

CLIENT:	TILLICOULTRY QUARRIES LIMITED
PROJECT:	TILLICOULTRY QUARRIES COATED STONE PLANT, ELY
SUBJECT:	SURFACE WATER MANAGEMENT (PLANNING CONDITION 7)
JOB NO.:	NT16548
DATE:	28 FEBRUARY 2024
PREPARED BY:	BRYN GRIFFITHS

1 INTRODUCTION

- 1.1 This Technical Note has been prepared to support the discharge of Planning Condition
 7 (Surface Water Management) outlined in Cambridgeshire County Council Decision
 Notice Ref: CCC/22/108/FUL, issued on 26 September 2023.
- 1.2 This Technical Note is divided into sections, which correspond with items A to H within the Planning Conditions document.

2 SURFACE WATER MANAGEMENT PLAN (ITEMS A - C)

- 2.1 The surface water drainage proposals are shown in Drawing No. NT16548-100 'Proposed Surface Water Drainage Layout'. This is based on the conceptual scheme within the Technical Note (ref: ED13486/TECHNICAL NOTE 1) produced on 19 June 2023 and approved through planning.
- 2.2 The existing site is a brownfield site within a larger industrial development. Historical site investigation works confirmed the presence of Made Ground across all areas of the industrial estate, including within the site. Historical land use mapping provided by Groundsure (see Figure 1) shows that the southern portion of the site was used for landfilling until 1981.
- 2.3 It is considered that infiltration drainage will not be viable within the proposed development and surface water runoff will, therefore, be discharged to the unnamed watercourse extending through the centre of the site at a restricted rate of 2 l/s.
- 2.4 The site is divided into a northern and southern area either side of the watercourse, connected by a single bridge crossing. It is not, therefore, possible to use any formal drainage infrastructure such as pipes or drainage ditches to connect the two areas and



form a single drainage network. Surface water runoff from northern and southern portions of the site will, therefore, be retained within the respective areas of the site and redistributed by pumping.

- 2.5 There is a lack of open space within the northern area of the site, and it will not be feasible to provide all of the necessary attenuation for runoff generated within this area of the site. Additional attenuation will, therefore, be provided within the southern area and where additional storage capacity is required in the northern area, water will be pumped to the southern site area.
- 2.6 Due to the potential for made ground within the site, it is proposed to keep excavation to a minimum and attenuation will be provided in shallow detention basins rather than underground storage features such as geocellular tanks.
- 2.7 The outfall to the watercourse will be from the southern lagoon, with water pumped at the restricted rate of 2 l/s, considered the lowest feasible discharge rate and as approved in Technical Note (ref: ED13486/TECHNICAL NOTE 1). Pumping within the site between northern and southern areas of the site will be restricted to 15 l/s with no pathway off site.
- 2.8 The proposed surface water drainage network had been modelled using Causeway's 'Flow' drainage modelling software. The results are contained in Appendix 1 and show that the sufficient attenuation is provided within the network attenuation for the QBAR, 1 in 30, 1 in 100 and 1 in 100 (plus 40% climate change allowance) storm events.
- 2.9 The Surface Water Management Plan (Drawing No. NT16548-100 'Proposed Surface Water Drainage Layout') shows the location and dimensions of the detention basins. Cross sections of these features are shown on Drawing No NT16548-100.

3 CCTV SURVEY OF THE DRAINAGE NETWORK (ITEM D)

3.1 The culvert downstream of the proposed development was heavily surcharged and overgrown (see Figure 1 and 2 below) and it was not possible to conduct a CCTV survey. Work would be required to clear the channel before this could take place.





Figure 1. Culvert inlet looking westwards towards open channel





Figure 2. Culvert inlet looking westwards towards open channel

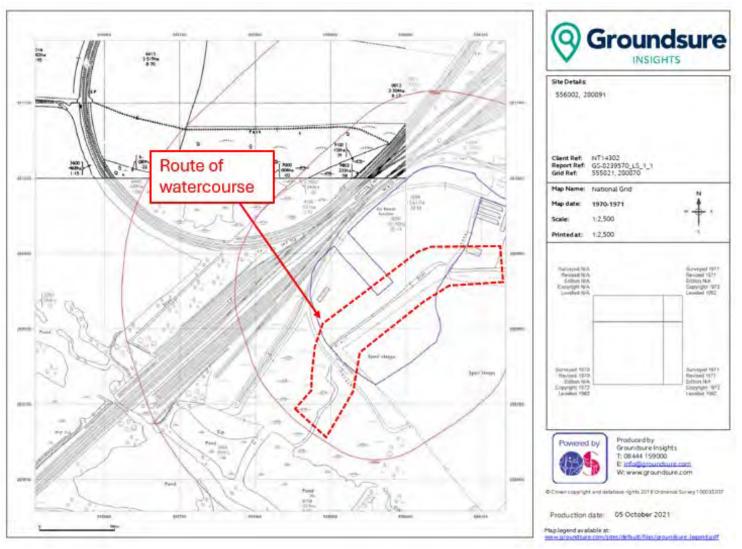
3.2 A previous CCTV survey undertaken in January 2021 at the site and wider industrial area also found the network to be surcharged with land in several areas downstream of the site inaccessible. The survey confirms an incoming 450mm diameter connection into a manhole chamber approximately 55m to the east of the development which is aligned approximately with the route of the open channel within the site and it is, therefore, considered that this is the downstream route of the culvert. This then



continues south-eastwards downstream of the manhole chamber. This follows the route of a historic watercourse within the site area as shown on Figure 3 and 4 below.

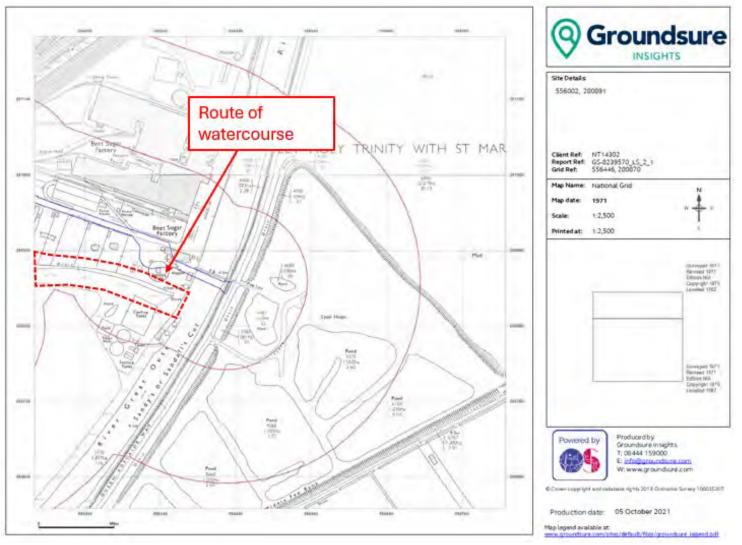
3.3 An extract of the 2021 survey drawing is included on Drawing No. NT16548-100 'Proposed Surface Water Drainage Layout'.















4 OVERLAND FLOW AND EXCEEDANCE FLOWS (ITEM E)

- 4.1 Sufficient attenuation will be provided within the detention basins for the 1 in 100 year storm event (plus a 40% allowance for climate change). An extreme rainfall event above the 1 in 100 year (+40% climate change allowance) event may, therefore, exceed the capacity of the detention basin network and cause flooding.
- 4.2 Similarly a failure of the pumping systems during a storm event, may also cause flooding when water cannot be discharged from the site. Potential exceedance flow routes during these scenarios are shown on Drawing No. NT16548-100
- 4.3 As shown on Drawing No. NT16548-100, the layout of the site means that there are no pathways for exceedance flows to run off site and these will be retained by existing or proposed bunds with no impact on downstream areas. The offices and welfare building are located outside of areas where exceedance flows could accumulate and there would be no risk to site operatives.

5 ACCORDANCE WITH RELEVANT TECHNICAL STANDARDS (ITEM F)

5.1 The DEFRA 'Non-Statutory Technical Standards for Sustainable Drainage Systems' report¹ contains 14 no. standards which sustainable drainage systems should meet. Several standards do not apply to the proposed development as a brownfield development, however, the relevant standards are summarised below.

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

¹ DEFRA (2015) Sustainable Drainage Systems: Non-Statutory Technical Stands for Sustainable Drainage Systems (reference: PB14308)



S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with **S4** or **S5** above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

- 5.2 Based on the HR Wallingford 'Greenfield Runoff Rate Estimation for Sites' tool, the greenfield runoff rates in the vicinity of the site are:
 - 1 in 1 year: 0.11 l/s/ha
 - QBAR: 0.12 l/s/ha
 - 1 in 30 years: 0.31 l/s/ha
 - 1 in 100 years: 0.44 l/s/ha
- 5.3 The site has an area of approximately 4 hectares and the greenfield runoff rate would, therefore, be 0.44 l/s for the 1 in 1 year event and 1.76 l/s for the 1 in 100 year event. It is, therefore, not feasible to discharge runoff at these rates and discharge will be restricted to 2 l/s, which was approved as part of the planning application for the proposed development.

S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

5.4 As shown in the modelling data (see Appendix 1), the surface water drainage network will provide sufficient attenuation for all storm events up to and including the 1 in 100 year (+40%) storm event with no flooding. As shown on Drawing No. NT16548-100, exceedance flows will be retained on site with no risk to site operatives.



S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

5.5 The proposed detention basins will be located away from vehicle routes and all drainage infrastructure will be located above ground, with no risk of damage and straightforward access for maintenance.

S11 The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

5.6 The proposed detention basins will be lined with clay. This will be suitably compacted when installed to prevent infiltration. The proposed pumps will also be of suitable specification.

S12 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

5.7 It will not be possible to discharge to the watercourse via gravity and it would not be feasible to use piped drainage to convey runoff from the northern portion of the site to the outfall in the south of the site. Pumping will, therefore, be required within the proposed development.

S13 The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.

S14 Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.

5.8 There are no public sewers within the site area and minimal private drainage infrastructure and there will, therefore, be no risk of damage to any existing drainage network.



6 MAINTENANCE AND ADOPTION (ITEM G)

6.1 The proposed surface water drainage network will incorporate clay-lined detention basins. An example of the maintenance requirements is included in Table 1 below, based on Table 22.1 of the CIRIA SuDS Manual.

