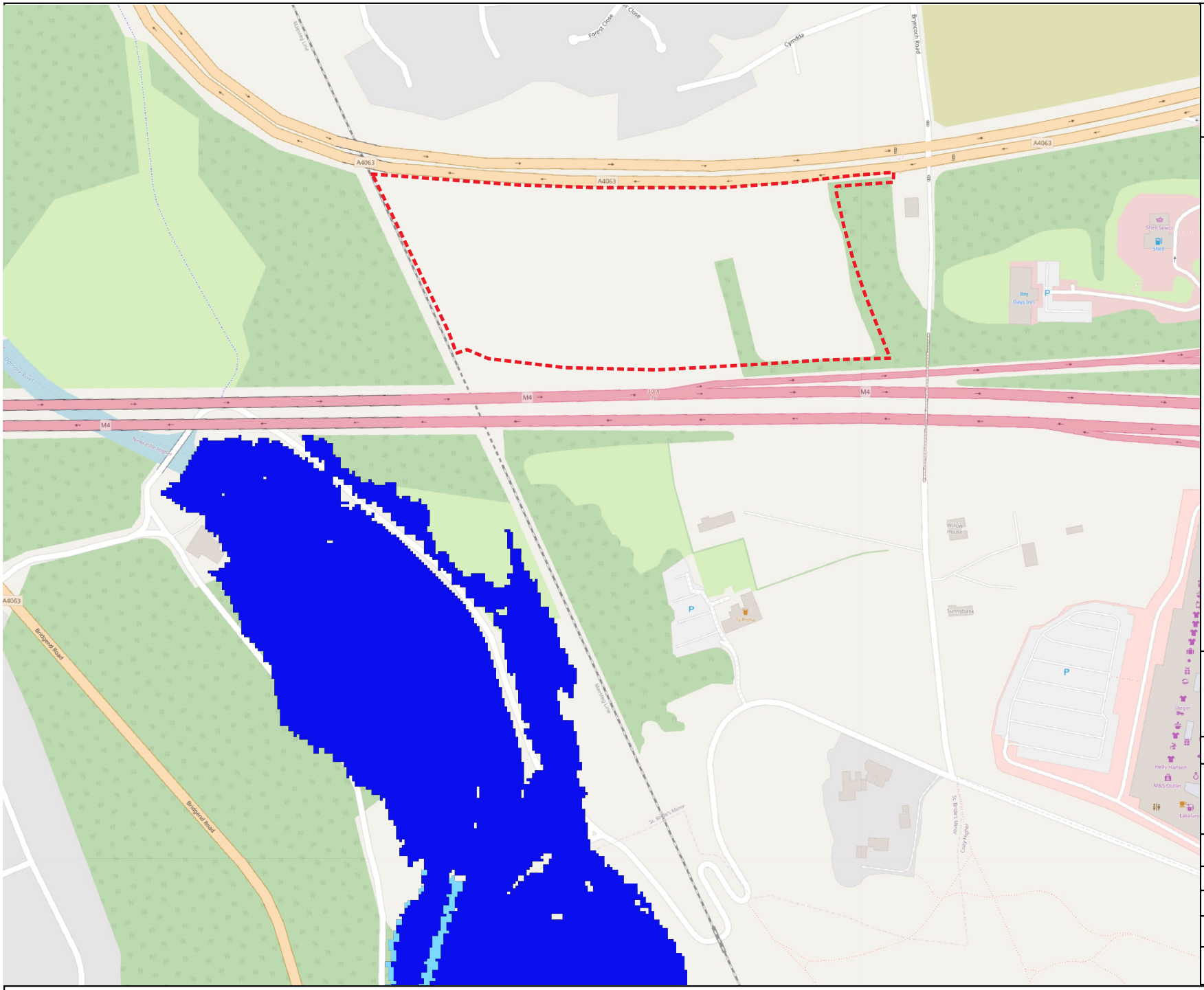
Scale:1:3,752	Size: A4
Job Ref: ENV-21344	Rev: 01

Drawn	Checked	Approved
CE	AM	JM

0 25 50 75 m

N

rpsgroup.com



Notes

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- Defended 1000 +CC extent
- Undefended 1000 +CC extent
- Site Boundary

20 Farringdon Street
London, EC4A 4AB
E:rpshydrologyservices@rpsgroup.com

Client: Cenin

Title: NRW Bridgend (2022) modelled 1 in 1000 year + Climate Change Defended and Undefended Extents

Site: T'ir Isha

Date: 02-01-2025

Scale:1:3,752	Size: A4
Job Ref: ENV-21344	Rev: 01

Drawn	Checked	Approved
CE	AM	JM

0 25 50 75 m

N

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Appendix B

BCBC Response

Evans, Caitlin

From: landdrainage <landdrainage@bridgend.gov.uk>
Sent: 06 December 2024 09:01
To: Evans, Caitlin
Subject: Drainage requirements and Flood Risk Information: Junction 36 M4

Thank you for your email from 27th November 2024.

Unfortunately BCBC holds no drainage information for the site; however it is possible that the site may receive highway drainage discharges from both the A4063 and M4

We would advise that greenfield run-off would be a suitable restriction rate when considering any drainage design.

The minor watercourse crossing the site would be classed as an ordinary watercourse, alterations to this will require Flood Defence/Land Drainage Consent, any proposal to culvert this would generally be refused apart from small lengths for access purposes.

