

# Trevor Basin Area Site Arrival & Car Park

Pontcysyllte Aqueduct & Canal World Heritage Site



## Design & Access Statement

January 2024





# Trevor Basin World Heritage Site Arrival

Project Information

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# Contents

<b>01</b>	<b>Introduction</b>	<b>5</b>	<b>03</b>	<b>Vision</b>	<b>41</b>
1.1	General Introduction	6	3.1	Design Approach	42
1.2	Project Location	8			
1.3	Pontcysyllte Aqueduct & Canal	9	<b>04</b>	<b>Design</b>	<b>47</b>
	World Heritage Site		4.1	Masterplan Concept	48
1.4	The Trevor Basin & Surrounding	10	4.2	Concept Development	49
	Area Masterplan		4.3	Design Option 1	50
1.5	Planning Policy	15	4.4	Design Option 2	51
			4.5	Proposed Detail Design	52
<b>02</b>	<b>Site Analysis</b>	<b>17</b>	4.6	Illustrative Masterplan	53
2.1	Access & Connectivity	18	4.7	Precedent Images	54
2.2	Heritage	18	4.8	Car Park Arrangement	55
2.3	Topography	23	4.9	Design response	57
2.4	Flood Risk	24	4.10	Illustrative Sections	59
2.5	Drainage	25	4.11	Access	61
2.6	Ground Investigation	27	4.12	Materials	62
2.7	Ecology	29	4.13	Street Furniture	64
2.8	Arboriculture	30	4.14	Lighting Strategy	65
2.9	Land Use	31	4.15	Planting Strategy	66
2.10	Landscape Character	32	4.16	Planting Palette	68
2.11	Site Photographs	34	4.17	Management & Maintenance	73
2.12	Opportunities & Constraints	36			
2.13	Landownership	37			
2.14	Current Car Parking Provision	38			







01

# Introduction



## 1.1 General Introduction

This Design and Access Statement accompanies an application which has been jointly prepared by Arcadis and on behalf of Wrexham Borough Council (the “Applicant”). It supports a planning application which seeks consent for access improvements and a new visitor car park and associated vehicular access on the brownfield site locally recognised as the “Flexsys Site” hereafter called “the Site”.

This project forms part of a for a programme of work to improve movement infrastructure at key destination sites in Wrexham County Borough and Denbighshire, following a successful joint County Borough application to the UK Government Levelling Up Fund. . The funding covers 3 subprojects with this commission forming part of the Project 1 highlighted on Figure 01-1.

This project is for a new arrival point and car park primarily for the Pontcysyllte Aqueduct & Canal World Heritage Site (WHS), and includes:

- car, coach and cycle parking.
- hard and soft landscape works.
- pathways for vehicles and active travel.
- a recreational walking and cycle route to the Aqueduct.
- woodland enhancement with additional planting and amenity green space.
- signage and wayfinding.
- drainage ponds.
- fencing.

Situated just off the A539 between Llangollen and Wrexham in the heart of North Wales, the Trevor Basin Area forms part of the Pontcysyllte Aqueduct & Canal World Heritage Site (WHS). Design by one of the eminent engineers of his day, the Thomas Telford designed Pontcysyllte aqueduct forms part of the WHS, where UNESCO has described this world heritage site as ‘a masterpiece of creative genius’. The first 11 miles of the Llangollen Canal is an outstanding piece of industrial and engineering heritage, including The Pontcysyllte Aqueduct and 31 other listed structures comprising of embankments, tunnels, viaducts and aqueducts form a industrial and engineering heritage asset as part of the first 11 miles of the Llangollen Canal.

This Design & Access Statement (DAS) provides a comprehensive overview of the proposed project (Trevor Basin Area Site Arrival & Car Park) , outlining design principles and access considerations, in support of a full planning application for the proposed site and works. With reference to previous studies including the “Trevor Basin Area Masterplan” the DAS sets out the project’s objectives, contextual significance, and design proposals to support the established masterplan, local plan policy and respects the wider cultural and historical context within the WHS setting and designated buffer zone.

This project represents a significant investment to help ensure the Trevor Basin Area current visitor levels are maintained and appropriately catered for.





- KEY**
- Masterplan Area
  - Pontcysyllte Aqueduct & Canal W.H.S
  - Pontcysyllte Aqueduct & Canal W.H.S Buffer
  - River Dee
  - Roads
  - Rail
  - Settlement
  - 1 Project 1- Trevor Basin
  - 2 Project 2- a. Four Great Highway Project, Llangollen  
b. Wenffrwd  
c. Horseshoe Falls  
d. Chirk Visitor Safety & Movement
  - 3 Project 3- a. Corwen Station Visitor Improvements  
b. Corwen Pavilion  
c. Cynwyd to Corwen Active Travel Link
  - ★ Community Projects
  - ★ Other Projects

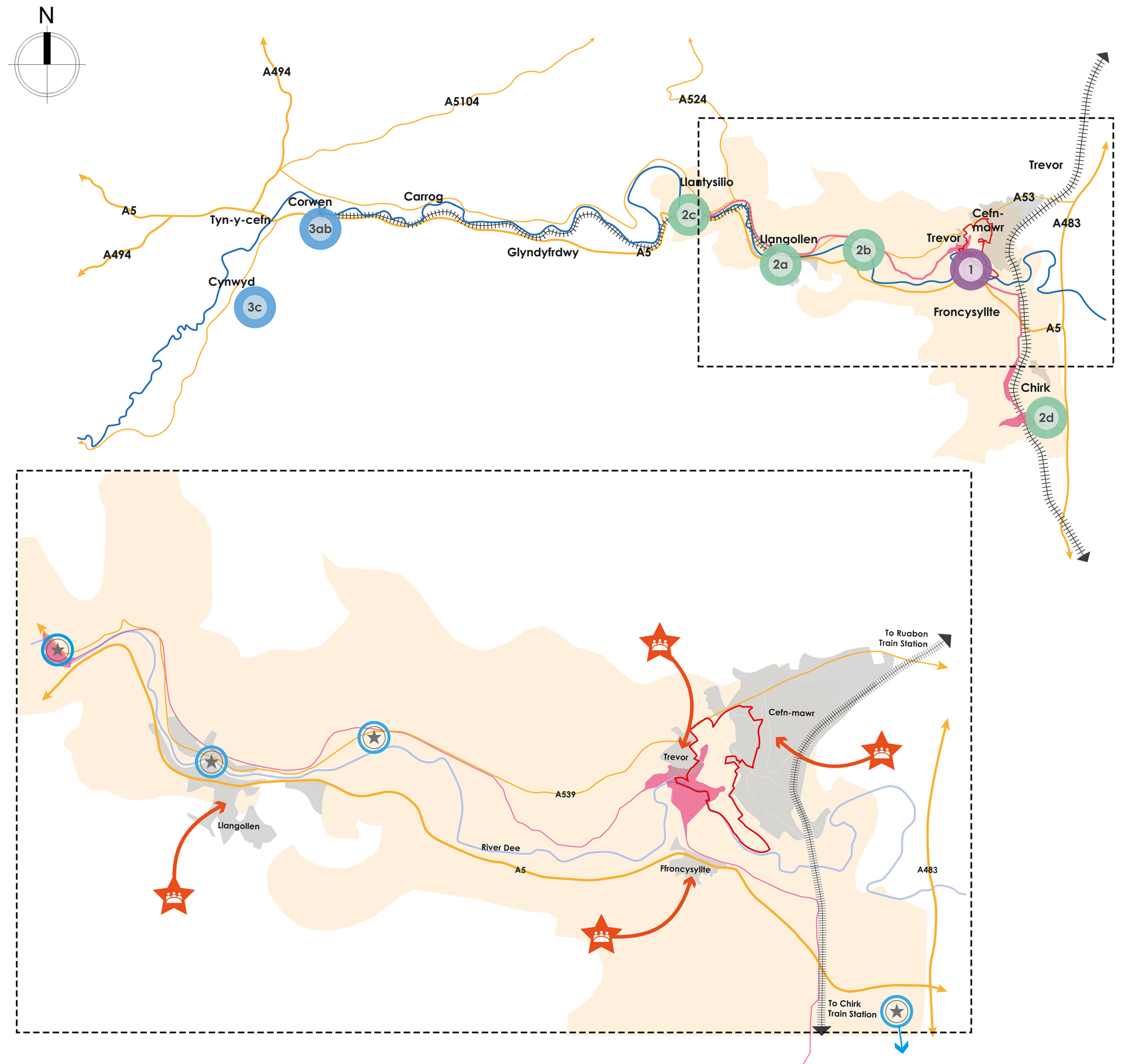


Figure 01-1: Pontcysyllte Aqueduct and Canal World Heritage Site



## 1.2 Project Location

The site is located on Queen Street, Cefn-mawr, Wrexham, Wales, LL14 3NP. The current site consists of car parking areas, access roads and the concrete foundations remaining from the manufacturing plant that once stood there.

The site is located approximately 10km south-west of Wrexham town centre, Wales, near the villages of Trevor and Cefn-mawr centred at approximate National Grid Reference (NGR) SJ 27578 42545. The site is bounded by Queen Street to the south and Cefn(Trefynant) Cemetery to the north east. To the east of the site lies Cefn-mawr and beyond the site to the south lies the River Dee and approximately 500m to the south west lies the Pontcysyllte Aqueduct.

The site covers an area of 4.54 hectares of brownfield land being the site of former industrialisation, most recently the former Flexys site, and includes the current visitor coach park.

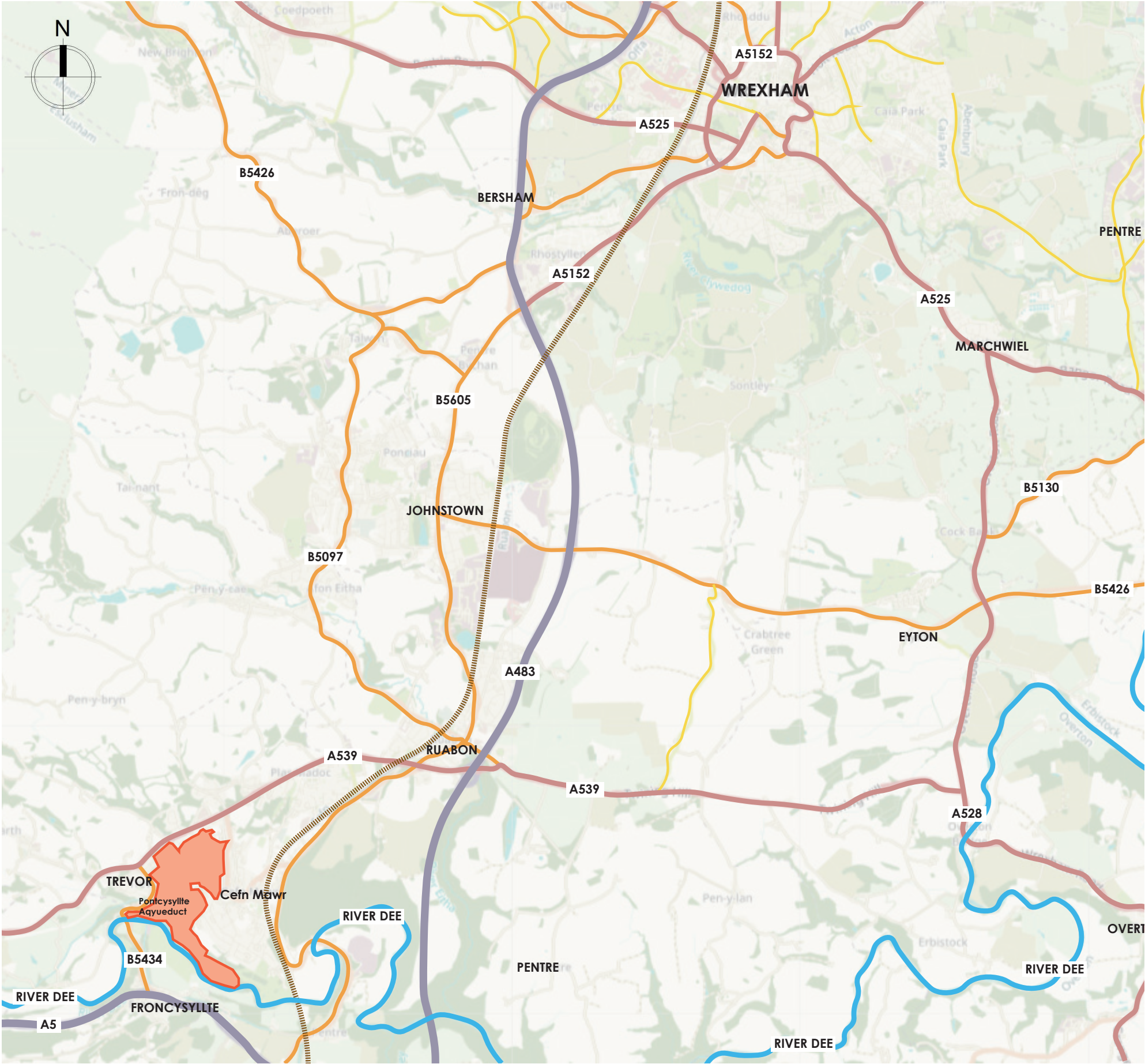


Figure 01-2: Local Context



## 1.3 Pontcysyllte Aqueduct & Canal World Heritage Site

A World Heritage Site represents a location of Exceptional Universal Value for the entire human population. The designation of World Heritage Site status to the Pontcysyllte Aqueduct and Canal in June 2009 acknowledges that its value and significance are distinctly articulated through the integrity and authenticity of its features, as well as its broader landscape and cultural context.

The Pontcysyllte Aqueduct and Canal represent a cohesive collection of civil engineering marvels from the transformative era of transportation advancements in the British Industrial Revolution. Constructed between 1795 and 1808 by eminent figures in civil engineering, Thomas Telford and William Jessop, this canal facilitated waterborne transport from the English lowlands to the challenging topography of the Welsh uplands. Employing innovative techniques, the canal traversed two significant river valleys and the intervening ridge, becoming a testing ground for groundbreaking ideas that would resonate in global engineering practices.

In 2009, the site attained World Heritage status, a recognition reserved for locations of exceptional universal value meeting stringent selection criteria. Pontcysyllte Aqueduct and Canal fulfil three of these criteria:

- Criterion (i): The Pontcysyllte Aqueduct is a highly innovative monumental civil engineering structure, made using metal arches supported by high, slender masonry piers. It is the first great masterpiece of the civil engineer Thomas Telford and formed the basis of his outstanding international reputation. It bears witness to the production capacities of the British ironmaking industry, which were unique at that time.
- Criterion (ii): The intensive construction of canals in Great Britain, from the second half of the 18th century onwards, and that of the Pontcysyllte Canal in particular in a difficult region, bear witness to considerable technical interchanges and decisive progress in the design and construction of artificial waterways.
- Criterion (iv): The Pontcysyllte Canal and its civil engineering structures bear witness to a crucial stage in the development of heavy cargo transport in order to further the Industrial Revolution. They are outstanding representatives of its new technical and monumental possibilities.

Spanning the Dee Valley with nineteen cast iron spans at a towering height of 126 feet (38.4 meters), the aqueduct is internationally acknowledged as a waterways engineering masterpiece and an early exemplar of iron construction. The canal showcases the innovative engineering approaches that Britain pioneered during the Industrial Revolution, setting precedents for waterway, railway, and road construction worldwide.

The landscape intervention by engineers, navigating the Welsh upland topography, was characterised by a new scale and intensity. Described at its completion as a canal length featuring works more challenging than perhaps anywhere else within a comparable distance of canal navigation, it combined engineering prowess with sensitivity to its impact on the valued landscape. The site, in continuous use for two centuries, served various purposes, from transporting coal, iron, slate, limestone, and general goods to accommodating pleasure boats and facilitating water conveyance.

Pontcysyllte Aqueduct and Canal stand as remarkable monuments of the canal age in the United Kingdom, flourishing from the 1760s until the rise of locomotive railways in the 1830s. Canal construction reached its zenith during the “Canal Mania” after 1790, contributing significantly to the Industrial Revolution’s economic growth, regional specialization, and urbanization. The name “Pontcysyllte,” meaning “the bridge that connects,” aptly describes how the canal majestically spans the tumultuous River Dee below. Designed by Thomas Telford and Williams Jessop and constructed by John Simpson (stonework) and William Hazledine (ironwork), the aqueduct, completed in 1805, stands as a testament to bold civil engineering solutions, featuring a cast iron trough suspended above the river by iron arched ribs supported on 18 hollowed masonry pillars.





# 1.4 The Trevor Basin & Surrounding Area Masterplan

In 2017, Arcadis (UK) Ltd were commissioned by the Canal & River Trust, Solutia UK Ltd, and Wrexham County Borough Council. The objective was to formulate a viable and achievable masterplan for an expansive site covering approximately 74 hectares, incorporating the land surrounding Trevor Basin and the locally recognized ‘Flexsys site’ at Cefn-mawr. The primary focus of this masterplanning initiative centered on evaluating land use, fostering place-making enhancements, refining World Heritage Site (WHS) facilities, and establishing improved linkages within the masterplan area and with adjacent settlements, including Cefn-mawr, Trevor, and Froncysyllte. The subsequent Masterplan outlined the following specific aims and objectives that guided the planning process:

- Safeguard the World Heritage Site.
- Maximise economic & community benefits.
- Identify realistic options for brownfield regeneration.
- Minimise brownfield maintenance.
- Enhance visitor attractions and dwell time,
- Balance the needs of community, residents and visitor numbers.
- Improve accessibility.
- Promote the health and wellbeing of communities and visitors.
- Explore viability for extending canal / water space.
- Inform the emerging Wrexham County Borough Council Local Development Plan.

Extensive stakeholder and community engagement was undertaken as part of workshops during the masterplan. The priorities highlighted as part of this engagement included:

- the need to improve the sense of arrival at the WHS.
- issues relating to parking, access and movement both to and within the masterplan area.
- the importance of creating links with the wider area.
- consideration of income generating uses to benefit the local economy (for example waterside or camping uses, activity tourism, supporting infrastructure).
- the importance of encouraging visitor spend and increasing dwell time.
- emphasis on education opportunities within the WHS.

The masterplan took on board the findings and put forward the following eight elements:

1. Primary arrival area, car park and new Multi-Use Welcome Hub/ Event Space.
2. Rewilding’ the former manufacturing site.
3. Creation of a Treetop Walk.
4. Public realm improvements to the Basin Area.
5. Woodland activity area and education centre.
6. Developing a glamping/camping site.
7. Creation of a Dee River walk.
8. Creation of Development Plot.

As an integral component of the initial sub-projects, this project focuses on establishing a primary arrival area, car and coach park addressing item 1 of the masterplan. The overarching goal is to enhance the visitor experience at the World Heritage Site (WHS) by addressing current challenges related to inadequate parking, limited visitor stay duration, and suboptimal visitor management. The proposed solution includes the creation of a landscaped car park at Wimborne Gate, providing visitors with a fitting point of arrival for the WHS. The masterplan envisioned a Multi-Use Welcome Centre nearby and although this is not part of this current project, the vision is that it will later serve as the central ‘welcome centre’ for the entire World Heritage Site.



TREVOR BASIN AND SURROUNDING AREA  
MASTERPLAN

January 2021

ARCADIS

Design & Consultancy  
for natural and built assets

Solutia

Wrexham  
University Research Centre  
Wrexham

Glandŵr Cymru

Canal & River Trust in Wales  
Do gw bod wrth y dŵr



Figure 01-3: Extract from the Trevor Basin and Surrounding Area Masterplan. Number 1 is the Primary Arrival Area



# 1.4 The Trevor Basin & Surrounding Masterplan

## Site Analysis

The table below and diagram opposite summarise the baseline analysis from the Masterplan process and the opportunities and constraints identified. Those with a specific relation to this application are highlighted (Items 2,3,5).

Day- to Day Issues and Constraints		Opportunities / Strengths / Quick Wins
On street parking/yellow lines & safety concerns	1	
Temporary car park – limited access	2	Introduce all-weather surfacing (grass-create), extend access
Car park too far away / unsightly views of site	3	Improve link to car park/screen unsightly views
Litter and dog waste - site wide issue	4	Voluntary litter picking / provide additional litter bins/dog waste bins
Lack of formal car parking - site wide	5	Parking improvements (Cefn-mawr) / additional car parking
Canal quality deteriorates	6	
Lack of links with Cefn-mawr through former industrial site	7	Create links with Cefn-mawr through former industrial site
Limited connectivity - Cefn-mawr and Tŷ Mawr Country Park	8	Signpost links/Festival days with Cefn-mawr and Tŷ Mawr Country Park
Restricted land use opportunities	9	Explore options for use as Solar Farm
Limited facilities	10	Opportunities for improved facilities
No moorings	11	
Issues with 'Booze Cruise' visitors	12	
Restricted views and river access	13	Tree works to maximise views and improved access to river
Lack of signage and wayfinding - internal and external to study site	14	Improve signage and wayfinding - signposting other local attractions
River corridor footpaths deteriorating / washed away	15	Footpath improvements
Accessibility - site wide	16	Access improvements

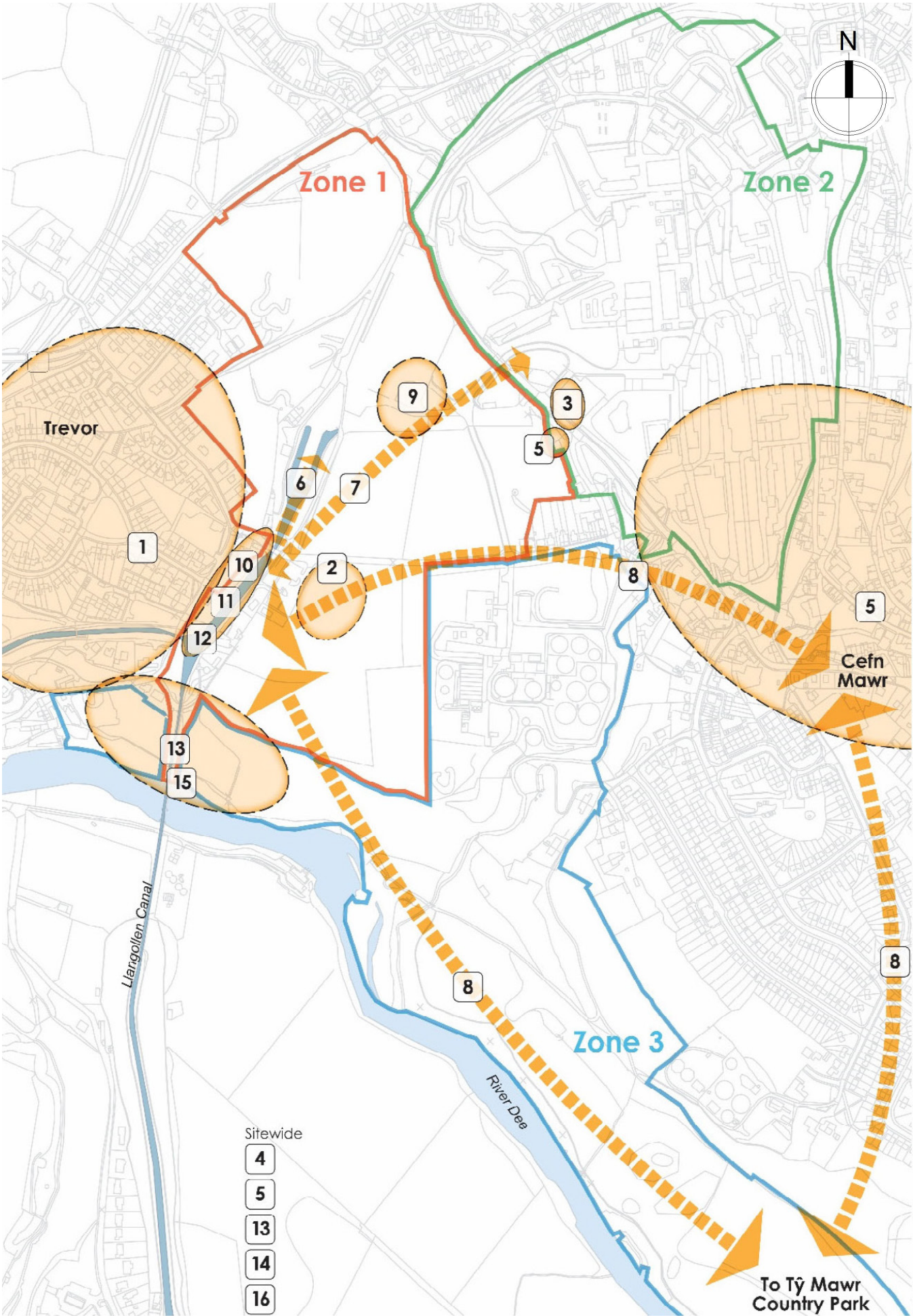


Figure 01-4: Trevor Basin and Surrounding Area Masterplan Opportunities and Constraints



## 1.4 The Trevor Basin & Surrounding Masterplan

### Engagement

Extensive stakeholder and community engagement was undertaken as part of the Masterplan development. The priorities highlighted as part of this engagement included:

- the need to improve the sense of arrival at the WHS
- issues relating to parking, access and movement both to and within the masterplan area
- the importance of creating links with the wider area
- consideration of income generating uses to benefit the local economy (for example waterside or camping uses, activity tourism, supporting infrastructure)
- the importance of encouraging visitor spend and increasing dwell time
- emphasis on education opportunities within the WHS

Figure 01-5 opposite builds on the engagement feedback and provides a conceptual framework that the masterplan was developed from. At the core of the layout and a central pivot to the proposals is the “Arrival”.

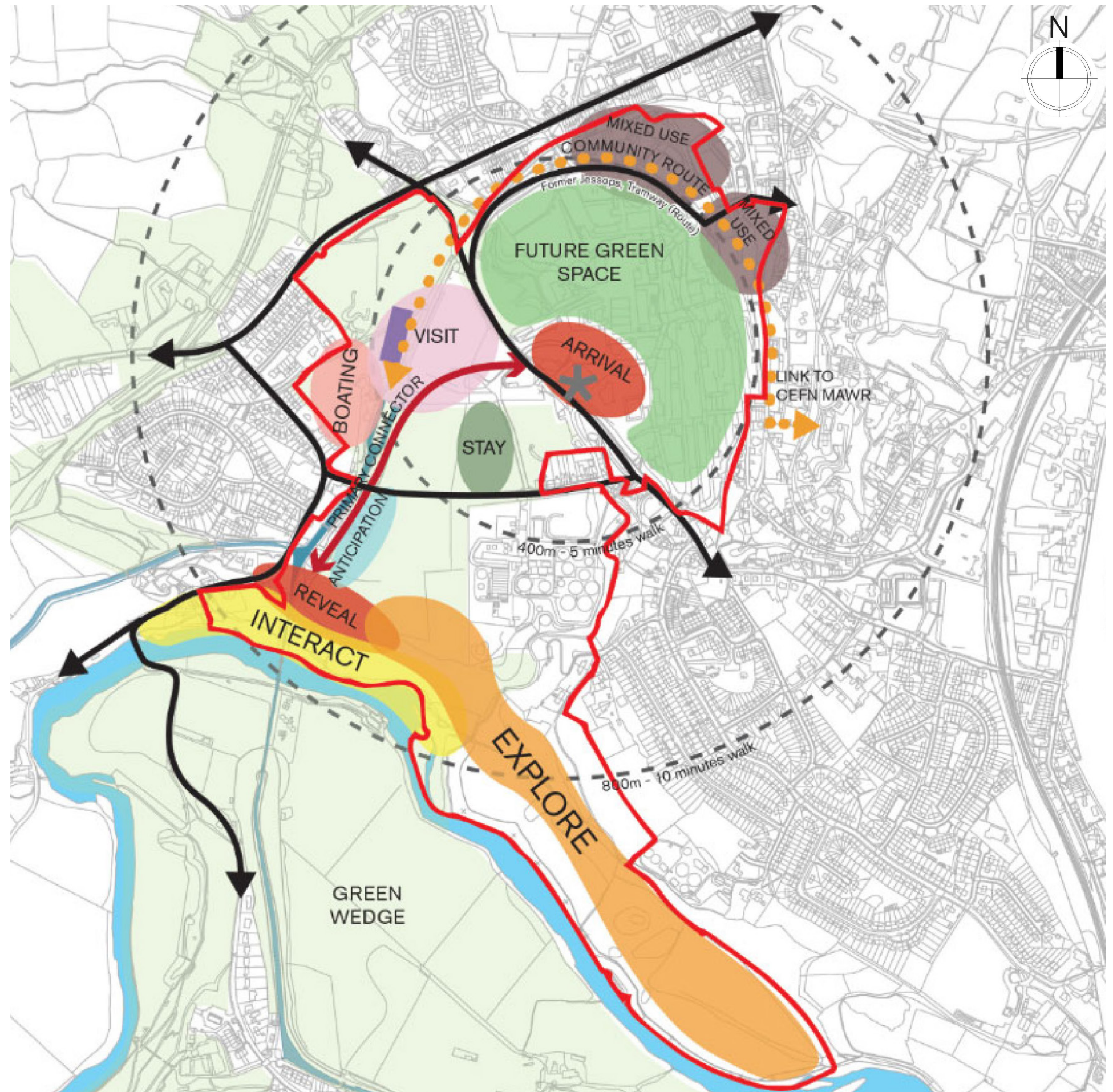


Figure 01-5: Proposed user experience & functions diagram



# 1.4 The Trevor Basin & Surrounding Masterplan

## Access Project

This project represents an initial phase in the implementation of the overall masterplan, focusing on establishing a primary arrival area, car and coach park. It is intended that this infrastructure will eventually be enriched with a Multi-Use Welcome Hub/Event Space, serving as a combined visitor centre, community resource, and event venue.

