

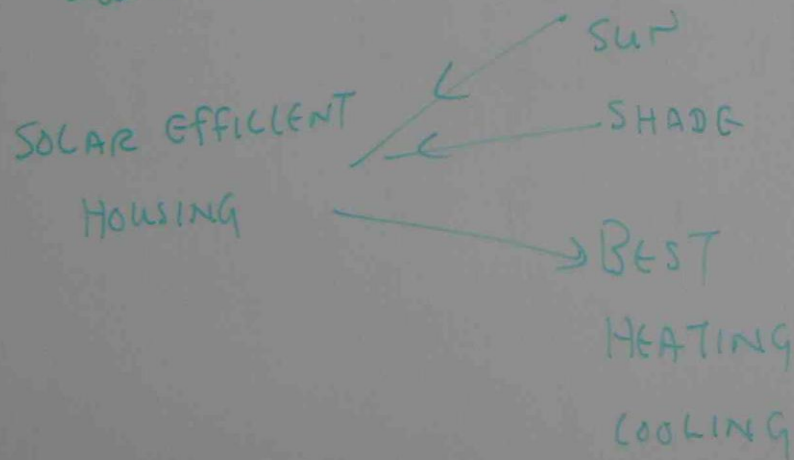
+ E 047 BUILDING → 17794

LOCATION

TOPOGRAPHY, SOLAR ACCESS, LANDSCAPING
DESIGN DEPENDENT CLIMATE TYPE

ACTIVE SOLAR SYSTEM

SOLAR WATER, SPACE HEATING, USING
COLLECTOR PANELS, HEAT STORAGE.



