

Flood Consequences Assessment and Outline Drainage Strategy

Silica Sand Mold Ltd

11 August 2026

CONFIDENTIAL

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1 Introduction

1.1 Background

Silica Sand Mold Ltd (Silica Sand) is submitting a planning application for the reopening and deepening of the existing (dormant) Maes y Droell Site (the Site) located approximately 7.6 km south of Mold, Denbighshire. The Site used to target the sands of the Cefn y Fedw Formation and an increased demand and improvements in processing techniques has initiated Silica Sand to reopen the Site.

Silica Sand proposes to rework the southern part of the existing Site, not going deeper than the existing ~294 m AOD lowest elevation. The northern part of the existing Site will be deepened by 15 m to ~315 m AOD (refer to Appendix A for detailed development plans). Phase 4 will work a north-western extension area to a depth of 326 m AOD, ~30 m deeper than the existing land surface, it is agreed that this part of the quarry benefits from extant planning permission. No dewatering is proposed, with excavations to remain above the water table. Following operations, the Site will be restored to accommodate various natural habitats including rhos & upland woodland scrub with heath and wetland mosaic. Figure 1 shows the Site location and surrounding area.

Envireau Water has been engaged by Stephenson Halliday on behalf of Silica Sand to prepare a Flood Consequences Assessment (FCA) and Outline Drainage Strategy to support the planning application. Envireau has also prepared a Hydrogeological Impact Assessment (HIA) (Envireau, 2026).

1.2 Scope of Work

The scope of work undertaken from this FCA includes the following:

- Review of the local physical and hydrological setting of the Site (Section 2);
- Description and details of the Proposed Development (Section 3);
- Flood Consequences Assessment (Section 4);
- Surface Water Drainage Strategy (Section 5); and
- Conclusions of this report (Section 6).

1.3 Data Sources

The information and assessments in this report are based on:

- Proposed development plans provided by Stephenson Halliday;
- Proposed restoration plan provided by Stephenson Halliday;
- British Geological Survey (BGS) mapping;
- Ordnance Survey mapping;
- Site visits undertaken by Envireau Water on 3 March 2025;
- Data on designated sites from NRW, and
- Data from NRW including LiDAR data and flood mapping.

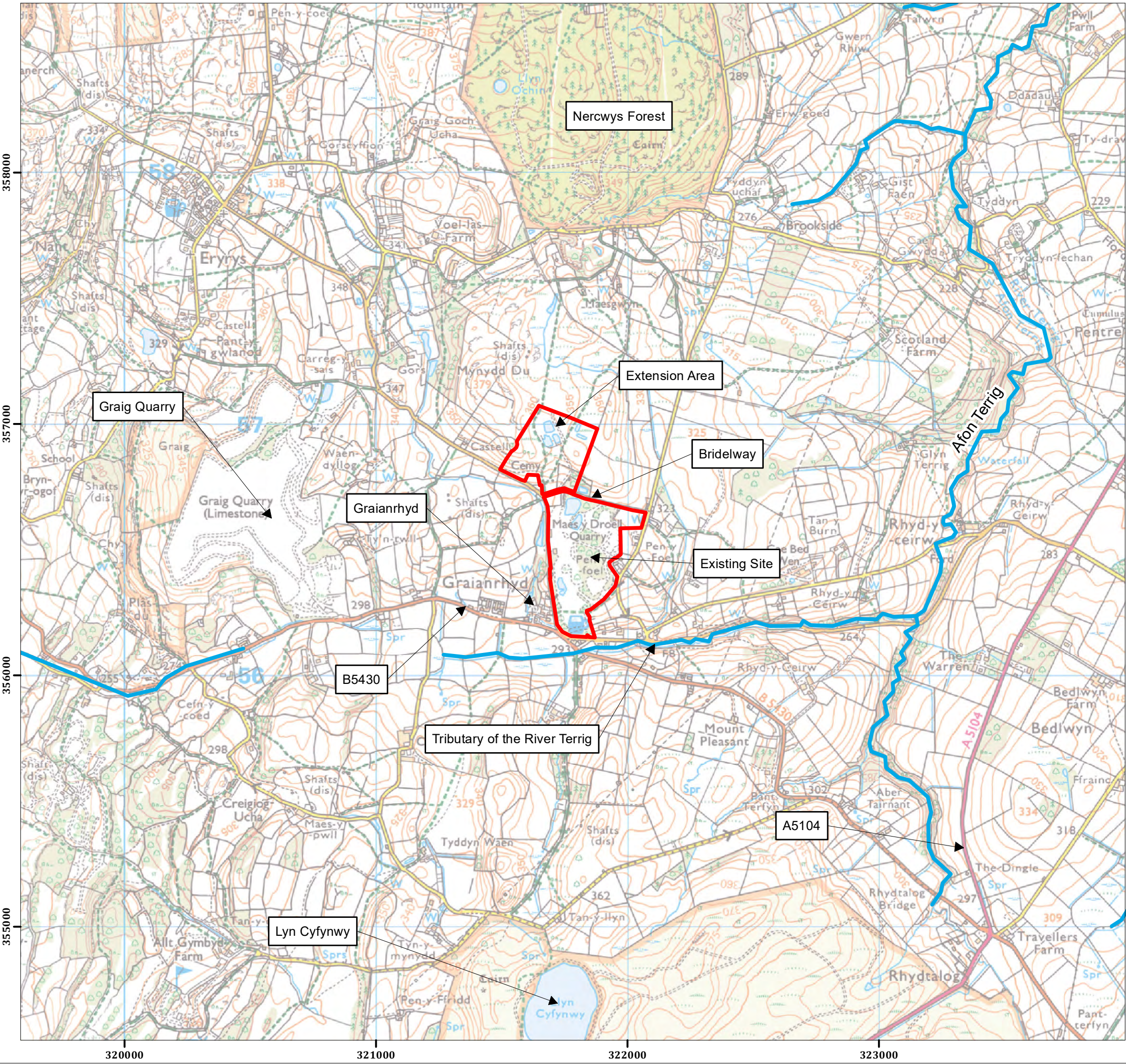


Figure 1: Site Location

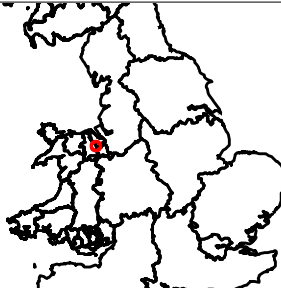
Maes y Droell, Mold



-  Application Site Boundary
-  Watercourses

Notes:

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0 200 400 600 800 Meters
Scale: 1:15,000 at A3

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Client: Graianrhyd Maes y Droell
Drawn by: MT
Ref: Site Location



2 Baseline Conditions

2.1 Site Setting

Maes y Droell Quarry (the Site) is located at the small settlement of Graianrhyd and is approximately 7.6 km south of Mold in North Wales (Figure 1). The economic mineral to be extracted is the Cefn- y-Fedw Sandstone Formation of the Millstone Grit Group. Extraction operations at the Site began in 1880 and reached an excavation depth of ~300 m AOD in the early 2000's.

The Site is in a rural area primarily characterised by agricultural land and forestry. Graig Quarry, operated by Tarmac, is located 830 m west of the Site. The Nercwys Forest is located 1.2 km north of the Site and forms part of the Clwydian Range and Dee Valley Area of Outstanding Natural Beauty (AONB). The Site is accessed from the Eryrys road off the B5430 which links to the A5104, 1.6 km east, and the A494, 4.3 km to the west.

2.2 Existing Development

The Site consists of two areas (Figure 2), the existing quarry which is 13.6 ha in size and the northern extension area (the 'extension area') which is located to the north of the existing site and is separated from the existing site by a bridleway.

Today, the Site is dormant with previously worked waste piles and a series of surface water ponds. The extension area contains 5 surface water ponds.

2.3 Topography

The existing Site rises from 296 m AOD in the south to 329 m AOD in the north, Figure 3. The north-west extension area is separated from the current site by a bridleway and is situated on land that rises from approximately 330 m AOD to 355 m AOD towards the north of the Site.

200 m to the northeast of the Site, elevations reaches 368 m AOD at Mynydd Du. To the south of the Site, land falls to the tributary to the River Terrig at circa. 293 m AOD.

2.4 Geology and Soils

The local geology has been identified from the British Geological Survey (BGS) 1:50,000 scale mapping on the Onshore GeoIndex (British Geological Survey, 2025). The BGS mapping shows that there are no superficial deposits at the Site apart from a small area of lacustrine deposits located on the north-east of the Site. A recent investigation borehole that was drilled towards the north-west of the existing quarry Site records groundwater levels of 294.7 m AOD, suggesting groundwater depths of over 30 mbgl.

Strata Surveys Ltd drilled a total of five boreholes in 2010, see Figure 4, the majority of the locations focused towards the south of the Site (BH1, BH3, BH4 and BH5) and one towards the north (BH2). BH2, BH3 and BH5 show thick sandstone units present. BH1 and BH4 show the presence of clay units, this is where a waterbody has formed within the existing site

Soilscapes describes the natural soils at the Site as 'freely draining very acid sandy and loamy soils' (Cranfield Soil and Agrifood Institute, 2025). However due to historic quarry workings at the Site it is expected that the majority of the natural soils have been stripped away.



