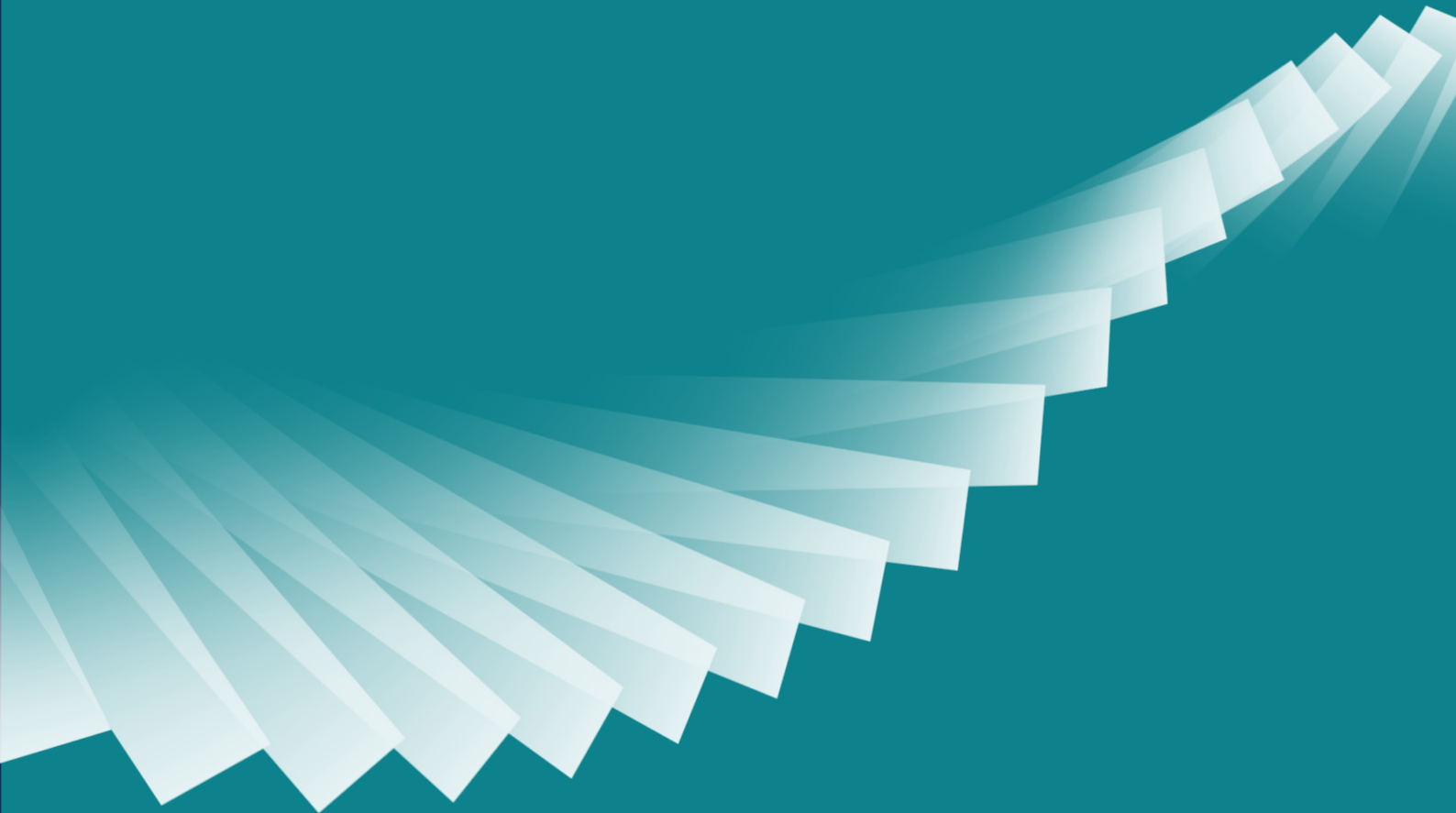




Bute Energy
Aberedw Energy Park

Appendix 9.3:

Flood Consequence Assessment





AQUA TERRA | CONSULTING

Aberedw Energy Park: Flood Consequence Assessment

P24039_R3

June 2025



AQUA TERRA

CONSULTING

Document Control

Title

Aberedw Energy Park: Flood Consequence Assessment

Client

LUC
On behalf of
Aberedw Energy Park



Reference

P24039_R3

Status

Final

Table of Contents

1.	Introduction	6
1.1.	Instruction	6
1.2.	Background	6
1.3.	Scope	6
1.4.	Data sources	6
1.5.	Limitations	7
2.	Site Information	8
2.1.	Site location and description	8
2.1.1.	Environmental Designations.....	Error! Bookmark not defined.
2.2.	Topography	10
2.3.	Geology and Hydrogeology	11
2.3.1.	Soil	11
2.3.2.	Superficial Deposits	12
2.3.3.	Solid Geology	12
2.3.4.	Hydrogeology	15
2.4.	Hydrology	16
2.4.1.	Current drainage arrangements and existing surface water features	16
2.4.2.	Catchment descriptors.....	16
3.	Proposed Development	18
3.1.	Design	18
3.2.	Programme	18
4.	Flood Risk to the Proposed Development	20
4.1.	Risk from Rivers and Sea	20
4.1.1.	Flood Model Data	20
4.1.2.	Flood Defences	20
4.1.3.	Historical Fluvial Flooding	20
4.2.	Risk from Surface Water and Small Watercourses	20
4.3.	Risk from Groundwater.....	23
4.4.	Risk of Flooding in the event of a Reservoir Failure.....	24
4.5.	Climate Change	24
5.	Suitability of the Proposed Development	25

5.1.	Planning policy.....	25
5.2.	Flooding and the plan-led system.....	25
6.	Acceptability of Flood Consequences	26
6.1.	No increase of flooding elsewhere	26
6.2.	Occupiers aware of flood risk	26
6.3.	Escape / Evacuation routes present	27
6.4.	Flood Emergency Plans and Procedures agreed and in place	27
6.5.	Flood resistant and resilient design	27
6.6.	Acceptable consequences for type of use.....	27
6.7.	Flood Consequences during the Construction Phase.....	28
7.	Conclusions.....	29
8.	References	30

List of Tables

Table 2-1	Environmental designations within proximity of the Site.....	9
Table 2-2	Strata encountered in nearby historical borehole logs	15
Table 2-3	Hydrological descriptors for representative part of the Site.....	16

List of Figures

Figure 2-1	Site location.....	9
Figure 2-2	Topography and Drainage Paths	11
Figure 2-3	BGS 1:50,000 Superficial Geology	13
Figure 2-4	BGS 1:50,000 Bedrock Geology.....	14
Figure 3-1	Proposed Site Layout.....	19
Figure 4-1	Flood Map for Planning – Rivers and Sea.....	21
Figure 4-2	Flood Risk from Surface Water and Small Watercourses.....	22

List of Appendices

Appendix A	Report conditions.....	31
------------	------------------------	----

1. Introduction

1.1. Instruction

Aqua Terra Consultants Ltd was instructed by Land Use Consultants Ltd (LUC; the Client) on behalf of Aberedw Energy Park Limited (the Applicant) to provide a Flood Consequence Assessment (FCA) for the proposed Aberedw Energy Park near Builth Wells (the Site). Instruction to proceed in accordance with Aqua Terra Consultants Work Scope was confirmed by LUC sub-consultant agreement 12522.

1.2. Background

The Applicant proposes to submit an application to Planning and Environment Decisions Wales for a Development of National Significance (DNS) consent under section 62D of the Town and Country Planning Act 1990 to develop Aberedw Energy Park (hereafter referred to as 'the Proposed Development'). The Site is located approximately 3 km east of Builth Wells. The entirety of the Site lies within the administrative boundary of Powys County Council.

18 wind turbines and associated infrastructure are proposed to be constructed. Plans of the Proposed Development are included in Section 3.

This report constitutes a FCA that has been prepared to support the DNS application for the Proposed Development.

