

## **Northward Cottage**

Job no. B0709

Proposed Extension to existing dwelling

Work stage D

Preliminary Construction Notes

March 2008

### About This Document

*This document has been prepared as preliminary set of construction notes for discussion and preliminary costing purposes prior to making a planning application. This document is not comprehensive and it should be understood that it is subject to civils/structural and M&E engineering input which will be incorporated into the proposals after agreement with the client. This includes all service routes and layouts – heating, lighting and choice of all fittings.*

### External Land Movement and Build Up

To structural and civil engineers information.

### Surface Water Land Drainage

To structural and civil engineers information.

### Ground Conditions and Foundations for Building (Extension)

To structural and civil engineers information.

### DPCs in New Walls

Recycled plastic DPC by Zedcore, Zedex CPT high performance DPC linked/lapped to DPM, or similar approved suitable for radon protection where part of the system.

### DPM to all Floors

Recycled plastic membrane to be a recycled plastics type such as 'Zedcore' Zedex Visqueen 300mu DPM linked/lapped to DPC, or similar approved.

### Radon (Extension)

An allowance for a continuous membrane continuously linked through the external wall should be made. This could be the DPM membrane. NB DPM specification may need to be increased.

## **Solid Ground Floor Construction**

### Floor construction (existing building)

The structural floors to all ground floor areas will be lowered to allow for an increased room height, improved insulation and underfloor heating system.

The finished floor level to the hall will be lowered by an additional 300mm, the finished floor levels of the kitchen and the living room will stay the same.

Compacted hardcore onto existing ground, 50mm sand blinding, DPM (see above), 100–150mm reinforced insitu concrete linked into external wall, 150mm expanded polystyrene (EPS) floor grade insulation with minimum of 50mm turn up at all

perimeters, nominally 50-65mm fibre reinforced flow screed on proprietary insulation to take underfloor heating (this construction TBC by a heating specialist and M&E consultant). Leveling compound (and possible vapour check layer) and floor finish (see later sections for floor finish).

#### Floor construction (Extension)

Floor is to be a ground-bearing slab on a min of 225-mm Type 1 well compacted hardcore to SE details and specification. 25mm of sand blinding over Visqueen 300mu DPM/radon barrier and 175mm flooring grade insulation and a 150mm min reinforced concrete slab with A252 mesh to SE detail and specification. Concrete slab to be locally thickened in accordance with SE details. 50mm flooring grade insulation is to be laid over the floor slab in two layers and 20mm pipe in pipe service pipes are to be laid within the insulation level. Screed to be 85mm dense sand cement screed with fibre reinforcement and incorporating 20mm diameter underfloor heating system. Floor covering to be confirmed with client.

Vent pipes for ventilating of floor void or removal of gaseous containment's to be minimum 100mm diameter.

Expansion joints to concrete slab to Structural Engineer details and specification.

Insulation material to be protected from moisture damage during construction, and ensure protection from mechanical damage and dislodgement during construction.

## **Wall Constructions**

#### External Walls (Existing Building)

All existing lining, battens and internal insulation is to be removed. Electrical outlets, sockets and switches need 65mm extensions.

Installation of 50mm (thickness of phenolic foam) Gyproc ThermaLine Super with incorporated vapour control membrane to the inside of all external walls to be installed to manufacturers requirements. To avoid thermal bridging 30mm Gyproc Thermaline super is to be installed within window and door openings. Where this continuous layer of insulation is interrupted through to ceiling or internal wall junctions a 500mm section to both sides of the ceiling/wall needs to be insulated in the same way as the external walls.

The eastern wall to the living room on ground floor consist of two leaves. The inner leaf (approximately 250mm to client's information) is to be removed to gain more space if there is no structural purpose. SE to advise.

#### External Wall (Extension)

Below DPC level the external walls are to be constructed from two leaves of concrete blockwork with a 100mm cavity, where practical, filled with 100mm of fulfil cavity insulation. The inner leaf is to be 100mm dense concrete blockwork to SE and Leisure Line Joinery (Timber frame manufacturer) design and details.

