W. Stirland Ltd.

# WORDSWORTH ROAD
# WORTHING

# CODE FOR SUSTAINABLE HOMES ASSESSMENT

**A guide to code 3 compliance at:**
**36 Wordsworth Road**

16th January 2009 Rev A
Report ref: 1001/04

## Executive Summary

This report has been prepared using the Technical Guide dated October 2008 and provides a practicable solution for the delivery to W Stirland requirements to provide a project that satisfies the requirements of a Code for Sustainable Homes Code rating 3. This detailed code analysis supports W Stirlands bid proposal to ensure a deliverable project by utilising code worksheets and existing knowledge such as air tightness and sound attenuation results. Credits have been maximised and risks reduced utilising a risk register to monitor design development. Onsite construction and delivery in all areas of the code have been considered.

The project will involve 10 energy types and thus each flat will have a separate code assessment. The worst case Flat 7 has been assessed and a total of 58.43 credits awarded. Code 3 dwellings have been achieved by allocating code categories into three key strategic areas. The first summary contains all the site wide issues that impact upon all code levels, secondly areas of common design requirements, employers requirements and other regulation, thirdly areas where flexibility allow alternative strategies to specifically deliver the required code level. These areas are summarized as follows:

1. Wat 2, Sur 1,2, Was 1, Hea 3, 4, Eco 1,2,3,4,5
2. Ene, 3,4,5,6,8,9 Mat 2,3, Was 2, Pol 1, Hea 1,2,3, Man 1,2,3,4
3. Ene 1,2,7 Wat 1, Mat 1, Was 3, Pol 2,

The Code for Sustainable Homes summary attached to the end of this report highlights the W Stirland design strategy and confirms all credits are achieve. W Stirland has been able to propose code 3 compliant dwellings.

W Stirland have identified that a number of credits will be required as a safety factor, to ensure delivery and reduce risk of non-compliance during the final site assessment. Through the provision of a risk register as drafted at the end of this report, this will be monitored throughout the project to ensure delivery. Composting bins and improved material selection throughout the project could provide additional credits than shown.

Summary

1. All materials and products have been identified within this report to confirm deliverability of a code strategy.
2. Water strategy delivering a common solution for easy management and maintenance for the Housing Association.
3. Risk of losing credits through planning acceptance of reserved matters (24) could affect this project and are reviewed in the ZLC report.
4. PVs provided to flats will be allocated to the clients electricity supply reducing running costs and provided with a smart export meter.
5. Detailed review of Zero Low Carbon (ZLC) options in ZLC report.

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Appendix A – Code Summary

# 1 Code for Sustainable Proposal – W Stirland Design Stage Assessment

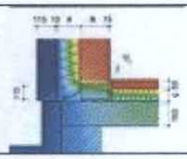
## 1.1 Energy

### 1.1.1 Ene 1 Carbon Dioxide

W Stirland utilising the CSH technical guidance (October 2008) and the SAP software by NHER (April 2008) have carried out a detailed evaluation of various scenarios based on Worthing Homes requirements to achieve a code 3 scheme considering positives and negatives of passive solar gain and cost effective energy efficient measures to conserve energy. ***Five credits*** have been awarded having modelled plots 5 & 7 being worst-case.

The summary below explores the results:-

| **Thermal Envelope** | | **Code 3** |
|---|---|---|
| | | **Block of Flats** |
|  | Walls | 0.28 W/m²K<br><br>*Sand cement render*<br>100mm 1950kg dense concrete block<br>50mm clear cavity<br>11mm OSB 3 face to the frame<br>***140mm timber stud/steel, infill***<br><br>Knauf Frametherm Slab 35 0.035 W/mK<br><br>12.5mm plasterboard & VCL |
| | Pitched | 0.15 W/m²K<br><br>300mm Knauf Loft roll 44 /<br>1 @ 100 cross laid<br>1@ 200 |
| | Roof | 0.15 W/m²K<br><br>350mm quilt Insulation |
|  | Floor – Jetfloor/Cube6 | 0.19 W/m²K<br>150mm Beam and Block Suspended Floor<br>Hanson Jetfloor 2B (EPS) or Cube 6<br>60/75mm Screed |
|  | Doors – IG Weatherbeater | 1.20 W/m²K |

| | | |
|---|---|---|
|  | Window – Mercury Range | 1.50 W/m²K<br><br>UPVC frames, sliding sash, double glazed, |
|  | Thermal bridges – Accredited details | y=0.08 |
| | | ***Mechanical ventilation*** |
| | | ***Common areas unheated*** |
| ***SAP*** | | ***89*** |
| ***DER/TER improvement*** | | ***25.24*** |

