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13. 06. 2013
RECEPTION

love every drop
anglianwater

Notification number (Anglian Water use only)

Application for connection to the public sewer/adoption of a lateral drain

This form should be used if you require a new connection, either directly or indirectly to an existing public sewer under Section 106 of the Water Industry Act 1991 and if you require the adoption of your new lateral drain by Anglian Water.

Please ensure that you fully complete ALL sections in BLOCK CAPITALS AND USING BLACK INK as failure to do so will delay the processing of your application.

Please note that there is a vetting and administration fee for the technical assessment and processing of your application. This fee is applied per application which can be made by returning a cheque with the application made payable to 'Anglian Water Services Ltd' or by contacting us on 08457 056 010 (select option 1) with your debit or credit card details prior to returning the form.

Please note we do not issue proforma invoices however we will issue a VAT receipt once we have processed your payment.

If you are acting on behalf of the owner/occupier and you have issued a cheque made out in their name, we will require their contact details to enable a receipt to be issued. For guidance regarding the level of payment required and completion of the form please refer to the accompanying guidance notes.

PLEASE COMPLETE USING BLOCK CAPITALS AND BLACK INK

Section 1 - Applicant (correspondence address)
PLEASE COMPLETE IN BLOCK CAPITALS AND BLACK INK

Guidance notes

See note 1

Company name: PANNELL DEVELOPMENTS LIMITED

For the attention of: NEIL STEPHENS

Property name/number: THE OAKS

Street: 2, HOWARDS WAY

Telephone number:

Village/town: LEIGH ON SEA

Mobile number: 07771 711047

City/county: ESSEX

Fax number:

Postcode: SS9 5FB

Email address: stephens889@btinternet.com

Section 2 - Site address and details (proposed location of connection)
PLEASE COMPLETE IN BLOCK CAPITALS AND BLACK INK

See note 2a

Site address:

Property name/number: LAND TO SIDE & REAR OF

Street: 62 PARK GARDENS & 63 HAWKWELL PARK DRIVE

Village/town: HOCKLEY

City/county: ESSEX

Postcode: SS5 4HF

Local Authority: ROCHFORD D.C.

See note 2b

Have you consulted Anglian Water regarding your drainage proposals at the pre development stages? Yes ☐ No ☑

Pre development reference (if applicable): ☐☐☐☐/☐☐☐☐☐☐☐☐☐☐

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Section 3 - Connection details

See note 3a **Is the proposed connection to serve:**

Existing premises? *Yes ☐ No ☐ Number: ☐

Altered/converted premises? *Yes ☐ No ☐ Number: ☐

New premises? Yes ☑ No ☐ Number: 5

See note 3b ***If you have answered 'Yes'** please confirm whether this is the first time that the property(s) will be connected to the public sewer: Yes ☐ No ☐

See note 3c Is the proposed connection for one or more individual dwellings? Yes ☑ No ☐ **If 'No'** please complete the rest of section 3 and also complete section 4

See note 3d **Is the proposed connection for:**

Foul water? } SEE ATTACHED DRAINAGE STRATEGY REPORT Yes ☑ No ☐

Surface water? Yes ☑ No ☐

Please note: Confirmation of the impermeable area to be drained (in square metres) will be required for each **surface water** connection.

If no to 3d how do you intend to dispose of:

Foul water?

Surface water? PARKING BAYS & PRIVATE DRIVE DRAINED TO GROUND VIA PERMEABLE PAVING.

See note 3e **Will your foul water discharge be domestic content only?** Yes ☑ No ☐

If no, what is the content of the non domestic foul water discharge?

See note 3f **Type of proposed connection**

	Foul water Y/N	Foul water Number	Surface water Y/N	Surface water Number
Indirectly to an existing private drain/sewer or lateral				
Direct to the public sewer via a junction insertion				
Direct to the public sewer via a saddle connection				
Direct to a new manhole constructed onto the public sewer	Y	3	Y	2
Direct to an existing public manhole			Y	1
	TOTAL	3	TOTAL	3

Please note: Additional approval is required from your Building Control officer for your drainage work.

See note 3g **Do you intend to pump any flows?** NO

If no, go to section 3h

If yes, what is the proposed peak pump rate for the pump(s) of the private pumping station?

litres/second.

See note 3h **Lateral drains**

i) Do you require Anglian Water to consider the adoption of your new lateral drain? Yes ☐ No ☑

If yes, please specify how many lateral drains you require to be considered for adoption Number: ☐

Please note: For lateral drain adoption an additional vetting and administration fee must be paid with your application. For information regarding fees, lateral drains and adoption criteria please refer to the attached guidance notes.

ii) Is the proposed drain(s) for:

Foul sewage? Yes ☐ No ☐ Number: ☐

Surface water? Yes ☐ No ☐ Number: ☐

Section 3 - Connection details (continued)

See note 3i **Water supply**

i) Is there an existing water supply to the premises? Yes ☐ No ☐

ii) Have you already made an application to Anglian Water for a water connection? Yes ☐ No ☐

If yes, to 3i i) or 3i ii) above, please provide an Anglian Water Developer Services reference number:

Please note: The completion of this form does not constitute an application for a water connection. If you have answered 'no' to 3i i) or 3i ii) above and you are within our water supply area please call 0845 6066087 to request a water connection application form or download one from our website www.anglianwater.co.uk/developers.

iii) If you have answered 'no' to 3i i) and 3i ii) above and have applied to another water company for a water connection, please confirm (tick) which company below:

Cambridge Water	☐	Thames Water	☐
Essex and Suffolk Water	☐	Three Valleys Water	☐
Severn Trent	☐	Affinity Water (formerly Veolia)	☐
		Independent Water Company/Other	☐

Section 4 - Infrastructure charges

Normal domestic dwellings will be charged the standard infrastructure charge per dwelling.

This section will require completing if you have answered 'no' to 3c and your water supply is to be provided by Essex and Suffolk Water or if you have answered 'no' to 3c and have an existing water supply.

See note 4a

	Number per unit/property	Loading units	Load (Anglian Water use only)
WC flushing system		2	
Washbasin in house		1.5	
Washbasin elsewhere		3	
bath (tap size 20mm)		10	
bath (tap size >20mm)		22	
Shower		3	
Sink (tap size 20mm)		3	
Sink (tap size >20mm)		5	
Spray tap		0.5	
Bidet		1.5	
Domestic appliances		3	
Communal/commercial appliance		10	
Any other water fitting or outlet (including a tap but excluding a urinal or water softener)		3	
Total load (to be calculated by Anglian Water)			

See note 4b **Infrastructure charge credits:**

In some cases infrastructure charge credits may be applicable, this will be the case if there was a previous sewer connection to the site that has been disconnected within the last five years.

Has the site being developed previously been connected within the last five years? Yes ☐ No ☐

Name of previous owner:

Approximate date of disconnection: ☐☐/☐☐/☐☐☐☐

Please provide details of the type and number of units previously on the site, i.e. house, factory, etc. Information in Section 4a. would be required for any units which is not an individual domestic dwelling.

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Section 5 - VAT

See note 5 **The vetting and administration fee will be subject to VAT at the standard rate.**

Section 6 - Declaration

6a **By signing this declaration I can confirm that:**

i) I wish to apply for a sewer connection/adoption of a lateral drain (delete as appropriate) under Section 106 of the Water Industry Act 1991.

ii) I will comply with the Anglian Water terms and conditions for connection to the public sewer (available at www.anglianwater.co.uk/developers)

iii) I acknowledge that payment of the vetting and administration fee is required with this application.

I attach a cheque, made payable to 'Anglian Water Services Ltd', for £ 477=60

I have made a payment by credit/debit card for: £

Date of payment: / / Payment reference no.

Connection Vetting & Admin Fee	Adoption of Lateral Drain (optional)
£477.60 inc VAT	+ £307.20 inc VAT

iv) **I will be liable for any additional charges in respect of connecting the premises to the sewerage system, including any relevant infrastructure charges, as laid out in the summary of charges.**

v) Where I have requested the adoption of my lateral drain, I agree to construct the drain in accordance with the Public Lateral Drain Guidance Document and to waive the statutory two month notice period required under Section 102 of the Water Industry Act 1991.

See note 6b **OWNER:** ***(delete as appropriate)***

I confirm that I am the owner/occupier of the address to be connected (Section 2) and that:

i) The applicant has approval to act exclusively on my behalf in dealing with Anglian Water regarding the connection to the public sewer at the site.

ii) I will pay any charges as per 6a iv) prior to the sewer connection being made.

Print name: Signature:

See note 6c **APPLICANT:** ***(delete as appropriate)***

I confirm that I am the applicant acting on behalf of the owner/occupier and that:

i) The owner/occupier will pay any charges as per 6a iv) prior to the sewer connection being made.

ii) I will pay any charges as per 6a iv) prior to the sewer connection being made.

Print name: Signature:

Company: Position in company:

Date: / /

iii) I am happy to receive all contact and communications by electronic means unless I tick this box ☐

Please return your completed application form, including:

- A site location plan (scale 1:1250): Yes ✓
- A drainage plan (minimum scale 1:500) showing the proposed position of connection: Yes ✓

  Please note, if you require Anglian Water to consider your lateral drain for adoption, please indicate the line of the drain, the gradient, pipe material and the demarcation chamber on the drainage plan.

Failure to provide all details will result in delays to your application.

Please return all documentation to:
Developer Services, PO Box 495, Huntingdon, Cambridgeshire, PE29 6YY.

