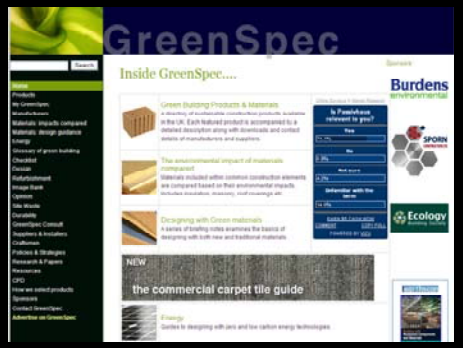

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Cycle Assessment Procedure for Eco-Materials

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TSB Retrofit for a Future

Project in Development

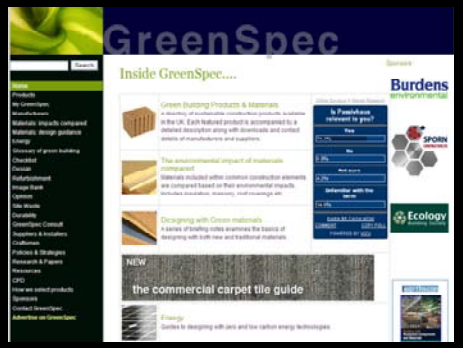
Material Choices

TSB Retrofit for a Future

- Technology Strategy Board (Ex DTI)
- Seeking data for government
- to be able to start setting CO_2 targets for existing buildings
- Code for Sustainable Homes Refurbishment can follow
- Running competition to find solutions and get data
- 390 entries
- 190 through to First stage
- 85 through to Second stage will be built

Existing building stock

- Is a bigger problem than new build
- We should be aiming for equivalent to Code level 5 but for refurbishment
- TSB target:
  - Was 80% reduction in CO_2
  - now set at x CO_2 consumption per dwelling
  - Generous £150,000 budget
- Only concerned with CO2 in use
- Not interested in CO2 in materials or construction



Local Companies

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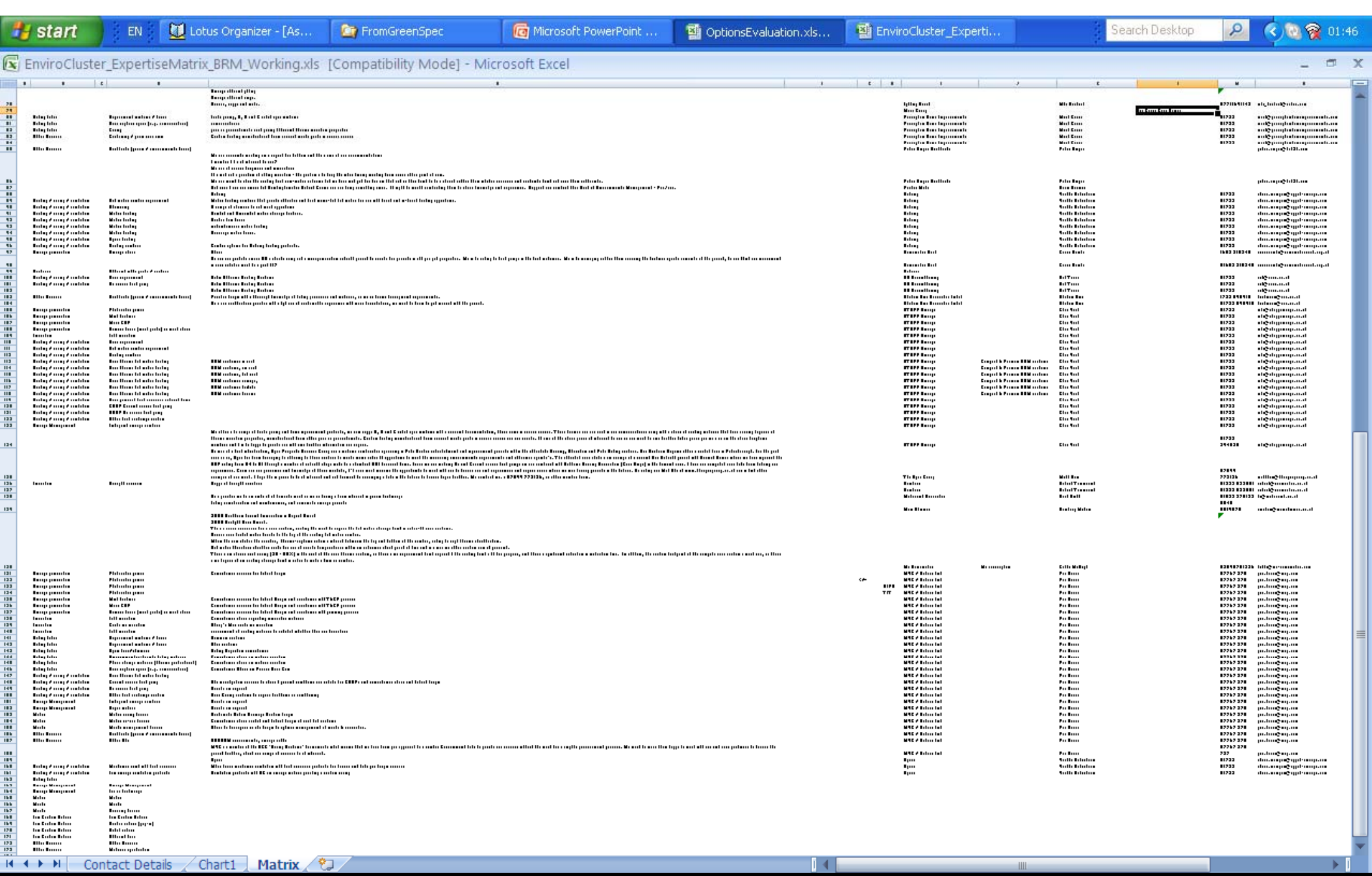
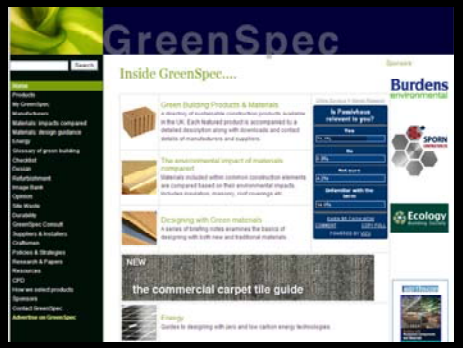
- Manufacturers
- Stockists/distributors
- Applicators
- Contractors





Thermal Analysis

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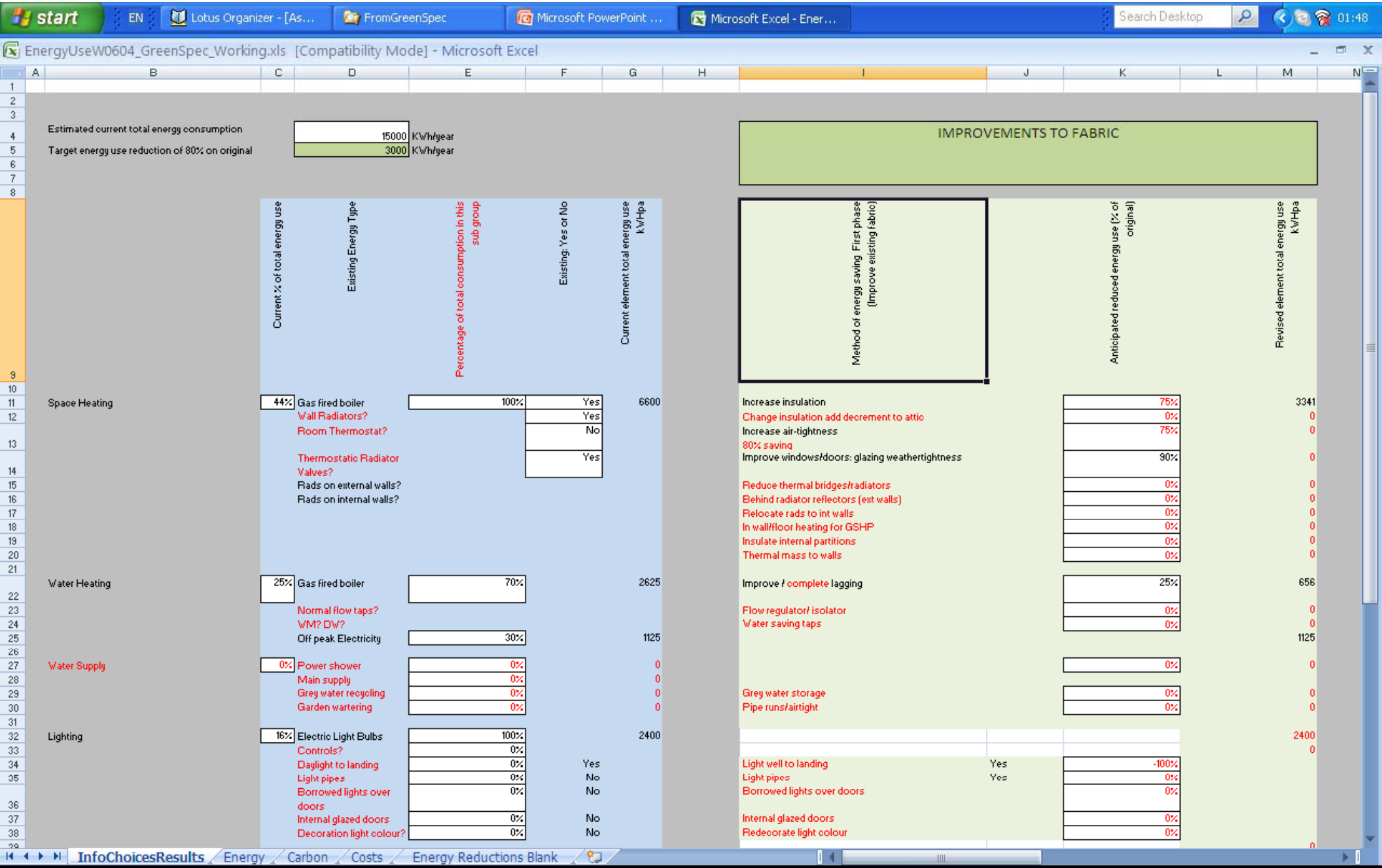
- Existing base point
  - Energy and carbon imported
  - Energy consumed and carbon released
  - Energy losses
- Proposed interventions
  - Renewable energy inputs & carbon saved
  - Reduced Losses
  - Energy saved

