

Townsville, Queensland

72.

P L E X

DHA Aitkenvale

eko

10.04.2010

DESIGN

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CLIMATE RESPONSE

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BUILT FORM

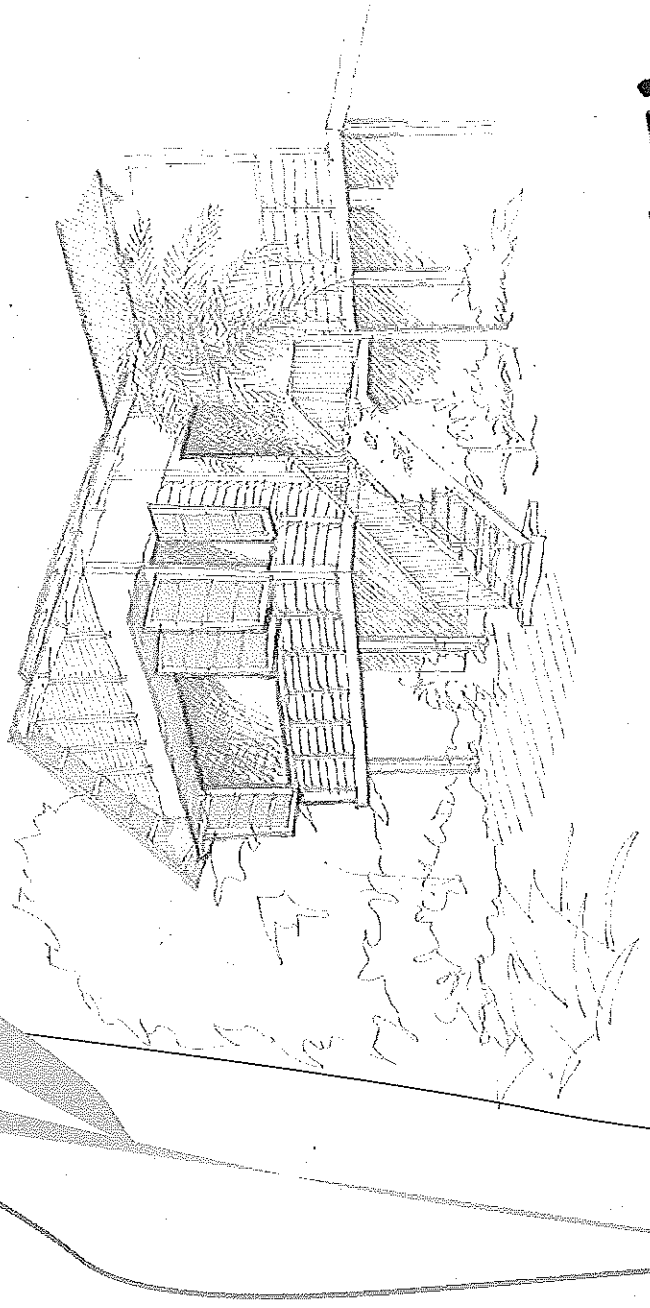
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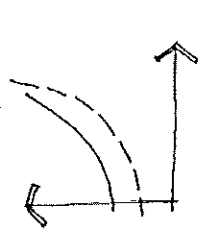
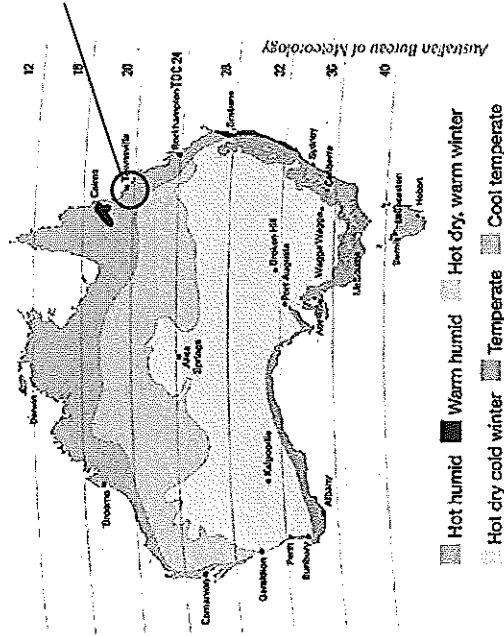
- VERANDAHS
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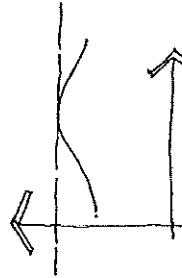
DUPLEX Aitkenvale

RESPONSE TO CLIMATE DESIGN

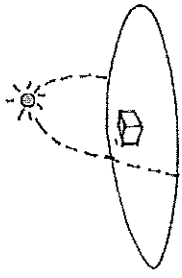
CLIMATE: Hot Humid



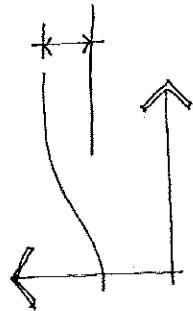
high humidity (+70%)



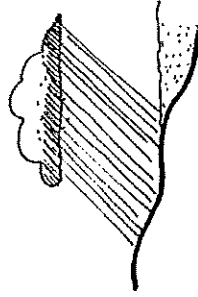
moderately high air temperature



moderately high solar radiation
mainly overhead



small range in diurnal and
annual temperature



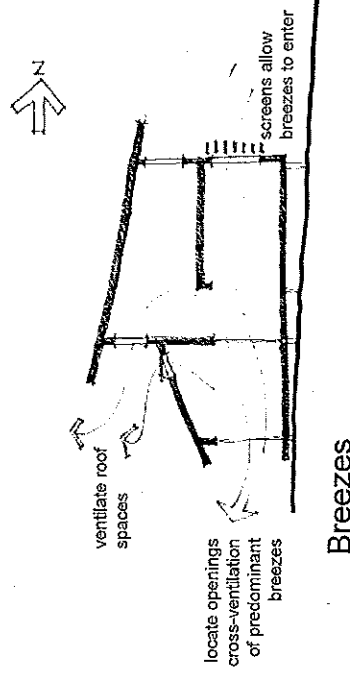
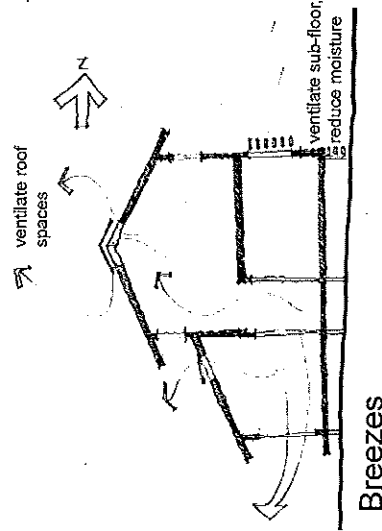
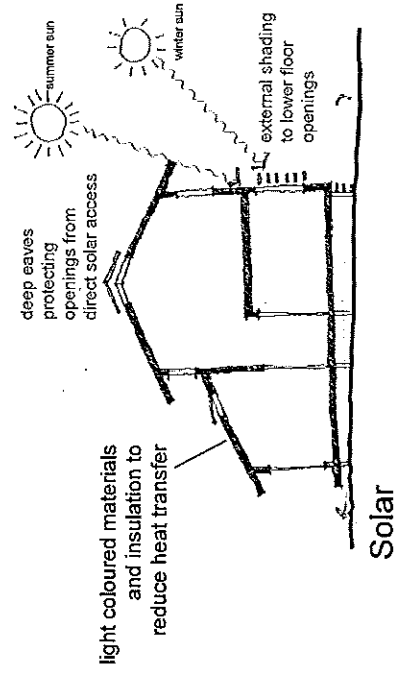
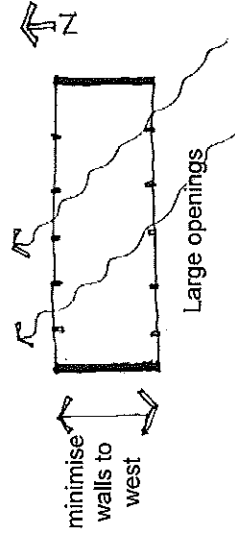
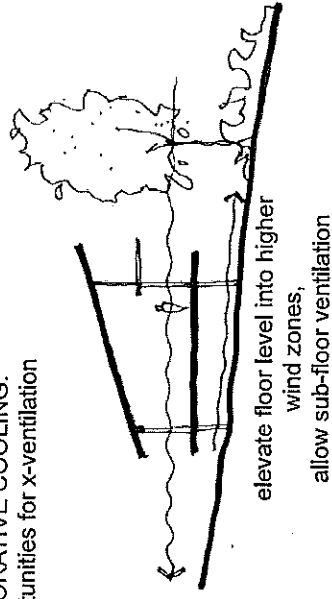
high rainfall
damp earth + flooding