MICRO CLIMATES IN AUSTRALIA

HOT-HUMID
ZONE

NORTHERN
AUSTRALIA
QUEENSLAND
COAST
HIGH TEMPERATURE

HOT
ARID
ZONE

MIDDLE-
AUSTRALIA

WIDE
CHANGE
OF
TEMPERATURE

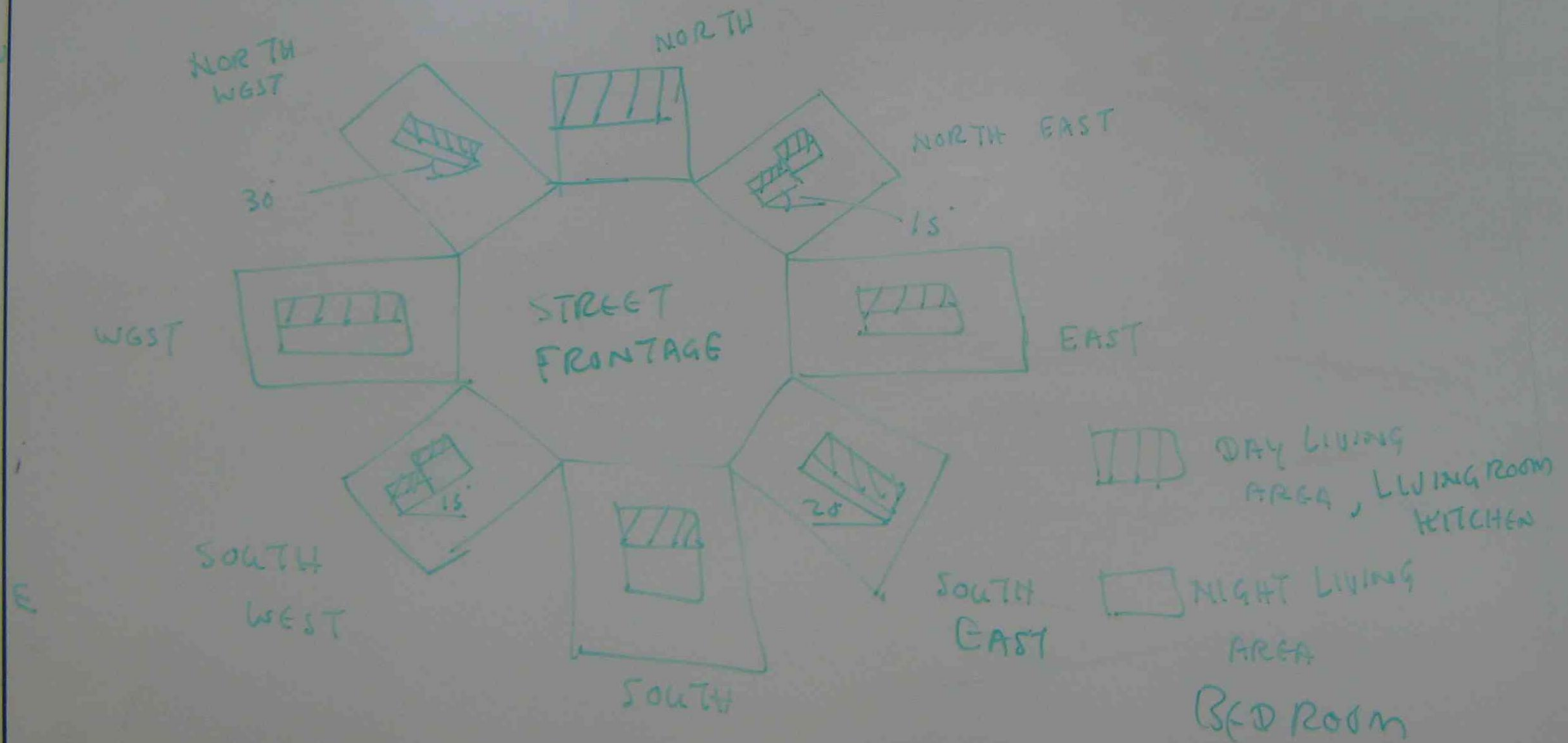
TEMPERATE
ZONE

SOUTH EASTERN
AUSTRALIA
VICTORIA
TASMANIA
SOUTH
WESTERN
AUSTRALIA
LOWER
AVERAGE
TEMPERATURE

PASSIVE SOLAR DESIGN

ORIENTATION → TRUE NORTH ORIENTATION → MAXIMUM SUN ENTRY IN WINTER

EASIER SUN EXCLUSION IN SUMMER



THERMAL MASS

USE OF MASSIVE BUILDING MATERIALS
SUCH AS CONCRETE FLOOR AND MASONRY
WALLS.

- ABSORB DAY TIME WARMTH
 - RELEASE IT BACK TO ROOM AT NIGHT
- SUITABLE FOR TEMPERATE ZONE

HOT HUMID CLIMATE