Table 1. Detention Basin N	laintenance Schedule	
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter/debris	Monthly
	Manage	Monthly/as required
	vegetation/nuisance	
	plants	
	Inspect	Monthly
	inlets/outlets/overflows	
	for blockages	
	Inspect	Monthly
	banksides/structures for	
	physical damage	
	Remove sediment from	Annually/as required
	inlets/outlets	
Occasional Maintenance	Remove sediment from	Every 5 years (assuming
	inlets/outlets and main	effective upstream source
	basin	control)
Remedial Actions	Repair damage to clay	As required
	lining	
	Repair/rehabilitation of	As required
	inlets, outlets and	
	overflows	
	Relevel uneven surfaces	As required
	and reinstate design levels	

6.2 The pumping equipment will be managed in accordance with the manufacturer's specifications.



7 POLLUTION OF GROUNDWATER AND SURFACE WATER (ITEM H)

- 7.1 Attenuation will be provided within detention basins which will be lined with clay to prevent infiltration to ground. Surface water will drain to the detention basins via overland flow. The existing surfacing within the site is a mixture of hardstanding and loose compacted mineral and any infiltration can be expected to be minimal. There will, therefore, be no pathway for surface water runoff to infiltrate to ground and impact the underlying groundwater as a result of the proposed development.
- 7.2 The watercourse flowing through the centre of the site will be protected by bunding and there will be no pathway for surface water runoff to flow directly into the watercourse.
- 7.3 Surface water runoff will be retained within detention basins to allow for the settlement of sediments and will be pumped to the watercourse via an oil interceptor which will provide a second stage of treatment prior to discharge.
- 7.4 General good practices will be followed on site with regards to storing fuels and chemicals, and retaining and remediating spillages with no pathway for this to flow off site.



APPENDIX 1

Drainage Network Modelling Results



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	\checkmark
Time of Entry (mins)	5.00	Enforce best practice design rules	х

<u>Nodes</u>

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
LAGOON NORTH	0.597	5.00	4.500	1200	555909.049	280798.129	1.000
PUMP 1			4.400	1800	555922.077	280793.836	1.900
LAGOON SOUTH	0.720	5.00	4.200	1200	555942.469	280765.401	2.000
PUMP 2			4.400	1200	555937.762	280769.762	2.400
1			5.525	1200	555929.133	280781.763	1.525
2			5.218	1200	555921.464	280785.513	1.718
OUTFALL			4.825		555916.607	280787.637	1.425

<u>Links</u>

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	LAGOON NORTH	PUMP 1	13.717	0.600	3.500	2.500	1.000	13.7	225	5.00	50.0
1.001	PUMP 1	LAGOON SOUTH	34.991	0.600	3.500	2.200	1.300	26.9	225	5.00	50.0
1.002	LAGOON SOUTH	PUMP 2	6.417	0.600	2.200	2.000	0.200	32.1	300	5.00	50.0
1.003	PUMP 2	1	14.781	0.600	2.650	4.000	-1.350	-10.9	225	5.00	50.0
1.004	1	2	8.537	0.600	4.000	3.500	0.500	17.1	225	5.00	50.0
1.005	2	OUTFALL	5.301	0.600	3.500	3.400	0.100	53.0	300	5.00	50.0

Name	Vel (m/s)	Cap (I/s)	Flow (I/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (I/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.551	141.2	113.3	0.775	1.675	0.597	0.0	153	3.935
1.001	2.531	100.7	113.3	0.675	1.775	0.597	0.0	225	2.578
1.002	2.785	196.9	250.0	1.700	2.100	1.317	0.0	300	2.821
1.003	1.000	39.8	250.0	1.525	1.300	1.317	0.0	225	0.000
1.004	3.182	126.5	250.0	1.300	1.493	1.317	0.0	225	3.240
1.005	2.164	152.9	250.0	1.418	1.125	1.317	0.0	300	2.192

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					<u>P</u>	ipeline Scl	<u>hedule</u>					
L	ink	Length	Slope	Dia	Link	US CL	US IL	US Depth	DS CL	DS IL	DS Depth	
		(m)	(1:X)	(mm)	Туре	(m)	(m)	(m)	(m)	(m)	(m)	
1.	000	13.717	13.7	225	Circular	4.500	3.500	0.775	4.400	2.500	1.675	
1.	001	34.991	26.9	225	Circular	4.400	3.500	0.675	4.200	2.200	1.775	
1.	002	6.417	32.1	300	Circular		2.200	1.700	4.400	2.000	2.100	
	003	14.781	-10.9	225	Circular		2.650	1.525	5.525	4.000	1.300	
	004	8.537	17.1	225	Circular		4.000	1.300	5.218	3.500	1.493	
1.	005	5.301	53.0	300	Circular	5.218	3.500	1.418	4.825	3.400	1.125	
Link		US	[Dia	Node	МН		DS	Dia	Node	e MH	I
		Node	•	nm)	Туре	Туре		Node	(mm)	Туре		
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1.001	PUN				lanhole	Adoptable		DON SOUTH	1200	Manho		
1.002	-	OON SOU			lanhole	Adoptable		P 2	1200	Manho		
1.003	PUN	1P 2			1anhole	Adoptable			1200	Manho		
1.004	1				1anhole	Adoptable			1200	Manho		able
1.005	2		1	200 N	1anhole	Adoptable	OUT	FALL		Junctio	on	
					<u>N</u>	<u>lanhole Sc</u>	<u>hedule</u>					
Noc	le		sting	Nort	-	CL Dep			nections	Lin	k IL	Dia
		(m)	(n	n)	(m) (n	n) (m	im)			(m)	(mm)

	555909.049	200790.129	4.500	1.000	1200					
							0	1.000	3.500	225
PUMP 1	555922.077	280793.836	4.400	1.900	1800		1	1.000	2.500	225
						70	0	1.001	3.500	225
LAGOON SOUTH	555942.469	280765.401	4.200	2.000	1200	0 ¹	1	1.001	2.200	225
							0	1.002	2.200	300
PUMP 2	555937.762	280769.762	4.400	2.400	1200	0	1	1.002	2.000	300
						X				
						ì	0	1.003	2.650	225
1	555929.133	280781.763	5.525	1.525	1200		1	1.003	4.000	225
						° <				
						1	0	1.004	4.000	225
2	555921.464	280785.513	5.218	1.718	1200		1	1.004	3.500	225
						° ~				
							0	1.005	3.500	300
OUTFALL	555916.607	280787.637	4.825	1.425			1	1.005	3.400	300
						۹۱				

CAUSEWAY	File: Full Site SW Network FINAPage 3Network: SW NetworkLuke Imber28/02/202428/02/2024
<u>Sir</u>	mulation Settings
Rainfall Methodology FSR FSR Region England a M5-60 (mm) 20.000 Ratio-R 0.400 Summer CV 0.750 Analysis Speed Normal	Skip Steady Statexand WalesDrain Down Time (mins)240Additional Storage (m³/ha)20.0Check Discharge Rate(s)xCheck Discharge Volumex
	Storm Durations
156018036060030120240480720	
Return Period Climate Ch (years) (CC %	5) (A %) (Q %)
1 30	0 0 0 0 0 0
100	0 0 0
100	40 0 0
Node PUMP :	1 Online Depth/Flow Control
-	Invert Level (m) 3.500 Design Flow (I/s) 100.0 esign Depth (m) 1.900
(m)	Flow Depth Flow (I/s) (m) (I/s) 5.000 1.900 15.000
Node PUMP 2	2 Online Depth/Flow Control
Flap Valve x Replaces Downstream Link √	Invert Level (m) 2.650 Design Flow (I/s) 2.0 Design Depth (m) 2.400
(m)	Flow Depth Flow (I/s) (m) (I/s) 2.000 2.400 2.000
Node LAGOON NO	RTH Depth/Area Storage Structure
Base Inf Coefficient (m/hr) 0.00000 Side Inf Coefficient (m/hr) 0.00000	Safety Factor2.0Invert Level (m)3.500Porosity1.00Time to half empty (mins)148
•	Area Depth Area Inf Area (m²) (m) (m²) (m²) 0.0 1.000 220.0 0.0
Node LAGOON SOL	UTH Depth/Area Storage Structure
Base Inf Coefficient (m/hr) 0.00000 Side Inf Coefficient (m/hr) 0.00000	Safety Factor 2.0 Invert Level (m) 2.200 Porosity 1.00 Time to half empty (mins) 480
•	Area Depth Area Inf Area m²) (m) (m²) (m²) 0.0 1.000 1350.0 0.0



Page 4

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (I/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	LAGOON NORTH	42	3.629	0.129	54.0	30.0333	0.0000	ОК
60 minute summer	PUMP 1	42	3.621	1.121	17.7	2.8531	0.0000	ОК
10080 minute summer	LAGOON SOUTH	10320	2.590	0.390	5.1	529.2947	0.0000	SURCHARGED
10080 minute summer	PUMP 2	10260	2.590	0.590	0.0	0.6669	0.0000	ОК
15 minute summer	1	1	4.000	0.000	0.0	0.0000	0.0000	ОК
15 minute summer	2	1	3.500	0.000	0.0	0.0000	0.0000	ОК
15 minute summer	OUTFALL	1	3.400	0.000	0.0	0.0000	0.0000	ОК

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (I/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	LAGOON NORTH	1.000	PUMP 1	17.7	0.709	0.126	0.4340	
60 minute summer	PUMP 1	Depth/Flow	LAGOON SOUTH	15.0				
10080 minute summer	LAGOON SOUTH	1.002	PUMP 2	0.0	0.027	0.000	0.4519	
10080 minute summer	PUMP 2	Depth/Flow	1	0.0				
15 minute summer	1	1.004	2	0.0	0.000	0.000	0.0000	
15 minute summer	2	1.005	OUTFALL	0.0	0.000	0.000	0.0000	0.0