These developments are part of a comprehensive strategy aimed at enhancing the visitor experience within the World Heritage Site (WHS). The initiative aims to help address current challenges around visitor patterns, including inadequate parking, limited dwell time, and suboptimal visitor management.

The proposed landscaped car and coach park at Wimborne Gate will redefine the arrival experience, guiding visitors through to the WHS via improved signage and wayfinding.

Figure 1-6 opposite shows the masterplan in its full context and how the various elements are integrated to form a cohesive approach.



- 1. Primary arrival area, car park and new Multi-Use Welcome Hub/Event Space
- 2. Rewilding' the former manufacturing site
- 3. Creation of a Treetop Walk
- 4. Public realm improvements to the Basin Area
- 5. Woodland activity area and education centre
- 6. Developing a glamping/camping site
- 7. Creation of a Dee River walk
- 8. Creation of Development Plot

Figure 01-6: Illustrative Masterplan



# 1.4 The Trevor Basin & Surrounding Masterplan

## Access Project

The Illustration below (Fig 01-7) shows the masterplan concept of the car park and welcome areas. This sets out some of the key principles which have driven the project, notably setting the car park within a landscape-led design.

The layout includes the following elements:

1. Car parking in a linear arrangement with an avenue of trees along the edge of the car parking bays

2. The existing car parking spaces adjacent to Queens Street at the vehicular entrance is the proposed location for Coach Parking. The current provision is also in this area but smaller in scale.

3. A pedestrian link along the old canal line which runs along the perimeter of the site connecting to the village of Cefyn Mawr
4. An access route under Queens Street utilising the existing bridge structure complimented by a wayfinding feature.

5. The main vehicle entrance off Queens Street

6. The inclusion of a Multi-Use Welcome Hub/Event Space (a combined visitor centre, community resource and event space).

7. Proximity to a potential Glamping/Camping Site on fields to the east of Trevor Basin

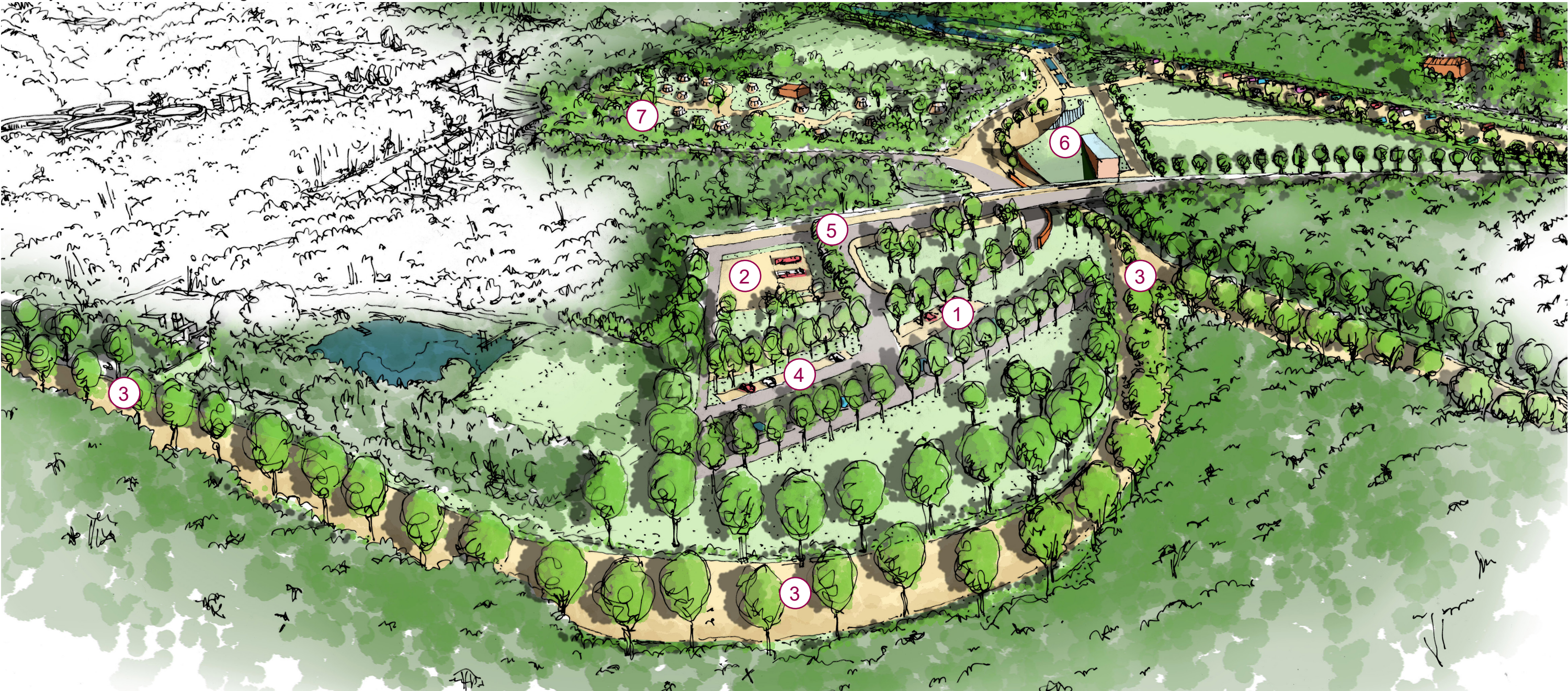


Figure 01-7: Illustration of Proposed Arrival space from the Trevor Basin and Surrounding area Masterplan



# 1.5 Planning Policy

Please refer to the accompanying Planning Statement (ref: 10054502-ARC-XX-XXX-RP-PL-01003) which supports the application. This document considers the proposed development of Trevor Basin Arrival against all the relevant national and local planning policies and has identified and assessed the principal issues.

The relevant national, regional, and local planning policy include:

- Wrexham Unitary Local Development Plan (WULDP) 2013–2028/1996
- Future Wales: The National Plan 2040
- Pontcysyllte Aqueduct and World Heritage Site Management Plan 2019-2029

Material Considerations:

- Trevor Basin Masterplan (2020)
- Local Planning Guidance Note 16 – Car Standards
- Local Planning Guidance Note 33 – Pontcysyllte Aqueduct and Canal World Heritage Site
- Planning Policy Wales (Edition 11)
- National Planning Policy Framework (NPPF) (2023)
- National Planning Practice Guidance (NPPG) (2014)

The Planning Statement has demonstrated that the proposed development is supported by policies in the Local Development Plan. The site is in a sustainable location and the proposed development would provide a high-quality arrival point for the World Heritage Site. The proposed development would not prejudice the existing vehicular and active travel networks and would not lead to any negative environmental impacts that could not be appropriately mitigated. The development is also in accordance with National Planning Policy, Planning Policy Wales, and the adopted Local Plan.



Figure 01-7: Planning Policy Documents







02

Site Analysis



# 2.1 Access & Connectivity

## Wider Context

The site is located approximately 10km south-west of Wrexham city centre, Wales near the villages of Trevor and Cefn-mawr centred at approximate National Grid Reference (NGR) SJ 27578 42545.

Figure 02-1 identifies the existing accessibility to the wider area including the communities of Cefn-mawr, Trevor and Froncysyllte

- To the east of the site is National Cycle Route 85 which runs south from Chester to Wrexham and then head west towards Llangollen, Corwen and Bala to pick up Lon Mawddach at Dolgallau. A section of the route is open between Trevor and Llantysilio via Llangollen alongside the Llangollen Canal. enjoyable path, allowing users to appreciate the natural beauty and cultural richness of the North Wales landscape.
- A spur to the west of National Cycle Route 85 is Route 84. a partially completed route. When completed the route will connect Rhyl to Oswestry via the Vale of Clwyd and the Llangollen Canal.
- There is a network of Public Rights of Way within proximity of the site but non that directly run through or connect to the site.
- The closest railway station is just over 2 miles away at Ruabon, a combined rail and bus interchange. It is on the Shrewsbury to Chester Line. To reach the site by Public Transport involves an approximate 20minute journey to the nearest bus stop on the A539 and a short walk to the site.
- The nearest bus stop from the site is the Duke of Wellington Hotel on the A539 Llangollen Road, which is approximately at a walking distance of 300m. The bus service currently runs every 30 mins from Llangollen Monday to Sunday.

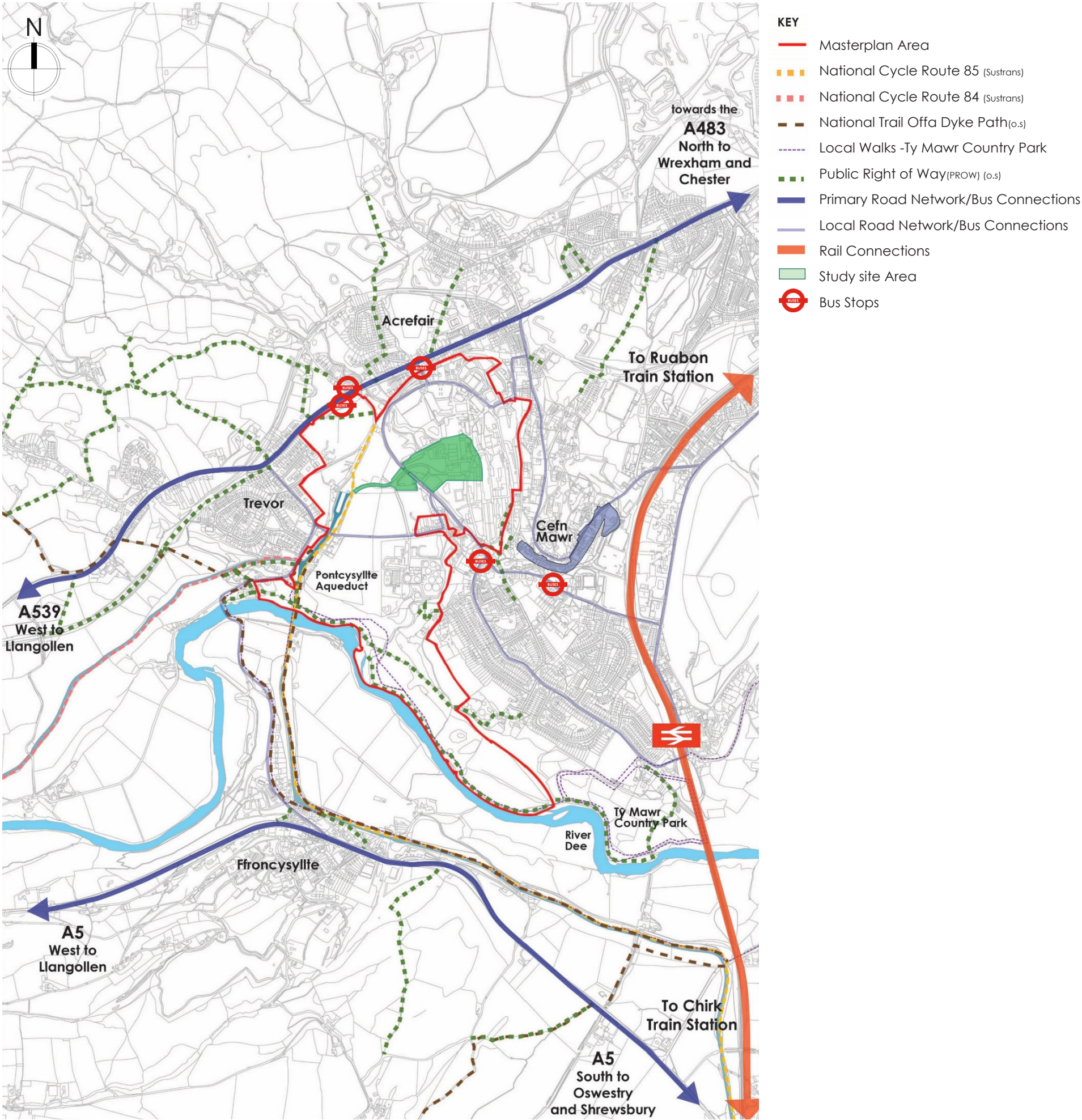


Figure 02-1: Access and Connectivity - Wider Context



# 2.1 Access & Connectivity

## Local Context

Figure 02-2 shows the more local connections within the vicinity of the site. A walk to the local shops and services in Cefn-mawr is just under 0.5miles from the site heading southeast down Queen Street.

To reach the Trevor Basin via the footpath route from Tower Hill is also just under 0.5miles.

The plan shows:

- The existing local car park is shown accessible off Queen Street. This currently carries a provision of 100 parking spaces including 6 mobility spaces.
- The conservation area of Cefn Mawr which lies to the east of the site. Cefn Mawr has a historic core which has been formed on several tiers within the hillside, wrapped around a central quarry creating a unique and distinctive townscape. Its elevated position affords Cefn Mawr with magnificent views along the Vale of Llangollen towards the Pontcysyllte Aqueduct.
- The Pontcysyllte Aqueduct Conservation Area to the south west of the site which covers the Pontcysyllte Aqueduct and Canal World Heritage Site extending from the Llangollen canal Trevor Basin terminus in the settlement of Pontcysyllte, southwards as far as the settlement of Froncysyllte.
- The boundary of the site in proximity to the Pontcysyllte Aqueduct & Canal World Heritage Site
- The network of private roads within the site.

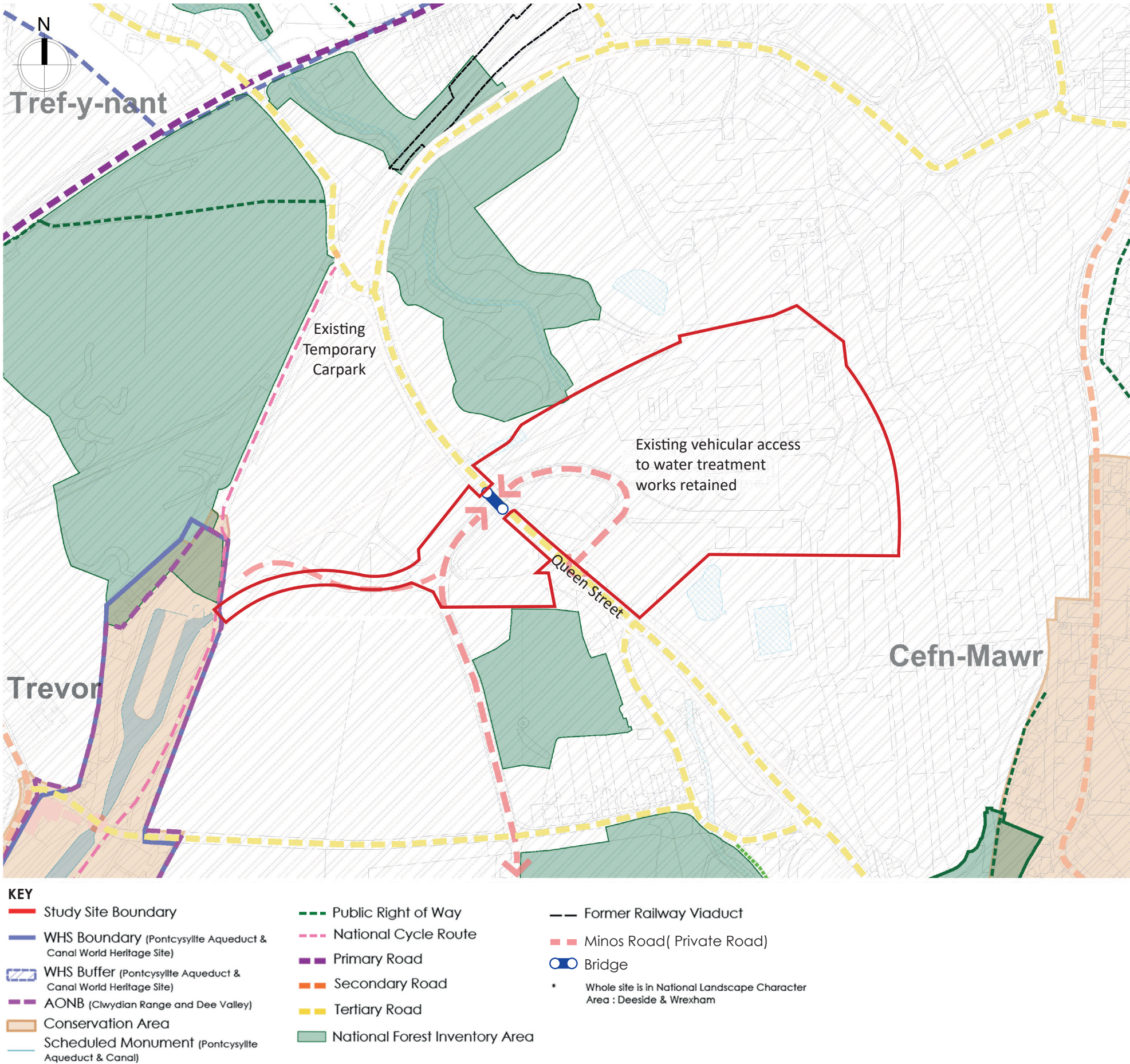


Figure 02-2: Access & Connectivity Local Context



## 2.2 Heritage

From the late eighteenth century onward, the region underwent substantial economic development, evolving into a diverse industrial economy marked by numerous small-scale enterprises that gradually yielded to larger, more highly capitalized concerns.

In 1867, the German chemist Graesser, in collaboration with Manchester lawyer Timothy Crowther, established operations at Cefn-mawr to produce paraffin from colliery shale on the proposed site. However, the market collapsed with the advent of American oil-wells, leading to the dissolution of the partnership. Graesser then shifted his focus to producing phenol from crude carbolic, becoming a major global supplier by 1910. He also engaged in the production of synthetic dyes and picric acid for burn treatment.

In 1920, Monsanto Works acquired a half share, and the Cefn-mawr facility transitioned to producing saccharin, vanillin, salicylic acid, and aspirin. The Graesser partnership concluded in 1928, and from 1930 onward, the site produced rubber chemicals as part of the Flexsys company, remaining in active production until the early twenty-first century.

As the works expanded, it absorbed and, in effect, eliminated sites previously occupied by small coal operations, the Kynaston foundry, and the Kynaston pottery which can be identified on the historical maps in figures 02-4. It utilised earlier transport links across the site, such as the Kynaston Canal and standard gauge railway sidings, which were gradually obliterated by ongoing expansion in the latter half of the twentieth century. After a partial closure in 2011, much of the site was cleared in 2010, leaving behind a network of retaining walls and footings.

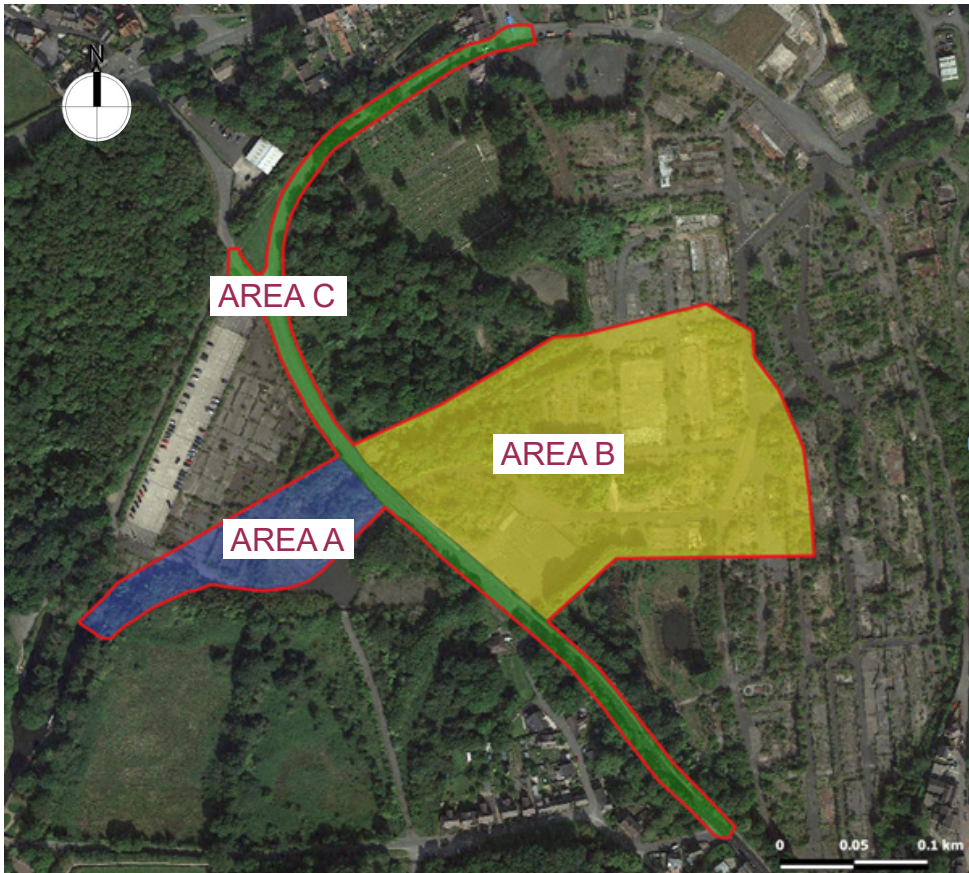


Figure 02-3: Area History Key Plan

Year	On-Site History		
	Area A	Area B	Area C
1873-1875	Canal running northeast to southwest through the area. Some unnamed buildings present adjacent to the canal to the northeast of the area. Railway tracks and a railway depot found on the south-western boundary of the area.	Plas-Kynaston Chemical works found to the east of the area. Unnamed buildings to the west of the area, assumed to be residential. Canal running along northern and eastern boundary, with a canal basin found to the northeast. An old shaft noted at the south-eastern boundary. Tref-y-nant brook runs through the west of the area, flowing north-west to southeast.	Northern section of the area is shown to have tracks running east to west (later noted to be a tramway). Some unnamed buildings found to the north-west and central sections of the area. The south of the area crosses undeveloped land and the Tref-y-nant brook. The ground is noted to be marshy.
1898-1899	Unnamed building now listed as an old kiln. The railway tracks crossing the western section of the site are no longer mapped.	Some expansion to the chemical works. An old shaft is noted towards the centre of the area.	One of the previously unnamed buildings now mapped as an old limekiln.
1959-1963	Canal has been partially backfilled at the east of the area. Un-named building has been constructed on former footprint of the canal.	Whole area is now classed as works, with an expansion of industrial buildings associated with the chemical works including pipework and tanks. The canal and canal-basin at the east and northeast of the area have now been backfilled.	The tramlines to the north of the area are no longer mapped. By 1963 the southern end of Area C is mapped as a road, following the present-day layout.
1977	Canal is now completely backfilled in the area.	Canal now almost completely backfilled except for a small area of water in the north-west of the area.	No significant change.
1985	No significant change	The brook running through the area has been diverted and appears to run along the boundary of Area B and Area C.	No significant change.
2006-2010	The east of the area appears to be used as a car and lorry park for nearby industries.	No significant change.	No significant change.
2016	Appears to be unused land.	Former chemical works now demolished with remnant concrete pads and roads remaining in place. No structures are mapped on the site.	No significant change.



2.2 Heritage

The historic maps opposite show some of the changes in use over. In 1879 there is a mixture of uses including Plas Kynaston Chemical Works, Foundry and Pottery within the site vicinity with the canal network extending into the site.

By the 1950's the site has a clear arrangement of industrial units, with the canal partially backfilled.

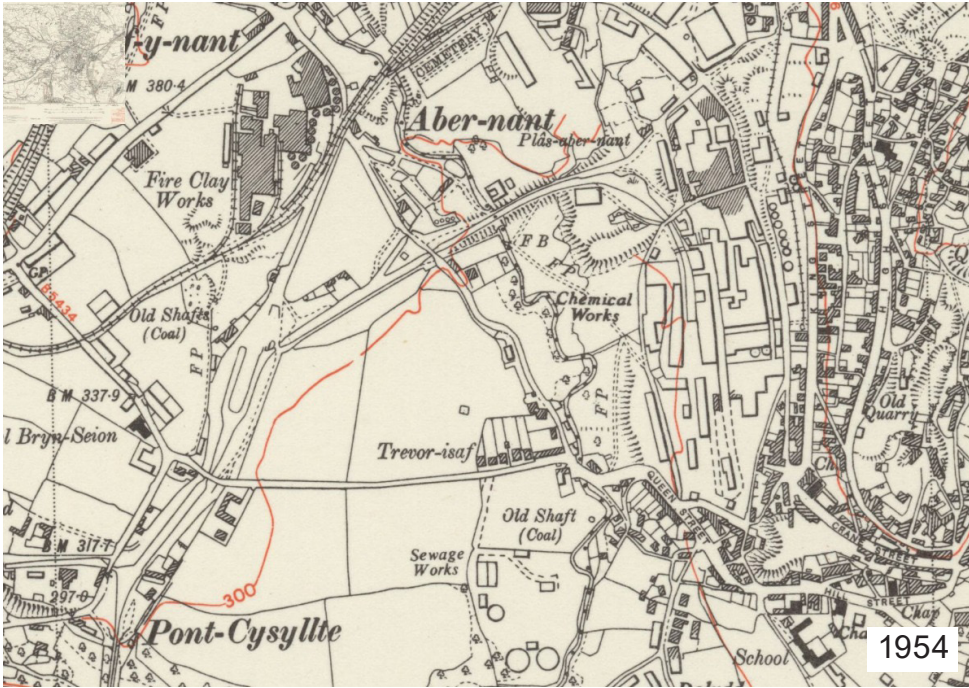
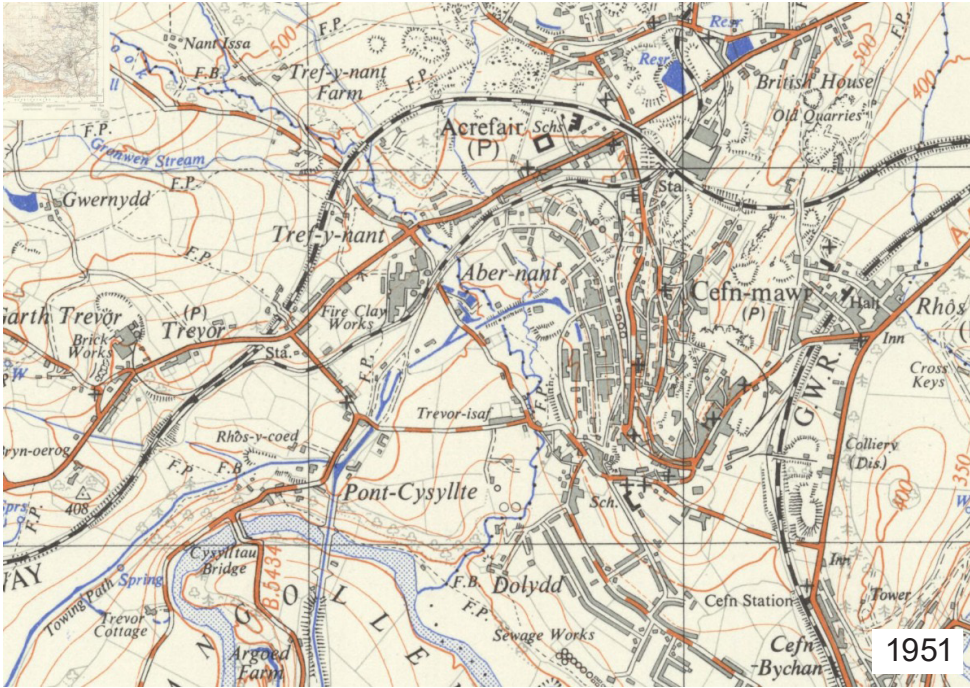
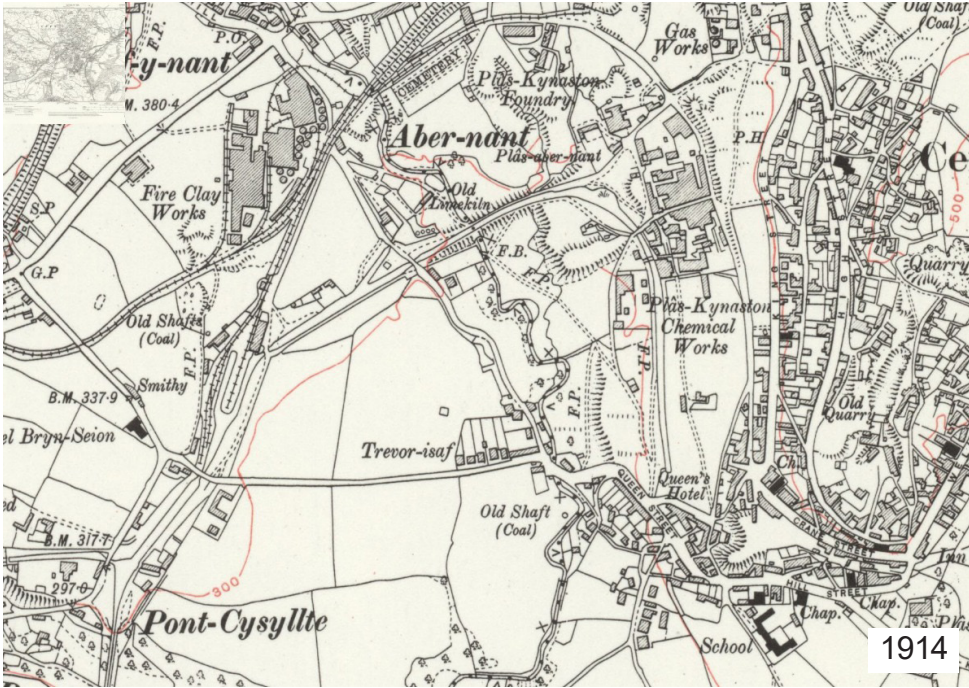
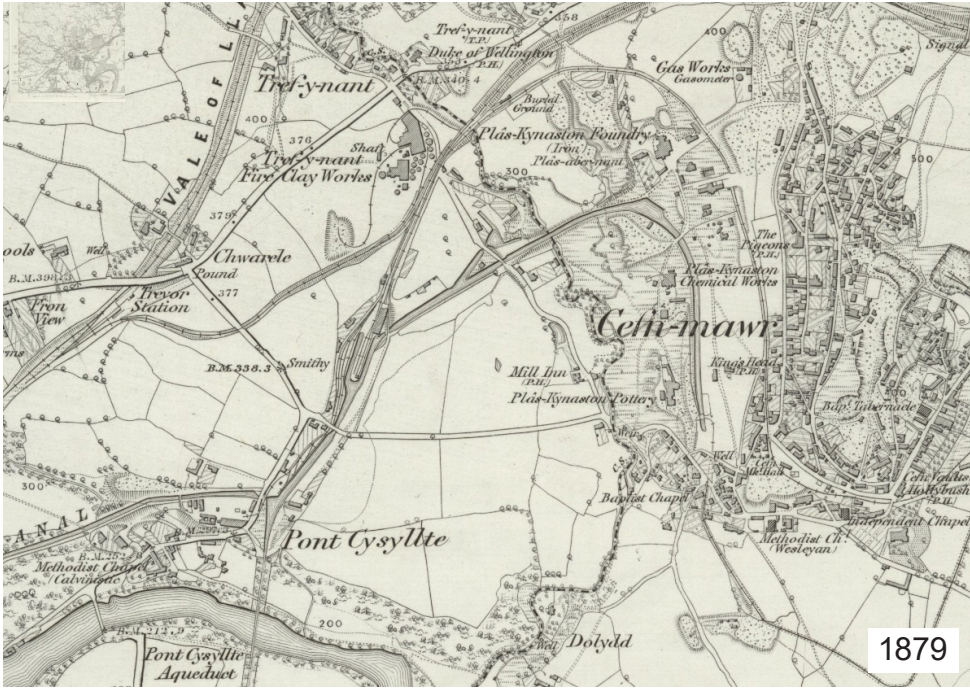