1.3. Scope

This FCA has been written in line with Technical Advice Note (TAN) 15 (Welsh Assembly Government, 2025) and Good Practice Guide (GPG) 101 to satisfy both Natural Resources Wales (NRW) and the Lead Local Flood Authority (LLFA; Powys County Council) that all potential flood risks to and from the Proposed Development have been considered. Site-specific flood mitigation measures, where necessary/ appropriate, are included.

In addition to this report, a separate Outline Drainage Strategy (Appendix 9.4 to the Environmental Statement (ES)) has been prepared for the Proposed Development. The purpose of the drainage strategy is to ensure that runoff from the developed Site does not adversely affect flood risk at the Site or elsewhere, as well as ensuring that the quality of water leaving the Site has been suitably treated, and amenity and biodiversity benefits are maximised where appropriate.

1.4. Data sources

The principal sources of data used in this assessment are summarised below:

- Site development plans provided by the Applicant;
- NRW flood map for planning datasets;
- Powys Strategic Flood Consequence Assessment - Level 1 (Powys County Council, 2012);
- Rainfall and hydrological descriptors from the Centre for Ecology and Hydrology (CEH) Flood Estimation Handbook (UK Centre for Ecology & Hydrology, 2023);
- Digital Terrain Model (DTM) data from Welsh Government 2020-22 LiDAR;
- Ordnance Survey mapping; and,
- British Geological Survey (BGS) mapping data and borehole logs.

1.5. Limitations

This report is written strictly for the benefit of the Client and bound by the conditions presented in Appendix A.

2. Site Information

2.1. Site location and description

The Proposed Development is located approximately 3 km east of Builth Wells, and is 1322.55 hectares in size. The entirety of the Site lies within Powys. The national grid reference for the approximate Site centre is SO 09397 51302.

The Site is located between the A481 (to the north of the Site boundary) and the B4567 (to the west of the Site boundary). The River Wye runs to the west of the Site, flowing from north to south.

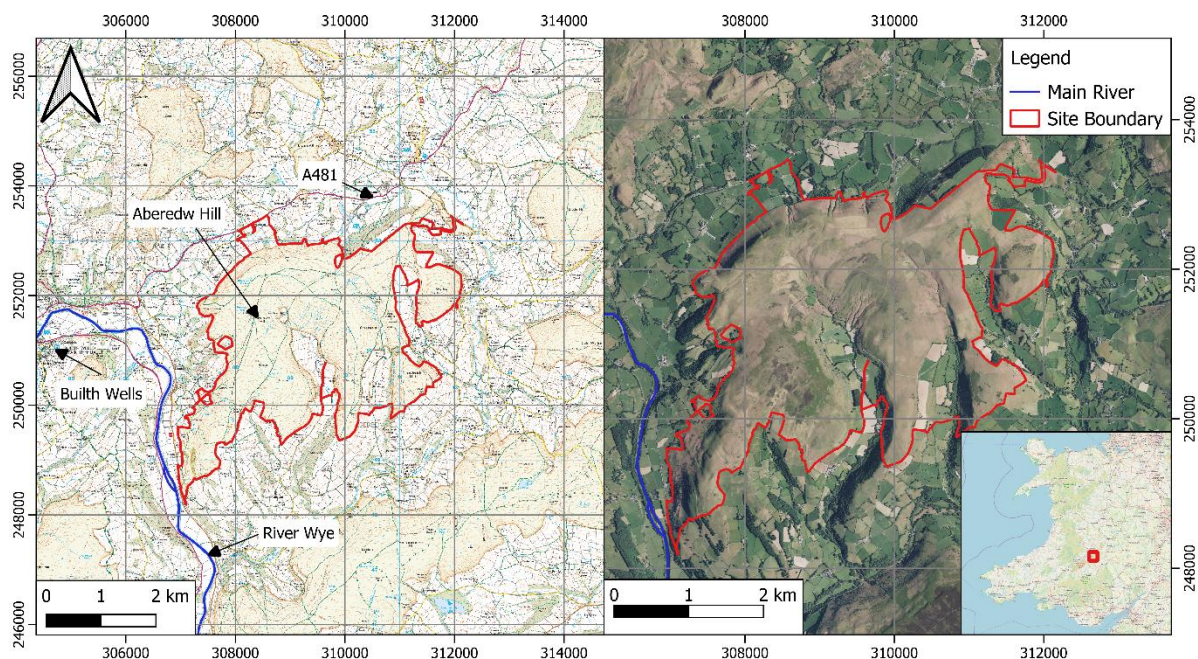
The Site is located on high terrain, with the highest point being 451 m Above Ordnance Datum (AOD). It is generally defined by Aberedw Hill which is a broad hill, with steep escarpments/slopes and valleys on all sides. The deepest valley is to the west of the Site is the River Wye Valley. The majority of the Site is made up of undulating upland which is managed as open moor common land, with a small number of access tracks and small areas of scrub woodland.

Within the Site there are areas of ancient woodland, with the majority being classed as ancient semi natural woodland. BGS mapping indicates two small outcrops of peat on the Site, one across a small area of upland plateau at the peak of Aberedw Hill, and a second small patch on the upland plateau of the adjacent lobe of hill to the east.

The Site is surrounded by countryside with a few isolated settlements. Besides Builth Wells, other smaller settlements including Hundred House (to the north of the Site), Cregina (to the east of the north-eastern edge of the Site) and Aberedw (to the south of the Site) are also located nearby. In addition, there are other roadside clusters and farmsteads, as well as more isolated properties on the surrounding hills and valley slopes.

Figure 2-1 provides the Site location and an aerial image of the Site.

Figure 2-1 Site location



© Crown copyright and database rights 2025 OS AC0000867555
 Ⓗ Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555
 © OpenStreetMap and Bing Aerial imagery © Microsoft

2.1.1. Environmental Designations

Online mapping (Defra) indicates there are multiple environmental designations on and in the surrounding local area, a summary of these designations is provided in Table 2-1.

