

PAID  
27 MAY 2011  
1000 20



# Sales Invoice

Mace Sustain Limited, CDM Coordination

<b>To:</b>	Matterhorn Capital DC Management Limited 10 Gloucester place Portman Square London W1U 8EZ	<b>Date:</b>	31st March 2011
<b>FAO:</b>	Lloyd Simon	<b>Invoice No:</b>	27072 - MS0311021

<b>Description:</b>	
<b>Project:</b>	Bury Green Demolition
<b>Agreed Fee:</b>	£2,500.00
<b>Services:</b>	Provision of CDM Coordinator services in accordance with our agreed fee submission.
	
<b>For Period Commencing:</b>	1st March 2011
<b>For Period Ending:</b>	31st March 2011
<b>Payment to be received by:</b>	30th April 2011

Mace Sustain Limited	<b>Sub-Total</b>	£900.00
VAT Registration No 778 4687 56	<b>VAT 20%</b>	£180.00
<b>Please send Remittance Advice to: Maunik Raval</b>	<b>Total</b>	<b>£1,080.00</b>

**Bankers:** Barclays Bank Plc  
UK Banking  
1 Churchill Place  
London  
E14 5HP  
**Sort Code:** 20-77-67  
**Account:** 80184314

Mace Sustain is part of the Mace Group  
Mace Sustain company registration: 8978466  
Registered company address: Atelier House, 64 Pratt Street, London, NW1 0LF

Mace Sustain  
Atelier House  
64 Pratt Street  
London, NW1 0LF  
United Kingdom  
T: +44 (0)20 7554 9500  
F: +44 (0)20 7554 9111  
info@macesustain.co.uk  
www.macesustain.co.uk

858120 BUR.

URN: 289

Ref'd WA

26.5.11.

# Invoice

11/5/2011  
copy emailed to L Lloyd to code

Invoice No [REDACTED]

Matterhorn Capital DC Management Limited  
10 Gloucester Place  
Portman Square  
London  
W1U 8EZ  
For the attention of Lloyd Simon

4 April 2011

### Bury Green Data Centre

To provide Management of Demolition Contract - March 2011

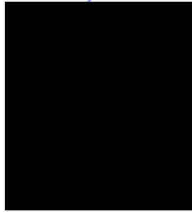
	Total
931 Project Management Fees - Demolition	5,000.00
Net	5,000.00
VAT 20.0%	1,000.00
<b>Total this invoice</b>	<b>6,000.00</b>

All figures are in UK Pounds

PAID  
27 MAY 2011  
100023 - Burg

RECEIVED  
11 MAY 2011

858120



Payment is due by **4 May 2011**  
Please make payment to  
Mace Limited  
Atelier House  
64 Pratt St  
London  
Attention Alison Burgess  
tel +44 (0)20 7068 6171  
e-mail alison.burgess@macegroup.com  
Our VAT Registration Nr is 778 4687 56

Or via BCS to Barclays Group plc  
London Corporate Banking  
PO Box 15161R  
50 Pall Mall  
London SW1A 1QA  
Sort code 20-77-67  
Account Nr 80623881

# Invoice



Invoice No [REDACTED]

Matterhorn Capital DC Management Limited  
10 Gloucester Place  
Portman Square  
London  
W1U 8EZ  
For the attention of Lloyd Simon

4 April 2011

RECEIVED  
25 MAY 2011

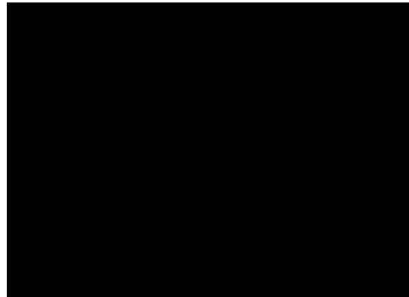
*posted paid*

## Bury Green Data Centre

To provide NTT Programme Review Support - March 2011

	Total
931 Project Management Fees - NTT Programme Review Support	2,000.00
Net	2,000.00
VAT 20.0%	400.00
<b>Total this invoice</b>	<b>2,400.00</b>