Figure 2: Existing Development

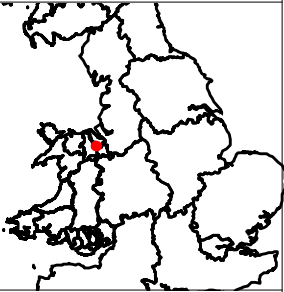
Maes y Droell, Mold



-  Application Site Boundary
-  Watercourses

Notes:

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Ref: Existing Development



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

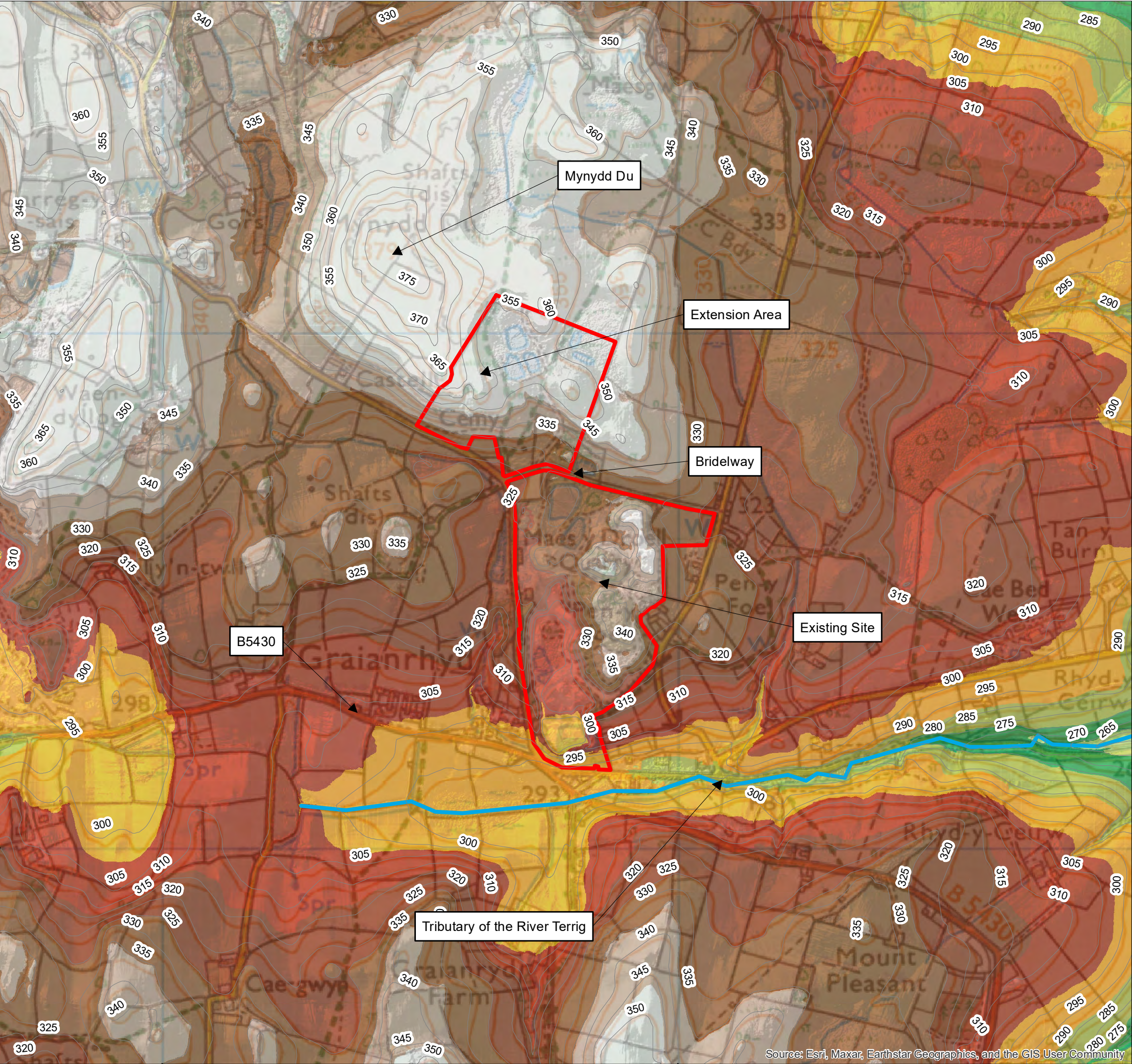


Figure 3: Site Topography

Maes y Droell, Mold



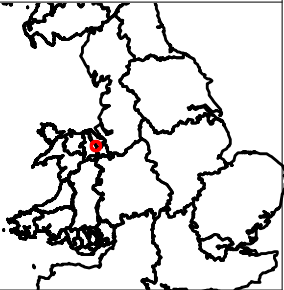
- Application Site Boundary
- Watercourses
- Contours (5m Intervals)

Ground Elevation (mAOD)

- 216.8 - 245.5
- 245.6 - 258.2
- 258.3 - 269.7
- 269.8 - 280.5
- 280.6 - 291.3
- 291.4 - 302.2
- 302.3 - 313.6
- 313.7 - 325.1
- 325.2 - 335.3
- 335.4 - 346.1
- 346.2 - 356.9
- 357.0 - 379.2

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0 100 200 300 400 Meters
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Drawn by: MT
Ref: Site Topography



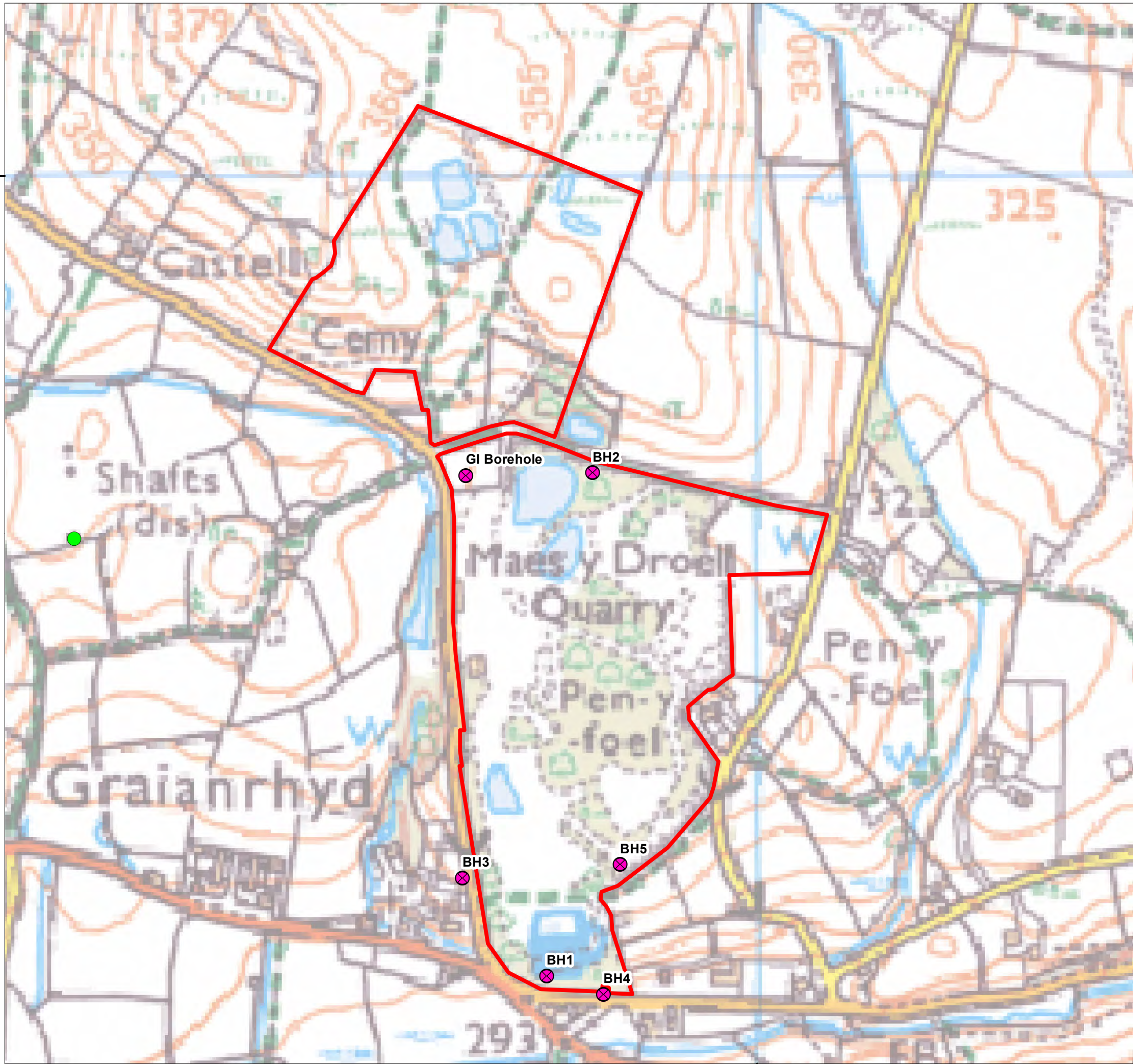


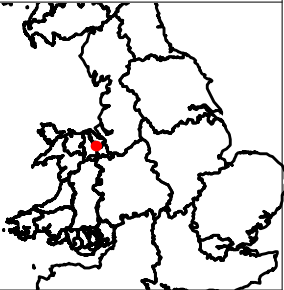
Figure 4: Borehole Locations

Maes y Droell, Mold

- Application Site Boundary
- Groundwater Level Boreholes
- Mine Shaft

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Drawn by: CA
Ref: Groundwater Levels



2.5 Watercourses and Artificial Waterbodies

The Site is located in the River Terrig Catchment, and the local watercourses to the Site are the River Terrig, River Alyn and River Cegidog. A tributary to the River Terrig runs easterly 45 m (at it's closest point) south of the Site where it confluences with the River Terrig 1 km to the east of the Site, see Figure 5. The River Terrig is sourced from a series of springs approximately 1 km south-east from the Site, and joins the River Alyn approximately 7 km north-east of the Site. The Alyn then discharges to the River Dee approximately 18 km east of the Site.

A minor watercourse runs in a southerly direction to the west of the Site. It originates approximately 1.4 km north west of the Site before flowing in a southerly direction passing through a series of ponds before confluencing with the tributary of the River Terrig to the south of the Site. At its closest, the minor watercourse runs 20 m from the Site boundary.

A second minor watercourse runs to the east of the Site, it originates at a small pond located 350 m north of the Site before flowing southwards before it confluences with the tributary to the River Terrig 190 m south east of the Site. At its closest it runs 110 m from the eastern boundary of the Site.

A series of artificial ponds exist with the current site and the extension area associated with the previous quarry workings.

A large raised reservoir, Lyn Cyfynwy, is located 1.3 km to the south of the Site.

2.6 Sewers

The Welsh Water sewer asset plans are presented in Appendix A. There are no Welsh Water sewers located at the Site.

2.7 Current Water Management

There are three catchments that cover the Site, labelled the Eastern, Southern and Western Catchments on Figure 6.

Currently surface water entering the Site, and precipitation that falls upon the Site, infiltrates to ground due to the sandy nature of the underlying strata. However, during extreme rainfall events when rainfall intensity surpasses infiltration rate, there is potential for runoff to be generated.

Should runoff be generated, the northern portion of the extension area and a small eastern section of the existing site will drain to the Eastern Catchment. The Western Catchment is formed from the southern section of the extension area that flows southerly, a portion of which goes to the local road or towards the northern portion of the existing Site, where this once again, drains towards the local road and onto the tributary of the River Terrig.

The Southern Catchment is wholly within the existing Site. Should runoff be generated it would flow to the southern boundary of the existing Site, where it would accumulate within an existing waterbody. This waterbody is formed from the old quarry workings/void and sits circa. 3 m below the natural ground level at the southern boundary. Therefore, unless water levels are raised by circa. 3 m, runoff cannot leave the southern boundary and

is held within the existing quarry void, where it would infiltrate to ground following extreme events. There is no formal drainage system currently at the Site.