Table 2-1 Environmental designations within proximity of the Site

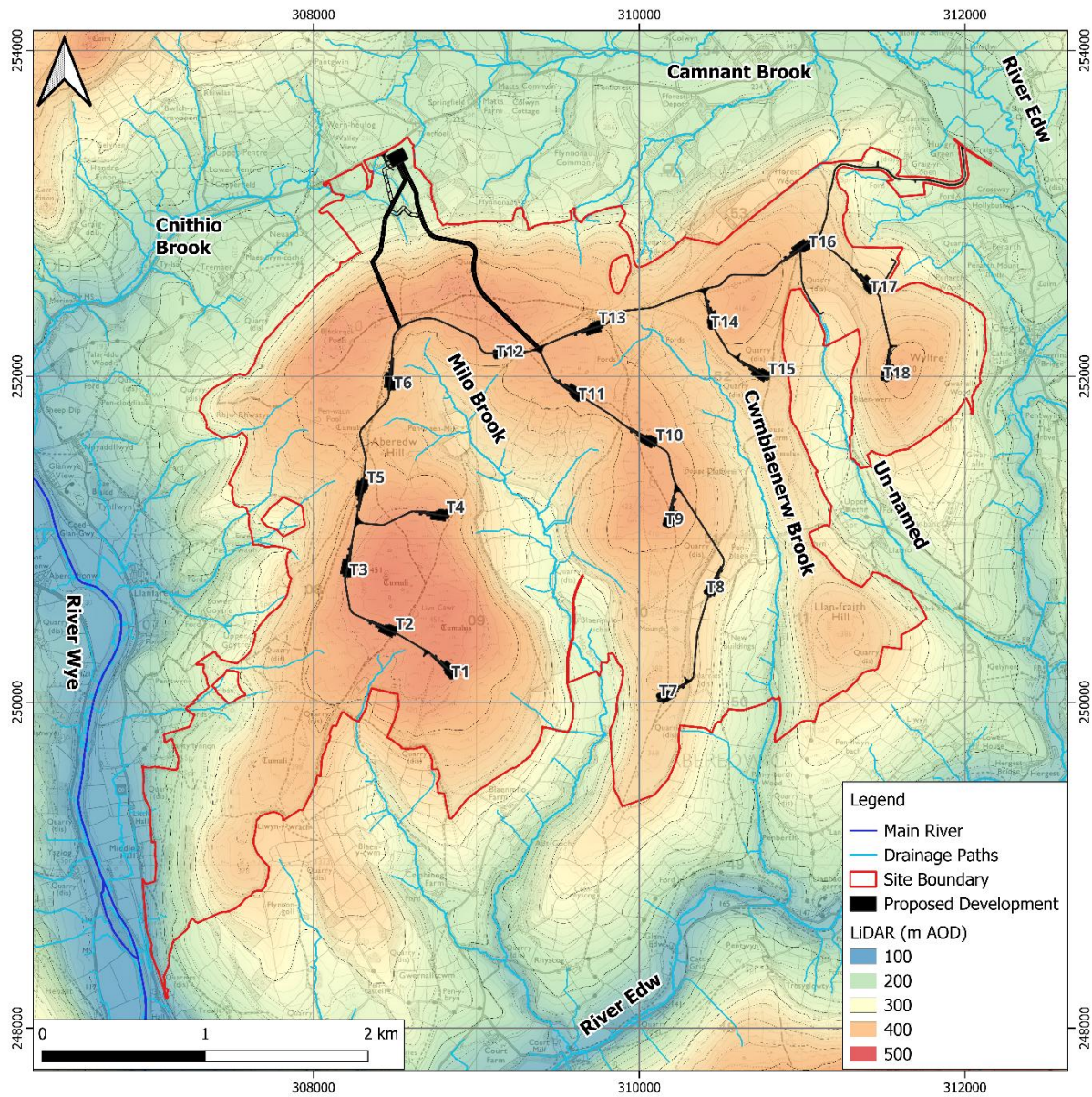
Designation	Location	Information
Environmentally Sensitive Areas	On Site	Radnor (decommissioned)
Ancient Woodland	On Site	There are several small areas of ancient and semi-natural woodland on the Site. This includes along Cnithia Brook at the north of Site, north of Blaenmilo-Uchaf and along Cwmblaenerw Brook at the south-east of Site. There are also multiple areas of ancient and semi-natural woodland which border the Site.
Special Areas of Conservation (SAC)	50 m west of the Site	River Wye and its tributaries are classed as a SAC. This includes the Colwyn Brook. Is located approximately 50 m west of the Site at its closest point to the Site

Designation	Location	Information
		boundary, and approximately 750 m to the nearest infrastructure.
		Various watercourses within the Site drain into the SAC.
Sites of Special Scientific Interest (SSSI)	Adjacent to northern Site boundary, 50 m west of the Site and 1.5 km south of the Site	The Colwyn Brook Marshes (North & South) SSSI extends to the northern Site boundary, but does not intersect the Site. The SSSI is defined as biological. The Llandeilo, Rhulen and Llanbedr Hills SSI is located approximately 1.5 km south of the Site The River Wye and its tributaries are also designated as a SSSI for its associated plant and animal communities.

2.2. Topography

Ground elevation on Site fall from the peak elevations of the upland summits (at a maximum of approximately 451 m above Ordnance Datum (mAOD) to the lower elevations in the west (at the River Wye Valley) at approximately 130 mAOD. Figure 2-2 shows the latest 2020-22 LiDAR data, along with a detailed drainage network derived from the LiDAR data.

Figure 2-2 Topography and Drainage Paths



© Crown copyright and database rights 2025 OS AC0000867555
Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555

2.3. Geology and Hydrogeology

2.3.1. Soil

Soilscapes online mapping (Cranfield Soil and AgriFood Institute, 2023) indicates that the majority of the study area is underlain by very freely draining acid loamy soils over rock. An area in the centre of the Site (around the headwaters of Milo Brook) is classified as having slowly permeably wet very acid upland soils with a peaty surface, whilst the Milo Brook valley itself is classified as a slowly

permeable seasonally wet acid loamy and clayey soils. A small area on the top of Aberedw Hill is described as very acid loamy upland soils with a wet peaty surface.

2.3.2. Superficial Deposits

BGS mapping indicates Superficial Deposits on Site mainly comprise of Glacial Till, which outcrops across lower elevations, and is present across the agricultural fields at the northern most point of Site and within the two valleys which extend southwards between Aberedw Hill and Llan-fraith Hill. There is also a small linear deposit of Head associated with Milo Brook at the south of the Site, a small outcrop of alluvium at the north of the Site near the A481 and two small deposits of peat towards the centre of the Site.

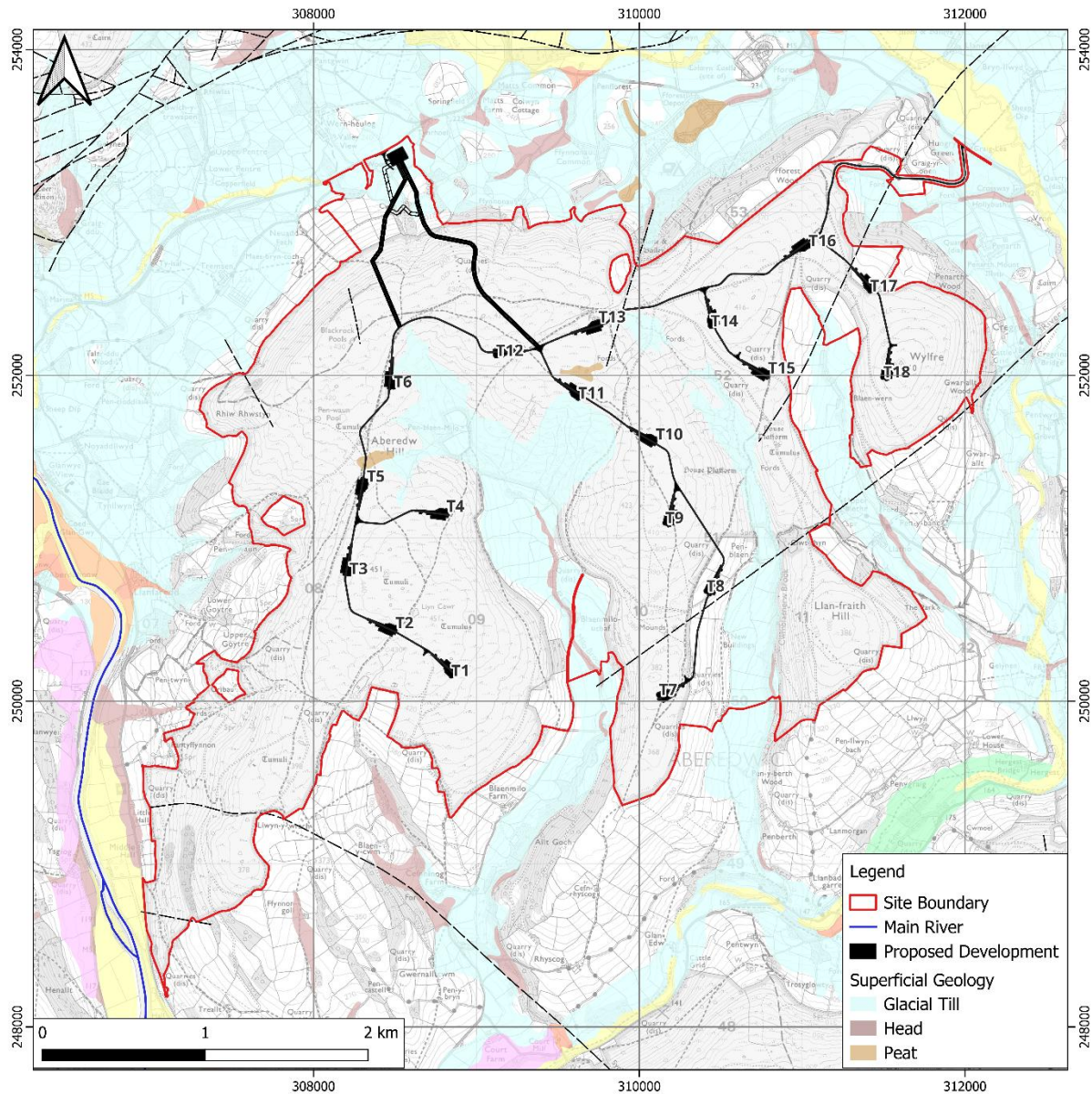
Aqua Terra Consulting carried out a Phase 1 Peat Probing Site Investigation in May 2023, during which three small discrete areas of peat were identified. Two of these areas lie along Cwmblaenerw Brook and the third lies south-west of the BGS mapped peat at the centre of Site.