All figures are in UK Pounds



Payment is due by **4 May 2011**

Please make payment to Mace Limited  
Atelier House  
64 Pratt St  
London

Attention Alison Burgess  
tel +44 (0)20 7068 6171  
e-mail alison.burgess@macegroup.com

Our VAT Registration Nr is 778 4687 56

Or via BCS to Barclays Group plc  
London Corporate Banking  
PO Box 15161R  
50 Pall Mall  
London SW1A 1QA

Sort code 20-77-67  
Account Nr 80623881

### Mace Limited

Atelier House, 64 Pratt Street, London NW1 0LF United Kingdom  
t+44 (0)20 7068 6000 f+44 (0)20 7554 8111 www.macegroup.com

# Invoice



Invoice No [REDACTED]

Matterhorn Capital DC Management  
10 Gloucester Place  
London  
W1U 8EZ  
For the attention of Accounts Payable

7 July 2011

### Bury Green Substation

<i>Interim application nr 1 for works carried out to the substation base and fencing at Bury Green site</i>		Total
939		190,000.00
Net		190,000.00
VAT 20.0%		38,000.00
<b>Total this invoice</b>		<b>228,000.00</b>

All figures are in UK Pounds

RECEIVED  
10 AUG 2011  
858120 BUR

[REDACTED] PAID 10 AUG 2011 100039 [REDACTED]

*Allocate to Bury Green,  
Okay to pay.*

Payment is due by **6 August 2011**  
Please make payment to  
Mace Limited  
Atelier House  
64 Pratt St  
London  
Attention Alison Burgess  
tel +44 (0)20 7068 6171  
e-mail alison.burgess@macegroup.com  
Our VAT Registration Nr is 778 4687 56

Or via BCS to Barclays Group plc  
London Corporate Bank  
PO Box 15161R  
50 Pall Mall  
London SW1A 1QA  
Sort code 20-77-67  
Account Nr 80623881

[REDACTED]

*7th July 2011*

Mace Limited, part of the Mace Group  
Atelier House, 64 Pratt Street, London, NW1 0LF United Kingdom  
t+44 (0)20 7554 8000 f+44 (0)20 7554 8111 www.macegroup.com

Registered office: Atelier House, 64 Pratt Street, London NW1 0LF. Registered no. 2410326.  
This piece of paper is made using only Elemental Chlorine Free pulps sourced from commercially managed forests.

PAID  
23 AUG 2011  
100051

# Invoice



Invoice No [REDACTED]

Matterhorn Capital DC Management  
10 Gloucester Place  
London  
W1U 8EZ  
For the attention of Accounts Payable

18 July 2011

RECEIVED  
23 AUG 2011

### Bury Green Substation

Interim application nr 2 for works carried out to the substation base and fencing at Bury Green site

Total

939	63,772.34
Net	63,772.34
VAT 20.0%	12,754.47
<b>Total this invoice</b>	<b>76,526.81</b>

All figures are in UK Pounds

RECEIVED  
22 AUG 2011  
858120 BUR

JL.  
is this FINAL FOR MACE?  
LS.

[REDACTED]  
Charge to Bury Green  
OK to pay  
[REDACTED]

Payment is due by 17 August 2011  
Please make payment to Mace Limited  
Ateller House  
64 Pratt St  
London  
Attention Alison Burgess  
tel +44 (0)20 7068 6171  
e-mail alison.burgess@macegroup.com  
Our VAT Registration No is 778 487 56  
Mace Limited, part of the Mace Group  
Ateller House, 64 Pratt Street, London NW1 0LE, United Kingdom  
t+44 (0)20 7554 8000 f+44 (0)20 7554 8111 www.macegroup.com

Or via BCS to Barclays Group plc  
London Corporate Banking  
PO Box 15161R  
50 Pall Mall  
London SW1A 1QA  
Sort code 20-77-67  
Account Nr 80623881