HOT HUMID CLIMATES: TOWNSVILLE

Really good design for the hot humid tropics makes use of good shading, sheltered outdoor areas, and lightweight construction elevated for natural ventilation. A well designed house will provide for a relaxed outdoor lifestyle.

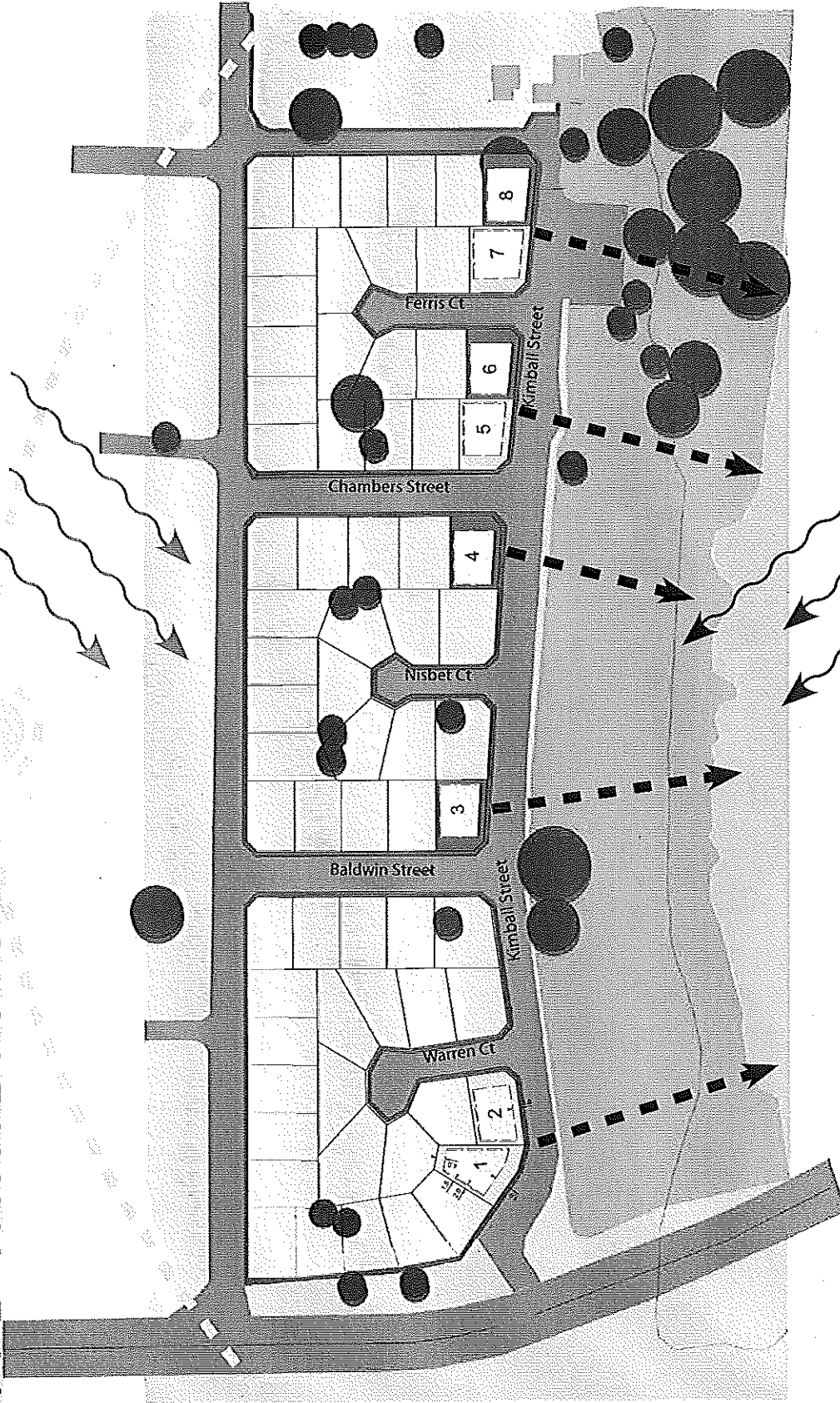
1. lightweight construction
2. good cross flow ventilation
3. insulated and ventilated roofs
4. vegetation and outdoor areas can enhance shade and cooling breezes
5. increased ceiling heights and ceiling fans

EVAPORATIVE COOLING: opportunities for x-ventilation

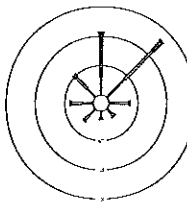


SITE ANALYSIS

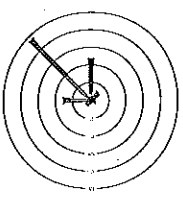
PREVAILING SUMMER BREEZES (p.m.)



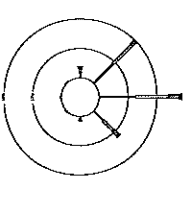
PREVAILING SUMMER BREEZES (a.m.)