For Anglian Water use only

Date application received: / /

Value of payment: £ Cheque number:

Date payment received: / /

Date payment processed: / /

Temporary reference number: Local authority:

Water supplier:

Processed by: Doc number:

John Sime & Associates Limited

STRUCTURAL AND CIVIL ENGINEERING CONSULTANTS

57 High Street, Wickford, Essex, SS12 9AQ

Tel: 01268 560050 Fax: 01268 561474 E-mail: admin@johnsime.co.uk

Proposed Residential Development

at

Land off Park Gardens & Hawkwell Park Drive
Hockley
Essex
SS5 4HF

for

Pannell Developments Limited

Drainage Strategy Report

Report dated: 16th May 2013

Registered in England No. 5927582

Proposed Development at Land to rear of 62 Park Gardens & 63 Hawkwell Park Drive, Hockley, Essex SS5 4HF

Drainage Strategy Report

Contents

1.0 Introduction

1.1 This report relates to a residential development at land between Park Gardens and Hawkwell Park Drive. The development proposals comprise five new detached residential properties and comprises a strategy for the foul and surface water disposal and includes proposals for sustainable surface water drainage.

1.2 This report has been commissioned by Pannell Developments Limited, The Oaks, 2 Howards Way, Leigh-on-Sea, Essex; SS9 5FB.

2.0 Aims

2.1 To set out a drainage strategy for the design of the developments which disposes of foul water and, with respect to surface water, avoids, reduces and delays as far as possible the discharge of rainfall to public sewers and watercourses. This will protect watercourses and reduce the risk of localised flooding, pollution and other environmental damage.

2.2 To provide relevant designs, data, calculations and drawings in support of the proposals made.

3.0 References

The following documents are referred to in the preparation of this report.

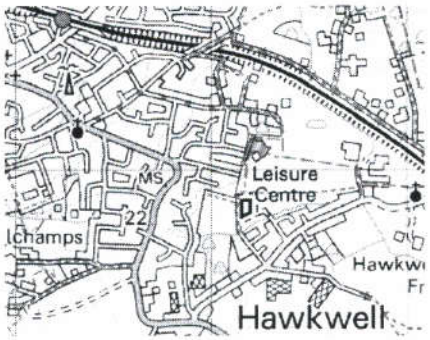
1. CIRIA Report C697: The SUDS Manual.
2. Department of Environment & National Water Council Standing Technical Committee Report No. 28: The Wallingford Procedure.
3. Site investigation data obtained on 14th March 2013.

4.0 Development description and location

Existing Site

4.1 Located in rear gardens between 62 Park Gardens & 63 Hawkwell Park Drive. This site comprises vegetated scrubland/cultivated gardens and lies adjacent to a public bridleway and playing field to the east.

4.2 The site area under development measures approximately 0.233 hectares (2330m²) and is located at TQ 852 920.



Site Location

Aerial view of site

View of site from Park Gardens

4.3 Existing site areas are broken down as follows:

Element	Area	Discharging to:
Bridleway/Footpath	260m²	To ground
Soft landscape	2070m²	Naturally
Total	2330m2	

Surveys and Investigations

4.4 Ground investigation: Boreholes were taken to a depth between 3.0m and 6.0m below ground level. Results of the ground investigation show that the soils comprise mid-brown/orange, grey veined silty, clay with partings of orange and brown silt and fine sand firm, becoming very stiff with depth to 6.0m below ground level. Groundwater was not encountered in the borehole investigation.

4.5 The topographical survey indicates that the site slopes from north to south at a gradient of approximately 1 in 70.

4.6 Infiltration tests: no infiltration tests were taken on the site. The National Soils Resources Institute record soil conditions as clayey with impeded drainage. This indicates poor soil permeability where soakaways would not be sustainable, however permeable paving should be considered.

Existing drainage arrangement on site

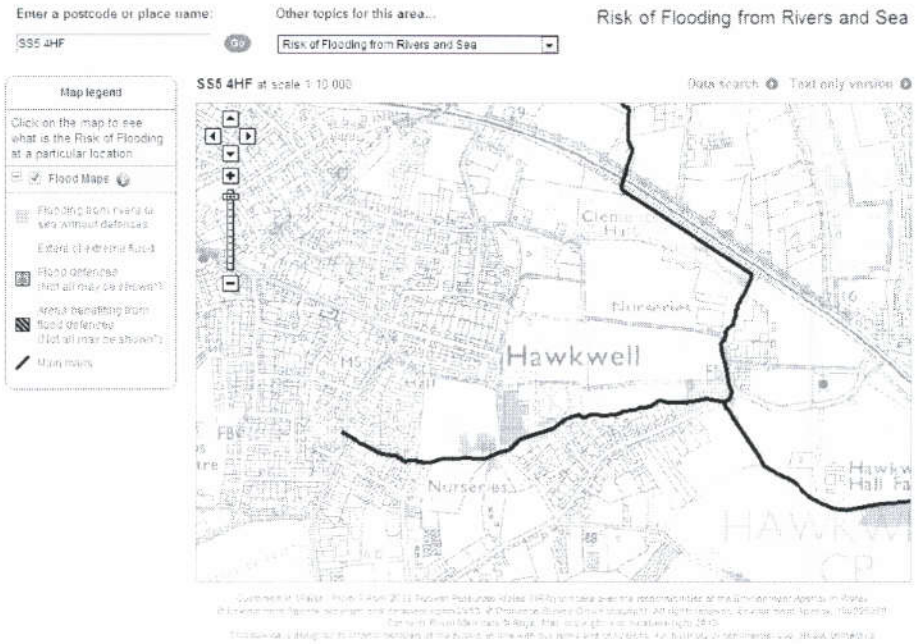
4.7 Foul and surface water sewers exist on site. Both sewers require diversion in order to accommodate the proposed development.

Public Sewerage

4.8 Public foul water and surface water sewers are located in Park Gardens and Hawkwell Park Drive, linking over the land proposed for development. Asset plans are enclosed in Appendix A.

Flood Risk

4.9 The site lies within Flood Zone 1; the probability of the site flooding is greater than a 1:1000 year return period. EA records are reproduced below.



Proposed development

4.10 The development proposals comprise two detached 3/4 bed houses and three detached 2 bed bungalows with garages, private drive with access from Park Gardens.

4.11 The existing site and development proposals are represented on the planning application drawings. The following drawings represent the drainage proposals for the site:

5050/CE01: Section 185 Sewer diversions & long sections	Indicating: Proposed diversions of existing sewerage.
5050/CE02: Plot drainage layout & construction details	Indicating: Proposals for foul and surface water plot drainage and construction details.

4.12 The site areas and SW disposal techniques are broken down and listed as follows:

Element	Area	Discharging to:
Roofs	551m²	Public SW sewer
Private drive	349m²	Ground via permeable paving
Parking bays	151m²	Ground via permeable paving
Paved areas	300m²	Ground via permeable paving
Bridleway	384m²	Ground via granular sub-base surface
Soft landscape	595m²	Ground
Total	2330m²	

SuDS Proposals

4.13 Permeable paving is proposed for the private drive, parking bays and hard landscape within the site. The design for these is in line with the recommendations of The SUDS Manual. Permeable paving is a documented method (Refer to SuDS Manual A1.4.4) of treating pollutants that may be present within the surface water discharged from areas of paving used for vehicular parking.

4.14 The use of infiltration blankets (i.e. permeable paving – as proposed) allows the hydraulic load created by the design rainstorm to be spread over a large contact area, thus mimicking natural surfaces. The soil types will allow slow and gradual dispersal and the open graded sub-base material will store the rainwater within the voids until it is fully dispersed.

4.15 The design comprises a permeable surfacing (block paving) on a 300mm deep high void sub-base.

4.16 The bridleway surface is to be finished in a granular sub-base material.

4.17 Roof water disposal via soakaways is not practical because of the soil types that exist on site. The soils are considered to be poor permeability because of the presence of silts and clays. Soakaway designs tend to concentrate the stored rain water within a relatively restricted area, limiting the discharge through the sides of the construction. To achieve Building Regulation compliance the soakaways should be designed to BRE365: "Soakaways" which requires that 50% of the stored rainwater is to be infiltrated within 24 hours. Soils with poor permeability cannot achieve this design criterion.

4.18 Roof water will be collected to an underground drainage system, discharging to the public SW sewer on site. Consent from the Sewerage Undertaker will be required for these connections.

Foul Water Drainage

4.19 Waste water will be collected to an underground drainage system, discharging to the public FW sewer on site. Consent from the Sewerage Undertaker will be required for these connections.

5.0 Conclusions

5.1 Public sewerage requires diversion to accommodate the proposed development.

5.2 Foul water will be disposed from site by gravity drainage connected to the public sewer situated on site.

5.3 Surface water from roofs will be disposed from site by gravity drainage connected to the public sewer situated on site.

5.4 Surface water from all hard paving and landscape will be disposed to ground using permeable paving, designed in line with the recommendations of "The SUDS Manual".

5.5 The site lies within a Zone 1 flood risk area as defined by PPS25.

JThomas

James Thomas B Sc, C. Eng, M.I.C.E, M.I.H.T, M.A.P.M

APPENDIX A

Public sewerage plans

Borehole logs from soil investigation.