Above DPC the external walls are to be Twin Timber framed walls constructed from an internal lining of 2 layers of 12mm plasterboard and skim to provide 60 minute fire resistance, fixed to 50x50mm battens forming a 50mm service void. Over a 9mm layer of OSB board. Over a timber framed external wall 350mm thick, consisting of two 90x38mm studs with a void of 120mm, studs at 600mm centres. The 300mm wall construction is to be completely filled with 300mm of cellulose fibre insulation. An outer layer of 9mm Panelvent and an air bag consisting of Tyvek SUPRO PLUS, or

similar as approved, all joints in the air bag are to be taped and sealed and where possible are to occur in a batten location with a 38mm thick clear cavity for ventilation and an external cladding layer of green oak feathered weather board fixed with marine stainless steel screws and washers. Maximum 'U' value through walls = 0.13 W/m<sup>2</sup>K.

The building structure requires a fire resistance of 60mins. All external timber framed walls without a blockwork lining are to have an internal face of two layers of 12mm plasterboard and skim to provide 60mins fire resistance.

For holding down strap details for the external walls see SE details and calculations.

Wall ties to SE details and specification.

For external wall calculations see SE calculations and details.

The Rockwool insulation below the DPC level is to consist of three layers of Rockwool fullfill cavity batts typically layers of 100mm thick batt and one layer of 50mm batt which are to fully fill the cavity. The batts are to be supported with the stainless steel wall ties.

All insulation materials to have third party certification.

Ensure blockwork has fully dried out before rendering, and provide shrinkage control joints as recommended by the block manufacturer and in accordance with B.S. 5628 Part 3 and to SE details and specification.

Ensure that all joints in the air bag are taped and sealed and wherever possible ensure that the joints occur in locations that have external battens batten fixed over the joints.

Seal around dry-lining perimeters and holes made by services with a continuous ribbon of plaster adhesive.

U-Value calculation through the 300-mm timber framed wall above the DPC

| <b>U-VALUE CALCULATIONS: 300mm insulated stud external walling to Housing</b> |               |                               |                                   |
|---|---------------|-------------------------------|-----------------------------------|
| <b>300mm external wall thro insulation (no studs)</b>                         |               |                               |                                   |
| <b>Element</b><br>(External oak cladding and stone cladding ignored)          | Thickness (m) | Thermal conductivity<br>W/m K | Resistance<br>m. <sup>2</sup> K/W |
| External (severe exposure)  |               |                               | 0.03                              |
| Internal  |               |                               | 0.12                              |
| 9mm Panelvent   | 0.009         | 0.051                         | 0.18                              |
| 300mm insulation  | 0.3           | 0.035                         | 8.57                              |
| 9mm OSB Boarding  | 0.009         | 0.1                           | 0.09                              |
| 50mm service cavity   |               |                               | 0.18                              |
| 24.mm plasterboard  | .024          | 0.36                          | 0.07                              |
|   |               | Total R =                     | <b>9.24</b>                       |
|   |               | U-value =                     | 0.09                              |
| <b>300mm external wall thro timber studs</b>                                  |               |                               |                                   |
| <b>Element</b><br>(External oak cladding ignored)                             | Thickness (m) | Thermal conductivity<br>W/m K | Resistance<br>m. <sup>2</sup> K/W |
| External (severe exposure)  |               |                               | 0.03                              |
| Internal  |               |                               | 0.12                              |
| 9mm Panelvent   | 0.009         | 0.051                         | 0.18                              |
| 90mm timber stud @600c/s  | 0.09          | 0.14                          | 0.64                              |