Figure 02-4: Historical Site Maps





Figure 02-5: Historical Photograph of the Flexys Industrial Works



## 2.3 Topography

Topographic surveys of the site show ground levels across the main site generally range from 85.90m Above Ordnance Datum (AOD) to 97.81m AOD. The highest ground levels are in the north-eastern corner of the site with ground levels generally sloping in a south-western direction from the western portion of the site and in a south-eastern direction from the eastern part of the site meeting at the southern part of the site. The lowest ground levels are in the southern part of the site on Queen Street.

The historical industrial use is evident in the site topography, with the building bases remaining insitu creating a series of terraces across the site. A former access road runs under Queen Street.

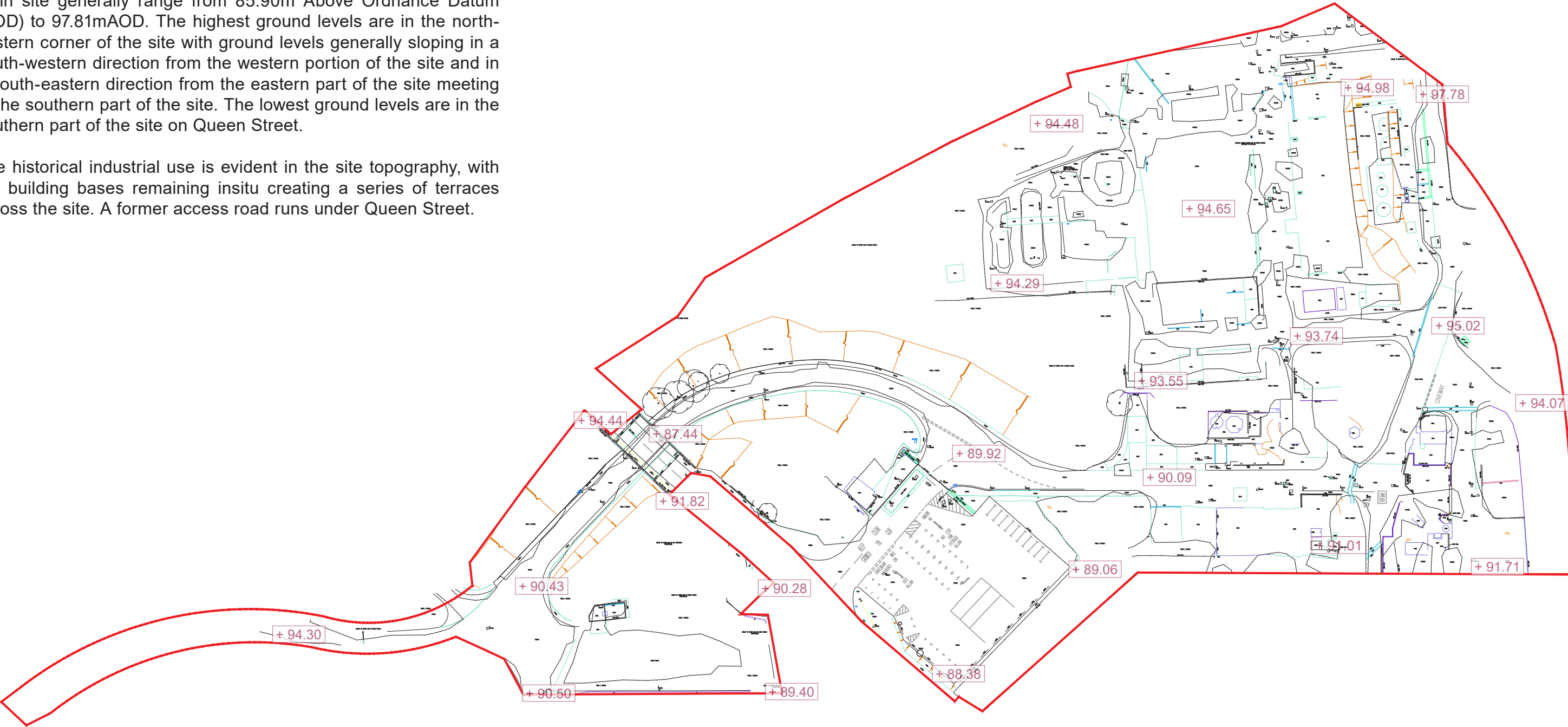


Figure 02-6: Topographic Survey

- KEY**
- + 00.00 Existing levels
  - Study Site Boundary



## 2.4 Flood Risk

The Flood Risk Map in Figure 02-7 is taken from the National Resources Wales website which provides valuable insights into the potential flood hazards in specific regions. This interactive map, , offers a comprehensive overview of flood risk areas throughout the country.

The key findings for the site are:

- Very low risk of Flooding from rivers - Risk less than 0.1% chance each year
- Very low risk from Flooding from the sea - Risk less than 0.1% chance each year
- High risk Flooding from surface water and small watercourses Risk greater than 3.3% chance each year

This area:

- Does not benefit from flood defences
- Has no recorded flooding

This risk level considers the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.

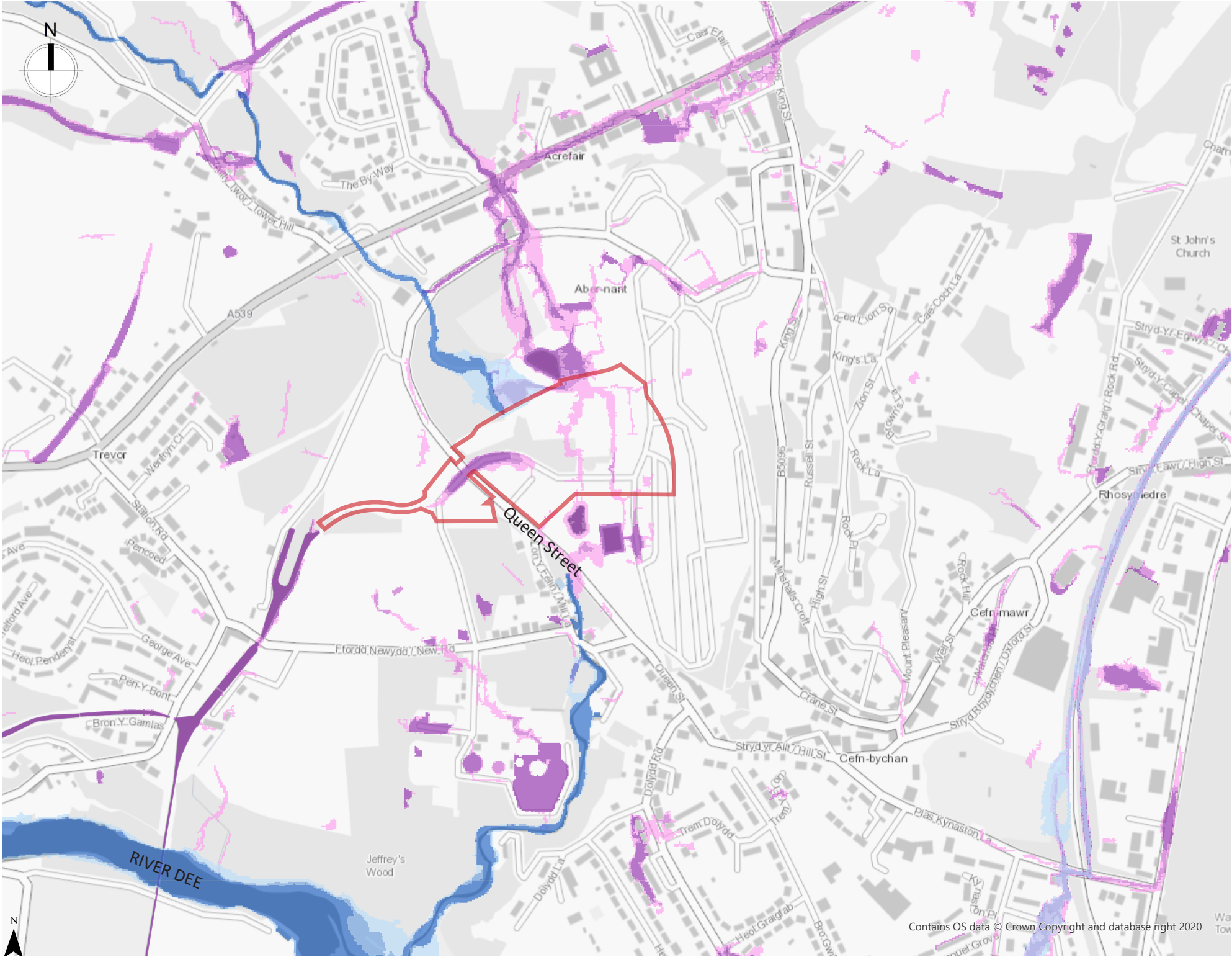
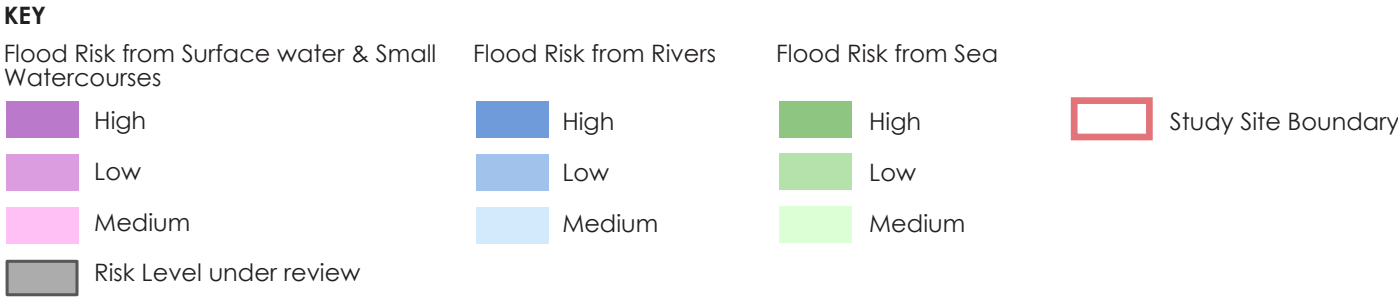


Figure 02-7: Flood Risk Map





## 2.5 Drainage

The site demolition sewer, drains and brooks records dated September 2009 show existing surface water and foul networks within the site. The plans show several assets within the proposed site boundary. These include a number of culverted brooks, foul water sewers, main municipal sewer carrying foul and Syton effluent drain carrying effluent to the waste-water treatment plant situated south of the site. The main municipal sewer also carries foul to the waste-water treatment plant before discharging to the River Dee south of the waste water plant.

The most culverted brook appears to be the Trefynant Brook culvert which flows southwards and crosses the centre of the site north to south. It is unclear how big this culvert is and what the invert levels are along this culverted section.

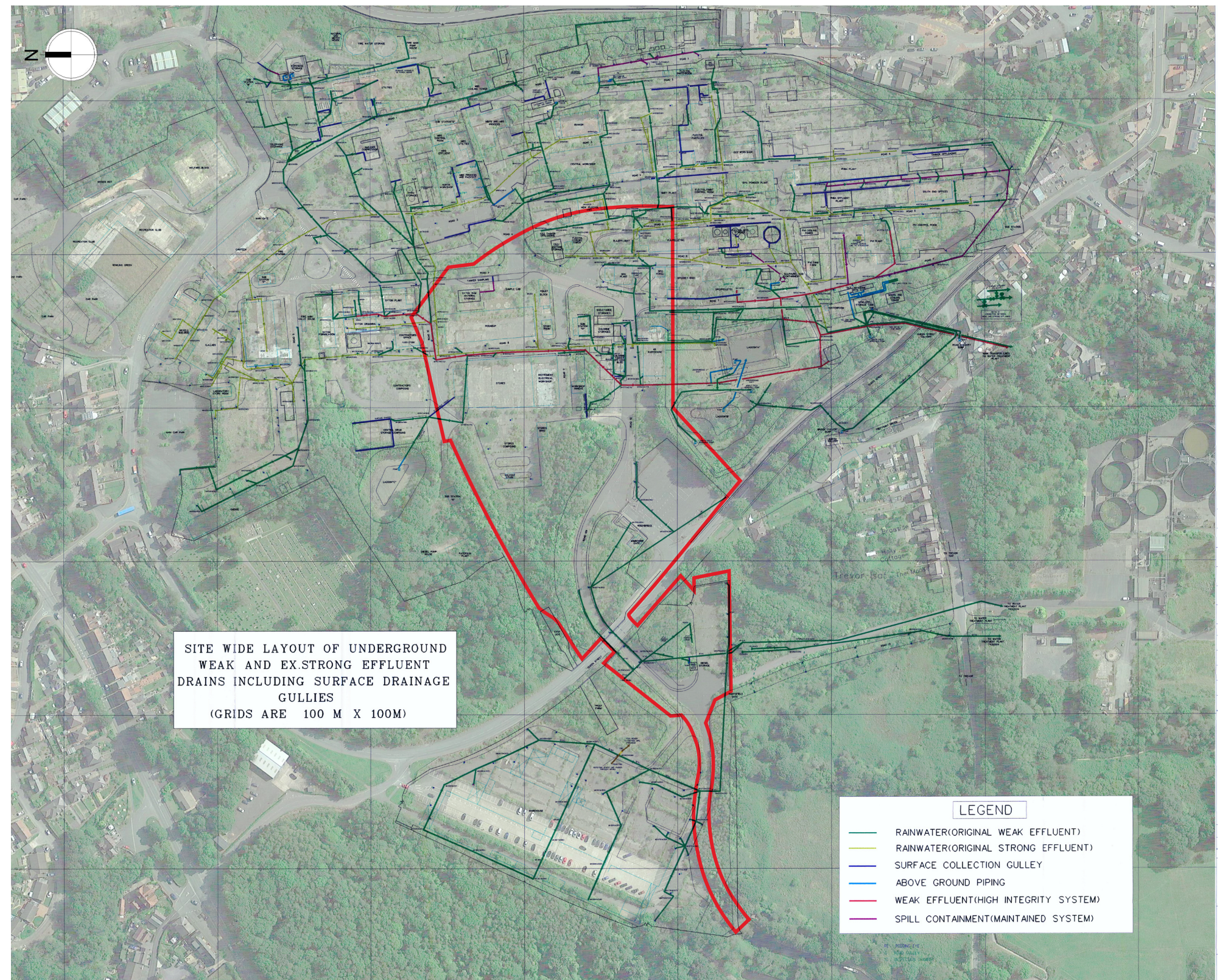


Figure 02-8: Site Utility Plans



## 2.5 Drainage

The sewer records also indicate the presence of other culverts named Huntsfield Gate culvert located in the west of the site and the Old Works Robert Graesser culvert located east of the site. It is however unclear if the Old Works Robert Graesser culvert still stands as it is now shown on the site demolition sewer plan dated September 2009.

The western portion of the site generally slopes in a south-western direction and the eastern part of the site in a south-eastern direction before converging at the low point in the southern part of the site on Queen Street. Therefore, surface water runoff generally appears to runoff into Trefynant Brook and Huntsfield Gate Brook.

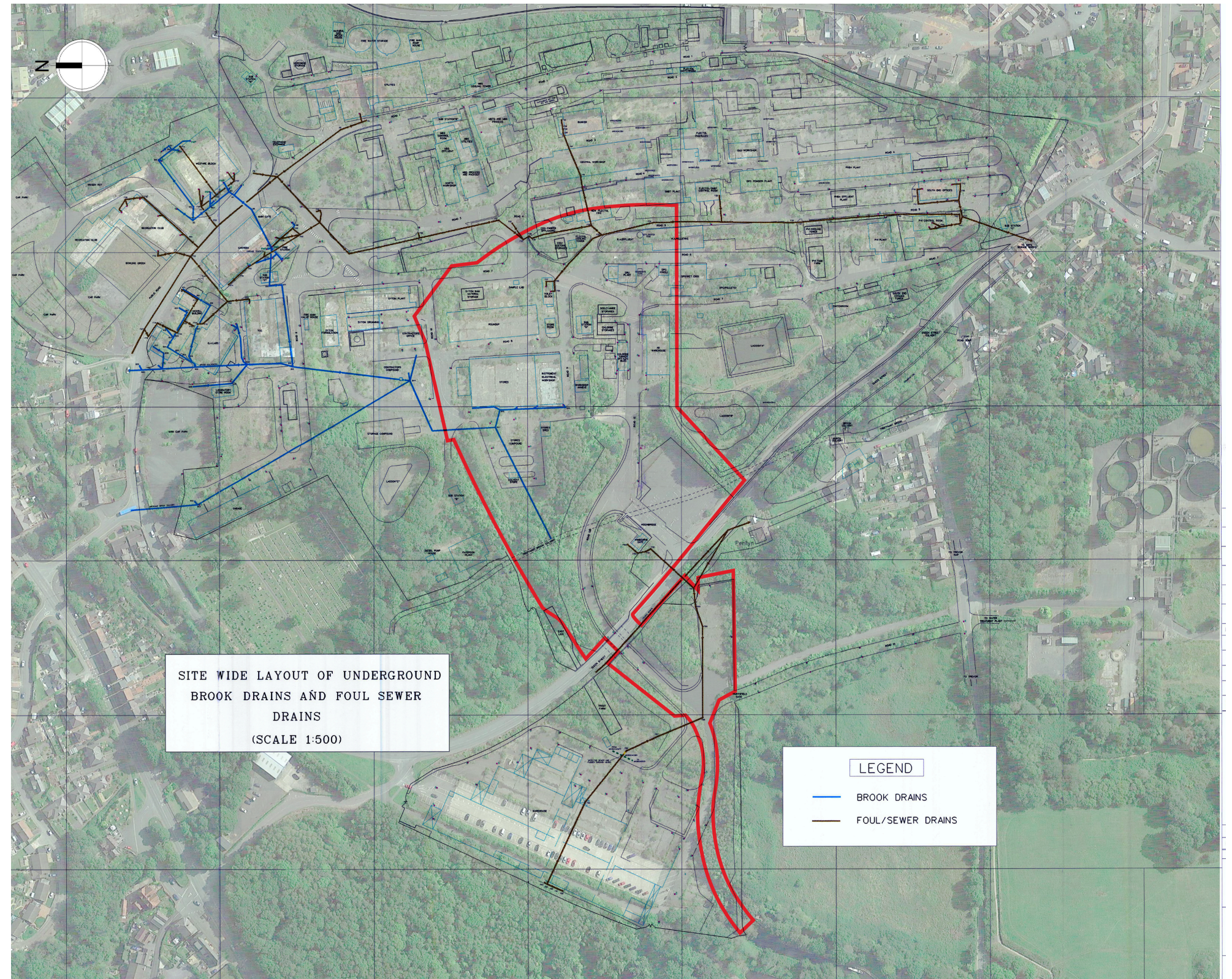


Figure 02-9: Site Utility Plans



## 2.7 Ground Investigation

Based on a review of the British Geological Survey (BGS) bedrock mapping (Figure 02-10), it is clear that the whole site is situated on Pennine Lower Coal Measures Formation And Pennine Middle Coal Measures Formation (Undifferentiated). The Pennine Coal Measures are predominantly grey in colour, nonmarine and characterised by vertically stacked, coarsening-upward cycles commonly up to 15m thick. Each cycle is composed, in upward sequence, of mudstone, siltstone and sandstone and is capped by a seatearth and coal, though coal forms only a minor part of the sequence. Clay ironstone occurs within some of the mudstones. The mapping of the superficial deposits shows that the whole site is overlain by Till, Devensian– Diamicton. Diamicton is a Thrussington member, a sedimentary rock with varying particle sizes.

Given the presence of underlying mudstone and coal, it is presumed that the permeability of the underlying ground on the site is likely to be low.

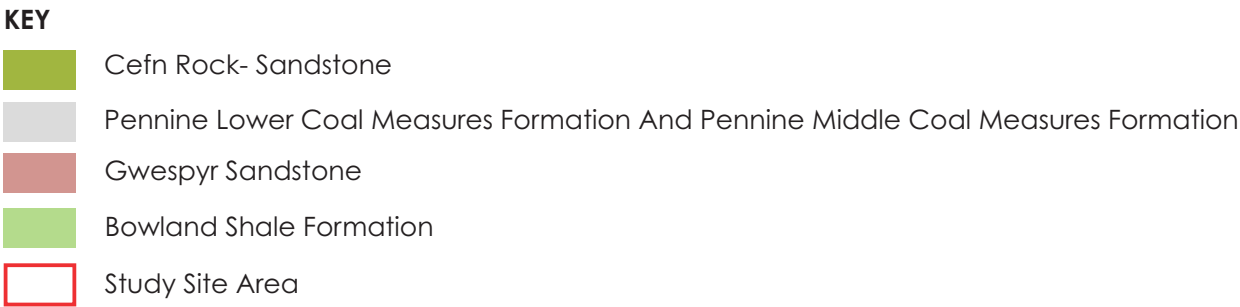
A Phase 1 Geo Environmental Study has been undertaken and presents an assessment of the geo-environmental information for the site based on readily available desktop / published sources and a site reconnaissance walkover survey. The objective of this assessment was to collate and review the available geo-environmental and geotechnical information to inform potential development constraints.

The historical land uses, including a former chemical works, historical coal mining, former car/lorry park, lime kilns, and historical railways, have been identified as potential sources of contamination impacting the soil and/or groundwater.

There are potentially active pollutant linkages between these sources and risks will need to be investigated and further assessed by intrusive site investigation, appropriate sampling, analysis and risk assessment.



Figure 02-10: Bedrock Geology Plans





## 2.6 Ground Investigation

Prior to any redevelopment of the site, intrusive investigations will be undertaken to establish the nature of the ground conditions, identify any instability issues associated with potential shallow voiding / mine entries resulting from historical mining beneath the site, and the backfill of the former canal and brook, and to obtain development-specific geotechnical design parameters.

The investigation strategy should include an “environmental” investigation; designed to establish the status of the identified Source-Pathway-Receptor linkages and thereby reduce uncertainties in the preliminary risk assessment.

There is potential for shallow voiding beneath the site due to historical mine workings within several shallow coal seams. Several untreated mine entries are also recorded on the site. These have been identified on Figure 02-11.

There is also the potential for poor ground conditions due to historic backfilling of canals and brooks previously running through the site. Intrusive ground investigation will be required to determine the near surface and deeper ground conditions.

