Issue 03 : 03:2021

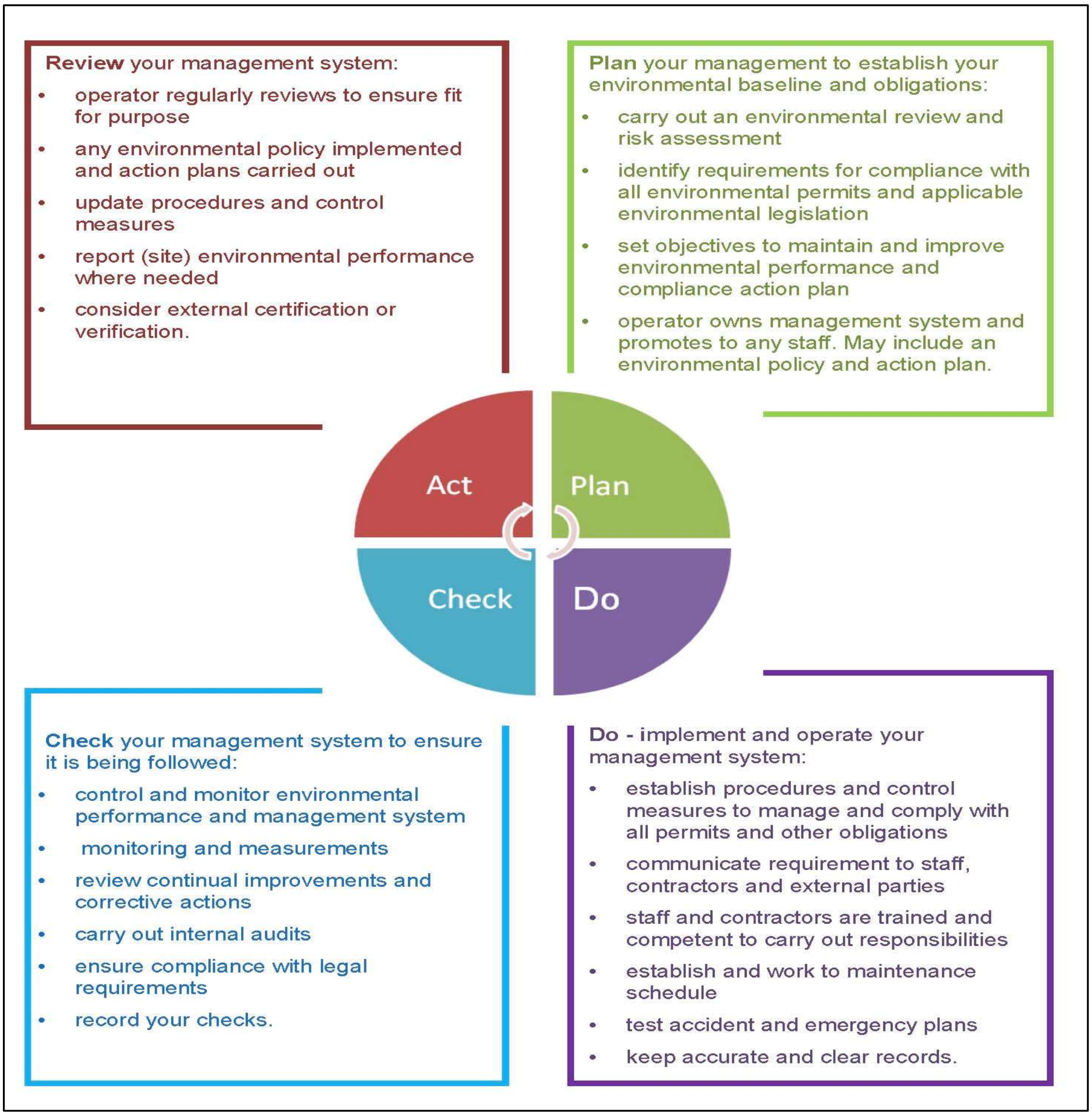
CHELSON MEADOW LEACHATE TREATMENT PLANT MANAGEMENT SYSTEM

PLYMOUTH CITY COUNCIL, THE RIDE, PL9 7JT

QUALITY CHECK			
SECTION	ISSUE	DATE OF ISSUE	SIGNATURE
Contents	03	03.2021	
1	03	03.2021	
2	03	03.2021	
3	03	03.2021	
4	03	03.2021	
5	03	03.2021	
6	03	03.2021	
7	03	03.2021	
8	03	03.2021	
Appendix A	03	03.2021	
Appendix B	03	03.2021	
Appendix C	03	03.2021	
Appendix D	03	03.2021	
Appendix E	03	03.2021	
Appendix F	03	03.2021	
Appendix G	03	03.2021	
Appendix H	03	03.2021	
Appendix H	03	03.2021	

1.0 Introduction

In accordance with minimal requirements stipulated by the Environment Agency (EA) guidance on the gov.uk page (*Develop a management system: environmental permits*) https://www.gov.uk/guidance/develop-a-management-system-environmental-permits the written (site) management system for the permitted Leachate Treatment Plant (LTP) at Chelson Meadow is based on the Plan Do Check Act (PDCA) cycle. This cycle represents a continual process of review and improvement of performance, as shown below.



This document, the Chelson Meadow Leachate Treatment Plant Management System (LMS), outlines key operational procedures central to the Environmental Management System (EMS) for Chelson Meadow LTP. Like the EMS, it is a living document subject to periodic internal review and should be read in conjunction with the EMS, planning permission and the

Environmental Permit for Chelson Meadow LTP. Any alterations to the waste operations at the site, i.e. changes to mechanical plant or waste treatment processes etc., should prompt an immediate review of the LMS.

.

Record of Amendments

Issue	Date of Issue	Reason for amendment	Details of amendment
01	November 2006	Permit Application	
02	September 2011	Permit Variation	
03	March 2021	Permit Variation	

Redundancy of an issue should be indicated by striking through on the form above.

1.1 Records of Training on this Management System

All personnel employed by Plymouth City Council (PCC) and any contractors who work on the LTP or take over its management, including temporary staff, should be trained in this LMS by a competent person. A record of all training should be made in the table below. In the event of any amendment all relevant personnel must be retrained in the entire system but with particular attention to the amended information, after which the following form should be completed.

Name	Responsibility	Details of Trainer	Date	Signature
Peter McNamara	TCM	G Leppitt		

An up-to-date copy of the above table should be stored in personnel records and all previous tables retained.

1.2 Management System

Under the conditions of the Permit (EPR/CP3731LZ/V004) (Appendix A) the following requirements must be met:

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with rule 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

In accordance with minimal requirements stipulated by the EA guidance on the gov.uk page (*Develop a management system: environmental permits*) the written (site) LMS for the permitted and operational LTP contains the following sections:

- Environmental risk assessment (*Section 7, Appendix G*)
- A risk assessment for the site outlining the foreseeable environmental risks
- A description of the appropriate measures used to minimise these risks
- Site operations (Section 5, 6 & Appendix A, C H & I)
- Maintenance plan (Section 4 & Appendix F)
- Accident/emergency plan (*Appendix H*)
- Training (Sections 1 & Appendix D)
- Records (Section 5 & 6, Appendix E, F & I).

Normally, the site management system will be reviewed every four years but more frequently in the event of any of the following:

- changes on site in operational activities and/or equipment;
- requirement for a variation to the permit;
- an accident, complaint, at the request of the EA or breach of the permit.

This document forms part of the wider EMS for the LTP, structured in accordance with ISO14001 (2015). The PCC Environmental Policy for the LTP is shown in Box 1.1.

Plymouth City Council	Section 1
Environmental Policy (4.4)	MCERTS CHELSON MEADOW LTP

Section 1. Environmental policy 4.4

Aim

4.4.1 The Operator shall establish and maintain a documented quality/environmental policy. The policy shall be issued under the authority of top management. A policy statement in compliance with the requirements of ISO 14001 that includes a commitment to comply with applicable legal requirements shall be considered to meet this requirement.
4.4.2 Those responsible for MCERTS related operations shall be made aware of the policy.

Method

The management of Chelson Meadow Waste Facility recognise that it has a responsibility and duty of care to the environment in which it operates. The activities of the whole facility including the LTP have an environmental effect not only on its workforce but also on many other individuals and groups such as customers, local residents and the wider community. The management therefore intend to provide and develop services which, within reasonable practical constraints, limit or avoid adverse impacts on the environment. In order to achieve the following policy aims have been set.

- To identify the significant environmental impacts of the all facets of the waste management activities which it can reasonably be expected to control.
- To achieve a thorough knowledge of the actual, or potential, environmental impacts arising from raw materials, waste management activities and processes.
- To continually improve the environmental performance of the waste management activities and minimise the impact arising from any actual or potential pollution.
- To meet or exceed where practical all legislative, regulatory and other compliance obligations relating to the environmental and waste management activities.
- To achieve the MCERTS site conformity inspection certificate for the open channel flow meter/sensor.
- To set out and regularly review and amend the key environmental objectives to be achieved and draw up targets and timetables to achieve these objectives.
- To set up and maintain a management system supported by sufficient resources to achieve these objectives and targets.
- To minimise, where technically and economically possible, the consumption of energy, water and non-renewable resources.
- To give adequate consideration to environmental impacts when decisions are taken on the purchasing of raw materials, machinery and consumable items.
- To provide the interested parties with relevant and appropriate information and establish open and on-going dialogue with persons having a bona fide interest in the waste management activities.
- Raise the awareness and understanding of all staff about the management's environmental policy and related matters and actively encourage the participation and contribution of all staff in these matters.

Signed ....(Compliance Technician)

Date ....20.11.2019....................

Box 1.1: ISO14001 Environmental Policy for PCC and applied to the LTP

1.3 Site Context

Chelson Meadow Leachate Treatment Plant is adjacent to the east bank of the River Plym, east of the city of Plymouth and south of the A38 trunk road. The National Grid Reference for the centre of the site is approximately SX50612 54476 (Figure 1.1 & Plate 1.1). The LTP Permit boundary occupies an area of approximately 0.63 ha.

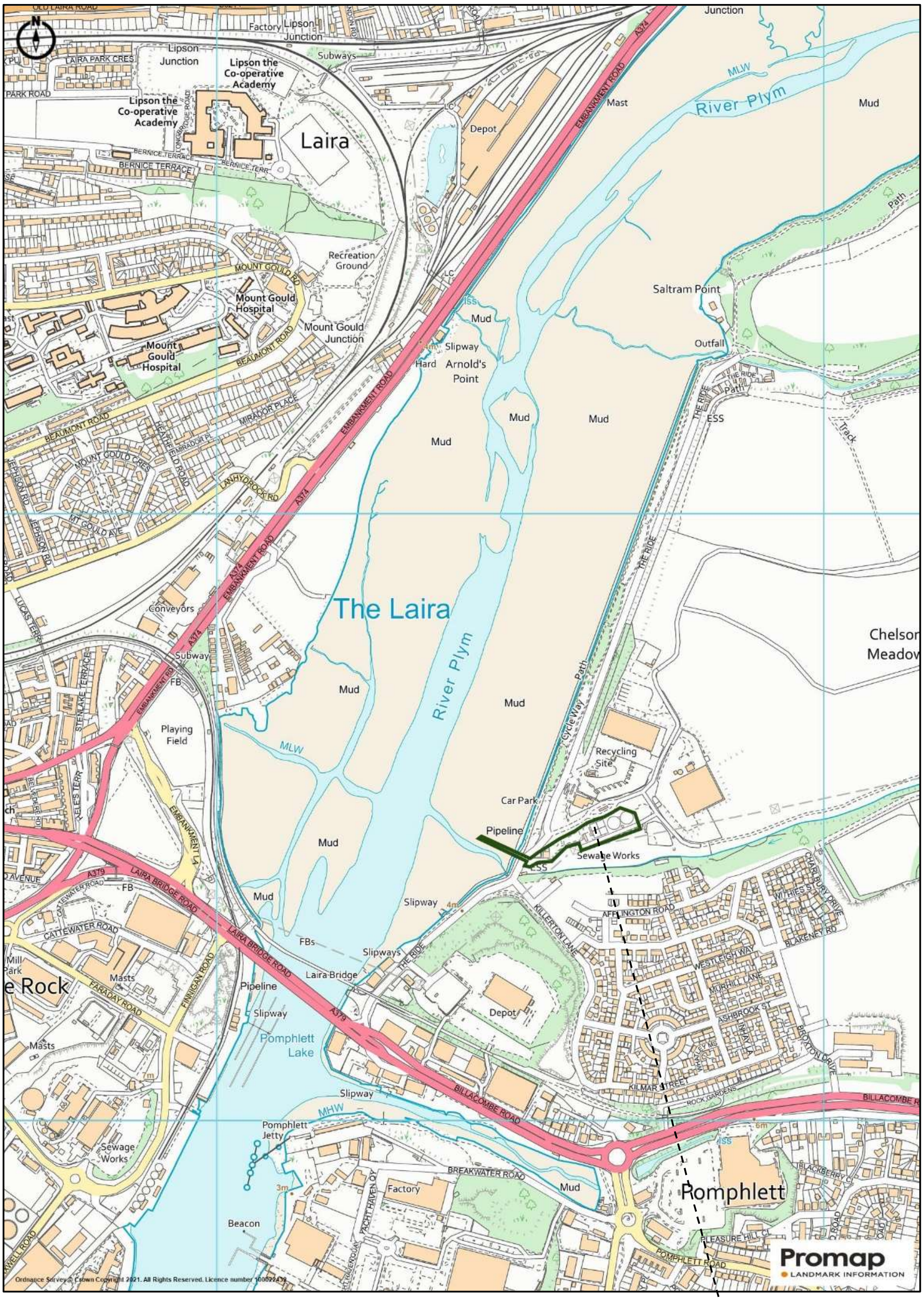


Figure 1.1: Location and permit boundary of Chelson Meadow LTP outlined in green

Plate 1.1: Aerial view of Chelson Meadow LTP, with the permit boundary shown in green, 2017

Plate 1.2: Haul road to access the LTP and the wider facility, looking west south west and showing the south end of the permit area, viewed from on top of the SBRs, 2021

Plate 1.3: South east boundary to the permit area, looking south east across the old lagoon towards the new housing estate, viewed from the top of the SBR, 2021

Plate 1.4: Looking south west across the old lagoon towards the new housing estate, viewed from the top of the SBR, 2021

Plate 1.5: Looking north across the adjacent waste facility, viewed from the top of the SBR, 2021

The LTP permit area is in the south west corner of the former closed Chelson Meadow landfill inter-related permitted waste facilities comprised of Refuse Transfer Station (RTS), Household Waste Recycling Centre (HWRC) and Viridor Materials Recycling Facility (MRF).

Planning permission was granted on May 12th 1995 for the construction of the LTP (Application & Decision No. 08.00.00447.95, Appendix B). Further planning permission was granted on January 14th 2011 for the construction of storage tanks (Application & Decision No. 10/02029/FUL, Appendix B).

Before 2007 the LTP was regulated under the landfill permit. The separate LTP permit issued in 2007 has had several variations subsequently; the main one was in 2011 to include two above ground storage tanks, requiring an increase in the permit boundary (Box 1.2; Plate 1.6).

The current boundary is shown in Figure 1.2 and Drawing No. LTP01 (Appendix C).

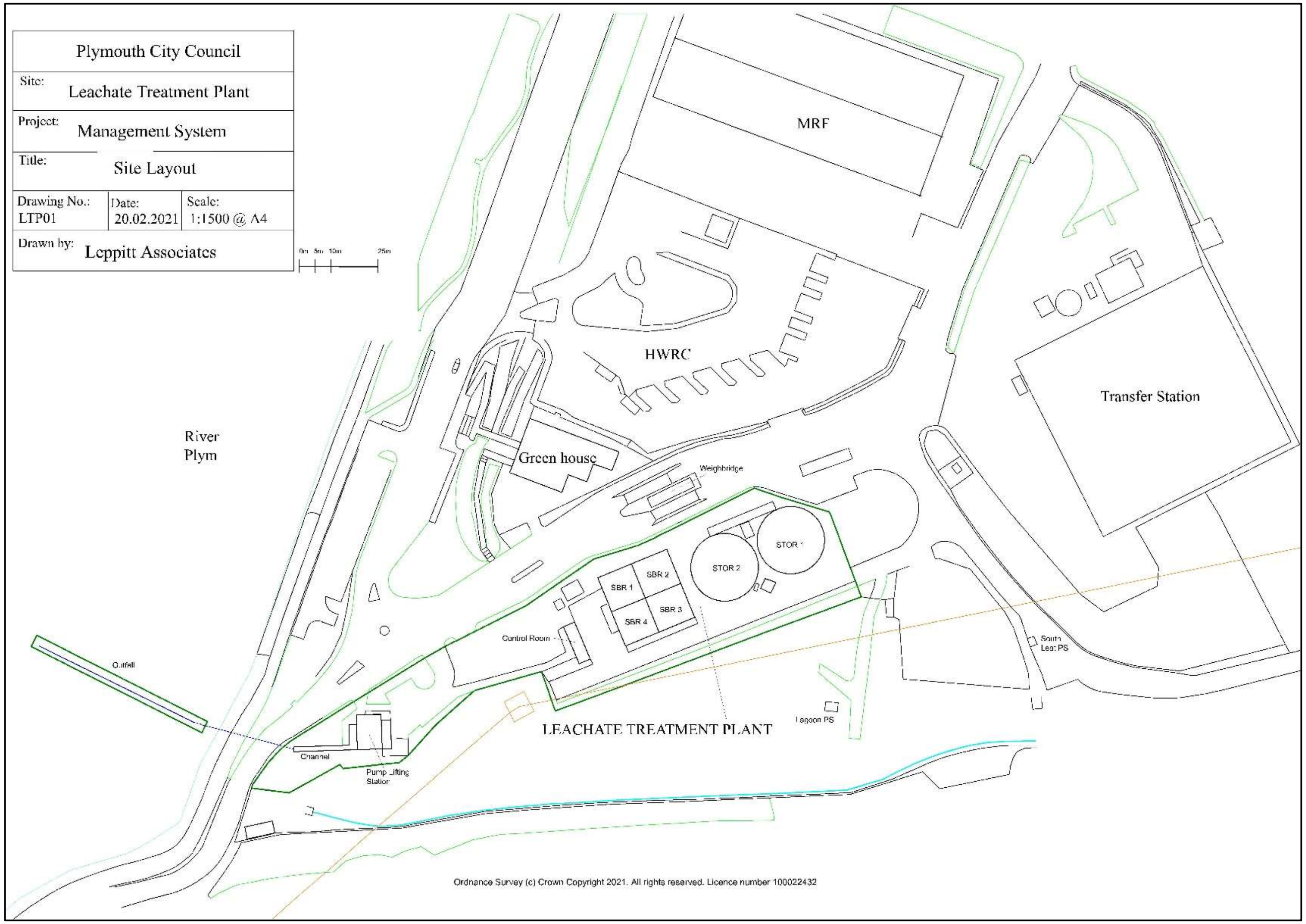


Figure 1.2 Chelson Meadow LTP permit boundary, showing major infrastructure and additional waste facilities on the closed landfill.

Status log of the permit		
Description	**Date**	**Comments**
Application CP3731LZ (EPR/CP3731LZ/A001)	Duly made 18/07/2006	
Permit CP3731LZ determined (EPR/CP3731LZ/A001)	28/03/2007	Permit issued to Plymouth City Council
Variation Application EPR/CP3731LZ/V002	Duly made 10/10/2011	Application to replace lagoon with above ground storage tank, installation of new pump, discharge conditions and increase waste limit to 650,000 te/annum
Variation EPR/CP3731LZ/V002 determined	12/12/2011	
Agency variation EPR/CP3731LZ/V003 determined	11/02/2014	Environment Agency initiated variation to implement the changes introduced by IED
Environment Agency Landfill Sector Review Permit reviewed Variation determined EPR/CP3731LZ/V004 Permit EPR/CP3731LZ Billing/PAS Ref: NP3931YW	15/09/2017	Varied and consolidated permit issued in modern condition format

Box 1.2: Permit history for LTP

Site History

Chelson Meadow Landfill commenced in ca. 1965 and waste tipping ceased in March 2008. The landfill generates leachate (see later), which is collected and treated to prevent pollution of ground and surface water. Prior to 1983 leachate was discharged to the Plym Estuary via three outfall pipes controlled by tidal flaps. The Pump Lifting Station, which is part of the LTP, was installed in 1983 at the head of the (now redundant) leachate storage lagoon. The storage lagoon was originally a section of ditch feeding one of the outfall pipes and is likely to predate Chelson Meadow Landfill, presumably part of the network of ditches created for land reclamation when the site was agricultural land. The Pump Lifting Station was designed to comply with an ongoing, but debatably valid, Discharge Consent issued 18 August 1983, which adopted a volume restriction (maximum 3240 m^3hr^{-1}) and restriction to effluent release to between High Tide + 0.5 hrs and High Tide + 2.5 hrs only.

In early 1993 the National Rivers Authority proposed (but never formalised) quality constraints on the effluent discharging to the River Plym of: ammonia 50 mgl^{-1}; iron 10 mgl^{-1}; and no visible oil or grease. The LTP was constructed in 1996 in response to this proposal but consent conditions were never formalised. The LTP permit of March 2007 (Appendix A) established three trigger levels for the discharge: ammoniacal nitrogen as N (NH_4-N) 10 mgl^{-1}, Biological Oxygen Demand (BOD) 10 mgl^{-1}, and Suspended Solids (SS at 105ºC) 75 mgl^{-1}. The volume of leachate destined for the River must be quantified precisely, which is done via a flow meter regulated under MCERTS, as required by the permit. To comply with MCERTS the flow meter has its own MS separate from that of the LMS, requiring an annual third-party audit through SIRA (CSA Group) and a five-year audit on the channel and flow meter.

The landfill and LTP have separate permits but leachate arising from the landfill is pumped and gravity fed to the LTP, so the two are interconnected. The four pumping stations around the landfill are included in the Management System although they are outside the LTP permit boundary, because they are essential to the functioning of the LTP.

Plate 1.6: Leachate Treatment Plant, looking south west from the lagoon pumping station, Chelson Meadow, Plymouth 2021. Infrastructure components from left to right are: Sequential Batch Reactors (SBRs), STOR 2 & STOR 1

1.4 Permit holder

The Permit holder and site address is:-

Plymouth City Council
Chelson Meadow Leachate Treatment Plant
Plymstock
Plymouth
Devon
PL9 7JA

1.5 Staffing and supervision

The persons with overall responsibility for the LTP are:-

XXXXXX – based in the Greenhouse offices at the adjacent Chelson Meadow waste management facility.

Peter McNamara (Compliance Technician) (TCM), based in the control room of the LTP

Glyn Leppitt (Chartered Waste Manager), TCM holiday cover or long-term sickness.

1.6 Technically Competent Person

The TCM will be qualified in the appropriate WAMITAB Level 4 Medium Risk Operator Competence for non-hazardous waste, treatment and transfer (Appendix D) or equivalent (presently MROC1). All TCMs will maintain competency through the WAMITAB/CIWM Continuing Competency test every two years and will be the main point of contact with the EA. The TCM will be responsible for:

- compliance with permit;
- maintenance;
- record-keeping;
- emergency action plans;
- notifications to the EA;
- MCERTS compliance for flow meter in the discharge channel

1.7 Hours of operation

The LTP is a fully automated 24/7 operation for continuous treatment of leachate generated constantly by the landfill. The site is manned approximately 40 hours per week, but it can be monitored remotely and is provided with a comprehensive alarm and fault diagnostic system.

The site gates are locked when there are no operatives in attendance.

1.8 Provision of site identification board

The site sign is adjacent to the main site entrance gate and shows the following information:

(i) Site name and address;
(ii) Permit Holder name;
(iii) Operator Name;
(iv) Permit Number;
(v) Emergency contact name and telephone number;
(vi) Statement that the site is permitted by the EA;
(vii) EA national number: 0800 807060.

The sign will be maintained and updated as necessary.

Plate 1.7: Site noticeboard, Chelson Meadow LTP, 2021

1.9 Site Security

The entire LTP boundary is 0.46km in length and is constructed of 2.0m high chain link fencing with angle-topped steel supports and two rows of barbed wire (Plates 1.8-1.11).

Plate 1.8: Security gate to the LTP, looking west from the site entrance 2021

Plate 1.9: Section of security fence surrounding the LTP, looking east from the south east boundary adjacent to the SBRs, 2021

Plate 1.10: Section of security fence surrounding the LTP, looking east from the top of the SBR 2021

Plate 1.11: Section of security fence surrounding the LTP (obscured by vegetation), looking west from the top of the SBR 2021

Three of the four pumping stations serving the LTP, but within the landfill permit boundary, are secured by 1.8m or 2.0m steel palisade fencing (Plates 1.12-1.15).

Plate 1.12: The Ride pumping station, viewed from the Ride, 2021

Plate 1.13: The South Leat pumping station, 2021

Plate 1.14: The North Leat pumping station, 2021

Plate 1.15: Lagoon Pumping Station, 2021

The lagoon pumping station (Plate 1.15) is situated on top of the old lagoon; it is inside an enclosure but not fenced.

2.0 Landfill Leachate

Landfill leachate is a generic term given to water that has percolated through land-filled waste materials, and in doing so has dissolved contaminants from them (EA 2007; Hussein et al. 2019). The chemical properties of leachate vary widely and are affected by the amount, composition and moisture content of the refuse; hydrogeology and climate of the site; age and height of landfill; and season of the year (Chu, Cheung & Wong 1994; Hussein et al. 2019). The nature of the processes creating leachate change as the landfill ages, passing through the strongly aerobic, acetogenic to the largely anaerobic, methanogenic-phase (Robinson 1995; Renou *et al.*2008; Tsilogeorgis, J. *et al.* 2008), which typifies the Chelson Meadow Landfill.

Leachate is a complex effluent containing at least 140 (Oman & Junestedt 2008) to 170 (Senior & Shibani 1990) different components. It has a characteristic dark color, odour and significant values for chemical oxygen demand (COD), ammonia-nitrogen, heavy metals and refractory substances, such as humic and fulvic acids, which are not easily degraded (Viegas et al 2021). The principle organic content is measured in terms of BOD, Chemical Oxygen Demand (COD) or Total Organic Carbon (TOC).

Based on its composition, leachate may be classified as young or old. Young leachate contains more volatile fatty acids (VFA) and has higher level of BOD (Biological oxygen demand)/COD ratio (> 0.3). Old leachate usually contains high total ammonia nitrogen (TAN) concentrations and low BOD/COD ratio (< 0.3) as a result of organic matter stabilization under anaerobic conditions (Ren et al. 2017).

The pollutants in the leachate can be classified into four main groups: inorganic macro-components, xenobiotic organic compounds, dissolved organic matter, and heavy metals (e.g. cadmium, lead, chromium, arsenic, copper, cobalt, nickel, zinc, and mercury). The organic chemicals encompass an enormous range of organic species such as personal care products, pharmaceuticals, and other compounds (alicyclic acids, aliphatic and aromatic acids, neutral alicyclic and aliphatic compounds, phenolic compounds, phthalate and phosphate esters, neutral aromatic and chlorinated aromatic compounds, and heterocyclic compounds) that are carcinogenic and toxic (Kevikoglu et al 2021).

Among the toxic compounds, the NH_3–N compounds have been recognized as one of the main threats to aquatic organisms because of their inhibitory effects on nitrification, toxic effects on living organisms and stimulatory effect on algal growth at high concentrations (100+ mg/l) (Kevikoglu et al 2021)..

Inorganic ions are an important component of leachate and include manganese (Mn^{2+}), magnesium (Mg^{2+}), calcium (Ca^{2+}), sodium (Na^+), ammonium (NH_4^+), potassium (K^+), iron (Fe^{2+}), bicarbonate (HCO_3^-), sulphate (SO_4^{2-}), and chloride (Cl^-). Of these, bicarbonate, chloride, and sulphate ions occur most commonly (Kevikoglu et al 2021).

Xenobiotic compounds are organic materials that originate from industrial and household materials and waste sludges containing various chlorinated aliphatics, pesticides, phenols, plasticizers, and aromatic hydrocarbons (Kevikoglu et al 2021).

References

Chu, L.M., Cheung, K.C. & Wong, M.H. (1994) Variations in the chemical properties of landfill leachate. *Environmental Management* **16**, 105-117.

Environment Agency (2007) *Guidance for the Treatment of Landfill Leachate*. Sector Guidance Note IPPC S5.03

Hussein, M., Yoneda, K., Zaki, Z.M., Othman, N'A & Amir, A (2019) Leachate characterizations and pollution indices of active and closed unlined landfills in Malaysia. *Environmental Nanotechnology, Monitoring & Management (12)* **100232**.

Keyikoglu, R., Karatas, O., Rezania, H., Kobya, M., Vatanpour, V., Khataee, A. (2021) A review on treatment of membrane concentrates generated from landfill leachate treatment processes. *Separation and Purification Technology* **259: 118182**

Oman, C.B. & Junestadt, C (2008) Chemical characterisation of landfill leachates - 400 parameters and compounds. *Waste Management* **28** Issue 10 1876-1891

Ren, Y., Ferraz, F., Lashkarizadeh, M. & Yuan, O. (2017) Comparing young landfill leachate treatment efficiency and process stability using aerobic granular sludge and suspended growth activated sludge. *Journal of Water Process Engineering* **17:161-167**

Renou, S. Givaudan, J.G., Poulain, S., Dirassouyan, F. & Moulin, P. (2008) Landfill leachate treatment: Review and opportunity. *Journal of Hazardous Materials*. **150**, Issue 3 468-493

Robinson, H. (1995) *A review of the composition of leachates from domestic wastes in landfill sites*. Report to the Department of Agriculture, Aspinwall & Co.

Senior, E. & Shibani, S.B. (1990) Landfill leachate. In: *Microbiology of Landfill Sites* (ed. E. Senior), CRC Press, Florida.

Tsilogeorgis, J. Zouboulis, A. Samaras, P. & Zamboulis, D. (2008) Application of a membrane sequencing batch reactor for landfill leachate treatment *Desalination* **221** 483–493

Viegas C., Nobre C., Mota, A., Vilarinho C., Gouveia L., Gonçalves, M (2021) A circular approach for landfill leachate treatment: Chemical precipitation with biomass ash followed by bioremediation through microalgae. *Journal of Environmental Chemical Engineering* **9: 105187**

2.1 Cheslon Meadow Landfill & Leachate Characteristics

The landfill pre-dates contemporary stringent engineering requirements and is therefore a dilute and disperse system rather than a contained system. The base to the landfill is clay in places but in the south and north this becomes limestone and slates, and slates, respectively: clay offers some containment, but slate and limestone are permeable.

There is an engineered cut-off wall around the landfill perimeter, primarily designed to prevent landfill gas migration but it also serves to reduce leachate migration and therefore protect surface water from pollution. The cut-off wall was constructed in stages between 1996 and 2004 to different specifications: earlier sections were lined with HDPE only, whereas bentonite was included in later sections.

The landfill was completed in sections, each of which was capped and restored to engineering standards appropriate at the time resulting in different permeabilities to rainfall.

There are two distinct areas of landfill capping at Chelson Meadow:

The Northern Sector (Plate 2.1: 19.2ha)
The cap in the Northern Sector is understood to comprise a soil cover of between 0.3m and 1.0m thickness, overlain with 300mm of 'brown clay' overlain by 400m of either granular soil or purple slate fragments. The northern sector permanent capping was constructed between 1996 and 1998. As there is no impermeable or low permeability layer within the capping, the northern sector is permeable and potentially allows surface water to enter the landfill. Plate 2.2 shows the location of the LTP in the context of the entire landfill.

Plate 2.1: Northern sector looking north west from the northern slope of the Southern sector, 2021

Plate 2.2: Aerial view of Chelson Meadow Landfill (extensive grassland area bounded by woodland and hedges), with the LTP in the bottom left-hand corner.

The Southern Sector (43.7ha)

The southern part of the site is covered with an engineered cap designed primarily to reduce rainwater infiltration, providing a simultaneous reduction in vertical gas migration.

Plate 2.3: Northern slope of the southern sector, looking west, 2021

Plate 2.4: Swallow's End, the eastern most tip of the landfill, 2021

Ingression of rainfall, surface water migration from elsewhere on the wider facility and intrusion from ground water all contribute to the production of leachate. Annual production varies depending on the amount of rainfall: Table 2.1 shows total leachate collected and treated at the LTP for an eleven-year period from 2010 to 2020. Table 2.2 illustrates the main components of leachate from 2002 to 2020.

Table 2.1 Total volume (m^3) of treated leachate discharged to the River Plym from Chelson Meadow LTP 2010-2020 with corresponding total annual rainfall data (mm, Mountbatten, Plymouth). Figures in red exceed the permit limit while figures in green are compliant.

Year	**Leachate Quantity m^3**	**Rain (mm) MET**
2010	555,450	887.3
2011	465,938	771.5
2012	771,309	1370.2
2013	661,085	1003.2
2014	707,759	1132.0
2015	608,117	946.0
2016	593,404	956.4
2017	569,110	1021.6
2018	632,276	1066.8
2019	684,584	1125.6
2020	701,130	1102.8

Figures 2.1-2.3 show the location of historic in-waste and perimeter leachate drains feeding the LTP via the pumping stations.

Table 2.2: Mean chemical determinants (mg/l unless stated otherwise, accredited laboratory) of landfill leachate sampled from STOR1 (or the lagoon prior to 2011) monthly on at least 12 occasions per year (and up to weekly in some years). Mean and standard deviation are calculated from the annual mean values for each determinant over the 19-year period.

December	pH	Cond	Alk	TOC	BOD	COD	SS 105`C	SS 500`C	TON	NH3	Cl	P
2002	7.74	3040	1337	42	12	164	44	34	1.90	120	376	0.22
2003	7.80	3038	1310	59	10	165	43	28	2.48	122	409	0.25
2004	7.84	2588	1178	38	8	113	32	24	2.38	100	379	0.21
2005	7.88	2470	1092	52	7	133	51	39	2.79	100	318	0.18
2006	7.94	2575	1230	52	10	162	61	47	3.23	119	320	0.21
2007	8.11	2590	1184	40	10	161	44	30	6.49	118	376	0.24
2008	7.93	2205	1132	39	9	142	45	32	2.50	96	325	0.28
2009	7.87	2153	1047	50	10	128	46	33	2.11	84	293	0.25
2010	7.88	1997	924	42	10	121	52	30	4.71	86	306	0.33
2011	7.94	2134	973	39	8	107	37	26	2.70	78	365	0.32
2012	7.81	1560	729	19	5	65	101	68	2.84	51	226	0.16
2013	7.83	1962	941	38	6	81	35	26	2.07	72	333	1.32
2014	7.68	1816	771	19	6	70	23	16	1.08	62	260	0.16
2015	7.66	1790	797	20	5	73	44	34	1.46	60	251	0.60
2016	7.69	1794	856	23	5	75	54	40	2.19	61	290	0.40
2017	7.53	1721	708	20	5	59	23	16	1.41	51	200	0.33
2018	7.55	1934	805	24	5	76	29	22	1.42	66	270	0.37
2019	7.44	1733	697	20	5	54	22	18	1.56	55	239	0.90
2020	7.44	1596	652	14	4	50	20	16	1.47	51	212	1.69
Mean	7.77	2142	966	34	7	105	42	31	2.46	82	303	0.44
sd	0.18	456	220	14	2	41	19	13	1.29	26	62	0.42

Table 2.2 cont: Mean chemical determinants (mg/l unless stated otherwise, accredited laboratory) of landfill leachate sampled from STOR1 (or the lagoon prior to 2011) monthly on at least 12 occasions per year (and up to weekly in some years). Mean and standard deviation are calculated from the annual mean values for each determinant over the 19-year period.

December	SO4	Ca	Mg	K	Na	Fe	Mn	Cu	Zn	Pb	Cd	Cr	Ni
2002	41	150	50	115	317	6.17	1.30	0.03	0.03	0.03	0.01	0.03	0.03
2003	39	141	50	123	336	4.02	1.54	0.03	0.06	0.04	0.01	0.03	0.03
2004	37	136	39	84	241	7.62	1.21	0.03	0.03	0.03	0.01	0.03	0.03
2005	38	126	36	90	227	3.88	1.02	0.03	0.04	0.05	0.01	0.03	0.03
2006	35	126	39	99	259	3.35	0.96	0.03	0.05	0.03	0.01	0.03	0.03
2007	29	131	38	104	236	3.32	1.04	0.03	0.10	0.03	0.01	0.03	0.03
2008	29	132	34	89	208	3.90	0.96	0.02	0.09	0.03	0.01	0.02	0.02
2009	28	137	35	79	209	3.52	1.07	0.01	0.05	0.05	0.00	0.01	0.01
2010	30	124	32	67	199	3.56	0.94	0.01	0.04	0.02	0.00	0.01	0.01
2011	36	131	45	74	286	3.13	1.16	0.01	0.04	0.02	0.00	0.01	0.01
2012	22	118	28	49	144	2.75	0.74	0.02	0.07	0.02	0.00	0.01	0.04
2013	25	126	35	60	210	7.82	1.01	0.03	0.10	0.03	0.01	0.02	0.07
2014	25	122	28	45	149	7.55	0.80	0.02	0.10	0.02	0.00	0.02	0.04
2015	29	115	29	43	157	16.25	0.85	0.10	0.09	0.04	0.00	0.02	0.03
2016	20	124	29	51	151	22.70	1.07	1.53	0.09	0.05	0.00	0.03	0.01
2017	16	114	26	43	130	7.99	0.79	0.10	0.09	0.05	0.00	0.03	0.01
2018	20	128	30	52	156	8.59	1.05	0.18	0.12	0.05	0.00	0.03	0.01
2019	23	122	28	41	145	11.58	0.86	0.17	0.20	0.07	0.00	0.03	0.01
2020	14	105	19	30	91	4.33	0.65	0.09	0.09	0.05	0.00	0.03	0.01
Mean	28	127	34	70	202.6	6.95	1.00	0.13	0.08	0.04	0.01	0.02	0.02
sd	8	10	8	28	66.1	5.15	0.21	0.34	0.04	0.01	0.00	0.01	0.02

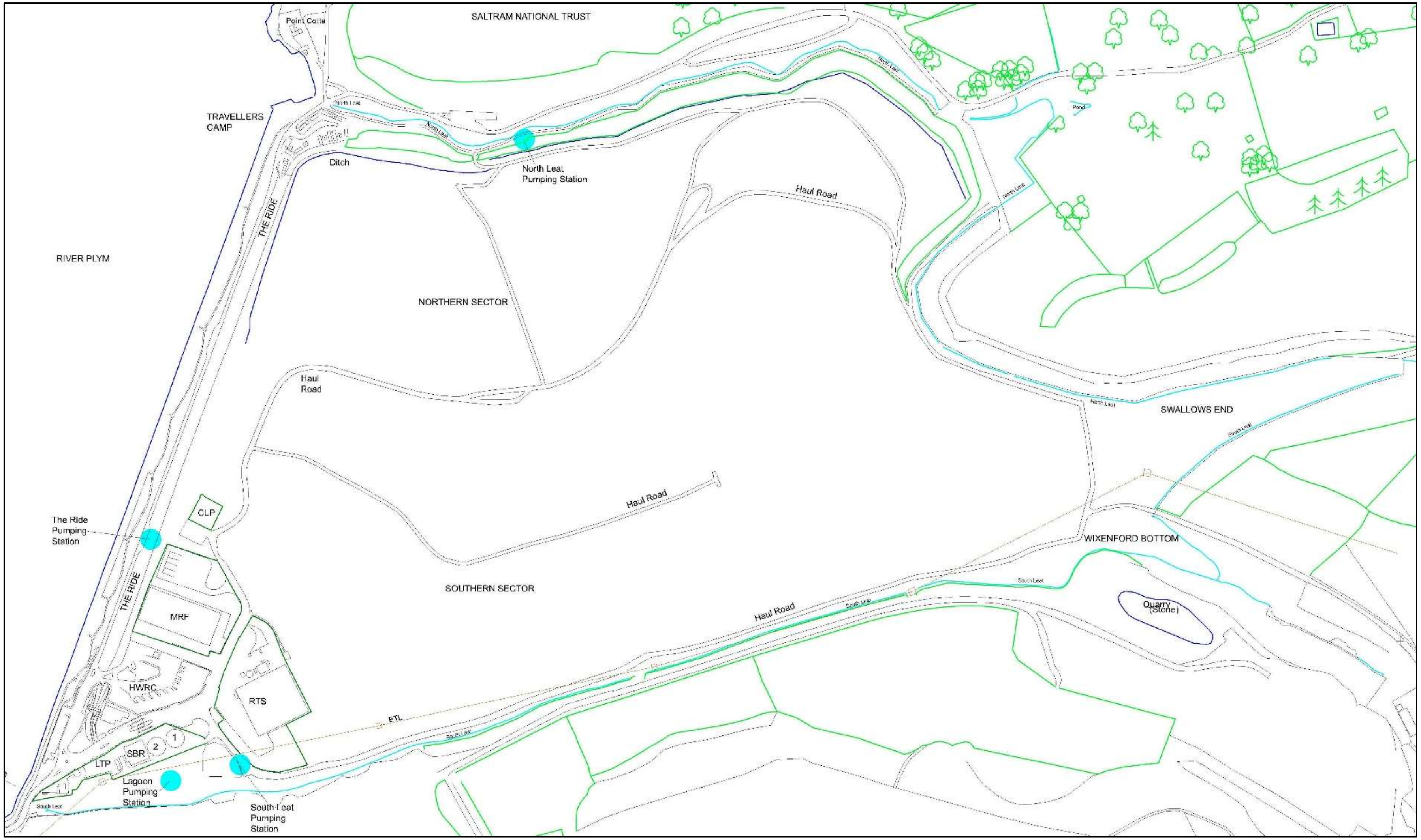


Figure 2.1: Location of leachate pumping stations (solid blue circles) in relation the landfill and LTP

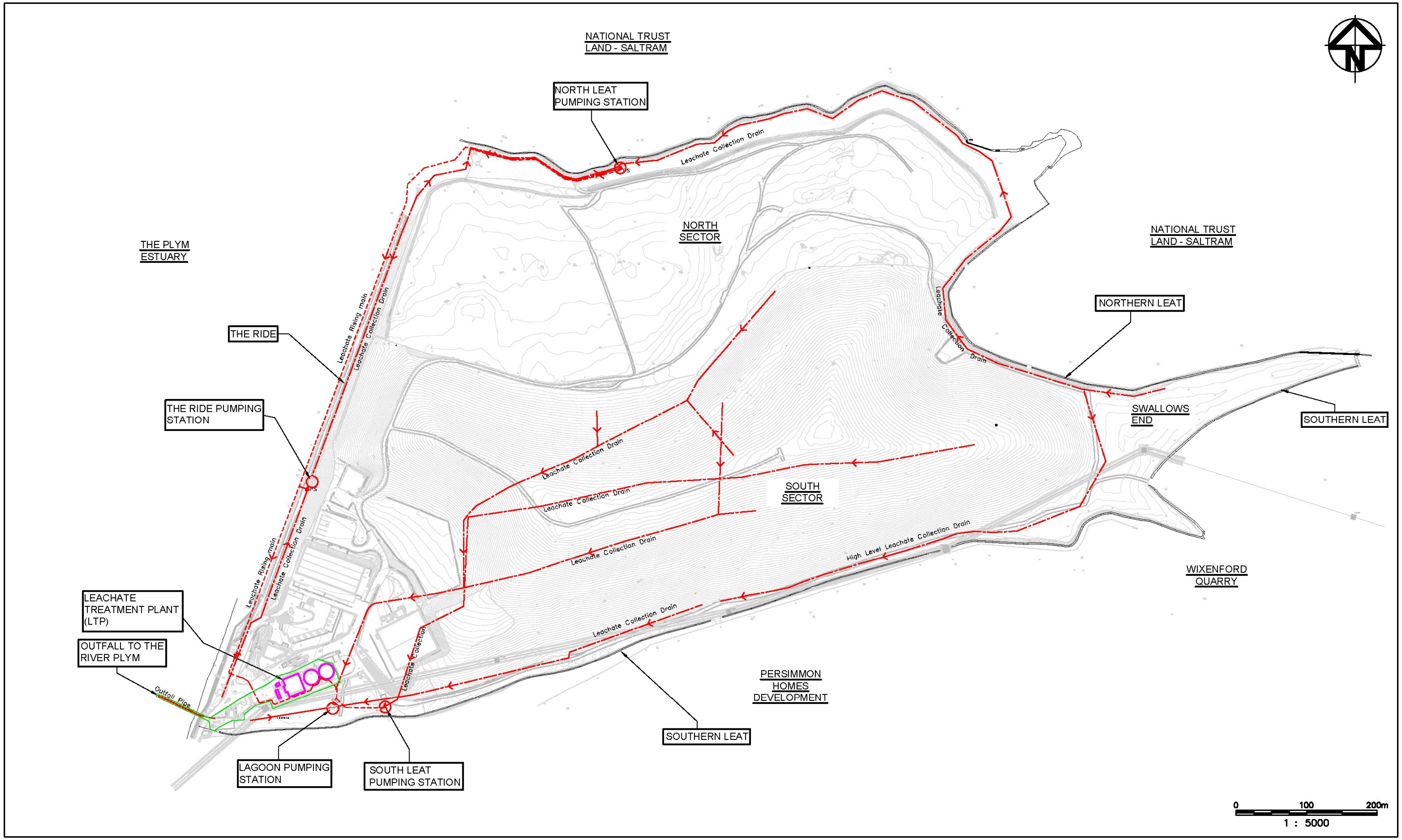


Figure 2.2: Leachate drains installed within the landfill and around the perimeter

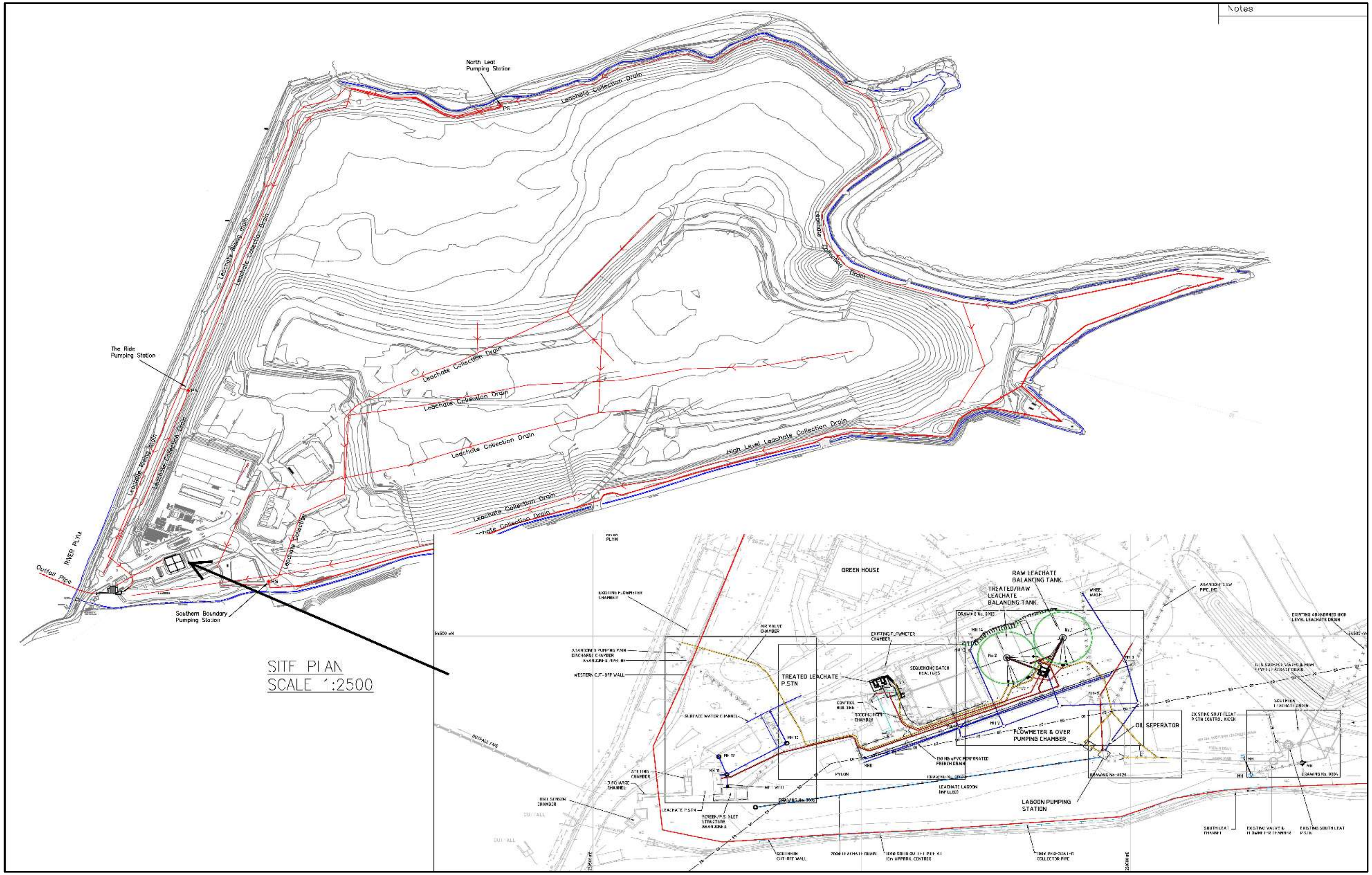


Figure 2.3: Connection between in-waste and perimeter leachate drains and the LTP (insert)

Figures 2.4-2.5 and Plate 2.5 show the site drainage for the key components of the wider waste facility, and the potential catchment area of surface water run-off entering the LTP system. The management of all inputs to the LTP is discussed in Section 7.

Table 2.3 and Figure 2.6 show the change in the concentration of key parameters of raw leachate, and their relationship to rainfall, over the 24-month period January 2019 to December 2020. There is a large volume of dilute leachate entering the LTP: the maximum and minimum concentrations of ammoniacal-N were recorded as 142 and 24.9 mg/l respectively. The overall mean concentration is 70.9 mg/l with a standard deviation of 35.2 mg/l.

The main influence on leachate production is rainfall, as shown in Figure 2.6.

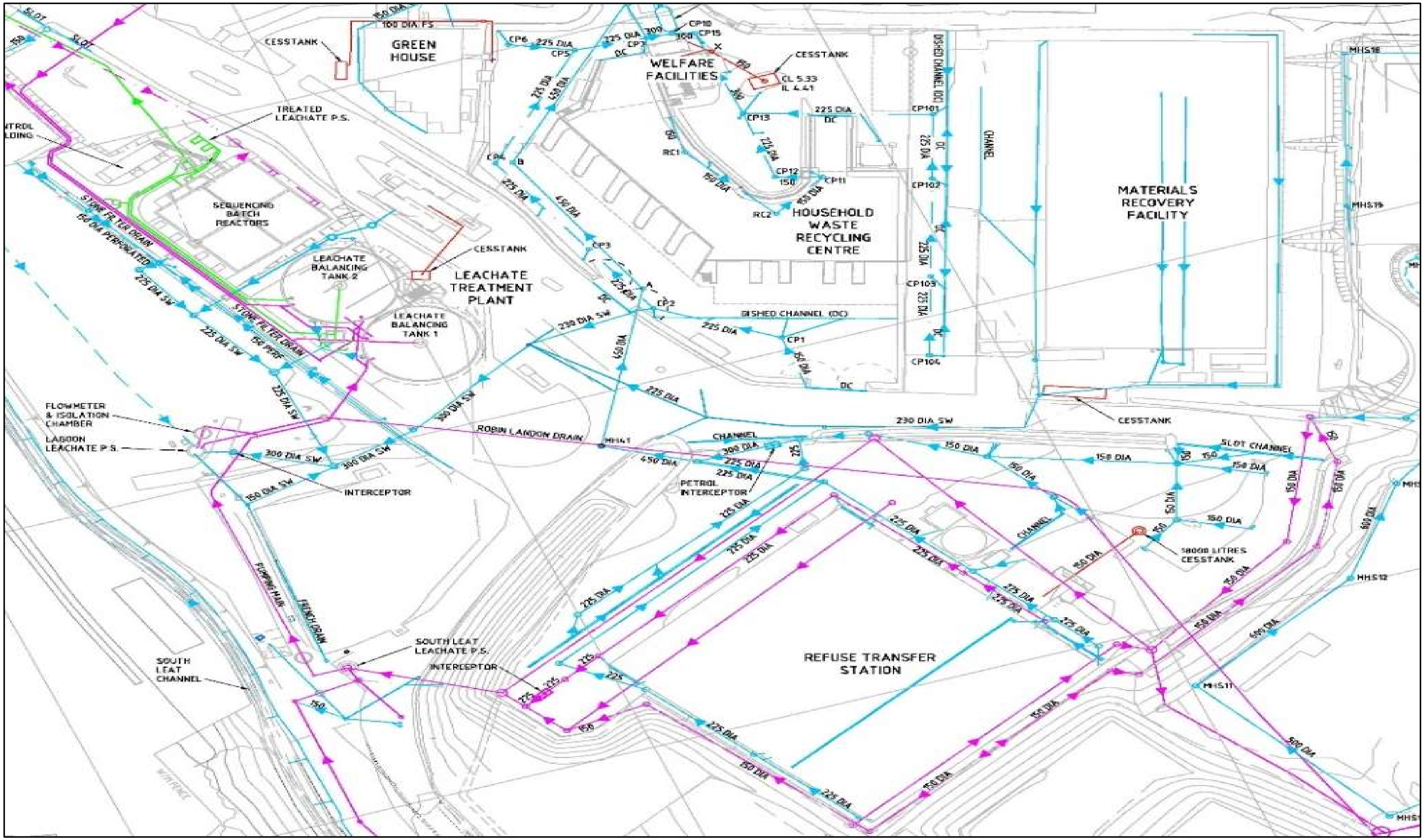


Figure 2.4: Drainage for Chelson Meadow waste facility showing connections to the LTP

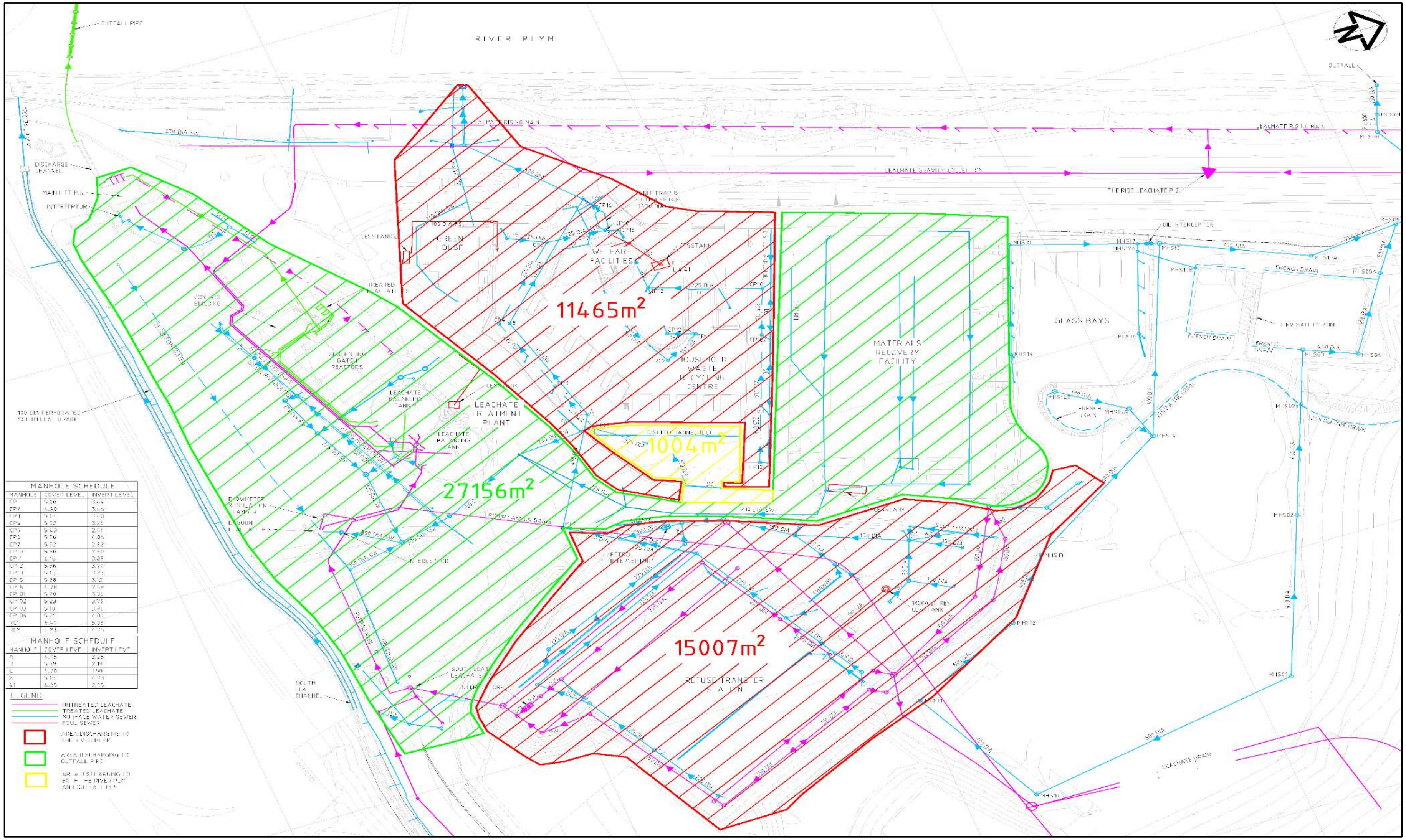


Figure 2.5: Potential waste facility infrastructure catchment (Green and Yellow) area of surface water entering the LTP via the surface water drains; surface water from areas hatched red enters the River Plym direct.

Plate 2.5: Aerial view focussing on the section hatched in green on Figure 2.5 and quantifying three key areas of impermeable surface draining to the LTP.

Table 2.3 Concentration of key parameters in the raw leachate over the 24-month period January 2019 to December 2020, mostly measured weekly. Covid restrictions prevented monitoring in April & May 2020

Sampled date	SS at 105`C mg/l	NH_4 mg/l	NH_3-N mg/l	Sampled date	SS at 105`C mg/l	NH_4 mg/l	NH_3-N mg/l
02/01/2019	23	51.3	40	04/01/2020	13	56.2	44
07/01/2019	26	58.1	45	06/01/2020	15	49	38
15/01/2019	12.5	82.9	64	13/01/2020	13	52.3	41
21/01/2019	48	58.5	45	20/01/2020	13	44.3	34
28/01/2019	12.5	41.2	32	27/01/2020	17	60.1	47
01/02/2019	12.5	42.1	33	02/02/2020	13	43.6	34
04/02/2019	43	42.2	33	03/02/2020	13	41.7	32
11/02/2019	13	34	26	10/02/2020	13	52.5	41
18/02/2019	45	38.6	30	17/02/2020	13	25.1	19
25/02/2019	52	54.2	42	24/02/2020	13	56.4	44
01/03/2019	50	66.8	52	01/03/2020	13	41.3	32
04/03/2019	20	65.2	51	02/03/2020	13	45.8	36
11/03/2019	29	42.3	33	09/03/2020	28	44.1	34
18/03/2019	25	51.6	40	16/03/2020	20	44.4	35
23/03/2019	15	59	46	23/03/2020	22	68.7	53
26/03/2019	38	57.8	45	03/06/2020	19	127	99
01/04/2019	15	76.6	60	11/06/2020	40	85	66
08/04/2019	31	56	44	01/06/2020	33	116	90
15/04/2019	33	63.5	49	18/06/2020	30	99.6	77
22/04/2019	23	85.5	66	24/06/2020	30	108	84
23/04/2019	16	90.5	70	02/07/2020	19	102	80
29/04/2019	18	85.3	66	02/07/2020	14	103	80
01/05/2019	17	96.7	75	07/07/2020	13	97.5	76
07/05/2019	27	91	71	16/07/2020	13	109	85
13/05/2019	20	84	65	23/07/2020	39	129	100
21/05/2019	17	103	80	30/07/2020	23	126	98
28/05/2019	13	112	87	06/08/2020	24	125	98
03/06/2019	13	115	89	13/08/2020	18	136	110
17/06/2019	31	93.1	72	20/08/2020	20	63.3	49
24/06/2019	13	103	80	27/08/2020	38	69	54
01/07/2019	13	109	85	01/09/2020	13	46	36
07/07/2019	24	125	97	01/09/2020	13	43.7	34
15/07/2019	34	123	96	10/09/2020	24	75.5	59
22/07/2019	13	126	98	17/09/2020	76	87.4	68
24/07/2019	52	129	100	24/09/2020	13	103	80
26/07/2019	13	137	110	01/10/2020	22	94.9	74
29/07/2019	31	140	110	08/10/2020	25	65.3	51
01/08/2019	24	127	99	15/10/2020	13	55.5	43
05/08/2019	16	142	110	22/10/2020	13	57.9	45
27/08/2019	22	120	94	27/10/2020	13	31.7	25
01/09/2019	81	113	88	19/11/2020	29	35.5	28
09/09/2019	23	138	110	26/11/2020	17	42.9	33
16/09/2019	16	133	100	30/11/2020	13	43.7	34
23/09/2019	19	140	110	02/12/2020	19	47	37
30/09/2019	13	28	22	07/12/2020	13	44.5	35
03/10/2019	68	33.4	26	14/12/2020	14	29	23
07/10/2019	17	37.1	29	29/12/2020	13	38	30
14/10/2019	13	24.9	19				
21/10/2019	13	34.8	27				
28/10/2019	13	31.7	25				
01/11/2019	13	41.3	32				
04/11/2019	13	31.4	24				
11/11/2019	15	32.9	26				
18/11/2019	13	41.2	32				
25/11/2019	16	31.9	25				
02/12/2019	13	38.7	30				
09/12/2019	13	41.6	32				
16/12/2019	13	33	26				
22/12/2019	13	30.1	23				
30/12/2019	38	47.7	37				

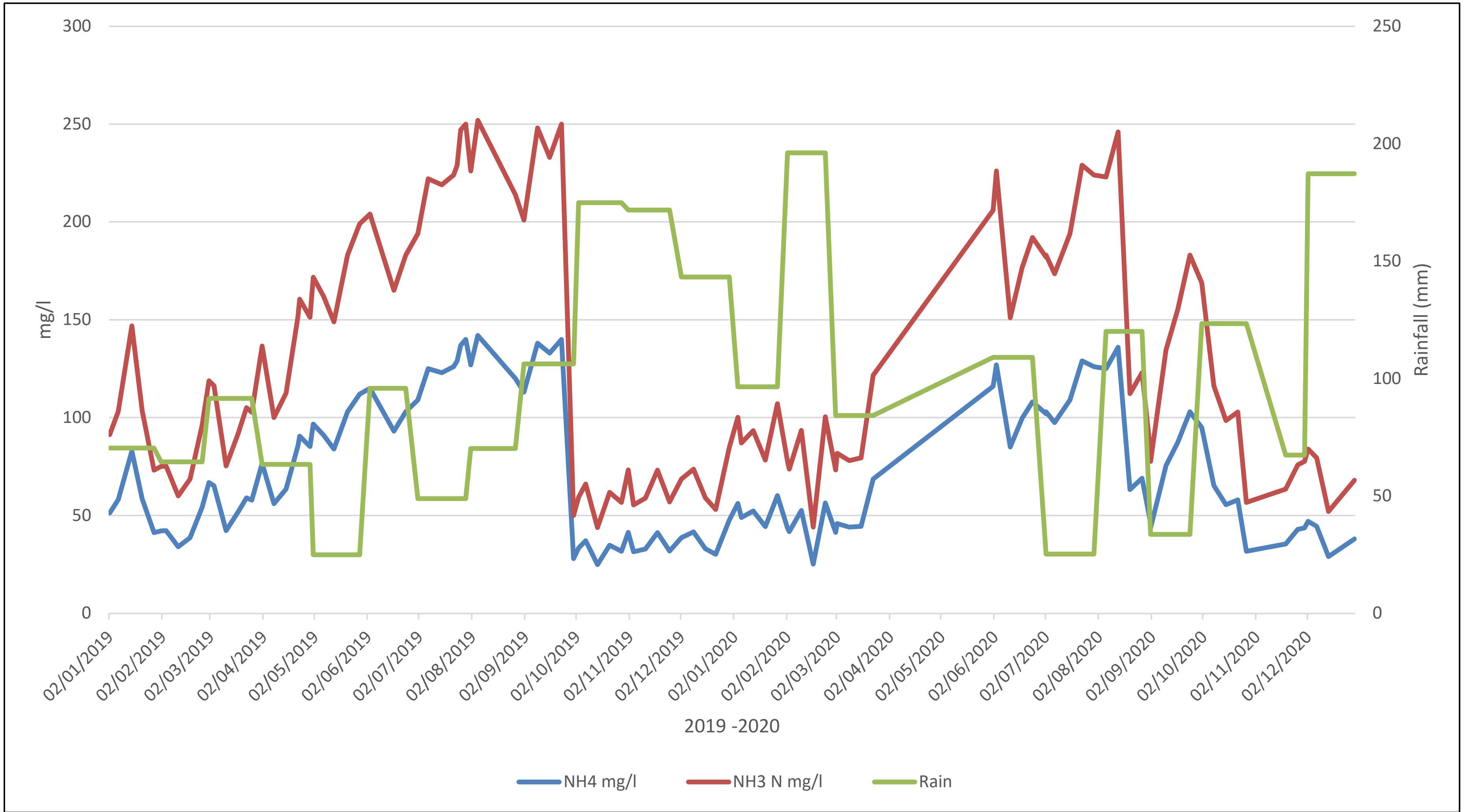


Figure 2.6: Change in the concentration of key nitrogenous components of raw leachate (mg/l, mostly measured weekly) and corresponding monthly rainfall figures (mm, monthly total shown across each four/five-week period) for the 24-month period of January 2019 to December 2020

2.2 Chelson Meadow Leachate Treatment Plant

When landfilling first began, leachate was collected in drains in the north and south of the site and then discharged directly to the Plym Estuary by outfalls with flap valves. Later, leachate was collected in a lagoon before being discharged untreated by pumping to the estuary on an outgoing tide. A treatment plant was constructed in 1996 whereby ammoniacal nitrogen was converted biologically to nitrate nitrogen. Raw leachate was still permitted to discharge direct to the river during emergency periods when leachate inputs exceeded treatment capacity.

Following the installation of the final sections of the cut-off wall, leachate was collected from the entire landfill via three pumping stations (Northern Leat, The Ride and Southern Leat) feeding the lagoon, except for gravity fed leachate from the original drains, which entered the lagoon direct.

The LTP was required to operate under an independent permit from 2007 onwards, when compliance levels were established. The lagoon was replaced by STORs 1 and 2 in 2011, and an additional pumping station was constructed to collect the gravity fed leachate plus surrounding surface water drainage.

Under normal conditions pumps in the pumping station wells operate every few hours but during prolonged/extreme wet weather when rainfall is percolating through the landfill and the ground water table is raised, they may operate continuously for several weeks.

Following treatment, leachate is discharged to the River Plym in compliance with the environmental permit (see boundary shown in Figure 2.7), mostly at high tide provided it is within the specified limits for compliance chemical parameters. The key infrastructure comprising the LTP is described in Section 3.

Initial Storage
Leachate drained from the landfill is pumped to one of two storage tanks at the LTP. Each open-topped tank has a capacity of ca.2200m^3: only one tank stores raw leachate (STOR1) with second normally being used to store the treated leachate prior to discharge (STOR2, Plate 2.6).

Treatment
Leachate is treated biologically by bacteria in one of four sequential batch reactors (SBRs, Plate 2.7), all of which operate independently. The SBRs are open-topped tanks constructed of reinforced concrete and of approximate dimensions 11.1 x 11.1 x 6.4m depth. The bacteria converting ammoniacal-nitrogen to nitrate require an aerated environment, created by blowers forcing air into the bottom of the tank.

Each SBR has a maximum volume of ca. 730m^3 but only 330m^3 of treated liquor is discharged after a treatment event. The remaining liquid contains the bacterial population, which is fed 330m^3 of fresh leachate drawn from STOR1 at the start of the next sequence directed to the SBRs by pumps located below ground level in the Pump Lifting Station, which is treated as a confined space (Plate 2.8).

Table 2.4 details the main components of treated leachate from 2008 to 2020.

Plate 2.6: STOR2 open-topped tank, showing STOR1 to the rear, 2021

Plate 2.7: Top of the treatment tanks SBR1 & SBR4 viewed from the access walkway, showing aeration during the treatment process in SBR1 left of centre, 2021

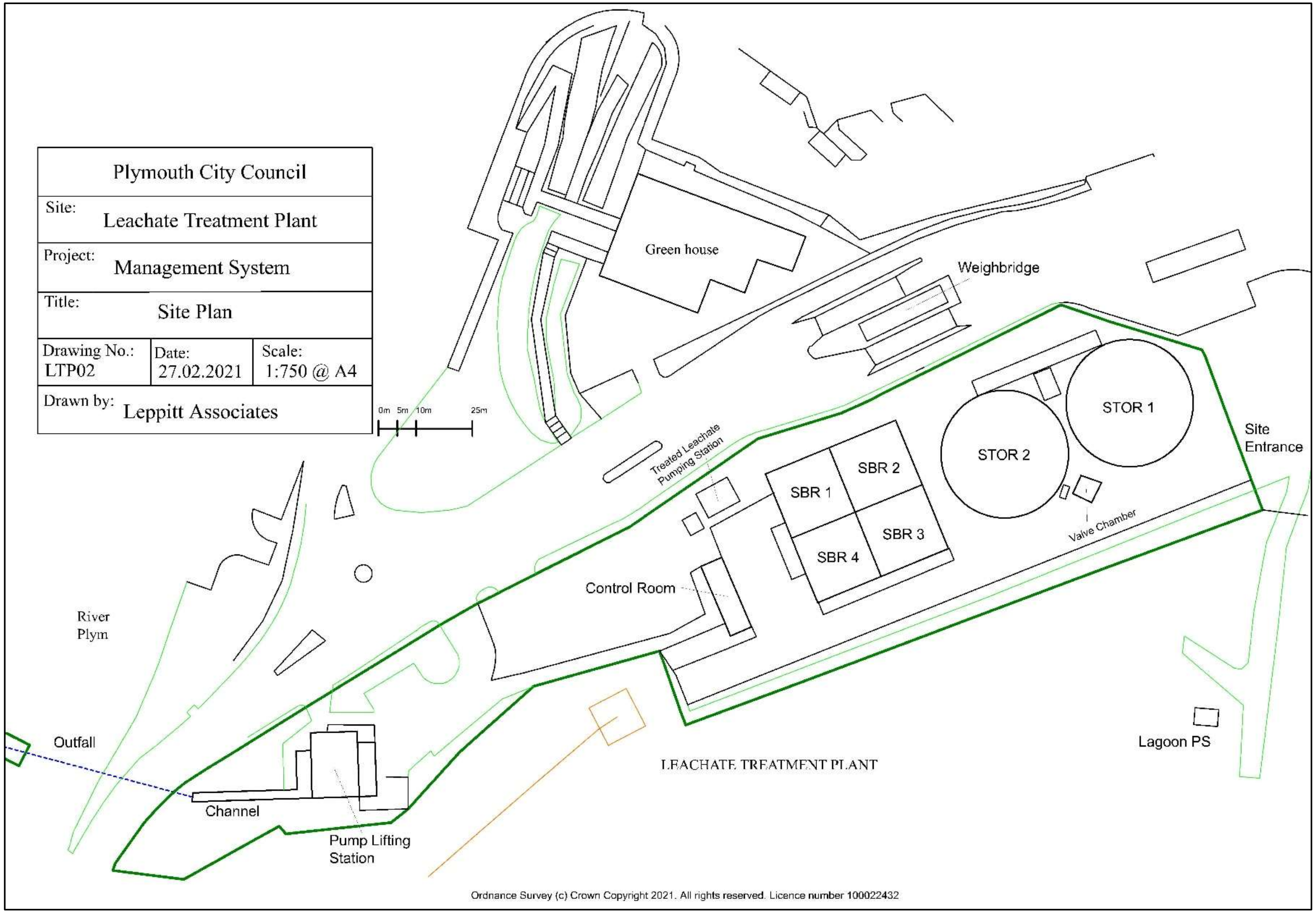


Figure 2.7: LTP permit boundary (dark green line)

Table 2.4: Mean chemical determinants (mg/l unless stated otherwise, accredited laboratory) of treated leachate sampled from W1 (outfall) weekly. Mean and standard deviation are calculated from the annual mean values for each determinant over the 13-year period 2008-2020

Year	pH	Cond	Alk	TOC	BOD	COD	SS 105`C	SS 500`C	TON	NH3	Cl	P
2008	8	1913	251	28	5	110	67	50	97	0.73	319	0.20
2009	8	1863	303	28	6	85	45	28	85	1.55	326	0.23
2010	8	1768	253	23	6	95	55	29	88	0.66	328	0.32
2011	8	1713	249	18	5	69	43	31	74	0.36	347	0.31
2012	8	1349	314	16	5	53	47	34	50	1.45	220	0.18
2013	8	1633	283	19	4	52	37	24	71	0.87	322	0.18
2014	8	1487	291	16	5	46	31	22	57	1.34	242	0.16
2015	8	1486	288	19	5	53	31	21	54	0.26	245	0.25
2016	8	1481	304	18	5	53	32	22	57	0.45	249	0.35
2017	8	1254	288	17	5	49	35	26	50	0.62	203	0.34
2018	8	1585	291	20	5	57	38	28	61	0.45	255	0.34
2019	8	1492	285	18	4	46	27	18	56	0.68	243	0.33
2020	8	1395	283	12	4	40	22	16	53	0.60	226	2.15
Mean	8.0	1571	283	19	5	62	39	27	66	0.77	271	0.41
sd	0.2	199	21	5	0	21	12	9	16	0.42	49	0.53

Table 2.4 cont: Mean chemical determinants (mg/l unless stated otherwise, accredited laboratory) of treated leachate sampled from W1 (outfall) weekly. Mean and standard deviation are calculated from the annual mean values for each determinant over the 13-year period 2008-2020

Year	SO4	Ca	Mg	K	Na	Fe	Mn	Cu	Zn	Pb	Cd	Cr	Ni
2008	27	139	36	84	213	2.74	0.79	0.02	0.07	0.04	0.01	0.02	0.02
2009	26	141	37	81	223	3.44	0.69	0.04	0.04	0.04	0.00	0.01	0.01
2010	30	128	33	68	202	1.59	0.43	0.01	0.04	0.02	0.00	0.00	0.01
2011	31	124	33	60	189	2.36	0.26	0.01	0.04	0.02	0.00	0.01	0.01
2012	34	117	24	37	118	6.01	0.60	0.02	0.09	0.02	0.00	0.01	0.06
2013	31	134	36	61	213	8.91	0.54	0.07	0.10	0.03	0.00	0.01	0.06
2014	23	117	26	42	135	11.00	0.61	0.06	0.10	0.05	0.00	0.01	0.04
2015	26	116	29	45	160	15.60	0.77	0.16	0.11	0.07	0.00	0.02	0.03
2016	19	113	26	43	130	15.59	1.07	0.10	0.09	0.06	0.00	0.03	0.01
2017	18	111	26	42	135	9.43	0.62	0.09	0.09	0.05	0.00	0.03	0.01
2018	21	121	28	47	143	11.99	0.96	0.16	0.19	0.22	0.00	0.03	0.01
2019	23	125	30	48	159	6.13	0.48	0.10	0.09	0.07	0.00	0.03	0.01
2020	15	104	25	39	118	4.76	0.38	0.09	0.09	0.05	0.00	0.03	0.01
Mean	25	122	30	54	164	7.66	0.63	0.07	0.09	0.06	0.00	0.02	0.02
sd	6	11	5	16	39	4.84	0.23	0.05	0.04	0.05	0.00	0.01	0.02

Section 2.3 describes the biological treatment process in depth. Table 2.5 provides a summary of how the chemical nature of raw leachate changes over a six-hour period following biological treatment within the SBRs. Samples were taken in winter when the strength of the incoming raw leachate was relatively weak. When the leachate is pumped into the SBR it is added to existing treated liquor and is therefore diluted before the treatment process starts, hence the difference in ammoniacal-N between 1L (raw leachate) and mixed liquor (39A, 40A). Table 2.5 shows that treatment was complete after a two hour react period.

