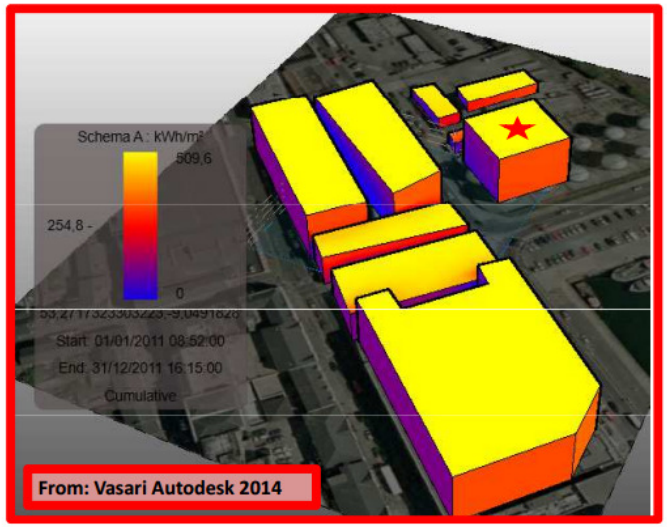
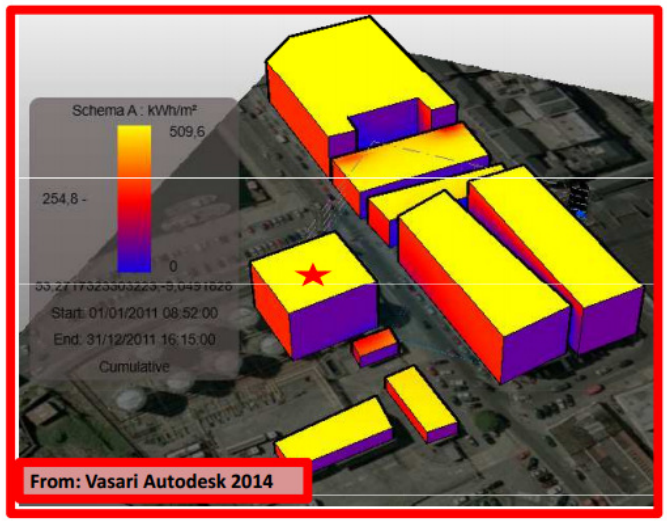
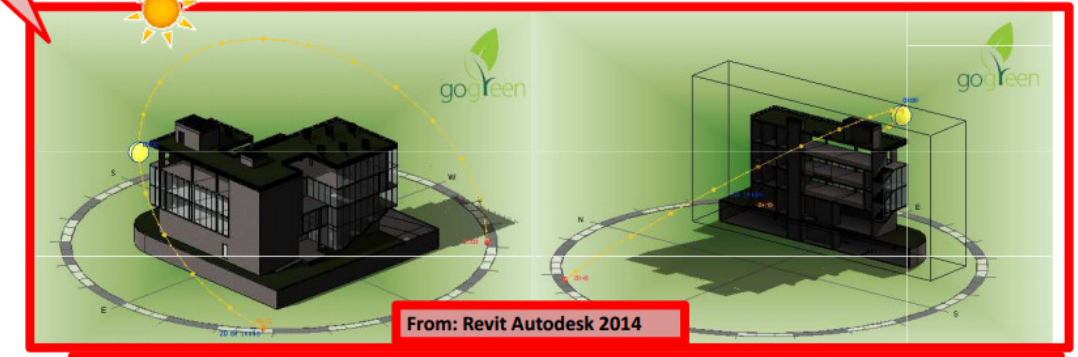




Altitude at 09:00 a.m. 38.9º

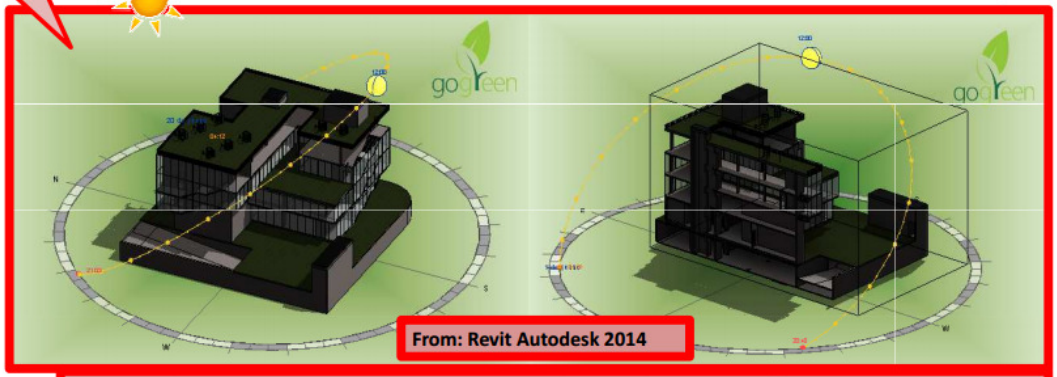
SUMMER SOLSTICE – 09:00 AM – 01/06/2010



At 09:00 a.m. the Sun is beating on the East facade and a little bit on the South facade. According to the analysis you can use natural light in practically all the rooms that is on the East and South façade , being not necessary the use of artificial light, and probably will not be necessary to use heater in those rooms

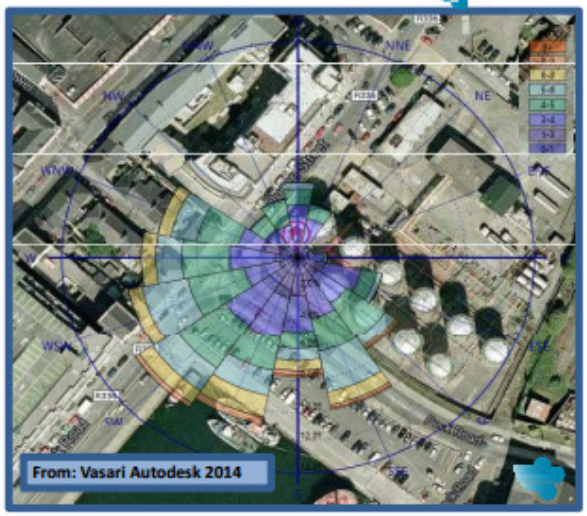
Altitude at 12:00 noon 57.7º

SUMMER SOLSTICE – 12:00 NOON– 01/06/2010



At noon the Sun is radiating energy toward the South and West facades, transmitting heat and light for most rooms situated in this area, as this time normally people are having lunch, probably will not be necessary the use of artificial light in this time