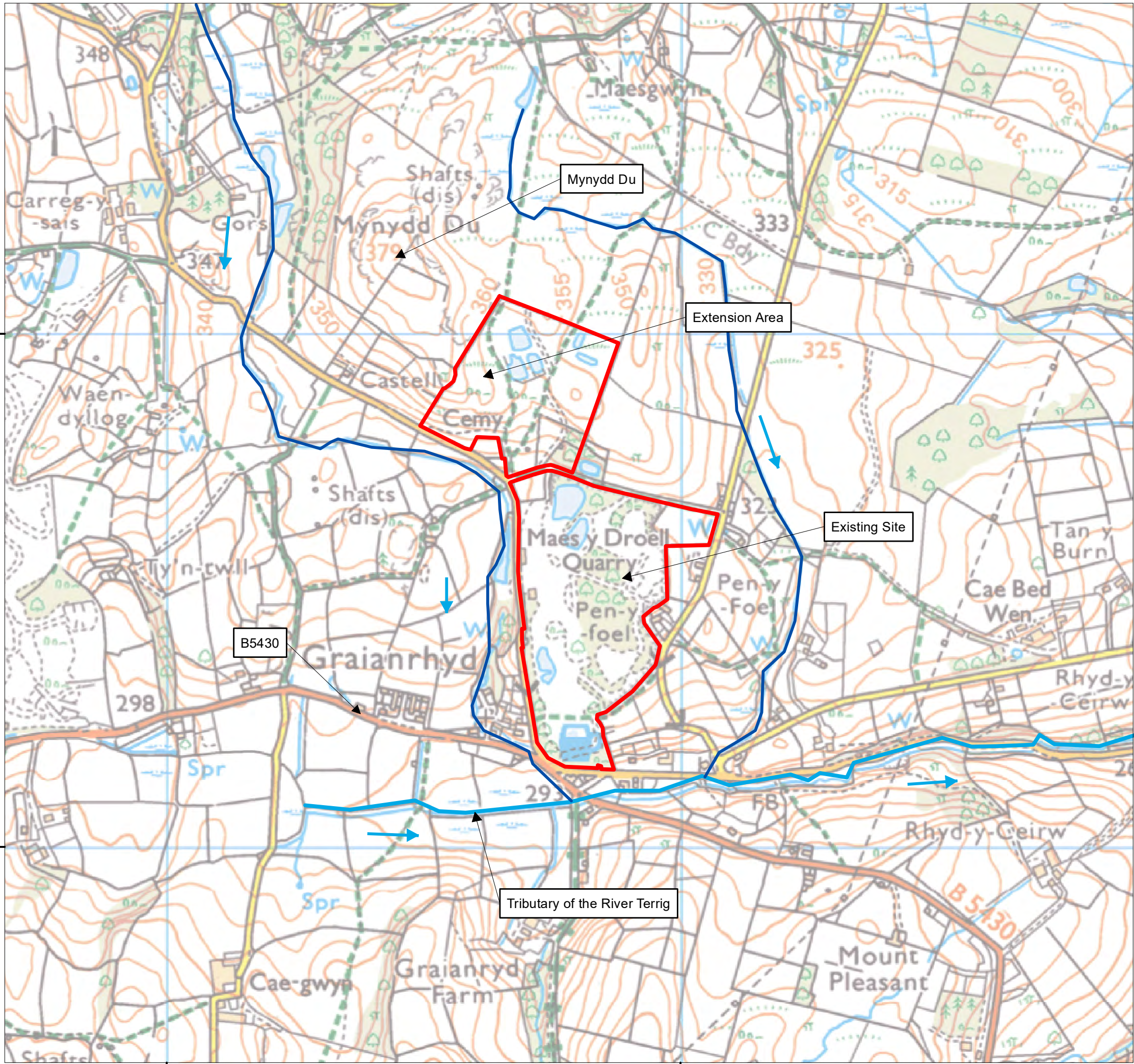


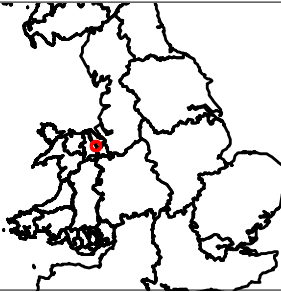
Figure 5: Hydrological Setting

Maes y Droell, Mold

- Application Site Boundary
- Watercourses
- Minor Watercourses
- Flow Direction

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Ref: Hydrological Setting



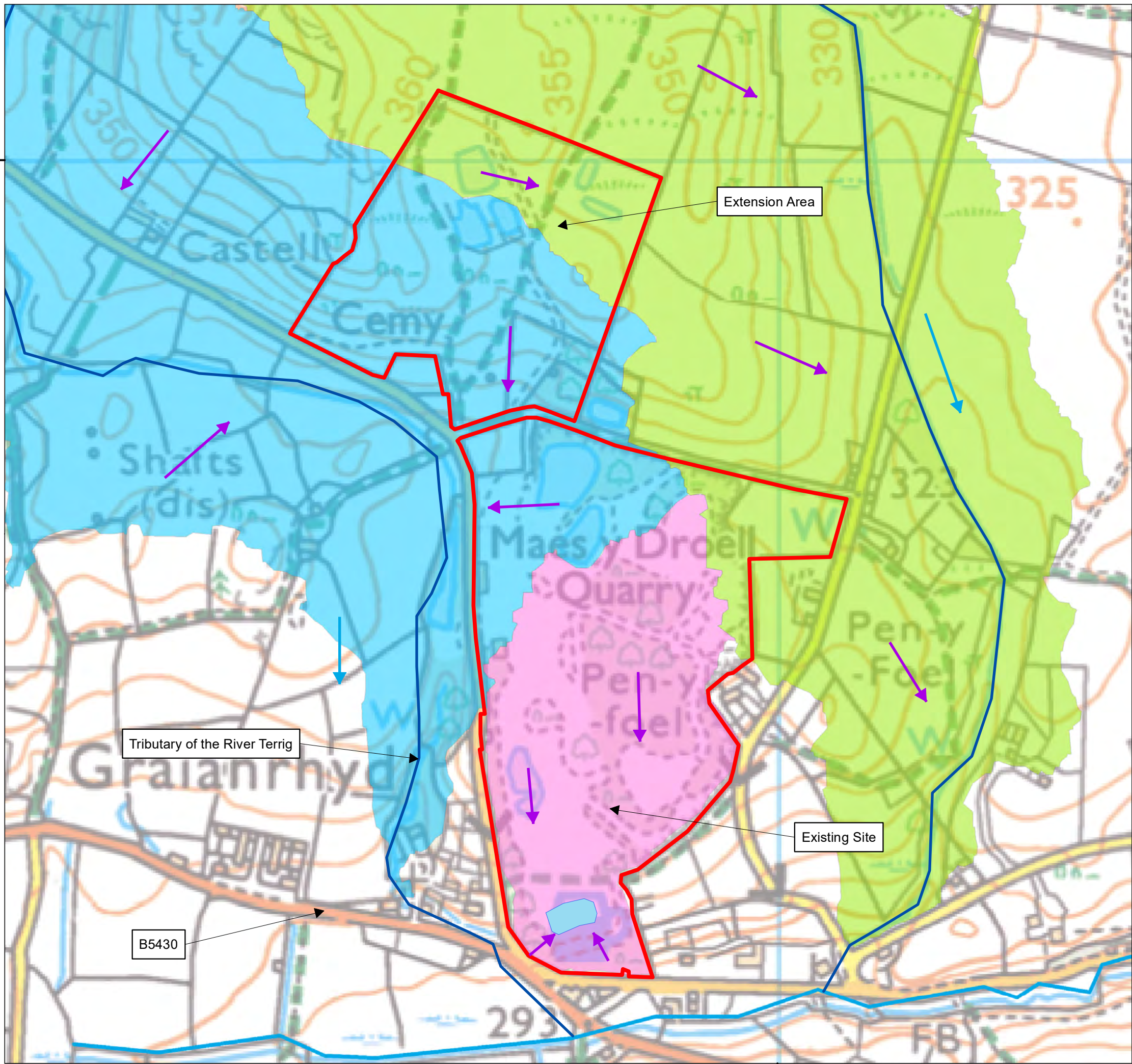


Figure 5: Current Water Management Strategy

Maes y Droell, Mold



- Application Site Boundary
- Eastern Catchment
- Southern Catchment
- Western Catchment
- Existing Waterbody
- Watercourses
- Minor Watercourses
- Flow Direction
- Surface Water Runoff

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Client: Graianrhyd Maes y Droell

Drawn by: MT

Ref: Current Water Mangement Strategy



3 Proposed Development

3.1 Operational Phase

Full details of the proposed development are presented in the accompanying Environmental Statement (ES) (Stephenson Halliday, 2025). A summary is presented below and development plans are shown in Appendix A.

Silica Sand is applying for planning permission to rework the existing Site. Reworking of the existing area comprises an excavation elevation being staggered towards the south from 315 m AOD to 300 m AOD, and finally 294 m AOD. The northern extension plans to excavate to a depth of 30 m bgl (~326 m AOD).

Existing infrastructure will be demolished with a new processing plant being situated towards the north-east of the existing Site. The quarry void will be worked over four phases.

3.1.1 Groundwater Dewatering

Silica Sand proposes to excavate the upper sandstone above the groundwater table, which, based on groundwater level monitoring, is considered to be at a sufficient depth to allow initial quarrying to proceed without the need for dewatering.

The recent investigation borehole that was drilled towards the north-west of the existing quarry Site records groundwater levels of 294.7 m AOD. The top of the extension area is approximately 400 m north of the GI borehole and assuming a groundwater gradient of 0.01, it is expected that groundwater levels in the extension area are to be around 298.7 m AOD. The proposed maximum worked depth in the extension area is to be 326 m AOD, thus extraction is not anticipated to intercept the water table, and dewatering will not be required.

The Cefn-y-Fedw Sandstone is noted to have mudstone layers throughout the sandstone formation. No drilling has been undertaken in the extension area and so the number and lateral extent of potential impermeable horizons of mudstone is unknown. These mudstone layers provide natural no flow boundaries (minimal flow) vertically and so perched groundwater may be intercepted during the works. It is expected that any perched groundwater would be of low volumes. Recharge to the Cefn-y-Fedw Sandstone Formation beyond the extension area elevation would be considered minimal and so once initially drained, further dewatering is not anticipated.

3.2 Restoration Phase

This restoration strategy aims to restore and enhance upland habitats through a combination of targeted active and passive ecological interventions. Central to the scheme is upland restoration, focusing on rewetting degraded areas to improve hydrological function and carbon sequestration. Restoration will be complemented by the re-introduction of native plant species, selected to reflect the site's historical vegetation and support local biodiversity. The proposed restoration plan is included in Appendix A.