Ordnance Survey Mapping © Crown Copyright 1000018507 | Date: 18/03/13 | Scale: 1:1250 | Map Centre: 585140,192080.1 | Data updated: 30/01/13 | Our Ref: 56233 - 1 | Wastewater Plan A3

This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. The plan is produced by Anglian Water Services Limited from Ordnance Survey © Crown Copyright, 100018507. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

- Foul Sewer
- Surface Sewer
- Combined Sewer
- Final Effluent
- Rising/Vacuum Main*
- Private Sewer*
- Decommissioned Sewer*
- Outfall*
- Inlet*
- Manhole*
- Sewage Treatment Works
- Pumping Station

*Colour denotes effluent type
Please note that not all fittings are shown on the map

james-thomas@btconnect.com

Park Gdns Hockley

anglianwater

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0101	F	24.49	22.74	1.75
0201	F	25.83	23.53	2.3
0903	F	21.66	19.79	1.87
1001	F	21.35	19.68	1.67
1002	F	22.27	20.88	1.39
1101	F	23.26	21.81	1.45
1901	F	20.24	18.26	1.98
1902	F	20.45	18.48	1.97
9001	F	23.19	21.29	1.9
9101	F	26.63	24.49	2.14
9901	F	22.63	21.2	1.43
9902	F	22.23	20.2	2.03
0152	S	25.17	23.79	1.38
0153	S	25.29	23.51	1.78
0154	S	25.34	24.35	0.99
0155	S	24.24	22.71	1.53
0156	S	24.19	23.49	0.7
0157	S	25.37	24.36	1.01
0158	S	-	-	-
0159	S	24.78	23.42	1.36
0160	S	-	-	-
0251	S	26.08	25.46	0.62
0952	S	21.79	21.05	0.74
0953	S	21.73	20.2	1.53
0954	S	-	-	-
1051	S	21.31	19.99	1.32
1151	S	22.8	22.21	0.59
1152	S	24.69	23.93	0.76
1153	S	24.28	23.72	0.56
1154	S	23.31	21.92	1.39
1156	S	-	-	-
1157	S	22.1	20.72	1.38
1951	S	20.4	18.04	2.36
1952	S	20.51	19.22	1.29
1953	S	20.93	20.01	0.92
1954	S	20.33	18.78	1.55
1955	S	-	-	-
1956	S	20.7	19.27	1.43
9051	S	23.89	22.57	1.32
9151	S	26.29	24.63	1.66
9152	S	26.99	25.57	1.42
9153	S	26.94	25.4	1.54
9154	S	28.13	26.94	1.19
9155	S	27.23	25.94	1.29
9951	S	22.5	21.67	0.83
9952	S	22.56	21.79	0.77
9961	S	22.75	21.42	1.33
9963	S	22.56	21.74	0.82

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Our Ref: 56233 - 1

FACTUAL REPORT

TRIAL PIT & BOREHOLE INVESTIGATION

AT	63 Hawkwell Park Road, Hockley
ON	14th March 2013
FOR	Springfield Structural Engineering Consultants
YOUR REF	
OUR REF	BAT1084

---- BY ----

B. A. TURNER SUBSIDENCE INVESTIGATION

WHILST READING THIS REPORT PLEASE NOTE:

It is possible that other conditions exist elsewhere on this site, not revealed by the Boreholes or Trial Pits and thus will not have been taken into account

Any reference to ground water relates specifically to the time of the investigation and does not account for any variations due to seasonal or other effects

B.A. TURNER SUBSIDENCE INVESTIGATION

Forge Cottage, 37 Main Road
Little Leighs, Chelmsford, Essex, CM3 1NB
Email: baturnersiteinvestigation@yahoo.co.uk
Tel/Fax: (01245) 364030 Mobile (07768) 073119

Ref. BAT1084 | B H No. One | Sheet No. 1 of 1 | Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoil	200					0.2mRoots of live appearance to 1mmØ to 0.6m		
0.2	Topsoily, clay	200							
0.4	Firm, mid brown/orange, silty, clay with partings of orange and brown silt and fine sand	1.600		•	V	50 54	0.6m Hair and fibrous roots to 1.0m		1.0
				•					1.5
2.0	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	2.000		•	V	86 92			2.0
				•					2.5
				•	V	110 114			3.0
4.0	Very stiff as above	2.000		•	V	140+			4.0
				•	V	140+			5.0
6.0	Borehole ends at 6.0m			•	V	140+			6.0

Remarks: Borehole dry and open on completion

KEY: • Disturbed Sample I: Test by Mackintosh Probe V: Vane Test

B.A. TURNER SUBSIDENCE INVESTIGATION

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Little Leighs, Chelmsford, Essex, CM3 1NB
Email: baturnersiteinvestigation@yahoo.co.uk
Tel/Fax: (01245) 364030 Mobile (07768) 073119

Ref. BAT1084	B H No. Two	Sheet No. 1 of 1	Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoily, clay	300					0.1m Roots of live appearance to 3mmØ to 0.5m		
0.3							0.5m Roots of live appearance to 1mmØ to 1.0m		
	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.700		•	V	68 70	1.0m Hair and fibrous roots to 2.0m		1.0
				•					1.5
2.0				•	V	124 126			2.0
	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.000		•					2.5
3.0	Borehole ends at 3.0m			•	V	140+			3.0

Remarks: Borehole dry and open on completion.
Water seepage from ground level. No standing water on completion

KEY: • **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

B.A. TURNER SUBSIDENCE INVESTIGATION

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Little Leighs, Chelmsford, Essex, CM3 1NB
Email: baturnersiteinvestigation@yahoo.co.uk
Tel/Fax: (01245) 364030 Mobile (07768) 073119

Ref. BAT1084	B H No. Three	Sheet No. 1 of 1	Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoily, clay	200							
0.2	Stiff, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.300		•	V	82 84	0.1m Roots of live appearance to 3mmØ to 0.6m		1.0
1.5	Very stiff, fragmented, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.300		•	V	140+	0.6m Roots of live appearance to 1mmØ to 1.6m 1.6m hair and fibrous roots to 2.5m		1.5 2.0 2.5
2.8	Very stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	4.700		•	V	140+			3.0
				•	V	140+			4.0
				•	V	140+			5.0
				•	V	140+			6.0
7.5	Very stiff, mid grey, silty, clay with partings of brown and grey silt and fine sand	1.700			V	140+			7.0
					V	140+			8.0
					V	140+			9.0
9.2	Borehole ends at 9.2m. Obstruction; claystone								

Remarks: Borehole dry and open on completion

KEY: ● **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

B.A. TURNER SUBSIDENCE INVESTIGATION

Forge Cottage, 37 Main Road
Little Leighs, Chelmsford, Essex, CM3 1NB
Email: baturnersiteinvestigation@yahoo.co.uk
Tel/Fax: (01245) 364030 Mobile (07768) 073119

Ref. BAT1084 | B H No. Four | Sheet No. 1 of 1 | Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoily, clay	300					0.1m Roots of live appearance to 1mmØ to 0.7m		
0.3							0.7m Hair and fibrous roots to 1.1m		
	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	2.200		•	V	42 50			1.0
				•					1.5
				•	V	76 80			2.0
2.5	Stiff, mid brown/orange, silty, clay with occasional fine gravel. Thinly laminated with orange and brown silt and fine sand	500		•					2.5
3.0	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	2.000		•	V	100 102			3.0
				•	V	118 126			4.0
5.0	Very stiff, as above	1.000		•	V	140+			5.0
6.0	Borehole ends at 6.0m			•	V	140+			6.0

Remarks: Borehole wet and open on completion
Water seepage at 2.5m. water standing at 5.7m on completion

KEY: • **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

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Ref. BAT1084	B H No. Five	Sheet No. 1 of 1	Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoily, clay	400					0.1m Roots of live appearance to 2mmØ to 0.4m		
0.4							0.4m Roots of live appearance to 1mmØ to 0.7m		
	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.600		•	V	60 66	0.7m Hair and fibrous roots to 1.6m		1.0
				•					1.5
2.0				•	V	86 92			2.0
	Stiff, mid brown, silty, clay with partings of orange and brown silt and fine sand	1.000		•					2.5
3.0	Borehole ends at 3.0m			•	V	110 118			3.0

Remarks: Borehole dry and open on completion

KEY: ● **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

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Ref. BAT1084 | B H No. Six | Sheet No. 1 of 1 | Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoil	150							
	Topsoily, clay	150					0.1m Roots of live appearance to 2mmØ to 0.5m		
0.3							0.5m Roots of live appearance to 1mmØ to 0.9m		
	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.700		•	V	60 64	0.9m hair and fibrous roots to 1.4m		1.0
				•					1.5
2.0				•	V	82 94			2.0
				•					2.5
	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	2.000		•	V	108 110			3.0
4.0				•	V	140+			4.0
	Very stiff, as above	2.000		•	V	140+			5.0
6.0	Borehole ends at 6.0m			•	V	140+			6.0

Remarks: Borehole dry and open on completion

KEY: • **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

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Ref. BAT1084 | B H No. Seven | Sheet No. 1 of 1 | Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoil	100							
0.1	Topsoily, clay	300					0.1mRoots of live appearance to 1mmØ to 0.6m		
0.4	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.600		•	V	54 56	0.6m Hair and fibrous roots to 1.1m		1.0
				•					1.5
2.0	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	2.000		•	V	80 84			2.0
				•					2.5
				•	V	102 110			3.0
4.0	Very stiff, as above	3.500		•	V	140+			4.0
				•	V	140+			5.0
				•	V	140+			6.0
					V	140+			7.0
7.5	Very stiff, mid grey, silty, clay with partings of brown and grey silt and fine sand	4.500			V	140+			8.0
					V	140+			9.0
					V	140+			10.0
					V	140+			11.0
12.0	Borehole ends at 12.0m				V	140+			12.0