SUMMER WIND ROSE

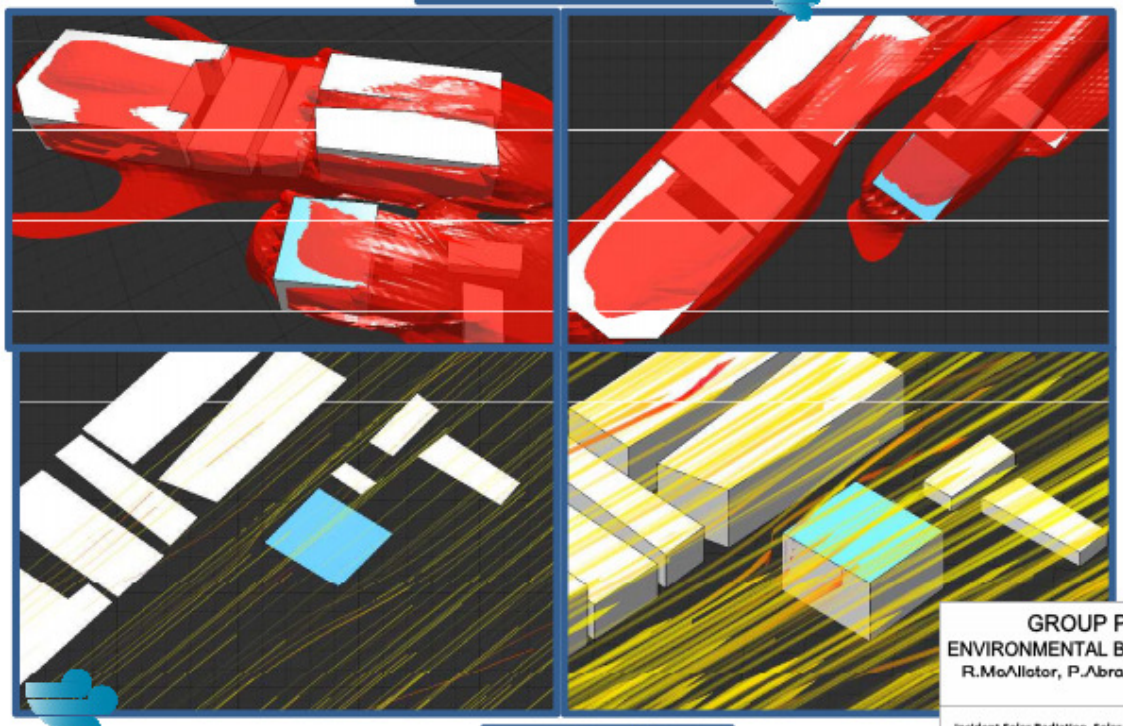


The Wind analysis was made on Vasari Autodesk 2014. These analysis give us enough information to position the wind turbine in the roof and also show us how the wind will pass trough the building, how the buildings around influence the wind to come to the building in study.

The Wind Rose show how much will pass trough the building in winter and summer seasons, as we can see the West and South facade will be receiving most part of the wind, so the wind turbines will be directed in this direction as well as the ventilation system air flow regulating. The Wind Rose also indicate the speed of the wind.

The analysis made on Wind Tunnel demonstrate how the wind will crash the building facades, being possible to choose the best places to put the ventilation system air flow regulating.