HIGH OUT DOOR TEMPERATURE

NOT DESIRABLE THERMAL MASS

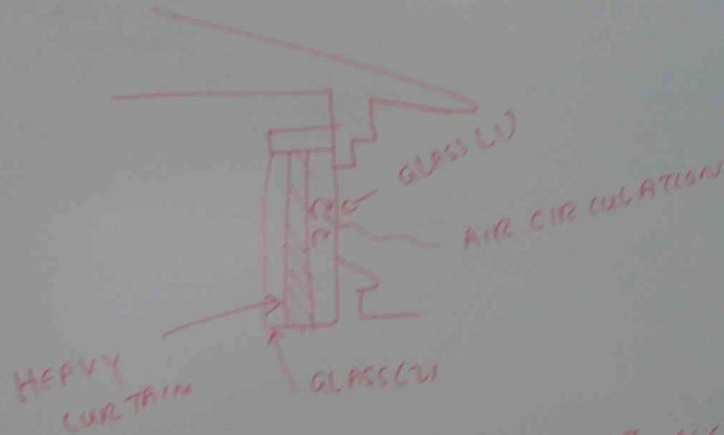
LIGHT WEIGHT MATERIALS, LIMBER BRICK

INSULR. / HEAT UP / COOL DOWN QUICKLY.

GLASS

WINDOWS ARE THE WEAKEST SPOT.

DOUBLE GLAZING \rightarrow REDUCE WINTER HEAT LOSS



GLASS AREA INCREASED \rightarrow IT NEEDS TO STABILIZE TEMPERATURE

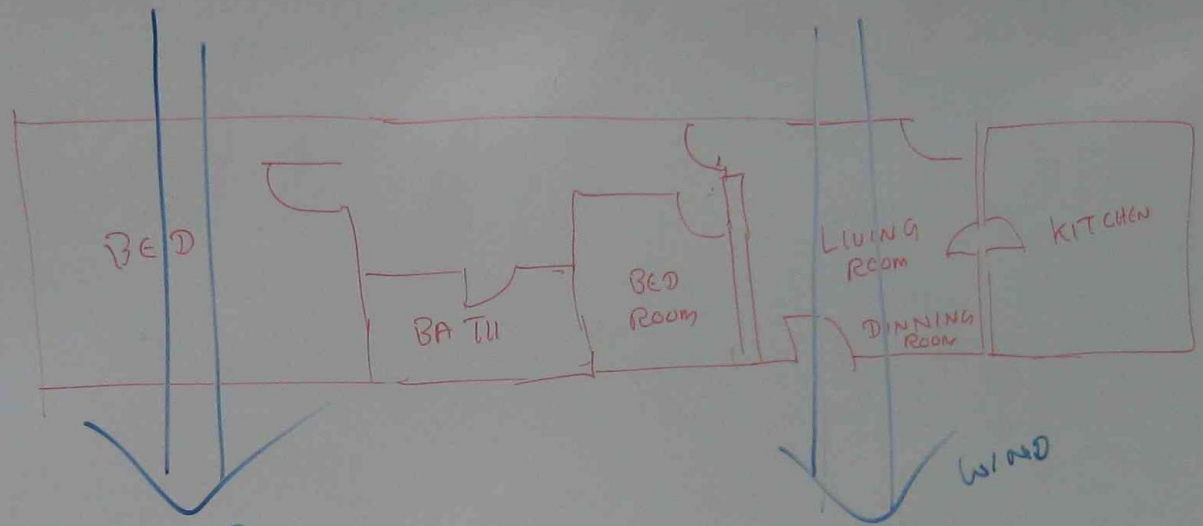
TOO MUCH GLASS \rightarrow OVER HEATING

EAST FACING GLASS \rightarrow SPEED UP MORNING WARMING OF A ROOM IN SUMMER.

SOUTH FACING GLASS \rightarrow COLDER IN WINTER, SLIGHTLY WARMER IN SUMMER

WEST FACING GLASS \rightarrow INCREASE HEAT IN SUMMER AFTERNOON.