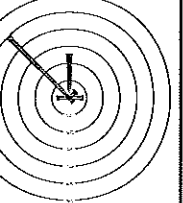
1:15 Wind rose diagram



2:15 Wind rose diagram



3:15 Wind rose diagram



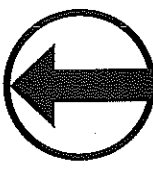
4:15 Wind rose diagram

SUMMER BREEZES

WINTER BREEZES

VIEWS

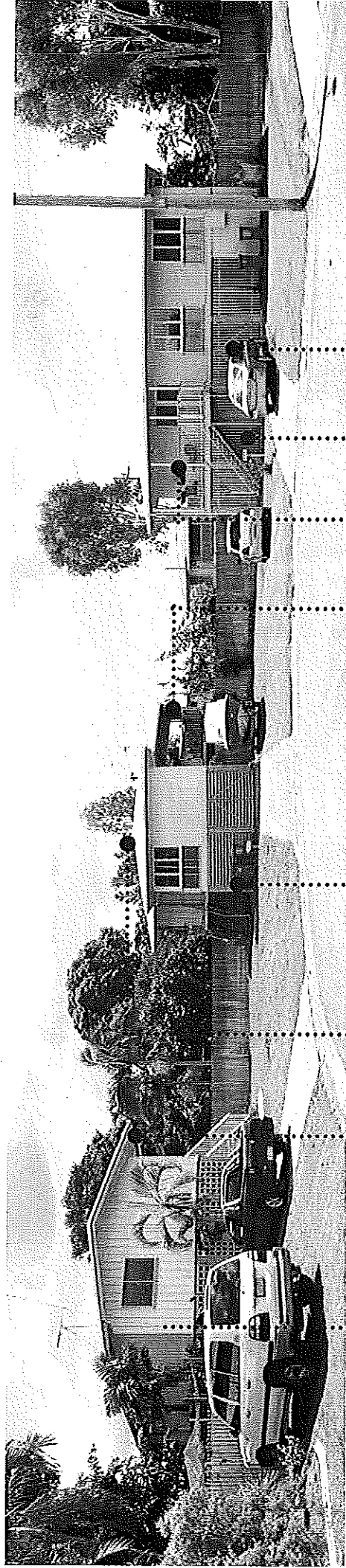
SUN



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BUILT FORM

EXISTING BUILT-FORM ANALYSIS



● NATURAL VENTILATION

● PERMEABLE LIGHTWEIGHT

● DEEP SHADED VERANDAHS

● VERTICAL

● ELEVATED CONSTRUCTION

● LOW PITCH

● DEEP EAVES

● LIGHT WEIGHT
CONSTRUCTION

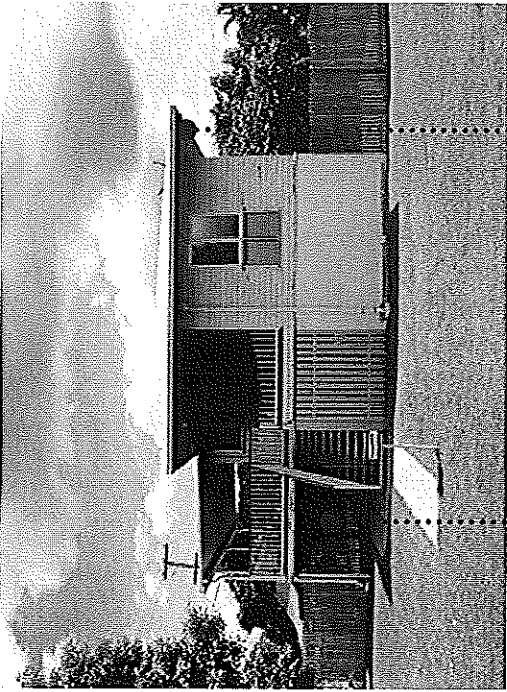
PROMOTE PREVAILING BREEZES

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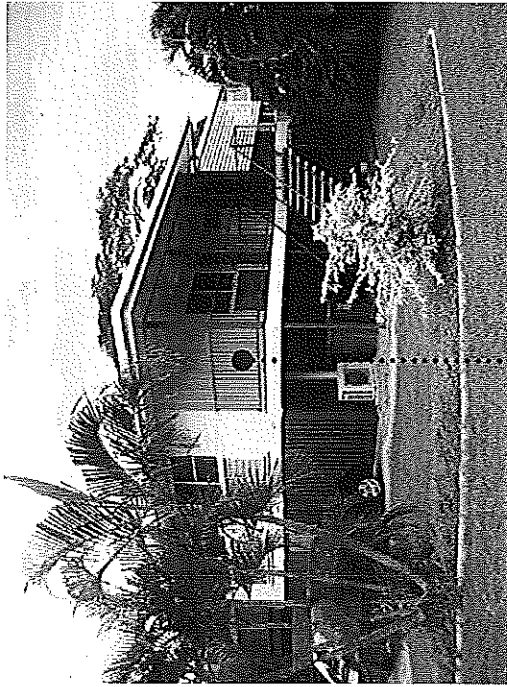
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Design elements	Design essentials	Best practice design options
Siting	Site for exposure to summer breeze and shading all year. Elevated construction can help to ensure access to breezes, and create shaded outdoor space.	Use plans with one room depth to encourage ideal movement of breezes through the building (cross ventilation). Appropriately designed thermally massive lower floor living areas can provide cooler refuge during the day.
Sub-floor and floor	Use lightweight construction – elevated on bearers and joists to permit airflow beneath floors.	Create some full height recreational areas under elevated floors – they enjoy 'indirect evaporative cooling' all year round from the shaded ground surface.
Roof	Ventilate roof spaces. Use light coloured roof materials. Consider high or raked ceilings.	Consider using a 'fly roof' for permanent shading.
Walls	Use reflective insulation, and bulk insulation if mechanically cooling. Use light coloured wall materials. Design and build for cyclonic conditions.	Minimise exposed east and west walls. Shade all walls from sun.
Clip-ons	Shade the whole building in summer and winter. Provide shaded and screened verandas for indoor-outdoor living, and sleepout spaces.	Extended vertical screens can modify otherwise unfavourably oriented openings to improve natural ventilation.
Landscape elements		Use planting to channel breezes.



NATURAL VENTILATION

DEEP EAVES

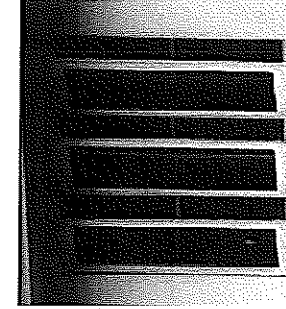
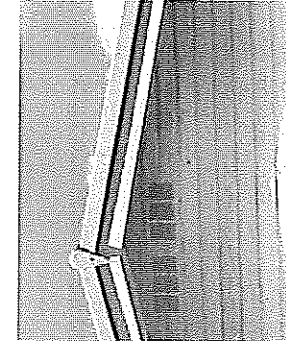
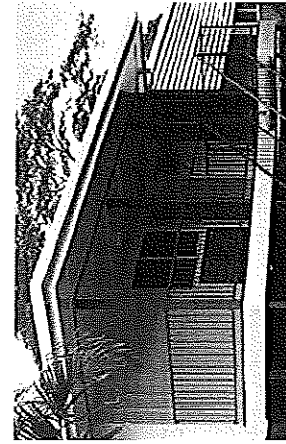


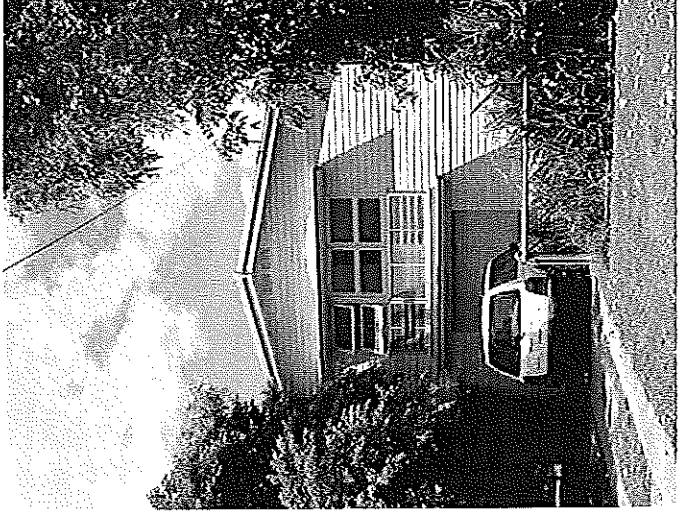
DEEP SHADED VERANDAHS



LOW PITCH

LARGE OPENINGS

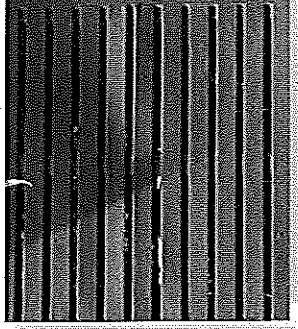
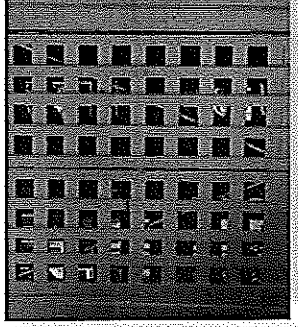
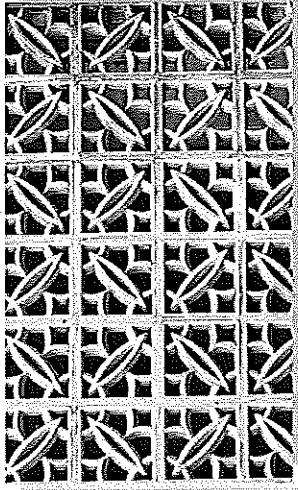
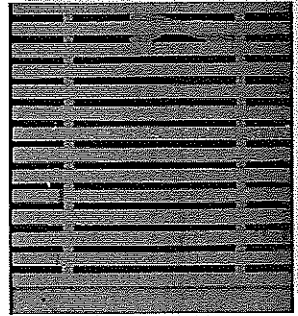
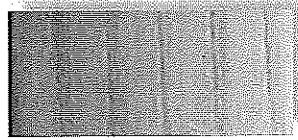
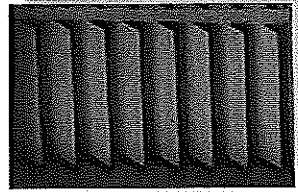