Page 5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (I/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	LAGOON NORTH	55	3.901	0.401	130.2	93.4470	0.0000	SURCHARGED
60 minute summer	PUMP 1	55	3.885	1.385	16.6	3.5257	0.0000	SURCHARGED
10080 minute summer	LAGOON SOUTH	6540	2.731	0.531	8.3	720.6801	0.0000	SURCHARGED
10080 minute summer	PUMP 2	6540	2.731	0.731	1.6	0.8262	0.0000	ОК
10080 minute summer	1	6540	4.018	0.018	1.6	0.0202	0.0000	ОК
10080 minute summer	2	6540	3.522	0.022	1.6	0.0250	0.0000	ОК
10080 minute summer	OUTFALL	6540	3.422	0.022	1.6	0.0000	0.0000	ОК

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (I/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m ³)
60 minute summer	LAGOON NORTH	1.000	PUMP 1	16.6	0.885	0.117	0.5455	
60 minute summer	PUMP 1	Depth/Flow	LAGOON SOUTH	15.0				
10080 minute summer	LAGOON SOUTH	1.002	PUMP 2	1.6	0.023	0.008	0.4519	
10080 minute summer	PUMP 2	Depth/Flow	1	1.6				
10080 minute summer	1	1.004	2	1.6	0.939	0.013	0.0148	
10080 minute summer	2	1.005	OUTFALL	1.6	0.704	0.011	0.0121	312.7



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (I/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	LAGOON NORTH	61	4.071	0.571	171.1	133.1980	0.0000	SURCHARGED
60 minute summer	PUMP 1	61	4.056	1.556	17.0	3.9598	0.0000	SURCHARGED
10080 minute summer	LAGOON SOUTH	6540	2.805	0.605	6.5	822.4551	0.0000	SURCHARGED
10080 minute summer	PUMP 2	6540	2.805	0.805	2.0	0.9110	0.0000	ОК
1440 minute summer	1	1350	4.020	0.020	2.0	0.0224	0.0000	ОК
1440 minute summer	2	1350	3.524	0.024	2.0	0.0277	0.0000	ОК
1440 minute summer	OUTFALL	1350	3.424	0.024	2.0	0.0000	0.0000	ОК

US Node	Link	DS Node	Outflow (I/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
LAGOON NORTH	1.000	PUMP 1	17.0	0.951	0.121	0.5455	
PUMP 1	Depth/Flow	LAGOON SOUTH	15.0				
LAGOON SOUTH	1.002	PUMP 2	2.0	0.028	0.010	0.4519	
PUMP 2	Depth/Flow	1	2.0				
1	1.004	2	2.0	0.998	0.016	0.0171	
2	1.005	OUTFALL	2.0	0.752	0.013	0.0141	78.5
	Node LAGOON NORTH PUMP 1 LAGOON SOUTH	Node LAGOON NORTH 1.000 PUMP 1 Depth/Flow LAGOON SOUTH 1.002 PUMP 2 Depth/Flow 1 1.004	NodeNodeLAGOON NORTH1.000PUMP 1PUMP 1Depth/FlowLAGOON SOUTHLAGOON SOUTH1.002PUMP 2PUMP 2Depth/Flow111.0042	Node Node (l/s) LAGOON NORTH 1.000 PUMP 1 17.0 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 LAGOON SOUTH 1.002 PUMP 2 2.0 PUMP 2 Depth/Flow 1 2.0 1 1.004 2 2.0	Node Node (I/s) (m/s) LAGOON NORTH 1.000 PUMP 1 17.0 0.951 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 15.0 LAGOON SOUTH 1.002 PUMP 2 2.0 0.028 PUMP 2 Depth/Flow 1 2.0 1 1 1.004 2 2.0 0.998	Node Node (l/s) (m/s) LAGOON NORTH 1.000 PUMP 1 17.0 0.951 0.121 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 0.028 0.010 LAGOON SOUTH 1.002 PUMP 2 2.0 0.028 0.010 PUMP 2 Depth/Flow 1 2.0 1 0.998 0.016	Node Node (I/s) (m/s) Vol (m³) LAGOON NORTH 1.000 PUMP 1 17.0 0.951 0.121 0.5455 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 1 0.028 0.010 0.4519 PUMP 2 Depth/Flow 1 2.0 1 0.016 0.0171 1 1.004 2 2.0 0.998 0.016 0.0171



I/s

Page 7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (I/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	LAGOON NORTH	116	4.389	0.889	154.1	207.1794	0.0000	FLOOD RISK
120 minute summer	PUMP 1	116	4.373	1.873	16.5	4.7675	0.0000	FLOOD RISK
7200 minute summer	LAGOON SOUTH	5400	3.055	0.855	13.5	1161.0100	0.0000	SURCHARGED
7200 minute summer	PUMP 2	5400	3.055	1.055	2.0	1.1229	0.0000	SURCHARGED
360 minute summer	1	392	4.020	0.020	2.0	0.0224	0.0000	ОК
240 minute summer	2	404	3.524	0.024	2.0	0.0277	0.0000	ОК
240 minute summer	OUTFALL	404	3.424	0.024	2.0	0.0000	0.0000	ОК

US Node	Link	DS Node	Outflow (I/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m ³)
LAGOON NORTH	1.000	PUMP 1	16.5	0.901	0.117	0.5455	
PUMP 1	Depth/Flow	LAGOON SOUTH	15.0				
LAGOON SOUTH	1.002	PUMP 2	2.0	0.041	0.010	0.4519	
PUMP 2	Depth/Flow	1	2.0				
1	1.004	2	2.0	0.998	0.016	0.0171	
2	1.005	OUTFALL	2,0	0.752	0.013	0.0141	19.1
				[4	Attenuatio	on:	7
	Node LAGOON NORTH PUMP 1 LAGOON SOUTH PUMP 2 1 2 Pump rate	NodeLAGOON NORTH1.000PUMP 1Depth/FlowLAGOON SOUTH1.002PUMP 2Depth/Flow11.004	NodeNodeLAGOON NORTH1.000PUMP 1PUMP 1Depth/FlowLAGOON SOUTHLAGOON SOUTH1.002PUMP 2PUMP 2Depth/Flow111.004221.005OUTFALL	Node Node (I/s) LAGOON NORTH 1.000 PUMP 1 16.5 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 LAGOON SOUTH 1.002 PUMP 2 2.0 PUMP 2 Depth/Flow 1 2.0 PUMP 2 Depth/Flow 1 2.0 2 1.004 2 2.0 2 1.005 OUTFALL 2.0	Node Node (l/s) (m/s) LAGOON NORTH 1.000 PUMP 1 16.5 0.901 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 15.0 LAGOON SOUTH 1.002 PUMP 2 2.0 0.041 PUMP 2 Depth/Flow 1 2.0 1 1 1.004 2 2.0 0.998 2 1.005 OUTFALL 2.0 0.752	Node Node (I/s) (m/s) LAGOON NORTH 1.000 PUMP 1 16.5 0.901 0.117 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 15.0 0.001 0.010 LAGOON SOUTH 1.002 PUMP 2 2.0 0.041 0.010 PUMP 2 Depth/Flow 1 2.0 1 1.010 PUMP 2 Depth/Flow 1 2.0 0.016 0.016 2 1.005 OUTFALL 2.0 0.752 0.013	Node Node (I/s) (m/s) Vol (m³) LAGOON NORTH 1.000 PUMP 1 16.5 0.901 0.117 0.5455 PUMP 1 Depth/Flow LAGOON SOUTH 15.0 15.0 0.010 0.4519 LAGOON SOUTH 1.002 PUMP 2 2.0 0.041 0.010 0.4519 PUMP 2 Depth/Flow 1 2.0 1 0.016 0.0171 2 1.004 2 2.0 0.752 0.013 0.0141 Pump rate Pump rate Pump rate Pump rate Pump rate Pump rate Pump rate

Pump rate to outfall 2l/s

Attenuation: 207m3 (North) 1161m3 (South)

CAUSEWA	Wardell Armstrong LLP	File: Full Site SW Network FINA Network: SW Network Luke Imber 28/02/2024	AL alt. pump.pfd	Page 1
Node Name	LAGO	ON NORTH	PUMP 1	
A4 drawing				
Hor Scale 200 Ver Scale 100				
Datum (m) -2.000				
Link Name		1.000		
Section Type		225mm		
Slope (1:X)		13.7		
Cover Level (m)	4.500		4.400	
Invert Level (m)	3.500		2.500	
Length (m)		13.717		
		1988-2024 Causeway Technologies Ltc		

CAUSE		Wardell Armstrong LLP	File: Full Site SW Network FINAL alt. pump.p Network: SW Network Luke Imber 28/02/2024	fd Page 2		
Node Name	PUMP 1				LAGOON SOUTH	PUMP 2
A4 drawing Hor Scale 200 Ver Scale 100 Datum (m) -3.000						
Link Name			1.001		1.002	
Section Type			225mm		300mm	
Slope (1:X)			26.9		32.1	
Cover Level (m)	4.400				4.200	4.400
Invert Level (m)	3.500			000 0	2.200	2.000
Length (m)			34.991		6.417	ĺ
	· ·	Flow+ v10.8 Convrig	ght © 1988-2024 Causeway Technologies Ltd			

CAUSEWAY	Wardell Armstrong LLP	File: Full Site SW Network FINA Network: SW Network Luke Imber 28/02/2024	L alt. pump.pfd	Page 3	
Node Name	PUMP 2	1	2	OUTFA	ALL
A4 drawing Hor Scale 200 Ver Scale 100					
Datum (m) -2.000					
Link Name	1.003	1.004		1.005	
Section Type	225mm	225mm		300mm	
Slope (1:X)	-10.9	17.1		53.0	
Cover Level (m)	4.400	5.525	5.218	4.825	
Invert Level (m)	2.650	4.000	3.500 3.500	3.400	
Length (m)	14.781	8.537		5.301	
) 1988-2024 Causeway Technologies Ltd		ļ	





DRAWINGS



DO NOT SCALE FROM THIS DRAWING

- TO BE READ IN CONJUNCTION WITH TECHNICAL NOTE REF: ED13486/TECHNICAL NOTE 1 (JUNE 2023)
- 2. LAYOUT IS INDICATIVE AND SUBJECT TO DETAILED DESIGN.
- 3. PUMPING ROUTES INDICATIVE. ASSUMING A MOVEABLE PUMP. IF MORE THAN ONE PUMP IS TO BE USED MAXIMUM TOTAL RATE OF PUMPING FROM SITE WILL NOT EXCEED 2 L/S
- . SURFACE WATER TO BE TREATED PRIOR TO DISCHARGE AND IN ACCORDANCE WITH THE PERMIT(S)
- OVERLAND FLOW ROUTES BASED ON EXISTING TOPOGRAPHY. PROPOSED LEVELS DESIGN TO ENSURE FLOWS ARE DIRECTED TO THE DETENTION
- 6. PLEASE NOTE THESE DRAWINGS ARE NOT FOR CONSTRUCTION