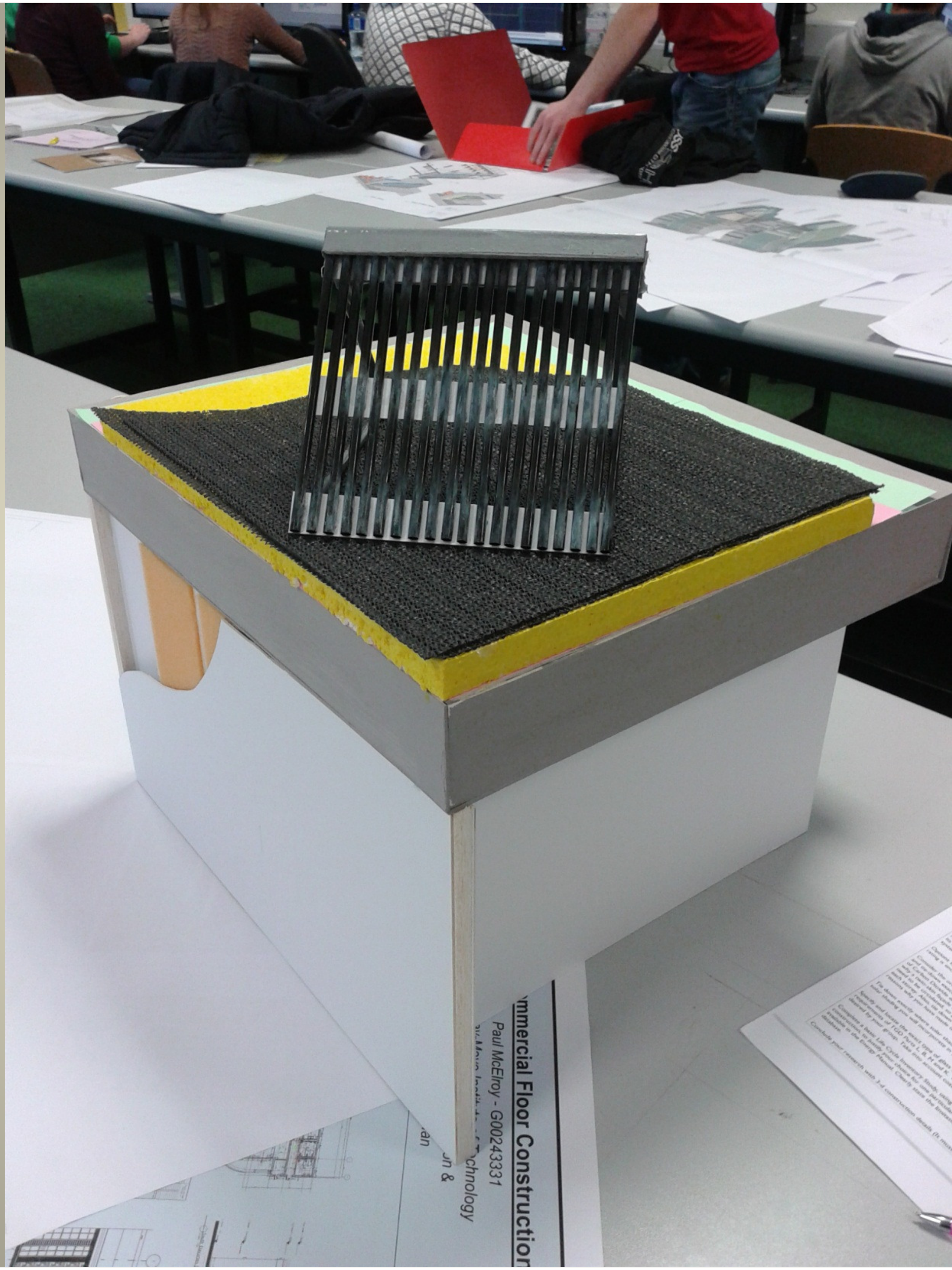
WIND TUNNEL ANALYSIS

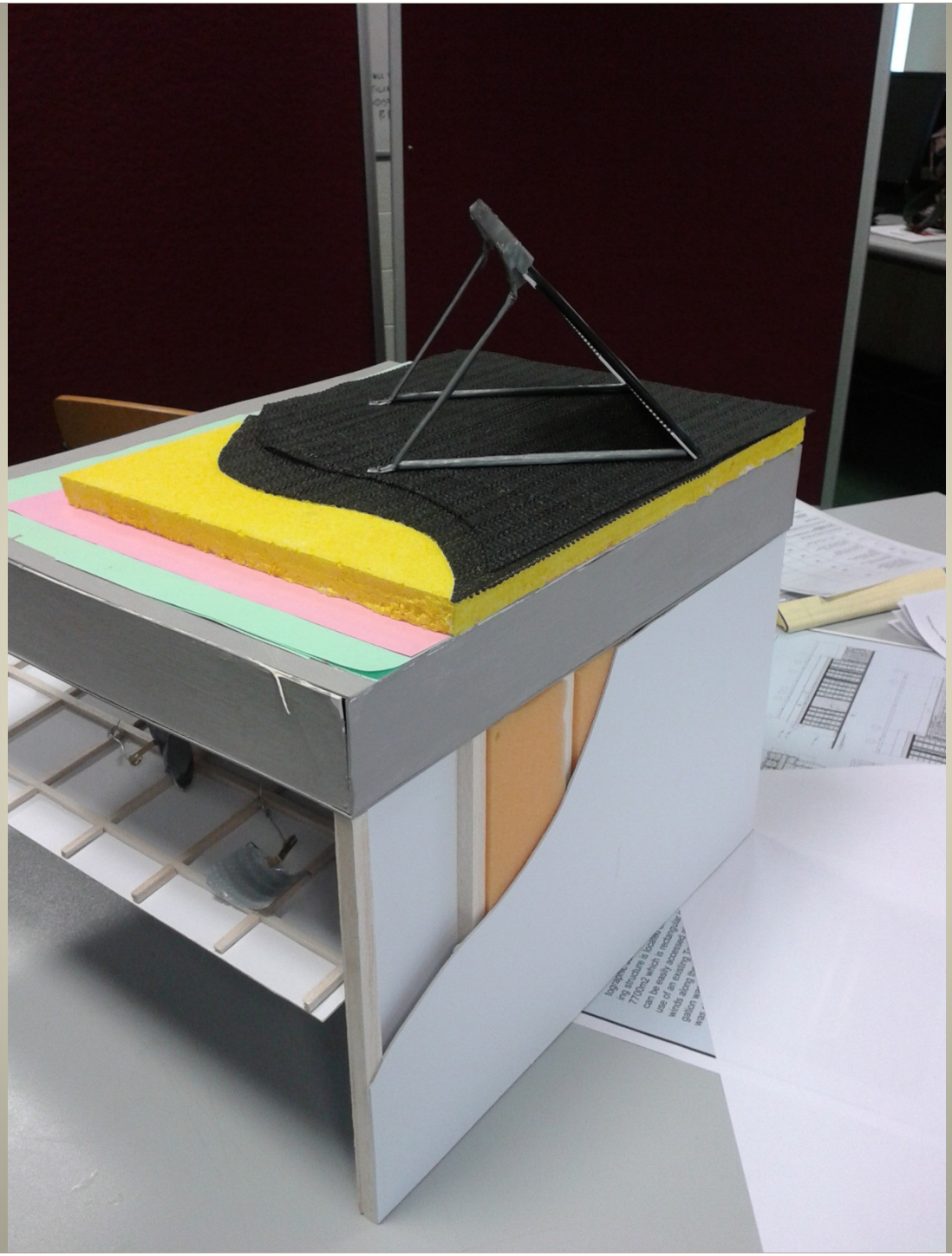


GROUP PRO
ENVIRONMENTAL BUILD
R.MoAllator, P.Abrao &

Incident Solar Radiation, Solar Path A

SCALES: AS SHOWN


mmercial Floor Constructio
Paul McElroy - G00243331



WIND TURBINE SYSTEM

SPECIFICATIONS

1kW

Type: 3 Blade Upwind
Rotor Diameter: 2.7m
Start-up Wind Speed: 3 5m/s (5 6 mph)
Cut-in Wind Speed: 3 m/s (6.7 mph)
Rated Wind Speed: 9m/s (20.1 mph)
Rated Power: 1000 Watts
Maximum Power: ~ 1300Watts
Furling Wind Speed: 12 m/s (27 mph)
Overspeed Protection: AutoFurl
Temperature Range: -40 to +60 Deg. C (-40 to +140 Deg. F)
Generator: Permanent Magnet Alternator
Output Form: 48 VDC Nominal
Tower Height: 6m (20ft)

DIY SELF INSTALLED WIND TURBINE

1kw DIY Self Installed Wind Turbine

WindTurbines.ie can now offer a 1kw DIY self installed wind turbine for €3600 + 23% VAT

€100 is required for postage & packaging.

Details:

- 1kw wind turbine complete kit including 6m (20ft) tower
- Typical savings for this in a good windy area could be of up to €475 a year off your electricity bill.
- All fitting instructions are included in the pack.
- Heavy lifting equipment is needed to erect the tower
- This turbine is exempt from planning but there are guidelines for installation. You must comply with National Planning guidelines which can be found in the Department of Environment website.
- This turbine is not suitable for mounting on buildings.
- This turbine connects to the electricity network in your house but must be wired to ESB1 regulations

Click here to order

BENEFITS

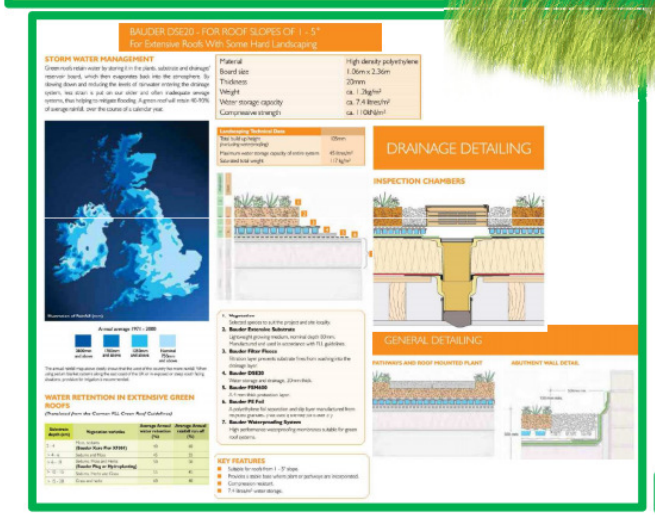
Savings

The larger the turbine the more power it will produce. It is vital to match the turbine to the usage of the premises to get the best economic return. The table below shows the simple economic returns from a wind turbine on a yearly basis.