Airtightness, has been considered by W Stirland assisted by SAP modelling and a design target based on knowledge from the KPI records. The design target is $6m^3/hr.m^2$ with an expected improvement at completion. W Stirland has a specific air strategy to enable correct project design detailing and thus result in accurate construction.

Thermal Junctions. The importance of construction junctions can be overlooked but becomes critical. W Stirland propose that all junctions are designed and constructed to the standard performance requirement of y=0.08.

### 1.1.2 Ene 2 Building fabric

The heat loss parameter (HLP) has been confirmed by the SAP modelling as:

Plot 7 worst case - ***2 credits have been awarded HLP 1.07***

### 1.1.3 Ene 3 Internal lighting

***Two credits*** will be awarded. The Employers requirements section 6 requires all rooms other than bathrooms and cloakrooms to be provided with a dedicated low energy fitting, and contradicts the performance specification where 50% is stated. It is evident that bathroom lighting can be highly used as comfort night lighting and the client's consideration to provide bathrooms would be requested. The calculation would support 75% low energy lighting being achieved. In order to deliver a logical specification 100% of lighting should be considered low energy and comply with the requirement of 40 lumens per circuit watt as the phasing out of incandescent light bulbs began in 2009.

### 1.1.4 Ene 4 Drying space.

***One credit*** will be awarded for the provision of a space suitable for internal drying or external space such as a ventilated bathroom with a drying line of a suitable length being provided. The ER's section 5.6 requires commercial dryers to a shared area. The design does not confirm this requirement to be available.

### 1.1.5 Ene 5 Energy Labelled white goods.

***One credit*** will be awarded as white goods will not be supplied. The provision of information will be provided within the Home users guide on the EU Energy Efficiency Labelling scheme.

### 1.1.6 Ene 6 External lighting

***Two credits*** have been awarded for the compliance with Secured by Design and the integration of the following

- Security external. An external low energy dedicated light fitting, max 150W with PIR
- Space lighting. An external low energy dedicated light fitting, maximum 150W with PEC control.

### 1.1.7 Ene 7 ZLC

The Ene1 credit has been calculated and utilizing the efficiency of the building fabric to create a strategy for the ZLC requirement.

Various strategies have been considered within the ZLC report. Thermal improvements and alternative renewables have been informed by worst-case SAP calculations. At this stage is has been determined that a single strategy best suits the tender submission whilst complying with the requirement for gas boilers. The worst Sap plot 7, calculations indicate a requirement of 0.78kwp per flat, Where plot 5 only requires 0.45Kwp. The recommendation is to allow for a site total of 5Kwp, thus allowing for the best case flat type to require zero or minimal area of PV.

***2 credits*** have been awarded as Plot 7 achieved 19.76% of ZLC. ***This item is high risk if the planning Authority do not accept this strategy.***

Due to the limited pitched roof the solution will accommodate as much of the PV laid flat to minimise the planning risk and the remainder be of the pitched roof.

The PV will be supplied for the benefit of the landlord's communal services and external lighting. An export smart meter will be supplied, selling electricity to the power grid. This will reduce the landlords running costs.

The renewable strategy has been informed only by two worst-case SAP calculations. The total of 3Kwp is a fair consideration of a site overall requirement but only with the provision of 10 SAP calculations could this figure be guaranteed.

### 1.1.8 Ene 8 Cycle storage.

***Two credits*** have been awarded for the compliance of the provision of secure cycle storage. The Planning permission, condition 2 states that cycle parking is to be agreed. The ER's section 5.5 requires 4 bikes per lockable division and section 6 states 95% to be provided with compliant storage.

Drawing 5013/03C provides a single cycle storage building 5.2m by 2.0m (length x depth) housing 19 cycles in one combined lockable store. To satisfy the client's requirement and attain two credits the ten flats will require 19 cycles and split into 5 blocks of 4 cycles. The provision of a communal cycle store with a proprietary storage system within 100m for the front door would satisfy the code requirements.