Estimated current total energy consumption: 15000 KWh/year

Target energy use reduction of 80% on original: 3000 KWh/year

	Current % of total energy use	Existing Energy Type	Percentage of total consumption in this sub group	Current element total energy use kWh/a	IMPROVEMENTS TO FABRIC: Method of energy saving First phase (Improve existing fabric)	Anticipated reduced energy use (% of original)	Revised element total energy use kWh/a	IMPROVEMENTS TO FITTINGS / : Method of energy saving Second phase (Improve fittings/appliances)	Anticipated reduced in energy use (% of revised amount)	Revised element total energy use kWh/a	LIFESTYLE CHANGES: Method of energy saving Third phase (Renewables and life style changes)	Anticipated reduced in energy use (% of revised amount)	Revised element total energy use kWh/a	MICRO-RENEABLES & LOW-: Method of energy generation Can we assign the energy to a specific use?	Anticipated Energy Generation KWH/year
Space Heating	44%	Gas fired boiler	100%	6600	Increase insulation	75%	3341	TRVs on Radiators	0%	3341	Reduce heating usage	90%	3007	Solar collector	300
		Radiators?			Change insulation	0%	0	Improve Thermostat	0%	0	Visible meters	0%	0		
					Add decrement										
		Thermostat?			Increase air-tightness	75%	0	Intuitive controls	0%	0	Training: Meter awareness & Controls	0%	0	Photovoltaic panels	300
					80% saving										
		TRVs?			Improve windows/doors: glazi	90%	0		0%	0	Training: Trickle vent	0%	0	Wind turbine: unlikely @ greenham	300
					Reduce thermal bridges/radiators	0%	0	Single pipe radiator heating system	0%	0	Create User Manual	0%	0	Ground source heat pump	300
					Behind radiator reflectors (ext walls)	0%	0		0%	0				Air source heat pump	300
					Relocate rads to int walls	0%	0	Relocate rads to int. walls	0%	0					
					In wall/floor heating for GSHP	0%	0	In wall/floor heating for GSHP	0%	0					
					Insulate internal partitions	0%	0							Micro CHP	300
					Thermal mass to walls	0%	0				Training: Heat purging	0%	0		
Water Heating	25%	Gas fired boiler	70%	2625	Improve / complete lagging	25%	656	Efficient smaller boiler	75%	492	Reduce hot water usage	75%	369	Solar collector porch? Wrong elevation?	300
		Normal flow taps?			Flow regulator/ isolator	0%	0	Flow regulator/ isolator	0%	0	Visible meters	0%	0	Increase thermal mass	300
		WM? DW?			Water saving taps	0%	0	Water saving taps	0%	0				Solar collector sunspace	0
		Off peak Electricity	30%	1125			1125	Efficient heater	95%	1069		95%	1015	Thermal storage	0
Water Supply	0%	Power shower	0%	0		0%	0	Water head shower	0%	0	Training: Shower taking	0%	0		
		Main supply	0%	0											
		Grey water recycling	0%	0	Grey water storage	0%	0	3rd pipe runs to WCs	0%	0	Reduce mains reliance	0%	0	Increase Decrement	0
		Garden wartering	0%	0	Pipe runs/airtight	0%	0	Gravity irrigation system	0%	0	Reduce mains reliance	0%	0		
Lighting	16%	Electric Light Bulbs	100%	2400	Light pipes	0%	2400	Low energy lighting	25%	600	reduced appliance use	25%	150		
		Controls?			Borrowed lights	0%	0								
					Internal glazed doors	0%	0								
					Redecorate	0%	0								
Cooking	9%	Gas	80%	1080			1080	More Efficient Appliance	90%	972	reduced appliance use	90%	875		
		Electric (Oven/Hob)	0%	0			0	More Efficient Appliance	75%	0	reduced appliance use	75%	0		
		Electric (Microwave)	20%	270			270	More Efficient Appliance	75%	203	reduced appliance use	75%	152		
Appliacnces	6%	Fridge	10%	90			90	More Efficient Appliance	75%	68	reduced appliance use	75%	51		
		Freezer	5%	45			45	More Efficient Appliance	75%	34	reduced appliance use	75%	25		
								Modulation control							
		Kettle	5%	45			45	More Efficient Appliance	75%	34	reduced appliance use	75%	25		
		Washing Machine	10%	90			90	More Efficient Appliance	65%	59	reduced appliance use	65%	38		
					Create winter drying cupboard	0%	0	Drying over bath	0%	0	Solar drying in garden	0%	0	Solar drying in sunspace	0%
		Tumble drier	15%	135			135	More Efficient Appliance	65%	88	reduced appliance use	65%	57		
		Dishwasher	10%	90			90	More Efficient Appliance	75%	68	reduced appliance use	75%	51		
					Insulation to wastes	0%	0							Heat recovery on water wastes	0
		Television	5%	45			45	More Efficient Appliance	75%	34	reduced appliance use	75%	25		
		Other (too broad)	40%	360			360	More Efficient Appliance	75%	270	reduced appliance use	75%	203	Total generation	2400
								Socket/adaptor switching	0%	0	Training: turning off	0%	0		
								Low wattage circuit						Green tarrif supply	0
								Remove transformers	0%	0					
Ventilation	0%	Kitchen extracter	0%	0	Airtight the apperture	0%	0	Add heat recovery	0%	0	Training: Use	0%	0		
					Internal door closers & seals	0%	0							Whole House Mechanical Ventialtion Heat Recovery	0
											Secure window opening	0%	0		
Local Procurment	0%	Materials	0%	0		0%	0		0%	0		0%	0		
	0%	Labour	0%	0											
	0%	Contractor	0%	0											
			Total Energy kWH/year	15000		Total Energy kWH/year	9773		Total Energy kWH/year	7329		Total Energy kWH/year	6043		Total Energy kWH/year 3643
					Section	% reduction	35	Section	% reduction	16	Section	% reduction	9		% reduction 16
					Cumulative	% reduction	35	Cumulative	% reduction	51	Cumulative	% reduction	60		% reduction 75.71
															Total reduction in energy consumption