Model	Units Output/Yr	Cost/Unit	Saving/Yr*	CO2 Saving	Typically Suitable For
400W	1800	20 cent	€200	1.8 tonnes	Small House
1kw	2500	20 cent	€475	2.5 tonnes	House
2kw	5000	20 cent	€1000	5.0 tonnes	House/Farm
3kw	7500	20 cent	€1500	7.5 tonnes	Farm/SME
5kw	12500	20 cent	€2500	12.5 tonnes	Farm/SME/Factory

From: WindTurbines.ie

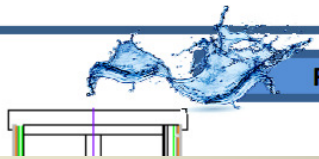
GREEN ROOF SYSTEM

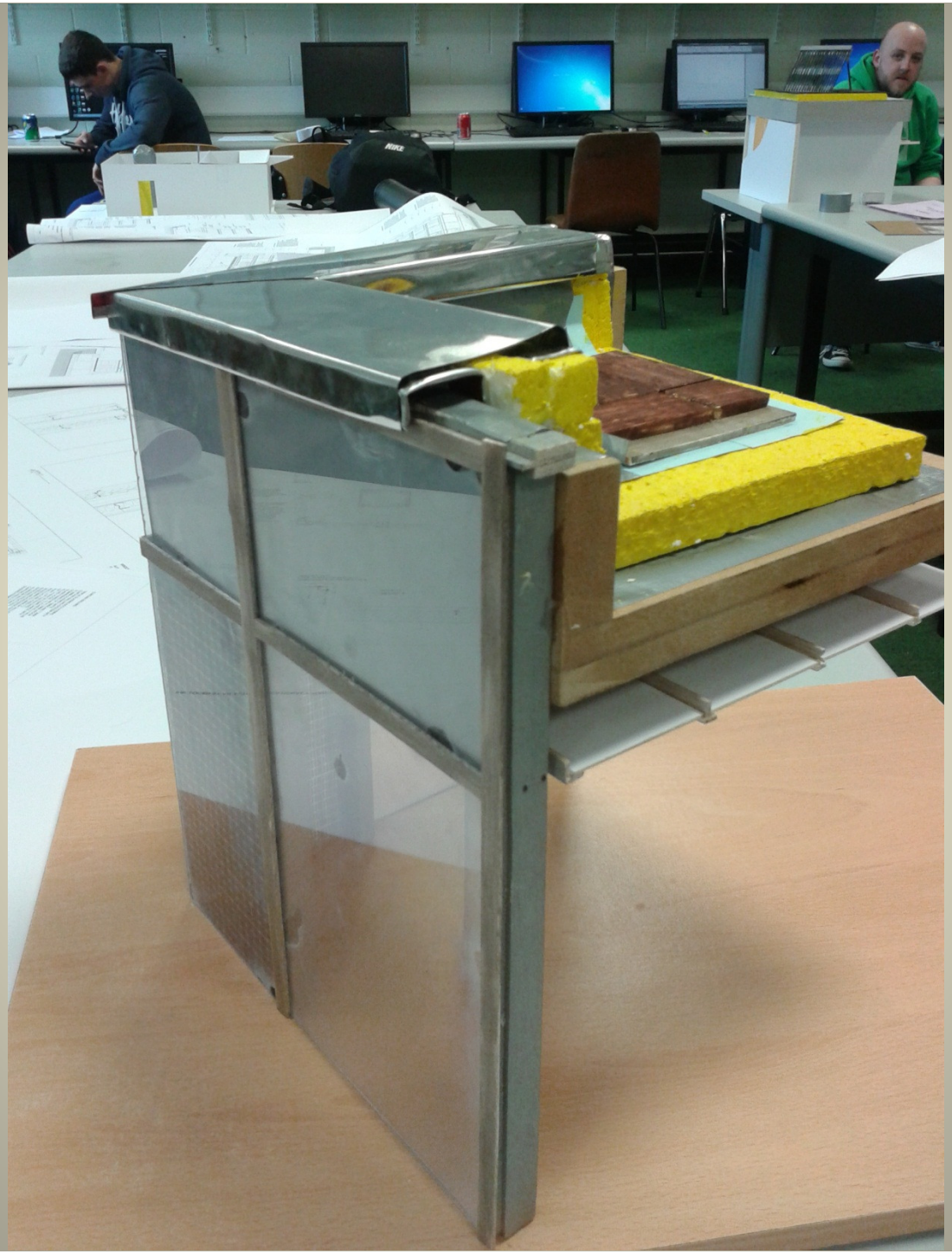


From: Bauder Website

UNDERFLOOR HEATING SYSTEM

RAINWATER/WATER SYSTEM + UNDERFLOO





DAY TIME WINTER HEATING/VENTILATION STRATEGY

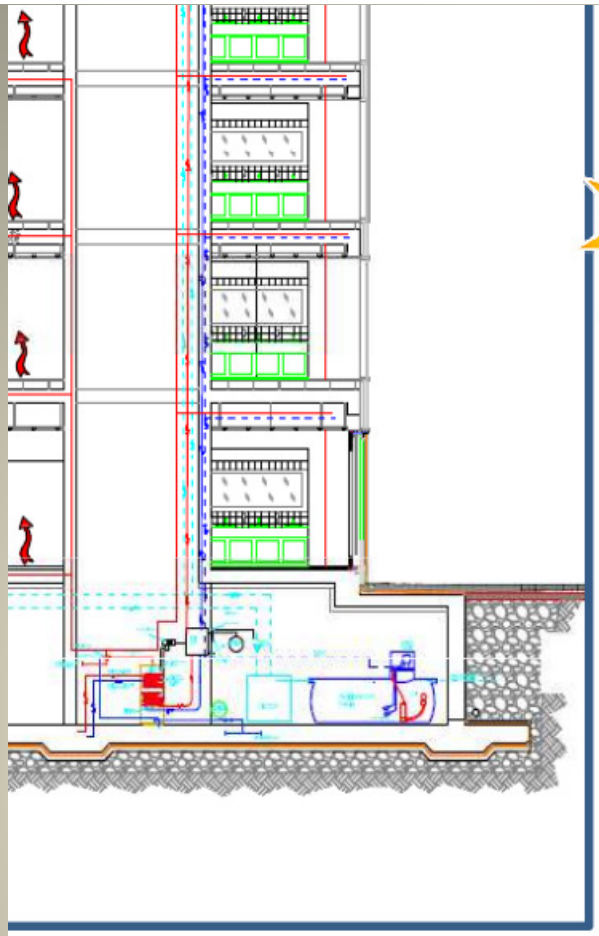
The average temperature in Galway on Winter time is about 3°C, but inside the building a comfort temperature will be about 21° , so how heat the air and in the same time ventilate the building in a way that don't spend a lot of energy and consequently money ? The answer that we found is "Energy-saving units X-vent" this system collect the air from outside pass the air trough a air flow regulating and shutoff damper then to a pocket filter , in sequence to a plate heat exchanger and then to a radial fan that distribute this air into the room.