18th Aug 2011

**LAND AT BURY GREEN FARM, BURY GREEN, LITTLE HADHAM,**

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**Exhibit: "SW5"**

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This is the Exhibit "SW5" referred to in the Statutory Declaration of Stephen Robert  
Whatling sworn this <sup>29th</sup>..... day of September 2023 before me



Solicitor/Commissioner for Oaths

OPERATION & MAINTENANCE MANUAL  
DOCUMENT NO – 2300-OM-ST-001

FOR

Works Package:	Bury Green Farm Sub – Station & Enabling Works
Contractor Name:	J Coffey Construction Ltd.
Contractor Address	93-95 Greenford Road, Harrow, Middx, HA1 3QL
Contractor Telephone No.	[REDACTED]
Contractor Fax No.	[REDACTED]
Contractor E-mail Address:	[REDACTED]
Contractor Contact:	K. Kalapan
Emergency Contact: (out of hours)	[REDACTED]

AT

Project Name:	Proposed Data Centre Development, Bury Green Farm		
Project Address:	Bury Green Farm, Millfield Lane Little Hadham Ware/Herts SG11 2ED		
Revision	A	Date:	08-07-11

## CONTENTS

- 1 **Scope of the Works**  
A brief description of the works carried out on the project by the contractor
- 2 **(A) List of Materials, Products and Components Used on the Project**  
Details of what was used and where it was used and who supplied it.  
**(B) List of Plants, Muckaways and skips Used on the Project**  
**(C) List of Sub-contractors and service providers details on the Project**
- 3 **Maintenance / Cleaning Details**  
Details and information on how to maintain the installed works and recommended cleaning instructions for all parts of the installation.
- 4 **Product Literature**  
A copy of manufacturer literature for materials and components used in the works.
- 5 **Certification of Reinforcement**
- 6 **Concrete Mix Designs**
- 7 **Test Certificates / Commissioning Data / Certificates of Compliance**  
For all relevant parts of the works.
- 8 **Index of 'As Built' Drawings and Schedules**  
A full list of 'as built' drawings and schedules for the package works.



## SECTION 1

### SCOPE OF THE WORKS

J Coffey Construction Limited was employed to participate in a Sub – Structure / Associated Ground Works to sub station, Open ditch works to fencing and temporary protection works to existing building at Proposed Data Centre Development, Bury green Farm, Millfield Lane, Little Hadham, SG11 2ED. J Coffey Construction was involved in the following areas of works.

1. Cut and fill operation to the sub station buildings.
2. Construction of transformer & switch room base slabs .
3. Open ditch works to fencing with a land drain infiltration drainage system.
4. Temporary board and netting protection to existing building openings.

SECTION 2(A)

LIST OF MATERIALS AND COMPONENTS

Material / Component	Product No. / Reference	Name of Supplier	Locations Used / Drawing Reference
Ready Mixed Concrete		Cemex UK Materials Limited. Cemex House Coldharbour Lane Thorpe, Egham Surrey TW20 8TD [REDACTED]	See scope of works and Drawing Schedule.
Steel Reinforcement bars, Mesh Reinforcement.		Thames Reinforcements Ltd New Road Sheerness Kent M12 1NB [REDACTED]	See scope of works and Drawing Schedule.
Terram		Warren Insulation Accounts Office, P.O. Box 1480 Sheffield S6 2YB [REDACTED]	

<p>Reinforcement Accessories (Plastic / Steel chairs, spacers, concrete square/rectangular bars, tying wire), Adocure surface treatment, Terram, Tie bar, waller plates, tie bar cones and wing nuts.</p>		<p>Buildspan/SIG Construction Accessories Lysons Link South Lysons Avenue Ash Vale Surrey GU12 5GN Tel: 01252 527000 Fax: 01252 527001</p>	<p>See scope of works and Drawing Schedule.</p>
<p>Shuttering Timber, Shuttering Plywood</p>		<p>South London Timber Co. Ltd 709, Old Kent Road London SE15 1JZ Tel: 0207 252 8383 Fax: 0207 252 8668 www.sltimber.co.uk</p>	<p>See scope of works.</p>
<p>Type 1/6F5 Material, 20mm Pea Shingle, topsoil</p>		<p>B. P. Mitchell The Recycling Centre Burnside Hertford Road Hatfield Herts, AL9 5RB Tel: 01707 261166</p> <p>Charles Morris Fertilizers Ltd Hythe End Farm Hythe End Road Wraysbury, Middlesex TW19 5AW Tel: 01784 481114</p>	<p>See scope of works.</p>