LIGHT WEIGHT CONSTRUCTION

PATTERN & TEXTURE

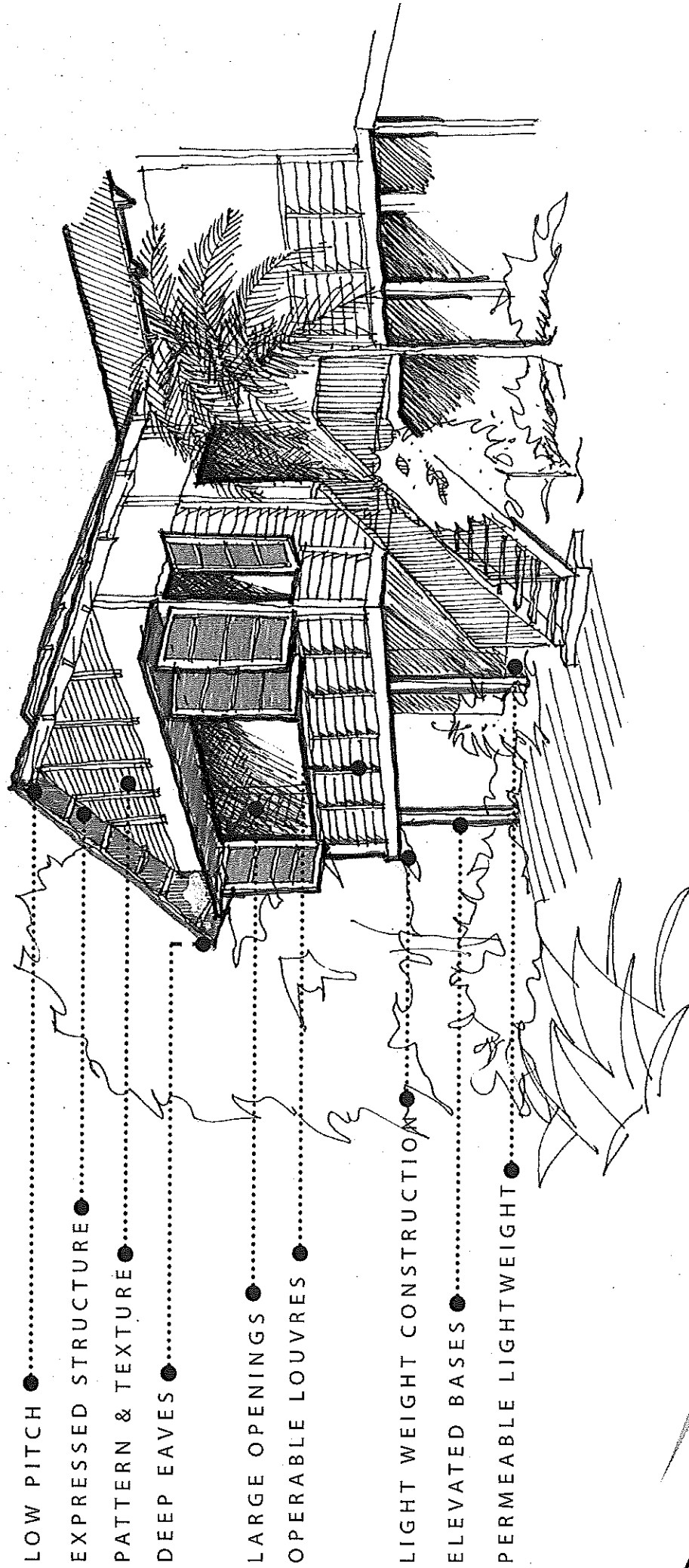
PERMEABLE LIGHTWEIGHT BASES



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BUILT FORM

PROPOSED BUILT-FORM



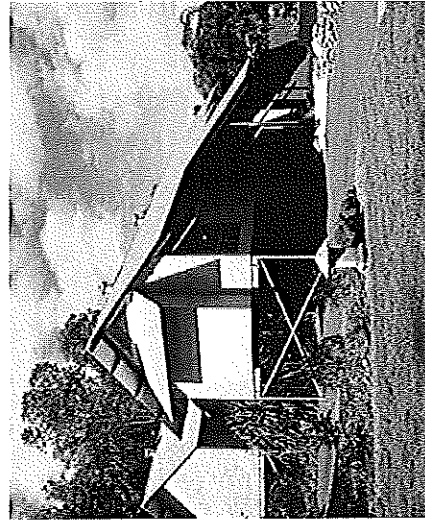
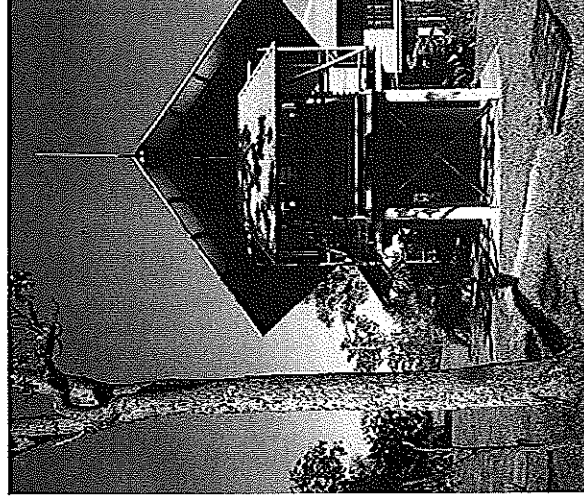
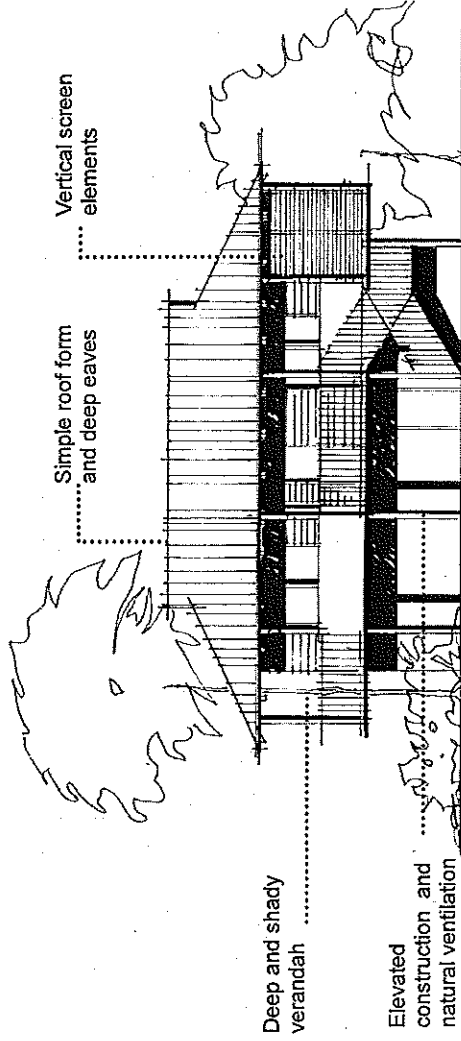
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ELEVATED CONSTRUCTION