Remarks: Borehole dry and open on completion

KEY: • **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

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Ref. BAT1084 | B H No. Eight | Sheet No. 1 of 1 | Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoil	150							
	Topsoily, clay	150					0.1m Roots of live appearance to 1mmØ to 0.7m		
0.3							0.7m Hair and fibrous roots to 1.3m		
	Firm, mid brown/orange, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.700		•	V	60 62			1.0
				•					1.5
2.0				•	V	90 104			2.0
				•					2.5
	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown sit and fine sand	2.000		•	V	120 124			3.0
4.0				•	V	140+			4.0
	Very stiff, as above	2.000		•	V	140+			5.0
6.0	Borehole ends at 6.0m			•	V	140+			6.0

Remarks: Borehole dry and open on completion

KEY: ● **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

B.A. TURNER SUBSIDENCE INVESTIGATION

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Ref.	BAT1084	B H No. Nine	Sheet No. 1 of 1	Date: 14th march 2013

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth To Water	Depth Mtrs.
	Topsoil	150							
	Topsoily, clay	250					0.1m Roots of live appearance to 3mmØ to 0.8m		
0.4									
	Stiff, mid brown/orange grey veined, silty, clay with partings of orange and brown silt and fine sand	1.600		•	V	80 82	0.8m Roots of live appearance to 1mmØ to 1.4m		1.0
				•			1.4m Hair and fibrous roots to 1.9m		1.5
2.0				•	V	98 102			2.0
	Stiff, mid brown, grey veined, silty, clay with partings of orange and brown silt and fine sand	1.000		•					2.5
3.0	Borehole ends at 3.0m			•	V	118 124			3.0

Remarks: Borehole dry and open on completion

KEY: ● **Disturbed Sample** **I: Test by Mackintosh Probe** **V: Vane Test**

APPENDIX B

Calculation sheets:

1. Schedule of paved areas
2. Permeability calculations for private drive

Proposed Residential Development
Park Gardens/ Hawkwell Park Drive
Hockley
Essex

PROPOSED IMPERMEABLE AREAS

Reference		AREA	
Plot 1	Roof	138	5.9%
Plot 2	Roof	121	5.2%
Plot 3	Roof	90	3.9%
Plot 4	Roof	88	3.8%
Plot 5	Roof	114	4.9%
	Total impermeable	**551**	**23.6%**
6	Bridleway	384	16.5%
7	Private drive	349	15.0%
8	Parking	151	6.5%
9	Paved areas	300	12.9%
10	Landscape	595	25.5%
	Total permeable	**1779**	**76.4%**
TOTAL		2330	100.0%

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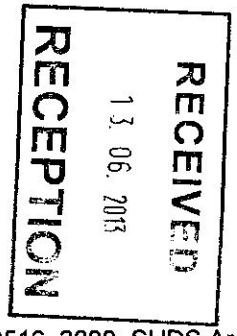
Proposed Residential Development
Park Gardens/ Hawkwell Park Drive
Hockley
Essex

PROPOSED IMPERMEABLE AREAS

	ROOF	PARKING	HARD LANDSCAPE	AREA	
Reference					
Plot 1	138	32	67	237	10.2%
Plot 2	121	36	57	214	9.2%
Plot 3	90	37	29	156	6.7%
Plot 4	88	26	45	159	6.8%
Plot 5	114	20	102	236	10.1%
Private drive		349		349	15.0%
Bridleway		384		384	16.5%
Total impermeable				1735	74.5%
	8.7%	33.4%	6.3%		
Landscape				595	25.5%
TOTAL				2330	100.0%



130516_2090_SUDS Area schedule/Area breakdown-Proposed(3)/16/05/2013

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Proposed Residential Development
Park Gardens/ Hawkwell Park Drive
Hockley
Essex

SOAKAWAY CALCULATIONS TO BRE DIGEST 365

DATA

Ratio, r (Figure 1)	0.42	Hockley	
M5-60	20	mm	
Drainage area - A	241	m2	
Infiltration rate - f	5.00E-07	m/s	See note below

Permeable Paving

Effective storage depth	0.3	m
Length	65	m
Width	3.7	m
Porosity	30	%
a = Total surface area for storage depth	240.5	m2

SOAKAWAY DIMENSIONS	
Length	65.0 m
Width	3.7 m
Effective storage depth	0.3 m
Base depth below ground level	0.33 m

Rainfall duration D (mins)	Z1 Table 1	M5 - D (mm)	Z2 (M100) Table 2	*M100 - D (mm)	Inflow (m^3)	Outflow (m^3)	Soakaway storage (SS) Ring (m^3)	Fill (m^3)	Total (m^3)	I - O = S SR	Balance SS - SR	Time (hrs) to empty 50%
5	0.38	7.6	1.85	18.3	4.4	0.0	0.0	21.6	21.6	4.4	17.3	5.05
10	0.54	10.8	1.92	27.0	6.5	0.1	0.0	21.6	21.6	6.4	15.2	7.43
15	0.64	12.8	1.96	32.5	7.8	0.1	0.0	21.6	21.6	7.7	13.9	8.93
30	0.82	16.4	2.00	42.7	10.3	0.2	0.0	21.6	21.6	10.1	11.6	11.63
60	1.00	20.0	2.03	52.8	12.7	0.4	0.0	21.6	21.6	12.3	9.4	14.19
120	1.25	25.0	2.01	65.3	15.7	0.9	0.0	21.6	21.6	14.9	6.8	17.18
240	1.43	28.6	1.98	73.7	17.8	1.7	0.0	21.6	21.6	16.0	5.6	18.50
360	1.58	31.6	1.96	80.4	19.4	2.6	0.0	21.6	21.6	16.8	4.9	19.38
600	1.77	35.4	1.93	88.7	21.4	4.3	0.0	21.6	21.6	17.0	4.6	19.68
1440	2.16	43.2	1.86	104.7	25.2	10.4	0.0	21.6	21.6	14.8	6.8	17.14
2880	2.58	51.6	1.80	120.7	29.1	20.8	0.0	21.6	21.6	8.3	13.3	9.59

NOTES:
Infiltration rate: Value estimated from soils report

Climate change = 30% *(M10-D modified for climate change)

JT/130516_2090_Permeable paving+ climate change_(20-0.42)/M100

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APPENDIX C

Drawings

5050/CE01	Section 185 Sewer diversions and long sections
5050/CE02	Plot drainage layout & construction details

FW MANHOLE SCHEDULE

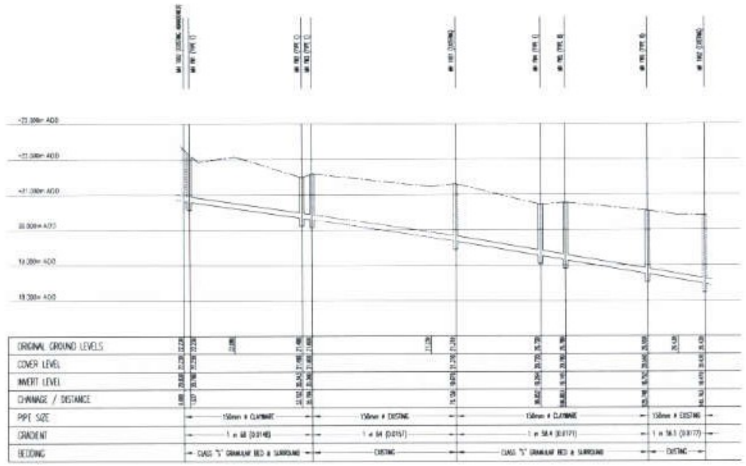
REFERENCE	TYPE	COVER LEVEL	INVERT LEVEL	[illegible]	COVER GRADE
1102	EXISTING	21.230	20.858	EXISTING	EXISTING
FW1	I	22.230	20.805	1200mm	D400
FW2	I	21.490	20.340	1200mm	D400
FW3	I	21.600	20.300	1200mm	D400
1901	EXISTING	21.310	19.675	EXISTING	EXISTING
FW4	I	20.730	19.264	1200mm	D400
FW5	II	20.780	19.145	1200mm	D400
FW6	II	20.350	18.752	1200mm	D400
1902	EXISTING	20.420	[illegible]	EXISTING	EXISTING

SW MANHOLE SCHEDULE

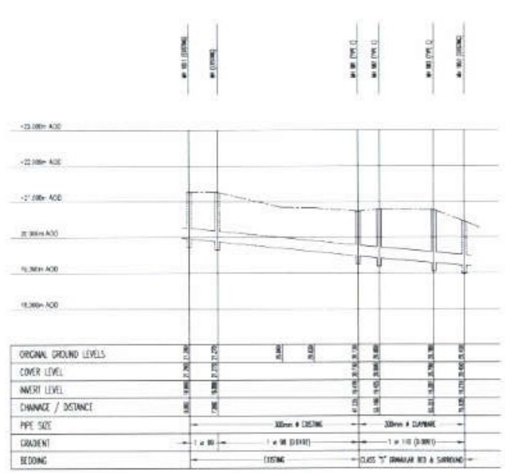
REFERENCE	TYPE	COVER LEVEL	INVERT LEVEL	[illegible]	COVER GRADE
1051	EXISTING	21.280	19.950	EXISTING	EXISTING
UNKNOWN	EXISTING	21.270	19.880	EXISTING	EXISTING
SW1	I	20.730	19.479	1200mm	D400
SW2	I	20.800	19.425	1200mm	D400
SW3	I	20.730	19.290	1200mm	D400
1952	EXISTING	20.450	19.210	EXISTING	EXISTING
1951	EXISTING	20.360	18.010	EXISTING	EXISTING

DIVERSION OF PUBLIC SEWER(S)