SECTION 2(B)


LIST OF PLANT HIRERS AND SUPPLIERS INCLUDING MUCKAWAYS AND SKIPS

Plant	Product No. / Reference	Name of Supplier	Locations Used / Drawing Reference
General Plant (Barriers, Concrete pokers, Dumpers, Skip loaders, Jet washers, Compressors, Safety equipment, Pumps, Drills, Breakers and Excavators)		Already Hire 469, Malton Ave Slough Trading Estate SL1 4QU [REDACTED] J-Coffey Plant Limited 8-12 Minerva Road, Park Royal London NW10 6HJ [REDACTED]	See scope of works
Concrete Pumps		South Coast Concrete Pumping Ltd Unit 14, Spurlings Industrial Estate Wallington Fareham Hants, PO17 6AB [REDACTED]	See scope of works
Total Station, Mini Prism, Mini Poles, Tripods and Prism Stations		ESS Safeforce Central House Beckwith Knowle Otley Road Harrogate HG3 1UD [REDACTED]	See scope of works.

<p>Excavators, Breakers and Dumpers/Dump Trucks</p>		<p>L Lynch Fourth Way Wembley Middlesex HA9 0LH [Redacted]  J-Coffey Plant Limited 8-12 Minerva Road, Park Royal London NW10 6HJ [Redacted]</p>	<p>See scope of works</p>
<p>Portable Store Cabin</p>		<p>J J-Coffey Plant Limited 8-12 Minerva Road, Park Royal London NW10 6HJ [Redacted]</p>	<p>See scope of works</p>
<p>Skip Hire</p>		<p>O' Donovan (Waste Disposal) Ltd Markfield House 82, Markfield Road Tottenham, London N15 4QF [Redacted]</p>	<p>See scope of works.</p>

SECTION 2(C)

LIST OF SUB-CONTRACTORS AND SERVICE PROVIDERS

Sub Contract Works	Product No. / Reference	Name of Supplier	Locations Used / Drawing Reference
Security Fencing repairs and installation. Entrance gate repairs		J & G Fencing Limited Unit 1b, Advantage Park 75 Whitchurch Lane, Bishopsworth, Bristol, Avon BS13 7TE 	See scope of works

## SECTION 3

### MAINTENANCE & CLEANING DETAILS

#### Drainage:

Manhole covers should be lifted periodically to ensure no blockages have occurred and that fluids flow freely. In the event of a blockage, the drain run should be 'rodded' downstream to free the obstruction, followed by inserting a water hose and turning the water full on for a short period to flush the run. If obstruction remains, contact drain clearance specialists immediately. On completion of drain run clearance; apply grease to the manhole frame before replacing the manhole cover.

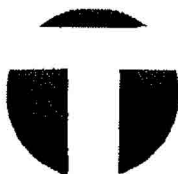
## SECTION 4

### PRODUCT / MANUFACTURER'S LITERATURE

The following literature is attached:

Product Supplier	Product for which literature is attached
B. P. Mitchell	20mm Pea Shingle, Type1, 6F5
Charles Morris	Top soil
J&G Fencing	Security Fencing Details





**TESTCONSULT LIMITED**  
 3 Harold Close, The Pinnacles, Harlow, Essex, CM19 5TH  
 Tel (01279) 729029 Fax (01279) 416879