|   |              |           |                                  |
|---|--------------|-----------|----------------------------------|
| 170mm insulation  | 0.17         | 0.035     | 4.86                             |
| 90mm timber stud @600c/s  | 0.09         | 0.14      | 0.64                             |
| 9mm OSB boarding  | 0.009        | 0.1       | 0.09                             |
| 50mm service cavity   |              |           | 0.18                             |
| 24mm plasterboard   | .024         | 0.36      | 0.07                             |
|   |              | Total R = | <b>6.81</b>                      |
|   |              | U-value = | 0.15                             |
| <b>Fractional area of stud</b>                                    |              |           |                                  |
| <b>Element</b>  | Distance (m) |           |                                  |
| Fractional area of wall - stud                                    | 0.05         |           |                                  |
| Fractional area of wall - insulation                              | 0.55         |           |                                  |
| <b>Fractional area stud</b>                                       |              |           | <b>0.09</b>                      |
| <b>Fractional area of insulation</b>                              |              |           |                                  |
| Fractional area of insulation                                     | 1            | Less      | Fractional area stud <b>0.91</b> |
| U-VALUE CALCULATIONS: 300 mm insulation and stud element combined |              |           |                                  |
| <b>Total resistance of wall</b>                                   | <b>7.57</b>  |           |                                  |
| <b>U Value of wall</b>  | <b>0.13</b>  |           |                                  |

## Internal walls

### New Walls

Timber stud partitioning where shown of 90x38mm studding at 400mm centres with 90x38mm head and sill and two rows of noggins @ 1200mm c/s 12mm plasterboard and skim both sides.

All internal stud partition walls are to be provided with sound insulation. The walls are to be constructed with two layers of plasterboard with a min mass per unit area of 10kg/m<sup>2</sup> to both sides of 100mm timber studs. An absorbent layer of un-faced 25mm mineral wool batts, or quilt with a min density of 10kg/m<sup>3</sup>, to be suspended within the cavity. Partitioning to bathrooms/WC's to have 75mm fibreglass quilt infill between studs.

### Existing walls

All existing walls need to be made good dependent on their condition and redecorated.

See also structural and civil engineers information.

## Structural Beams and Members

To SE information and detail

## Roof

### Roof to Extension

The roof construction of both pitches of the roof are to be twin framed 350mm thick roofs. The roof is generally to consist of two rafters, the lower being 190x38mm and the upper rafter being 90x38mm. The two rafters are to be joined with gusset plates to form single joists and are to be centred at 600mm centres. The internal side of the rafters are to be clad with 9mm OSB boarding and an air bag of Tyvek SUPRO PLUS roof sarking, or similar as approved. To the external leaf the rafters are to be covered with 9mm Panel vent and Tyvek SUPRO PLUS roof sarking, or similar as approved.

Between the studs is to be totally filled with 350mm of cellulose fibre Warmcell insulation. The U Values through the roof construction is to be  $0.13W/m^2C^{\circ}$

The housing roofs are to be 40-degree pitch and covered with Natural British slates 250x500mm with a 100mm-min head lap (first grade Spanish slate to be allowed for if British slate is not able to be afforded). The slates are to be fixed to 25x50mm pre-treated timber battens on 25x50mm counter battens.

The ridge is to be a ventilated dry Universal terracotta ridge tile.

The plasterboard ceilings are to be fixed to the underside of the twin frame rafters, the ceiling is to consist of 2 layers of 12mm plasterboard - both are to have a min density of  $8kg/m^2$

Size and location of beams are to be specified and designed by the timber frame SE engineer.

Tyvek eaves carriers and stainless steel insect mesh are to be incorporated at the eaves or similar as approved.

All steel anchors and fixings are to be designed and specified by the timber frame SE.

All structural timber is to be designed and specified by the timber frame SE.

Treated boarding to soffit. An allowance for a lining board or a soffit board of 18 mm Douglas Fir, or similar durable species of T&G softwood stained timber, should be made. Rafters to be exposed and planed finished.

Code 4 lead valleys, flashings and aprons, to Lead Development Association handbook details.