Best regards
Steve

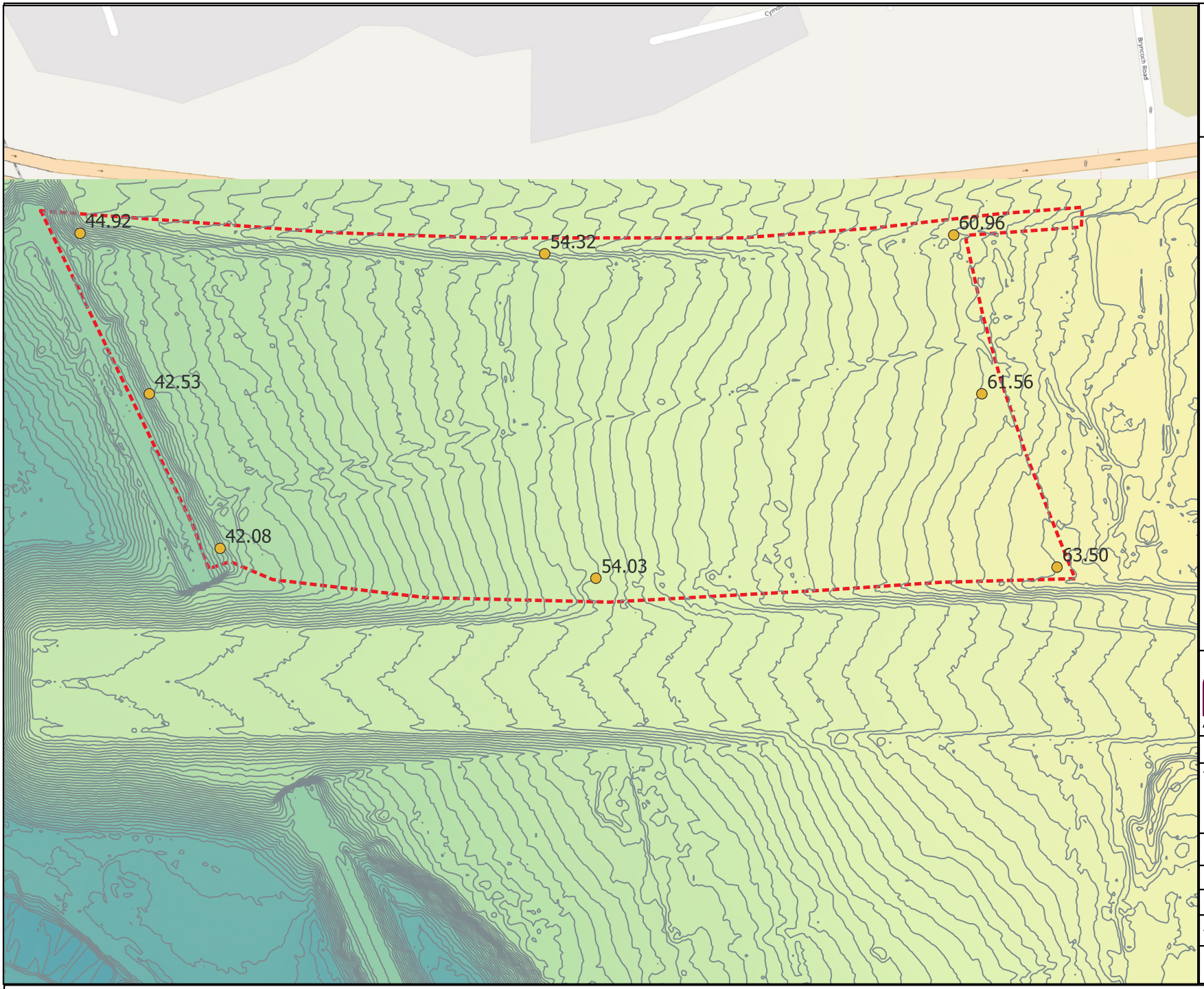
Stephen Edwards
Swyddog Draenio | Land Drainage Officer
Y Gyfarwyddiaeth Cymunedau | Communities Durectorate
Cyngor Bwrdeistref Sirol Pen-y-bont ar Ogwr | Bridgend County Borough Council

Ffôn / Phone: (01656) 642576
E-bost / Email: stephen.edwards@bridgend.gov.uk
Gwefan / Website: www.bridgend.gov.uk

Rydym yn croesawu gohebiaeth yn Gymraeg. Rhowch wybod i ni os mai Cymraeg yw eich dewis iaith.
We welcome correspondence in Welsh. Please let us know if your language choice is Welsh.

Appendix C

LiDAR Data



Notes

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Site Boundary

LiDAR Spot heights (mAOD)

LiDAR (mAOD)

110

20

rps
A TETRA TECH COMPANY
20 Farringdon Street
London, EC4A 4AB
E:rpshydrologyservices
@rpsgroup.com

Client: Cenin

Title: LiDAR Levels at Site (mAOD)

Site: T'ir Isha

Date: 02-01-2025

Scale:1:1,876	Size: A4
Job Ref: ENV-21344	Rev: 01

Drawn	Checked	Approved
CE	AM	JM

0 25 50

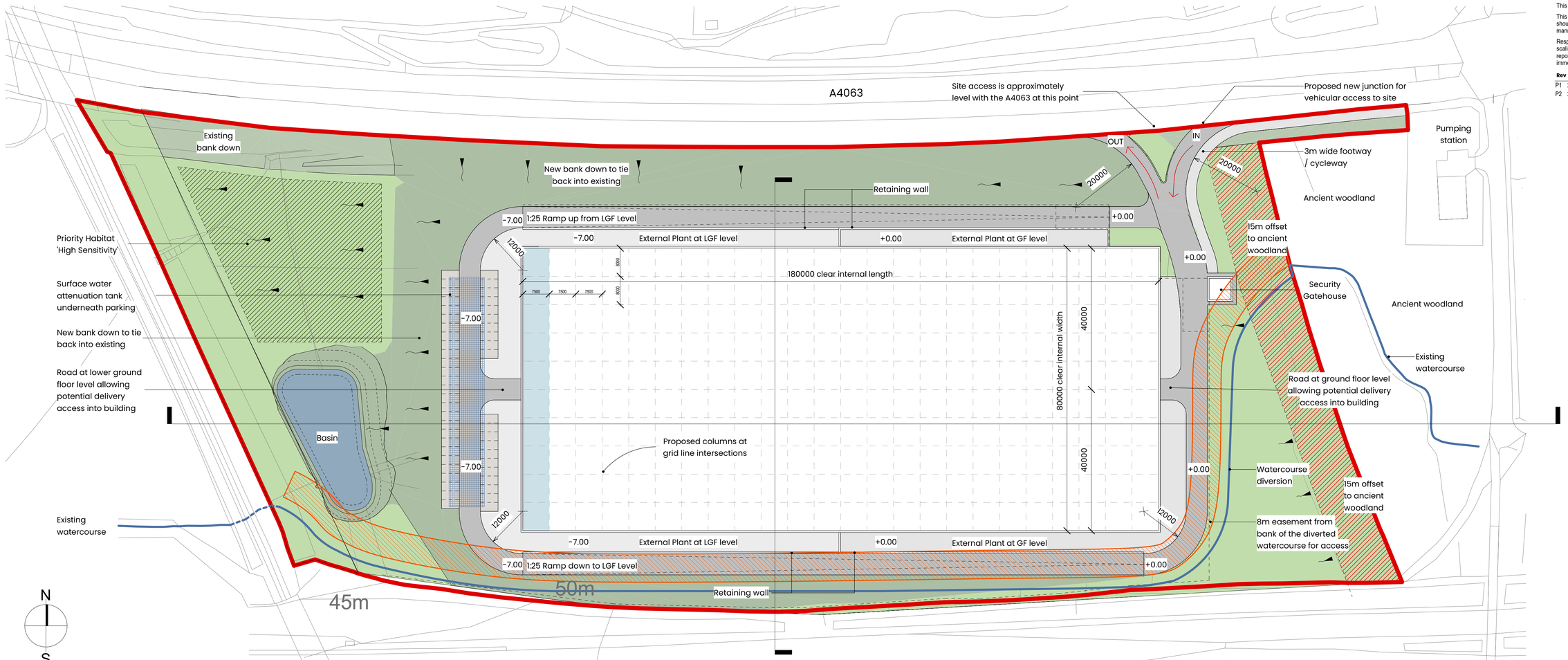
N

rpsgroup.com

Appendix D

Development Plans

Rev	Date	By	Chk	Description
P1	21.11.24	OJF	AR	Updated Issue
P2	23.12.24	EC	OJF	Updated Issue

