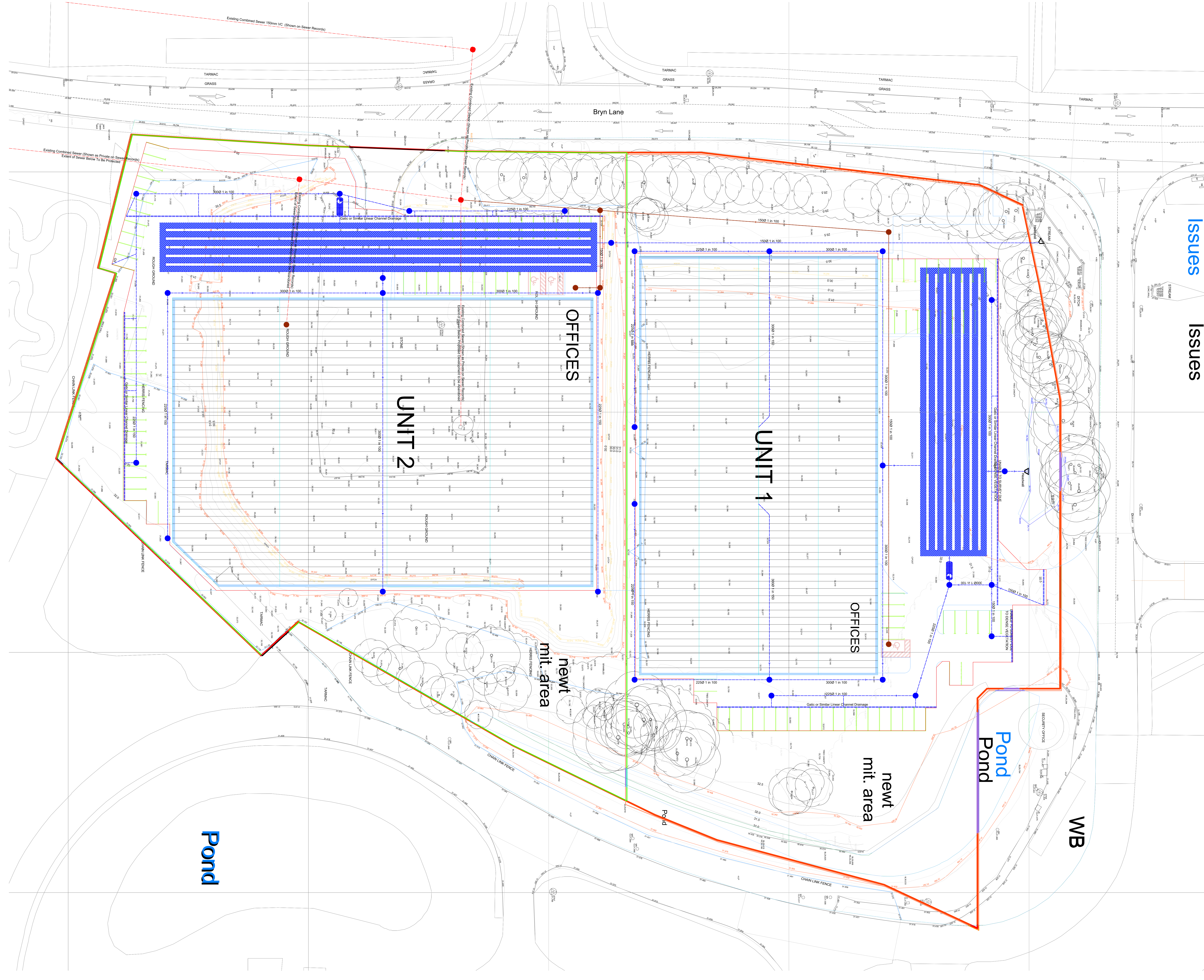
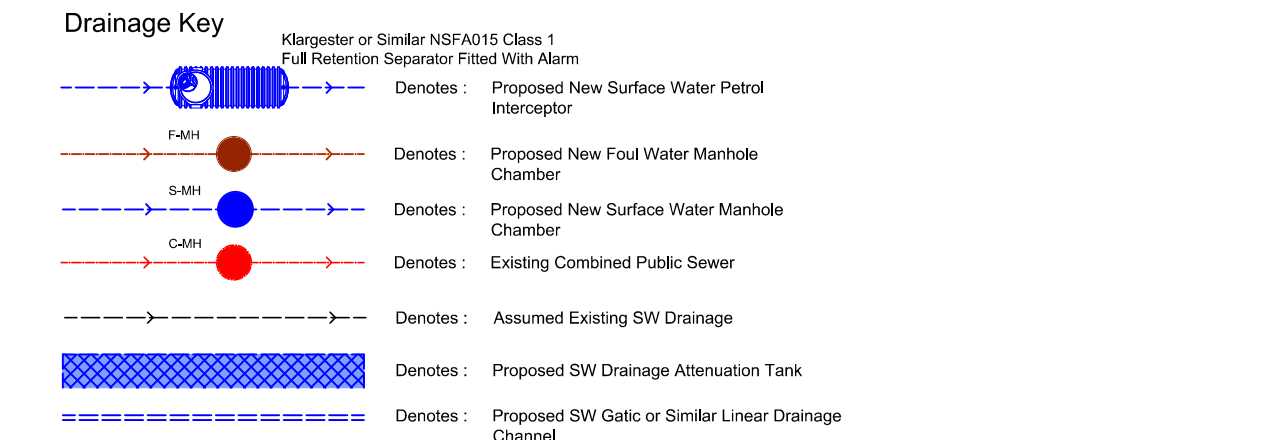