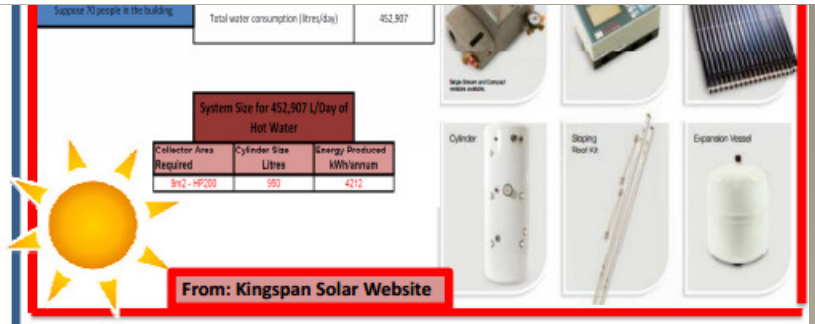
The same system collect the air from inside the room. This air is already heated, it will pass trough a panel filter in sequence the air pass in the plate heat exchanger as the air is already heated it will help the air that come from outside to be heated as well. This system is illustrated in the figure below.
The heating of the rooms will be via Underfloor heating system, the most efficient choice. The combination of the ventilation and heating system will provide a very good comfort inside the building as well as a big reduction in the electricity bill.

The energy used to run these system will come from the photovoltaic's and the wind turbines if It needs more electricity then will be provide from the local supplier. The only different between the winter and summer ventilation/heating strategy will be that on summer the average temperature in Galway is 20° C and in the winter is 3° C so in some days in summer will not be necessary the use of the heating system.

A positive fact from this system is that everything can be controlled. Every room will have controls, where will be possible to manage the temperature inside that room. The Ventilation system will be programmed to distribute the air inside the room at 18°C.

NIGHT TIME WINTER HEATING/VENTILATION STRATEGY





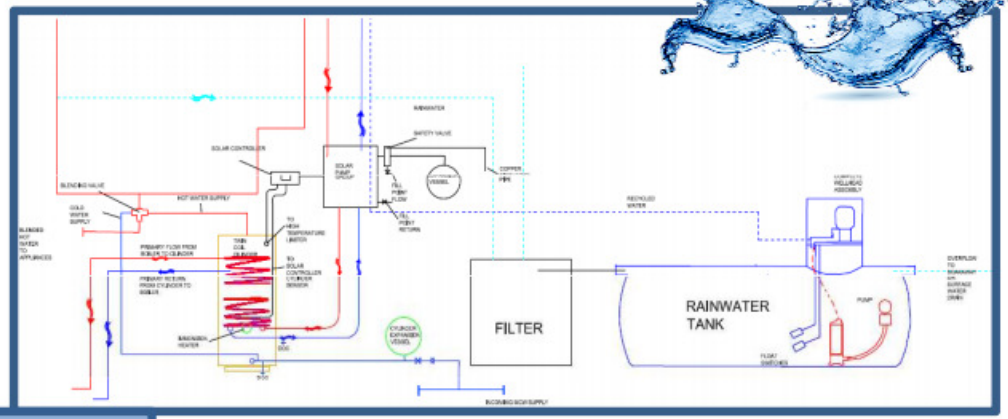
RAINWATER USE

The water calculator

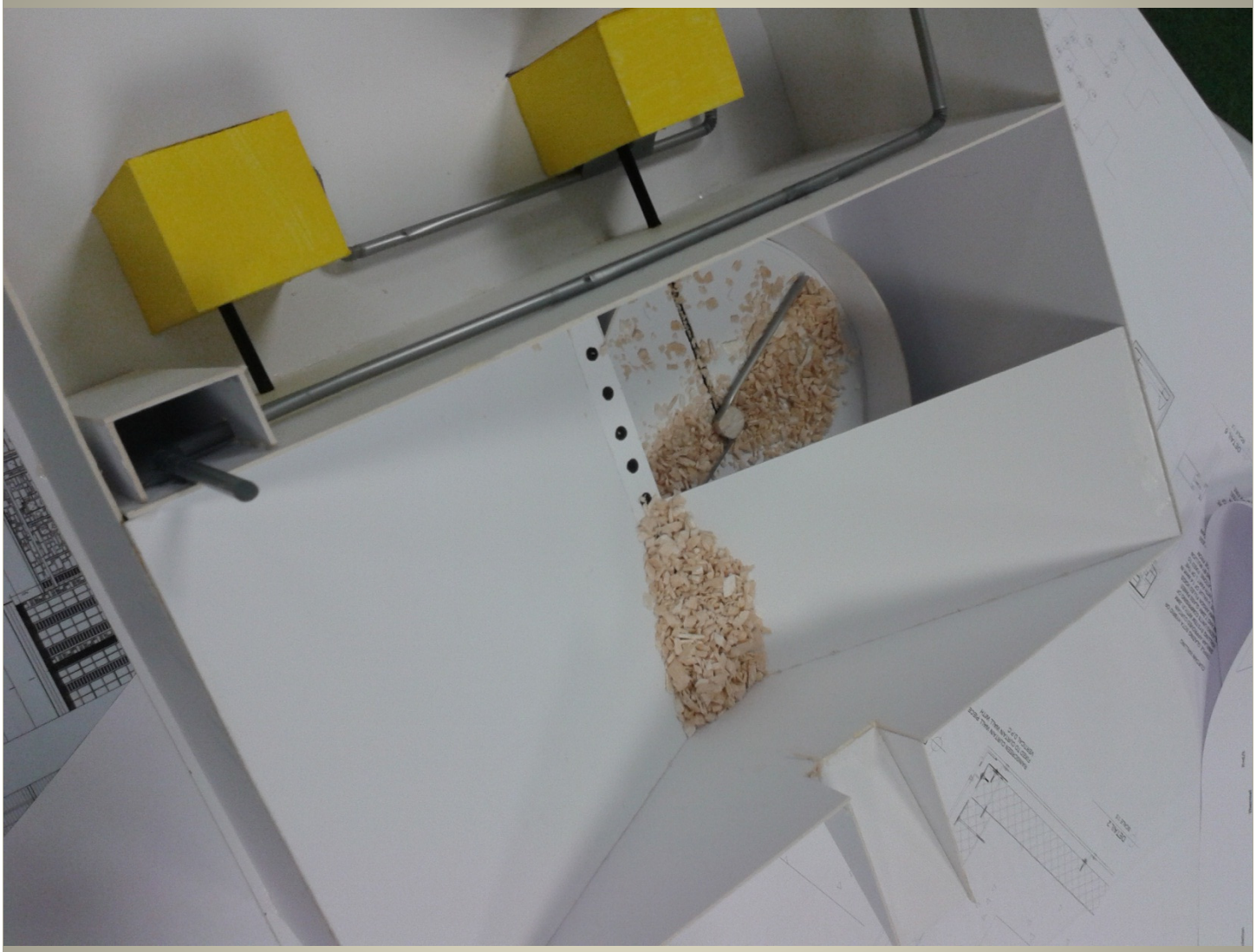
Installation type	Unit of measure	Capacity/ flow rate (1)	Use factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1) x (2)] + (3) (4)
WC (dual flush)	Flush volume (litres)	4	1,46	0	5,84
		Total calculated use (litres/person/day) = (Sum column 4)			5,84
		Normalisation factor			0,91
		Total water consumption (Code for Sustainable Homes) (litres/person/day)			5,3144
		External water use			5
		Total water consumption (Building Regulation 17.K) (litres/person/day)			10,3144
Suppose 70 people in the building		Total water consumption (litres/day)			722,008
		Total water consumption (litres/year)			263532,92
		Total water consumption (m^3/year)			263,53292
Contribution from rainwater from separate rainwater calculation		263007,3713			
Total water consumption (litres/year)		525,54875			