Table 2.5: Change over time in the concentration of key chemical parameters (accredited laboratory) of leachate during the treatment process shown for two SBRs (indicated by sample identities'40' and '39') sampled on the same day, starting with raw leachate (1L), at the start of the react phase (39A, 40A) and every hour thereafter until just prior to the settling phase (39G and 40G) six hours later

Sampled Date	Sample Time	Collected From	Alkalinity mg/l	Ammonium mg/l	Nitrate mg/l	Nitrite as N mg/l	pH	SS 105`C mg/l
28/10/2020	06:45	1L	474	30.5	<1.3	0.05	7.9	<13.0
28/10/2020	07:50	40A	870	13.2	17.03	0.24	7.6	2360
28/10/2020	08:50	40B	1036	4.8	17.99	0.46	7.5	4980
28/10/2020	09:50	40C	1223	<0.5	19.84	<0.02	7.9	4840
28/10/2020	10:50	40D	820	<0.5	25.18	<0.02	8.0	5040
28/10/2020	11:50	40E	1268	<0.5	28.39	<0.02	7.8	4860
28/10/2020	12:50	40F	1370	<0.5	26.95	0.02	7.9	5520
28/10/2020	13:50	40G	529	<0.5	23.47	<0.02	7.8	5060
28/10/2020	06:45	1L	474	30.5	<1.3	0.05	7.9	<13.0
28/10/2020	08:15	39A	838	9.9	21.71	0.60	7.4	2220
28/10/2020	09:15	39B	308	2.3	16.28	1.37	7.5	3300
28/10/2020	10:15	39C	738	<0.5	20.57	<0.02	7.8	3380
28/10/2020	11:15	39D	592	<0.5	29.86	<0.02	7.9	3680
28/10/2020	12:15	39E	333	<0.5	18.40	<0.02	8.0	3460
28/10/2020	13:15	39F	310	<0.5	18.71	<0.02	8.0	3820
28/10/2020	13:45	39G	288	<0.5	13.08	<0.02	8.0	1180

2.3 Biological Treatment

The LTP is an Aerobic Biological Treatment Plant designed to treat the NH_4-N component of the leachate, but it also treats trace organic and other compounds through oxidation (Klimiuk, E. & Kulikowska, D. 2006; EA 2007; Yong et al 2018; Jagaba 2021). This technology is still used widely in the waste industry but is often supplemented by an anaerobic treatment process in more modern plants (Yong et al 2018, Jagaba 2021).

During aerobic biological treatment, organic compounds should be largely oxidised to carbon dioxide and water, and NH_4-N largely removed by oxidation. A well-designed treatment process ensures that the bacteria responsible for ameliorating the contaminants of leachate are provided with optimal growth conditions and are mixed intimately with the leachate to be treated, with oxygen, nutrients as necessary, and at appropriate temperatures and pH-values (EA 2007; Yong et al 2018).

The leachate treatment process is based on nitrification, which is the interconversion of nitrogen by autotrophic bacteria through the oxidation of NH_4-N to NO_3-N (Siripong & Rittman 2007; Jagaba et al 2021). The bacteria derive energy from the reaction but require inorganic carbon (CO_2) for growth, the source of which is predominantly the alkalinity of the leachate (HCO^-_3).

The nitrification reaction is a two-stage oxidation, each stage being performed by a distinct group of bacteria. The first stage, oxidation of NH_4-N to nitrite nitrogen (NO_2-N), is performed by bacteria of the genus *Nitrosomonas* and *Nitrosospira*, commonly known as AOB (ammonia oxidising bacteria, Siripong & Rittman 2007; Dytczak, Londry & Oleszkiewicz 2008; Yong et al 2018). The second stage is performed by species of *Nitrobacter* and *Nitrospira* (NOB, nitrate oxidising bacteria, Siripong & Rittman 2007; Dytczak, Londry & Oleszkiewicz 2008; Yong et al 2018) and involves further oxidation of NO_2-N to NO_3-N. If for some reason, e.g. lack of oxygen (insufficient aeration by blowers), this second stage cannot proceed nitrite will accumulate and NH_4-N remains only partly converted (EA 2007).

The nitrification reaction is often simplified in the literature (e.g. Gerardi 2002a) but the full equation is shown below to illustrate the role of alkalinity (the source of the CO_2) in the process (EA 2007; Yong et al 2018):

1st stage: $55\ NH_4^+ + 76\ O_2 + 5\ CO_2 \rightarrow 54\ NO_2^- + 109\ H^+ + 52\ H_2O + C_5H_7O_2N$

2nd stage: $115\ NO_2^- + 52.5\ O_2 + 5\ CO_2 + NH_4^+ + H_2O \rightarrow C_5H_7O_2N + H^+ + 115\ NO_3^-$

Both AOB and NOB are relatively sensitive to environmental conditions and either one or both stages can be easily inhibited by (EA 2007):

- Low pH-values (below about 6.5);
- Insufficient dissolved oxygen (below about 2 mgl^{-1});
- Low temperatures (below 5°C), or high temperatures (above 35°C);
- Toxic inhibition (e.g. Nitrite build up (Martienssen, M. & Schops, R. 1997)).

The extent to which each of these factors affects the reaction depends on the precise composition of the bacterial community, which is complex, diverse and effectively performs as a micro-ecosystem exhibiting a range of life history strategies. Fast growing genera such as *Nitrosomonas* and *Nitrobacter* will respond quite differently to the environment within the SBR compared to slower growing bacteria such as *Nitrosospira* and *Nitrospira* (Dytczak, Londry & Oleszkiewicz 2008). Consequently, treatment efficiency can be highly variable and the reaction period can vary dramatically among successive operational periods and during the year.

The density of the total bacterial community can be estimated from the difference between two determinants, Mixed Liquor Suspended Solids (MLSS, 105ºC) and Mixed Liquor Volatile Suspended Solids (MLVSS 500ºC): it is a key operational variable for SBR technology that should be regularly monitored. High value results for both determinants reduce the efficiency of the treatment system because some of the bacteria fail to settle and remain in the treated liquor. Conversely, a low value for both determinants leads to ineffective treatment, energy inefficiency and the potential discharge of poor-quality effluent with high nitrogenous concentrations (Jagaba 2021). Yong et al (2018) consider MLVSS to be an accurate indicator of bacterial concentrations in the SBR.

References

Dytczak, M.A., Londry, K.L. & Oleszkiewicz, J.A. (2008) Activated sludge operational regime has significant impact on the type of nitrifying community and its nitrification rates. *Water Research* **42** Issues 8-9 2320-2328

Environment Agency (2007) *Guidance for the Treatment of Landfill Leachate*. Sector Guidance Note IPPC S5.03

Gerardi, M.H. (2002a) *Nitrification and Denitrification in the Activated Sludge Process*. *Waste Water Microbiology Series*. Wiley & Sons, New York.

Jagaba, A.H., Kutty, S.R.M., Lawal, I.M., Abubakar, S., Hassan I., Zubairu, I., Umaru, I, Abdurrasheed, I.M., Adam, A.A., Ghaleb, A.A., Almahbashi, N.M.Y, Al-dhawi, B.N. S., & Noor, A. (2021). Sequencing batch reactor technology for landfill leachate treatment: A state-of-the-art review. *Journal of Environmental Management* **282: 111946**

Klimiuk, E. & Kulikowska, D. (2006) Organics removal from landfill leachate and activated sludge production in SBR reactors *Waste Management* 26 1140–1147

Martienssen, M. & Schops, R. (1997) Biological Treatment of Leachate From Solid Waste Landfill Sites--alterations in the Bacterial Community During the Denitrification Process *Water Research* **Vol. 31**, No. 5, pp. 1164-1170.

Siripong, S. & Rittmann, B.E. (2007) Diversity study of nitrifying bacteria in full-scale municipal Waste water treatment plants *Water Research* **41** 1110 – 1120

Yong, Z.J., Bashir, M,J.K., Ng, C.A., Sethupathi, S. & Lim, J (2018). A sequential treatment of intermediate tropical landfill leachate using a sequencing batch reactor (SBR) and coagulation. *Journal of Environmental Management* **205: 244-252**

2.4 Pumping Stations

The LTP receives landfill leachate from Chelson Meadow capped landfill, arising from waste degradation within the landfill and the percolation of precipitation through the waste. Leachate generated by the landfill is collected via gravity drainage and by four pumping stations (Plates 2.8-2.19 & Drawing No. LTP02, Appendix C and Figures 2.1-2.3). Surface water drainage from elsewhere in the waste facility also drains to one of the pumping stations and enters the LTP (see later).

Plate 2.8: North Leat Pumping Station (NGR SX51089 55216), Chelson Meadow Closed Landfill, 2021

Plate 2.9: Inside the electrical housing showing the control panel serving the North Leat pumping station, August 2018

Plate 2.10: Looking into the North Leat leachate well, showing the pump and floats, October 2018

Plate 2.11: Ride Pumping Station (NGR SX50658 54756), Chelson Meadow Landfill.

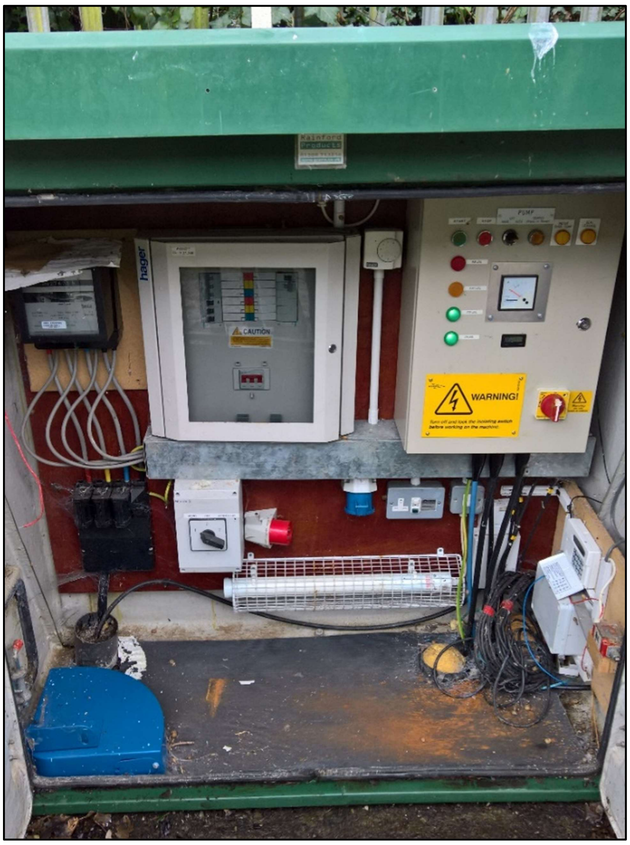


Plate 2.12: Inside the electrical housing showing the control panel serving the Ride pumping station, August 2018

Plate 2.13: Looking into the Ride leachate well, showing the pump, floats and junction boxes, August 2018

Plate 2.14: South Leat Pumping Station (NGR SX50753 54464), Chelson Meadow closed landfill 2021.

Plate 2.15: Inside the electrical housing showing the control panel serving the South Leat pumping station, August 2018

Plate 2.16: Looking into the South Leat leachate well, showing the pump in the bottom of the well, April 2019

Plate 2.17: Lagoon Pumping Station (NGR SX50673 54449), Chelson Meadow Landfill 2020.

Plate 2.18: Inside the electrical housing showing the control panel serving the lagoon pumping station, August 2018

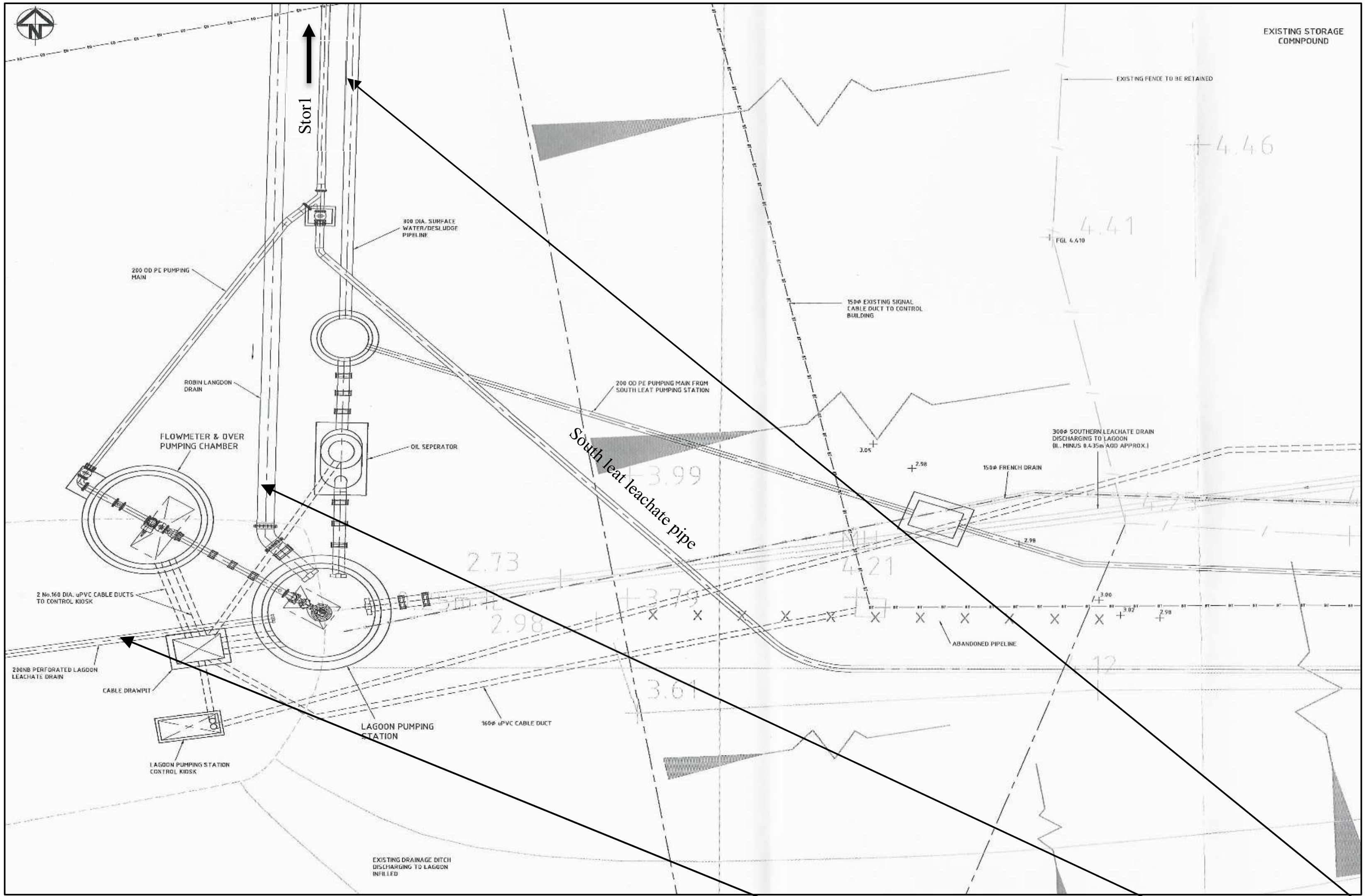


Figure 2.8: Schematic diagram showing location of lagoon pumping station and its three independent inputs: the main gravity fed drain, surface water drainage and the drainage from the old leachate lagoon

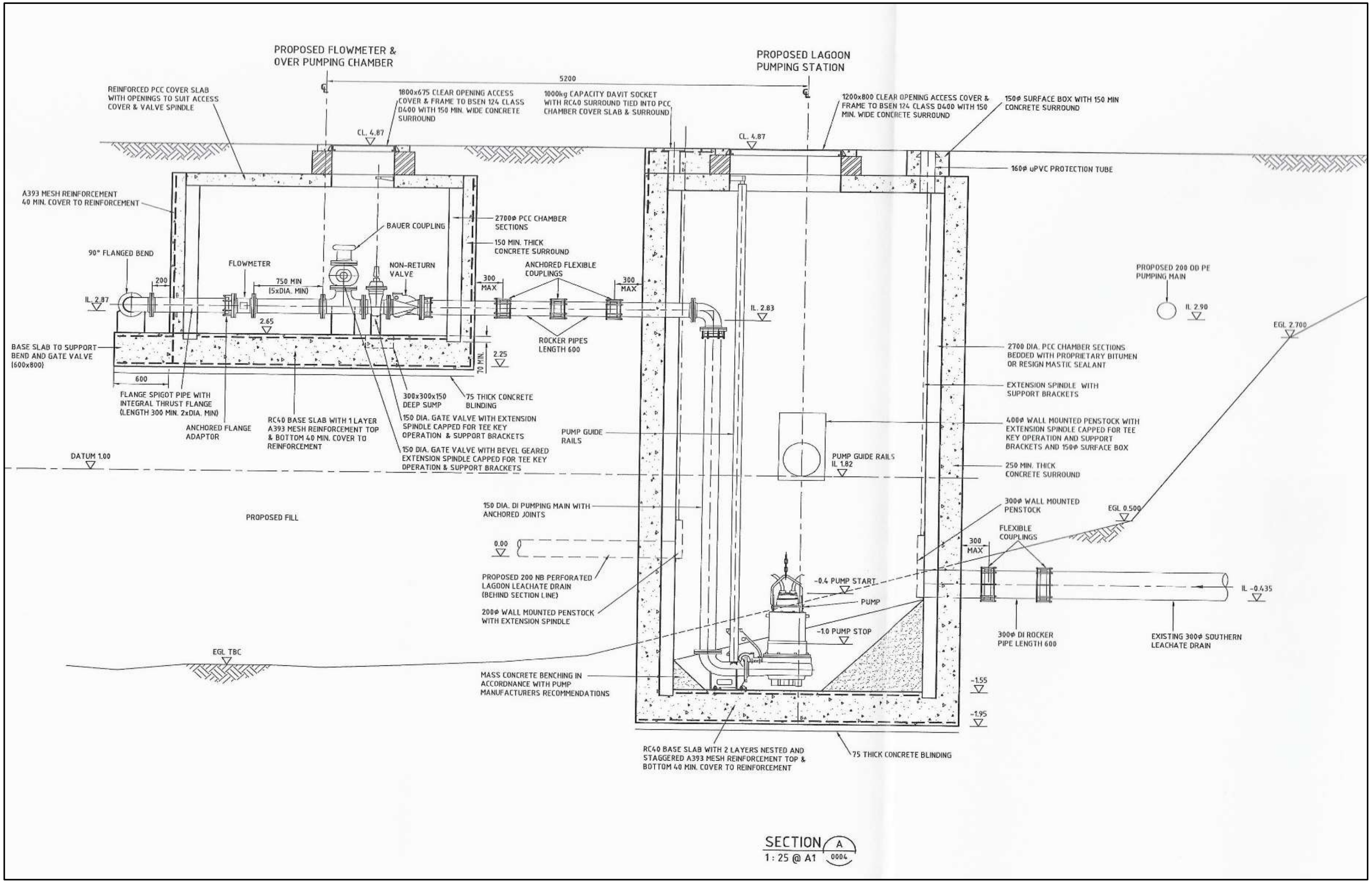


Figure 2.9: Schematic cross-sectional diagram of the Lagoon Pumping Station

Plate 2.19: Looking into the Lagoon leachate well, showing the pump and associated infrastructure, August 2018

Maintenance of the pumping stations is discussed in Section 4.

It should be noted that the North Leat Pumping Station and South Leat Pumping Station are named as such to identify their location and do not connect in any way with outflow from the respective leats.

3.0 Introduction

The following infrastructure comprises the LTP within the permit boundary (Figures 3.0.1 & 2.7):

1. Two above ground storage tanks (STOR1 & STOR2)
2. Valve Chamber
3. Pump Lifting Station and associated wet well
4. Sequencing Batch Reactor Plant (SBRs 1-4) with supporting infrastructure
5. Control Room (MCC)
6. Treated Leachate Pumping Station
7. Discharge Channel and Outfall Pipe

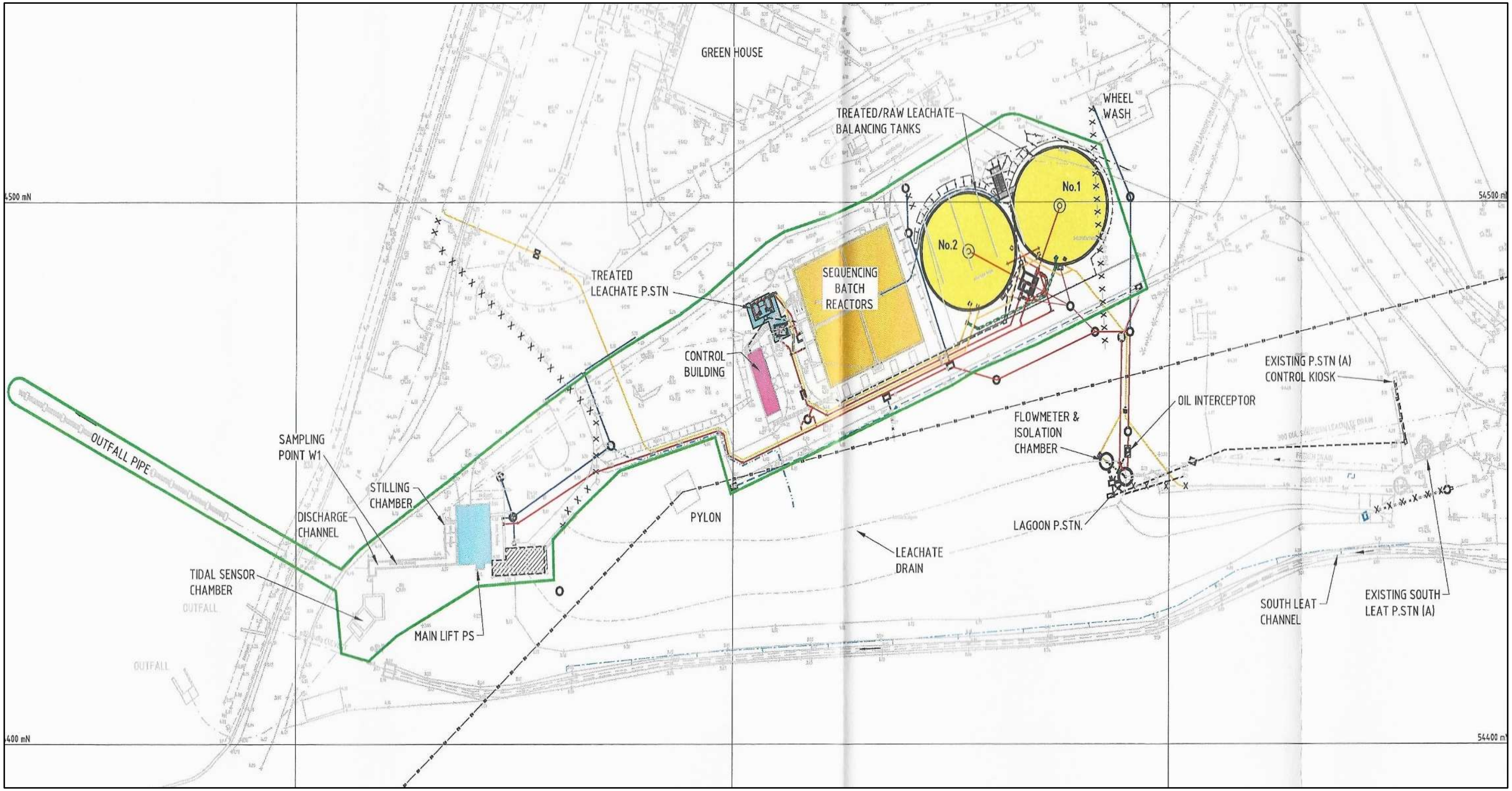


Figure 3.0.1: Permit boundary (outlined in green) showing LTP infrastructure and site layout in relation to some of the associated leachate management infrastructure

3.1 Storage Tanks STOR1 & STOR2

Two leachate storage tanks were constructed in 2011-2012 on the former glass bay area adjacent to the SBRs in preparation for decommissioning of the original leachate lagoon. Pile foundations were required because the structures were erected on the historic landfill. A reinforced concrete base was constructed on the pile foundations (Figures 3.1.1 & 3.1.2; Plates 3.1.1-3.1.3) for each new STOR to support the glass-coated steel body (Plates 3.1.4 & 3.1.5) each with a capacity of 2,250m^3.

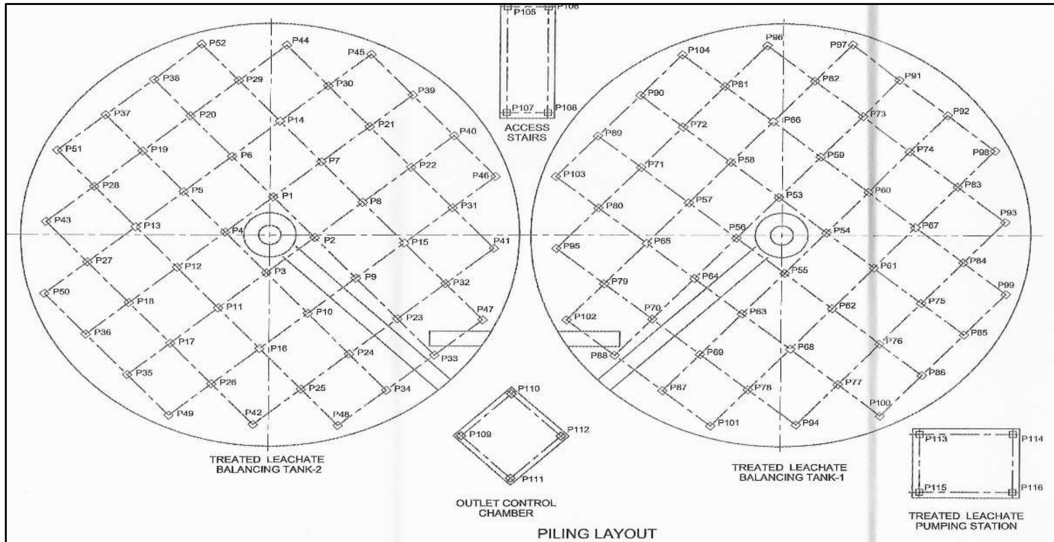
Plate 3.1.1: Preparation of the reinforced concrete slab for the new STOR2

Plate 3.1.2: Laying concrete for the base to STOR2

Plate 3.1.3: Completed concrete base to STOR1 and STOR2

Plate 3.1.4: Construction of glass-coated steel tank sides to STOR2

Plate 3.1.5: Internal view of glass-coated steel tank sides to STOR2



PILING LAYOUT

PILE SCHEDULE

SOP	PILE TYPE	PILE SIZE	EASTING	NORTHING	CUT-OFF LEVEL (m)	DEAD LOAD (kN)	LIVE LOAD (kN)
P1	PRECAST	300 SQ	250653.419	54492.783	+4.334	90	550
P2	PRECAST	300 SQ	250655.911	54491.507	+4.334	110	550
P3	PRECAST	300 SQ	250654.635	54489.015	+4.334	110	550
P4	PRECAST	300 SQ	250652.143	54490.291	+4.334	90	550
P5	PRECAST	300 SQ	250649.651	54491.567	+4.359	90	570
P6	PRECAST	300 SQ	250650.927	54494.059	+4.359	90	570
P7	PRECAST	300 SQ	250654.695	54495.275	+4.359	90	570
P8	PRECAST	300 SQ	250657.187	54493.999	+4.359	90	570
P9	PRECAST	300 SQ	250658.403	54490.231	+4.359	120	570
P10	PRECAST	300 SQ	250657.127	54487.739	+4.359	120	570
P11	PRECAST	300 SQ	250653.359	54486.523	+4.359	90	570
P12	PRECAST	300 SQ	250650.867	54487.799	+4.359	90	570
P13	PRECAST	300 SQ	250648.374	54489.075	+4.376	90	560
P14	PRECAST	300 SQ	250652.203	54496.552	+4.376	90	560
P15	PRECAST	300 SQ	250659.68	54492.723	+4.376	80	560
P16	PRECAST	300 SQ	250655.851	54485.246	+4.376	80	560
P17	PRECAST	300 SQ	250652.083	54484.03	+4.389	80	490
P18	PRECAST	300 SQ	250649.59	54485.307	+4.389	80	490
P19	PRECAST	300 SQ	250647.158	54492.843	+4.389	80	490
P20	PRECAST	300 SQ	250648.435	54495.336	+4.389	80	490
P21	PRECAST	300 SQ	250655.971	54497.768	+4.389	80	490
P22	PRECAST	300 SQ	250658.464	54496.491	+4.389	80	490
P23	PRECAST	300 SQ	250660.896	54488.955	+4.389	120	490
P24	PRECAST	300 SQ	250659.619	54486.462	+4.389	100	490
P25	PRECAST	300 SQ	250658.343	54483.97	+4.400	70	520
P26	PRECAST	300 SQ	250654.575	54482.754	+4.400	80	520
P27	PRECAST	300 SQ	250647.098	54486.583	+4.400	80	520
P28	PRECAST	300 SQ	250645.882	54490.351	+4.400	80	520
P29	PRECAST	300 SQ	250649.711	54497.828	+4.400	80	520
P30	PRECAST	300 SQ	250653.479	54499.044	+4.400	80	520

PILE SCHEDULE

SOP	PILE TYPE	PILE SIZE	EASTING	NORTHING	CUT-OFF LEVEL (m)	DEAD LOAD (kN)	LIVE LOAD (kN)
P31	PRECAST	300 SQ	250660.956	54495.215	+4.400	80	520
P32	PRECAST	300 SQ	250662.172	54491.447	+4.400	80	520
P33	PRECAST	300 SQ	250663.121	54487.815	+4.415	160	540
P34	PRECAST	300 SQ	250661.845	54485.323	+4.415	110	540
P35	PRECAST	300 SQ	250650.943	54481.805	+4.415	80	540
P36	PRECAST	300 SQ	250648.451	54483.081	+4.415	80	540
P37	PRECAST	300 SQ	250644.933	54493.983	+4.415	80	540
P38	PRECAST	300 SQ	250646.209	54496.475	+4.415	80	540
P39	PRECAST	300 SQ	250657.111	54499.993	+4.415	80	540
P40	PRECAST	300 SQ	250659.603	54498.717	+4.415	80	540
P41	PRECAST	300 SQ	250663.448	54493.939	+4.419	90	580
P42	PRECAST	300 SQ	250657.067	54481.478	+4.419	90	580
P43	PRECAST	300 SQ	250644.606	54487.859	+4.419	90	580
P44	PRECAST	300 SQ	250650.987	54500.32	+4.419	90	590
P45	PRECAST	300 SQ	250654.619	54501.269	+4.424	60	390
P46	PRECAST	300 SQ	250662.095	54497.44	+4.424	60	390
P47	PRECAST	300 SQ	250664.397	54490.307	+4.424	100	390
P48	PRECAST	300 SQ	250660.568	54482.831	+4.424	60	390
P49	PRECAST	300 SQ	250653.435	54480.529	+4.424	60	390
P50	PRECAST	300 SQ	250645.959	54484.358	+4.424	60	390
P51	PRECAST	300 SQ	250643.657	54491.491	+4.424	60	390
P52	PRECAST	300 SQ	250647.486	54498.967	+4.424	60	390
P53	PRECAST	300 SQ	250674.042	54501.067	+4.334	90	550
P54	PRECAST	300 SQ	250676.687	54500.15	+4.334	90	550
P55	PRECAST	300 SQ	250675.77	54497.505	+4.334	110	550
P56	PRECAST	300 SQ	250673.125	54498.422	+4.334	110	550
P57	PRECAST	300 SQ	250670.479	54499.338	+4.359	90	570
P58	PRECAST	300 SQ	250671.396	54501.984	+4.359	90	570
P59	PRECAST	300 SQ	250674.958	54503.713	+4.359	90	570
P60	PRECAST	300 SQ	250677.604	54502.796	+4.359	90	570

PILE SCHEDULE

SOP	PILE TYPE	PILE SIZE	EASTING	NORTHING	CUT-OFF LEVEL (m)	DEAD LOAD (kN)	LIVE LOAD (kN)
P61	PRECAST	300 SQ	250679.333	54499.234	+4.359	90	570
P62	PRECAST	300 SQ	250678.416	54496.588	+4.359	90	570
P63	PRECAST	300 SQ	250674.854	54494.859	+4.359	120	570
P64	PRECAST	300 SQ	250672.208	54495.776	+4.359	120	570
P65	PRECAST	300 SQ	250669.562	54496.693	+4.376	80	560
P66	PRECAST	300 SQ	250672.313	54504.63	+4.376	90	560
P67	PRECAST	300 SQ	250680.25	54501.879	+4.376	90	560
P68	PRECAST	300 SQ	250677.499	54493.942	+4.376	80	560
P69	PRECAST	300 SQ	250673.937	54492.213	+4.389	100	490
P70	PRECAST	300 SQ	250671.291	54493.13	+4.389	120	490
P71	PRECAST	300 SQ	250667.833	54500.255	+4.389	80	490
P72	PRECAST	300 SQ	250668.75	54502.901	+4.389	80	490
P73	PRECAST	300 SQ	250675.875	54506.359	+4.389	80	490
P74	PRECAST	300 SQ	250678.521	54505.442	+4.389	80	490
P75	PRECAST	300 SQ	250681.979	54498.317	+4.389	80	490
P76	PRECAST	300 SQ	250681.062	54495.671	+4.389	80	490
P77	PRECAST	300 SQ	250680.145	54493.025	+4.400	80	520
P78	PRECAST	300 SQ	250676.582	54491.297	+4.400	70	520
P79	PRECAST	300 SQ	250668.645	54494.047	+4.400	80	520
P80	PRECAST	300 SQ	250666.917	54497.61	+4.400	80	520
P81	PRECAST	300 SQ	250669.667	54505.547	+4.400	80	520
P82	PRECAST	300 SQ	250673.23	54507.275	+4.400	80	520
P83	PRECAST	300 SQ	250681.167	54504.525	+4.400	80	520
P84	PRECAST	300 SQ	250682.895	54500.962	+4.400	80	520
P85	PRECAST	300 SQ	250684.341	54497.498	+4.415	80	540
P86	PRECAST	300 SQ	250683.424	54494.852	+4.415	80	540
P87	PRECAST	300 SQ	250673.118	54489.851	+4.415	110	540
P88	PRECAST	300 SQ	250670.472	54490.768	+4.415	160	540
P89	PRECAST	300 SQ	250665.471	54501.074	+4.415	80	540
P90	PRECAST	300 SQ	250666.388	54503.72	+4.415	80	540
P91	PRECAST	300 SQ	250676.694	54508.721	+4.415	80	540
P92	PRECAST	300 SQ	250679.34	54507.804	+4.415	80	540
P93	PRECAST	300 SQ	250683.612	54503.608	+4.419	90	580
P94	PRECAST	300 SQ	250679.228	54490.38	+4.419	90	580
P95	PRECAST	300 SQ	250666	54494.964	+4.419	90	580
P96	PRECAST	300 SQ	250670.584	54508.192	+4.419	90	590
P97	PRECAST	300 SQ	250674.048	54509.638	+4.424	60	390
P98	PRECAST	300 SQ	250681.985	54506.887	+4.424	60	390
P99	PRECAST	300 SQ	250685.258	54500.144	+4.424	60	390
P100	PRECAST	300 SQ	250682.507	54492.207	+4.424	60	390
P101	PRECAST	300 SQ	250675.764	54488.934	+4.424	60	390
P102	PRECAST	300 SQ	250667.827	54491.685	+4.424	100	390
P103	PRECAST	300 SQ	250664.554	54498.428	+4.424	60	390
P104	PRECAST	300 SQ	250667.305	54506.365	+4.424	60	390
P105	PRECAST	300 SQ	250662.230	54505.802	+4.575	30	40
P106	PRECAST	300 SQ	250660.909	54506.473	+4.575	30	40
P107	PRECAST	300 SQ	250661.289	54500.898	+4.575	30	40
P108	PRECAST	300 SQ	250662.959	54501.369	+4.575	30	40
P109	PRECAST	300 SQ	250665.81	54484.372	+2.775	90	40
P110	PRECAST	300 SQ	250667.037	54487.219	+2.775	90	40
P111	PRECAST	300 SQ	250668.657	54483.145	+2.775	90	40
P112	PRECAST	300 SQ	250669.884	54485.991	+2.775	90	40
P113	PRECAST	300 SQ	250004.11	54481.373	+4.575	40	30
P114	PRECAST	300 SQ	250007.914	54482.902	+4.575	40	30
P115	PRECAST	300 SQ	250605.23	54478.589	+4.575	40	30
P116	PRECAST	300 SQ	250009.033	54480.119	+4.575	40	30

REFER TO MORRISON AS CONSTRUCTED LAYOUT FOR LOCAL VARIATIONS TO PILING LAYOUT

100mm on Original

Figure 3.1.1: Locations and depths of pile foundations for construction of STORs 1 & 2

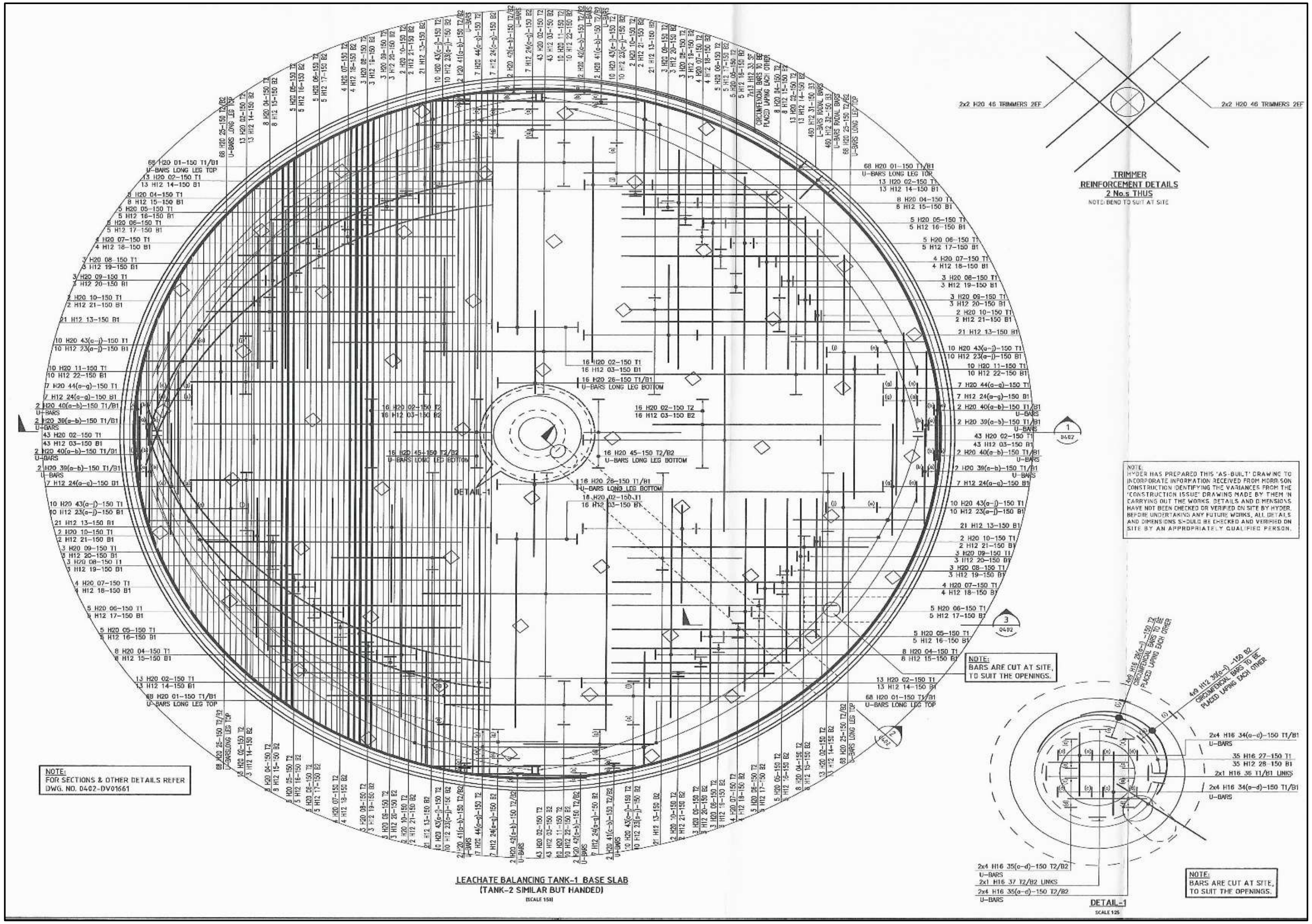


Figure 3.1.2: Layout of steel reinforcing for concrete base to the STORs

Plate 3.1.6: Completed STORs with associated pipework for leachate input

One tank (usually STOR1, right on Plate 3.1.6) stores raw leachate collected from the entire landfill (plus surface water drainage) via the four pumping stations. The second tank (STOR2, left in Plate 3.16) stores the treated leachate from the SBRs. Both STORs are confined spaces for the purpose of entry. There is an outlet valve at the bottom of each STOR, and a third valve allows the two tanks to be linked (see Section 5). Figures 3.1.3 and 3.1.4 show the layout of the inlet and outlet pipework for the STORs.

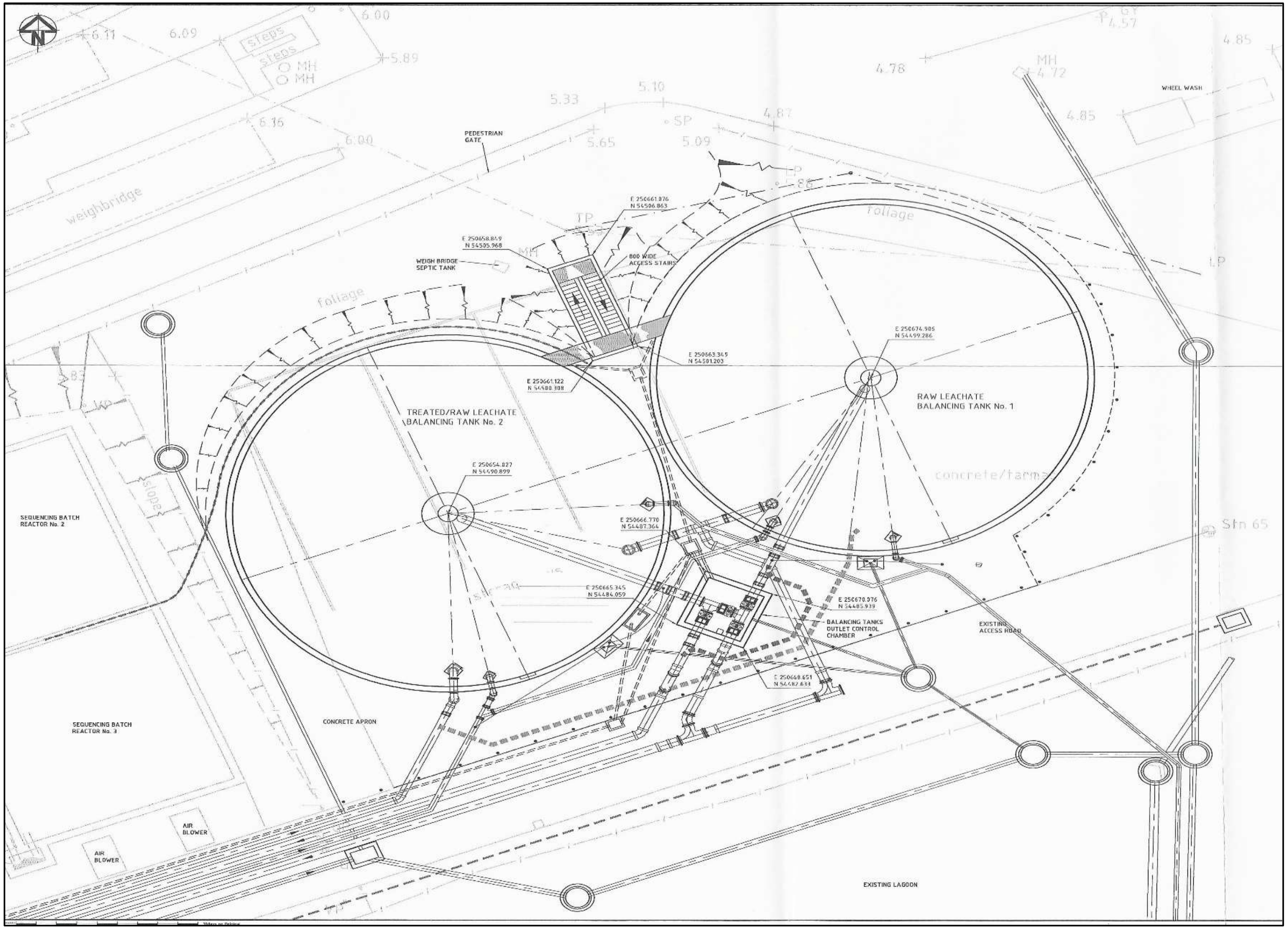


Figure 3.1.3: Schematic plan diagram showing the pipe infrastructure feeding leachate to the STORs and exit routes for liquor

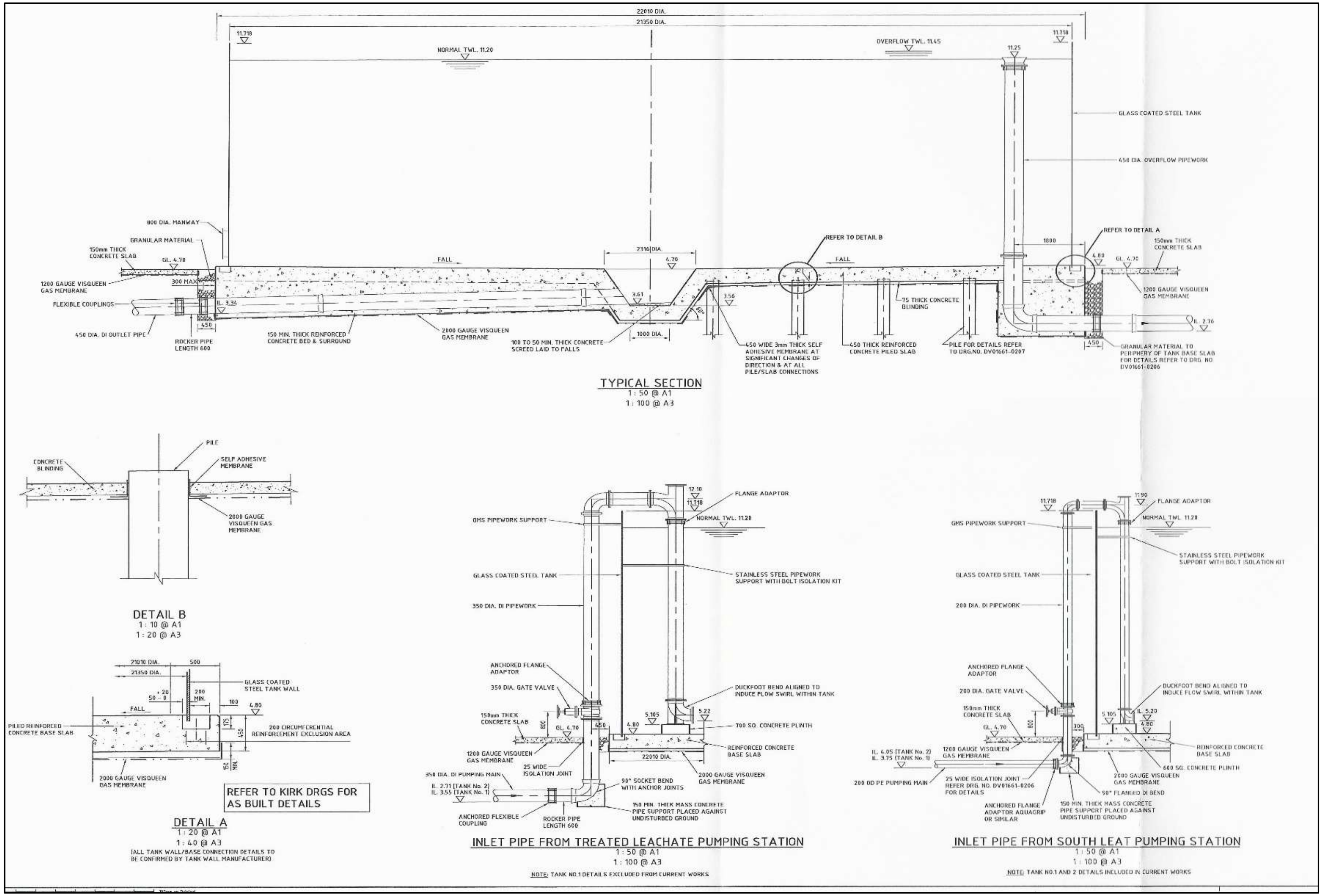
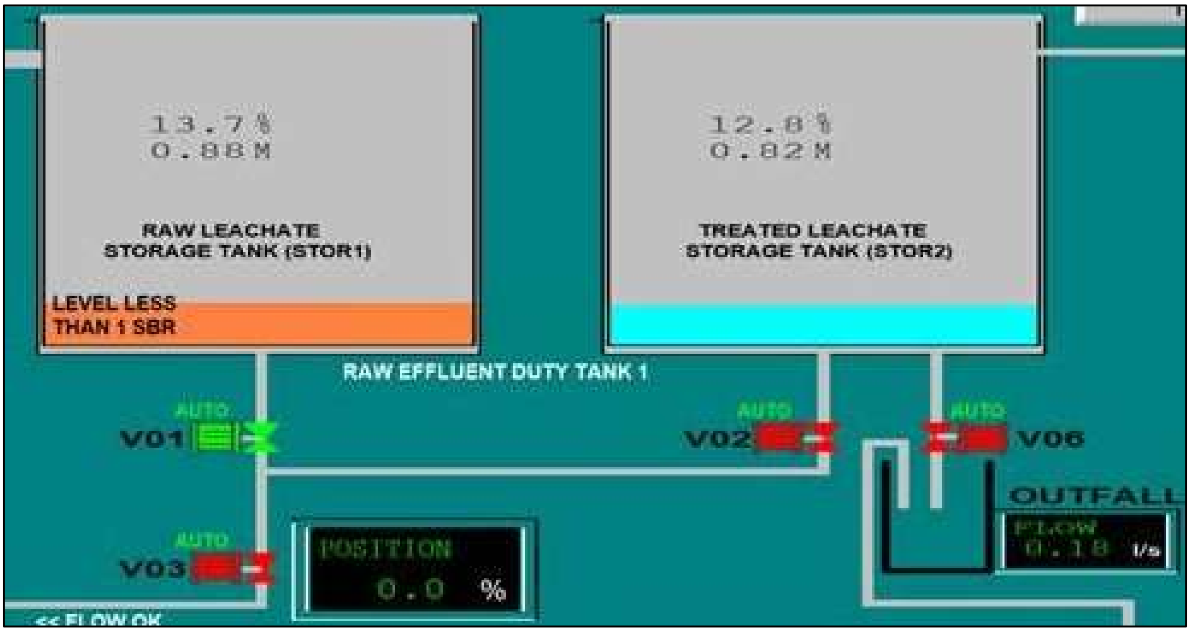


Figure 3.1.4: Cross-sectional schematic diagram showing the pipe infrastructure feeding leachate to the STORs and exit routes for liquor

3.2 Valve Chamber

The outlets for STOR1 and STOR 2 are arranged with 4 actuated valves (STOR-V01, V02, V03 and V06, Plates 3.2.1 & 3.2.5) installed within a common valve chamber (Figure 3.2.1 & 3.2.2). The valves are 450mm diameter with electric actuators. All valves are gate valves except V03, which is an eccentric plug valve.



Screenshot 3.2.1: Status of each of the four valves serving STOR1 and STOR2

Valve V03 is fitted with a failsafe closed quarter turn actuator, while valves V01, V02 and V06 are fitted with single phase multiturn electric actuators suitable for power failure operation from a UPS (uninterruptable power supply) during maintenance of V03. Each valve actuator is equipped with a switch for local/remote control, where local is manual activation from either a panel or the actuator itself, and remote control is via the PLC in the control room (see later).

The actuators have digital output signals for open (fully open) and closed (fully closed). Valve STOR-V03 is a flow control valve with an analogue output signal showing valve position (see Screenshot 3.2.1 – 0.0% flow). Valve V03 enters emergency shutdown in the event of a power failure in all modes of treatment operation.

All actuators are fitted with limit switches to allow monitoring of valve operation against pre-set opening and closing times: failure to open / close within the pre-set limits will automatically generate an alarm. All control set points are operator adjustable via the PLC interface.

Plate 3.2.1: Installation of valves to STORs 1 & 2

Plate 3.2.2: Installation of valves to STORs 1 & 2

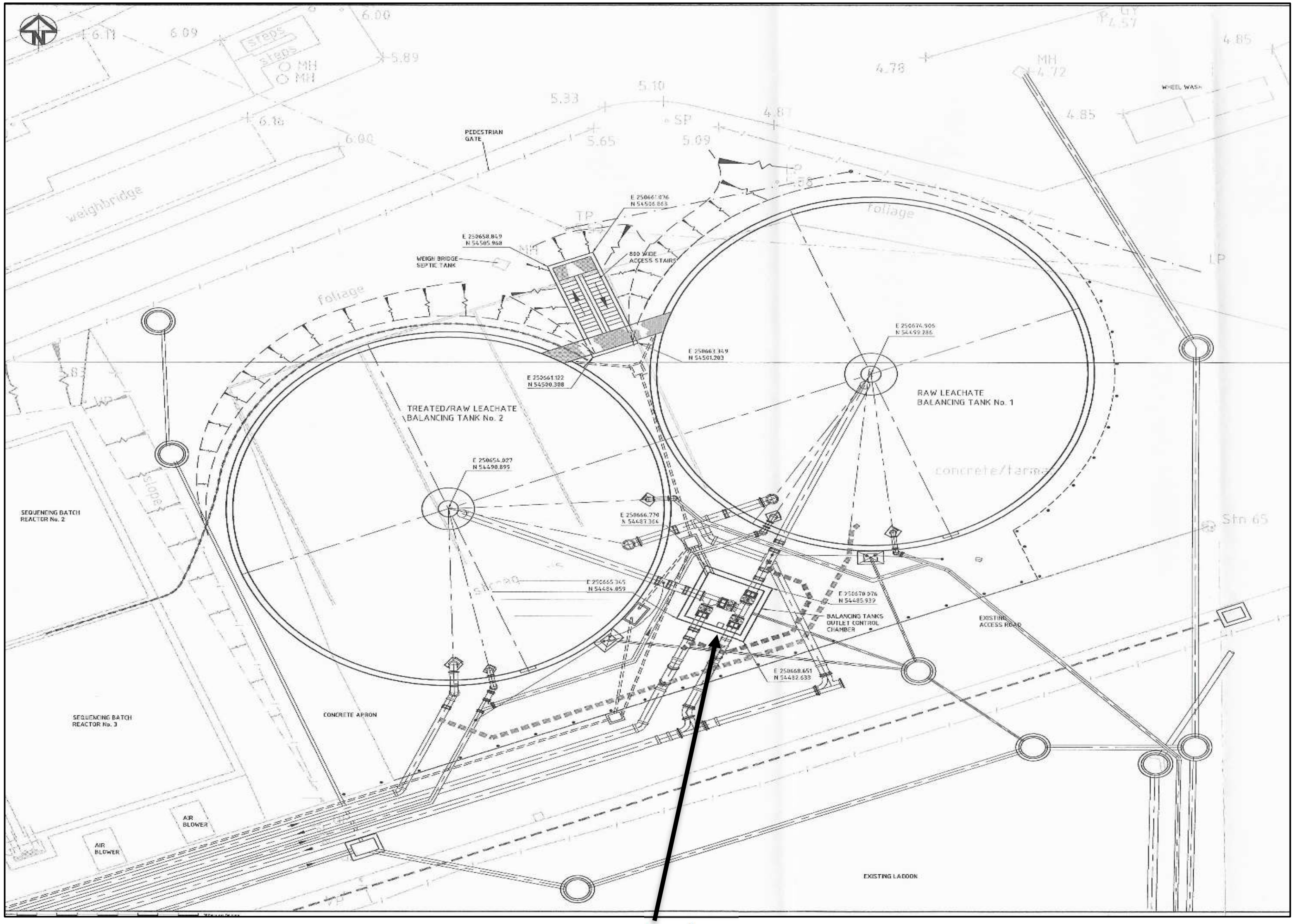


Figure 3.2.1: Schematic plan diagram showing the valve chamber and exit routes for liquor from STOR1 and STOR2

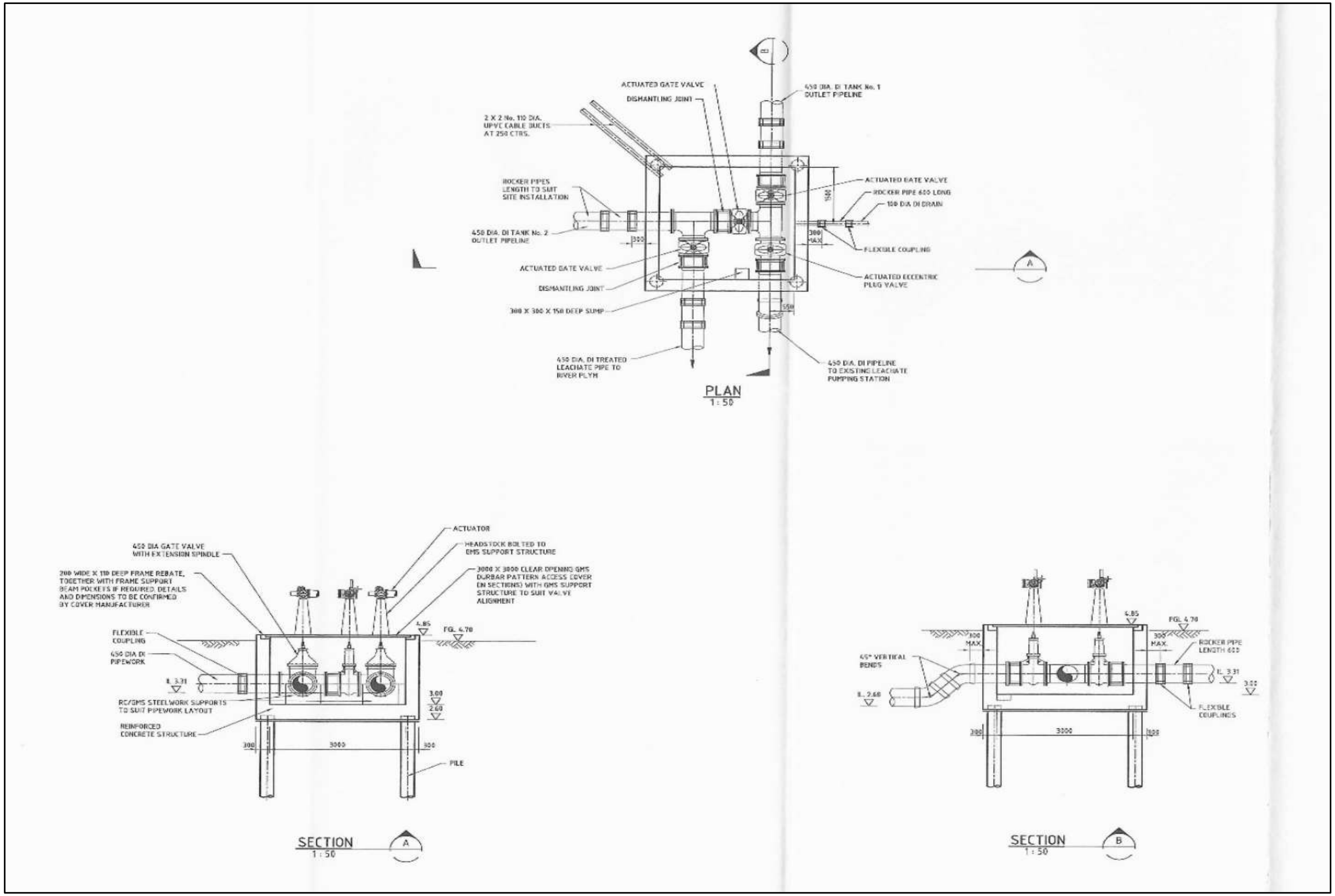


Figure 3.2.2: Cross-sectional schematic diagram showing the valve chamber and valves

Plate 3.2.3: Completed valve chamber, minus security fence, showing control cabinet housing UPS on the left

Plate 3.2.4: Completed valve chamber with security fence

Plate 3.2.5: Control cabinet for the STOR valves, housing electric panels & the UPS

3.3 Pump Lifting Station and associated wet well

The Pump Lifting Station (PLS, Plate 3.3.1) was constructed in 1983 and comprises three ABS semi-solid pumps (Plate 3.3.2 & 3.3.3), which operate in pairs to a combined capacity of 300l s^{-1}, plus associated non-return and directional valves. Pumps take leachate from the wet well, fed by STOR1 (in Normal mode), and pump it to the SBRs for treatment via the underground Rising Main according to the specified treatment programme.

Plate 3.3.1: Pump lifting station & wet well, 2021

The three inlet pumps have an individual capacity of 150 ls^{-1} and are operated on a duty-assist-standby basis. The duty pump is rotated for each timed pumping event according to output from the PLC control:

- One – duty; Two – assist; Three – standby;
- Two – duty; Three – assist; One – standby;
- Three – duty; One – assist; Two – standby.

Impending failure of a pump is indicated by thermal overload or over current, both of which are shown on the control panel in the PLS and on the PC in the control room (Plate 3.3.4). Once a fault has been indicated the (fixed) pump can only be re-started by a manual reset on the control panel using the manual/auto/off switch.

.

[Note: At least 20 seconds should be allowed between pump starts in manual mode.]

The PLS is classified as a confined space; it is constructed with the pumps below ground level (Figures 3.3.1-3.3.3) on ground with a history of landfill and is immediately adjacent to an active landfill. It has an integral permanent gas detection system. If gas is detected the red light on the outside of the PLS is activated and no-one should enter until portable gas detection equipment is used on the holes provided in both doors

There is a crane inside the PLS (Plate 3.3.5) used to raise the pumps and associated gate valves from the bottom of the pump house by suitably qualified persons.

There is a sump in the bottom of the PLS containing a pump which collects and discharges to the wet well any liquid arising when the three PLS pumps are being maintained.

Plate 3.3.2: Internal view of PLS showing below ground pumps: ground level is at the walkway secured by railings

Plate 3.3.3: View of the pump outlets inside the PLS and inspection walkway used when the overhead crane is being serviced

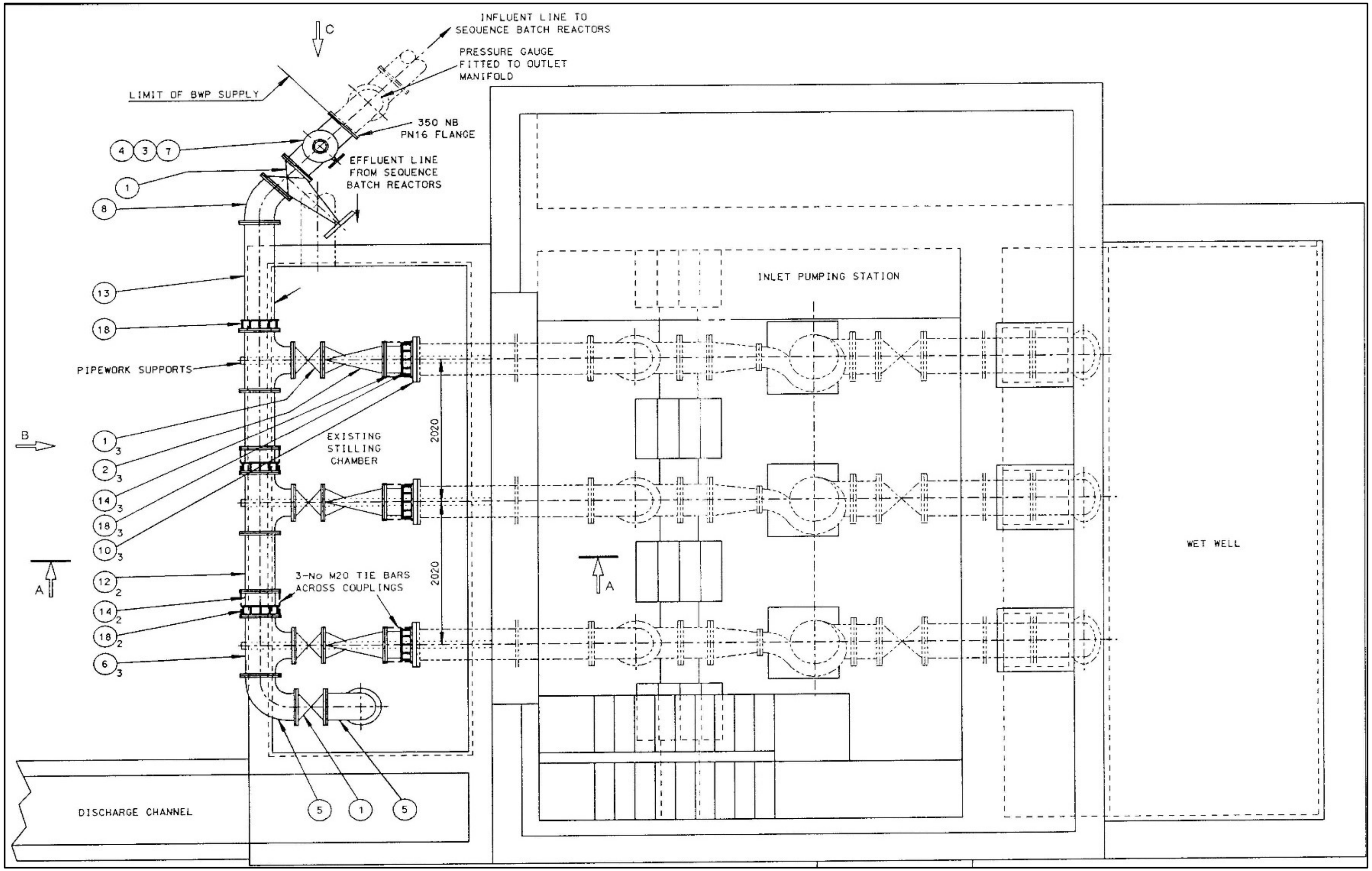


Figure 3.3.1: Schematic plan showing the layout of the PLS viewed from above

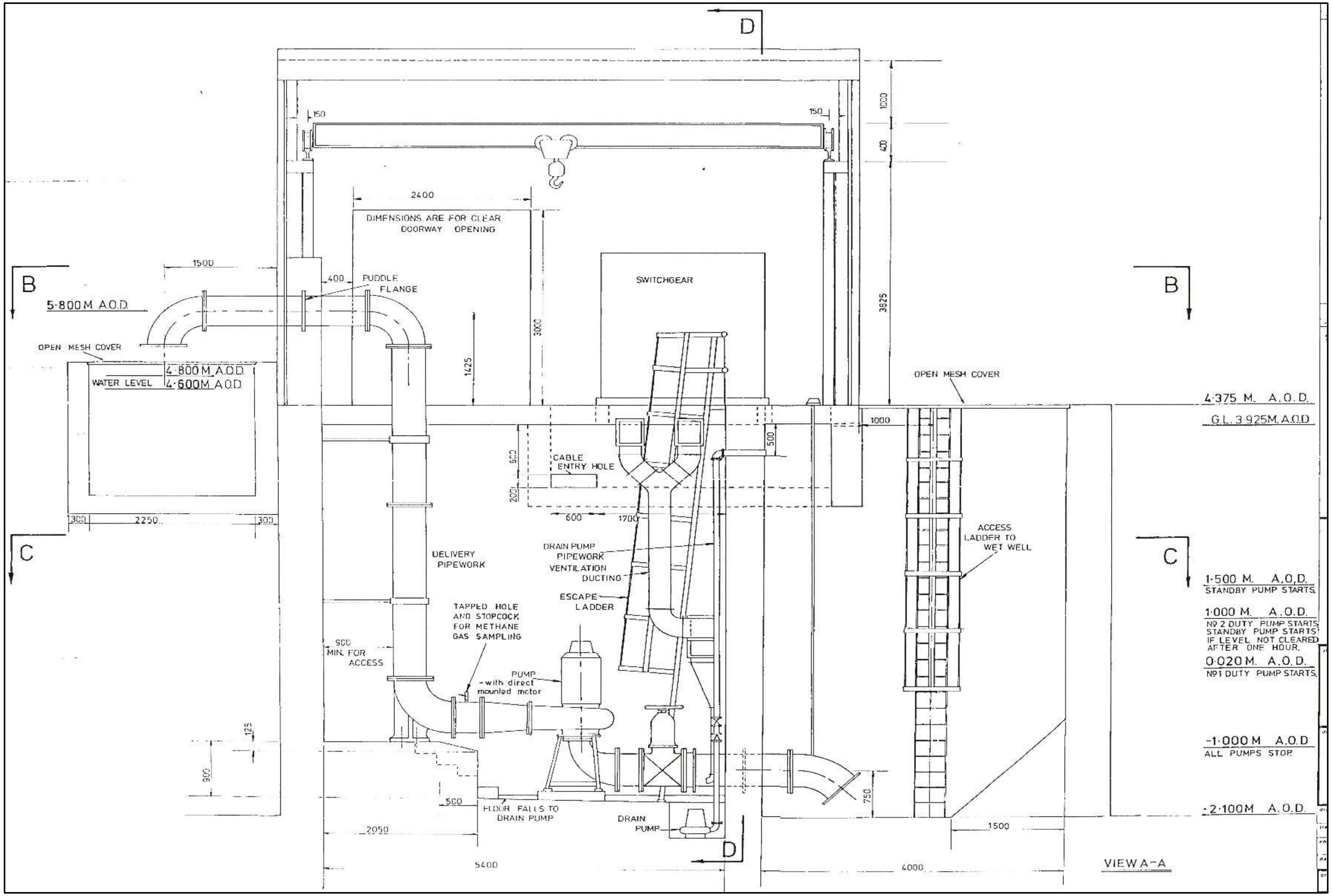


Figure 3.3.2: Cross-sectional schematic diagram showing the internal layout of the PLS

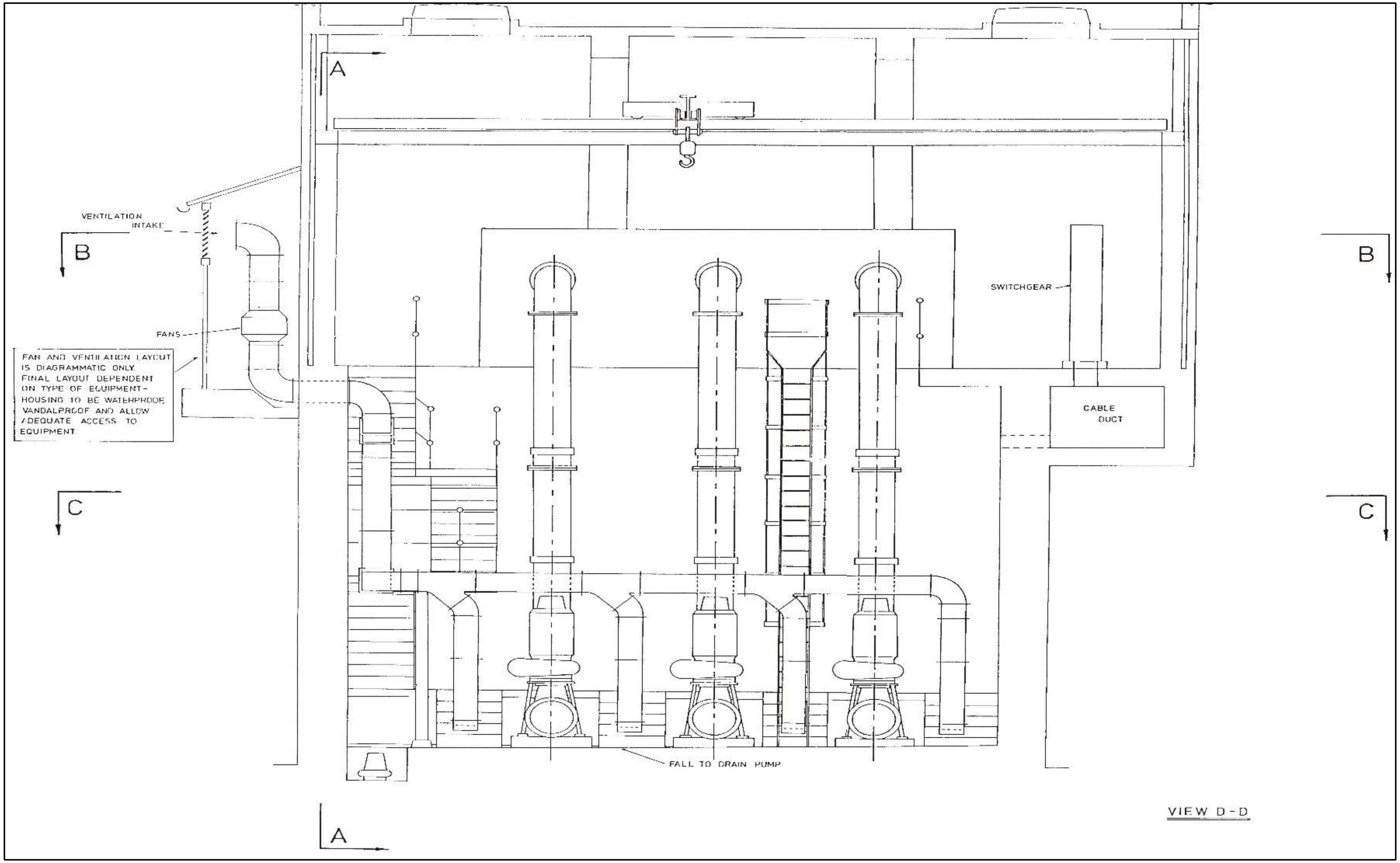


Figure 3.3.3: Cross-sectional schematic diagram showing the internal layout of the PLS

Plate 3.3.4: Control panels (MCC) that operate the three pumps, within the PLS

Plate 3.3.5: Overhead crane and gantry for crane inspection

3.4 Sequential Batch Reactor Plant (SBR) with supporting infrastructure

The LTP comprises four square, concrete tank SBRs (Plate 3.4.1) numbered 1 to 4, of internal dimensions 11.1m x 11.1m x 6.4m deep arranged in a square formation with common internal walls (Figures 3.4.1-3.4.3 and Plates 3.4.3 & 3.4.4). The SBRs were constructed in 1996 on historic landfill (Plate 3.4.2); each can operate in isolation and none of the functions occurring within an SBR should affect another. Manually operated drain penstocks allow gravity transfer of liquor between adjacent SBRs.