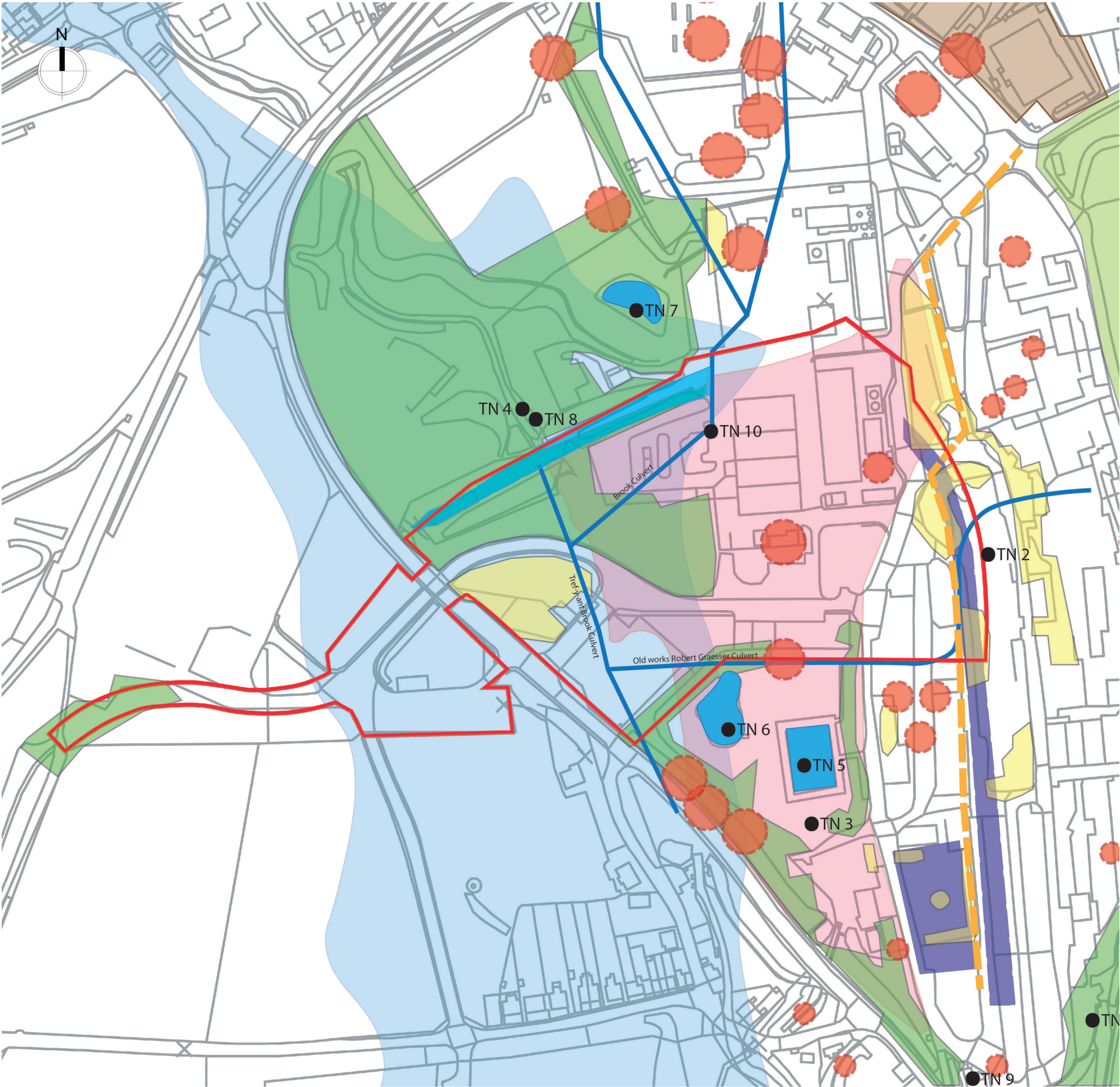
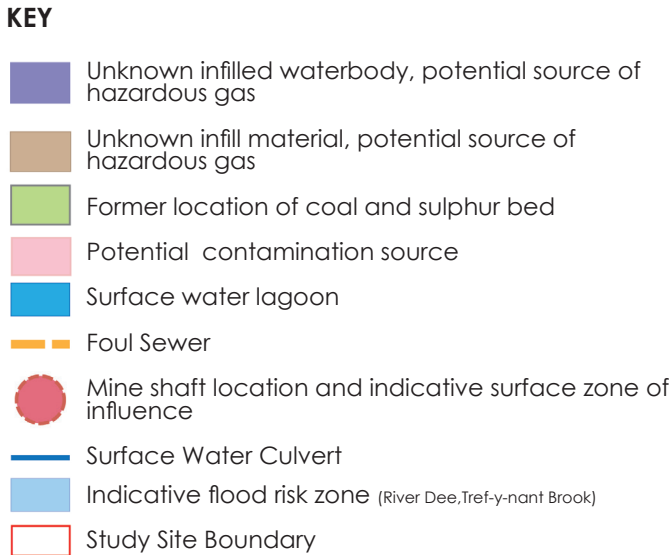


Figure 02-11: Hopspot Plan



## 2.7 Ecology

A desk study and a field survey were undertaken in October and November 2022 to assess and map habitats within the site. An initial assessment was undertaken in the field to determine the potential of on-site habitats to support protected and notable species. The desk study indicated that there are six statutory protected sites (of ecological relevance) within 10km of the site and eight non-statutory) within 2km of the site. There were no areas of Ancient Woodland within 200m of the survey area. River Dee SAC/SSSI is located approximately 500m to the southwest and is hydrologically connected to the site via Tref-y-nant brook.

The site comprises of a large area of former industrial land on a mostly west facing slope. The remainder of the site was occupied by broadleaved semi-natural woodland, mixed species scrub, ruderal and ephemeral land, poor semi-improved grassland, and several scattered trees.

The site contained habitats with the potential to support protected or notable species. Potential ecological constraints may include:

- River Dee SAC/SSSI
- Non-native invasive plant species
- Amphibians, including great crested newts
- Reptiles
- Nesting birds
- Roosting, foraging and commuting bats
- Badgers
- Otter
- Hedgehog

In line with the 25 Year Plan for the Environment (HM Government, 2018) and the Planning Policy Wales (Welsh Government, 2021), new development should identify and pursue opportunities for securing measurable net gains for biodiversity and for the wider environment.

The Environment Act 2021 introduces a mandatory requirement for 10% biodiversity net gain for new development to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. The proposed enhancement and habitat creation will look to achieve this target as a minimum.

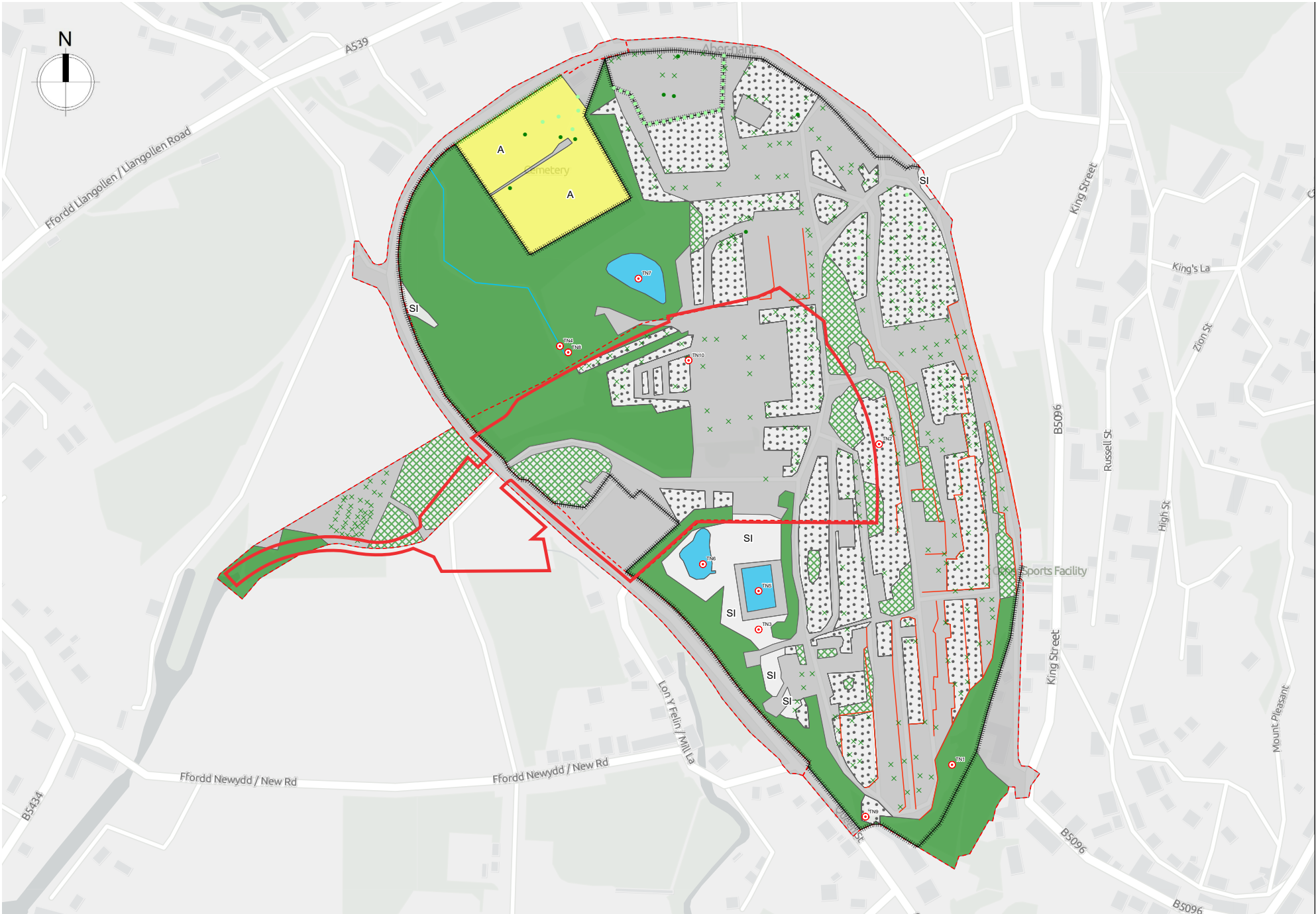


Figure 02-12: Ecology Plan

KEY	
	Site Boundary
	Broadleaved Parkland/Scattered Trees
	Coniferous Parkland/Scattered Trees
	Scrub-Scattered
	Running water
	Hedge with trees - Species(Poor)
	Fence
	Wall
	Broadleaved Woodland-Semi Natural
	Scrub-Dense/Continuous
	Poor semi-improved Grassland
	Standing water
	Amenity Grassland
	Bare Ground
	Other Habitat
	Target notes



## 2.8 Arboriculture

An Arboricultural Survey and Impact Assessment Report in line with British Standard BS 5837: 2012 Trees in relation to design has been undertaken. A total of 50 arboricultural features were recorded within the study area, these were recorded as 15 individual trees (T), 34 groups of trees (G) and one hedgerow (H). A total of 20 different individual tree species were recorded.

One veteran tree (T1) has been identified in the baseline arboricultural survey, an Ash tree, entitling it to protection under the National Planning Policy Framework (NPPF) (2023), and it is retained in the current designs.

The northern part of the site has become overgrown with vegetation, predominantly Silver Birch..  
Wrexham Borough Council has confirmed that none of the surveyed trees are subject to Tree Preservation Orders or Conservation Area restrictions. Additionally, there are no designated ancient woodlands in the study area.

Trees & Groups within the site:

- G3 - Ash, Dog Rose, Goat Willow, Norway Spruce, Silver Birch
- G4 - Silver Birch
- G5 - Silver Birch
- G6 - Ash, Goat Willow, Hawthorn, Oak, Silver Birch, Sycamore, Wild Cherry
- G7 - Goat Willow, Silver Birch
- G8 - Silver Birch
- G9 - Alder, Cherry, Elder, Hawthorn, Silver Birch, Willow
- G19 - Silver Birch
- G20 - Goat Willow, Silver Birch
- G21 - Goat Willow, Silver Birch
- G22 - Goat Willow, Silver Birch
- G23 - Goat Willow, Silver Birch
- G24 - Goat Willow, Silver Birch, Sycamore
- G25 - Goat Willow, Silver Birch
- G26 - Silver Birch
- G27 - Silver Birch
- G28 - Goat Willow, Silver Birch
- G30 - Goat Willow, Oak, Silver Birch
- G31 - Goat Willow, Silver Birch
- G32 - Silver Birch
- G33 - Goat Willow, Silver Birch
- G34 - Silver Birch

- T1 - Ash - Veteran Tree
- T4 - Goat Willow
- T14 - Hawthorn
- T15 - Goat Willow

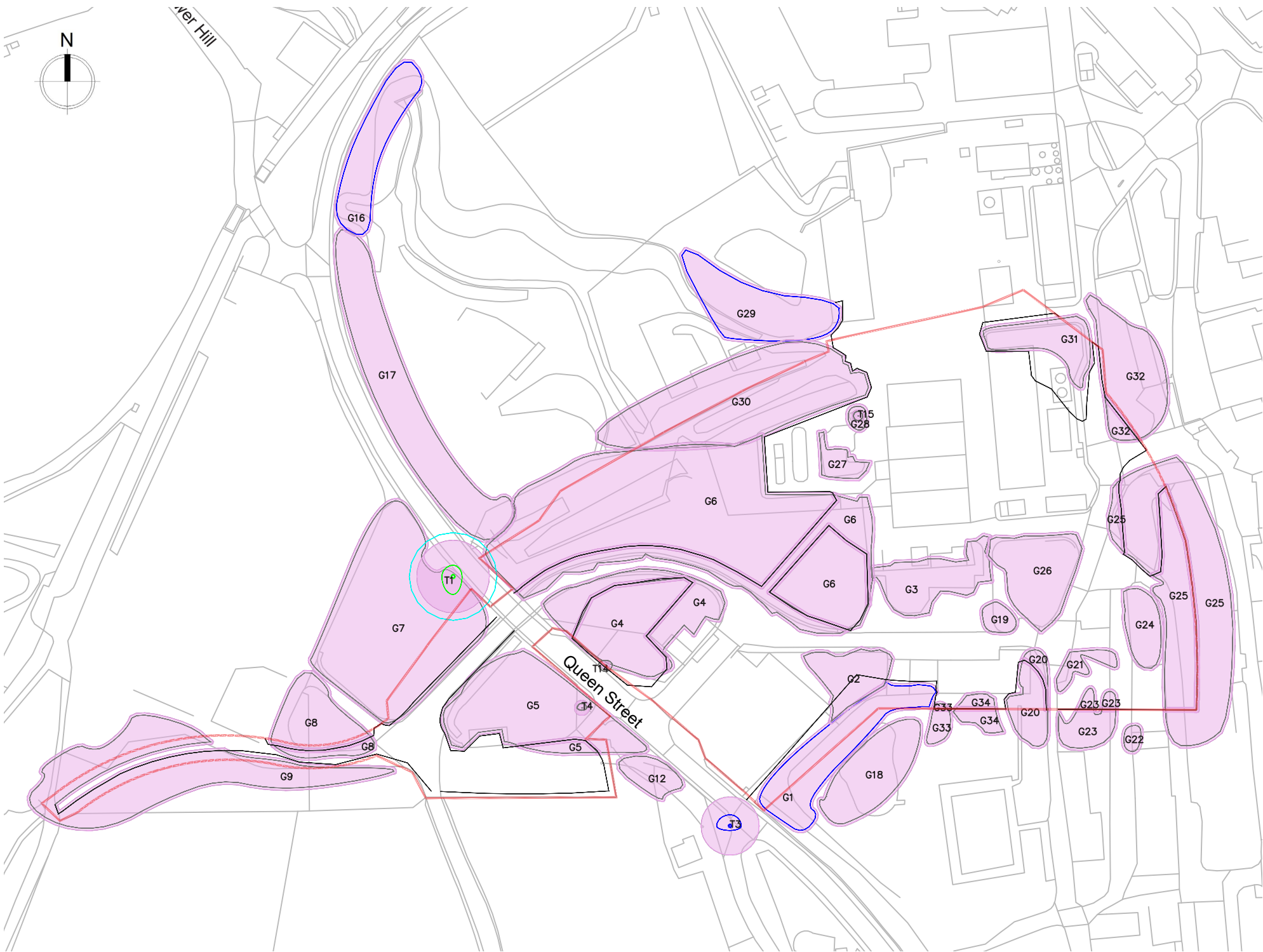


Figure 02-13: Extract from Arboricultural Survey

**KEY**

- Root Protection Area for the Veteran Tree
- Group of Trees
- Individual Tree
- Study Site Area



## 2.9 Land Use

About 65% of the site is comprised of hardstanding and bare ground, featuring terraces, brick walls, asphalt roads, and concrete pads from previous structures. These areas, often adorned with Butterfly-bush and tree saplings. The northern section displays a more sporadic scrubland, while the southern scrub is notably denser. Small pockets of concentrated scrub are dispersed in the south, east, and west regions, including the woodland perimeters.

In the northern part, a disused car park, adorned with ornamental shrubs and trees, has become overgrown with vegetation such as Silver Birch, Cypress, Bindweed (*Convolvulus* sp.), Firethorn (*Pyracantha coccinea*), Wall Cotoneaster (*Cotoneaster horizontalis*), mosses, and Bramble, concealing the original hardstanding. The remaining areas are covered with post demolition debris and fines, with minimal to no exposed soil. It is plausible that the gravel areas, resulting from previous building demolitions, may conceal additional hardstanding, as vegetation is sparse across these areas, with some mixed scrub beginning to regenerate.

The northern part of the site is characterised by scattered scrubland, while the southern part hosts more concentrated scrub, including dense patches around the south, east, and west areas, as well as near the western entrance and along the woodland perimeters. The site currently accommodates an existing small car park, consisting of approximately 3 coach bays and 46 car parking spaces. Access to the former Flexys site beyond (now owned by Solutia UK Ltd) is restricted by a galvanised palisade security fence and gate. To the northeast of the site lies the Cefn (Trefynant) Cemetery which is managed by Cefn Community Council and bounds the site by existing trees.

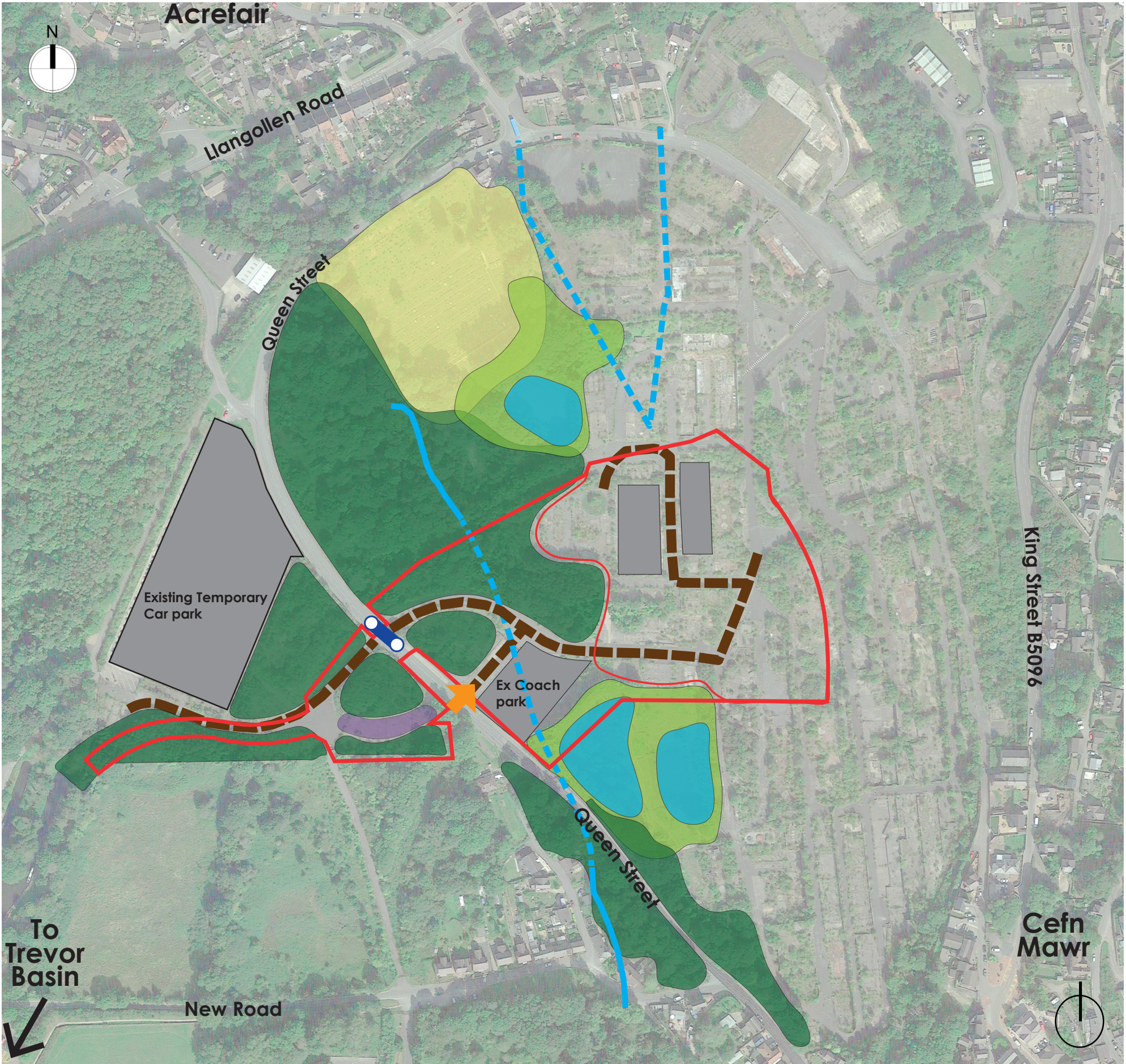


Figure 02-14: Land Use Plan



# 2.10 Landscape Character

## Designations

The project site lies within a number of landscape designations of international and national importance, including the Pontcysyllte Aqueduct World Heritage Site, Bryniau Clwyd a Dyffryn Dyfrdwy Area of Outstanding Natural Beauty (AONB) and Pontcysyllte Aqueduct Conservation Area. The Pontcysyllte Aqueduct and Canal is designated a Scheduled Ancient Monument of National Importance. Ty Mawr Country Park lies a short distant east of the Site.

There are no National Parks, Registered Historic Landscapes or Historic Parks and Gardens within the local area.

## Landscape Character

The following published national and local character assessments have been reviewed to inform the design process:

- National - National Landscape Character Areas (NLCA) published by Natural Resources Wales; and
- Local - Wrexham LANDMAP Supplementary Planning Guidance, Wrexham County Borough Council, 2007

### NATIONAL LANDSCAPE CHARACTER

The site is situated in NLCA 13, Glannau Dyfrdwy a Wrecsam / Deeside and Wrexham and within close proximity to NLCA 15, Bro Llangollen a Dyffryn Dyfrdwy / Vale of Llangollen and Dee Valley. The NLCA provides a comprehensive profile for each area, outlining the key characteristics that contribute to the understanding of the Study Area’s baseline. These characteristics are detailed below:

#### NLCA 13 Glannau Dyfrdwy a Wrecsam / Deeside and Wrexham:

- Lowland, foothills, and levels sloping down to the lower Dee and Dee estuary.
- Dominated by the single large river, the Dee, traversing the area.
- Broad flat floodplain adjacent to the Dee estuary.
- Narrow, incised, wooded tributary valleys, many originating from the west.
- Mixed pasture and some arable land, alongside farm woodland cover.
- Presence of urban settlements.
- Industrial character evident in the landscape.
- Small settlements associated with landed estates and isolated farmsteads.

#### NLCA 15 Bro Llangollen a Dyffryn Dyfrdwy / Vale of Llangollen and Dee Valley:

- A distinctive, deeply cut, meandering valley featuring the River Dee.
- Predominantly tranquil and rural landscape.
- Unique and spectacular limestone rock outcrops, particularly north of Llangollen.

- River morphology characterised by alluvium, gravels, and terraces, creating a gently undulating valley floor and floodplain in certain areas.
- Predominantly poorly drained / seasonally wet soils.
- Ecologically significant river habitats along the River Dee and its various small tributaries.
- Geometric field patterns of small to medium scale, defined by stone walls or hedgerows, with many hedgerow trees, extending up hillsides.
- Woodlands and pastures on valley and hillside, with a densely wooded character in some areas, featuring a mix of coniferous and deciduous plantations. In other places, open valley floor grazing and steep hillside sheep grazing.
- The Llangollen Canal and Pontcysyllte aqueduct, designated as a World Heritage Site.
- Settlement patterns related to historic transport patterns, which, in turn, are linked to the valley and topography. Notable historic and tourist towns, such as Corwen and Llangollen, are situated by the River Dee at historic crossing points.
- An iconic cultural landscape centered around Llangollen.



LOCAL LANDSCAPE CHARACTER

At the local landscape character level, the site falls within two character areas LCA 9d Dee Valley, Froncysyllte to Newbridge and LCA 7b Cefn-mawr. (Wrexham LANDMAP SPG) as per Figure 02-15.

LCA 9d Dee Valley, Froncysyllte to Newbridge

This designation encompasses a small wooded valley extending from Wrexham to Minera. Key characteristics pertinent to the landscape and visual context of the Site, as outlined in the SPG, include:

- An enclosed lowland valley featuring a level floodplain.
- A distinctive blend of farmed and wooded elements, bordered by closely built ‘urban villages’ such as Cefn-mawr, Trevor, and Froncysyllte.
- Exceptional views extending to and from landmarks like the Pontcysyllte Aqueduct, Cefn railway viaduct, and nearby hills.
- A notable man-made embankment that carries the canal to the aqueduct, contributing to the formation of a ‘gateway’ within the valley.
- The SPG emphasizes the sensitivity of LCA 9a to any development that may impact the setting of the Pontcysyllte Aqueduct and the scenic Vale of Llangollen.
- Management guidelines specific to LCA 9d and the Site are summarised as follows:
- Preserve and enhance the scenic and historic landscape character, identifying, maintaining, and enhancing significant views.
- Strengthen tree planting on valley edges while preserving selected views for a visually exciting rural-urban contrast.
- Improve recreational routes linking historic landscape features.
- Manage woodlands to enhance biodiversity, including diversifying woodland structure, restricting grazing, and retaining old/dead trees.
- Expand native woodland types, such as upland mixed ash

- woodland, and replace conifers with broadleaves.
- Safeguard industrial archaeology and earlier prehistoric and medieval heritage, particularly preserving the canal and associated structures.
- Promote understanding and enjoyment of the outstanding historic industrial landscape and setting through existing management strategies for Pontcysyllte, Trefor, and Ty Mawr Country Park.

LCA 7b Cefn-mawr

- The character area LCA 7b Cefn-mawr, is situated on a ridge overlooking the scenic Dee Valley at the entrance to the Vale of Llangollen. Key characteristics contributing to the landscape and visual baseline of the Study Area in this locale include:
- Diverse communities, including the tightly built Cefn-mawr on a ridge, the 1960s housing estate of Plas Madoc, and Acrefair visible from the Llangollen Rd tourist route.
- Scenic views to the south over the Dee Valley towards the Berwyn foothills.
- The presence of unsightly industrial development, particularly noticeable in views from the southwest.

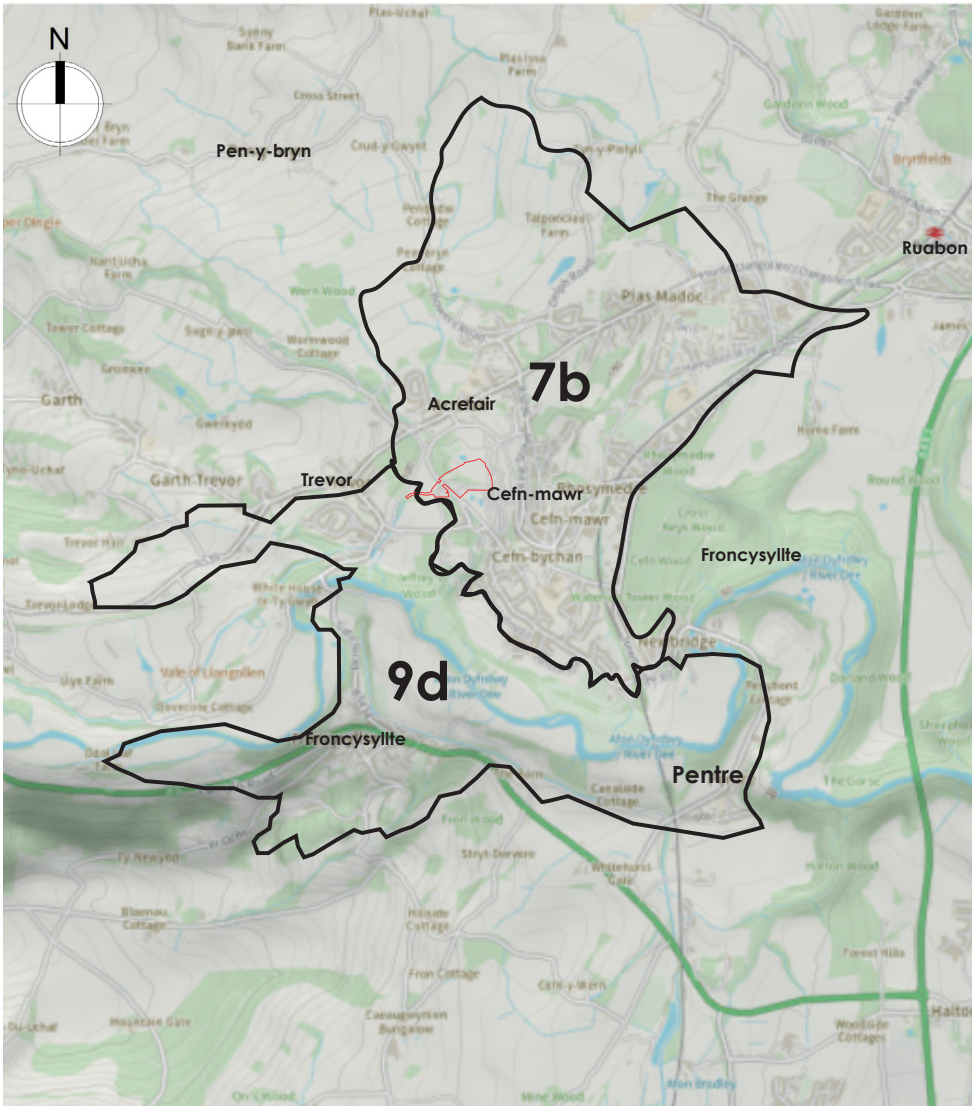


Figure 02-15: Landscape Character Map

KEY

Study site Location

Landscape Character Area



## 2.11 Site Photos

The following photographs provide a visual narrative of the site, capturing the dynamic interplay between existing former industrial infrastructure and the evolving landscape of the development area.

These images offer a perspective on the intricate relationships between human activity and nature. The industrial elements stand as a testament to the site's history and existing land use, showcasing the tangible imprint of prior endeavours.

This collection is a representative documentation of the complex interactions shaping the site, illustrating the delicate balance between progress, sustainability, and the preservation of natural elements.



1. View from the Queen Street looking south west along the current underpass road. To the left and right of the road is self seeded and emergent trees and woodland.