2.3.3. Solid Geology

The Site spans across BGS Sheet 197 (Hay-on-Wye) and Sheet 196 (Builth Wells). The two sheets have differing detail of mapping, resulting in more detailed mapping being available for the west of the Site than the east. The bedrock in the east of the Site is simply mapped as Silurian Rocks (undifferentiated). However, the west of the Site is mapped (from north to south) as the Builth Mudstone Formation, the Irfon Formation (mudstone and siltstone), Irfon Formation (slumped mudstone and slumped siltstone), and the Cwm Graig Ddu Formation (mudstone, siltstone and sandstone), all of which are of Silurian age.

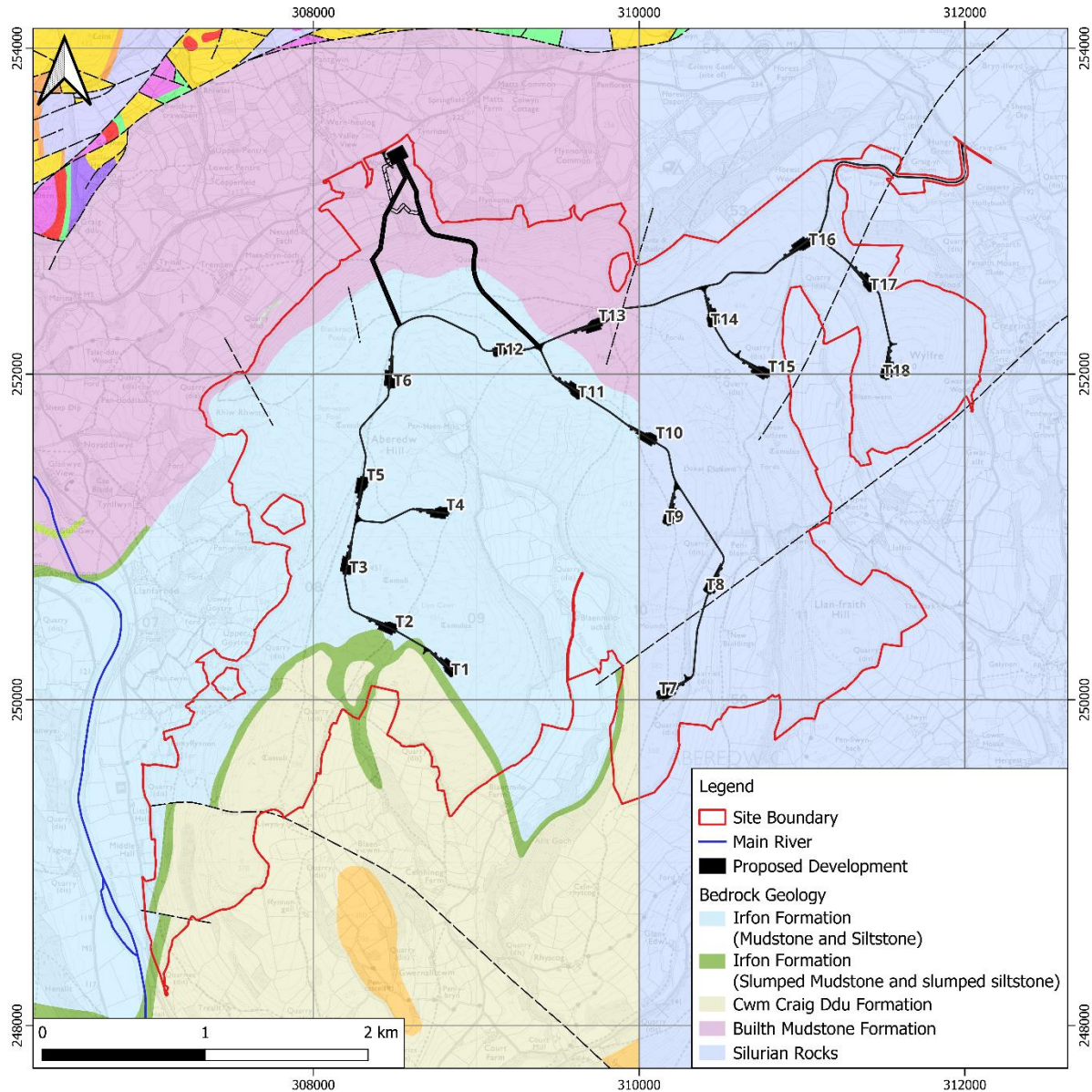
BGS mapping also indicates several areas of faulting across the Site which is depicted in Figure 2-4 below.

Figure 2-3 BGS 1:50,000 Superficial Geology



© Crown copyright and database rights 2025 OS AC0000867555
 (H) Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555
 BGS 1:50,000 data

Figure 2-4 BGS 1:50,000 Bedrock Geology



© Crown copyright and database rights 2025 OS AC0000867555
 Ⓗ Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555
 BGS 1:50,000 data

Nearby historical borehole logs within the BGS database confirm the geological succession and those closest are summarised in Table 2-2.

Table 2-2 Strata encountered in nearby historical borehole logs

Borehole ref.	Strata	Maximum depth (m bgl)
SO04NE2	Drift deposits	12
(0.47km south)	Light grey Mudstone or Siltstone	49.5
	Topsoil	0.1
	Sands and Gavels with cobbles and occasional boulders in a soft, yellow brown sandy, silty Clay	2.5
SO14NW8	Dense grey, brown shaley Mudstone liithorelics in a light brown very sandy clay matrix	2.8
(1.02km south)	Weak, weathered, dark grey shaley Mudstone, in places weathered to stiff dark grey silty Clay	3.0
	Dark grey with occasional cream calcite veining Mudstone, moderately weathered	6.4
	Light to dark brown Clay	7.5
SO15SW1	Dark grey broken Slate	9
(6.7km north)	Dark grey Slate	45
	Dark grey Mudstone	60
SO04NE5	Boulder Clay	7.3
(4.4km west)	Dark grey Sandstone, strong to very strong, with closely spaced to widely spaced, slightly rough planar, slightly stained, tight to slightly open discontinuities (Ludlow Series)	17.7

2.3.4. Hydrogeology

The bedrock across Site is classified by NRW as a Secondary B aquifer. A Secondary B aquifer is defined as '*predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering*'. The aquifer underlying the Site is rated as being "low productivity".

The superficial Glacial Till which covers the very northern extent of the Site and the two valleys which extend southwards between Aberedw Hill and Llan-fraith Hill, and the Head Deposit associated with Milo Brook, are classified as Secondary (undifferentiated) aquifers. These are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type, they have only a minor value.

The Alluvium deposit which outcrops in the north of the Site is classified as a Secondary A aquifer. This comprises of permeable layers that can support local water supplies and may form an important source of base flow to rivers.

According to the BGS, groundwater vulnerability across the majority of the Site is medium to high.

An information request submitted to Powys County Council, has indicated there are 16 No. recorded private water supplies within a 500 m radius of the Site, of which 2 No. are located on Site:

- Upper Blaenmilo, Aberedw, Builth Wells, Powys, LD2 3UP; and
- Edw Country Wines, Glyn Farm, Aberedw, Builth Wells, Powys, LD2 3UH.