EnergyUseW0604_GreenSpec_Working.xls [Compatibility Mode] - Microsoft Excel

Estimated current total energy consumption: 15000 KWh/year

Target energy use reduction of 80% on original: 3000 KWh/year

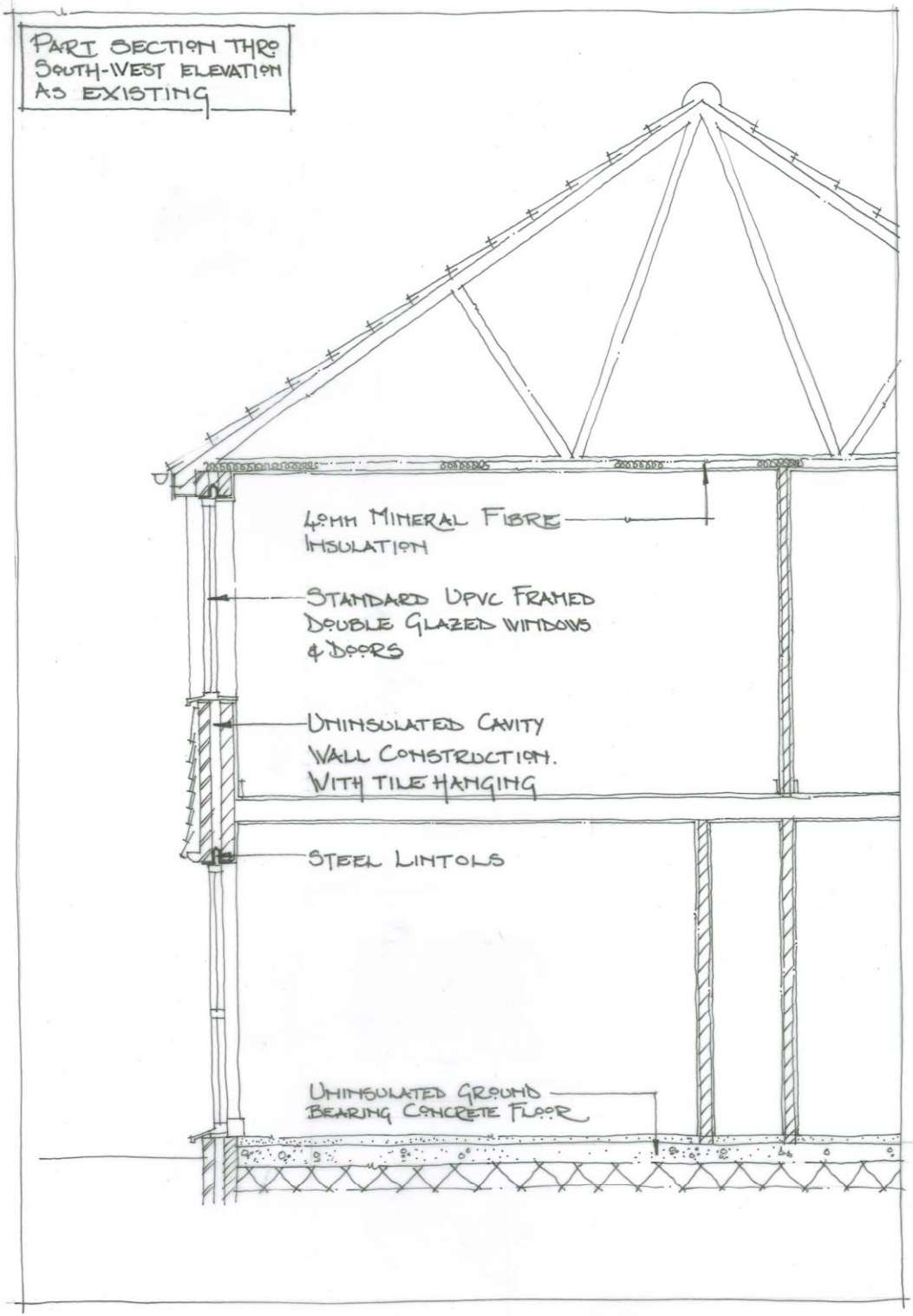
IMPROVEMENTS TO FABRIC

	Current % of total energy use	Existing Energy Type	Percentage of total consumption in this sub group	Existing: Yes or No	Current element total energy use kWHpa	Method of energy saving First phase (Improve existing fabric)		Anticipated reduced energy use (% of original)	Revised element total energy use kWHpa
Space Heating	44%	Gas fired boiler	100%	Yes	6600	Increase insulation		75%	3341
		Wall Radiators?		Yes		Change insulation add decrement to attic		0%	0
		Room Thermostat?		No		Increase air-tightness 80% saving		75%	0
		Thermostatic Radiator Valves?		Yes		Improve windows/doors: glazing weathertightness		90%	0
		Rads on external walls?				Reduce thermal bridges/radiators		0%	0
		Rads on internal walls?				Behind radiator reflectors (ext walls)		0%	0
						Relocate rads to int walls		0%	0
						In wall/floor heating for GSHP		0%	0
						Insulate internal partitions		0%	0
						Thermal mass to walls		0%	0
Water Heating	25%	Gas fired boiler	70%		2625	Improve / complete lagging		25%	656
		Normal flow taps?				Flow regulator/ isolator		0%	0
		WM? DW?				Water saving taps		0%	0
		Off peak Electricity	30%		1125				1125
Water Supply	0%	Power shower	0%		0			0%	0
		Main supply	0%		0				0
		Grey water recycling	0%		0	Grey water storage		0%	0
		Garden wartering	0%		0	Pipe runs/airtight		0%	0
Lighting	16%	Electric Light Bulbs	100%		2400				2400
		Controls?	0%						0
		Daylight to landing	0%	Yes		Light well to landing	Yes	-100%	
		Light pipes	0%	No		Light pipes	Yes	0%	
		Borrowed lights over doors	0%	No		Borrowed lights over doors		0%	
		Internal glazed doors	0%	No		Internal glazed doors		0%	
		Decoration light colour?	0%	No		Redecorate light colour		0%	

Sheet tabs: InfoChoicesResults | Energy | Carbon | Costs | Energy Reductions Blank

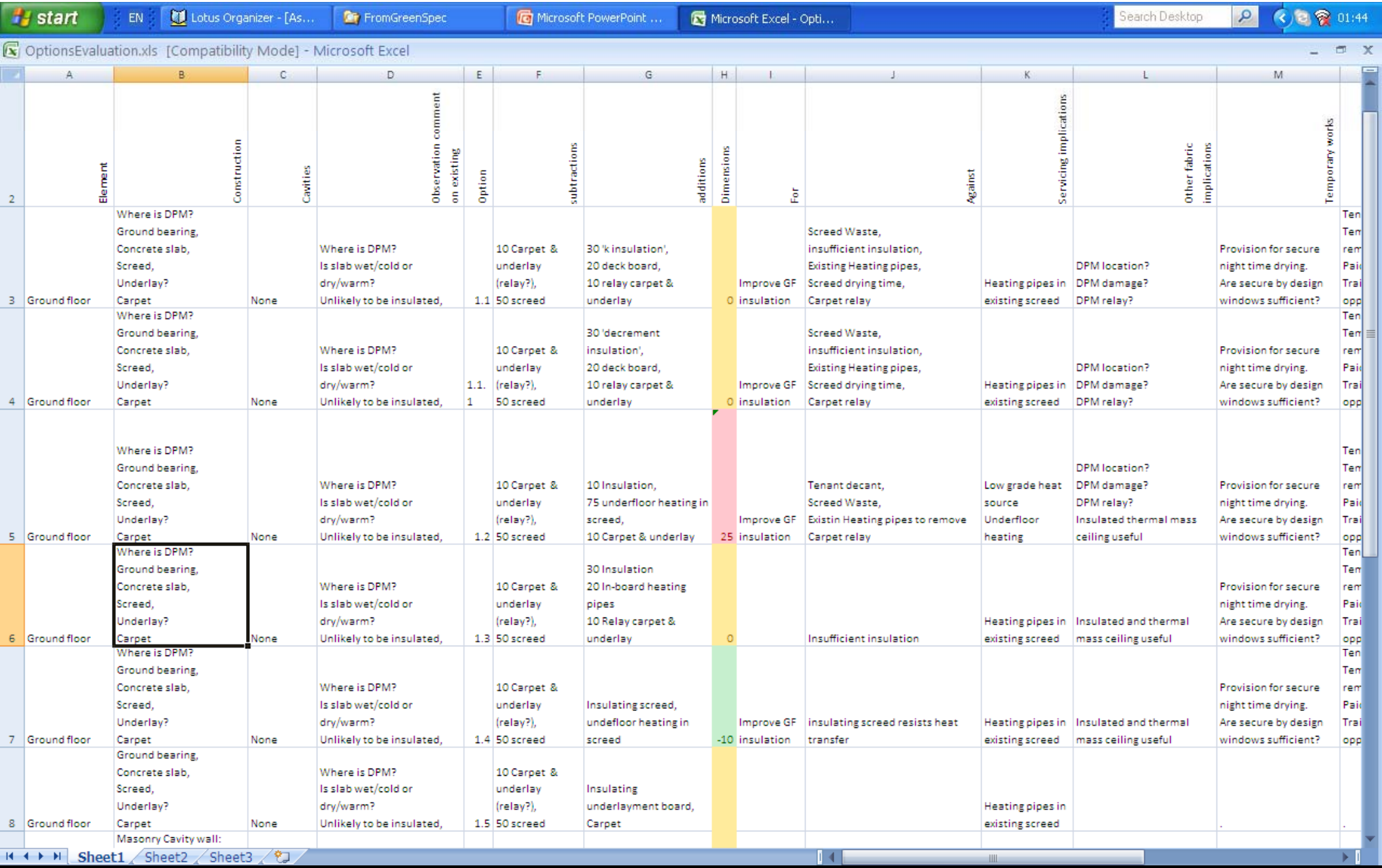
Existing building

- 1970s
- End of terrace
- Cavity wall construction
- Concrete tile hanging upper floor
- Cold bridge at base of tiling
- Uninsulated cavity
- 40 mm. glass or rock wool in attic (was 50 mm. shrunk after 40 years)
- Uninsulated concrete floor



Consider the options

- Look at each element and consider options
- Consider impact on energy and carbon
- Consider impact on occupant
- Weigh up the pros and cons



	A	B	C	D	E	F	G	H	I	J	K	L	M	
2	Element	Construction	Cavities	Observation comment on existing	Option	subtractions	additions	Dimensions	For	Against	Servicing implications	Other fabric implications	Temporary works	
3	Ground floor	Where is DPM? Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.1	10 Carpet & underlay (relay?), 50 screed	30 'k insulation', 20 deck board, 10 relay carpet & underlay	0	Improve GF insulation	Screed Waste, insufficient insulation, Existing Heating pipes, Screed drying time, Carpet relay	Heating pipes in existing screed	DPM location? DPM damage? DPM relay?	Provision for secure night time drying. Are secure by design windows sufficient?	Ten Ten rem Pai Trai opp
4	Ground floor	Where is DPM? Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.1. 1	10 Carpet & underlay (relay?), 50 screed	30 'decrement insulation', 20 deck board, 10 relay carpet & underlay	0	Improve GF insulation	Screed Waste, insufficient insulation, Existing Heating pipes, Screed drying time, Carpet relay	Heating pipes in existing screed	DPM location? DPM damage? DPM relay?	Provision for secure night time drying. Are secure by design windows sufficient?	Ten Ten rem Pai Trai opp
5	Ground floor	Where is DPM? Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.2	10 Carpet & underlay (relay?), 50 screed	10 Insulation, 75 underfloor heating in screed, 10 Carpet & underlay	25	Improve GF insulation	Tenant decant, Screed Waste, Existin Heating pipes to remove Carpet relay	Low grade heat source Underfloor heating	DPM location? DPM damage? DPM relay? Insulated thermal mass ceiling useful	Provision for secure night time drying. Are secure by design windows sufficient?	Ten Ten rem Pai Trai opp
6	Ground floor	Where is DPM? Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.3	10 Carpet & underlay (relay?), 50 screed	30 Insulation 20 In-board heating pipes 10 Relay carpet & underlay	0		Insufficient insulation	Heating pipes in existing screed	Insulated and thermal mass ceiling useful	Provision for secure night time drying. Are secure by design windows sufficient?	Ten Ten rem Pai Trai opp
7	Ground floor	Where is DPM? Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.4	10 Carpet & underlay (relay?), 50 screed	Insulating screed, undefloor heating in screed	-10	Improve GF insulation	insulating screed resists heat transfer	Heating pipes in existing screed	Insulated and thermal mass ceiling useful	Provision for secure night time drying. Are secure by design windows sufficient?	Ten Ten rem Pai Trai opp
8	Ground floor	Ground bearing, Concrete slab, Screed, Underlay? Carpet	None	Where is DPM? Is slab wet/cold or dry/warm? Unlikely to be insulated,	1.5	10 Carpet & underlay (relay?), 50 screed	Insulating underlayment board, Carpet				Heating pipes in existing screed		.	.
		Masonry Cavity wall:												