2. View from the existing underpass road looking south west towards the Queen Street Bridge



3. View west along the existing private road which links to the existing Car Park

Figure 02-16: Site Photograph Location Plan





4. View east from within the existing site boundary fence along the existing road linking to the underpass of the Queen Street Bridge.



7. View west from within the centre of the site. Concrete foundations at base level, with Buddleja growing within gaps.



10. View north showing existing brick retaining wall and concrete building foundations



5. Remnant of the former industrial use. Existing reinforced concrete slabs and retaining walls



8. View west from within the centre of the site. Concrete foundations at base level, with Buddleja growing within gaps.



11. View west along the existing internal road network. Existing block paving offers potential for reuse.



6. View from the existing access road looking north. To the right an existing brick retaining wall



9. View north west from inside the site boundary.



12. View east from an elevated viewpoint looking down on the remnant building foundations



## 2.12 Opportunities & Constraints

Figure 02-17 shows a summary for the site that identifies the potential advantages (opportunities) and limitations (constraints) inherent in the location, guiding the strategic decisions and planning for the project;

- 1 Improvements to access road.
  - a. Improved street scene.
  - b. Boundary improvements.
  - c. Enhancement to existing hedgerows.
  - d. Replace existing unsightly security fencing.
2. New pedestrian and cycle link on route of former historical route.
  - a. New high quality secure fencing.
  - b. Heritage interpretation.
  - c. Key views into rewilded areas.
3. Rewilded area - restricted access.
  - a. Retention of mature trees.
  - b. Protection of/improvement to existing habitats and their settings for enhanced biodiversity.
  - c. Planting designed to create new views in and out of site.
  - d. Controlled management of plant species.
4. New 'woodland' setting car parking and coach park.
  - a. Re-use of existing materials and areas of hard stand where stable and appropriate.
  - b. Tree planting for canopy shade, creation of views and reduction of visual impact on designated landscapes.
  - c. Potential use of permeable paving and SuDS.
  - d. Improved visual impact from AONB and WHS.
5. Re-use of existing materials and areas of hard stand where stable and appropriate.
  - a. Potential use of permeable paving and SuDS.
  - b. Improved visual impact from AONB and WHS.
6. Temporary landscape (future phase visitor centre).
  - a. Improved pedestrian and cycle access - main route to WHS.
  - b. Improved connectivity - potential pedestrian link to existing car park ('Gateway/Nodal area').
  - c. Location for potential welcome pod or kiosk.

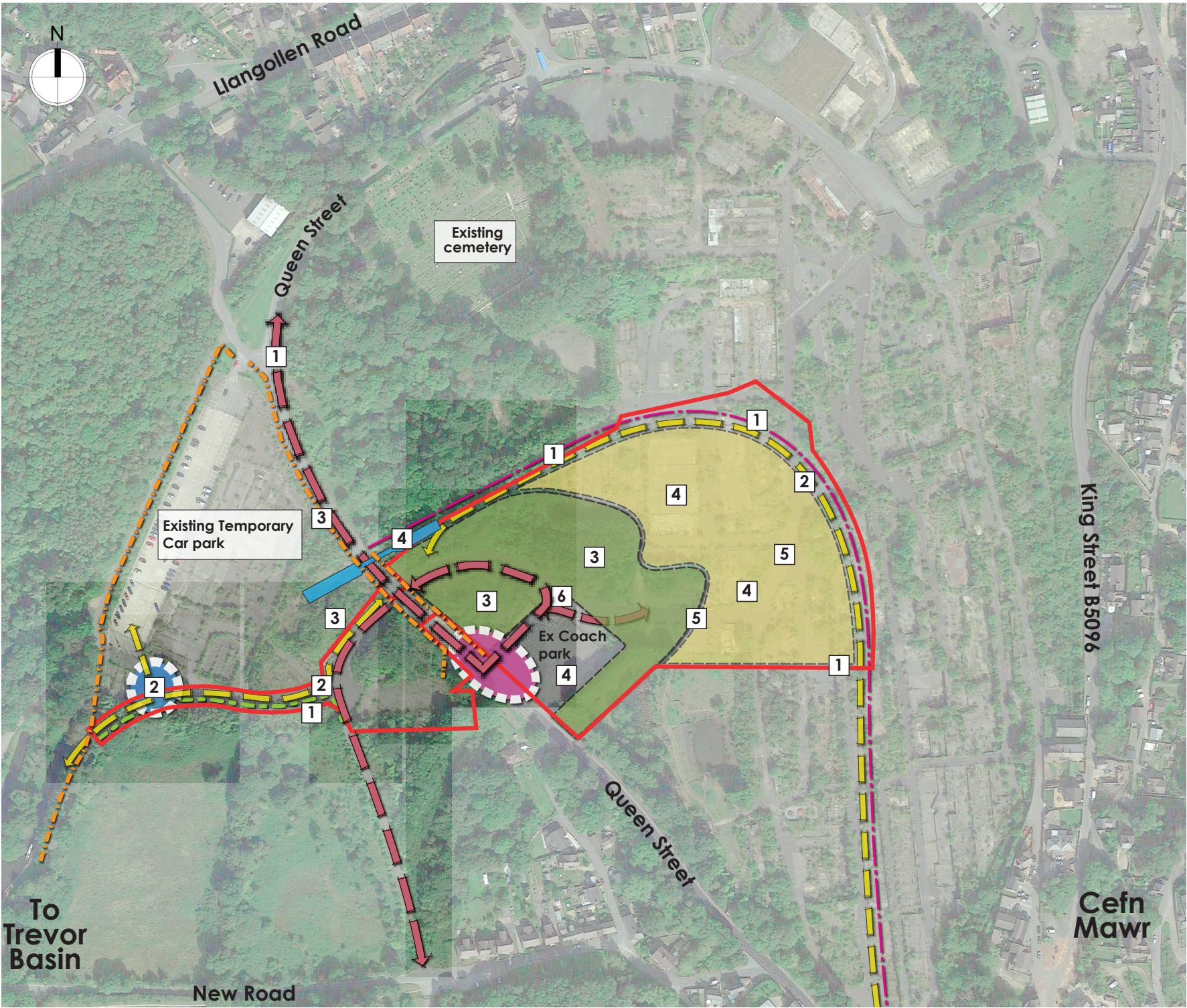
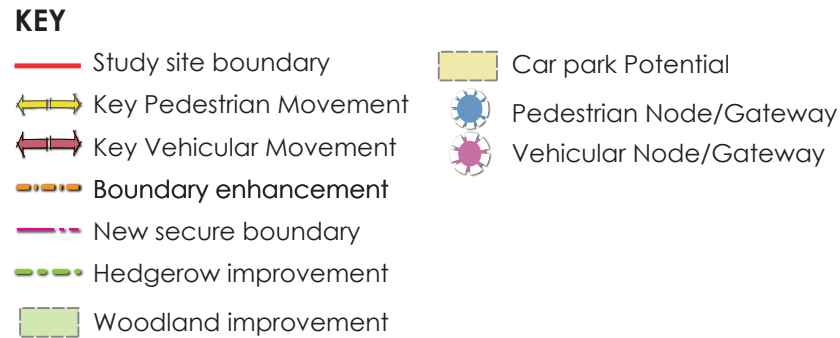


Figure 02-17: Initial Opportunities Map





## 2.13 Landownership

Figure 02-18 shows the current land in the ownership of Solutia and Wrexham Bouough Council. It is anticipated that ownership of the site is to be transferred to Wrexham Borough Council, with the infrastructure becoming a council asset. This will result in the Council becoming ultimately responsible for the car park and its management and maintenance.

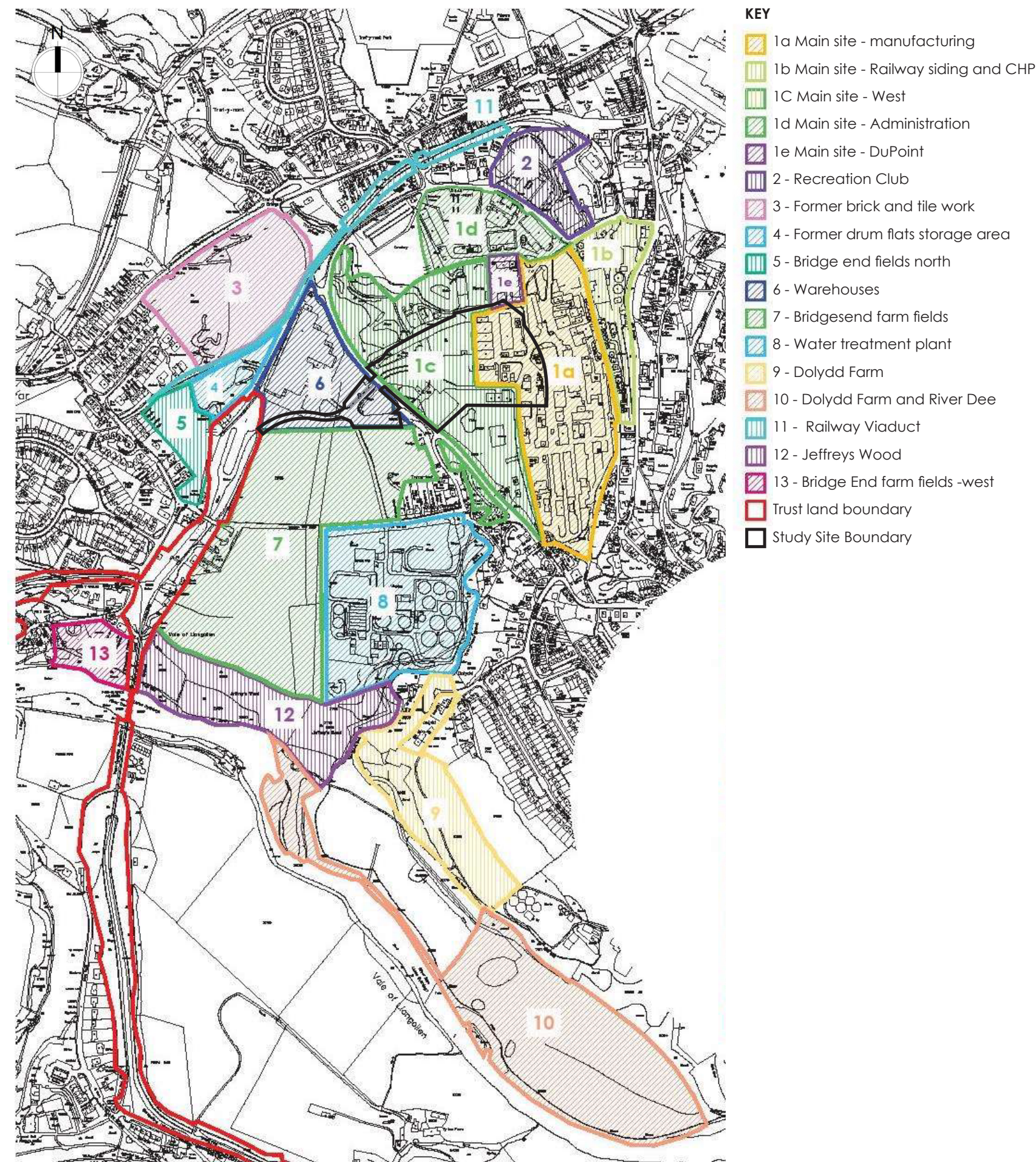


Figure 02-18: Land Ownership Plan



## 2.14 Current Car Parking Provision

There are currently three car parks within the vicinity as summarised below and show in Figure 02-19.

### 1 - Main Car Park accessed off Tower Hill

This car park is on the site of a former industrial unit and utilises the concrete foundation as its base. It is operated by the Canal & River Trust. It has capacity for 99 cars of which 6 are for disability access (Blue Badge Holders). There is a large turning head at the southern section of the site that allows for drop off by Coaches.

### 2 - Queen Street Car Park

This car park is surfaced in Asphalt and has capacity for 46 cars and 3 Coaches

### 3 - Pontycysyllte Aqueduct Blue Badge Car Park accessed off New Road

This car park is accessed off New Road and is only available for Blue Badge and Permit holders. It has capacity for 16 disability access bays and 16 permit holders bays.

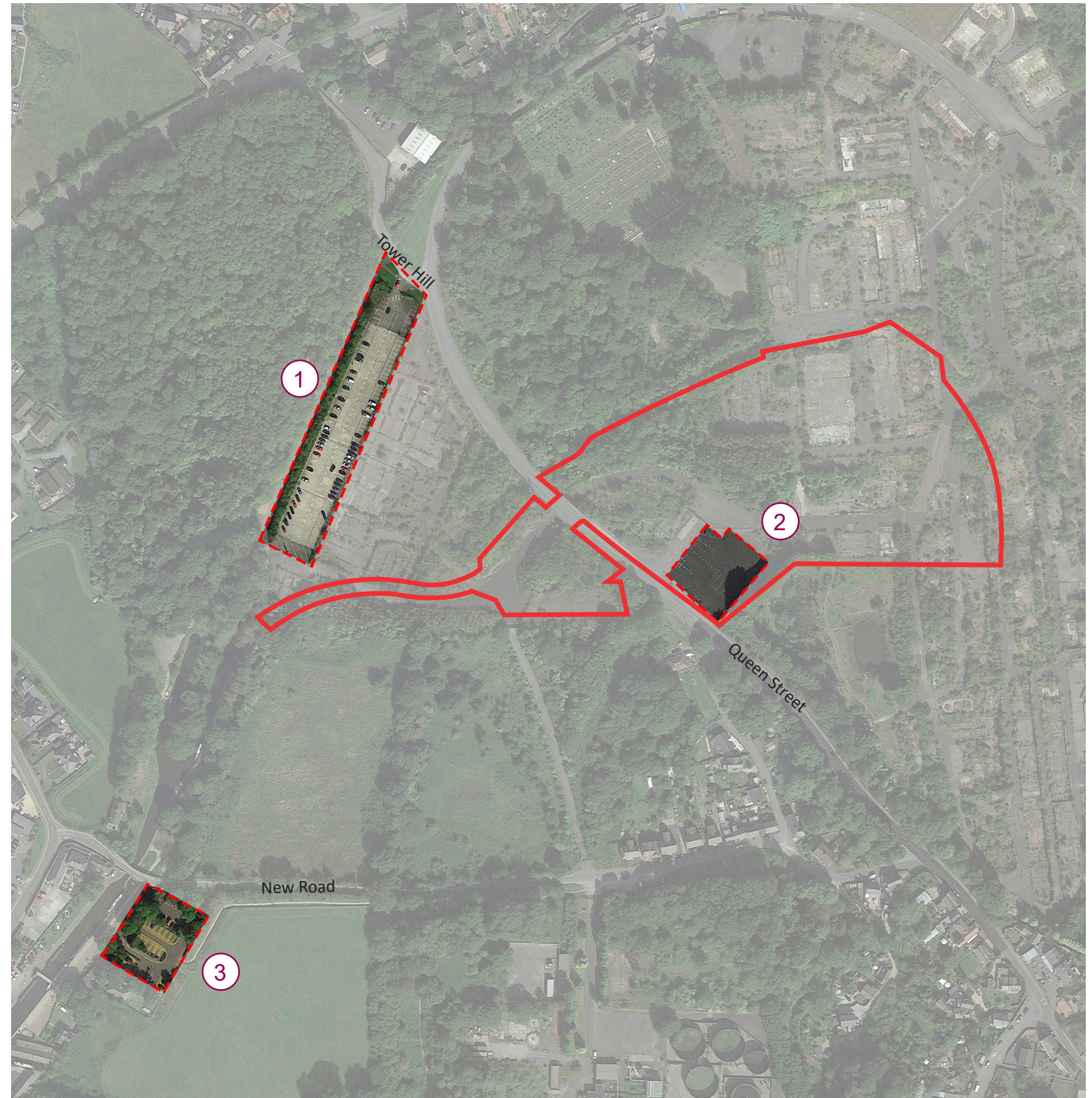


Figure 02-19: Car Parking Provision



2.14 Car Parking Provision



Figure 02-20: Current Main Car Park looking south from Tower Hill entrance



Figure 02-21: Current Main Car Park looking north from the southern section of the site



Figure 02-22: Queen Street Car Park looking east from the entrance.



Figure 02-23: Pontycysyllte Aqueduct Blue Badge Car Park accessed off New Road







03

Vision



# 3.1 Design Approach

## Vision Statement

The project will seek to construct an efficient arrival point which will include designated car, coach, and cycle parking areas, purposeful pathways for both vehicles and active travel, and a recreational walking and cycle route to the Pontcysyllte Aqueduct via the Trevor Basin. This will be undertaken by preserving the natural environment, with enhancements like woodland planting and amenity green spaces, clear signage, effective wayfinding, drainage ponds, and additional fencing. To support this, the project will work within the following framework vision:



### Aim: Safeguard the World Heritage Site

Ensure long-term sustainable access, to aid the generation of income and allow for reinvestment in maintenance and management, improve physical and non-physical accessibility elevate the quality of land use and views in and out.



### Aim: Balance needs of community, residents and visitor numbers

The project to be designed around the needs of the local community to provide additional amenities that improve the quality of life for residents of Trevor and Cefn Mawr and address current parking issues in Trevor.



### Aim: Maximise Economic & Community Benefits

Maximise economic and community benefits by creating a sustainable project that enhances the heritage experience. This project to be a catalyst for positive change, ensuring lasting benefits for residents, businesses, and visitors.



### Aim: Enhance visitor attractions & dwell time

Improving visitor management through parking, wayfinding and the breadth of activities and destinations, to enhance the visitor experience and increasing dwell time and visitor spend.



### Aim Improve Accessibility

Improved access to the WHS site through an enhanced public realm, footways and car parking.



### Aim: Realistic options for brownfield regeneration / minimise brownfield maintenance.

Providing sympathetic development, improving access and minimising visual impact, with limited remedial works.



### Aim: Enhance the health & wellbeing of community & visitors

Spread of new and existing visitors along the Llangollen Canal towpath, across the Pontcysyllte Aqueduct, and within the network of paths in and around the masterplan area, supporting the physical and mental health of those who use them. The woodland activity and education centre will offer opportunities to educate visitors (both adults and children) about biodiversity and sustainability issues



## 3.1 Design Approach

### Fundamental Principles

The foundation of the Landscape and Public Realm Design is anchored in a set of fundamental principles. The design team has endeavoured to craft a thoughtfully designed proposal that engages with both the qualities of the site and the broader context beyond its boundaries.

The design must take into account the existing landscape character, strategically placing new access points and parking facilities within a well-defined network of routes, bolstered by a robust landscape framework. A key guiding principle is to minimise hard surfaces, to help promote permeable and sustainable drainage solutions (SUDS). These proposals will be intricately tailored to respond to pivotal local assets, making a constructive contribution to the distinctive character and positive features of the surrounding area. The result is a design that not only respects the site's inherent attributes but also enhances its integration within the broader context, reflecting a commitment to both aesthetic and environmental considerations.

- Public Realm is to be well connected and legible to enable people move around easily by walking and cycling.
- Green infrastructure will be at the core of the public realm and is fundamental to the success of the layout.
- Sustainable design, attenuation ponds, trees and other greenery are to be incorporated into the infrastructure, to soften the appearance, aid legibility, enhance the ecological value, aid flood management and contribute to sustainable drainage and air quality.
- A coherent palette of good quality materials and design features is to be used in the public realm, visually knitting the fabric together to contribute to a strong sense of place.
- High quality distinctive design, taking opportunities to integrate bespoke features, enhancing local character and wayfinding. The form of the landscape will take reference to the rich social character and heritage.
- The Public Realm will be constructed using sustainable materials and methods, and to allow for ease of future management and maintenance.
- A site wide planting strategy that enables ecology and wildness to establish, balanced with recreation, social and spaces for visitors, users and local residents.
- Car Parking Arrangement is in keeping with the aesthetic setting and ensures an efficient and robust arrangement.
- Access routes to the existing treatments works will be retained and integrated into the proposed layout.

### Green & Blue Infrastructure

The project will transform the brownfield site with a focus on the natural environment. A network of green infrastructure space runs through the layout and is an essential component of the overall vision. Strategic interventions at the localised scale will include new attenuation features, retained and enhanced tree planting and the use of wildflower meadows where space allows. These elements provide positive gains for natural capital, whilst the green infrastructure will be multifunctional, with roles in enhancing the appearance of, improving air quality, delivering biodiversity benefits, providing shade and cooling, and creating a space for people to enjoy. The surface water run-off is managed in a positive way that enhances water quality, amenity and biodiversity.

The project will support:

- Green infrastructure including trees, other planting and relevant sustainable urban drainage solutions.
- The public realm design recognises the importance of trees in promoting the character of place and environmental quality.
- Sustainable Urban Drainage Systems along the movement network forms part of the active strategy. Accommodated where feasible around existing services, are designed to concentrate and convey storm water runoff while removing debris and pollution and are also beneficial in recharging groundwater.
- Planting will be low maintenance, with a bias towards native species and nectar rich plants.

The attenuation features are to be vegetated, with gentle slopes to safely maximise the time the water spends in them. The growing media acts as a filter which aids the collection and removal of pollutants, silt, and debris. They will capture and treat storm water runoff before releasing it to the underground attenuation and back into the wider network at a controlled rate.

### The Landscape Structure

The green space network will provide opportunities for formal and informal recreation linking the car park to the wider tourist destination. The landscape structure is designed to be high quality, robust and adaptable over time so that it will remain fit for purpose and will be managed and maintained for continual use.

The Landscape Structure will work within the following framework:

- To provide a high quality, well maintained and attractive landscape setting for the project and local community, for the long-term benefit.
- To establish and maintain species-rich wildflowers to increase wildlife habitat.
- To enhance public awareness and appreciation of the habitats and associated flora and fauna of the site.
- To comply with legal obligations and constraints and demonstrate use of best practice.
- To ensure all planting is suitably cared for to enable its successful establishment, to maintain healthy growth and attractive form.
- To ensure that hard surfaces and street furniture are maintained in a safe, debris-free state to facilitate all year-round use.



## 3.1 Design Approach

### Inclusive Design

Inclusive design means making places attractive and accessible to all. It encapsulates more than physical infrastructure. It should also be considered as part of a process to encourage community involvement and participation.

The Project is committed to inclusive design in removing barriers to movement for people with impaired mobility and for pedestrians generally.

The public realm design will create a safe environments which will encourage people to use outdoor facilities and will provide appropriate seating and lighting, level access and features to help people find their way around.

The design of the public realm prioritises inclusivity in adherence to UK standards, notably quoting relevant guidance to ensure accessibility for all. Proposed levels aim to maintain shallower gradients than the 1:21 ratio recommended by UK standards. An exception is noted in the existing underpass beneath the Queens Street bridge, where a section at 1:16 is present. It is acknowledged that this existing slope does not fully align with current best practices for gradients. The decision to retain the current slope is rooted in the preservation of the existing Industrial Infrastructure, acknowledging constraints imposed by the available space and the context of the existing bridge, including considerations related to parapet clearance. This approach is aligned with the commitment to creating an inclusive public realm while addressing specific challenges posed by the site's historical and infrastructural context.

Relevant Guidance:

- *The Equality Act 2010*, which outlines legal obligations to make reasonable adjustments for disabled people, ensuring they have equal access to services and facilities.
- *Part M of the Building Regulations* pertains to access to and use of buildings. It focuses on ensuring that buildings are accessible to all.
- *BS 8300 Design of an Accessible and Inclusive Built Environment*, Covering outdoor spaces, parking areas, and other external features to make them accessible to all.
- *Guidance on the Use of Tactile Paving and Inclusive Mobility* Department of Transport.



Figure 03-1: Accessible Routes within a Woodland Character



## 3.1 Design Approach

### Safety and Security

The project is designed to be well connected, continuous with high levels of natural surveillance.

Public realm will be lit to appropriate levels to encourage safe and proper use of the space. Street furniture is selected to reflect the industrial heritage and character and constructed from durable, robust materials.

Design prioritises the needs of pedestrians and cyclists within the setting, whilst facilitating appropriate traffic movement. Designs have been developed in accordance with best practice.

Relevant Guidance:

- *Wrexham Borough Council Local Planning Guidance Note 24 Designing Out Crime* - Measures aimed at enhancing public safety extend well beyond the functions of land use planning. The approach taken to designing out crime is, therefore:
  - a. comprehensive - design must be considered in conjunction with other security measures (e.g. CCTV, locks, Night Safe registration, etc.) and informal policing by the community; and
  - b. collaborative – extending responsibility for safety to all interested organisations (e.g. North Wales Police, house builders, etc.) and residents will promote a sense of ownership and pride.
- *Secure by Design*
- *Manual for Streets* (DfT, 2007).
- *Manual for Streets 2* (DfT, 2011).



Figure 03-2: *Parking with integrated green infrastructure*

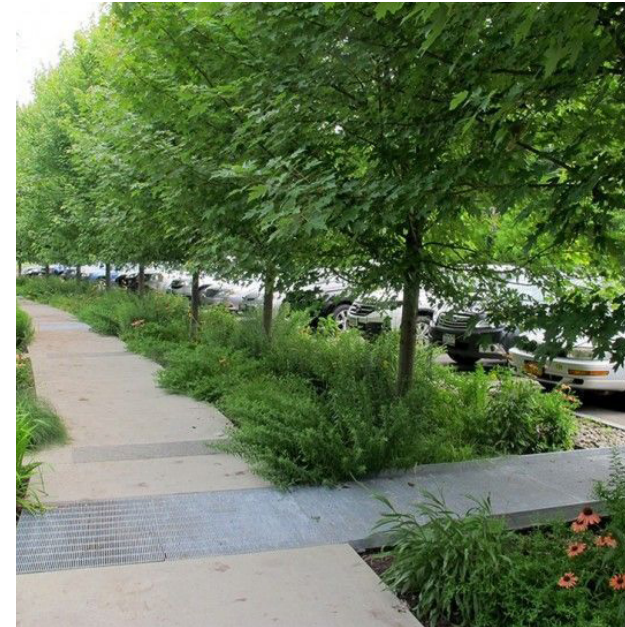


Figure 03-3: *SuDS and planting features within parking areas*



Figure 03-4: *SuDS and drainage*







04

Design



## 4.1 - Masterplan Concept

The Masterplan proposed a distinctive linear approach, emphasising efficiency and a modern aesthetic. This design diverges from the contours of the existing landscape, adopting a more structured and organized layout for the car park. The linear approach aimed to maximise space utilisation and create a visually striking and contemporary parking facility.

The design for the car park and access encompasses a linear car parking with tree-lined edges. The entrance to the site is aligned to the existing site entrance with Coach parking adjacent on the location of the existing car park. A pedestrian link follows the old canal line along the site's perimeter, which will connect and provide an access route to the village of Cefyn Mawr. Access to the Trevor Basin from the main car park runs along the existing internal road network running underneath the Queens Street bridge. A Multi-Use Welcome Hub/Event Space serves as a combined visitor center, community resource, and event venue is positioned off this access route with a plaza and entrance space. Additionally, the design considers the proximity to potential Glamping/Camping Sites in fields east of Trevor Basin.

A detailed topographic survey and the information provided in Section 2 was not available to inform the layout at the initial concept masterplan stage.



Figure 04-1: Trevor Basin and Surrounding Area Masterplan - Car Park Initial stage Sketch Design



## 4.2 - Concept Development

Figure 04-2 illustrates the initial design concept, developed through the systematic site analysis outlined in Section 2. Working on the opportunities and constraints identified, The this holistic bubble approach incorporates the following eight key elements:

1. Approach: Seizing the opportunity to enhance the site's approach by upgrading pavements, roads, and boundaries.
2. Arrival: Creating a memorable impression upon arrival with an improved "Gateway" featuring a setback of fence lines to facilitate street-side tree planting.
3. Welcome and Wayfinding Features: Installing welcoming signage with clear wayfinding instructions to guide visitors to parking areas and onward movement toward the World Heritage Site.
4. Woodland Parking: Designing car and coach parking within a landscaped woodland setting, incorporating a robust tree canopy for shading and view screening. The parking spaces will integrate greenery, Sustainable Urban Drainage System (SUDS) drainage, and electric charging points. The organic layout will seamlessly blend with the landscape, supported by tree canopy coverage for effective screening. Consideration will be given to planting that softens views into the coach park from the entrance.
5. Recreation and Connection: Establishing a new recreational shared foot and cycle path along the route of the former canal, connecting to the nearby community of Cefn-mawr.
6. Confluence/Nodal Points: Designating meeting points for multi-modal routes and creating orientation points for signage and wayfinding.
7. Dwell: Providing a meeting point or dwell space with seating and opportunities for public art and interpretation.
8. Green Infrastructure: Implementing structured planting for screening and softening of views, protecting habitats and biodiversity areas, and introducing temporary planting to precede further phased works.