- DRAINAGE NOTES**
- This drawing shall be read in conjunction with all other relevant drawings.
 - Any ambiguities, omissions and errors on Drawings, shall be brought to the Engineers attention immediately.
 - The Contractor shall confirm the location and level of existing drainage outfalls prior to commencement of the drainage works.
 - Exact locations of proposed manholes and inspection chambers to be determined on site.
 - All pipes built into the manhole inverts shall be installed with sufficient levels. Unless shown otherwise.
 - Connections to road gullies shall be in 150mm nominal bore. Connections to other terminal fittings shall be in 100mm nominal bore pipe. Unless shown otherwise.
 - Cover levels shown are approximate and shall be adjusted and confirm on site by the Contractor.
 - The Contractor shall control accurate line and level of pipe laying by use of an optical laser.
 - The Contractor shall protect the pipeline from damage by site traffic during construction.
 - Pipeline and fittings shall comply with the following requirements except where noted otherwise:
 - All rest bend to stacks of more than 3 storeys (i.e. extending above ground +3) to be 750mm below lowest branch, i.e. min 650mm below GFL. All other rest bends to be minimum 450mm below FFL.
 - All drains passing through walls or foundations to have 600mm long rocker pipes either side with C20 concrete surround and soft joint at coupling.
 - All SVP and stub stack connections to have sealed access covers for rodding and clearing.
 - Pipeline with less than 100mm cover from finished road level shall be protected with a 150mm C20 concrete surround and surround. Flexible joints shall be maintained at 1 metre centres on pipe joints with compressible sheet 15mm thick. Trenches in highways and car parking areas shall be backfilled with Type 1 granular sub-base.
 - Soft spots in the trench formation shall be removed and replaced with granular bedding unless instructed otherwise.
 - Road gullies shall be constructed using a 900mm deep x 375mm diameter gully pot, surrounded by 150mm thickness C20 concrete, with rodding eye and chained stopper.
 - Gully covers shall be Grade B captive rimmed ductile iron to BS497 black coated.
 - Unless noted otherwise manhole covers shall be ductile iron to BS497 black coated with 600 x 600 square opening as follows:-
 - Highways - Class D400
 - Car Parks - Class C250
 - Landscape - Class B125

- Connections in pipes between manholes runs shall be formed by using purpose made 45° junction fittings to BS656. Bend fittings shall be provided where appropriate to direct the flow in the main runs. Alternatively man pipes may be diameter cord to like lateral connections with a saddle fitting to BS85 and 150mm C20 concrete surround.
- The Contractor shall confirm the location of all existing statutory undertakers apparatus and service connections by trial pits prior to opening up for the works.
- All inlet and outlet pipes from manholes require rocker pipes in accordance with UU standard Details.

