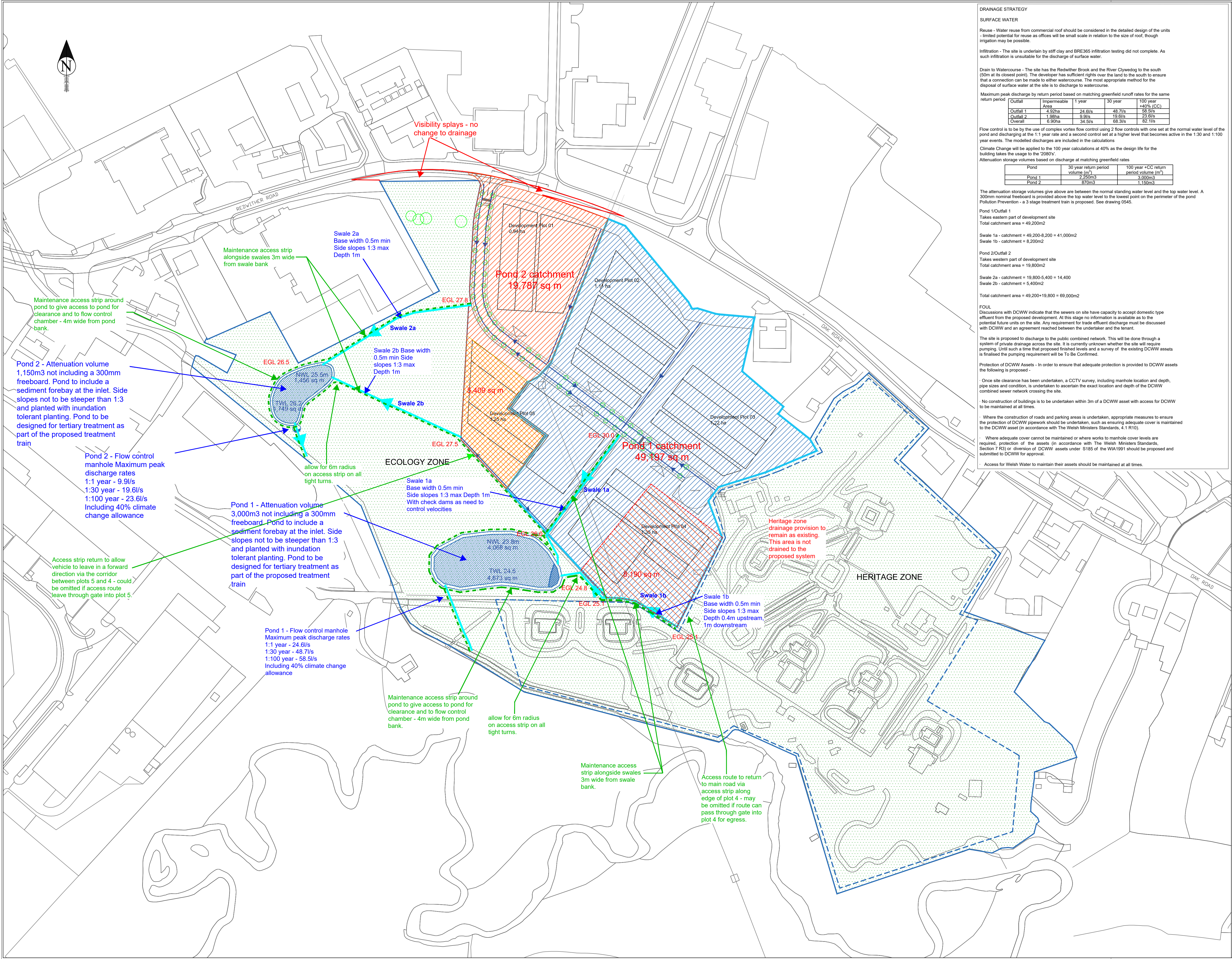




DRAINAGE STRATEGY

SURFACE WATER

Reuse - Water reuse from commercial roof should be considered in the detailed design of the units
- limited potential for reuse as offices will be small scale in relation to the size of roof, though irrigation may be possible.

Infiltration - The site is underlain by stiff clay and BRE365 infiltration testing did not complete. As such infiltration is unsuitable for the discharge of surface water.