SITE BOUNDARY

 \longrightarrow $\frac{1}{1} \frac{1}{1} \frac{1}{1} \frac{1}{1}$

EXISTING WATERCOURSE (OPEN CHANNEL) EXISTING WATERCOURSE (CULVERTED) PROPOSED SURFACE WATER PROPOSED BUND / BARRIER

28/02/24 LJI JG JG DATE DRAWN CHKD APPD

PO SUIT. CODE

OVED BY

23/01/2024

JG

TILLICOULTRY QUARRIES LTD

REPLACEMENT OF COATED STONE PLANT ELY

DRAINAGE LAYOUT

1:250

JG

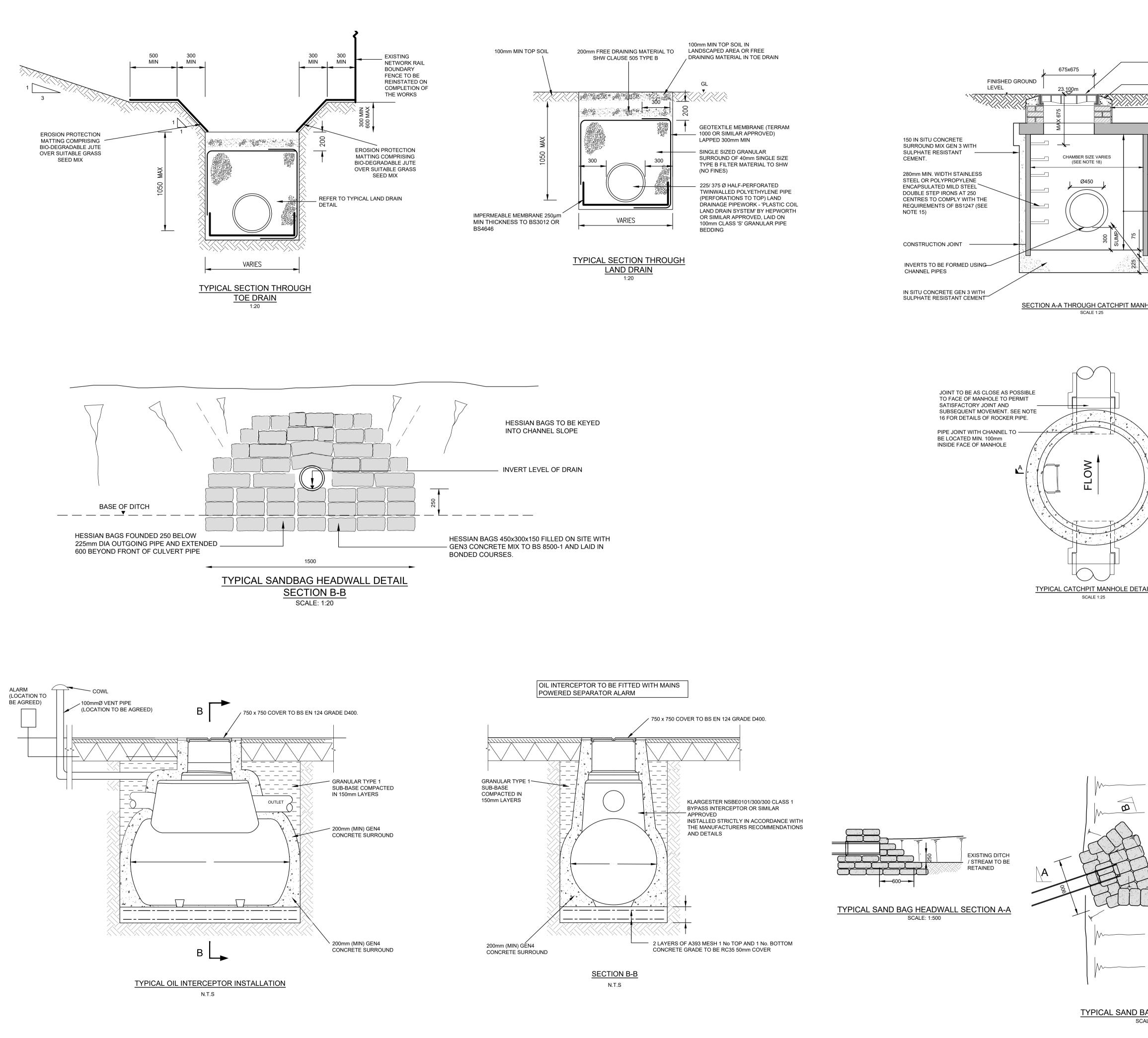
Jell Ong

_ _ _ _ _ _

ECKED BY

NT16548-100

- EXISTING CULVERT
 - OVERLAND FLOW ROUTE PROPOSED POND
 - PROPOSED HEADWALL
 - PROPOSED SWALE



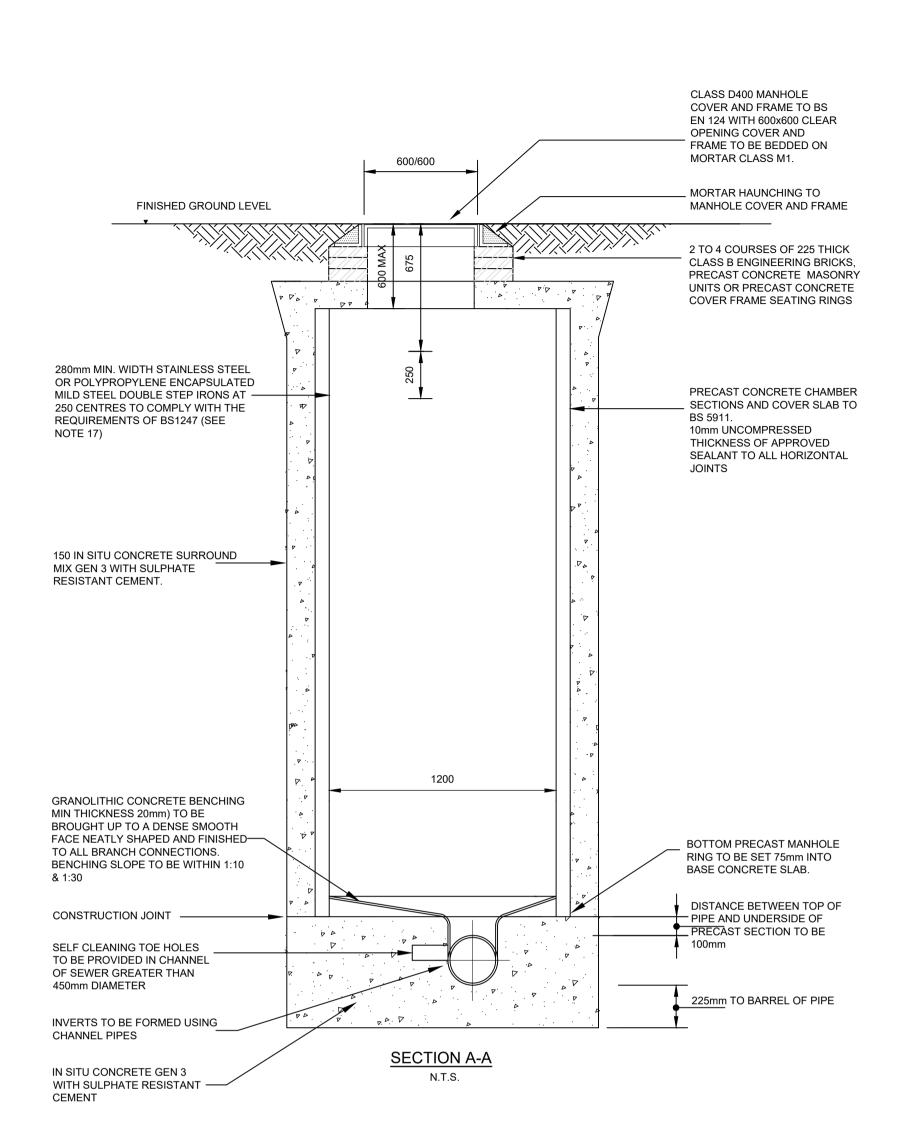
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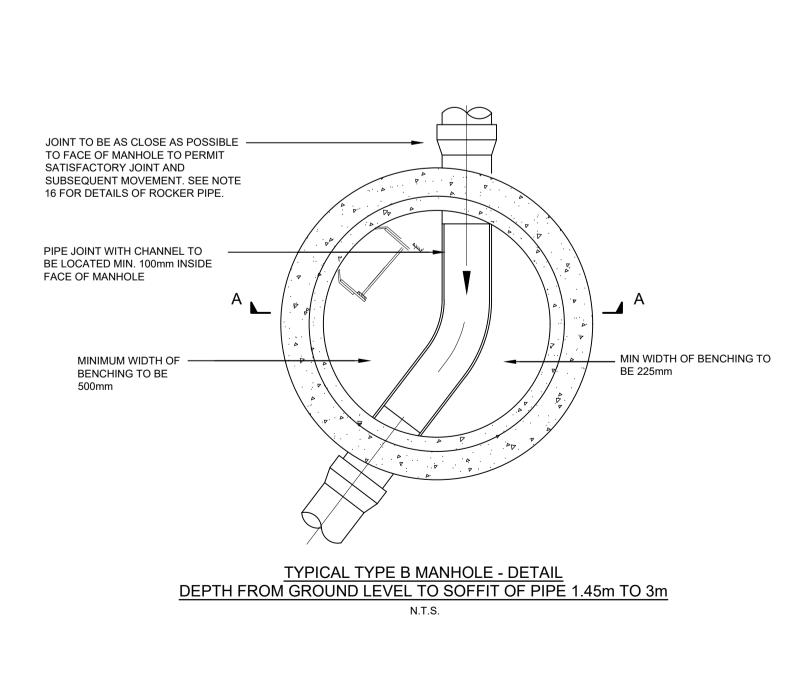
N:INTINT16548 - ELY COATED STONE CONDITIONS/03 - DESIGN/AUTOCADINT16548-101-P0_102-P0_103-P0 & 104-P0 CONSTRUCTION DETAILS.DWG