**LABORATORY TEST REPORT**  
**PARTICLE SIZE DISTRIBUTION - BS EN 933-1:1997**

<b>Project:</b>	The Recycling Centre, Burnside	<b>Job No.:</b>	L0043
<b>Client:</b>	B P Mitchell Ltd	<b>Lab Ref No.:</b>	SA8099
	Burnside	<b>Date Received:</b>	01/06/11
	Hertford Road	<b>Date Tested:</b>	01/06/11
	Hatfield	<b>Date Reported:</b>	24/06/11
	Herts. AL9 5RB	<b>Material:</b>	10/20 Concrete Aggregate
<b>Originator:</b>	Andy Catchpole	<b>Specification:</b>	BS EN 12620

*Client Sample Ref :*

10/20

*Supplier:*

BP Mitchell

*Location :*

Burnside

*Ticket No.:*

N/A

*Date Sampled :*

Not Given

*Sample Type:*

Bulk

*Sampled By:*

Client

*Sampling Cert.:*

No

*Specification:*

BS EN 12620

*Description:*

10/20 Aggregate

Coefficient of Uniformity

N/A

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
40.0mm	100	100
31.5mm	100	98 - 100
20.0mm	83	80 - 99
16.0mm	42	
14.0mm	21	10 - 60
10.0mm	2.7	0 - 20
8.0mm	1.8	
6.3mm	1.8	
4.0mm	1.7	0 - 5
2.8mm	1.6	
2.0mm	1.6	
1.0mm	1.5	
500µm	1.3	
250µm	1.0	
125µm	0.7	
63µm	0.5	0 - 1.5

Conformance with BS EN 933-1:1997 - WET STEVING

Mark Collyer  
 Harlow Manager  
 TESTCONSULT Limited

Phil Church  
 Laboratory Operations Manager



**TESTCONSULT LIMITED**  
 3 Harold Close, The Pinnacles, Harlow, Essex, CM19 5TH  
 Tel (01279) 729029 Fax (01279) 416879



**LABORATORY TEST REPORT**  
**PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

<b>Project:</b>	The Recycling Centre Burnside	<b>Job No.:</b>	L0043
<b>Client:</b>	BP Mitchell	<b>Lab Ref No.:</b>	SA7635
	Burnside	<b>Date Received:</b>	23/11/2010
	Hertford Road	<b>Date Tested:</b>	23/11/2010
	Hatfield	<b>Date Reported:</b>	30/11/2010
	Herts. AL9 5RB	<b>Material:</b>	Class 6F2
<b>Originator:</b>	Andy Catchpole	<b>Specification:</b>	SHW 600 Series Table 6/2

*Client Sample Ref:* 6F2

*Supplier:* BP Mitchell  
*Location:* Burnside  
*Ticket No.:* N/A  
*Date Sampled:* Unknown  
*Sample Type:* Bulk  
*Sampled By:* Client  
*Sampling Cert.:* No  
*Sample Preparation Method:* Oven dried  
*Specification:* SHW 600 Series Table 6/2  
 Coefficient of Uniformity n/a

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	100
90.0mm	100	80 - 100
75.0mm	100	65 - 100
37.5mm	88	45 - 100
28.0mm	78	
20.0mm	62	
14.0mm	47	
10.0mm	37	15 - 60
6.3mm	29	
5.0mm	26	10 - 45
3.35mm	24	
2.0mm	21	
1.18mm	19	
600µm	17	< 25
425µm	15	
300µm	13	
150µm	10	
63µm	8.6	< 12

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990



Mark Collyer  
 Harlow Manager

Martin Newton  
 Laboratory Operations Manager

CLIENT:

TestConsult Ltd  
 Unit 3 Harold Close  
 Harlow  
 Essex  
 CM19 5TH



**TEST REPORT NO 0249/PSD/6597**  
**DETERMINATION OF PARTICLE SIZE DISTRIBUTION**  
**AND MOISTURE CONTENT OF AGGREGATES**