Based on the above assessment two detail design options were developed using a contrasting approach and are outlined on the following pages.

From the initial concept design, two options were developed while retaining the identified spatial arrangement. These alternatives underwent detailed exploration to assess their impacts on layout and functionality. The dual approach facilitated a comprehensive examination of design considerations, including aesthetics, usability, and efficiency. Presenting two options aimed to provide a well-informed foundation for decision-making, aligning the chosen solution with project objectives and spatial requirements.

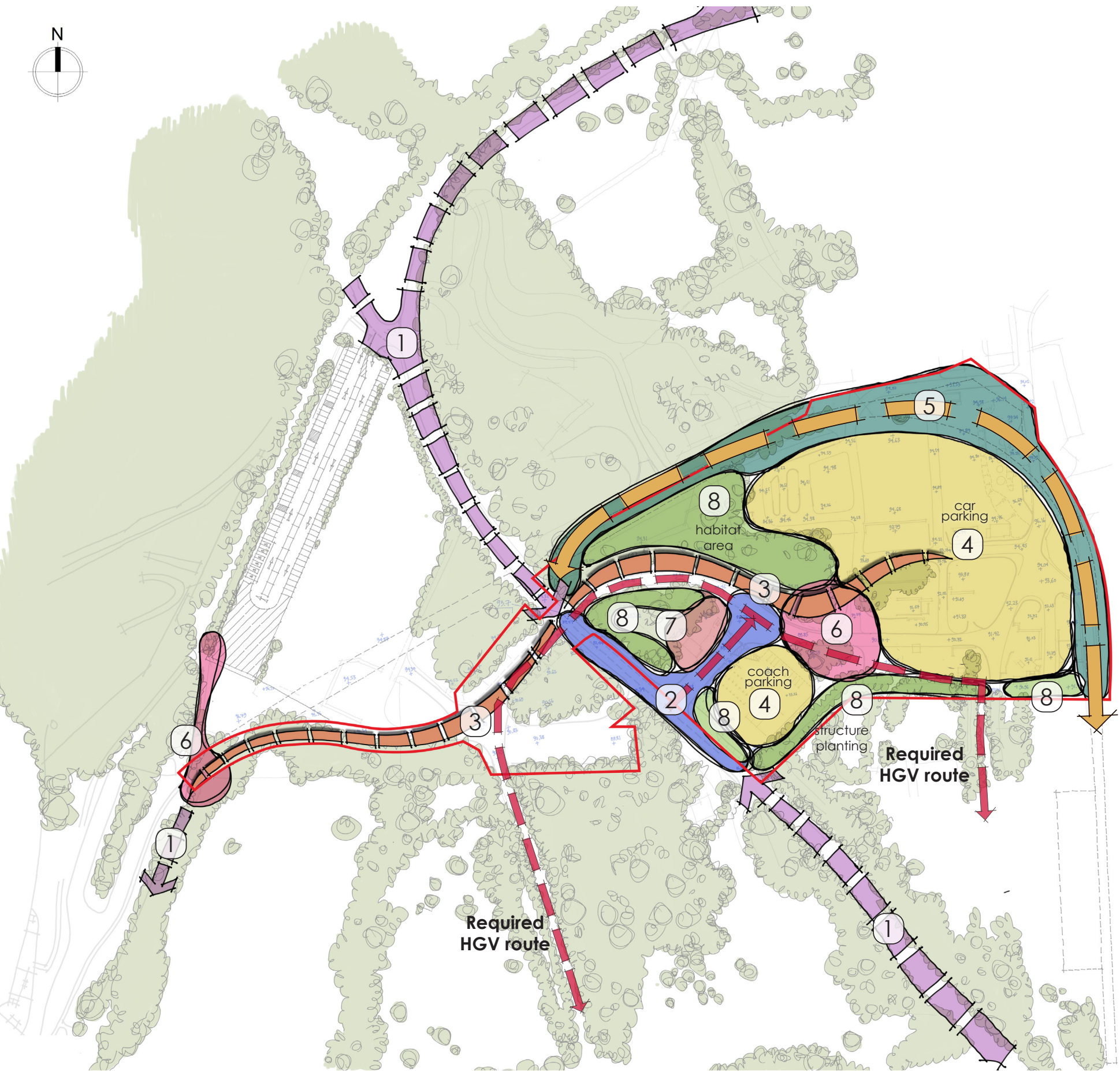


Figure 04-2: Car Park and Arrival Concept Design Plan



# 4.3 Design Option 1

## Concept 1: Existing Levels Integration

The design approach focuses on seamlessly integrating the new car park within the existing topography and levels of the site. This concept capitalises on the natural contours of the land and the terraces of the former building foundations, minimising the need for extensive earthworks and alterations. By aligning with the existing levels, the car park becomes a harmonious extension of the landscape. Key Features:

- Main Entrance: Access to the site is served via the existing vehicular access point onto Queen Street.
- Preservation of Natural Grading: Concept 1 prioritises the preservation of the site's natural grading, avoiding unnecessary disruption to the terrain. This will give topographic interest whilst not only enhances the aesthetics of the car park but also reduces reducing the environmental impact.
- Minimised Earthworks: The concept minimises the need for extensive earth-moving activities, resulting in cost-effective construction and a faster implementation timeline.
- Visual Integration: The car park is designed to visually integrate with the surroundings, creating an aesthetically pleasing and unobtrusive addition to the landscape.
- Sustainable Drainage Solutions: Integration with existing levels allows for the incorporation of sustainable drainage solutions, utilising natural slopes and contours to manage stormwater runoff effectively.
- Series of Terraces: The layout meanders in a “zig zag” approach creating a series of terraced car parking bays. This in itself will be a one-way system but then present a series of junctions within its form.

Visitors to the site would arrive via the Queen Street Entrance and enter the site in a northern direction passing a welcome Hub/Kiosk to the left. Cars would then be directed right into the main body of the car park and enter a one-way system which would navigate up the changes in levels with a series of terraces to the next available space. Coaches would depart the main access road to the right into a coach parking area designed to minimise the reverse movement. Upon departing the vehicle visitors would be directed along a series of pedestrian routes set within the landscape to a central path leading south back to the point of arrival. From this nodal points, visitors would then progress in a eastern and then southern direction, passing under the Queen Street Bridge, meandering through the site to arrive at a connection point into the Trevor Basin. Public art would aid the legibility of the site through wayfinding and entrance signage. Vehicular movements were tested using swept path analysis to ensure the functionality and efficiency of junctions, validating the flow of vehicular traffic. This option provides 210 car parking spaces of which 25 (more than 10%) would be mobility standard spaces plus provision for 10 coaches.



Figure 04-3: Design Option 1

- |   |  |
|---|--|
| <p>1-Wayfinding feature<br/>Strong linear wayfinding feature - structure or set in paving</p> <p>2-Arrival point<br/>Gateway/ Welcome Area</p> <p>3-Structure planting and woodland enhancement/creation<br/>Planting for screening, retained/enhance existing planting.<br/>Woodland areas managed for habitat retention/creation and enhanced biodiversity, including removal of non native invasive species</p> <p>4-Coach park (9 spaces)<br/>One way in and out, reverse movement necessary</p> <p>5-Mobility parking (24 spaces)<br/>min 10% of total spaces, in line with Wrexham guidance</p> <p>6-'Welcome Hub'<br/>Kiosk/Café/Bike Hire/electric bike charging point with spill-out amenity space, cycle parking</p> <p>7-Woodland car parking (210 spaces)<br/>Parking spaces set in woodland, to include 'greening' of spaces and electric vehicle charging points</p> <p>8-Nodal points<br/>Confluence points, pedestrian priority given</p> | <p>9-Heritage Trail<br/>Recreational Route: Shared foot and cycleway following route of former canal arm linking to Cefn Mawr</p> <p>10-Existing car park<br/>Phased closure for future repurposing</p> <p>11-Temporary green space<br/>Area to be greened temporarily to safeguard future Visitor Centre location</p> <p>12-Improve highways boundaries<br/>Set back fencing and upgrade to enable tree planting on approach to Welcome Point</p> <p>13-Signage and Wayfinding Improvements<br/>Potential improvements to signage and wayfinding at junctions approaching the site</p> <p>14-Bridge structure<br/>Structure to be reviewed to assess the impact of the proposed scheme</p> <p>15-Seating/art feature<br/>Potential for seating/wayfinding/interpretation feature within woodland edge and promotion of views into future rewilding area</p> |
|---|--|



## 4.4 Design Option 2

Option 2 takes an organic and innovative approach, prioritising accessibility and user experience. This design goes beyond the constraints of existing levels to create a more user-friendly and efficient parking facility. Key Features:

- Main Entrance: Access to the site is served via the existing vehicular access point onto Queen Street.
- Optimised Accessibility: Concept 2 prioritises user convenience to ensure easy navigation for both pedestrians and vehicles, enhancing the overall accessibility of the car park.
- Curved Pathways and Routes: Unlike traditional linear layouts, Concept 2 incorporates curved pathways and roads. This not only adds a dynamic and visually appealing element but also optimises traffic flow and minimises congestion.
- Green Spaces and Landscape: The organic design integrates green spaces and landscape elements throughout the car park, contributing to a more environmentally friendly and aesthetically pleasing environment.
- Visual Integrations: The layout considers the car park as a potential landscape focused space, designed to visually integrate with the surroundings, creating an aesthetically pleasing and unobtrusive addition to the landscape.
- Universal Design Principles: This concept incorporates universal design principles to ensure inclusive and accessibility for all users, including those with mobility challenges.
- Sustainable Drainage Solutions: Integration with existing levels allows for the incorporation of sustainable drainage solutions, utilising natural slopes and contours to manage stormwater runoff effectively.

Site visitors would arrive through the Queen Street Entrance, proceeding northward upon entry. Vehicles would then be guided to the right, leading into the primary section of the car park, where they would follow a one-way system along curved roads. Upon exiting their vehicles, visitors would be directed towards a central pedestrian spine, aligned with the site entrance road. This pathway would link to a central node, guiding visitors eastward and then southward beneath the Queen Street Bridge. The route meanders through the site, ultimately connecting to a point of entry into the Trevor Basin. Accessible spaces are provided in two locations, to the left of the arrival point and the first bays of the main vehicular route, both located on lower ground. Swept path analysis was undertaken to assess vehicular movements, ensuring the effectiveness and efficiency of junctions and validating the flow of traffic. This option offers 245 car parking spaces, including 24 (10%) designated for mobility standard spaces, along with provisions for accommodating 9 coaches. The proposed layout incorporates a one way system. Drivers typically find it easier to navigate and park in one-way systems, as they can anticipate the flow of traffic and follow a consistent path to access their parking spaces.



Figure 04-4: Design Option 2

1-Wayfinding feature  
Strong linear wayfinding feature - structure or set in paving

2-Arrival point  
Gateway/ Welcome Area

3-Woodland retention/creation  
Retain/enhance existing woodland and create new woodland 'pockets'. Areas managed for habitat retention/creation and enhanced biodiversity, including removal of non native invasive species. Include 'amenity' green spaces set within clearings in woodland 'pockets', opportunities for interpretation and art, seating and natural and woodland play elements

4-Coach park (9 spaces)  
One way in and out, reverse movement necessary

5-Mobility parking (24 spaces)  
min 10% of total spaces, in line with Wrexham guidance

6-'Welcome Hub'  
Kiosk/Café/Bike Hire/electric bike charging point with spill-out amenity space, cycle parking

7-'Entrance Square'  
Confluence area with pedestrian priority

8-Woodland car parking (245 spaces)  
Parking spaces set in woodland, to include 'greening' of spaces and electric vehicle charging points

9-Nodal points  
Confluence points, pedestrian priority given

10-Heritage Trail  
Recreational Route: Shared foot and cycleway following route of former canal arm linking to Cefn Mawr

11-'Archimedes Screw'  
Ramp design based on Archimedes Screw

12-Existing car park  
Phased closure for future repurposing

13-Temporary green space  
Area to be rgreened temporarily to safeguard future Visitor Centre location

14-Improve highways boundaries  
Set back fencing and upgrade to enable tree planting on approach to Welcome Point

15-Signage and Wayfinding Improvements  
Potential improvements to signage and wayfinding at junctions approaching the site

16-Bridge structure  
Structure to be reviewed to assess the impact of the proposed scheme



## 4.5 - Detail Design

A comprehensive review and assessment of the two layouts were conducted, evaluating the merits of each design. Subsequently, design option two was selected and brought forward based on its attributes and alignment with project objectives. The detail design is captured on the following page in Figure 04-6. A cost analysis was conducted to align the proposed design with the available budget, identifying and prioritising key elements, ultimately shaping the project in accordance with financial considerations. The following describes the changes from Concept to Detailed Design:

- The perimeter route identified within the initial concept along the old canal line has been identified as a future recreational route. As part of the wider LUF funding the area to the north of the site, and still part of the original Flexys site, is identified as a “Rewilding” project which will progressively develop as a restricted access brownfield nature reserve.
- The total area of the car park footprint was reduced. This allowed for a better co-ordination with the perimeter levels on the northern and eastern boundary whilst also providing a cost saving to maximise the available budget.
- A hierarchy of spaces and materials has been included, with different application of materials for the Accessible Bays, Standard Parking Bays, Overflow Parking Bays, Coach Parking.
- Introduction of an overflow car park, to address situations if the primary parking area reaches capacity during peak times or events. It serves as an additional space where vehicles can be directed when the main parking facility is full. Having an overflow car park helps manage traffic efficiently, prevents congestion, and ensures that visitors still have convenient access to parking even during high-demand periods (see section 4.8 for more details)
- The central pedestrian axis is retained and maintains the linear connection the main entrance, however it has been reduced in length.
- The drainage strategy identified the requirement for Sustainable Urban Drainage System (SUDS) and the introduction of new attenuation ponds. These will help prevent flooding by temporarily storing excess rainwater during heavy rainfall events. This temporary storage allows for a gradual release of water, reducing the risk of downstream flooding and erosion. They also aid the Biodiversity Net Gain of the site by allowing for the introduction of new habitat creation.
- Further thought was given to the function of the open space with the introduction of cycle parking and seating areas.
- A space and location for a future “Welcome Hub” is retained (the detail for the building does not form part of this application).

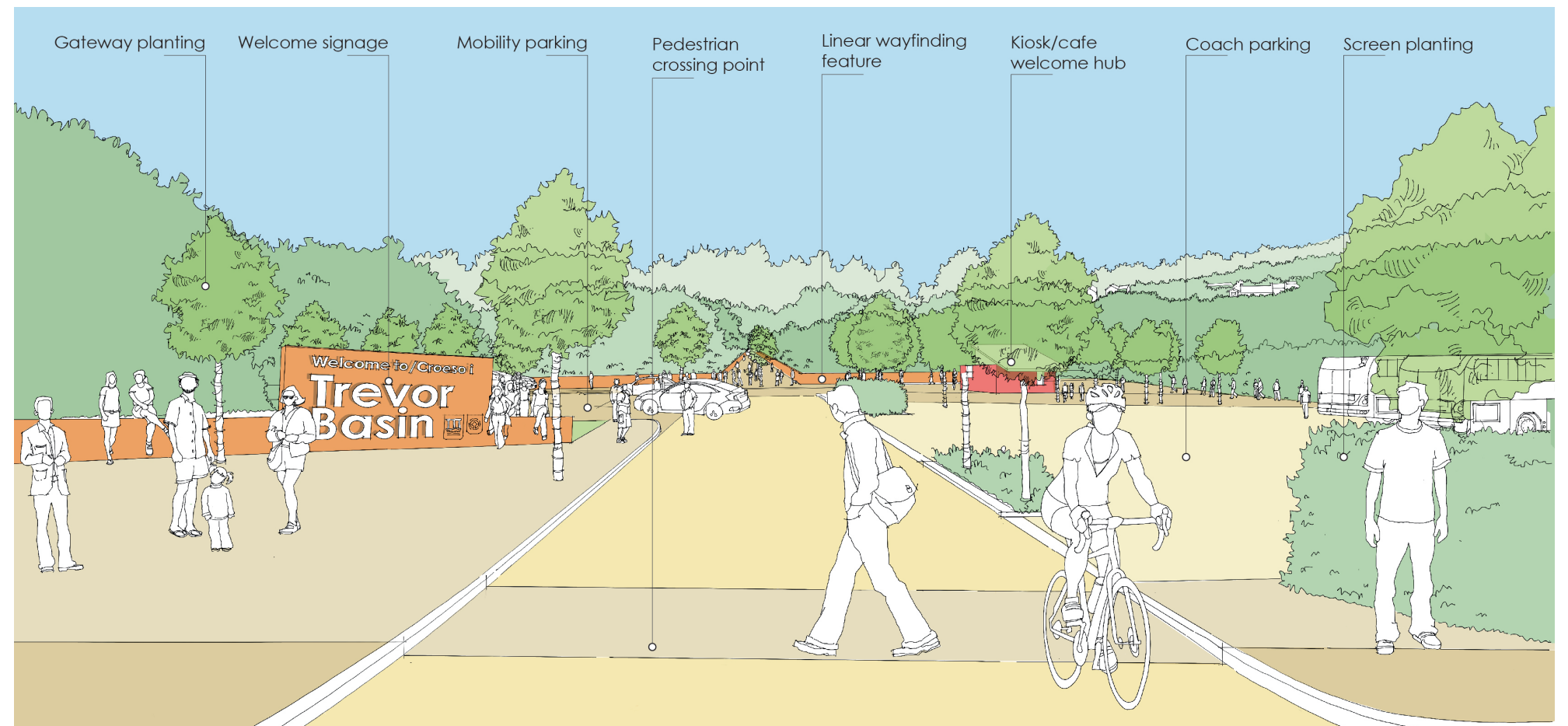


Figure 04-5: Illustration of Site Entrance



# 4.6 Illustrative Masterplan

## KEY FEATURES

- ① Wayfinding feature  
Strong linear wayfinding feature
- ② Arrival point  
Gateway/ Welcome Area
- ③ Woodland retention/creation  
Retain/enhance existing woodland and create new woodland 'pockets'. Areas managed for habitat retention/creation and enhanced biodiversity, including removal of non native invasive species. Include 'amenity' green spaces set within clearings in woodland 'pockets', opportunities for interpretation and art, seating and natural and woodland play elements
- ④ Coach park (9 spaces)  
One way in and out, reverse movement necessary
- ⑤ Mobility parking (25 spaces)  
min 10% of total spaces, in line with Wrexham guidance
- ⑥ 'Welcome Hub'  
Kiosk/Toilets/Bike Hire/electric bike charging point with spill-out amenity space, cycle parking - indicative footprir
- ⑦ 'Entrance Node'  
Confluence area with pedestrian priority
- ⑧ Woodland car parking (172 spaces)  
Parking spaces set in woodland, to include 'greening' of spaces and electric vehicle charging points
- ⑨ Nodal points  
Confluence points, pedestrian priority given
- ⑩ Future Recreational Route  
Recreational Route: Shared foot and cycleway following route of former canal arm linking to Cefn Mawr
- ⑪ Existing car park  
Phased closure for future repurposing
- ⑫ Improve highways boundaries  
Set back fencing and upgrade to enable tree planting on approach to Welcome Point
- ⑬ Signage and Wayfinding Improvements  
Potential improvements to signage and wayfinding at junctions approaching the site
- ⑭ Bridge structure  
Structure to be reviewed to assess the impact of the proposed scheme
- ⑮ Future phase parking (57 spaces)  
Potential for expansion of parking area
- ⑯ Attenuation Ponds



Figure 04-6: Illustrative Masterplan



4.7 - Precedent Images

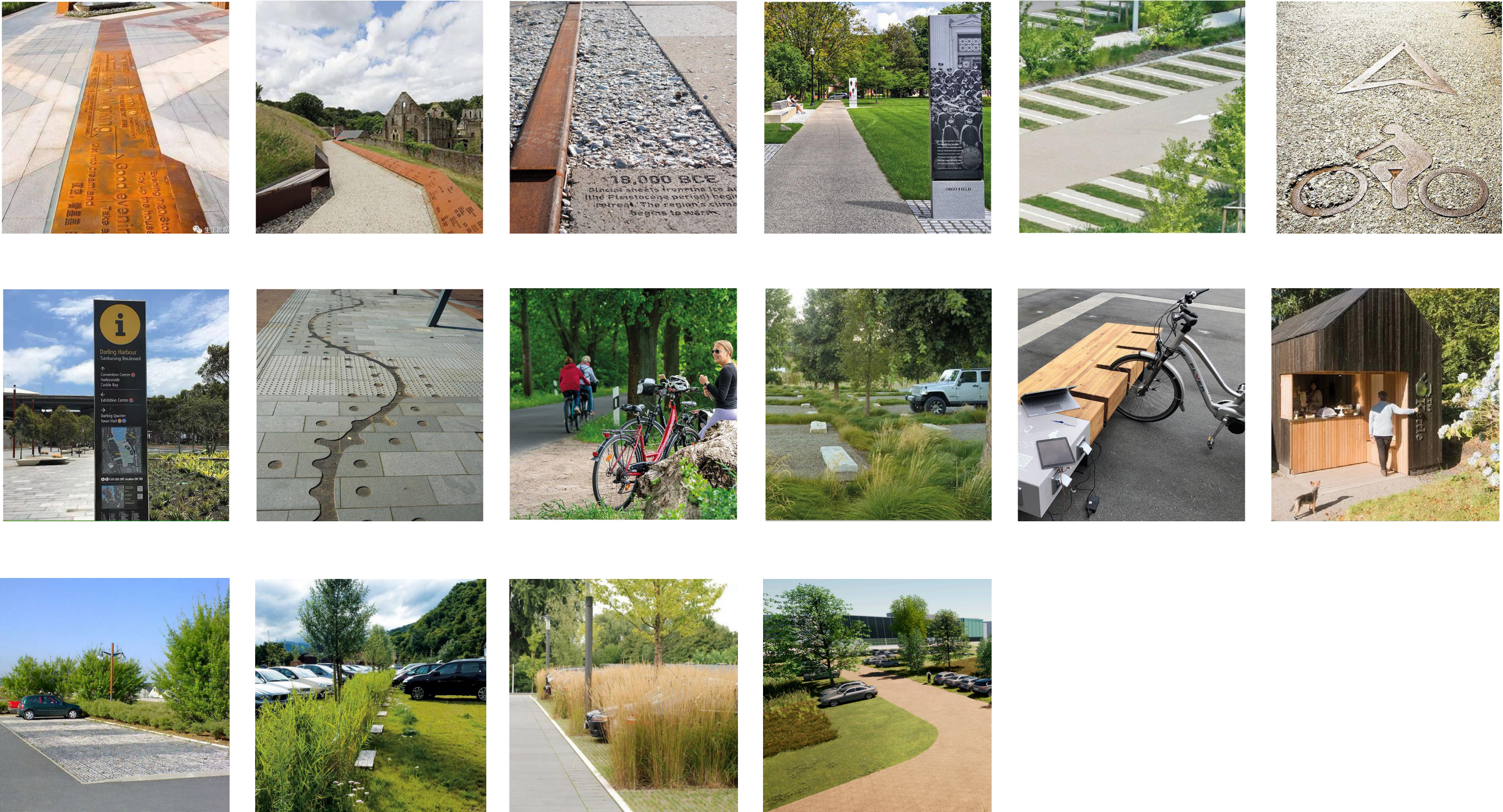


Figure 04-7: Precedent Images



## 4.8 Car Park Arrangement

The visitor car park has been designed for space efficiency utilising the general site levels, retaining a core structure of established vegetation and providing new planting to create a suitable landscape character within the wider WHS setting. The design provides distinct parking zones as shown on Figure 04-9:

1. Accessible Bays - featuring durable asphalt surfacing, the primary parking area, and an overflow section surfaced in reinforced grass - 25 bays proposed
2. Standard Parking Bays - surfaced in reinforced gravel. - 170 bays proposed
3. Overflow Parking Bays – surfaced in reinforced grass, to be activated during peak visitor times. - 57 bays proposed
4. Coach Car Parking – surfaced in asphalt. - 9 bays proposed

An essential goal of the car park's design is to provide an enhanced facility that integrates the site into the surrounding character and landscape. Existing belts of woodland trees will be preserved, managed and thinned, complemented by new tree plantings to soften and enhance the car park aesthetics. The design ethos follows a parkland style approach with a landscape led form and layout, with tree planting at its core.

To optimise traffic flow and enhance the overall visitor experience,

the design incorporates natural wayfinding and clearer vehicular routes. A centralized and welcoming arrival zone, featuring improved coach parking, is a focal point. The design includes a dedicated footpath network and central pedestrian spine, guiding visitors to the eastern entrance of the Trevor Basin.

To maintain a harmonious environment, subtle detailed wayfinding and natural cues will be used allowing signage to be minimised. Cyclists are accommodated with secure bike racks conveniently located near the entrance.

The proposed car park boasts a capacity that caters to diverse needs, including standard parking spaces, dedicated disabled spaces adhering to good practice guidelines, coach bays, and secure cycle racks. The introduction of a new one-way system into and out of the main body of the car park, aligned with existing generous dimensions at the Queens Street junction and enhanced by low-level signage, ensures clarity in indicating the main flow of visitor traffic. Defined parking bays contribute to the efficient Utilisation of the available space, optimizing both functionality and aesthetics. The coach parking area will have capacity for nine coaches, located close to the site entrance for practically drop off and collection of passengers and visitors.

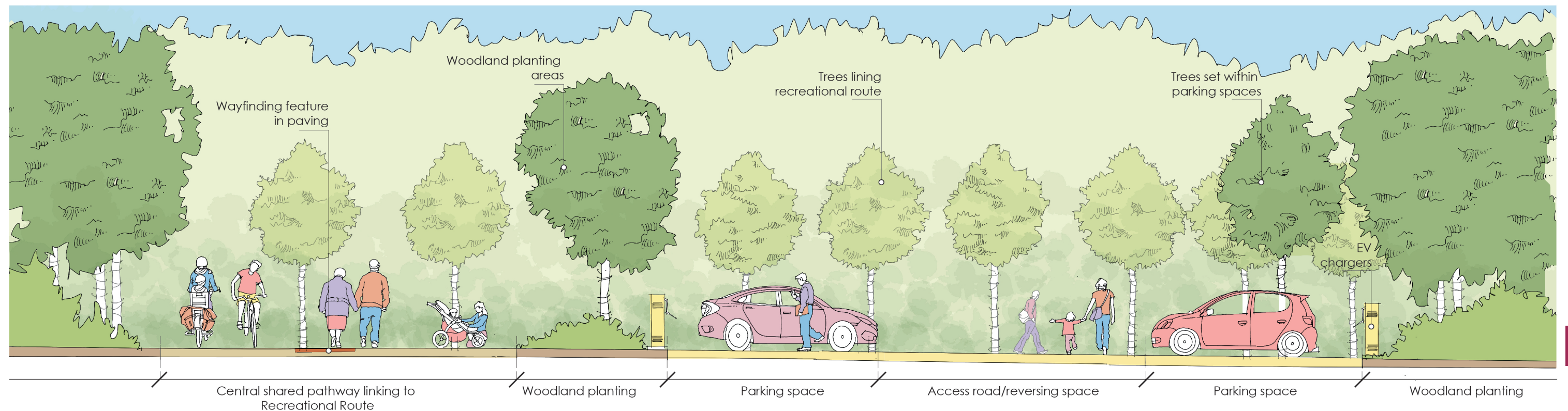
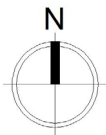


Figure 04-8: Illustrative Section



# 4.8 Car Park Arrangement



KEY

- ① Accessible Parking Bays - Durable asphalt surfacing
- ② Coach Parking - Surfaced in asphalt
- ③ Standard Parking Bays - Surfaced in reinforced gravel
- ④ Overflow Parking Bays - Surfaced in reinforced grass, to be activated during peak visitor times



Figure 04-9: Car Park Hierarchy



# 4.9 Design Response

## Sustainability

The design and layout of the project embodies a commitment to sustainable principles, integrating environmentally conscious elements. The use of Sustainable Urban Drainage Systems (SUDS) is central to our approach, ensuring responsible stormwater management and reducing the impact on local water resources. Native species have been prioritised in the soft landscape to enhance biodiversity and promote ecological balance, while adhering to Biodiversity Net Gain (BNG) principles to ensure a positive impact on local ecosystems.

Materials have been selected with careful consideration of their environmental footprint, opting for those with low embodied energy and high recyclability. Maintenance considerations are embedded in the design, with an emphasis on low-maintenance materials and landscaping practices to minimise operational costs over time. The layout is designed for ease of operational management, incorporating efficient traffic flow, clear wayfinding, and intuitive spatial organization to enhance the overall functionality and sustainability of the development.

## Flood Risk & Drainage

The entire application site lies within Flood Zone 1, with a low risk of flooding from various sources. Due to the sloping nature of the car park site, options for surface water attenuation storage are limited. Given the presence of underlying mudstone and coal, it is presumed that the permeability of the underlying ground on the site is likely to be low.