A typical 4 bay communal cycle store will require an internal dimension of 2.50m x 2.00m. With a proprietary storage system by Basics Ltd this bay size can be reduced to 1.50m x 2.00m utilising their free standing cycle rack 1.2m wide. Thus a compliant bike store would therefore have internal dimensions of 9.4m x 2.0m.

Each cycle bay will be constructed in ½ brick skin, fully enclosed on all sides with a double set of FLB softwood doors, with floor bolt, BS 3621 mortice deadlock and the proprietary system securely bolted to the concrete slab.



Proprietary system - 720mm x 1200mm

### 1.1.9 Ene 9 Home office.

***No Credits*** have been awarded as detailed below and in accordance with drawings 501/01F for the integration of the following requirements into a suitable room

- 1.8m of wall space for associated furniture in addition to the requirement of SDS.
    - The drawings would suggest that the furniture could not be provided in addition to the room furniture except Flat 2.
- Two power sockets
- Double telephone socket
- Maximise daylight and provide a daylight factor of 1.5%. (see Hea 1)
    - Pass
      Flat 2, 4,5, 6, 7,
    - Fail
      Flat 1, 3, 8, 9, 10
- Adequate ventilation via an openable window.

### 1.1.10 Wat 1 Potable water consumption

The CSH requires a minimum water consumption to be achieved as follows using the CSH water calculator tool (revision 4 dated January 2008).

- Code 3 less than 105 l/day

The provision of a water conditioner only to the hot water system has been assumed and thus no water softener has been used within these calculations.

| Image | | Code 3 |
|---|---|---|
| | **Credits awarded** | **3** |
| | **Water consumption** | **102.31 l/day** |
|  | **WC – Twyford**<br>Galerie FLUSHWISE Dual Flush | 4/2.6 Lt<br>or<br>4.5/3 Lt |
|  | **Wash hand basin taps**<br>Ideal standard Ceramix Alto Click taps | 2.4 l/min click taps |
|  | **Bath – Twyford**<br>shallow bath 1700 x 700 porcelain enamelled steel bath | 130lt bath |
|  | **Shower – Triton Dart Eco** | 8L/min shower |
| | **Kitchen pillar taps** | 4 L/min restricted flow |
|  | **White goods** – Not supplied | Typical practice washing machine & Dishwasher |
|  | **Grey water** | None |
| | **Rainwater** | None |

### 1.1.11 Wat 2 External Potable water use.

The provision for all 10 flats will be via a communal storage tank system based on a maximum of 30litres per unit for landscape watering.

The proposal would be to locate two 150 litre rainwater butts within the development, one butt near plot 4 and one near plot 1.

### 1.1.12 Mat 1 Environmental Impact of Materials

The three categories of Mat 1, Mat 2 & Mat 3 will be balanced to deliver a holistic solution. For the purpose of this assessment it has been determined that the estimated credits obtained are as detailed. This may vary during the delivery of the project but overall an equal number of credits will be obtained within these three categories.

A minimum of three key elements should achieve a relevant Green Guide rating A+ to D. It should be noted that within a design & build contract W Stirland will be capable of maximising the credits awarded. ***8 credits*** have been obtained via the construction specification as confirmed by drawings and W Stirland. The selection of natural slate or a polymer modified cement slate would not have a negative effect on the credits awarded. The external wall would need to have a bespoke rating.

W Stirland have assessed the main key construction specifications other than the proposed timber frame to be:

| | |
|---|---|
| Structurally insulated timber panel system with OSB each side, roofing underlay, counter battens, battens and UK produced slate | B |
| Plasterboard, timber joists, OSB-3 decking, vapour control layer, insulation, EPDM single ply waterproofing membrane (Warm roof) | A+ |
| PVC-U vertical sliding sash window with steel and aluminium reinforcement, double glazed | C |
| Screed on insulation laid on beam and dense block (≈1950 kg/m3) flooring | B |

### 1.1.13 Mat 2 Responsible Sourcing of Materials – Basic Elements

**Four credits** have been awarded out of a total six possible. The specification of materials will in part be guided by locality and design. We have assumed that our credits will be delivered through the frame, upper floors, internal walls and staircases due the use of PEFC/FSC timber within these elements. All materials will require careful sourcing of materials to ensure that we can maximise these credits. All concrete, plasterboard, brick, metal and other composite materials where possible will come with an EMAS and ISO 14001 certificate. Any material suppliers will be asked to provide confirmation during the design phase to ensure that the target of three credits is achieved.

### 1.1.14 Mat 3 Responsible Sourcing – Finishing Elements.

All **Three credits** have been awarded for finishing elements. W Stirland will propose that the majority of all finishing elements are timber, allowing in areas a 20% allowance for composite materials such as kitchen worktops. All timber will be sourced from PEFC/FSC sources to ensure it will satisfy the 80% requirement of elements.

- Stairs, windows, internal & external doors, skirting, battening, kitchen units, fascias.

#### 1.1.15 Water surface run off (Sur 1)

***Two credits*** have been awarded. Evidence needs to be obtained from a sketch design to ensure that the minimum peak run off from site will not be greater than the previous condition. The appointment of a consultant to carry out the determination of the data is required including any SUDs/attenuation if credits are to be secured. The risk register highlights the effects of loosing these credits.

#### 1.1.16 Sur 2. Flood Risk (Sur 2)

***Two credits*** have bee awarded. Confirmation has not been provided within the tender documentation but the EA web site indicates the site has a low probability of flooding.

#### 1.1.17 Was 1. Waste

The requirement of the waste credit is to ensure that the provision of storage space to accommodate the local authority waste bins and recycling bins has been integrated. The requirements to achieve the mandatory requirements as well as attain the **Four credits** being awarded have been assessed and confirmed as compliant.

Mandatory compliance.
The scheme has been determined to require 1530 litres of storage per week using BS 5906:2005. Arun & Worthing Council Services (AWCS) collect refuse weekly and recyclable fortnightly. AWCS offer a 240Lt recycling blue lid bin and 240lt household waste bins. This would require 7 bins, therefore the proposal is to offer 6 No 240Lt refuse bins and 2No 140Lt recycling bins providing 1580Lts per week (6x240, 2x140/2).

The containers and location of the bin enclosure is deemed to be accessible to disabled people as confirmed by Was 1 checklist. Lighting, signs and tactile contrasts will be provided.

**Four credits** awarded for a Local Authority collection scheme.

- Household waste is sorted after collection fortnightly by AWCS.
- Provision of 30lt of internal recyclable storage integrated into a dedicated kitchen base unit.
- Worthing operate a collection scheme AWCS to this site.

#### 1.1.18 Was 2 Construction site waste management

***Two credits*** have been awarded. W Stirland a Site Waste Management Policy.

#### 1.1.19 Was 3 Composting.



The provision of a communal composting facility been considered inappropriate to this development. Adur and Worthing Borough Council operate a weekly Garden collection system for an annual subscription fee of £50 but this does not extend to include kitchen waste and therefore does not satisfy the requirements of the code.

***No credit*** has been awarded.

### 1.1.20 Pol 1 GWP.

***One credit*** has been awarded as W Stirland has given a specific undertaking to satisfy the requirements for specifying and purchasing products that contain a GWP must be less than 5.

### 1.1.21 Pol 2 Nox Emissions

***Two credits*** have been awarded for the code 3 dwellings due to the use of a Class 5 Ecotech Plus gas boiler for space and water heating.

It should be noted that if the ZLC strategy is not approved by the local planning authority these credits would be lost through implementation of another ZLC strategy not utilising a gas boiler.

### 1.1.22 Hea 1 Daylight.

The award of ***zero credits*** has been attained based on drawing 501/01F. Bedroom 2 has generally been shown as the Home Office. It may be difficult to influence the designs to ensure that any of these credits can be attained for a single code dwelling type:

- Kitchen to have a daylight factor of at least 2%.
    - Fail Flat 4
    - Pass Flat 6

  Not all kitchen attain the 2% thus on this overview and risk assessment no credits have been awarded.

- Living rooms, dining rooms and studies (homes office) to achieve a daylight factor of 1.5%

- 80% of the working plane in kitchen, living rooms, dining rooms and studies must receive direct light from the sky. Internal kitchens where light is received through a deep room will rarely attain this credit. A reasonableness check has been made to all flats. Ground floor flats are unlikely to achieve the requirement where upper floors should. Further information relating to heights of surrounding buildings, fences etc is necessary to finalise this credit.