Within 50m of the Site there are a further two private water supplies at the following addresses:

- Ffynnonau, Hundred House, Llandrindod Wells, Powys, LD1 5RU (10 m from Site); and
- Fforest Farm, Hundred House, Llandrindod Wells, Powys, LD1 5RT (49 m from Site).

Further assessment of the private water supplies on and adjacent to the Site is reported within Appendix 9.2: Water Resources Assessment of the ES. The Site is not within a Source Protection Zone.

2.4. Hydrology

2.4.1. Current drainage arrangements and existing surface water features

There are numerous small watercourses present across the Site, the majority of which drain to the River Edw. A small area at the north of the Site is drained to the River Wye via Cnithio Brook and the western edge of the Site direct to the River Wye. All three catchments have a good overall status as identified by the Water Framework Directive (WFD). The River Edw is a tributary of the River Wye, with the River Edw joining the River Wye 1.35 km south of the Site in Aberedw.

Headwaters of the River Edw that drain the Site include the tributaries of Cwmblaenerw Brook and the tributaries of Milo Brook which follow the two valleys which extend southwards between Aberedw Hill and Llan-fraith Hill. There is also a third un-named watercourse to the east of Cwmblaenerw Brook which drains in a north-south direction towards the River Edw. The headwaters of Cwmblaenerw Brook and Milo Brook are fed by a number of springs noted during Site surveys. A small portion of the north-east of the Site drains to the River Edw via Camnant Brook.

In addition to these watercourses, the Site has several small discrete pools and ponds, many of which are man-made. These are typically located within topographical hollows within the upland landscape, the largest being Llyn Cawr, approximately 70 m in length on Aberedw Hill.

Figure 2-2 shows the drainage paths across the Site based on analysis of topographic data. The majority of the drainage paths are not formal watercourses but rather gullies along which flow is likely to accumulate. However, during periods of heavy rain these may begin to form overland flow routes towards the more established watercourses.

2.4.2. Catchment descriptors

Representative hydrological descriptors for part of the Site have been obtained from the online Flood Estimation Handbook (FEH) (UK Centre for Ecology & Hydrology, 2023) and are provided in Table 2-3.

Table 2-3 Hydrological descriptors for representative part of the Site

Descriptor	Abbreviation	Value
Base Flow Index associated with each HOST soil class	BFIHOST	0.462
Proportion of time when soil moisture deficit was equal to, or below, 6mm during 1961-90	PROPWET	0.49
Average Annual Rainfall (1961 – 1990)	SAAR	1018mm

3. Proposed Development

Full details of the Proposed Development are described in detail in Chapter 4 of the ES and summary information relevant to this flood consequence assessment is presented below.

3.1. Design

The Proposed Development is described in detail in Chapter 4 of the ES.

Figure 3-1 shows the proposed layout of the permanent features on the Site, including turbines, substations, and tracks. A single watercourse crossing is required immediately adjacent to the substation where the access track passes over a surface water flow path – although no permanent watercourse is present here. Watercourse crossings are further discussed in the Outline Drainage Strategy. It will also be necessary for the cable corridors to cross three ephemeral streams. The cables are proposed to be laid underground, with existing topsoil replaced following installation, and this will take place in the summer when the streams are likely to be dry.

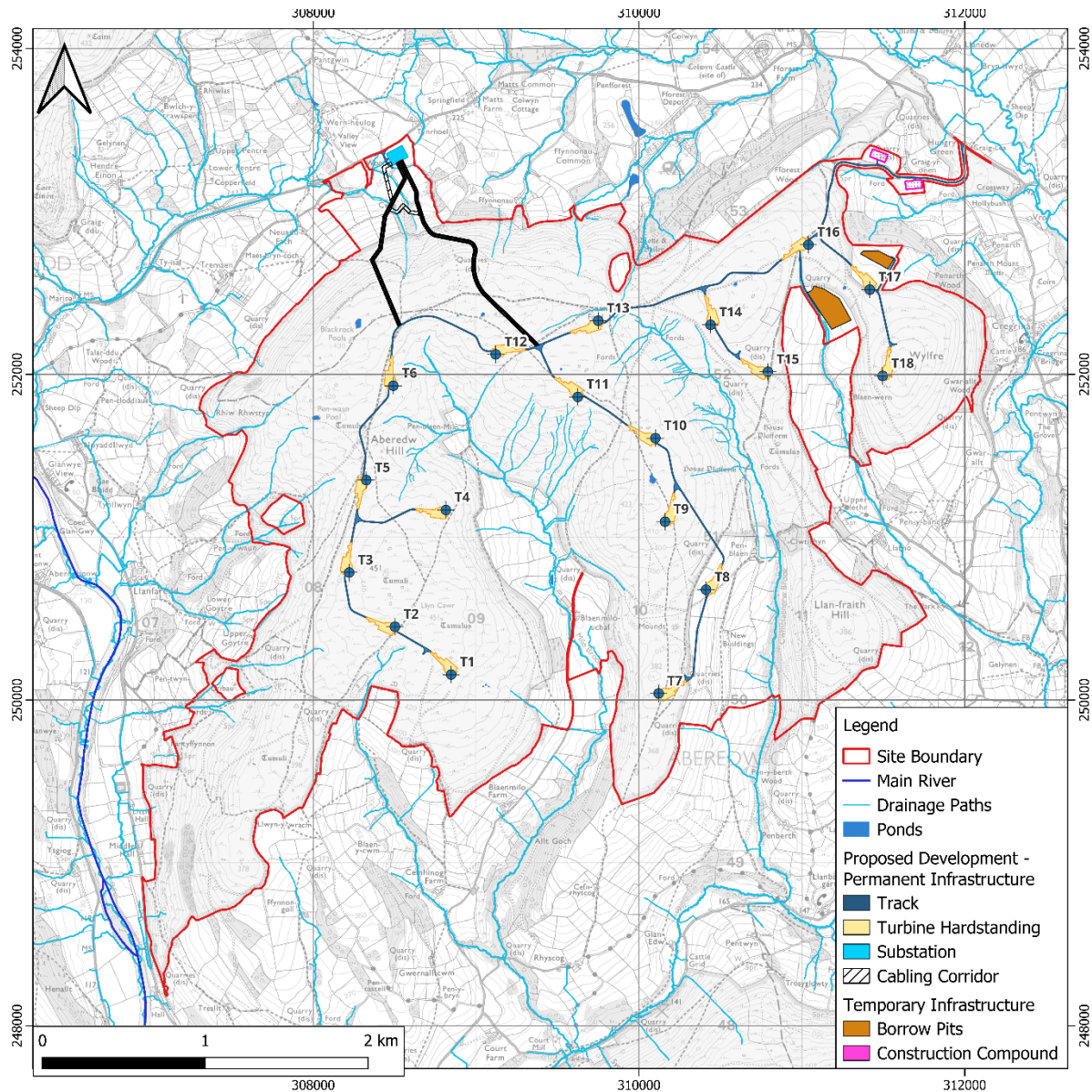
3.2. Programme

The overall construction programme is expected to take approximately 15 months.

The Proposed Development is to be operational for 40 years. During this period, onsite activity would be low and would consist of regularly scheduled maintenance and operational checks.

At the end of the operational period, the Proposed Development would be decommissioned and the turbines removed. There may be potential to extend the life of the Proposed Development or replace the turbines, which would be the subject of a future study/ application.

Figure 3-1 Proposed Site Layout



© Crown copyright and database rights 2025 OS AC0000867555
H Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555

4. Flood Risk to the Proposed Development

4.1. Risk from Rivers and Sea

The Flood Map for Planning (Natural Resources Wales, 2023) flood risk zones are presented in Figure 4-1. The Flood Map for Planning identifies the areas at risk of fluvial or tidal flooding, accounting for climate change. This indicates that the vast majority of the Site is within Flood Zone 1 (i.e. less than a 0.1% annual probability of flooding from these sources) and as such has a Low Probability of flooding. This may be expected given its elevated position on a mountainous plateau. There is a small corridor of Flood Zone 2 and 3 along the course of Milo Brook, flowing from the centre of the Site towards the southern boundary and then to its confluence with the River Edw. This is well contained within the watercourse valley and is not near any proposed infrastructure.