All quarry plant and buildings will be removed from the Site. At cessation of operations low lying areas in the existing Site will be clay lined to retain water and help establish acid wet woodland with heath and wetland scrape mosaic. Native tree species will also be planted.

The extension area will include occasional shallow water body scrapes. The remaining area will be planted and developed to form rhos and upland woodland scrub with heath and wetland mosaic.

4 Flood Consequences Assessment

4.1 Introduction and Policy Context

This Flood Consequence Assessment (FCA) has been prepared in accordance with Planning Policy Wales (PPW) (Welsh Government, 2021), Technical Advice Note 15 Development and Flood Risk (TAN15) (Welsh Government, 2024).

This FCA identifies and assesses the risks of all forms of flooding to and from the Proposed Development and demonstrates how these flood risks will be managed so that the development remains safe throughout its lifetime, taking account of climate change. In line with the requirements of TAN15, all potential sources of flooding have been considered, these are: fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from infrastructure failure (reservoirs).

4.2 Flood risk vulnerability classification

TAN15 assigns one of three flood risk vulnerabilities to development as set out in Table 1.

Table 1 TAN15 Development Vulnerability Classifications

Development Category	Types
Highly vulnerable development	All residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators) and waste disposal sites.
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites.

Classification Justification

The Site is classified as a mineral extraction site and there is classified as ‘Less Vulnerable Development’

4.3 Flood Risk

4.3.1 Flood Map for Planning

The Welsh Government implemented a revised TAN15 during 2024. This was supported by the Flood Map for Planning (FMfP) (Natural Resources Wales, 2024). The new TAN15 replaced the Development Advice Map (DAM) with the FMfP, which will be used to trigger different planning actions based on the precautionary assessment of flood risk. Importantly, the FMfP includes for predicted effects of climate change, whereas the DAM did not.

4.3.2 Historic Flooding

The Recorded Flood Extents dataset indicates that the Site is not situated within an area that has been recorded to have flooded in the past from rivers, the sea or surface water (Natural Resources Wales, 2024). The records come from a number of evidence sources including NRW, its predecessors or other Risk Management Authorities.

4.3.3 Sea (Tidal) flooding

The FMfP indicates that the Site is located within Flood Zone 1. This means that there is less than 0.1% (1 in 1,000) chance of flooding from the sea in any given year. The Site is therefore at **No risk** of flooding from the sea.

4.3.4 Rivers (Fluvial) flooding

The FMfP shows that the Site is located wholly within Flood Zone 1 (see Figure 7). This means that there is less than a 0.1% (1 in 1,000) chance of flooding from rivers in any given year. The Site is therefore at a **No risk** of flooding from rivers.

4.3.5 Surface Water (Pluvial) and Small Watercourses

The FMfP indicates that the majority of the Site lies within Flood Zone 1, see Figure 8. This means that there is a less than a 0.1% (1 in 1,000) chance of flooding from surface water and small watercourse in any given year. The areas within the Site that are shown to be within Flood Zone 3 are surface water bodies associated with previous quarry workings or topographic depressions within the Site. There are no surface water flow pathways across the Site.

The Site is therefore at **Very Low Risk** of flooding from surface water and small watercourses.

4.3.6 Groundwater flooding

The Susceptibility to Groundwater Flooding Map indicates that the majority of the Site is categorised as 'Unaffected Area' with a small parcel of land along the eastern boundary of the Site being categorised as 'limited potential for groundwater flooding to occur' associated with the superficial deposits. This is supported by groundwater level data at the Site which shows that groundwater levels are approximately 30 mbgl.

Based on the above, it can be concluded that there is **No risk** of groundwater flooding at the Site.

4.3.7 Reservoir (Infrastructure Failure) flooding

The FMfP indicates that the far south of the Site is at risk of flooding from the failure of a large reservoir, which in this case is Llyn Celyn, see Figure 9. The reservoir flooding extent overlaps into the southern boundary of the Site by 10 m covering an area of 0.08 ha (0.4%). The reservoir mapping shows the worst-case scenario if a large raised reservoir were to fail. Reservoir flooding is extremely unlikely to happen as all large raised reservoirs must be inspected and supervised by reservoir panel engineers under the Reservoirs Act 1975.

The Site is therefore at **Very Low risk** of flooding from reservoirs.

4.3.8 Sewer flooding

There are no Welsh Water sewers located at the Site. Therefore, there is **No Risk** of sewer flooding at the Site.

4.4 Flood Risk Summary

Table 2 provides a summary of the risk of flooding to the Proposed Development from the assessments above and including mitigation.

Table 2 Overall Flood Risk to Proposed Development from All Sources

Flood Source	Risk of Flooding (with mitigation)				
	No Risk	Very Low	Low	Medium	High
Sea (Tidal)	✓				
River (Fluvial)	✓				
Surface Water (Pluvial) and Small Watercourses		✓			
Groundwater	✓				
Sewers	✓				
Reservoirs (infrastructure failure)		✓			

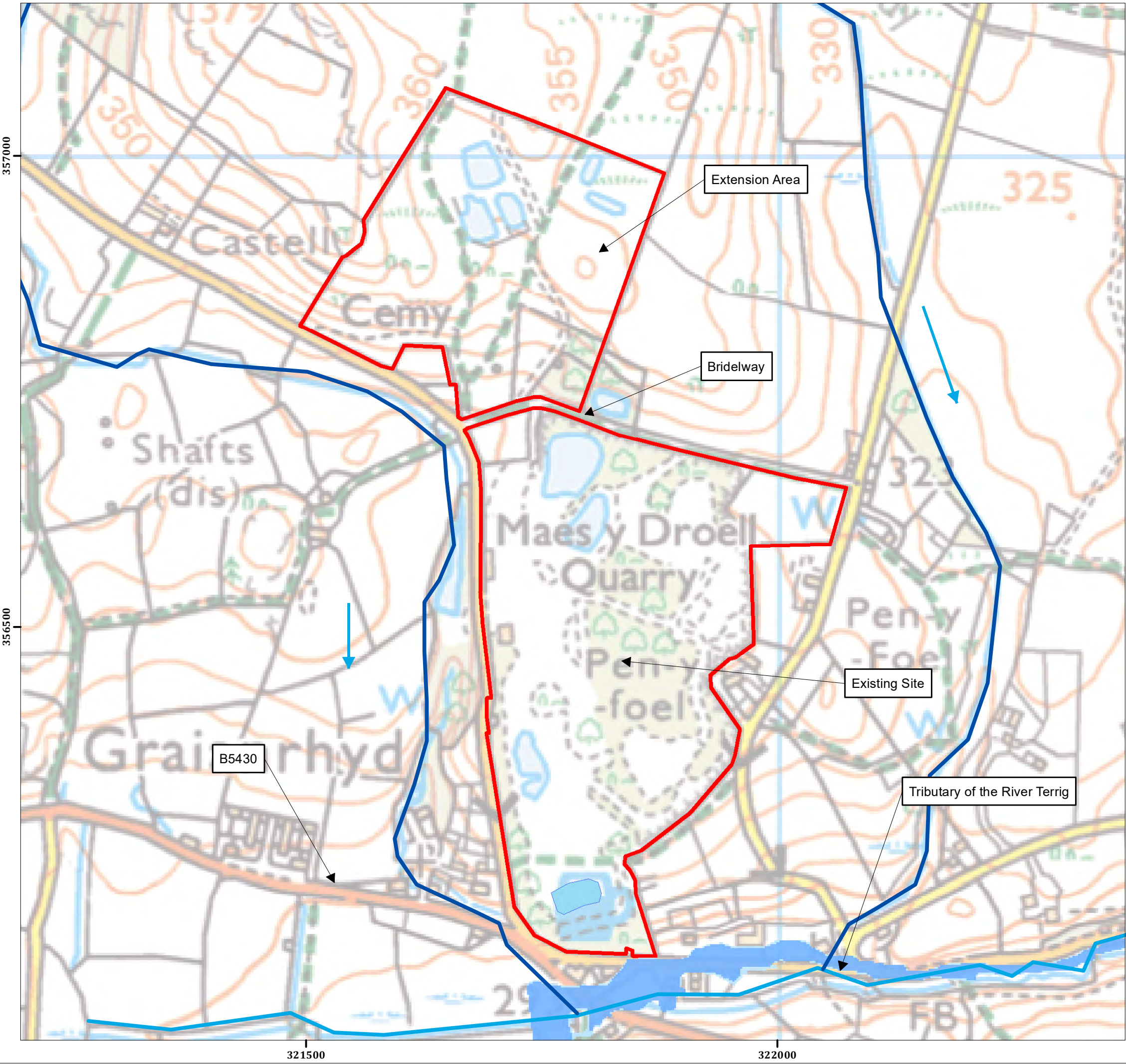


Figure 7: Flood Map for Planning- Rivers

Maes y Droell, Mold



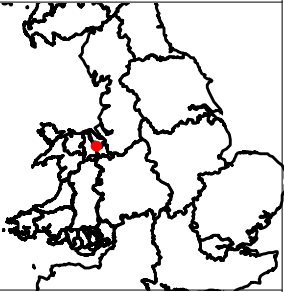
- Application Site Boundary
- Existing Waterbody
- Watercourses
- Minor Watercourses
- Flow Direction

Flood Map for Planning- Rivers

- Flood Zone 2
- Flood Zone 3

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Figure 8: Flood Map for Planning - Surface Water and Small Watercourses

Maes y Droell, Mold

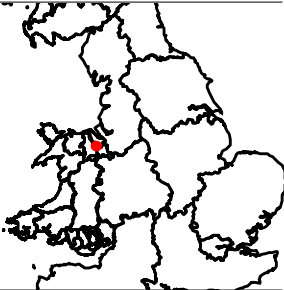
- Application Boundary
- Existing Waterbody
- Watercourses

Flood Risk from Surface Water and Small Watercourse

- Low
- Medium
- High

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Drawn by: MT
Ref: Flood Map SW





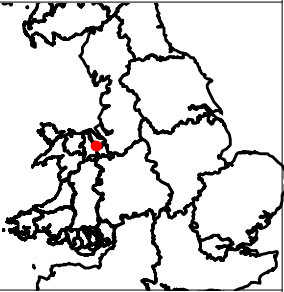
**Figure 9: Reservoir
Flood Map**

Maes y Droell, Mold

- Application Application
- Existing Waterbody
- Flood Risk from Reservoirs
- Watercourses

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Drawn by: MT
Ref: Flood Map SW



5 Surface Water Drainage Strategy

5.1 Introduction

The Surface Water Drainage Strategy outlines how surface water would be managed at the Site during the Operational and Restoration phase of the Proposed Development.

