# **CAULMERT LIMITED**

Engineering, Environmental & Planning Consultancy Services

## **Yanley Landfill Site**

Viridor Waste Exeter Ltd

## Surface Water Pollution Risk Assessment for Discharge to Sewer

Prepared by:

#### **Caulmert Limited**

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### APPROVAL RECORD

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Client:	Viridor Waste Exeter Ltd
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Approved	Sarah Venning	Date	04/03/2021

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- Appendix 2 Trade Effluent Consent

### 1 SURFACE WATER POLLUTION RISK ASSESSMENT OF YANLEY LEACHATE DISCHARGE TO SEWER

#### 1.1 Background

- 1.1.1 Viridor Waste Exeter Ltd (hereafter referred to as the 'Operator') are applying to vary their permit to allow the installation of a new Methane Stripping Plant (MSP) at the site, which will comply with conditions detailed in the Wessex Water discharge consent (Appendix 2).
- 1.1.2 A trade effluent agreement is already in place at the site which allows the discharge of 100 m<sup>3</sup>/day of treated effluent. The MSP will continue to discharge via foul sewer (west Colliter's Brook), which ultimately ends up at Avonmouth Sewage Treatment Works.
- 1.1.3 The regulation of the discharge of leachate from the site will be via the discharge consent.
- 1.1.4 In order to assess the environmental impact of the proposed variation, a H1 assessment has been undertaken in accordance with the Environment Agency Surface Water Pollution Risk Assessment for your Environmental Permits (Environment Agency<sup>\*</sup>). The details of the assessment are as presented below.

<sup>\*</sup> Environment Agency Surface water pollution risk assessment web based guidance accessed 18/02/21, https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

### 2 DATA COLLECTION

### 2.1 Stage 1: Identify the pollutants released from your plant

- 2.1.1 Leachate quality is monitored in accordance with the Permit and has been characterised over time. With respects to the risk to surface water from the agreed trade effluent consent, it is considered appropriate to assess the potential pollutants which are present within the bulk leachate as these are reflective of the discharge rather than point source concentrations contained within the waste mass itself. Data on the quality of the discharge has been collected over many years in association with the trade effluent consent. These parameters are presented in table 1 below. The concentrations assessed represent the discharge consent limit, i.e. the maximum concentration permitted to be released. In practise, the concentrations within the discharge are significantly below these levels, however the discharge limits have been adopted within this assessment such that the discharge may continue to be regulated through the discharge consent.
- 2.1.2 The discharge is to public sewer and therefore sewer treatment reduction factors have been applied to the discharge prior to the assessment of the impact on surface water. The receiving sewage treatment works is Avonmouth Sewage Treatment Works. This treatment works discharges to the Severn Estuary. No account of dilution within the STW has been included within the assessment.
- 2.1.3 A number of parameters do not have sewage treatment reduction factors as shown in the table below. Many of these parameters are removed in the treatment process, and therefore are not considered past stage 1 of testing. This applied to sulphide gas.

Raw Trade Effluent Discharge Consent (mg/l)		Percentage removal rate of substance by activated	Proportion remaining in activated sludge plant	RC Value		
		sludge plant		mg/l	ug/l	
Suspended Solids 105°C *	500		1	500	500000	
Sulphate as SO4 *	1000		1	1000	1000000	
Chromium Total	2.5	84	0.16	0.4	400	
Copper Total	2.5	79	0.21	0.525	525	
Lead Total	2.5	83	0.17	0.425	425	
Zinc Total	2.5	67	0.33	0.825	825	
Nickel Total	2.5	24	0.76	1.9	1900	
Sulphide as SO2 *	5	100	0	0	0	

#### Table 1: Summary of Trade Effluent Agreement Values

\* Indicates substances without STRF values.