SECTION 185 AGREEMENT WATER INDUSTRY ACT 1991



FOUL WATER SEWERS



SURFACE WATER SEWERS

ARCHITECT SMITH & MITSON STUDIO 1 LEIGH PARK ROAD LEIGH ON SEA SS9 2DU	CONTRACT TITLE RESIDENTIAL DEVELOPMENT LAND OFF PARK GARDENS HOCKLEY ESSEX	DRAWING TITLE EXTERNAL WORKS - DRAINAGE SECTION 185 SEWER DIVERSION PLAN & LONG SECTIONS	JOHN SIME & ASSOCIATES LTD STRUCTURAL & CIVIL ENGINEERING CONSULTANTS JOB NO. 5050 DRAWING NO. CE01

RECEIVED
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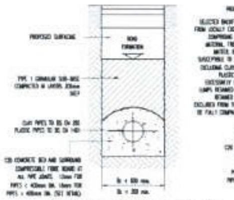
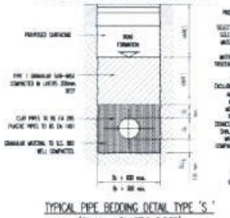
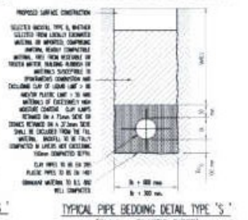


TYPICAL PIPE BEDDING DETAIL TYPE 'Z'
(CLAYWARE OR PLASTIC PIPES)

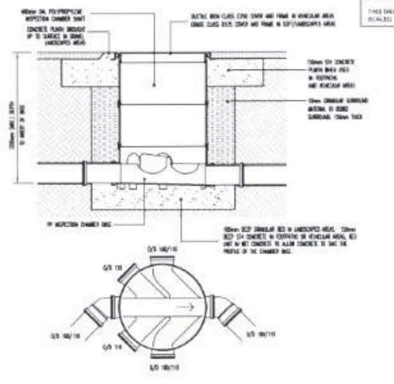
TYPICAL PIPE BEDDING DETAIL TYPE 'Z'
(CLAYWARE OR PLASTIC PIPES)



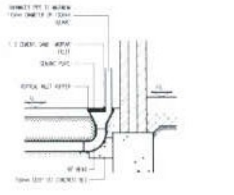
TYPICAL PIPE BEDDING DETAIL TYPE 'S'
(CLAY or PLASTIC PIPES)



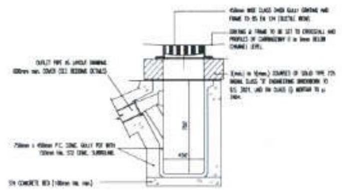
TYPICAL PIPE BEDDING DETAIL TYPE 'S'
(CLAY or PLASTIC PIPES)



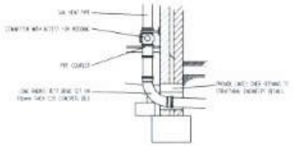
POLYPROPYLENE INSPECTION CHAMBER (PPIC)



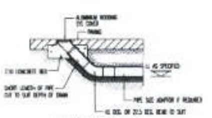
RAINWATER HOPPER & OUTLET PIPE



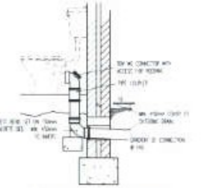
GULLY DETAIL



TYPICAL CONNECTION AT GL FOR SVP



RODDING EYE DETAIL



TYPICAL DIRECT CONNECTION AT GL FOR WC

DRIVEWAY/PARKING CONSTRUCTION
(PERMEABLE BLOCK PAVING)

NOTES (PLOT DRAINAGE/STACK CONNECTIONS)

GENERAL NOTES (PLOT DRAINAGE)

PLOT DRAINAGE SPECIFICATION NOTES:

FW & SW DRAINAGE CHAMBER NOTES:

DRAINAGE CONNECTIONS TO PUBLIC SEWERS

DIVERSION OF PUBLIC SEWER(S):

KEY (PLOT DRAINAGE):

ARCHITECT: SMITH + METSON, STUDIO 1, LEIGH PARK ROAD, LEIGH ON SEA SS9 2DU

CONTRACT TITLE: RESIDENTIAL DEVELOPMENT LAND OFF PARK GARDENS HOCKLEY ESSEX

DRAWING TITLE: EXTERNAL WORKS - DRAINAGE PLOT DRAINAGE LAYOUT & CONSTRUCTION DETAILS

JOHN SIME & ASSOCIATES LTD
STRUCTURAL & CIVIL ENGINEERING CONSULTANTS

SCALE		JOB NO.	DRAWING NO.
DRAWN		5050	CE02
DATE			
CHECKED			

GDF HOME ENERGY assessors Ltd.

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Weston Super Mare
North Somerset
BS23 4HQ
01934 642712
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graham@gdfhome-energy.co.uk
www.gdfhome-energy.co.uk

14 May 2013

Mr Mark Metson
Smith and Metson Chartered Architects
Studio One
1 Leigh Park Road
The Old Town
Leigh-on-sea,

Our Ref: **FSAP 2009 – Smith-Metson – Hawkwell Park Drive.**

Re: 5 Proposed New Dwellings, Hawkwell Park Drive, Hockley, Essex, SS5 4HB

Dear Sir

Please find herewith the Design Carbon Emission Calculations for Building Regulation approval in accordance with Approved Document L1A 2010 for the above site. The calculations are based upon drawings supplied and the specification as follows:-

Ground Floor	70mm Screed on 80mm Celotex - Beam Block flooring system based upon P/A unique to each plot	0.19 / 0.20	W/m²K
Over Garage	20mm Mineral Wool between timber joists	0.23	W/m²K
External Wall – Cavity Construction	Rendered Medium Density Blocks + 100mm CavityTherm Full Fill system + 100mm 0.15 W/mk AAC Blocks + Plaster Finish	0.17	W/m²K
Garage Wall	As Cavity construction	0.17	W/m²K

External Timber Stud Wall	100mm Celotex insulation in timber stud (15% timber)	0.34 W/m^2K
Party Walls	Party Walls to have Fully Filled Cavity with Effective Edge Sealing	0.00 W/m^2K
Internal Walls	AAC Block + 12.5mm plasterboard on dabs to each side Timber Stud Internal Walls with Plasterboard to both sides	
Roof (Flat Ceiling)	300mm X Laid insulation to flat ceiling 100mm between with 200mm laid at 90°	0.14 W/m^2K
Windows	Minimum 4/16/4 Low Emissivity glass with Argon Fill – A Rated maximum overall casement U Value	1.60 W/m^2K
Lintels	Insulated lintels without continuous base plate max Ψ 0.30 W/mK	
Doors	GRP Composite or Similar External Doors – Maximum U Value	2.20 W/m^2K
Design Air Permeability	All of the above is based upon achieving a maximum air permeability of:	5.00 $m^3/(h.m^2)$
Air Testing	All properties have been designed to an air permeability target of 5.00 $m^3/(h.m^2)$. With the new regulations for related properties, each related property will be subject to an as built figure of the average test result + 2 per site. This will mean that for all units to pass as built stage building regulations, either the first relatable plot tested will need to achieve a tested value of 3.00 or less, or all properties will need to be tested at 5.00 or better.	
Boiler details	SEDBUK "A" Rated Gas Condensing Boiler	
Boiler and Heating Controls	Bungalows - Programmer, Room Thermostat and TRV's to Radiator Heating System Houses – Full Zone Control to Radiator Heating System – TFA =>150m^2	
Internal water Usage	All new build dwellings are calculated using the limit of 125 ltr per person / per day and therefore each dwelling should be designed with this in mind.	
Lighting	100% Low Energy Lighting to be fitted all habitable rooms	
Low / Zero Carbon technologies	500watt Photovoltaic Panels to be placed on each unit to the southern face – most systems are 250watt per panel and can be easily sourced	

PLEASE NOTE:
As of 6th April 2010 the revised Approved Document G, new Regulation 17K, & new Regulation 20E commenced. Transitional periods apply and subject to these transitional periods, all new dwellings and dwellings formed by Material Change of Use now require a Water Efficiency Calculation prior to completion.

GDF Home Energy Assessors ltd can supply a basic Specification to your requirements with full calculations to satisfy this regulation.

Calculations showing savings through the use of renewable energy sources.					
Renewable Energies Used: - Solar Photovoltaic 0.5 Kwp per unit					
Dwelling	**Basic Dwelling Primary Energy Usage Kwh/Year**	**Basic Dwelling Primary Energy Usage Kwh/m² Year**	**Enhanced Dwelling Primary Energy Usage Kwh/Year**	**Enhanced Dwelling Primary Energy Usage Kwh/m² Year**	**% reduction in Primary Energy**
Plot 01	**15635.1324**	**83.6025**	**14381.8684**	**76.9012**	**8.02%**
Plot 02	**9744.2286**	**100.6012**	**8490.9646**	**87.6622**	**12.86%**
Plot 03	**8145.1172**	**113.854**	**6891.8532**	**96.3357**	**15.39%**
Plot 04	**8145.1172**	**113.854**	**6891.8532**	**96.3357**	**15.39%**
Plot 05	**13917.9489**	**72.7698**	**12664.6849**	**66.2171**	**9.00%**
					12.13%
	Total Site Energy		Total Enhanced Site Energy		
	55587.5443		**49321.2243**		11.27%

All calculations are based upon the use of mixed construction details.