Plate 3.4.1: External view of SBR plant, 2021

Plate 3.4.2: Excavation of historic waste mass beneath the LTP during installation of pipes serving STORs1 and 2

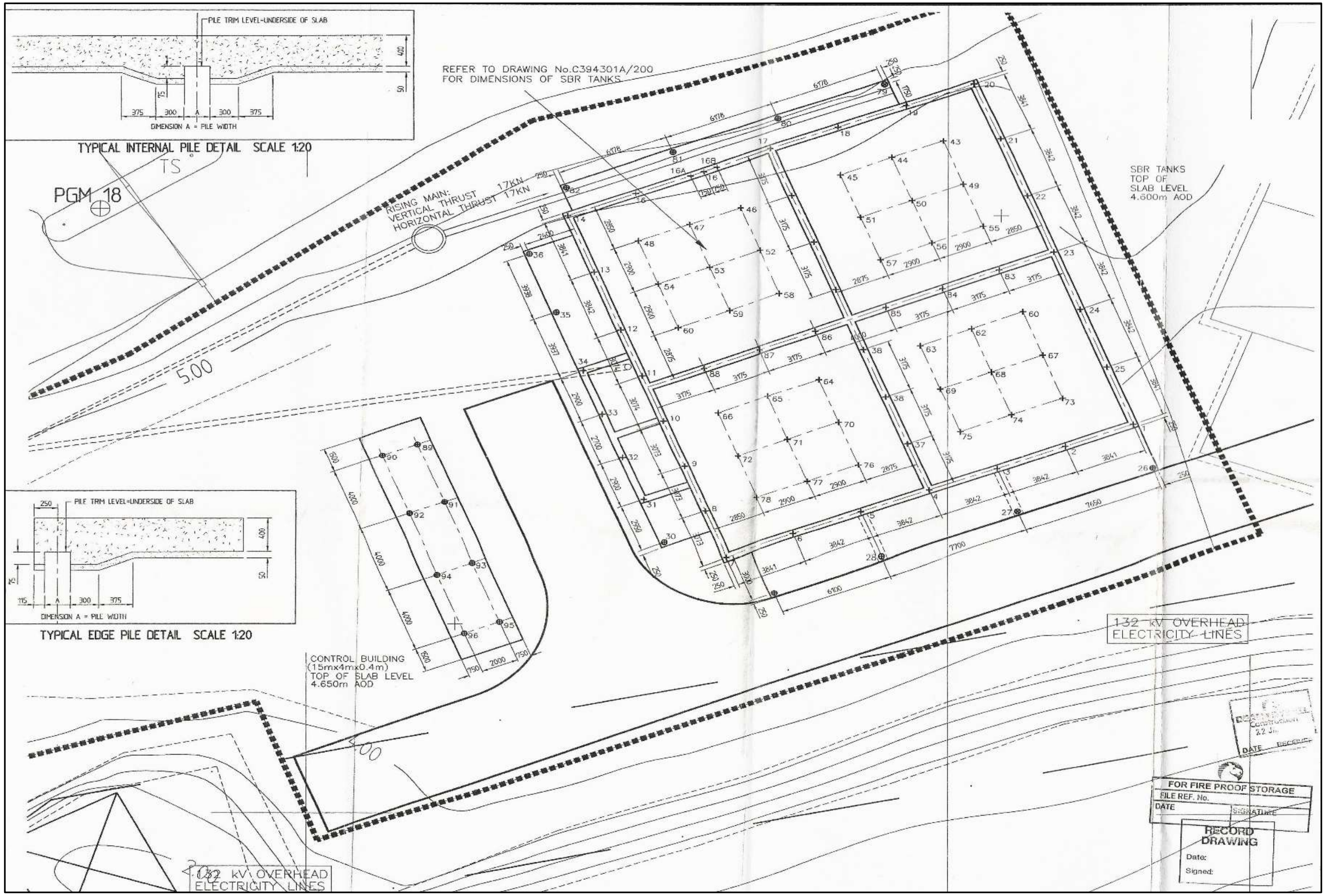


Figure 3.4.1: Pile foundations constructed during the installation of the SBRs

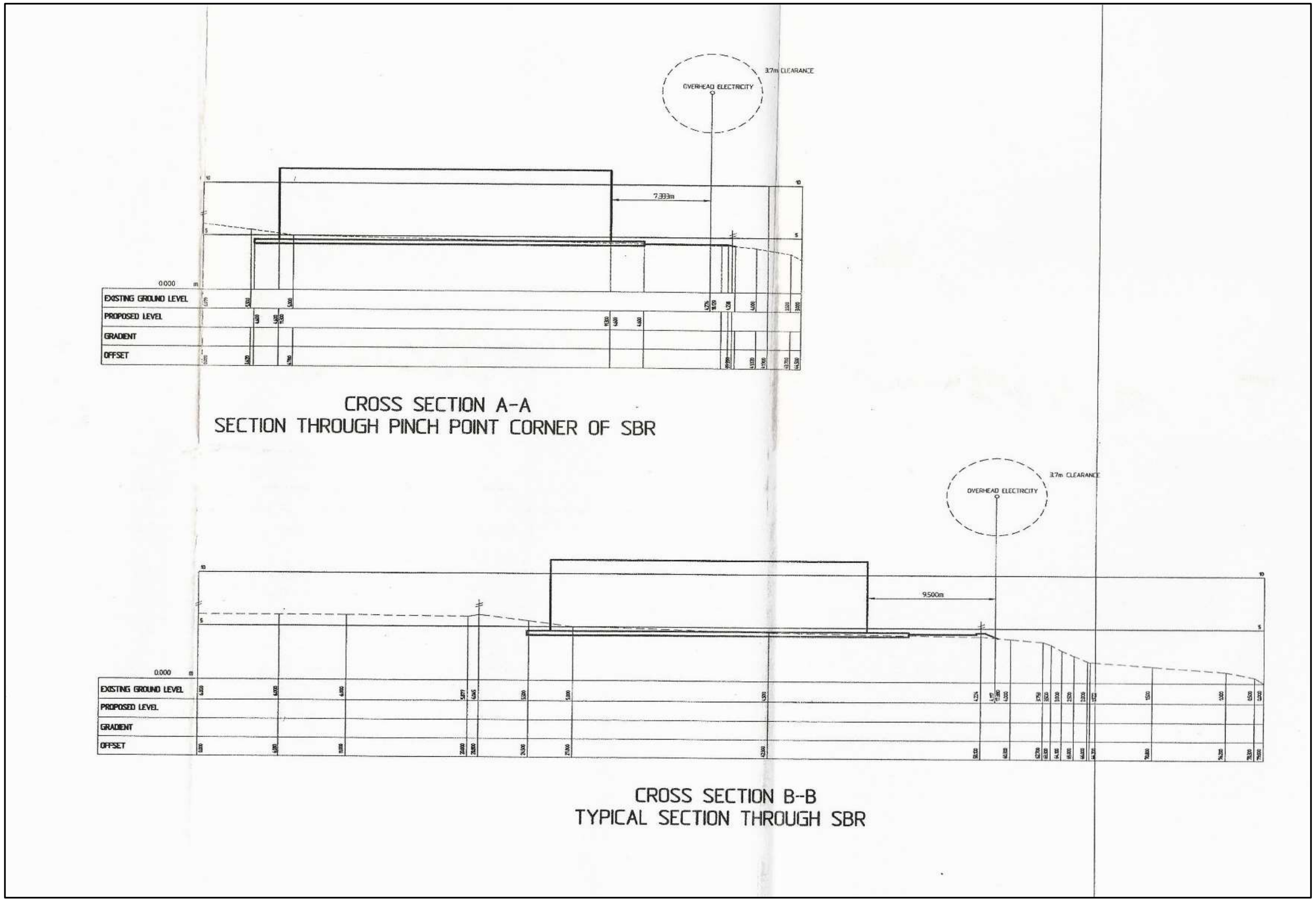


Figure 3.4.2: Cross-sectional diagram of SBR

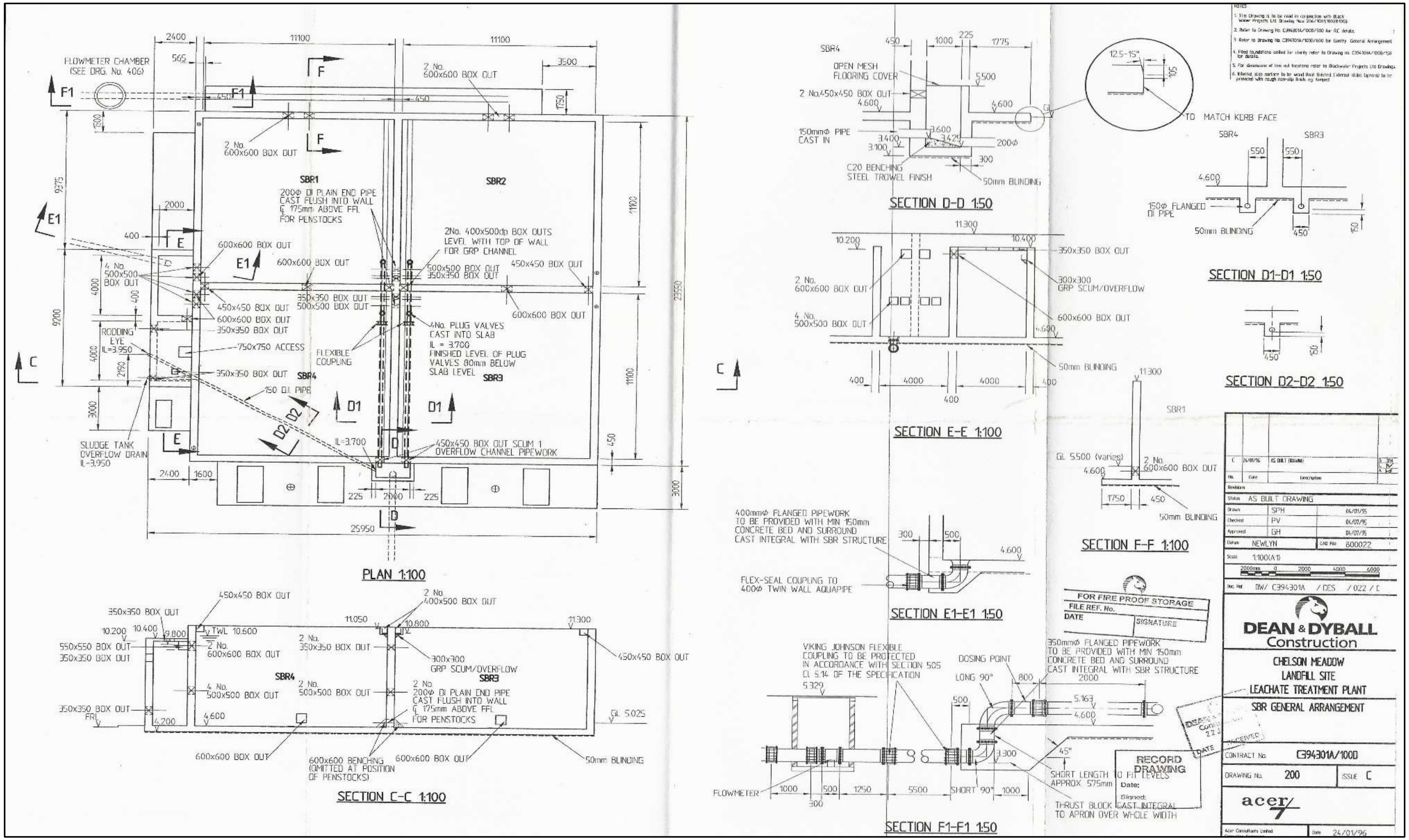


Figure 3.4.3: Technical specifications of the SBRs

Plate 3.4.3: Looking west across the top of the walkway serving the SBRs, 2021

Plate 3.4.4: Looking east across the top of the walkway serving the SBRs, 2021

Each SBR has a Dissolved Oxygen (DO), pH and temperature gauge, liquor height sensor, and its own 300mm diameter inlet valve with electric actuators, fed from the Rising Main via the PLS (Plates 3.4.5 & 3.4.6).

Plate 3.4.5: Northern edge of the SBRs showing leachate inlet pipe from the PLS and associated valves

The inlet valves (V01, V02, V03 & V04) are 1/4 turn ball valves with electric actuators. Each valve is equipped with a local switch for local/remote control at the valve or control room, respectively. When set to local, the valves may be opened, closed, or held in any intermediate position by the local control switch. When leachate is being treated the valves need to be controlled by the PLC according to the programme times and are set in remote to enable this.

Plate 3.4.6: Two inlet valves, one serving SBR1 and one serving SBR4

Each SBR has the following mechanical components (Figures 3.4.4 – 3.4.8):

Jet Motive Pumps
Each SBR houses a jet motive pump to circulate the contents of the SBR. The pumps are ABS submersibles. The pumps are monitored on the appropriate control panel in the control room for failure by:

- Thermal overloads
- Over current
- Leak seal detection

The pumps are capable of being controlled by a manual/auto/off switch located on the control panel:

- Manual mode: allows the pump to run according to the local/stop/start button.
- Auto mode: gives control of the pump to the PLC and sends a signal to the PLC indicating auto mode.
- Off Mode: the pump is disabled from running in either manual or auto modes.

[Note: At least 20 seconds should be allowed between pump starts in manual mode.]

De-sludge Pumps
Each SBR houses a de-sludging pump to transfer excess sludge from the SBR to the sludge holding tank. The pumps are capable of being controlled by a manual/auto/off switch located on the control panel as described above for the jet motive pumps.

Decant Arms
The Decant Arms are manufactured from stainless steel tubing and are used to decant liquor from the SBR at a point just below the surface. The unit floats on the surface either in a buoyant (or Normal) state when no decanting can take place, or in the decanting state when the inlet is submerged.

The Decant unit consists of 4 parts:

1. The hinge - is mounted at a low level in the SBR and allows the floating arm to rise and fall with liquor level.
2. The Discharge arm - is supported by the floatation units and carries the decanted liquor to the outlet chamber. Note, the Decant Arm is restrained laterally by tie wires against wind loading and vertically by stabiliser wires.
3. The Collecting tube - is connected to the discharge arm and consists of a tube with a series of 60mm holes along its underside. These collect decanted liquor from the SBR when the decant arm is in the lowered (decanting) position
4. The Flotation tubes - two tubes arranged above and below the collecting tube cause the Decant Arm to float on the surface of the liquor. The top tube is sealed with foam and the bottom tube is used to control floatation.

When the bottom tube is filled with air, the Decant Arm is raised and decanting stops. When air is released from the bottom tube, the Decant Arm sinks and decanting occurs.

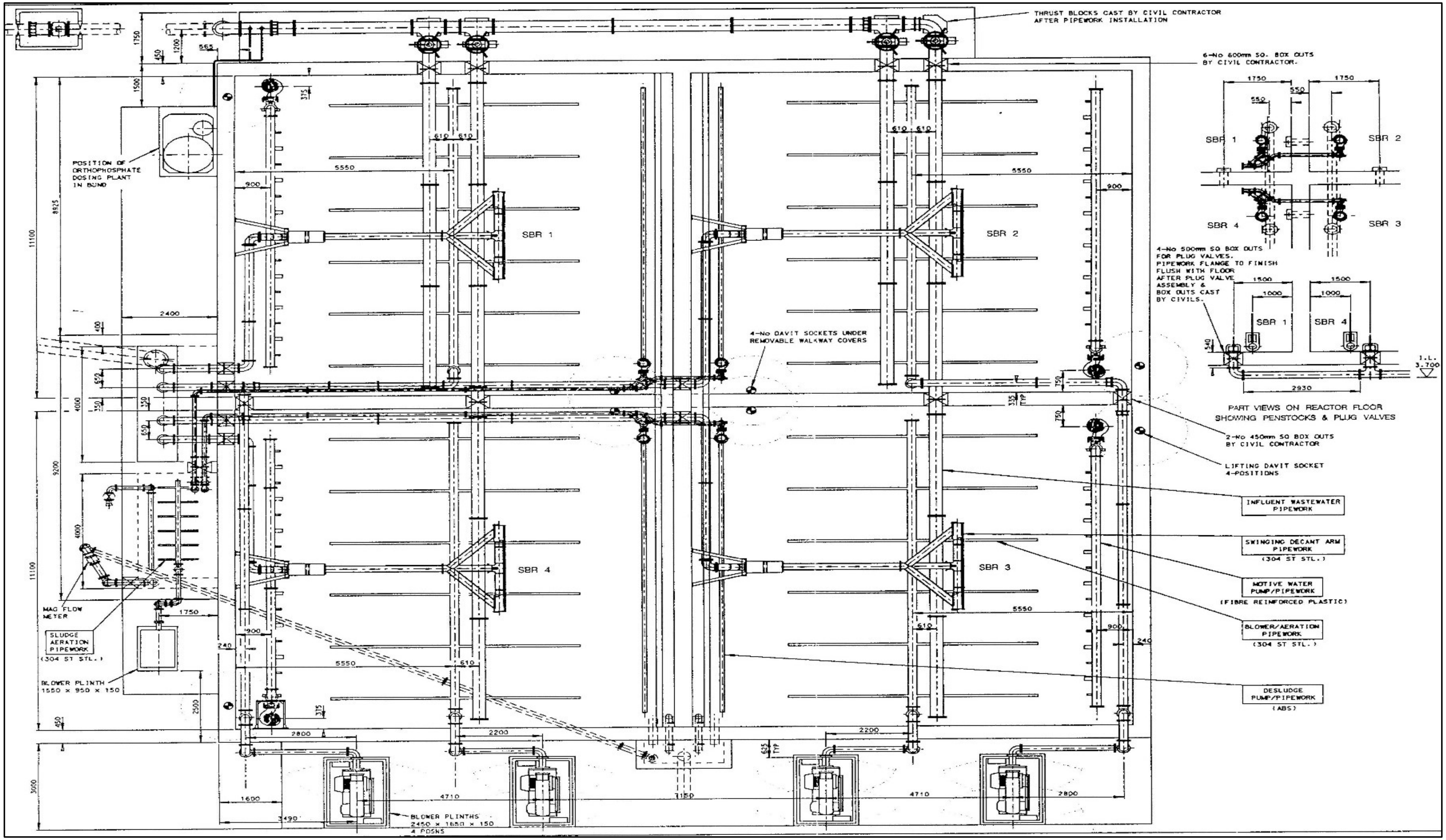
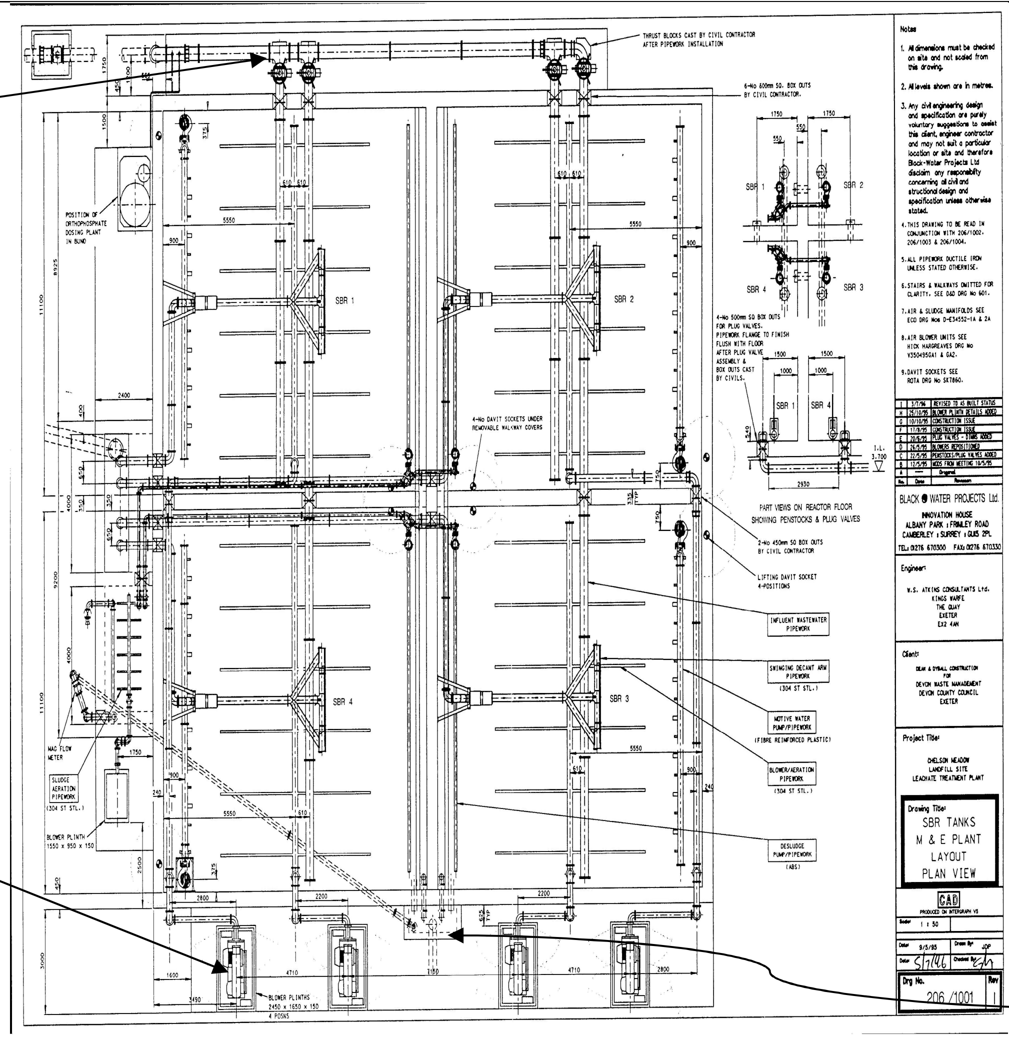
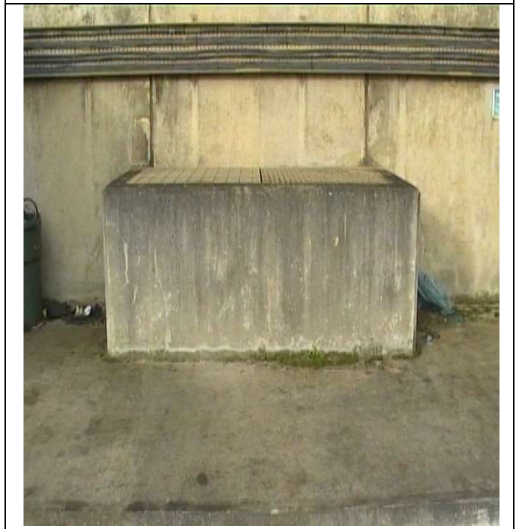


Figure 3.4.4: Plan view of SBR infrastructure

Rising Main & Inlet Valves

Blower Cabinets 1 -4





De-sludge discharge chamber

Figure 3.4.5: Illustrated plan view of SBR external infrastructure

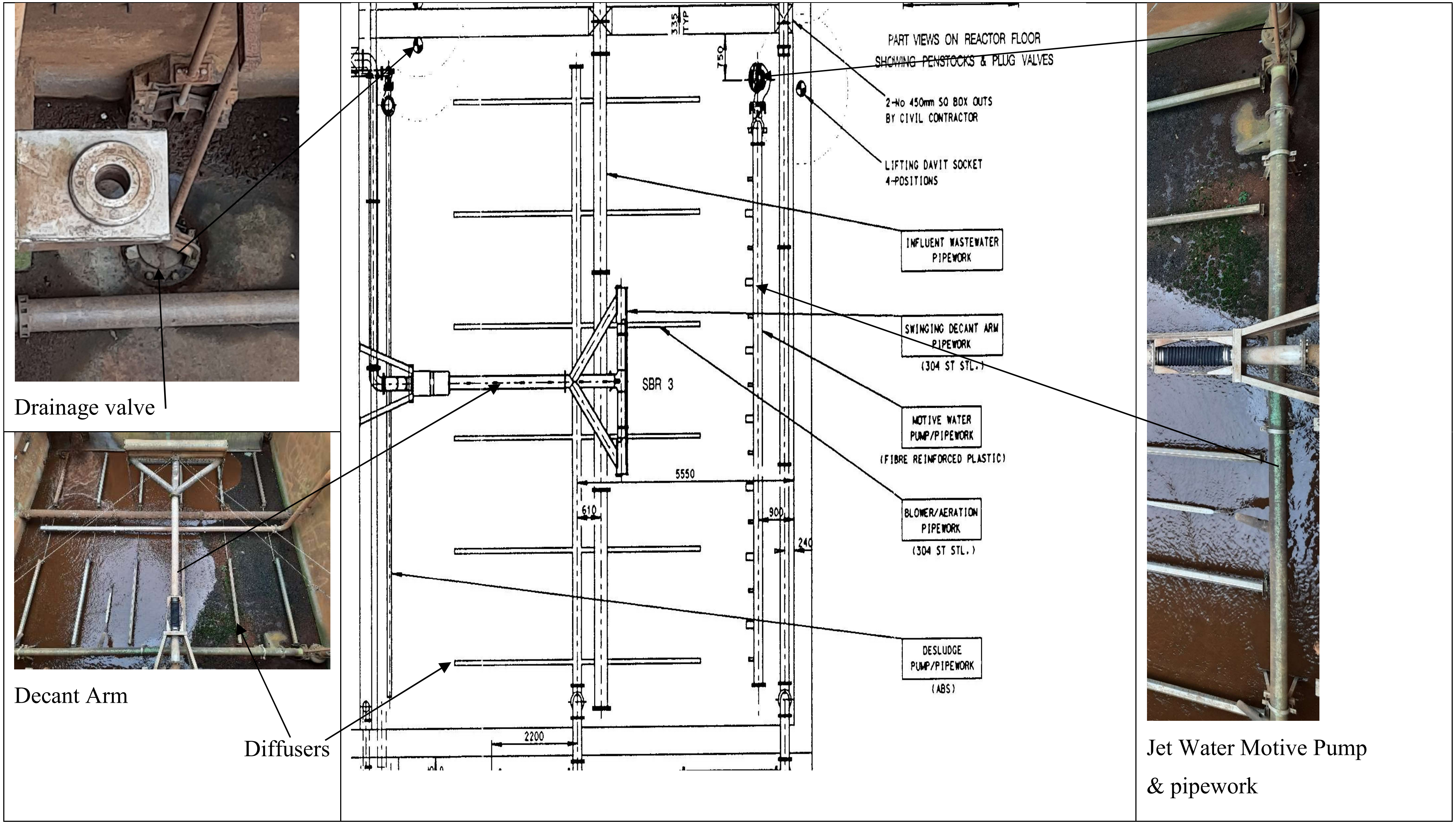


Plate 3.4.6: Illustrated schematic diagram of SBRs showing key internal infrastructure.

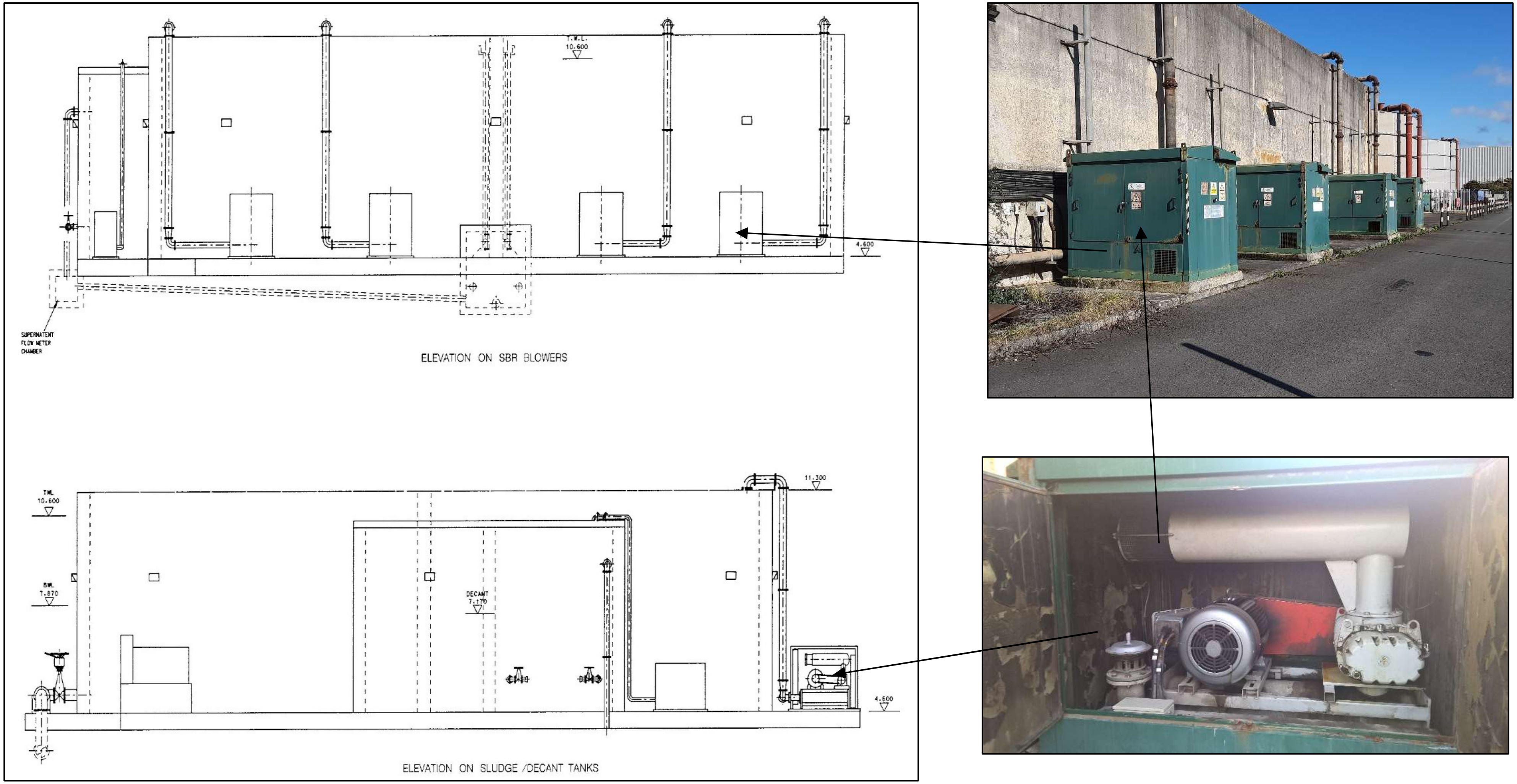


Figure 3.4.7: Illustrated cross-sectional plan of SBR external infrastructure (blowers)

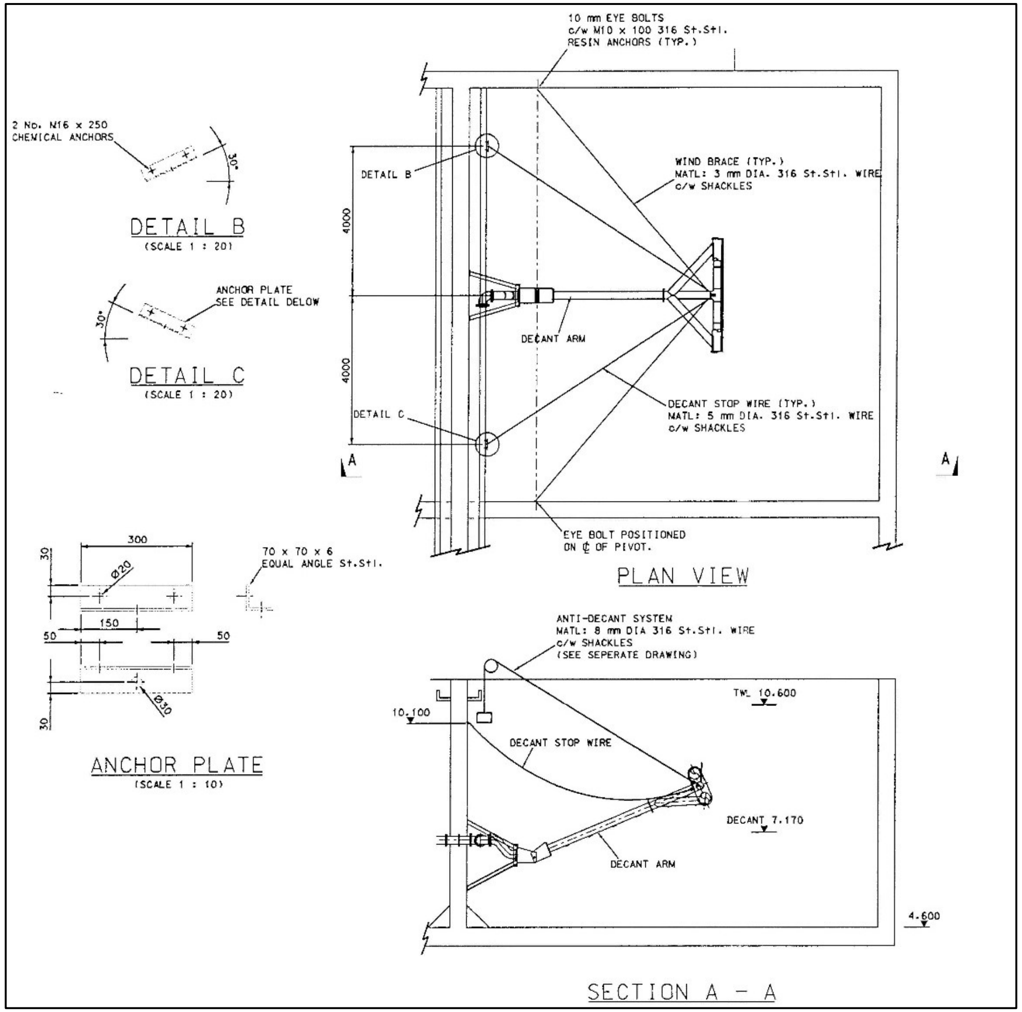


Figure 3.4.8: Illustrated plan and sectional views of SBR decant infrastructure

The SBR Decant Arm control selector switches are connected into the PLC. The selector switches have 3 positions: 1) Auto, 2) Normal, and 3) Decant. The switch must be in one of the three positions for at least 5 seconds before any action is taken by the PLC. When the switch is changed into a new position the purge sequence is initiated (except when changing from Normal to Auto, when an auto decant is not required). The switch must be in the auto position to allow an auto "start of decant". The switch can be changed to the decant position at any time, and will purge and start decanting, regardless of liquor height in the SBR.

The PLC inputs are Auto and Decant. When neither of these inputs are sensed, the Normal selection is assumed. This makes the Normal position (or floating) fail safe. This is a key safety feature and must remain in place irrespective of any changes to the PLC logic.

When the SBR Decant Arm control switch is in the decant mode, the output is energized. Similarly, when the Decant Arm is in the Auto mode and the process is in the Decant Step, the output is energised. Once energised, the Decant Arm can lower according to falling liquor level. At any time, the output can be de-energized by activating the emergency stop sequence.

Air for the decant system is provided by two Clarke Model RD9 air compressors; each compressor can provide sufficient air to operate the whole SBR Decant system. The compressors are located next to the control room (Plate 3.4.7).

The compressors provide air to the Decant Arm system via a common 220 litre receiver vessel mounted adjacent to the SBRs (Plate 3.4.8). Both compressors are continuously under power but only one compressor is connected at any time to the 220 litre receiver except under power fail conditions when there is a failsafe to provide maximum reserve capacity.

Plate 3.4.7: Clarke air compressors serving the SBR Decant Arms

Plate 3.4.8: Receiving vessel for compressed air, showing control cabinet above for regulating each SBR Decant Arm

Plate 3.4.9: Blower cabinets alongside the SBR plant, 2021

Blowers

Each SBR has its own dedicated Hick Hargreaves air blower (Plates 3.4.9-3.4.11). The air is transferred to diffusers in the bottom of the SBR by 200mm diameter ductile iron pipe above top water level (TWL) and stainless steel pipe below TWL. The blowers are monitored on the appropriate control panel in the control room for failure by:

- Thermal overloads
- Over current
- Leak seal detection

The blowers are capable of being controlled by a manual/auto/off switch located on the control panel:

- Manual mode: allows the blower to run according to the local/stop/start button.
- Auto mode: gives control of the blower to the PLC and sends a signal to the PLC indicating auto mode.
- Off Mode: the blower is disabled from running in either manual or auto modes.
  .

[Note: At least 30 seconds should be allowed between motor starts in manual mode and no more than 20 starts per hour per motor should be allowed in manual mode.]

Plate 3.4.10: Air blower inside the acoustic cabinet external to the SBR

Plate 3.4.11: Air blower inside the acoustic cabinet external to the SBR

Diffusers
The diffusers are stainless steel and are mounted in the bottom of each SBR (Plate 3.4.12); they produce coarse bubbles (Plate 3.4.13) of a defined size when the blowers are operating. The diffusers have no moving parts or controls and have no output devices.

Plate 3.4.12: Diffusers (12) located at the bottom of each SBR, served by the air feed pipe

Plate 3.4.13: Liquor within SBR being aerated when blowers and diffusers are operational

Sacrificial Anodes
There are sacrificial anodes inside each SBR to protect associated metal structures from corroding. Sacrificial anodes work by oxidizing more quickly than the metal being protected, being consumed completely before the functional metal can react with electrolytes: they are inspected every time a tank is emptied and replaced when consumed.

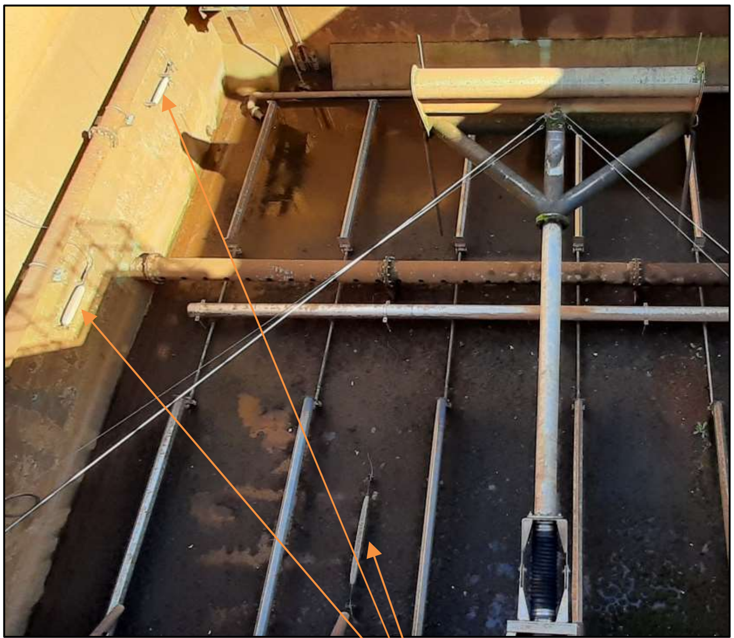


Plate 3.4.13: Sacrificial Anodes inside the SBR

3.5 Control Room (MCC)

The control room (Plate 3.5.1, sometimes known as the MCC) contains the control panels for all the electrical equipment supporting and operating the SBRs; operating manuals; maintenance records; spare parts for the control panels; and the operational computer. The layout of the control room is provided in Figure 3.5.1. The control room houses the PLC and linked Supervisory Control and Data Acquisition (SCADA) software system, which provides information to and from a PC (Plate 3.5.2). The system is semi-automated and controls the entire plant: which of the pumps is in operation during leachate transfer; the timing of discharge; filling; aeration; stirring and settlement, all of which are recorded. It also monitors DO, pH, liquor levels and temperature within each SBR. There is a separate probe to measure the level of leachate in the wet well. Flow meters measuring input from the North Leat, Ride and South Leat Pumping Stations, outflow into the River Plym and the flow into an SBR are all connected to the PLC. The PLC also monitors oxygen and methane within the control room.

Plate 3.5.1: Control room, 2021

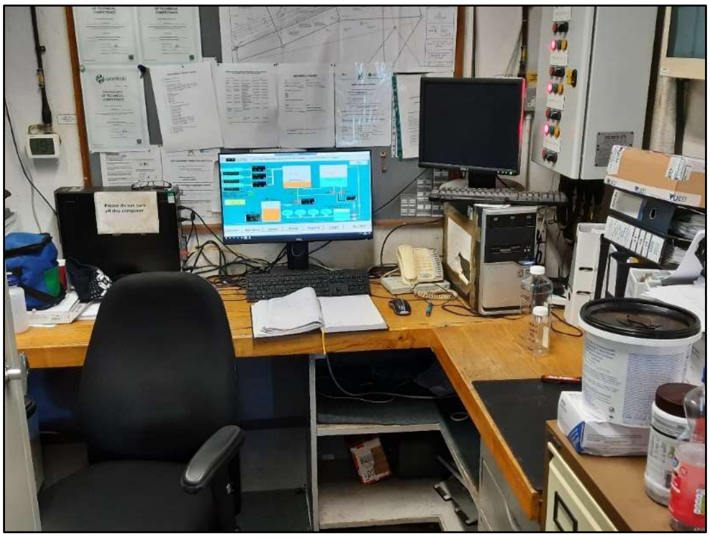


Plate 3.5.2: PC inside the control room, 2021

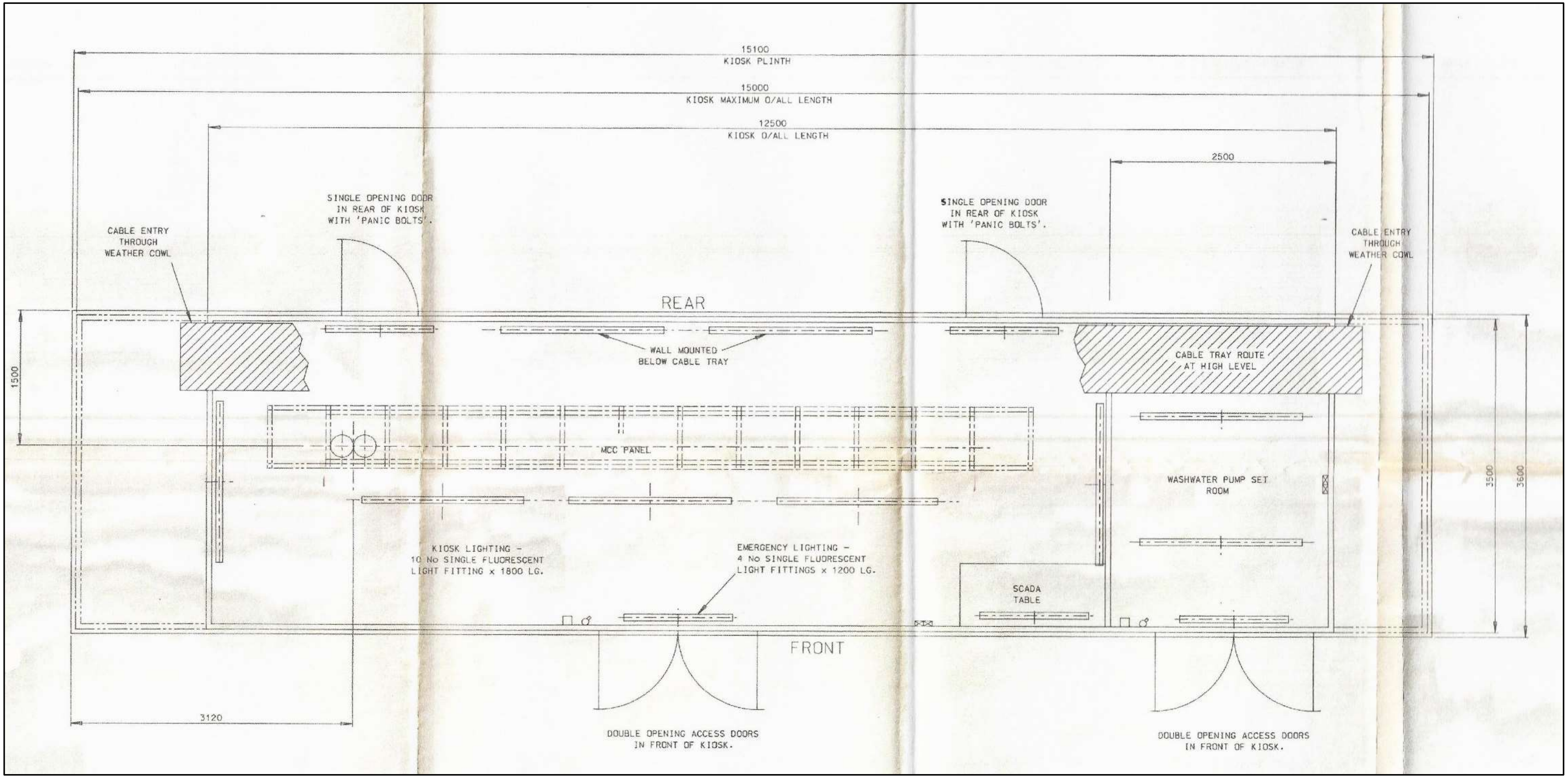


Figure 3.5.1: Schematic plan showing layout of the control room

The control room houses a row of cabinets housing all the electrical equipment and hardware necessary for the LTP to function (Plate 3.5.3).

Plate 3.5.3: Control cabinets in the control room, 2021

There is a washwater unit adjacent to the control room but within the same building. It houses two compressors which pressurise the decant arms in the SBRs; two pumps and a water holding tank used for washing down sludge from motors, pumps etc.

Plate 3.5.4: Washwater unit showing the two air compressors, 2021

3.6 Treated Leachate Pumping Station

The Treated Leachate Pumping Station (TLPS) is located between the SBRs and the control room. It has two pumps working sequentially to pump treated leachate to STOR2 from the SBRs during the decant phase of Normal and Peak Mode (Plate 3.6.1) and has its own control panel inside a dedicated cabinet (Plate 3.6.2). Figures 3.6.1-3.6.3 show the relationship between the TLPS and the SRB, and the TLPS and STOR2.

Plate 3.6.1: Treated Leachate Pumping Station showing two pumps and associated pipework

Plate 3.6.2: Control panel for the TLPS inside the cabinet adjacent to the pumps

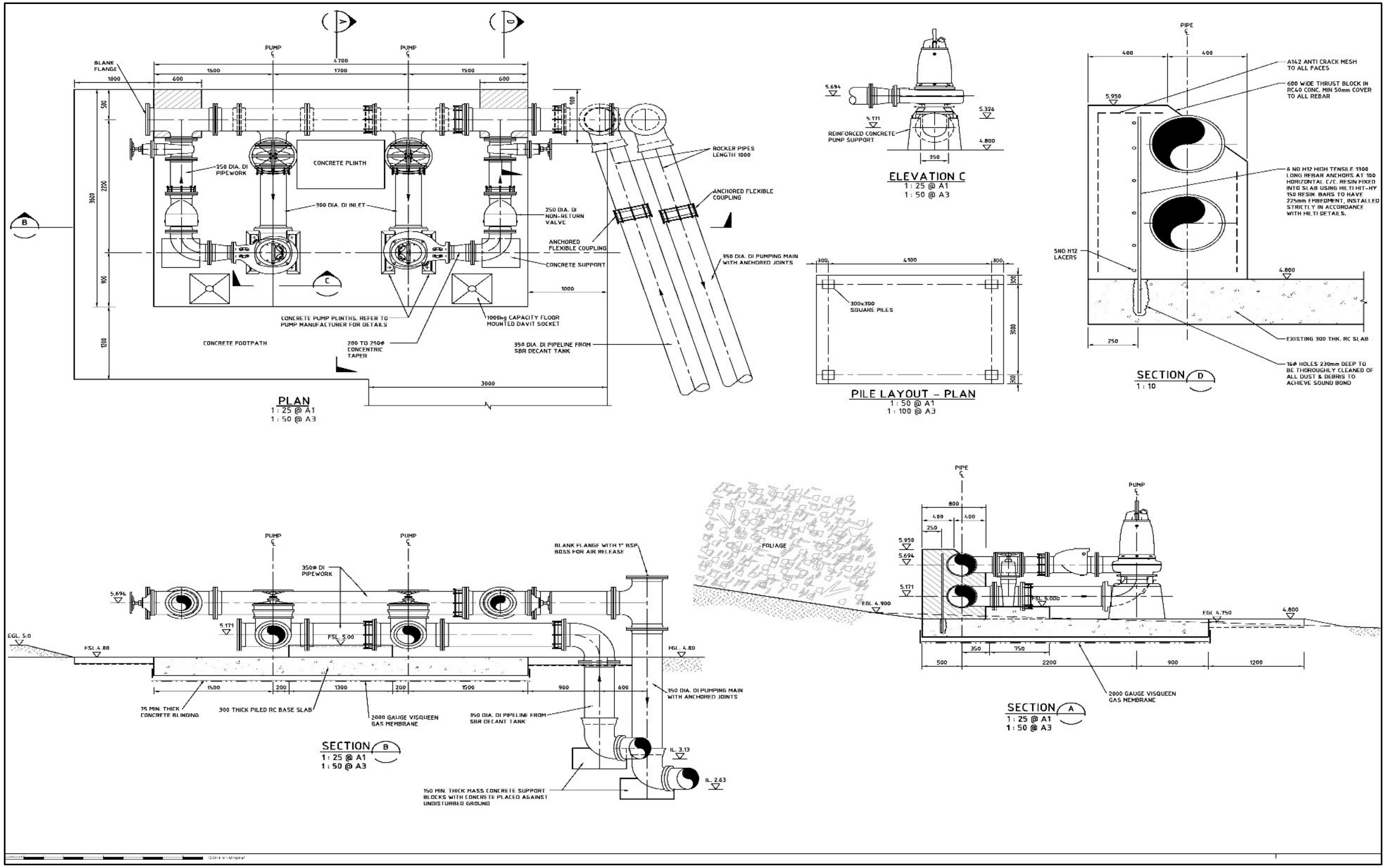


Figure 3.6.1: Schematic diagrams showing the structure and layout of the TLPS

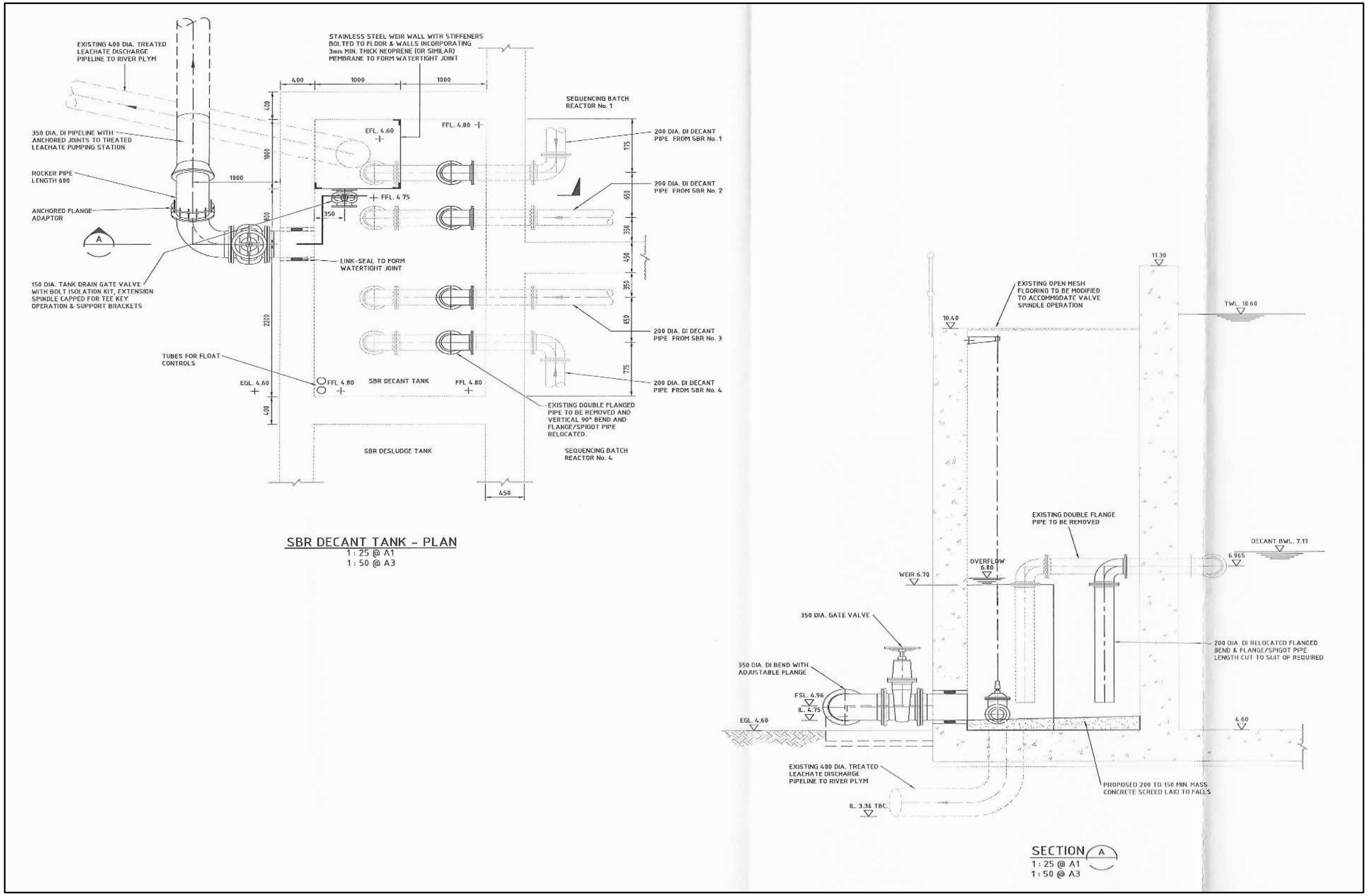


Figure 3.6.2: Schematic diagram of the flow route for treated leachate from the SBRs to the TLPS

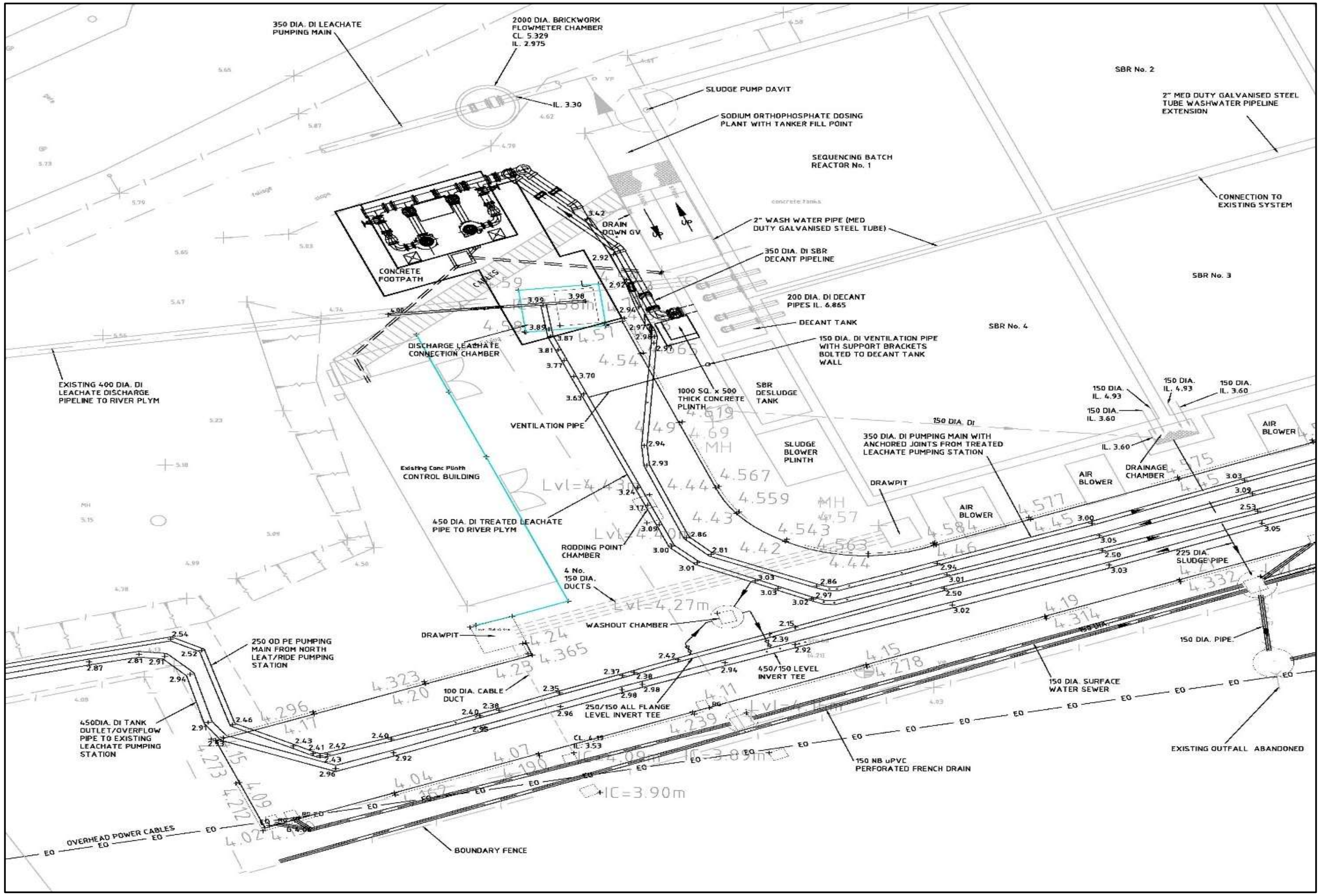


Figure 3.6.3: Schematic diagram showing pipework carrying treated leachate from the TLPS to STOR2

3.7 Discharge Channel and Outfall Pipe

There is a purpose-built concrete channel with protective grill leading from the PLS to the River Plym (Plates 3.7.1-3.7.2). It passes beneath The Ride (Plate 3.7.3) and across the surface of the mudflats as an outfall pipe visible when the tide is out (Plate 3.7.4).

Plate 3.7.1: Discharge channel at the point where it meets The Ride and travels below ground

Plate 3.7.2 Discharge channel showing housing for the MCERTS flow meter

Plate 3.7.3: The Ride showing the approximate location of the below ground route of the discharge channel (dashed red line)

Plate 3.7.4: Location of the outfall pipe on the mudflats of the River Plym

There is a flow meter in the discharge channel that is MCERTS compliant to measure daily the outfall to the River to validate permit compliance. The channel has a five-yearly technical inspection as part of the MCERTS process, and the MCERTS Management System is audited annually by an external contractor. The channel is inspected daily and the condition of the surface noted in the site diary as a trigger to any cleaning required. The flow meter is serviced annually.

All environmental aspects of the LTP infrastructure are inspected monthly by the TCM (Appendix E) along with statutory nuisance (see Section 7).

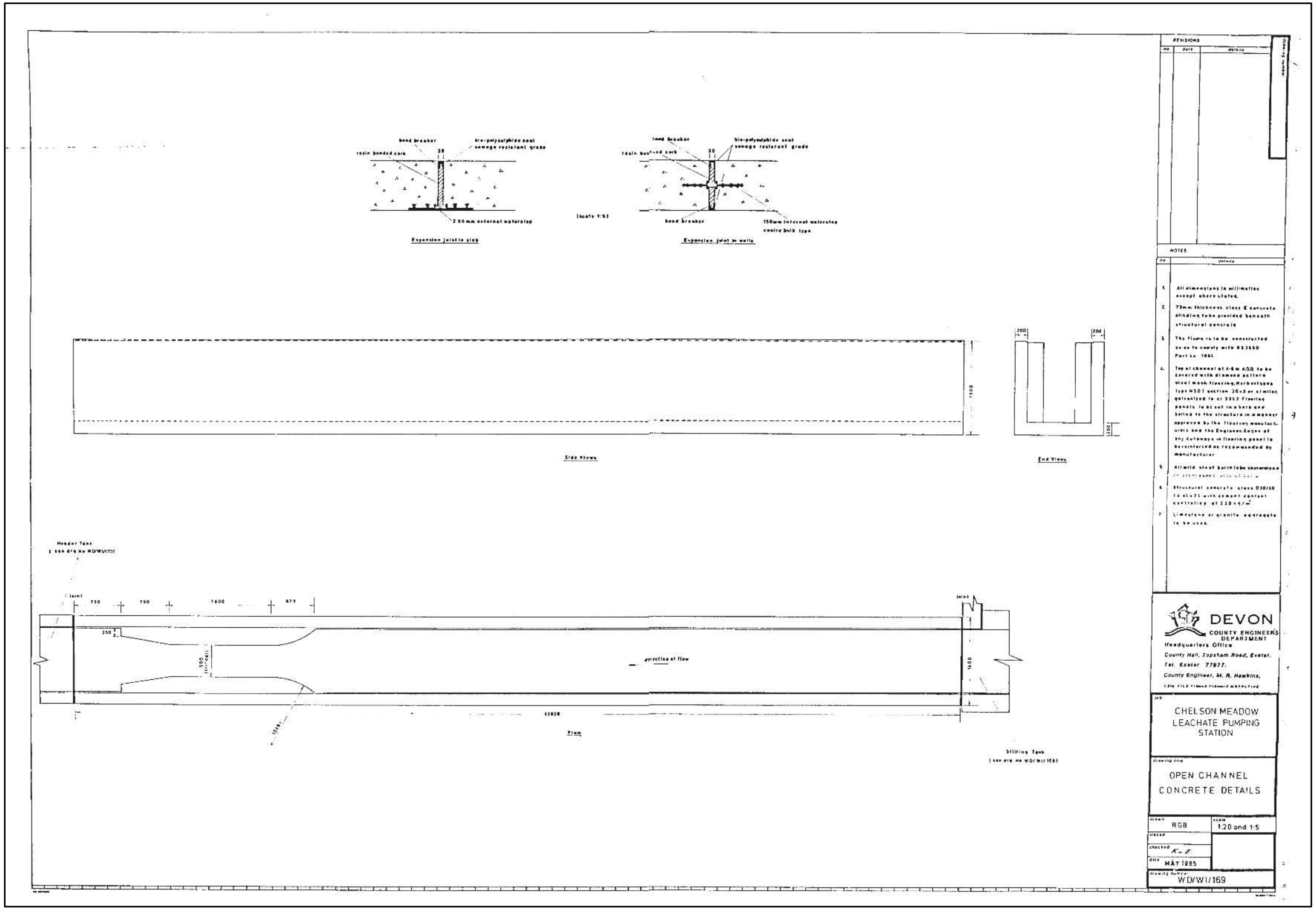


Figure 3.7.1: Construction details for the discharge channel

4.0 Maintenance

There is a monthly maintenance programme on all electrical and mechanical infrastructure of the LTP and associated pumping stations. Example inspection sheets are provided in Appendix F. Any faults are recorded at the end of the sheet and the combined list is the maintenance required for the coming month.

All pumps have an insulation resistance test as part of the inspection. Oil and grease in the blowers are topped up monthly and there is a full oil change on a staggered three-month sequence. Pumps that are not lifted (i.e. two TLPS pumps plus three in the PLS) can be checked via an inspection hatch to determine the condition of the impellors. There are three spare pumps stored in the PLS for the purpose of emergency replacement of pumps in the leachate pumping stations, other than the PLS.

All lighting and heating (inside pump control cabinets) are inspected monthly, when the control panel is opened, and all components are checked (relays, connections and contactors).

Some spare parts are kept on site and replacements are made following the inspections if required.

The valve chambers (VO1, VO2, VO3 & VO6) are inspected visually for leaks, evidence of sludge accumulation and that the associated UPS of each is functioning.

All walkways and steps within the LTP are also inspected three-monthly and repair undertaken as required.

Flow meters registering inputs to the LTP (i.e. not the MCERTS flow meter) are calibrated annually by an external contractor. The monitoring probes in each SBR are serviced every six months. Compressors are also serviced by an external engineer every six months.

All fire extinguishers are serviced annually, as well as fire alarms and gas alarms.

There is a 14-month service of the Local Exhaust Ventilation system of the PLS.

Table 4.1 outlines the technical specification of the pumps on site.

Table 4.1: Technical specification for each of the pumps serving the LTP

Pump Location	Manufacture	Model No	Date Installed	Weight kg	rpm	P_1 kW
The Ride	Flygt	3153.091 1160095	2011	217	1455	15.6
South Leat		3153.091 1610011	2011	223	1455	15.6
North Leat		3171.091 1160045	2011	346	2925	24.0
Lagoon PS		3153.091 1140033	2011		1455	15.6
Treated LPS 1		3202.090 1160025	2011	670	970	25.0
Treated LPS 2		3202.090 1160026	2011	670	970	25.0
Pump Lifting Stn 1	ABS	AFP-N50/SL MK	1986	?	?	42.0
Pump Lifting Stn 2						
Pump Lifting Stn 3						
Sump Pump						
JMP SBR 1	Flygt	3153.091 0880086	?	320	1460	10.4
JMP SBR 2		3153.091 1010030				
JMP SBR 3		3153.091 1140033		217	1455	15.6
JMP SBR 4	ABS	AFP2006 C M110/60	1996			18.5
De Sludge Pump SBR1	ABS	03212505 9579121	1996	?	1390	2.65
De Sludge Pump SBR2		03212505 9579122				
De Sludge Pump SBR3						
De Sludge Pump SBR4		03212505 9579123	1996		1390	2.65
Transfer Pump	Flygt	3102.181 1310343		121	1450	3.1
Spare Pumps – stored within PLS						
1	Flygt	3153.091 1970020	N/A	217	1455	15.6
2		3153.091 1970001		320	1460	10.4
3		3171.091 1040046		346	2925	24.0

? = data cannot be confirmed from information available currently.

4.1 LOLER

Lifting Operations and Lifting Equipment Regulations require all chains used for lifting pumps to have a thorough examination by a suitably competent contractor six-monthly. Each chain is lifted attached to its pump, allowing an electrical and physical inspection of the pump during the chain examination. The overhead crane in the PLS is inspected by a separate contractor at the same time.

A mobile crane is hired when it is necessary to lift the pumps within each SBR (Plates 4.1.1-4.1.2) and the South Leat Pumping Station (Plate 4.1.3). Before any works are undertaken a Permit to work must be issued including inspection of documents provided by the external contractor: risk assessment, method statement, lifting plan, training certificates and/or appropriate technical ID card, LOLER certification for crane. The contractor must also supply a trained slinger. During planning the LTP operator must make the contractor aware of the overhead power cables. Before works commence the pump needs to be isolated at the control panel and locked off.

The other pumping stations require a davit and associated lifting chains to enable a manual lifting operation. Each manhole cover is different and requires a specific manhole lifting key and technique (Plate 4.1.4 – 4.1.6). After lifting the cover, all leachate wells should be vented before the pump is lifted or any works undertaken to release any potential landfill gas that may have accumulated.

Plate 4.1.1: Crane position for lifting pumps in SBRs 1 & 4

Plate 4.1.2: Crane position for lifting pumps in SBRs 2 & 3, showing overhead power cables on the left

Plate 4.1.3: Crane position for lifting pump out of South Leat Leachate Well

Plate 4.1.4: Ride pumping staion leachate well manhole cover being lifted prior to chain test

Plate 4.1.5: North leat pumping station leachate well manhole cover being removed and internal atmosphere tested for landfill gas

Plate 4.1.6: Removal of Lagoon Pumping Station leachate well manhole cover, and raising of pump therein

5.0 Permitted activities

Schedule 1 – Operations

Table S1.1 activities				
Activity reference	**WFD Annex I and II operations (where applicable)**	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
A1	D8 – Biological treatment of waste	Section 5.4, Part A(1)(a)(i), Biological treatment of non-hazardous waste	Treatment of leachate in a facility with a capacity of >50 tonnes/ day	From receipt of leachate into wet well to discharge of effluent via pipeline into the Plym Estuary. Waste types for treatment to be as specified in schedule 2 table S2.1
Directly Associated Activities				
A2	N/A	-	Temporary storage of waste (leachate)	Waste types form storage to be as specified in schedule 2 table S2.1

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application CP3731LZ	The response to section 2.1, excluding 2.1.2 box 4 (disposal), 2.2, excluding 2.2.14, 2.2.15 and 2.2.20 and 2.10 in the application.	18/07/2006
Variation Application EPR/CP3731LZ/V002	Table 3 in Section 3 of Part C3 of the application document in response to section 3a – technical standards. The Risk Assessment submitted as part of the application stating improvements will be considered alongside 'Guidance for the Treatment of Landfill Leachate', Integrated Pollution Prevention and Control (IPPC) S5.03.	10/10/2011
Additional information	*'Chelson Meadow Leachate Treatment Plant: Interim Report'*, detailing LTP operations and discharges on falling tide.	08/11/2011

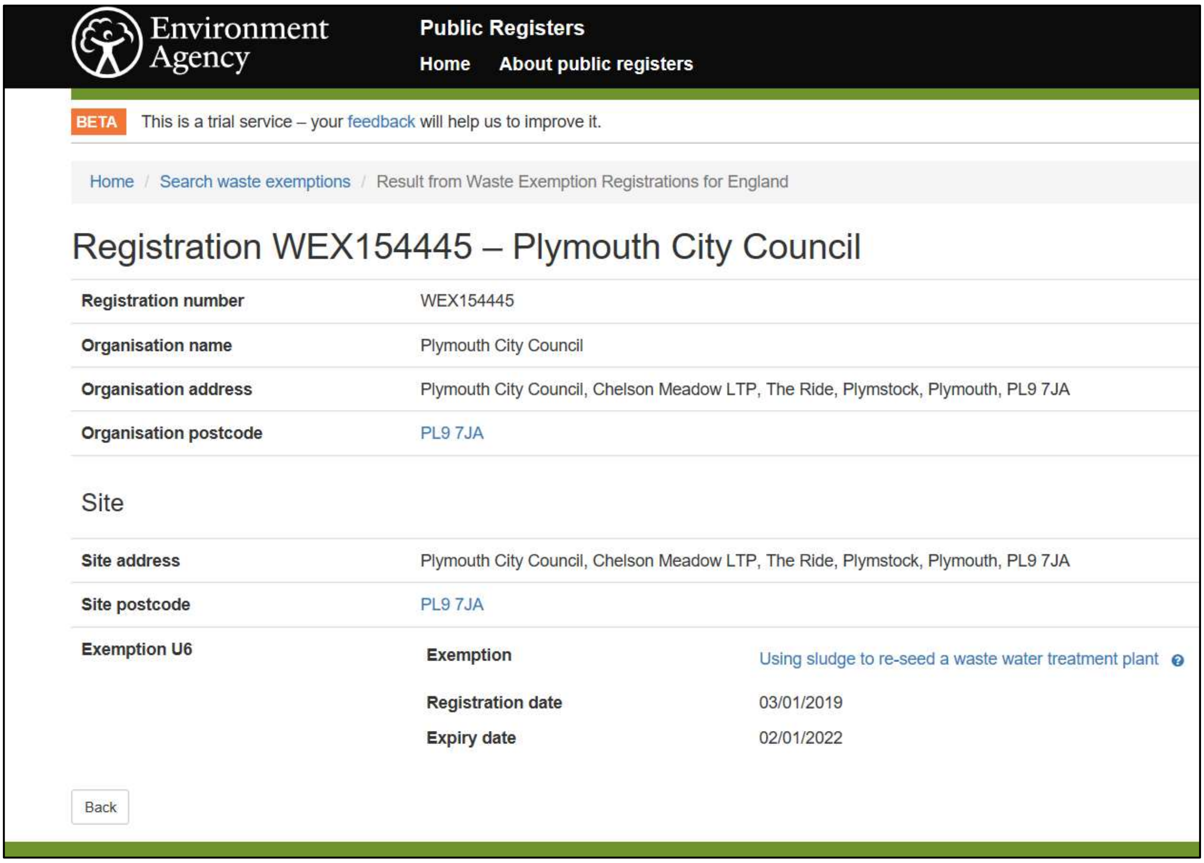
5.1 Waste acceptance

Waste shall only be accepted if:

- it is of a type and quantity listed in Table 5.1 below; and
- it must originate from the adjacent landfill

Table 5.1 Permitted waste types accepted for treatment The total quantity of waste accepted at the site shall be less than 650,000 tonnes a year.	
Waste Code	Description
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF SITE WASTE WATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION / INDUSTRIAL WASTE
19 07	landfill leachate
19 07 03	landfill leachate other than those mentioned in 19 07 02

The LTP also has a U6 exemption allowing the input of activated sewage sludge (generally obtained from South West Water) to either re-seed or boost the bacterial population in the SBR by direct introduction of the correct bacterial species (Box 5.1).



Environment Agency

Public Registers

Home About public registers

BETA This is a trial service – your feedback will help us to improve it.

Home / Search waste exemptions / Result from Waste Exemption Registrations for England

Registration WEX154445 – Plymouth City Council

Registration number	WEX154445
Organisation name	Plymouth City Council
Organisation address	Plymouth City Council, Chelson Meadow LTP, The Ride, Plymstock, Plymouth, PL9 7JA
Organisation postcode	PL9 7JA

Site

Site address	Plymouth City Council, Chelson Meadow LTP, The Ride, Plymstock, Plymouth, PL9 7JA	
Site postcode	PL9 7JA	
Exemption U6	Exemption	Using sludge to re-seed a waste water treatment plant
	Registration date	03/01/2019
	Expiry date	02/01/2022

Back

Box 5.1: Exemption for import of activated sludge to re-seed the LTP

When re-seeding/boosting is required, the LTP operative enquires of South West Water as to which wastewater treatment plant in Plymouth is operating most effectively in terms of generating activated sewage sludge. A tanker is then hired by PCC and directed to the appropriate treatment plant, where a load of activated sewage sludge is obtained. The tanker is weighed as it enters Chelson Meadow Waste Facility and is directed to the LTP where the sludge is pumped by pipe into the appropriate SBR (Plate 5.1), which must be in a suitably receptive state (see Section 5.3), i.e. only half full of treated leachate with negligible ammoniacal nitrogen (Plate 5.1 & 5.4).

Plate 5.1: Tanker delivering activated sewage sludge to the SBR, LTP.

Raw leachate is pumped gradually into the primed SBR allowing the bacteria to adjust to new conditions and preventing bacterial population collapse from excessive ammonia compared to the wastewater treatment plant.

5.2 Treatment Philosophy

Ideally, the plant operates using three SBRs with the fourth acting as standby capacity (i.e. normally empty, Plate 5.2) available in the event of any process/mechanical failure which prevents treatment and discharge of leachate. During periods of excessive rainfall in winter large volumes of leachate are produced, which may require all four SBRs operating together. During a dry summer two SBRs are often operated with two on standby.