TYPICAL SAND BA SCA

			DO NOT SCALE FROM THIS DRAWING
			DTES ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
	CLASS D400 MANHOLE COVER AND FRAME TO BS EN 124 WITH 675x675 CLEAR	2.	ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
	OPENING COVER AND FRAME TO BE BEDDED ON MORTAR CLASS M1.	3.	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND DETAILS AND CONTRACT DOCUMENTATION .
	- MORTAR HAUNCHING TO MANHOLE COVER AND FRAME	4.	ANY DISCREPANCIES IN THE DETAILS SHOWN ON THIS DRAWING ARE TO BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE
	2 TO 4 COURSES OF 225 THICK CLASS B ENGINEERING BRICKS, PRECAST CONCRETE	5.	PRIOR TO CONSTRUCTION. THE GENERAL SPECIFICATION OF MATERIALS AND WORKMANSHIP FOR DRAINAGE WORKS SHALL BE THE 'CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY - 7TH EDITION' (CESWI) PUBLISHED BY WRC (2011) ON BEHALF OF THE WATER SERVICES
	MASONRY UNITS OR PRECAST CONCRETE COVER FRAME SEATING RINGS PRECAST CONCRETE CHAMBER SECTIONS AND COVER SLAB TO BS 5911. 10mm UNCOMPRESSED	6.	ASSOCIATION. ALL PRIVATE DRAINAGE WORKS ARE TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 BUILDING DRAINAGE AND BUILDING REGULATIONS APPROVED DOCUMENT H -DRAINAGE AND WASTE DISPOSAL (2002 EDITION INCORPORATING 2010 AMENDMENTS). ANY ADOPTABLE DRAINAGE IS TO COMPLY WITH THE REQUIREMENTS OF SEVERN TRENT WATER AND SEWERS FOR
	THICKNESS OF APPROVED SEALANT TO ALL HORIZONTAL JOINTS -CHAMBER HEIGHT NOT LESS THAN 900mm	7.	ADOPTION (LATEST EDITION). THE LOCATION OF EXISTING SEWERS SHOWN ON THIS DRAWING ARE INDICATIVE ONLY BASED ON KEELE UNIVERSITY ESTATE AND DEVELOPMENT DIRECTORATE SEWER RECORD PLANS AND TOPOGRAPHICAL INFORMATION. DEPTHS/INVERT LEVELS OF
	BOTTOM PRECAST MANHOLE RING TO BE SET 75mm INTO BASE CONCRETE SLAB.	8.	EXISTING SEWERS MUST BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS. ALL EXISTING DRAINAGE SHOWN ON THIS DRAWING IS INDICATIVE AND IS SHOWN FOR GUIDANCE ONLY. ALL EXISTING DRAINAGE RUNS MUST BE LOCATED AND TRACED ON SITE. ANY POTENTIAL CLASH WITH NEW PROPOSED DRAINAGE RUNS MUST BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE PRIOR TO
	SIZE OF PIPEWORK VARIES. - REFER TO GAS PLAN AND DRAWINGS ST18959-101 & 103	9.	CONSTRUCTION. ALL EXISTING SERVICES MUST BE LOCATED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. WHERE NECESSARY, PROTECTION OR DIVERSIONS ARE TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
		10	ALL MATERIALS UNLESS SPECIFIED OTHERWISE, SHALL COMPLY WITH RELEVANT BRITISH STANDARD. SOURCES OF MATERIALS ARE TO BE AGREED WITH THE EMPLOYERS REPRESENTATIVE IN ADVANCE OF WORKS.
		11	ALL GRAVITY SEWERS AND DRAINAGE INCLUDING ADOPTABLE DRAINAGE AND FITTINGS TO BE FLEXIBLY JOINTED CLAYWARE TO BS EN 295 OR CONCRETE TO BS 5911 PART 100. FLEXIBLY JOINTED UPVC PIPES AND FITTINGS TO BE EN 1401-1 MAY BE USED FOR PRIVATE BUILDING DRAINAGE ONLY.
×.		12	2. TYPICAL PIPE BEDDING TO DRAINAGE WHERE DEPTH TO SOFFIT IS GREATER THAN 600mm IN LANDSCAPED AREAS AND GREATER THAT 900mm IN OTHER TRAFFICKED AREAS IS TO BE CLASS S (I.E. 10-14mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES UP TO 525mm DIAMETER AND 20 -40mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES GREATER THAN 525mm DIAMETER).
A		13	B. WHERE DEPTH TO SOFFIT OF DRAINAGE PIPEWORK IS LESS THAN 600mm IN LANDSCAPED AREAS AND LESS THAN 900mm IN HARDSTANDING/TRAFFICKED AREAS THEN PIPEWORK IS TO BE PROTECTED WITH GEN3 MASS CONCRETE. COMPRESSIBLE MATERIAL, FLEXCELL OR SIMILAR, APPROXIMATELY 13mm THICK, IS TO BE PROVIDED AT EVERY PIPE JOINT.
			BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE FREE DRAINING READILY COMPATIBLE MATERIAL, FREE FROM RUBBISH AND ORGANIC MATTER, FROZEN SOIL CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 150mm THICK.
AIL			5. CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8500-1, 2006. ALL CONCRETE TO BE SULPHATE RESISTANT. CONTRACTOR TO MAKE ALLOWANCE FOR CARRYING OUT ADDITIONAL TESTING ON-SITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION. .A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT, COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENT OF THE JOINT. THE LENGTH OF THE NEXT PIPE (ROCKER PIPE) AWAY FROM THE STRUCTURE SHALL BE AS SHOWN IN THE TABLE BELOW.
			NOMINAL DIAMETER (mm) EFFECTIVE LENGTH (m) 150-600 0.6 675-750 1.0 825 AND OVER 1.25
			ALL STEP IRONS TO BE STAINLESS STEEL (GRADE 316 S31 BS 5970) OR POLYPROPYLENE ENCAPSULATED TO BS 1247 PARTS 1-2, DOUBLE STEP RUNGS (280mm MIN WIDTH AT 250mm MAXIMUM CENTRES). MAXIMUM DISTANCE FROM COVER LEVEL TO FIRST STEP TO BE 675mm. EXISTING DRAINAGE RUNS TO BE MADE REDUNDANT ARE TO BE JETTED AND RODDED THROUGH PRIOR TO BEING SEALED OFF. ALL RUNS TO BE MADE REDUNDANT ARE TO BE CHECKED BY CCTV FOR SADDLE CONNECTIONS. ANY SADDLE CONNECTIONS LOCATED ARE TO BE TRACED TO THEIR POINT OF ORIGIN AND THEN UNDER THE DIRECTION OF THE EMPLOYER'S REPRESENTATIVE ARE TO BE DIVERTED INTO NEW RUNS AS DEEMED NECESSARY.
-		L	PO FIRST ISSUE 28/02/24 LJI JG JG EVISION DETAILS DATE DRAWN CHKD APPD
CTION OF I		CL	TILLICOULTRY QUARRIES LTD
KELD SIKE DIRECTION OF FLOW		PR	ROJECT ELY COATED STONE NEW PLANT
a		DR	RAWING TITLE CONSTRUCTION DETAILS
		DR	(SHEET 1 OF 4)
-			NT16548-101 P0 RG SIZE A1 SCALE DATE 24/01/24 ANNU BY CHECKED BY APPROVED BY
EXISTING TO BE RE	DITCH / STREAM TAINED	DR	RAWN BY CHECKED BY APPROVED BY JG JG
AG HEAE	DWALL PLAN		wardell armstrong

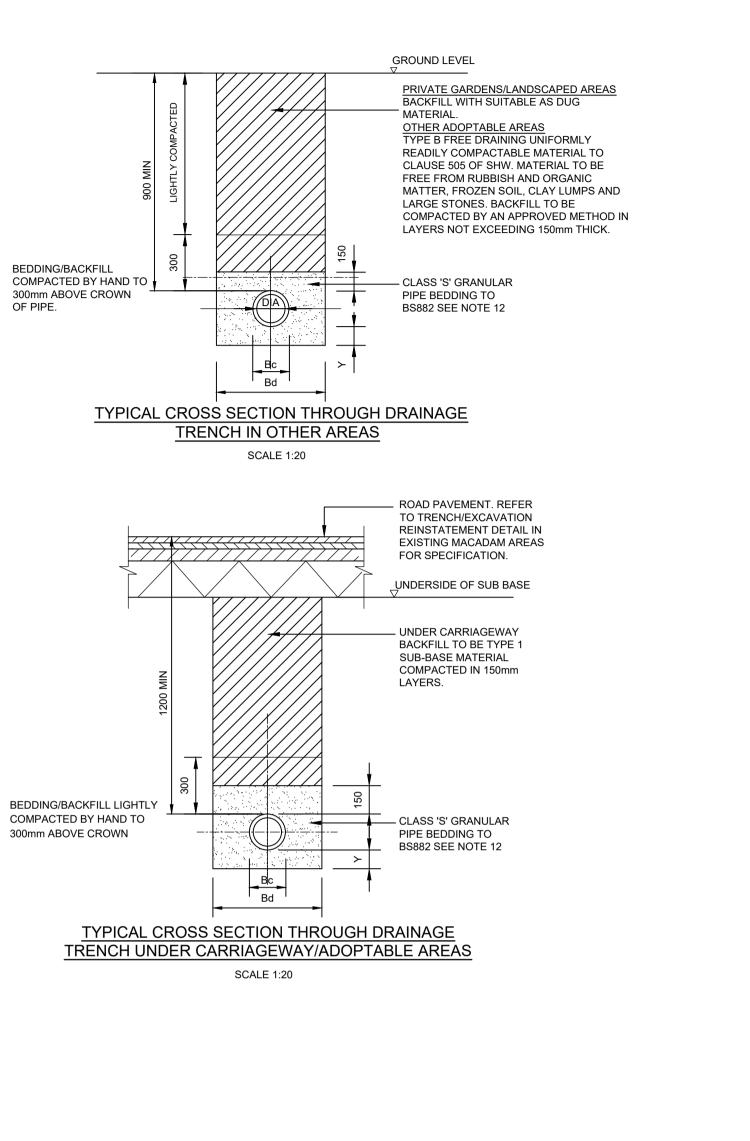
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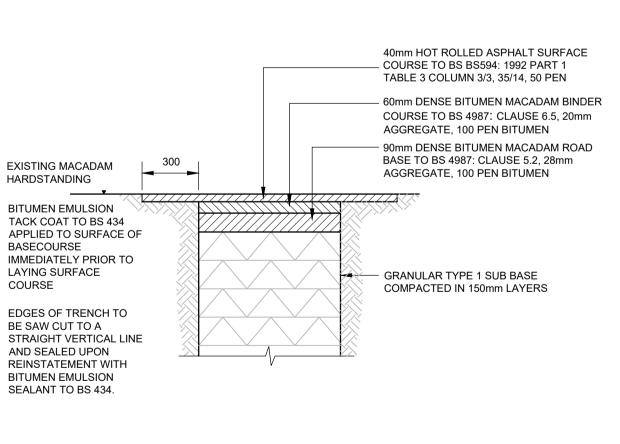