The AAC details as follows:

WD – 02	Other Lintels	Ψ 0.214
WD – 03	Sills	Ψ 0.019
WD – 04	Jambs	Ψ 0.020
GF – 01	Ground Floor	Ψ 0.044
RE – 01	Eaves (insulation at ceiling)	Ψ 0.069
RG – 01	Gable (insulation at Ceiling)	Ψ 0.046

All other details can be found at:

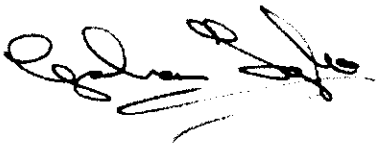
http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/bcassociateddocuments9/acd (click to link direct)

Copies of the completed accredited details sheets as per above link to planning portal, must be retained by you and produced upon request.

Please note any Upgrades to Specification as it differs from that listed on plans to achieve building regulation approval under Approved Document L1A. Failure to implement these upgrades may result in a Building Regulation Failure at final Stage.

Upon completion of the dwelling we will require a written statement that the dwelling was built to the specification as given and / or list any changes made during the build process. Upon receipt of this statement, copy of the Air Permeability Test and notice of full postal address we will be able to issue an Energy Performance Certificate for the property. This service is charged at £30.00 per plot + VAT.

Yours faithfully

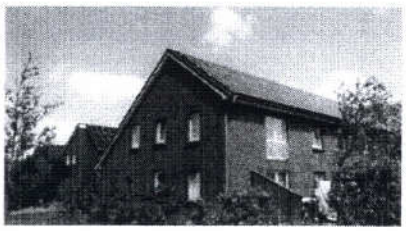


Graham Fright

SHARP

ND-RxxxA5 (60 cells)
xxx = 250|245|240|235|230 W
Polycrystalline silicon photovoltaic modules

Sharp is a pioneer in photovoltaics /This is Why Sharp solar modules have set standards for over 50 years.



Innovations from a photovoltaic pioneer

As a solar specialist with more than 50 years of experience in photovoltaics (PV), Sharp makes significant contributions to groundbreaking progress in solar technology. Sharp photovoltaic modules in the ND series are designed for applications with high power requirements. All Sharp ND series modules offer system integration which is optimal both technically and economically, and are suitable for installations in on- and off-grid PV systems.

EUPD RESEARCH
TOP BRAND PV
MODULES
GERMANY
2012

AWARDS FOR BRAND AWARENESS, BRAND EVALUATION, INSTALLERS' CHOICE AND DISTRIBUTION.

Certificates and approvals

All modules are tested and certified according to
- IEC/EN 61215 und IEC/EN 61730, Anwendungsklasse A
- Schutzklasse II/CE
- MCS accredited product (MCS PV0007)

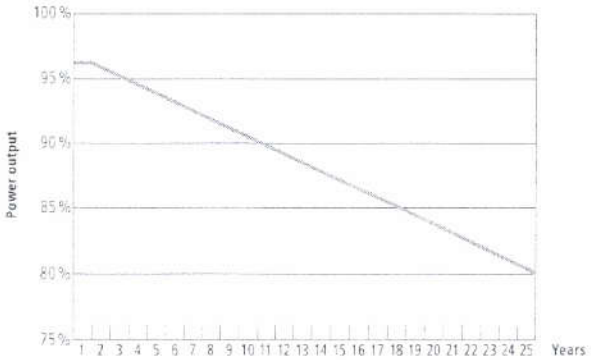
Sharp is certified based on
- ISO 9001:2008 und ISO 14001:2004

Product features

- High-performance photovoltaic modules made of polycrystalline (156.5 mm)² silicon solar cells with module efficiencies of up to 15.2%.
- 3 busbar technology for enhancing the power output.
- Anti-reflex coating to increase light absorption.
- Production controlled positive power tolerance from 0 to +5%. Only modules will be delivered that have the specified power or more for high energy yield.
- Delivery of modules in 5-watt intervals.
- Improved temperature coefficient to reduce power losses at higher temperatures.
- High power performance even at lower irradiations.

Quality from Sharp

Continual checks guarantee a consistently high level of quality. Every module undergoes visual, mechanical, and electrical inspection. This is recognisable by means of the original Sharp label, the serial number, and the Sharp guarantee:
- 10-year product guarantee
- 25-year linear performance guarantee
  - Minimum 96% of the specified minimum power output during the first year
  - Maximum 0.667% annual reduction of the power output for following 24 years



Passed DLG resistance-to-ammonia test

Passed salt mist corrosion test (IEC 61701)

As of: April 2012

2no. per dwelling = 500 watt.

ELECTRICAL DATA (AT STC)

		ND-R250A5	ND-R245A5	ND-R240A5	ND-R235A5	ND-R230A5	
Maximum power	P_{max}	250	245	240	235	230	W_p
Open-circuit voltage	V_{oc}	37.6	37.3	37.2	36.8	36.4	V
Short-circuit current	I_{sc}	8.68	8.62	8.57	8.49	8.41	A
Voltage at point of maximum power	V_{mpp}	30.9	30.7	30.4	30.3	30.3	V
Current at point of maximum power	I_{mpp}	8.10	7.99	7.90	7.76	7.61	A
Module efficiency	η_m	15.2	14.9	14.6	14.3	14.0	%

STC = Standard Test Conditions: irradiance 1,000 W/m², AM 1.5, cell temperature 25 °C.
Rated electrical characteristics are within ±10% of the indicated values of I_{sc}, V_{oc} and 0 to +5% of P_{max} (power measurement tolerance ±3%)

ELECTRICAL DATA (AT NOCT)

		ND-R250A5	ND-R245A5	ND-R240A5	ND-R235A5	ND-R230A5	
Maximum power	P_{max}	180.2	176.6	173.0	169.3	165.7	W_p
Open-circuit voltage	V_{oc}	36.7	36.4	36.4	36.0	35.6	V
Short-circuit current	I_{sc}	7.0	6.96	6.92	6.85	6.79	A
Voltage at point of maximum power	V_{mpp}	27.7	27.5	27.2	27.1	27.1	V
Nominal Operating Cell Temperature	NOCT	47.5	47.5	47.5	47.5	47.5	°C

NOCT: Module operating temperature at 800 W/m² irradiance, air temperature of 20 °C, wind speed of 1 m/s.

LIMIT VALUES

Maximum system voltage	1,000 V DC
Over-current protection	15 A
Temperature range	−40 bis +90 °C
Maximum mechanical load	2,400 N/m²

MECHANICAL DATA

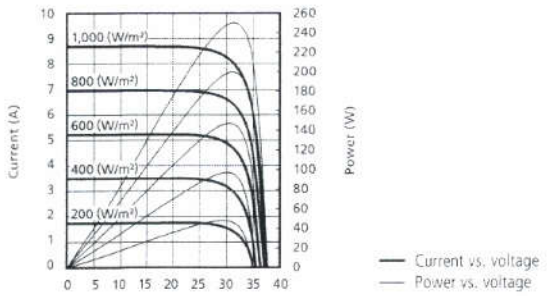
Length	1,652 mm (+/−3.0 mm)
Width	994 mm (+/−2.0 mm)
Depth	46 mm (+/−0.8 mm)
Weight	19 kg

TEMPERATURE COEFFICIENT

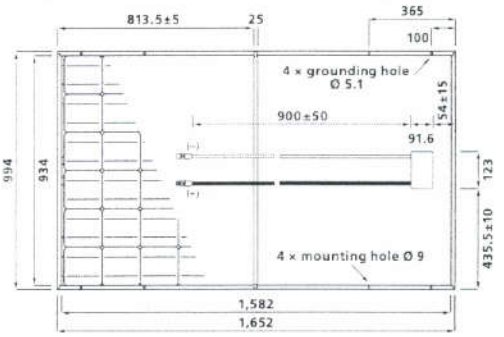
P_{max}	−0.440 % / °C
V_{oc}	−0.329 % / °C
I_{sc}	+0.038 % / °C

CHARACTERISTIC CURVES ND-R250A5

Characteristic curves: current / power vs. voltage (cell temperature: 25 °C)



REAR VIEW



GENERAL DATA

Cells	polycrystalline, 156.5 mm × 156.5 mm, 60 cells in series
Front glass	low iron tempered glass, 3 mm
Frame	anodized aluminium alloy, silver
Connection box	PPE/PPO resin, IP65 rating, 58 × 125 × 15 mm, 3 bypass diodes
Cable	4 mm², length 900 mm
Connector	SMK (MC4 compatible), Type CCT9901-2361F/2451F (Catalogue no. P51-7H/R51-7), IP67 rating To extend the module connection leads, only use SMK connector from the same series or MultiContactAG MC4 connector (PV-KST04/PV-KBT04)

REGISTRATION

Sharp Solar guarantees the safety, quality and value of your product over many years – the only thing we ask you to do is to register your modules with the serial number, so that we can send you the guarantee certificate. Register your modules quickly and easily at **www.brandaddedvalue.net**.

The reference image on the front page shows a 13 kWp system in Northern Germany. **Note:** Technical data is subject to change without prior notice. Before using Sharp products, please request the latest data sheets from Sharp. Sharp accepts no responsibility for damage to devices which have been equipped with Sharp products on the basis of unverified information. The specifications may deviate slightly and are not guaranteed. Installation and operating instructions are to be found in the corresponding handbooks, or can be downloaded from **www.sharp.eu/solar.** This module should not be directly connected to a load.