STRF from http://www.fwr.org/WQreg/Appendices/horizontal\_Guidance\_H1\_Annex\_D\_Surface\_Water\_Basic\_geho0810bsxl-e-e(1).pdf

### **3** SCREENING TESTS ESTUARIES AND COASTAL WATERS

#### 3.1 Test 1 Check whether the level of pollutant in the discharge is more than the EQS Limits.

- 3.1.1 This screening test assesses whether the concentrations of the discharged substances exceed the relevant EQS for coastal waters. The current EQS standards have been sourced from the following two Environment Agency spreadsheets:
- Estuaries and coastal waters specific pollutants and operational environmental quality standards (EQS)<sup>+</sup>- accessed 18/02/2021
- Estuaries and coastal waters Priority hazardous substance, priority substances and other pollutants<sup>‡</sup>- accessed 18/02/2021
- 3.1.2 As the discharge is to sewer, a Sewage Treatment Reduction Factor (STRF) is applied to the concentration of each substance discharged. The STRF is an Environment Agency defined multiplier to simulate the impact on the concentration from treatment at a sewage treatment works. The resulting concentration after the STRF has been applied is hereafter referred to as the corrected release concentration (RCcorr). These are presented in Table 2 below.

			EQS (µg/l)		
STEP 1 - is RC > EQS	RC <sub>corr</sub> (µg/I)	AA	MAC	selected	RC>EQS?
Suspended Solids 105°C *	500000				PASS
Sulphate as SO4 *	1000000				PASS
Chromium Total	400	0.6	32	32	FAIL
Copper Total	525	3.76		3.76	FAIL
Lead Total	425	1.3	14	14	FAIL
Zinc Total	825	6.8		6.8	FAIL
Nickel Total	1900	8.6	34	34	FAIL
Sulphide as SO2 *	0				PASS

### Table 2: Corrected Data for STRF

3.1.3 In test 1, many of the parameters exceed the EQS limits. Suspended solids and sulphate do not have EQS limits for coastal waters and therefore are screened out during this stage.

<sup>&</sup>lt;sup>†</sup> https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit <sup>‡</sup> https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

### 3.2 Test 2: Are you discharging to the low water channel?

3.2.1 The discharge site from Avonmouth Sewage Treatment Works is located within the Severn Estuary and is therefore not discharging to the low water channel.

### 3.3 Test 3: Does your discharge have restricted dilution or dispersion?

3.3.1 The discharge site does not have restricted dilution or dispersion.

### 3.4 Test 4: Distance to chart datum

- 3.4.1 Based on current regulations it is assumed the existing discharge site and the associated pipework from the sewage treatment works are located more than one mile offshore and therefore neither of the following conditions apply:
  - The discharge location is less than 50m offshore from where the seabed is at chart datum
  - The seabed at the discharge location is less than 1m below chart datum
- 3.4.2 As a result, modelling is not required and test 5 can be undertaken.

### 3.5 Test 5: Buoyance of discharge

- 3.5.1 The discharge is considered buoyant as it is a freshwater discharge into a saline environment. The water depth below chart datum is assumed to be more than 3.5m due to the distance of the discharge site offshore and therefore a fixed allowable flux of 3.5 m<sup>3</sup>/s is appropriate.
- 3.5.2 Following the assessment methodology of Test 5, the effective volume flux for each parameter was calculated as follows:

$$EVF = \frac{(EFR \times RC_{corr})}{(EQS - BC)}$$

Where

$$\begin{split} & \text{EVF} = \text{Effective volume flux (m^3/s)} \\ & \text{EFR} = \text{Effluent flow rate (m^3/s)} \\ & \text{RC}_{\text{corr}} = \text{release concentration (with STRF) from Waste Treatment Facility (µg/l)} \\ & \text{EQS} = \text{environmental quality standard (µg/l)} \\ & \text{BC} = \text{background concentration (µg/l)} \end{split}$$

- 3.5.3 The effluent flow rate from the site is a mean effluent rate of 100 m<sup>3</sup>/day (0.0012 m<sup>3</sup>/s) and a maximum effluent flow rate of 12 litres/s (0.012 m<sup>3</sup>/s).
- 3.5.4 No background water quality is available and therefore half of the Environmental Quality Standard (AA) has been used for assessment.

3.5.5 Effective volume flux of all the parameters carried through from test 1 were assessed, and all parameters were found to be within the allowable volume flux of 3.5 m<sup>3</sup>/s.