Insulation material to be protected from moisture damage during construction, and ensure protection from mechanical damage and dislodgement during construction.

U Value calculations for 350-mm Housing twin frame roof Construction

| <b>U-VALUE CALCULATIONS: 350mm insulated roof construction ignoring finishes</b> |                             |                              |                                   |
|--|-----------------------------|------------------------------|-----------------------------------|
| <b>350mm thro insulation</b>   |                             |                              |                                   |
| <b>Element</b><br>(External slate covering to be ignored)                        | Thickness (m)               | Thermal conductivity<br>W/mK | Resistance<br>m. <sup>2</sup> K/W |
| External (severe exposure)   |                             |                              | 0.03                              |
| Internal   |                             |                              | 0.12                              |
| 15mm Panelvent   | 0.015                       | 0.051                        | 0.29                              |
| 350mm insulation   | 0.35                        | 0.035                        | 10.00                             |
| 6.4mm Paneline   | 0.0064                      | 0.1                          | 0.06                              |
| 38mm service cavity  |                             |                              | 0.18                              |
| 2 layer 12.5mm Fermacell   | .025                        | 0.36                         | 0.07                              |
|  |                             | Total R =                    | <b>10.75</b>                      |
|  |                             | U-value =                    | 0.09                              |
| <b>350mm thro timber studs</b>   |                             |                              |                                   |
| <b>Element</b><br>(External slate covering to be ignored)                        | Thickness (m)               | Thermal conductivity<br>W/mK | Resistance<br>m. <sup>2</sup> K/W |
| External (severe exposure)   |                             |                              | 0.03                              |
| Internal   |                             |                              | 0.12                              |
| 15mm Panelvent   | 0.015                       | 0.051                        | 0.29                              |
| 90mm timber stud @600c/s   | 0.09                        | 0.14                         | 0.64                              |
| 66mm insulation  | 0.066                       | 0.035                        | 1.89                              |
| 194mm timber stud @600c/s  | 0.0194                      | 0.14                         | 0.14                              |
| 6.4mm Paneline   | 0.0064                      | 0.1                          | 0.06                              |
| 38mm service cavity  |                             |                              | 0.18                              |
| 12.5mm plasterboard  | .0125                       | 0.16                         | 0.08                              |
|  |                             | Total R =                    | <b>3.43</b>                       |
|  |                             | U-value =                    | 0.29                              |
| <b>Fractional area of stud</b>   |                             |                              |                                   |
| <b>Element</b>   | Distance (m)                |                              |                                   |
| Fractional area of wall - stud   | 0.05                        |                              |                                   |
| Fractional area of wall - insulation   | 0.55                        |                              |                                   |
|  | <b>Fractional area stud</b> |                              | <b>0.09</b>                       |
| <b>Fractional area of insulation</b>   |                             |                              |                                   |
| Fractional area of insulation  | 1                           | Less                         | Fractional area stud              |
|  |                             |                              | <b>0.91</b>                       |
| <b>U-VALUE CALCULATIONS: 300mm insulation and stud element combined</b>          |                             |                              |                                   |
| <b>Total resistance of wall</b>  |                             |                              | <b>7.78</b>                       |
| <b>U Value of wall</b>   |                             |                              | <b>0.13</b>                       |

Existing roof

Plasterboard to existing roof will need to be removed. Condition of existing rafters to be checked.

New additional common soft wood rafters are to be joined with existing wall plate and purlin to SE information and detail and are to be screwed to existing rafters that are at 600mm centres. These rafters are to take the new improved insulation. The internal side is to have an air bag and vapor barrier of Tyvek SUPRO PLUS roof sarking, or similar as approved. In between new rafters fill with 200mm of mineral fibre insulation with a 50 mm clear ventilation path to the outside.

Plasterboard ceilings are to be fixed to the underside of the rafters, the ceiling is to consist of 2 layers of 12mm plasterboard both are to have a min density of 8kg/m and skim.