Sharp Energy Solution Europe - a division of Sharp Electronics (Europe) GmbH · Sonninstrasse 3, 20097 Hamburg, Germany · Tel: +49 (0) 40 / 23 76 - 0 · Fax: +49 (0) 40 / 23 76 - 2183

www.sharp.eu/solar

SHARP

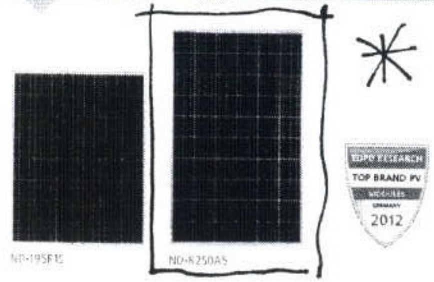
Local responsibility:
Austria: SolarInfo.at@sharp.eu
Benelux: SolarInfo.seb@sharp.eu
Central & Eastern Europe: SolarInfo.scee@sharp.eu
Denmark: SolarInfo.dk@sharp.eu
France: SolarInfo.fr@sharp.eu
Germany: SolarInfo.de@sharp.eu
Scandinavia: SolarInfo.sen@sharp.eu
Spain & Portugal: SolarInfo.es@sharp.eu
Switzerland: SolarInfo.ch@sharp.eu
United Kingdom: SolarInfo.uk@sharp.eu

SolarND_60A5_E0412

Many features – and just as many benefits

Offering the highest standards in safety, durability, wind loading and ease of assembly, Sharp PV-Kits have been designed using components from some of the leading European solar equipment manufacturers. Each part has been selected for its high quality, speed of assembly and efficiency in use. Each kit includes PV modules, inverter, mounting system, fixings, AC & DC isolators, DC cable with connectors, export meter and warning labels. The Sharp PV-Kit is available as standard in sizes ranging from 1.5 to 4.0 kWp, with larger systems or alternative layouts available on request. All the components are supplied by renowned top-class manufacturers and the system is tested to European technical standards as well as being GS, VDE and MCS certified.

MODULES



ND-195R1S ND-R250A5

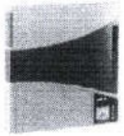
Premium quality modules

Sharp, a photovoltaics pioneer, can point to more than 50 years of experience in solar power. The solar cells and modules manufactured by Sharp deliver a total output of over 4 GWp, making Sharp one of the world's leading manufacturers of premium-quality modules. Sharp photovoltaic modules in the ND series are designed for applications with high power requirements. These quality polycrystalline modules produce a continuous, reliable yield, even under demanding operational conditions. The special profile of the horizontal framing provides safe drainage and ventilation, which hinders frost and corrosion damage to the modules.

INVERTER

Best-in-class performance

Aurora inverters are made in Italy to the highest standards by Power-One, one of the worlds largest manufacturers of solar power inverters. They offer best-in-class performance and reliability along with a reassuring customer care package. We have selected the most efficient Aurora inverter to suit each system size and added a five year warranty extension as standard, giving you piece of mind for a full ten years.


PVI-2000

CABLE

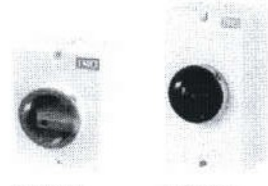
Perfect compatibility

Our DC cable comes pre-terminated with the same SMK connectors we use on our modules, guaranteeing perfect compatibility. The single cable length can be cut to suit your installation.

AC & DC ISOLATORS

Highest technical standards

AC and DC isolators from IMO, a company at the forefront of control component technology specifically designed for the solar energy market, have been developed to meet the highest technical and commercial standards. Explicitly developed for arduous DC disconnect applications, the IMO range of solar isolators feature an operator-independent trigger ratchet switching mechanism resulting in switching times of less than 5mS. High reliability knife-edge contacts and long arc cooling chambers ensure safe and effective isolation of DC voltages within solar installations. Moreover, IMO DC isolators are true DC switching isolators, not an AC type that has been de-rated or re-wired for DC operation.


AC ISOLATOR DC ISOLATOR

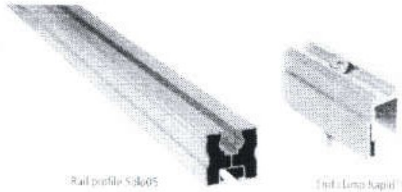
EXPORT METER


Elster A100C BS Single Phase Meter

Safe and reliable readings

This export meter made by Elster Metering, a global leader in innovative metering systems, is a cost-effective, compact yet advanced solution for one- or two-rate domestic applications. The main meter cover is permanently secured to the base for enhanced security. The meter registers and security data can be read electronically from a laptop or hand-held device, greatly reducing the possibility of manual meter reading errors.

MOUNTING SYSTEM


Rail profile Solo05 End clamp Rapid

"Made in Germany" quality

Exclusively produced in Germany and combining optimum structural dimensioning, short mounting times and economic efficiency with maximum durability, Schletter PV mounting systems are made up of high-value aluminium or high-grade steel components, including plain tile or Prefa roof hooks and Rapid²⁺, a newly developed solar mounting system for swift, safe and simple mounting on pitched roofs.

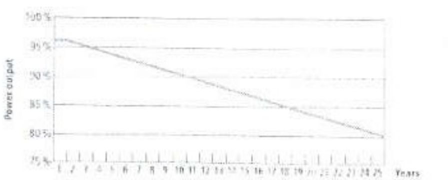
SHARP PV-KIT PORTFOLIO

Sharp PV-Kit*1	Sharp parts no.	Output (W)	Orientation*2	Rows	Columns	Tile type*3	Module	Inverter	Dimensions (mm) Height	Width	Array	Parts list no.
1500W-ND-R250A5-1x6-Portrait- -PowerOne	L70DP1X6P1500x	1,500	P	1	6	C / P / S	ND-R250A5	PVI-2000	1,652	6,164		C = 1, P = 12, S = 23
1500W-ND-R250A5-2-4+2-Portrait- -PowerOne	L70DP4A2P1500x	1,500	P	4	2	C / P / S	ND-R250A5	PVI-2000	3,326	4,136		C = 145, P = 149, S = 153
1500W-ND-R250A5-2x3-Landscape- -PowerOne	L70DP2X3L1500x	1,500	L	2	3	C / P / S	ND-R250A5	PVI-2000	2,100	4,996		C = 34, P = 45, S = 56
1500W-ND-R250A5-2x3-Portrait- -PowerOne	L70DP2X3P1500x	1,500	P	2	3	C / P / S	ND-R250A5	PVI-2000	3,324	3,122		C = 2, P = 13, S = 24
1500W-ND-R250A5-3x2-Landscape- -PowerOne	L70DP3X2L1500x	1,500	L	3	2	C / P / S	ND-R250A5	PVI-2000	3,122	3,324		C = 35, P = 46, S = 57
1560W-ND-195R1S-2x4-Landscape- -PowerOne	L70DP2X4L1560x	1,560	L	2	4	C / P / S	ND-195R1S	PVI-2000	2,108	5,332		C = 109, P = 117, S = 125
1560W-ND-195R1S-2x4-Portrait- -PowerOne	L70DP2X4P1560x	1,560	P	2	4	C / P / S	ND-195R1S	PVI-2000	2,656	4,136		C = 67, P = 81, S = 95
1560W-ND-195R1S-4x2-Portrait- -PowerOne	L70DP4X2P1560x	1,560	P	4	2	C / P / S	ND-195R1S	PVI-2000	5,332	2,108		C = 68, P = 82, S = 96
1750W-ND-R250A5-1x7-Portrait- -PowerOne	L70DP1X7P1750x	1,750	P	1	7	C / P / S	ND-R250A5	PVI-2000	1,652	7,175		C = 3, P = 14, S = 25
1750W-ND-R250A5-2-5+2-Portrait- -PowerOne	L70DP5A2P1750x	1,750	P	5	2	C / P / S	ND-R250A5	PVI-2000	3,324	5,150		C = 133, P = 137, S = 141
1755W-ND-195R1S-3x3-Landscape- -PowerOne	L70DP3X3L1755x	1,755	L	3	3	C / P / S	ND-195R1S	PVI-2000	3,122	3,994		C = 110, P = 118, S = 126
1755W-ND-195R1S-3x3-Portrait- -PowerOne	L70DP3X3P1755x	1,755	P	3	3	C / P / S	ND-195R1S	PVI-2000	3,994	3,122		C = 69, P = 83, S = 97
1950W-ND-195R1S-2-6+4-Portrait- -PowerOne	L70DP6A4P1950x	1,950	P	6	4	C / P / S	ND-195R1S	PVI-2000	2,656	6,164		C = 157, P = 161, S = 165
1950W-ND-195R1S-2x5-Landscape- -PowerOne	L70DP2X5L1950x	1,950	L	2	5	C / P / S	ND-195R1S	PVI-2000	2,108	6,670		C = 111, P = 119, S = 127
1950W-ND-195R1S-2x5-Portrait- -PowerOne	L70DP2X5P1950x	1,950	P	2	5	C / P / S	ND-195R1S	PVI-2000	2,656	5,150		C = 70, P = 84, S = 98

*1 Since every Sharp PV-Kit is available for concrete, plain and slate tiles, the name of the Sharp-PV Kit contains a C, S or P (see grey marking), as appropriate. *2 L = Landscape, P = Portrait *3 C = Concrete, P = Plain, S = Slate

MODULE PERFORMANCE

- 10-year product guarantee
- 25-year linear performance guarantee on the power output
  - Minimum 96% of the specified minimum power output after one year
  - Maximum 0.667% annual reduction of the power output for following 24 years
  - Minimum 80% of the specified minimum power output after 25 years



CERTIFICATES AND APPROVALS

All modules are tested and certified according to

- IEC 61215, IEC 61730, IEC 61701, IEC 62716
- Safety class II/CE
- MCS accredited product (MCS PV0001)

Mark Metson

From: Matthew Turner [matt@gdfhome-energy.co.uk]
Sent: 30 May 2013 15:24
To: 'Mark Metson'
Subject: RE: hawkwell
Attachments: Hawkwell Park Drive - Specification & Renewable Calculations - 30-05-13.pdf

Dear Mark

I can turn Plot 01 to West facing for you and you still achieve to 10% renewables target.