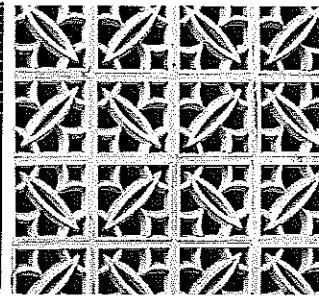
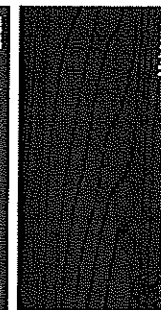
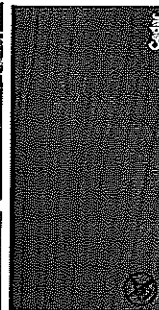
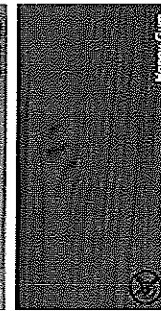
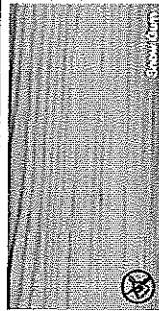
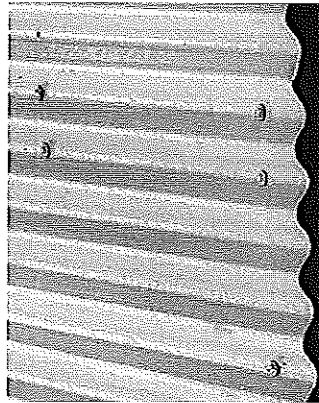
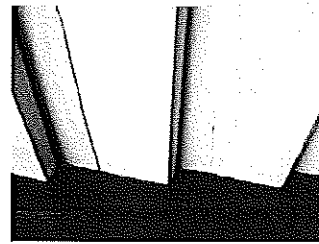
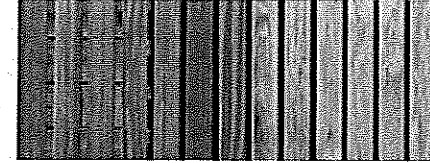
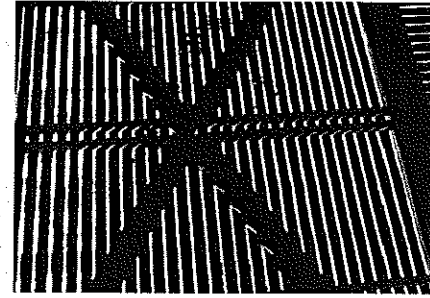
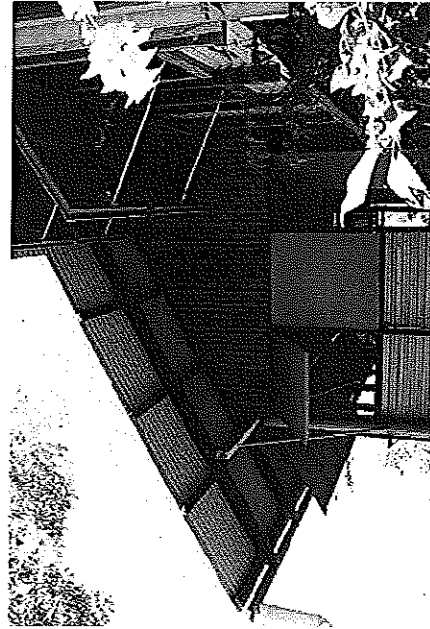
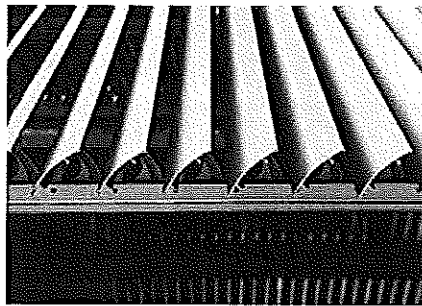
NATURAL VENTILATION



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TEXTURE + PATTERN

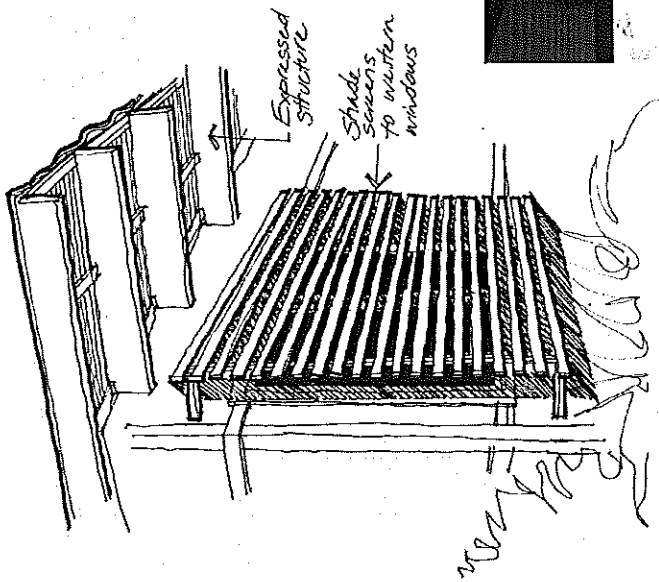
MATERIAL PALETTE



Detail is encouraged on the front facade. A blend of rendered masonry and lightweight construction add scale and texture and variation to simple facades.

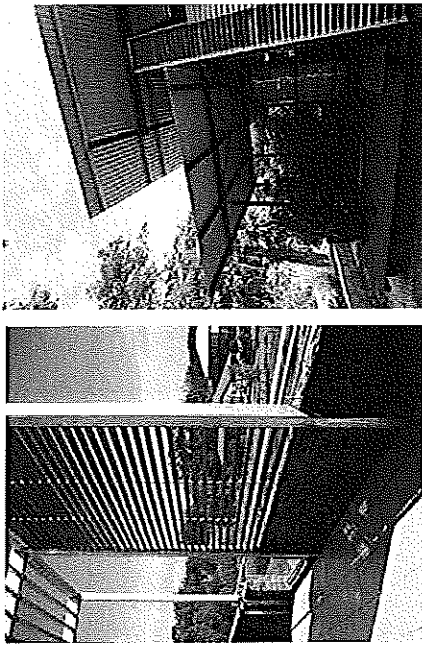
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LIGHT + SHADE



ROOF FORM

Roof forms give protection to houses from down pours and harsh summer sun. Deep eaves (min 900mm) are encouraged to provide shady places and for weather protection.

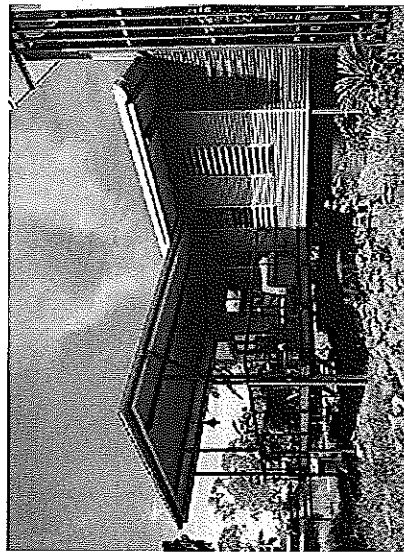


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LIFESTYLE

VERANDAHS

BIG, OPEN VERANDAH

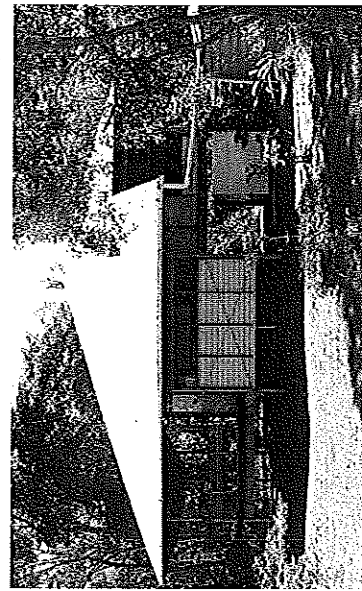


Verandah and pergola elements integrated with the living zones and front facade will offer occupants the opportunity to relax outside in a sheltered area, and take advantage of the prevailing summer breezes.