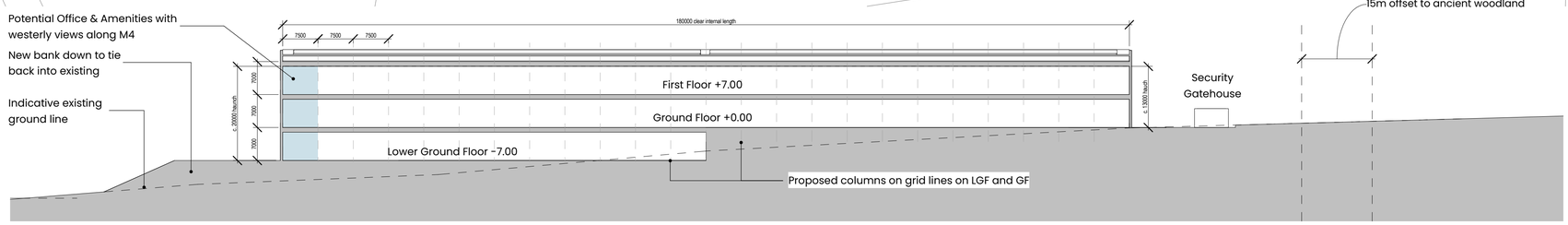


Proposed Illustrative Site Plan
1 : 600

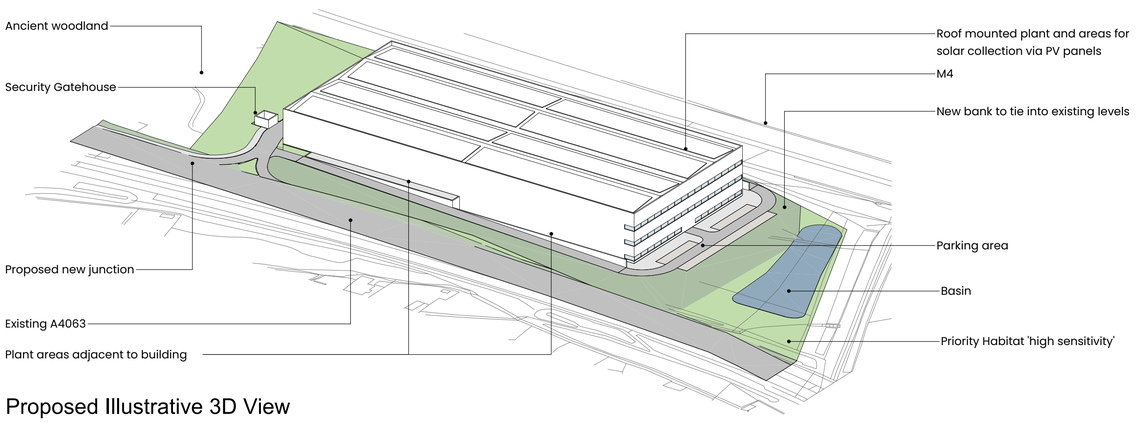
0 6 12 30 m

Approx Gross Internal Floor Area: c. 32,000 sq.m / 344,445 sq.ft

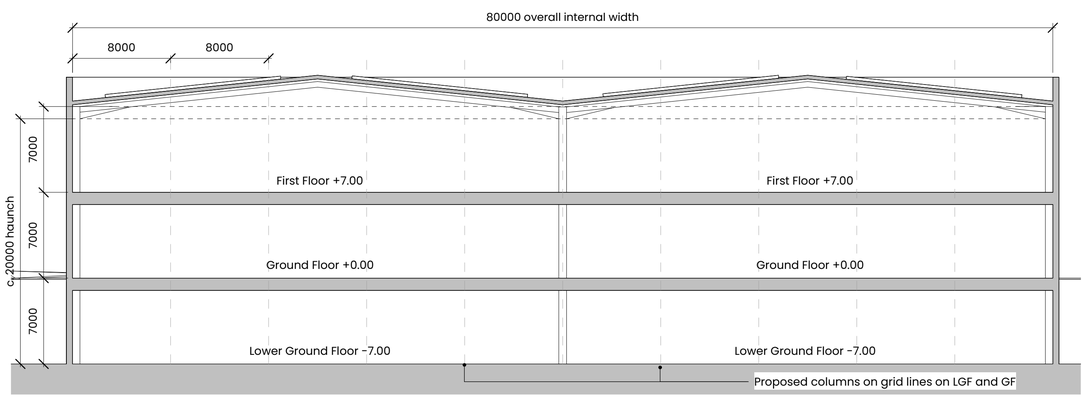
Lower Ground Floor: c. 6,000 sq.m / 64,583 sq.ft
Ground Floor: c. 13,000 sq.m / 139,930 sq.ft
First Floor: c. 13,000 sq.m / 139,930 sq.ft



Proposed Illustrative Site Section
1 : 600



Proposed Illustrative 3D View



Proposed Illustrative Section through Lower Ground Floor
1 : 250

0 2.5 5 12.5 25 m

The current proposal is for illustrative purposes only and is pending confirmation following the completion of a topographic survey, below ground utility survey and Arboricultural survey in addition to consultation with the Local Authority.

Roberts Limbrick
03333 405 500
mail@robertslimbrick.com
robertslimbrick.com
Registered Office: England No. 06658029

Project Name
T'ir Isha, Sarn, Bridgend

Client Name
Cenin

Drawing Title
Proposed Concept Site Plan

Scale	Project No.
As indicated • A1	10291

Status	Purpose Of Issue
S2	Issued for Information

Project	Org	Vol	Level	Form	Role
10291	RL	XX	ZZ	DR	A

Number	Revision
P2001	P2

23122024 16:12:03

Appendix E

Greenfield Runoff Rates

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Caitlin Evans
Site name:	T'ir Isha
Site location:	Bridgend

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.53435° N
Longitude:	3.58414° W
Reference:	1268997425
Date:	Dec 19 2024 11:23

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 2.26

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.327
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	1282	1305
Hydrological region:	9	9
Growth curve factor 1 year:	0.88	0.88
Growth curve factor 30 years:	1.78	1.78
Growth curve factor 100 years:	2.18	2.18
Growth curve factor 200 years:	2.46	2.46

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):		38.31
1 in 1 year (l/s):		33.71
1 in 30 years (l/s):		68.19
1 in 100 year (l/s):		83.52
1 in 200 years (l/s):		94.25