However, where feasible, the use of sustainable drainage systems to manage and attenuate the increase in surface water runoff onsite, for up to and including the 1 in 100-year rainfall event including an allowance for 40% climate change has been accommodated. This includes the use of attenuation ponds which have been thoughtfully integrated into the layout, supplemented by below-ground geo-cellular crates within the Coach Parking Area. Additionally, tanked permeable paving structures have been provided to collect runoff from the car park bays and access roads and convey this runoff to the attenuation ponds. The drainage scheme incorporates separators for petrol, oil, and grit, markedly improving water quality by intercepting surface water runoff.

It is proposed that the surface water drainage system for the site will consist of two separate networks, discharging to two separate outfalls where the low point of the site is located. The two outfalls will discharge into the existing culvert with each network discharging at the greenfield runoff rate. Discharge will be limited to the greenfield runoff rate of 2.6 l/s/ha.

Surface water generated from the proposed 1.188ha impermeable area of the site that is to be positively drained is proposed to drain via gravity to the outfalls at the existing culvert. This however is subject to the culvert invert levels being situated at a sufficient depth to allow gravity drainage to work.

Provision for foul water connection to the proposed cabin located in the coach parking area has been provided. This discharges to the existing foul water sewer which crosses the site at an unrestricted rate

## Utilities

The enhanced car park demands electrical supply for various areas, including pay kiosks, lighting, and electric car charging points, alongside a water supply for a future payment and meet-and-greet kiosk.

Ducting for power and data cables will share trenches to streamline installation. Special care is to be taken when underground services intersect with the root protection areas of existing trees, with excavation using hand-held tools or compressed air soil displacement to minimise impact on retained tree roots.



## Access Improvements

Accessibility stands at the forefront of the project, driving key design considerations. To enhance accessibility, the design addresses the uneven and often steep topography by levelling and providing consistent surfacing for universal ease of use. Dedicated areas with wider disabled parking bays, provision for electric vehicle charging, intuitive design, and improved signage collectively contribute to ease of movement within the car park.

A dedicated entrance for coaches, complete with well-defined drop-off and collection points, improves the arrival experience. Clearly delineated entry routes ensure legibility for drivers, reducing conflict between visitor cars and pedestrians. The provision of a designated space for Welcome staff enhances the overall arrival experience, embodying a commitment to public benefit and a welcoming atmosphere

## Transport Assessment

The supporting Transport Assessment reviewed the transport impacts of the proposed development of the new WHS arrival area. The existing site conditions, and surrounding highway network were analysed, including, active travel arrangements (cycle & pedestrian network), existing parking condition and the collision data analysis around the proposed site. The predicted impacts of the traffic due to proposed development for the following two junctions were assessed:

- A539 Llangollen Road priority crossroads junction with Tower Hill (four arm junction)
- A539 Llangollen Road priority junction with side road leading to The Oaks (T junction).

The trip generation for the existing development was established using an accumulation profile derived from appropriate sites from TRICS and cross referencing this with existing Trevor Basin car park revenue data.

The results showed that there would be a limited increase in traffic on the highway network and as such can be accommodated without any significant impacts.

## Arboriculture

Within the site’s arboricultural features, a total of 17 groups are situated within or immediately adjacent to the development works, necessitating full or partial removal to facilitate the proposals.

Out of the 50 arboricultural features slated for full or partial retention in the study area, two tree groups (G6 and G7) face potential incursions within their calculated Root Protection Areas (RPA). Minor facilitation pruning within these groups will be required to accommodate proposed construction works and future site usage. The proposed tree removals primarily consist of 11 relatively young and 6 semi-mature self-set groups. These removals are anticipated to have a low impact on the overall visual public amenity and arboricultural value of the site. Most of the trees marked for removal are of low-quality Category C features, providing minimal visual screening to residents to the east from the existing site.

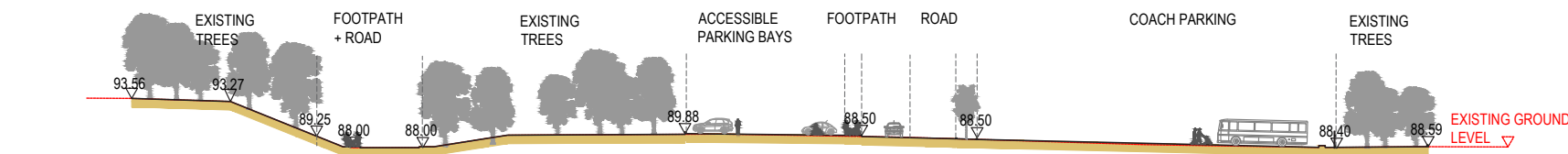
The veteran ash tree just outside the site boundary on Queens Street will be protected and fenced in accordance with BS 5837 (2012) – Trees in Relation to Design, Demolition and Construction. The proposed development incorporates mitigation tree planting within the soft landscape. While the design outlines the planting of individual trees and groups, specific details such as the number of trees, species, and size are yet to be finalized. Based on the existing designs, it is believed that the level of planting offers suitable mitigation for the proposed loss of trees on the site. However, a thorough review will be conducted once a detailed design has been finalized.

The existing woodland will be managed by thinning out conifers, the retention of standing and fallen deadwood and creation of a more diverse woodland edge. This includes selective coppicing to increase light understory and increase understory diversity – more diverse species to be planted. Felled wood will be retained and used to create habitat piles for reptiles, amphibians, other invertebrates and small mammals. Bat and bird boxes will be installed on suitable trees in the woodland to encourage these species.

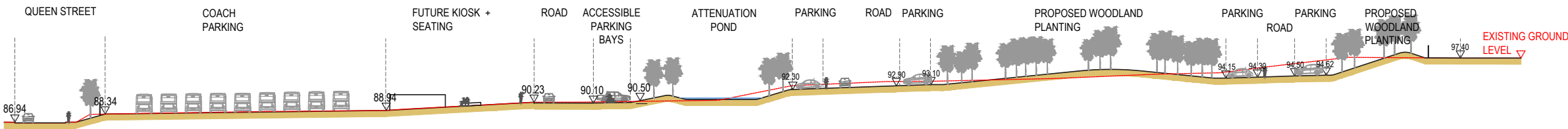


# 4.10 Illustrative Sections

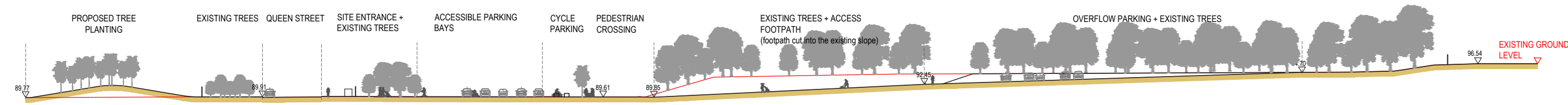
The illustrative sections for the project serve as visual representations of the site's topography, highlighting the alignment to existing levels and showcasing efforts to reduce cut and fill wherever feasible. These sections provide a comprehensive overview of the existing slopes within the site, demonstrating the integration of the car park and public realm. By strategically highlighting the relationships between car parking, public realm, and proposed landscape features, these sections offer insights into the seamless integration of various elements within the project.



Section-CC



Section-BB



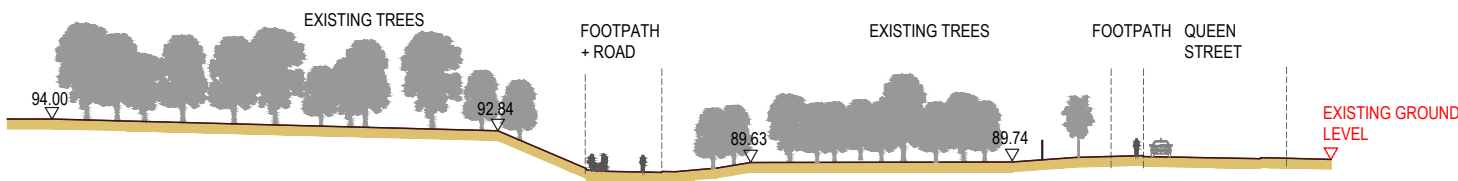
Section-AA

Figure 04-10: Illustrative Sections

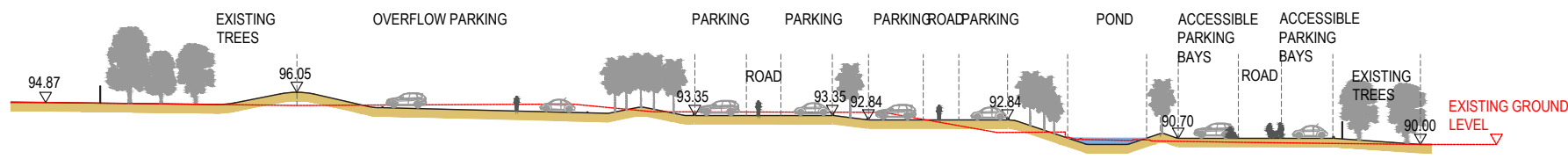


# 4.10 Illustrative Sections

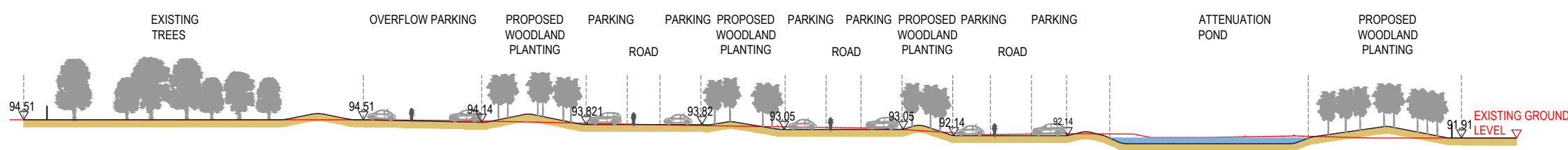
The contours and gradients depicted in the illustrative sections not only reveal the existing topographical nuances but also showcase how the design minimises disruptions to the natural slopes. This emphasis on minimal cut and fill aligns with sustainable design principles, ensuring a harmonious blend with the site's existing terrain. Additionally, the sections offer a clear visualisation of how the car park and public realm are intricately woven into the landscape, presenting a cohesive and well-integrated design approach. The relationship between these elements is carefully articulated, providing stakeholders with a vivid understanding of the project's spatial dynamics and the thoughtful interplay between built and natural environments.



Section-FF



Section-EE



Section-DD

Figure 04-11: Illustrative Sections



## 4.11 Access

The final design prioritises user-friendly elements, emphasising clear pedestrian walkways that guide individuals safely through the site. Universal design principles ensure accessibility for users of all abilities, and strategically placed wayfinding signage enhances navigational ease. The road network is planned for efficient traffic flow, featuring one-way systems to prevent congestion. An optimised parking layout maximises space utilisation, reducing search times for available spots. Safety measures, including clearly marked pedestrian crossings, contribute to a secure traffic environment.

The design places a strong emphasis on inclusive by incorporating dedicated accessible parking bays, adhering to accessibility standards. These spaces will be marked with recognisable signage, are strategically located to enhance convenience for users with disabilities, fostering equal access and ease of use. Integrating accessible parking into the design aims to create a welcoming and accommodating facility that considers the diverse needs of all visitors.

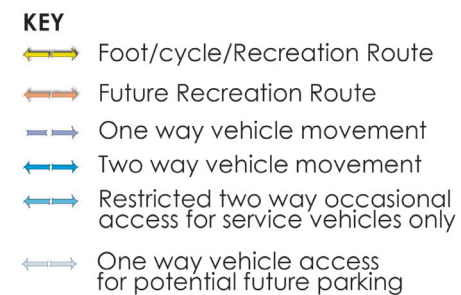


Figure 04-12: Access & Circulation



# 4.12 Materials

The existing materials within the site have minimal character value. The former road network is primarily a tarmac finish with some occasional block paving. The former use is focused on industry and the project material selection, especially within the street furniture, will take this as a reference within its approach, giving a simple, functional, and robust palette.

The materials strategy will introduce a language and tone to the setting. The incorporation of hard landscape features in a soft landscape dominated setting will provide users with a visual identity and focus.

Functionality and aesthetics appropriate for the setting and use are the drivers of the material selection. The overall palette is not too diverse to give a legibility and continuity to the spaces and avoid unnecessary confusion to users.

The proposed paving palette is shown opposite. All materials will be subject to planning conditions.

Reinforced Gravel laid within a reinforced grid will be utilised both within the parking bays and the connecting routes. The grid helps reduce the depth of construction

The primary material for the footways will be a Hoggin surface, which has a natural and rustic appearance, making it suitable for the naturalistic aesthetic desired. Hoggin is permeable, allowing water to pass through and reducing the risk of water pooling or runoff. The material has been used for centuries and is appropriate for the WHS buffer area.

Tactile paving is provided to aid walking routes and crossing points to assist visually impaired people in moving around an area. Guidance on the provision of tactile paving will be in accordance to the Department of Transport publication ‘Guidance on the Use of Tactile Paving’ and ‘Inclusive Mobility’ on the use of tactile paving surfaces’.

The selection of materials is also driven by the sustainability of the material, with a focus on minimising carbon emissions in its production. For example, the selection of Hoggin for the footpaths doesn’t involve the use of chemicals or energy-intensive manufacturing processes, reducing its environmental impact. The underlying ground conditions are predominately clay. The selection of permeable surfaces will be developed in accordance with an underdrain system beneath to direct water away from the surface and into a drainage network.

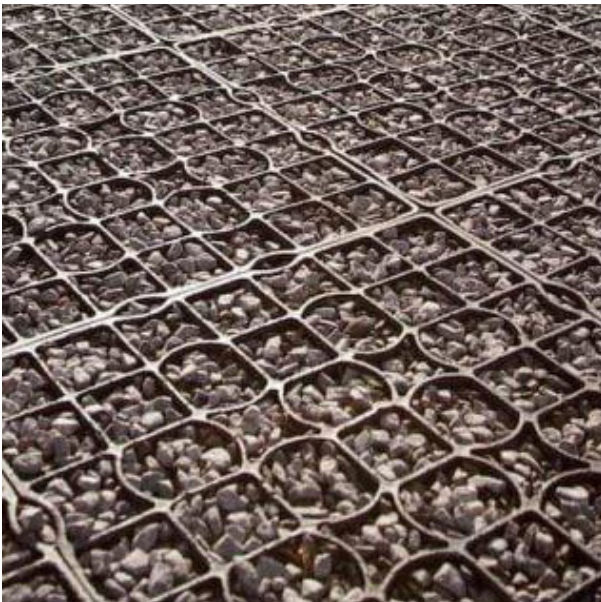


Figure 04-13: Reinforced Gravel Grey



Figure 04-14: Reinforced Gravel Buff



Figure 04-15: Hoggin Path



Figure 04-16: Reinforced Grass



Figure 04-17: Asphalt



# 4.12 Materials

KEY

- Proposed Reinforced Gravel Vehicular Routes
- PT02 -Proposed Reinforced Gravel Car Parking Bays
- PT03 -Proposed Reinforced Grass overflow Car Parking
- PT04-Proposed Hoggin Footpath
- PT05-Proposed Asphalt Road
- PT06-Proposed Coloured Asphalt

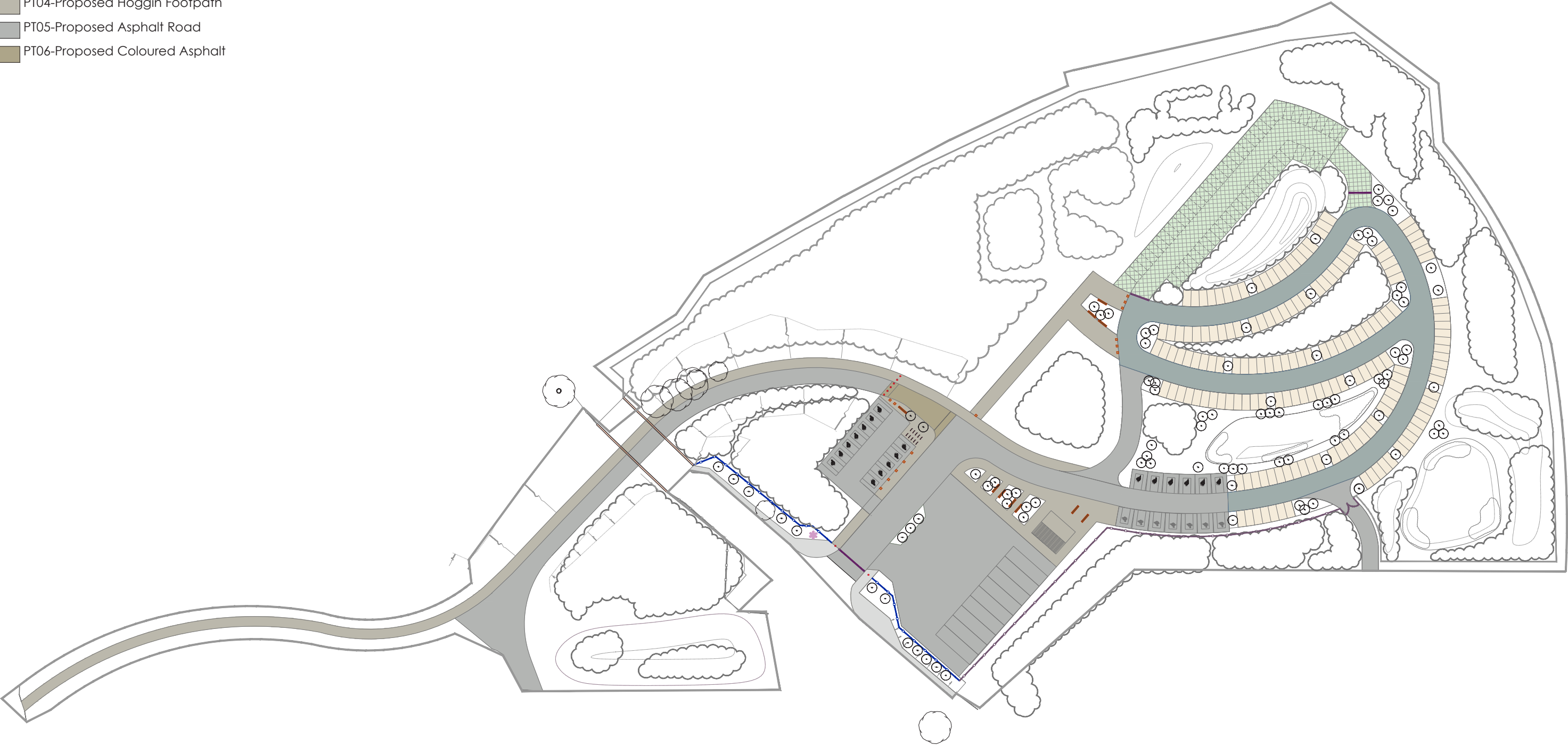


Figure 04-18: Hard Landscape Proposals



# 4.13 Street Furniture

Seating, benches and litter/recycling bins will be integrated into spaces. Seating is an important positive contributor and has been located allowing for a clear route for pedestrians and cyclists, in both sunny and shady positions. The style of street furniture is to be robust giving a gentle nod to the sites former industrial use, using elements that are durable and constructed from vandal proof materials and technologies.

Street furniture is to be orientated parallel to paving to avoid awkward junctions. When litter bins are installed adjacent to seating, the interaction between the two is carefully considered and appropriate space provided.

Secure cycle parking is provided close to the entrance space for visitors and users of the site.

Provision for electric bike charging will be brought forward with the detail of the future Welcome Hub and Kiosk, with potential for cycle hire to be included.

The proposed vehicular barrier will be in keeping with the wider street furniture palette with a focus on the use of Corten Steel. A bespoke vehicular barrier will be designed for functionality and aesthetic cohesion and will restrict access into the car park after dusk, and access into the overflow areas at non-peak visiting times, prioritising safety and security.

The carefully selected materials for the street furniture will assist in giving an identity and ensure a contributing to the overall character of the site.



Figure 04-19: Timber Seating



Figure 04-20: Timber Seating



Figure 04-21: Timber Seating



Figure 04-22: Cycle Parking

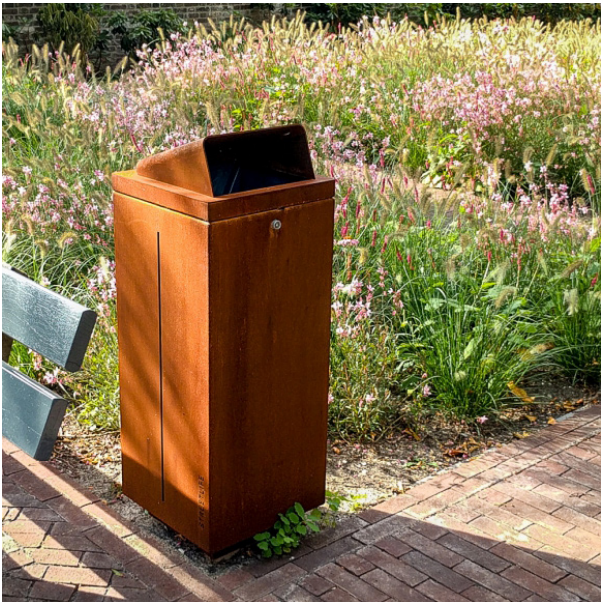


Figure 04-23: Litter Bins



Figure 04-24: Corten Panel for Vehicle Barrier



Figure 04-25: Corten Panel for Vehicle Barrier



Figure 04-26: Tree Grille with Uplighters



Figure 04-27: Corten and Timber Bollards



## 4.14 Lighting

The overall lighting will look is to achieve a good level of constant illumination across the public realm areas, minimising dark areas to create a safe environment avoiding light pollution.

The landscape lighting will create spaces which are inviting, safe and can be enjoyed at all hours, which is visually interesting as it forms a vital interaction point for visitors to the area.

The design objectives of the lighting scheme will be:

- Identify and illuminate pedestrian and vehicle access routes within the site, to secure the health and safety of both its users and visitors throughout the hours of darkness.
- Sufficient lighting will be provided for a safe environment whilst limiting light pollution and ingress to neighbours to a minimum impact on ecology.
- Provide effective lighting control to ensure luminance levels are suitable for the activities taking place while also maximising light source life, and minimising energy consumption and maintenance.
- Provide a cost effective, sustainable and energy efficient system, in terms of initial capital costs and continuing operational use. Select light source types for their efficacy, colour rendition and longevity to provide an efficient lighting solution.
- Utilise light source types appropriate for the character and function of each space while retaining a coherent, rationalised illumination system.

The lighting strategy will incorporate a thoughtful approach to ecological considerations, minimizing potential impacts on local fauna and flora. Developed with the project Ecology team it will include environmentally friendly lighting solutions that consider the natural behaviours of wildlife. The design will aim to strike a balance between illuminating the space and preserving the surrounding ecological environment. The use of Illuminated LED Bollards along the key pedestrian routes

- Provision of Street Lighting along the main vehicular routes and kept to a minimal.
- The lighting strategy is to minimise the use of traditional street lighting columns to the key areas, and these will be regulated by timing and movement sensors.
- The use of uplighters for tree planting, within both soft and hard tree pit details to provide ambient lighting.



Figure 04-28: Corten Bollard Lighting



Figure 04-29: Corten Bollard Lighting

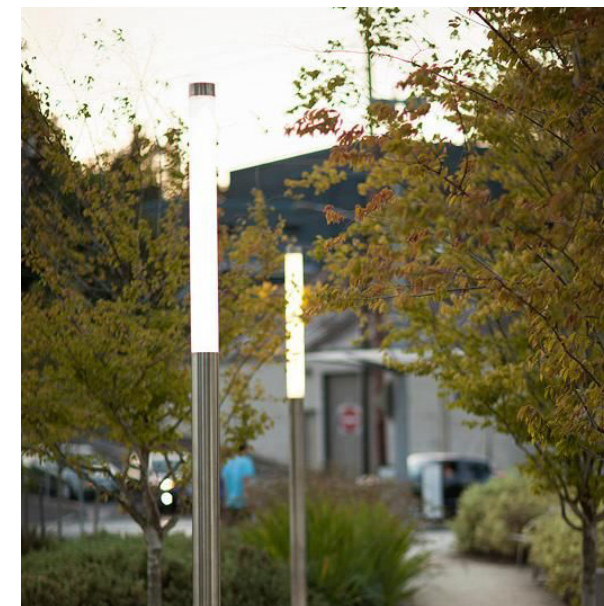


Figure 04-30: Lighting Columns



Figure 04-31: Lighting Columns



Figure 04-32: Uplighter in Hard Landscape

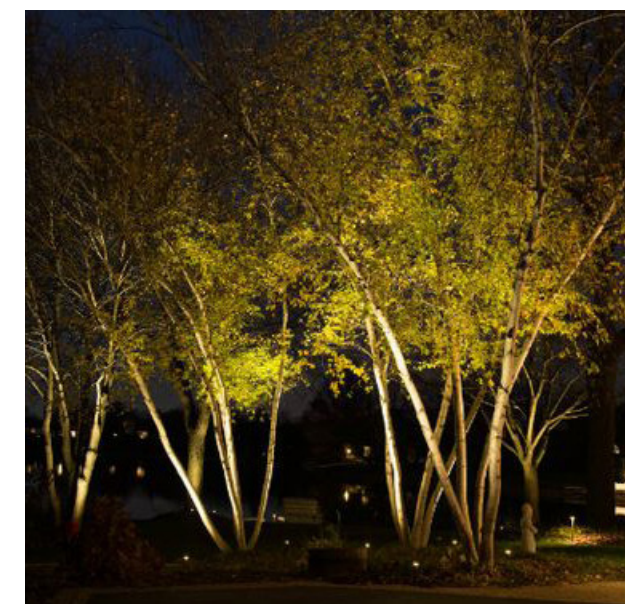


Figure 04-33: Uplighter in Soft Landscape



# 4.15 Planting Strategy

The planting strategy seeks to enhance the existing “rewilding” of the project development area which is occurring by adopting an approach to support the natural processes. The planting aims to foster a balance between human and natural elements, creating an environment where both can thrive, to provides opportunities for ecological diversification. Planting will include wildlife and pollinator friendly planting, and be robust and low maintenance, becoming a dominant feature assisting in the transformation of the brownfield site. Planting has been selected that is fit for purpose and will be practical to the setting.

A range of aquatic and terrestrial habitats will be present within the attenuation ponds. Habitats associated with ponds will be varied, as there will be a range of conditions from areas which are permanently wet, where there will be emergent vegetation forming ecological steppingstones, to areas which are periodically wet.

Species in these areas will be native and provide habitat for aquatic invertebrates and. Terrestrial habitats will have a bias towards native plant species, with areas managed to balance amenity value and biodiversity provision, with flower rich grasslands, native fruit trees providing a pollinator resource.

Trees give us fresh air, food, and shelter. They are a home and food source for an unimaginable range of plants, animals and insects. A network of connected tree canopies provides an improved wildlife corridor for birds. Trees are among our greatest allies, working with each other, and alongside fungi, plants, insects, birds and animals, to form part of the life force that keeps us alive.

Tree planting will be used strategically and with purpose, for focal points, shelter or to benefit ecosystems to increase the sense of place. Robust native tree selection will allow an overall sense of identity.

Ecological enhancements and habitat creation are at the forefront and have been incorporated into the Landscape Design. The following biodiversity principles have been integrated into the proposals:

- creation and enhancement of strategic wildlife corridors running through and across the site.
- naturalisation and enhancement of the existing soft landscape framework.
- Achieving biodiversity gain through increased tree and low-level planting.
- provided enhance flood mitigation methods.
- introduction of ecologically considered planting mixes.
- introduce fruit and nectar species that will create a bio identity and encourage pollinators and produce fruits for birds and other animals.
- creation of a network of diverse wildflower meadows running along the pedestrian routes.
- Planting of trees, shrubs, ferns and grasses to introduce a structure and a range of species across the site.