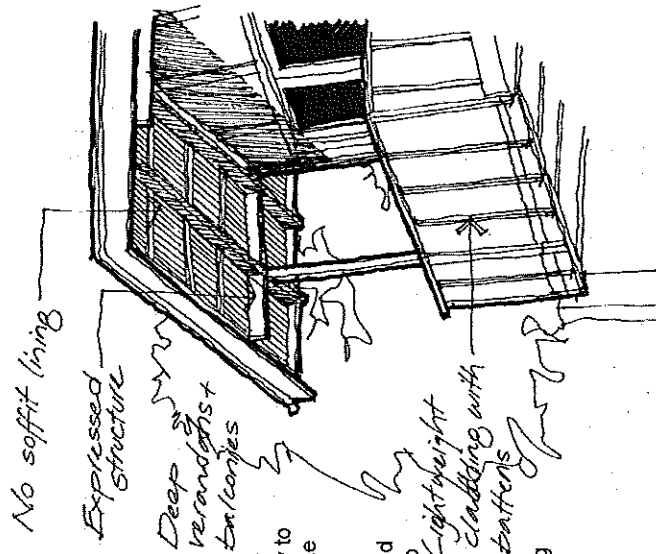
Front verandahs add quality living areas which address and engage with the street. This creates a positive relationship to the street and its neighbours whilst enhancing passive surveillance.

These semi-enclosed living spaces create the opportunity for a direct relationship between internal and external living areas.

Verandah elements also reduce the bulk of the facade.