Plate 5.2: Standby SBR, left empty of sludge (bacterial biomass) and leachate, 2021

Landfill leachate (and surface water drainage) is pumped from the four pumping stations located around the perimeter of the landfill into a holding tank, STOR1 (Plate 5.3)

Plate 5.3: STOR1 containing raw leachate derived from throughout the landfill, 2021

The SBRs treat raw leachate from STOR1 by the following automated sequential operational phases:

Fill
Mix (this is an archaic phase, which is now part of the React sequence)
React
Settle
Decant

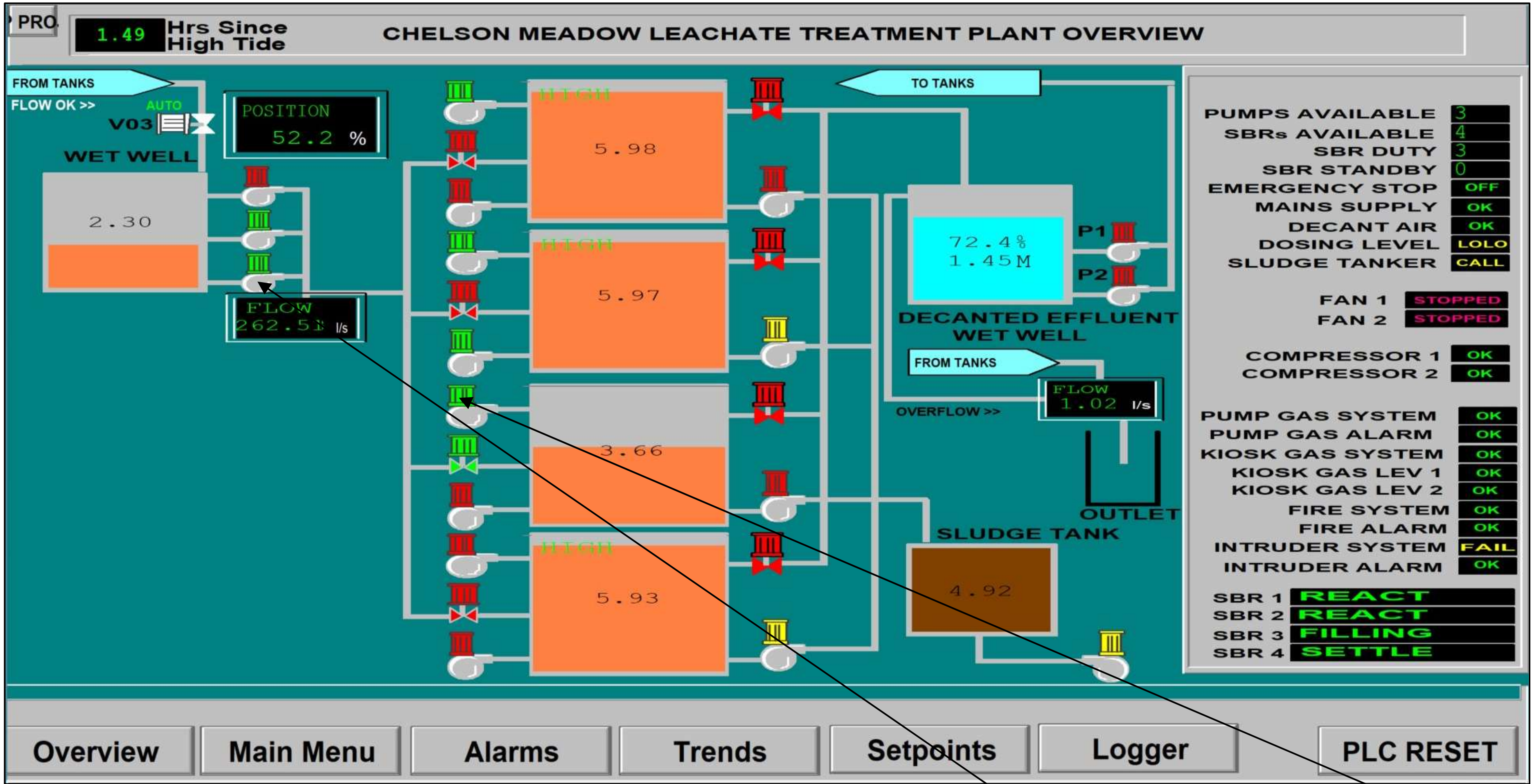
The LTP has three full-automated operating modes:

(i) Normal
(ii) Peak
(iii) Emergency

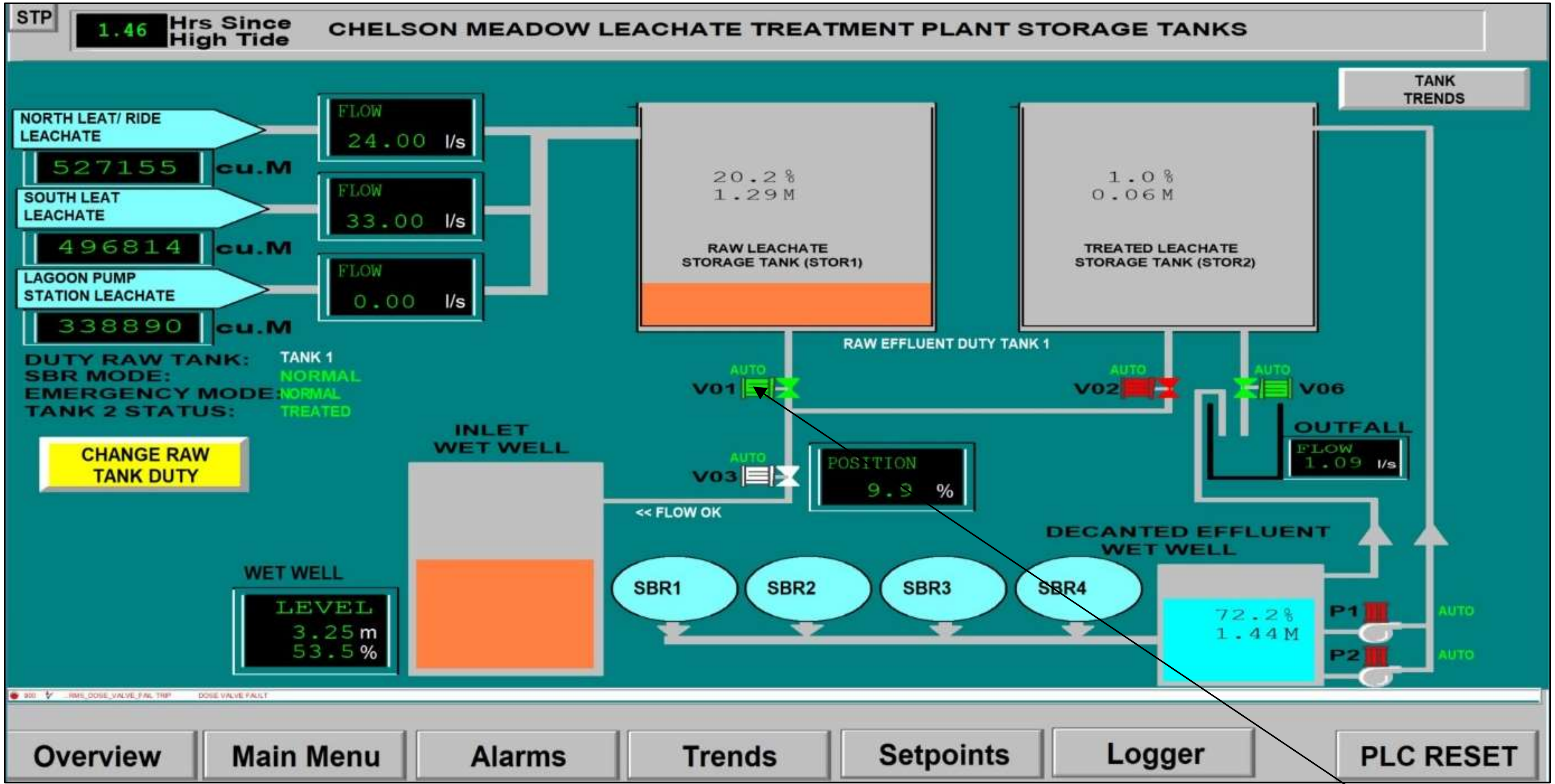
Normal Mode
Raw leachate is pumped from STOR1 via the pumps in the PLS into a waiting SBR (Screenshots 5.2.1-4), which is approximately half full of treated leachate plus bacterial biomass, called 'mixed liquor' (Plate 5.4).

Plate 5.4 Leachate-receptive SBR containing treated leachate and bacterial biomass (mixed liquor), 2021

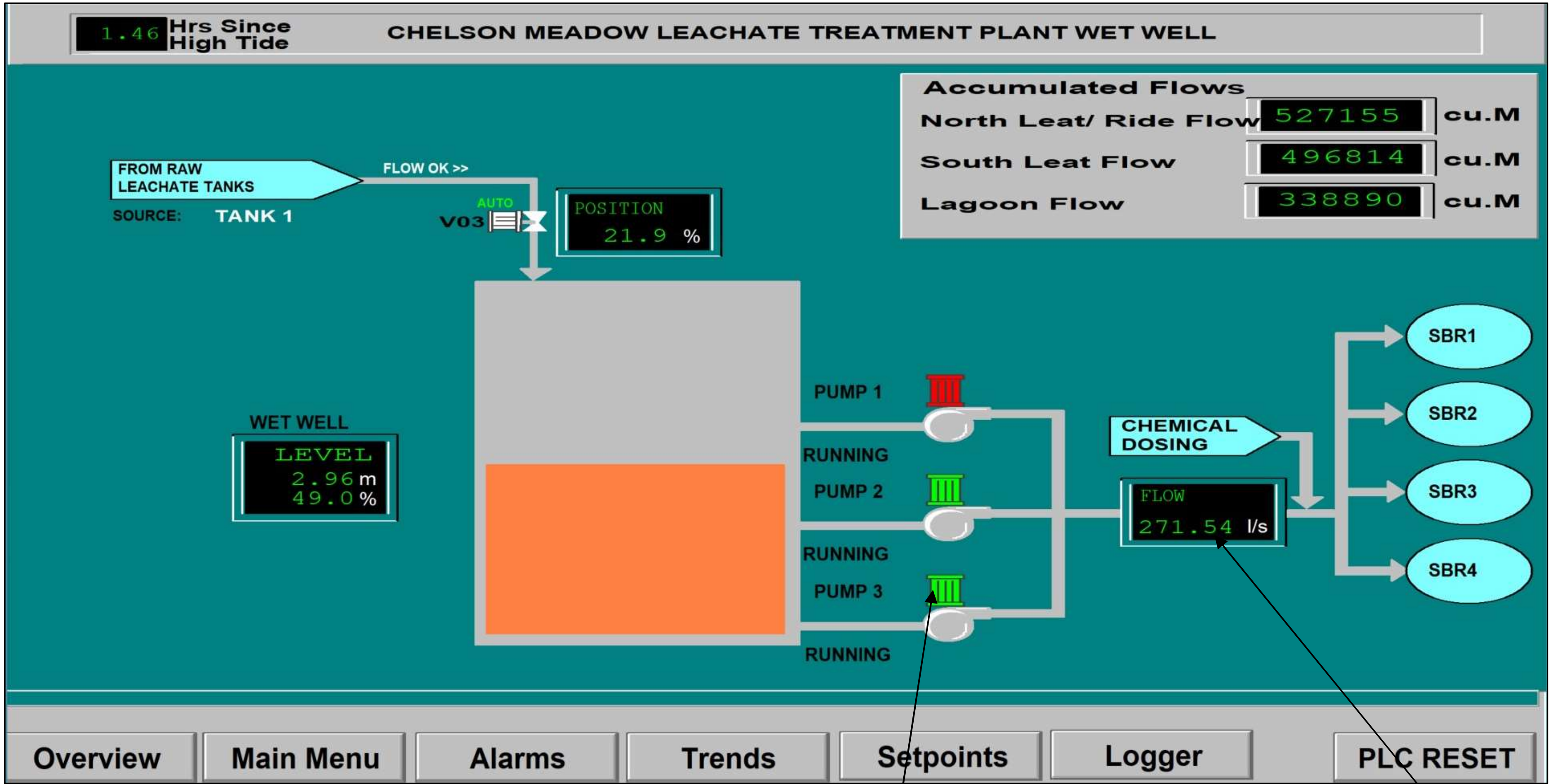
When the SBR tank has reached its set height (5.95m) the pumps stop and the SBR starts the Mix/React phase (Screenshot 5.2.5) when the blower forces air into the bottom of the SBR tank via diffusers. This introduces oxygen (Plate 5.5) and helps the bacteria circulate throughout the SBR to treat the ammoniacal nitrogen in the leachate. The blower operates for 55mins of every hour during this phase, with a 5-minute pause. The duration of the Mix/React phase is set via the PC (see section 6) and depends on the flows and incoming leachate strength (aka concentration of ammoniacal nitrogen).



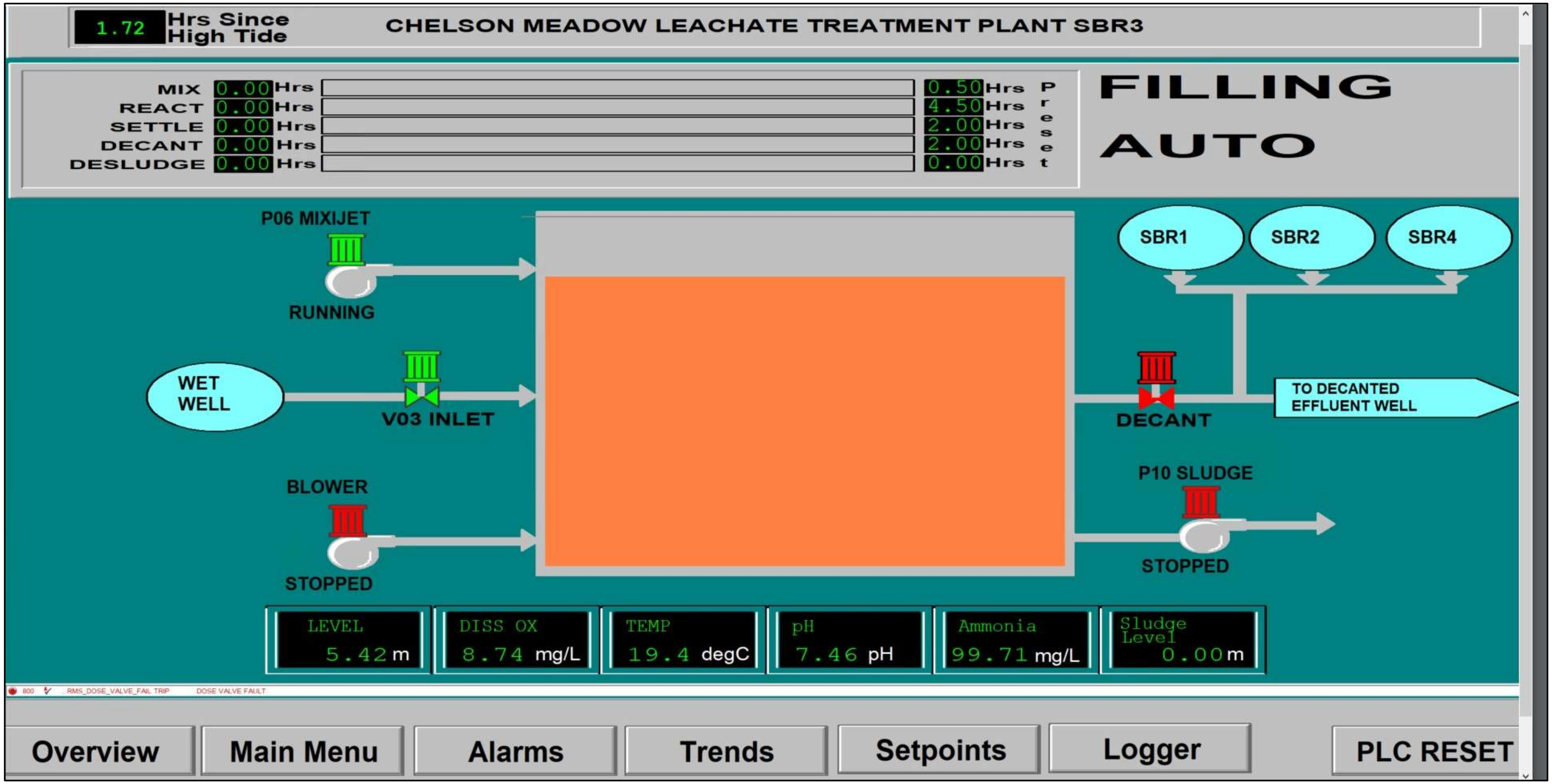
Screenshot 5.2.1: LTP overview screen showing SBR ready to receive raw leachate from STOR1, with pumps activated and the valve open to SBR 3



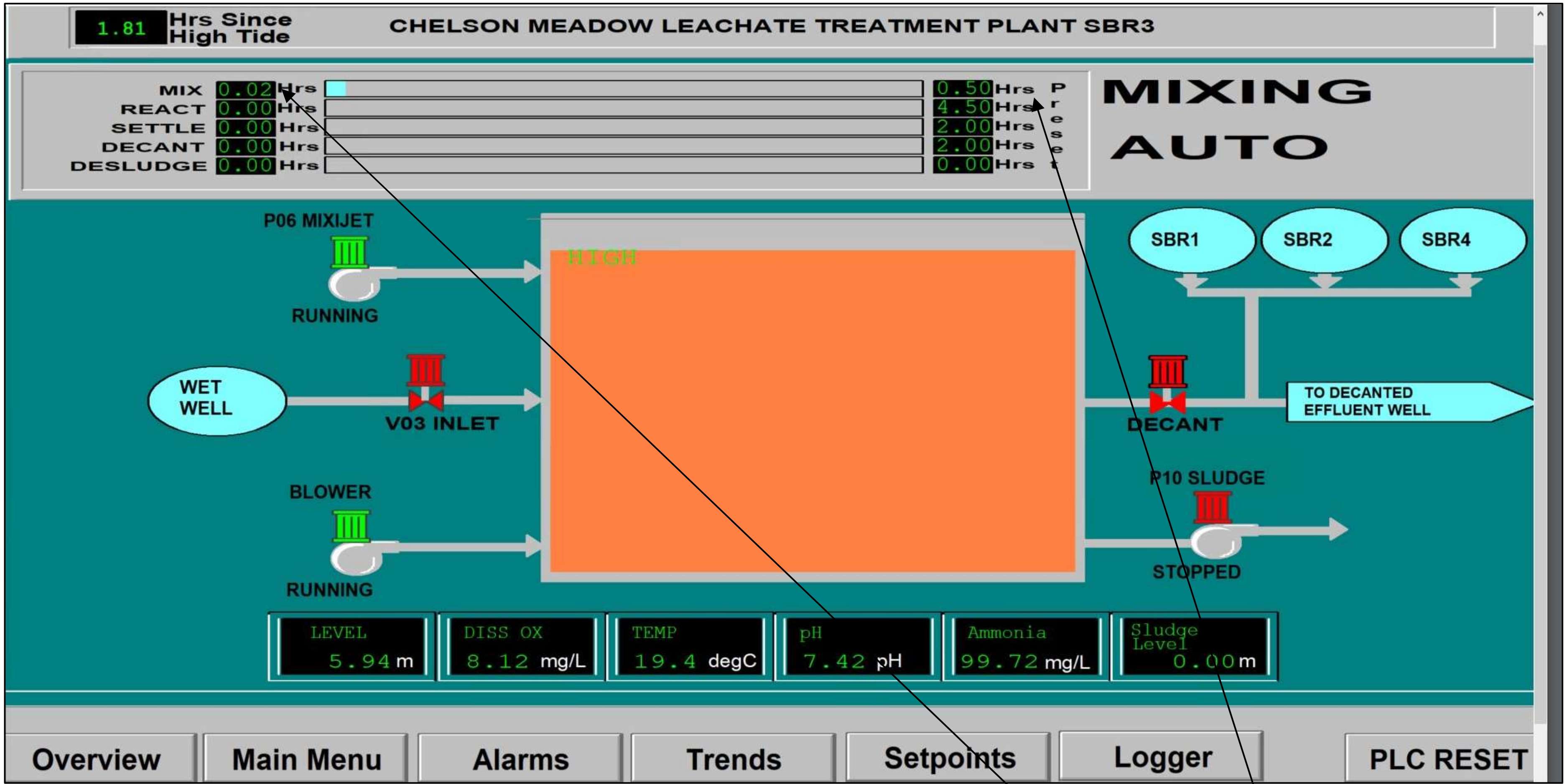
Screenshot 5.2.2: LTP overview screen for storage tanks showing volume of raw leachate in STOR1 exceeds 20% and the valve VO1 is open to allow passage to the inlet wet well feeding the PLS.



Screenshot 5.2.3: LTP overview screen for wet well showing pumps (alternating) actively sending leachate to the SBR, with the flow rate indicated.



Screenshot 5.2.4: LTP overview screen for SBR3 only, indicating filling in progress via the inlet valve 3.

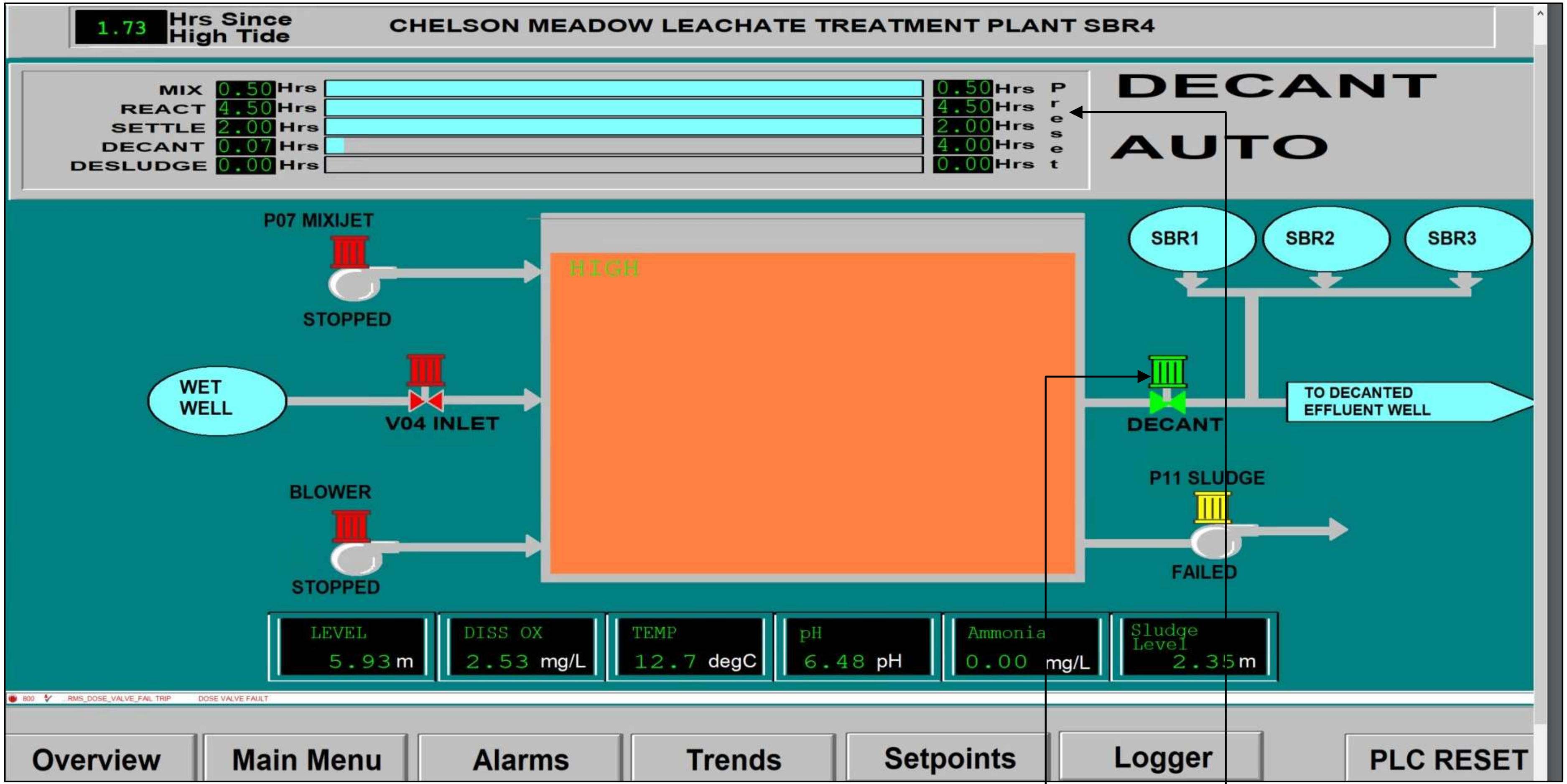


Screenshot 5.2.5: LTP overview screen for SBR3 showing the start of the Mix/React phase and its duration

When the leachate is most dilute, i.e. during winter, the react phase may be 3.5hrs whereas in summer when the leachate is strong (high concentration of ammoniacal nitrogen) it may be as much as 8.0hrs. When the react phase has been completed the blowers switch off to allow the suspended bacteria to settle to the bottom of the SBR so that the discharged treated liquor is as low in suspended solids as possible. Settle time varies between 2 – 4hrs depending on season and the need to treat leachate rapidly because of high incoming volume. Once settling is complete the decant arm is activated (Screenshot 5.2.6) to allow treated leachate to decant from the top of the liquor level in the SBR until the height reaches approximately 3.29m.

Plate 5.5: Blowers aerating liquor in the SBR during the Mix/React phase, 2021

Plate 5.4: SBR in the settle phase, showing the top of the decant arm above the level of the liquor, 2021

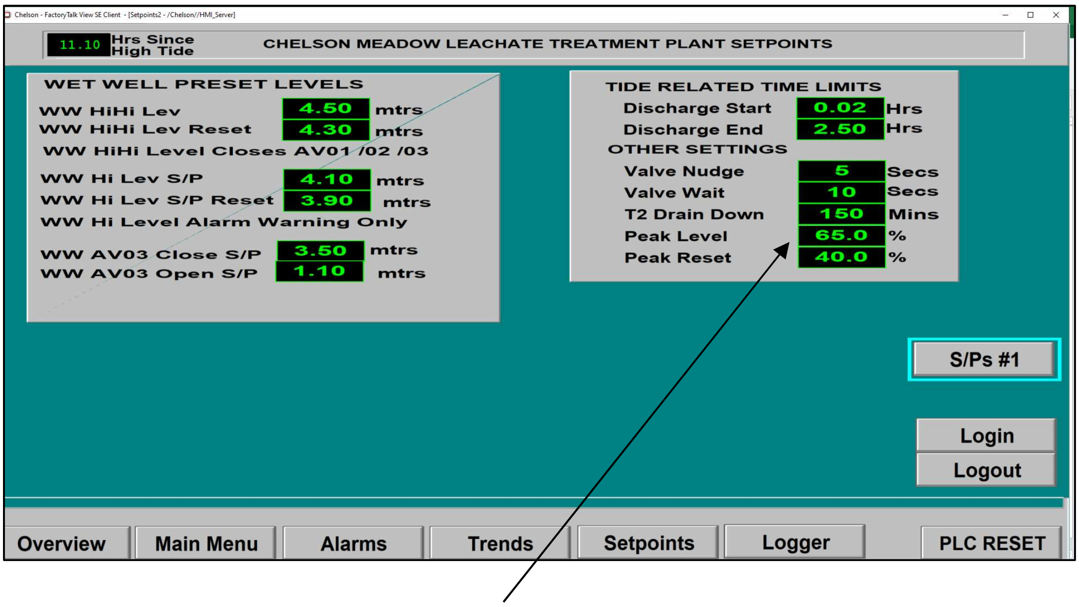


Screenshot 5.2.6: LTP overview screen for SBR4 showing the start of the decant phase following the Mix/React/Settle phases

The decanted leachate is pumped to STOR2 over a period of approximately 1.0hr via the TLPS. Only one SBR can decant at a time during normal operating mode. When the tank is emptied to the required height (3.29m) it will wait in sequence (idling) to fill again and repeat the phased cycle. During idling the activity of the blowers is controlled by the DO level detected by a sensor for which 2% DO is the signal to switch on, and 4% is the signal to switch off.

When the high tidal window is recognised by the tidal sensor STOR 2 empties via gravity the treated leachate content into the discharge channel containing the MCERTS flow metre, and then on to the River Plym via the outfall pipe,

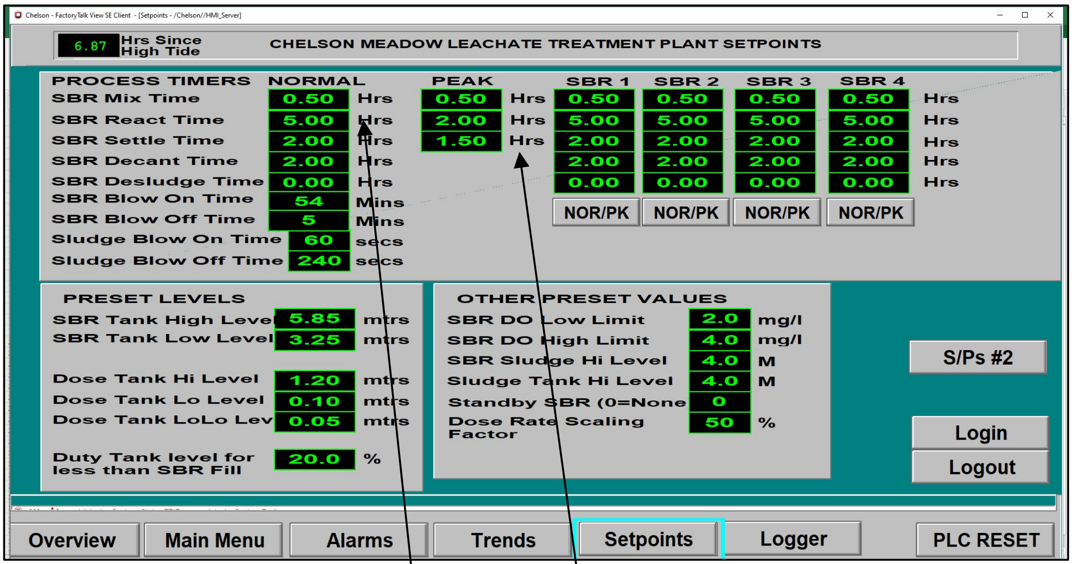
Peak
This mode is similar to Normal but the switch to Peak occurs automatically if STOR 1 reaches 65% capacity (see Screenshot 5.2.7 of the PC below).



Screenshot 5.2.7: STOR 1 at 65% capacity, prompting the LTP into Peak mode

Once in Peak mode the duration of each sequential phase is truncated compared to Normal mode; entering Peak mode over-rides immediately whatever duration a phase (Mix/React times combined & Settle, see Screenshot 5.2.8 overleaf) was set for under Normal mode.

Peak mode is required because leachate is entering STOR1 faster than the treatment capacity of the SBRs in Normal mode, e.g. when excessive rainfall increases leachate production, or one of the SBRs is not functioning properly and is taken off-line. Peak mode reduces the duration of the treatment process and ensures export of treated liquor from the SBRs exceeds the inflow demand from the system. The system will revert to Normal from Peak mode when STOR1 reaches 40% capacity, when the duration of each phase will lengthen again. During Peak mode treated leachate still is pumped to STOR2 prior to normal discharge after high tide is sensed.



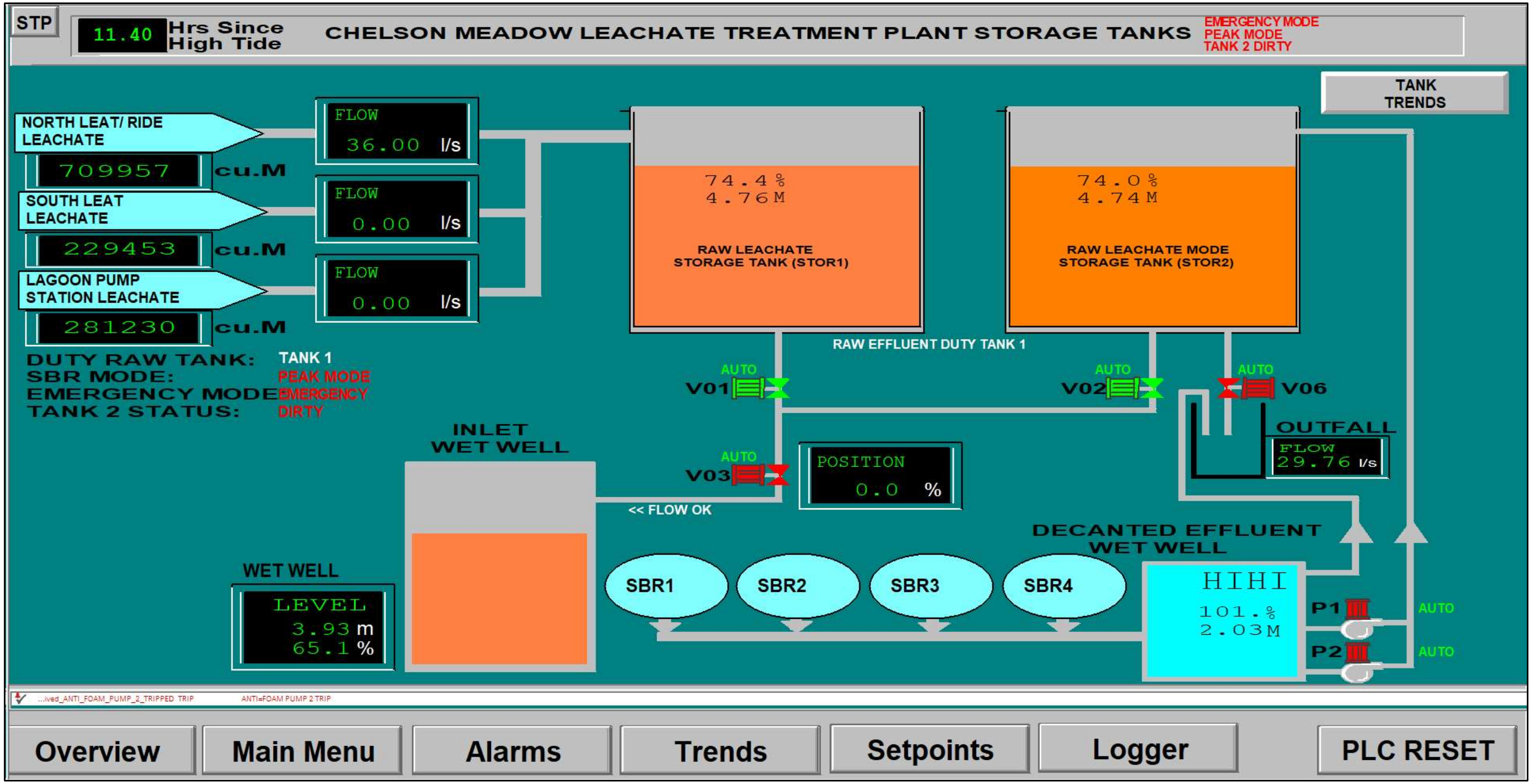
Screenshot 5.2.8: Duration (in hours) of each sequential phase in the treatment process for Normal (left) and Peak (right) modes

Emergency

The LTP switches to Emergency mode when STOR1 reaches 80% volume, e.g. when excessive rainfall causes more leachate to be produced from the adjacent landfill (combined with surface water drainage) than can be treated in Peak mode. In Emergency mode STOR2 will decant treated leachate into the River Plym irrespective of tidal status. Once this initial decant is complete, valves beneath STOR1 and STOR2 (VO1 & VO2) open simultaneously to allow the untreated leachate from STOR1 to decant to STOR2 until the level in both tanks has equalised (Screenshot 5.2.9).

The SBRs continue as for Peak mode described above, but decanting is direct to the River Plym by gravity irrespective of tidal status. Emergency mode lasts as long as required. If the capacity of both STORs falls below 40% the system switches to the time settings for Normal mode, but the LTP is still in Emergency mode.

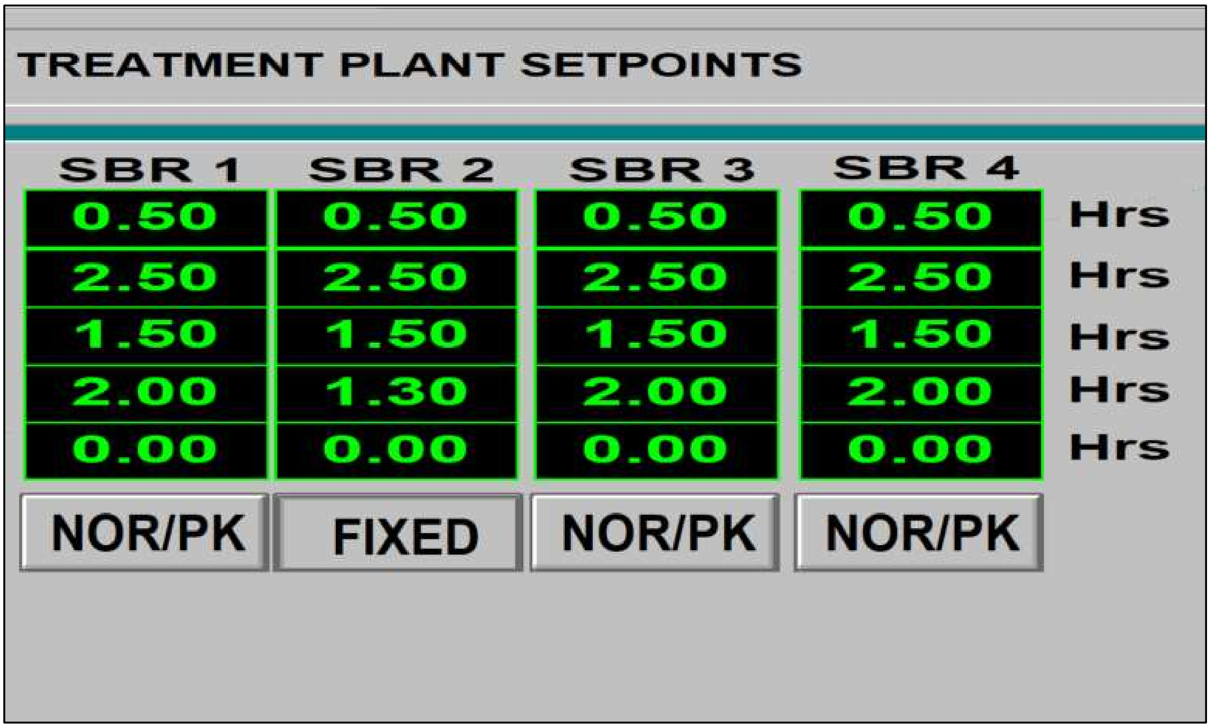
The decision to take the LTP out of Emergency mode is at the discretion of the LTP operator and is based on weather forecast and the performance of the SBRs. Emergency mode is deactivated via the PC, which closes VO2 beneath STOR2 once it is empty of leachate and returns STOR2 to a storage tank for treated leachate. Before the flow of treated leachate recommences the base of STOR2 is inspected visually to determine if sediment has accumulated that needs to be removed by cleaning. The next time SBRs decant after the LTP has been switched out of Emergency mode, they operate according to Normal mode.



Screenshot 5.2.9: LTP overview screen for storage tanks (STOR1 & STOR2) in Emergency Mode

5.3 SBR Fixed Mode

Within any of the three operational modes one or more SBRs can be set to the ‘fixed’ mode, which allows the phases to be programmed independently of the SBRs. Fixed mode is accessed via the Setpoints menu, followed by switching the ‘NOR/PK’ tab to ‘FIXED’ after which the set times can be altered by clicking on each cell. The operation may be required if an individual SBR is shown to be treating ineffectively, which may be improved by increasing the duration of the React phase, or as an aid to a sampling programme which is underway.



Screenshot 5.3.1: Manipulating SBRs individually using the ‘Fixed’ mode tab: here the decant period was shortened for SBR2 because the decant arm failed to turn off.

5.4 SBR/SBR Transfer

Each of the four SBRs has a valve at the bottom enabling the SBR to link to another, but constrained to the following permitted pairs:

- SBR1 to either SBR2 or SBR4
- SBR2 to either SBR1 or SBR3
- SBR3 to either SBR2 or SBR4
- SBR4 to either SBR1 or SBR3

This linkage can enable priming of an empty SBR (Plate 5.5) by transfer of active liquor from an operative SBR. The source SBR must be in the post-decant period with a height of ca. 3.29m (Plate 5.6). The source SBR is then unlinked from the treatment process (taken off-line, Plate 5.7) and the blower is activated by turning the selector switch to 'Hand', enabling continuous aeration to suspend the bacteria fully during the transfer process. The valve to a permitted receptor SBR is opened manually allowing liquor transfer until the level in both tanks is equal (ca. 1.65m), when the valve is closed.

Plate 5.5: Empty SBR4 ready for linkage to a permitted source SBR for liquor transfer

Plate 5.6: Source SBR3 in the post-decant period, before blowers are activated and available as a source of liquor

Plate 5.7: Control panel to isolate a SBRs3 & 4 from the main treatment process such that liquor can be transferred from SBR3 to SBR4

Plate 5.8: Control panel for blower 3, showing the blower has been switched to 'Hand' mode during the liquor transfer process

Plate 5.9: Blowers in 'Hand' mode aerating the source liquor prior to transfer to the receptor SBR

Before the transfer of liquor commences, the air valve for the decant arm of the receptor SBR must be switched on (Plate 5.10) and the outlet point of the receptor SBR must be closed (like putting the plug in the plug hole – Plate 5.11), after which the linkage valve can be opened to allow filling (Plates 5.12 & 5.13).

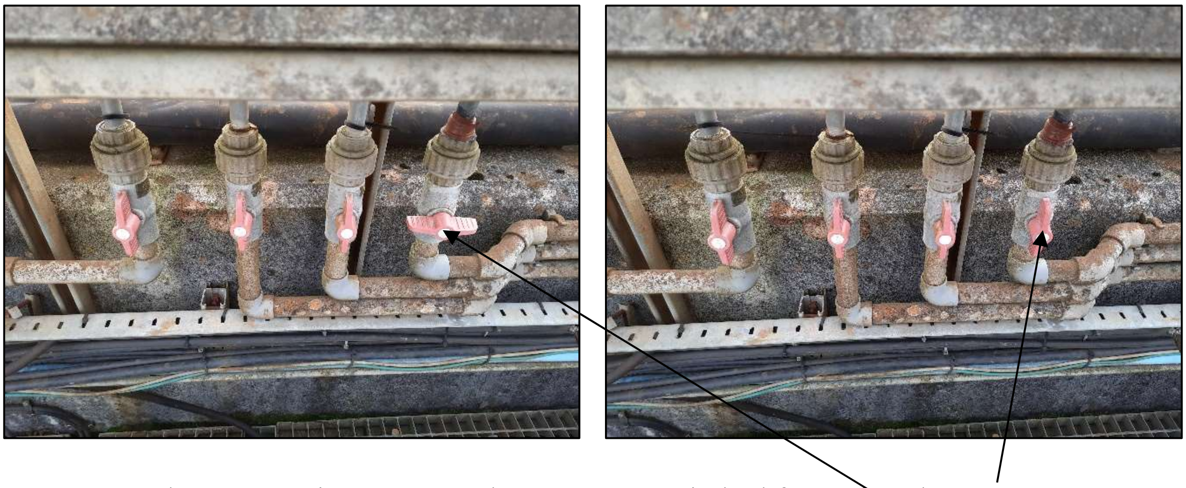


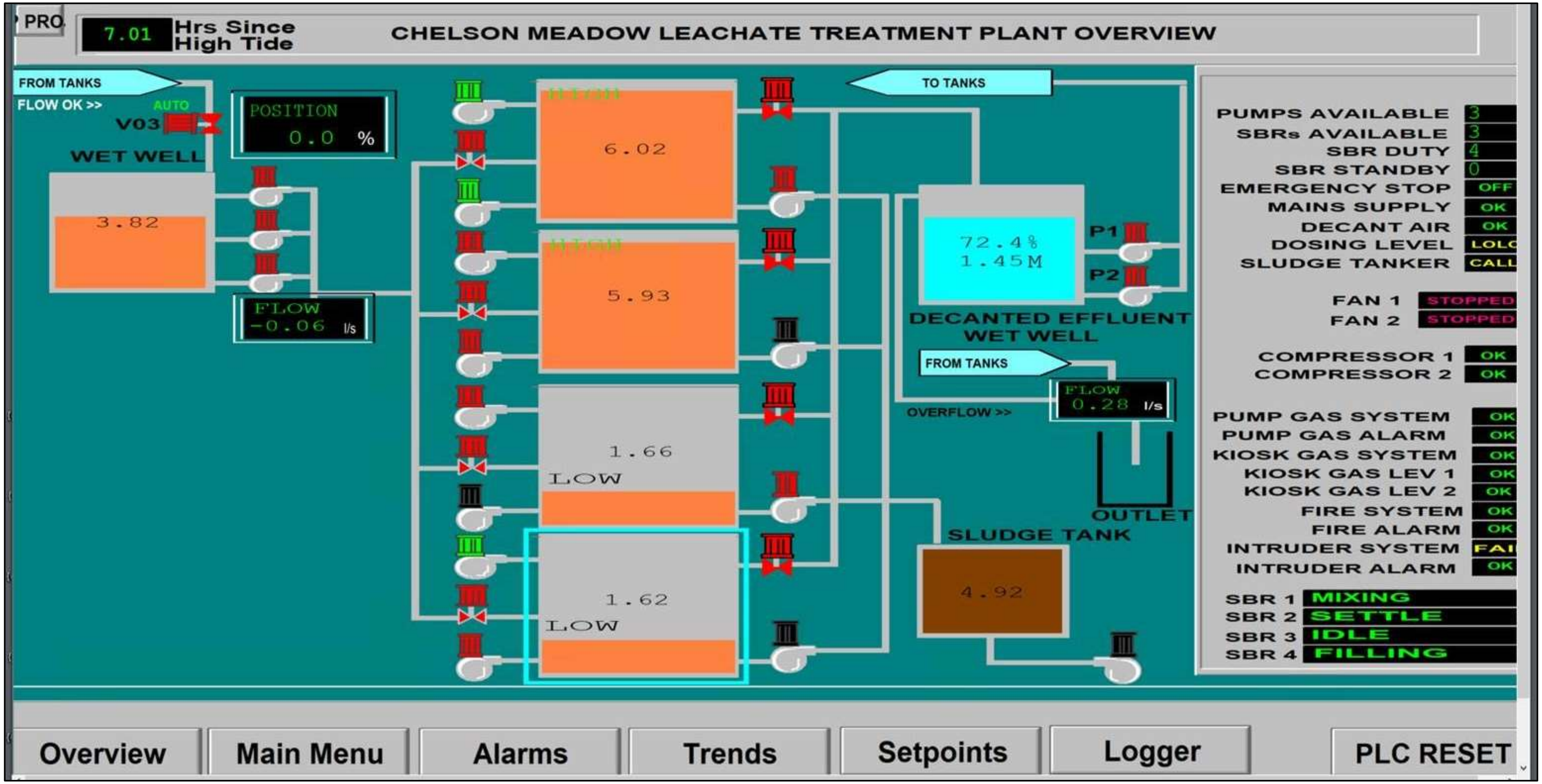
Plate 5.10: Air pressure valve to SBR4 switched from closed to open

Plate 5.11: Manual closure of outlet point from SBR

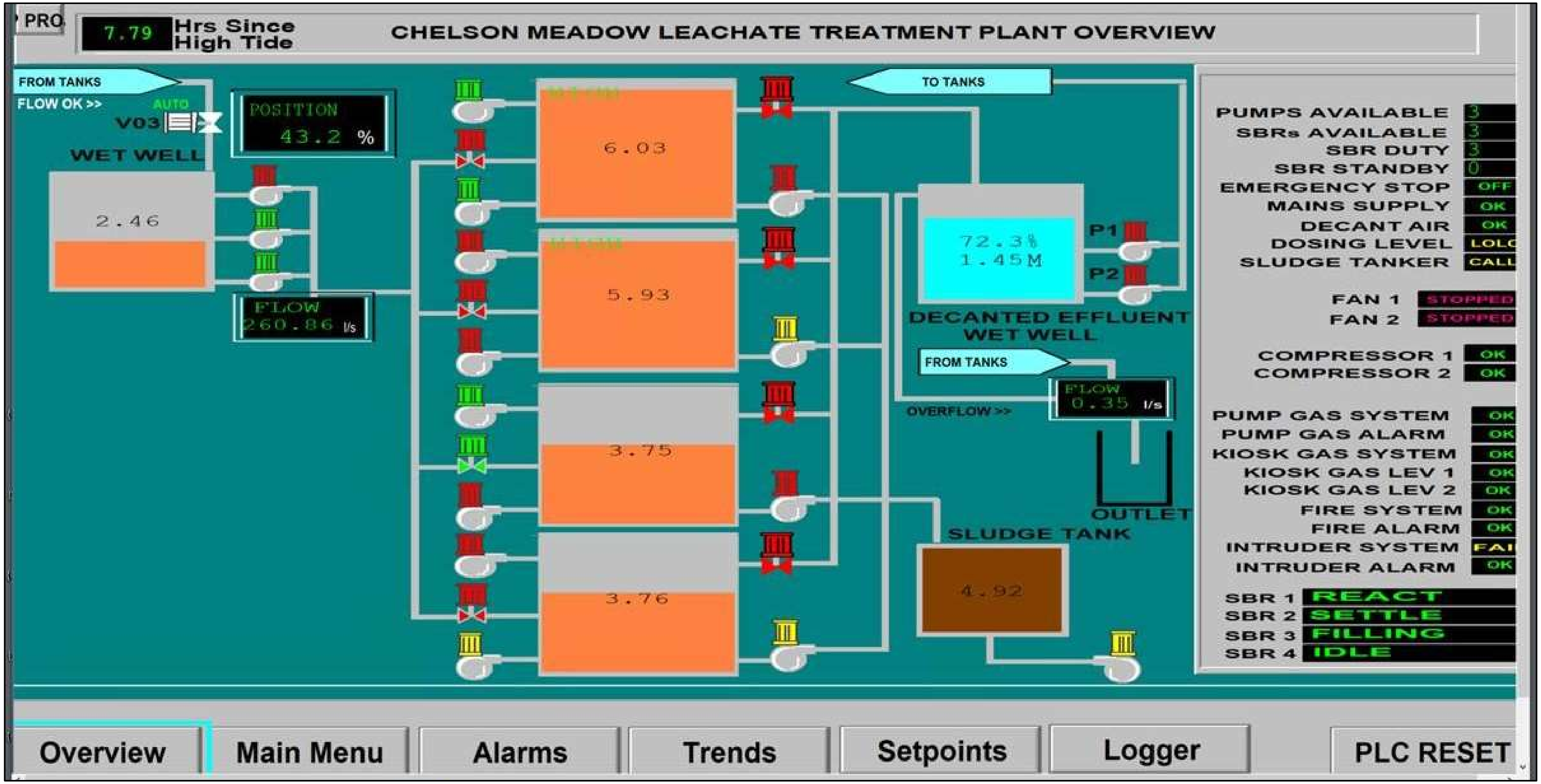
Plate 5.12: In flow of liquor into receptor SBR achieved by opening the linkage valve

Plate 5.13: Gradual filling of receptor SBR from linkage to a source SBR

When the liquor level in source and receptor SBRs is equal (Screenshot 5.4.1) the linkage is closed, and the blower is returned to auto for the source SBR. Both SBRs are returned to the treatment sequence. Because the status of the bacterial population in the receptor SBR cannot be guaranteed adequate, the first input of raw leachate should only raise the height of liquor in the tank by ca. 2m (Screenshot 5.4.2). Blowers should be set on 'Hand' to aerate for several hours before additional raw leachate is added and the aeration process repeated. It may be necessary to stagger filling of the receptor SBR in multiple stages before the maximum capacity of the SBR is achieved, at which point the SBR can be returned to the automatic process.



Screenshot 5.4.1: LTP overview screen showing liquor levels in linked SBRs 3 & 4 at approximately equal heights after the transfer process



Screenshot 5.4.2: LTP overview screen showing the first filling stage of returning a receptor SBR to the automatic process following a period off-line

SBR/SBR Transfer using Transfer Pump
To transfer liquid between SBRs diagonally across the block (e.g. SBR1 to SBR3, or SBR2 to SBR4) requires a transfer pump because there is no physical linkage diagonally beneath. This requires a davit, pump and chains and there must be a contracted electrician to assist (Plate 5.14). The same initial sequence is followed to ensure the outlet to the receptor SBR is closed, the blower in the source SBR is on 'Hand' to ensure suspension of bacteria, after which the pump is lowered to just above the base of the source tank and the connecting hose is lowered into the receptor tank (Plate 5.15). Pumping continues until the level of liquor in both tanks is approximately equal.

This process can also be used just to transfer suspended bacteria between two SBRs that both contain liquor but where the bacterial biomass in one SBR is inadequate and needs supplementing. The linkage valve cannot be used if the liquor level is similar between the SBRs because the transfer is by gravity, and ideally both SBRs should be in the idle phase after decanting (i.e. half empty).


Plate 5.14: Electrical contractors preparing the davit and chain to lower the pump into the source SBR when liquor transfer is required

Plate 5.15: Pump being lowered into the source SBR (left) and the discharge of liquor into the receptor SBR (right)

Once transfer is achieved the pump is withdrawn from the source tank and both SBRs are returned to the treatment process. Refilling may need to be progressive if the bacterial biomass is suspected to be low.

5.5 Cleaning Tanks

Periodically the infrastructure within an SBR needs maintenance, servicing, repair or replacement. Before works commence, ideally the transfer pump will be used to remove as much liquor as possible to the other SBRs that are in operation. This usually leaves a sludge at the bottom of the SBR (Plate 5.16). The SBR is classified as a confined space, and cleaning can only be undertaken by suitably trained contractors.

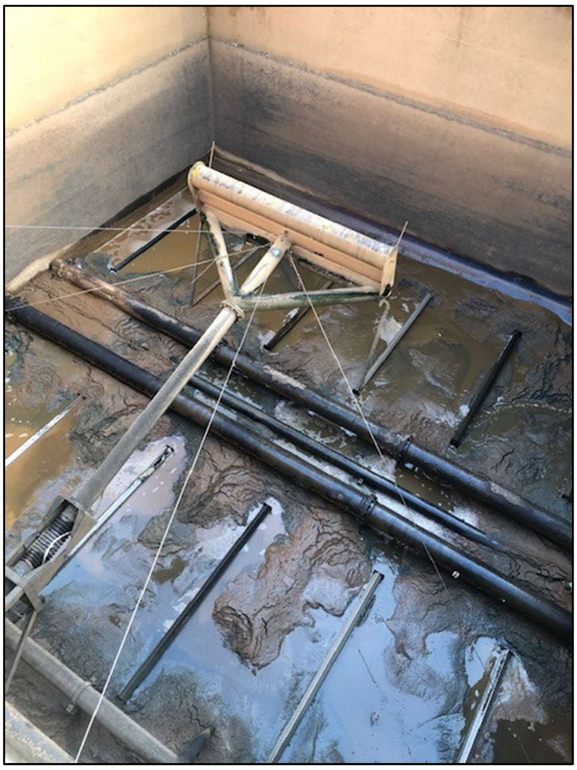


Plate 5.16: Empty SBR requiring cleaning, showing residual sludge in the bottom

Prior to starting, contractors need to supply the following, which must be checked by the operator to ensure everything is in date and correct:

- Certificates of Confined Space Entry
- Risk Assessment
- Method Statement
- Escape Plan
- Harness & lanyards
- Oxygen escape kit
- Portable gas detectors

Contractors new to the site must be given an induction programme and the operator must complete a Permit to Work with the contractors, to be signed by the operator and person(s) entering the SBR. Entry to the SBR is via a secured ladder but in future it is likely that entry will be via a crane and basket. Before the SBR is entered all electrical connections and the inlet valve are all isolated, so there is no chance of leachate entering the SBR during the work; the outlet point must be open and stay open throughout the works. The davit is erected so that the lanyard can be attached, which is then connected to the harness. During works, one person stays at the top of the SBR as Topman and there may potentially be several contractors working in the bottom of the tank.

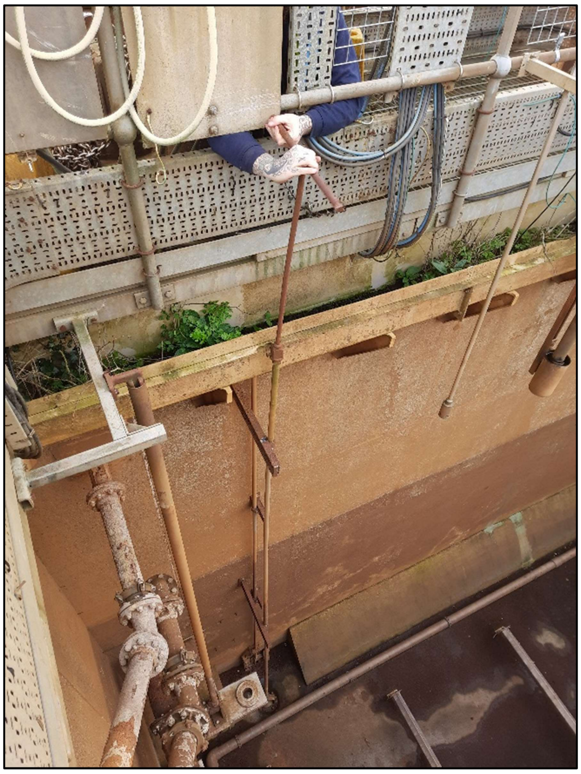


Plate 5.17: Outlet point being opened (left) and left open (right) throughout cleaning of SBR

A pressurised hose (Plate 5.18) is used to clean the residue manually using brooms and yard scrapers (Plate 5.19) and direct the waste to the outlet point, from where it drains to a collection sump. A tanker removes the material from the sump during the cleaning process (Plate 5.20), which may require several tanker movements depending on how much sludge is present. The tanker passes over the weighbridge on leaving the site so that a waste transfer note can be issued for the waste, which is destined for a permitted facility in Plymouth.

Once the SBR is clean (Plate 5.21) the contractors exit the SBR and the Permit to Work is signed off.

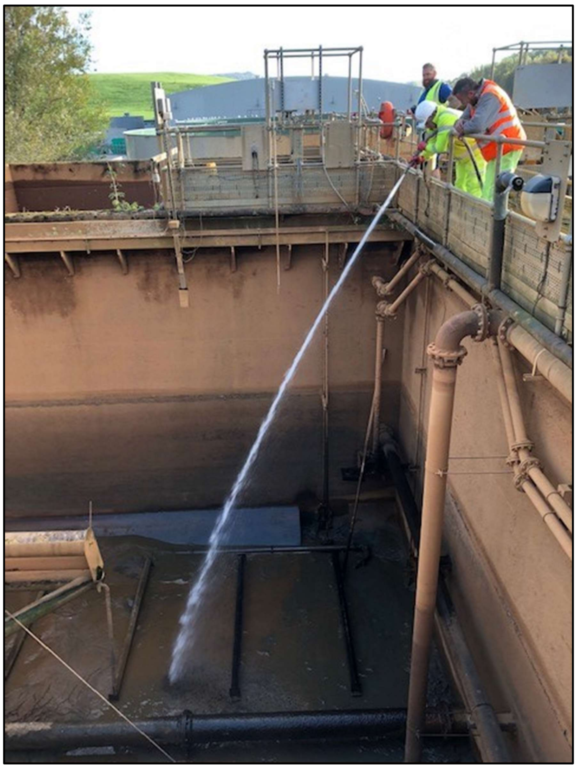


Plate 5.18: Water being hosed into the bottom of the SBR to facilitate sludge removal

Plate 5.19: Contractors mobilising the sludge to the outlet point during cleaning, showing access ladder (right)

Plate 5.20: Tanker emptying the outlet sump during cleaning of the SBR

Plate 5.21: Cleaned SBR ready for any required servicing or repairs

6.0 SCARDA & PC

Supervisory control and data acquisition (SCADA) is a control system architecture comprising computers, networked data communications and graphical user interfaces for high-level process supervisory management. It incorporates other peripheral devices, for example programmable logic controllers (PLC) to interface with LTP components at Chelson Meadow.

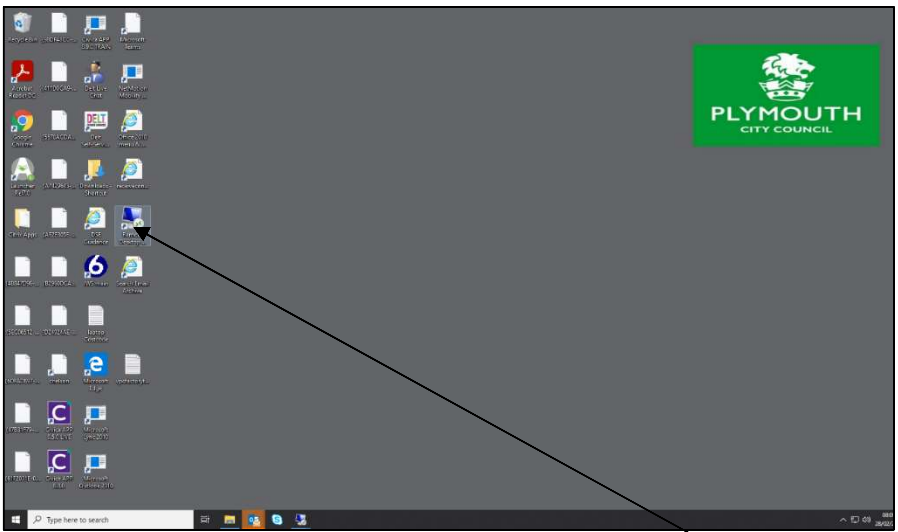
The SCADA system has user-friendly screen displays accessed either remotely or via the PC in the Control Room (MCC), providing clear diagrammatic displays of all aspects of the plant, with an Overview screen for ease of navigation.

The LTP uses an Allen Bradley PLC that automatically controls the day-to-day functionality of the leachate plant. The PLC uses Rockwell RS logix code and is accessible via the PC which also uses Rockwell RS logix. The PC enables updating and monitoring of the PLC code but the PC itself is not required for the running of the plant.

The PLC is connected directly to the network hub and thereby to a virtual PC on the main network which acts as the server for the Rockwell FactoryTalk SCADA system, from where data is recorded, retrieved, and returned to the PLC.

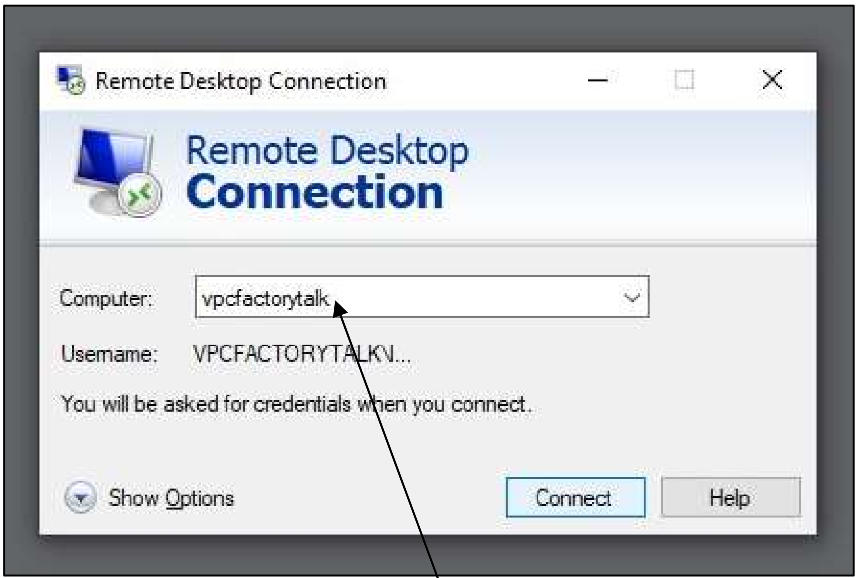
A second virtual PC on the main network acts as the client for the SCADA, this exchanges data with the SCADA server PC and provides displays for operators to interact with as well as the alarm feedback. The LTP operator can record analogue values and change set points in the PLC program such as times and levels.

The LTP PC is also connected to the network hub via the approved password system. PC users have no access to the software, which can only be altered by third party engineers with prior permission from PCC to enable access and make any required changes to the SCADA System. Only PCC approved users can log onto the PC using their unique Username and Password. Once logged in, the operator requests the Remote Desktop Connection via the icon (Screenshots 6.1 & 6.2).



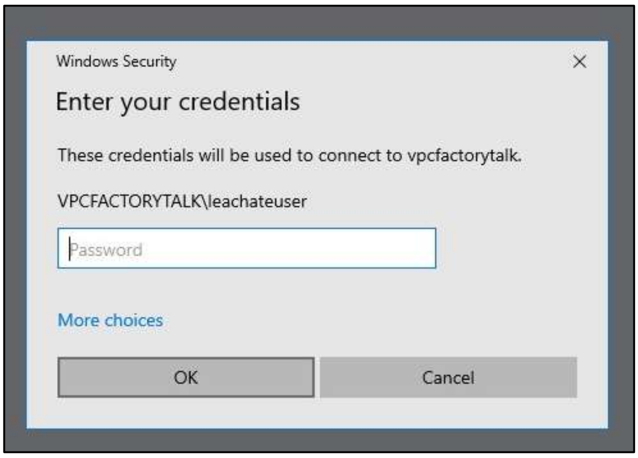
Screenshot 6.1: Start up screen providing the icon to access the Remote Desktop Connection

Once the window for Remote Desktop Connection is open the computer ID must be as shown in Screenshot 6.2 otherwise login will fail.



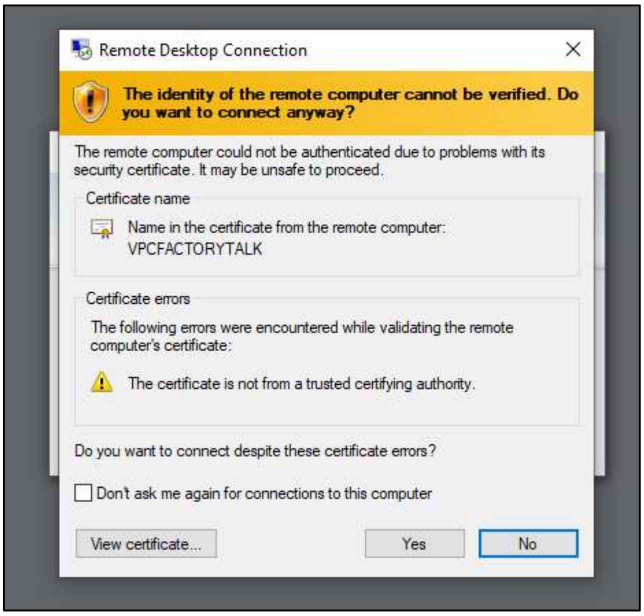
Screenshot 6.2: Opening window for the Remote Desktop Connection showing the correct computer Username

Pressing ‘Connect’ generates a window where the Password is requested (Screenshot 6.3).

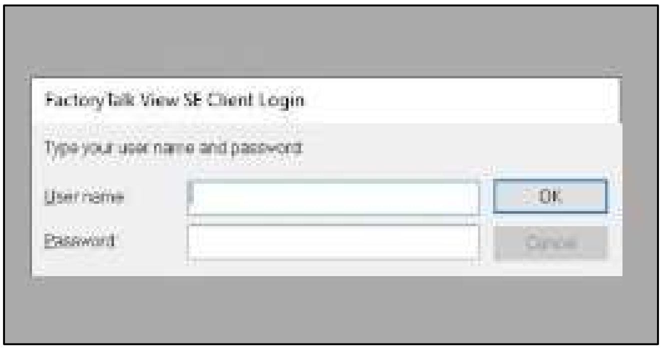


Screenshot 6.3: Security window with Password request box

Once the Password has been entered correctly, Screenshot 6.4 appears, which requires a ‘Yes’ response. If this is the first login of the day, the Username and Password will be requested again (Screenshot 6.5).



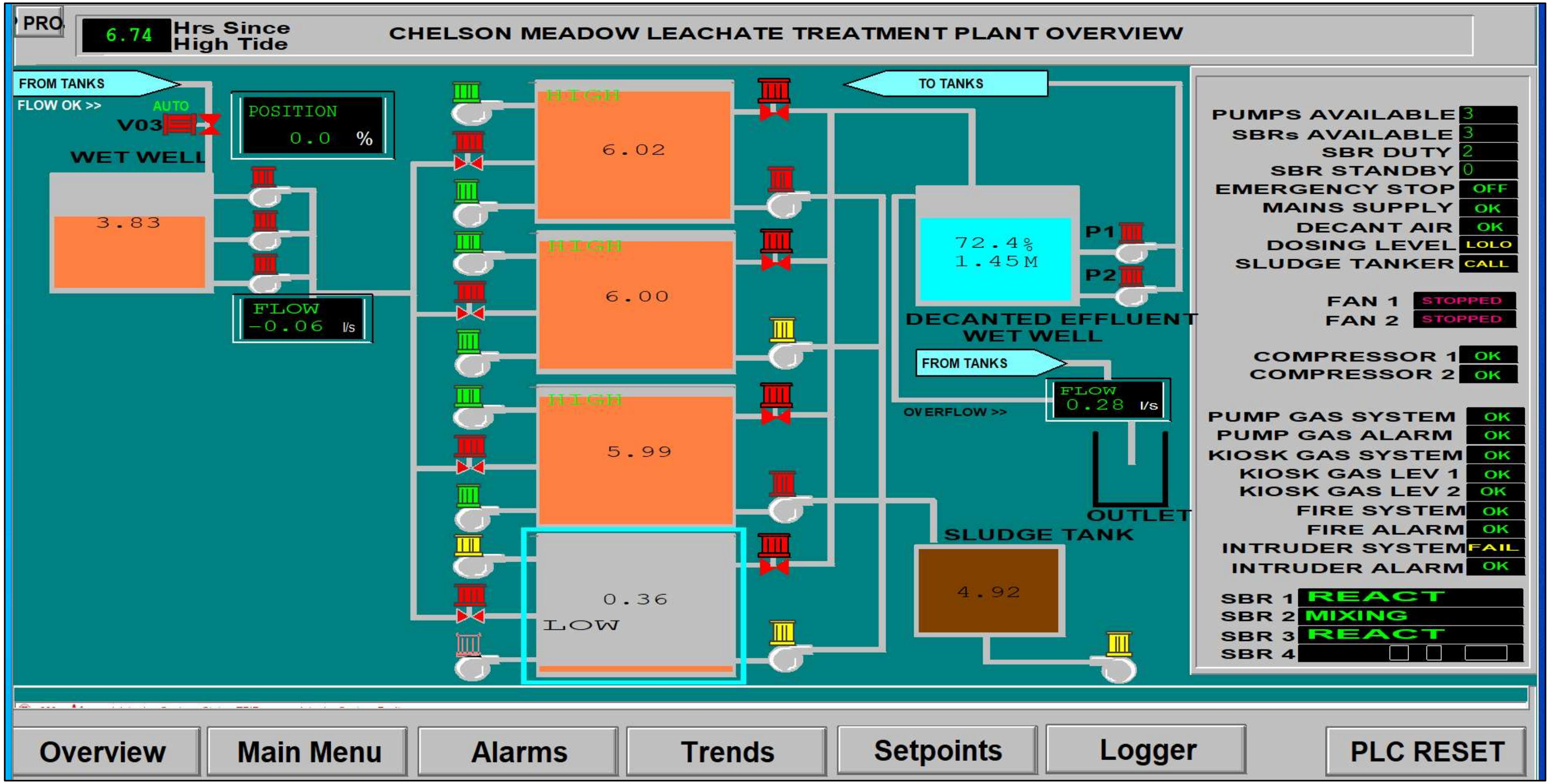
Screenshot 6.4: Security request during login process



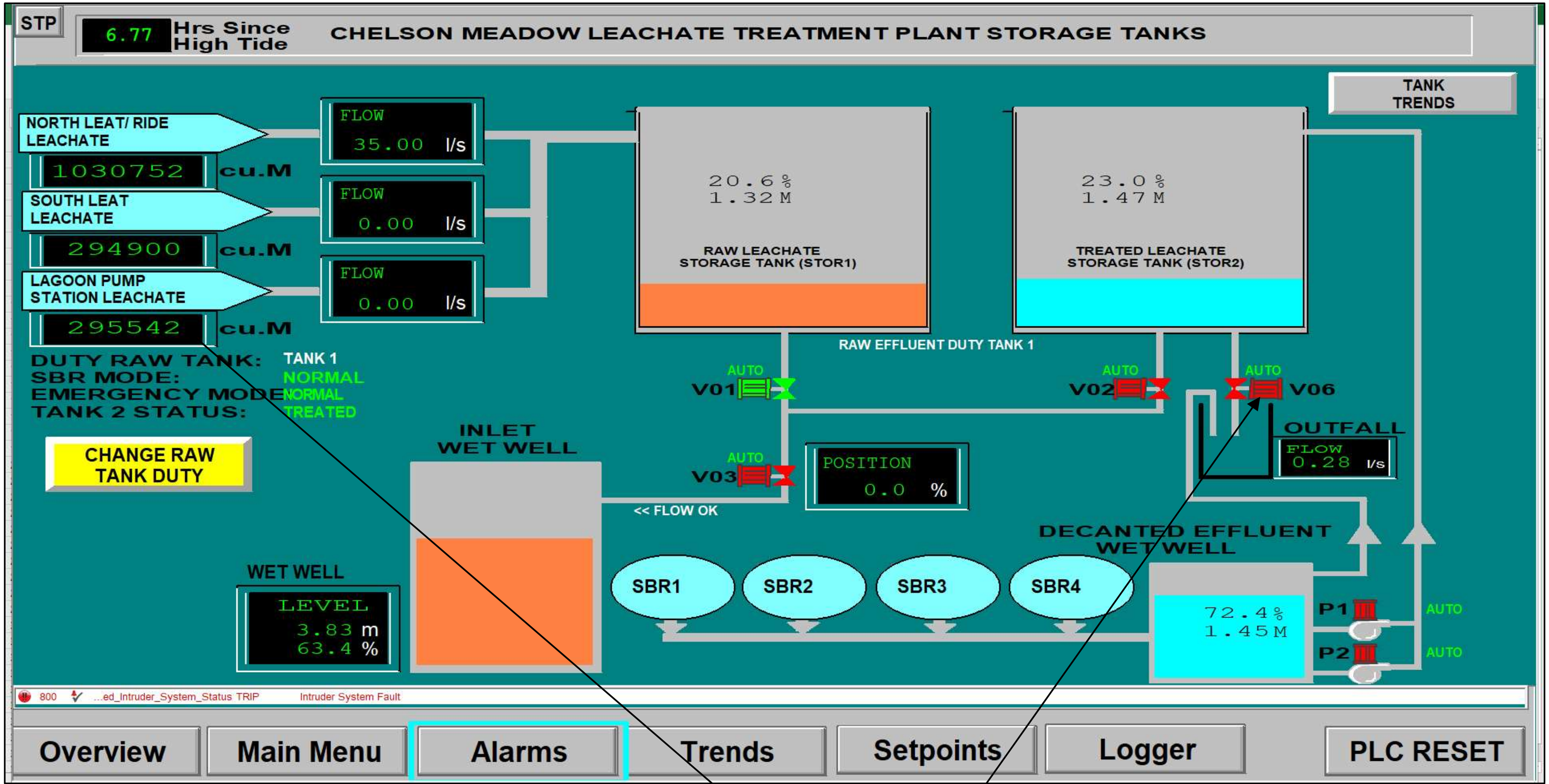
Screenshot 6.5: Repeat request for Username and Password following discontinuity of PC usage

Once login is fully successful the last overview screen used will appear. There are six tabs along the bottom of the screen (Screenshot 6.6), which access different operational screens: some of these enable increased interaction e.g. whereby time can be reset. The main screen is the LTP Overview Screen (Screenshot 6.6), which shows the four SBRs, the blowers in operation and any relevant alarms. An overview screen for the STORs and flow meters (Screenshot 6.7) is reached via the 'TO TANKS' tab, and the overview screen for the wet well is then accessible (Screenshot 6.8).