- Materials**
- Protection to drains and gully connections may be concrete bed and surround between cover depths of 450mm to 200m.
 - All pipes and joints for use in drains shall comply with the manufacturers requirements.
 - Clay Pipe:
 - Clay pipes to be used for sewerage shall be British Standard pipes and pipes for surface water shall be either British Standard or British Standard.
 - Surface Water all manufactured to the requirements of BS EN 295 and BS551991. The pipes shall be Type 1 sockets and supplied complete with the manufacturer's recommended flexible joints, or with Type 2 Sockets for cement mortar joints or plan ended pipes supplied with sleeve couplings.
 - Watertight Flexible Joints for clayware pipes shall comply with BS EN 295 and BS551991.
 - Concrete Pipes:
 - Concrete pipes for general drainage shall comply with the requirements of BS EN 1916:2002 and BS5911-1:2002, except that they may be complete.
 - with watertight flexible joints, as supplied by the manufacturer.
 - Watertight flexible joints shall be so constructed as to tolerate a longitudinal movement of ±10mm without breaking the joint.
 - Unplasticised Polyvinyl Chloride (PVC-U) Pipes shall conform to BS EN 1401-1:2009, BS EN 13598-1:2003, BS5506:1969 and BS4660:2000 for pipes up to 160mm nominal external diameter and to BS EN 1401-1:2009 for pipes above 200mm nominal external diameter.
 - Substrate material shall be granular material in accordance with the recommendations of BS EN 8855, Part 6: 1980 having a nominal particle size not exceeding 10mm or 15mm for 110mm and 150mm diameter pipes respectively, or that which passes the tests described in appendix A of the above standard.
 - Where drains are required to be laid under buildings, deep hardcore from within the foundation boundaries should be compacted prior to excavating the trench for the pipe. Suitable material should then be employed for the bedding and backfilling.
 - When trenches are dug from original ground, pipes may be laid and surrounded with appropriate material before the top layer of hardcore is placed. Where pipes pass through a wall or foundations of a building, they should be protected by a liner or sleeve.
 - Shallow drains: Where there is risk of damage, pipes laid at less than 600mm depth (not under a road) should be protected by use of a paving slab or similar. A minimum 75mm cushioning layer of granular material must be laid between any slab and the crown of the pipe.
 - Pipes laid under roads: The minimum cover under roads should be 0.5m from the top of the pipe. Where this is less than 0.5m additional protection is required ie, reinforced bridging slabs.



- General Notes**
- The Contractor must check all existing drainage levels prior to undertaking any works on site and Report in Writing the Findings.
 - Any connections to existing public sewer will be subject to Agreement with the statutory undertaker of the existing sewerage.
 - All rainwater positions are shown indicative and the final building drainage is the be agreed prior to undertaking any drainage works on site.
 - All proposed cover and invert levels are subject to final design and to be in conjunction with the finalised building layout and levels.
 - Final discharge rate to be agreed with LPA and Statutory Authority (United Utilities)

Drained Area & Attenuation Volumes				
Area Ref	Drained Area m ²	Dev Area m ²	1 in 30 + 0%	1 in 100 + 40%
Unit 1	7275m ²	N/A	895m ³	2 1/2
Unit 2	8091m ²	N/A	865m ³	2 1/2
				4 1/2 Total

Proposed Surface Water Drainage Strategy & Flood Risk Assessment

The proposed development site has been identified as being located within Flood Zone 1, Land and Property having Low Probability of Flooding (<0.1%).

The existing ground conditions on site are generally believed to be unsuitable for use as soakaways to deal with the increased volumes of surface water drainage as a result of the proposed extension and increase in service yard areas created.

It is proposed to use below ground large diameter pipe storage tanks (Tubosider or Similar) which incorporate the flow control device to limit the discharge to 2 l/s to each unit.

Attenuation will be designed to achieve the 1 in 100 year rainfall event + 30% Climate Change event with no flooding occurring on or off site.

The designated flow will connect to the existing Surface Water Ponds currently on site by means of a headwall.

Attenuation for the 1 in 100 year + 40% climate change will be achieved by utilising shallow flooding of the service yards, car parking areas by creating falls to the slot drains to achieve the additional volume required.

The shared attenuation tank will have independent flow control device in line with the agreed flow rates outlined above. The flows will be restricted by means of a hydrobrake float either within the attenuation tank or in the final manhole prior to discharge into the existing surface water sewer network on site.

All of the proposed finished floor levels and external levels will be set to mitigate any risk of overland flooding from sites in and around the development site by way of maintaining service yard levels below the levels of the buildings.

The site will be fully self contained and individually responsible for the maintenance of the attenuation system within the curbside of the unit boundary.

A Full Retention pond interceptor to restrict of from entering the system prior to discharge into the public surface water sewers will be incorporated due to the areas of external service yards being used for parking of HGV's in addition to cars.

Planning Issue - Not For Construction

Rev.	Date	Description	Status	Rev. by
P1	02.08.2021	First Issue	Planning Issue	MUJ

Project Bryn Lane, Wrexham Industrial Estate
Proposed Site Redevelopment

Title Proposed Foul & Surface Water Drainage Strategy

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Director	Proj. Eng.	Client
Drawn by	Checked by	Drawing Number

Scale 1:250 @ A0 Date August 2021 1123-21-01-001 P1

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