## **Drainage**

### Downpipes and Guttering

100 mm half round pressed metal guttering and dia 89mm down pipes. By 'Lindab'. Tel 0121 585 2780.

### Below Ground Level Drainage

Clay 100mm dia with plastics joint sleeves (Hepworth 'Supersleve' or equivalent).

Bedding for pipes as Building Regulation document and as:

- Pipes under floor constructions, or within 1000mm of the building to be encased in concrete with movement joints at 3000mm intervals or at every joint if pipes are less than 3000mm long.
- Pipes to be bedded on 100mm granular fill to BS882.
- Generally in landscaped areas under paths and in lightly trafficked areas with more than 300mm cover, pipes to be laid as bedding class 'F'.
- When pipe is less than 300mm from underside of slab the pipe is to be cast integral with the slab with concrete surround.
- Pipes under roadways/trafficked areas with less than 500mm cover to be laid as class 'Z'.
- Pipes under ground floor slabs with more than 300mm cover to underside of slab to be laid in gravel with 100mm granular cover from top of crown and then compacted hardcore of granular 300mm layers up to underside of slab.
- Where pipe is beneath the bottom of the footing and closer than 1000mm to the wall. Pipe is to be in concrete surround with concrete extending to the same depth as the footing.
- Where pipe is beneath the footing and further away from the building than 1000mm the advice of the structural engineer should be sought.

Clay access points (100 x 260mm) with necessary raising pieces and alloy covers and propriety rodding eyes with alloy covers when drainage is 600mm deep and less (Hepworth 'Supersleve' or similar). Covers to be fixed type.

Brick built manholes to be used when depth of drain is more than 600mm. Manholes to be designed by engineer. Covers to be fixed type.

Rainwater downpipes are to discharge into clay trapped gullies with separate inspection cover with rodding access. Covers to be fixed type.

Where underground pipes penetrate walls relieving lintol(s) will be installed with a min 50mm clearance all around, all sides of opening to be masked with slates (foundation at this point and lintol to be to structural engineers design).

Surface water below ground not collected for reuse to discharge to soakaways or mains as specified by engineer.

#### Above Ground Internal Drainage

All pipes to be ABS plastics or metal or similar approved (not PVC) to be specified by project engineer. Basins to have 40mm diameter pipe for runs of less than 3000mm and to have 50mm diameter pipe for runs up to 4000mm length. Traps to have 75mm depth of seal.

All pipes that penetrate through the roof are to be black.

#### Accessible Services Runs

All above ground drainage runs and services and incoming service routes are to be hidden from view for reasons of durability and compliance standards. When possible, this will mean that runs will be above suspended ceilings, behind wall finishes that have lockable access panels. The architecture of the building will generally be designed to conceal services without need for protrusions.

### **Fire Precautions**

Fire precautions remain to be designed. It should be noted that M&E information will need to be referred to.

Provisionally the following items should be considered:

- External timber cladding to be pretreated with fire retardant 'Non Com Exterior' by Dricon to raise the material class to Class 0 to comply with Building Regulation Approved Document Part B.
- Fire spread fire stopping behind cladding and other voids/air gaps to external cladding fixed at a regular interval. This item to be a wire wrapped mineral quilt item mechanically fixed in place and then mineral quilt. This detail is for spread of flame and building insurance reasons.

### **Windows and Doors**

#### External Door Thresholds

External doors are to have an internal finished floor that is virtually the same level as the exterior finished pathway/paving level using appropriate weather seals/bar. Maximum difference in level 15 mm.

#### External Windows and External Glazed Doors

Storm proof weather sealed timber stained units. Trickle vents with a mesh and weather protection cowl to head of all window frames, colour to match windows. Window units to have restriction limiting openings at 15 mm and a maximum of 100mm opening. Units to comply with polices 'Secure by Design' scheme or to be approved by the client if this is not possible. Consultation will be required with client to confirm opening and locking mechanisms.