The southwestern tip of the Site lies adjacent to the River Wye floodplain, however a raised embankment (not a formal flood defence) separates the Site from the B4567 and the floodplain.

4.1.1. Flood Model Data

No detailed modelling data is available for the Site. This is to be expected given the Site location, in an elevated position above the floodplain.

4.1.2. Flood Defences

The Site does not benefit from flood defences (being sited on top of a plateau and away from the current floodplain).

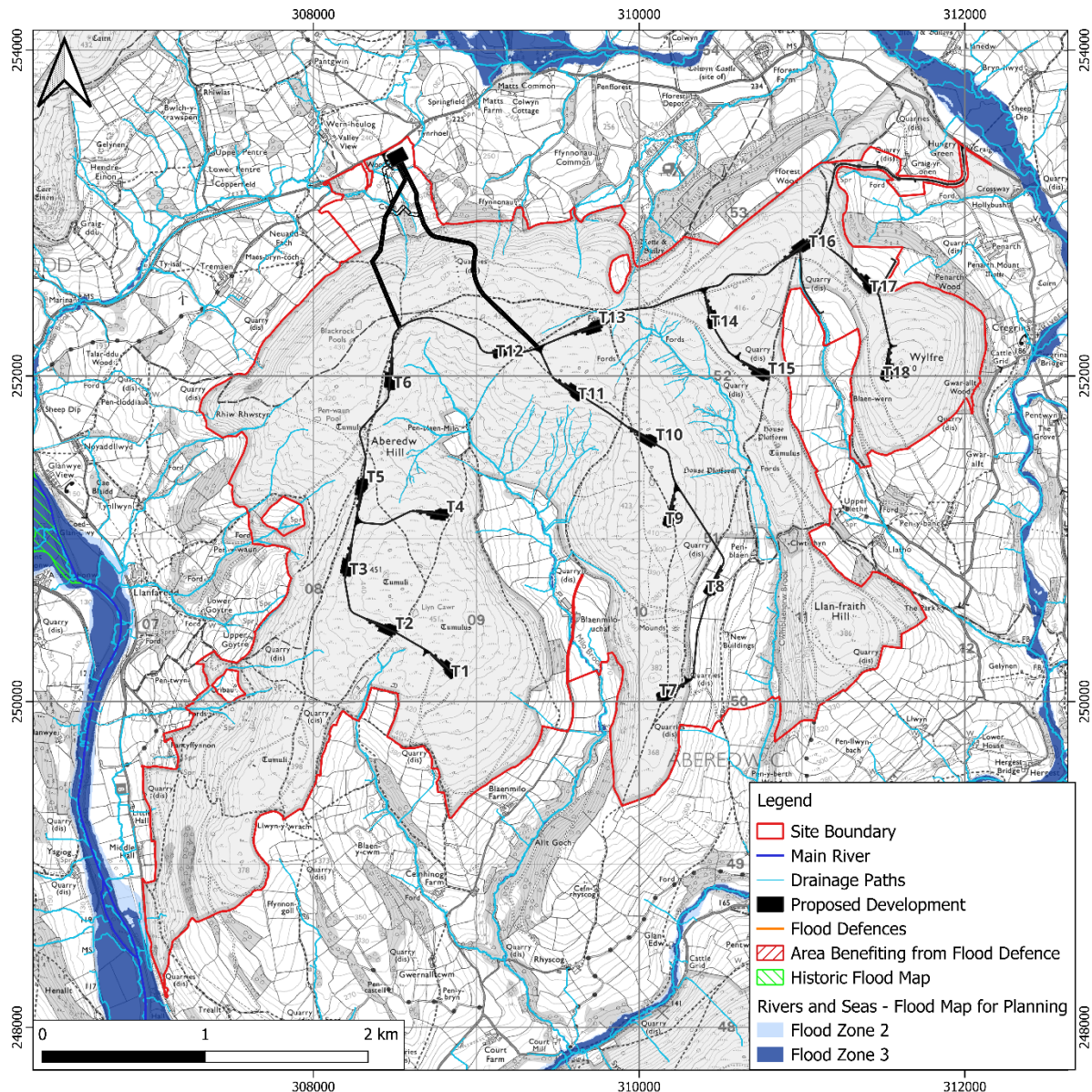
4.1.3. Historical Fluvial Flooding

The Site has not experienced any historical flooding according to NRW data.

4.2. Risk from Surface Water and Small Watercourses

Surface water (pluvial) flooding is usually associated with extreme rainfall events but can also occur when rain falls on land that is already saturated or is of low permeability. Rainfall that is unable to infiltrate, either due to high rainfall intensity or ground conditions, generates overland flow. Runoff can cause flooding or ponding in localised topographic depressions before runoff can enter a drainage system or watercourse.

Figure 4-1 Flood Map for Planning – Rivers and Sea



© Crown copyright and database rights 2025 OS AC0000867555
H Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555

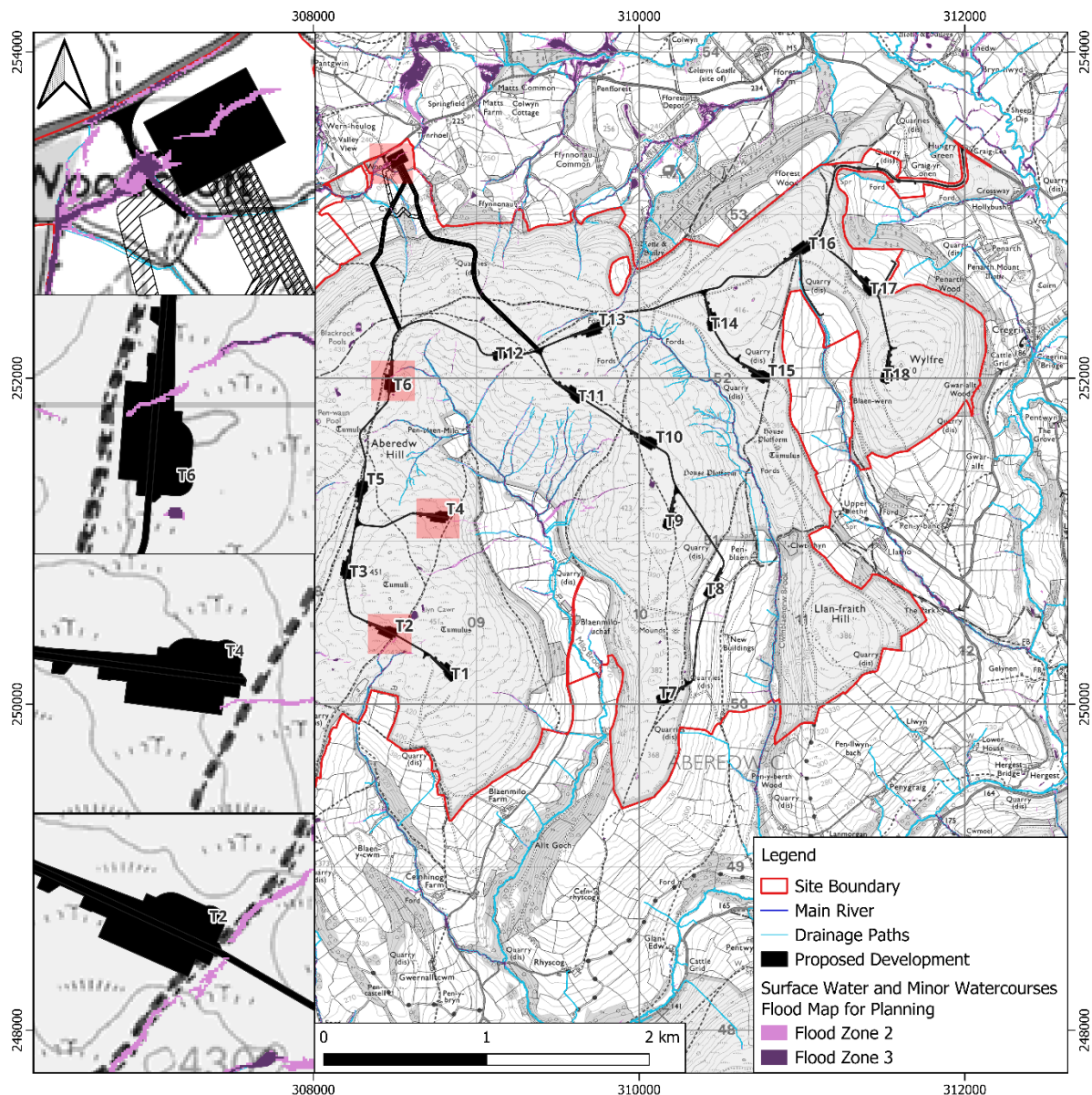
Error! Reference source not found. shows that the risk of surface water flooding within the Site is predominantly very low (no colour). This data includes the predicted flood extents associated with minor watercourses (such as those present within the Site). Isolated areas of elevated risk (1-in-30 chance of flooding or greater on a given year) are present within the Site boundary, associated with the minor watercourses/valley features which are likely to be ephemeral given the elevated position