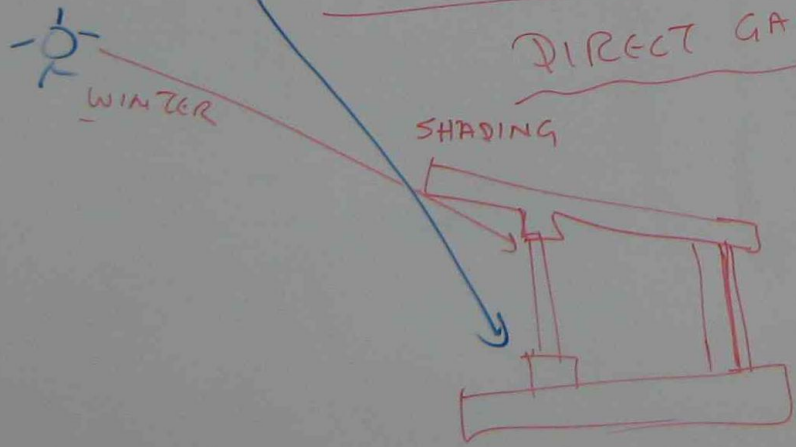
EST



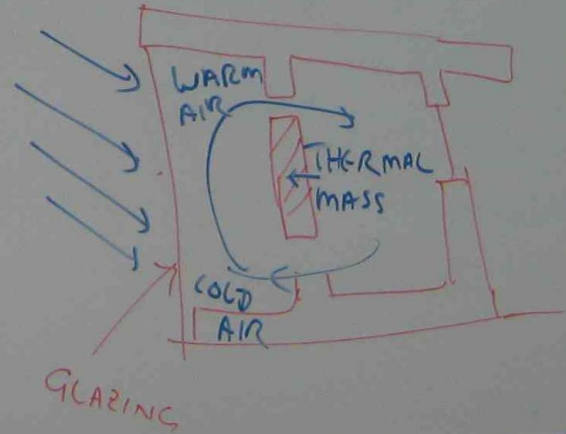
SUMMER

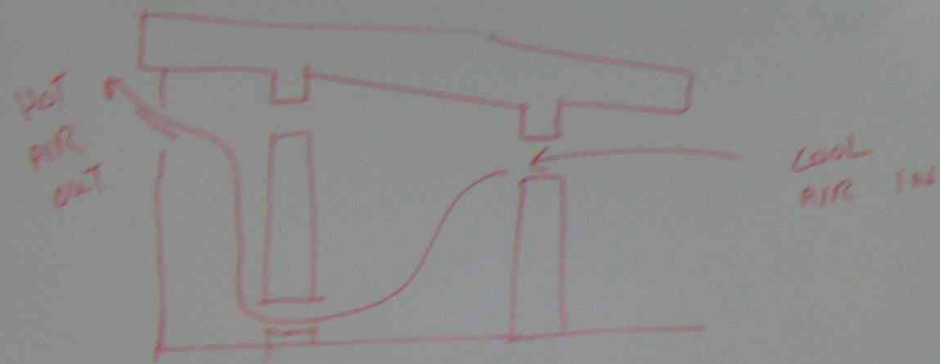
SUN ENTRY

DIRECT GAIN SYSTEM



INDIRECT GAIN SYSTEM





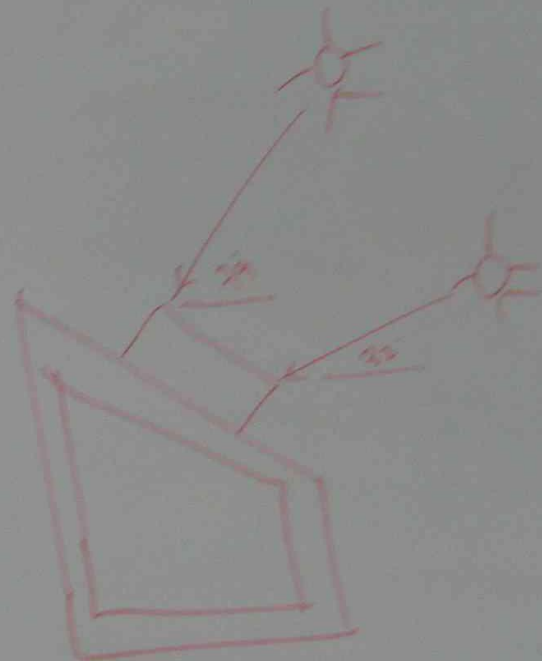
SOLAR COLLECTOR



IDEAL FOR WINTER
HEATING

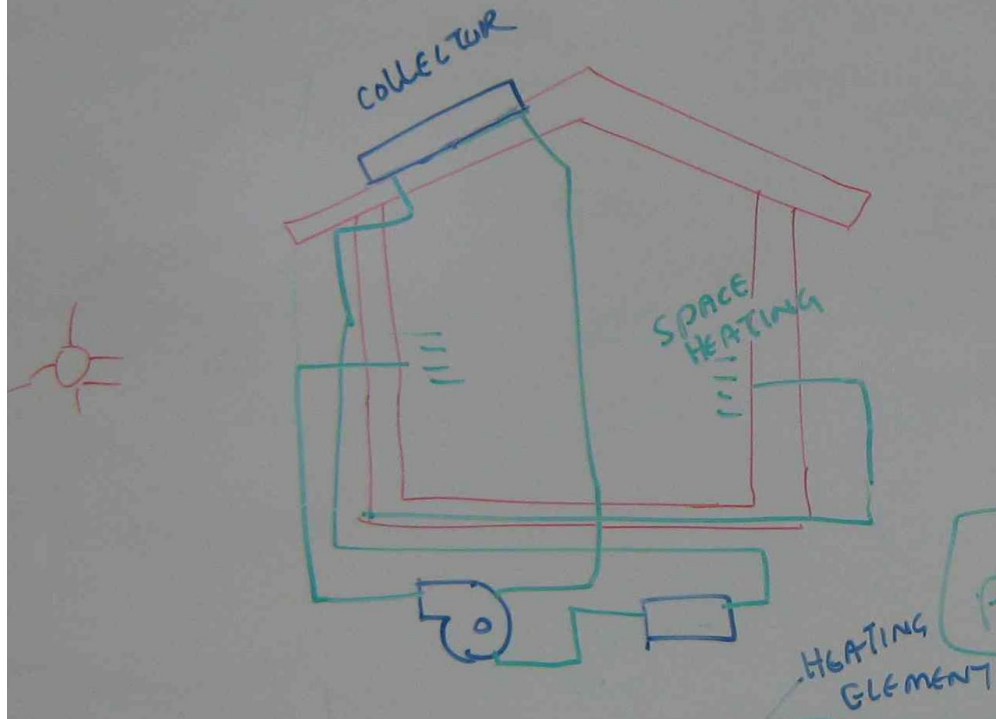


IDEAL FOR
SUMMER COOLING

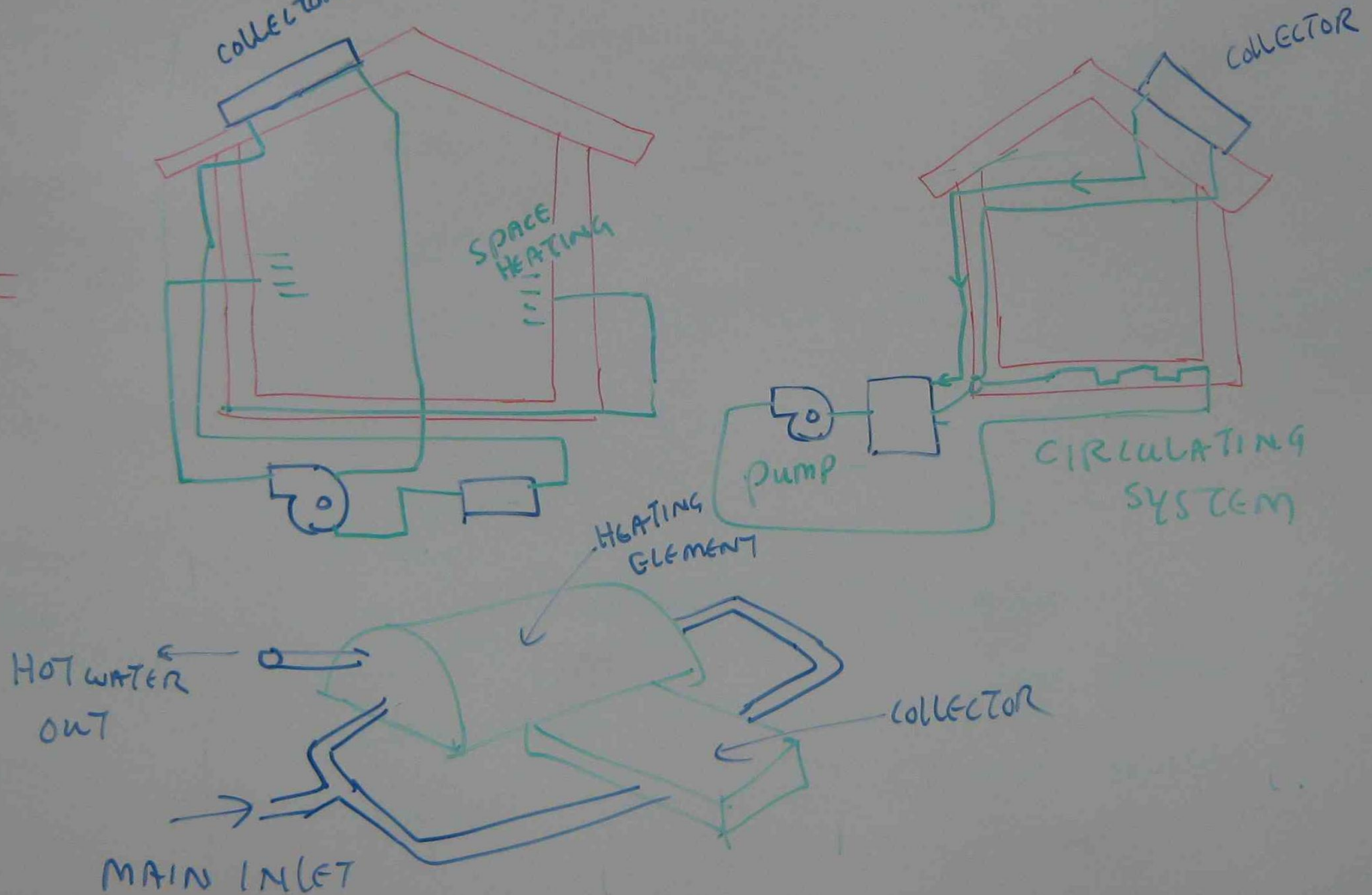


IDEAL FOR
HEATING AND
COOLING

AIR BASED SOLAR SYSTEM



WATER BASED SOLAR SYSTEM



PASSIVE SOLAR SYSTEM

BASIC ELEMENTS OF PASSIVE SOLAR HEATING SYSTEM ARE

- EQUATOR FACING GLASS FOR SOLAR COLLECTION
- THERMAL MASS FOR HEAT ABSORPTION
- STORAGE HEAT EMISSION
- INSULATION TO REDUCE HEAT TRANSMISSION
- WEATHER STRIPPING TO MINIMIZE INFILTRATION OF AIR FROM OUTSIDE.