The landscape strategy includes the following types of planting:

- Woodland Planting
- Tree Planting within Car Park
- Amenity Tree Planting
- Native Shrubs, Herbaceous, Grasses, Ferns and Bulbs
- Wildflower Meadow
- Attenuation Planting to SUDS Ponds



# 4.15 Planting Strategy

KEY

- Proposed Car Park and Public Frontage
- Proposed Native Amenity Trees
- Proposed Native Woodland Planting
- Proposed Native Shrubs, Herbaceous, Grasses and Fern Planting
- Proposed Wildflower Meadow Planting
- Proposed Attenuation Planting to SUDs Ponds
- Proposed Reinforced Grass overflow Car parking
- Existing Trees to be retained
- Existing trees and vegetation to be remained, thinned and managed



Figure 04-34: Planting Strategy



# 4.16 Planting Palette

## Woodland Planting

The tree planting for the project showcases a thoughtful selection of native species, each chosen for its ecological compatibility and ability to contribute to a resilient and biodiverse landscape. The chosen species are as follows:

- *Acer platnoides* (Field Maple): Revered for its vibrant, large, and lobed leaves, the Norway Maple introduces a striking aesthetic to the landscape. With its adaptability to different soil types and urban conditions, it stands as a resilient choice, providing shade and ornamental appeal.
- *Carpinus betulus* (Common Hornbeam): Known for its dense and durable wood, the Common Hornbeam adds structural diversity to the woodland. Its distinctive serrated leaves and tolerance to various soil conditions make it a hardy and valuable choice.
- *Malus sylvestris* (Common Crab Apple): Celebrated for its blossoming spring display and the production of small, flavourful fruits, the Wild Apple tree is both visually appealing and ecologically significant. Known for its adaptability, this species contributes to biodiversity and adds a touch of natural charm.
- *Pinus sylvestris* (Scots Pine): A majestic evergreen, the Scots Pine is a symbol of resilience. With its distinctive orange-brown bark and slender needles, it contributes to the visual character of the woodland while offering habitat and shelter for wildlife.
- *Prunus avium* (Wild Cherry): The Wild Cherry, with its elegant blossoms and edible fruit, brings a touch of seasonal beauty and provides a food source for birds. Its inclusion enhances the woodland's visual diversity and ecological richness.
- *Quercus robur* (Common Oak): An emblematic native tree, the Common Oak offers longevity and robust ecological value. Supporting a myriad of insects and serving as a habitat for birds, the oak contributes to the overall biodiversity of the woodland.
- *Sorbus aucuparia*: Renowned for its clusters of bright red berries and distinctive pinnate leaves, the Rowan is a hardy tree that adds visual interest throughout the seasons. Its tolerance to diverse environmental conditions makes it an excellent choice for enhancing biodiversity.
- *Sorbus aria*: Recognised for its silver-backed leaves that shimmer in the sunlight, the Whitebeam is a deciduous tree known for its aesthetic appeal. Adaptable to various soils, it contributes to ecological diversity while offering an elegant presence in the landscape.
- *Ulmus minor*: Noted for its distinctive serrated leaves and gracefully arching branches, the English Elm brings a classic and stately appearance to the environment.

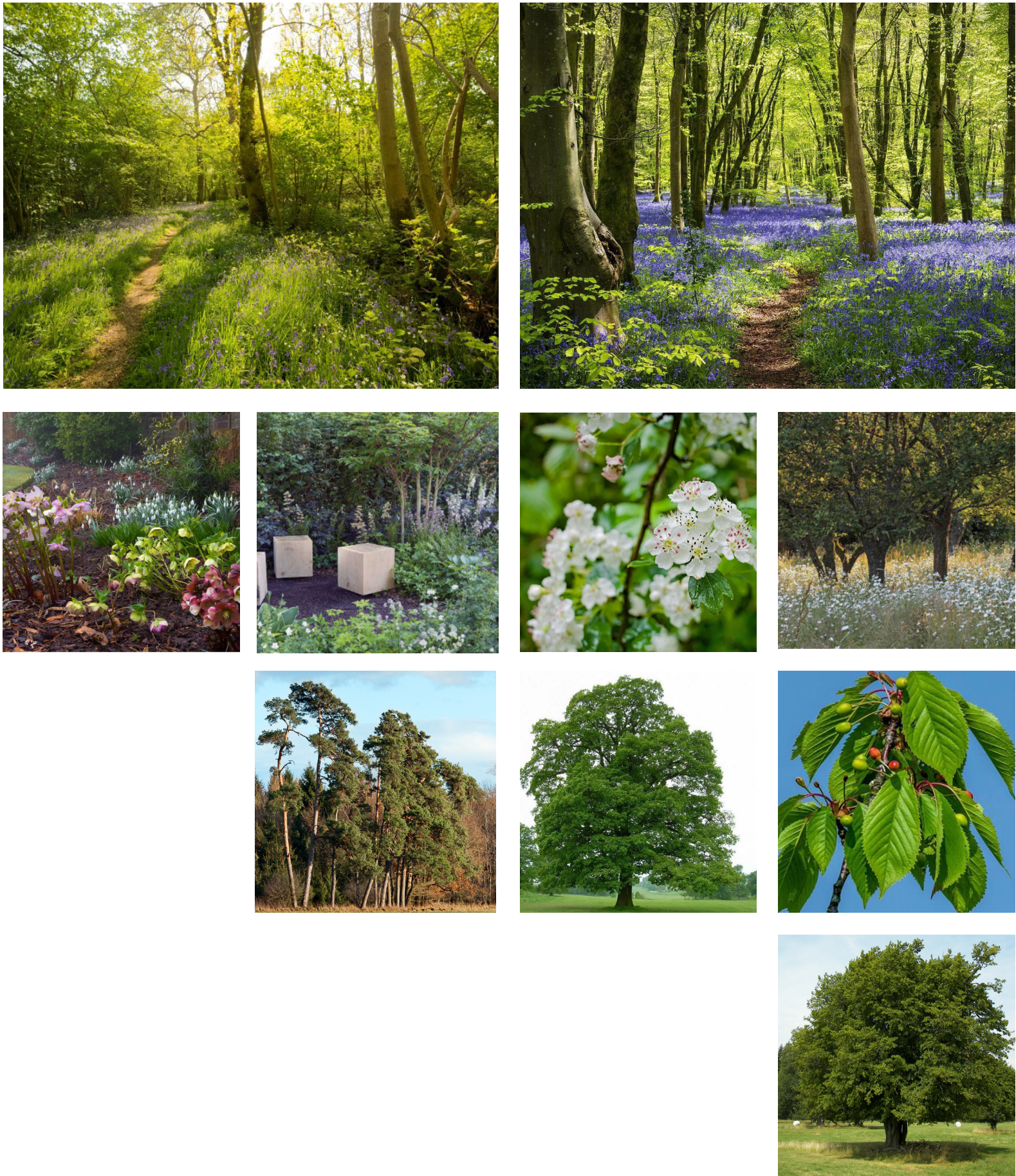


Figure 04-35: Woodland Planting



# 4.16 Planting Palette

## Car Park & Public Frontage Trees

A selection of native trees, carefully chosen for their adaptability to urban environments and aesthetic contributions, will be strategically planted in the car park to enhance both the visual appeal and environmental resilience of the space:

- *Liriodendron tulipifera* Fastigiata (Tulip Tree); Recognised for its unique columnar or fastigate growth habit, making it an ideal choice for confined spaces or avenues. This cultivar inherits the distinctive tulip-shaped leaves and vibrant flowers of its parent species, adding an elegant and compact vertical element to landscaping designs

## Native Amenity Tree Planting

The tree planting for the project showcases a thoughtful selection of native species, each chosen for its ecological compatibility and ability to contribute to a resilient and biodiverse landscape. The chosen species are as follows:

- *Alnus glutinosa* (Alder): is a deciduous tree valued for its adaptability to various soil types, including wet and waterlogged conditions. Renowned for its serrated green leaves and distinctive catkins.
- *Carpinus betulus* (Common Hornbeam): Known for its dense and durable wood, the Common Hornbeam adds structural diversity to the woodland. Its distinctive serrated leaves and tolerance to various soil conditions make it a hardy and valuable choice.
- *Pinus sylvestris* (Scots Pine): A majestic evergreen, the Scots Pine is a symbol of resilience. With its distinctive orange-brown bark and slender needles, it contributes to the visual character of the woodland while offering habitat and shelter for wildlife.
- *Prunus avium* (Wild Cherry): The Wild Cherry, with its elegant blossoms and edible fruit, brings a touch of seasonal beauty and provides a food source for birds. Its inclusion enhances the woodland's visual diversity and ecological richness.
- *Quercus robur* (Common Oak): An emblematic native tree, the Common Oak offers longevity and robust ecological value. Supporting a myriad of insects and serving as a habitat for birds, the oak contributes to the overall biodiversity of the woodland.
- *Ulmus minor*: Noted for its distinctive serrated leaves and gracefully arching branches, the English Elm brings a classic and stately appearance to the environment. Resilient and adaptable, this tree stands as a testament to enduring beauty while providing habitat benefits.

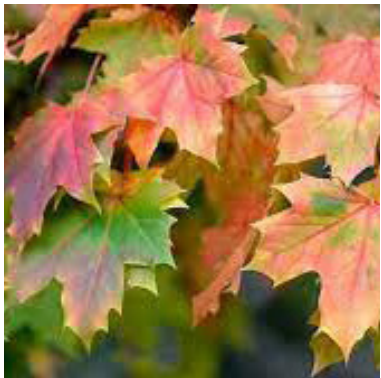
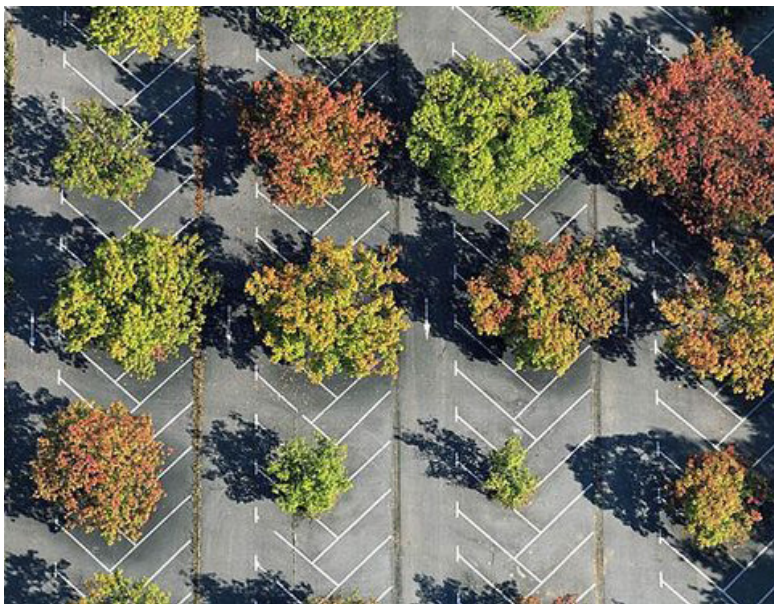


Figure 04-36: Tree Planting



# 4.16 Planting Palette

## Native Shrubs, Herbaceous, Grasses Ferns & Bulbs

For the ornamental planting in the project, a rich variety of shrubs, grasses, bulbs, herbaceous perennials, ferns, and even an orchid have been thoughtfully chosen to create a vibrant and visually appealing landscape. The selection includes:

### Shrubs:

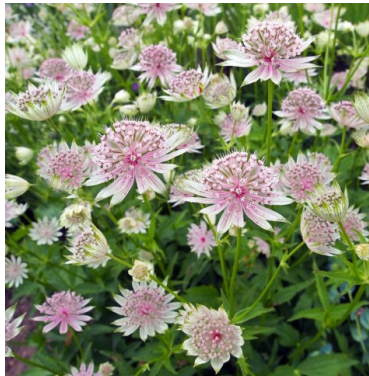
- *Corylus avellana* (Common Hazel): Adds a rustic touch with its catkins and serrated leaves.
- *Lingustrum vulgare* (Common Privet): Forms neat hedges with small, fragrant flowers.
- *Sambucus nigra* (Common Elder): Known for its large clusters of fragrant, creamy flowers.

### Grasses:

- *Calamagrostis x acutiflora* (Feather Reed Grass): Offers elegant, upright plumes in summer.
- *Carex morrowii* (Japanese Sedge): Showcases graceful arching foliage, adding a low-maintenance and textural element to the landscape.
- *Deschampsia cespitosa* (Tufted Hair Grass): Features delicate, airy panicles that sway gracefully in the breeze, contributing a natural and dynamic quality to the surroundings
- *Miscanthus sinensis* (Chinese Silver Grass): Tall grass with feathery plumes, providing movement and texture.
- *Pennisetum setaceum* (Fountain Grass): Displays slender, feathery plumes that evoke a fountain-like effect,
- *Stipa tenuissima* (Mexican Feather Grass): Delicate and wispy, feathery tufts that sway with the wind, imparting a soft and ethereal quality to the landscape.

### Bulbs:

- *Galanthus nivalis* (Snowdrops): Early bloomers, adding delicate white flowers.
- *Hyacinthoides non scripta* (Bluebells): Creates carpets of blue in spring woodlands.
- *Convallaria majalis* (Lily of the Valley): Fragrant and enchanting ground cover.
- *Narcissus pseudonarcissus* (Daffodil): Radiant and iconic, Daffodils herald spring with their golden trumpets.
- *Pulsatilla vulgaris* (Pasque flower): Offering nodding, bell-shaped blossoms in early spring, Pasque flowers.



### Herbaceous Perennials:

- *Allium ursinum* (Ransoms): Woodland carpets adorned with delicate white flowers and lush, broad leaves.
- *Anemone nemorosa* (Wood Anemone): Graceful and ephemeral, Wood Anemones carpet woodland floors
- *Centaurea nigra* (Common Knapweed): Cdark purple flower heads, adds wild beauty and serves as a valuable nectar source.
- *Digitalis mertonensis* (Foxglove): Towering spikes of tubular flowers in various hues, adding vertical interest.
- *Echium vulgare* (Viper's Bugloss): Vibrant blue flowers and bristly foliage, attracting pollinators..
- *Pulmonaria longifolia* (Lungwort): Lungwort, featuring clusters of tubular flowers transitioning from pink to blue.
- *Rudbeckia fulgida deamii* (Black-eyed Susan deamii): Resilient and golden-yellow petals with dark central cones.

### Ferns:

- *Dryopteris affinis* (Scaly Male Fern): Known for its intricate, scaly fronds, the Scaly Male Fern adds texture and greenery.
- *Osmunda regalis* (Royal Fern): Elegant and feathery fronds, adds a touch of sophistication to damp or wet landscapes.
- *Polystichum setiferum* (Soft Shield Fern): Offers lush, finely divided foliage.
- *Athyrium filix-femina* (Lady Fern): Delicate and finely divided, the Lady Fern is a classic choice for woodland gardens,

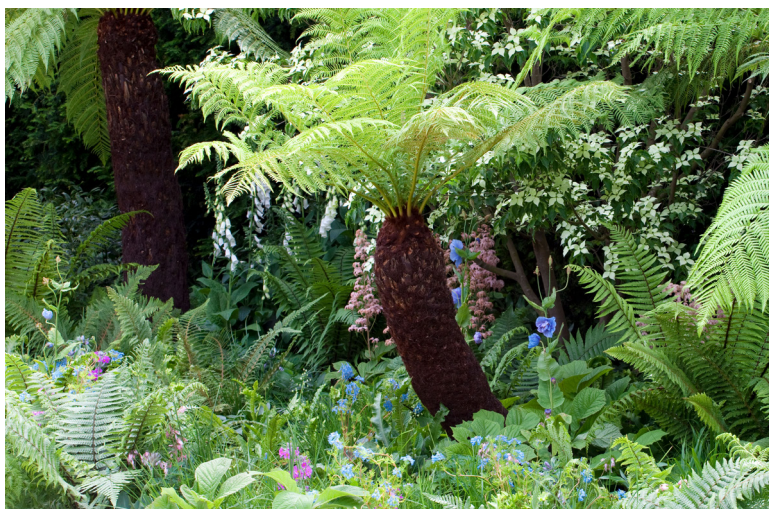


Figure 04-37: Structure Planting



## 4.16 Planting Palette

### SUDS Planting

The planting selection for attenuation ponds and Sustainable Urban Drainage System (SUDS) areas is carefully curated to foster ecological balance and water management. These plants contribute to both the aesthetic appeal and functional resilience of these crucial environmental components.

#### Marginal Plants:

- *Iris pseudacorus* (Yellow Flag Iris): Adds vibrant yellow blooms along water edges.
- *Lythrum salicaria* (Purple Loosestrife): Presents striking spikes of purple flowers, attracting pollinators.
- *Mentha aquatica* (Water Mint): Fragrant and thrives in damp conditions, providing a natural scent.
- *Myosotis scorpioides* (Water Forget-Me-Not): Delicate blue flowers enhance the water's edge.
- *Juncus effusus* (Soft Rush): A grass-like rush that stabilizes banks and provides habitat.
- *Caltha palustris* (Marsh Marigold): Adorns wet areas with bright, yellow blooms.

#### Bog Garden Plants:

- *Gunnera manicata* (Giant Rhubarb): Impressive in scale, offering visual drama.
- *Lobelia cardinalis* (Cardinal Flower): Presents striking red flowers, attracting hummingbirds.
- *Mimulus guttatus* (Monkey Flower): Cheerful yellow blooms add vibrancy.
- *Primula florindae* (Giant Himalayan Cowslip): Tall spikes of fragrant flowers contribute to the biodiversity.

#### Ground Cover Plants:

- *Geum rivale* (Water Aven): Low-growing with nodding flowers, forming attractive ground cover.
- *Calla palustris* (Bog Arum): White flowers and distinctive arrow-shaped leaves create visual interest.
- *Iris versicolor* (Blue Flag Iris): Offers showy blue flowers and linear foliage.
- *Lysimachia nummularia* (Creeping Jenny): Spreading ground cover with bright yellow flowers.

#### Grasses and Rushes:

- *Carex acutiformis* (Lesser Pond Sedge): Grass-like sedge that thrives in damp conditions.
- *Glyceria maxima* (Reed Sweet Grass): Tall grass providing habitat and stabilizing pond edges.
- *Phalaris arundinacea* (Reed Canary Grass): Hardy grass with feathery flower heads.

#### Shrubs:

- *Cornus sericea* (Red Osier Dogwood): Offers red stems for winter interest.
- *Salix purpurea* (Purple Osier Willow): Purple stems provide visual appeal and erosion control.
- *Myrica gale* (Bog Myrtle): Fragrant shrub with historical uses, contributing to biodiversity.
- *Spiraea japonica* (Japanese Meadowsweet): Compact shrub with clusters of small flowers.

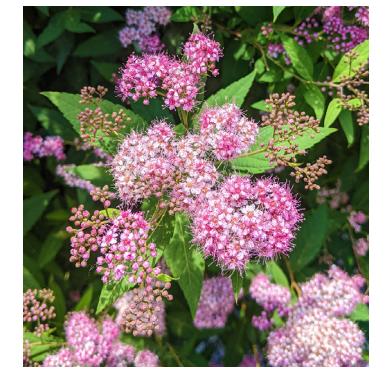
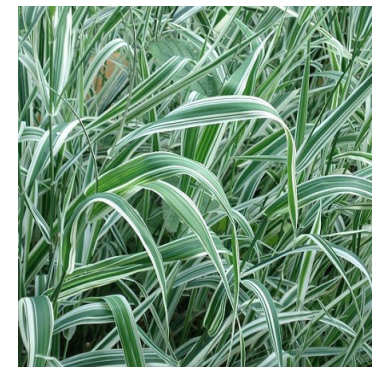
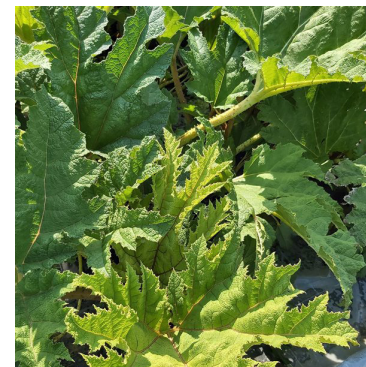
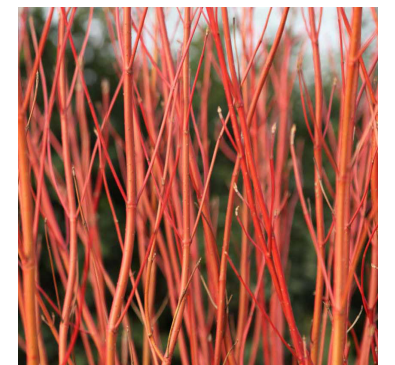
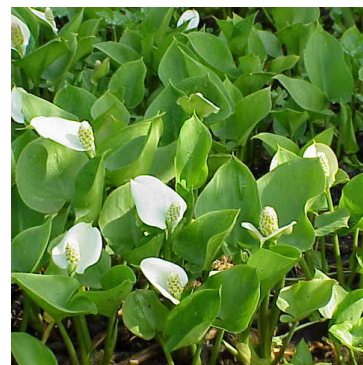


Figure 04-38: SUDS Planting



# 4.16 Planting Palette

## Wildflower Meadow

In the meadow grass areas, a meticulous selection of wildflowers and grasses has been chosen to create a vibrant and biodiverse landscape. This thoughtful mix enhances the visual appeal of the meadows while providing essential habitats for pollinators and other wildlife.

### Wild Flowers – 20%:

- *Achillea millefolium* (Yarrow): A resilient and aromatic wildflower with intricate white blooms.
- *Agrimonia eupatoria* (Agrimony): Bears slender spikes of yellow flowers, contributing to meadow diversity.
- *Betonica officinalis* (Betony): Displays spikes of purple flowers, adding a touch of colour to the meadow.
- *Centaurea nigra* (Common Knapweed): Attracts pollinators with its distinctive purple flowers.
- *Filipendula ulmaria* (Meadowsweet): Graceful clusters of creamy-white flowers provide visual interest.
- *Galium verum* (Lady’s Bedstraw): Forms low mats of yellow flowers, contributing to the meadow tapestry.
- *Geranium pratense* (Meadow Crane’s-bill): Presents delicate blue flowers amid the grasses.
- *Lathyrus pratensis* (Meadow Vetchling): Displays charming yellow blooms, enriching the meadow palette.
- *Leucanthemum vulgare* (Oxeye Daisy): Iconic white daisies add a classic touch to the meadow.
- *Lotus corniculatus* (Bird’s-foot Trefoil): Yellow flowers resemble bird’s feet, enhancing biodiversity.
- *Malva moschata* (Musk Mallow): Delicate pink flowers contribute to the meadow’s visual appeal.
- *Plantago lanceolata* (Ribwort Plantain): Slender spikes of flowers add structural diversity.
- *Primula veris* (Cowslip): Clusters of nodding yellow flowers provide a charming display.
- *Prunella vulgaris* (Selfheal): Low-growing purple flowers support pollinators.
- *Ranunculus acris* (Meadow Buttercup): Vibrant yellow flowers stand out in the meadow.
- *Rhinanthus minor* (Yellow Rattle): Semi-parasitic plant with distinctive yellow flowers.
- *Rumex acetosa* (Common Sorrel): Adds a touch of red with its slender, red-tinged flower spikes.
- *Sanguisorba officinalis* (Great Burnet): Unique maroon flower heads contribute to diversity.
- *Silene flos-cuculi* (Ragged Robin): Displays distinctive pink flowers, enhancing the meadow palette.
- *Vicia cracca* (Tufted Vetch): Clusters of purple flowers climb amid the grasses, supporting biodiversity.

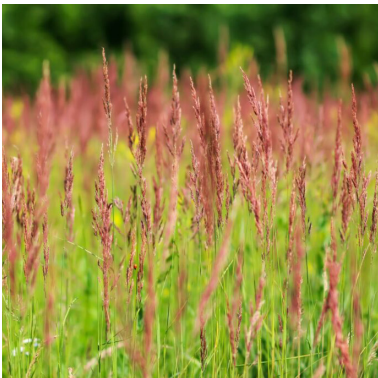
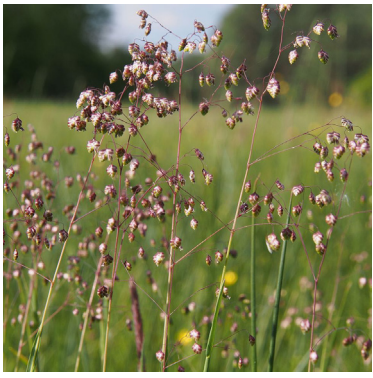


Figure 04-39: Wildflower Meadow

### Grasses – 80%:

- *Agrostis capillaris* (Common Bent): Fine-textured grass contributing to the meadow’s overall texture.
- *Anthoxanthum odoratum* (Sweet Vernal-grass): Adds a sweet fragrance to the meadow environment.
- *Briza media* (Quaking Grass): Graceful nodding flower heads bring a delicate touch to the grassy expanse.
- *Cynosurus cristatus* (Crested Dogstail): A fine grass contributing to the meadow’s structural diversity.
- *Festuca rubra* (Red Fescue): Fine-textured grass forming dense tufts amid wildflowers.
- *Alopecurus pratensis* (Meadow Foxtail): Contributes to the meadow’s texture with its dense, cylindrical flower spikes.



## 4.17 Management & Maintenance

The process by which the landscape is cared for is just as important as the design. Ensuring that adequate provision is made for how new infrastructure will be managed and maintained at the outset is fundamental to achieve a successful legacy. This includes clearly defining who is responsible for the infrastructure, for undertaking the aftercare activities and ensuring there is adequate funding in place to undertake these tasks. As such the future maintenance requirements have been considered during the development of the design. Whilst all aspects have not been fully resolved at this stage, this section documents the status of key elements and forms the basis of the approach.

### Management

It is anticipated that ownership of the site is to be transferred to Wrexham Borough Council, with the infrastructure becoming a council asset. This will result in the Council becoming ultimately responsible for the car park and its management and maintenance.

At this point in time information related to design and construction will be collated through the Operation and Maintenance manual and Health and Safety file and provided to the site owner.

The scheme will result in to following assets:

- Hard Landscape Treatments, comprising:
  - Bitmac – carriageways
  - Reinforced gravel – parking bays
  - Hoggin – paths
- Soft Landscape Treatments comprising:
  - Existing planting
  - Woodland
  - SuDS
  - Tree Planting
  - Native and Semi-ornamental
  - Wildflower meadows
  - Reinforced grass
- Drainage elements, comprising
  - Ponds
  - Porous pavements
  - Positive drainage elements.

- Street Furniture, comprising:
  - Benches
  - Barriers & Bollards
  - Bins
  - Lighting
  - Signage
  - Fencing, gates and boundary treatments.

Options are available for the operation of the car park, such as directly by the Council or a lease arrangement with a third party - such as the Canal and River Trust. This could result in certain management responsibilities being undertaken by the third party (such as revenue collection, security and routine inspections), with routine maintenance being undertaken by the Council and funded in part through car park revenue contributions. Whilst no firm decision has been made upon this at this point in time, it is a priority to resolve prior to construction. Should this become the case it recommended that a management working group is established with roles and responsibilities clearly defined.

Key management principles are proposed as follows:

- Provide a well maintained and safe environment which is befitting the World Heritage Site environment.
- Manage new and existing soft landscape elements in a manner that promotes biodiversity and habitat creation where appropriate.

Three key management time periods are anticipated which relate to the soft estate, which require different maintenance tasks and are likely to be undertaken by different organisations. These are:

- Defects Period - immediately after construction (0-2 years), typically undertaken by the works contractor.
- Establishment Period – A key period after the defects period where the solutions grown and mature (typically 2-10 years, up to 25 years for trees). This could be undertaken by the works contractor or by the council.
- Long term Management Period (after 10 years) – The ‘business as usual’ time period where the solutions have developed adequately, and routine maintenance tasks are undertaken.





# Maintenance

It is anticipated that the Council will either undertake maintenance tasks directly or procure external contractors to undertake these tasks. It is likely that maintenance will be split into different departments - for example trees being maintained and managed by the Arboriculture department, whereas wildflower meadows could be looked after by the Open Spaces department. As the project progresses further engagement with the Council teams who would take on these assets will be undertaken to develop the aftercare strategy and secure adequate resources in the long-term. This will be captured within a Landscape and Ecology Management Plan, which is anticipated as a planning condition if permission is granted. Essential operations for each time period are noted below.

Essential operations with the Defects period include:

- watering,
- formative pruning,
- weed control,
- plant feeding (where considered a benefit),
- monitoring for growth and plant health,
- replacement of failed planting,
- first cuts for meadows and establishment cuts to reinforced grass parking areas.
- Regular inspections of the drainage ponds and infrastructure.

Typical operations within the Establishment period include:

- watering (till 3 years after planting for new tree planting),
- formative pruning,
- weed control,
- periodic tree safety inspections,
- monitoring for growth, plant health,
- yearly cuts for meadows, and infrequent cuts to reinforced grass parking areas
- Routine inspections of the drainage ponds and infrastructure.
- Biannual cleaning of all signage and benches.
- Annual inspections to all hard surfaces, and remedial works undertaken as required (such as hoggin top up).

Typical operations within the Long-Term management period include:

- weed control,
- monitoring for growth, plant health,
- periodic tree safety inspections,
- yearly cuts for meadows, and infrequent cuts to reinforced grass parking areas.
- Routine inspections of the drainage ponds and infrastructure.
- Biannual cleaning of all signage and benches.
- Annual inspections to all hard surfaces, and remedial works undertaken as required (such as hoggin top up).