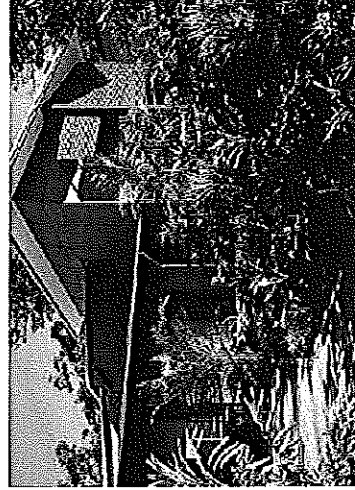


ELEVATED SIDE YARD

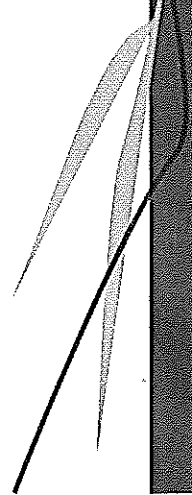


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INDOOR-OUTDOOR LIVING

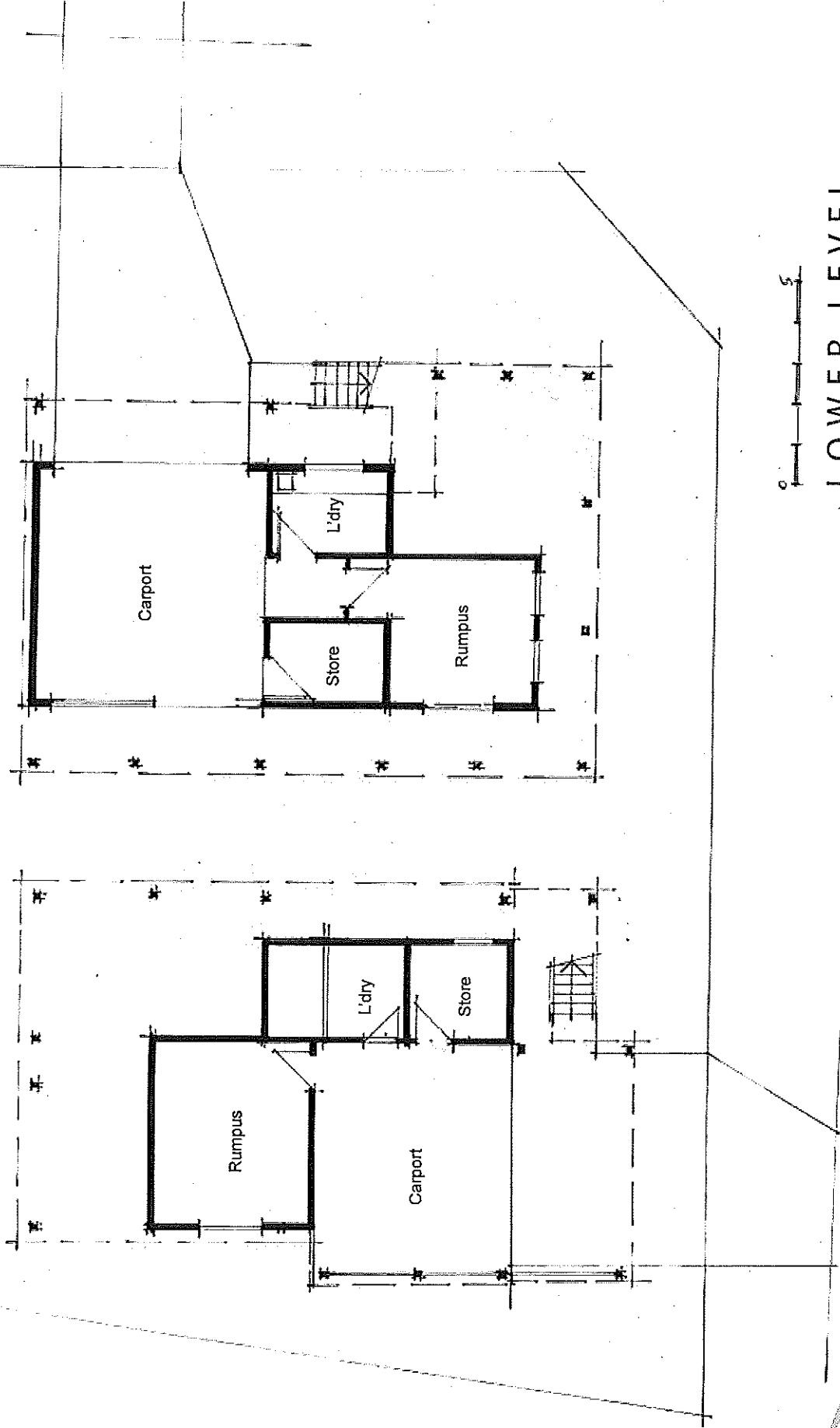


LAID BACK AND SHADY



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BED 1

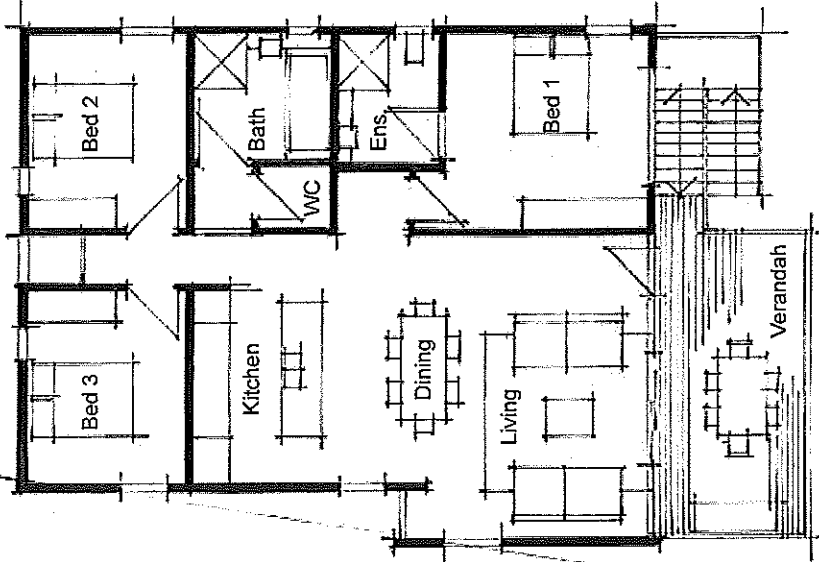
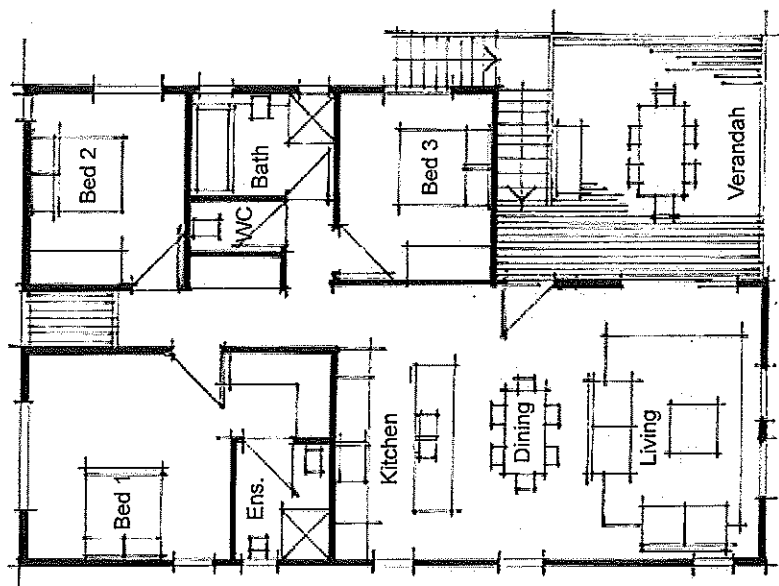


LOWER LEVEL
DETACHED

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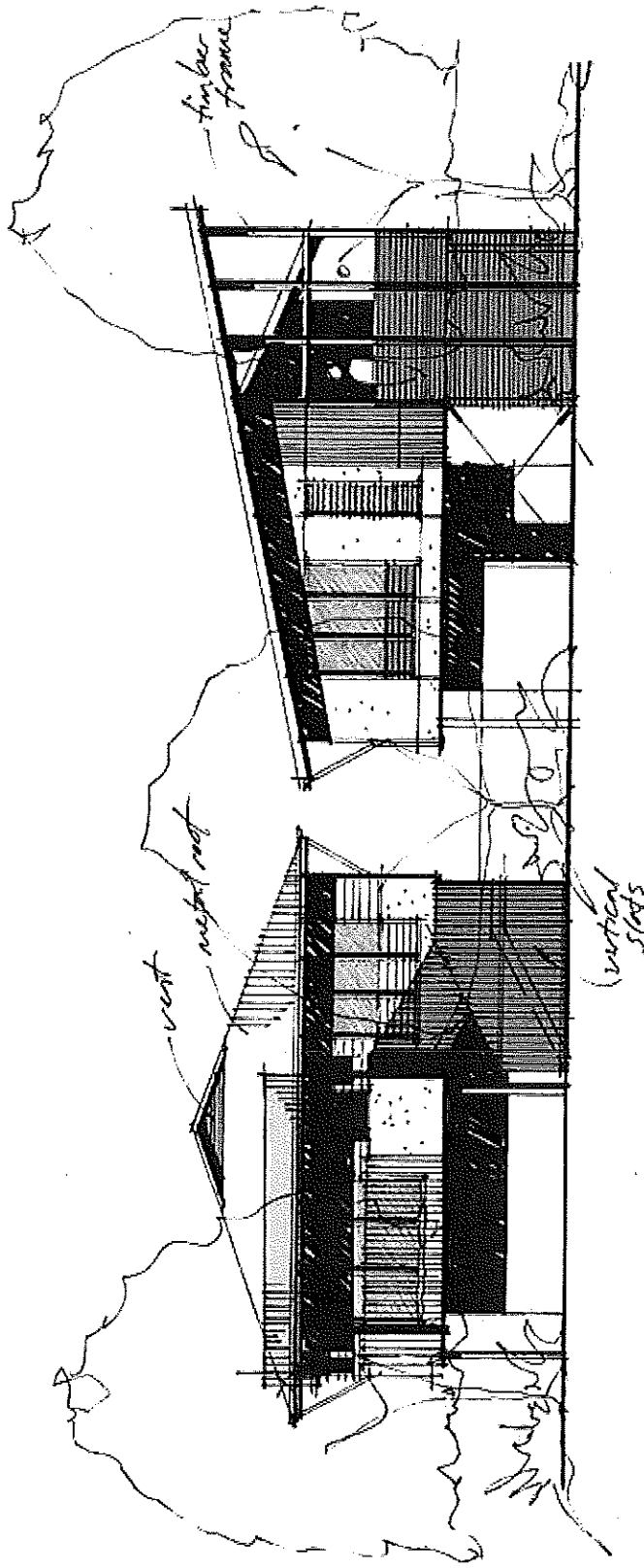
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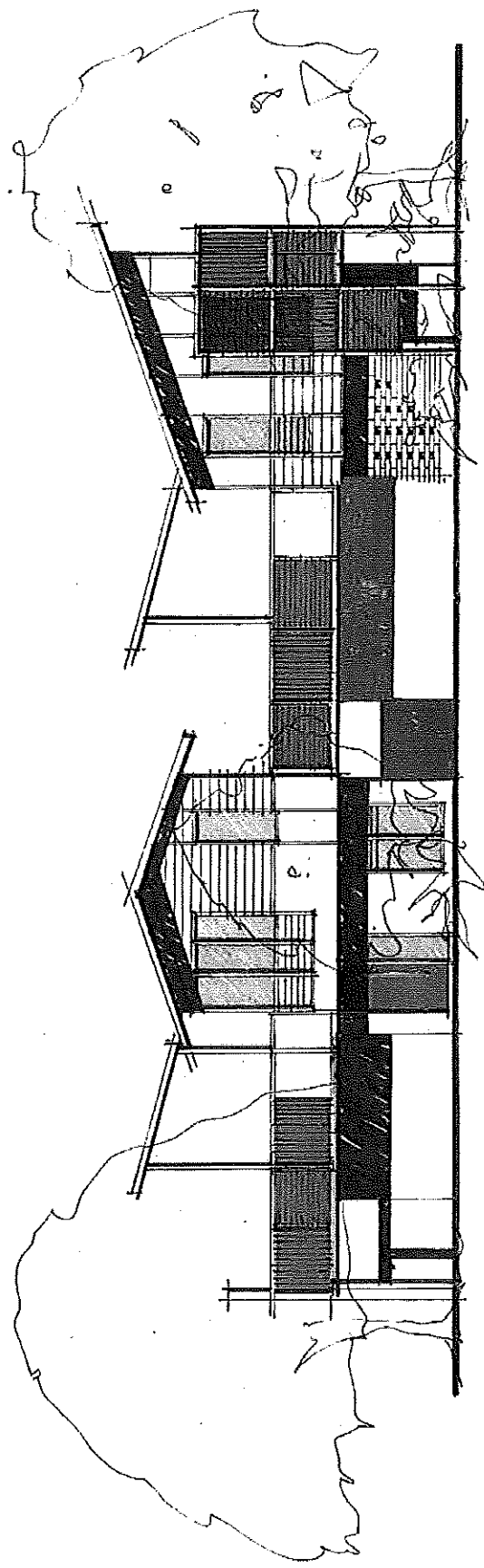
UPPER LEVEL DETACHED

DUPLIX Aitkenvale



FRONT ELEVATION
DETACHED

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DUPLX A i t k e n v a l e

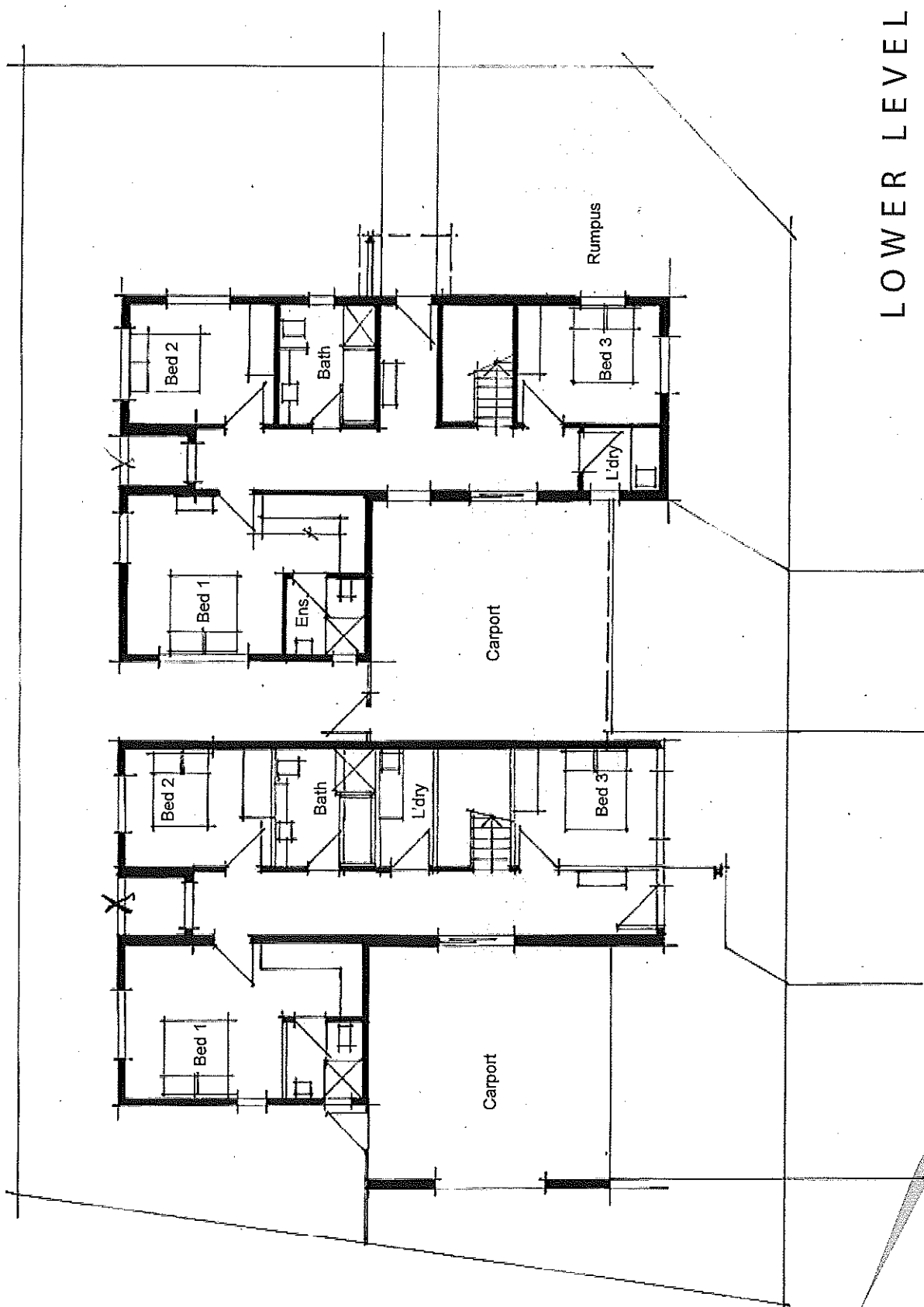


FRONT ELEVATION
ATTACHED

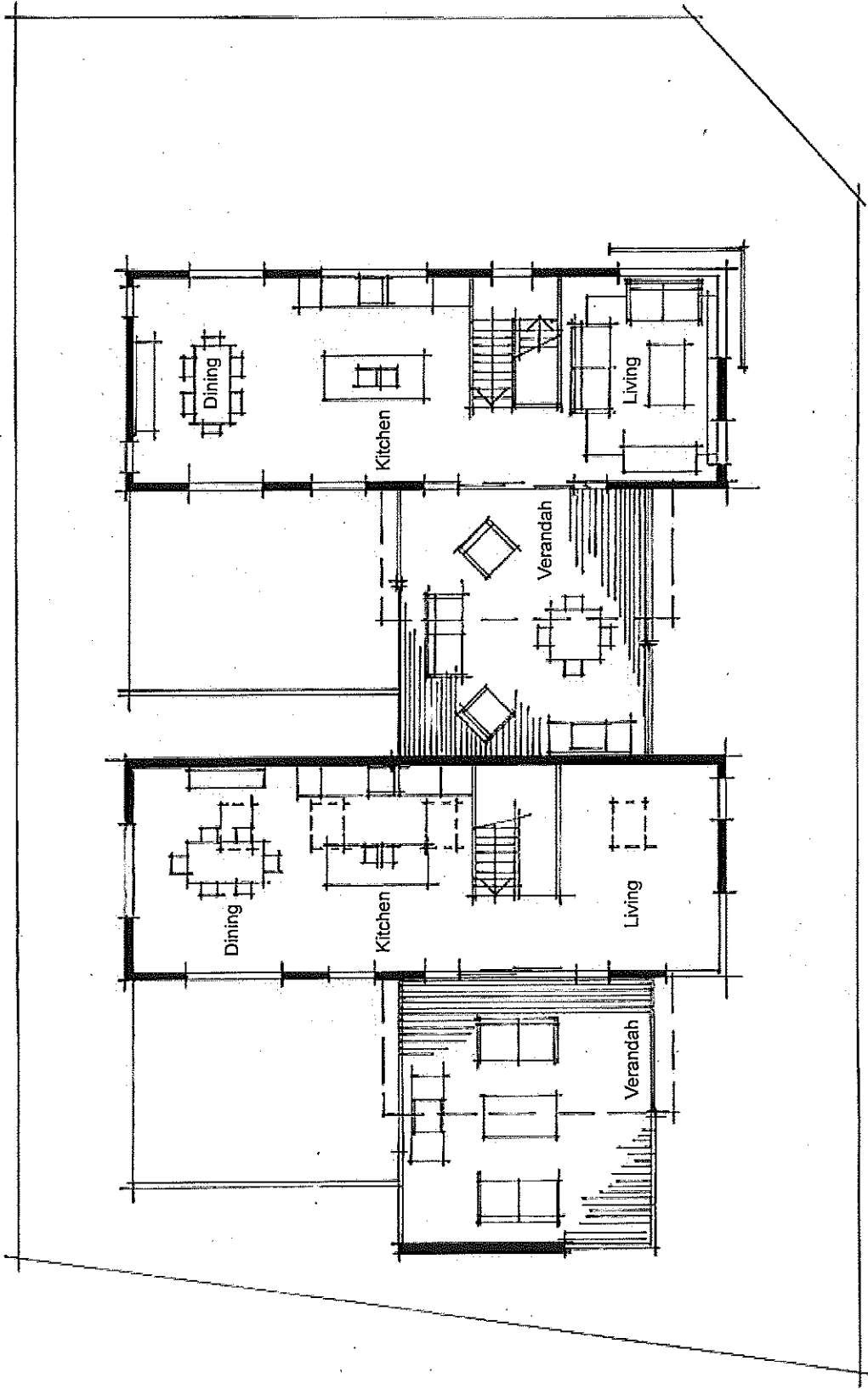
DH A A i t k e n v a l e
DUPLX A i t k e n v a l e

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LOWER LEVEL
ATTACHED



UPPER LEVEL
ATTACHED

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PPLEX

DESIGN



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