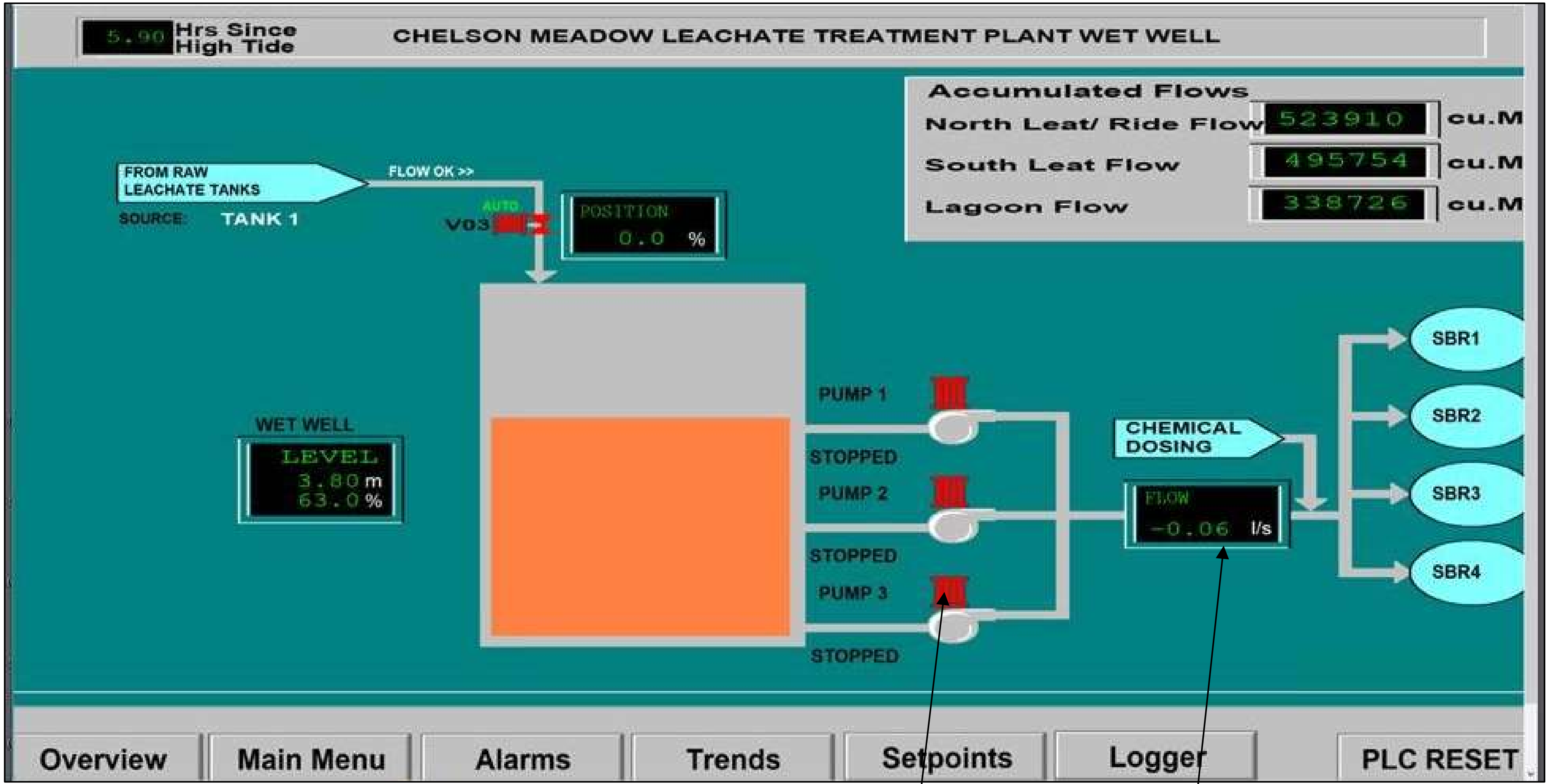
Clicking on an individual SBR on the LTP overview screen enables access to the screen for that SBR (Screenshot 6.9).



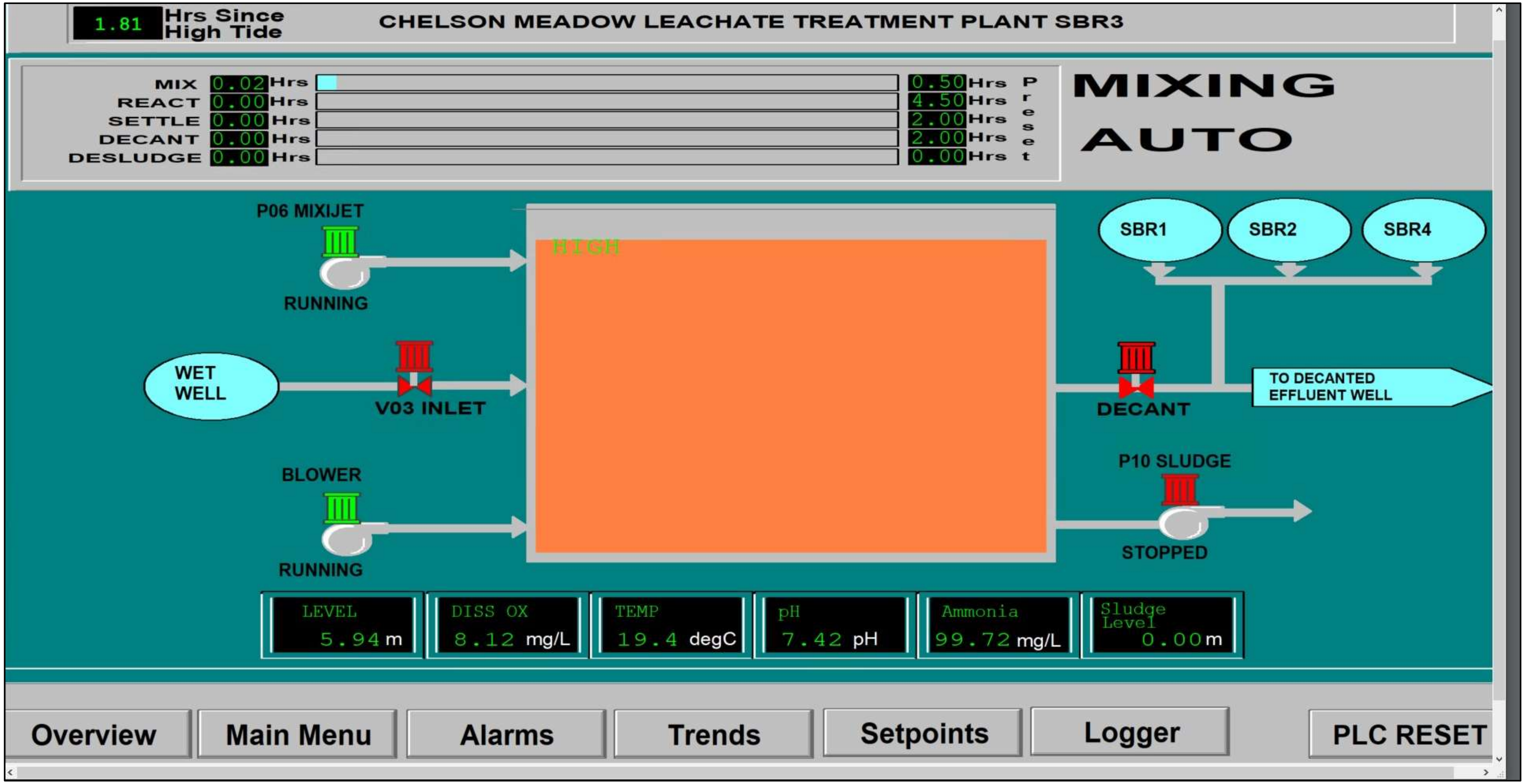
Screenshot 6.6: LTP overview screen



Screenshot 6.7: LTP storage tank (STOR) screen showing flow meters and valves beneath the tanks (green = open, red = closed)



Screenshot 6.8: Wet well screen showing active pumps (green = on, red = off) and the flow rate to the SBRs

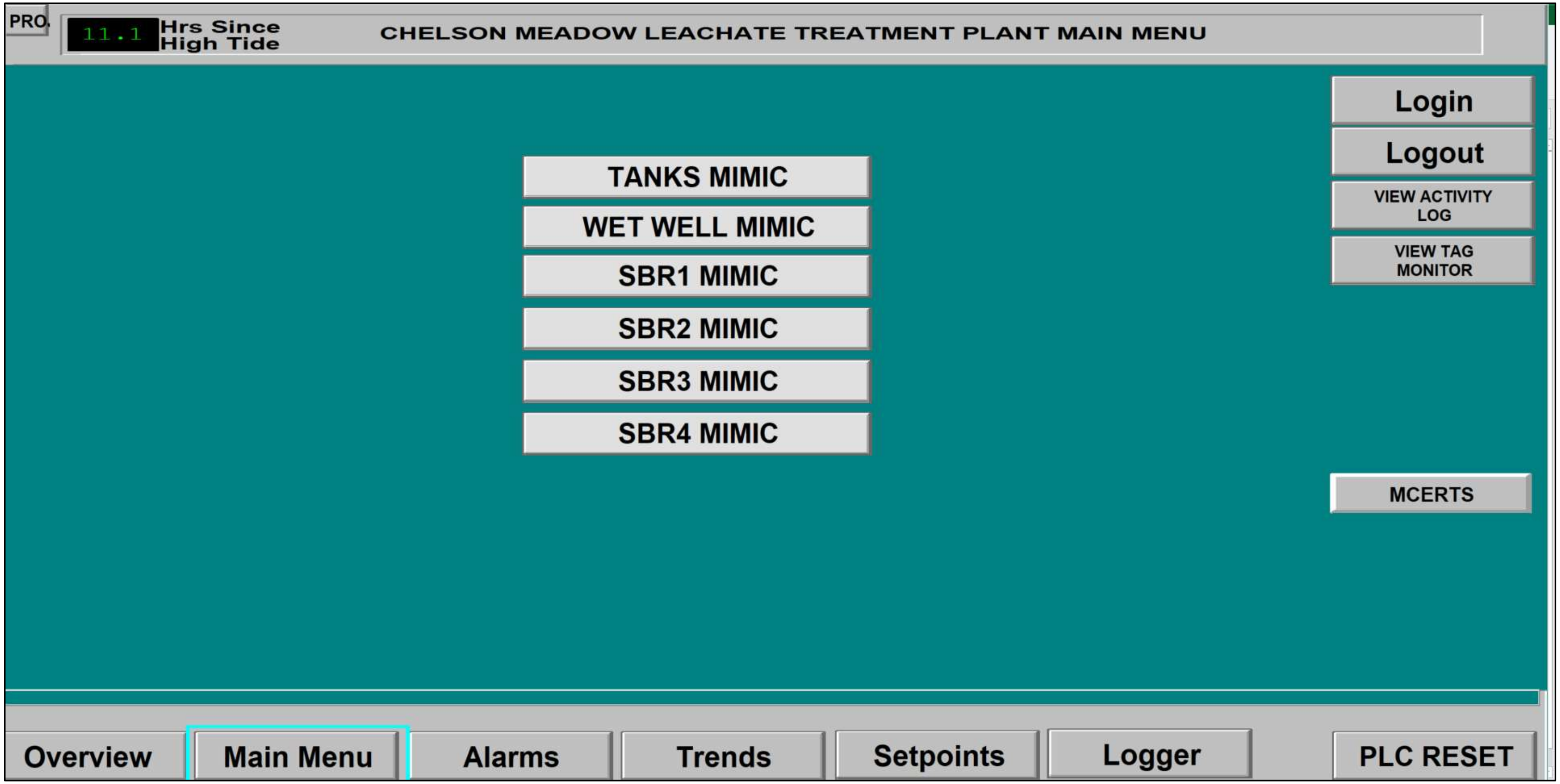


Screenshot 6.9: Individual SBR screen showing all the details of SBR operation and control

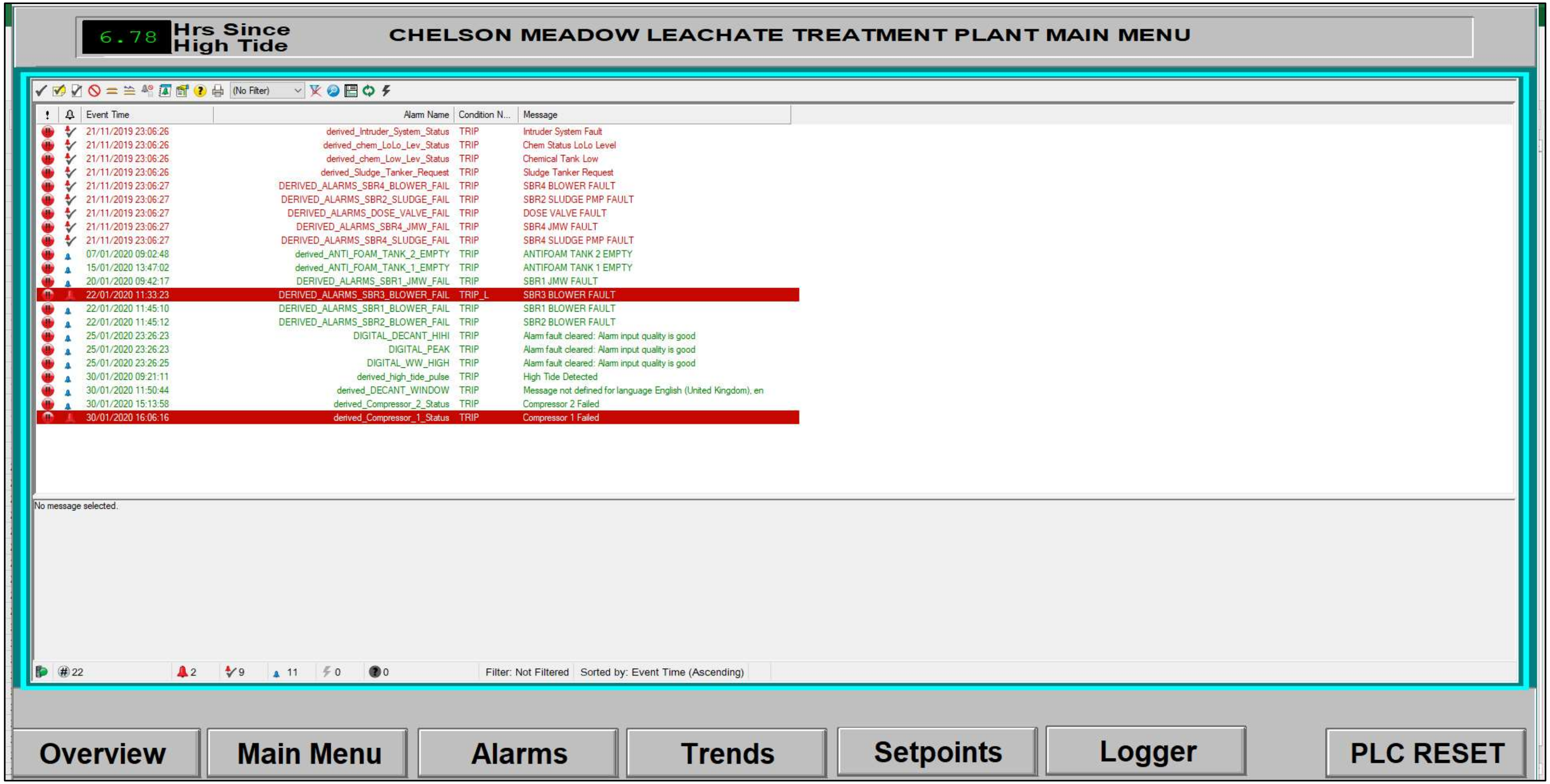
Screenshot 6.10 is the LTP main menu screen, which is rarely used for operational purposes but is required for collecting MCERTS data. Alarms are shown on Screenshot 6.11. The operator can 'acknowledge' an alarm once it has been investigated. One of the alarms indicates high tide and does not require action. Screenshots 6.12-6.15 show the most up to date trends (but longer trend histories previous to the current screen can be accessed) and are used to monitor the treatment process from filling to decanting. In the event of a problem screens can be interrogated historically so that trends preceding a problem can be investigated.

Screenshots 6.16-6.18 show the set point screens, which enable settings to be altered e.g. aeration times, settle times, height of liquor in STOR1 before releasing leachate, switching an SBR to 'Fixed' mode. Settings are changed via the relevant tab, which opens a small window into which the required parameter is reset.

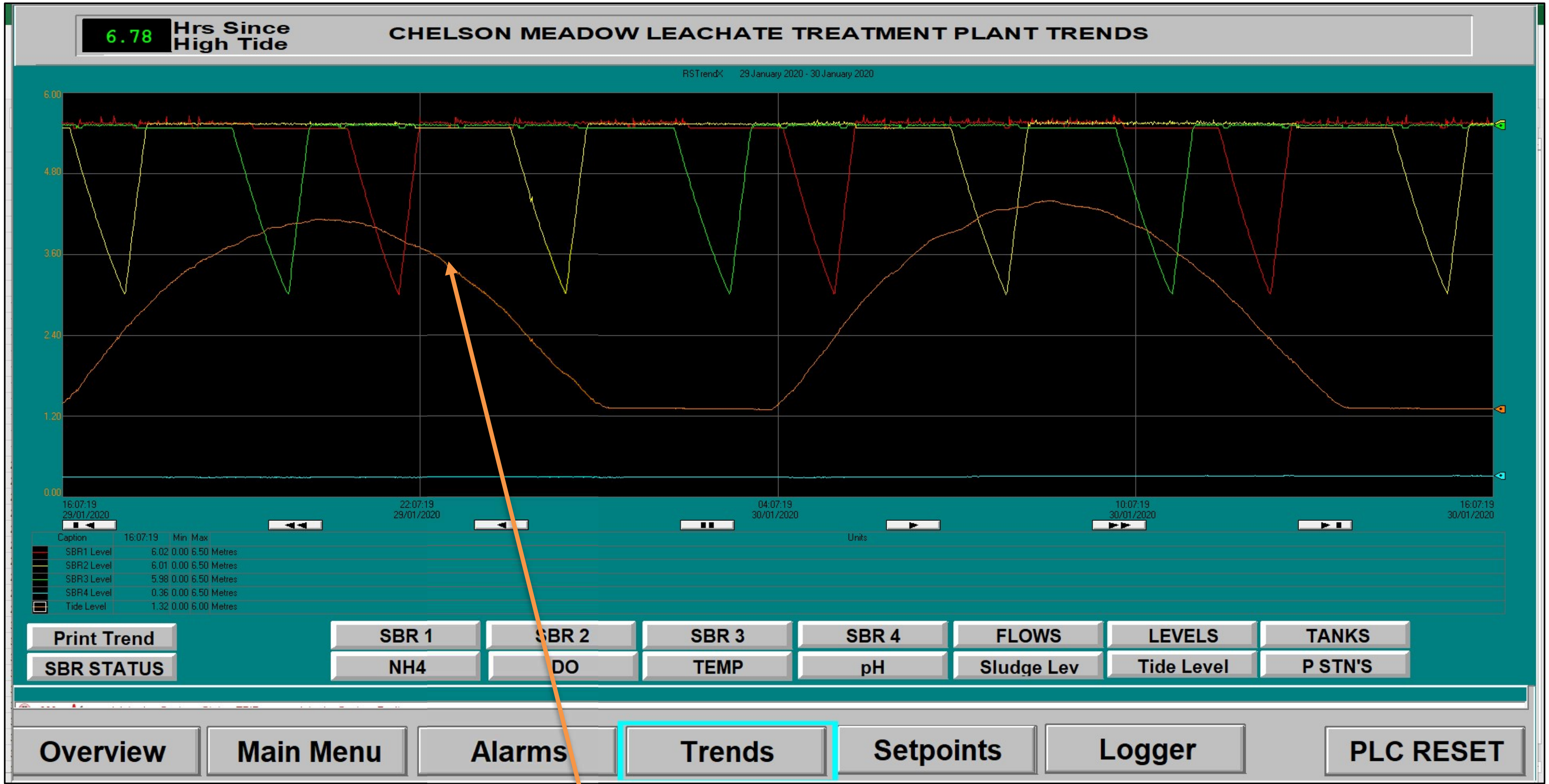
Screenshot 6.19 is the Logger screen displaying hours run on different pumps, flow meter readings and electrical readings.



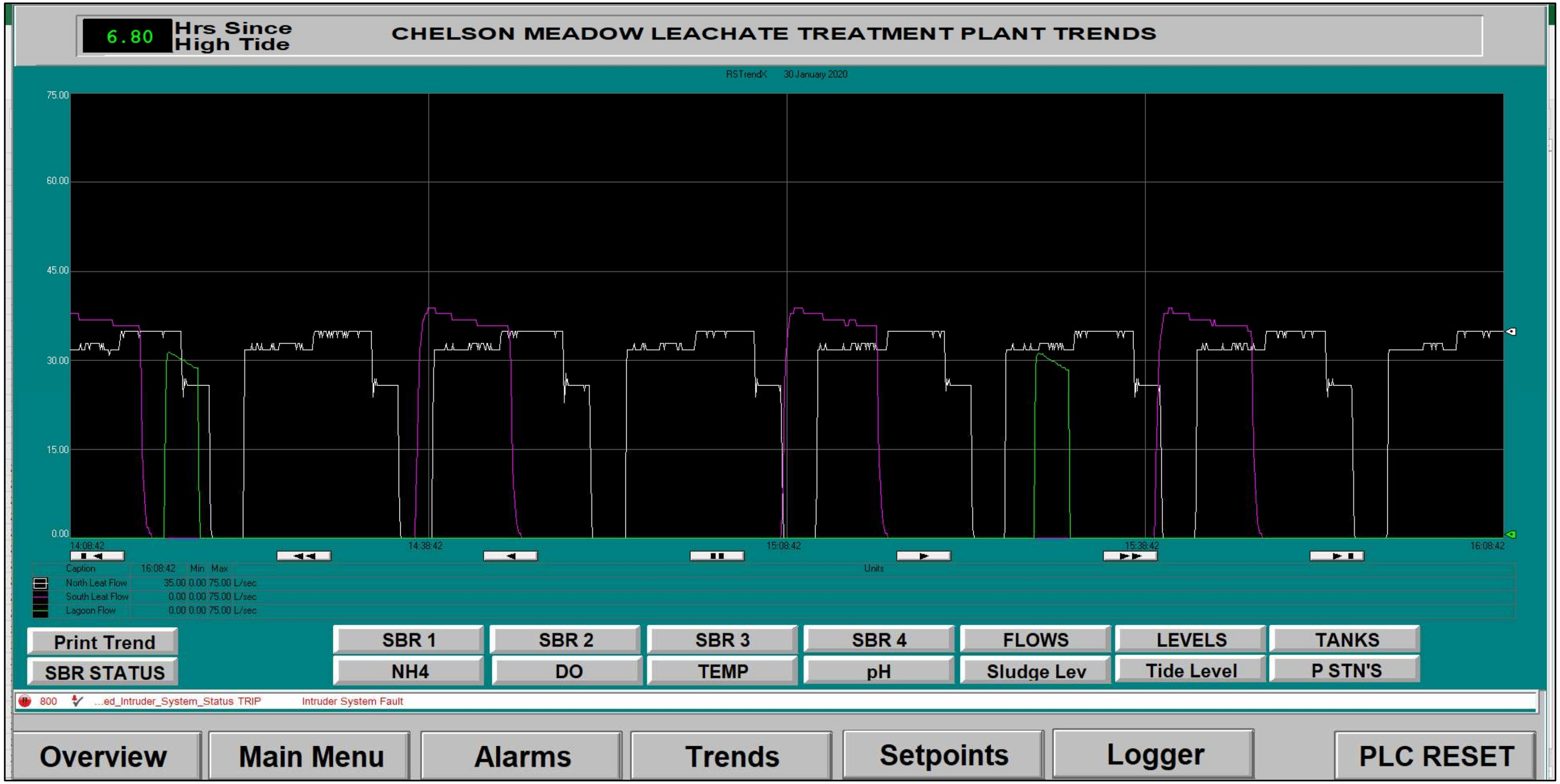
Screenshot 6.10: LTP main menu screen



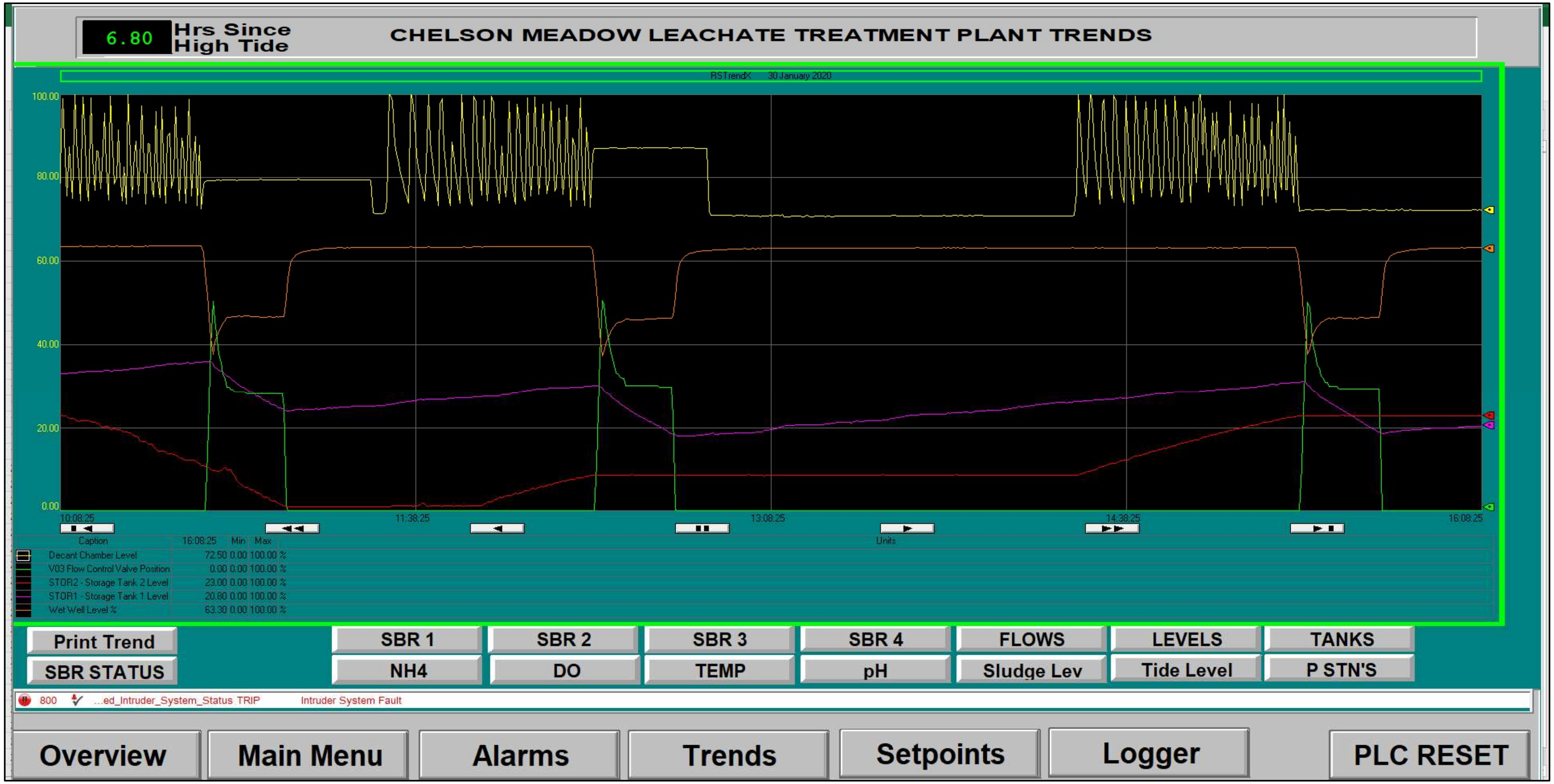
Screenshot 6.11: Alarm screen, where red indicates unacknowledged alarms and green acknowledged alarms



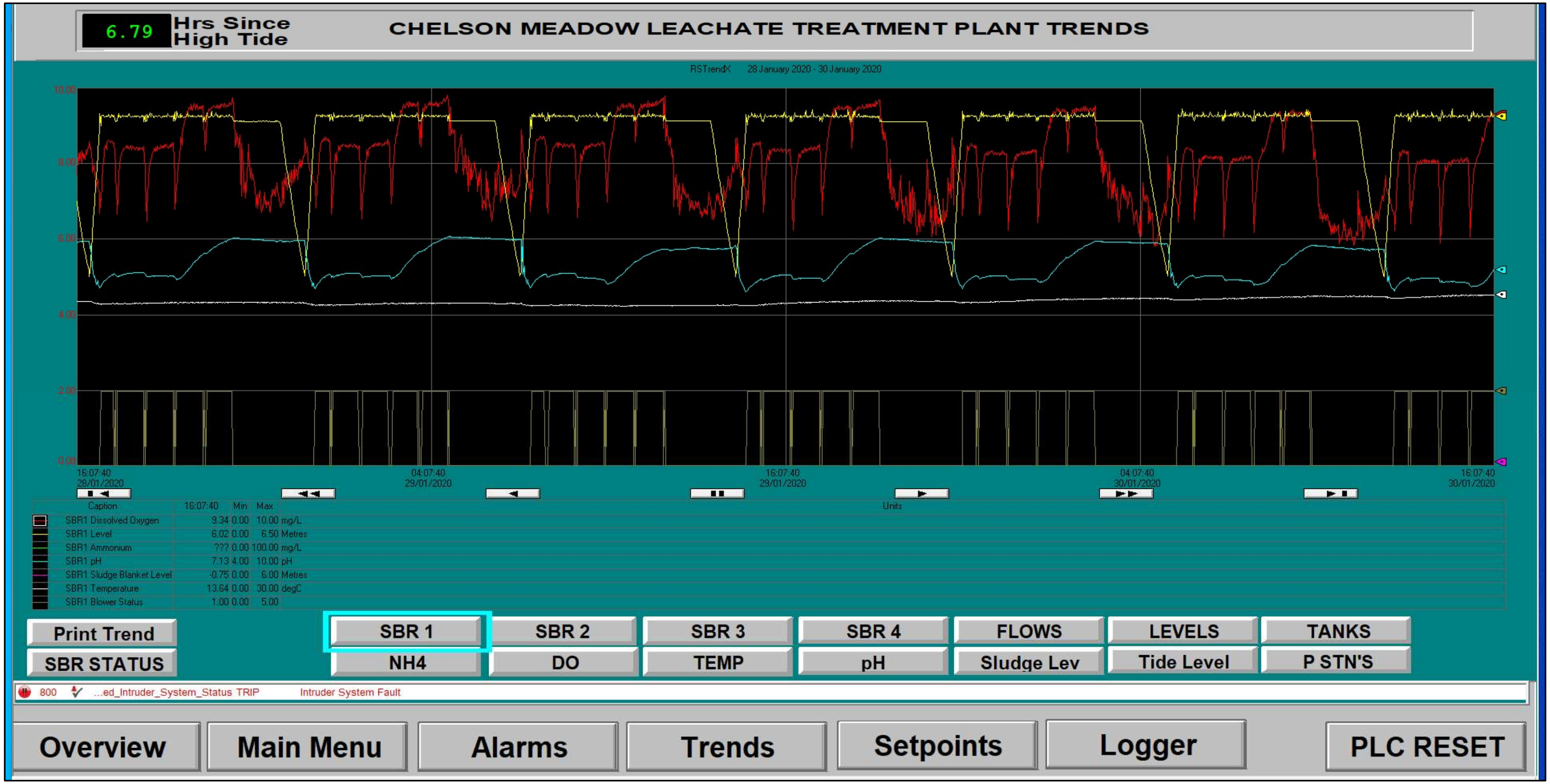
Screenshot 6.12: LTP trend screen indicating tide heights and individual SBRs decanting and filling over a 24-hour period, where each colour represents a different SBR



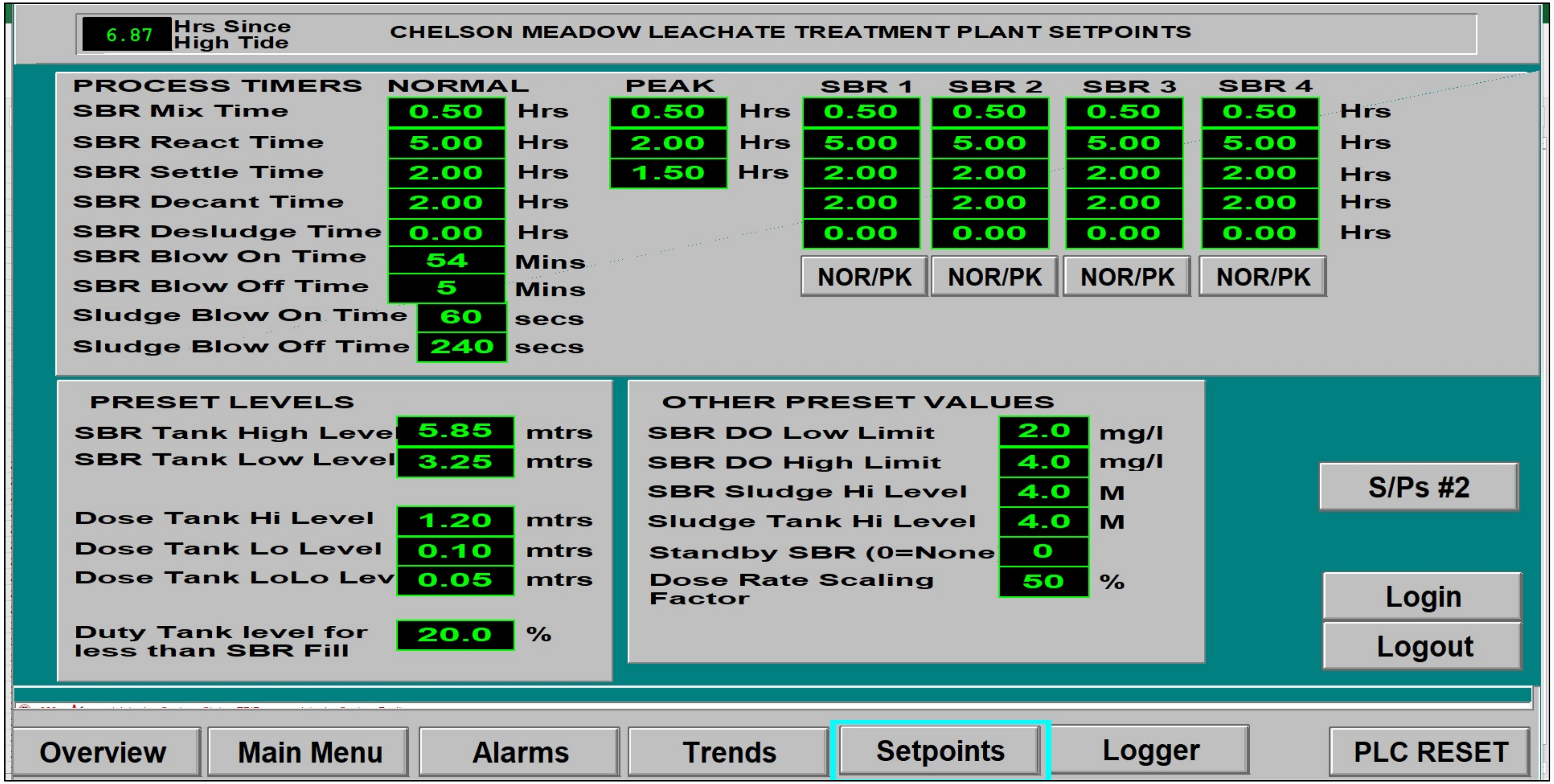
Screenshot 6.13: LTP trend screen indicating activity in the three main pumping stations over a 2-hour period, each colour representing a specific pump



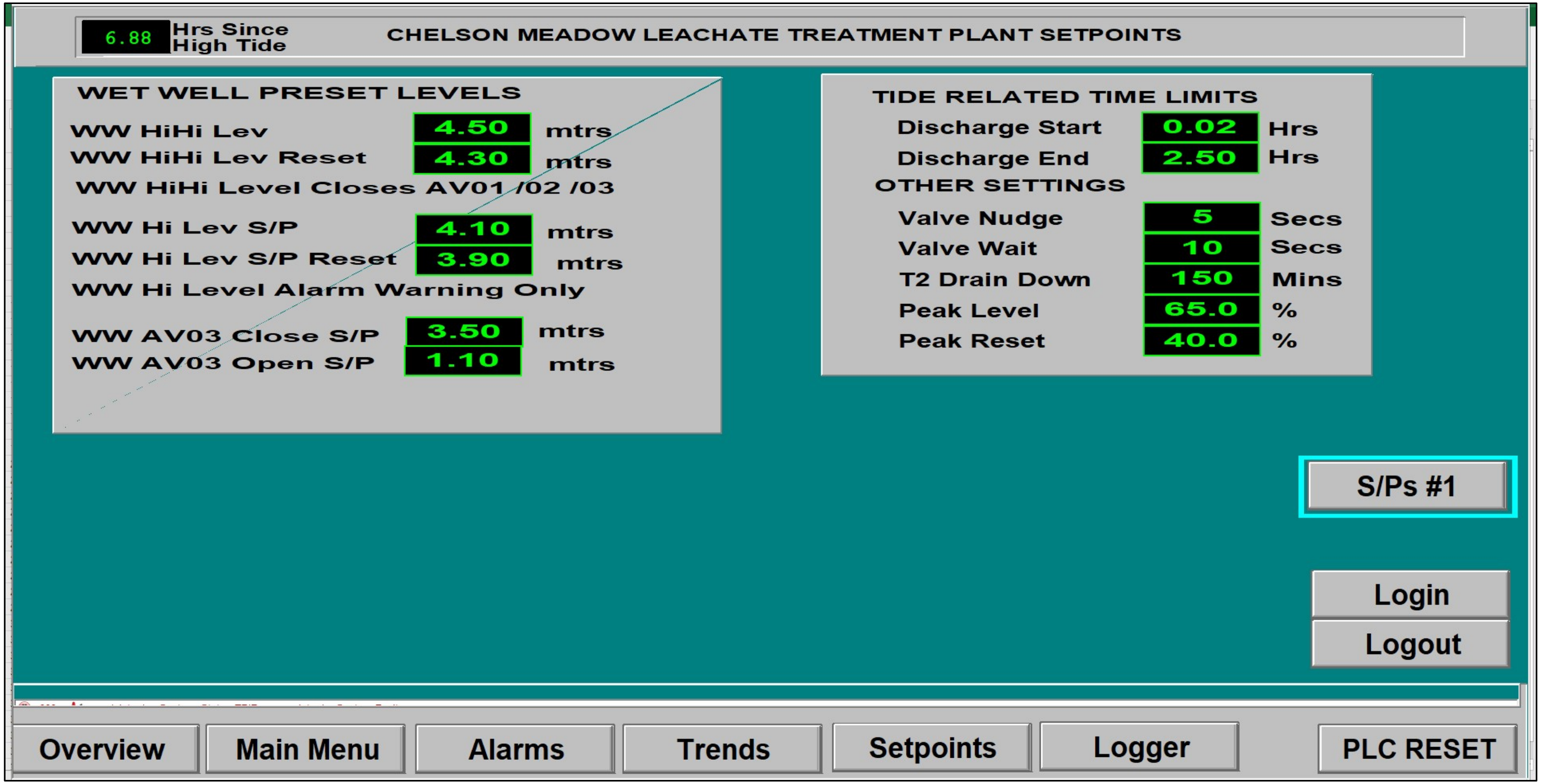
Screenshot 6.14: LTP trend screen indicating heights of liquor in STOR1 and STOR2 (red and purple), and when an SBR is decanting to STOR2 (yellow line)



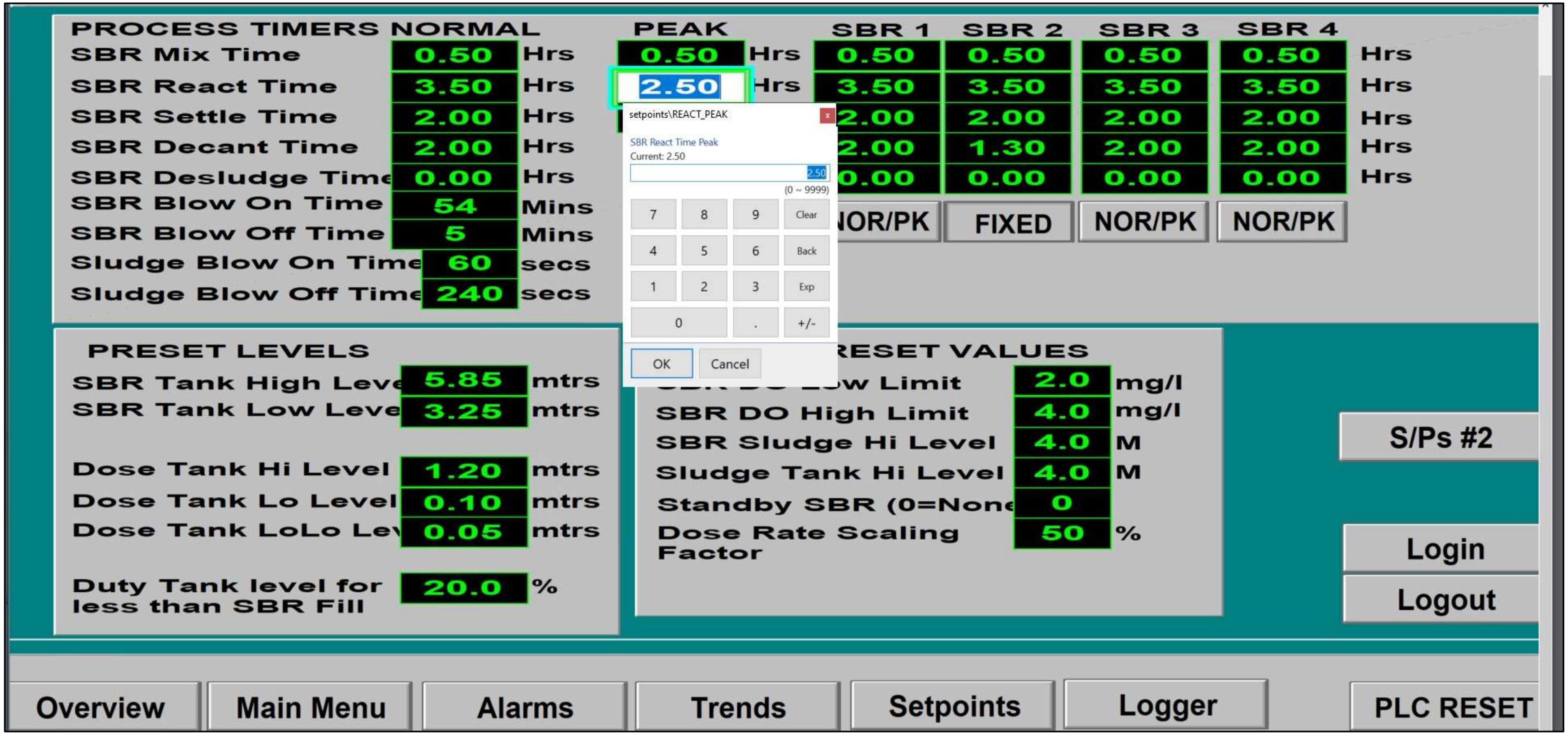
Screenshot 6.15: LTP trend screen for an individual SBR



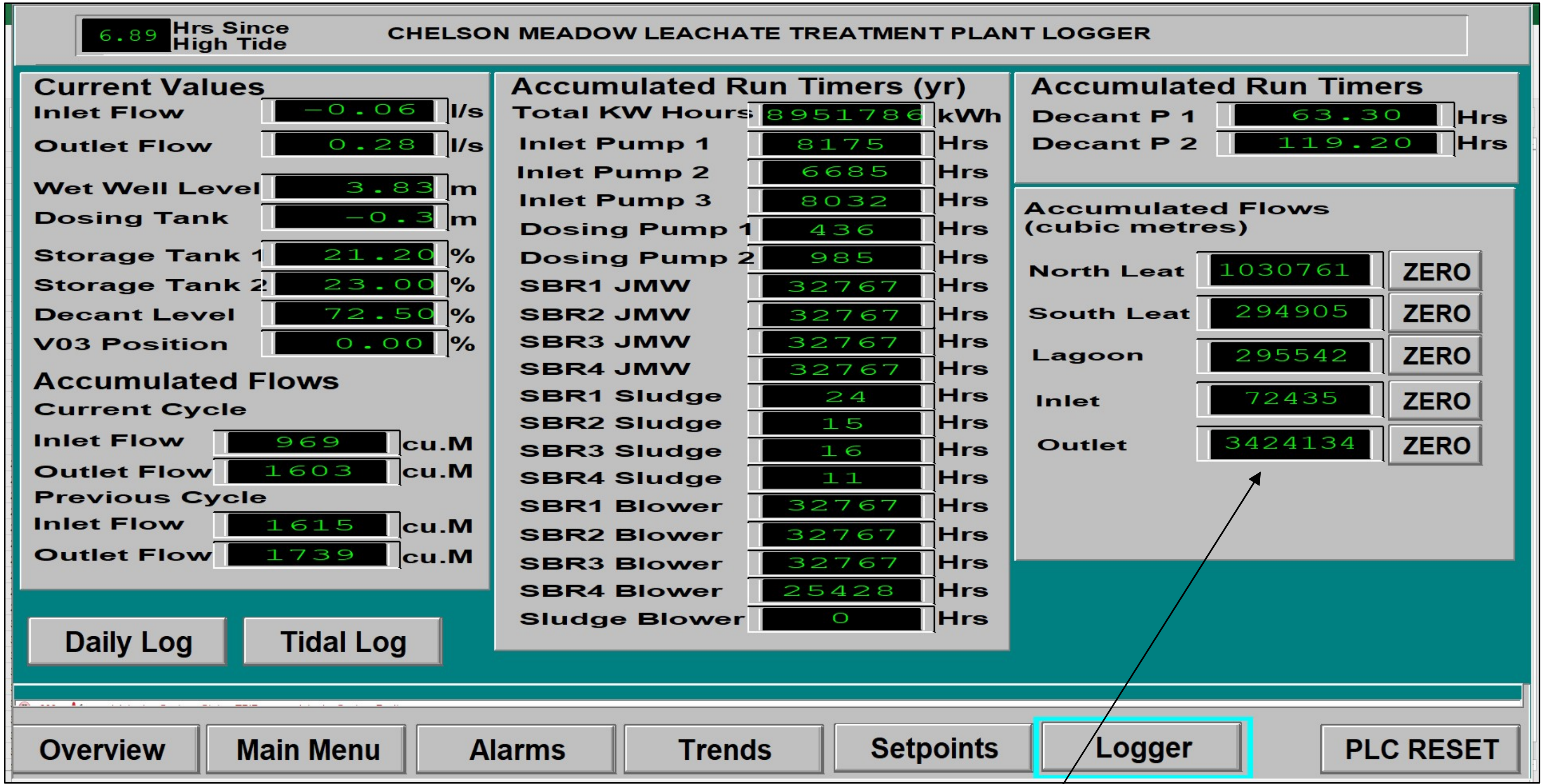
Screenshot 6.16: Setpoints screen 1, showing current set values, which can be altered by the operator via the respective box



Screenshot 6.17: Setpoints screen 2, showing current set values, which can be altered by the operator via the respective box



Screenshot 6.18: Altering the duration of the react period for an SBR in Peak mode



Screenshot 6.19: Logger screen showing hours run and flow meters

6.1 SBR Telemetry System

Selected alarms are transmitted from the Main PLC over a serial link to a Remote I/O Rack located within the telemetry outstation. These alarms, in turn, dial out using the ‘Yank’ Telemetry System to the LTP operator’s mobile phone leaving a verbal message identifying the sensor fault.

The sensors described below are operated by the PLC, however, a sensor may be operated outside the control of the PLC, in the Pump Station. All the telemetry output signals are energised in the safe mode, and de-energised if a fault occurs.

S*ensor Number 1 Fire alarm in the Kiosk*
This is sensed by the digital input from the fire alarm unit in the kiosk.

Sensor Number' 2 Intruder alarm in the Kiosk
This is sensed by the digital input from the intruder alarm unit in the kiosk.

Sensor Number 3 Gas alarm in the Kiosk
This is sensed by the two digital inputs from the gas alarm unit in the kiosk. If either the Level 1 or Level 2 gas alarms are activated in the kiosk, this telemetry signal is operated.

Sensor Number 4 Gas/Fire/Intruder alarm system fault in the Kiosk
This is sensed by the three digital inputs from the gas/fire /intruder alarm systems in the kiosk. If any of the Healthy signals are lost, this telemetry signal is operated. The "Gas System Healthy" signal is overridden in the event of a power failure and will not be active again until 45 seconds after power is restored.

Sensor Number 5 MCC Mains Failure
Initiated by power fail relay: output is energised on power failure.

Sensor Number 6 SBR1 Fault
Initiated if any of the following conditions occur on SBR1:
a) Jet Motive Pump (mixer) failure
b) Blower failure
c) Inlet valve unhealthy
d) A discharge occurs outside the decant window, or if an emergency stop sequence is in operation.

Sensor Number 7 SBR2 Fault
as SBR 1

Sensor Number 8 SBR 3 Fault
as SBR 1

Sensor Number 9 SBR 4 Fault
as SBR 1

Sensor Number 10 Air compressor/Low Air
Initiated by:

a) Low air pressure as indicated on pressure switch at air valve control box
b) Compressor 1 or 2 failure
c) Solenoids, valves on compressors 1 or 2 fail

Sensor Number 11 Dosing Plant/Fans
No dosing plant present

Sensor Number 12 - STOR-T01 or 02 or Inlet Wet Well High
Common alarm if wet well or STORs reach a critical level.

Sensor Number 13 PLC fault
Signalled when fault flag in PLC is energised

Sensor Number 14 - Inlet Pump Failure
Initiated from the inlet pump fault signal. The output is energised if any one of the three pumps fail.

Sensor Number 15 - Telemetry Power Failure
Direct from telemetry outstation - internal

Sensor Number 16 - Emergency Flow Mode
Initiated when the LTP enters Emergency mode.

7.1 Emissions to air, water and land

Permit conditions for the LTP specify:

> ***3.1 Emissions to water, air or land***
> *3.1.1 The limits in schedule 3 shall not be exceeded.*
> *3.1.2 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3, table S3.1.*
> *3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on systematic appraisal of the risk of contamination.*

There are no uncontrolled emissions to air, water or land, as ensured by operational procedures and environmental monitoring programmes outlined in the following sections. In response to the Environmental Risk Assessment (ERA, Appendix G), management of the LTP should include the following environmental procedures for the protection of the environment (Appendix H to the LMS):

Procedure 1 – Leaks & Spillages
Procedure 2 – Fires
Procedure 3 – Odour
Procedure 4 – Off-site incidents

These will be revised or supplemented if required and in particular after an incident.

Whatever its nature, if an accident or incident causes damage to the environment, or risks doing so the following should be undertaken as a matter of Good Practice:

i. comply with the emergency procedure(s) immediately;
ii. report the accident/incident to the EA, call the UK pollution incident hotline on 0800 807060 (24 hours) to get advice and help;
iii. Undertake whatever action is necessary to minimise the environmental consequences;
iv. clean up after the incident or spillage;
v. find out why the accident happened;
vi. consider if the response and actions were adequate;
vii. take any actions needed to stop it happening again;
viii. as soon as possible review and amend the emergency procedure(s).

If serious pollution occurs that cannot be controlled immediately normal operation of the LTP will be reviewed and appropriate liaison conducted with the EA such that a satisfactory mode of operation can be agreed and continue until such time as normal operation can be resumed.

The site lies adjacent to the River Plym and an outlet, which passes under the Ride/footpath/cycle way, discharges legally into the river. The river flows into the Tamar Estuaries SAC and the LTP permit boundary is within 2km of a biological SSSI (Billacombe Field). The mudflats of the river are Priority Habitat (PH) as is the deciduous woodland, wood pasture and parkland within the boundary of the National Trust Saltram Estate. There is a new housing estate to the south.

Other than the River Plym, the only potentially vulnerable surface water is the South Leat, which follows the south boundary of the closed landfill and collects surface run-off from the landfill cap as well as from elsewhere; the South Leat is a seasonal surface water body.

The closest residential properties are ca. 70m from the LTP permit boundary, which is immediately adjacent to the other components of the wider waste facility.

Wind rose

Wind speed and direction determine how airborne emissions may affect sensitive receptors. The wind rose for Plymouth (2015 to 2019, Figure 7.1) indicates that the prevailing winds are in the sector between west and south west. Winds in the sectors north to north-north-east and south to east-south-east are least frequent. Over this period, easterly winds occurred ca. 10% of the time. Based on these data, Table 3.1 indicates the most likely receptors for fugitive emissions downwind of the site as well as those at risk because of proximity: shade intensity is directly proportional to risk.

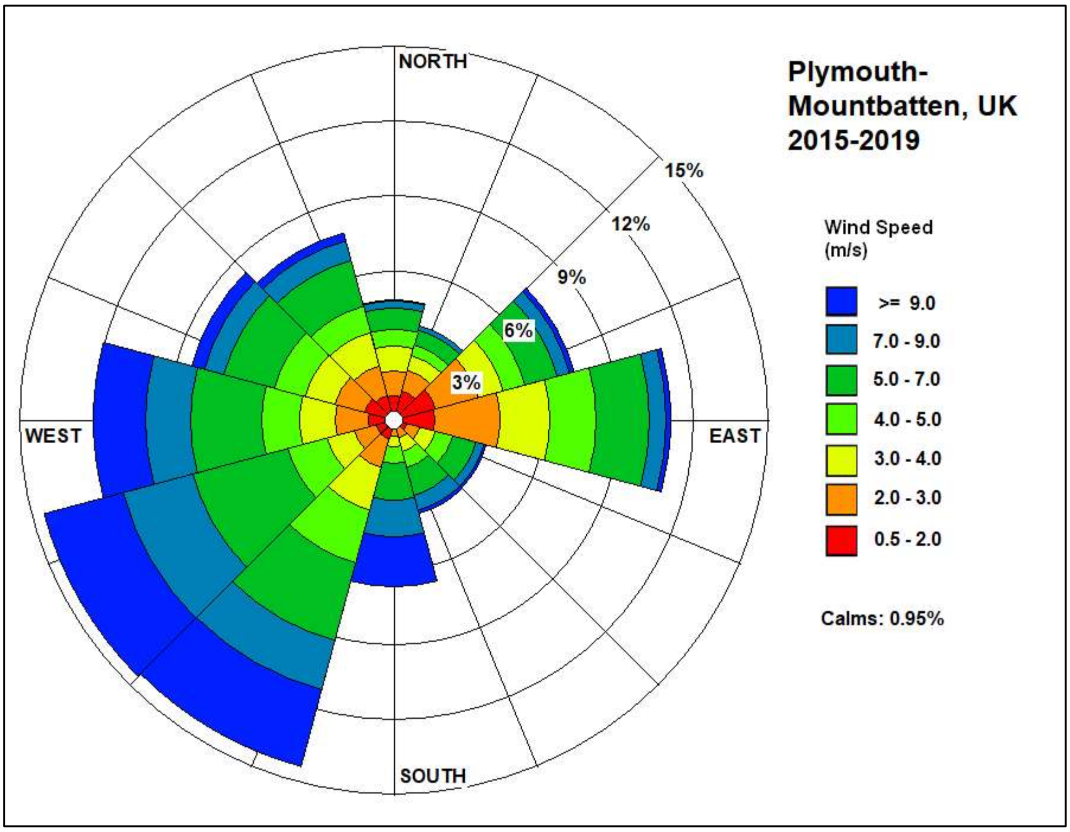


Figure 7.1: Wind rose from Plymouth (2015-2019)

Key receptors are the river Plym, the Ride, the HWRC, the residential area of the new housing estate, the RTS building and PH deciduous woodland.

.

Table 7.1: Potential sensitive receptors to airborne emissions and noise within 1km of the permit boundary of the LTP; receptors down gradient of prevailing winds are shaded in blue, with increasing depth of shade signifying increased risk

	Potential Receptor	**From Permit Boundary**	
		Distance (m)	**Direction**
1	River Plym	0	-
2	The Ride	0	W
3	HWRC boundary	20	N
4	Housing estate	70 minimum	S
5	RTS building	75	E
6	Priority Habitat Deciduous Woodland	125	ESE
7	Bus Depot	190	SSW
8	A379 Laira Bridge	400	SW
9	School	415	SE
10	Traveller’s Camp	680	N
11	Saltram Estate	770	NNE

Potentially sensitive receptors to all putative emissions at 250m, 500m and 1000m from the LTP permit boundary are illustrated in Figures 7.3-7.12, including ecological, hydrological, geological and the built environment: the environmental procedures outlined hereafter are designed to protect all of these from potentially negative impacts of site operations. This section of the LMS should be read in conjunction with the ERA (Appendix G).

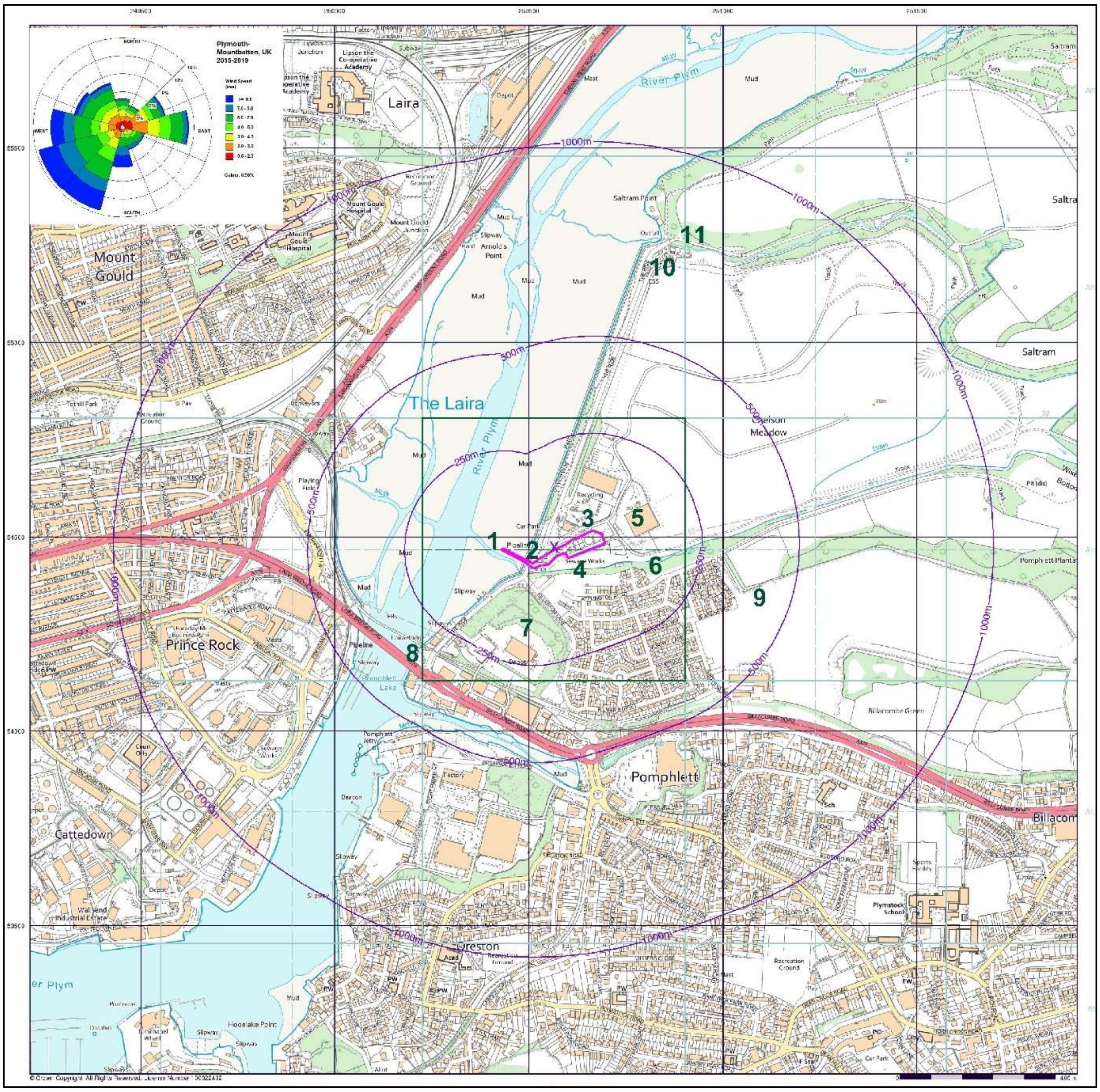


Figure 7.2: Potential sensitive receptors within 1km of the LTP permit boundary, numbered sequentially from those closest to the site to those furthest away (see Table 7.1 and details in text); associated wind rose indicates likely prevailing wind (Figure 7.1).

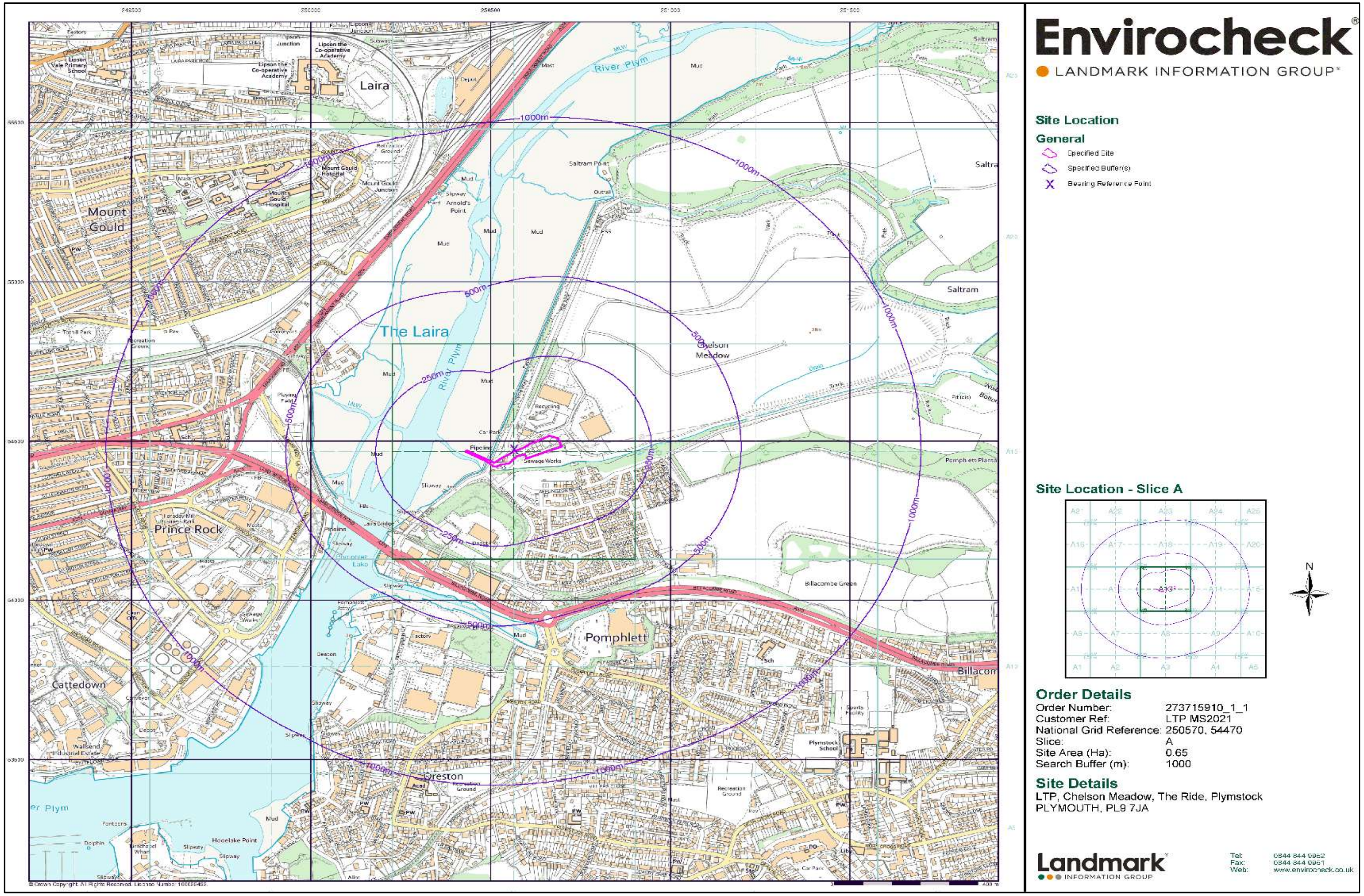


Figure 7.3: Location of LTP showing sensitive receptors at 250m, 500m & 1000m from the permit boundary, 2021

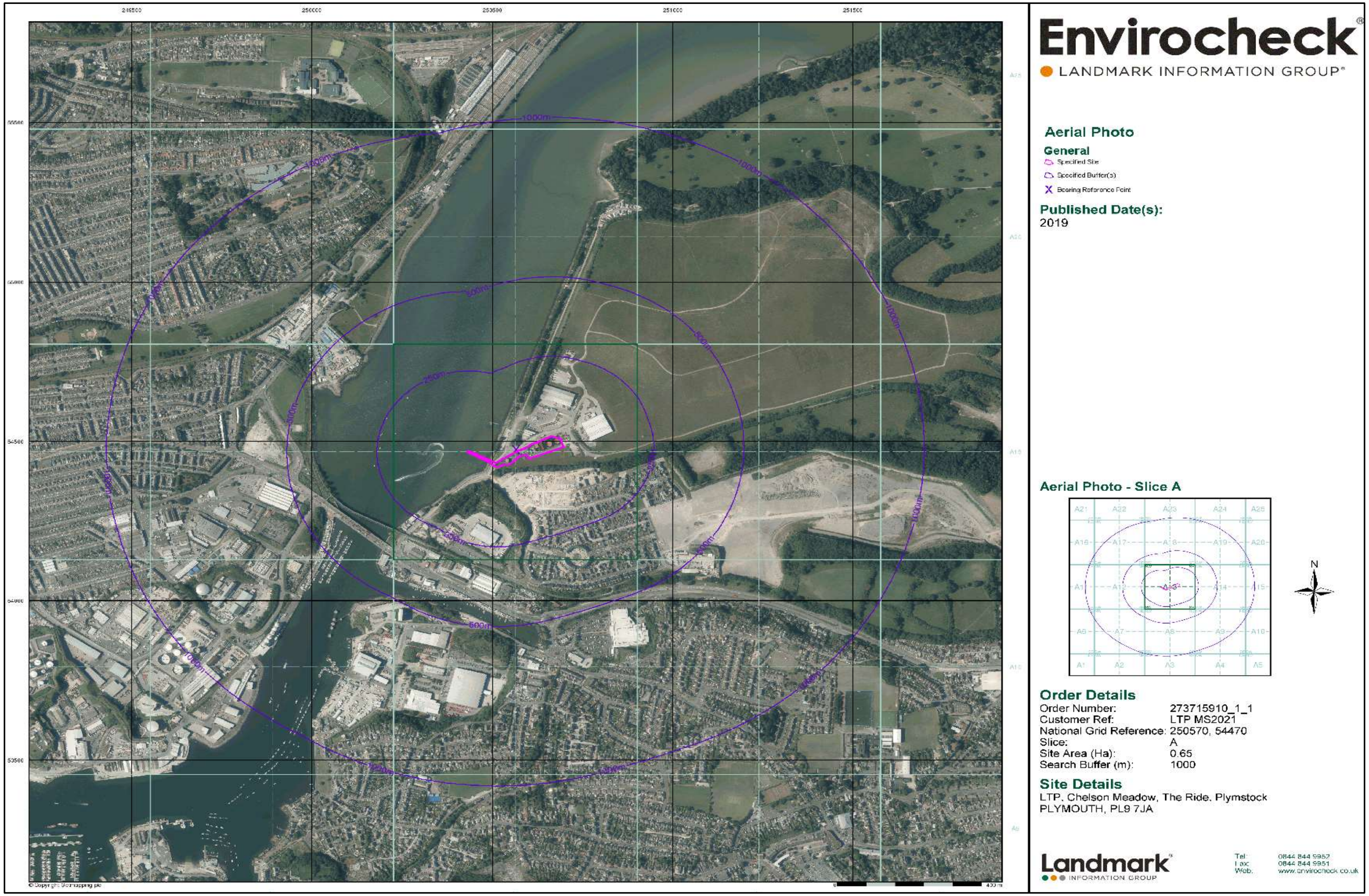


Figure 7.4: Aerial view of LTP (2019) showing sensitive receptors at 250m, 500m & 1000m distance from the permit boundary

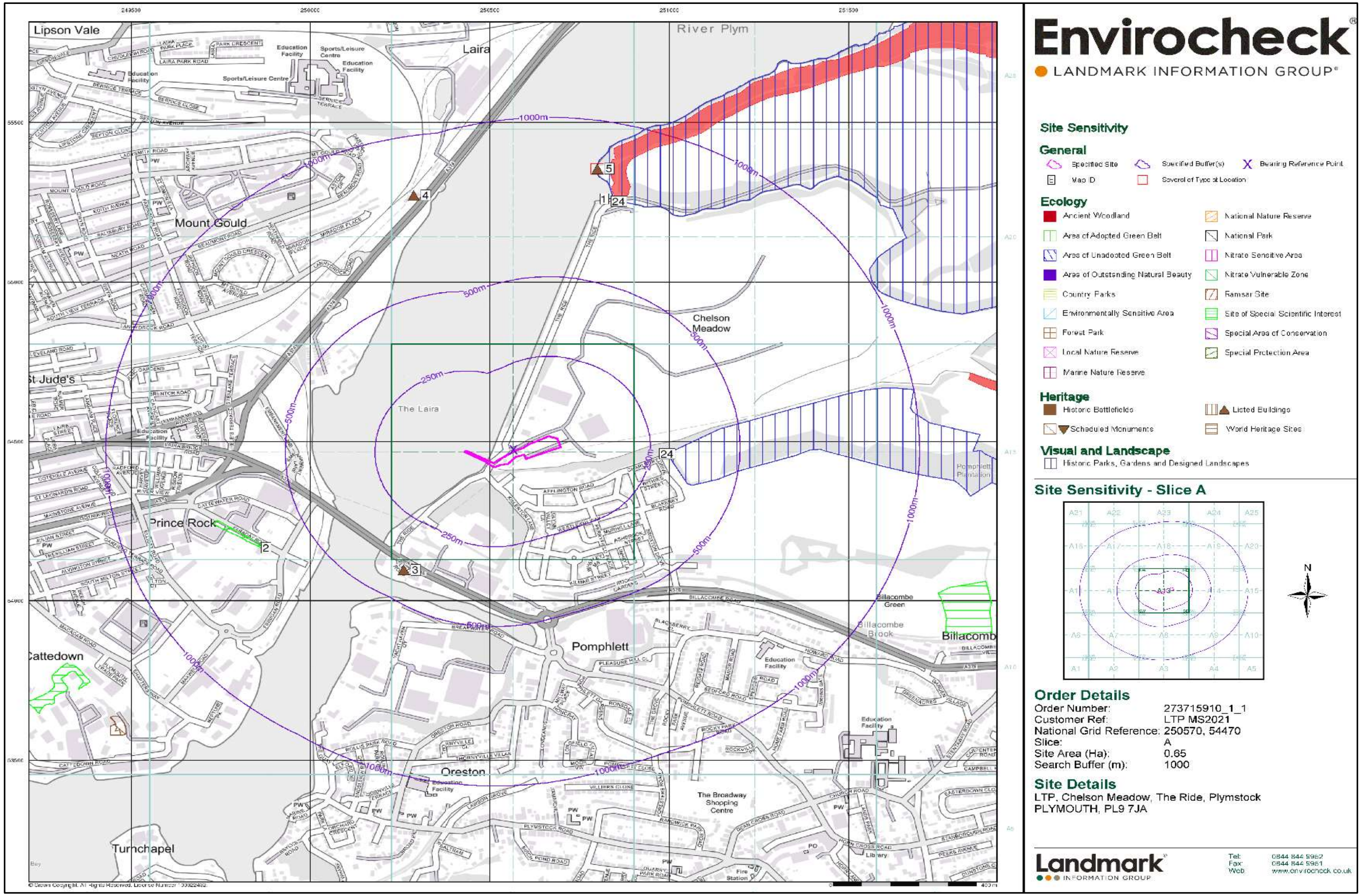


Figure 7.5: Sites of ecological interest within 250m, 500m & 1000m distance of the LTP permit boundary, 2021

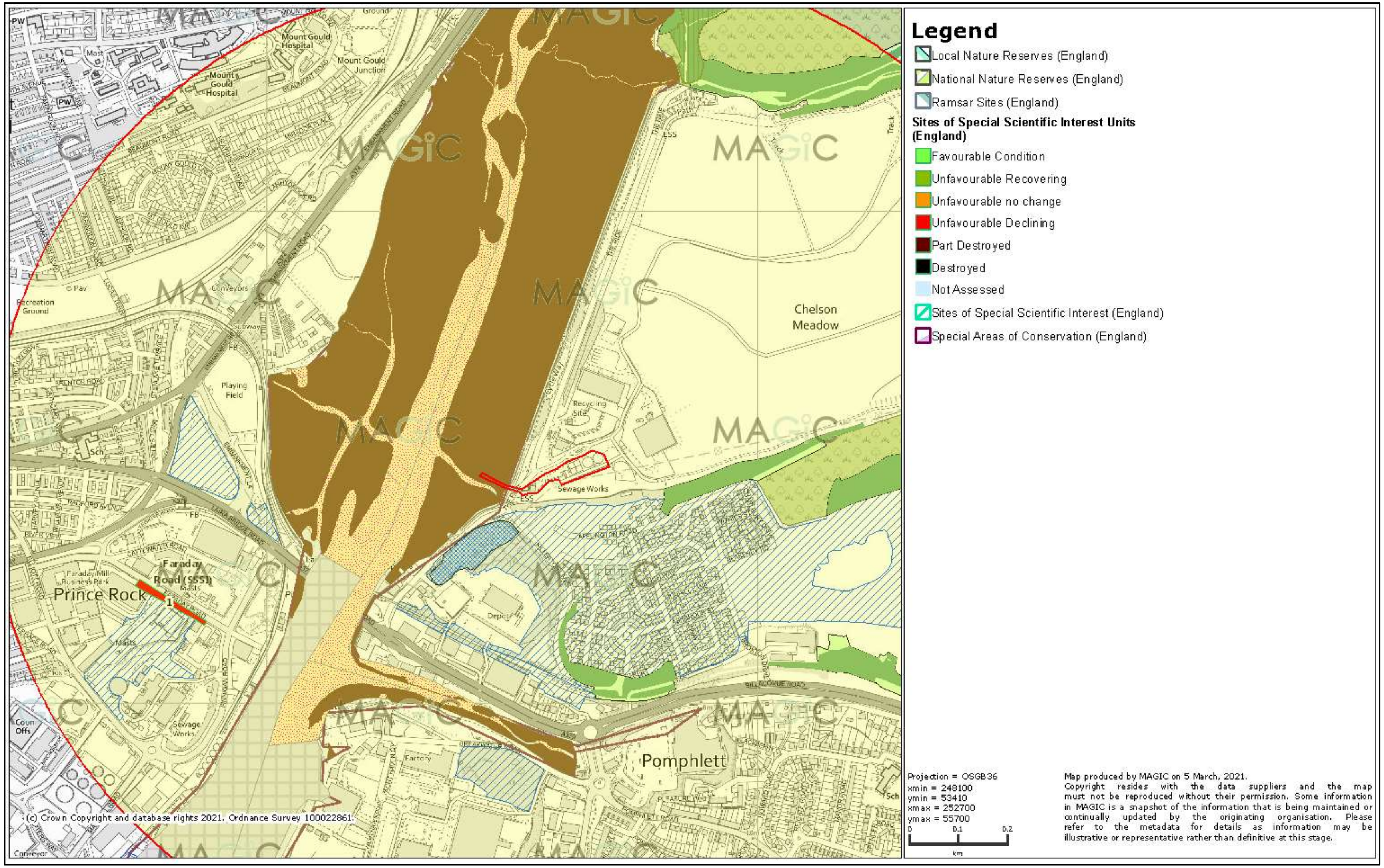


Figure 7.6: Sites of ecological interest within 1000m distance of the LTP permit boundary, magic.gov.uk. 2021