I have quickly changed the spec sheet to show this along with the updated figures for planning condition.

Kind Regards

Matthew Turner

01934 642712

GDF HOME ENERGY assessors Ltd.

"Kilkhampton"
18 Charlton Road
Weston-Super-Mare
North Somerset
BS23 4HQ

www.gdfhome-energy.co.uk

matt@gdfhome-energy.co.uk

Certified SAP and Code for Sustainable Homes Assessors.

NHER SAP STROMA CERTIFIED CODE ASSESSOR THE CODE FOR SUSTAINABLE HOMES

From: Mark Metson [mailto:mark.metson@btconnect.com]
Sent: 30 May 2013 13:53
To: GDF Home Energy Assessors Ltd
Subject: hawkwell

GDF HOME ENERGY assessors Ltd.

"Kilkhampton"
18 Charlton Road
Weston Super Mare
North Somerset
BS23 4HQ
01934 642712
07951 455022
graham@gdfhome-energy.co.uk
www.gdfhome-energy.co.uk

30 May 2013

Mr Mark Metson
Smith and Metson Chartered Architects
Studio One
1 Leigh Park Road
The Old Town
Leigh-on-sea,

RECEIVED
13 06 2013
RECEPTION

Our Ref: **FSAP 2009 – Smith-Metson – Hawkwell Park Drive.**

Re: 5 Proposed New Dwellings, Hawkwell Park Drive, Hockley, Essex, SS5 4HB

Dear Sir

Please find herewith the Design Carbon Emission Calculations for Building Regulation approval in accordance with Approved Document L1A 2010 for the above site. The calculations are based upon drawings supplied and the specification as follows:-

Ground Floor	70mm Screed on 80mm Celotex - Beam Block flooring system based upon P/A unique to each plot	0.19 / 0.20	W/m²K
Over Garage	20mm Mineral Wool between timber joists	0.23	W/m²K
External Wall – Cavity Construction	Rendered Medium Density Blocks + 100mm CavityTherm Full Fill system + 100mm 0.15 W/mk AAC Blocks + Plaster Finish	0.17	W/m²K
Garage Wall	As Cavity construction	0.17	W/m²K

External Timber Stud Wall	100mm Celotex insulation in timber stud (15% timber)	0.34 W/m^2K
Party Walls	Party Walls to have Fully Filled Cavity with Effective Edge Sealing	0.00 W/m^2K
Internal Walls	AAC Block + 12.5mm plasterboard on dabs to each side Timber Stud Internal Walls with Plasterboard to both sides	
Roof (Flat Ceiling)	300mm X Laid insulation to flat ceiling 100mm between with 200mm laid at 90°	0.14 W/m^2K
Windows	Minimum 4/16/4 Low Emissivity glass with Argon Fill – A Rated maximum overall casement U Value	1.60 W/m^2K
Lintels	Insulated lintels without continuous base plate max Ψ 0.30 W/mK	
Doors	GRP Composite or Similar External Doors – Maximum U Value	2.20 W/m^2K
Design Air Permeability	All of the above is based upon achieving a maximum air permeability of:	5.00 $m^3/(h.m^2)$
Air Testing	All properties have been designed to an air permeability target of 5.00 $m^3/(h.m^2)$. With the new regulations for related properties, each related property will be subject to an as built figure of the average test result + 2 per site. This will mean that for all units to pass as built stage building regulations, either the first relatable plot tested will need to achieve a tested value of 3.00 or less, or all properties will need to be tested at 5.00 or better.	
Boiler details	SEDBUK "A" Rated Gas Condensing Boiler	
Boiler and Heating Controls	Bungalows - Programmer, Room Thermostat and TRV's to Radiator Heating System Houses – Full Zone Control to Radiator Heating System – TFA =>150m^2	
Internal water Usage	All new build dwellings are calculated using the limit of 125 ltr per person / per day and therefore each dwelling should be designed with this in mind.	
	PLEASE NOTE: As of 6th April 2010 the revised Approved Document G, new Regulation 17K, & new Regulation 20E commenced. Transitional periods apply and subject to these transitional periods, all new dwellings and dwellings formed by Material Change of Use now require a Water Efficiency Calculation prior to completion. GDF Home Energy Assessors ltd can supply a basic Specification to your requirements with full calculations to satisfy this regulation.	
Lighting	100% Low Energy Lighting to be fitted all habitable rooms	
Low / Zero Carbon technologies	500watt Photovoltaic Panels to be placed on each unit to the southern face – most systems are 250watt per panel and can be easily sourced – Plot 1 to be West facing Units	

Calculations showing savings through the use of renewable energy sources.

Renewable Energies Used: - Solar Photovoltaic 0.5 Kwp per unit

Dwelling	Basic Dwelling Primary Energy Usage Kwh/Year	Basic Dwelling Primary Energy Usage Kwh/m² Year	Enhanced Dwelling Primary Energy Usage Kwh/Year	Enhanced Dwelling Primary Energy Usage Kwh/m² Year	% reduction in Primary Energy
Plot 01	15635.1324	83.6025	14568.7484	77.9005	6.82%
Plot 02	9744.2286	100.6012	8490.9646	87.6622	12.86%
Plot 03	8145.1172	113.854	6891.8532	96.3357	15.39%
Plot 04	8145.1172	113.854	6891.8532	96.3357	15.39%
Plot 05	13917.9489	72.7698	12664.6849	66.2171	9.00%
					Average % Reduction
					11.89%
	Total Site Energy		Total Enhanced Site Energy		Total % Reduction
	55587.5443		49508.1043		10.94%

All calculations are based upon the use of mixed construction details.

The AAC details as follows:

WD – 02	Other Lintels	Ψ 0.214
WD – 03	Sills	Ψ 0.019
WD – 04	Jambs	Ψ 0.020
GF – 01	Ground Floor	Ψ 0.044
RE – 01	Eaves (insulation at ceiling)	Ψ 0.069
RG – 01	Gable (insulation at Ceiling)	Ψ 0.046

All other details can be found at:

http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/bcassociateddocuments9/acd (click to link direct)

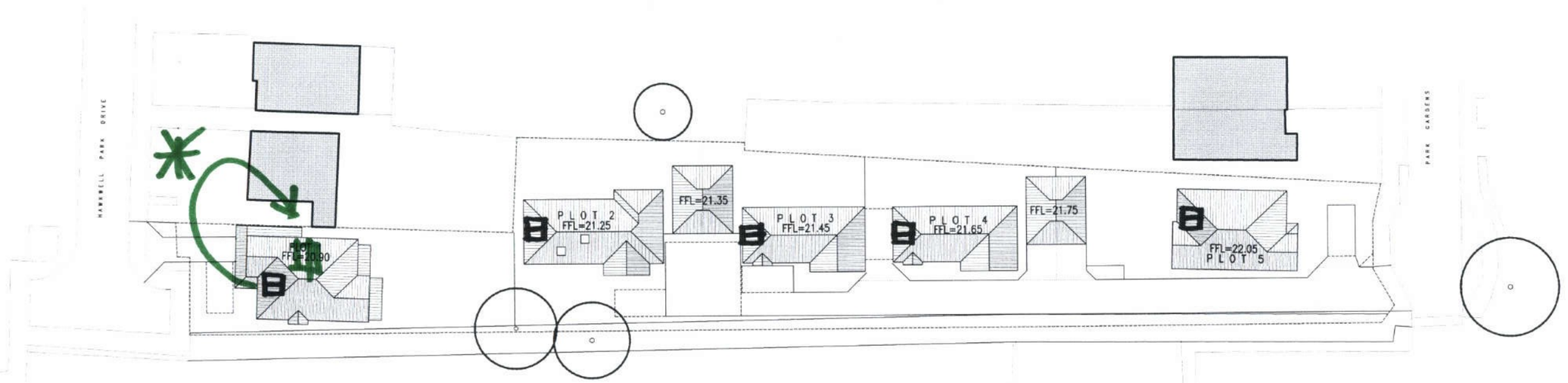
Copies of the completed accredited details sheets as per above link to planning portal, must be retained by you and produced upon request.

Please note any Upgrades to Specification as it differs from that listed on plans to achieve building regulation approval under Approved Document L1A. Failure to implement these upgrades may result in a Building Regulation Failure at final Stage.

Upon completion of the dwelling we will require a written statement that the dwelling was built to the specification as given and / or list any changes made during the build process. Upon receipt of this statement, copy of the Air Permeability Test and notice of full postal address we will be able to issue an Energy Performance Certificate for the property. This service is charged at £30.00 per plot + VAT.

Yours faithfully

Graham Fright



KEY:

Location of roof mounted PV panels.
2 no. Sharp ND-R250A5 @ 500 watts.

* relocate west as GDF email 31.5.13.

0 5 10 15 20 25
1:500 scale METERS

RECEIVED
13 06 2013
RECEPTION

SITE PLAN

SMITH+METSON
CHARTERED ARCHITECTS
STUDIO 1 LEIGH PARK ROAD
LEIGH ON SEA ESSEX SS9 2DU
t: 01702 472714 f: 01702 715049
e: mark.metson@btconnect.com

1:500@A3 MAY 2013 MCM

PANNELL DEVELOPMENTS

PLANNING CONDITION

5 NEW DWELLINGS
LAND OFF PARK GARDENS, HAWKWELL

1302
15