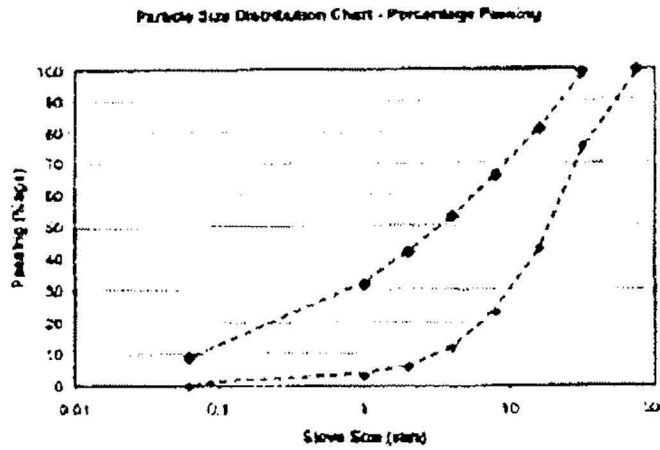
JOB NO: 0249	MATERIAL: Recycled Aggregates as CSE Type 1
SCHEME: TestConsult Ltd General Testing	LAB SAMPLE REF: US87 Statto Sample
LOCATION IN WORKS: Sample delivered to Lab	DATE RECEIVED: 20/09/2010
Client Ref No: SA 7491	CONDITION ON RECEIPT: Wet Bagged
SOURCE: Not advised	QUANTITY RECEIVED: 75kg
SAMPLING CERTIFICATE SUPPLIED: No	DATE TESTED: 28/10.02/11/10
	TECHNICIAN: IRS / SJ

**TEST METHOD**

BS EN 603 11: 1997  
 BS 812 Part 100: 1990

**TEST RESULT**

SIEVE	% PASSING	SPECIFICATION
75	100	100 - 100
63	100	
45	100	
40	100	
31.5	99	75 - 99
25	98	
22.4	01	
20	87	
16	74	43 - 81
14	66	
12.5	62	
11.2	58	
10	56	
8	51	23 - 66
6.3	47	
5.6	45	
5	43	
4	40	12 - 53
2.0	32	6 - 42
1.0	28	3 - 32
0.500	20	
0.250	12	
0.125	7	
0.063	4.7	0 - 0
MFC	0.09%	



**REMARKS**

Sample fails comply with the specification SHW C1 803 Table B.5  
 Marginally too fine on 31.5mm sieve

Comments and observations on the results should be recorded on the back of this report. If space is insufficient, a separate sheet should be attached. This report is the property of TestConsult Ltd and is not to be distributed outside the company.

Digitally signed by Ian Stoelo  
 Date: 2010.11.06 09:03:58 Z

Authorised Signatories:

Date: 05/11/10

- I. Burns - Managing Director
- I. R. Stoelo - Laboratory Technical Manager

NJUC



50 Hawthorpe Avenue, Hawthorpe Industrial Estate, Redhill, Surrey RH1 2NR  
 Phone: 01737 780384 Fax: 01737 784100  
 E-mail: [enquiries@testconsult.co.uk](mailto:enquiries@testconsult.co.uk) Web: [www.testconsult.co.uk](http://www.testconsult.co.uk)  
 Registered in England 3261166



2010

CLIENT:  
 TestConsult Ltd  
 Unit 3 Harold Close  
 Harlow  
 Essex  
 CM19 6TH



**TEST REPORT No. 0249/FH/6597**  
**TEST FOR DETERMINATION OF FROST HEAVE**

JOB NO:	0249	MATERIAL:	GSB1 Recycled Aggregate
SCHEME:	TestConsult Ltd	LAB SAMPLE REF:	6597
	General Testing	DATE RECEIVED:	20/09/2010
CLIENT REF:	SA 7481	CONDITION ON RECEIPT:	damp bagged
LOCATION	Sample Delivered to Laboratory	QUANTITY RECEIVED:	100kg
IN WORKS:		DATE TESTED:	26/10-06/11/2010
SOURCE:	Not Advised	TICKET NO:	N/A
SAMPLING CERTIFICATE SUPPLIED:	No	TECHNICIAN:	IRS

<b>TEST METHOD</b>	BS EN.933-1 : 1997 - Particle Distribution BS EN.13286-4 : 2003 - Dry Density and Water Content BS.812-124 : 2009 - Frost Heave
--------------------	---