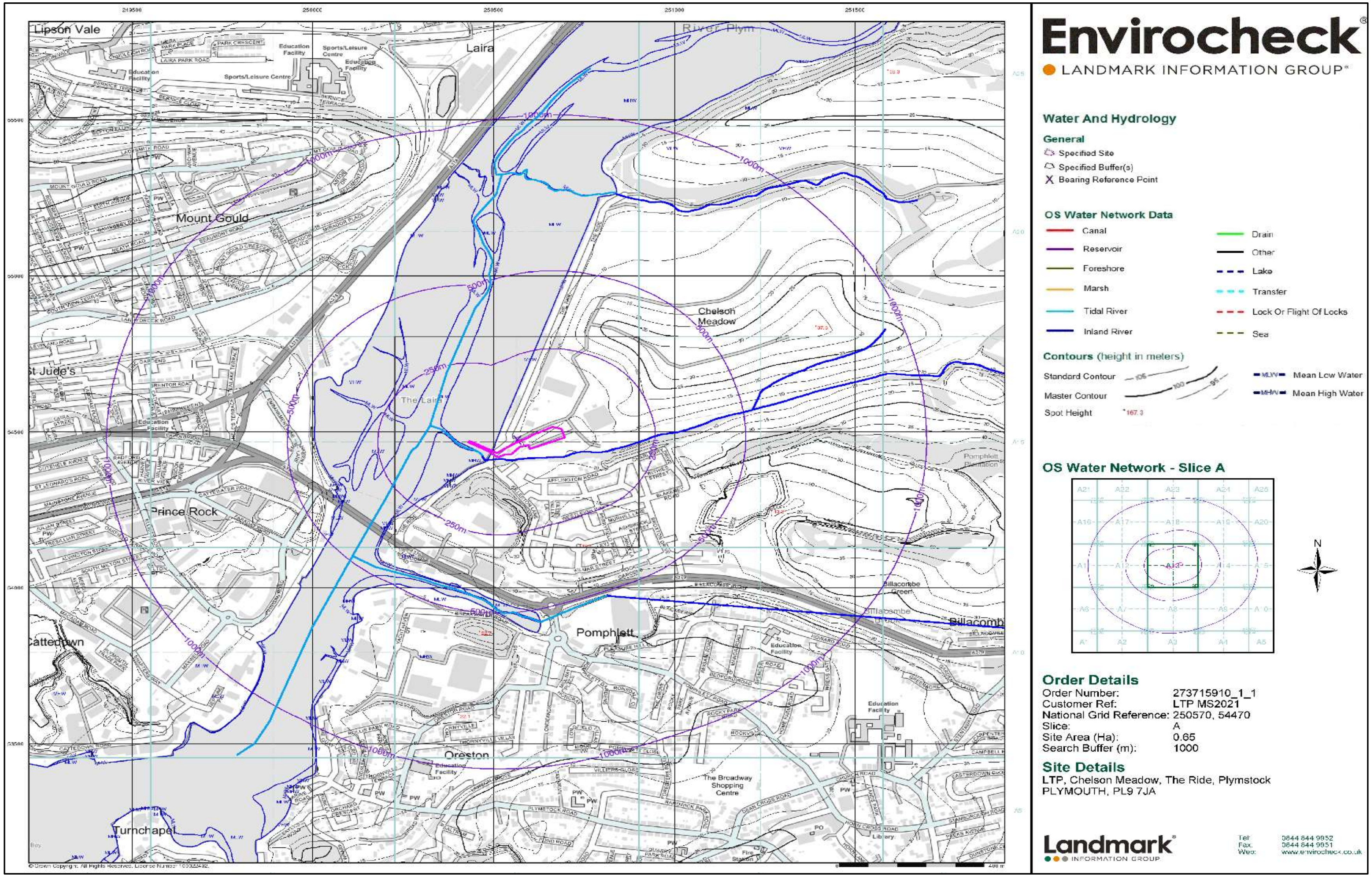


Figure 7.7: Hydrological features within 250m, 500m & 1000m distance from the LTP permit boundary, 2021

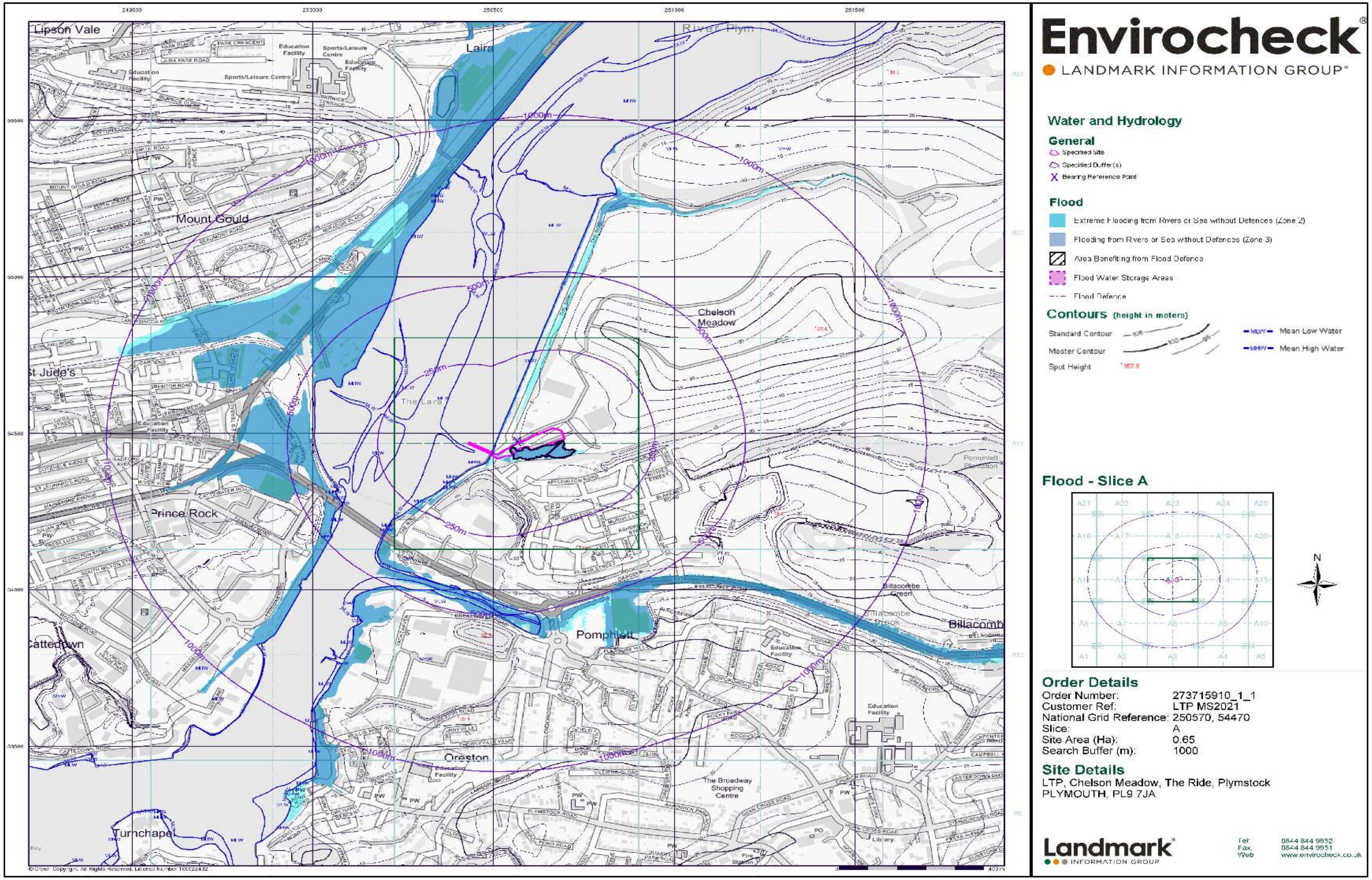


Figure 7.8: Flood risk at 250m, 500m & 1000m distance from the LTP permit boundary, 2021

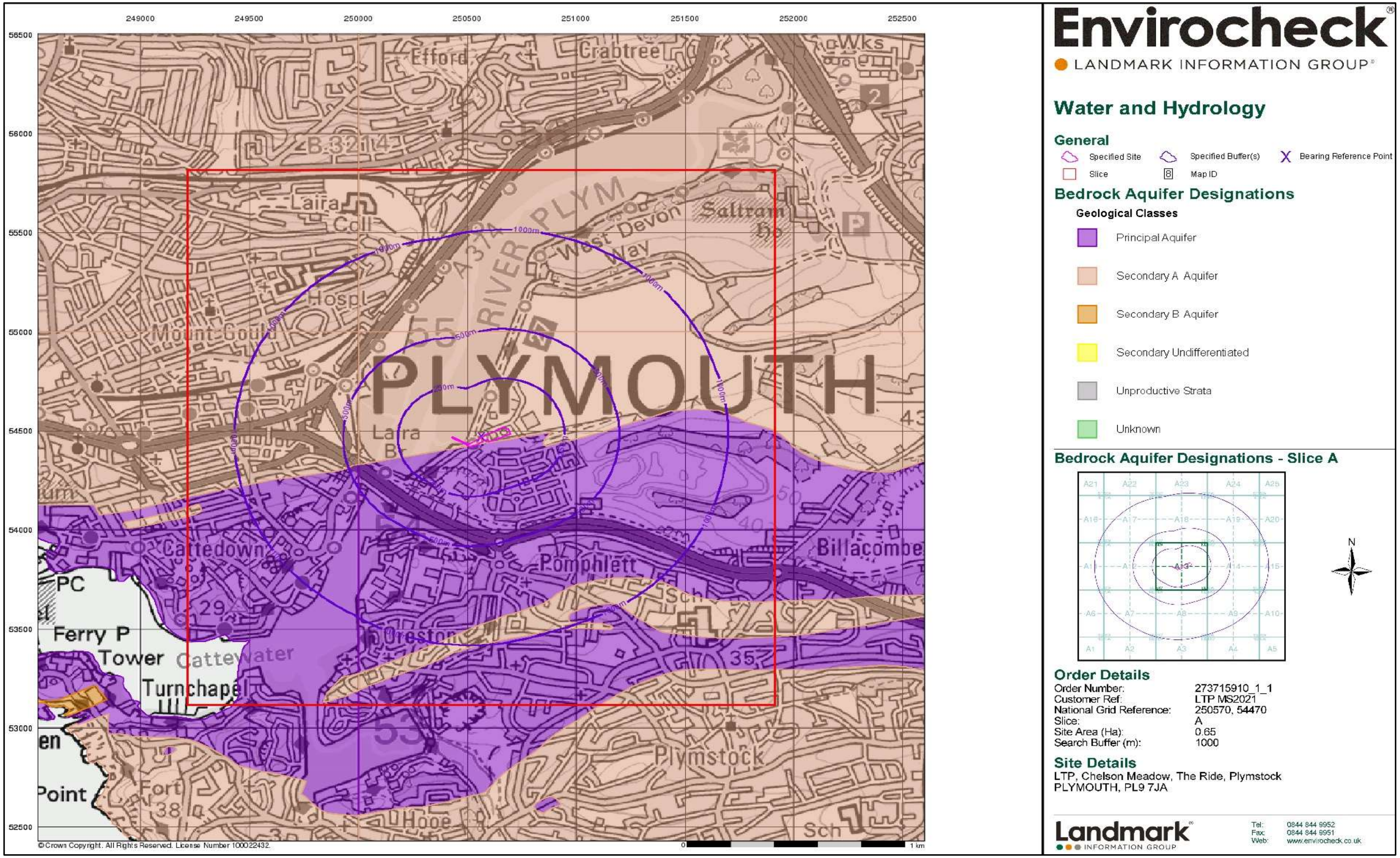


Figure 7.9: Groundwater zones at 250m, 500m & 1000m distance from the LTP permit boundary

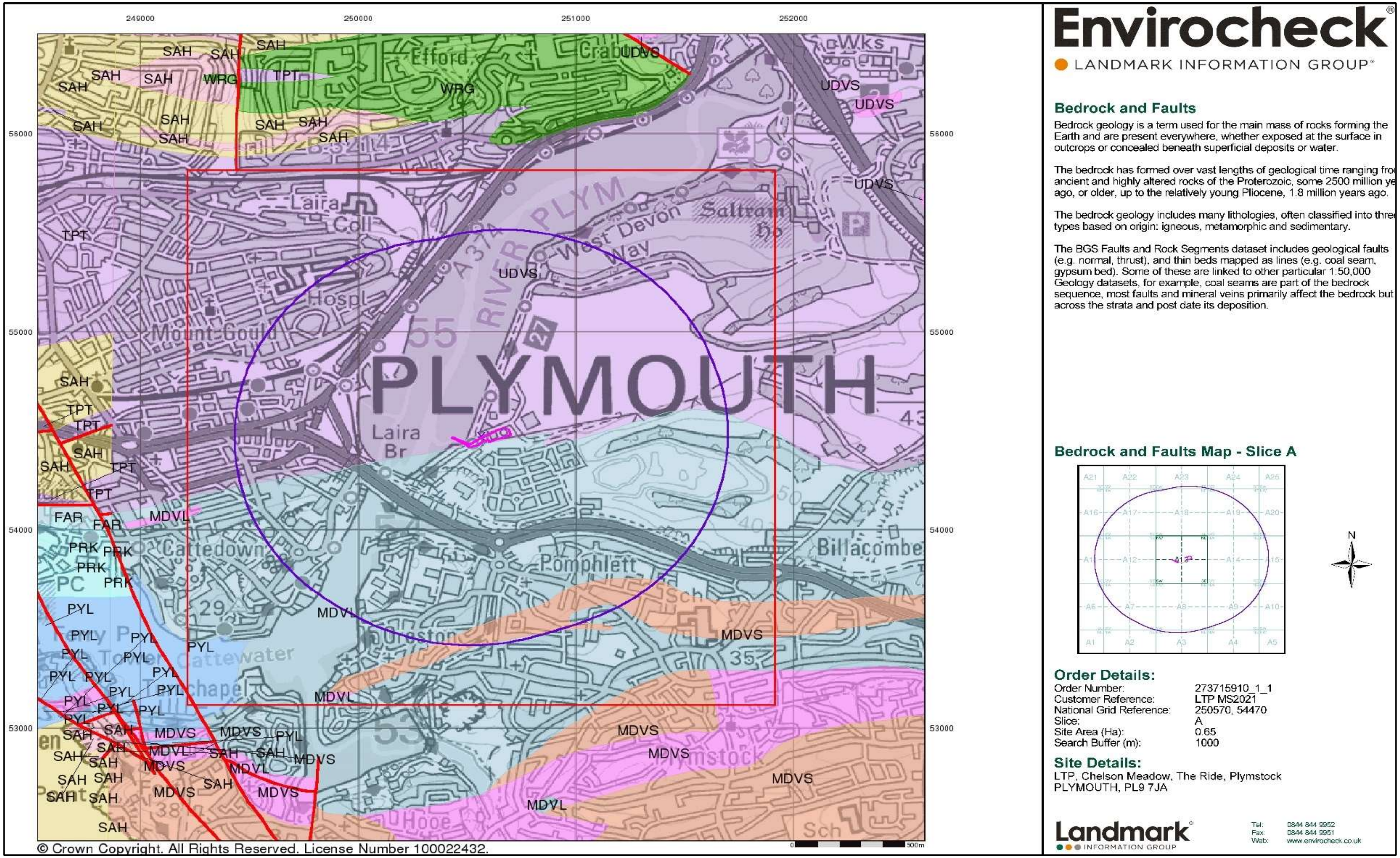


Figure 7.10: Geological bedrock at 250m, 500m & 1000m distance from the LTP permit boundary, 2021, showing prevalence of Upper Devonian Slates

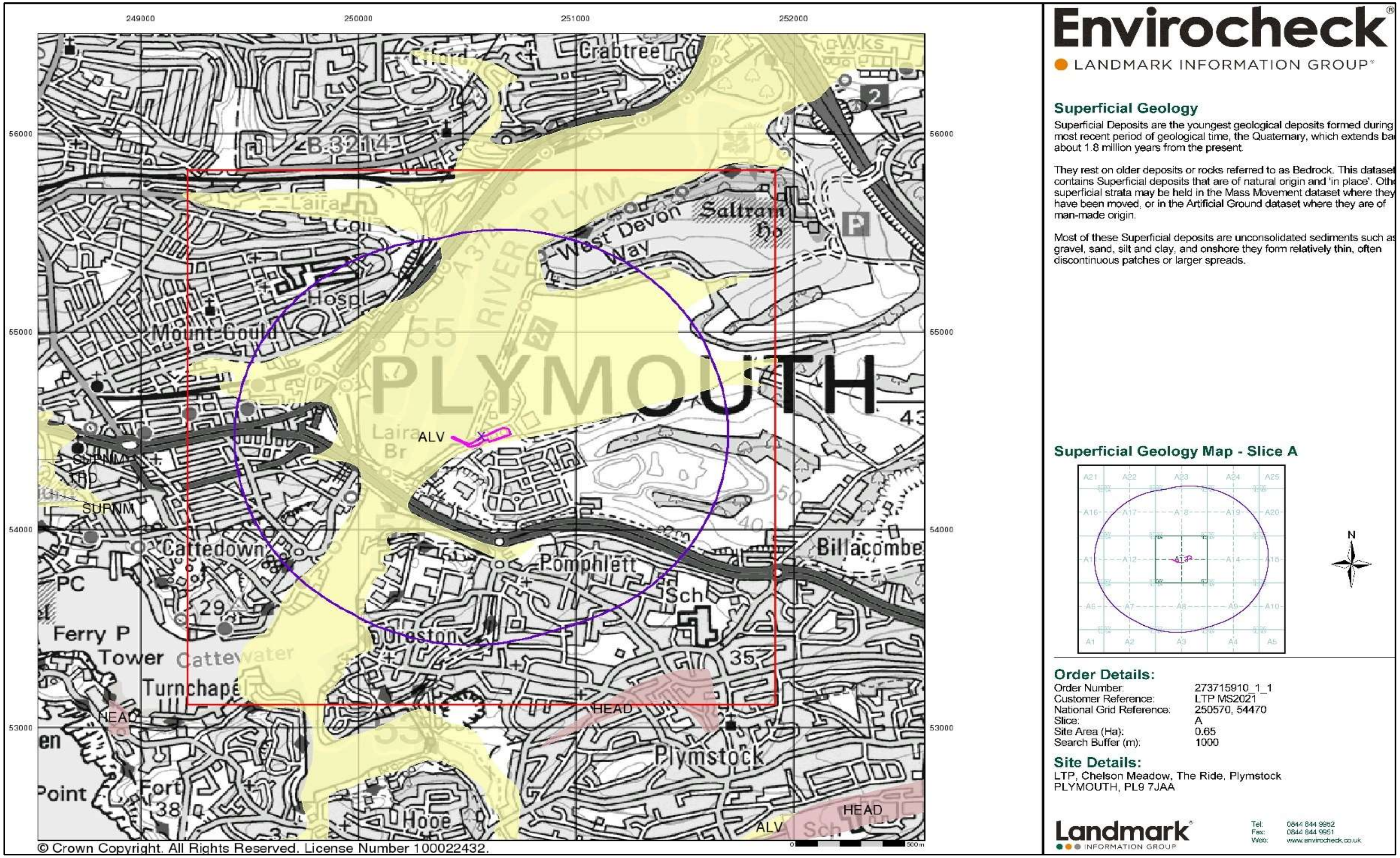


Figure 7.11: Superficial Geology at 250m, 500m & 1000m distance from the LTP permit boundary, 2021, showing prevalence of Tidal River Deposits-Clay & Silt

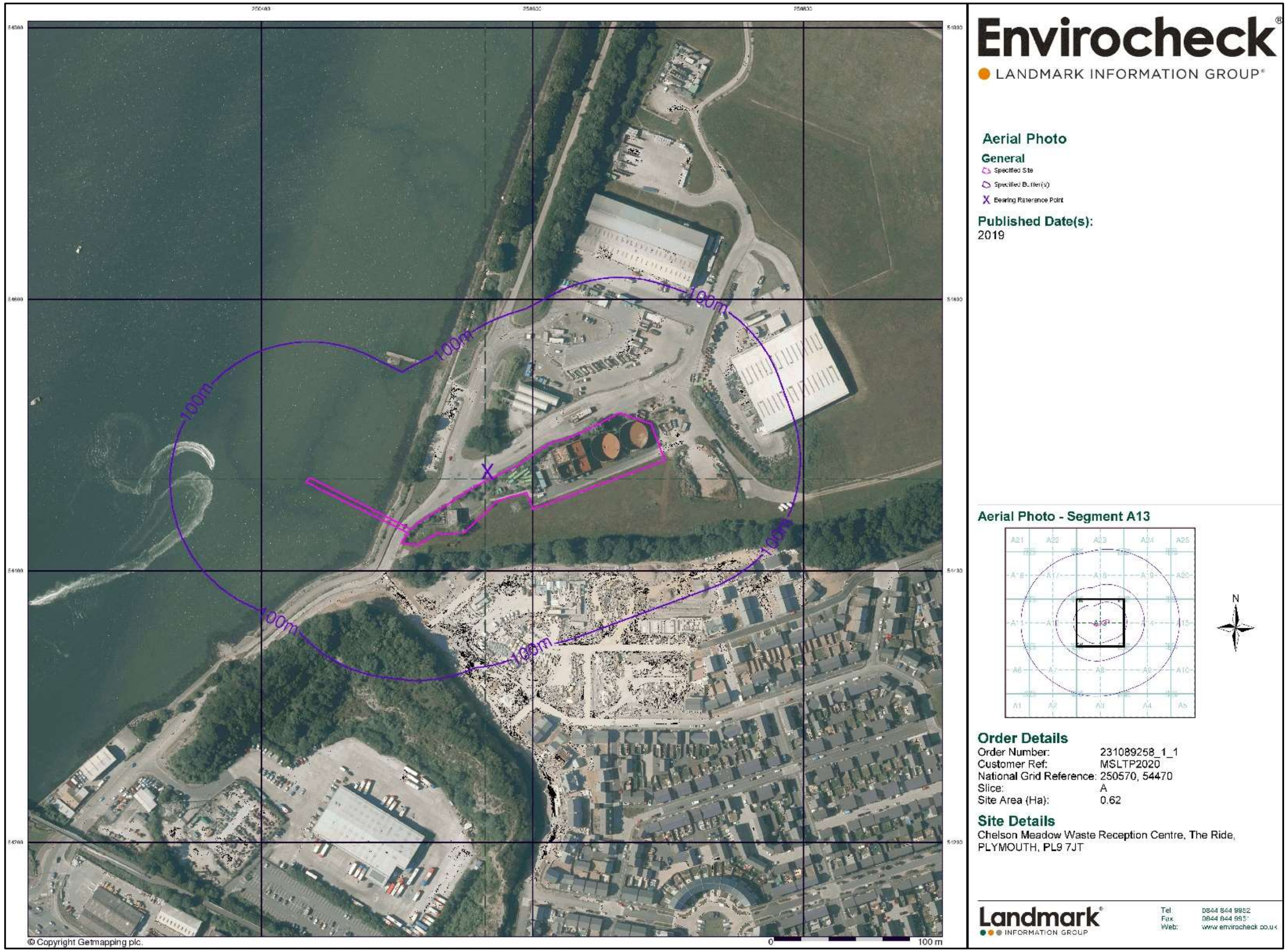


Figure 7.12: Aerial view of LTP (2019) showing sensitive receptors at 100m distance from the permit boundary

7.2 Fugitive emissions of substances

Permit conditions for the LTP specify:

> ***3.2 Emissions of substances not controlled by emission limits***
> *3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.*
> *3.2.2 The operator shall:*
> *(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;*
> *(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.*
> *3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.*

Potential fugitive emissions arising from operations at the LTP are outlined below along with the relevant controls:

<u>Potentially Polluting Leaks and Spillages</u>

The main possible causes of spillage or pollution are hydraulic leaks from mechanical site infrastructure and vehicles using the site or catastrophic failure to contain raw leachate: all efforts will be made to prevent leaks and spills by adherence to the pollution control hierarchy (see Box 7.1).

1. Contain at source
2. Contain close to source
3. Contain on the surface
4. Contain in the drainage system
5. Contain on the watercourse.

Box 7.1: Essential elements of the Pollution Control Hierarchy

Any spillages of e.g. hydraulic fluids etc. will be ameliorated immediately by adherence to Emergency Procedure 1 (Appendix H of LMS). Hydrocarbon contamination of any origin is highly detrimental to the health of the biological treatment system and would always be treated as an emergency. Absorbent granules are available within the LTP; spill kits are stored in the adjacent HWRC and staff are trained in their usage.

To minimise the risk of hydraulic/fuel spillages and leakages, mechanical site infrastructure is checked and serviced regularly. In addition, daily checks of all LTP operations are monitored. Any defects that could result in a pollution incident will be recorded and remediated.

The site drainage is ultimately linked to the LPS so that any failure of the LTP to contain raw leachate would result in a return of the liquor to the system that feeds STOR1. There is one oil interceptor (Figures 7.13 & 7.14) that captures drainage from the haul road and other hard surfaces before it enters the LPS drainage system, which should be sufficient to contain a major raw leachate containment failure or a major fuel/hydraulic fuel leakage. Surface water drainage from the PLS car park and adjacent haul road into the main waste facility enters the wet well via an oil interceptor. The wet well is the reception point for leachate draining from STOR1 and destined for the SBRs. Both oil interceptors are inspected regularly and have a cleaning programme, which involves hiring a tanker to remove the contents.

Control of Litter

The site does not generate wind-blown litter and any such material is likely to be derived from the adjacent waste facilities or public amenities. General on-site waste should be contained in the litter bins provided outside the control room. If material is found within the permit boundary it will be treated as a priority and collection commenced immediately and continued until all material has been removed. All incidents will be noted in the site diary.

Dust

Dust can only be caused by vehicles using the site and there would be negligible risk of sufficient dust being generated to be deemed a nuisance or to move beyond the site boundary. The site has pressurised hoses available to be used on engineered surfaces if required, and visual monitoring will be used at the site boundary if required. The results of any dust monitoring will be recorded in the site diary. Any other measurements will be forwarded to the EA in an agreed format and at agreed intervals as detailed in the Permit.

Foam

The blowers create a bio-foam from vigorous aeration of the liquor. It is possible for wind to carry foam beyond the SBR and permit boundary. There is an automatic de-foaming process which should administer anti-foaming chemical (Foamfree) once wind speed reaches 12 miles/hour as detected by an anemometer on the top of the SBR walkway (Plate 7.1). If the automatic system fails, the anti-foam can be decanted manually into each SBR from the walkway.

The level of liquor in an SBR is normally high so dispersion of foam by wind is quite likely if the automatic system is not operational and wind speed is high. Electrical engineers are present regularly to service all LTP infrastructure.

Plate 7.1: Automatic defoaming system, dedicated cabinet, LTP 2021

7.3 Odour Management Plan

Permit conditions for the LTP specify:

> *3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.*
> *3.3.2 The operator shall:*
>> *(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;*
>> *(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.*

Receptors
Potential receptors are shown on Figure 7.2 and are: users of the Ride, the adjacent operatives and users of the wider waste facility and residents of the housing development to the south. The adjacent waste facility accepts a range of waste types, some of which may generate odour. It is highly unlikely that LTP operations would generate significant odour because the leachate is usually very dilute.

Potential receptors are shown on Figure 7.2 and are: users of the Ride; the adjacent operatives and users of the wider waste facility; and residents of the housing development to the south. The adjacent waste facility accepts a range of waste types, some of which may generate significant odour.

Sources
The risk of nuisance from the LTP is very low. It is highly unlikely that LTP operations would generate significant odour because the leachate is usually very dilute. Odour could potentially occur if anoxic conditions developed in an SBR, but continuous monitoring of the treatment process would identify an aeration problem well before anoxia could establish. When concentrated sludge is being removed from the bottom of an SBR, physical disturbance may release minor odour. However, the base of the SBR is 6m below the top of the structure and the cleaning operation may occur once or twice a year at the most.

Import of mixed liquor (bacterial re-seeding) from a wastewater treatment plant has the potential to generate odour. Decanting from the tanker into an SBR takes a maximum of 30 minutes, during which time mild sewage odour may be detected over a short period of time. This process may occur once or twice a year.

Controls
Site operations are monitored constantly and the composition of raw and treated leachate is analysed weekly. There is no history of odour at the site either since 1996 when the SBR plant was first built or following upgrading in 2012.

Monitoring

Monitoring will be used to substantiate any public complaint, or fulfil any statutory or in-house request, and to provide additional information to check the source of the odour as well as any remedial action necessary. Olfactory monitoring of aerial emissions from the site shall be carried out by a competent person, adopting the intensity scale proposed in Table 7.2 for a period of ten minutes at least twice daily at the site boundary down-wind of the LTP, or from the location of any complaint. Results will be recorded in the site diary, including wind direction and strength.

Table 7.2 Odour Intensity Scale for Olfactory Monitoring

Intensity	Description
1	No detectable odour
2	Faint odour (barely detectable, need to stand still and inhale facing into the wind)
3	Moderate odour (odour easily detected whilst walking & breathing normally)
4	Strong odour

Any odour intensity greater than 3 will be deemed unacceptable, providing the source of the odour can be confirmed as the LTP. If so, an on-site odour inspection will take place to trace back the source of the odour and all control procedures outlined above will be verified.

7.4 Noise and vibration

Permit conditions for the LTP specify:

> *3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.*
> *3.4.2 The operator shall:*
> > *(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;*
> > *(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.*

The site has a high potential to generate noise because operations are continuous and require mechanical infrastructure. Most noise is generated by the blowers, which are at the side of the SBR opposite the residential area, especially during the start-up process. When large volumes of leachate are being generated and treated, the blowers are on more frequently and more SBRs are in use.

The EA have stipulated that the blowers, which were installed in 1996 more than 20 years before the residential development commenced, must be replaced to reduce noise or other mitigation provided. PCC are investigating the options for upgrading/replacing the blowers, which should be completed by the end of 2021.

Mitigation is outlined below.

Control of Noise
Mitigation of noise emissions from the site is achieved by:
- The fitting of silencers to relevant mechanical infrastructure; install blowers that generate less noise;
- Maintaining and servicing all relevant infrastructure regularly to ensure that noise emissions are minimised, in compliance with all relevant legislation;
- Time, as far as possible, non-routine operations with the potential to create noise (tanker and crane movements) within the central section of the working day unless circumstances prevent.

Noise Monitoring
Noise monitoring will be carried out by the operator if requested, utilising an integrating sound level meter, to ensure that noise levels from site operations shall not exceed the existing background level at the noise sensitive receptors closest to the site. Any measurement and assessment shall be made according to BS4142:2014 + A1:2019. A record of all complaints and the actions taken in response will be kept in the site diary.

7.5 Pests & Non-Native Invasive Plant Species

Gulls roost on the edges of the STORs temporarily during the day and sometimes swim on the liquor. The nuisance is not considered sufficient to warrant the deployment of deterrents. The gulls are only at the site because of the scavenging opportunities offered by the wider waste facility, and the nearby estuary.

Control Measures
If flies, or other such insects posing a nuisance, are problematic insecticides offering rapid knock-down and long-term treatment will be used. A specialist contractor will inspect the site at weekly intervals during the summer months, or alternative appropriate frequency at other times, if required.

Inspections for rats and other pests will occur if required. If evidence of rats or other pests is found, appropriate controls will be applied.

Records of any control methods applied will be kept in the site diary.

7.6 Control of Mud and Debris

The ERA (see Appendix H of the LMS) has identified only a low risk that mud could be transferred beyond the permit boundary.

7.7 Off-Site Incidents

Figures 7.13-7.16 show an overview of the drainage serving the LTP. Surface water drains for part of the adjacent waste facility, including the haul route into the Chelson Meadow waste facility and part of the surface water drainage from the HWRC and MRF, are linked to the LTP drainage system. Each of the linked facilities has its own Management System for its individual permit, with Emergency Procedures to tackle potential pollution incidents. In the event of an incident that could potentially cause uncontrolled substances to enter the drainage system, the Supervisors/Managers of these facilities will contact the LTP operator and Manager to identify the risk to the LTP. In the worst-case scenario, pumps moving leachate can be turned off to prevent contaminated liquid entering the STORs and SBRs.

Because the drainage system of the LTP is linked to the wider site there is the potential for off-site leaks/spills or firewater to pass into the treatment system. The PLS car park is at low risk of flooding from the river (Box 7.7.1) or surface water but the risk may alter as a result of climate change and rising sea levels/tidal range.

Box 7.7.1: Excerpt from Environment Agency flood risk map showing low of risk of flooding (between 0.1% and 1% each year) from the river Plym and affecting the pump lifting station car park.

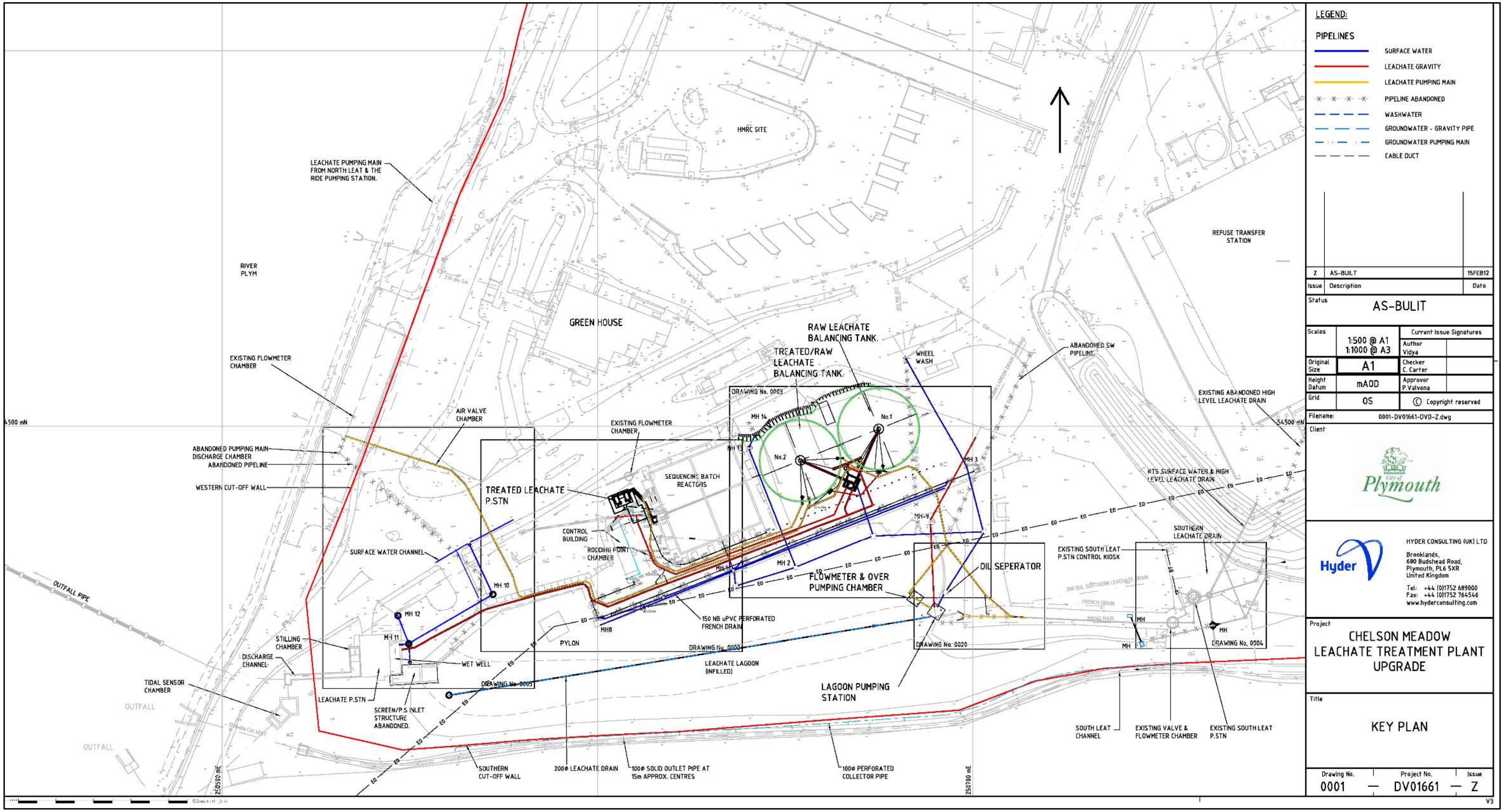


Figure 7.13: Drains and conduits within the LTP, 2021

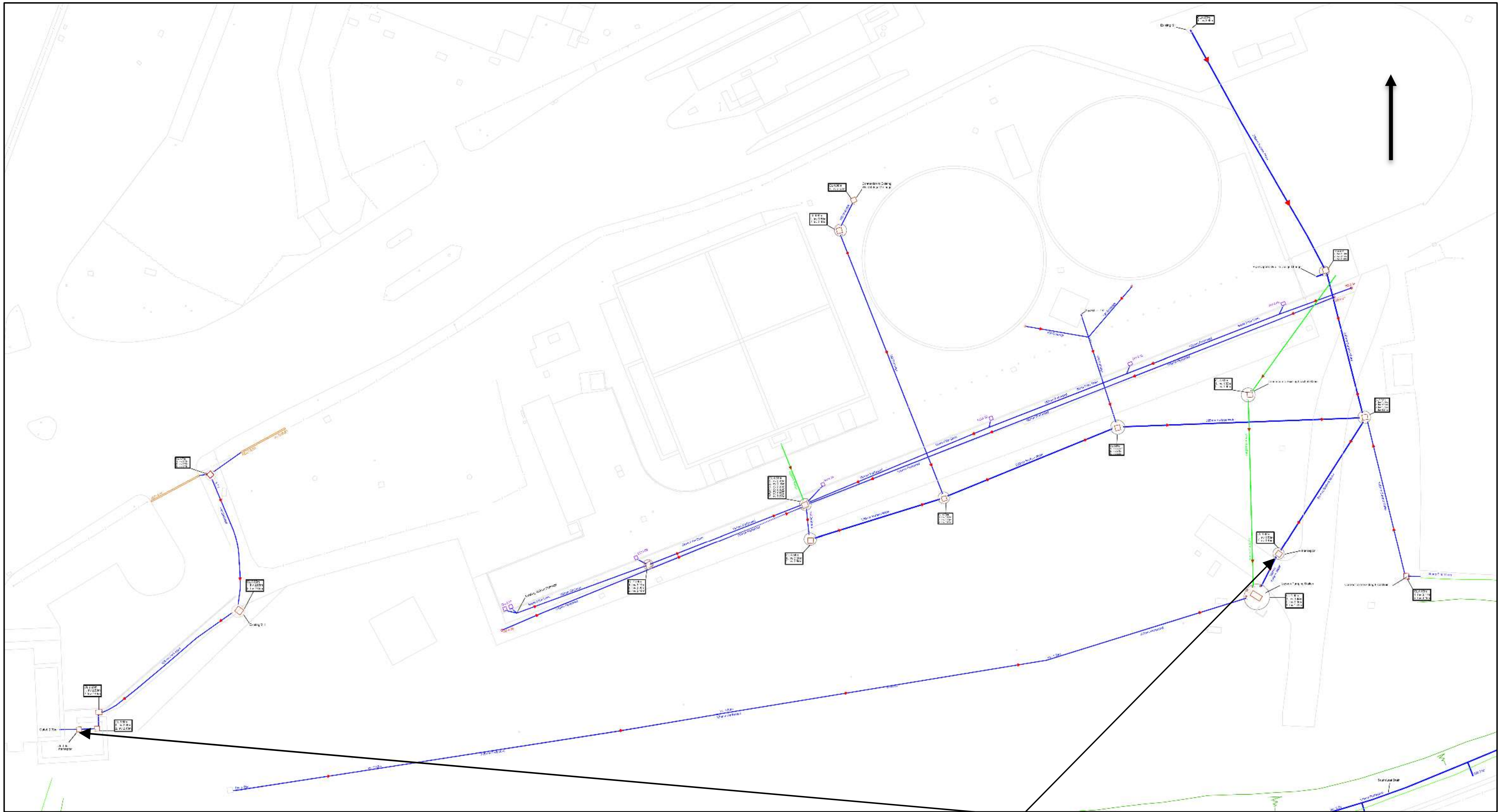


Figure 7.14: LTP surface water drainage layout, showing locations of the two oil interceptors

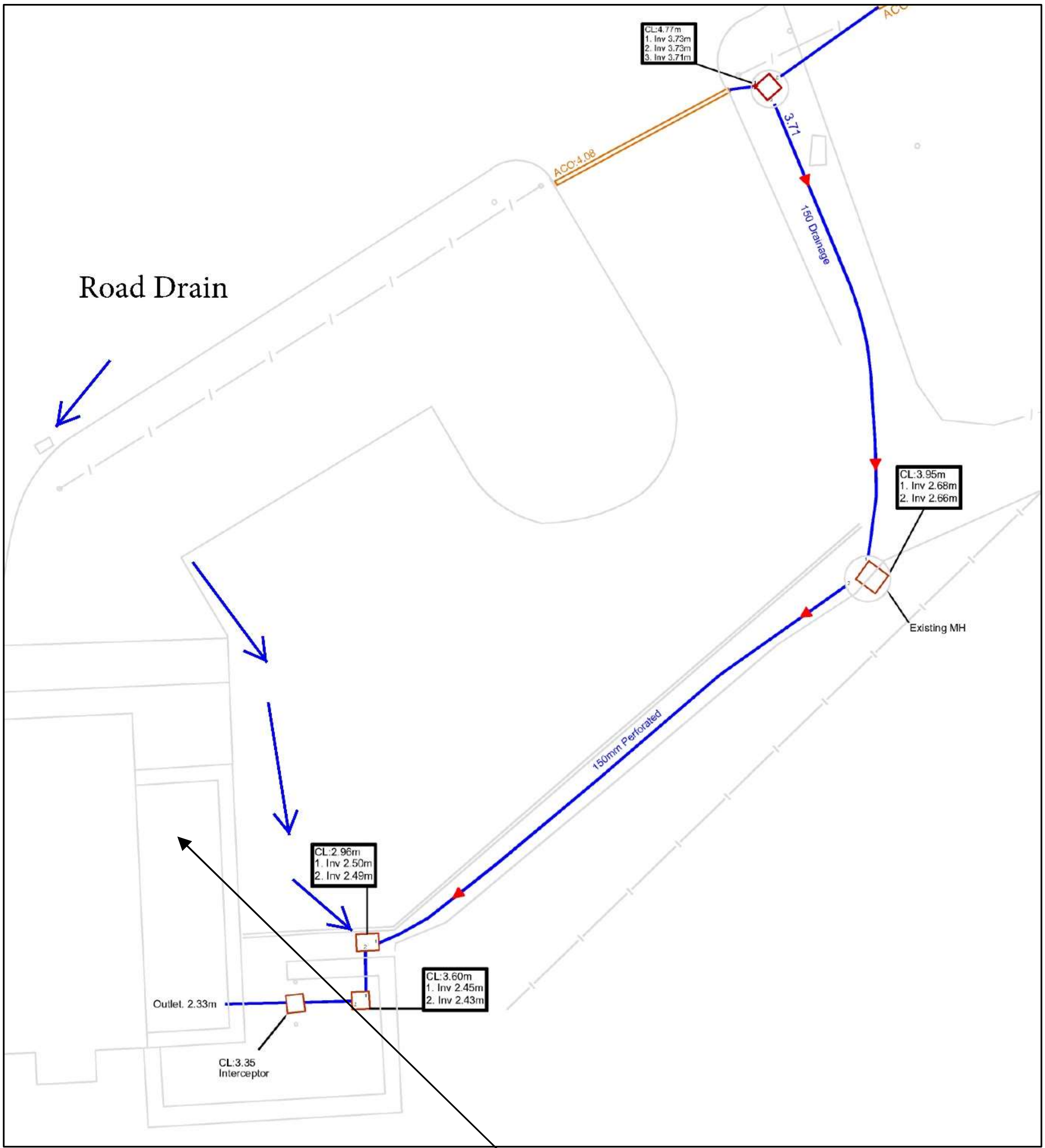


Figure 7.15: Pump Lifting Station car park surface water drainage, entering the oil interceptor serving the wet well

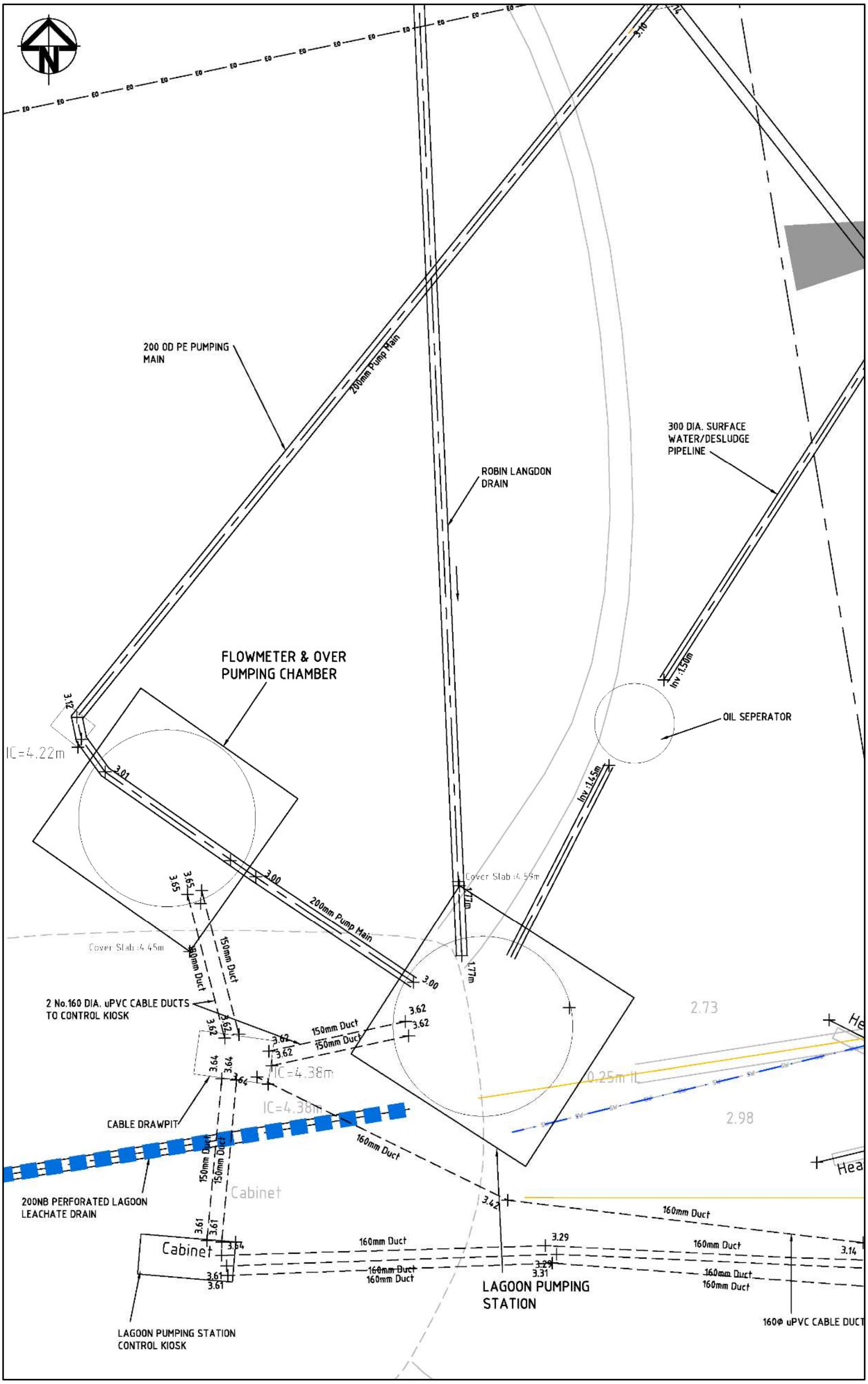


Figure 7.16: Oil interceptor serving the surface water drainage arising around the SBRs and STORs, plus a wider area off-site

7.8 Fires on Site

There is a separate DSEAR risk assessment covering the LTP permit area and all the pumping stations. Fires may originate from: flammable materials entering the site, arson and poor infrastructure maintenance. On its own leachate has no flammable properties but it can contain dissolved methane.

For fire to occur it is necessary to have three elements, fuel, heat (or ignition) and oxygen, come together at the same time, in the correct amount. This is known as the fire triangle (Figure 7.17).

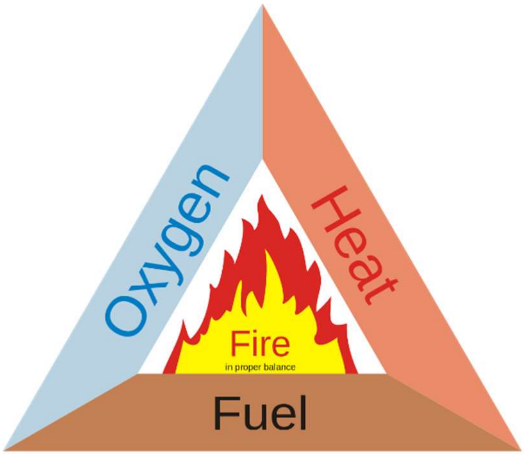


Figure 7.17: Fire triangle

Examples of the three elements that could combine to create fire at the LTP are:

Identify sources of ignition at the LTP

- Arson
- Unintentional sources e.g. discarded cigarette ends/fireworks
- Over-heating of mechanical plant and associated electrical equipment
- Bursting of hydraulic pipe from tankers etc.
- Operation of welding equipment or similar during maintenance
- Electrical items within the MCC, e.g. computers, heaters and other portable electrical equipment
- Electrical equipment within the various pumping station cabinets and within the PLS

Identify sources of fuel

- Fuels – fuel in operators/contractor's vehicles
- Poor housekeeping (dust/litter accumulation)
- Paperwork within MCC and PLS
- Welding gases or similar (maintenance)
- Chemicals/lubricants used by contractors
- Damage to COSHH cupboard

Identify sources of oxygen

- General atmosphere

There is no history of fire at the LTP.

Should a fire occur operatives on site will tackle the event with a water hose or fire extinguishers if feasible, otherwise the Fire & Rescue Service will be summoned.

Emergency Procedure 2 (Appendix H of the LMS) should be adhered to for all site fires. A no smoking policy is enforced throughout the site and no fuel is stored on site.

Fire prevention requires the control of sources of ignition; the containment of fuels; and continued awareness and vigilance to ensure that control and containment are ongoing.

The following measures are in place at the LTP to ensure fire prevention:

Controlling ignition sources

- Maintenance of the site perimeter and securing gates out of operational hours
- Use of CCTV for the wider waste facility, both during and outside hours of operation 7 days a week.
- Daily checks of key infrastructure with problems recorded in the site diary
- All infrastructure subject to programmed preventative maintenance and servicing as per manufacturer's recommendation
- End of day visual inspection of site prior to securing site gates
- No smoking policy throughout the site with appropriate site signage
- PAT for all portable electrical equipment
- All electrical work at the site is undertaken according to NICEIC Regs by a suitable competent Electrical Contractor; this includes periodic inspection of all site wiring to industry Code of Practice, i.e. annual visual inspection; full inspection every 3-5 years. Damaged wiring etc. is reported, recorded in the site diary, and repaired appropriately.
- Only authorised electrical equipment allowed and used on site. No industrial heaters are used at the site.
- Welding/torch cutting to be undertaken by trained operatives only and with a hot work permit using a fire watcher and providing appropriate fire extinguishers in the vicinity; no hot works will be performed within 6m of combustible/incompatible materials; site signage will be used to reinforce the permit to work policy for welding.

Contain sources of fuel

- Contain potentially polluting leaks and spillages
- Regular removal of litter from the site
- Paperwork mostly stored within filing cabinets, paperwork and furniture kept clear of portable heaters
- Only approved welding gas cylinders to be used by trained personnel.
- Ensure COSHH cupboard is secure and contents stored appropriately with suitable accompanying list

Fire Control and Elimination Procedures

No material is burnt within the boundaries of the site. All spontaneous fires will be treated as a potential emergency and dealt with accordingly within appropriate time scales, depending on the location of the fire. If a fire occurs, the area around the fire will be cordoned off and public access will be prevented within that area until the fire is extinguished.

Fire Fighting Equipment and Materials

Fire-fighting equipment of a suitable type is kept within the MCC, pumping station electrical cabinets and PLS. Equipment is kept in good condition, unobstructed and serviced at least once a year by a competent person. There is mains water at the site.

Training

The TCM and all site staff have undertaken a Fire Safety Awareness Training Course.

Recording and Reporting Procedures

If a fire is discovered at the LTP the EA will be informed as soon as is practicable of the incident, which will be recorded in the site diary. In all cases the TCM will submit a detailed account of any incident of fire to the EA if required. The Fire & Rescue Service will be called or informed whenever appropriate.

7.9 Complaints

All complaints received at the site will prompt the following actions:

- The TCM will log the details of the complaint as soon as possible including the location, nature, time and date it occurred.
- For all complaints, reference will be made to the site activities at the time of the complaint via the site diary. Further on-site investigations will be conducted to determine whether any abnormal operations are/were occurring:

  Are there any unusual characteristics evident in the treatment process or associated activities (e.g. SBR cleaning)?
  Are/were treatment processes occurring as per normal?
  Are/were there any unusual activities taking place off-site?

- Once the cause of a valid complaint has been established, appropriate actions will be implemented immediately, and actions devised to prevent a recurrence of the incident.
- If practicable feedback will be given to complainants on the findings of these investigations and a summary will be provided of any remedial measures taken to rectify problems.

7.10 Monitoring

Permit conditions for the LTP specify:

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring and any other actions specified in the following tables in schedule 3 to this permit:

(a) Point source emissions specified in table S3.1.

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3, tables S3.1 unless otherwise agreed in writing by the Environment Agency.

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to water (other than sewer) – emission limits and monitoring requirements

Emission point Ref. & Location	Parameter	Source	Limit (incl unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method Note 1
W1 Final discharge point - as marked on site plan in Schedule 2 discharge to Plym Estuary	Total Suspended solids	Leachate treatment plant	75 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	BS EN 6068-2.54:1996 or other method as agreed in writing with the Environment Agency
	Biochemical oxygen demand		10 mg/l			BS EN 1899-1: 1998 or other method as agreed in writing with the Environment Agency
	Ammoniacal nitrogen, expressed as N		10 mg/l			BSEN ISO 11732:1997 or other method as agreed in writing with the Environment Agency
	Direct toxicity assessment		-	-	Annually	In accordance with Environment Agency S5.03 Guidance for the treatment of landfill leachate – 2.10.2 Emission monitoring.
	Flow		-	-	Continuous	MCERTS or other method as agreed in writing with the Environment Agency
Note 1: Sample point for monitoring marked as 'Sample Point W1' on site plan in Schedule 2 discharge to Plym Estuary						

Monitoring is undertaken weekly for the outfall, STOR1 and the operational SBRs (when reacting and when the settling period is complete). Samples are collected and transported to a collection point for the contracted analytical laboratory.

Samples for monitoring for a larger suite of parameters are collected monthly for the outfall, STOR1 and the two inputs to STOR1, which are collected from taps and are for the Ride and North Leat pumping stations (coded '75L'); and the South Leat and LPS (coded '90L').

There is an annual assessment of direct toxicity of the treated leachate, for fish and benthic communities.

Former List 1 and List 2 analyses are performed annually for the outfall and STOR1.

Appendix I contains the Monitoring protocol for weekly sampling at the LTP.

8.1 Records

Permit conditions for the LTP specify:

> *4.1.1 All records required to be made by this permit shall:*
> *(a) be legible;*
> *(b) be made as soon as reasonably practicable;*
> *(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and*
> *(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made.*
> *4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.*

All records that are required to be made under the conditions of the Permit, LMS and planning conditions are maintained and kept secure from, loss, damage or deterioration. Records are kept on paper in a secure cabinet/cupboard and on computer with a back-up copy; they are made available for inspection at the MCC if required by an authorised officer of the EA or PCC.

Site Diary
A site diary/monthly inspection form is kept secure and is available for inspection at the MCC if required by an authorised officer of the EA. The following significant events are recorded in the site diary or monthly inspection sheets within 24 hours of occurrence by the TCM or other operatives:

1. daily pump readings
2. STOR1 & STOR2 liquor heights
3. flow meter reading from PC and in-situ instrumentation
4. kW/h reading
5. samples collected for monitoring
6. persons on site
7. construction work
8. maintenance
9. breakdowns
10. emergencies
11. site inspections and consequent actions carried out by the operator
12. severe weather conditions
13. complaints about the site operations and actions taken
14. environmental problems and remedial actions

8.2 Reporting

Permit conditions for the LTP specify:

> *4.2.1 The operator shall send reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.*
> *4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31st January each year or such other date as may be agreed in writing by the Agency, with the exception of 4.2.2(b) that must be provided by the end of February each year. The report(s) shall include as a minimum:*
>
> > *(a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this activity and any agreed amendments thereto. The review will include written descriptions of the improvements made to operational performance during the year, action plans developed and planned improvements for the coming year;*
>
> *(b) the annual production/treatment set out in schedule 4, table S4.2;*
> *(c) the energy consumed at the site, reported in the format set out in schedule 4, table S4.3*
> *4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:*
>
> > *(a) in respect of the parameters and emission points specified in schedule 4, table S4.1;*
> > *(b) using the forms specified in schedule 4, table S4.4 or other reporting format as agreed in writing with the Environment Agency; and*
> > *(c) giving the information from such results and assessments as may be required by the forms*
>
> *specified in those tables.*
> *4.2.4 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.*
> *4.2.5 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.*

All reports and notifications required by the Permit (see Schedule 4 overleaf) are sent to the EA using the contact details supplied in writing by the EA.

A quarterly waste return is issued to the EA and a record of all weekly records of biological oxygen demand, suspended solids (105ºC) and ammoniacal nitrogen for the outflow is returned quarterly. There is an annual report of volume of leachate treated, water usage for the year, electricity usage for the year, any off-site outputs (e.g. sludge exports).

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data

Parameter	Reporting period	Period ends
Point source emission to water (other than sewer) As specified by schedule 3, table S3.1	Every 3 months	31 March, 30 June, 30 September, 31 December

* - where the reporting period is 12 months, you may submit this information as part of the ‘annual report’ required by condition 4.2.2.

Table S4.2: Annual production/treatment

Leachate: Disposed of off-site; Recirculated into the waste mass. Accepted from offsite for treatment	Cubic metres/year

Table S4.3 Performance Parameters

Parameter	Frequency of assessment	Annual total	Unit
Energy used	Annually		MWh of electricity or natural gas

Table S4.4 Reporting Forms

Media/parameter	Reporting Format	Date of Form
Controlled water	Form Water 1 or other reporting format to be agreed in writing with the Environment Agency	15/03/2007
Waste Return	E-waste Return Form	-

8.3 Notifications

4.3.1 In the event:

(a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident; and

(iii) take the measures necessary to prevent further possible incidents or accidents.

(b) of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency; and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time.

(c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

Operation of the LTP will conform to the requirements stated above.

Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Plymouth City Council

Chelson Meadow Leachate Treatment Plant
Chelson Meadow Landfill Site
Plymstock
Plymouth
Devon
PL9 7JA

Variation application number

EPR/CP3731LZ/V004

Permit number

EPR/CP3731LZ

Chelson Meadow Leachate Treatment Plant
Permit number EPR/CP3731LZ

Introductory note

This introductory note does not form a part of the notice.

The following gives notice of the variation and consolidation of this environmental permit. We have issued this variation to consolidate the original permit and subsequent variations and to update some of the conditions following a statutory review of permits in the landfill sector that includes standalone leachate treatment plants. We have also converted the permit into the current EPR permit format using modern conditions.

The Environment Agency has a duty, under the Environmental Permitting (England and Wales) Regulations 2016, regulation 34(1), to periodically review permits. As a result of that review we have identified a number of necessary changes we must make to the permit to reflect current legislation and best practice.

Schedule 1 to this notice summarises the changes we have made to this permit.

The status log sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application CP3731LZ (EPR/CP3731LZ/A001)	Duly made 18/07/2006	
Permit CP3731LZ determined (EPR/CP3731LZ/A001)	28/03/2007	Permit issued to Plymouth City Council
Variation Application EPR/CP3731LZ/V002	Duly made 10/10/2011	Application to replace lagoon with above ground storage tank, installation of new pump, discharge conditions and increase waste limit to 650,000 te/annum
Variation EPR/CP3731LZ/V002 determined	12/12/2011	
Agency variation EPR/CP3731LZ/V003 determined	11/02/2014	Environment Agency initiated variation to implement the changes introduced by IED
Environment Agency Landfill Sector Review Permit reviewed Variation determined EPR/CP3731LZ/V004 Permit EPR/CP3731LZ Billing/PAS Ref: NP3931YW	15/09/2017	Varied and consolidated permit issued in modern condition format

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2016 varies and consolidates

Permit number

EPR/CP3731LZ

Issued to

Plymouth City Council (“the operator”)

of

The Civic Centre
Plymouth
Devon
PL1 2AA

to operate a regulated facility at

Chelson Meadow Leachate Treatment Plant
Chelson Meadow Landfill Site
Plymstock
Plymouth
Devon
PL9 7JA

to the extent set out in the schedules.

The notice shall take effect from 15/09/2017

Name	Date
Philip Lamb	**15/09/2017**

Authorised on behalf of the Environment Agency

Schedule 1

All conditions have been varied by the consolidated permit as a result of an Environment Agency initiated variation. The following table summarises the latest changes to the permit template, however your permit may contain more changes than this where your permit has not been varied to recent template conditions.

Condition	Description of change
1.4	Generic condition to reflect the requirements of the Waste Framework Directive.
2.5	Condition added to ensure that all plant, equipment and pipe work on site is installed to an appropriate standard, consistent with the requirements of a landfill permit with an associated leachate treatment plant
3.1.3	Condition added for all installations subject to the Industrial Emissions Directive (IED) for period monitoring of soil and groundwater.
4.2.2	Amended to ensure that information on ‘annual production/ treatment’ (Schedule 4, Table S4.2) is provided in February each year.
4.2.2(a)	Text expanded to clarify the details we require in a performance report.
4.3.1	Generic notifications condition added.
Schedules	
Table S1.1	Activity references amended to reflect changes introduced by Industrial Emissions Directive (2010/75/EU).
Table S4.1	Amended to only require regular reports of information that relate to compliance limits.
Table S4.3	Amended to include natural gas as an energy source for consistency with other sectors.
Schedule 6	Definitions added to clarify meaning of: Exceeded Hazardous substance Previous year

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/CP3731LZ

This is the consolidated permit referred to in the variation and consolidation notice for application **EPR/CP3731LZ/V004** authorising,

Plymouth City Council (“the operator”),

of

The Civic Centre
Plymouth
Devon
PL1 2AA

to operate an installation at

Chelson Meadow Leachate Treatment Plant
Chelson Meadow Landfill Site
The Ride
Plymstock
Plymouth
Devon
PL9 7JA

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Philip Lamb	**15/09/2017**

Authorised on behalf of the Environment Agency

1. Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Energy efficiency

1.2.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) Review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) Implement any appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall:

(a) take appropriate measures to ensure that waste produced by the activities is avoided or reduced, or where waste is produced it is recovered wherever practicable or otherwise disposed of in a manner which minimises its impact on the environment;

(b) review and record at least every four years whether changes to those measures should be made; and

(c) take any further appropriate measures identified by a review.

2. Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1, table S1.1 (the “activities”).

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation (“plan”) specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.3.3 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1, table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.

2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.5 Engineering

2.5.1 No construction of infrastructure shall commence until the operator has submitted relevant construction proposals or a written request to use previous construction proposals to the Environment Agency and the Environment Agency has confirmed that it is satisfied with the construction proposals.

2.5.2 The construction of the infrastructure shall take place only in accordance with the approved construction proposals unless:

(a) any change to the approved construction proposals would have no impact on the performance of any element of the design; or

(b) a change has otherwise been agreed in writing by the Environment Agency.

2.5.3 The operator shall submit a CQA Validation Report within four weeks of the completion of the construction of the relevant infrastructure or other time period agreed in writing with the Environment Agency.

2.5.4 Where pollution controls are immediately necessary to prevent an incident or accident, then conditions 2.5.1 and 2.5.2 do not apply and the relevant infrastructure may be constructed, provided that the construction proposals are submitted to the Environment Agency as soon as practicable.

2.5.5 For the purposes of conditions 2.5.1 and 2.5.3 the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the relevant construction proposals or CQA Validation Report, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.5.6 Where the Environment Agency has required further information under condition 2.5.5(b), the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the further information, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.6 Waste acceptance

2.6.1 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2, table S2.1; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

3. Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 The limits in schedule 3 shall not be exceeded.

3.1.2 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3, table S3.1.

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on systematic appraisal of the risk of contamination

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring and any other actions specified in the following tables in schedule 3 to this permit:

(a) Point source emissions specified in table S3.1.

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3, tables S3.1 unless otherwise agreed in writing by the Environment Agency.

4. Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31st January each year or such other date as may be agreed in writing by the Agency, with the exception of 4.2.2(b) that must be provided by the end of February each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this activity and any agreed amendments thereto. The review will include written descriptions of the improvements made to operational performance during the year, action plans developed and planned improvements for the coming year;

(b) the annual production/treatment set out in schedule 4, table S4.2;

(c) the energy consumed at the site, reported in the format set out in schedule 4, table S4.3

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4, table S4.1;

(b) using the forms specified in schedule 4, table S4.4 or other reporting format as agreed in writing with the Environment Agency; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.2.5 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.3 Notifications

4.3.1 In the event:

(a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident; and

(iii) take the measures necessary to prevent further possible incidents or accidents.

(b) of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency; and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time.

(c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(c) the death of any of the named operators (where the operator consists of more than one named individual);

(d) any change in the operator's name(s) or address(es); and

(e) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.4 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities				
Activity reference	**WFD Annex I and II operations (where applicable)**	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
A1	D8 – Biological treatment of waste	Section 5.4, Part A(1)(a)(i), Biological treatment of non-hazardous waste	Treatment of leachate in a facility with a capacity of >50 tonnes/ day	From receipt of leachate into wet well to discharge of effluent via pipeline into the Plym Estuary. Waste types for treatment to be as specified in schedule 2 table S2.1
Directly Associated Activities				
A2	N/A	-	Temporary storage of waste (leachate)	Waste types form storage to be as specified in schedule 2 table S2.1

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application CP3731LZ	The response to section 2.1, excluding 2.1.2 box 4 (disposal), 2.2, excluding 2.2.14, 2.2.15 and 2.2.20 and 2.10 in the application.	18/07/2006
Variation Application EPR/CP3731LZ/V002	Table 3 in Section 3 of Part C3 of the application document in response to section 3a – technical standards. The Risk Assessment submitted as part of the application stating improvements will be considered alongside ’Guidance for the Treatment of Landfill Leachate’, Integrated Pollution Prevention and Control (IPPC) S5.03.	10/10/2011
Additional information	*‘Chelson Meadow Leachate Treatment Plant: Interim Report’,* detailing LTP operations and discharges on falling tide.	08/11/2011

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The Operator shall submit to the Environment Agency for approval written proposals for the installation of replacement aeration blowers which service the treatment tanks at the installation. The proposals shall include full details of the design and specification of the proposed aeration blowers; a timescale for the installation of the proposed aeration blowers (the installation shall be no later than 31/03/2018) and an updated noise impact assessment (in accordance with BS4142:2014 and Environment Agency Guidance document H3) for the installation that takes account of the proposed aeration blowers. Following written approval of the proposals by the Environment Agency the Operator shall install the aeration blowers to the timescales in the approval.	30/06/2018

Schedule 2 – List of permitted wastes

Table S2.1 Permitted waste types accepted for treatment	
Maximum Quantity	**650,000 tonnes per annum**
Waste code	**Description**
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 07	**landfill leachate**
19 07 03	landfill leachate other than those mentioned in 19 07 02

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to water (other than sewer) – emission limits and monitoring requirements

Emission point Ref. & Location	Parameter	Source	Limit (incl unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method Note 1
W1 Final discharge point - as marked on site plan in Schedule 2 discharge to Plym Estuary	Total Suspended solids	Leachate treatment plant	75 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	BS EN 6068-2.54:1996 or other method as agreed in writing with the Environment Agency
	Biochemical oxygen demand		10 mg/l			BS EN 1899-1: 1998 or other method as agreed in writing with the Environment Agency
	Ammoniacal nitrogen, expressed as N		10 mg/l			BSEN ISO 11732:1997 or other method as agreed in writing with the Environment Agency
	Direct toxicity assessment		-	-	Annually	In accordance with Environment Agency S5.03 Guidance for the treatment of landfill leachate – 2.10.2 Emission monitoring.
	Flow		-	-	Continuous	MCERTS or other method as agreed in writing with the Environment Agency
Note 1: Sample point for monitoring marked as ‘Sample Point W1’ on site plan in Schedule 2 discharge to Plym Estuary						

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data		
Parameter	**Reporting period**	**Period ends**
Point source emission to water (other than sewer) As specified by schedule 3, table S3.1	Every 3 months	31 March, 30 June, 30 September, 31 December

* - where the reporting period is 12 months, you may submit this information as part of the 'annual report' required by condition 4.2.2.

Table S4.2: Annual production/treatment	
Leachate: Disposed of off-site; Recirculated into the waste mass. Accepted from offsite for treatment	Cubic metres/year

Table S4.3 Performance Parameters			
Parameter	**Frequency of assessment**	**Annual total**	**Unit**
Energy used	Annually		MWh of electricity or natural gas

Table S4.4 Reporting Forms		
Media/parameter	**Reporting Format**	**Date of Form**
Controlled water	Form Water 1 or other reporting format to be agreed in writing with the Environment Agency	15/03/2007
Waste Return	E-waste Return Form	-

Schedule 5 – Notification

This page outlines the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any incident or accident which significantly affects or may significantly affect the environment	
To be notified within 24 hours of detection	
Date and Time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B to be supplied as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

"accident" means an accident that may result in pollution.

"annually" means once every year.

"application" means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

"authorised officer" means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

"background concentration" means such concentration of that substance as is present in:

- the surface water outside the site and not attributable to the site.

"construction Proposals" means written information, at a level of detail appropriate to the complexity and pollution risk, on the design, specifications of materials selected, stability assessment (where relevant) and the construction quality assurance (CQA) programme in relation to the Infrastructure.

"CQA Validation Report" means the final "as built" construction and engineering details of the Infrastructure. It must provide a comprehensive record of the construction and must include, where relevant:

- The results of all testing required by the CQA programme - this must include the records of any failed tests with a written explanation, details of the remedial action taken, referenced to the appropriate secondary testing;
- Plans showing the location of all tests;
- "As-built" drawings of the works;
- Copies of the site engineer's daily records;
- Records of any problems or non-compliances and the solution applied;
- Any other site specific information considered relevant to proving the integrity of the Infrastructure;
- Validation by a qualified person that all of the construction has been carried out in accordance with the Construction Proposals.

"EP Regulations" means The Environmental Permitting (England and Wales) Regulations 2016, SI 2016 No.1154. Words and expressions used in this permit which are also used in those Regulations have the same meanings as in those Regulations.

"emissions of substances not controlled by emission limits" means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

"exceeded" means that a value is above a permitted limit, or where a range of values or a minimum value is set as a permitted limit it means a value outside that range or below the minimum value, whichever is applicable.

"groundwater" means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"hazardous substances" as defined by the Environmental Permitting (England and Wales) Regulations 2016, SI 2016 No.1154, schedule 22.

"Industrial Emissions Directive" means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions.

"infrastructure" means any specified element of the leachate management system or associated pipe work within the site.

“liquids” means any liquid other than leachate within the engineered system.

“List of Wastes” means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time.

“MCERTS” means the Environment Agency’s Monitoring Certification Scheme.

“no impact” means that the change made to the construction process will not affect the agreed design criteria, specification or performance in a way that has a negative effect.

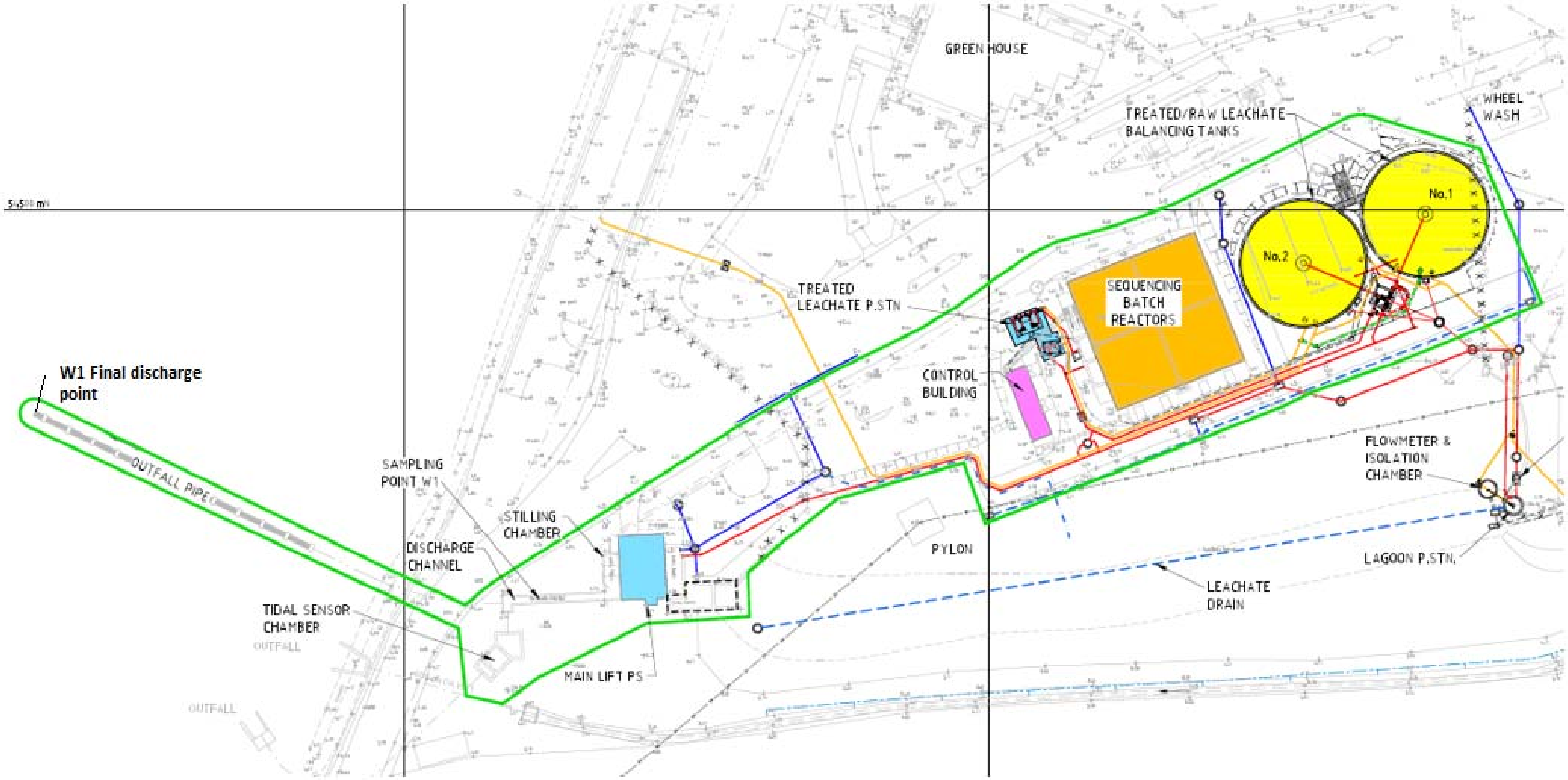
“Previous year” means the 12 month period preceding the month the annual report is submitted in.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“Waste code” – see ‘List of Wastes’

“WFD” means Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste [and repealing certain Directives] – the Waste Framework Directive.