and small catchment areas (supported by the absence of water within most of the features during the Site walkover).

A few isolated depressions are also identified within the surface water flood zone extents as having elevated risk. These correspond to a number of small ponds that were noted during a Site visit (September 2023). These were predominantly man-made and surface water fed, to create a water source for livestock on the hills. The largest were located in the west of the Site atop Aberedw Hill.

Surface water may constitute an erosion risk along flow paths, particularly where the ground surface is unvegetated. Surface water runoff is unlikely to present a scour risk to the foundations of the turbines as they are located on the high ground away from any watercourses. Routine inspection would note the potential presence of scour accumulating over time, with mitigation measures being employed if necessary.

Figure 4-2 Flood Risk from Surface Water and Small Watercourses



© Crown copyright and database rights 2025 OS AC0000867555
H Hawlfraint y Goron a hawliau cronfa ddata 2025 OS AC0000867555

4.3. Risk from Groundwater

Groundwater flooding occurs when the water table rises above the ground surface or into man-made ground. The Powys County Council SFCA (Powys County Council, 2012) states that:

"There is no local information on historical groundwater flooding, which suggests that the risk of groundwater flooding in Powys is low."

The Site is not considered to be at an elevated risk of groundwater flooding. This is principally owing to the elevated position of the Site relative to the surrounding area. In addition to this, the bedrock at

the Site (Irfon Formation) is classified as a “low productivity aquifer” according to the British Geological Survey’s 1:625:000 scale hydrological mapping data.

There are numerous springs around the Site which feed the small watercourses in the area. Flood risk from this source is covered under Section 4.2 above.

4.4. Risk of Flooding in the event of a Reservoir Failure

According to NRW data, there is no flood risk to the Site in the unlikely event of reservoir failure.

4.5. Climate Change

Projections of future climate change in the UK suggest that short-duration, high-intensity rainfall and long-duration rainfall events will become more frequent. Guidance drafted by the Welsh government recommends that the effects of climate change are incorporated into FCAs (Welsh Assembly Government, 2004). Recommended precautionary sensitivity ranges for peak rainfall intensities (40% increase for the upper end estimate for 2080s) and peak river flows (25% increase for the central estimate for 2080s for the Severn river basin, and 70% for the upper end estimate) have been set out in the guidance for Flood Consequence Assessments (Welsh Government Planning Policy Branch, 2021).

Detailed fluvial flood model data with climate change allowances are not available for the Site area, however the Flood Map for Planning does incorporate the effects of climate change.

Increases in rainfall intensity have been factored into calculations for surface water runoff within the Outline Drainage Strategy for the Site.

5. Suitability of the Proposed Development

5.1. Planning policy

TAN 15 aims to steer new developments towards areas at a low risk of flooding. The principal tool supporting this process is the Flood Map for Planning. The Site is predominantly within the fluvial Flood Zone 1 which is defined as being "*at little or no risk of fluvial or tidal/coastal flooding*", with the exception of land immediately adjacent to Milo Brook.

Flood Zones 2 and 3 from the surface water and small watercourses dataset cross the Site in numerous locations consistent with the narrow gullies formed by the small watercourses draining the upland areas of the Site.

The various components of the Proposed Development would be classified as either Highly Vulnerable (such as transformers) and Less Vulnerable (such as the access roads and turbines themselves).

5.2. Flooding and the plan-led system

TAN 15 allows for all types of development within Zone 1, and applications for all types of development are acceptable in principle.

Planning applications within Zone 2 require careful consideration and must be consistent with the acceptability considerations set out in section 11 of TAN 15. Applications for new highly vulnerable development on greenfield land are only appropriate where the Site has been allocated in adopted Development Plans. Land in Zone 2 may also be allocated within a Local Development Plan (LDP) for new developments that address energy security needs provided that a Strategic Flood Consequence Assessment has identified an acceptable level of risk.

A small area of the proposed substation is within Zone 2 of the surface water and small watercourse extents (as shown in the inset maps in **Error! Reference source not found.**). Less vulnerable infrastructure encroaches over an area of Zone 2 in the surface water and small watercourse extents in three locations – Turbine hardstanding 2, 4 and 6 (as shown in the inset maps in **Error! Reference source not found.**).

The Powys Strategic Flood Consequence Assessment has not yet been updated to reflect the updated TAN 15 plan-led system, and the Site has not been allocated within the LDP (which does not include any allocations for renewable energy infrastructure). It is therefore considered that the portions of the Proposed Development which are within Zone 2 fall within the 'require careful consideration and must be consistent with the acceptability considerations set out in section 11 of TAN 15 requirement. The acceptability of flood consequences is assessed in Section 6.

6. Acceptability of Flood Consequences

In accordance with TAN 15, the Proposed Development has been assessed for the acceptability of flood consequences, with particular reference to the 3 wind turbine hardstandings that encroach on Zone 2 of the surface water and small watercourses flood extents. The following conditions are required to be met:

- No increase of flooding elsewhere
- Occupiers aware of flood risk
- Escape/evacuation routes present
- Flood emergency plans and procedures agreed and in place
- Flood resistant and resilient design
- Acceptable consequences for type of use

6.1. No increase of flooding elsewhere

The expected impermeable surface area over the Site as a whole is expected to be low given the nature of the development and therefore unmitigated changes in runoff are expected to be low. Much of the Site will remain as permeable greenfield land post-development.

The Outline Drainage Strategy (Appendix 9.4 of the ES) details how surface water runoff will be managed for each element of infrastructure as close to source as possible through implementation of infiltration trenches / basins. There will therefore be no net increase in surface runoff rates or volumes from the Proposed Development.

The substation, which straddles a surface water flow path (indicated as Zone 2 in the flood map for planning), and the access track immediately adjacent to the substation will be designed to allow the surface water to flow through the substation site (base made of crushed stone and gravel) and under the access track maintaining the existing flow paths.

The three wind turbine hardstandings that straddle surface water flow paths for events greater than the 1% AEP event with climate change may result in the flow path being locally deflected around the turbine hardstanding due to changes in the local Site levels. In each case however, the overall destination of flow will remain the same due to the wider topography of the Site with negligible difference in travel time to the nearest defined watercourse.

The Proposed Development will not result in a net loss of river floodplain storage as no part of the Proposed Development is within the floodplain. Installation of temporary or permanent structures in the channels of the small watercourses / flow paths defined in Section 4.2 should be avoided.

There will therefore be no increase in flooding elsewhere due to the Proposed Development.

6.2. Occupiers aware of flood risk

Construction workers and operational staff will be made aware of the potential for flood risk on the Site. The location of temporary construction compounds and welfare facilities should be sited outside of the surface water flood risk zones defined in Section 4.2 as too should the permanent features.