<b>TEST RESULT</b>	
Maximum Dry Density	1.91 Mg/m <sup>3</sup>
Optimum Moisture Content	7.1 %
Dry density specimen was prepared	1.91 Mg/m <sup>3</sup>
Water content used	7.1 %
PSD of Sample	Carried out by Client
PSD of Stable Sample	See Attached Sheet
Individual Frost Heave observed Test 1	3.0 mm
Individual Frost Heave observed Test 2	3.6 mm
Individual Frost Heave observed Test 3	3.0 mm
Mean Frost Heave	3.2 mm
<b>SAND FILLER REFERENCE SAMPLES</b> Not Used	
Individual Frost Heave observed Test 1	mm
Individual Frost Heave observed Test 2	mm
Individual Frost Heave observed Test 3	mm
Mean Frost Heave	mm

<b>REMARKS</b>	Maximum Density and Optimum M/C figures supplied by Client
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Opinions and interpretations expressed herein are outside scope of UKAS accreditation  
 All bulk samples retained for 14 days from report date unless otherwise advised

Page 1 of 1  
 Form Ref: R/0074  
 (11.09)



Digitally signed by Ian Steele  
 Date: 2010.11.06 09:04:12 Z

Authorised Signatories: P Burns : Managing Director   
 Date: 05/11/10 I R Steele : Laboratory Technical Manager



2049

NJUG



50 Holmehorpe Avenue, Holmehorpe Industrial Estate, Redhill Surrey, RH1 2NL  
 Phone: 01737 780384 Fax: 01737 784100  
 E-mail: ian@firstintervention.co.uk, Web: www.firstintervention.co.uk  
 Registered in England 3203198

Our Ref : 20025h  
Your Ref : GP

Glossop House  
Hogwood Lane  
Wokingham  
Berkshire  
RG40 4QW

27 June 2011

**Charles Morris Fertilisers**

Hythe End Farm  
Hythe End Road  
Wraysbury  
Middlesex  
TW19 5AW

T:  
F:  
E:



**For the attention of Nicky Morris**

Dear Sirs

**Topsoil Compliance to BS3882: 2007: Hythe End Farm GP Topsoil**

The following comments refer to the results in the attached Certificate of Analysis referenced 20025h for one (1) topsoil sample supplied to CL Voelcker (Voelcker) on 15 June 2011.

Voelcker understand that the soil represented by the sample(s) is required to be of a suitable quality/fertility for general landscape usage in accordance with British Standards 3882: 2007 for Multipurpose topsoil. Where applicable we have included our own recommendations.

**BS3882: 2007 – Soil Quality Grades**

BS3882 specifies the performance requirements for specific purpose (e.g. acidic, calcareous, low fertility) and multipurpose topsoil. It is our understanding that the sample(s) submitted for analysis are to be considered under the requirements of the Multipurpose specification of BS3882: 2007.

*"Multipurpose topsoil includes natural topsoil or manufactured topsoil. If correctly handled, placed over a non-compact subsoil and managed appropriately (including attention to drainage), it is capable of sustainably supporting grass, trees, shrubs, herbaceous plants and other plantings."*

**1 Sample Description**

With the exception of soil texture, the sample was described in accordance with the Soil Survey of England and Wales Field Handbook (Technical Monograph No. 5, 1975). Soil texture has been classified using the UK soil texture classification system, as included in BS 3882: 2007.

The GP topsoil sample could be described as dark brown (Munsell colour 10YR 3/3), friable, slightly stony, sandy loam with moderately well developed structures consisting of a range of fine (<2 mm), medium (2-5 mm) and coarse (6-15 mm) granular aggregates. The sample was free from deleterious material (ash, brick, concrete, glass etc) and no particular odours were noticed. The sample contained frequent roots and rhizomes. The identity of the rhizomes was not confirmed but may indicate the presence of aggressive weeds. The source species should be identified on site. However, it should be noted that fertile topsoils often contain fragments of roots.



## 2 Analytical Results

The following parameters were determined in accordance with the British Standard 3882: 2007, which is appropriate for assessment of topsoils for general landscaping use.