Drain to Watercourse - The site has the Redwither Brook and the River Clywedog to the south (50m at its closest point). The developer has sufficient rights over this land to the south to ensure that a connection can be made to either watercourse. The most appropriate method for the disposal of surface water at the site is to discharge to watercourse.

Maximum peak discharge by return period based on matching greenfield runoff rates for the same return period

Outfall	Impermeable Area	1 year	30 year	100 year
Outfall 1	4.92ha	24.6l/s	48.7l/s	+40% (CC) 68.5l/s
Outfall 2	1.98ha	9.9l/s	19.6l/s	23.6l/s
Overall	6.90ha	34.5l/s	68.3l/s	92.1l/s

Flow control is to be by the use of complex vortex flow control using 2 flow controls with one set at the normal water level of the pond and discharging at the 1:1 year rate and a second control set at a higher level that becomes active in the 1:30 and 1:100 year events. The modelled discharges are included in the calculations

Climate Change will be applied to the 100 year calculations at 40% as the design life for the building takes the usage to the '2080's'

Attenuation storage volumes based on discharge at matching greenfield rates

Pond	30 year return period volume (m ³)	100 year +CC return period volume (m ³)
Pond 1	2,250m ³	3,000m ³
Pond 2	870m ³	1,150m ³

The attenuation storage volumes give above are between the normal standing water level and the top water level. A 300mm nominal freeboard is provided above the top water level to the lowest point on the perimeter of the pond.

Pollution Prevention - a 3 stage treatment train is proposed. See drawing 0545.

Pond 1/Outfall 1
Takes eastern part of development site
Total catchment area = 49,200m²

Swale 1a - catchment = 49,200-8,200 = 41,000m²
Swale 1b - catchment = 8,200m²

Pond 2/Outfall 2
Takes western part of development site
Total catchment area = 19,800m²

Swale 2a - catchment = 19,800-5,400 = 14,400
Swale 2b - catchment = 5,400m²

Total catchment area = 49,200+19,800 = 69,000m²

FOUL

Discussions with DCWW indicate that the sewers on site have capacity to accept domestic type effluent from the proposed development. At this stage no information is available as to the potential future units on the site. Any requirement for trade effluent discharge must be discussed with DCWW and an agreement reached between the undertaker and the tenant.

The site is proposed to discharge to the public combined network. This will be done through a system of private drainage across the site. It is currently unknown whether the site will require pumping. Until such a time that proposed finished levels and a survey of the existing DCWW assets is finalised the pumping requirement will be To Be Confirmed.

Protection of DCWW Assets - in order to ensure that adequate protection is provided to DCWW assets the following is proposed -

- Once site clearance has been undertaken, a CCTV survey, including manhole location and depth, pipe sizes and condition, is undertaken to ascertain the exact location and depth of the DCWW combined sewer network crossing the site.
- No construction of buildings is to be undertaken within 3m of a DCWW asset with access for DCWW to be maintained at all times.
- Where the construction of roads and parking areas is undertaken, appropriate measures to ensure the protection of DCWW pipework should be undertaken, such as ensuring adequate cover is maintained to the DCWW asset (in accordance with The Welsh Ministers Standards, 4.1 R10).
- Where adequate cover cannot be maintained or where works to manhole cover levels are required, protection of the assets (in accordance with The Welsh Ministers Standards, Section 7 R3) or diversion of DCWW assets under S185 of the WIA1991 should be proposed and submitted to DCWW for approval.
- Access for Welsh Water to maintain their assets should be maintained at all times.

- Notes**
1. Do not scale from drawing. Not issued for construction
 2. Location and exact alignment of drainage and water strategy requirements requires confirmation on site.
 3. Surface water sewer and drainage locations are indicative only and not to be used for construction
 4. Topographic site levels have been utilised for development of this be subject to change based on development finishing and layout amendments.

TerraConsult

Bold Business Centre, Bold Lane,
Sutton, St Helens WA9 4TX

Client

Site

**The Oaks
Wrexham**

Title

Proposed Drainage Strategy

Scale	1:1,500	@ A1
Drawing No.	TOW-TCL-HDG-XX-DR-D-0510	
Rev	Date	Description
A	04/20	New Layout & Drainage Amendments
B	10/20	Maintenance Access Routes Added
File	TOW-TCL-HDG-XX-DR-D-0510 RevB.dwg	
Date	04/20	Engineer TCL
Drawn	PP GH	Checked DRAFT