Glazing is to be double or triple glazed low E coated of a thickness suitable to give an average U - value of 1.1 W/m<sup>2</sup>K or better through the whole window (not centre pane value). Glazing beneath 800mm in height above finished floor level and within 300mm of an opening door is to be safe breakage glazing to comply with the requirements of BS6206 class C. All glazing to be clearly kite marked above any sealant or paint work to allow for visual inspection. All glass is to be visually identical

so that glazing in all external windows and doors is visually identical (this to ensure that window glazing does not appear to be patchy).

### Rooflights

Rooflights to be VELUX GGL C02 pinewood with clear varnish or white painted pinewood finish, or similar approved, pitched with roof with vapour barrier collar and underfelt collar. Flashings for recessed installation to be suitable for the use with slates.

Rooflights to be double glazed or triple glazed low E coated of a thickness suitable to give an average U – value (center pane) of 1.1 W/m<sup>2</sup>K. Safe breakage glazing to comply with the requirements of BS6206 class C. All Glazing to be clearly kite marked above any sealant or paint work to allow for visual inspection.

### Internal Doors

New doors are to be solid core paint grade and decorated door sets.

### Ironmongery.

Ironmongery in brushed stainless steel.

Further client feedback required for all ironmongery

## **Fixtures and Fittings and Blinds**

In the GF kitchen a feature stone fireplace is to be fitted into opening of the existing fireplace as this is to be covered through the internal wall installation. Details to be confirmed by client.

Brief for these items requires development.

## **Finishes**

- External softwood. Plant/mineral based stain e.g. 'OS Country Colour' range.
- Internal softwood. Plant/mineral based stain e.g. 'OS Country Colour' range.
- Internal wall paint to be a plant/mineral based product eg clay paint by 'Earthborne'
- Ceramic wall tiling by Johnsons or Pilkingtons or similar
- 18mm solid timber flooring to ground and first floor with an additional 25mm layer of Isowool Sound Deadening Floor Roll with 19mm Gyproc planc above.
- WC's and Bathrooms to be designed as wet rooms with half height tiling to walls and floor tiles.
- All ceilings apart from hall and kitchen (GF) to be durable plasterboard and skim and decorated (see walls above). Ceilings to Hall and Kitchen to be exposed floor joists and stained (see above).

## **Landscape Design**

TBC

## **M&E**

M&E consultant to advise.

### Ventilation

The building is to be designed as a passively ventilated building. The design of each room will be subject to the input and requirements of M&E. Opening windows for daytime ventilation. No mechanical ventilation is to be used unless absolutely necessary.

M&E consultant, architect and client to develop this concept further.

### Sanitary Ware / Water Conservation

- Low flush (2/4 litre dual flush) and low water use appliances.
- Flow and regulators to all hot and cold water pipes to taps, showers and WCs.
- Low water use / aerated taps and showers (type to be confirmed by client)
- Temperature control to all hot taps.
- WC, wash basins and shower tubs to be confirmed by client.

### **Air Testing**

The building is to exceed the requirements of the air testing standards set in the building regulations and is to perform such that the air leakage is no more than 3 air changes per hour at 50 PA in compliance with CIBSE TM 23. This will inevitably mean that the roof membranes and the wall construction/detailing will require careful monitoring/detailing. Provisionally, all services penetrations and external windows and doors will have weather sealant at the exterior and interior face at the junction with render/plaster and blockwork construction. There is also to be an expanding foam sealer between frame and structure ('Compriband' or similar). At corners/junctions where cracking may occur i.e. between wet plaster on masonry construction and plasterboard type materials, gaps are to be filled with caulking prior to skimming/finishing. It will be necessary to receive independent certification to confirm the air leakage performance of the building. Experience has demonstrated that it is advisable to complete sample areas of the building early, to test the performance of these spaces so that time consuming and expensive opening up is not needed.

All of the above TBC by M&E consultant and client