### 2.1 Particle Size Distribution

The GP sample was found to have particle size distribution that fell into the sandy loam textural range (UK Classification).

Soils of this textural range can conform the BS3882: 2007 Multipurpose Topsoil specification provided that the organic matter content is over 3%. Provided they are of sufficient structure with adequate organic matter, soils of this textural range have the potential to be suitable for a wide range of general landscaping purposes.

### 2.2 Stone Content

British Standards 3882: 2007 for Multipurpose topsoil outlines that a conforming sample shall contain no stones over 50 mm in size, no more than 10% stones over 20 mm in size, and no more than 30% over 2 mm in size.

The GP sample contained a moderate stone content by weight including greater than 10% of stones between 2- and 50 mm. The presence of medium sized stones may cause patchy establishment (particularly of seeded grass) and hinder some maintenance operations such as grass mowing.

If the soils appear stony on re-spreading, the stone content could be reduced by some form of raking and picking.

### 2.3 Soil Reaction (pH Value)

The GP sample was alkaline in reaction (pH 7.7), conforming to the BS3882: 2007 specification for Multipurpose topsoil. The pH measured however, would not be suitable for acid demanding plants.

### 2.4 Electrical Conductivity (Salinity) Value

The electrical conductivity (salinity) value in the calcium sulphate extract was low, conforming to the requirements of BS3882: 2007, indicating that soluble salts were not present at levels that could impede plant growth.

### 2.5 Organic Matter & Major Plant Nutrients

The organic matter and major plant nutrient content of the samples (with reference to the requirements of BS3882: 2007 Multipurpose topsoil) have been summarised in the table below:

<i>Sample Reference</i>	<i>Organic Matter*</i>	<i>Total Nitrogen</i>	<i>Carbon : Nitrogen Ratio</i>	<i>Phosphorus</i>	<i>Potassium</i>	<i>Magnesium</i>
GP	✓	X	✓	✓	✓	✓

✓ Indicates parameter which conforms to BS3882 : 2007 Multipurpose

X Indicates parameter which does not conform to BS3882 : 2007 Multipurpose

\* organic matter is dependant on soil texture

## **2.6 Phytotoxic Contaminants**

None of the potentially phytotoxic contaminants (copper, nickel or zinc) were present above their respective MAFF, 1998 threshold trigger concentrations for plant growth for a soil with a pH of above 7 and thus should not prove restrictive to plant growth.

## **3 Summary**

From our visual examination and subsequent laboratory analysis, the GP topsoil sample was found to be a friable, alkaline, sandy loam with adequate structures and a moderate stone content. The sample contained levels of organic matter and extractable phosphorus potassium and potassium that met the minimum requirements of the BS3882: 2007 specification, but was deficient in total nitrogen.

The nitrogen deficiency could be remedied relatively easily with the addition of a straight nitrogen fertiliser.

## **4 Discussion & Recommendations**

The following comments are given to discuss important characteristics of the sample(s) in relation to the requirements of BS3882: 2007 Multipurpose topsoil, and to give recommendations for improvement where appropriate and if practically possible.

**Based on our findings, with the exception of deficiency in total nitrogen and greater than 10% of stones greater than 20 mm, the GP sample met the minimum requirements of the BS3882: 2007 multipurpose topsoil specification.**

### **4.1 Fertiliser Application**

The deficiency of total nitrogen may be remedied by applying 6 g/m<sup>2</sup> of N. This could be applied as a straight nitrogen fertiliser, eg ammonium sulphate (21% N) at the rate of 28 g/m<sup>2</sup> (280 kg/ha). This type of fertiliser would have a slight acidifying effect.

### **4.2 Soil Handling**

Voelcker recommend that great care be taken during soil handling and cultivation to avoid structural damage. In particular, the soil should not be worked when excessively wet, or tracked over by heavy plant. Ideally the soils should only be handled whilst in a friable condition, which basically equates to a moisture content at which the soil crumbles easily in the hand and does not smear.