Report

Norman Disney & Young

BUILDING SERVICES

3 Moore Street, Port Hedland - Dust Impact Assessment
RFF Australia

CONFIDENTIAL

Revision: 1.0 - DRAFT
Issued: 26 November 2013

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Project Co-ordinator:	Ian Harwood		
Editor:	Ian Harwood		

Table of Contents

1. TOWN OF PORT HEDLAND REQUIREMENTS

We understand that the residential development at 3 Moore Street, Port Hedland is within the West End Residential Zone and within the area bounded by Acton Street and Jacoby Street, Port Hedland. The development plan/design guideline adopted by the council detail the building design and performance standards to reduce exposure to dust and to include, but not necessarily be limited to:

- filtration of incoming air into the building
- location of operable windows and doors on the western and southern building facades only;
- use of deflection screens on the northern and eastern edges of operable windows;
- use of eaves;
- Protective screens and porticos at building entrances to reduce the direct impact of wind onto the opening.
- Note that the location of the site is just outside of the area that would affected by the North Westerly Wind and this has been considered in the recommendation of shielding devices and fixed windows to the site. Refer to Appendix D for site location and Wind Rose causing dust related problems.

1.1. Recommendations to Reduce Dust Ingress

Therefore to maintain an energy efficient design to meet BCA section J requirements we offer the following solutions to mitigate and comply where possible to mitigate the dust issue.

1. Install non operable and operable windows and doors as per marked up drawings enclosed with report.
2. All units are fitted with ducted split air conditioning system. Outside air is filtered and mixed at the unit with return air which is then filtered and conditioned to meet the heating and cooling requirements of the spaces. See notes below on outside air. Filters are to be regularly cleaned. We propose monthly cleaning to address this.
3. The quantity of outside air will be determined by meeting the exhaust air rates, BCA code requirements for mechanical ventilation as well as over supplying to provide a positive pressurisation of the units to stop uncontrolled outside air ingress.
4. The outside air will be provided at a sufficient quantity to pressurise the space to reduce dust being drawn into the building due to wind pressure on the building.
5. The internal and outside air will be filtered to the standards required by the Town development standards. Outside air shall be filter by a coarse filter and higher grade filter of G3, G4 and F5 type filters respectively. The internal air mixed with the filtered outside air will be filtered by a high grade F5 filter.
6. Entry door and balcony doors will be fitted with dust seals.
7. The toilet and bathroom would be fitted with vertical discharge exhaust systems. The exhaust air quality would be 50% lower than the fresh air intake to provide a positive pressure within the unit.
8. Windows on the West and South Facades are to include fixed shields as shown on the sketched but can be open able windows.
9. Windows to the North and South are to be permanently fixed closed.
10. Window seals are to an airtight type seal to prevent dust ingress.
11. All doors (entry and balcony doors included) are to be included with dust brush seals to prevent dust ingress.

12. Any eaves are to be sealed so that dust cannot enter into the roof cavity or rest on the members over the door ways.

We consider these measures demonstrate that the proposed design achieves the same intent as the provisions within Clause 6.3.9 of Town of Port Hedland Planning Scheme No. 5 and Amendment 22.

1.2. Filtration Ratings

The following air filter grade list is for BS EN779 and BS EN1822 tests. The tests apply to filters used for HVAC, controlled zones and other process control requirements.

BS EN 779 arrestance		Test type/application
G1 G2 G3 G4	<65 65<80 80<90 >90	Average value for collection of large particles using synthetic dust. Filters installed to prevent mechanical system fouling and as pre-filters to secondary and semi-HEPA range.

BS EN 779 efficiency %		
F5 F6 F7 F8 F9	40<60 60<80 80<90 90<95 >95	Average percentage value (for atmospheric dust spot efficiency) using atmospheric air. Filters installed to keep buildings and process spaces clean and free from airborne pollution.

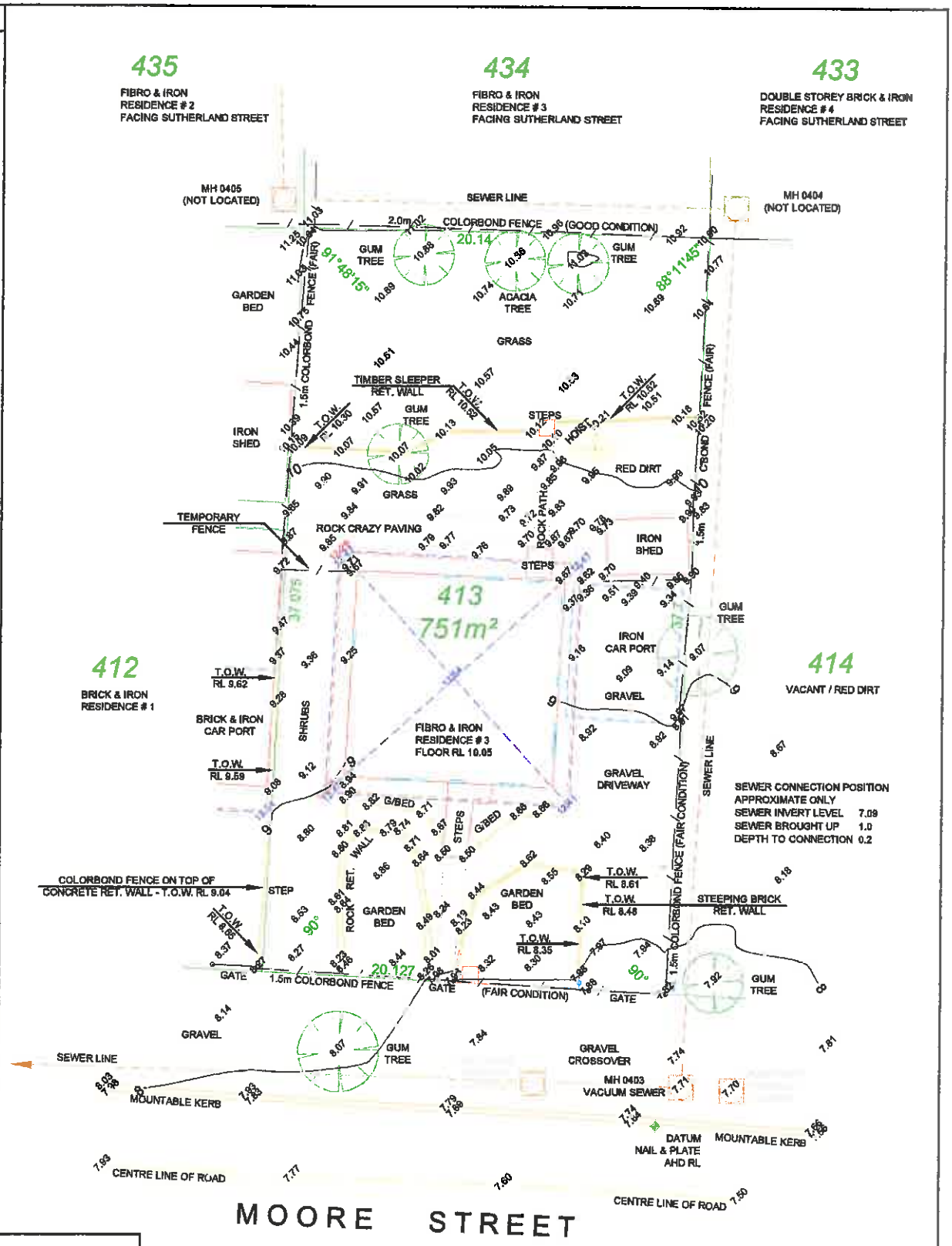
BS EN 1822 minimum MPPS* %		
H10 H11 H12 H13 H14	85 95 99.5 99.95 99.995	EN 1822 – Oil mist aerosol MPPS. Filters for specific (high efficiency) air quality control

1.3. Outside Air Unit

The outside air unit will provide approximately 300 litres a second filtered, pre conditioned outside air to pressurise the space and provide outside air to the areas which do not have openable windows. The unit would generally be located above the entry hall way. The fresh air intake would ideally be located on the east side of the apartments. However given this is not possible for all of the apartments, intakes on the southern facade are also acceptable. The air conditioning units are to be designed and selected to handle Port Hedland conditions and provide an air off condition which leads to a maximum internal humidity in the range of 55% RH ± 5% under design conditions. The unit is also to be selected to handle the additional static pressure capacity required of the filters.

2. APPENDIX A

Sketches Showing Openable and Fixed Openings.



SERVICE LEGEND

WATER
- STOP VALVE — SV
- HYDRANT — HY
- FLUSH POINT — FP
- WATER TAP — TAP
- WATER MARKER — W
- WATER METER — M

DRAINAGE
- SW MANHOLE
- GRATE
- SIDE ENTRY PIT

SEWERAGE
- SEWER MANHOLE
- INSPECT. SHAFT — IS
- INSPECT. OPENING — IO

POWER
- CONSUMER POLE — CP
- POWER POLE — PP
- LIGHT POLE — LP
- STAY POLE — SP
- S. WIRE ANCHOR — SWA
- POWER PIT — P
- CABLE M/H
- CABLE DOME

TELSTRA
- TELSTRA MARKER — T
- TEL / COMMS PIT — TEL
- TELSTRA M/H

GAS
- GAS MARKER — G
- GAS METER — GM
- GAS VALVE — GV

SURVEY
- PEG FOUND — PF
- PEG GONE — PG
- DATUM

OTHER
- WINDOW / DOOR
- MAIL BOX

SERVICE RECORD

SERVICE \ STATUS	LOCATED	AVAILABLE	NO SERVICE	CONFIRM
WATER	✓			
SEWERAGE		✓		✓
GAS			✓	✓
TELSTRA		✓		
POWER U/G	✓			
POWER O/H				

SERVICES MARKED CONFIRM REQUIRE BUILDER / CLIENT TO CONFIRM AVAILABILITY AND / OR POSITION ON SITE.

N

NOTE:
AHD LEVEL DERIVED FROM STANDARD SURVEY MARK PH99.

WARNING!
BOUNDARY RE-ESTABLISHMENT SURVEY REQUIRED TO CONFIRM LOT BOUNDARY POSITION AND DIMENSIONS.

NOTE:
THIS SURVEY WAS PERFORMED USING GPS. EXPECTED ACCURACIES +/- 20mm IN HORIZONTAL AND VERTICAL COORDINATES.