Appendix F

Conceptual Drainage Strategy

Notes

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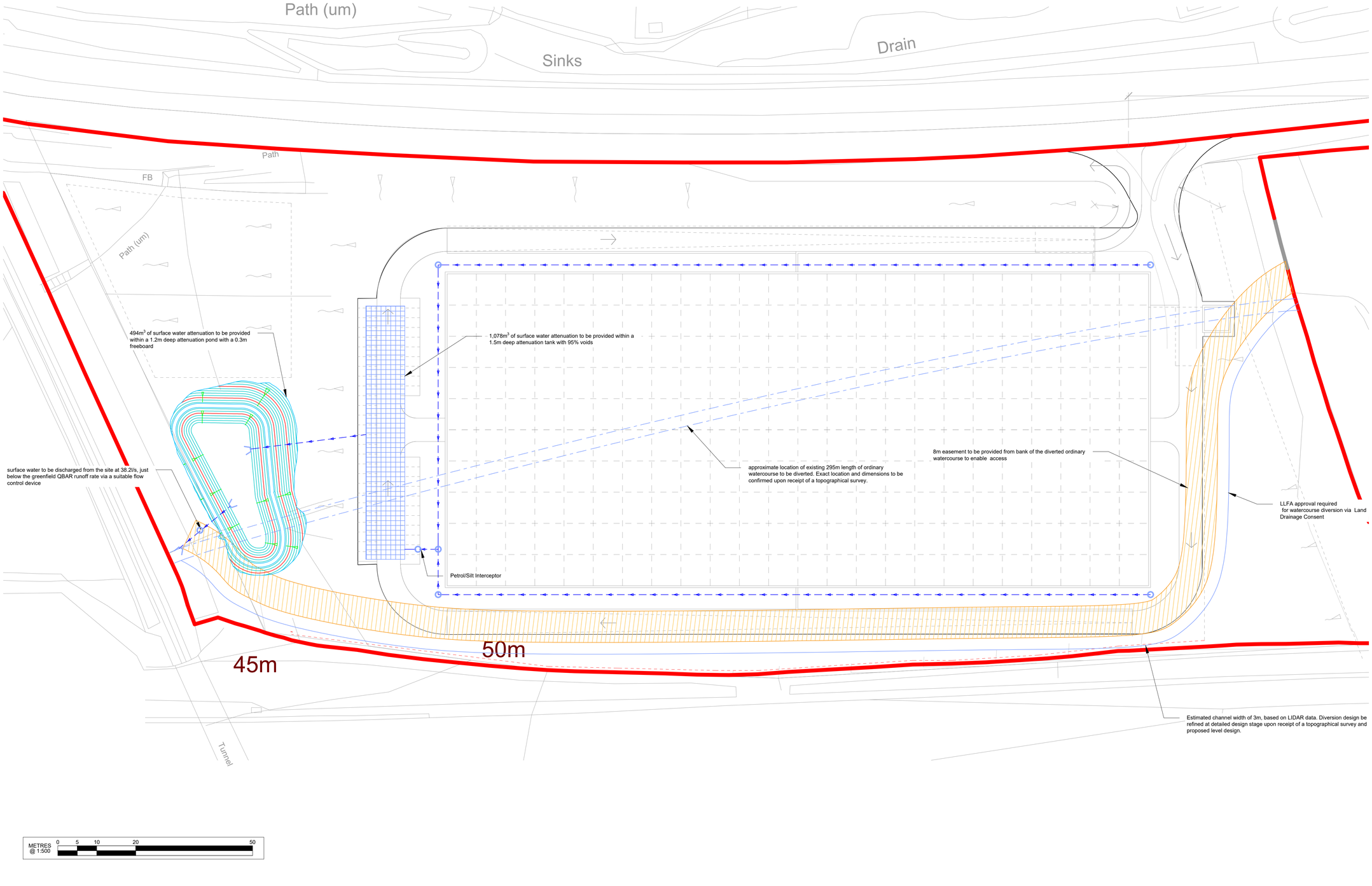
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

PRELIMINARY
SUBJECT TO DETAILED DESIGN

This drawing illustrates a sketch proposal only and as such is subject to detailed site investigation including ground conditions/contaminants, drainage, design and planning/density negotiations. The layout maybe based upon an enlargement of an OS sheet or other small scale plans and its accuracy will need to be verified by Survey. Full risk analysis under the CDM Regulations has not been undertaken.



KEY

- Surface Water Manhole
- Surface Water Pipe Line
- Surface Water Headwall
- 8m Easement
- Attenuation Tank

A total of 1,507m³ of surface water attenuation will be required to store surface water from the 1 in 100-year + 40% climate change rainfall event. Attenuation is to be split between underground tanks (1,078m³) within the car park area and an attenuation pond (494m³).

Rev	Description	By	Ckd	Date
P01	First Draft Issue	CE	AM	02.01.25

A TETRA TECH COMPANY

20 Farringdon Street, London, EC4A 4AB
T: +44 20 3691 0500 E: rpshydrologyservices@rpsgroup.com

Client: Cenin

Project: Ti'r Isha Employment Hub

Title: Conceptual Surface Water Drainage Strategy

Status	Scale	Date Created
Preliminary	1:500 @A1	02.01.25

Task Team Manager	Information Author	Task Information Manager
JM	CE	AM

Document Number: 21344-RPS-SD-ZZ-DR-D100-P01

RPS Project Number: 794-ENV-HYD-21344

Revision: P01

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O:\Environment\01 Projects\794-ENV-HYD\ENV-21344 - Ti'r Isha Employment Site\7. Drainage\Drainage Concept Ti'r Isha v02.dwg

Appendix G

Causeway Flow Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	9.000
CV	1.000	Preferred Cover Depth (m)	1.000
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1-STORAGE	2.260	5.00	100.000	1500	1010.000	1000.000	1.500
2-FC			100.000	1800	1020.000	1000.000	1.600
3-OF			100.000	1500	1030.000	1000.000	1.700

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	2880	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2-FC Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	98.400	Product Number	CTL-SHE-0257-3830-1500-3830
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	38.3	Min Node Diameter (mm)	1800

Node 1-STORAGE Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	368

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1018.4	0.0	1.500	1701.5	0.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1-STORAGE	344	99.671	1.171	252.2	1506.9410	0.0000	SURCHARGED
360 minute winter	2-FC	344	99.670	1.270	57.1	3.2318	0.0000	SURCHARGED
15 minute summer	3-OF	1	98.300	0.000	38.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	1-STORAGE	1.001	2-FC	57.1	0.721	0.118	2.1603	
360 minute winter	2-FC	Hydro-Brake®	3-OF	38.2				2150.5

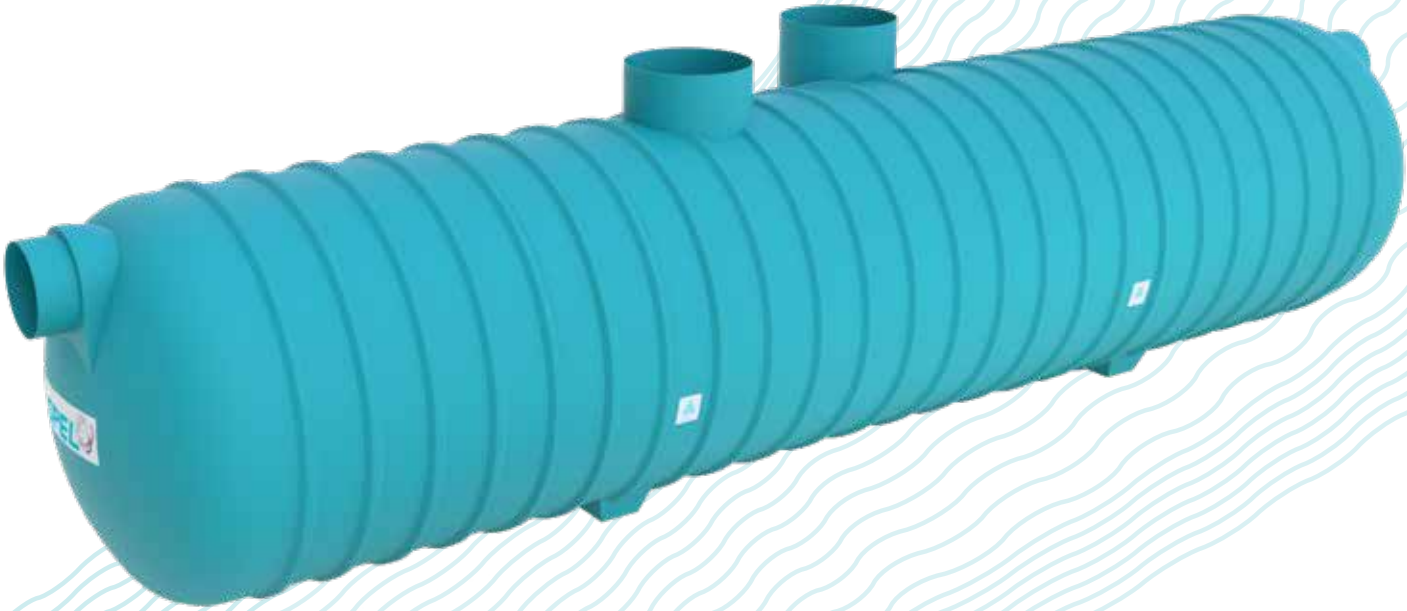
Appendix H

SPEL Management Data Sheet

SPEL

Quality solutions protecting our global environment

*The **safest answer** for **pollution control** and our **environment***



SPEL Stormceptor

ESR (Enhanced Silt Retention)