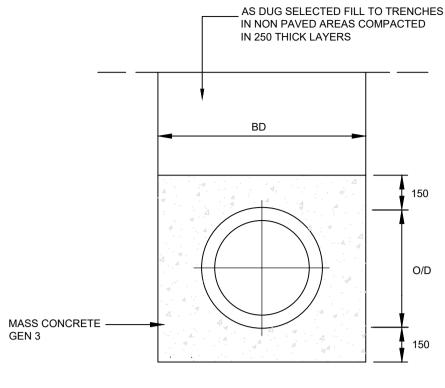
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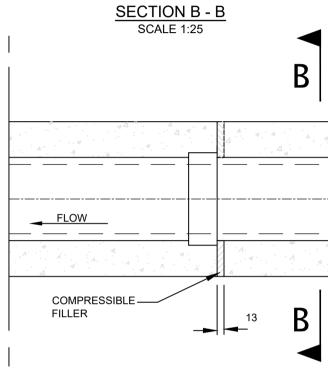
N:INTINT16548 - ELY COATED STONE CONDITIONS/03 - DESIGN/AUTOCADINT16548-101-P0_102-P0_103-P0 & 104-P0 CONSTRUCTION DETAILS.DWG





TRENCH/EXCAVATION REINSTATEMENT DETAIL IN EXISTING MACADAM AREAS SCALE 1:20



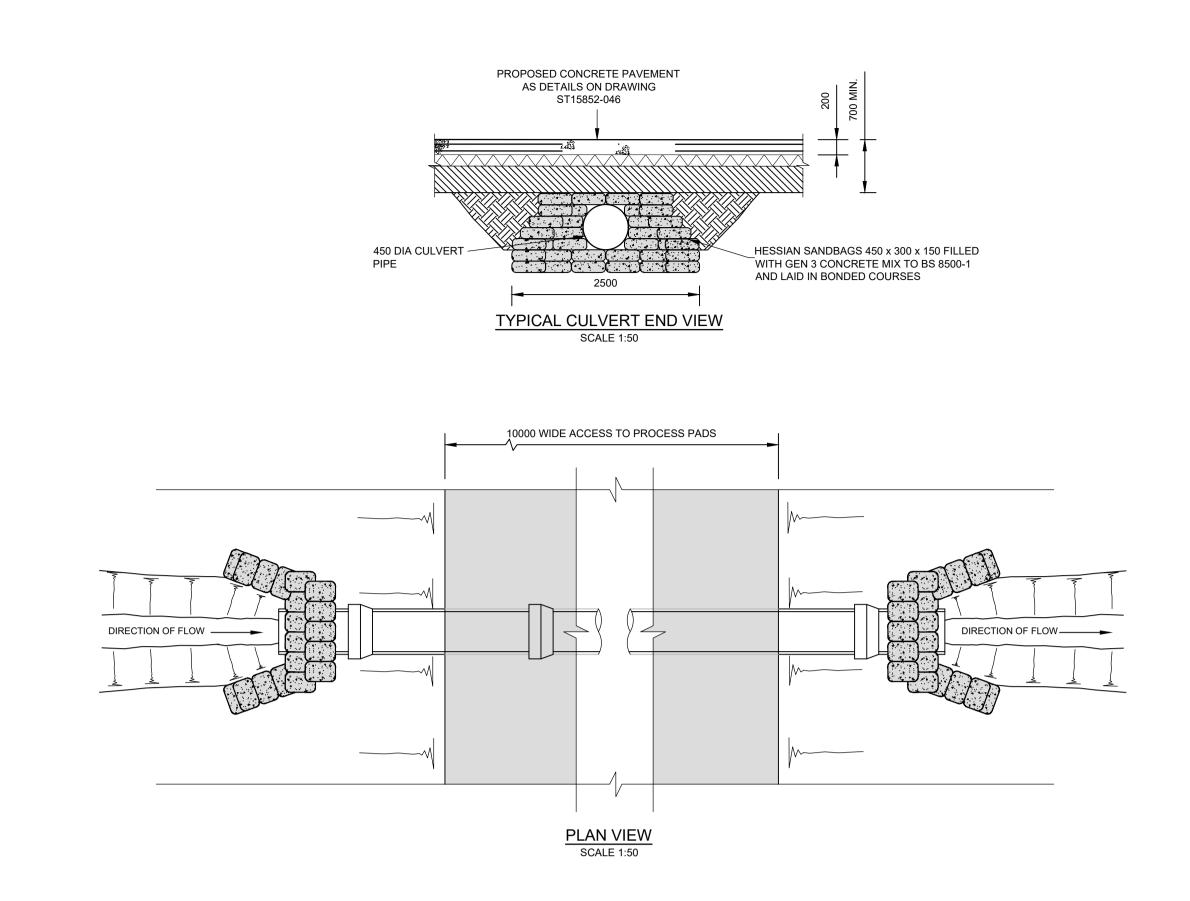


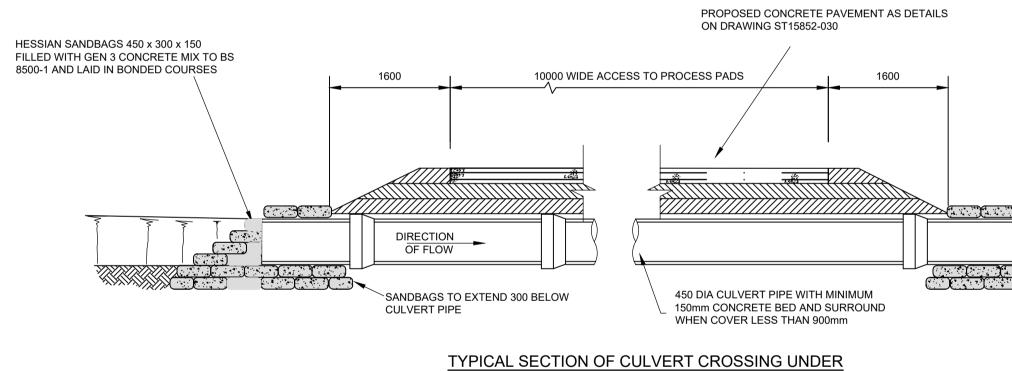
FLEXIBLE JOINT DETAIL CONCRETE BED AND SURROUND N.T.S

TABLE APPLIES FOR TRENCHES UNDER CARRIAGEWAY AND IN LANDSCAPED AREAS							
PIPE DIA/TYPE	TRENCH WIDTH Bd	APPROX. EXT PIPE DIA Bc	BEDDING T⊢ Y				
150	600	190	100				
225	700	280	100				
300	850	380	100				
450	1150	575	100				
525	1200	670	125				
600	1350	770	130				
900	1900	1100	185				