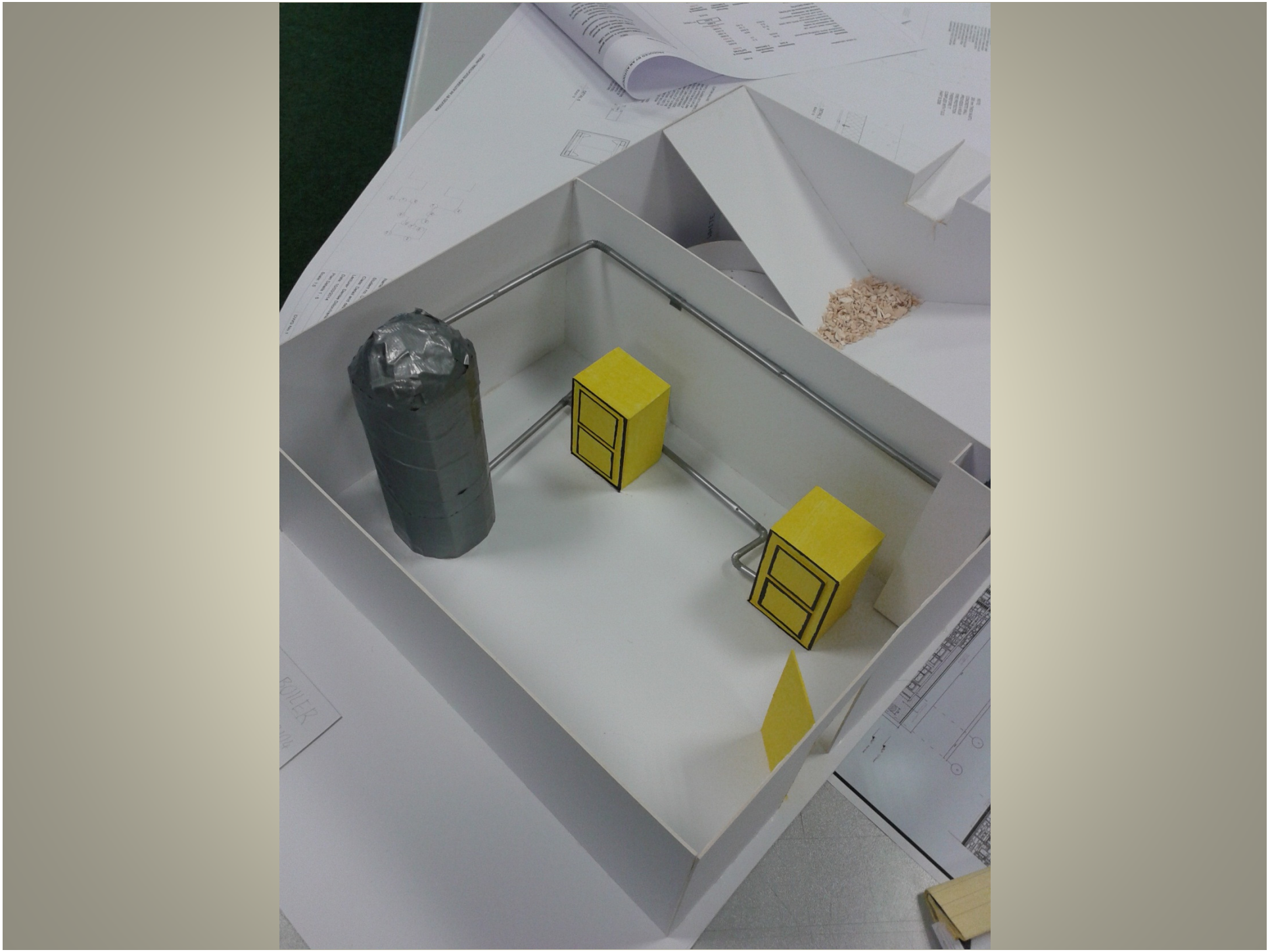
From: Water Efficiency in new developments: A best practice guide.