SuDS Compliant ESR Range

spelproducts.co.uk

SPEL Stormceptor ESR Range
By-Pass System

The **total** treatment solution for SuDS

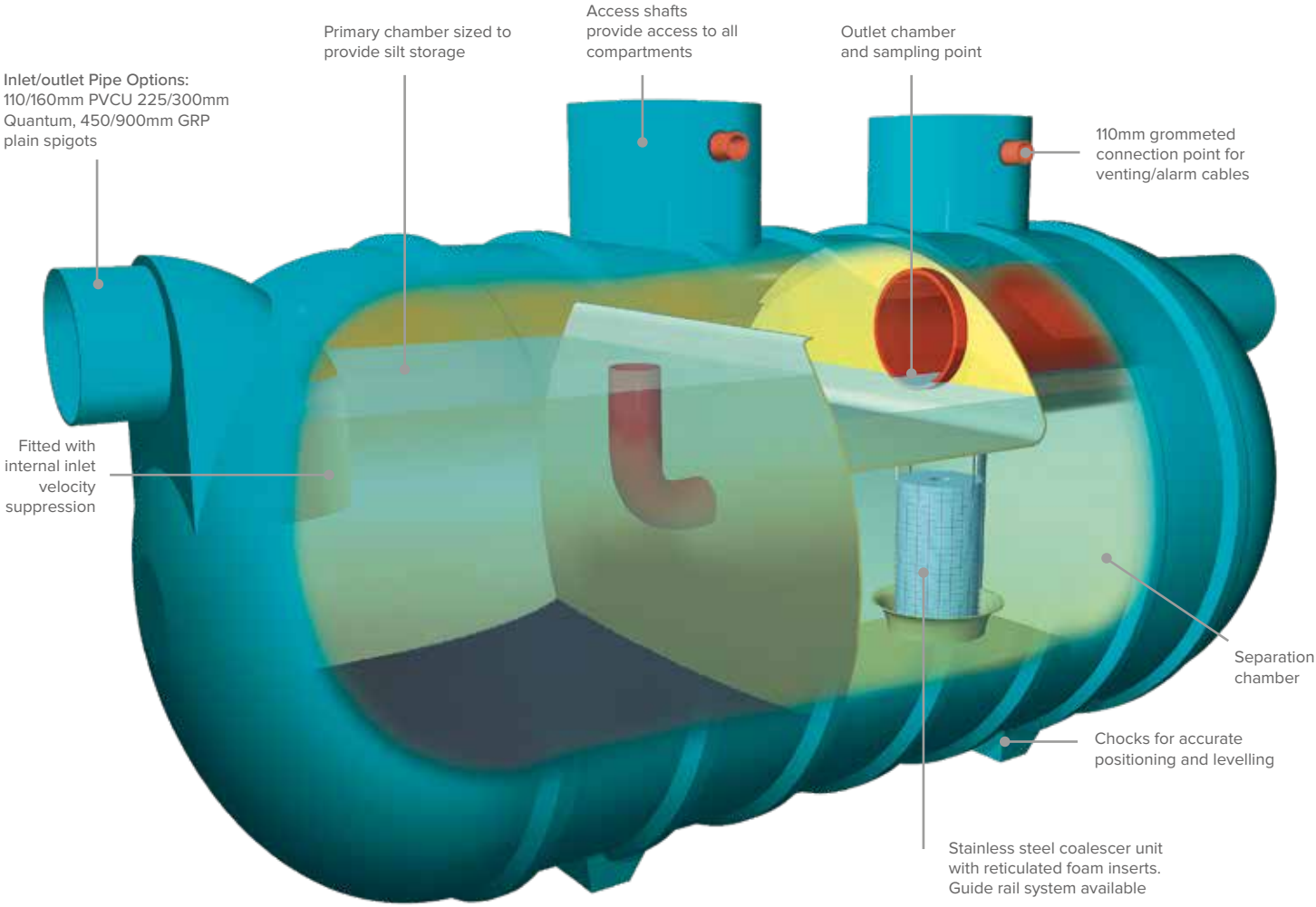
The new SPEL ESR System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc (for TSS and Metals) to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also compliant to the British and European Standard BS EN 858.

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals (particulate). It's a highly efficient, single unit, water quality SuDS component.

SPEL ESR Stormceptor Certified Mitigation Index

TSS	0.8
Metals	0.6
Hydrocarbons	0.9*

**H R Wallingford test results to BS EN 858*



SPEL Stormceptor ESR Range
By-Pass System

Surface Water Treatment Device Performance Declaration

Testing carried out according to British Water Code of Practice

Product Details	Description
Manufacturer	SPEL Products
Treatment Device Name/Model	Stormceptor Type 210 C1/SC
General description	Class 1 By-pass Separator with Silt Capacity
Envisaged application	Treatment of Surface Water Run-off
Pollutant(s) captured	Suspended Solids

Test	Value	Unit
Treatment device capacity	3200	litres
Sediment Storage capacity	1000	litres
Treatment Flow rate	10	l/s
Connected Area	1,333	m²
Pollution retention flow rate	10	l/s

Parameter	Value	Unit
Maximum capacity flow rate	100	l/s
Device head loss (at treatment flowrate)	0.15	m
Device head loss (at maximum capacity treatment flowrate)	-	m
TSS capture and retention efficiency (Milisil W4 test sediment)	**82**	**%**
Zinc capture efficiency (if tested)	Not tested for dissolved metals	%
Zinc retention efficiency (if tested)	Not tested for dissolved metals	%
Copper capture efficiency (if tested)	Not tested for dissolved metals	%
Copper retention efficiency (if tested)	Not tested for dissolved metals	%
Dissolved Metals reduction	0.0	%
Particulate metals reduction*	61.5*	%
Total Metals reduction*	61.5*	%
Total Metals Mitigation Index	0.615*	-