Schedule 7 – Site plan



END OF PERMIT

Application No. 08.00.00447.95

(In correspondence please quote this reference)

COUNTY OF DEVON

TOWN AND COUNTRY PLANNING ACT 1990
TOWN AND COUNTRY PLANNING GENERAL DEVELOPMENT ORDER 1988
TOWN AND COUNTRY PLANNING (APPLICATIONS) REGULATIONS 1988
TOWN AND COUNTRY PLANNING GENERAL REGULATIONS 1992

GRANT OF CONDITIONAL PLANNING PERMISSION

To: Messrs. Dean & Dyball Construction Ltd., Rayell House, Chancel Lane, Pinhoe, Exeter EX2 8JT

Agent for: Devon Waste Management, Cranmere Court, Matford Business Park, Exeter EX2 8PW

The Devon County Council hereby grants planning permission to carry out the development described in the application dated 1st March 1995 and the plans attached thereto numbered: C3943A/100D (Site Layout), C3943A/100D/103 (Location Plan), C3943A/100D/102 and 101 (Cross Sectional Plans)

brief particulars of which are as follows: **Construction of Leachate Treatment Plant, Site adjacent to weighbridge and site entrance offices, Chelson Meadow Tip, Ride Road, Plymouth.**

subject to the conditions set out in the attached sheets (numbered 1 to 1).

Edward Chorlton

....
Edward Chorlton,
County Environment Director.

Date: 12th May 1995

NOTE

This is not a decision under the Building Regulations

Failure to adhere to the details of the approved plans or to comply with the above conditions constitutes a contravention of the Town and Country Planning Act 1990 in respect of which enforcement action may be taken.

1 **The development hereby approved shall commence within five years of the date of this decision notice.**

REASON To comply with Section 91 of the Town and Country Planning Act 1990.

2 **Prior to the commencement of development the agreement of the Local Planning Authority shall be obtained for the materials to be used on the external elevations of the buildings and structures**

REASON In the interests of visual amenity

3 Unless an alternative arrangement has been agreed in writing with of the County Planning Authority prior to the start of works the existing hedge plants along the northern boundary of the site shall be maintained and protected during the contract period by the erection of a chestnut paling or similar fence. Any change in levels adjacent to the hedge plants shall be made good in a manner which shall not interfere with the health of the plants.

REASON In the interests of amenity and to minimise the impact of the development.

4 **The hawthorn and beech hedge shown on the approved plans to the west of the development shall be planted in the planting season immediately following the leachate treatment works being brought into use.A trench at least one metre deep and one metre wide shall be excavated and filled with selected soil to accommodate the plants which shall be set at half metre centres in two staggered rows and protected in individual tubes or by means of a protective ring fence.**

REASON To ensure that the hedge establishes successfully in the interests of visual amenity.

Application Ref: 08.00.00447.95

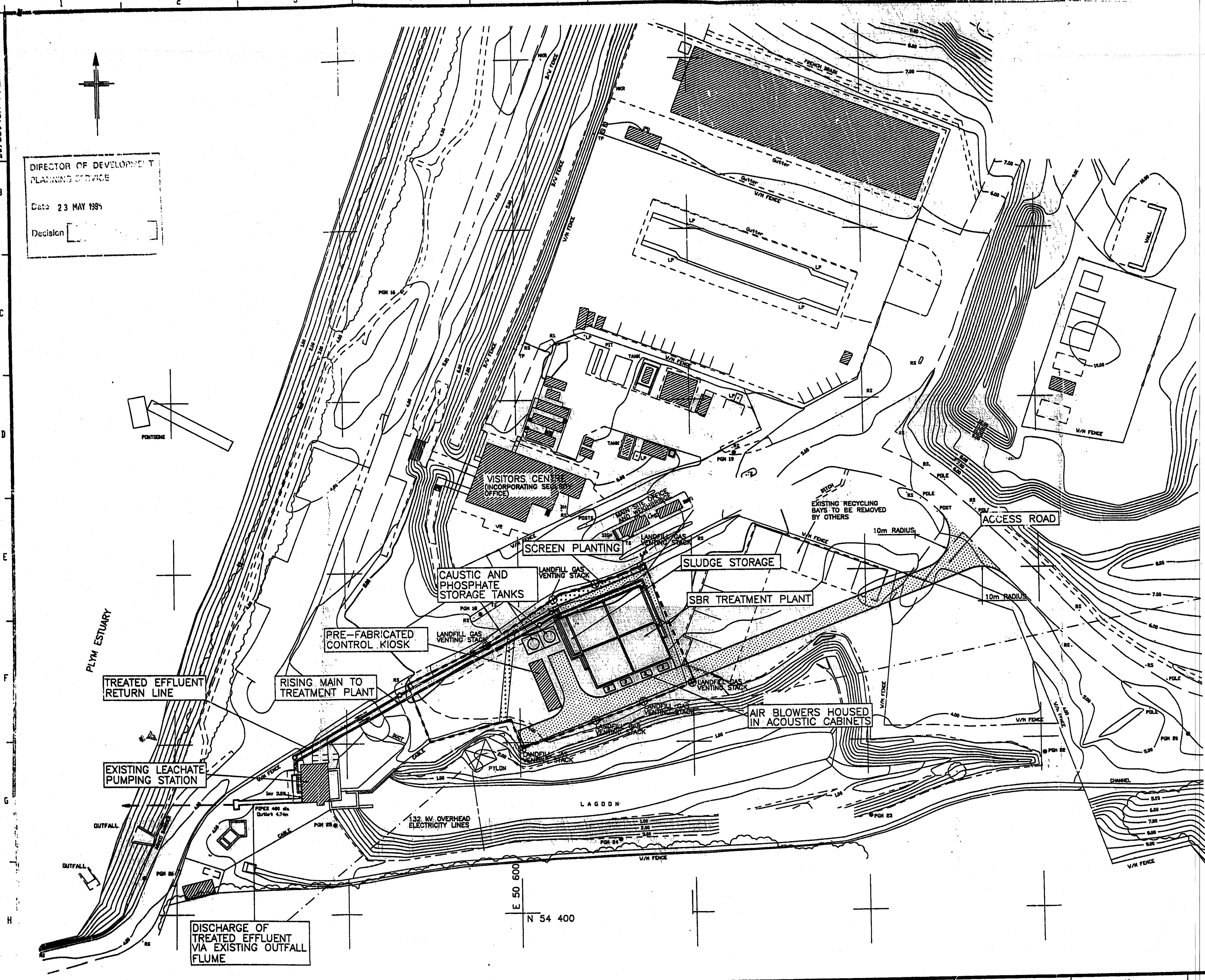
Date 12th May 1995

Edward Chorlton

Edward Chorlton
County Environment Director

DW/C3943A /PLAN/ /

DIRECTOR OF DEVELOPMENT
PLANNING SERVICE
Date 23 MAY 1995
Decision



NOTES:

1. TOPOGRAPHICAL INFORMATION BASED ON SURVEY BY MARTIN OVERY, 20th OCTOBER 1994.
2. GRID REFERENCES ARE IN METRES BASED ON NATIONAL GRID REFERENCE.
3. ALL LEVELS ARE IN METRES RELATIVE TO ODNANCE DATUM (NEWLYN).
4. THE POSITIONS OF EXISTING SERVICES ARE TO BE DETERMINED BY THE CONTRACTOR (REFER TO SPECIFICATION).

LEGEND:

MAIN SITE AREA

SURFACE FINISHES:

CONCRETE

BUILDING

HAWTHORN/BEECH HEDGING

NOTE
ALL AREAS OUTSIDE HARD-STANDING, WITHIN THE SITE TO BE GRASS SEEDED UNLESS OTHERWISE SHOWN

No.	Date	Description
Revisions		

Status PLANNING STAGE
Drawn SPH
Checked PV
Approved
Datum NEWLYN
CAD File 800100
Scale 1:500

Doc. Ref. DW/C3943A /PLAN/ /

CITY OF PLYMOUTH
PLANNING SERVICE
- 3 APR 1995

CHELSON MEADOW
LANDFILL SITE
LEACHATE TREATMENT PLANT

SITE AND PLANT LAYOUT
GENERAL ARRANGEMENT

CONTRACT No. C3943A/100D

DRAWING No. 100 ISSUE

DEAN & DYBALL
Construction

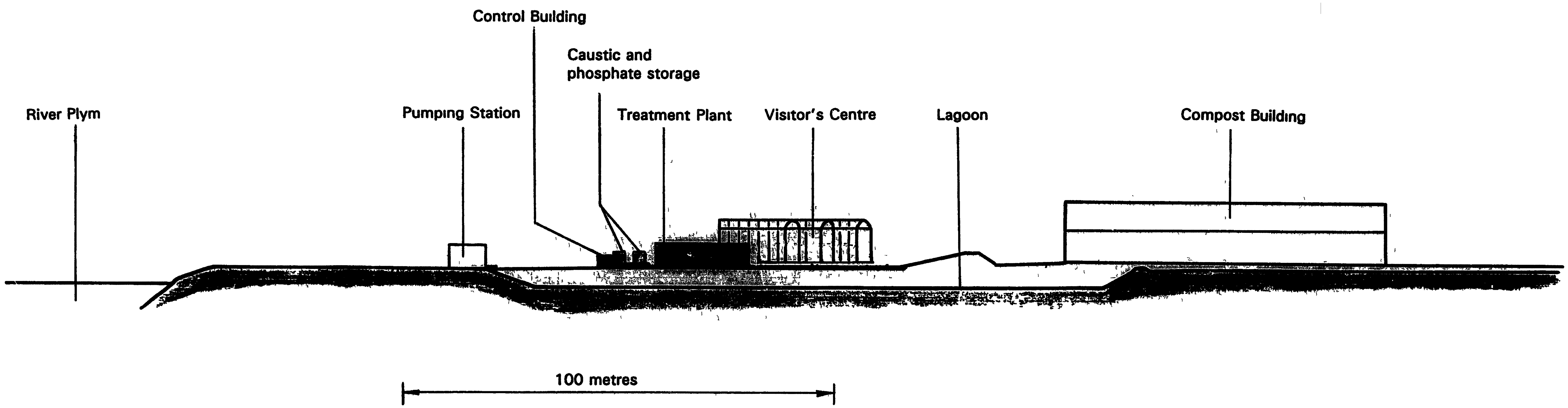
Endeavour House,
Crow Arch Lane,
Ringwood, Hampshire.

Date MAR.95

DIRECTOR OF DEVELOPMENT
PLANNING SERVICE

Date 23 MAY 1995

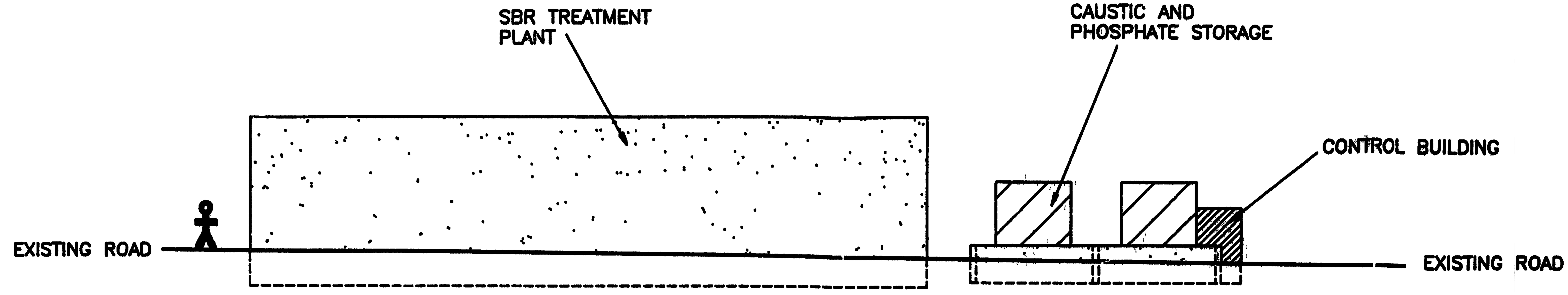
Decision



DEAN & DYBALL Construction
Endeavour House, Crow Arch Lane,
Ringwood, Hampshire BH24 1PN

CHELSON MEADOW LANDFILL SITE
LEACHATE TREATMENT PLANT
SOUTH ELEVATION

Scale. 1:1000	
Drawn. SPH	Date MAR.95
CAD Ref No. 800101	
Fig. No. C3943A/100D/101	



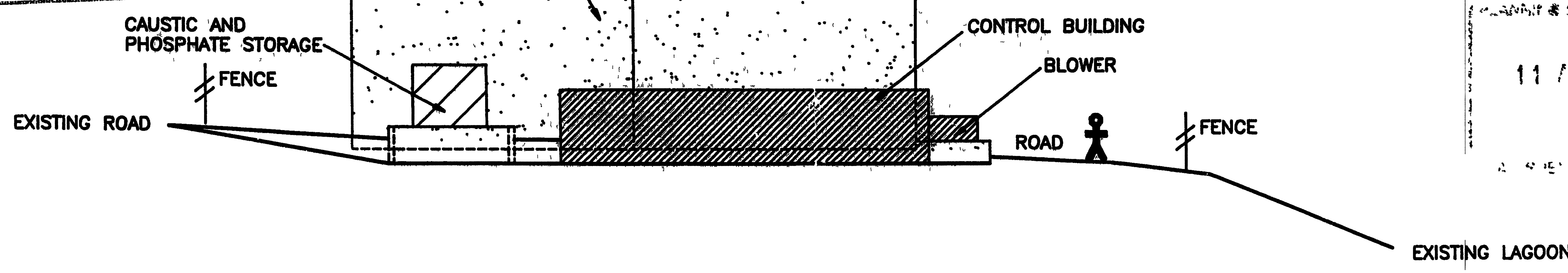
NORTH ELEVATION

Decision Consultation- No objections

SURFACE FINISHES:-

- GLASS COATED STEEL (GCS)
- GLASS REINFORCED PLASTIC (GRP) GREEN (10C39) FINISH
- CONCRETE

11 APR 1995



WEST ELEVATION

DEAN & DYBALL Construction
Endeavour House, Crow Arch Lane, Ringwood, Hampshire BH24 1PN

CHELSON MEADOW LANDFILL SITE
LEACHATE TREATMENT PLANT
NORTH AND WEST ELEVATIONS

Scale. 1:200	
Drawn. SPH	Date. MAR.95
CAD Ref No. 800104	
Fig. No.	C3943A/100D/104

FILE COPY

City of Plymouth

DEVELOPMENT MANAGEMENT
PLANNING SERVICES
Department of Development and Regeneration

Floor 9 Civic Centre
Plymouth PL1 2EW

Tel: 01752 304366
Email: planningconsents@plymouth.gov.uk
www.plymouth.gov.uk

Hyder Consulting
Mr Dominic Lovell
3 Kew Court
Pynes Hill
Rydon Lane
Exeter
EX2 5AZ

14 January 2011

Dear Sir/Madam,

Town and Country Planning Act 1990

APPLICATION NO: 10/02029/FUL

SITE: CHELSON MEADOW RECYCLING PARK, THE RIDE, PLYMOUTH, PL9 7JA

DEVELOPMENT: Upgrade and redevelopment works within the southern part of the Recycling Park, including the infilling of a leachate lagoon and removal of glass recycling bays, and the construction of two leachate buffer tanks (7m high) and underground service diversions. Part of the area would be used for flood attenuation, and part for continued waste management activities.

Please find enclosed the Planning Decision Notice for the above site. This permission relates to the submitted plans which are listed and the development should be carried out in accordance with the details shown unless prior consent has been obtained in writing from the Local Planning Authority. Failure to comply with the approved drawings could result in enforcement action being taken.

It is important to note that applications for approval under the Building Regulations are dealt with separately from applications for Planning Permission. You should not commence works until all necessary consents have been obtained.

APPEAL
If you are aggrieved by the decision of the Local Planning Authority to grant permission, subject to conditions, you may appeal under Section 78 of the Town and Country Planning Act 1990 within six months of receipt of this notice, to:

Customer Support Unit,
The Planning Inspectorate,
Room 3/15b, Eagle Wing,
Temple Quay House,
2 The Square,

Temple Quay,
Bristol
BS1 6PN
www.planning-inspectorate.gov.uk

The Planning Inspectorate need not consider an appeal if the Local Planning Authority could not have granted planning permission for the proposed development without the conditions it imposed, having regard to the statutory requirements, to the provisions of the Development Order and to any directions given under that Order.

In practice, the Planning Inspectorate does not refuse to consider appeals solely because the Local Planning Authority based its decision on a Direction.

PURCHASE NOTICE

If either the Local Planning Authority or the Planning Inspectorate grants permission to develop land subject to conditions, the owner may claim that they can neither put the land to a reasonably beneficial use in its existing state nor can they render the land capable of a reasonably beneficial use by the carrying out of any development which has been or would be permitted.

In these circumstances, the owner may serve a purchase notice on the Council in whose area the land is situated. If confirmed, this notice will require the Council to purchase interest in the land in accordance with provisions of the Town and Country Planning Act 1990.

COMPENSATION

In certain circumstances compensation may be claimed from the Local Planning Authority if permission is granted subject to conditions by the Planning Inspectorate on appeal or on reference to the application to him.

These circumstances are set out in Sections 114 and related provisions of the Town and Country Planning Act 1990.

CONTACT DETAILS

If you have any enquiries please do not hesitate to contact **Alan Hartridge** on **01752 304207.**

Yours faithfully,

Paul Barnard
Assistant Director of Development
Planning Services

City of Plymouth

GRANT OF CONDITIONAL PLANNING PERMISSION

Town and Country Planning Act 1990
The Town and Country Planning (General Development Procedure) Order 1995

In correspondence please quote application number: **10/02029/FUL**

Applicant: Plymouth City Council

Site: CHELSON MEADOW RECYCLING PARK, THE RIDE, PLYMOUTH, PL9 7JA

Development: Upgrade and redevelopment works within the southern part of the Recycling Park, including the infilling of a leachate lagoon and removal of glass recycling bays, and the construction of two leachate buffer tanks (7m high) and underground service diversions. Part of the area would be used for flood attenuation, and part for continued waste management activities.

Under the provision of the above act, Plymouth City Council hereby grants permission to carry out the development described in your application dated **26/11/2010** together with the following plans/drawings: **Environment Statement dated 19th november 2010 including site location plan0610 DV01661-01; site plan 0611 DV01661-01; cross sections 0612 DV01661-01; key plan 0001 DV01661-P2; Lagoon works plan 0241 DV01661-P2; works section 0243 and 0245 DV01661-P2; Demolition works 0901 DV01661-P2,**

Subject to the following conditions:

DEVELOPMENT TO COMMENCE WITHIN 3 YEARS
(1) The development hereby permitted shall be begun before the expiration of three years beginning from the date of this permission.

Reason:
To comply with Section 51 of the Planning & Compulsory Purchase Act 2004.

SPECIFIED USE RESTRICTION
(2) The eastern end of the capped lagoon shall be used for storage purposes only and for no other purposes including any other purpose in Class B of the Schedule to the Town and Country Planning (Use Classes) Order 1987, or in any provision equivalent to that Class in any statutory instrument revoking and re-enacting that Order with or without modification.

Reason:
The Local Planning Authority considers that, in the particular circumstances of the case, the use of the eastern area for the purpose specified is appropriate but that a proposal to use the land for any other purposes that might generate noisy activity would need to be made the subject of a separate application to be considered on its merits in accordance with Policy CS34 of the Plymouth Local Development Framework Core Strategy (2006-2021) 2007.

APPROVED PLANS
(3) The development hereby permitted shall be carried out in accordance with the approved plans in the Environmental Statement dated 19th November 2010: including site location plan 0610 DV01661-01; site plan 0611 DV01661-01; cross sections 0612 DV01661-01; key plan 0001 DV01661-P2; Lagoon works plan 0241 DV01661-P2; works section 0243 and 0245; DV01661-P2; Demolition works 0901 DV01661-P2.

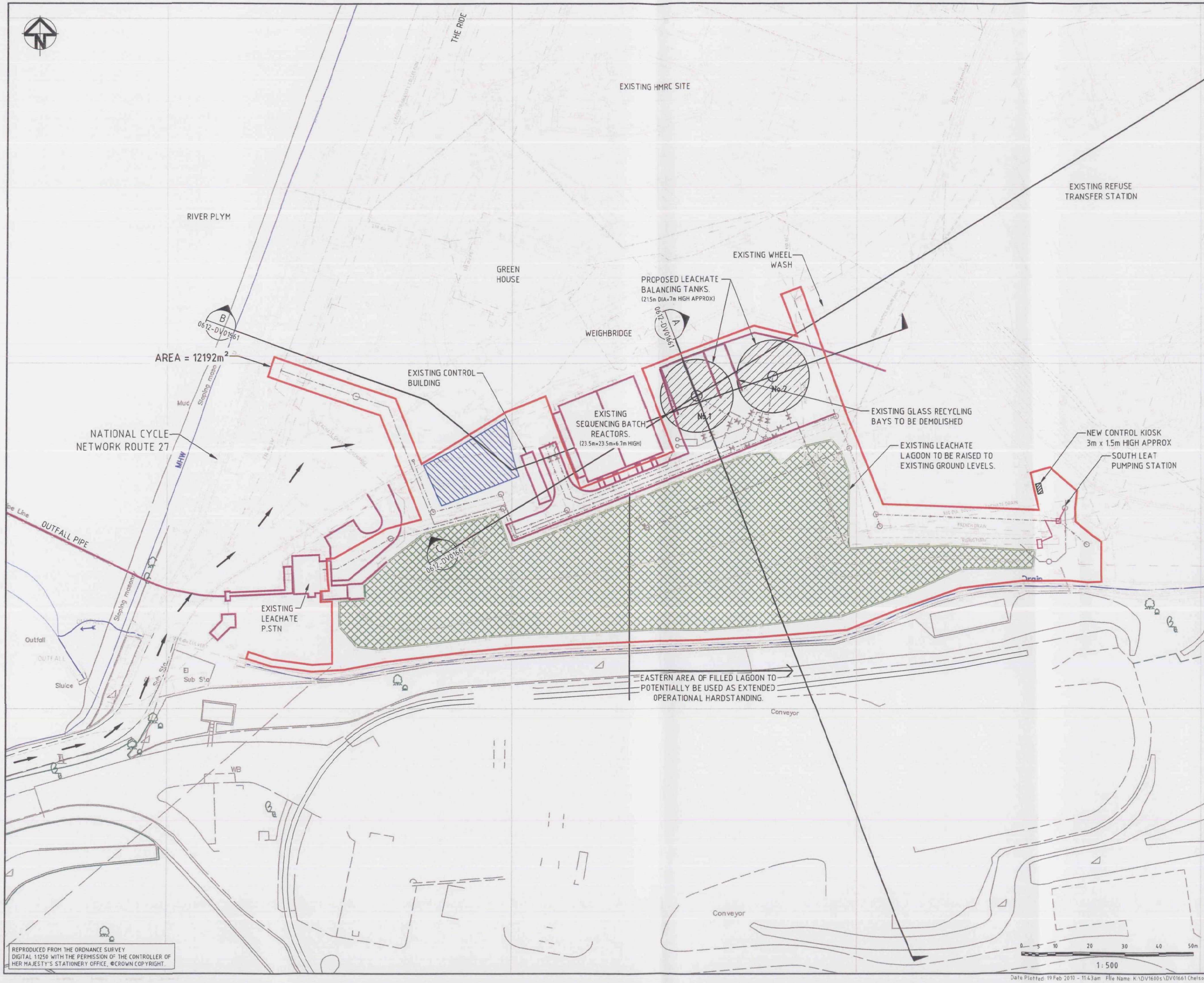
Reason:
For the avoidance of doubt and in the interests of good planning, in accordance with policy CS34 of the Plymouth Local Development Framework Core Strategy (2006-2021) 2007.

Statement of Reasons for Approval and Relevant Policies
Having regard to the main planning considerations, which in this case are considered to be: impacts upon the River Plym, ecological and heritage interests, flood risk and visual intrusion, impacts upon existing and proposed neighbouring development, the proposal is not considered to be demonstrably harmful. In the absence of any other overriding considerations, and with the imposition of the specified conditions, the proposed development is acceptable and complies with (a) policies of the Plymouth Local Development Framework Core Strategy (2006-2021) 2007 and supporting Development Plan Documents and Supplementary Planning Documents (the status of these documents is set out within the City of Plymouth Local Development Scheme) and the Regional Spatial Strategy (until this is statutorily removed from the legislation) and (b) relevant Government Policy Statements and Government Circulars, as follows:

PPS10 - Planning for Sustainable Waste Management
CS34 - Planning Application Consideration
CS19 - Wildlife
CS21 - Flood Risk
CS22 - Pollution
CS03 - Historic Environment
PPS25 - Development and Flood Risk
W4 - Controlling, Reusing and Recycling Waste
NP14 - Chelson Meadow Waste Management Centre

Paul Barnard
Assistant Director of Development
Planning Services

Dated: 14 January 2011



NOTES

1. DO NOT SCALE FROM THIS DRAWING, USE FIGURED DIMENSIONS ONLY.
2. ALL LEVELS IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN.

LEGEND

- PLANNING APPLICATION BOUNDARY
- EXISTING OPERATIONAL PLANT/AREAS
- PROPOSED WORKS
- EXISTING LAGOON
- CONTRACTORS COMPOUND
- SITE ACCESS

Issue	Description	Date
01	ISSUE FOR PLANNING	10NOV10

Status
ISSUE FOR PLANNING
NOT TO BE USED FOR CONSTRUCTION

		Current Issue Signatures	
Scales	1:500 @ A1 1:1000 @ A3	Author A.NIMMO	
Original Size	A1	Checker D.Lovell	
Height Datum	mAOD	Approver D.Lovell	
Grid	OS	© Copyright reserved	

Filename: 0601-DV01661-DVD-P1.dwg

Client

City of Plymouth

HYDER CONSULTING (UK) LTD

Brooklands,
680 Budshead Road,
Plymouth, PL6 5XR
United Kingdom

Tel: +44 (0)1752 769675
Fax: +44 (0)1752 764546
www.hyderconsulting.com

Project

CHELSON MEADOW RECYCLING PARK LEACHATE TREATMENT PLANT UPGRADE

Title

SITE PLAN

Drawing No.	Project No.	Issue
0611	DV01661	01

NOTES

1. DO NOT SCALE FROM THIS DRAWING USE FIGURED DIMENSIONS ONLY.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS IN METRES RELATIVE TO ORDNANCE DATUM.
4. THE CONTRACTOR IS TO VERIFY THE PRESENCE & DETAILS OF ALL EXISTING PIPELINES AND OTHER SERVICES PRIOR TO COMMENCEMENT OF THE WORKS.
5. ALL EXISTING STRUCTURES AND PIPEWORK ETC ARE SHOWN IN GREY, PROPOSED WORKS SHOWN IN BLACK.
6. ALL EXPOSED CONCRETE ARISES TO HAVE A 25 x 25 CHAMFER.
7. CONCRETE GRADE:

BLINDING	GEN 3
MASS	C20/25
BENCHING	C20/25
THRUST BLOCKS	C20/25

8. FORMWORK: BURIED SURFACES FAIR. ALL OTHER FACES FAIR WORKED UNLESS NOTED OTHERWISE.
9. ALL AREAS BENEATH STRUCTURES SUBJECT TO OVER EXCAVATION SHALL BE BACKFILLED WITH GRADE C20/25 CONCRETE TO UNDISTURBED GROUND.
10. MIN COVER TO PIPELINES SHALL BE 900mm IN VERGES & 1200mm IN ROADS.
11. ALL WORK IS TO COMPLY WITH REQUIREMENTS OF THE FOLLOWING SPECIFICATIONS AND STANDARDS:
    a. CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY, 6th EDITION.
    b. SEWERS FOR ADOPTION 6th EDITION.
    c. RELEVANT BRITISH STANDARDS.
12. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DWG. No. DV01661-0005 & THE NOTES RELATING TO THE EXISTING LEACHATE PUMPING STATION SCREEN/INLET STRUCTURE.

P2

LEGEND

- WATER PIPE
- TELECOMS
- OVERHEAD TELECOMS
- ELECTRIC
- FOUL SEWER
- STORM SEWER
- LEACHATE DRAIN

Issue	Description	Date
P2	NOTE 11 REVISED & NOTE 12 ADDED	01JUN10
P1	ISSUE FOR INFORMATION	25MAY10

Status: FOR INFORMATION

Scales	1:125 @ A1 1:250 @ A3	Current Issue Signatures	
		Author R. Searle	
Original Size	A1	Checker C. Carter	
Height Datum	mAOD	Approver D. Lovell	
Grid	OS	© Copyright reserved	

Filename: 0901-DV01661-DVD-P2.dwg

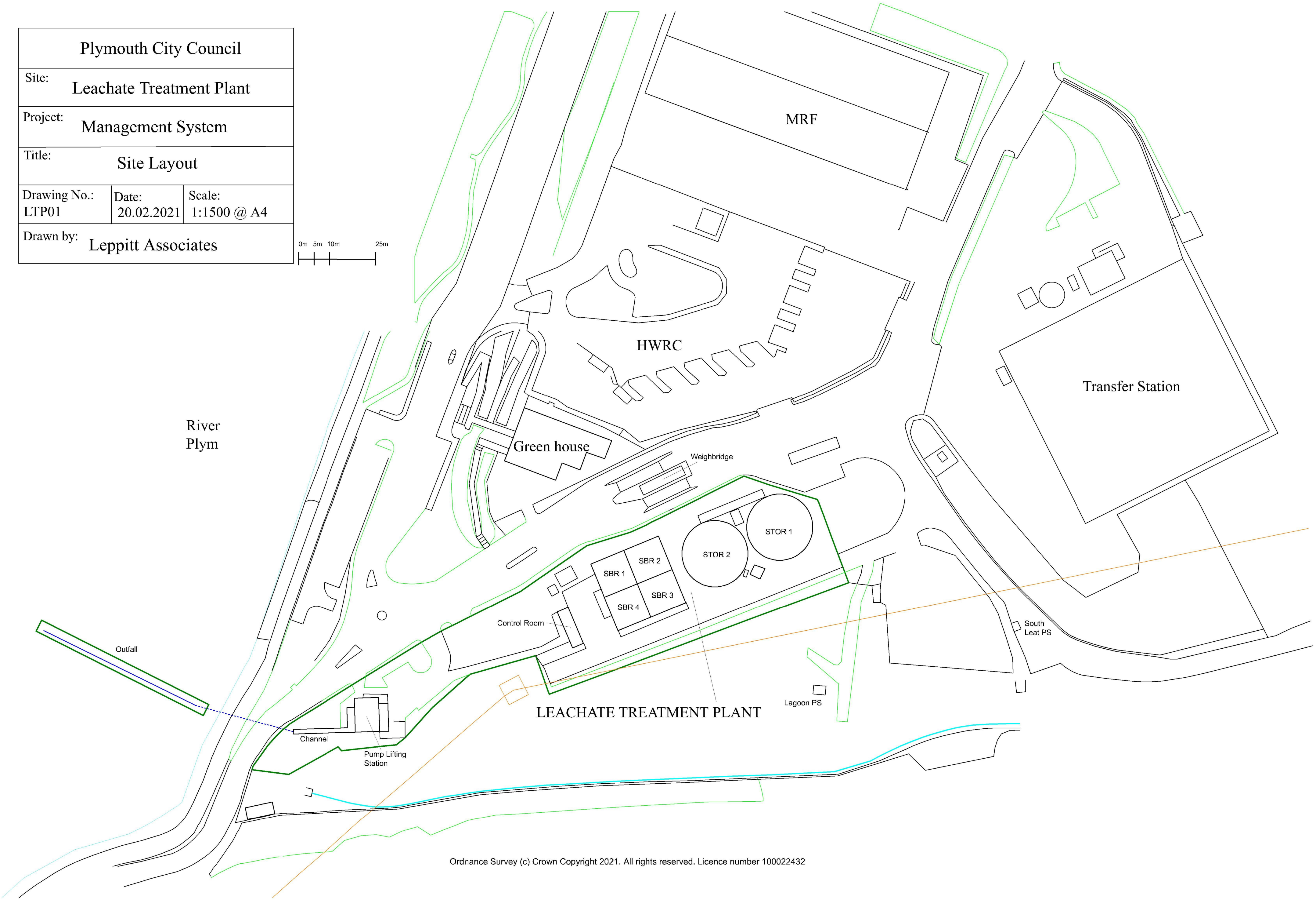
Client: City of Plymouth

HYDER CONSULTING (UK) LTD
Brooklands,
680 Budshead Road,
Plymouth, PL6 5XR
United Kingdom
Tel: +44 (0)1752 769675
Fax: +44 (0)1752 764546
www.hyderconsulting.com

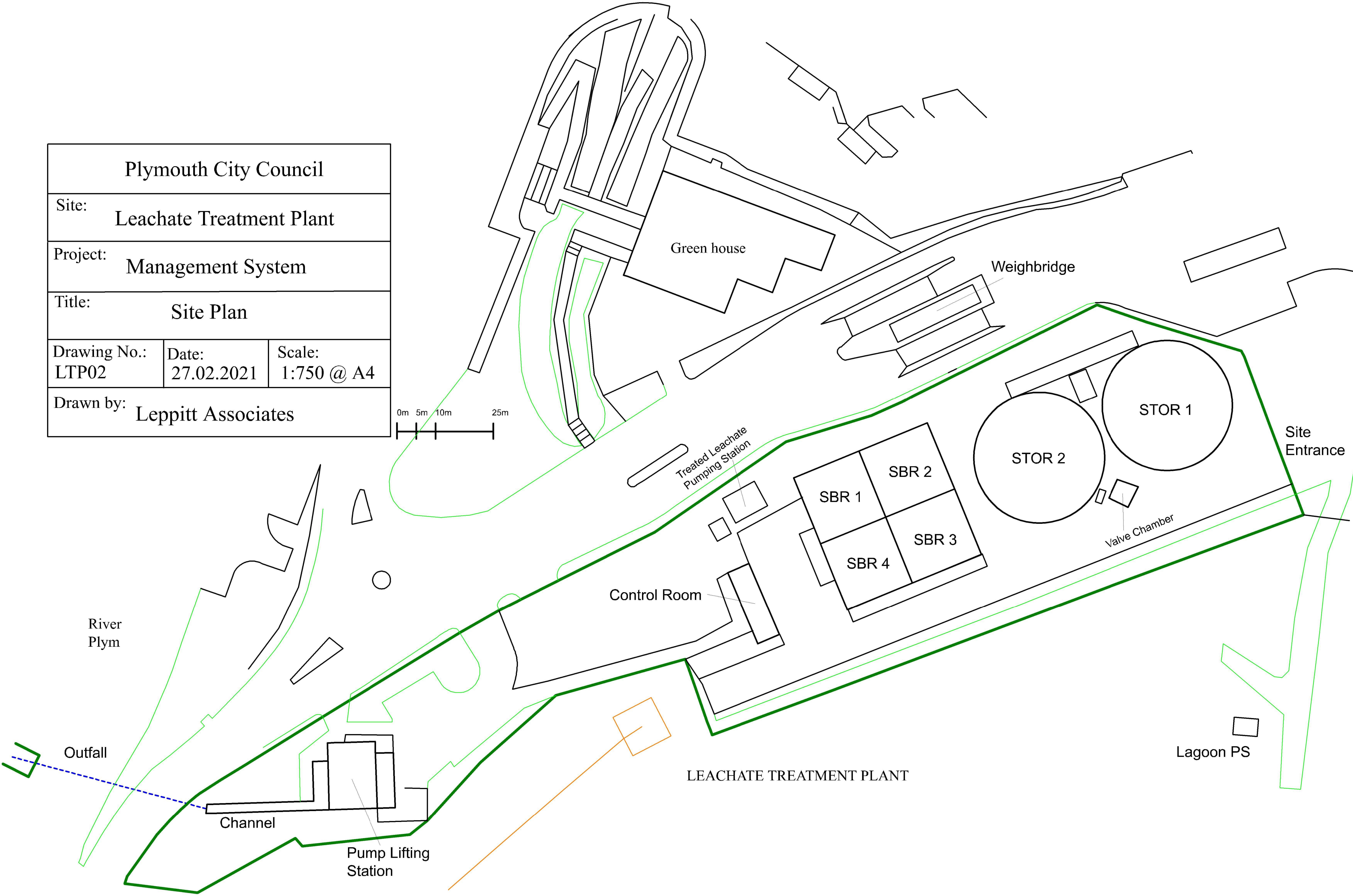
Project
CHELSON MEADOW LEACHATE TREATMENT PLANT UPGRADE

Title
RAW/TREATED LEACHATE BALANCING TANKS - DEMOLITION WORKS PLAN

Drawing No.	Project No.	Issue
0901	DV01661	P2

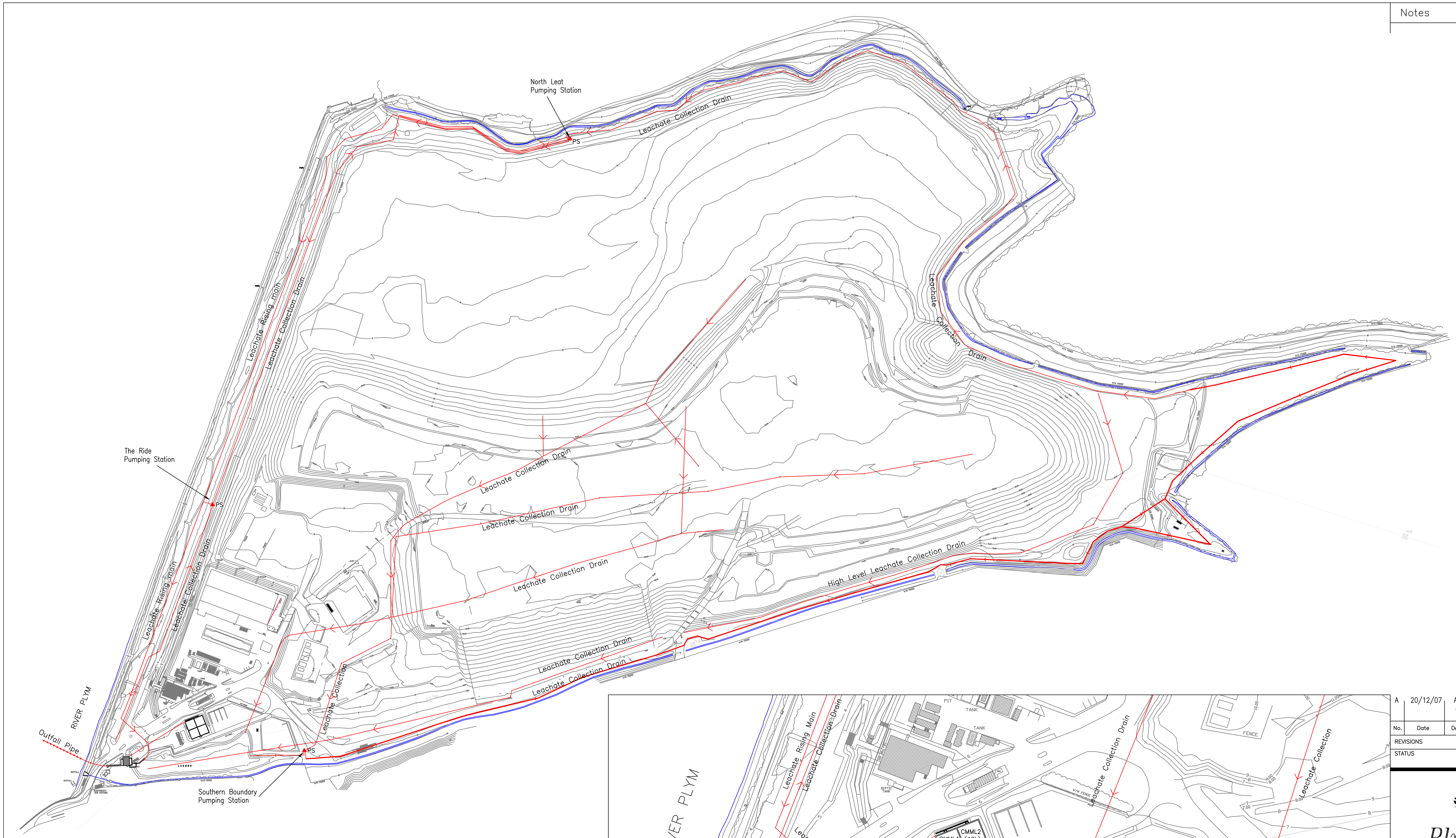

Plymouth City Council
Site: Leachate Treatment Plant
Project: Management System
Title: Site Layout
Drawing No.: LTP01
Date: 20.02.2021
Scale: 1:1500 @ A4
Drawn by: Leppitt Associates
0m 5m 10m 25m
MRF
HWRC
Transfer Station
Green house
Weighbridge
River
Plym
STOR 1
STOR 2
SBR 1
SBR 2
SBR 3
SBR 4
Control Room
Outfall
Channel
Pump Lifting
Station
South
Leat PS
Lagoon PS
LEACHATE TREATMENT PLANT

Plymouth City Council		
Site: Leachate Treatment Plant		
Project: Management System		
Title: Site Plan		
Drawing No.: LTP02	Date: 27.02.2021	Scale: 1:750 @ A4
Drawn by: Leppitt Associates		

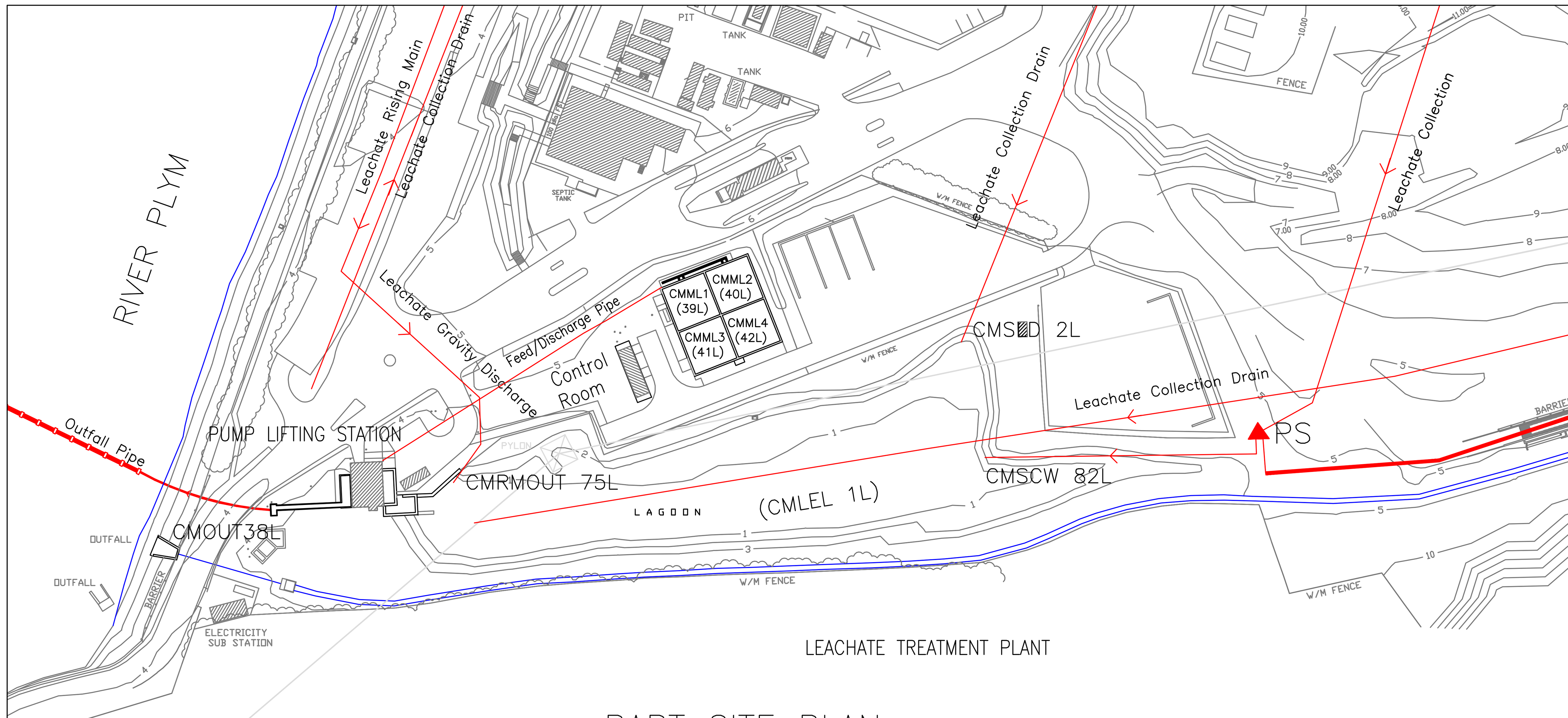


CHELSON MEADOW CLOSED LANDFILL
PCCCL01
JANUARY 2015
1:2250 at A1

Notes



SITE PLAN
SCALE 1:2500



PART SITE PLAN
SCALE 1:1000

No.	Date	Details
A	20/12/07	Addition of southern boundary drainage

REVISIONS

STATUS

City of Plymouth

Department of Development
Civic Centre
Plymouth PL1 2EW
Tel: Plymouth 01752 668000

SCHEME
Chelson Meadow
Landfill Site

DRAWING TITLE
Leachate Management

Drawn	S.CON.	Traced	
Checked		Date	12:11:03
Scale	1:2500 & 1:1000		
Drawing Number	WD/W1/463	Revision.	A

wamitab

Certificate No: 12673

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Peter McNamara

Has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type

Level 4 in Waste Management Operations - Managing

Treatment Non-Hazardous Waste (4TMNH)

Authorising Signatures:

Chief Executive Officer

Director:

Date of issue: 04/07/2012

Copy Printed on 15/Jul/2019

00021943

wamitab

Certificate No: **12673**

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Peter McNamara

Has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type

Level 4 in Waste Management Operations - Managing

Treatment Non-Hazardous Waste (4TMNH)

Authorising Signatures:

Chief Executive Officer

Director:

Date of issue: 04/07/2012

Copy Printed on 15/Jul/2019

00021943

wamitab

Certificate No. CCC17614

Continuing Competence Certificate

This certificate confirms that

Peter McNamara

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 23/04/2018

LH	Landfill - Hazardous Waste
TSH	Transfer - Hazardous Waste
TMNH	Treatment - Non Hazardous Waste

Awarded: 23/04/2018

Expiry Date: 23/04/2020

Authorised

WAMITAB Chief Executive Officer

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

Copy Printed on 15/Jul/2019

00134087

wamitab

Continuing Competence Certificate

This certificate confirms that

Peter McNamara

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 17/07/2020

LH	Landfill - Hazardous Waste
TSH	Transfer - Hazardous Waste
TMNH	Treatment - Non Hazardous Waste

Expiry Date:
17/07/2022

Verification date: 25/06/2020

Authorised:

WAMITAB Chief Executive Officer

Learner ID: 902

Certificate No.: 5166979

Date of Issue: 17/07/2020

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

00149805

MONTHLY SITE COMPLIANCE CHECKLIST

LOCATION: Chelson Meadow LTP	**INSPECTED BY:**
LICENCE NO: EPR/ CP3731LZ/V004	**DATE:**

1.	**Site Access**	
i)	Entrance & exit gates in good condition (**integrity)**	
ii)	All external areas free of potholes	
iii)	Traffic routes and restrictions clearly signed.	
2.	**Control Room**	
i)	Control Room clean and tidy	
ii)	PC working	
iii)	Site diary being completed daily	
iv)	Hand wipes and disposable gloves available	
v)	First aid with equipment appropriate to the risks. Site operatives have emergency first aid training as a minimum.	
vi)	Control Room contains:	
	Permit	
	Management System (Working Plan) Version:	
	Maintenance/Service Records	
	Sample bottles & labels	
3.	**Identification board/Notices**	
i)	Identification board of durable material showing:- name of the site, opening hours name, address and telephone number of operator name, address and telephone number of EA Permit No	
ii)	Statutory notices on display including:- poster - Health & Safety Law certificate of insurance	
4.	**Site Boundary**	
i)	Integrity of fencing	
ii)	Gates have working locks	
5.	**SBRs**	

Overview of current operation (*i.e. Emergency/Peak*):

	SBR 1	**SBR 2**	**SBR 3**	**SBR 4**
i) Operational				
ii) Where in the process				
iii) Blower condition				

		Integrity	Operational
iii)	Steps		
iv)	Walkways		
v)	Lighting		
vi)	Life buoys – integrity & condition		
vii)	Anti-foam		
viii)	Weather centre		
ix)	Air compressors		
x)	Adequate housekeeping on walkways and steps		
xi)	Treated Leachate PS operational		
xii)	Treated Leachate PS cabinet condition		
	Comments/Actions:		

7.	**STOR1 & STOR2**	
	STOR1	**STOR2**
i)	Treated or Raw Leachate	Treated or Raw Leachate
ii)	Liquor Height:	Liquor Height:
iii)	External condition of STOR1	
iv)	External condition of STOR2	
v)	Steps & platform condition	
vi)	Valve chamber fence condition	
vii)	STOR1 tap operational (within valve chamber)	
viii)	STOR2 tap operational (within valve chamber)	
ix)	Valve chamber cabinet condition	
x)	North Leat Tap operational (STOR1)	
xi)	South Leat Tap operational (STOR1)	

8.	**Fires**	
i)	All fire extinguishers in service and operational	
ii)	Written fire procedure instructions displayed on site.	
iii)	Fire detection system operational (Control Room)	
iv)	CCTV operational	
9.	**Vermin**	
i)	Evidence of pests	
i)	General waste bins not over full	
ii)	Routine inspections by pest controller carried out; records of these & remedial treatment kept.	
10.	**Odour**	
i)	Evidence of odour beyond site boundary	
ii)	Odour monitoring undertaken	
11.	**Noise**	
i)	Evidence of excessive noise beyond the site boundary	

ii)	Comment:	

12.	Pump Lifting Station	
i)	External wall condition	
ii)	Roller shutter door condition	
iii)	Gas Alarm functional	
iv)	Platform condition	
v)	Steps condition	
vi)	Housekeeping	
vii)	Fire extinguisher within service date	
viii)	Chemical storage container	
ix)	Chemical stored correctly (drip tray)	
x)	Condition of wet well	
xi)	Condition of discharge channel	
xii)	Flow meter operational	
Comments:		

14.	Site Records	
i)	Types and quantities of waste that are removed from the site recorded, kept and delivered to the EA within 20 working days of the end of each year quarter.	
ii)	Weekly sample results available	
iii)	Quarterly outfall (W1) reporting undertaken	

Comments/Observations:

Checklist Item No.	Subject
Details of non-compliance	

Checklist Item No.	Subject
Details of non-compliance	

Checklist Item No.	**Subject**
Details of non-compliance	

Checklist Item No.	**Subject**
Details of non-compliance	

Signed: .... **Date:** ....

MONTHLY MAINTENANCE SERVICE RECORD CHELSON MEADOW LTP & SUPPORTING INFRASTRUCTURE	
Date Start: **Date Finish:**	**Contractor:** **Engineer 1:** **Engineer 2:**
Weather Conditions:	**Engineer 3:**

LOCATION: Blower Cabinets – Ground Level

BLOWER 1	**x/✓**	**COMMENTS**	**BLOWER 2**	**x/✓**	**COMMENTS**
Grease Bearing			Grease Bearing		
Belt Tension			Belt Tension		
Air Filter			Air Filter		
Nuts & Bolts			Nuts & Bolts		
Oil Level			Oil Level		
Insulation Test		M-Ω	Insulation Test		M-Ω

BLOWER 3	**x/✓**	**COMMENTS**	**BLOWER 4**	**x/✓**	**COMMENTS**
Grease Bearing			Grease Bearing		
Belt Tension			Belt Tension		
Air Filter			Air Filter		
Nuts & Bolts			Nuts & Bolts		
Oil Level			Oil Level		
Insulation Test		M-Ω	Insulation Test		M-Ω

BLOWER 5	**x/✓**	**COMMENTS**	**FURTHUR COMMENTS**
Grease Bearing			
Belt Tension			
Air Filter			
Nuts & Bolts			
Oil Level			
Insulation Test		M-Ω	

LOCATION: LTP Platform

JWMP 1	x/✓	COMMENTS	JWMP 2	x/✓	COMMENTS
Local Isolator			Local Isolator		
JWMP 3	**x/✓**	**COMMENTS**	**JWMP 4**	**x/✓**	**COMMENTS**
Local Isolator			Local Isolator		
DESLUDGE 1	**x/✓**	**COMMENTS**	**DESLUDGE 2**	**x/✓**	**COMMENTS**
Local Isolator			Local Isolator		
DESLUDGE 3	**x/✓**	**COMMENTS**	**DESLUDGE 4**	**x/✓**	**COMMENTS**
Local Isolator			Local Isolator		

MOBILE TRANSFER PUMP	x/✓	COMMENTS
Impeller		
Cable		
Panel		
Hose/Pipework		

FURTHUR COMMENTS:

LOCATION: LTP Platform

DECANT ARM PANEL	x/✓	COMMENTS	AIR RECEIVER TOP	x/✓	COMMENTS
Heater					
Gauge					

ANTI-FOAM CABINET	x/✓	COMMENTS
Wind Speed		
Panel		
Lights		
Heater		
Pump 1		
Pump 2		
Container 1		
Container 2		

FURTHUR COMMENTS:

LOCATION: LTP Platform

SBR 1	x/✓	COMMENTS	SBR 2	x/✓	COMMENTS
Decant Arm			Decant Arm		
Decant Wires			Decant Wires		
Hand Rails			Hand Rails		
Pump Guide rails			Pump Guide rails		
Lagging			Lagging		
Overspill gutter			Overspill gutter		
NH4 PROBE 1			**NH4 PROBE 2**		
Clean Bucket			Clean Bucket		
Check Fittings			Check Fittings		
pH PROBE 1			**pH PROBE 2**		
Cable			Cable		
DO PROBE 1			**DO PROBE 2**		
Cable			Cable		
Ht SENSOR 1			**Ht SENSOR 2**		
Clean Sensor			Clean Sensor		
High Level Float 1			High Level Float 2		
SBR 3	**x/✓**	**COMMENTS**	**SBR 4**	**x/✓**	**COMMENTS**
Decant Arm			Decant Arm		
Decant Wires			Decant Wires		
Hand Rails			Hand Rails		
Pump Guide rails			Pump Guide rails		
Overspill gutter			Overspill gutter		
NH4 PROBE 3			**NH4 PROBE 4**		
Clean Bucket			Clean Bucket		
Check Fittings			Check Fittings		
pH PROBE 3			**pH PROBE 4**		
Cable			Cable		
DO PROBE 3			**DO PROBE 4**		
Cable			Cable		
Ht SENSOR 3			**Ht SENSOR 4**		
Clean Sensor			Clean Sensor		
High Level Float 1			High Level Float 2		

FURTHUR COMMENTS

LOCATION: LTP Platform					
HANDRAILS	**x/✓**	**COMMENTS**	**WALKWAYS**	**x/✓**	**COMMENTS**
Secure			Tidy		
WALKWAY LIGHTING	**x/✓**	**COMMENTS**	**LTP WALL LIGHTING**	**x/✓**	**COMMENTS**

Life Buoys	**x/✓**	**COMMENTS**
No 1		
No 2		
Emergency Stop Buttons	**x/✓**	**COMMENTS**
FURTHUR COMMENTS		

LOCATION: Control Room - Panels					
TRANSFORMER	**x/✓**	**COMMENTS**	**MAINS INCOMER**	**x/✓**	**COMMENTS**
Panel			Panel		
			Hrs		
			Amp x3 Meter		
			Volt Meter		
BLOWER 1	**x/✓**	**COMMENTS**	**BLOWER 2**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	Insulation Test		M-Ω
Amp Meter			Amp Meter		
Contactors			Contactors		
BLOWER 3	**x/✓**	**COMMENTS**	**BLOWER 4**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	Insulation Test		M-Ω
Amp Meter			Amp Meter		
Contactors			Contactors		
DESLUDGE 1	**x/✓**	**COMMENTS**	**DESLUDGE 2**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Amp Meter			Amp Meter		
Insulation Test		M-Ω	Insulation Test		M-Ω
Internal			Internal		
DESLUDGE 3	**x/✓**	**COMMENTS**	**DESLUDGE 4**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Amp Meter			Amp Meter		
Insulation Test		M-Ω	Insulation Test		M-Ω
Internal			Internal		
JWMP 1	**x/✓**	**COMMENTS**	**JWMP 2**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	Insulation Test		M-Ω
Amp Meter			Amp Meter		
Internal			Internal		
JWMP 3	**x/✓**	**COMMENTS**	**JWMP 4**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	Insulation Test		M-Ω
Amp Meter			Amp Meter		
Internal			Internal		
BLOWER 5	**x/✓**	**COMMENTS**	**FURTHUR COMMENTS:**		
Panel					
Hour Reading					
Light Test					
Insulation Test		M-Ω			
Amp Meter					
Internal					

LOCATION: Control Room - Panels					
DOSING P1	**x/✓**	**COMMENTS**	**DOSING P2**	**x/✓**	**COMMENTS**
Panel			Panel		
Light Test			Light Test		
WASH WATER	**x/✓**	**COMMENTS**	**INSTRUMENT**	**x/✓**	**COMMENTS**
Light					
Amp					
SBR SWITCH	**x/✓**	**COMMENTS**	**INLET VALVE SWITCH**	**x/✓**	**COMMENTS**
1			1		
2			2		
3			3		
4			4		
DECANT VALVE	**x/✓**	**COMMENTS**		**x/✓**	**COMMENTS**
1					
2					
3					
4					
EXTRACT FAN 1	**x/✓**	**COMMENTS**	**EXTRACT FAN 2**	**x/✓**	**COMMENTS**
Insulation Test		M-Ω	Insulation Test		M-Ω
INTERNAL LIGHTING	**x/✓**	**COMMENTS**	**EXTERNAL LIGHTING**	**x/✓**	**COMMENTS**
TEST UP'S					
STORAGE TANK ACTUATED VALVE PANEL					

LOCATION: Wash Room					

AIR COMP 1	**x/✓**	**COMMENTS**	**AIR COMP 2**	**x/✓**	**COMMENTS**
Oil			Oil		
Filter			Filter		
Insulation Test		M-Ω	Insulation Test		M-Ω
Belt			Belt		
Drain			Drain		
Pressure Gauge			Pressure Gauge		
AIR COMP PANEL	**x/✓**	**COMMENTS**	**PUMP PANEL**	**x/✓**	**COMMENTS**
Panel			Panel		
Internal			Amp Meter		
PRESSURE CYLINDER	**x/✓**	**COMMENTS**	**PUMP1**	**x/✓**	**COMMENTS**
			Insulation Test		M-Ω
PUMP 2	**x/✓**	**COMMENTS**	**FURTHUR COMMENTS:**		
Insulation Test		M-Ω			
INTERNAL LIGHTING	**x/✓**	**COMMENTS**			
EMERGENCY LIGHT	**x/✓**	**COMMENTS**			

LOCATION: LTP Inlet Valves

INLET VALVE 1	x/✓	COMMENTS	INLET VALVE 2	x/✓	COMMENTS
Mechanical			Mechanical		
INLET VALVE 3	**x/✓**	**COMMENTS**	**INLET VALVE 4**	**x/✓**	**COMMENTS**
Mechanical			Mechanical		

COMMENTS:

LOCATION: Wheel Wash

PANEL	x/✓	COMMENTS	LIFT PUMP	x/✓	COMMENTS
Panel			Mechanical		
Hour Reading			Insulation Test		M-Ω
Light Test					

COMMENTS:

LOCATION: Access Platform – Storage Tank 1 & 2

Platform	x/✓	COMMENTS
Lock		
Hinges on Door		
Steps		
Life Buoy		
Ht Sensor Store 1		
Ht Sensor Store 2		
Joint Box		
Lagging		

LOCATION: Storage Tank 1 & 2

	x/✓	COMMENTS
Sampling Tap 1		
Sampling Tap 2		

LOCATION: Pump Lifting Station

CONFINED SPACE LOCATION – PERMIT TO WORK REQUIRED

PUMP 1 Panel	**x/✓**	**COMMENTS**	**PUMP 2 Panel**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	Insulation Test		M-Ω
Amp Meter			Amp Meter		
Internal			Internal		
PUMP 3 Panel	**x/✓**	**COMMENTS**	**FURTHUR COMMENTS:**		
Panel					
Hour Reading					
Light Test					
Amp Meter					
Internal					
FAN 1 Panel	**x/✓**	**COMMENTS**	**FAN 2 Panel**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Insulation Test		M-Ω	**SUMP PUMP**	**x/✓**	**COMMENTS**
Amp Meter			Insulation Test		M-Ω
Internal			Amp Meter		
			Internal		

PUMP 1	**x/✓**	**COMMENTS**	**PUMP 2**	**x/✓**	**COMMENTS**
Oil			Oil		
VALVE 1			VALVE 2		
NR VALVE 1			NR VALVE 2		
PUMP 3	**x/✓**	**COMMENTS**			
Oil					
VALVE 3					
NR VALVE 3					
LIGHTING	**x/✓**	**COMMENTS**	**EXTERNAL VALVES**	**x/✓**	**COMMENTS**
Internal			MD VALVE 6		
Emergency			MD VALVE 7		
External					

COMMENTS:

LOCATION: Pump Lifting Station Crane		
		
Service Date:		
Crane	**x/✓**	**COMMENTS**
Operational		
Control Box-Batton-Remote Control		
Leads		
Chains Secure		
Isolator		

LOCATION: Actuated Valve Chamber					
					
SECURITY OF CABINET:			**SIGNAGE:**		
LIGHTING	**x/✓**	**COMMENTS**			
Internal					
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
UPS BYPASS	**x/✓**	**COMMENTS**	**MCC DIST BOARD**	**x/✓**	**COMMENTS**
ACTUATED VALVE PANEL	**x/✓**	**COMMENTS**		**x/✓**	**COMMENTS**
Panel					
Light Test					
Displays					
COMMENTS:					

LOCATION: Actuated Valve Compound					
SECURITY OF COMPOUND:					
TAP 1	**x/✓**	**COMMENTS**	**TAP 2**	**x/✓**	**COMMENTS**
Functional			Functional		
Hose in Place			Hose in Place		
Diaphragm Pump Operational			Diaphragm Pump Operational		
Lagging in place			Lagging in place		
COMMENTS:					
Actuated Valves – See Three Monthly Service Record Sheet					

LOCATION: South Leat

LEAVES/LITTER

SECURITY OF COMPOUND:	**LOCK:**	**BEACON:**

SECURITY OF CABINET:	**OVERRIDE BUTTON:**

WATER SUPPLY CABINET:

LIGHTING	**x/✓**	**COMMENTS**	**LIGHTING**	**x/✓**	**COMMENTS**
External			Internal		
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
Telemetric	**x/✓**	**COMMENTS**	**BATTERY BACK UP**	**x/✓**	**COMMENTS**
Dial Out					
FLOW METER	**x/✓**	**COMMENTS**	**GENERATOR CONNECTION**	**x/✓**	**COMMENTS**
Reading					
PANEL SUMP PUMP	**x/✓**	**COMMENTS**	**PANEL FEED SUB STATION**	**x/✓**	**COMMENTS**
Panel			Panel D/B		
Hour Reading			**PANEL**	**x/✓**	**COMMENTS**
Light Test			Kw-Hour Reading		
Displays					
FLYPT PUMP INTERNAL	**x/✓**	**COMMENTS**	**EXTRA COMMENTS:**		
Insulation Test		M-Ω			

VALVE CHAMBER SOUTH LEAT

INLET VALVE	x/✓	COMMENTS	NR VALVE	x/✓	COMMENTS
ISO VALVE 1	**x/✓**	**COMMENTS**	**ISO VALVE 2**	**x/✓**	**COMMENTS**
AIR VALVE	**x/✓**	**COMMENTS**	**MANHOLE COVER**	**x/✓**	**COMMENTS**

COMMENTS:

PUMP CHAMBER

	x/✓	COMMENTS
Free of Obstruction		
Manhole Covers		
Davit Hole		

COMMENTS:

LOCATION: Lagoon Pumping Station


SECURITY OF CABINET:

WATER SUPPLY CABINET:

LIGHTING	**x/✓**	**COMMENTS**	**LIGHTING**	**x/✓**	**COMMENTS**
External			Internal		
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
Telemetric	**x/✓**	**COMMENTS**			
PANEL	**x/✓**	**COMMENTS**	**DIS BOARD**	**x/✓**	**COMMENTS**
Panel					
Hour Reading			**FLOW METER**	**x/✓**	**COMMENTS**
Light Test					
Displays					
Level Sensor					
Amp Meter					
FLYPT PUMP	**x/✓**	**COMMENTS**			
Insulation Test		M-Ω			

EXTRA COMMENTS:

VALVE CHAMBER LAGOON PUMPING STATION					
					
INLET VALVE	**x/✓**	**COMMENTS**	**NR VALVE**	**x/✓**	**COMMENTS**
ISO VALVE 1	**x/✓**	**COMMENTS**	**ISO VALVE 2**	**x/✓**	**COMMENTS**
AIR VALVE	**x/✓**	**COMMENTS**	**MANHOLE COVER**	**x/✓**	**COMMENTS**
COMMENTS:					

PUMP CHAMBER		
		
	x/✓	**COMMENTS**
Free of Obstruction		
Manhole Covers		
Davit Hole		
COMMENTS		

LOCATION: North Leat


SECURITY OF COMPOUND:	LOCK:	BEACON:

SECURITY OF CABINET:	OVERRIDE BUTTON:
SIGNAGE:	LEAVES/LITTER

LIGHTING	x/✓	COMMENTS	LIGHTING	x/✓	COMMENTS
External			Internal		
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
Telemetric	**x/✓**	**COMMENTS**	**BATTERY BACK UP**	**x/✓**	**COMMENTS**
PANEL PUMP 1	**x/✓**	**COMMENTS**	**PANEL MAINS MONITORING**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Kw-Hour Reading		
Light Test			Light Test		
Displays			Displays		
FLYPT PUMP	**x/✓**	**COMMENTS**	**EXTRA COMMENTS:**		
Insulation Test		M-Ω			
PANEL POWER FACTOR	**x/✓**	**COMMENTS**	**PANEL GENERATOR INCOMER**	**x/✓**	**COMMENTS**
Panel			Panel		
PANEL CONTROL	**x/✓**	**COMMENTS**			
Panel					
Light Test					

EXTRA COMMENTS:

VALVE CHAMBER NORTH LEAT					
					
	x/✓	COMMENTS		x/✓	COMMENTS
Free of Vegetation					
INLET VALVE	**x/✓**	**COMMENTS**	**NR VALVE**	**x/✓**	**COMMENTS**
ISO VALVE 1	**x/✓**	**COMMENTS**	**ISO VALVE 2**	**x/✓**	**COMMENTS**
AIR VALVE	**x/✓**	**COMMENTS**	**MANHOLE COVER**	**x/✓**	**COMMENTS**
COMMENTS:					

PUMP CHAMBER		
		
	x/✓	**COMMENTS**
Free of Obstruction		
Manhole Covers		
Davit Hole		
COMMENTS		

LOCATION: The Ride

SECURITY OF COMPOUNDS:	**LOCK**	BEACON

SECURITY OF CABINET:	**OVERRIDE BUTTON:**

WATER SUPPLY CABINET:

SIGNAGE:	**LEAVES/LITTER**

LIGHTING	**x/✓**	**COMMENTS**	**LIGHTING**	**x/✓**	**COMMENTS**
External			Internal		
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
Telemetric	**x/✓**	**COMMENTS**	**BATTERY BACK UP**	**x/✓**	**COMMENTS**
PANEL PUMP 1	**x/✓**	**COMMENTS**	**DISTRUBUTIO N BOARD**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			**DISPLAY ELEC**	**x/✓**	**COMMENTS**
Light Test			Kw-Hour Reading		
Displays					
FLYPT PUMP	**x/✓**	**COMMENTS**			
Insulation Test		M-Ω			

EXTRA COMMENTS:

PANEL GENERATOR CONNECTION	**x/✓**	**COMMENTS**

VALVE CHAMBER THE RIDE					
					
INLET VALVE	**x/✓**	**COMMENTS**	**NR VALVE**	**x/✓**	**COMMENTS**
ISO VALVE 1	**x/✓**	**COMMENTS**	**ISO VALVE 2**	**x/✓**	**COMMENTS**
AIR VALVE	**x/✓**	**COMMENTS**	**MANHOLE COVER**	**x/✓**	**COMMENTS**
COMMENTS:					

PUMP CHAMBER		
		
	x/✓	**COMMENTS**
Free of Obstruction		
Manhole Covers		
Davit Hole		
COMMENTS		

LOCATION: Treated Leachate Pumping Station

SECURITY OF CABINET:

SIGNAGE:

LIGHTING	**x/✓**	**COMMENTS**	**LIGHTING**	**x/✓**	**COMMENTS**
External			Internal		
HEATING	**x/✓**	**COMMENTS**	**F Extinguisher**	**x/✓**	**COMMENTS**
Working			Full		
Thermostat			Service Date		
Telemetric	**x/✓**	**COMMENTS**	**BATTERY BACK UP**	**x/✓**	**COMMENTS**
PANEL PUMP 1	**x/✓**	**COMMENTS**	**PANEL PUMP 2**	**x/✓**	**COMMENTS**
Panel			Panel		
Hour Reading			Hour Reading		
Light Test			Light Test		
Displays			Displays		
FLYPT PUMP	**x/✓**	**COMMENTS/READINGS**	**FLYPT PUMP**	**x/✓**	**COMMENTS/READINGS**
Insulation Test		M-Ω	Insulation Test		M-Ω
PANEL	**x/✓**	**COMMENTS**	**PANEL**	**x/✓**	**COMMENTS**
Panel			Kw-Hour Reading		
Light Test					
INLET VALVE	**x/✓**	**COMMENTS**	**NR VALVE**	**x/✓**	**COMMENTS**
ISO VALVE 1	**x/✓**	**COMMENTS**	**ISO VALVE 2**	**x/✓**	**COMMENTS**
ISO VALVE 3	**x/✓**	**COMMENTS**	**ISO VALVE 4**	**x/✓**	**COMMENTS**

COMMENTS:

MONTHLY LIST OF DEFECTS					
No.	**ITEM**	**COMMENTS ON FAULT**	**REPAIR COMMENTS**	**NAME & SIGNATURE**	**DATE**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

MONTHLY LIST OF DEFECTS CONTINUED					
No.	**ITEM**	**COMMENTS ON FAULT**	**REPAIR COMMENTS**	**SIGNATURE**	**DATE**
11					
12					
13					
14					
15					
16					
17					
18					
OVERALL COMMENTS					

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant | **DATE:** 11.05.2021 | **ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate | **WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
1	**Litter** *Non-hazardous (plastics & man-made fibres) windblown material moving off site Vandalism of containers leading to escape of loose waste*	Airborne material derived from waste transfer operations	Visual & physical impact Ingestion Physical impact Smothering	People: *On site* *Off site* Property: *Waste Facility* *Residential Area* Ecosystems: *River Plym* *Mud Flats Priority Habitat (PH)* *Woodland PH* *Saltram estate* *Restored landfill* *South Leat*	L L M M H H H H H H	L L L L L L L L L L	L L M M M M M M M M	Liquid waste (landfill leachate) derived from landfill drainage system. Large waste facility immediately adjacent . Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Boundary fence to intercept litter. TCM on site and inspecting regularly. 24 hour CCTV Closed waste bins provided outside control room Litter removal as required and transfer to residual container.	L
2	**Noise & Vibration** *Vehicle movements on & off site* *Mechanical and electrical infrastructure operating 24/7*	Airborne noise Ground vibration	Unacceptable noise pollution Structural damage to buildings Noise levels damaging to human health & disruptive to animal/bird behaviour	People: *On site* *Off site* Property: *Waste Facility* *Residential Area* Ecosystems: *River Plym* *Mud Flats Priority Habitat (PH)* *Woodland PH* *Saltram estate* *Restored landfill*	H H H H H H H H H	H H M H H H H M H	H H H H H H H H H	Small numbers of vehicles visiting regularly. Tanker movements occasional Treatment operations 24/7 Aging blowers inherently noisy and close to residential area Proximity and direction of receptor: waste facility immediately adjacent; residential 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	24hr repeating treatment Regular servicing of all infrastructure. Blowers to be replaced 2021, to conform to requirements of noise risk assessment TCM on site PPE for site operatives Complaints procedure	L

GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW

SEVERITY * PROBABILITY = RISK

H * H = H
H * M = H
M * M = M
L * H = M
L * M = M
L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant	**DATE:** 11.05.2021	**ASSESSOR:** Leppitt Associates
OPERATION: Biological Treatment of Non Hazardous Landfill Leachate		**WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
3	**Dust & Particulate matter** *Vehicle movements*	Airborne	Smothering Eutrophication/ contamination Inhalation	People: *on site* *off site* Property: *Waste Facility* *Residential Area* Ecosystems: *River Plym* *Mud Flats* *Priority Habitat (PH)* *Woodland PH* *Saltram estate* *Restored landfill* *South Leat*	 H H H H H H H H H H	 L L L L L L L L L L	 M M M M M M M M M M	Small numbers of vehicles visiting regularly. Tanker movements occasional Treatment process does not generate dust/particles South Leat has seasonal water flow Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat ca. 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Access route and site base engineered. Dampening down of engineered surfaces as required TCM on site and inspecting regularly including regular infrastructure checks. Management System and Emergency Procedure in place.	L

GUIDANCE NOTES **H = HIGH** **M = MEDIUM** **L = LOW**	**SEVERITY * PROBABILITY = RISK** **H * H = H** **H * M = H** **M * M = M** **L * H = M** **L * M = M** **L * L = L**

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant | **DATE:** 11.05.2021 | **ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate | **WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
4	**Odours** *Malodorous waste* *Vehicle emissions*	Airborne	Inhalation of emissions	People: *On site* *Off site*	 H H	 L L	 H H	Landfill leachate generated from anaerobic decomposition of waste with potential for odour. Leachate received is highly diluted and has minimal odour. No odorous additives during treatment process Storage tanks and SBR tanks open-topped Proximity and direction of receptor: waste facility immediately adjacent; residential 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Odour monitoring as outlined in Management System. Odour Emergency Procedure and Complaints Procedure in place. TCM on site and inspecting regularly.	L

GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW

SEVERITY * PROBABILITY = RISK

H * H = H
H * M = H
M * M = M
L * H = M
L * M = M
L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant	**DATE:** 11.05.2021	**ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate	**WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
5	**Mud on roads** *Vehicle movements*	Surface water bodies Highway	Oxygen depletion in surface water bodies Contamination of water accessed by domestic livestock Generation of dust on drying (see 3 above) Slippery road	Property: *Highway* Ecosystems: *River Plym* *Mud Flats* *Priority Habitat (PH)* *Woodland PH* *Saltram estate* *Restored landfill* *South Leat*	H M M M M M H	L L L L L L L	M M M M M M M	Approach road and site base of engineered construction No soils etc. accepted South Leat has seasonal water flow Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat ca. 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE.	Good housekeeping policy. TCM on site and inspecting regularly. Cleaning of engineered site base and adjacent highway as required.	L
6	**Noxious Weeds & Pests (Birds, Vermin & Insects)** *Perching points & open tank with liquor*	Airborne	Spread of disease	People: *On site* *Off site*	H H	L L	M M	Liquid waste (landfill leachate) derived from landfill drainage system. Large waste facility immediately adjacent Storage tanks utilised for roosting and bathing Proximity and direction of receptor: waste facility immediately adjacent; residential ca. 70m S; Saltram estate ca. 750m NNE connected by Ride adjacent to River Plym.	Pest inspection and control if required. Waste bins provided, secure and emptied regularly TCM on site undertaking regular site inspection. Management System in place	L

GUIDANCE NOTES	**SEVERITY * PROBABILITY = RISK**	
H = HIGH **M = MEDIUM** **L = LOW**	**H * H = H** **H * M = H** **M * M = M** **L * H = M**	**L * M = M** **L * L = L**

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

<table>
<tr><td colspan="5">LOCATION: Chelson Meadow Leachate Treatment Plant</td><td colspan="2">DATE: 11.05.2021</td><td colspan="4">ASSESSOR: Leppitt Associates</td></tr>
<tr><td colspan="6">OPERATION: Biological Treatment of Non Hazardous Landfill Leachate</td><td colspan="5">WASTE CATEGORY: Landfill Leachate</td></tr>
<tr><th>ITEM</th><th>HAZARD/SOURCE</th><th>PATHWAY</th><th>RISK/HARM</th><th>RECEPTOR</th><th>SEVERITY (H/M/L)</th><th>PROBABILITY (H/M/L)</th><th>RISK (H/M/L)</th><th>JUSTIFICATION OF RISK</th><th>GENERIC CONTROLS/PRECAUTIONS</th><th>OVERALL RESIDUAL RISK</th></tr>
<tr><td>7</td><td>Non-conforming Waste

Additional external inputs to leachate drainage system via surface water drainage system to waste facility</td><td>Surface water

Airborne</td><td>Toxic
Hazardous
Explosive</td><td>People:
On site
Off site

Property:
Waste Facility
Residential Area

Ecosystems:
River Plym
Mud Flats
Priority Habitat (PH)

LTP Biomass</td><td>
H
H

H
H

H
H

H</td><td>
L
L

L
L

L
L

M</td><td>
M
M

M
M

M
M

H</td><td>Part of drainage system serving adjacent waste facility enters the leachate drainage system via oil interceptors

Most outfall discharge is at high tide
Emergency discharge can be outside tidal window

Biological treatment process can be inhibited by uncontrolled inputs
Leachate of known composition monitored annually for permit compliance

Proximity and direction of receptor: River Plym & mud flats at permit boundary.</td><td>Drainage can be isolated from the tanks for known incident

Oil interceptors with maintenance programme

Long term plan to redirect surface water

Regular chemical monitoring of incoming leachate

Outfall monitored weekly

Permit compliance includes toxicity testing

Non-conforming liquor transferred to permitted facility as a priority.