COMFORT

COMFORT DESCRIBES THE DELICATE BALANCE OF FEELING IN THE BODY IN RELATIONSHIP TO IT'S SURROUNDINGS.

COMFORT INVOLVES FOUR THINGS

- (1) TEMPERATURE (2) HUMIDITY (3) AIR MOVEMENT
- (4) AIR CLEANLINESS

BODY TEMPERATURE = 98.6 °F

$$(F - 32) \times \frac{5}{9} = ^\circ C$$

$$(98.6 - 32) \times \frac{5}{9} \approx 36^\circ C$$

$$(100 - 32) \times \frac{5}{9} = 37^\circ C$$

$$73^{\circ}\text{F} \rightarrow (73 - 32) \times \frac{5}{9} = (23^{\circ}\text{C})$$

50% Humidity

Comfort

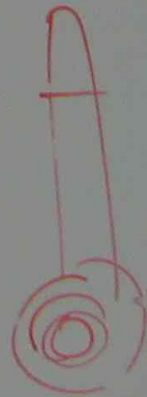
WINTER

- Lower TEMPERATURE CAN BE OFFSET WITH HIGHER HUMIDITY
- THE LOWER THE HUMIDITY IS, THE HIGHER THE TEMPERATURE MUST BE
- AIR MOVEMENT IS MORE NOTICEABLE

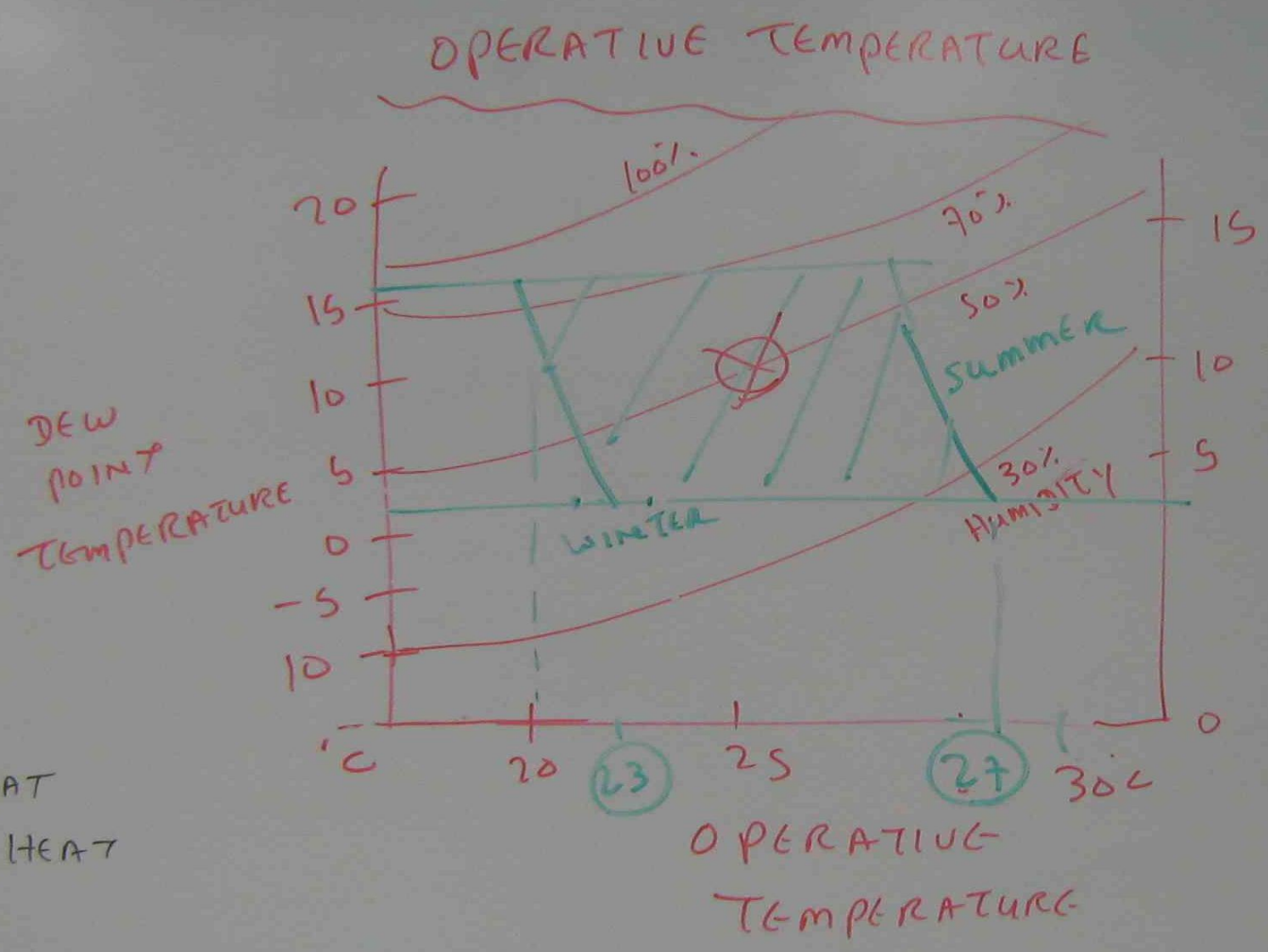
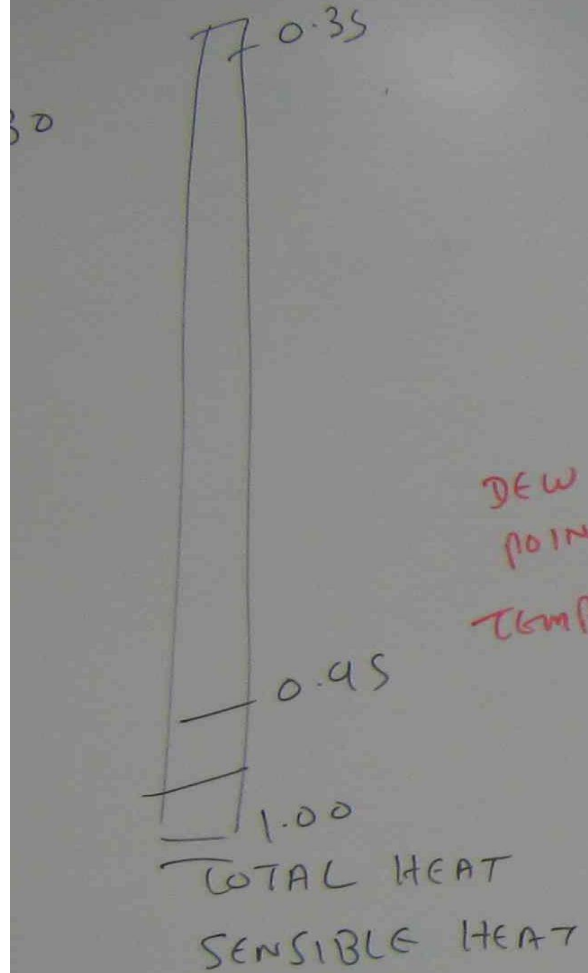
Summer