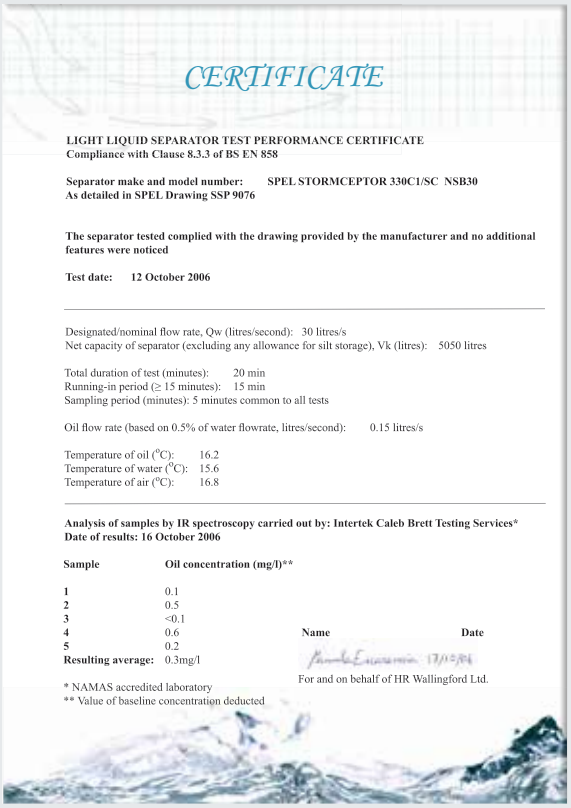
* Extrapolated value in accordance with British Water How to Guide: Applying the CIRIA The SuDS Manual (C753) Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Version 7, Section 4.3, (2021- under pre-publication review).

Research and Development

Research and development is at the heart of what we do at SPEL, our passion as Zero Pollution Ambassadors is to be at the cutting edge of clean surface water technology.

Months of rigorous testing has resulted in the new SPEL Stormceptor ESR Range.

Certificates of compliance from WRc and HR Wallingford for the SPEL Stormceptor ESR Range



CERTIFICATE

LIGHT LIQUID SEPARATOR TEST PERFORMANCE CERTIFICATE
Compliance with Clause 8.3.3 of BS EN 858

Separator make and model number: SPEL STORMCEPTOR 330C1/SC NSB30
As detailed in SPEL Drawing SSP 9076

The separator tested complied with the drawing provided by the manufacturer and no additional features were noticed

Test date: 12 October 2006

Designated/nominal flow rate, Qw (litres/second): 30 litres/s
Net capacity of separator (excluding any allowance for silt storage), Vk (litres): 5050 litres

Total duration of test (minutes): 20 min
Running-in period (≥ 15 minutes): 15 min
Sampling period (minutes): 5 minutes common to all tests

Oil flow rate (based on 0.5% of water flowrate, litres/second): 0.15 litres/s

Temperature of oil (°C): 16.2
Temperature of water (°C): 15.6
Temperature of air (°C): 16.8

Analysis of samples by IR spectroscopy carried out by: Intertek Caleb Brett Testing Services*
Date of results: 16 October 2006

Sample	Oil concentration (mg/l)**
1	0.1
2	0.5
3	<0.1
4	0.6
5	0.2
Resulting average:	0.3mg/l

Name Date

For and on behalf of HR Wallingford Ltd.

* NAMAS accredited laboratory
** Value of baseline concentration deducted

SPEL's Head of Technical Development alongside the WRc testing officer.

Protecting our Environment for Over 45 Years

The SuDS Manual is leading good practise in drainage design, SPEL are endorsing this with the release of the new SPEL Stormceptor ESR range.

Total Suspended Solids (TSS)	Metals	Hydrocarbons
0.8	0.6	0.9*

**H R Wallingford test results to BS EN 858*

Added to these class-leading Mitigation Indices, the ESR range benefits from:

- British/European Standard BS EN 858-1 2002 certification.
- The SPEL 25 year shell Warranty.
- 50 year+ life expectancy.
- ISO9001 quality assurance.
- ISO14001 committed to environmental improvement

26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation Indices		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Tables from The SuDS Manual (C753), p568-569
For reference notes, please see the full manual: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx

SPEL Stormceptor ESR Range By-Pass System

ESR Specification Chart

Model	Series	Treated Flow Rate - l/s	Maximum Flow	Catchment area (m^2)*	Oil storage (litres)	Silt capacity (litres)	Overall length* (mm) L	Overall diameter (mm)	Inlet Invert (mm) A	Base to Inlet (mm) B	Base to outlet (mm) C	Max in/ out pipe diameter** (mm)	Number of access shafts (dia. mm) 600	750	900	1200
210C1/ESR	200	10	100	1,333	150	1,000	2,920	1,225	560	1,350	1,300	300	-	1	-	-
212C1/ESR	200	12	120	1,600	180	1200	3,570	1,225	560	1,350	1,300	300	-	1	-	-
215C1/ESR	200	15	150	2,000	225	1,500	4,237	1,225	560	1,350	1,300	300	-	1	-	-
320C1/ESR	300	20	200	2,665	300	2,000	3,200	1,875	700	1,450	1,350	450	2	-	-	-
325C1/ESR	300	25	250	3,333	375	2,500	3,540	1,875	700	1,450	1,350	450	2	-	-	-
330C1/ESR	300	30	300	4,000	450	3,000	4,420	1,875	700	1,450	1,350	450	-	1	1	-
340C1/ESR	300	40	400	5,333	600	4,000	5,760	1,875	740	1,410	1,310	450	1	1	-	-
345C1/ESR	300	45	450	6,000	675	4,500	6,570	1,875	740	1,410	1,310	450	1	1	-	-
350/C1/ESR	300	50	500	6,665	750	5,000	7,060	1,875	740	1,410	1,310	450	1	1	-	-
460C1/ESR	400	60	600	8,000	900	6,000	4,400	2,700	950	2,100	2,000	600	1	-	1	-
470C1/ESR	400	70	700	9,333	1,050	7,000	5,250	2,700	950	2,100	2,000	600	1	-	1	-
480C1/ESR	400	80	800	10,665	1,200	8,000	6,170	2,700	950	2,100	2,000	600	1	-	1	-
4100C1/ESR	400	100	1000	13,333	1,500	10,000	7,400	2,700	1,100	1,950	1,850	750	1	-	1	-
4125C1/ESR	400	125	1250	16,665	1,875	12,500	9,050	2,700	1,100	1,950	1,850	750	1	-	1	-
4150C1/ESR	400	150	1500	20,000	2,250	15,000	9,950	2,700	1,100	1,950	1,850	750	-	-	2	-
4160C1/ESR	400	160	1600	21,333	2,400	16,000	11,830	2,700	1,250	1,800	1,700	750	1	1	1	-
5180C1/ESR	500	180	1800	24,000	2,700	18,000	7,470	3,650	1,185	2,690	2,550	900				
5200C1/ESR	500	200	2000	26,665	3,000	20,000	8,530	3,650	1,185	2,690	2,355	1,200				
5250C1/ESR	500	250	2500	33,333	3,750	25,000	10,040	3,650	1,185	2,690	2,355	1,200				
6300C1/ESR	600	300	3000	40,000	4,500	30,000	10,310	4,150	1,325	2,850	2,675	1,200				
6350C1/ESR	600	350	3500	46,665	5,250	35,000	11,470	4,150	1,325	2,850	2,675	1,200				
6400C1/ESR	600	400	4000	53,333	6,000	40,000	12,690	4,150	1,325	2,850	2,675	1,200				
6500C1/ESR	600	500	5000	66,665	7,500	50,000	15,870	4,150	1,325	2,850	2,675	1,200				
6600C1/ESR	600	600	6000	80,000	9,000	60,000	18,260	4,150	1,325	2,850	2,675	1,200				
6700C1/ESR	600	700	7000	93,333	10,500	70,000	22,250	4,150	2,850	2,850	2,675	1,200				

Access shafts dependent on orientation of pipework (see page 7 for orientation options).