	NOTES
	1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
	2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
	3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND DETAILS AND CONTRACT DOCUMENTATION .
S	 ANY DISCREPANCIES IN THE DETAILS SHOWN ON THIS DRAWING ARE TO BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
	5. THE GENERAL SPECIFICATION OF MATERIALS AND WORKMANSHIP FOR DRAINAGE WORKS SHALL BE THE 'CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY - 7TH EDITION' (CESWI) PUBLISHED BY WRC (2011) ON BEHALF OF THE WATER SERVICES ASSOCIATION.
	6. ALL PRIVATE DRAINAGE WORKS ARE TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 BUILDING DRAINAGE AND BUILDING REGULATIONS APPROVED DOCUMENT H -DRAINAGE AND WASTE DISPOSAL (2002 EDITION INCORPORATING 2010 AMENDMENTS). ANY ADOPTABLE DRAINAGE IS TO COMPLY WITH THE REQUIREMENTS OF SEVERN TRENT WATER AND SEWERS FOR ADOPTION (LATEST EDITION).
	7. THE LOCATION OF EXISTING SEWERS SHOWN ON THIS DRAWING ARE INDICATIVE ONLY BASED ON KEELE UNIVERSITY ESTATE AND DEVELOPMENT DIRECTORATE SEWER RECORD PLANS AND TOPOGRAPHICAL INFORMATION. DEPTHS/INVERT LEVELS OF EXISTING SEWERS MUST BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS.
	8. ALL EXISTING DRAINAGE SHOWN ON THIS DRAWING IS INDICATIVE AND IS SHOWN FOR GUIDANCE ONLY. ALL EXISTING DRAINAGE RUNS MUST BE LOCATED AND TRACED ON SITE. ANY POTENTIAL CLASH WITH NEW PROPOSED DRAINAGE RUNS MUST BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
	9. ALL EXISTING SERVICES MUST BE LOCATED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. WHERE NECESSARY, PROTECTION OR DIVERSIONS ARE TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
	10. ALL MATERIALS UNLESS SPECIFIED OTHERWISE, SHALL COMPLY WITH RELEVANT BRITISH STANDARD. SOURCES OF MATERIALS ARE TO BE AGREED WITH THE EMPLOYERS REPRESENTATIVE IN ADVANCE OF WORKS.
	11. ALL GRAVITY SEWERS AND DRAINAGE INCLUDING ADOPTABLE DRAINAGE AND FITTINGS TO BE FLEXIBLY JOINTED CLAYWARE TO BS EN 295 OR CONCRETE TO BS 5911 PART 100. FLEXIBLY JOINTED UPVC PIPES AND FITTINGS TO BE EN 1401-1 MAY BE USED FOR PRIVATE BUILDING DRAINAGE ONLY.
	12. TYPICAL PIPE BEDDING TO DRAINAGE WHERE DEPTH TO SOFFIT IS GREATER THAN 600mm IN LANDSCAPED AREAS AND GREATER THAT 900mm IN OTHER TRAFFICKED AREAS IS TO BE CLASS S (I.E. 10-14mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES UP TO 525mm DIAMETER AND 20 -40mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES GREATER THAN 525mm DIAMETER).
	13. WHERE DEPTH TO SOFFIT OF DRAINAGE PIPEWORK IS LESS THAN 600mm IN LANDSCAPED AREAS AND LESS THAN 900mm IN HARDSTANDING/TRAFFICKED AREAS THEN PIPEWORK IS TO BE PROTECTED WITH GEN3 MASS CONCRETE. COMPRESSIBLE MATERIAL, FLEXCELL OR SIMILAR, APPROXIMATELY 13mm THICK, IS TO BE PROVIDED AT EVERY PIPE JOINT.
	14. BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE FREE DRAINING READILY COMPATIBLE MATERIAL, FREE FROM RUBBISH AND ORGANIC MATTER, FROZEN SOIL CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 150mm THICK.
HICKNESS 200 00 00 25 50 55	 15. CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8500-1, 2006. ALL CONCRETE TO BE SULPHATE RESISTANT. CONTRACTOR TO MAKE ALLOWANCE FOR CARRYING OUT ADDITIONAL TESTING ON-SITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION. 16. A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT, COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENT OF THE JOINT. THE LENGTH OF THE NEXT PIPE (ROCKER PIPE) AWAY FROM THE STRUCTURE SHALL BE AS SHOWN IN THE TABLE BELOW. NOMINAL DIAMETER (mm)
	150-600 0.6 675-750 1.0 825 AND OVER 1.25
	825 AND OVER 1.25 17. ALL STEP IRONS TO BE STAINLESS STEEL (GRADE 316 S31 BS 5970) OR POLYPROPYLENE ENCAPSULATED TO BS 1247 PARTS 1-2, DOUBLE STEP RUNGS (280mm MIN WIDTH AT 250mm MAXIMUM CENTRES). MAXIMUM DISTANCE FROM COVER LEVEL TO FIRST STEP TO BE 675mm. 18. EXISTING DRAINAGE RUNS TO BE MADE REDUNDANT ARE TO BE JETTED AND RODDED THROUGH PRIOR TO BEING SEALED OFF. ALL RUNS TO BE MADE REDUNDANT ARE TO BE CHECKED BY CCTV FOR SADDLE CONNECTIONS. ANY SADDLE CONNECTIONS LOCATED ARE TO BE TRACED TO THEIR POINT OF ORIGIN AND THEN UNDER THE DIRECTION OF THE EMPLOYER'S REPRESENTATIVE ARE TO BE DIVERTED INTO NEW RUNS AS DEEMED NECESSARY.
	P0 FIRST ISSUE 28/02/24 LJI JG JG
	REVISION DETAILS DATE DRAWN CHICD APPD
	PROJECT ELY COATED STONE NEW PLANT
	DRAWING TITLE CONSTRUCTION DETAILS
	(SHEET 2 OF 4) DRG No. NT16548-102 REV P0 SUIT. CODE
	DRG SIZE A1 SCALE DATE 24/01/24
	DRAWN BY CHECKED BY APPROVED BY JG JG
	wardell armstrong

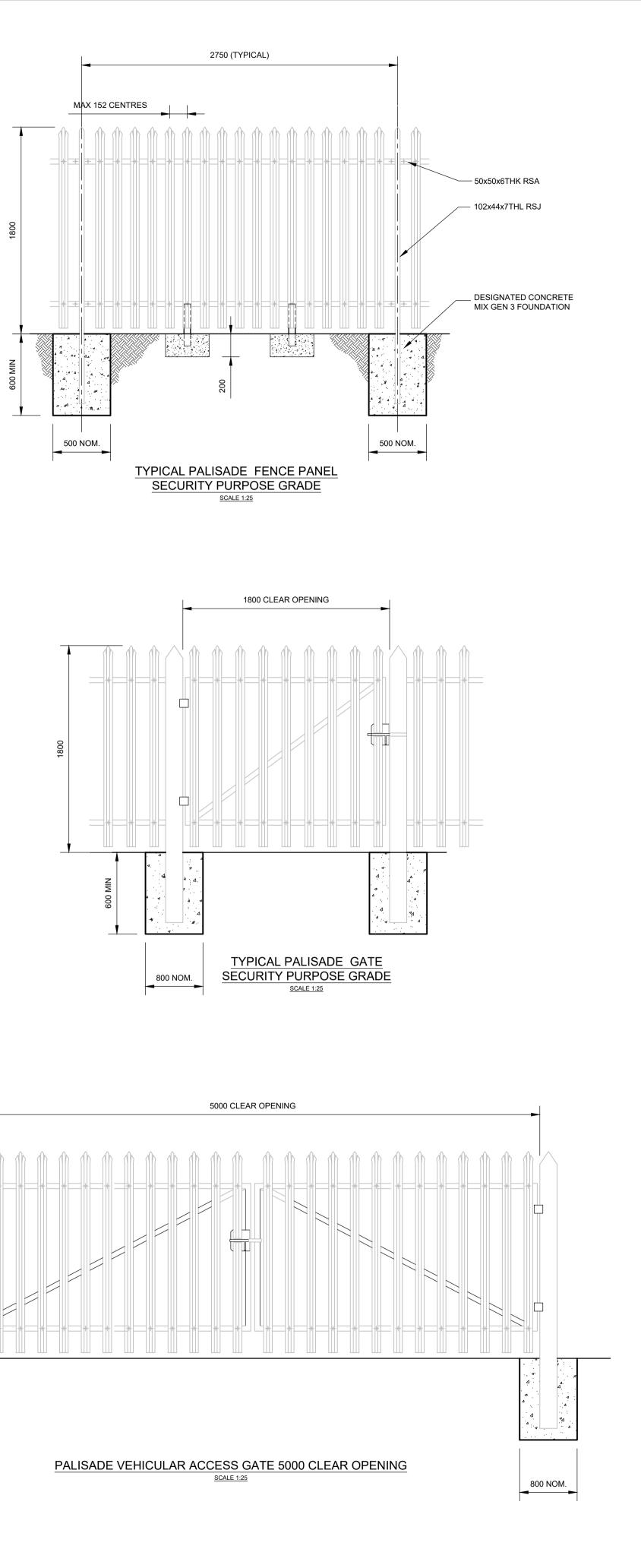
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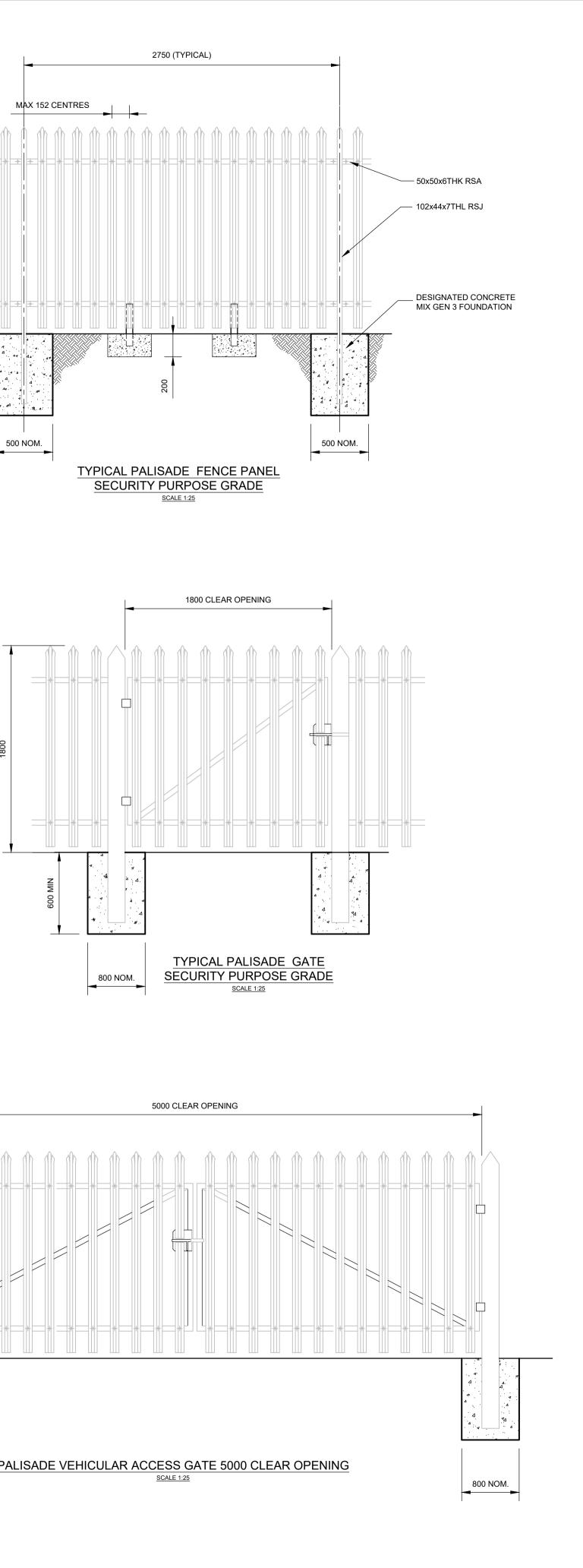