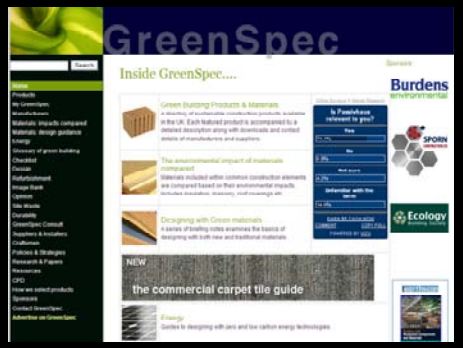
Assess the shortlisted

- Look at each element and consider thicknesses and k values
- Carry out SAP assessments
- Consider impact on energy and carbon
- Weigh up the pros and cons

11 Greenham, Bretton
PETERBOROUGH PE3 9YP

Specification used for SAP model revision B detailed

Elements	Baseline	Proposed changes
Walls ground floor	11mm. cement + 2mm. gypsum 100mm. concrete block inner leaf (λ=1.70) 50mm. air space 102mm. brick outer leaf (λ=0.77) U=1.80	11mm. cement + 2mm. gypsum 100mm. concrete block inner leaf **50mm. blown rock wool (λ=0,041)** in cavity 102mm. brick **200mm. dense wood Gutex Thermosafe-gf (λ=0,043)** 5mm. render (λ=0.8) U=0.16
Walls first floor	11mm. cement + 2mm. gypsum 100mm. concrete block inner leaf (λ=1.70) 50mm. air space 100mm. concrete block outer leaf (λ=1.70) Wall tiles on battens (λ=1.5) U=2.0	11mm. cement + 2mm. gypsum 100mm. concrete block inner leaf **50mm. blown rock wool (λ=0.041)** in cavity 100mm. concrete block outer leaf **200mm. dense wood Gutex Thermosafe-gf (λ=0.043)** 5mm. render (λ=0.8) U=0.16
Ceilling first floor	12.5 mm. plaster wallboard (λ=0.18) U=3,70	12.5 mm plaster wallboard (λ=0.18) Trussed rafters 100 x 50 mm. bottom chord 100 mm. cellulose fibre between trussed rafter bottom chord (λ=0.046) 100 mm. Gutex Multiplex Top over trussed rafter bottom chord (λ=0.046) U=0.22
Pitched roof	Timber rafters No insulation Tiles on battens 18mm. concrete roof tiles (λ=1.5)	rafters Air tightness layer PE 0,15mm Pro Clima Intello Plus or Pro Clima DB+ **200mm. dense wood Gutex Thermosafe Multiplex Top (λ=0.046)** **200mm. dense wood Gutex Thermoflex (λ=0,039)** Wind tightness layer PE 0,15mm (λ=0.17) Pro clima Solitex Plus 18mm. concrete roof tiles (λ=1.5) U=0.10



Approach

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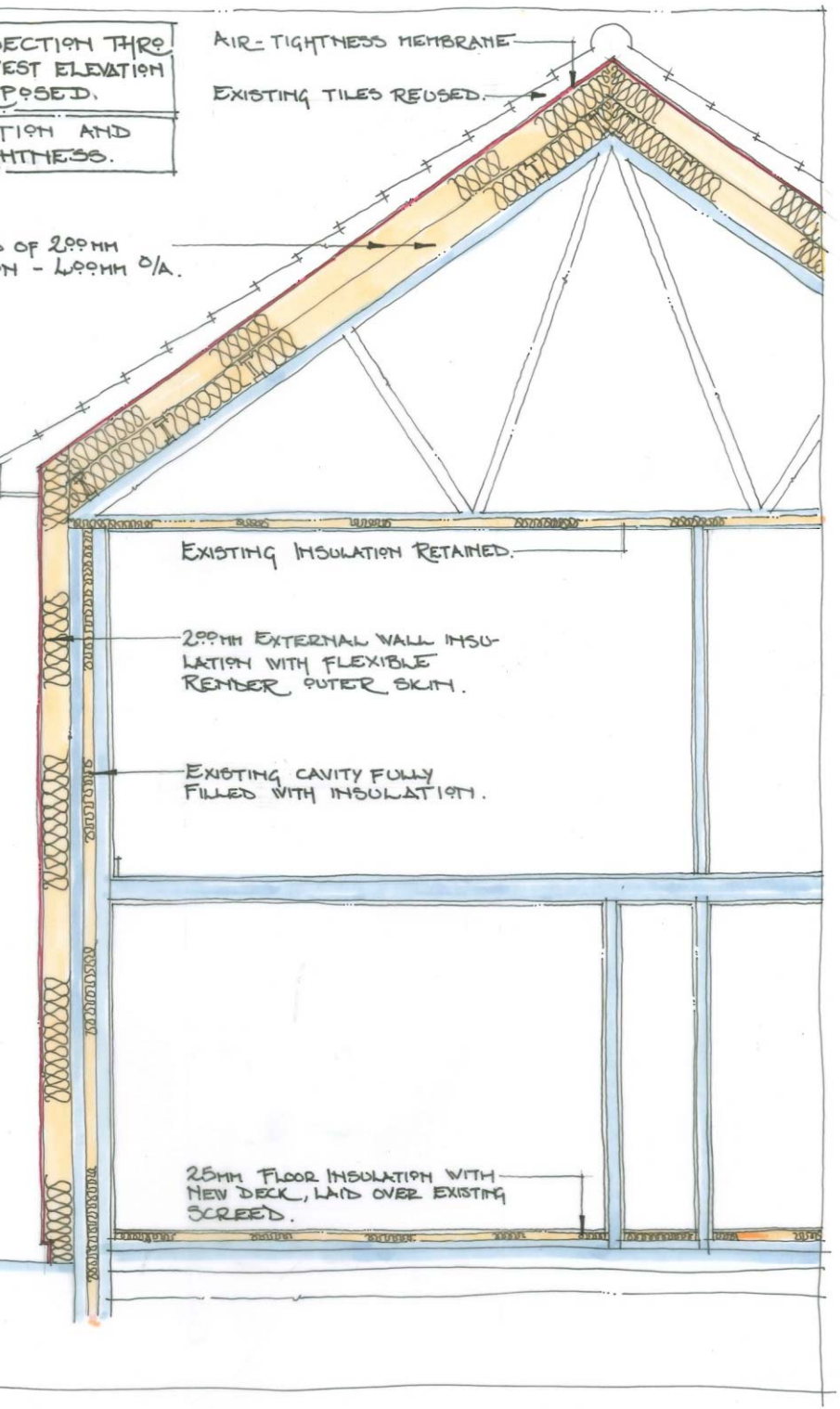
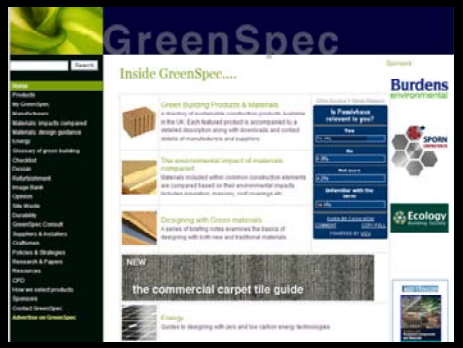
- Inuit Indians
  - Wind tight igloo, Insulated windtight moisture permeable fur coat,
- Reduce heating/energy demands by insulating roof and external wall
  - Tea cosy approach
  - Wrap up all construction with insulation
  - Wrap up cold bridges



Outside of building

- Concrete tile hanging removed and saved
- Cold bridge projection cut off flush
- Cavity insulated
- External insulated render
- Remove existing insulation
  - cellulose fibre 100 mm.
  - Wood fibre 100 mm.
- 20 mm. insulation to concrete floor
  - Vacuum Insulating panel
  - Aerogel Insulation quilt
  - High decrement dense wood fibre



Opportunities:

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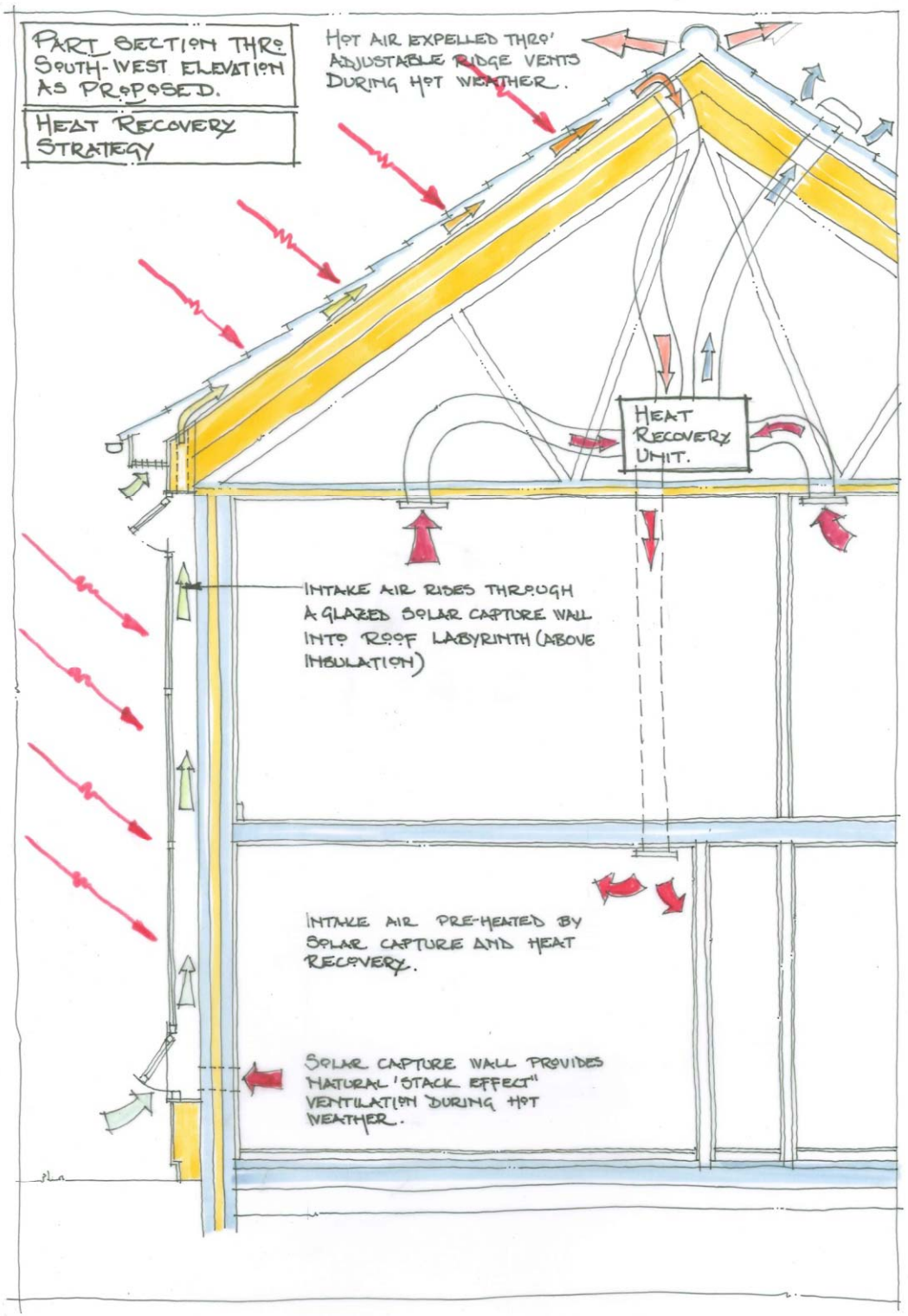
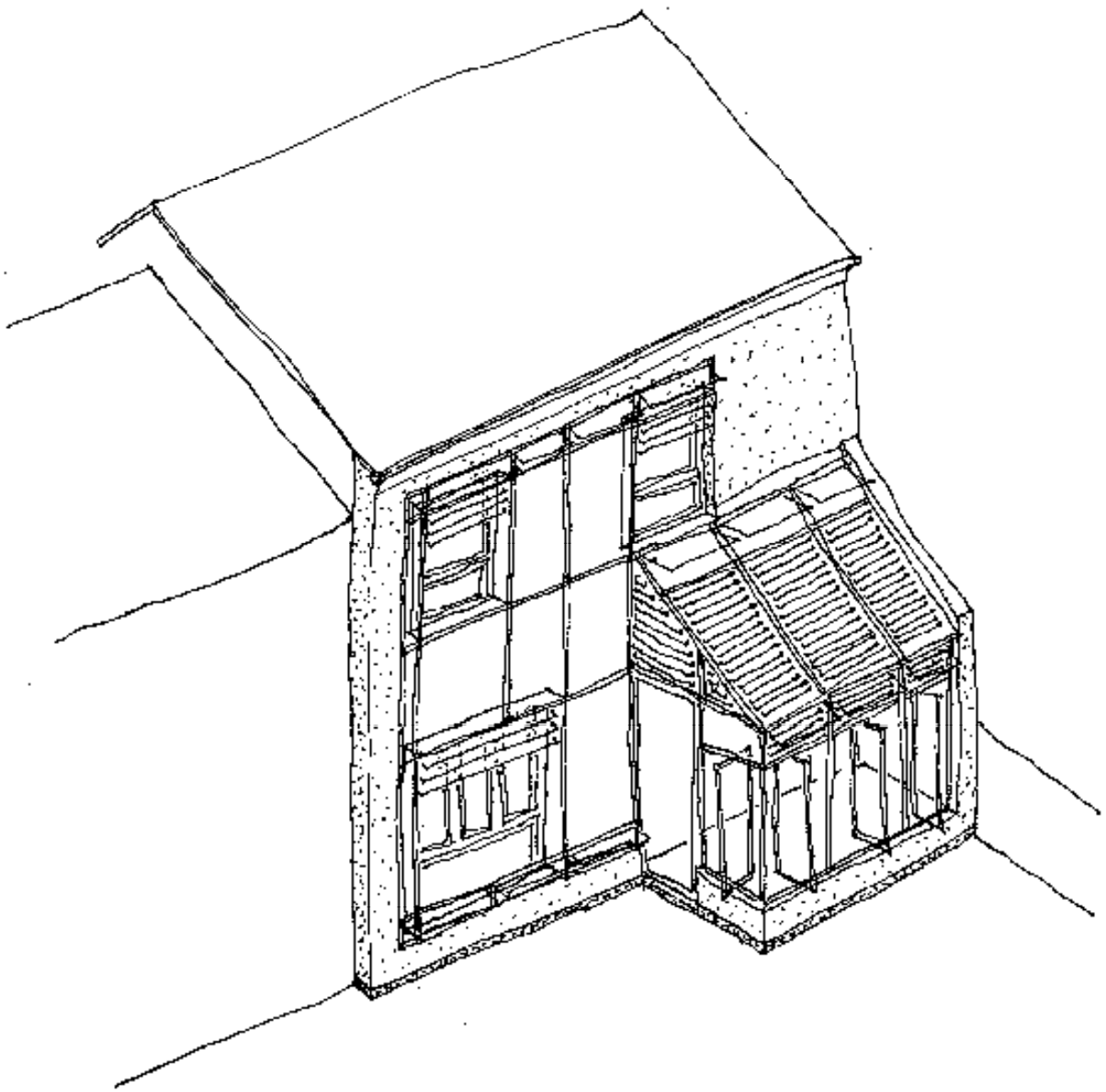
- Heat gain in roof tiles transferred to labyrinth below
- Edinburgh refurbishment exploited these gains
- Heat loss into party wall identified by Leeds Met University as a major loss
- Add a simplified Trembe wall
- Collect heat from all 3

Labyrinth Heat Recovery

- Under concrete roof tiles re-laid
- Batten and counterbatten labyrinth
- Cold bridge projection cut off flush
- Cavity insulated
- Party wall heat loss recovered too
- External insulated render
- Tubes through insulation
- Glazed wall: like Trombe wall





SKETCH SHOWING SOLAR WALL
WITH SUNSPACE AND
PERIPHERAL RENDERED INSULATION

LW 02.10.09

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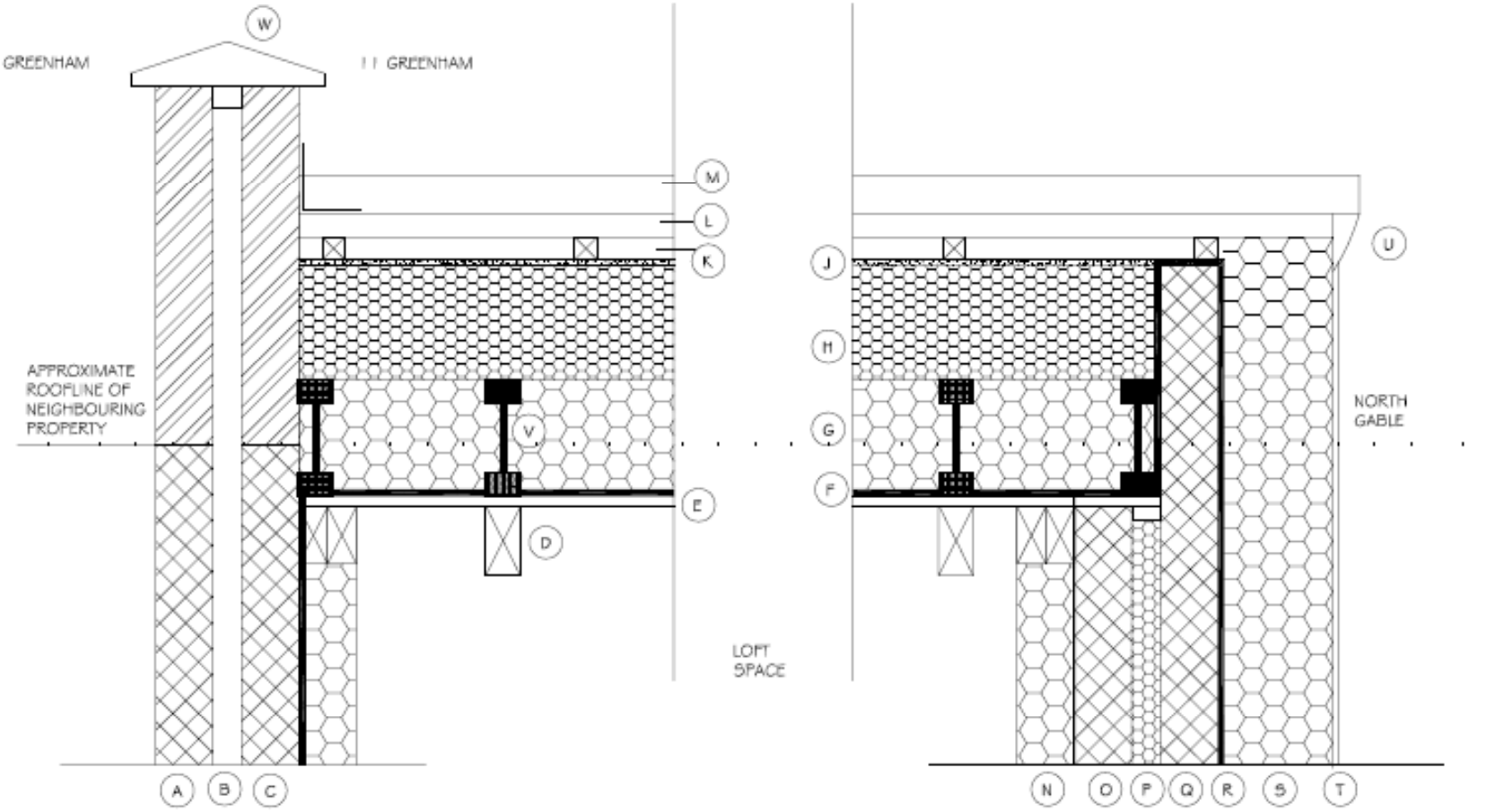
Porch/ Lobbies