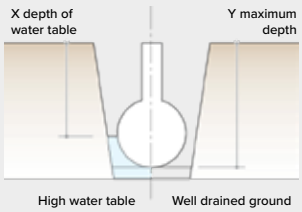
**These catchment areas are based on the SuDS Manual requirement for By-Pass devices to treat the 1 in 1 year storm event (27mm).*
***This dimension is for A-C inlet/outlet options, larger pipe sizes are available for D-I inlet/outlet options.*

Tank Shell Specifications

The 'standard' specification is normally adequate for most installations but Heavy, Extra Heavy and Special specifications are available depending upon the burial depth and water table level, in winter. The concern is when the system is emptied completely and remains empty for a period of time.

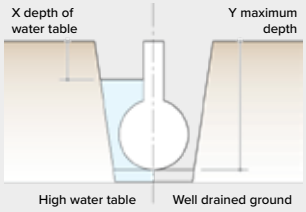
Standard tanks

Series	WT (m)	D (m)
200	1.0	4.0
300	0.9	4.0
400	1.3	5.0
500	1.9	5.7
600	2.4	6.2



Heavy tanks

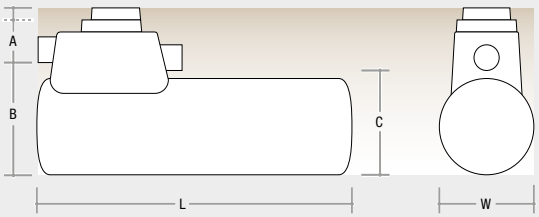
Series	WT (m)	D (m)
200	2.0	6.0
300	2.8	5.6
400	3.5	6.0
500	4.5	7.25
600	4.7	7.3



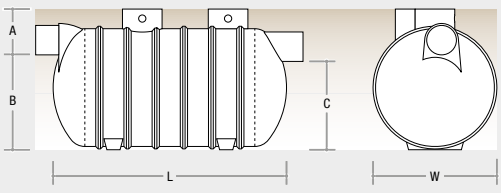
Based on installation in concrete with concrete surround.
For pea gravel surround, see SPEL Data Manual p13.5

200 Series ESR – Inside diameter 1200mm, outside diameter 1225mm.
300 series ESR – Inside diameter 1800mm, outside diameter 1875mm.
400 series ESR – Inside diameter 2600mm, outside diameter 2700mm.
500 series ESR – Inside diameter 3500mm, outside diameter 3650mm.
600 series ESR – Inside diameter 4000mm, outside diameter 4150mm.

200 series



300/400/500 & 600 series



Commissioning, Installation & Maintenance

Installation

SPEL Separators can be installed with a concrete or pea gravel surround, dependent upon ground conditions and water table level. Detailed installation instructions are provided with each unit, see Installation TSII or SPEL Data Manual Section 13.

Site access and conditions

It is the responsibility of the contractor to ensure suitable access to good hard ground that is safe and suitable for off-loading.

Off-loading/handling

The contractor is responsible for off-loading. The tank must be handled with care to prevent accidental damage from impact or contact with sharp objects.

Tanks should be lifted using slings, not chains or wire ropes. Do not drag tanks along the ground for any distance and avoid jarring or bumps. Do not lift with water in the tank.

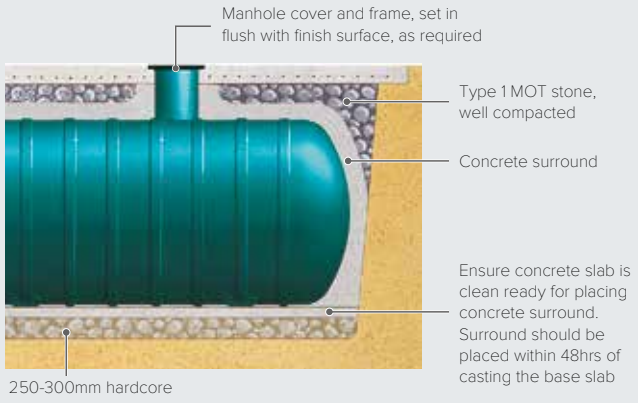
Health and safety

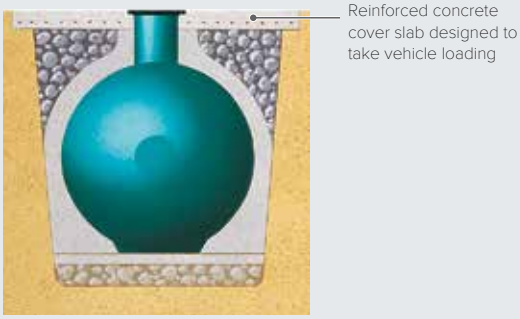
Installation should be carried out by a competent contractor in accordance with Health & Safety at Work legislation and good building practice.

A warning notice should be visible at the top of each access shaft – 'danger, harmful fumes' and 'respirators must be worn in this tank'. Before entering persons must be qualified in accordance with 'confined space' requirements.

Installation – Concrete

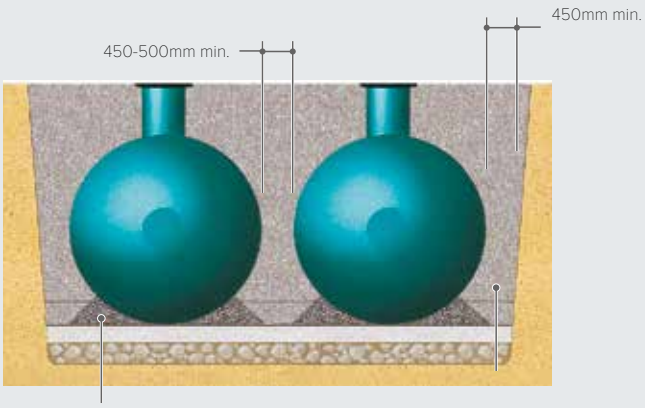
Installation of SPEL Separator tank with chocks and a load bearing cover slab.





Installation – Pea gravel

Installation of SPEL Separator tank where ground over installation is not required to be vehicle load bearing.



Tanks surrounded with pea gravel or similar

Where it is economical to do so, SPEL Separator tanks can be surrounded in pea gravel or with similar free flowing clean rounded aggregate. Details of the installation procedure, approved backfill materials and the need for mechanical anchoring in specific circumstances are contained in the SPEL Data Manual and SPEL Separator Installation Instructions.

Maintenance Requirements

We recommend the SPEL Separator is checked at 3, 6 or 12 monthly intervals to determine the depth of silt in the primary chamber.

The SPEL automatic alarm/monitoring system will automatically warn you when the SPEL Separator requires emptying of light liquids. See ref. 3.10 – 3.19. However, silt will accumulate and require removing at intervals depending on the site conditions.