5.2 Proposed Operational Water Management

5.2.1 Introduction

The quarry void will be worked over four phases, becoming progressively larger (in area) and deeper until it reaches its maximum areal extent and depth. The proposed water management plan has been developed based on the void at maximum areal extent. The proposed operational water management plan is shown on Figure 10.

5.2.2 Greenfield Runoff Rates

Runoff rates have been calculated for the extension area (8 ha) and the existing site (13.6 ha) and are presented in Table 3. There is no additional contribution catchment to the existing Site with a small area of runoff entering the extension area from the north (3 ha). Runoff rates are presented in Table 3.

Table 3 Greenfield Runoff Rates

Storm Return Period (years)	Extension Area Peak Runoff Rate (l/s)	Existing Site Peak Runoff Rate (l/s)
1	2.4	3.0
2.3 (Q_{bar})	2.8	3.4
30	4.9	6.1
100	6.0	7.5
200	6.8	8.4

5.2.3 Surface Water Runoff Destination

Any surface water runoff not collected for use must be discharged to one or more of the following in the order of priority shown in line with the CIRIA SuDS Manual C753 (Woods Ballard, et al., 2015):

- Infiltration to ground (most preferred);
- Discharge to a surface waterbody;
- Discharge to a surface water sewer; and
- Discharge to a combined sewer (least preferred).

An assessment of the suitability of each tier of the hierarchy has been made and is presented in Table 4.

Table 4 Surface Water Runoff Destination

Priority	Hierarchy	Suitability	Comment
1	Infiltration to ground	✓	During the operational stage, the surface runoff will be captured within sumps at low points within the quarry workings which will form over the 4 proposed phases. Water captured within the quarry sumps will soak away given the expected high permeability of the underlying sand and gravel deposits. No formal discharge currently occurs from the existing (dormant) site or extension area due to surface waters infiltrating to ground. This is expected to continue as quarry workings progress.
2	Discharge to surface waterbody	✓	There will be no requirement to discharge water off the Site due to the high permeability of the underlying deposits. Therefore, this option has not been considered further.
3	Discharge to a surface water sewer, highway drain or another drainage system	X	There are no surface water sewers at the Site. Therefore, this option has not been considered further.
4	Discharge to a combined sewer	X	There are no combined sewers at the Site. Therefore, this option has not been considered further.

5.2.4 Operational Drainage Strategy

During the operational stage, rainfall and runoff will infiltrate to ground due to the sandy nature of the underlying strata. In extreme rainfall events, should rainfall intensity exceed infiltration rate, there is potential for gravity flows to be generated which will drain to the sumps within the Site, which will be developed over successive quarry phases (Figure 10).

The Processing Area is located on flat ground in the eastern part of the existing Site and lies at a lower elevation than the surrounding topography. Given the high permeability of the underlying sandy strata, rainfall falling on the Processing Area is expected to infiltrate. Rainfall falling on the hardstanding within the Processing Area will runoff to the surrounding quarried floor, where it can infiltrate to ground. No dewatering will occur at the Site, and the available storage within the quarry depressions will provide sufficient capacity to contain all excessive (extreme storm) runoff within the system of sumps.

In the northern extension area, in the unlikely event that the sump reaches the overflow level, runoff will be directed into the southern area of the Site. Surface water flow paths entering the Site from off-site will remain unchanged. However, surface water will be contained within the Site and will infiltrate to ground, thereby reducing downstream flood risk. Runoff from the two biodiversity areas (Figure 10) will continue to drain naturally, although it is anticipated that most runoff will be attenuated within existing depressions in these areas.

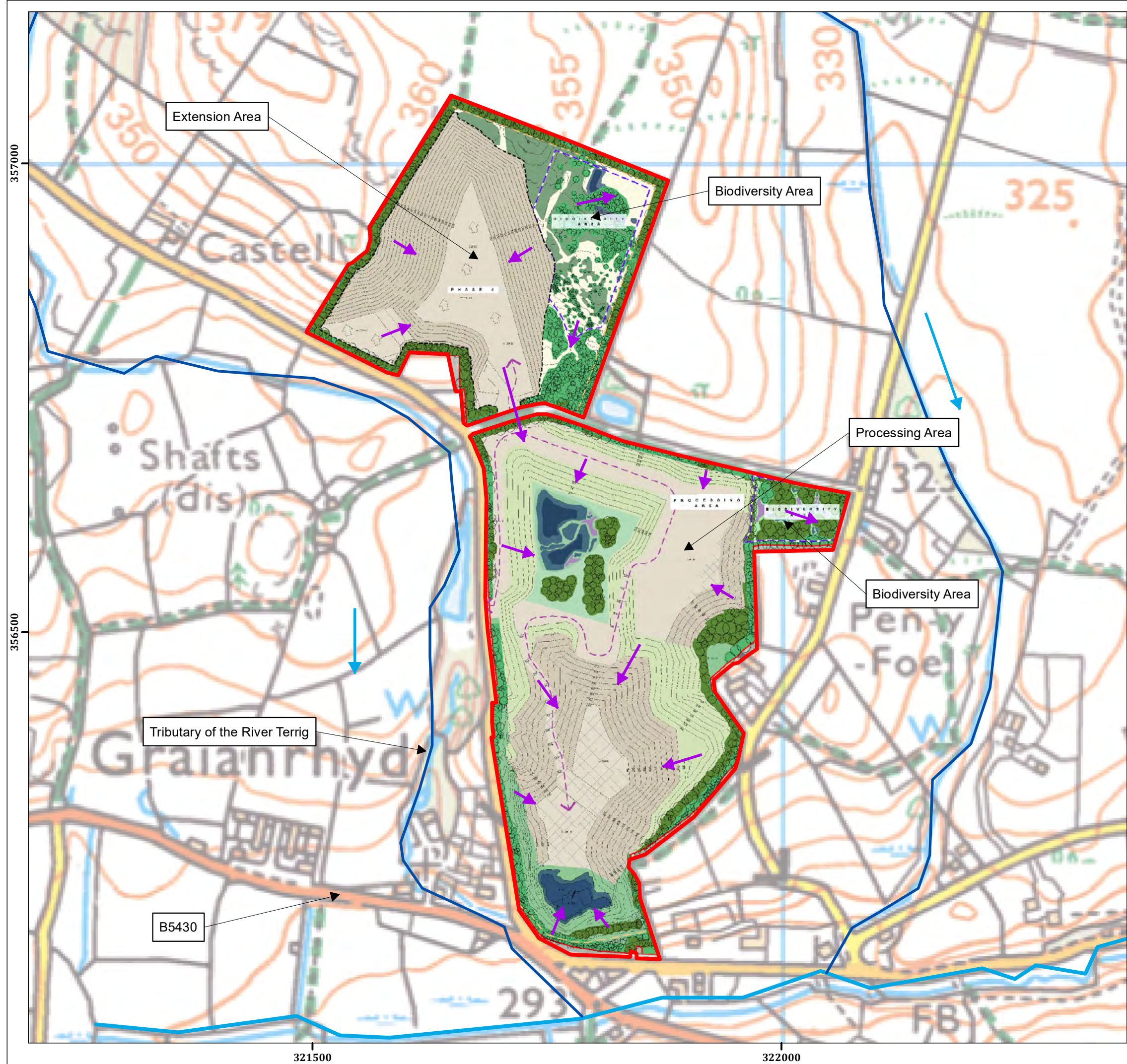


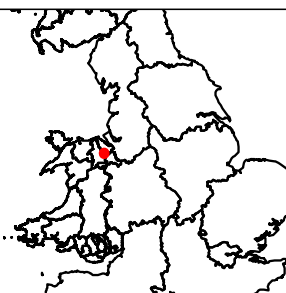
Figure 10: Operational Water Management Strategy

Maes y Droell, Mold

-  Application Site Boundary
-  Watercourses
-  Minor Watercourses
-  Flow Direction
-  Operational Surface Water Runoff

Notes:

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0 50 100 150 200 Meters
Scale: 1:4,000 at A3

23 January 2026
NGR: 321,783 E / 356,612 N

Project No. 3491083
Client: Graianrhyd Maes y Droell
Drawn by: MT
Ref: Operational Management Strategy



5.3 Restoration Water Management

Runoff from the entire Site will be directed into several restored topographic depressions dispersed within the quarry area. These will form ephemeral scrapes/wet areas that will be clay lined to prevent infiltration and retain water, to assist in creating an acid wet woodland with heath and wetland scrape mosaic.

Excess water, i.e. that which exceeds infiltration potential in extreme events, will potentially produce standing water in the base of the restored extension area or drain to the southern (existing) restored Site. For the southern (existing) restored site, excess water will gravity drain to the existing retained southern pond.

5.3.1 Maintenance and impact of failure

Once the Site is restored there will not be any engineered features or discharge points from the Site that require inspection or maintenance.

The restored Site will be a self-contained, low level restoration with an extremely large attenuation storage volume.

The void in the northern section of the Site has the storage capacity to attenuate 10,950 m³ (i.e. footprint of void to the first spill point x depth of void). In the unlikely event this capacity is reached overflow will be directed to the southern (existing) restored Site where flows will be attenuated within the void.

The attenuation storage volume in the southern (existing) restored Site will be circa. 45,250 m³ provided within the void (i.e. footprint of void to the first spill point x depth of void). This is a significant volume and given the high permeability nature of the underlying and surrounding strata, is extremely unlikely to be utilised. Therefore, failure of the proposed sustainable water management measures is considered extremely unlikely and would not result in any significant increase in flood risk to the proposed development or adjacent receptors.



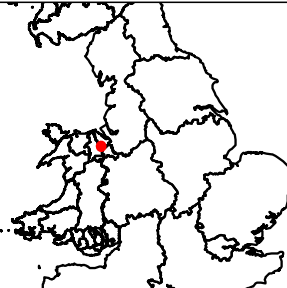
Figure 11: Restoration Water Management Strategy

Maes y Droell, Mold

- Application Site Boundary
- Watercourses
- Minor Watercourses
- Flow Direction
- Restoration Surface Water Runoff

Notes:

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0 50 100 150 200 Meters
Scale: 1:4,000 at A3

23 January 2026
NGR: 321,783 E / 356,612 N

Project No. 3491083

Client: Graianrhyd Maes y Droell

Drawn by: MT

Ref: Restoration Mangement Strategy



6 conclusions

This Flood Consequences Assessment and Surface Water Drainage Strategy demonstrates that:

- The Proposed Development is classified as 'less vulnerable development' in accordance with TAN15 and is a suitable development type on land at No Risk of flooding, as it constitutes mineral extraction.
- There is no risk of flooding to and from the Proposed Development from fluvial (river), coastal (tidal), groundwater and sewers.
- The risk of flooding to and from the Proposed Development from surface water (pluvial) and reservoir is Very Low.
- There is sufficient attenuation storage available within the quarry sumps during the proposed operational phase to attenuate runoff for infiltration to then occur.
- The restored landform will be designed to direct runoff into two clay-lined sumps within the exiting site and the extension area.

References

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- Woods Ballard, B., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R., & Kellagher, R. (2015). *The SuDS Manual (C753)*. CIRIA.

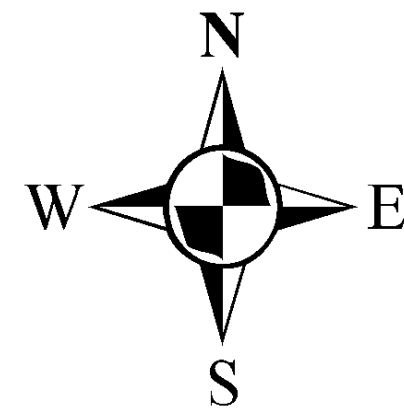
Appendices

Appendix A Sewer Asset Plans



Dŵr Cymru
Welsh Water

Quarry Graianrhyd



LEGEND(Representative of most common features)

Waste network:	Foul chamber	Outfall
Surface water chamber	LH	Lamp hole
Combined chamber	Storm Overflow	
Combined sewer overflow	Rising main	
Special purpose chamber	Gravity sewer	
Treatment works	Private sewer	
Pumping station	Private sewer subject to Sect. 104 adaptation agreement	
	Private Sewer Transfer	
	Lateral Drain	
	Inspection Chamber	

NB: Sewer symbol colour indicates the type.
RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre (PF)) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dŵr Cymru Cyllynedy (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the basis of the best information available and to the best of its knowledge and belief. The accuracy of the information is not guaranteed. The Company is not responsible for any loss or damage caused by the use of this information. The information is supplied for the use of the Company's customers and is not to be used for any other purpose. The information is not to be used for any purpose other than the use for which it is supplied. The information is not to be used for any purpose other than the use for which it is supplied. The information is not to be used for any purpose other than the use for which it is supplied.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

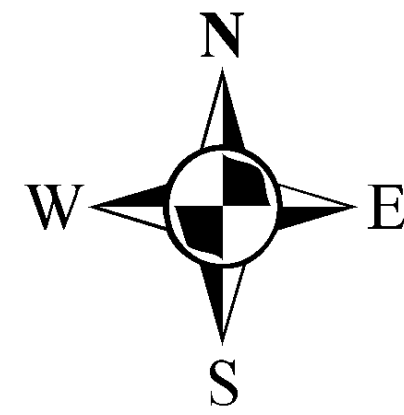
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Map Ref: 321820,356553
Map scale: 1:1250
Printed by: Liam Donovan
Printed on: 06 Jan 2026



Dŵr Cymru
Welsh Water

Quarry Graianrhyd



LEGEND

Clean network:	Sluice valve	Stop tap
Pressure reducing valve	Water Treatment Works	
Meter	Water Pumping Station	
Bulk meter	Existing main	
Hydrant	Non-operational main	
Cap end	Raw Water	
Air valve		

NB: Water main symbol colour indicates the type.
LIGHT BLUE - Trunk
DARK BLUE - Distribution
YELLOW - Raw Water

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement (AC) or Pitch Fibre (PF)) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dŵr Cymru Cyllynedy (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the basis of the best information available and to the best of its knowledge and belief. The Company is not responsible for any loss or damage caused by any excavation works carried out on the basis of this information. The information is supplied by the Company is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1985, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provisions of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref: 321822,356556
Map scale: 1:1250
Printed by: Liam Donovan
Printed on: 06 Jan 2026

Appendix B Development and Restoration Plans

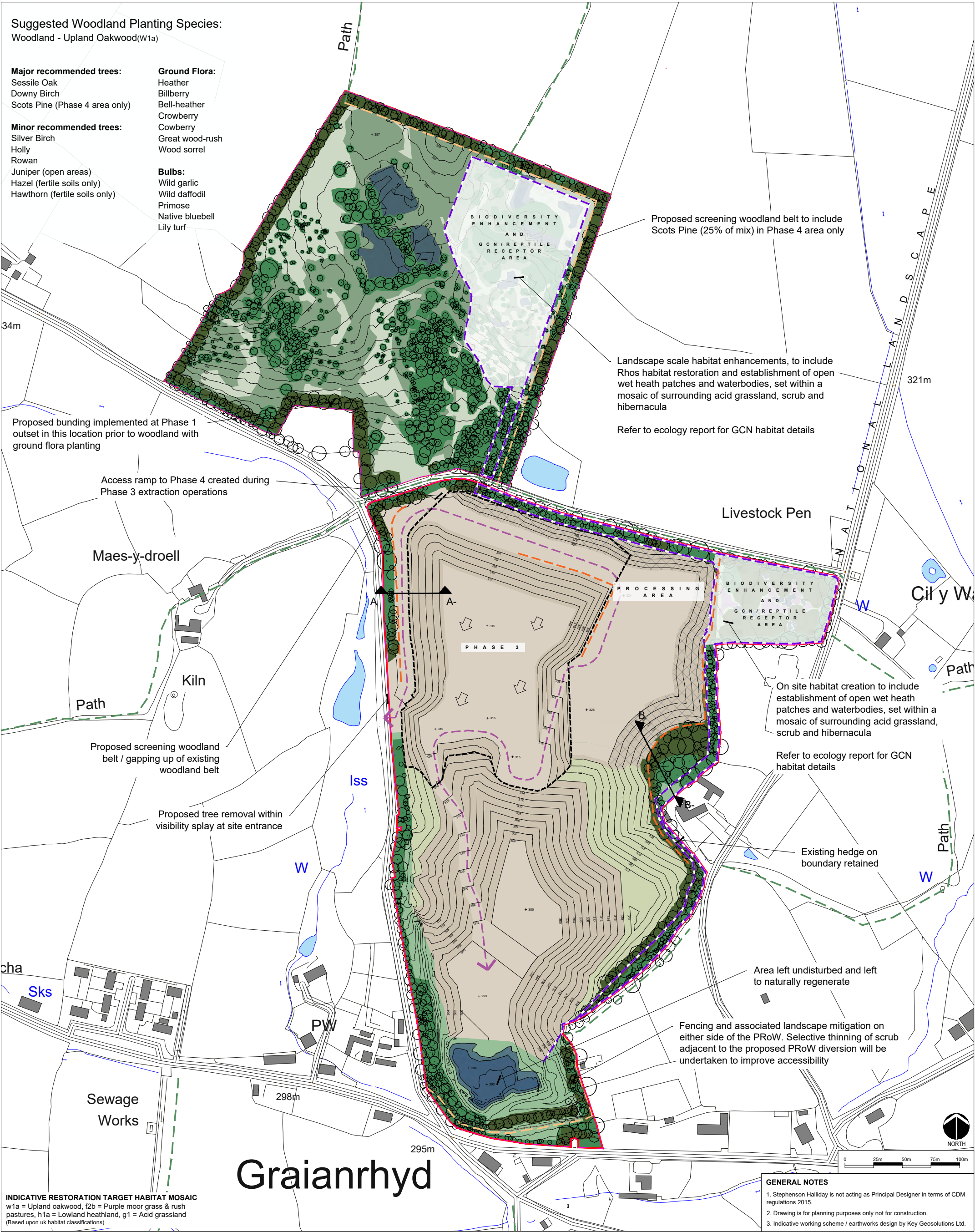
Suggested Woodland Planting Species:
Woodland - Upland Oakwood(w1a)

Major recommended trees:
Sessile Oak
Downy Birch
Scots Pine (Phase 4 area only)

Minor recommended trees:
Silver Birch
Holly
Rowan
Juniper (open areas)
Hazel (fertile soils only)
Hawthorn (fertile soils only)

Ground Flora:
Heather
Billberry
Bell-heather
Crowberry
Cowberry
Great wood-rush
Wood sorrel

Bulbs:
Wild garlic
Wild daffodil
Primrose
Native bluebell
Lily turf



INDICATIVE RESTORATION TARGET HABITAT MOSAIC
w1a = Upland oakwood, f2b = Purple moor grass & rush pastures, h1a = Lowland heathland, g1 = Acid grassland
(Based upon UK habitat classifications)

KEY			
	Application site boundary		Existing vegetation
	Phase 3 extraction area		Proposed woodland (w1a) with ground flora planting
	Quarry floor (disturbed)		Proposed wetland marginal zone (f2b)
	Quarry face (disturbed)		Proposed heath (h1a) & acid grassland (g1) mosaic
	Backfilling area		Proposed acid grassland (g1)
	Assisted natural regeneration of quarry face		Indicative 2m contours
	GCN / reptile terrestrial habitat connectivity & green infrastructure link (For details refer to ecology report)		Biodiversity enhancement areas
	PRoW (retained)		PRoW (indicative diversion)
	Indicative access route		Indicative acoustic mitigation

Client
Silica Sand Mold Limited

Project Title
Maes y Droell Quarry

Drawing Title
Phase 3 Indicative Quarry Development Plan

File Path
APRIL_26_UPDATE_MDQ-SH-ELS-M2-LS-005_PHASE_3.dwg

STEPHENSON HALLIDAY
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Web: www.stephenson-halliday.com

Drawn	Date	Checked	Date	Approved	Date
JD	07/2026	EK	07/2026	AP	07/2026

Scale	Orig Size	Status
1:3,000	A3	PLANNING

Drawing No.	Rev.
FIGURE 5	-

Woodland - Upland Oakwood (W1a)

Sessile Oak
Downy Birch
Scots Pine (Phase 4 area only)

- Silver Birch
- Holly
- Rowan
- Juniper (open areas)
- Hazel (fertile soils only)
- Hawthorn (fertile soils only)

Heather
Billberry
Bell-heather
Crowberry
Cowberry
Great wood-rush
Wood sorrel

Wild garlic
Wild daffodil
Primrose
Native bluebell
Lily turf

- Proposed screening woodland belt to include Scots Pine (25% of mix) in Phase 4 area only

Landscape scale habitat enhancements, to include Rhos habitat restoration and establishment of open wet heath patches and waterbodies, set within a mosaic of surrounding acid grassland, scrub and hibernacula

Refer to ecology report for GCN habitat details

Proposed bunding implemented at Phase 1 outset in this location prior to woodland with ground flora planting