STEP 5 - Is EVF>AVF?	RC (µg/l)	BC (µg/l)	EQS (µg/l)	EQS-BC (µg/l)	Effective Volume flux (m3/s)	Allowable flux (m3/s)	EVF>AVF?
Chromium Total	400	0.3	0.6	0.3	1.543	3.5	PASS
Copper Total	525	1.88	3.76	1.88	0.323	3.5	PASS
Lead Total	425	0.65	1.3	0.65	0.757	3.5	PASS
Zinc Total	825	3.4	6.8	3.4	0.281	3.5	PASS
Nickel Total	1900	4.3	8.6	4.3	0.511	3.5	PASS

Table 3: Substances modelled in Test 5

### 3.6 Additional Calculation – Ammoniacal Nitrogen

- 3.6.1 Whilst the discharge consent meets the surface water risk assessment, it is noted that ammoniacal nitrogen, one of the principal components of landfill leachate is not included within the consent. Therefore, in order to provide a robust assessment of the risks from the discharge to surface water, the risks associated with ammoniacal nitrogen is considered below.
- 3.6.2 The assessment is based on the approach identified above and utilises a STRF of 0.08. The EQS for saline water is based on NH₃ (free ammonia) as opposed the ammoniacal nitrogen. The following equation is used to convert between total ammoniacal nitrogen and free ammonia. It is based on an assumed temperature of 290°K (17°C) and pH 8.1.

$$NH3 as N = \frac{Total NH4 as N}{1 + 10^{(pKh-pH)}}$$

Where

pKh = 0.09018 + 2729.92/T

T = absolute temperature °K

### Table 4: Ammoniacal Nitrogen Test 1

	RC		EQS (µg/I)			
STEP 1 - is RC > EQS	(µg/l)	AA	MAC	selected	RC>EQS	
Ammoniacal Nitrogen	8560	21		32	FAIL	

3.6.3 The initial screening indicates that the initial screening fails this assessment.

STEP 5 - Is EVF>AVF?	RC (µg/l)	BC (µg/l)	EQS (µg/l)	EQS-BC (µg/l)	Effective Volume flux (m3/s)	Allowable flux (m3/s)	EVF>AVF?
NH3-N*	325	10.5	21	10.5	0.035824515	3.5	PASS

3.6.4 The assessment indicates that the concentration in the discharge is significantly below the screening value without taking into account any dilution effects within the sewage treatment works. Therefore, it is considered that the discharge from the site can continue to be regulated in accordance with the agreed trade effluent consent.

### 3.7 Water impact: Significant loads

3.7.1 For priority hazardous substances, an additional significant load assessment is required. This screening test assesses whether the annual load for the substance in question exceeds the annual significant load limit, which is the total mass of the substance realised across a single year. The discharge consent for the site does not identify any of the priority hazardous substances and therefore this additional screening is not required.

### 4 CONCLUSION AND DISCUSSION

- 4.1.1 The chemical quality of the treated leachate discharged to sewer under the trade effluent agreement with Wessex Water, is considered to meet the requirements of H1. The risks associated with this discharge proposal are considered to meet the requirement.
- 4.1.2 The discharge from the site is regulated under the trade effluent discharge consent. This assessment has demonstrated that the concentrations in the trade effluent discharge consent are acceptable in accordance with the Surface Water Pollution Assessment methodology.

### Appendix 1

H1 Calculations electronic copy

### **APPENDIX 2**

Trade Effluent Consent

· · ·	-	Viridor			
	APP	ROVAL FORM		· · · ·	
DOCUMENT TITLE : YANLEY TRADE EFFLUENT CONSENT					
ISSUE NUMBER :	One	ISSUE DATE	:	8 December 2000	
NEXT REVIEW DATE :	N/A NO OF PAGES (EXCLUDING THIS ONE)		N/A		
PROCEDURE & SECTION NO :	N/A				
APPROVED	SIGNA		SI	GNATORY TWO	
SIGNED :	Mel	hugg		N/A	
NAME :	M D Huggir	M D Huggins		N/A	
POSITION :	EMS Co-ordinator		N/A		
DATE :	8 December 2000		N/A		

### NB: WHERE FIELD IS NOT APPLICABLE - INSERT N/A IS DOCUMENT ATTACHED A CONTROLLED DOCUMENT? YES/NO (Please Delete) IF YES, REGISTRATION STAMP (Including Binder Number):



#### WESSEX WATER AUTHORITY

PUBLIC HEALTH ACT, 1936

PUBLIC HEALTH (DRAINAGE OF TRADE PREMISES) ACT, 1937

PUBLIC HEALTH ACT, 1961

#### WATER ACT, 1973

#### CONTROL OF POLLUTION ACT, 1974

#### CONSENT TO THE DISCHARGE OF

#### TRADE EFFLUENT

10:

Terry Adams Ltd Beech Cottage Old Rydon Lane EXETER EX2 73R

WHEREAS:

I. You have served on us the Wessex Water Authority (hereinafter referred to as 'the Authority') a Trade Effluent Notice, in pursuance of the provisions of the Public Health (Drainage of Trade Premises) Act, 1937,

dated the twenty fifth day of January 1988

in respect of trade premises situate at Yanley No 3 Landfill, Bridgwater Rd., BRISTOL, Avon

II. In pursuance of the provisions of the Public Health (Drainage of Trade Premises) Act, 1937, the discharge of trade effluent in accordance with the said trade effluent notice would not be lawful without the consent of the Authority.

III. The Authority is prepared to give such consent but subject to the conditions hereinalter set forth and to be observed by you.

IV. Any connection of your drain to the public sewer necessitated by this consent shall be made at your own expense and to the satisfaction of the Authority.

NOW THEREFORE WE HEREBY GIVE YOU NOTICE that the Authority's consent to the discharge of trade effluent from the above mentioned premises is subject to the following condition and not otherwise. –

Sewers Affected	1.	The public sewer into which the trade effluent may be discharged is the foul sewer, west of Colliter's Brook at Grid Ref: \$T560,700
Provision of drains for trade effluent only	2.	If required by the Authority drains, sampling and testing points shall be provided through which trade effluent and nothing else shall pass.
Change in the point(s) of discharge	3.	No change shall be made in the point or points at or through which the trade effluent is to be discharged to the public sewer except with the consent in writing of the Authority.

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Matters to be eliminated prior to discharge to	4.	Apart from the substances specified in this consent, the trade effluent shall not include any substances of a nature, composition or quantity likely, either alone or in combination with the contents of the sewer, to —
the sewer		<ul> <li>(a) injure the public sewers into which it is discharged or by which it is conveyed, or,</li> </ul>
		<ul> <li>(b) interfere with the free flow of the contents of the public sewers aforesaid, or,</li> </ul>
		(c) injure the sewage treatment works or any machinery or equipment installed thereat, or
		<ul> <li>(d) Interfere with any processes of purification of sewage or trade effluent, or,</li> </ul>
		(e) cause a nuisance or give off a vapour or harmful substance, or
		<li>(f) affect prejudicially the quality of the watercourse receiving the purified sewage effluent.</li>
Condensing water	5.	If required by the Authority condensing and cooling water shall be eliminated from the effluent.
Changes in composition and cessation of discharge	6.	THE AUTHORITY SHALL BE NOTIFIED FORTHWITH IN WRITING OF ANY CHANGES IN CONDITIONS AND OR PROCESSES WHICH ARE LIKELY TO ALTER THE NATURE OR COMPOSITION OF THE EFFLUENT AND ALSO THE PERMANENT CESSATION OF THE DISCHARGE IN WHICH LATTER CASE THIS CONSENT BECOMES VOID.
Nature or composition	7.	The trade effluent to be discharged under this consent shall consist of waste water specified in the said trade effluent notice and derived from. leachate from Landfill site
pH Value	8.	The pH of the trade effluent to be discharged under this consent shall not be less than pH 6 $$ or greater than pH.10 $$
Temperature	9.	The temperature of the trade effluent to be discharged under this consent shall not exceed $43.3^{\circ}$ C (110° F).
Conditions of acceptance	10.	The effluent shall not contain the substances listed in the Appendix in proportions greater than those stated.
Maximum amount to be discharged in any day	11.	The maximum quantity of trade effluent which may be discharged into the public sewer on any one day of 24 hours shall not exceed $100$ cubic metres (m <sup>3</sup> ).
Maximum rate of discharge	12.	The rate of discharge of trade effluent to the public sewer shall not exceed 12.0 litres per second (1/s).
Inspection	13.	You shall, if required by the Authority at your own expense:
Chamber		<ul> <li>(a) provide and maintain suitable inspection chambers or manholes in a position and of a type to be approved by the Authority in connection with each pipe or channel through which the trade effluent is discharged into the public sever, so as to enable a person readily to take at any time a semple of the trade effluent passing into the public sever.</li> </ul>
Measurement and determination of discharge		(b) provide and maintain in connection with every such pipe or channel either a notch gauge and continuous recorder or some other meter or other apparatus of a type approved by the Authority suitable and adequate for measuring and automatically recording the volume and rate of discharge of the trade effluent discharged into the public severs, and for the testing of such apparatus.

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13. Cont/		
		(c) provide and maintain apparatus to be approved by the Authority for determin- ing the nature and composition of the trade effluent being discharged from the premises into the public sever, and for the testing of such apparatus.
		(d) provide and maintain suitable and adequate treatment plant for the trade effluent if it is shown to be necessary.
		(e) keep to the satisfaction of the Authority records of the volume, rate of discharge, nature and composition of any trade effluent discharged and records of readings of meters and other apparatus provided in compliance with the conditions of this consent.
Payment	14.	(a) Subject to Section 59 (1) (c) of the Public Health Act, 1961 or any amendments, variations or modifications thereof, the occupier of the said premises shall pay to the Authority such charges as determined by the charging rates as the Authority may so prescribe.
		(b) A Schedule of charging rates including the methods by which, and the principles on which the charges are made, may be inspected during normal business hours at the Divisional Office of the Authority as designated in paragraph d below or at the Principal Offices of the Authority, namely Wessex House, Passage Street, Bristol.
		(c) All payments arising from the charges as levied by the Authority in respect of such Trade Effluent consents shall be paid on demand.
		<ul> <li>(d) All sums due in respect of charges should be remitted (unless otherwise specified by the Authority) to the Authority's Divisional Offices at I Clevedon Walk Nailsea BRISTOL BS19 2QR</li> <li>(e) The granting of time or any indulgence of any nature by the Authority shall not affect or invalidate the rights of the Authority or affect, reduce or mitigate the liability of the Occupier.</li> </ul>
Failure of recording apparatus	15.	If any notch gauge or recorder or other apparatus installed for the purpose of complying with conditions imposed by this consent ceases to measure or record or is suspected of not measuring or recording correctly, the quantity of trade effluent discharged on each day into the public sewer during the period from the date on which the records of the volume of trade effluent discharged into the public sewer were last accepted by the Authority as being correct, up to the date when the gauge or recorder or other apparatus again registers correctly, shall be deemed for the purpose of any payment to be made to the Authority to be the same quantity as the average daily volume of trade effluent discharged during the period of one month preceding the date on which the said records were last accepted as aforesaid, or during the period of one month immediately after the gauge or recorder or other apparatus has been correct, whichever is the greater.
Charging Information	16.	All information, figures and records, including those relating to water consumption, required by the Authority for the assessing of their charge for reception, conveyance and disposal of the effluent must be given on request. $A$
Dated this	ļ	day of August 19 89
		1 1/1Anii

Divisiona General Manager

For and on behalt of the Authority

22 Mar 00 12:24

Yanley Landfill

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Your attention is drawn to the right of appeal to the Secretary of State for the Department of the Environment which is conferred by Section 3 of the Public Health (Drainage of Trade Premises) Act, 1937, (as amended by Section 86 of the Fifth Schedule of the Public Health Act, 1961) on any person who is aggrieved by a condition attached to a consent.

Your attention is also drawn to Section 61 of the Public Health Act, 1961, which provides that, on such an appeal, the Minister may review all the conditions attached to the consent, whether appealed against or not, and may substitute for them any other set of conditions, whether more or less favourable to the appellant, or may annul the conditions. The Minister may include provision as to the charges to be made in pursuance of any condition attached to a consent for any period before the determination of the appeal. He may also give a direction that no trade effluent shall be discharged in pursuance of the trade effluent notice in question until a specified date, or vary such a direction by the local authority by substituting either an earlier or a later date specified in the direction.

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Terry Adams Ltd - Yanley

Wessex Water

WATER INDUSTRY ACT 1991

### NOTICE OF DIRECTION

TO: **Terry Adams Limited** Greendale Court Clyst St Mary Exeter EX5 IAW

#### WHEREAS:

Trade effluent is now discharged from the premises situate at Yanley No. 3 Landfill, Bridgwater Road, Bristol

(hereinafter referred to as 'the said premises') under a Consent by Wessex Water Services Limited (hereinafter recorded as 'the Company')

NOW THEREFORE the Company HEREBY GIVE NOTICE OF THEIR DIRECTION pursuant to Section 124 of the Water Industry Act 1991

that as from the 26th day of October 1994

the said Consent shall be varied to the extent set out in the Schedule overleaf.

Dated this

18 day of Ary UST 1954

For and on behalf of Wessex Water Services Ltd

**Richard Lacey Divisional Manager** 

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**SCHEDULE** 



The Technical Appendix to the Consent shall be in accordance with the attached conditions of discharge which replaces any previous Technical Appendix.

#### NOTE

Your attention is drawn to the right of appeal to the Director General of Water Services which is conferred by Section 126(1) of the Water Industry Act 1991.

"The owner or occupier of any trade premise may -

- (a) within two months of the giving to him under subsection(5) of Section 124 of a notice of direction under that section, or
- (b) with the written permission of the Director, at any later time, appeal to the Director against the direction."



Wessex Water Services Limited Registered Office Wessex House Passage Street Bristol Registered in England No 2366648

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### CONSENT APPENDIX 1

The effluent shall not at any time include the following substances:

- a Volatile petroleum products producing an inflammable vapour at a temperature of less than seventy three degrees Fahrenheit when tested in accordance with the Petroleum (Consolidation) Act 1928
- b Chlorinated hydrocarbons and related compounds
- c. Calcium carbide

#### CONSENT APPENDIX 2

- 1. Suspended solids shall not exceed 500 milligrams per litre (mg/l) of effluent.
- 2. The metals listed below shall not individually exceed the concentration stated in milligrams per litre (mg/l) of effluent of soluble or insoluble salts of compounds expressed as the metal:
  - a. Chromium (Cr) shall not exceed 2.5 mg/l of effluent
  - b. Nickel (Ni) shall not exceed 2.5 mg/l of effluent
  - c. Copper (Cu) shall not exceed 2.5 mg/l of effluent
  - d. Zinc (Zn) shall not exceed 2.5 mg/l of effluent
  - e. Lead (Pb) shall not exceed 2.5 mg/l of effluent
- 3. The total sulphate content of the effluent expressed as SO<sub>4</sub> shall not exceed 1000 milligrams per litre (mg/l) of effluent.
- 4. The total sulphide content of the effluent expressed as S shall not exceed 5 milligrams per litre (mg/l)

#### CONSENT APPENDIX 3

The effluent shall not contain materials which may be retained by a screen having perforations of 6mm in diameter.

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Terry Adams - Yanley No. 3

#### Wessex Water Services Limited

#### WATER INDUSTRY ACT 1991

#### NOTICE OF DIRECTION

TO: Terry Adams Limited Greendale Court Clyst St Mary Exeter EX5 1AW

#### WHEREAS:

Trade effluent is now discharged from the promises situate at Yanley No. 3 Landfill, Bridgwater Road, Bristol

(hereinafter referred to as 'the said premises') under a Consent by Wessex Water Services Limited (hereinafter recorded as 'the Company')

NOW THEREFORE the Company HEREBY GIVE NOTICE OF THEIR DIRECTION pursuant to Section 124 of the Water Industry Act 1991

that as from the 18th day of December 1995

the said Consent shall be varied to the extent set out in the Schedule overleaf.

Dated this

,7th

day of October 19 95

For and on behalf of Wessex Water Services Ltd

S M Allen Divisional Manager

**Caulmert Limited** 

Unit F13, InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG Tel: 01248 672671 Fax: 01248 672601 Email: contact@caulmert.com Web: www.caulmert.com