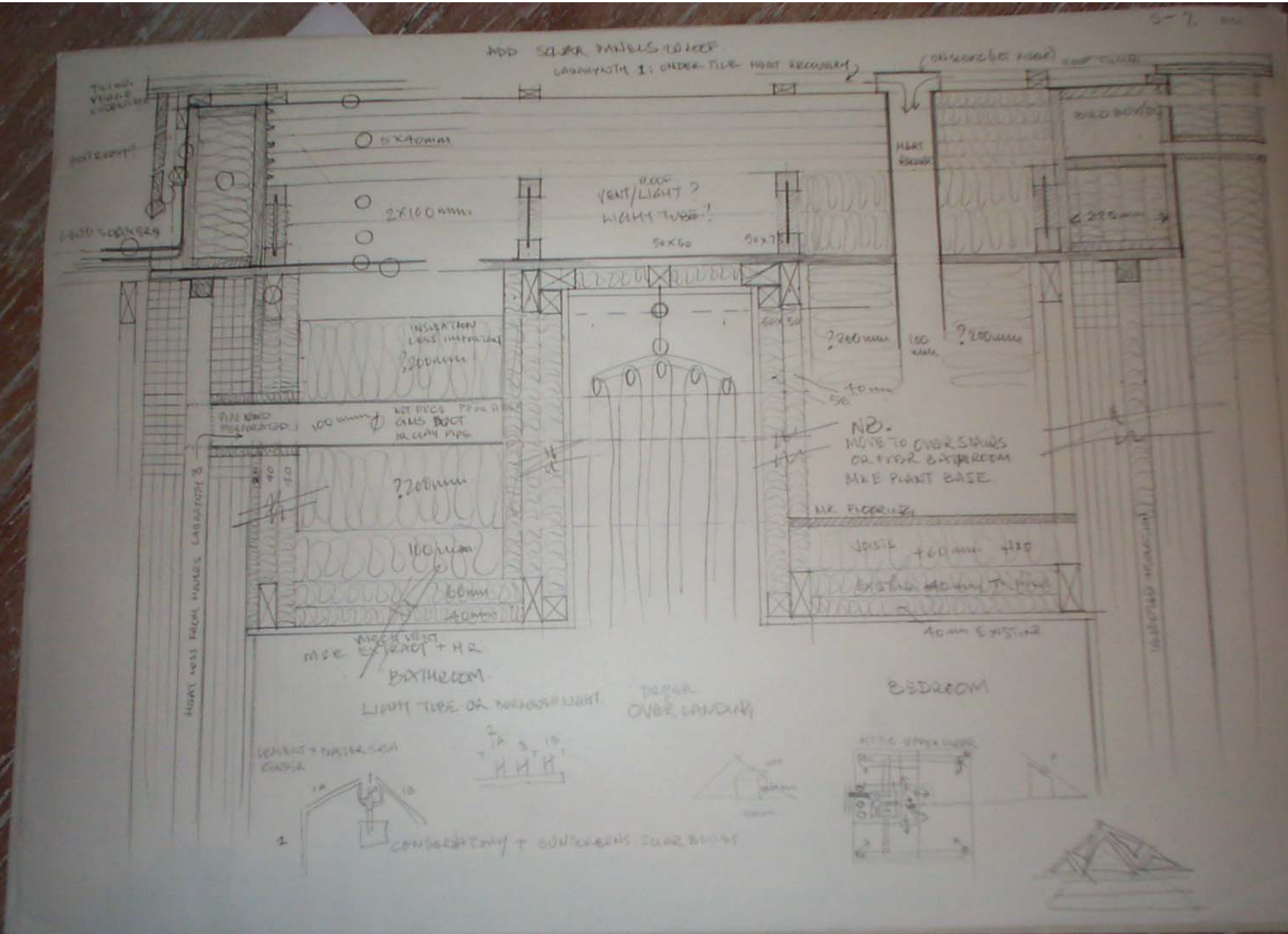
- Weather lobbies on front and rear doors
- Help prevent excessive heat loss and coolth gains
- Ventilate and shade in summer
- Trap sun in winter

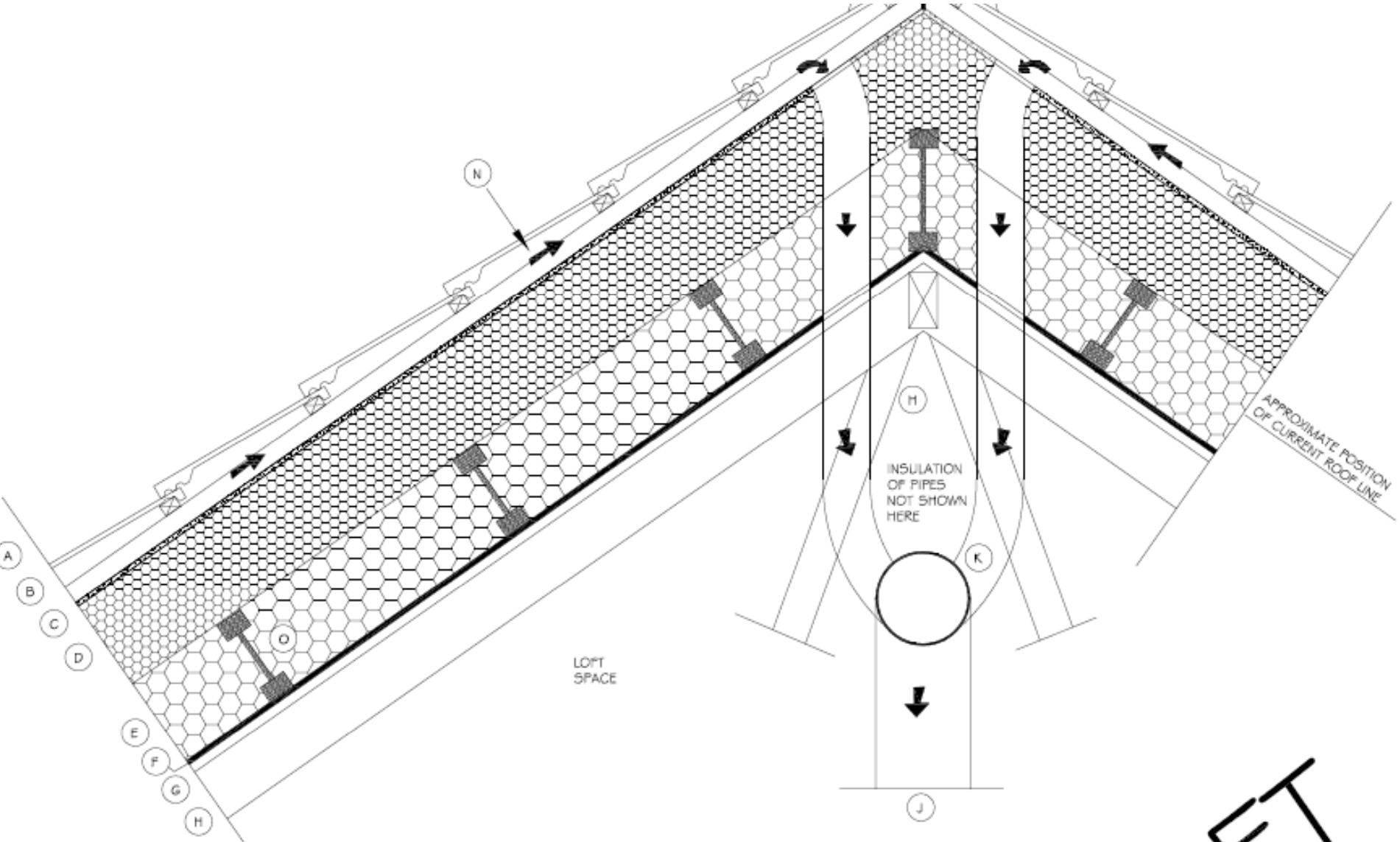


CURRENT OUTER LINE OF FIRST FLOOR WALL (INCLUDING TILE HANGING)

KEY

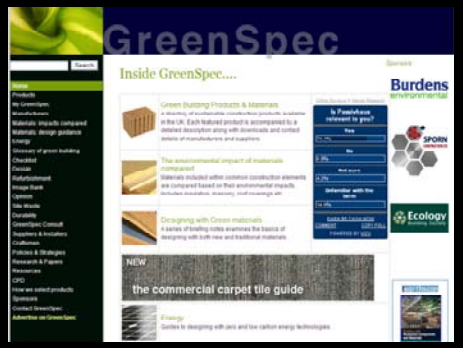
A EXISTING OUTER LEAF OF CONCRETE BLOCK PARTY WALL RAISED TO FORM PARAPET WALL.
B ASSUMED 50MM ACOUSTIC CAVITY WITHIN PARTY WALL. TO BE CONFIRMED. FOR GABLE INSULATION OPTIONS SEE DETAIL 2.
C EXISTING INNER LEAF OF CONCRETE BLOCK PARTY WALL RAISED TO FORM PARAPET WALL.
D EXISTING SOFTWOOD TRUSSED RAFTER - REINFORCED TO STRUCTURAL ENGINEER'S DETAILS.
E 20MM T&G SOFTWOOD BOARDING.
F AIR TIGHTNESS LAYER.
G 200MM INSULATION. OPTIONS 1) HOMATHERM RECYCLED PAPER, 2) ROCK MINERAL FIBRE, 3) LAYERS OF FOAMED PLASTIC.
H 8 LAYERS OF 25MM DENSE WOOD FIBRE BOARD INSULATION.
J WINDTIGHTNESS LAYER.
K SOFTWOOD COUNTER BATTENS. POSSIBLY RE-USE FROM VERTICAL CLADDING TILE SUPPORT.
L EXISTING SOFTWOOD BATTENS, RE-USED.
M EXISTING SAND-FACED INTERLOCKING ROOF TILES, RE-USED.
N 100MM INTERNAL RIGID INSULATION FIXED TO EXISTING INNER LEAF.