Bridleway crossing between the north and south areas during Phase 4. Planting in this location is to be managed to maintain appropriate visibility when the crossing is brought into use

Maes-y-droell

Kiln

Path

Proposed screening woodland
belt / gapping up of existing
woodland belt

Proposed tree removal within
visibility splay at site entrance

Livestock Pen

Cil y Ws

Path

On site habitat creation to include establishment of open wet heath patches and waterbodies, set within a mosaic of surrounding acid grassland, scrub and hibernacula

Refer to ecology report for GCN habitat details

Existing hedge on
boundary retained

Area left undisturbed and left to naturally regenerate

- Fencing and associated landscape mitigation on either side of the PRoW. Selective thinning of scrub adjacent to the proposed PRoW diversion will be undertaken to improve accessibility

Graianrhyd

INDICATIVE RESTORATION TARGET HABITAT MOSAIC
w1a = Upland oakwood, f2b = Purple moor grass & rush
pastures, h1a = Lowland heathland, g1 = Acid grassland
(Based upon uk habitat classifications)

	Application site boundary		Existing vegetation		GCN / reptile terrestrial habitat connectivity & green infrastructure (For details refer to ecology report)
	Phase 4 extraction area		Proposed woodland (w1a) with ground flora planting		Biodiversity enhancement areas
	Quarry floor (disturbed)		Proposed wetland marginal zone (f2b)		PRoW (retained)
	Quarry face (disturbed)		Proposed heath (h1a) & acid grassland (g1) mosaic		PRoW (indicative diversion)
	Backfilling area		Proposed acid grassland (g1)		Indicative access route
	Assisted natural regeneration of quarry face		Indicative 2m contours		Indicative acoustic mitigation

Client	Silica Sand Mold Limited
--------	--------------------------

Project Title

Maes y Droell Quarry

Phase 4
Indicative Quarry
Development Plan

File Path
APRIL 26 UPDATE MDQ-SH-ELS-M2-LS-006 PHASE 4.dwg

GENERAL NOTES

1. Stephenson Halliday is not acting as Principal Designer in terms of CDM regulations 2015.
2. Drawing is for planning purposes only not for construction.
3. Indicative working scheme / earthworks design by Key Geosolutions Ltd.



**STEPHENSON
HALLIDAY**
Planning, Landscape & Environment
an **RSK** company

30-32 Lowther Street,
Kendal,
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LA9 4DH

Drawn	Date	Checked	Date	Approved	Date
JD	07/2026	EK	07/2026	AP	07/2026

Scale 1:3 000	Orig Size A3	Status PLANNING
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Drawing No.	Rev.
FIGURE 6	-

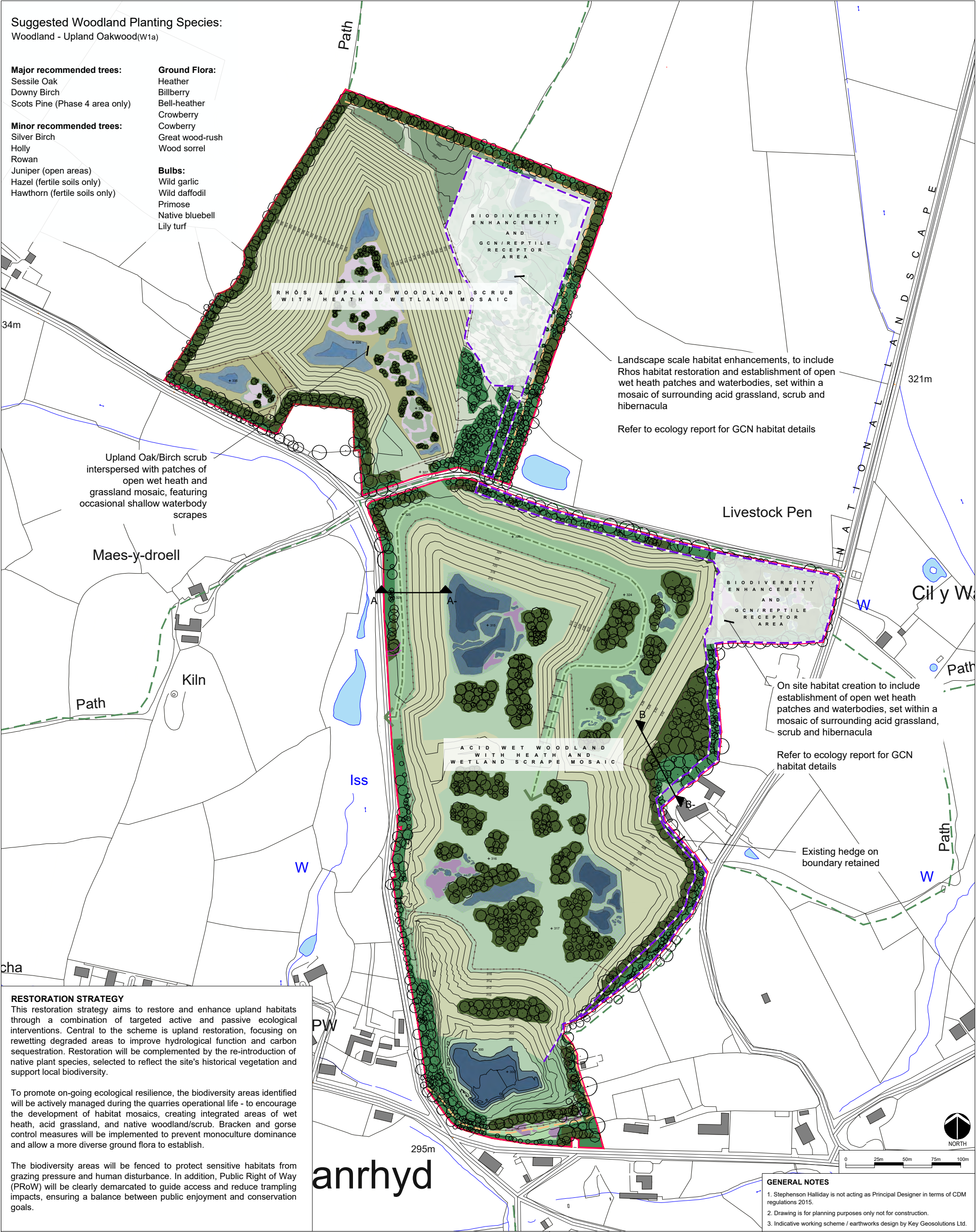
Suggested Woodland Planting Species:
Woodland - Upland Oakwood(w1a)

Major recommended trees:
Sessile Oak
Downy Birch
Scots Pine (Phase 4 area only)

Minor recommended trees:
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Hawthorn (fertile soils only)

Ground Flora:
Heather
Billberry
Bell-heather
Crowberry
Cowberry
Great wood-rush
Wood sorrel

Bulbs:
Wild garlic
Wild daffodil
Primrose
Native bluebell
Lily turf



RESTORATION STRATEGY

This restoration strategy aims to restore and enhance upland habitats through a combination of targeted active and passive ecological interventions. Central to the scheme is upland restoration, focusing on rewetting degraded areas to improve hydrological function and carbon sequestration. Restoration will be complemented by the re-introduction of native plant species, selected to reflect the site's historical vegetation and support local biodiversity.

To promote on-going ecological resilience, the biodiversity areas identified will be actively managed during the quarries operational life - to encourage the development of habitat mosaics, creating integrated areas of wet heath, acid grassland, and native woodland/scrub. Bracken and gorse control measures will be implemented to prevent monoculture dominance and allow a more diverse ground flora to establish.

The biodiversity areas will be fenced to protect sensitive habitats from grazing pressure and human disturbance. In addition, Public Right of Way (PRoW) will be clearly demarcated to guide access and reduce trampling impacts, ensuring a balance between public enjoyment and conservation goals.

KEY

	Application site boundary		Proposed heath (h1a) & acid grassland (g1) mosaic		PRoW (retained)
	Assisted natural regeneration of quarry face		Proposed Rhôs restoration (f2a8)		PRoW (indicative diversion)
	Indicative 2m contours		Proposed acid grassland (g1)		Indicative access route
	Existing vegetation		GCN / reptile terrestrial habitat connectivity & green infrastructure link (For details refer to ecology report)		Proposed fencing
	Proposed woodland (w1a) with ground flora planting		Biodiversity enhancement areas		
	Proposed wetland marginal zone (f2b)				

INDICATIVE RESTORATION TARGET HABITAT MOSAIC
w1a = Upland oakwood, f2b = Purple moor grass & rush pastures, h1a = Lowland heathland, g1 = Acid grassland (Based upon uk habitat classifications)

GENERAL NOTES

- Stephenson Halliday is not acting as Principal Designer in terms of CDM regulations 2015.
- Drawing is for planning purposes only not for construction.
- Indicative working scheme / earthworks design by Key Geosolutions Ltd.

Client	Silica Sand Mold Limited
Project Title	Maes y Droell Quarry
Drawing Title	Restoration Indicative Quarry Development Plan
File Path	APRIL_26_UPDATE_MDQ-SH-ELS-M2-LS-007_RESTORATION.dwg

		30-32 Lowther Street, Kendal, Cumbria, LA9 4DH		Tel: +44 (0)330 002 1780 Email: info@stephenson-halliday.com Web: www.stephenson-halliday.com	
Drawn	Date	Checked	Date	Approved	Date
JD	07/2026	EK	07/2026	AP	07/2026
Scale	1:3,000	Orig Size	A3	Status	PLANNING
Drawing No.	APRIL_26_UPDATE_MDQ-SH-ELS-M2-LS-007_RESTORATION.dwg	Rev.	-		

Appendix C TAN15 Checklist

TAN15 checklist

Requirement	Evidence
A location plan identifying all possible sources of flooding including overtopping and/or breach of existing defences and any in-channel structures that may be prone to blockages.	See Figures 7, 8 and 9 of FCA
A plan of the site showing existing and proposed levels related to Ordnance Datum.	Appendix A
A plan identifying any flood alleviation measures already in place.	N/A
An assessment of all sources of potential flooding including, but not confined to rivers, the sea, wave action, groundwater, surface flow or any combination of these.	Section 4.3 Flood Risk
Existing and proposed cross-sections of the site showing proposed development and site levels relative to the source of flooding, and to anticipated water levels and associated probabilities.	N/A
An assessment of peak flood depths and velocities at which various parts of the site might flood, the likely duration of flood events and impact of flooding.	N/A
Information regarding the extent and depth of past flood events and future predictions.	N/A
A plan of the area to show overland flow routes and appropriate access/evacuation routes from the proposed development site that are operational under all conditions.	See Figures 6, 10 and 11 of FCA
A plan and description of any structures which may influence local hydraulics, including bridges, pipes/ducts crossing the watercourse, culverts, screens, embankments or walls, overgrown or collapsing channels.	N/A
An assessment of the implications of any drains or sewers, existing or proposed, on the site during flood events.	Section 4.3.8
An assessment of the flood storage volumes that would be lost/and or displaced from the site.	N/A
An assessment of the run-off likely to be generated from the development.	Section 5.2.2
Details of the flood avoidance, mitigation, and resilience measures to be implemented.	N/A
Details to demonstrate that the development will not cause or exacerbate the nature and frequency of flood risk elsewhere.	Section 5
An assessment of the risk after the construction of any necessary mitigation measures.	N/A
A clear and comprehensive summary of the assessment describing the outcomes and recommendations.	Section 6