TCM on site and inspecting regularly
Site operated under Environmental Permit and with Management System and Emergency Procedure in place.</td><td>L</td></tr>
<tr><td colspan="2">GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW</td><td colspan="9">SEVERITY * PROBABILITY = RISK

H * H = H   L * M = M
H * M = H   L * L = L
M * M = M
L * H = M</td></tr>
</table>

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant	**DATE:** 11.05.2021	**ASSESSOR:** Leppitt Associates
OPERATION: Biological Treatment of Non Hazardous Landfill Leachate	**WASTE CATEGORY:** Landfill Leachate	

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
8	**Fire** *Vehicle fires* *Equipment/ Process fire* *Fire Water* *Smoke* *Arson - Waste/Plant* *Dissolved methane gas explosion (DSEAR)*	Convection Radiation Conduction	Loss of property Damage to human health Loss of vegetation Asphyxiation Contamination of treatment process	People:				Site drainage connected to treatment system, composed of bacterial biomass vulnerable to environmental variation Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat ca. 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Engineered site base with site drainage Gas and fire detection systems in control room and pump lifting station DSEAR RA for LTP Confined spaces defined Chemical cabinet storage Regular monitoring of mixed liquor and bacterial health Fire extinguishers Fire water can be isolated from incoming leachate storage tank Oils spills contained and cleaned immediately 24 hour CCTV Fire prohibition & no smoking policy Mains water on site Site mechanical and electrical infrastructure serviced to manufacturers specification. TCM on site and inspecting regularly.	L
				On site	H	L	*M*			
				Off site	H	L	*M*			
				Property:						
				Waste Facility	H	L	*M*			
				Residential Area	H	L	*M*			
				Ecosystems:						
				River Plym	H	L	*M*			
				Mud Flats	H	L	*M*			
				Priority Habitat (PH)						
				Woodland PH	H	L	*M*			
				Saltram estate	H	L	*M*			
				Restored landfill	H	L	*M*			
				South Leat	H	L	*M*			
				Groundwater	H	L	*M*			
				LTP Bacterial biomass	H	M	*H*			

GUIDANCE NOTES	SEVERITY * PROBABILITY = RISK	
H = HIGH **M = MEDIUM** **L = LOW**	**H * H = H** **H * M = H** **M * M = M** **L * H = M**	**L * M = M** **L * L = L**

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant	DATE: 11.05.2021	ASSESSOR: Leppitt Associates
OPERATION: Biological Treatment of Non Hazardous Landfill Leachate	WASTE CATEGORY: Landfill Leachate	

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
9	**Surface and ground water pollution** *Noxious liquid emanating from:* *- leaks of hydraulic fluids & fuel* *-uncontrolled emission of leachate* *- fire water*	Direct run-off from site Percolation into ground water	Contamination of ground and surface water	People: *Off site* Ecosystems: *River Plym* *Mud Flats* *Priority Habitat (PH* *South Leat* *Groundwater*	H H H H H	L M M M M	M H H H H	Small numbers of vehicles visiting regularly. Tanker movements occasional LTP constructed on historic landfill (contaminated land) Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat ca. 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Hydraulic fluids etc. stored in locked container/store Site base of engineered construction with site drainage Periodic infrastructure monitoring and maintenance Incoming leachate volume measured by flow meter - unusual decline should trigger investigation Monitoring of South Leat water composition All spillages contained, see Emergency Procedure. TCM on site and inspecting regularly Site operated under Environmental Permit with Management System in place. Site mechanical and electrical infrastructure serviced to manufacturers specification.	L

GUIDANCE NOTES	SEVERITY * PROBABILITY = RISK	
H = HIGH M = MEDIUM L = LOW	H * H = H H * M = H M * M = M L * H = M	L * M = M L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant | **DATE:** 11.05.2021 | **ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate | **WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
10	**Vandalism of Plant or Fuel & Hydraulic Oil Storage leading to leaks** *Noxious liquid emanating from:* *- leaks of hydraulic fluids & fuel from damaged site plant or fuel store*	Direct run-off from site Percolation into ground water	Contamination of ground and surface water Contamination of treatment process	People: *Off site* *On Site* Property: *LTP Infrastructure* Ecosystems: *River Plym* *Mud Flats* *Priority Habitat (PH* *South Leat* *Groundwater* *LTP Bacterial biomass*	 H H H H H H H H	 L L L L L L L M	 M M M M M M M H	Site drainage connected to treatment system, composed of bacterial biomass vulnerable to environmental variation Small numbers of vehicles visiting regularly. Tanker movements occasional Treatment operations 24/7 Proximity and direction of receptor: waste facility immediately adjacent; residential and South Leat ca. 70m S; capped landfill, River Plym & mud flats at permit boundary; PH woodland 125m ESE; Saltram estate ca. 750m NNE. Prevailing wind from SW to W, plus some E	Site secured by fencing and gates locked out of hours Compound is part of a larger facility with security measures Intruder alarms on key infrastructure with telemetric output Hydraulic fluids etc. stored in locked container/store Site plant maintained regularly and with daily checks CCTV Regular monitoring of mixed liquor and bacterial health Site base of engineered construction with site drainage All spillages contained, see Emergency Procedure. TCM on site and inspecting regularly, including regular infrastructure checks Site operated under Environmental Permit with Management System in place. Site mechanical and electrical infrastructure serviced to manufacturers specification.	L

GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW

SEVERITY * PROBABILITY = RISK

H * H = H
H * M = H
M * M = M
L * H = M
L * M = M
L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant	**DATE:** 11.05.2021	**ASSESSOR:** Leppitt Associates	
OPERATION: Biological Treatment of Non Hazardous Landfill Leachate		**WASTE CATEGORY:** Landfill Leachate	

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
11	**Discharge to River Plym** *Permit non-compliance in one or more parameters*	Direct emission to River Plym direct bio-uptake by mud flat ecosystem	Contamination of surface water (River Plym) and mud flats	People: *Off site* Ecosystems: *River Plym* *Mud Flats* *Priority Habitat (PH)*	H H H	L L L	M M M	River Plym used for leisure activities Treatment operations 24/7 Proximity and direction of receptor: River Plym & mud flats receive discharge	Permit specifies point source emission trigger levels Regular chemical monitoring of incoming leachate allowing treatment adjustment Outfall monitored weekly for discharge parameters SBR Biomass monitored weekly Site mechanical and electrical infrastructure serviced to manufacturers specification. LTP Operator or equivalent on site during the working week. LTP can be managed remotely TCM on site and inspecting regularly. Management System and Emergency Procedure in place.	L

GUIDANCE NOTES	SEVERITY * PROBABILITY = RISK	
H = HIGH M = MEDIUM L = LOW	H * H = H H * M = H M * M = M L * H = M	L * M = M L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant | **DATE:** 11.05.2021 | **ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate | **WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
12	**Flooding** *Damage to key infrastructure and treatment capability*	Direct flow from River Plym direct flow from South Leat Catastrophic rainfall generating surface water	Failure of LTP	Property: *LTP infrastructure* Ecosystems: *LTP Bacterial biomass*	H H	L L	M M	Site drainage connected to treatment system Part of LTP within 1 in 100 year flood risk zone	TCM on site and inspecting regularly. Management System and Emergency Procedure in place. LTP Operator or equivalent on site during the working week. LTP managed remotely Telemetric alarm Long term plan to raise engineered site base where required CCTV	M

GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW

SEVERITY * PROBABILITY = RISK

H * H = H
H * M = H
M * M = M
L * H = M
L * M = M
L * L = L

ENVIRONMENTAL RISK ASSESSMENT - WASTE OPERATIONS

LOCATION: Chelson Meadow Leachate Treatment Plant | **DATE:** 11.05.2021 | **ASSESSOR:** Leppitt Associates

OPERATION: Biological Treatment of Non Hazardous Landfill Leachate | **WASTE CATEGORY:** Landfill Leachate

ITEM	HAZARD/*SOURCE*	PATHWAY	RISK/HARM	RECEPTOR	SEVERITY (H/M/L)	PROBABILITY (H/M/L)	RISK (H/M/L)	JUSTIFICATION OF RISK	GENERIC CONTROLS/PRECAUTIONS	OVERALL RESIDUAL RISK
13	**SBR Foam** *Permit non-compliance*	Direct emission from SBRs direct bio-uptake or percolation into soil and surface/ ground water	Contamination of soils, ground and surface water Imperceptible contact with skin	People: *Off site* *On site* Ecosystems: *R Plym* *Mud Flats* *Priority Habitat* *South Leat*	 H H H H H	 M M L L L	 H H M M M	Storage tanks and SBR tanks open-topped Biofoam generated by aeration process Treatment operations 24/7 Proximity and direction of receptor: waste facility immediately adjacent - and specifically weighbridge and haul road; residential and South Leat ca. 70m S; River Plym & mudflats at permit boundary. Prevailing wind from SW to W, plus some E	Automated release of anti-foam at critical wind speed - system subject to regular servicing (monthly) TCM on site and inspecting regularly. Management System and Emergency Procedure in place. CCTV LTP Operator or equivalent on site during the working week. LTP managed remotely Telemetric alarm	L

GUIDANCE NOTES

H = HIGH
M = MEDIUM
L = LOW

SEVERITY * PROBABILITY = RISK

H * H = H
H * M = H
M * M = M
L * H = M
L * M = M
L * L = L

https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit

You must do a climate change risk assessment for any new bespoke waste and installation environmental permit application if you expect to operate for more than 5 years. If you get a screening **score of 5 or more**, you will need to **complete your climate change risk assessment** and submit it with your application form.

CATEGORY	SCREENING QUESTIONS	SCORE	YOUR SCORE
1 TIMESCALES	*How long will a permit be required for this site/activity?* 5 years or less of operation. No need to fill in the rest of the screening. You do not need to fill in a risk assessment.	0	
	Less than 20 years of operation	1	**5**
	Until between 2040 and 2060 (between 20 and 40 years from now)	3	
	Until 2060 or beyond (more than 40 years from now)	5	
2 FLOODING	*What is your site's risk of flooding from rivers or the sea?*		
	Not in a flood risk zone	0	**1**
	Very low or Low	1	
	Medium	2	
	High	5	
3 WATER USE	*source of your water?*		
	Water not required	0	
	Mains water	1	**1**
	Surface water or groundwater abstraction	5	
		TOTAL SCREENING SCORE	**7**

https://environment.data.gov.uk/catchment-planning/data-download/#/

South west England river basin district: climate change risk assessment worksheet

Name (as on your part A application form): Chelson Meadow Leachate Treatment Plant

Our permit reference number (if you have one): EPR/CP3731LZ/V004

Your document reference number: Environmental Risk Assessment

Risk assessment worksheet for the 2050s

South west England river basin district

You must carry out a climate change risk assessment for any new bespoke waste and installations permit applications if you expect to operate for more than 5 years. Use the user guide to complete the table. You can add in extra pages if necessary.

Consider how your operations will be affected by the changes in weather and climate described in the table. Consider any changes to average climate conditions that may impact on your operations, for example extreme rainfall.

Also consider:

- critical thresholds - where a 'tipping point' is reached, for example a specific temperature where site processes cannot operate safely
- changes to averages - for example an entire summer of higher than expected rainfall causing waterlogging
- where hazards may combine to cause more impacts

You can add in other climate variables if you wish.

If you have stated on your application form that you do not expect to be operational in 2050, you must still consider climate change risks for the time you do intend to operate. Whilst the variables are for the 2050s, this is an estimated date and you may experience these conditions before then.

Risk scoring matrix

Assess the impact(s) from each of the weather and climate change scenarios and calculate your risk score using the risk scoring matrix.

Your risk score is the likelihood of something happening multiplied by the severity of its impact.

	Severe impact (score = 4)	Medium impact (score = 3)	Mild impact (score = 2)	Minor impact (score = 1)
Highly likely (score = 4)	16	12	8	4
Likely (score = 3)	12	9	6	3
Low likelihood (score = 2)	8	6	4	2
Unlikely (score = 1)	4	3	2	1

This worksheet will sit in your management system. It must appear on the management system summary you submit with your application, even if you do not need to submit the whole risk assessment with your application.

If your pre-mitigation risk score (column D) is 5 or higher, you must complete columns E to H.

LOCATION: Chelson Meadow Leachate Treatment Plant	**DATE:** 12.05.2021	**ASSESSOR:** Leppitt Associates
OPERATION: Biological Treatment of Non Hazardous Landfill Leachate	**LOCATION:** Landfill Leachate	

Potential changing climate variable	**A Impact**	**B Likelihood**	**C Severity**	**D Risk (B x C)**	**E Mitigation (what will you do to mitigate this risk**	**F Likelihood** (after mitigation)	**G Severity** (after mitigation)	**H Residual risk (F x G)**
1. Summer daily maximum temperature may be around 7°C higher compared to average summer temperatures now.	Summer leachate production will decline Treatment efficiency will increase	1	1	1	None required			
2. Winter daily maximum temperature could be 4°C more than the current average, with the potential for more extreme temperatures, both warmer and colder than present.	Incoming leachate temperature buffered by ground temperature Treatment volume is large and aeration will buffer lower temperatures to some degree Treatment efficiency will increase with temperature increase Treatment efficiency vulnerable to prolonged extreme cold	1	1	1	None required			
3. The biggest rainfall events are up to 20% more intense than current extremes (peak rainfall intensity)*.	Large increase in incoming leachate	3	3	9	Leachate very dilute so treatment more rapid Ensure no surface water drainage enters the treatment system Maintain integrity of landfill cap Investigate and prevent other sources of water ingress	2	2	4
4. Average winter rainfall may increase by 41% on today's averages.	Large increase in incoming leachate	3	3	9	Leachate very dilute so treatment more rapid Ensure no surface water drainage enters the treatment system Maintain integrity of landfill cap Investigate and prevent other sources of water ingress	2	2	4
5. Sea level could be as much as 0.6m higher compared to today's level *.	Flood risk to LTP compound increased	3	4	12	Ensure no surface water drainage enters the treatment system Raise the level of wet well outer wall raise the level of the engineered base in the vulnerable section of the compound Design flood protection for electrical substation and pump lifting station	2	2	4
6. Drier summers, potentially up to 45% less rain than now.	Summer leachate production will decline	1	1	1	Treatment process adjusted to stronger leachate	1	1	1
7. At its peak, the flow in watercourses could be 40% more than now, and at its lowest it could be 80% less than now.	Tidal river - see No. 5 Increased flow in South Leat but unlikely to be sufficient to breach cut-off wall	1	1	1	Maintain integrity of cut-off wall	1	1	1

*Indicates data has come from climate change allowances as part of the spatial planning process. Evidence from your planning submission is acceptable evidence for this worksheet.
https://www.gov.uk/guidance/select-a-waste-recovery-or-disposal-method-for-your-environmental-permit

To operate under an environmental permit, you must do a risk assessment predicting the environmental impact that different ways of disposing of waste will have.

In your risk assessment you must compare the different options you have for recovering or disposing of the waste you produce. You need to do this when you're:

- choosing between recovery or disposal options for the waste you produce
- doing a derogation options appraisal because you cannot operate within the Best Available Technique (BAT) associated emissions levels

Nature of Waste: Use the following hazard rating scores:

hazardous waste - score 10	stable non-reactive hazardous waste - score 8	biodegradable non-hazardous waste - score 4	other non-hazardous waste - score 2	inert waste - score 1

D or R Code: Choose from the following list:

composting - R3 - score 2	recycling of wood, metal, plastic or glass - R3, R4, R5, R11, R12 - score 3	chemical recovery - R2 to R9 - score 4	land-spreading - R10 - score 4	using waste as fuel - R1 - score 6	biological treatment (with energy recovery) - D8 - score 8
incineration (with energy recovery) - D10 - score 10	biological and physico-chemical treatment - D8, D9 - score 12	releasing waste into rivers and lagoons - D6, D7 - score 15	permanent storage - D3, D12 - score 17	incineration without energy recovery - D10 - score 20	landfill - D1 or D5 - score 30

DISPOSAL OPERATIONS	**RECOVERY OPERATIONS**
D1 Deposit into or on to land (e.g. landfill, etc.) D2 Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.) D3 Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.) D4 Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.) D5 Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.) D6 Release into a water body except seas/oceans D7 Release to seas/oceans including sea-bed insertion D8 Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 D9 Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 (e.g. evaporation, drying, calcination, etc.) D10 Incineration on land D11 Incineration at sea D12 Permanent storage (e.g. emplacement of containers in a mine, etc.) D13 Blending or mixing prior to submission to any of the operations numbered D1 to D12 D14 Repackaging prior to submission to any of the operations numbered D1 to D13 D15 Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where the waste is produced)	R1 Use principally as a fuel or other means to generate energy R2Solvent reclamation/regeneration R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R4 Recycling/reclamation of metals and metal compounds R5 Recycling/reclamation of other inorganic materials R6 Regeneration of acids or bases R7 Recovery of components used for pollution abatement R8 Recovery of components from catalysts R9 Oil re-refining or other reuses of oil R10 Land treatment resulting in benefit to agriculture or ecological improvement R11 Use of waste obtained from any of the operations numbered R1 to R10 R12 Exchange of waste for submission to any of the operations numbered R1 to R11 R13 Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)

Chelson Meadow LTP

No.	**Type of Waste (LoW)**	**Nature of the Waste Produced**	**Hazard Rating**	**Waste Recovery or Disposal methods (R or D code)**	**Recovery or disposal method impact score**	**Impact: Hazard Score** *Multiplied* **R or D Score**	**Amount of waste (tonnes per year)**	**Total Score: Impact Score** *Multiplied* **Tonnes**
1	19 07 03	Biosludge	4	R3	4	16	100	1600
2								
3								

Leaks and Spillages on Site

Leaks and spillages of diesel, petrol, oils, coolants and hydraulic fluids from vehicles and LTP infrastructure; potential leachate spillages from damaged infrastructure.

Details of potential consequences

Spills of materials on site may lead to an environmental incident (ground and surface water pollution), a health and safety issue, or both. An incident of this nature may result in ecosystem damage or long-term health effects, depending on the nature of the material spilled. The site is of engineered construction, waste operations occur within open tanks, site drainage enters an oil interceptor before returning to a storage tank on site. The site lies adjacent to the River Plym and an outlet, which passes under the Ride/footpath/cycle way, discharges legally into the river. The river flows into the Tamar Estuaries SAC and the LTP permit boundary is within 2km of a biological SSSI (Billacombe Field). The mudflats of the river are Priority Habitat (PH) as is the deciduous woodland, wood pasture and parkland within the boundary of the National Trust Saltram Estate. There is a new housing estate to the south.

Action

Individual

1) IMMEDIATELY **NOTIFY** all personnel and Technically Competent Manager (TCM).

2) Isolate/cordon off the area of the incident.

3) Evaluate incident for location and type of hazards. Determine response based on risk. **DO NOT PLACE SELF AT RISK**. Inform TCM of the extent of the incident.

4) **IF POSSIBLE AND SAFE TO DO SO**, prevent further leakage or spillage. Use spill kit materials to bund affected area if possible or use absorbent material to prevent spread.

5) Check site drainage for signs of pollution and consider inspection of oil interceptor.

TCM

1) TCM immediately assumes responsibility.

2) TCM to consider calling specialist contractor to clean up spill once contained, or Fire & Rescue Service if risk of fire.

3) Assess the likelihood of any pollutant entering the biological treatment system. If pollution is possible isolate the active SBRs and potentially STOR1 until any contaminated liquor has been removed off site.

4) Monitor key parameters of treatment health in the SBRs and devise remediation if required.

5) If possible, make arrangements to transfer any un-spilt liquid to a secure container.

6) Determine the extent of the contamination of soils or pollution of haul route/site drainage.

7) Ensure spill area is fully cleaned before access to the public/site users resumes.

8) If there is evidence of pollution in the oil interceptor use appropriately qualified contractor to pump out contents and dispose of at a suitably permitted facility.

9) TCM to notify the Environment Agency.

10) Arrange for disposal of spilt material and any absorbent items used (Note: these may now be hazardous waste). Implement any further control measures as necessary.

Fire/Explosions/Vehicle fires

On site plant, or site user vehicles; fire within building.

Details of potential consequences

Minor fires may result in uncontrolled environmental releases with potential loss of time and equipment required for daily operations. There may be minor injuries. Major fires may result in loss of equipment/facilities, major injuries or loss of life, and uncontrollable damage to the environment. Either type of fire may affect the daily operation of the site. The site is of engineered construction, waste operations occur within open tanks, site drainage enters an oil interceptor before returning to a storage tank on site. The site lies adjacent to the River Plym and an outlet, which passes under the Ride/footpath/cycle way, discharges legally into the river. The river flows into the Tamar Estuaries SAC and the LTP permit boundary is within 2km of a biological SSSI (Billacombe Field). The mudflats of the river are Priority Habitat (PH) as is the deciduous woodland, wood pasture and parkland within the boundary of the National Trust Saltram Estate. There is a new housing estate to the south.

Action

Preventative

1) No smoking on site
2) No burning/fires on site
3) Permit to work for any hot works required
4) Maintain site security to prevent unauthorised access
5) Maintenance of fire and gas detection system.

Individual

1) Upon discovery **IMMEDIATELY NOTIFY** all personnel **AND EVACUATE** the area of personnel.
2) Contact TCM as soon as safe to do so. If not contactable then summon Fire & Rescue Service.
3) Account for all personnel and assess any personal injuries. Notify TCM of status of personnel.
4) Evaluate incident for location and type of hazards. Determine response based on risk. **DO NOT PLACE SELF AT RISK**.
5) If possible and safe to do so, attempt to tackle fire by proper use of locally available fire extinguishers.

TCM

1) Determine the best course of action based on the size of the fire, the availability of fire suppression equipment, number of personnel involved. (**NB** Sometimes the best course of action is to leave the area rapidly)
2) If the fire suppression efforts require it, summon the Fire & Rescue Services.
3) Assess the likelihood of any pollutant (fire water) entering the biological treatment system. If pollution is possible isolate the active SBRs and potentially STOR1 until any contaminated liquor has been removed off site.
4) Monitor key parameters of treatment health in the SBRs and devise remediation if required.
5) Notify Environment Agency.
6) If appropriate meet the emergency services and direct them to incident location.
7) If necessary, close the site.
8) Liaise with EA and Fire & Rescue Service.
9) Mount an inquiry into incident and review findings. Get as much information from witnesses as possible.
10) Implement any further control measures as necessary, e.g. if fire has prompted leakages then implement Leaks and Spillages Procedure.
11) Document incident in Site Diary and complete incident report.

Odour

Storage and treatment of landfill leachate; acceptance of sewage sludge (re-seeding).

Details of potential consequences

Permit non-compliance. Effects on-site operatives and off-site persons: housing development on south boundary.

Action

Strategy for Odour Mitigation
Effective management of leachate treatment system by ongoing monitoring of key treatment parameters and appropriate response via treatment variables.

Odour Complaint
The following procedure should be followed by the TCM in the event of a complaint or as part of normal site inspections:

Olfactory monitoring of aerial emissions from the site shall be carried out by a competent person, adopting the intensity scale proposed in Table 1 for a period of ten minutes at least twice daily at the site boundary at the entrance to the site and on the south boundary, or from the location of any complaint. Results will be recorded in the site diary, including wind direction and strength.

Table 1 Odour Intensity Scale for Olfactory Monitoring

Intensity	Description
1	No detectable odour
2	Faint odour (barely detectable, need to stand still and inhale facing into the wind)
3	Moderate odour (odour easily detected whilst walking & breathing normally)
4	Strong odour
5	Very strong odour (possibly causing nausea depending on type of odour)

Any odour intensity greater than 3 will be deemed unacceptable, providing the source of the odour can be confirmed as the LTP. If so, an on-site odour inspection will take place to trace back the source of the odour and all control procedures outlined above will be verified.

1) Upon discovery of an odour or on receipt of a compliant regarding odour, check the source and climatic conditions.
2) Proceed to relevant locations and adhere to the above if confirmed as arising from the site.
3) Record findings in site diary.
4) Modify treatment process or restrict intake of unacceptable leachate.

TCM

1) Determine the best course of action
2) Respond to complainant regarding source of odour and resulting mitigating procedure.
3) Notify Environment Agency.
4) Mount an inquiry into incident and review findings. Get as much information from witnesses as possible.
5) Implement any further control measures as necessary, e.g. modify treatment process or initiate tanker to remove unacceptable leachate.
6) Document incident in Site Diary and complete incident report.

Off Site Incident

Surface water drainage from part of the adjacent waste facility, including the main haul road, enters the lagoon pumping station of the wet well and will eventually enter STOR1 prior to transfer to an SBR.

Details of potential consequences

Spills of materials off site or loss of fire water may lead to contamination and potential failure (biomass collapse) of the biological treatment system. The site is of engineered construction, waste operations occur within open tanks, site drainage enters an oil interceptor before returning to a storage tank on site. The site lies adjacent to the River Plym and an outlet, which passes under the Ride/footpath/cycle way, discharges legally into the river. The river flows into the Tamar Estuaries SAC.

Action

TCM on adjacent waste facility

1) IMMEDIATELY **NOTIFY** LTP Technically Competent Manager (TCM) of potential contamination incident, e.g. diesel spill, fire dousing water, chemical spillage.

2) Isolate/cordon off the area of the incident within the affected facility.

3) **IF POSSIBLE AND SAFE TO DO SO**, prevent further leakage or spillage. Use spill kit materials to bund affected area if possible or use absorbent material to prevent spread.

4) Check site drainage for signs of pollution and consider inspection of oil interceptor.

LTP TCM

1) TCM to assess the likelihood of any pollutant entering the biological treatment system. If pollution is possible isolate the active SBRs and potentially STOR1 until any contaminated liquor has been removed off site.

2) TCM to notify the Environment Agency (EA).

3) Monitor key parameters of treatment health in the SBRs

4) Where evidence of contamination in STOR1 or SBRs is evident, initiate appropriate remediation (e.g. entire pump-out of SBR, prevent further leachate entering SBRs by turning pumping stations off, clean SBR, initiate re-seed procedure, re-monitor to confirm zero contamination).

5) If possible, isolate and remove contaminated liquor from the drainage system/oil interceptor using external contractor and dispose of at a suitably permitted facility.

6) Implement any further control measures as necessary.

7) Instigate investigation and report to the EA.

WEEKLY SAMPLING CHELSON MEADOW LTP

The purpose of sampling the LTP is to ensure compliance with the discharge parameters specified in the Environmental Permit (CP3731LZ):

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to water (other than sewer) – emission limits and monitoring requirements

Emission point Ref. & Location	Parameter	Source	Limit (incl unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method Note 1
W1 Final discharge point - as marked on site plan in Schedule 2 discharge to Plym Estuary	Total Suspended solids	Leachate treatment plant	75 mg/l	For 95% of all measured values of periodic samples taken over one year	Weekly	BS EN 6068-2.54:1996 or other method as agreed in writing with the Environment Agency
	Biochemical oxygen demand		10 mg/l			BS EN 1899-1: 1998 or other method as agreed in writing with the Environment Agency
	Ammoniacal nitrogen, expressed as N		10 mg/l			BSEN ISO 11732:1997 or other method as agreed in writing with the Environment Agency
CMOUT38L	Direct toxicity assessment		-	-	Annually	In accordance with Environment Agency S5.03 Guidance for the treatment of landfill leachate – 2.10.2 Emission monitoring.
	Flow		-	-	Continuous	MCERTS or other method as agreed in writing with the Environment Agency

Note 1: Sample point for monitoring marked as 'Sample Point W1' on site plan in Schedule 2 discharge to Plym Estuary

Box 1: Schedule 3 of the LTP Environmental Permit

Schedule 7 – Site plan

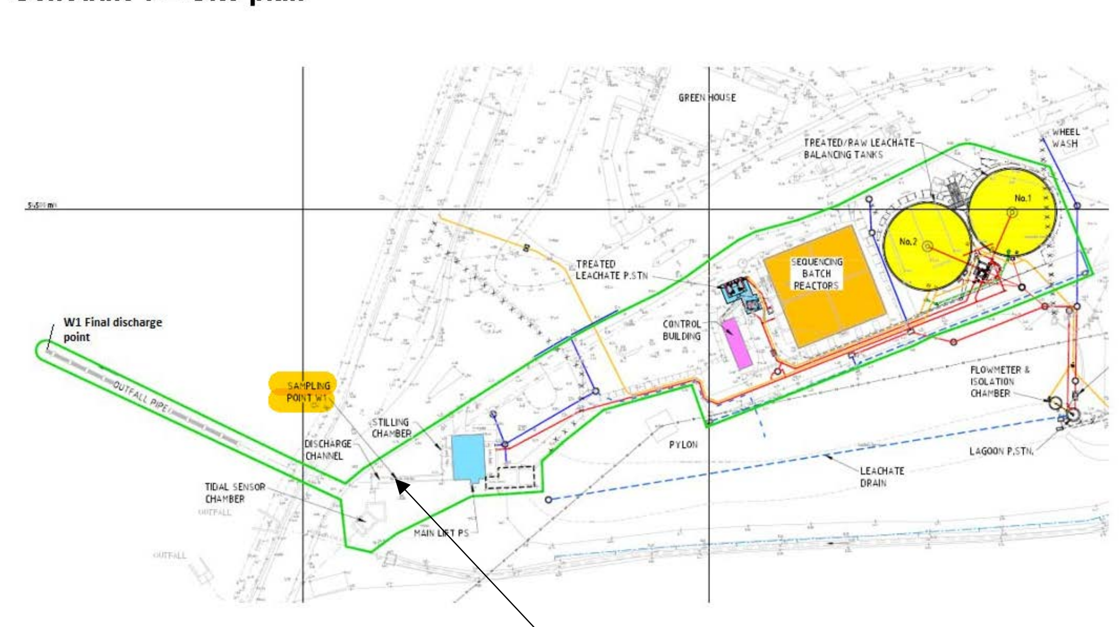


Figure 1: Permit boundary for Chelson Meadow LTP, indicating the location for sampling the treated outfall

Overview

The landfill leachate contains ammoniacal nitrogen NH_4, which cannot be discharged to the River Plym at concentrations above 10mg/l. The treatment process removes most of the NH4 nitrogen, which is metabolised to NO_3. Total suspended solids (TSS) represents the microbial biomass and other small particles suspended in the leachate: the permit limit for TSS ensures only clear outfall enters the River. The Biochemical Oxygen Demand of the leachate is inherently low and is of minor concern in achieving permit compliance at the LTP. If the outfall sample fails on a compliance parameter, data from each of the different points within the LTP enable the source of the problem to be isolated by tracing backwards through results.

The plant comprises two storage tanks and four SBRs. The treatment process is biological. The objective of monitoring at the LTP is to ensure permit compliance and that the biological treatment process is functioning within required limits for key parameters so that the process is sustainable. Failure to understand the performance of the microbial population can result in catastrophic failure of the LTP and its inability to treat leachate until the microbial biomass is re-established successfully through reseeding. Proactive weekly monitoring of the plant ensures appropriate corrective action is put in place quickly.

Weekly monitoring involves taking samples from:

- The **outfall** during discharge of treated leachate
- **Untreated leachate** in STOR1 – which provides information the concentration of ammoniacal nitrogen in the incoming leachate. The higher the concentration the longer the react phase required to treat it.
- **Mixed liquor** from up to four SBRs (depending on how many are in operation). Mixed liquor is the contents of a full SBR, which contains microbial biomass in liquor from the previous cycle, diluted with new incoming leachate requiring treatment. Mixed liquor can be sample at any stage once the react has started and the blowers are aerating to suspend the bacteria throughout the liquor and ensure full mixing.
- **Settled liquor** immediately prior to discharge from an individual SBR so that the performance of that SBR against the compliance parameters can be determined. Outfall liquor can be a combination of output from more than one SBR, only one of which may be functioning properly.

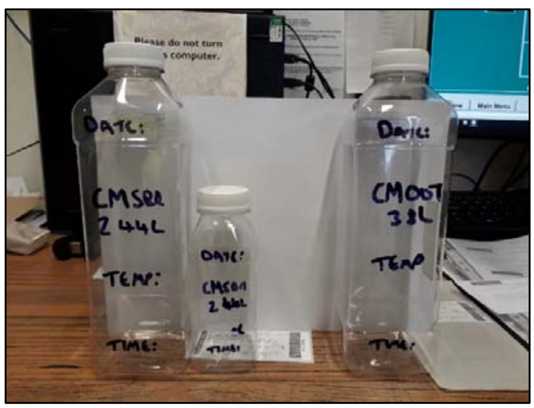
The above equates to a maximum of 10 samples to be taken each week.

Ideally sampling should be undertaken on the Monday to allow time for the results to come back from the laboratory by the end of the working week. Times of sampling vary because normally the outfall is discharged during a 2.5hr period in the high tide window. Also, each SBR operates sequentially and each should be monitored to pinpoint if one or more are not functioning effectively.

Bottles & Paperwork

Prior to sampling the following procedure is required:

1. Obtain 10 x 1 litre and 6 x 250ml PET bottles from the storage boxes kept at rear of Control Room or Pump Lifting Station. Each bottle should be labelled using waterproof ink with the Date, Sample ID, Time of sampling, and Temperature of the liquid sampled:



2. Obtain the SWW sheets and labels from the 2nd draw down in Control Room. There will be four A4 pages plus 16 sticky labels. You need to ensure the Job name in the top left-hand corner is the same on each of the 4 pages i.e. PLYMCCCM 191226.

```
Printed Date : 18-DEC-2019 11:20:17.87                          Page : 33
                              SAMPLE RUN SHEETS
                              =================
   Sampler:
Sampled Date:                               Job Name: PLYMCCCM_191226
===============================================================================
                              2 Bottles Required      Sample ID: 5013152
                                  Schedules: PPCC5.
    Sampling Point: PCMSTOR1                         Time Sampled: __________
                    CHELSON MEADOW - STOR 1
    Collected From:


     Material Code: E05                            Purpose Code: P
   Sampling Method: S                         Capital Indicator: FALSE
  Cost Centre Code: _______
      OBSERVATIONS:


                 Temperature: _______

-------------------------------------------------------------------------------
                              1 Bottle Required      Sample ID: 5013170
                                  Schedules: PPCC15.
    Sampling Point: PCMML139L                        Time Sampled: __________
                    CHELSON MEADOW - SBR1 MIXED LIQUOR
    Collected From:


     Material Code: E05                            Purpose Code: P
   Sampling Method: S                         Capital Indicator: FALSE
  Cost Centre Code: _______
      OBSERVATIONS:


                 Temperature: _______

          NH3 N Total On Site: _______

-------------------------------------------------------------------------------
                              1 Bottle Required      Sample ID: 5013188
                                  Schedules: PPCC15.
    Sampling Point: PCMML240L                        Time Sampled: __________
                    CHELSON MEADOW - SBR2 MIXED LIQUOR
    Collected From:


     Material Code: E05                            Purpose Code: P
   Sampling Method: S                         Capital Indicator: FALSE
  Cost Centre Code: _______
      OBSERVATIONS:


                 Temperature: _______

          NH3 N Total On Site: _______

-------------------------------------------------------------------------------
```

3. Also ensure the IDs on the sticky labels for the sample bottles match up with the IDs on the relevant paperwork

Printed Date : 18-DEC-2019 11:20:18.18 Page : 35

SAMPLE RUN SHEETS

Sampler:
Sampled Date: Job Name: PLYMCCCM_191226

2 Bottles Required Sample ID: 5013283
Schedules: PPCC5.
Sampling Point: PCMSBR244L Time Sampled: ________
CHELSON MEADOW - DIP FROM TOP DURING SETTLE AND DECANT P
Collected From:

Material Code: E29 Purpose Code: P
Sampling Method: S Capital Indicator: FALSE
Cost Centre Code: ________
OBSERVATIONS:

Temperature: ________

2 Bottles Required Sample ID: 5013315
Schedules: PPCC5.
Sampling Point: PCMSBR345L Time Sampled: ________
CHELSON MEADOW - DIP FROM TOP DURING SETTLE AND DECANT P
Collected From:

Material Code: E29 Purpose Code: P
Sampling Method: S Capital Indicator: FALSE
Cost Centre Code: ________
OBSERVATIONS:

Temperature: ________

South West Water
Sample: 5013315
PCC Chelson Meadow PLYMCCCM_191226
250ml PET for Tot COD
CHELSON MEADOW - DIP FROM TOP
DURING SETTLE AND DECANT PERIOD
PCMSBR345L E29
, COD-T H/L
Fill To Top: Fridge
Bottle 2 of 2
Z167893

South West Water
Sample: 5013315
PCC Chelson Meadow PLYMCCCM_191226
1L PET (or 500ml PET)
CHELSON MEADOW - DIP FROM TOP
DURING SETTLE AND DECANT PERIOD
PCMSBR345L E29
, BOD, SM-H, SS - USE 1L PET
Fill to Top: Fridge- if Waste 1L
Bottle 1 of 2
Z167892

On the top left-hand corner of each SWW sheet write the date of sampling and the name of the technician sampling.

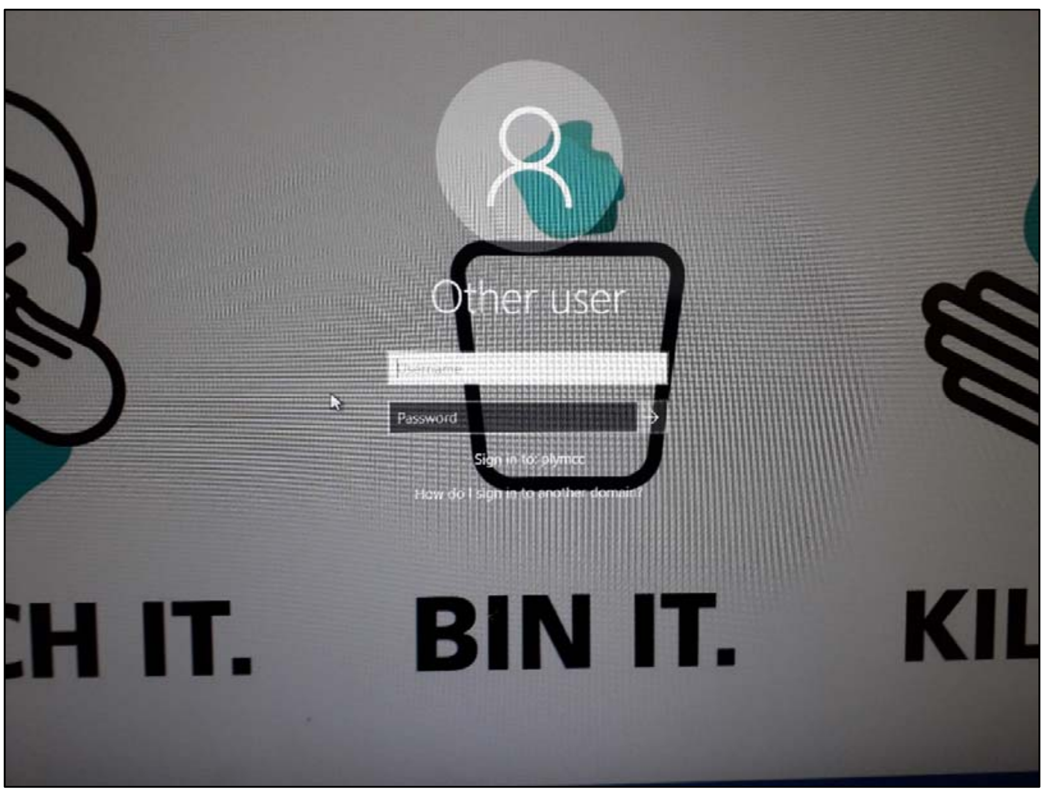
4. Check the draw to ensure there are always enough sheets and labels for at least two weeks in advance of the current samples being taken.

5. Sheets can be ordered from SWW labcustomersupport@southwestwater.co.uk using the following request template pasted into the email:

Sample ID -PLYMCCCM	**Analysis**
PCMOUT38L	PPCC5
PCMSTOR1	PPCC5
PCMSBR143L	PPCC5
PCMML139L	PPCC15
PCMSBR244L	PPCC5
PCMML240L	PPCC15
PCMSBR345L	PPCC5
PCMML341L	PPCC15
PCMSBR446L	PPCC5
PCMML442L	PPCC15

Specify you need 12-18 weeks supply of **weekly** sheets and labels. Sometimes the whole order arrives on joined sheets, which need separating into weekly batches and putting with the correct labels for a weekly batch, before storing in the draw.

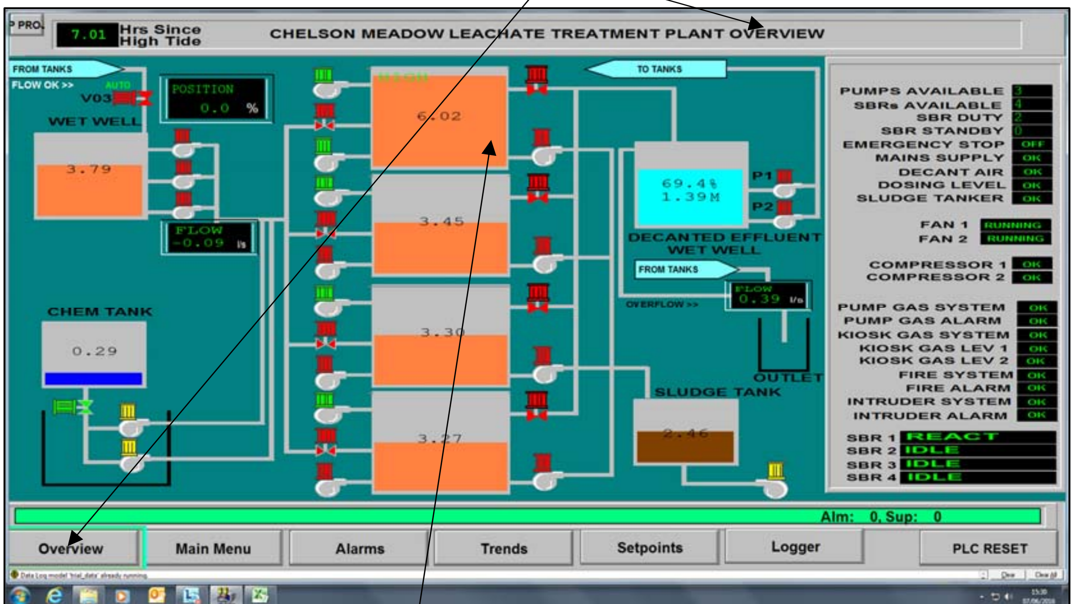
6. Log onto the PC using the following:
Username …………………………
Password…………………………



7. Then open the program …………………………

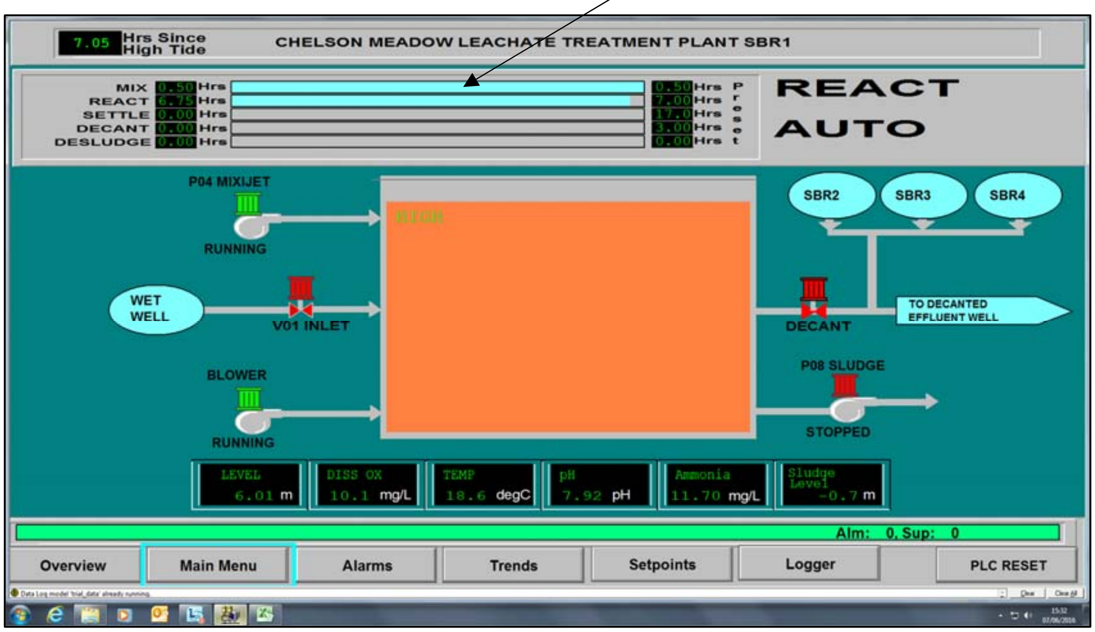
8. Input
   Username: <u>leachateuser</u> (if not already shown)
   Password:

9. LTP Program should open, click on overview if not on that window

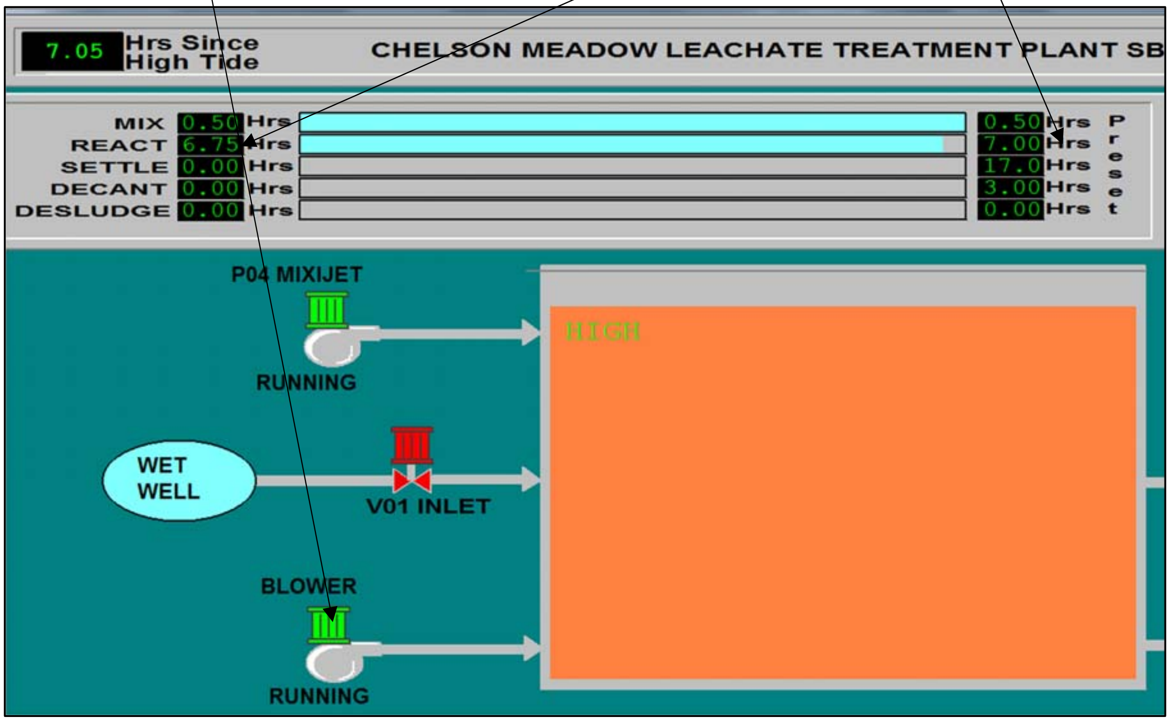


10. Check the status of the four SBR’s. Note which ones are aerating, or in settle or are waiting to be filled.

11. Clicking on an individual SBR will show the process times and where it is in the cycle



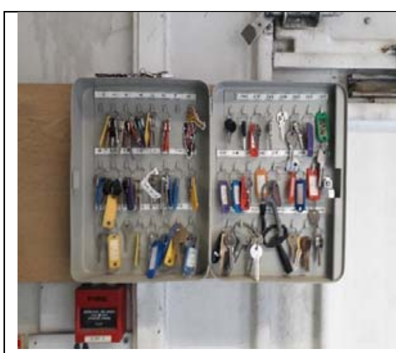
12. If the icon for the blower is green this indicates the blowers are in operation, and in the screen shot below the SBR has been aerating for 6.75 hrs of the allotted 7.00 hrs into the React phase.

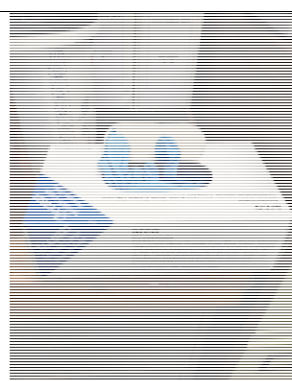


13. In the scenario shown above a mixed liquor sample (see below) should be taken straight away because there is only 15mins until the react phase is completed, and the settle phase commences. If you miss this window you would have to wait until the SBR has settled, discharged and re-filled, which could be anywhere between 5hrs and 24hrs depending in incoming flow rate.

Collecting Settled & Mixed Liquor Samples

Ensure you take the keys from the key box (keys for LTP usually kept in location 1 in key box in Control Room). Wear protective gloves and take the appropriate bottle/bottles before proceeding to the top of the LTP





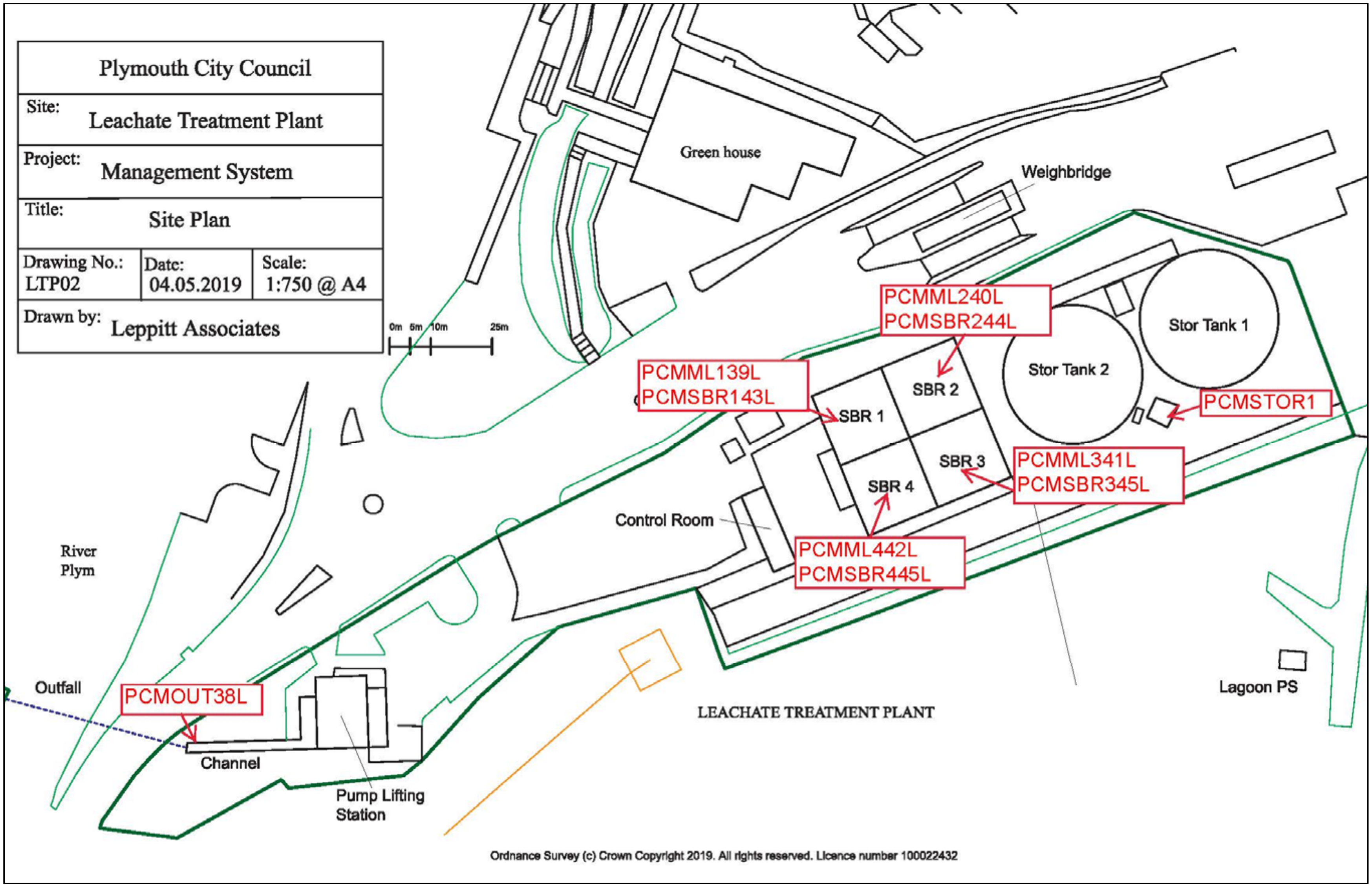


Figure 2: Sampling IDs and locations for weekly monitoring of LTP

Sampling Locations
If four SBRs are operational a maximum of 8 samples are collected per week.

Location	Sample ID	Analysis
SBR 1 – Mixing/Aerating	PCMSBR143L	PPCC5
SBR 1 - Settled	PCMML139L	PPCC15
SBR 2 – Mixing/Aerating	PCMSBR244L	PPCC5
SBR 2 - Settled	PCMML240L	PPCC15
SBR 3 – Mixing/Aerating	PCMSBR345L	PPCC5
SBR 3 - Settled	PCMML341L	PPCC15
SBR 4 – Mixing/Aerating	PCMSBR446L	PPCC5
SBR 4 - Settled	PCMML442L	PPCC15

<u>If less than four SBRs are on line sticky labels for the non-operational SBRs should be stuck on the appropriate location slot on the sheet to inform SWW, this sample has not been collected and results are not expected</u>.

For a sample to qualify as Mixing/Aerating the blowers in that SBR must have been in operation for at least 10 minutes (to allow bacteria to be resuspended), and the SBR should be full (Plate1). Blowers can cut in and out throughout the react phase – be aware how long the blower has been on before taking the sample – it is essential the liquor is well mixed.

Plate 1: SBR 1 in the react phase and suitable for the collection of a Mixing/Aerating sample

For a sample to qualify as Settle the blowers for that individual SBR must have been off for the allotted time period (refer to the PC for that SBR) and the SBR full prior to discharge (Plate 2).

Plate 2. SBR 2 not aerating and 3hrs into its settle phase prior to discharge (PC info)

Each SBR has a manual sampling pump with a blue valve handle and a lever with a wooden handle (Plate 3). The outlet pipe for the pump is yellow and discharges back into the SBR unless moved out.

Plate 3: Manual sampling pump in SBR

To collect a sample from the SBR the blue handle must be facing upwards. Move the (wooden) lever from left to right for a few minutes to ensure the pipe is cleaned of any remaining liquid from the previous sample collected. The liquid flowing from the outlet yellow pipe should be visually inspected when using the hand pump. When the liquid resembles the liquor in the SBR (e.g. dark brown for mixed liquor, clearer for settled liquor) move the yellow pipe into the sample bottle (Plate 4) and pump the handle until the bottle is full. Double check you have the correct labelled bottle for this sampling location.

Plate 4: SBR sampling pump outlet filling a sample bottle with mixed/aerated liquor

When the sample bottle/bottles (depending on the number of labels provided) are full screw the lid back on the bottle and turn the blue leaver to the off position (facing down|). Take the bottles back to the Control Room. When back in the control room, dry the bottles/bottles with disposable hand towels provided (Plate 5).

Plate 5: Paper towel dispenser used for drying filled sample bottles

Place the sample bottle(s) on the side/work surface and unscrew the lid. Insert the temperature probe into the liquid and read when stabilised: write the reading (i) onto the bottle and (ii) the associated paperwork. (Plate 6)

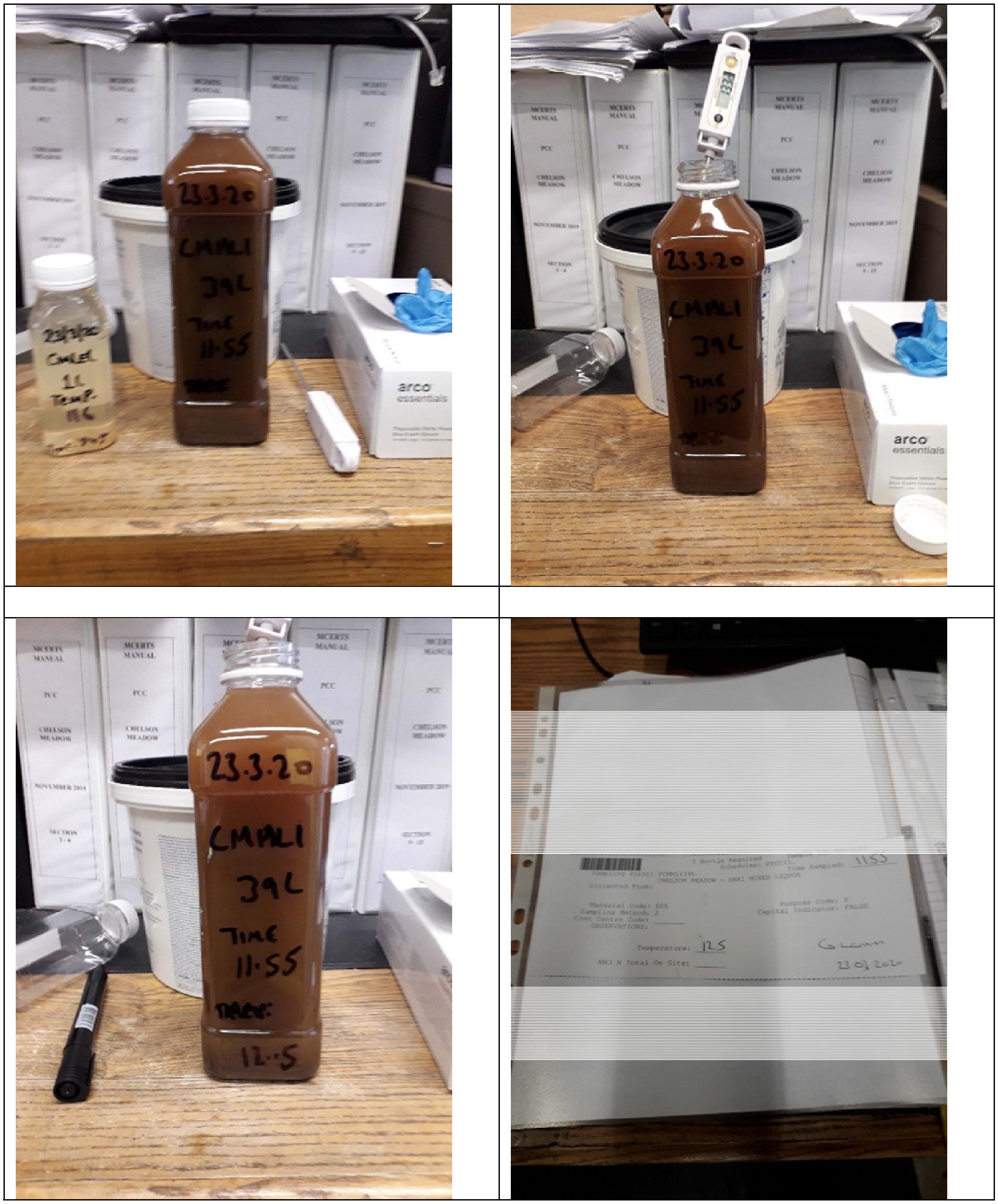


Plate 6: Recording the temperature of the sampled liquor collected from the SBRs

Screw the lid up tightly and fix the correct sticky label to the bottle/bottles (Plate 7). **Double check that the correct label is stuck to the bottle**. Place the bottle into the adjacent fridge (Plate 8).

Plate 7: Sample bottle with sticky label attached

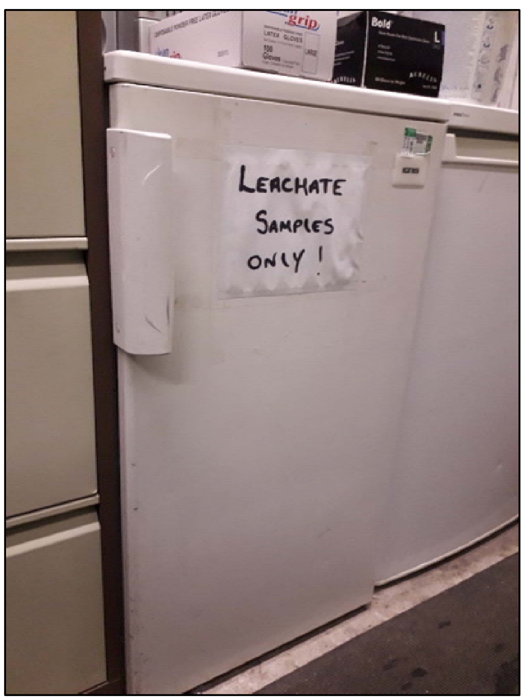


Plate 8: Dedicated fridge in Control Room for LTP samples

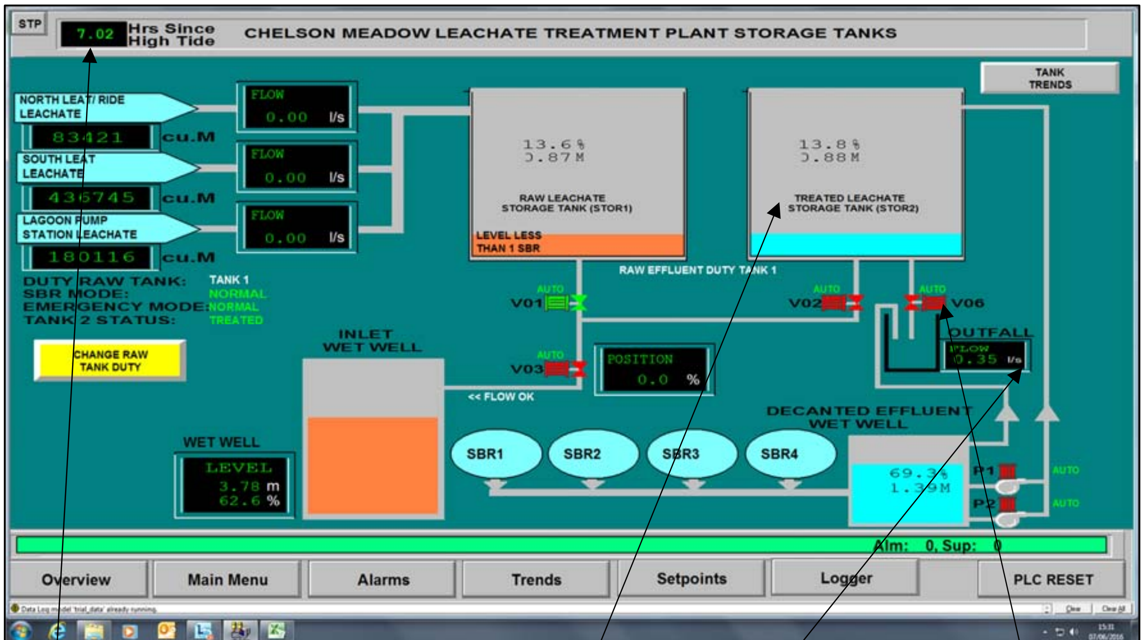
When all SBR samples have been collected, ensure the SBR door is shut and locked (Plate 9) to prevent unauthorised access, and place the keys back into the key box in the Control Room.

Plate 9: Access gate to SBRs, which must be relocked after sampling is completed or when absent from the LTP temporarily

Outfall Samples CMOUT38L

Location	Sample ID	Analysis
W1 – Outfall to River Plym	PCMOUT38L	PPCC5

Outfall samples should be collected from the end of the channel opposite the pump lifting station. Generally, this is at high tide when STOR 2 empties. The clock on the top left of the screen indicates the time since last high tide. The next high tide is imminent when the clock reads 12-13hrs. When STOR 2 is discharging the icon for V06 is **green** (valve open) and the OUTFALL window indicates a flow in l/s.



Hours since previous high tide window. Volume of treated leachate in STOR 2, V06 status and OUTFALL flow rate indicator

When the outfall is discharging, walk down to the pump lifting station (PLS), ensure you have the sample bottle/bottles and are wearing gloves. Open the door to the PLS and obtain the sampling bucket. Walk out to the end of the discharge channel and open the access hatch. Check the discharge is flowing and drop the sampling bucket into the hatch to obtain a sample. Pour the contents of the sampling bucket into the appropriate sampling bottle. Replace the hatch and put the bucket back in the PLS. Shut/lock the door. (Plate 10)

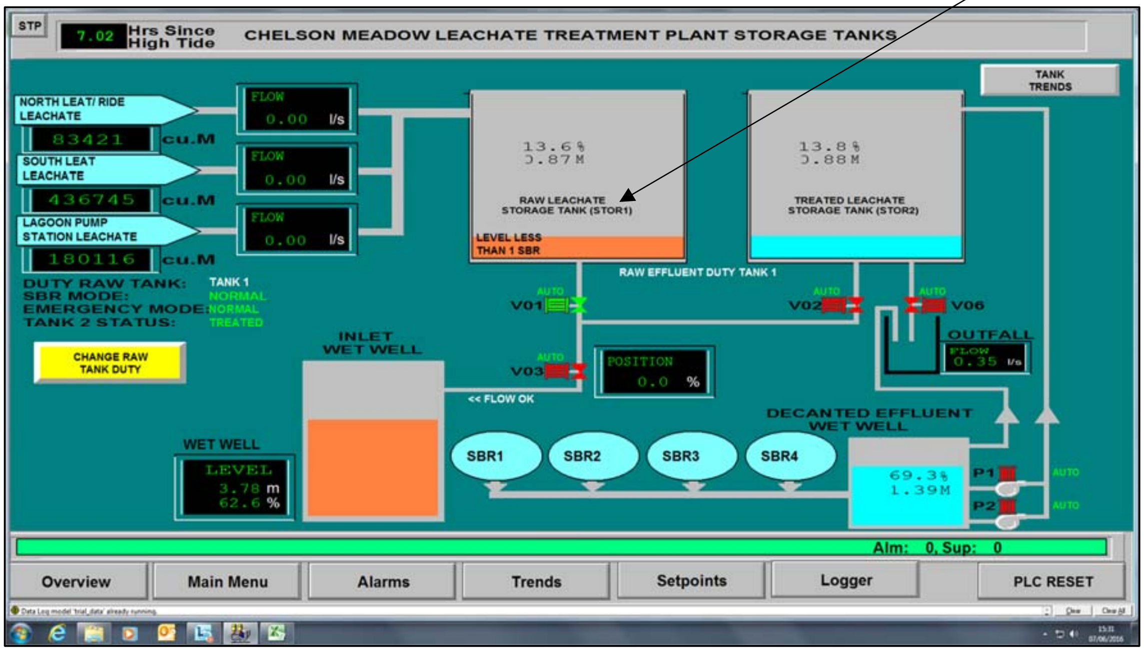
Walk back to the Control Room and take the temperature as described above, apply the sticky label, complete paperwork and store the sample in the dedicated fridge.

Plate 10: Step-by-step procedure for obtaining a sample of treated leachate from the outfall during discharge at high tide

Leachate Sample – CMSTOR1

Location	Sample ID	Analysis
Leachate – Stor 1	PCMSTOR1	PPCC5

Leachate samples should be collected from the actuated valve cage (Plate 11). The key is stored in the key safe in the Control Room. Check the PC screen to ensure there is leachate in STOR1



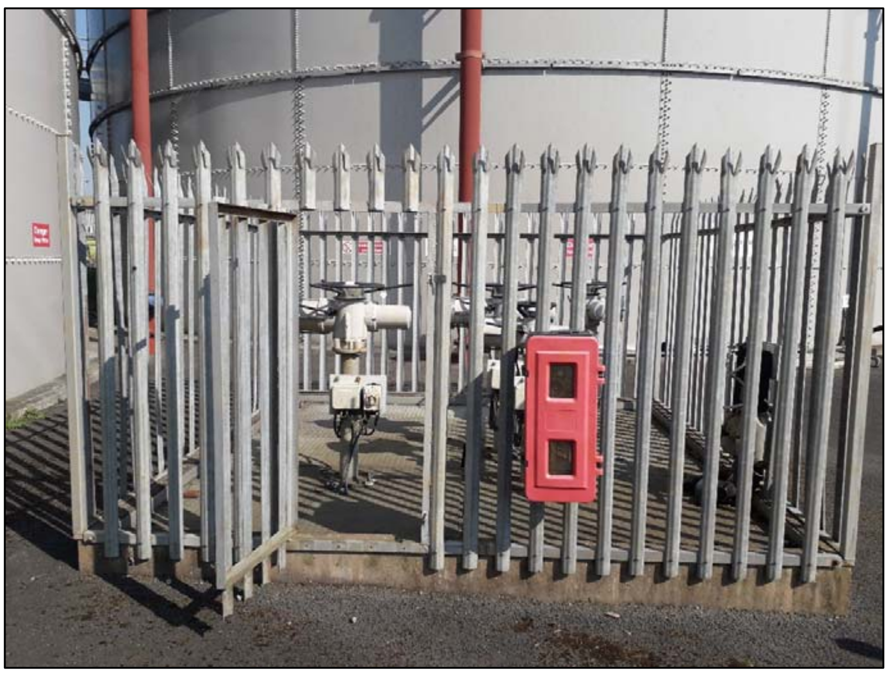


Plate 11: Actuated valve cage for access to leachate sampling point

Plate 12: Sampling points for STOR1 and STOR2 inside the actuated valve cage

Plate 13: Sampling points for STOR1 and STOR2 inside the actuated valve cage

Unlock the door to the actuated valve kiosk (Plate 11) and walk in. Open the blue handle tap (Plates 12 & 13 – swing from left to right). Pump the appropriate wooden handle below for several minutes until the previous sample has been cleared through the pipe. When the colour of liquid stops changing (i.e. homogeneous liquor is flowing) move the white pipe into the sample bottle and pump the handle until the bottle is full and cap the bottle. Double check you have the correct labelled bottle for that sampling location. Lock the cage door and walk back to the control room. Replace the keys back into the key box.

Walk back to the control room take the temperature as described above, apply the sticky label, complete paperwork and store the sample in the dedicated fridge.

CROWNHILL

Prior to transporting the samples to Crownhill, ensure the labels are attached securely to the bottles and the associated paperwork is completed. Ensure the paperwork is slotted into a ploy pocket.

Samples should be driven to SWW CROWNHILL ideally before 12.30p.m. Bottles should be placed in the last fridge on the left in the foyer. Paperwork located to the left of the first fridge should be completed appropriately:

- Time of depositing samples
- Name of person leaving the samples
- Client code PLYMCCM
- Department LTP
- Enter the number of samples deposited under ‘Chem’ for the appropriate numbered fridge (this is written on the fridge door).

Pre App - Accident prevention and management plan

You need to include an updated accident prevention and management plan which considers the requirements of this guidance https://www.gov.uk/guidance/develop-a-management-system-environmental-permits#accident-prevention-and-management-plan

While a detailed plan does not necessarily need to be submitted with the application, at the very least a summary of what the updated accident management plan will cover should be included, indicating how it has been updated as a result of the variation proposals.

SUPPORTING DOCUMENTS - SECTION 5. Management System - contains the following:

Appendix A – Permit

Appendix B - Planning

Appendix C - Site Plans

Appendix D – TCM

Appendix E - Inspection Form

Appendix F - Maintenance

Appendix G - Environmental Risk Assessment

Appendix H - Emergency Procedures

Appendix I - Monitoring