ADD SOLAR PANELS TO ROOF
LABYRINTH 1: UNDER TILE HEAT RECOVERY
5X40mm
2X100mm
ROOF VENT/LIGHT ?
LIGHT TUBE?
50X60
INSULATION LESS IMPORTANT
?200mm
?200mm
NB.
MOVE TO OVER STAIRS OR OVER BATHROOM
M&E PLANT BASE
100mm
60mm
40mm
M&E EXTRACT + HR
BATHROOM
OVER LANDING
BEDROOM
40mm EXISTING



KEY

A EXISTING SAND-FACED INTERLOCKING ROOF TILES, RE-USED.
B EXISTING SOFTWOOD BATTENS, RE-USED. SOFTWOOD COUNTER BATTENS. POSSIBLY RE-USE FROM VERTICAL CLADDING TILE SUPPORT.
C WINDTIGHTNESS LAYER.
D 8 LAYERS OF 25MM DENSE WOOD FIBRE BOARD INSULATION.
E 200MM INSULATION. OPTIONS 1) HOMATHERM RECYCLED PAPER, 2) ROCK MINERAL FIBRE, 3) LAYERS OF FOAMED PLASTIC.
F AIR TIGHTNESS LAYER.
G 20MM T&G SOFTWOOD BOARDING.
H EXISTING SOFTWOOD TRUSSED RAFTER - REINFORCED TO STRUCTURAL ENGINEER'S DETAILS.
J / K LABYRINTH HEAT RECOVERY SYSTEM , AS FOLLOWS: AIR COLLECTED FROM BATTEN/COUNTER BATTEN SPACE, DRAWN DOWN IN PIPES TO HEAT RECOVERY UNIT. 400MM INSULATION AROUND ALL PIPES. PIPE FROM CAVITY OF PARTY WALL TO DO SAME. INSULATION OF PIPES NOT SHOWN HERE.



Define proposals

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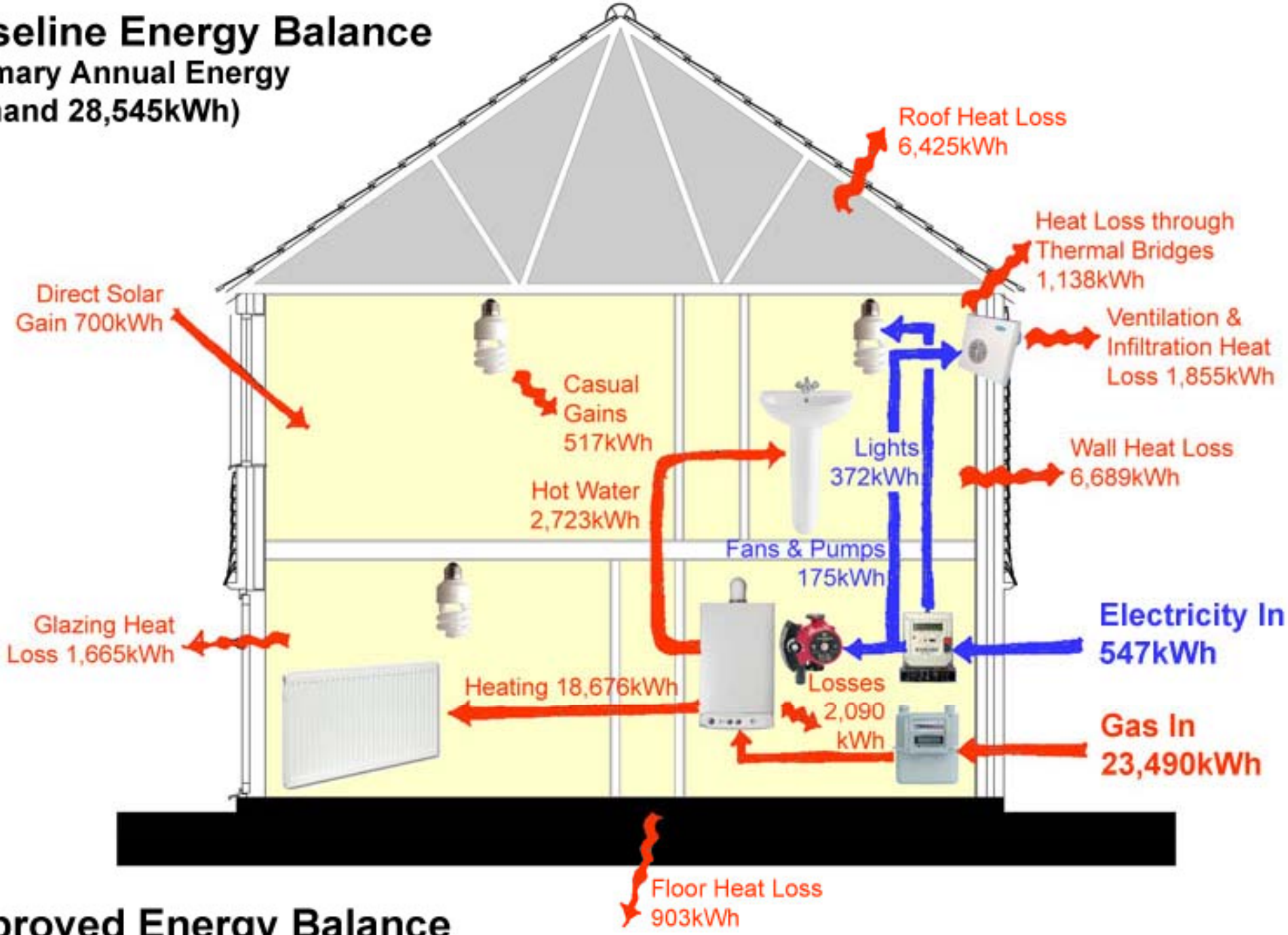
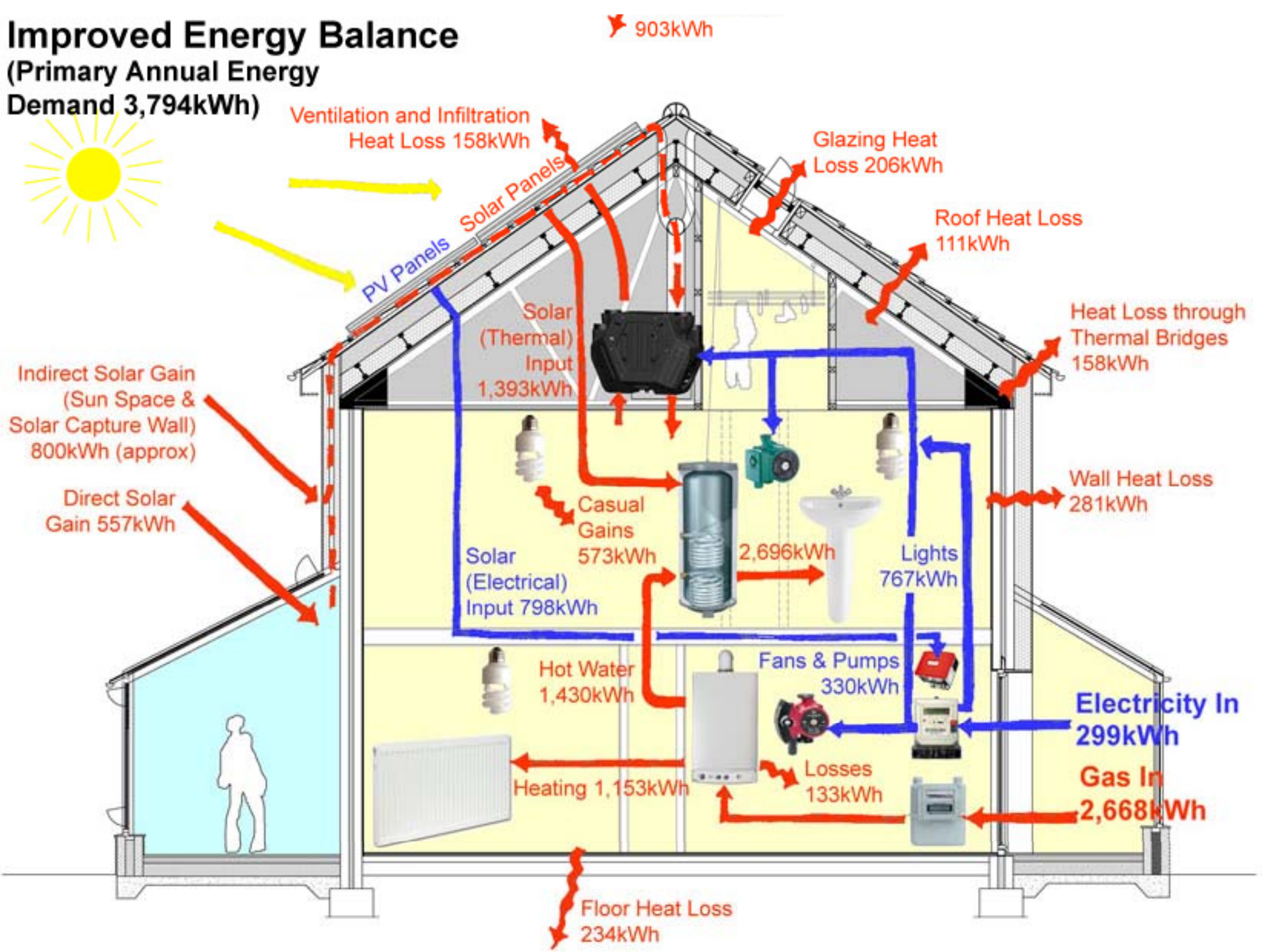
- Starting point
  - How bad it is
  - Building fabric and services
- Proposals
  - How good it could be
  - Improvement made
  - Building fabric,
  - services, meters, monitoring and controls