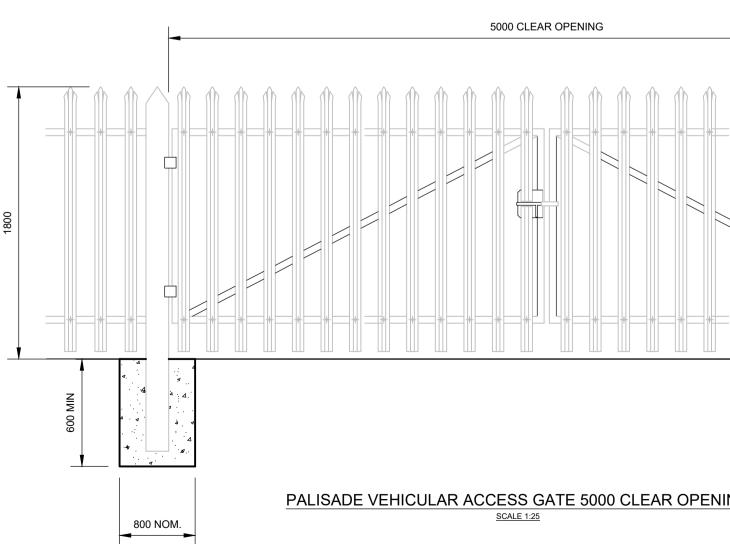


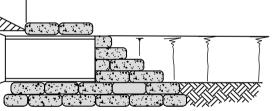
PROPOSED SITE ACCESS (CULVERT UNDER EXISTING HAUL ROAD SIMILAR) SCALE 1:50

N:INTINT16548 - ELY COATED STONE CONDITIONSI03 - DESIGN/AUTOCADINT16548-101-P0_102-P0_103-P0 & 104-P0 CONSTRUCTION DETAILS.DWG

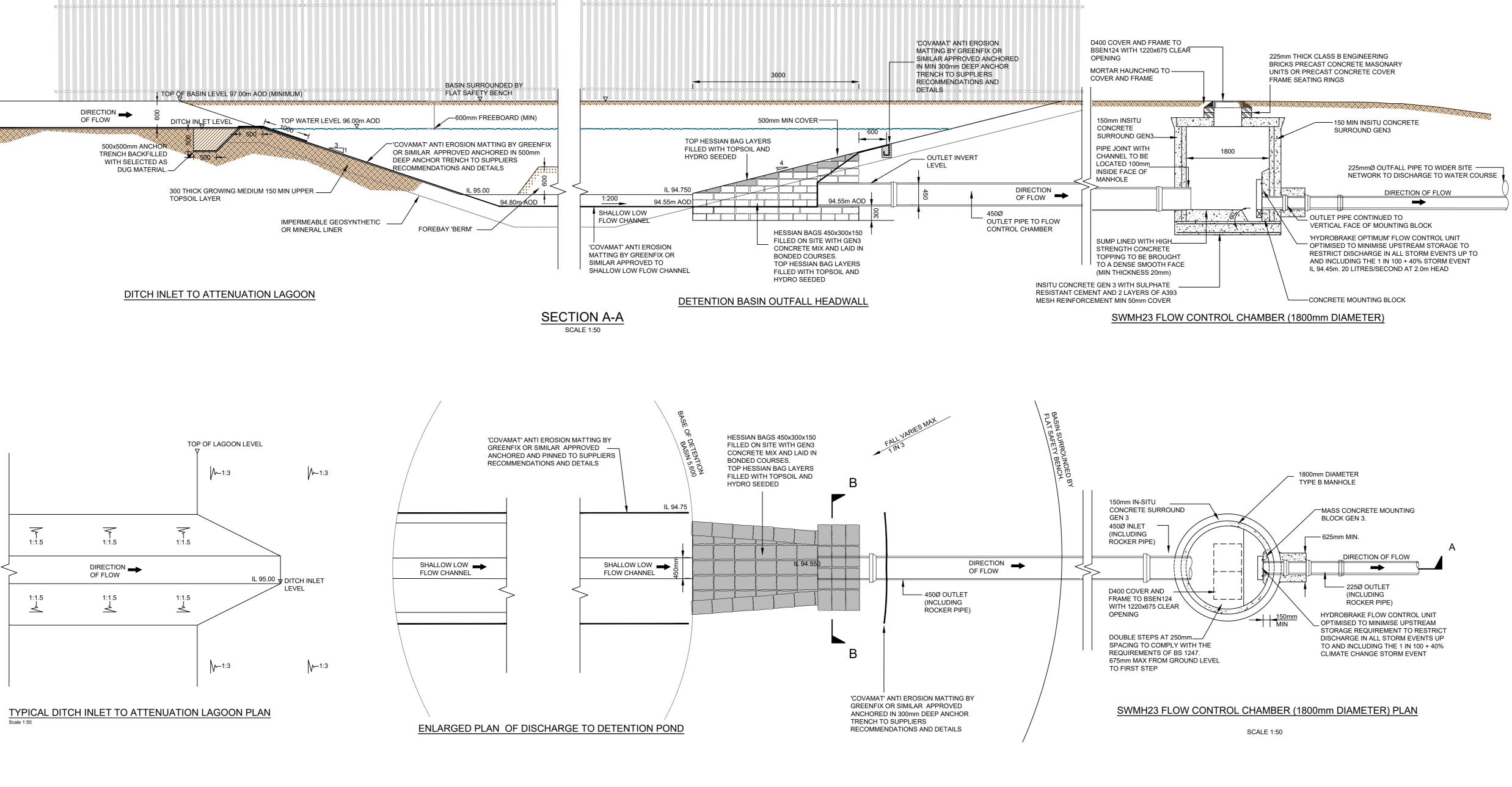








	THIS DRAWING
NONESES: 1. ALL DIMENSIONS ARE IN MILLIMETRES U OTHERWISE.	INLESS STATED
 ALL LEVELS ARE IN METRES ABOVE ORI STATED OTHERWISE. 	DNANCE DATUM UNLESS
3. THIS DRAWING IS TO BE READ IN CONJU ENGINEERING DRAWINGS AND DETAILS DOCUMENTATION .	
4. ANY DISCREPANCIES IN THE DETAILS SI ARE TO BE REPORTED TO THE EMPLOY PRIOR TO CONSTRUCTION.	
5. THE GENERAL SPECIFICATION OF MATE FOR DRAINAGE WORKS SHALL BE THE 'C SPECIFICATION FOR THE WATER INDUS' PUBLISHED BY WRC (2011) ON BEHALF C ASSOCIATION.	CIVIL ENGINEERING TRY - 7TH EDITION' (CESWI)
6. ALL PRIVATE DRAINAGE WORKS ARE TO REQUIREMENTS OF BS EN 752 BUILDING REGULATIONS APPROVED DOCUMENT H DISPOSAL (2002 EDITION INCORPORATIN ANY ADOPTABLE DRAINAGE IS TO COMF REQUIREMENTS OF SEVERN TRENT WAT ADOPTION (LATEST EDITION).	G DRAINAGE AND BUILDING H-DRAINAGE AND WASTE NG 2010 AMENDMENTS). PLY WITH THE
7. THE LOCATION OF EXISTING SEWERS SI ARE INDICATIVE ONLY BASED ON KEELE DEVELOPMENT DIRECTORATE SEWER F TOPOGRAPHICAL INFORMATION. DEPTH EXISTING SEWERS MUST BE CHECKED O COMMENCEMENT OF ANY DRAINAGE WO	E UNIVERSITY ESTATE AND RECORD PLANS AND IS/INVERT LEVELS OF ON SITE PRIOR TO THE
8. ALL EXISTING DRAINAGE SHOWN ON TH AND IS SHOWN FOR GUIDANCE ONLY. A RUNS MUST BE LOCATED AND TRACED CLASH WITH NEW PROPOSED DRAINAGI REPORTED TO THE EMPLOYER'S REPRE CONSTRUCTION.	ALL EXISTING DRAINAGE ON SITE. ANY POTENTIAL E RUNS MUST BE
9. ALL EXISTING SERVICES MUST BE LOCA THE COMMENCEMENT OF ANY WORKS. PROTECTION OR DIVERSIONS ARE TO B CONFLICT WITH THE PROPOSED WORKS	WHERE NECESSARY, E UNDERTAKEN TO AVOID
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11. ALL GRAVITY SEWERS AND DRAINAGE II DRAINAGE AND FITTINGS TO BE FLEXIBL TO BS EN 295 OR CONCRETE TO BS 591 ⁻ JOINTED UPVC PIPES AND FITTINGS TO FOR PRIVATE BUILDING DRAINAGE ONLY	Y JOINTED CLAYWARE 1 PART 100. FLEXIBLY BE EN 1401-1 MAY BE USED
12. TYPICAL PIPE BEDDING TO DRAINAGE W GREATER THAN 600mm IN LANDSCAPED THAT 900mm IN OTHER TRAFFICKED ARI 10-14mm GRADED IMPORTED GRANULAF PIPES UP TO 525mm DIAMETER AND 20 - GRANULAR BED AND SURROUND FOR P DIAMETER).	AREAS AND GREATER EAS IS TO BE CLASS S (I.E. R BED AND SURROUND FOR 40mm GRADED IMPORTED
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14.BACKFILL TO DRAINAGE TRENCHES UNE TYPE 1 SUB-BASE MATERIAL, ELSEWHEI DRAINING READILY COMPATIBLE MATER AND ORGANIC MATTER, FROZEN SOIL C STONES. TO BE COMPACTED IN LAYERS THICK.	RE BACKFILL TO BE FREE RIAL, FREE FROM RUBBISH LAY LUMPS AND LARGE
 15. CONCRETE MIXES INDICATED ON THIS E MIXES CONFORMING TO BS 8500-1, 2006 SULPHATE RESISTANT. CONTRACTOR T CARRYING OUT ADDITIONAL TESTING OI SULPHATE LEVEL CLASSIFICATION. 16. A FLEXIBLE JOINT SHALL BE PROVIDED / FEASIBLE TO OUTSIDE FACE OF ANY ST PIPE IS BUILT, COMPATIBLE WITH THE S COMPLETION AND SUBSEQUENT MOVEL LENGTH OF THE NEXT PIPE (ROCKER PI STRUCTURE SHALL BE AS SHOWN IN THE 	ALL CONCRETE TO BE O MAKE ALLOWANCE FOR N-SITE TO CONFIRM AS CLOSE AS IS RUCTURE INTO WHICH A ATISFACTORY MENT OF THE JOINT. THE PE) AWAY FROM THE IE TABLE BELOW.
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