Appendix D Greenfield Runoff Rates

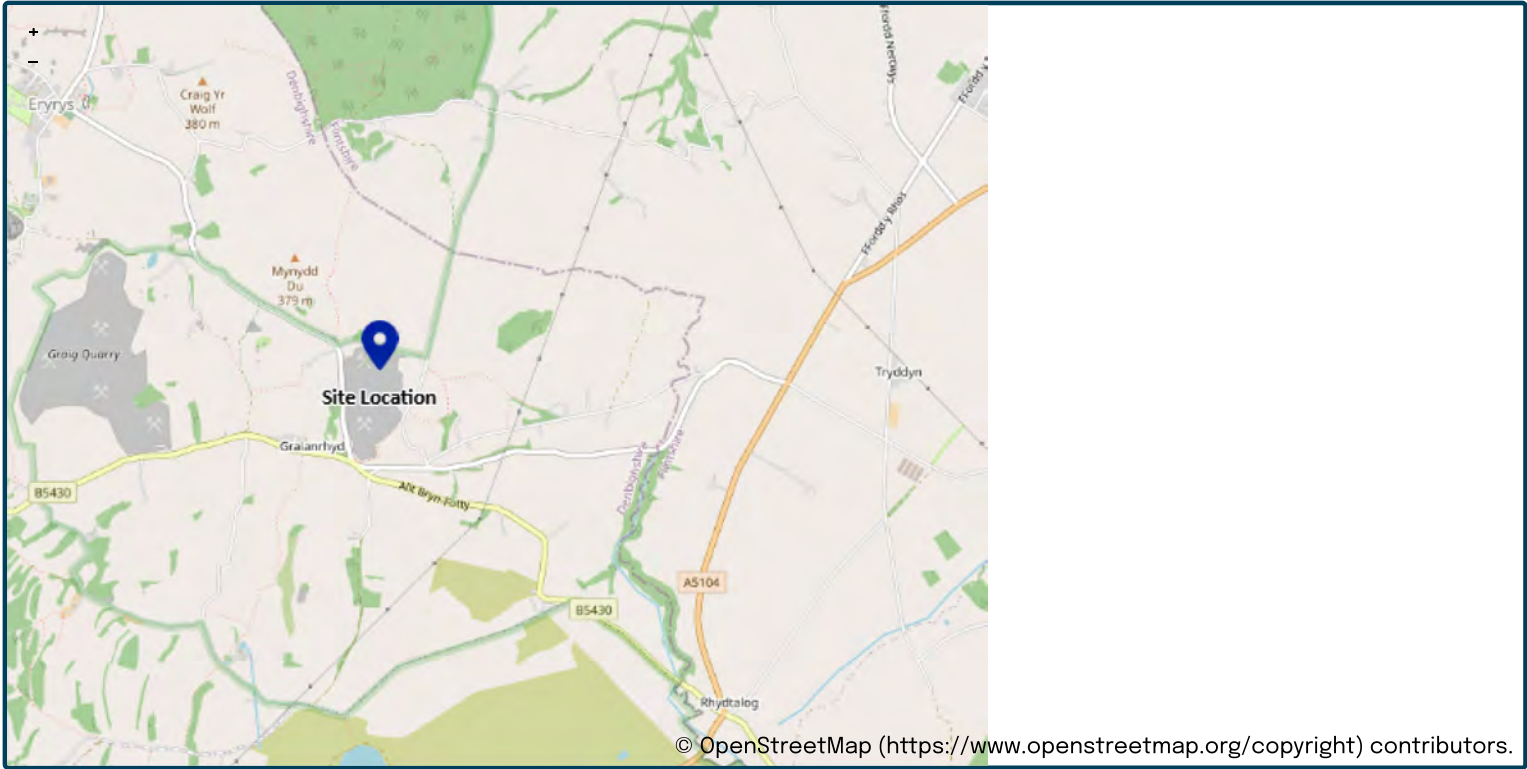
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	07/01/2026
Calculated by	MT
Reference	
Model version	2.2.2

Location

Site name	Maes-y-Droell
Site location	Existing Site



Site easting (British National Grid)	321857
Site northing (British National Grid)	356512

Site details

Total site area (ha)	13.6	ha
----------------------	-----------------------------------	----

Greenfield runoff

Method

Method	IH124
--------	-------

IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	989	mm	989
How should SPR be derived?	WRAP soil type		
WRAP soil type	1		1
SPR	0.1		
QBar (IH124) (l/s)	3.4	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	9		9
1 year growth factor	0.88		
2 year growth factor	0.93		
10 year growth factor	1.42		
30 year growth factor	1.78		
100 year growth factor	2.18		
200 year growth factor	2.46		

Results

Method	IH124	
Flow rate 1 year (l/s)	3.0	l/s
Flow rate 2 year (l/s)	3.2	l/s
Flow rate 10 years (l/s)	4.9	l/s
Flow rate 30 years (l/s)	6.1	l/s
Flow rate 100 years (l/s)	7.5	l/s
Flow rate 200 years (l/s)	8.4	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

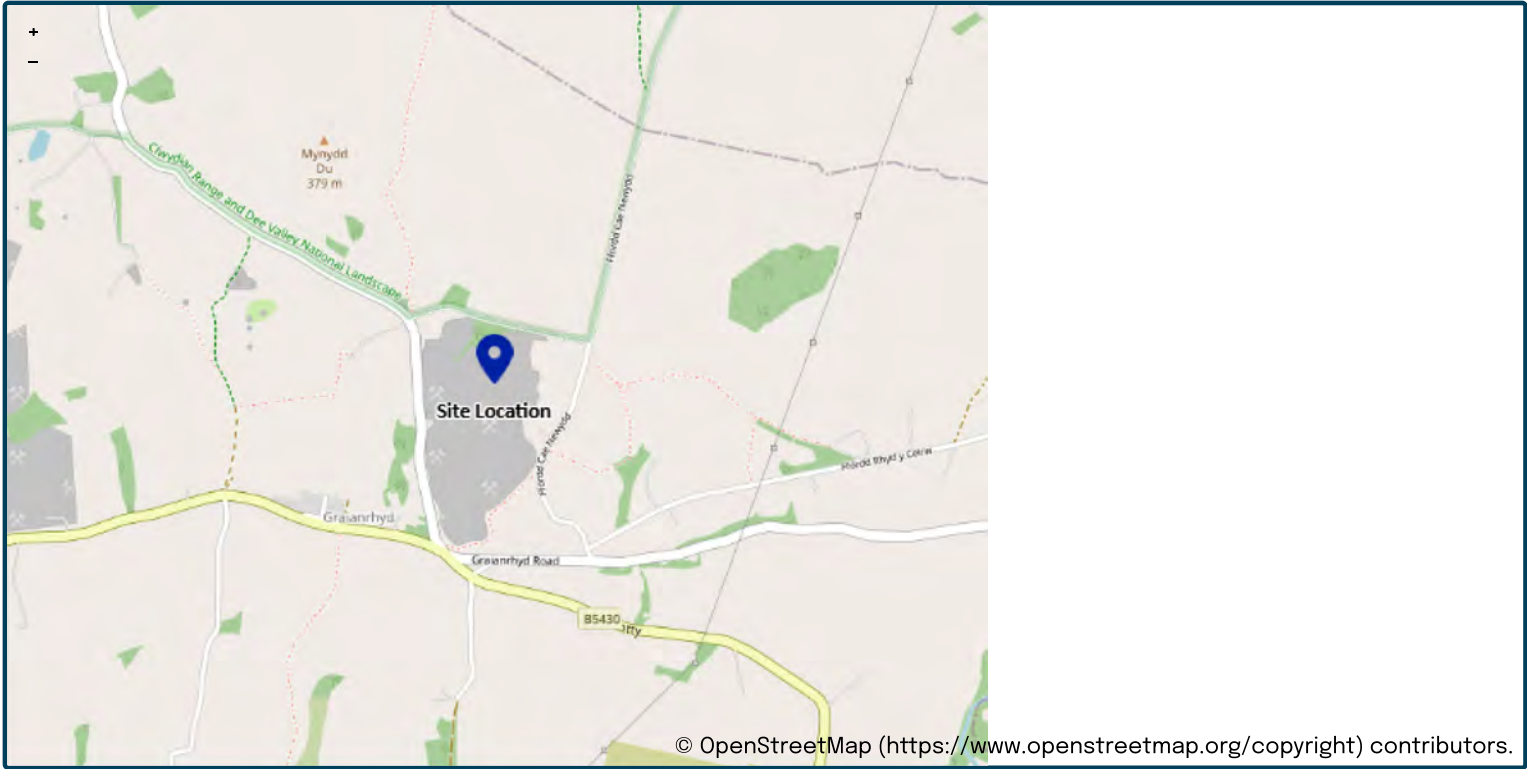
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	07/01/2026
Calculated by	MT
Reference	
Model version	2.2.2

Location

Site name	Maes-y-Droell
Site location	Extension Area



Site easting (British National Grid)	321857
Site northing (British National Grid)	356512

Site details

Total site area (ha)	11	ha
----------------------	---------------------------------	----

Greenfield runoff

Method

Method	IH124
--------	-------

IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	989	mm	989
How should SPR be derived?	WRAP soil type		
WRAP soil type	1		1
SPR	0.1		
QBar (IH124) (l/s)	2.8	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	9		9
1 year growth factor	0.88		
2 year growth factor	0.93		
10 year growth factor	1.42		
30 year growth factor	1.78		
100 year growth factor	2.18		
200 year growth factor	2.46		

Results

Method	IH124	
Flow rate 1 year (l/s)	2.4	l/s
Flow rate 2 year (l/s)	2.6	l/s
Flow rate 10 years (l/s)	3.9	l/s
Flow rate 30 years (l/s)	4.9	l/s
Flow rate 100 years (l/s)	6.0	l/s
Flow rate 200 years (l/s)	6.8	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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