### 1.1.23 Hea 2 Sound insulation

***Three credits*** have been awarded. W Stirland utilises specific construction standards to maximise building performance and though their own KPI study can substantiate the declared CSH credits for the performance of party walls and party floors by exceeding the clients minimum standard of 3dB referenced under section 6 of the Employers Requirements. W Stirland will target reduction of more than 5dB with Pre-completion testing carried out by a UKAS accredited acoustic engineer.

### 1.1.24 Hea 3 Private space.

***No credits*** have been awarded as all green areas considered being suitable as garden cannot be designated as private and secure, accessible only by the occupants of the proposed block of flats.

### 1.1.25 Hea 4 Lifetime Homes (LTH)

***No credits*** have been awarded within the scheme. The importance of design integration for all users has been summarised by the Joseph Roundtree Foundation in their guidance document "Lifetime Homes". This design guidance incorporates 16 design features that have become integral to the design of new homes allowing accessible and adaptable housing in any setting. The Housing Corporation and CSH have now adopted this design standard.

A brief audit of LTH of all flat types utilising the CSH checklist has indicated that not all of the criteria have been met. It is believe that even with some minor internal adjustments items such as glazing no higher than 800mm would alter the current design at 825mm & 975mm which would influence the approved elevations.

### 1.1.26 Man 1 Home User Guide.

W Stirland will provide a fully compliant home user guide as detailed within the code incorporating the Worthing Homes New Homes information manual. ***Three credits*** have been awarded.

### 1.1.27 Man 2 Considerate Constructors.

***One credit*** has been awarded. W Stirland has shown evidence that they will commitment to meeting Best Practice as a minimum under the Considerate Constructors Scheme. The ER's ref: 710 also confirm the client's wishes for registration. This scheme shall therefore be registered for this award and W Stirland will where possible seek to go beyond best practise and achieve a score of between 32 and 40, including regular monthly audits.

### 1.1.28 Man 3 Construction site impacts.

***Two credits*** awarded. W Stirland will ensure that a strategy and commitment is made to cover the four following criteria as detailed within the CSH technical guide.

- Monitor, report and set targets for water consumption from site activities
- Adopt best practise policies in respect of air (dust) pollution arsing from site activities.
- Adopt best practise policies in respect of water (ground and Surface) pollution occurring from the site
- 80% of site timber is reclaimed, re-used or responsibly sourced from PEC/FSC sources.

W Stirland will ensure that suitable site resources are available to record and monitor these criteria.

### 1.1.29 Man 4

W Stirland encourages the early integration of the Secured by Design initiative into all its projects. ***Two credits*** have been awarded for the commitment to integration all recommendations and where possible seek to receive the certificate.

This award scheme has become a key tool to assist planners, architects, housing associations and other bodies to design and evaluate proposed schemes for crime reduction. W Stirland considers the following products and components to be fully complaint.

- All doors, with associated locking devices are required to be fully tested and carry the SBD logo showing compliance with the relevant standards.
- Glazing to be laminated where security is deemed critical, such as in doors, adjacent to doors, fire egress windows.
- Ironmongery to doors.
- Security lighting.
  ***This requirement also forms part of CSH section Ene 6, thus full compliance is recommended and included within the construction specification.***
- Intruder Alarms. The provision of a 13amp non switched fused spur, suitable for a future alarm system
  ***The construction specification and M&E drawings should reflect this requirement. This also forms part of the HQI's of the D&QS***
- Utilities. Safely located.

### 1.1.30 Eco 1-4 Ecology.

***Four credits*** have been awarded from a maximum of seven. The requirements to achieve these credits are site specific and require detailed reports that have not yet been commissioned as noted in the ER's ref:850. With the lack of detail we have carefully considered a worst case. It is very important that the guidelines are closely followed from the CSH technical guide and the immediate appointment of an ecologist is recommended upon awarding of a building contract.