The substation design and layout will ensure that the surface flow path, active only in extreme flood events, fills the crushed stone / gravel base and spills to the west prior to surface flooding occurring on Site.

Due to the nature of the work proposed to be undertaken on the Proposed Development, and rural location of the Site, it is highly unlikely that during a forecasted flood event of magnitude greater than the 1% AEP event with climate change, any personnel will be on Site (See Section 6.4).

6.3. Escape / Evacuation routes present

The main access onto the Site along the north-east boundary is free from risk of flooding in the immediate vicinity of the access point. The main roads leading away from the Site are predominantly free from flooding, although these may become impassable during significant flood events due to flooding from Camnant Brook to the north and the River Edw to the east and south.

Access to and from the substation from the A481 is restricted by flood zones 2 and 3 of the surface water and small watercourse flood extents, however pedestrian access, 40 m across a field, to the A481 is possible to the north of the substation.

As detailed in section 6.2 it is highly unlikely that during a significant forecasted flood event, any personnel will be on Site.

6.4. Flood Emergency Plans and Procedures agreed and in place

The potential for flooding onsite in proximity to the Proposed Development is extremely limited (events greater than the 1% AEP with climate change, and at three isolated turbines and the substation). The greater risk is in Site personnel unable to leave the Site due to flooding of nearby roads from Camnant Brook, River Edw and River Wye.

It is recommended that as part of Site protocols, flood emergency procedures are put into place ensuring no personnel remain or attempt to access the Site when flood warnings and Severe flood warnings are in place for the River Wye at Builth Wells. This is the closest flood warning area to the Site.

6.5. Flood resistant and resilient design

The detailed design of the foundations for the three turbines that lie over the isolated flood zone 2 areas will need to take into consideration the increased risk of scour during an extreme flood event. Due to the topography of the Site there is unlikely to be any ponding of flood water in proximity to proposed infrastructure.

The substation, built with a crushed stone and gravel base will have critical equipment raised above ground level (by a minimum of 300 mm). The base will enable surface water to flow through the Site during an extreme event without ponding on the surface, and raising critical equipment will ensure no risk of failure of equipment due to surface water flooding.

Routine inspection of the Site will note the presence of potential scour accumulating over time (e.g. around turbine bases) with mitigation measures being employed if necessary.

6.6. Acceptable consequences for type of use

The Proposed Development is flood free during the 1% fluvial, surface water and small watercourse flood events with an allowance for climate change based on the flood map for planning, with the exception of the access track to the substation, where a watercourse crossing will be provided (further details provided in the Outline Drainage Strategy).

During an extreme flood event (considered to be the 0.1% AEP event, including an allowance for climate change) – three of the turbine hardstandings and the substation may be at risk of flooding. The TAN15 defines tolerable conditions in an extreme flood event for less vulnerable development (such as the turbines) as a maximum depth of flooding of 600 mm and a maximum velocity of flood waters of 0.3 m/s. Based on the available data (i.e. the flood map for planning) it is not possible to identify the flood depths and velocities at the three turbine hardstandings. It is however considered that given the extreme low likelihood of personnel being on Site during such an event, the limited extent of the areas shown to be at flood risk in proximity to the three turbines hardstandings affected, and robust foundational design of the turbines – the negligible consequences of flooding at these three turbine locations is acceptable.

The tolerable conditions in an extreme flood event for highly vulnerable development (such as the substation) is a maximum depth of flooding of 600 mm and a maximum velocity of flood waters of 0.15 m/s. By spreading the flow path out over the full width of the crushed stone / gravel base of the substation, flow velocities across the substation should be substantially reduced, and located sub-surface. The substation design will ensure that flow within the crushed stone/ gravel base spills to the west prior to surface water flooding occurring on the substation footprint.

6.7. Flood Consequences during the Construction Phase

Flood consequences associated with a site can increase during the execution of construction works, owing to removal or increased compaction of soils or by changing or blocking flow paths for example.

Good water management practices will be implemented to minimise construction phase impacts on flood risk/ consequences and will be subject to regular monitoring. This is likely to be delivered through a Construction Environmental Management Plan (CEMP), which would be expected to adhere to industry best practice measures, for example CIRIA guidance on the management of water quality and surface water runoff during construction projects.

Management of surface water and groundwater (if applicable) will be defined in the CEMP and will include attenuation and settlement of construction phase storm water. The CEMP will also provide guidance on the use of techniques to minimise soil compactions such as restricting access during wet conditions, using protective boarding and low ground pressure machinery. This will reduce the potential impact of compaction of soils during the construction phase on flood risk during the operational phase.

7. Conclusions

Flood risk to the Site in general is low, being in an elevated topographical position. Surface water / small watercourse flood risk is present in well-defined areas within the Site, adjacent to the watercourse channels. The Site is principally within Flood Zone 1 in the new Flood Map for Planning, which is defined as being at little or no risk of fluvial and coastal flooding, with the exception being along Milo Brook in the south. The risk of flooding from groundwater, sewer and reservoir failure are low / negligible.

The Proposed Development would be classified as being a mix in vulnerability ratings between 'Highly Vulnerable' and 'Less Vulnerable' with regards to flood risk. All types of development are permissible within Flood Zone 1. Three wind turbine hardstandings (less vulnerable infrastructure) extend over isolated areas of Flood Zone 2 in the surface water and small watercourse flood extent. The substation (highly vulnerable infrastructure) straddles a flow path within Flood Zone 2 of the surface water and small watercourse flood extent, and the immediately adjacent access track to the substation crosses an area of Flood Zone 3 where a watercourse crossing will be included. An acceptability of flood consequence assessment has been undertaken for the wind turbines hardstandings and substation and the flood risk consequences considered to be acceptable.

The principal mitigation measures proposed are avoidance by design to minimise onsite flood risk, the implementation of a Sustainable Drainage Strategy to mitigate any potential increases in offsite flood risk, a CEMP to mitigate flood risk during the construction phase and the positioning of material and structures outside of the flood risk areas noted in Section 4.2.

8. References

- Cranfield Soil and AgriFood Institute. (2023). Retrieved from Soil Scapes map:
<http://www.landis.org.uk/soilscapes/>
- Natural Resources Wales. (2023). *Flood Map for Planning / Development Advice Map*. Retrieved 10 31, 2023, from <https://naturalresourceswales.gov.uk/flooding/flood-map-for-planning-development-advice-map/?lang=en>
- Powys County Council. (2012). *Powys Strategic Flood Consequence Assessment*.
- UK Centre for Ecology & Hydrology. (2023). *Flood Estimation Handbook Web Service*. Retrieved from <https://fehweb.ceh.ac.uk/GB/map>
- Welsh Assembly Government. (2004). *Technical Advice Note 15: Development and Flood Risk*.
- Welsh Assembly Government. (2025). *Technical Advice Note 15: Development and Flood Risk*.
- Welsh Government Planning Policy Branch. (2021). *Flood Consequences Assessments: Climate change allowances*.

Appendix A Report conditions

Report Conditions

This report has been prepared by Aqua Terra Consulting Ltd. (Aqua Terra) in its professional capacity as soil and groundwater specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by Aqua Terra solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report, taking account of the terms of reference agreed with the client. The findings are based on the information made available to Aqua Terra at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology, and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

Where necessary and appropriate, the report represents and relies on published information from third party, publicly and commercially available sources which is used in good faith of its accuracy and efficacy. Aqua Terra cannot accept responsibility for the work of others.

Site investigation results necessarily rely on tests and observations within exploratory holes only. The inherent variation in ground conditions mean that the results may not be representative of ground conditions between exploratory holes. Aqua Terra take no responsibility for variation in ground conditions between exploratory positions.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, Aqua Terra may, by prior written agreement, agree to such release, if it is acknowledged that Aqua Terra accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. Aqua Terra accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual, or otherwise, against Aqua Terra except as expressly agreed with Aqua Terra in writing. Aqua Terra reserves the right to withhold and/ or negotiate the transference of reliance on this report, subject to legal and commercial review.