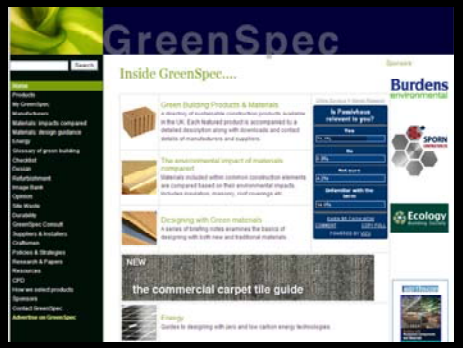
11 Greenham, Peterborough

Baseline Energy Balance
(Primary Annual Energy Demand 28,545kWh)



Improved Energy Balance
(Primary Annual Energy


Improved Energy Balance
(Primary Annual Energy Demand 3,794kWh)
903kWh
Ventilation and Infiltration Heat Loss 158kWh
Solar Panels
PV Panels
Glazing Heat Loss 206kWh
Roof Heat Loss 111kWh
Heat Loss through Thermal Bridges 158kWh
Solar (Thermal) Input 1,393kWh
Indirect Solar Gain (Sun Space & Solar Capture Wall) 800kWh (approx)
Direct Solar Gain 557kWh
Casual Gains 573kWh
Wall Heat Loss 281kWh
Solar (Electrical) Input 798kWh
2,696kWh
Lights 767kWh
Hot Water 1,430kWh
Fans & Pumps 330kWh
Electricity In 299kWh
Heating 1,153kWh
Losses 133kWh
Gas In 2,668kWh
Floor Heat Loss 234kWh



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Cost plan

- Determine the cost of each component
- Price the parts and labour
- Keep in budget
- Cost Effectiveness: £.00 per CO_2 saved

RETROFIT FOR THE FUTURE - CARBON CHALLENGE

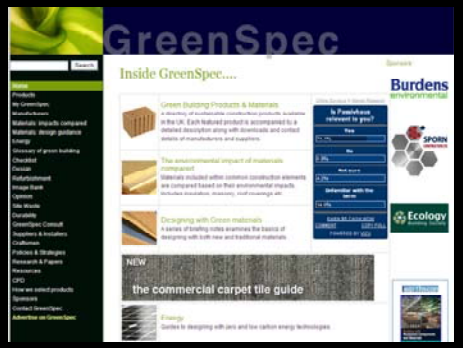
11 GREENHAM

ELEMENTAL COST PLAN REVISION A

ELEMENT	WORK SECTION	COST £	COMMENTS	
SUBSTRUCTURE	WORKS TO EXISTING FLOORS	3,410.00		
ROOF	FORM ATTIC PLATFORM	994.00		
	FORM CLOTHES AREA	1,061.00		
	INSULATION	11,799.00		
	AIR AND WIND TIGHNESS MEMBRANES	488.00		
	WORK TO ROOF STRUCTURE	3,902.00		
	BUILDERS WORK INCL. RWG	2,959.00		
EXTERNAL WALLS	RAISE GABLE END	910.00		
	INSULATION	6,197.00		
	RENDER	2,342.00		
	AIRTIGHTNESS MEMBRANES	861.00		
	BUILDERS WORK	1,788.00		
WINDOWS AND EXTERNAL DOORS	NEW WINDOWS	8,410.00		
	BUILDERS WORK	247.00		
SUNSPACE, PORCH & SOLAR COLLECTOR	SUNSPACE CONSTRUCTION	13,756.00		
	PORCH COMPLETE	7,146.00		
	SOLAR COLLECTOR WALL	11,879.00		
INTERNAL WALLS	INSULATION AND AIRTIGHT MEMBRANE	575.00		
	BUILDERS WORK	1,780.00		
FIXTURES & FITTINGS	LIGHT TUBE	602.00		
	SUNDRIES	454.00		3
DECORATIONS		1,500.00		
SERVICES	PHOTOVOLTAIC PANELS: 10m2 MONOCRYSTALINE	4,250.00	Including £4250 grant contribution	
	WHOLE HOUSE MV SYSTEM	2,500.00		
	SOLAR HOT WATER: 8m2 EVACUATED TUBE	3,000.00	Including £3000 grant contribution	
	LED LIGHTING AND DC CABLE NETWORK	1,500.00		
DRAINAGE	BELOW GROUND DRAINAGE	784.00		
PRELIMINARIES	SCAFFOLDING	1,559.00		
	GENERAL (Including supervision/welfare/H & S/skips etc)	11,650.00		
METERING	SMART METERING AND DISPLAY EQUIPMENT	3,500.00		
	SUB TOTAL	111,803.00		131368.50
CONSULTANTS FEES	@ 13%	13,975.38		16421.07
Tenant Education and Incentivisation		1,500.00		1762.50
	Total	127,278.38		149552.1
	VAT @ 17.5%	22,273.72		
	PROJECT TOTAL COSTS	**149,552.09**		

NOTES

1 VAT ASSUMED AT 17.5%(NOT15%)
2 ALL COSTS EXCLUDE REPLACEMENT KITCHENS/BATHROOMS AND FLOOR COVERINGS AND ASSOCIATED REDECORATION
3 POTENTIAL 50% GRANT REBATES ON CERTAIN ITEMS HAVE BEEN INCLUDED WITHIN THESE COSTS



Materials

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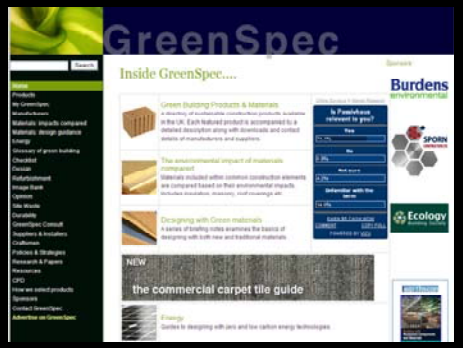
- TSB Retrofit Brief
  - Low Carbon in Use
- Materials
  - Can also be Low Carbon in manufacture
  - And also be:
    - Zero Carbon
    - or Carbon Negative
  - Carbon Sequestration during growth



Scope & Spec

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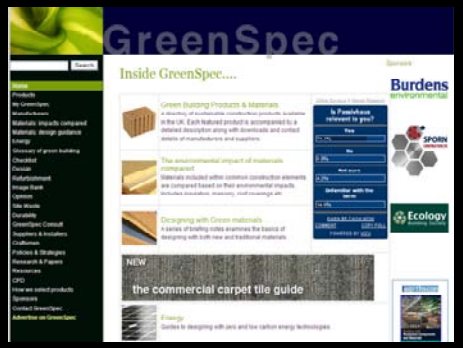
- Scope of work:
  - Existing
  - Removals, Modifications
    - Material reclaims, reuses & exchanges
  - Additions
- Specification:
  - Applications
  - Materials
  - Products

TSB RETROFIT COMPETITION UKCEED ENTRY¶
OUTLINE SPECIFICATION¶
Brian Murphy GreenSpec¶
Tuesday, 10 November 2009¶
Extracted from Spreadsheet Tuesday, 10 November 2009¶
¶
C00 → ANALYSIS:¶
¶
C10/00.1 → Site Survey: Biodiversity¶
Location(s): Site¶
Level(s): All¶
¶
C13/00.4 → Resource efficiency: Analyse Pre-alteration survey for any additional reapplication uses for surplus materials¶
Level(s): All¶
¶
C13/00.5 → Surplus to requirements materials: offer to Employer's maintenace department for use on estate¶
Location(s): On site¶
Level(s): None¶
Material: Existing sand faced concrete¶
¶
C13/00.6 → Surplus to requirements materials: unused and unuasable materials to transfer station for segregation and recycling or reuse¶
Location(s): Off site¶
Level(s): None¶
Overall thickness: Material: Existing sand faced concrete¶
Service provider: EcoCentre Dogsthorpe Peterborough¶
¶
C13/00.2 → Building Survey: Biodiveristy¶
Reference Drawing(s): Existing¶
Location(s): Building¶
Level(s): All¶
Orientation or elevation: All¶
¶



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- Brian Murphy BSc Dip Arch (Hons+Dist)
- Architect by Training
- Specification Writer by Choice
- Greening up my act since 1999
- Founder of www.greenspec.co.uk
- E BrianSpecMan@aol.com
- Twitter: http://twitter.com/brianspecman
- Scribd: www.scribd.com/brianspecman