- Eco 1 – no credits warded as the site is not considered to be of low ecological value due to existing TPO trees (Lime/Plum & Holly) and hedges on the site
- Eco 2 – one credit awarded for positively enhancing the ecology of the site and adopting all key recommendations and 30% of additional recommendations.
- Eco 3 – one credit for the protection of ecological features.
- Eco 4 – two credits for have a Neutral effect on the impact on existing species.

### 1.1.31 Eco 5 Building Footprint.

***No credits*** have been awarded as the Net internal Floor area to Net Internal Ground Floor area has been calculated as 2:1 and fails to achieve the requirement of 3:1. The areas have been calculated as follows based on the drawings 5013/01F & 03C:

Net Internal Floor areas including party walls 642m$^2$

Net Internal Ground floor area including the cycle store (9.4m x 2.0m see Ene 8) and bin store. Totalling 314m$^2$.

3 CSH 2007

# 36 Wordsworth Road, Worthing

## Code For Sustainable Homes Risk Register

**16th January 2009**

CSH October 2008 Technical Guidance

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| Section | Description | Total Credits Available | Best Case Additional Credits | Predicted Credits | Worst Case Loss of Credits |
|---|---|---|---|---|---|
| | **Energy / CO2** | 29 | 0 | 17 | -3 |
| Ene 1 | Dwelling Emission Rate | 15 | | 5 | |
| Ene 2 | Building Fabric | 2 | | 2 | |
| Ene 3 | Internal Lighting | 2 | | 2 | |
| Ene 4 | Drying Space | 1 | | 1 | |
| Ene 5 | Energy Labelled White Goods | 2 | | 1 | |
| Ene 6 | External lighting. | 2 | | 2 | |
| Ene 7 | Low/Zero Carbon (LZC) Technologies | 2 | | 2 | -2 |
| Ene 8 | Cycle Storage | 2 | | 2 | -1 |
| Ene 9 | Home Office | 1 | | 0 | |
| | **Water** | 6 | 0 | 4 | 0 |
| Wat 1 | Internal | 5 | | 3 | |
| Wat 2 | External | 1 | | 1 | |
| | **Materials** | 24 | 0 | 15 | 0 |
| Mat 1 | Environmental Impact | 15 | | 8 | |
| Mat 2 | Responsible Sourcing - Basic Elements | 6 | | 4 | |
| Mat 3 | Responsible Sourcing - Finishing Elements | 3 | | 3 | |
| | **Surface Water Run- Off** | 4 | 0 | 4 | -2 |
| Sur 1 | Management of Surface Water Run-off | 2 | | 2 | -2 |
| Sur 2 | Flood Risk | 2 | | 2 | |
| | **Waste** | 7 | 1 | 5 | 0 |
| Was 1 | Storage of non-recyclable waste and recyclable household waste | 4 | | 4 | |
| Was 2 | Construction Site Waste Management | 2 | | 1 | |
| Was 3 | Composting | 1 | 1 | 0 | |
| | **Pollution** | 4 | 0 | 3 | -2 |
| Pol 1 | GWP | 1 | | 1 | |
| Pol 2 | NOx | 3 | | 2 | -2 |
| | **Health and Well Being** | 12 | 0 | 3 | |
| Hea 1 | Daylighting. | 3 | | 0 | |
| Hea 2 | Sound Insulation. | 4 | | 3 | |
| Hea 3 | Private Space. | 1 | | 0 | |
| Hea 4 | Lifetime Homes | 4 | | 0 | |
| | **Management** | 9 | 1 | 8 | 0 |
| Man 1 | Home User Guide | 3 | | 3 | |
| Man 2 | Considerate Constructors Scheme | 2 | 1 | 1 | |
| Man 3 | Construction Site Impacts | 2 | | 2 | |
| Man 4 | Security | 2 | | 2 | |
| | **Ecology** | 9 | 0 | 4 | 0 |
| Eco 1 | Ecological Value Of Site. | 1 | | 0 | |
| Eco 2 | Ecological Enhancement. | 1 | | 1 | |
| Eco 3 | Protection Of Ecological Features. | 1 | | 1 | |
| Eco 4 | Change Of Ecological Value Of The Site. | 4 | | 2 | |
| Eco 5 | Building Footprint. | 2 | | 0 | |
| | **Predicted Level** | 104 | 55.52 | 58.43 | 52.17 |
| | **Predicted Level** | | * * | * * * | * * |