RAINWATER/WATER SYSTEM



From: Polypipe Website






GMIT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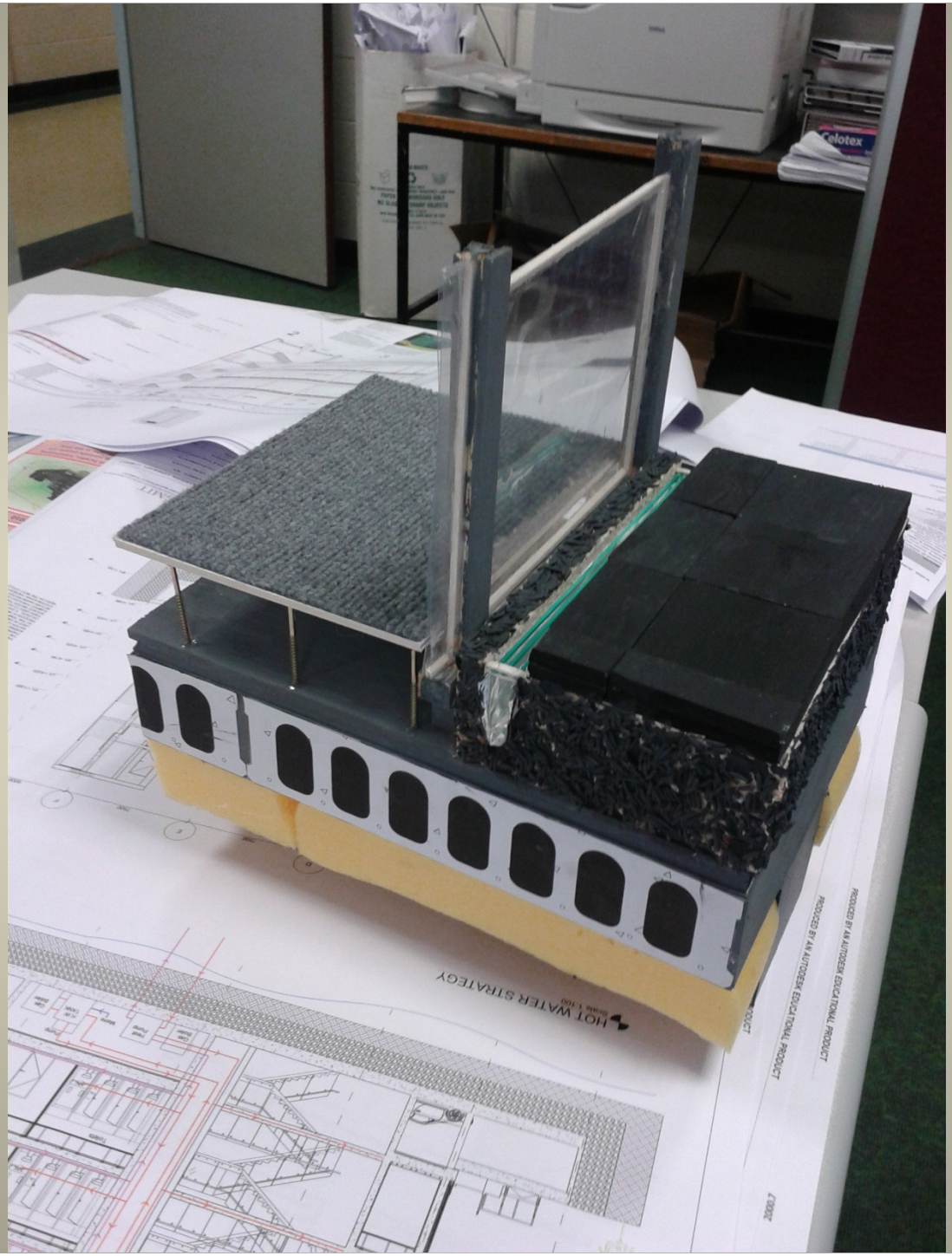
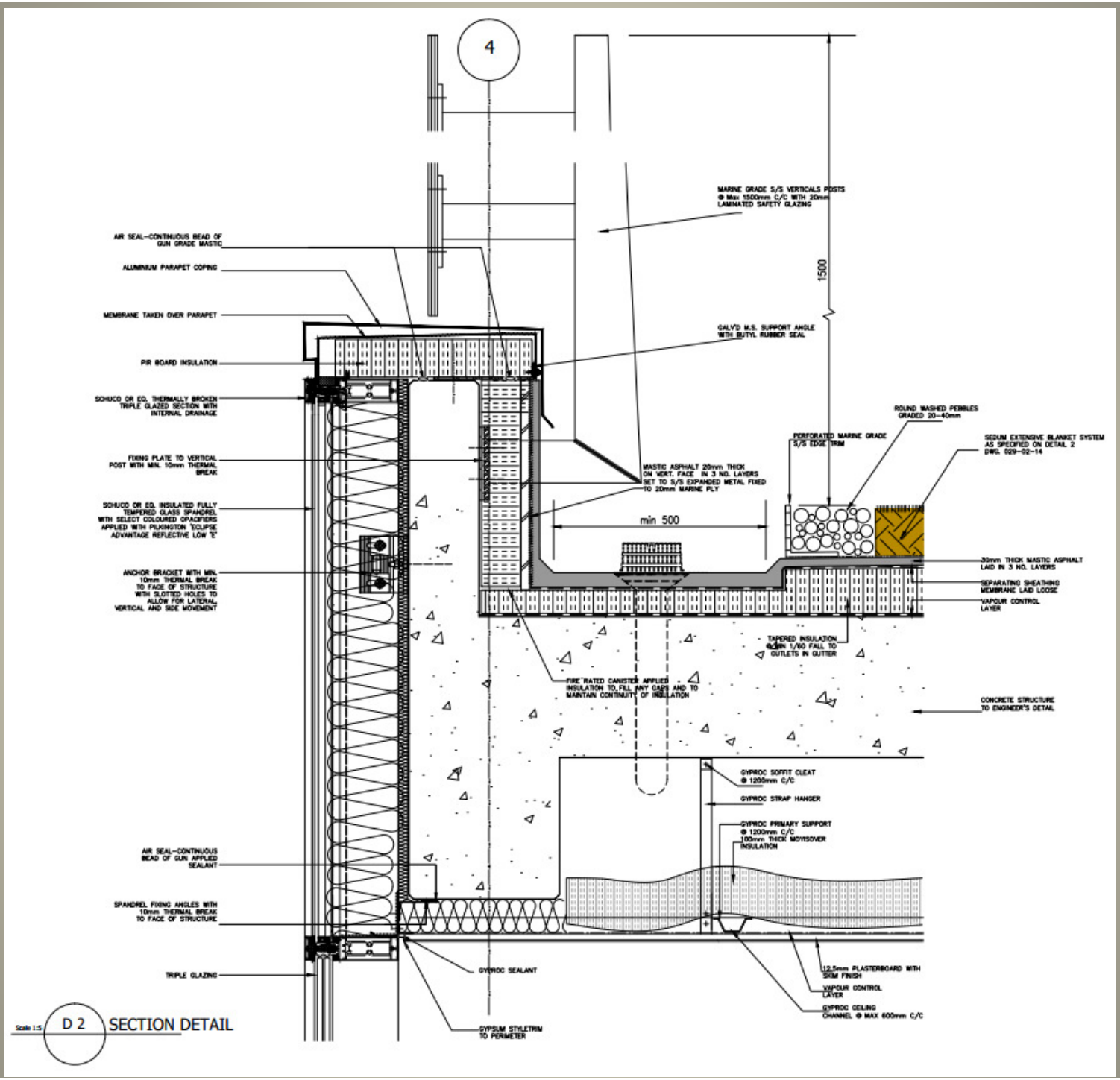
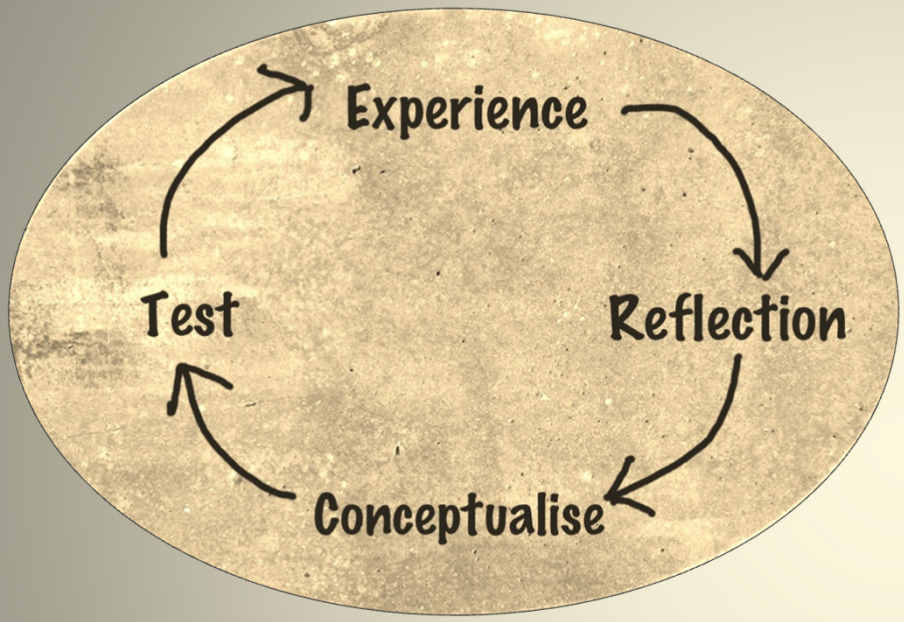
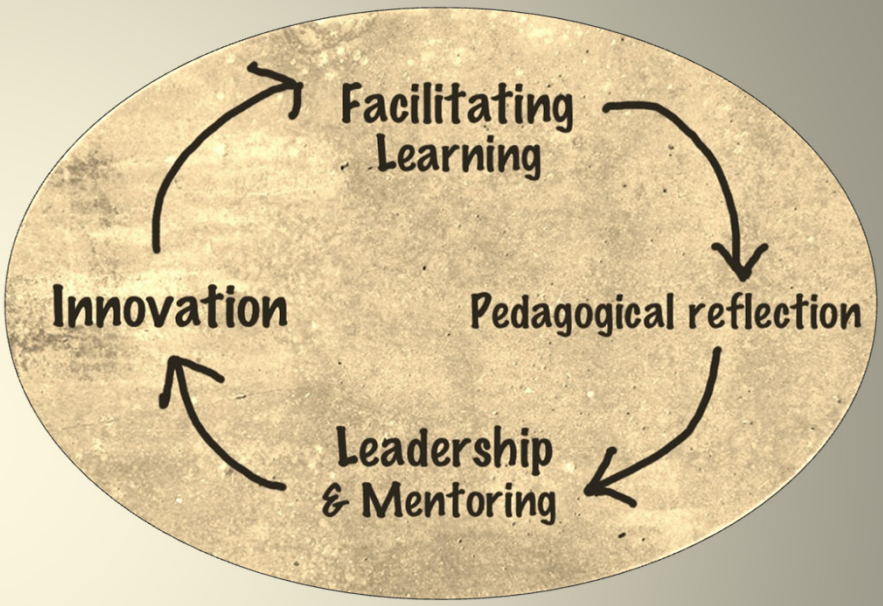
Fire Glazing
Photovoltaic Glazing
Safety Glazing


Celotex
HOT WATER STRATEGY
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT


4
MARINE GRADE S/S VERTICALS POSTS @ Max 1500mm C/C WITH 20mm LAMINATED SAFETY GLAZING
1500
AIR SEAL–CONTINUOUS BEAD OF GUN GRADE MASTIC
ALUMINIUM PARAPET COPING
MEMBRANE TAKEN OVER PARAPET
GALV'D M.S. SUPPORT ANGLE WITH BUTYL RUBBER SEAL
PIR BOARD INSULATION
SCHUCO OR EQ. THERMALLY BROKEN TRIPLE GLAZED SECTION WITH INTERNAL DRAINAGE
ROUND WASHED PEBBLES GRADED 20–40mm
PERFORATED MARINE GRADE S/S EDGE TRIM
SEDUM EXTENSIVE BLANKET SYSTEM AS SPECIFIED ON DETAIL 2 DWG. 029–02–14
FIXING PLATE TO VERTICAL POST WITH MIN. 10mm THERMAL BREAK
MASTIC ASPHALT 20mm THICK ON VERT. FACE IN 3 NO. LAYERS SET TO S/S EXPANDED METAL FIXED TO 20mm MARINE PLY
min 500
SCHUCO OR EQ. INSULATED FULLY TEMPERED GLASS SPANDREL WITH SELECT COLOURED OPACIFIERS APPLIED WITH PILKINGTON 'ECLIPSE ADVANTAGE REFLECTIVE LOW 'E'
30mm THICK MASTIC ASPHALT LAID IN 3 NO. LAYERS
SEPARATING SHEATHING MEMBRANE LAID LOOSE
VAPOUR CONTROL LAYER
ANCHOR BRACKET WITH MIN. 10mm THERMAL BREAK TO FACE OF STRUCTURE WITH SLOTTED HOLES TO ALLOW FOR LATERAL, VERTICAL AND SIDE MOVEMENT
TAPERED INSULATION @ MIN 1/80 FALL TO OUTLETS IN GUTTER
FIRE RATED CANISTER APPLIED INSULATION TO FILL ANY GAPS AND TO MAINTAIN CONTINUITY OF INSULATION
CONCRETE STRUCTURE TO ENGINEER'S DETAIL
GYPROC SOFFIT CLEAT @ 1200mm C/C
GYPROC STRAP HANGER
GYPROC PRIMARY SUPPORT @ 1200mm C/C
100mm THICK MOYISOVER INSULATION
AIR SEAL–CONTINUOUS BEAD OF GUN APPLIED SEALANT
SPANDREL FIXING ANGLES WITH 10mm THERMAL BREAK TO FACE OF STRUCTURE
TRIPLE GLAZING
GYPROC SEALANT
12.5mm PLASTERBOARD WITH SKIM FINISH
VAPOUR CONTROL LAYER
GYPROC CEILING CHANNEL @ MAX 600mm C/C
GYPSUM STYLETRIM TO PERIMETER
Scale 1:5
D 2
SECTION DETAIL



Kolb experiential learning cycle (1984)



Teachers' parallel learning cycle