SPELGuard contracts available.
For more information contact us:
info@spelproducts.co.uk | 01743 445 200

SPELGuard Commissioning & Maintenace

Optional extras

SPEL coalescer unit guide rail systems

To facilitate easy insertion of coalescer units, the SPEL guide rail system manufactured in stainless steel can be incorporated into SPEL Puraceptors and class 1 Stormceptors.

Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer unit is then lowered in the normal way, being guided at the correct angle into the conical base.

Lifting chains are available for the larger coalescer units and where extension shafts are fitted.

Extension guide rails can be incorporated into SPEL extension shafts to suit.

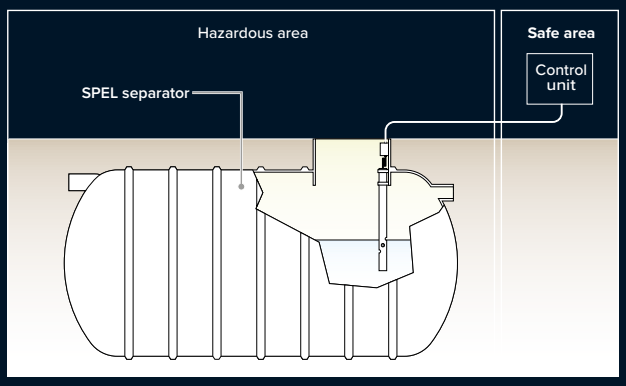
SPEL coalescer unit lifting, locating and locking system

The SPEL lifting, locating and locking system is manufactured in stainless steel and replaces the standard coalescer unit handle.

The locating/locking handle ensures the coalescer unit is seated and locked in its correct position after maintenance.

Above left:
Lifting, locating and locking system with guide rail system.

Above right:
The SPEL coalescer unit with lifting chain.



SPEL offer a range of alarms, f*or full details refer to the SPEL Data Manual Section 3*. Kiosks with beacons and provision for BMS and remote information via browser user interface.

SPEL Model Alarm-DY14400
Oil alarm only – not BMS compatible

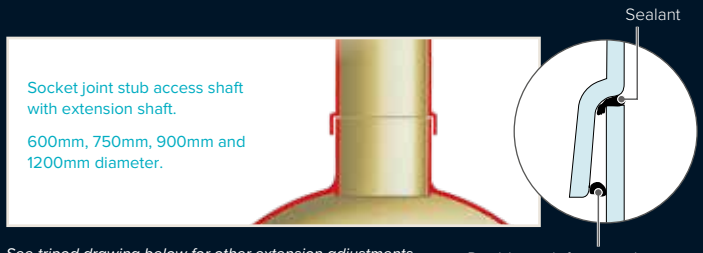
SPEL Model IdOil-20
Oil, silt and/or high level alarm with volt free terminal for beacon and BMS capability

SPEL Model IdOil-30
For oil, silt and/or high level as required. This alarm provides a range of options for BMS and remote information to on or off-site monitoring facilities.

SPEL Model IdOil Solar Oil Separator Alarm
for remote off-grid areas.

SPEL extension access shafts

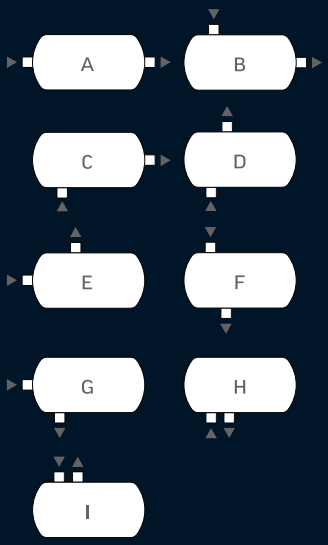
Extension access shafts are available for deep invert applications.



See tripod drawing below for other extension adjustments

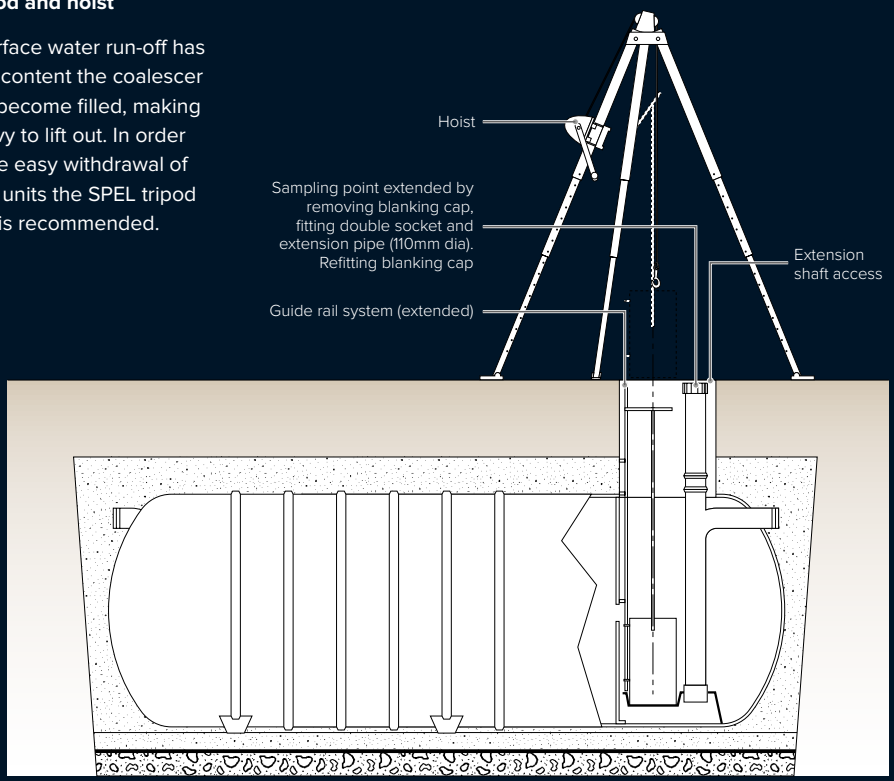
SPEL ESR Range – Inlet/outlet orientation

Dependent upon model and diameter of connections, these nine different orientations are available. However on the larger models it is important to check with our technical department.



SPEL tripod and hoist

Where surface water run-off has a high silt content the coalescer units can become filled, making them heavy to lift out. In order to facilitate easy withdrawal of coalescer units the SPEL tripod and hoist is recommended.



Stormceptor ESR

Enhanced Silt Retention

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals (particulate). It's a highly efficient, single unit, water quality SuDS component.

Lancaster Road, Shrewsbury, Shropshire SY1 3NQ

Phone: +44 (0)1743 445200

Email: info@spelproducts.co.uk / sales@spelproducts.co.uk

spelproducts.co.uk

08/22

Appendix I

Maintenance Plan

Attenuation Basin Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn}
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), the annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Flow Control Manhole Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Inspect vegetation above and around flow control chamber and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Remove sediment from flow control chambers	Annually
	Flow control devices: Check for and clear obstructions	Quarterly
Remedial Actions	Repair of Penstock and flow control device	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storm
	Inspect structures, flow control and pipework etc. for evidence of physical damage	Monthly/after large storm
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Petrol/Silt Interceptor Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Routine Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial Actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Attenuation Tanks Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Routine Maintenance	Inspect and identify any areas that are not operating correctly, if required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly.
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually.
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required.
Monitoring	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.
	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually.