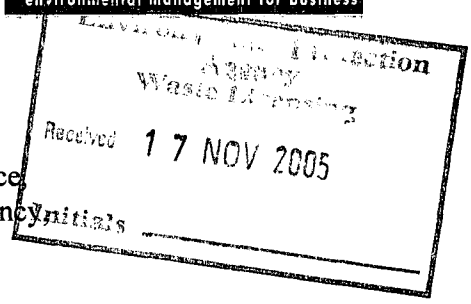
Granary House
Rutland Street
Cork

Tel. [021]4321521
Fax. [021]4321522

environmental management for business



Licensing Unit,
Office of Licensing & Guidance,
Environmental Protection Agency,
Headquarters,
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford.

16th November 2005

RE: Further Information under Article 16(1) of the Waste Management (Licensing) Regulations - Greenstar Ltd – Review Application Reg. No. 53-3

Dear Sir/Madam,

Please find enclosed, on behalf of Greenstar Ltd, an original and 2 no. copies of further information requested verbally under Article 16(1) of the Waste Management Licensing Regulations for the Waste Licence Review Application 53-3.

If you have any queries, please call me.

Yours sincerely,

Jim O'Callaghan

0307204/JOC/PS
Encs.
c.c. Mr. Micheal Geary, Greenstar Ltd.

email. info@ocallaghanmoran.com Website: www.ocallaghanmoran.com
O'Callaghan Moran & Associates. Registration No. 8272844U

Extent of Capping and Landfilling at *greenstar* Fassaroe

Introduction

Condition 4.4.1 of EPA Waste Licence Register No. 53-2 states:

"Within four months of the date of grant of this licence, the licensee shall submit a report on the extent of capping and landfilling at the site. This report shall include details on (i) waste types previously landfilled at the site, (ii) the areas landfilled, (iii) the areas that have been restored, (iv) the type of capping employed, (v) the condition of the restored areas and (vi) recommendations on final capping to be installed. Any recommendations arising from this report and a timetable for implementation shall be agreed with the Agency and implemented."

The following report provides details on each of the above sections. Further details are provided in Appendix A, environmental monitoring data, and in Appendix B, drawings indicating previously landfilled areas and development works at the facility.

(i) Waste Types previously landfilled

On the 24th November 2000 greenstar (formerly Celtic Waste) acquired the Fassaroe facility. Landfill activities ceased immediately after the acquisition. The Fassaroe facility operated as both a quarry and landfill site between 1947 and 2000. For many years, sand and gravel was excavated at the quarry and transported to construction sites. Trucks returning from deliveries, brought with them construction and demolition waste for disposal at the facility. Thus, quarrying and landfilling of construction and demolition waste occurred simultaneously. From the period 1947 to 1995 records were not kept of the waste types nor of the quantities accepted at the Facility.

Since 1995 approximately 350,000 tonnes of inert waste material has been deposited at the facility. Most of this material was deposited at the beginning of this period to provide a base on which to construct the present waste transfer building. The quantity of inert waste subsequently decreased to approximately 40,000 tonnes per annum until the end of 2000 when landfilling activities ceased.

Environmental monitoring undertaken at the facility over the past 3 years (see extracts from the Facility's Annual Environmental Reports for 2001 and 2002 contained within Appendix A) and inspection of previously landfilled areas indicate that the facility has negligible impact on its surrounding environment and poses a minimal threat in the future. The monitoring data supports anecdotal evidence that construction and demolition waste, comprised principally of subsoil and stone, was landfilled at the facility historically. As one would expect from this waste, which is predominantly inert, environmental monitoring indicates that little or no degradation of organic matter is occurring within previously landfilled areas. There is no spoiling of the extensive sideslopes by fugitive emissions of leachate, and landfill gas, surface water and groundwater monitoring indicate that the landfill has negligible impact on its environs.

(ii) The areas landfilled

It is not possible to accurately define previously landfilled areas because a pre-deposition topographic survey of the facility was never undertaken. Hence, most areas within the facility boundary other than those that follow the ground contours of neighbouring lands and appear to be original ground level (the river area and immediate surrounds and the eastern boundary etc.) are indicated as having been landfilled.

The areas suspected of having been landfilled are shown on the attached drawing no. D.1.6.

(iii) The areas that have been restored

No areas have yet been fully restored. Since recording of waste quantities and waste types was initiated in 1995, inert waste was landfilled at the facility. This has provided previously landfilled construction and demolition waste with some 350,000 tonnes of subsoil and stone capping.

(iv) The type of capping employed

As mentioned above, the temporary capping in place at present consists of subsoil and stone of varying depths. As no topographic survey was undertaken prior to its installation, the depth of capping cannot be confirmed at any given location. However, in recent years, excavations for various activities have indicated that the depth of capping varies between 0.5-1.5m.

(v) The condition of the restored areas

The construction of Phase I of the planned development works is completed. The landscaped mounds shown along the northern boundary of the landfill are nearing completion. On completion of Phase I much of the previously landfilled area have been capped to final restoration level and to the specification detailed below. The landscape mounds at the perimeter will be complete, screening operations from neighbouring properties and directing rainwater away from landfilled areas.

(vi) Recommendations on final capping to be installed

Drawing B9338-C002-B Civil Site Drainage Layout details the proposed development works. Phase II is scheduled for completion by February 2007. On completion of these Works, most areas previously landfilled other than sideslopes will be covered by impermeable hardstand. Areas not covered by hardstand will be topsoiled and planted. Both hardstanding and topsoiled areas will be profiled in accordance with the proposed restoration plans (Drawing B9058-CK04-A and B9058-CK03-B). The restoration profile, the extent of hardstand and planting of topsoiled areas will minimise the entry of incident rainfall through the capping to previously landfilled material. This will further reduce the minimal risk of negative impacts on the facility's environs. The profile indicated on the restoration plan provides for placement of the capping materials to the following depths on top of the existing temporary capping:

Landscaped Areas

1-2m of subsoil and 0.25-0.5m topsoil finish

Hardstand Areas

1-2m of subsoil and 0.25-0.5m stone sub-base and concrete/tarmacadam finish.

Appendix A

Environmental Monitoring

**No VOC or SVOC detected in BH-2, BH-4, BH-5, BH-6 and BH-7

Groundwater Monitoring - BH-2 - Noble Waste From AER 2001

	Results (mg/l)												Sampling	Method	Analysis method/
	9.1.01	23.2.01	16.3.01	30.4.01	28.5.01	8.6.01	19.7.01	15.8.01	13.9.01	30.10.01	19.11.01	11.12.01	Method	Detection Limit	technique
Temperature (°C)	NA	6.9	7.3	9.8	12.3	12.4		15.1	15.0	13.4	11.5	10.2	Bailer	0-100	Temperature probe
Chloride		57		46			42			29			Bailer	<5	Spectrophotometric analysis
TON		3.3		3.6			11.9			1.8			Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	0.77	0.23	0.16	<0.16	0.16	0.47	0.2	0.36	0.16	0.4	1.0	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		11		9.9			3.2			5.5			Bailer	<0.2	Flame Photometer
Sodium		33		74			29			26.5			Bailer	<0.2	Flame Photometer
TOC		6		7			4			6			Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.948	0.990	0.919	0.790	0.785	0.784	0.791	0.669	0.746	0.697	0.755	0.602	Bailer	<0.025	Meter
Dissolved Oxygen		0.5		1.8			6.8			3.69			Bailer	<0.1	Meter
pH (pH Units)	7.6	7.64	7.78	8.10	7.14	7.19	7.44	7.85	7.46	7.35	6.77	7.37	Bailer	<0.01	Meter
Boron										0.07			Bailer	<0.05	ICP
Calcium										124			Bailer	<0.05	ICP
Magnesium										10.55			Bailer	<0.05	ICP
Phosphorus										<0.05			Bailer	<0.05	ICP
Fluoride										0.20			Bailer	<0.01	Spectrophotometric analysis
Sulphate										40			Bailer	<3	Spectrophotometric analysis
Total Cyanide										<0.05			Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)										<0.05			Bailer	<0.05	CVAAS
Total Solids										348			Bailer	<1	Grav
Cadmium (ug/L)										<0.4			Bailer	<0.4	ICP-USN
Chromium (ug/L)										<1			Bailer	<1	ICP-USN
Copper (ug/L)										29			Bailer	<5	ICP-USN
Iron (ug/L)										420			Bailer	<1	ICP-USN
Manganese (ug/L)										<1			Bailer	<1	ICP-USN
Lead (ug/L)										<5			Bailer	<5	ICP-USN
Zinc (ug/L)										32			Bailer	<5	ICP-USN
Total Alkalinity										360			Bailer	<1	Titration

Groundwater Monitoring - BH-4 - Noble Waste

** Hydrocarbons detected as tentatively identified compound at a concentration of 2360ug/l in BH-4

	Results (mg/l)												Sampling	Method	Analysis method/
	9/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01	Method	Detection Limit	technique
Temperature (°C)	NA	16	17.9	17.9	18.9	17.7							Bailer	0-100	Temperature probe
Chloride		70		56			65			96			Bailer	<5	Spectrophotometric analysis
TON		<0.3		<0.3			<0.3			<0.3			Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	2.3	2.80	2.33	2.18	0.16	<0.16	2.65	3.30	3.51	6.08	0.70	1.98	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		17		26			19.5			22.5			Bailer	<0.2	Flame Photometer
Sodium		77.5		105			80			100			Bailer	<0.2	Flame Photometer
TOC		47		33			27			36			Bailer	<1	IR
Elec. Conductivity (mS/cm)	1.94	1.795	2.03	1.663	1.987	2.020	1.838	1.262	1794.000	2.38	2.170	1.901	Bailer	<0.025	Meter
Dissolved Oxygen		0.2		<0.1			0.4			1.85			Bailer	<0.1	Meter
pH (pH Units)	7.2	7.79	7.33	8.02	6.78	6.66	7.16	7.6	6.96	6.97	6.47	6.90	Bailer	<0.01	Meter
Boron										0.32			Bailer	<0.05	ICP
Calcium										613.80			Bailer	<0.05	ICP
Magnesium										51.95			Bailer	<0.05	ICP
Phosphorus										0.11			Bailer	<0.05	ICP
Fluoride										0.80			Bailer	<0.01	Spectrophotometric analysis
Sulphate										541			Bailer	<3	Spectrophotometric analysis
Total Cyanide										<0.05			Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)										<0.05			Bailer	<0.05	CVAAS
Total Solids										812			Bailer	<1	Grav
Cadmium (ug/L)										<0.4			Bailer	<0.4	ICP-USN
Chromium (ug/L)										1			Bailer	<1	ICP-USN
Copper (ug/L)										5			Bailer	<5	ICP-USN
Iron (ug/L)										1200			Bailer	<1	ICP-USN
Manganese (ug/L)										3300			Bailer	<1	ICP-USN
Lead (ug/L)										<5			Bailer	<5	ICP-USN
Zinc (ug/L)										83			Bailer	<5	ICP-USN
Total Alkalinity										930			Bailer	<1	Titration

Groundwater Monitoring - BH-5 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	9/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01	Method	Detection Limit	technique
Temperature (°C)		13.5	13.3	14.1	14.9	14.8		15.8	16.0	16.4	15.9	15.8	Bailer	0-100	Temperature probe
Chloride		128		123			135			125			Bailer	<5	Spectrophotometric analysis
TON		1.4		1			<0.3			<0.3			Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N		3.66	3.50	2.1	1.25	0.16	4.05	5.9	5.73	8.4	1.0	3.80	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		15.5		27.5			24			27			Bailer	<0.2	Flame Photometer
Sodium		106.3		125			122.5			98			Bailer	<0.2	Flame Photometer
TOC		26		26			20			18			Bailer	<1	IR
Elec. Conductivity (mS/cm)		2.01	2.15	2.090	2.270	2.270	2.110	1.410	2.003	2.010	1.927	1.691	Bailer	<0.025	Meter
Dissolved Oxygen		2.7		1.6			5.6			2.84			Bailer	<0.1	Meter
pH (pH Units)		7.39	7.10	7.7	6.7	6.48	6.89	7.46	6.88	6.88	6.19	6.84	Bailer	<0.01	Meter
Boron										0.65			Bailer	<0.05	ICP
Calcium										357.70			Bailer	<0.05	ICP
Magnesium										32.75			Bailer	<0.05	ICP
Phosphorus										0.16			Bailer	<0.05	ICP
Fluoride										0.80			Bailer	<0.01	Spectrophotometric analysis
Sulphate										402			Bailer	<3	Spectrophotometric analysis
Total Cyanide										<0.05			Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)										<0.05			Bailer	<0.05	CVAAS
Total Solids										1822			Bailer	<1	Grav
Cadmium (ug/L)										<0.4			Bailer	<0.4	ICP-USN
Chromium (ug/L)										<1			Bailer	<1	ICP-USN
Copper (ug/L)										9			Bailer	<5	ICP-USN
Iron (ug/L)										740			Bailer	<1	ICP-USN
Manganese (ug/L)										130			Bailer	<1	ICP-USN
Lead (ug/L)										<5			Bailer	<5	ICP-USN
Zinc (ug/L)										47			Bailer	<5	ICP-USN
Total Alkalinity										580			Bailer	<1	Titration

Groundwater Monitoring - BH-6 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	9/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/09/2001*	30/10/01	19/11/01	11/12/01	Method	Detection Limit	technique
Temperature (°C)		10.8	10.5	11.2	13.6	12		12.3	12.1	12.3	11.9	12.0	Bailer	0-100	Temperature probe
Chloride		46		21			45			31			Bailer	<5	Spectrophotometric analysis
TON		7.4		6.6			<0.3			7.8			Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N		2.26	0.47	<0.16	0.16	0.78	0.62	0.3		0.47	0.4	0.84	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		2.5		0.8			2.2			1.1			Bailer	<0.2	Flame Photometer
Sodium		32.5		17.5			25			25			Bailer	<0.2	Flame Photometer
TOC		3		3			7			3			Bailer	<1	IR
Elec. Conductivity (mS/cm)		0.836	0.667	0.581	0.782	0.674	0.741	0.695		0.861	0.810	0.752	Bailer	<0.025	Meter
Dissolved Oxygen		5.3		3.4			7.2			4.83			Bailer	<0.1	Meter
pH (pH Units)		7.48	7.64	7.83	6.97	7.24	7.18	7.9		7.16	6.95	7.17	Bailer	<0.01	Meter
Boron										<0.05			Bailer	<0.05	ICP
Calcium										182.90			Bailer	<0.05	ICP
Magnesium										10.04			Bailer	<0.05	ICP
Phosphorus										0.07			Bailer	<0.05	ICP
Fluoride										0.20			Bailer	<0.01	Spectrophotometric analysis
Sulphate										45			Bailer	<3	Spectrophotometric analysis
Total Cyanide										<0.05			Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)										<0.05			Bailer	<0.05	CVAAS
Total Solids										2222			Bailer	<1	Grav
Cadmium (ug/L)										<0.4			Bailer	<0.4	ICP-USN
Chromium (ug/L)										<1			Bailer	<1	ICP-USN
Copper (ug/L)										<5			Bailer	<5	ICP-USN
Iron (ug/L)										440			Bailer	<1	ICP-USN
Manganese (ug/L)										11			Bailer	<1	ICP-USN
Lead (ug/L)										<5			Bailer	<5	ICP-USN
Zinc (ug/L)										57			Bailer	<5	ICP-USN
Total Alkalinity										890			Bailer	<1	Titration

Groundwater Monitoring - BH-7 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	9/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01	Method	Detection Limit	technique
Temperature (°C)		9.7	9.1	9.7	10.7	10.4		13.0	12.9	13.1	12.4	12.1	Bailer	0-100	Temperature probe
Chloride		58		32			40			37			Bailer	<5	Spectrophotometric analysis
TON		0.6		0.4			2.8			2.6			Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N		2.26	1.32	0.39	0.7	0.16	0.47	0.4	0.35	0.23	0.3	0.62	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		0.8		2.4			1.5			2.2			Bailer	<0.2	Flame Photometer
Sodium		46		30			25.5			25.5			Bailer	<0.2	Flame Photometer
TOC		9		6			4			2			Bailer	<1	IR
Elec. Conductivity (mS/cm)		0.835	0.755	0.757	0.767	0.768	0.699	0.612	0.708	0.721	0.641	0.634	Bailer	<0.025	Meter
Dissolved Oxygen		1.4		1.8			4.6			3.52			Bailer	<0.1	Meter
pH (pH Units)		7.7	7.42	8.23	6.96	6.96	7.21	8.05	7.2	7.29	6.68	7.13	Bailer	<0.01	Meter
Boron										<0.05			Bailer	<0.05	ICP
Calcium										136.40			Bailer	<0.05	ICP
Magnesium										9.69			Bailer	<0.05	ICP
Phosphorus										0.06			Bailer	<0.05	ICP
Fluoride										0.20			Bailer	<0.01	Spectrophotometric analysis
Sulphate										25			Bailer	<3	Spectrophotometric analysis
Total Cyanide										<0.05			Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)										0.05			Bailer	<0.05	CVAAS
Total Solids										562			Bailer	<1	Grav
Cadmium (ug/L)										<0.4			Bailer	<0.4	ICP-USN
Chromium (ug/L)										<1			Bailer	<1	ICP-USN
Copper (ug/L)										<5			Bailer	<5	ICP-USN
Iron (ug/L)										320			Bailer	<1	ICP-USN
Manganese (ug/L)										320			Bailer	<1	ICP-USN
Lead (ug/L)										<5			Bailer	<5	ICP-USN
Zinc (ug/L)										60			Bailer	<5	ICP-USN
Total Alkalinity										350			Bailer	<1	Titration

Surface Water Monitoring - SW-1 - Noble Waste - From AER 2001

	Results (mg/l)				Sampling	Method	Analysis method/
	23/2/01	30/4/01	19/7/01	30/10/01	Method	Detection Limit	technique
Temperature (°C)	8.1	11		13.1	Grab	1-100	Temperature probe
Chloride	35	26	42	40	Grab	<5	Spectrophotometric analysis
COD	<10	11	<10	<15	Grab	<10	Spectrophotometric analysis
Nitrite	2.18	0.06	0.15	0.09	Grab	<0.05	Spectrophotometric analysis
BOD	<1	1	<1	<1	Grab	<1	ATU
Ammoniacal Nitrogen -N	0.93	0.62	0.39	0.23	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	<10	<10	<10	<10	Grab	<10	Grav
Phenol	0.02	<0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.628	0.564	0.598	0.617	Grab	<0.025	Meter
Dissolved Oxygen	4.4	9.3	9.9	7.4	Grab	<0.1	Meter
pH (pH Units)	8.19	8.35	8.22	8.17	Grab	<1	Meter
Calcium				110.50	Grab	<0.05	ICP
Magnesium				8.47	Grab	<0.05	ICP
Phosphorus				0.12	Grab	<0.05	ICP
Sulphate				21	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				7.5	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				0.26	Grab	<0.05	CVAAS
Potassium				2.1	Grab	<0.2	Flame Photometry
Sodium				19	Grab	<0.2	Flame Photometry
Total Suspended Solids				<10	Grab	<10	Grav
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				290	Grab	<1	ICP-USN
Manganese (ug/L)				<1	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				60	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				270	Grab	<1	Titration

Surface Water Monitoring - SW-2 - Noble Waste

	Results (mg/l)				Sampling	Method	Analysis method/
	23/2/01	30/4/01	19/7/01	30/10/01	Method	Detection Limit	technique
Temperature (°C)	7.8	10.8		13.0	Grab	1-100	Temperature probe
Chloride	39	24	33	35	Grab	<5	Spectrophotometric analysis
COD	32	<10	<10	<15	Grab	<10	Spectrophotometric analysis
Nitrite	5.46	0.07	0.11	0.08	Grab	<0.05	Spectrophotometric analysis
BOD	<1	1	<1	<1	Grab	<1	ATU
Ammoniacal Nitrogen -N	1.63	0.16	0.31	0.16	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	16	<10	32	<10	Grab	<10	Grav
Phenol	<0.01	<0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.622	0.5	0.619	0.62	Grab	<0.025	Meter
Dissolved Oxygen	0.3	9	9.2	7.6	Grab	<0.1	Meter
pH (pH Units)	8.18	8.47	8.2	8.18	Grab	<1	Meter
Calcium				103.50	Grab	<0.05	ICP
Magnesium				8.10	Grab	<0.05	ICP
Phosphorus				0.09	Grab	<0.05	ICP
Sulphate				28	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				7.6	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				0.07	Grab	<0.05	CVAAS
Potassium				2.1	Grab	<0.2	Flame Photometry
Sodium				22	Grab	<0.2	Flame Photometry
Total Suspended Solids				<10	Grab	<10	Grav
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				340	Grab	<1	ICP-USN
Manganese (ug/L)				<1	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				34	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				280	Grab	<1	Titration

Surface Water Monitoring - SW-3 - Noble Waste

	Results (mg/l)				Sampling	Method	Analysis method/
	23/2/01	30/4/01	19/7/01	30/10/01	Method	Detection Limit	technique
Temperature (°C)	7.8	11		13.3	Grab	1-100	Temperature probe
Chloride	38	27	54	34	Grab	<5	Spectrophotometric analysis
COD	42	<10	<10	<15	Grab	<10	Spectrophotometric analysis
Nitrite	4.76	0.05	0.11	0.07	Grab	<0.05	Spectrophotometric analysis
BOD	9	1	1	<1	Grab	<1	ATU
Ammoniacal Nitrogen -N	1.32	<0.16	0.54	0.16	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	30	<10	11	<10	Grab	<10	Grav
Phenol	<0.01	<0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.627	0.531	0.622	0.615	Grab	<0.025	Meter
Dissolved Oxygen	<0.1	9.1	9.8	0.667	Grab	<0.1	Meter
pH (pH Units)	8.52	8.34	8.21	8.18	Grab	<1	Meter
Calcium				104.60	Grab	<0.05	ICP
Magnesium				8.19	Grab	<0.05	ICP
Phosphorus				0.06	Grab	<0.05	ICP
Sulphate				23	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				7.6	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				4.49	Grab	<0.05	CVAAS
Potassium				2.1	Grab	<0.2	Flame Photometry
Sodium				21	Grab	<0.2	Flame Photometry
Total Suspended Solids				<10	Grab	<10	Grav
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				330	Grab	<1	ICP-USN
Manganese (ug/L)				<1	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				55	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				260	Grab	<1	Titration

Surface Water Monitoring - SW-4 - Noble Waste

	Results (mg/l)				Sampling	Method	Analysis method/
	23/2/01	30/4/01	19/7/01	30/10/01	Method	Detection Limit	technique
Temperature (°C)	7.7	11		13.2	Grab	1-100	Temperature probe
Chloride	39	26	35	38	Grab	<5	Spectrophotometric analysis
COD	28	10	<10	<15	Grab	<10	Spectrophotometric analysis
Nitrite	6.66	0.05	0.12	0.08	Grab	<0.05	Spectrophotometric analysis
BOD	6	<1	<1	<1	Grab	<1	ATU
Ammoniacal Nitrogen -N	1.17	0.16	0.47	0.16	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	22	<10	21	<10	Grab	<10	Grav
Phenol	<0.01	<0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.631	0.552	0.624	0.621	Grab	<0.025	Meter
Dissolved Oxygen	<0.1	9.3	9.9	8.00	Grab	<0.1	Meter
pH (pH Units)	8.13	8.29	8.2	8.18	Grab	<1	Meter
Calcium				106.80	Grab	<0.05	ICP
Magnesium				8.33	Grab	<0.05	ICP
Phosphorus				0.06	Grab	<0.05	ICP
Sulphate				22	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				7.5	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				<0.05	Grab	<0.05	CVAAS
Potassium				2.0	Grab	<0.2	Flame Photometry
Sodium				21.5	Grab	<0.2	Flame Photometry
Total Suspended Solids				<10	Grab	<10	Grav
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				300	Grab	<1	ICP-USN
Manganese (ug/L)				<1	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				49	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				260	Grab	<1	Titration

Noble Waste - Methane Levels (% v/v) for 2001

	8/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01
GS-01	3		0	0	0	0	0	0	0	0	0	0
GS-02	0.2	0	0	0	0	0	0	0	0	0	0	0
GS-03	0	0										
GS-04	0.2	0	0	0	1.1	0	0	0	0	0.3	0	0
GS-05		0	0	0	0	0	0	0	0	0		0
GS-06		0	0	0	0	0	0	0	0	0	0	0
BH-5		0	0	0	1	0.6	0.7	0.5	3.6	0	0	0
BH-6		0	0	0	0	0	0	0	0	0	0	0
BH-7		0	0	0	0	0	0	0	0	0	0	0
L-01		0	0	0	0	0	0	0	0.6			
L-02		0	0	0	0	0	0	0	0	0	0	0

Noble Waste - Carbon Dioxide Levels (% v/v) for 2001

	8/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01
GS-01	6		3	9.2	7	6.7	2.3	0.7	14	9.3	0.3	0
GS-02	0	0.8	0.2	0.5	0.1	0	0	0	0	0.3	1	1.4
GS-03	0.8	0.2										
GS-04	0.1	2	0.1	13	12	11	14	0.8	13	17	3.9	1.2
GS-05		4	2	1.7	2.9	0	0	2.3	4.4	4.4		2.5
GS-06		5	3	5	6.2	7	7.7	8.8	6.3	6.6	0	3.9
BH-5		7	1	0	10	3.4	4.1	5.7	11	7	4.3	0.2
BH-6		0.1	3	0	0.8	0	0	0.2	0	0.5	0.3	1.4
BH-7		4	1	0.1	2.3	2.3	0.2	0	2.1	1.1	0.1	0.2
L-01		7	11	9.3	6.7	5.1	2	0	11			
L-02		9	3	7.7	9.2	10	4.3	9.2	11	8.8	13	3

Noble Waste - Oxygen Levels (% v/v) for 2001

	8/1/01	23/2/01	16/3/01	30/4/01	28/5/01	8/6/01	19/7/01	15/8/01	13/9/01	30/10/01	19/11/01	11/12/01
GS-01	11.5		19.4	5.8	8.9	11	17.3	19.3	2.5	9	20.6	20.9
GS-02	18.5	20.9	20.9	19.1	19.6	20	20.3	20.2	21.2	20.8	20.5	20.3
GS-03	18.2	21.2										
GS-04	10.5	20.3	20.9	1.3	2.2	2.9	1.2	18.9	1.8	1.3	15.3	18.9
GS-05		20.4	19.9	17.7	16.2	20	20.3	17.6	12.4	16.8		18.5
GS-06		19.5	20	14.7	13.7	12.7	14	12	12.9	13.5	20.9	16.8
BH-5		17	20.2	20.1	4.7	14.8	14.4	11.3	4.7	10.9	13.1	20.6
BH-6		21.3	19.9	20.3	18.8	20.2	20.5	20	20.8	20.2	20.6	19
BH-7		18.5	20.1	19.6	14.7	15.2	19.8	20.1	16.5	19.1	21.2	20.9
L-01		16.2	16.4	5.3	8.3	10.3	16.2	20	3.4			
L-02		16.3	20.3	8.4	5.7	5.4	16.1	7.1	4.5	12.5	1.5	17.5

Groundwater Monitoring - BH-2 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	28/01/2002	25/02/2002	25/03/2003	22/04/2002	22/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002	Method	Detection Limit	technique
Temperature (°C)	8.4	8.6	9.0	10.3	12.4	13.2	14.3	15.2	15.3	14.1	11.4	10.2	Bailer	0-100	Temperature probe
Chloride		26			25				26		19		Bailer	<5	Spectrophotometric analysis
TON		1			0.8				<0.3		<0.3		Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen - N	0.62	0.41	0.7	<0.2	1.6	2.5	0.7	0.2	<0.2	0.4	<0.2	<0.2	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		7.5			9.4				9.8		6.7		Bailer	<0.2	Flame Photometer
Sodium		20.5			21				26.5		19		Bailer	<0.2	Flame Photometer
TOC		7			3				18		8		Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.564	0.866	0.891	0.550	0.749	0.956	0.699	0.919	0.980	0.911	0.833	0.967	Bailer	<0.025	Meter
Dissolved Oxygen		8.9			7.5				5.4		3.1		Bailer	<0.1	Meter
pH (pH Units)	7.38	7.29	7.34	7.45	7.45	7.20	7.18	7.12	7.54	6.91	7.12	6.93	Bailer	<0.01	Meter
Boron											0.05		Bailer	<0.05	ICP
Calcium											133.8		Bailer	<0.05	ICP
Magnesium											11.78		Bailer	<0.05	ICP
Phosphorus											<0.05		Bailer	<0.05	ICP
ortho Phosphate as PO4											<0.03		Bailer	<0.03	KONE
Fluoride											<0.5		Bailer	<0.01	Spectrophotometric analysis
Sulphate											33		Bailer	<3	Spectrophotometric analysis
Total Cyanide											<0.05		Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)											<0.05		Bailer	<0.05	CVAAS
Total Solids											488		Bailer	<1	Grav
Cadmium (ug/L)											<0.4		Bailer	<0.4	ICP-USN
Chromium (ug/L)											<1		Bailer	<1	ICP-USN
Copper (ug/L)											<5		Bailer	<5	ICP-USN
Iron (ug/L)							2				<1		Bailer	<1	ICP-USN
Manganese (ug/L)							1				16		Bailer	<1	ICP-USN
Lead (ug/L)											<5		Bailer	<5	ICP-USN
Zinc (ug/L)											<5		Bailer	<5	ICP-USN
Total Alkalinity											410		Bailer	<1	Titration
Total Coliforms (mpn/100ml)											1203		Bailer	<1	Count
Faecal Coliforms (mpn/100ml)											6		Bailer	<1	Count
VOC (ug/L)											<1		Bailer	<1	GCMS
SVOC (ug/L) Naphthalene 2-Methylnaphthalene											2 5		Bailer	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)											<10		Bailer	<10	GCMS

Groundwater Monitoring - BH-5 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	28/01/2002	25/02/2002	25/03/2003	22/04/2002	22/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002	Method	Detection Limit	technique
Temperature (°C)	15.4	15.5	15.3	15.0	14.5	15.4	15.4	15.5	15.8	15.7	16.7	16.6	Bailer	0-100	Temperature probe
Chloride		73			34				111		112		Bailer	<5	Spectrophotometric analysis
TON		3			6.6				1.3		0.7		Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen - N	3.8	4.5	5.00	3.6	4.5	6.40	1.3	3.7	4.70	5.0	4.5	7.3	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		9.6			14				9.6		19.5		Bailer	<0.2	Flame Photometer
Sodium		33.5			33				32		107.5		Bailer	<0.2	Flame Photometer
TOC		14			5				19		17		Bailer	<1	IR
Elec. Conductivity (mS/cm)	1.486	1.093	1.830	1.693	1.325	2.045	1.996	1.994	2.190	2.160	2.050	2.195	Bailer	<0.025	Meter
Dissolved Oxygen		8.6			7.2				3.4		2.6		Bailer	<0.1	Meter
pH (pH Units)	6.82	6.9	6.98	7.09	6.87	6.91	6.85	7.29	7.23	6.63	6.89	6.62	Bailer	<0.01	Meter
Boron											0.46		Bailer	<0.05	ICP
Calcium											347.9		Bailer	<0.05	ICP
Magnesium											30.75		Bailer	<0.05	ICP
Phosphorus											<0.05		Bailer	<0.05	ICP
ortho Phosphate as PO4											<0.03		Bailer	<0.03	KONE
Fluoride											<0.5		Bailer	<0.01	Spectrophotometric analysis
Sulphate											432		Bailer	<3	Spectrophotometric analysis
Total Cyanide											<0.05		Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)											<0.05		Bailer	<0.05	CVAAS
Total Solids											2053		Bailer	<1	Grav
Cadmium (ug/L)											<0.4		Bailer	<0.4	ICP-USN
Chromium (ug/L)											<1		Bailer	<1	ICP-USN
Copper (ug/L)											<5		Bailer	<5	ICP-USN
Iron (ug/L)							11				<1		Bailer	<1	ICP-USN
Manganese (ug/L)							222				172		Bailer	<1	ICP-USN
Lead (ug/L)											<5		Bailer	<5	ICP-USN
Zinc (ug/L)											<5		Bailer	<5	ICP-USN
Total Alkalinity											620		Bailer	<1	Titration
Total Coliforms (mpn/100ml)											73		Bailer	<1	Count
Faecal Coliforms (mpn/100ml)											<1		Bailer	<1	Count
VOC (ug/L)											<1		Bailer	<1	GCMS
SVOC (ug/L) Naphthalene 2-Methylnaphthalene											<1		Bailer	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)											<10		Bailer	<10	GCMS

Groundwater Monitoring - BH-6 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	28/01/2002	25/02/2002	25/03/2003	22/04/2002	22/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002	Method	Detection Limit	technique
Temperature (°C)	11.7	10.9	11.0	11.9	12.0	12.3	13.9	13.3	14.9	NS	11.6	11.7	Bailer	0-100	Temperature probe
Chloride		31			27				19		32		Bailer	<5	Spectrophotometric analysis
TON		8.4			5.3				1.1		5.4		Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen - N	0.47	0.49	0.8	0.3	3.7	3.3	0.4	0.3	0.3	NS	<0.2	<0.2	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		0.3			0.6				1.4		0.4		Bailer	<0.2	Flame Photometer
Sodium		24			16				21.5		20		Bailer	<0.2	Flame Photometer
TOC		4			<2				37		<2		Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.753	0.844	0.804	0.677	0.714	0.748	0.61	0.724	0.688	NS	0.813	0.906	Bailer	<0.025	Meter
Dissolved Oxygen		9.04			7.8				5.9		4		Bailer	<0.1	Meter
pH (pH Units)	7.12	7.26	7.37	7.56	7.31	7.22	7.18	7.45	7.67	NS	7.19	6.98	Bailer	<0.01	Meter
Boron											<0.05		Bailer	<0.05	ICP
Calcium											131.3		Bailer	<0.05	ICP
Magnesium											6.98		Bailer	<0.05	ICP
Phosphorus											<0.05		Bailer	<0.05	ICP
ortho Phosphate as PO4											<0.03		Bailer	<0.03	KONE
Fluoride											<0.5		Bailer	<0.01	Spectrophotometric analysis
Sulphate											58		Bailer	<3	Spectrophotometric analysis
Total Cyanide											<0.05		Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)											<0.05		Bailer	<0.05	CVAAS
Total Solids											1955		Bailer	<1	Grav
Cadmium (ug/L)											<0.4		Bailer	<0.4	ICP-USN
Chromium (ug/L)											<1		Bailer	<1	ICP-USN
Copper (ug/L)											<5		Bailer	<5	ICP-USN
Iron (ug/L)							2				<1		Bailer	<1	ICP-USN
Manganese (ug/L)							3				5		Bailer	<1	ICP-USN
Lead (ug/L)											<5		Bailer	<5	ICP-USN
Zinc (ug/L)											<5		Bailer	<5	ICP-USN
Total Alkalinity											310		Bailer	<1	Titration
Total Coliforms (mpn/100ml)											28		Bailer	<1	Count
Faecal Coliforms (mpn/100ml)											<1		Bailer	<1	Count
VOC (ug/L)											<1		Bailer	<1	GCMS
SVOC (ug/L)											<1		Bailer	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)											<10		Bailer	<10	GCMS

Groundwater Monitoring - BH-7 - Noble Waste

	Results (mg/l)												Sampling	Method	Analysis method/
	28/01/2002	25/02/2002	25/03/2003	22/04/2002	22/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002	Method	Detection Limit	technique
Temperature (°C)	10.7	10.6	10.1	10.7	10.7	11.9	12.1	12.6	13.0	13.0	12.5	12	Bailer	0-100	Temperature probe
Chloride		35			30				23		24		Bailer	<5	Spectrophotometric analysis
TON		1.1			1.7				2.6		2.2		Bailer	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen - N	0.69	0.99	1.3	0.3	2.7	3.2	0.9	<0.2	<0.2	<0.2	0.9	4.0	Bailer	<0.2	Colormetric Spectrophotometry
Potassium		1.8			1.9				1.7		1.5		Bailer	<0.2	Flame Photometer
Sodium		20			18				18.5		18		Bailer	<0.2	Flame Photometer
TOC		7			3				10		3		Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.654	0.724	0.756	0.675	0.679	0.687	0.455	0.601	0.665	0.66	0.690	0.825	Bailer	<0.025	Meter
Dissolved Oxygen		9.19			6.8				5.3		3		Bailer	<0.1	Meter
pH (pH Units)	7.13	7.28	7.09	7.45	7.2	7.13	7.15	7.83	7.70	6.97	7.13	6.77	Bailer	<0.01	Meter
Boron											<0.05		Bailer	<0.05	ICP
Calcium											103.7		Bailer	<0.05	ICP
Magnesium											9.08		Bailer	<0.05	ICP
Phosphorus											<0.05		Bailer	<0.05	ICP
ortho Phosphate as PO4											<0.03		Bailer	<0.03	KONE
Fluoride											<0.5		Bailer	<0.01	Spectrophotometric analysis
Sulphate											26		Bailer	<3	Spectrophotometric analysis
Total Cyanide											<0.05		Bailer	<0.05	Spectrophotometric analysis
Mercury (ug/L)											<0.05		Bailer	<0.05	CVAAS
Total Solids											508		Bailer	<1	Grav
Cadmium (ug/L)											<0.4		Bailer	<0.4	ICP-USN
Chromium (ug/L)											<1		Bailer	<1	ICP-USN
Copper (ug/L)											<5		Bailer	<5	ICP-USN
Iron (ug/L)							2				105		Bailer	<1	ICP-USN
Manganese (ug/L)							1				1231		Bailer	<1	ICP-USN
Lead (ug/L)											<5		Bailer	<5	ICP-USN
Zinc (ug/L)											<5		Bailer	<5	ICP-USN
Total Alkalinity											300		Bailer	<1	Titration
Total Coliforms (mpn/100ml)											<1		Bailer	<1	Count
Faecal Coliforms (mpn/100ml)											<1		Bailer	<1	Count
VOC (ug/L)											<1		Bailer	<1	GCMS
SVOC (ug/L)											<1		Bailer	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)											<10		Bailer	<10	GCMS

Surface Water Monitoring - SW-1 - Noble Waste

	Results (mg/l)				Sampling Method	Method Detection Limit	Analysis method/ technique
	25/02/2002	22/04/2002	16/09/2002	11/11/2002			
Temperature (°C)	9.6	12.1	13.2	10.1	Grab	1-100	Temperature probe
Chloride	25	21	23	19	Grab	<5	Spectrophotometric analysis
COD	49	<10	<15	<15	Grab	<10	Spectrophotometric analysis
Nitrite	22.88	0.08	<0.05	0.05	Grab	<0.05	Spectrophotometric analysis
BOD	19	<1	<2	3	Grab	<1	ATU
Ammoniacal Nitrogen -N	0.9	1.6	<0.2	<0.2	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	<10	48	<10	36	Grab	<10	Grav
Phenol	<0.01	0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.473	0.46	0.598	0.465	Grab	<0.025	Meter
Dissolved Oxygen	9.2	8.6	6.3	6.9	Grab	<0.1	Meter
pH (pH Units)	7.35	8.04	7.96	8.15	Grab	<1	Meter
Calcium				62.39	Grab	<0.05	ICP
Magnesium				5.99	Grab	<0.05	ICP
Phosphorus				<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4				0.1	Grab	<0.03	KONE
Sulphate				24	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				6.0	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				<0.05	Grab	<0.05	CVAAS
Potassium				2.2	Grab	<0.2	Flame Photometry
Sodium				15.0	Grab	<0.2	Flame Photometry
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				4	Grab	<1	ICP-USN
Manganese (ug/L)				4	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				170	Grab	<1	Titration
VOC (ug/L)				<1	Grab	<1	GCMS
SVOC (ug/L) 2-Methylnaphthalene				3	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)				<10	Grab	<10	GCMS

Surface Water Monitoring - SW-2 - Noble Waste

	Results (mg/l)				Sampling Method	Method Detection Limit	Analysis method/ technique
	25/02/2002	22/04/2002	16/09/2002	11/11/2002			
Temperature (°C)	9.6	12.1	12.8	10.1	Grab	1-100	Temperature probe
Chloride	23	24	22	20	Grab	<5	Spectrophotometric analysis
COD	34	<10	<15	<15	Grab	<10	Spectrophotometric analysis
Nitrite	24.13	0.08	<0.05	<0.05	Grab	<0.05	Spectrophotometric analysis
BOD	11	1	2	4	Grab	<1	ATU
Ammoniacal Nitrogen -N	0.82	3	<0.2	<0.2	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	20	<10	<10	32	Grab	<10	Grav
Phenol	0.01	0.02	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.468	0.445	0.574	0.456	Grab	<0.025	Meter
Dissolved Oxygen	6.06	8.9	6.6	7.2	Grab	<0.1	Meter
pH (pH Units)	7.37	8.02	7.82	8.14	Grab	<1	Meter
Calcium				63.21	Grab	<0.05	ICP
Magnesium				6.09	Grab	<0.05	ICP
Phosphorus				<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4				0.1	Grab	<0.03	KONE
Sulphate				25	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				6.1	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				<0.05	Grab	<0.05	CVAAS
Potassium				2.2	Grab	<0.2	Flame Photometry
Sodium				15.3	Grab	<0.2	Flame Photometry
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				<1	Grab	<1	ICP-USN
Manganese (ug/L)				4	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				170	Grab	<1	Titration
VOC (ug/L)				<1	Grab	<1	GCMS
SVOC (ug/L)				<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)				<10	Grab	<10	GCMS

Surface Water Monitoring - SW-3 - Noble Waste

	Results (mg/l)				Sampling	Method	Analysis method/
	25/02/2002	22/04/2002	16/09/2002	11/11/2002	Method	Detection Limit	technique
Temperature (°C)	9.7	12.2	12.8	10.0	Grab	1-100	Temperature probe
Chloride	22	23	21	20	Grab	<5	Spectrophotometric analysis
COD	40	<10	<15	<15	Grab	<10	Spectrophotometric analysis
Nitrite	23.82	0.08	0.05	<0.05	Grab	<0.05	Spectrophotometric analysis
BOD	13	1	5	3	Grab	<1	ATU
Ammoniacal Nitrogen -N	0.84	1.7	<0.2	<0.2	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	12	112	<10	<10	Grab	<10	Grav
Phenol	<0.01	0.02	<0.01	0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.479	0.465	0.593	0.462	Grab	<0.025	Meter
Dissolved Oxygen	7.38	8.7	7	6.9	Grab	<0.1	Meter
pH (pH Units)	7.44	8.02	7.77	8.18	Grab	<1	Meter
Calcium				63.72	Grab	<0.05	ICP
Magnesium				6.10	Grab	<0.05	ICP
Phosphorus				<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4				0.1	Grab	<0.03	KONE
Sulphate				24	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				6.0	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				<0.05	Grab	<0.05	CVAAS
Potassium				2.2	Grab	<0.2	Flame Photometry
Sodium				15.8	Grab	<0.2	Flame Photometry
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				<1	Grab	<1	ICP-USN
Manganese (ug/L)				4	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				150	Grab	<1	Titration
VOC (ug/L)				<1	Grab	<1	GCMS
SVOC (ug/L)				<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)				<10	Grab	<10	GCMS

Surface Water Monitoring - SW-4 - Noble Waste

	Results (mg/l)				Sampling	Method	Analysis method/
	25/02/2002	22/04/2002	16/09/2002	11/11/2002	Method	Detection Limit	technique
Temperature (°C)	9.7	12.2	12.9	10.0	Grab	1-100	Temperature probe
Chloride	22	22	22	19	Grab	<5	Spectrophotometric analysis
COD	36	<10	<15	<15	Grab	<10	Spectrophotometric analysis
Nitrite	25.12	0.08	<0.05	<0.05	Grab	<0.05	Spectrophotometric analysis
BOD	8	1	2	3	Grab	<1	ATU
Ammoniacal Nitrogen -N	0.75	2.5	0.6	<0.2	Grab	<0.2	Colormetric Spectrophotometry
Tot. Susp. Solids	20	84	<10	32	Grab	<10	Grav
Phenol	<0.01	0.01	<0.01	<0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.468	0.466	0.604	0.468	Grab	<0.025	Meter
Dissolved Oxygen	7.74	8.20	6.70	6.70	Grab	<0.1	Meter
pH (pH Units)	7.63	8.02	7.96	8.16	Grab	<1	Meter
Calcium				63.38	Grab	<0.05	ICP
Magnesium				6.08	Grab	<0.05	ICP
Phosphorus				<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4				0.1	Grab	<0.03	KONE
Sulphate				24	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen				6.2	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)				<0.05	Grab	<0.05	CVAAS
Potassium				2.2	Grab	<0.2	Flame Photometry
Sodium				15.5	Grab	<0.2	Flame Photometry
Cadmium (ug/L)				<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)				<1	Grab	<1	ICP-USN
Copper (ug/L)				<5	Grab	<5	ICP-USN
Iron (ug/L)				<1	Grab	<1	ICP-USN
Manganese (ug/L)				3	Grab	<1	ICP-USN
Lead (ug/L)				<5	Grab	<5	ICP-USN
Zinc (ug/L)				<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3				170	Grab	<1	Titration
VOC (ug/L)				<1	Grab	<1	GCMS
SVOC (ug/L)				<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)				<10	Grab	<10	GCMS

Noble Waste - Methane Levels (% v/v) for 2002

	28/01/2002	25/02/2002	25/03/2002	22/04/2002	20/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002
GS-01	0	0	0	0	0	0	0	0	0	0	0	0
GS-02	0		0	0	0	0	0	0	0	0	0	0
GS-03												
GS-04	0	0.1										
GS-05	0	0	0	0	0	0	0	0	0	0	0	0
GS-06	0	0	0	0	0	0	0	0	0	0	0	0
BH-5	0	0	0	0	0	0	0	0	0	0	0	0
BH-6	0	0	0	0	0	0	0	0	0	0	0	0
BH-7	0	0	0	0	0	0	0	0	0	0	0	0
L-01				0	0	0	0	0	0	0	0	0
L-02	0	0	0	0	0	0	0	0	0	0	0	0

Noble Waste - Carbon Dioxide Levels (% v/v) for 2002

	28/01/2002	25/02/2002	25/03/2002	22/04/2002	20/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002
GS-01	0.1	0	1.8	2.6	8.5	0	0	0	5	4.3	7.8	1.1
GS-02	0		0	0	0	0	0	0.1	0	0.1	0.1	0
GS-03												
GS-04	2.1	12										
GS-05	0	3.9	0.8	0	3.9	0.9	0.5	0.9	1.1	0.9	2.4	0.1
GS-06	2.2	4.1	3.2	2	6.4	2.1	1.1	2.2	2	1	7.2	3.8
BH-5	0	7.1	0	0	1.1	0	8.9	7.8	12	0.1	0	0.1
BH-6	0	0.8	0.2	0	3.3	0.3	0.1	0.2	0.1	0	0.2	0
BH-7	0	0.1	0.1	0	0.3	0	4.1	0	0	0	0	0
L-01				12	13	12	15	11.8	11.2	15	13	4.7
L-02	5.7	12	6.9	3.5	6.5	6.4	2	6.3	5.9	11	14	4.4

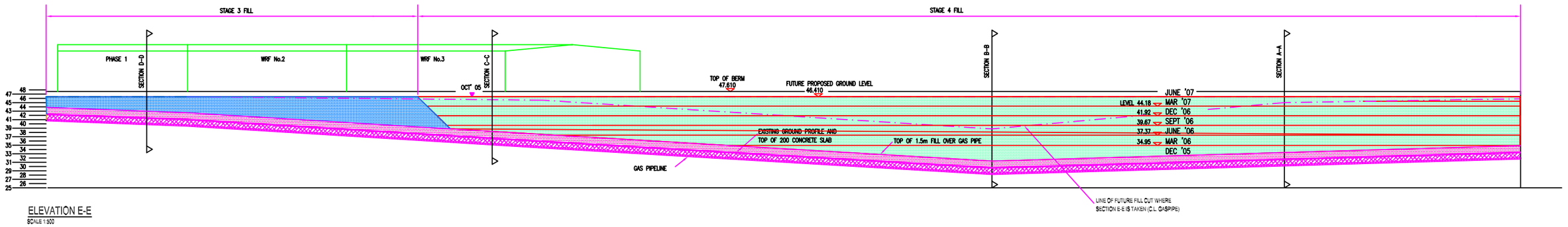
Noble Waste - Oxygen Levels (% v/v) for 2002

	28/01/2002	25/02/2002	25/03/2002	22/04/2002	20/05/2002	17/06/2002	15/07/2002	16/08/2002	16/09/2002	14/10/2002	11/11/2002	05/12/2002
GS-01	20.7	20.8	18.1	16.6	8.9	20.8	20.7	20.9	14.4	15.7	9.8	20.3
GS-02	21.1		20.5	20.7	20.9	20.8	20.5	20.8	20.3	20.5	21.5	21.4
GS-03												
GS-04	17.8	2.1										
GS-05	20.8	15.9	19.5	20.5	16.9	19.7	19.8	19.8	19.9	20.1	18.5	21.3
GS-06	18.1	16	16.9	17.5	11.9	19.2	19.1	18.9	19.2	19.9	12.5	17.9
BH-5	20.9	13.2	20.8	20.6	17.9	20.4	6.7	7.3	5.7	20.7	21.3	21.3
BH-6	20.9	19.8	20.6	20.4	16.9	20.1	20.2	20.3	20.5	21.1	21.1	21.5
BH-7	21.3	20.8	20.7	20.9	20.5	20.8	16.9	20.9	20.6	20.9	21.4	21.5
L-01				6.7	2.6	4.2	4.5	4.9	5.3	3.8	5.1	14.3
L-02	14.9	2.4	9.1	15.3	10.9	12	18	12.3	13.9	4.8	4	16.6

Appendix B

Drawings

Dwg. Nr. B9058-CK03-B
File Nr. 9058CK03



ELEVATION E-E
SCALE 1:500

LEGEND

STAGE 1: FILL PLATFORM TO MRF 1&2 : 14,400 M^3 JUNE–AUGUST 2005
STAGE 2: GAS MAIN PROTECTION: 8,800 M^3 JUNE–JULY 2005
STAGE 3: VOID INFILL AT OFFICES: 18,000 M^3 AUG–SEPT 2005
STAGE 4: GENERAL VOID INFILL: 77,200 M^3 OCT 2005–JUNE 2007

Rev.	Date	Description	Drn.By	Chkd.	Appd.	Client
B	30.05.05	ISSUED FOR DISCUSSION ONLY	M.O'F.			
A	27.09.04	ISSUED FOR	CCUN			
Not For Construction Unless Stamped Accordingly		Do Not Scale - If in Doubt Ask				A1

pettit

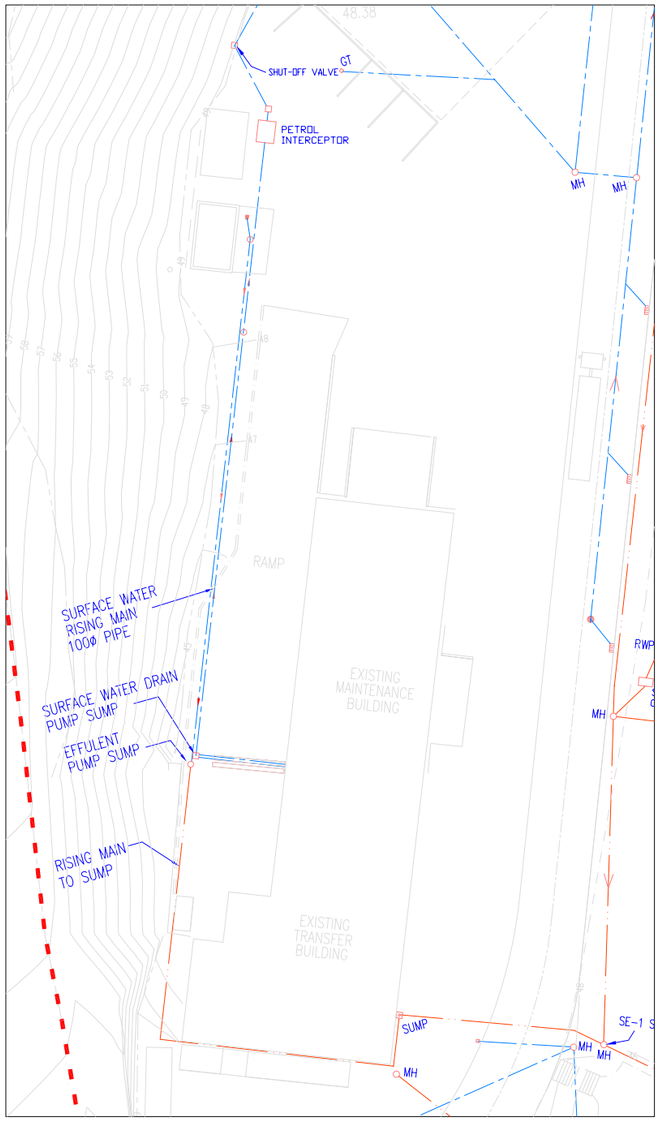
E.G. Pettit & Company
P.O. Box 893,
Shelbourne Hse.,
Shelbourne Rd.,
Dublin 4, Ireland.
Tel: 353-(0)1-6680111
Fax: 353-(0)1-6680954
email: info@pettit.ie
Website: www.pettit.ie
Other Offices : Cork, Killarney, Waterford and Limerick
Overseas Offices : U.S.A., Poland and Nigeria

Client: GREENSTAR LTD.

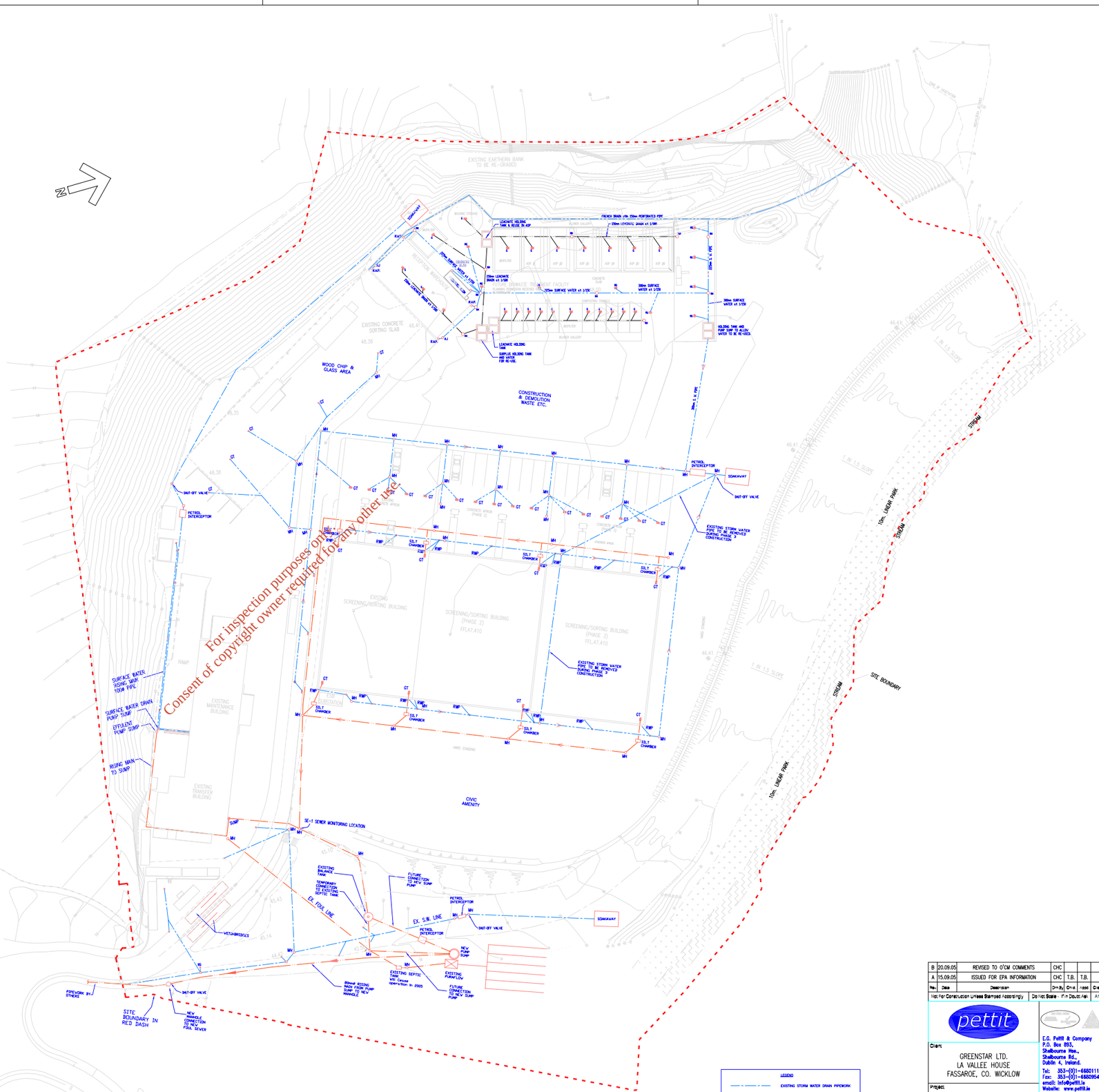
Project: FASSAROE DEVELOPMENT PLAN

Drg. Title: ITEM 1 VOID INFILL OVER GAS MAIN

Job Nr.	File Nr.	Scale	Drg. Nr.
B9058	9058CK03	AS SHOWN	B9058-CK03-B



EXISTING DRAINAGE AT QUARANTINE AREA/TRUCK WASH AREA/COMPACTOR AREA
SCALE 1:250



LEGEND
- EXISTING STORM WATER DRAIN PIPEWORK
- PROPOSED STORM WATER DRAIN PIPEWORK
- EXISTING FOUL WATER DRAIN PIPEWORK
- PROPOSED FOUL WATER DRAIN PIPEWORK

Rev.	Date	Description	Drn.By	Chkd	Appd.	Client
B	20.09.05	REVISED TO O'CM COMMENTS	CHC			
A	15.09.05	ISSUED FOR EPA INFORMATION	CHC	T.B.	T.B.	

Not For Construction Unless Stamped Accordingly | Do Not Scale - If in Doubt Ask | A1

pettit

E.G. Pettit & Company
P.O. Box 853,
Shelbourne Hse.,
Shelbourne Rd.,
Dublin 4, Ireland.
Tel: 353-(0)1-6680111
Fax: 353-(0)1-6680954
email: info@pettit.ie
Website: www.pettit.ie

Other Offices :
Cork, Kilkenny, Waterford and Limerick

Overseas Offices :
U.S.A., Poland and Nigeria

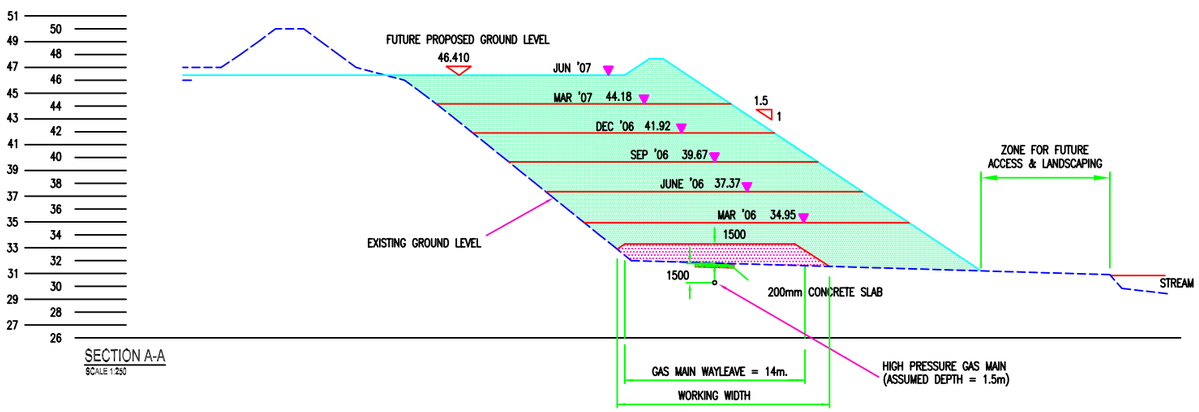
Client
GREENSTAR LTD.
LA VALLEE HOUSE
FASSAROE, CO. WICKLOW

Project
FASSAROE FACILITY
SCREENING/SORTING BUILDING
PHASE 3

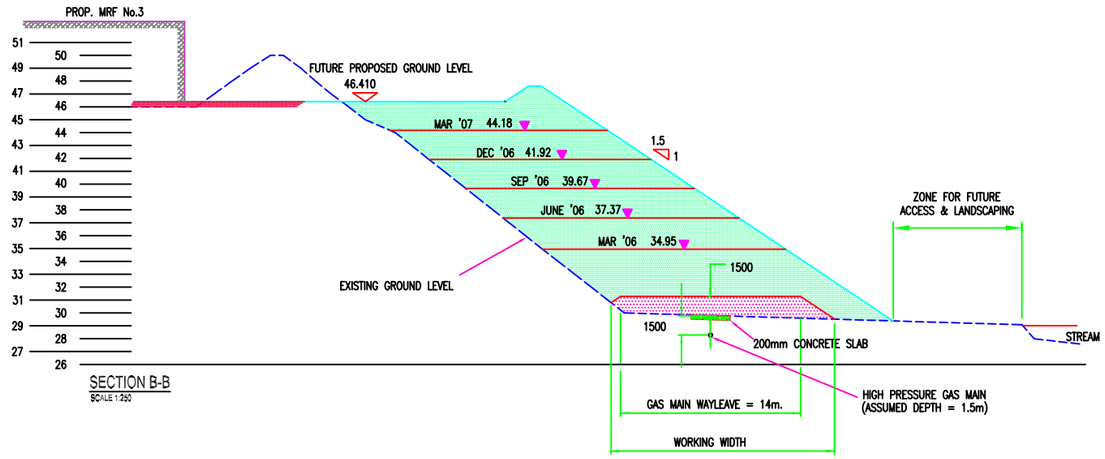
Drg. Title
CIVIL
SITE DRAINAGE LAYOUT

Job Nr.	File Nr.	Scale	Drg. Nr.
89338	9338C002	1:500	89338-C002-B

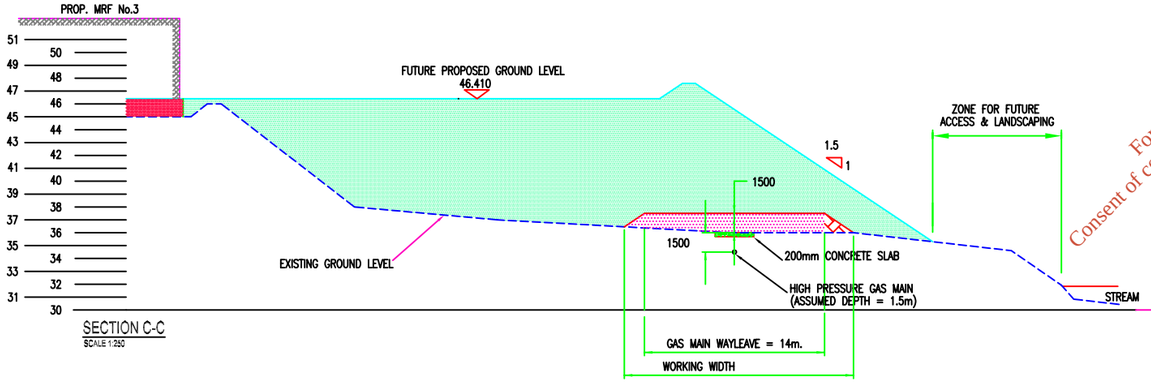
Drg. Nr. B9058-CK04-A
File Nr. 9058CK04



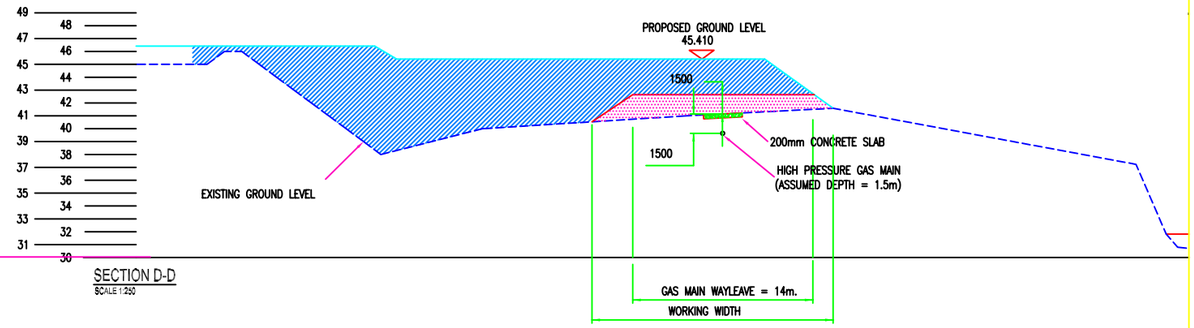
SECTION A-A
SCALE 1:250



SECTION B-B
SCALE 1:250



SECTION C-C
SCALE 1:250



SECTION D-D
SCALE 1:250

LEGEND

STAGE 1: FILL PLATFORM TO MRF 1&2 : 14,400 M^3 JUNE–AUGUST 2005
STAGE 2: GAS MAIN PROTECTION: 8,800 M^3 JUNE–JULY 2005
STAGE 3: VOID INFILL AT OFFICES: 18,000 M^3 AUG–SEPT 2005
STAGE 4: GENERAL VOID INFILL: 77,200 M^3 OCT 2005–JUNE 2007

Rev.	Date	Description	Drn By	Chkd	Appd	Client
B	30.05.05	ISSUED FOR DISCUSSION ONLY	M.O'F.			
A	27.09.04	ISSUED FOR	CCUN			

Not For Construction Unless Stamped Accordingly | Do Not Scale - If in Doubt Ask | A1

E.G. Pettit & Company
P.O. Box 893,
Shelbourne Hse.,
Shelbourne Rd.,
Dublin 4, Ireland.
Tel: 353-(0)1-6680111
Fax: 353-(0)1-6680954
email: info@pettit.ie
Website: www.pettit.ie
Other Offices : Cork, Killarney, Waterford and Limerick
Overseas Offices : U.S.A., Poland and Nigeria

Client: GREENSTAR LTD.

Project: FASSAROE DEVELOPMENT PLAN

Drg. Title: SITE DEVELOPMENT WORKS PHASE 1–SECTIONS VOID FILL OVER GAS MAIN

Job Nr.	File Nr.	Scale	Drg. Nr.
B9058	9058CK04	1/250	B9058-CK04-A

NOTES

REV	DATE	DESCRIPTION	DRN	CHKD	APP
A	22/07/03	PRELIMINARY ISSUE	MW	JOC	**

O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

CLIENT
NOBLE WASTE /Greenstar

TITLE
AREA OF PAST LANDFILLING

SCALE	DRAWING No.	REV.
1:500 A1	D.1.6	A

DOS Filename : **********