WHEN THE HUMIDITY IS HIGH
AIR MOVEMENT HELPS.

HIGHER TEMPERATURE CAN BE
OFFSET WITH LOWER HUMIDITY



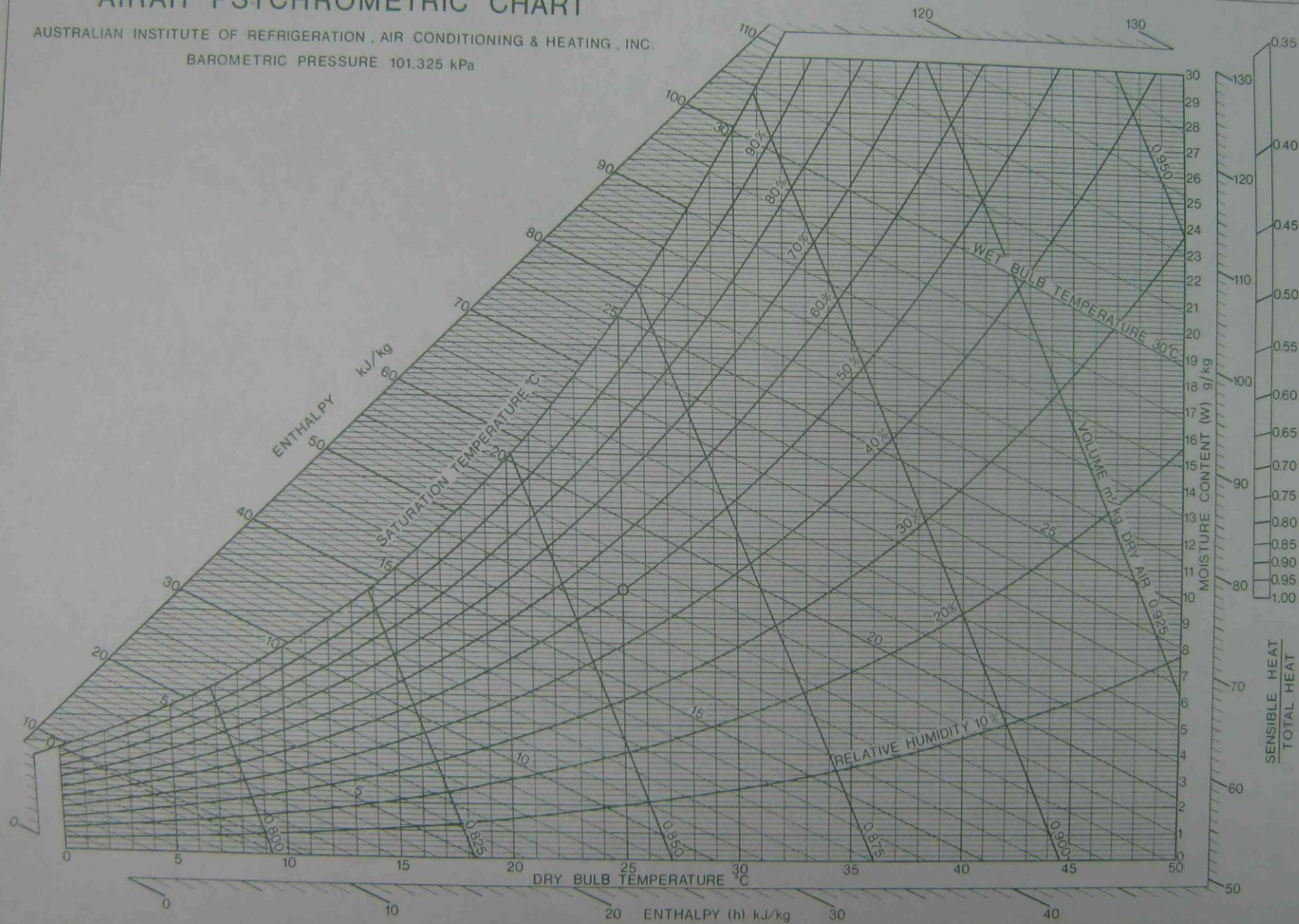
2 Sy Chiro metric Chart



AIRAH PSYCHROMETRIC CHART

AUSTRALIAN INSTITUTE OF REFRIGERATION, AIR CONDITIONING & HEATING, INC.

BAROMETRIC PRESSURE 101.325 kPa



HUMIDITY

MOISTURE CONTENTS IN AIR

RELATIVE HUMIDITY

COMPARISON BETWEEN WEIGHT OF WATER VAPOR IN
A GIVEN VOLUME OF SPACE COMPARED TO THE
WEIGHT OF WATER VAPOR

DRY BULB TEMPERATURE

SENSIBLE HEAT LEVEL OF AIR & IS TAKEN
WITH AN ORDINARY THERMOMETER

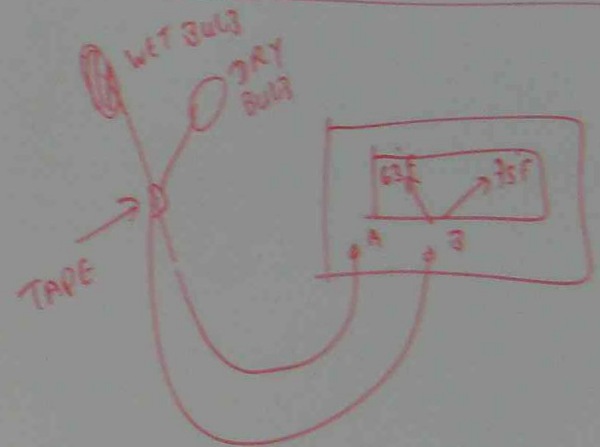
WET BULB TEMPERATURE

WET BULB TEMPERATURE IS TAKEN WITH A WICK ON END THAT IS SOAKED WITH DISTILLED WATER

DEW POINT TEMPERATURE

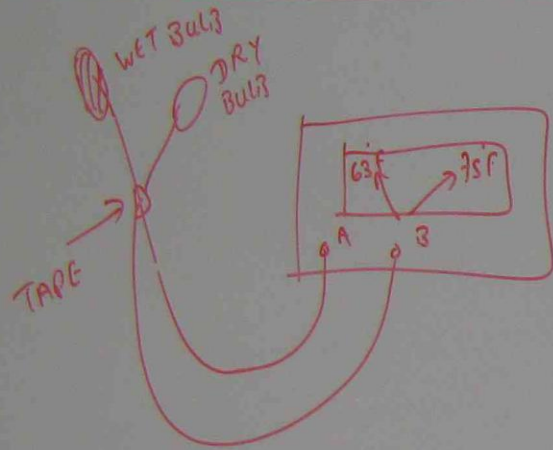
THE TEMPERATURE AT WHICH MOISTURE BEGINS TO CONDENSE OUT OF AIR.

MEASUREMENT OF DRY BULB AND WET BULB TEMPERATURE

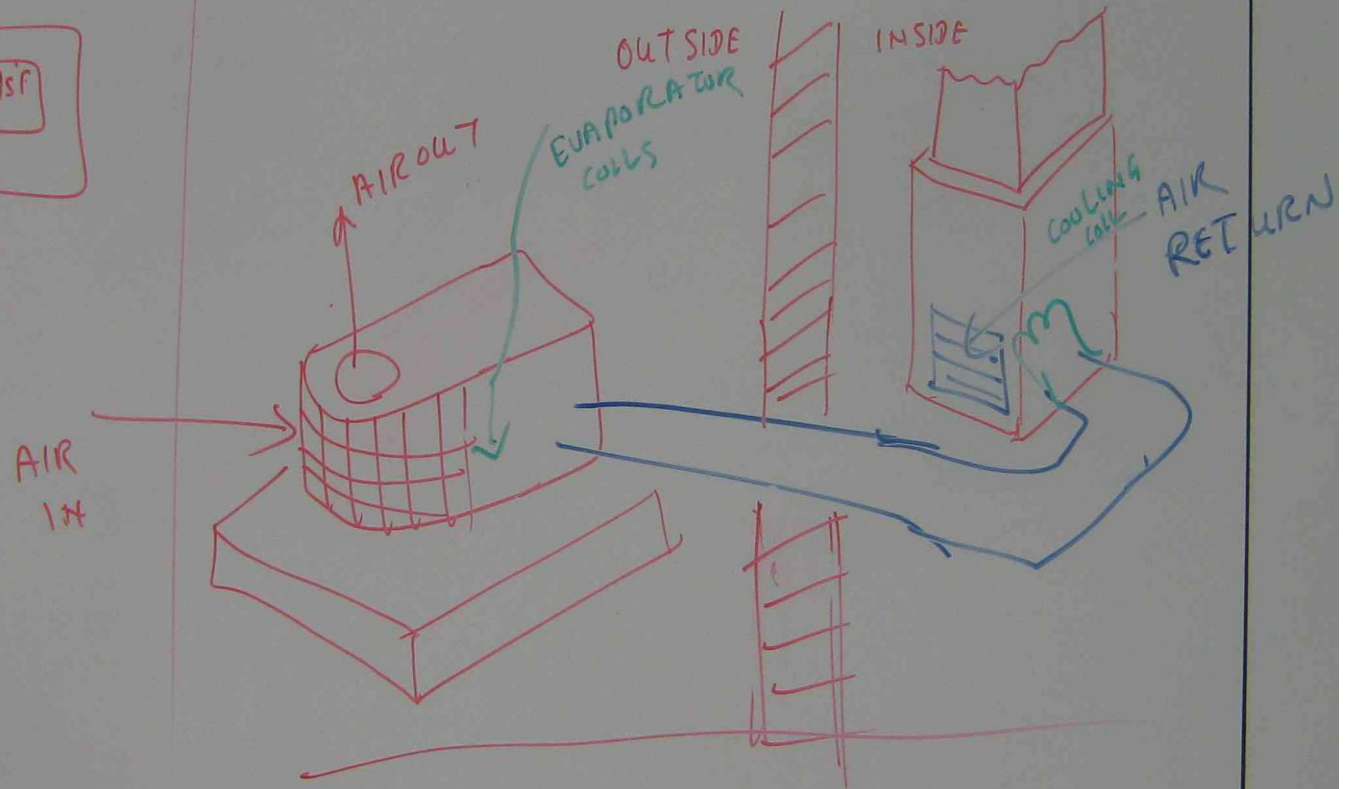


AIR IN

MEASUREMENT OF DRY BULB AND WET BULB TEMPERATURE



CONSTRUCTION OF AIR CONDITIONING SYSTEM FOR COMMERCIAL BUILDING



THE CAPACITY OF A HEATING OR COOLING UNIT
MAY BE CHECKED WITH PSYCHROMETRIC CHART.

THE AIR THAT SURROUNDS US HAS TO BE MAINTAINED
AT THE CORRECT CONDITIONS FOR US TO BE
COMFORTABLE.

CONDITIONED AIR IS FIRST PICKED UP FROM THE
ROOM AIR; CONDITIONED AND BLENDED WITH
THE ROOM AIR.

MEASURING AIR MOVEMENT AND BALANCING

AIR BLOWERS FORCE AIR INTO BUILDING.

THE AIR IS DIRECTED BY THE AIR DUCTS.

THE AIR WILL LOSE IT'S PRESSURE DURING TRANSMISSION PROCESS.

AIR PRESSURE LOSS DEPENDS ON LENGTH
TYPE AND SHAPE OF AIR DUCTS
FITTINGS AND DIFFUSERS.

AIR FRICTION CHART IS UTILIZED TO
CALCULATE AIR PRESSURE DROP.

BASIC BUILDING CONSTRUCTION

SET OUT

FOUNDATIONS

FOOTINGS.

FLOOR

WALL

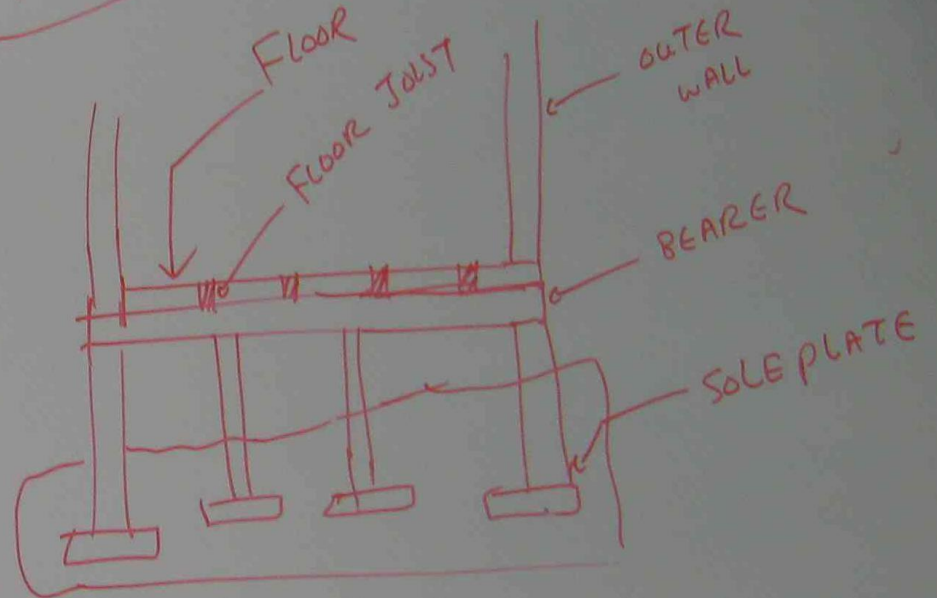
ROOF

CLADDING (EXTERNAL)

LINING (INTERNAL)

FINISH OUT

FOUNDATION



ROOF

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