NOTE:
ROOF RIDGE
ROOF EAVES
ROOF AWNING

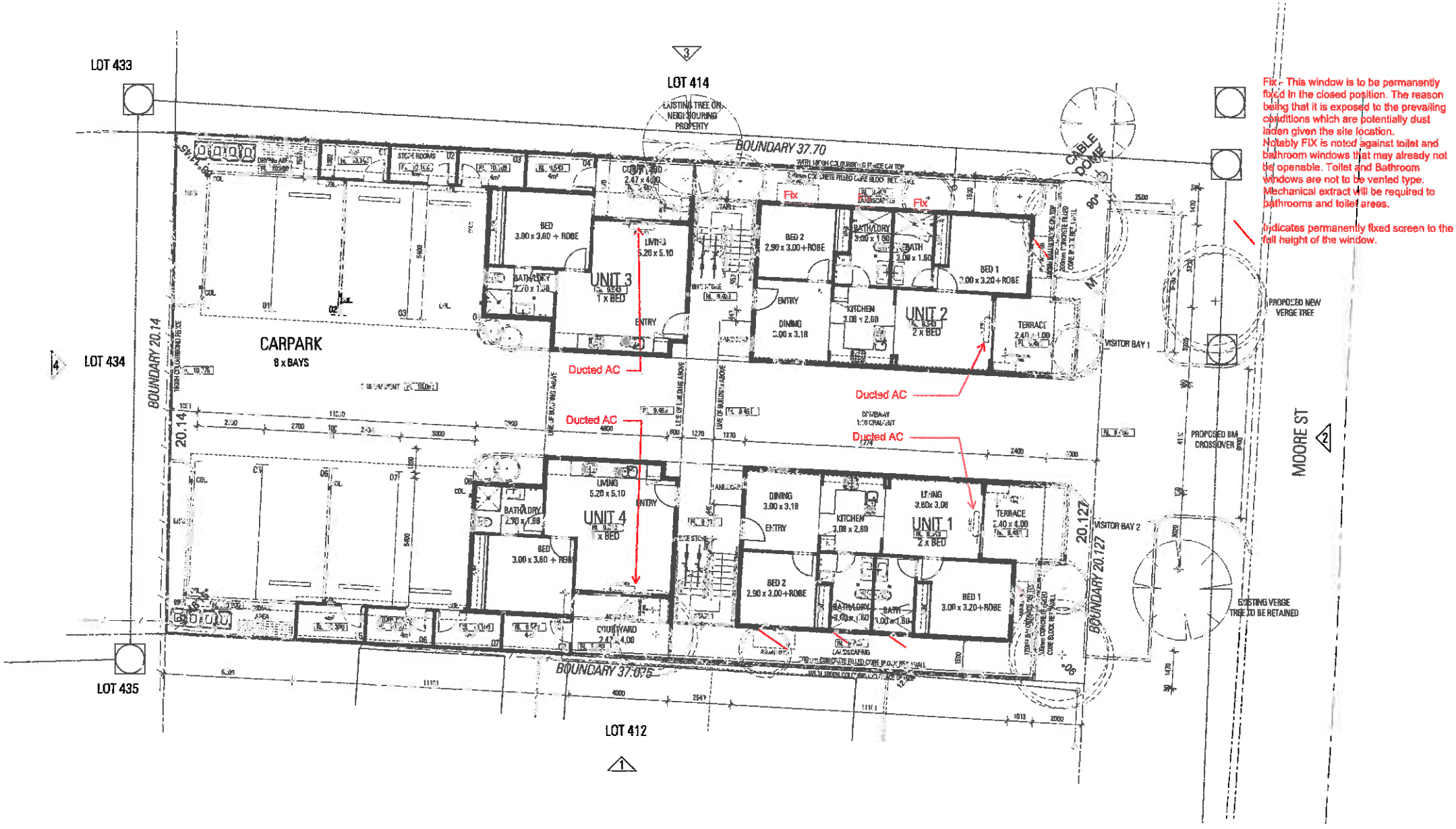
CLIENT	: NICHELIVING CONSTRUCTION	SURVEYED ON	: 08/08/2013	LOT	: 413 (# 3) MOORE STREET
AUTHORITY	: PORT HEDLAND	PROCESSED BY	: NP	SUBURB	: PORT HEDLAND — C/T : 1497 / 745
MAP REF	: COUNTRY — LANDGATE STREET SMART / MELWAY GREATER PERTH STREET DIRECTORY	SURVEYED BY	: JL	BUILDER	: — PLAN 7898

BUILDERS/CLIENTS

SITE SURVEY only. The information shown on this drawing is current as at the Date of Survey. Boundary information, Easements etc. to be verified from the Certificate of Title, Plan/Diagram or a Boundary Report. Boundary position approximate only. Location of boundary pegs or fences in relation to the boundary lines are not guaranteed. Sewer/Drainage may vary from schematic presentation, clearances to be checked on site. Services information to be confirmed with relevant AUTHORITIES. For underground services - ring "DIAL BEFORE YOU DIG" for confirmation of those services.

Land Surveys WA PTY LTD
PO Box 748
BELMONT WA 6984
Telephone (08) 9477 4477
Fax (08) 9477 4499
admin@landsurveys.net.au

SCALE	BUILDER REF No :	JOB No :	DWG No :	REV.
1:200 @ A3 Portrait		1300192	1300192	B



Fix - This window is to be permanently fixed in the closed position. The reason being that it is exposed to the prevailing conditions which are potentially dust laden given the site location.
Notably FIX is noted against toilet and bathroom windows that may already not be openable. Toilet and Bathroom windows are not to be vented type. Mechanical extract will be required to bathrooms and toilet areas.

indicates permanently fixed screen to the full height of the window.

AREAS

UNIT 1 & 2
- FLOOR AREA - 61.02 SQM
- TERRACE AREA - 9.85 SQM
- TOTAL - 70.87 SQM

UNIT 3 & 4
- FLOOR AREA - 50.00 SQM
- TERRACE AREA - 8.59 SQM
- TOTAL - 58.59 SQM

PROJECT TITLE / CLIENT
PROPOSED DEVELOPMENT OF 8 MULTIPLE DWELLINGS
3 MOORE STREET - PORT HEDLAND

DRAWING TITLE
GROUND FLOOR PLAN

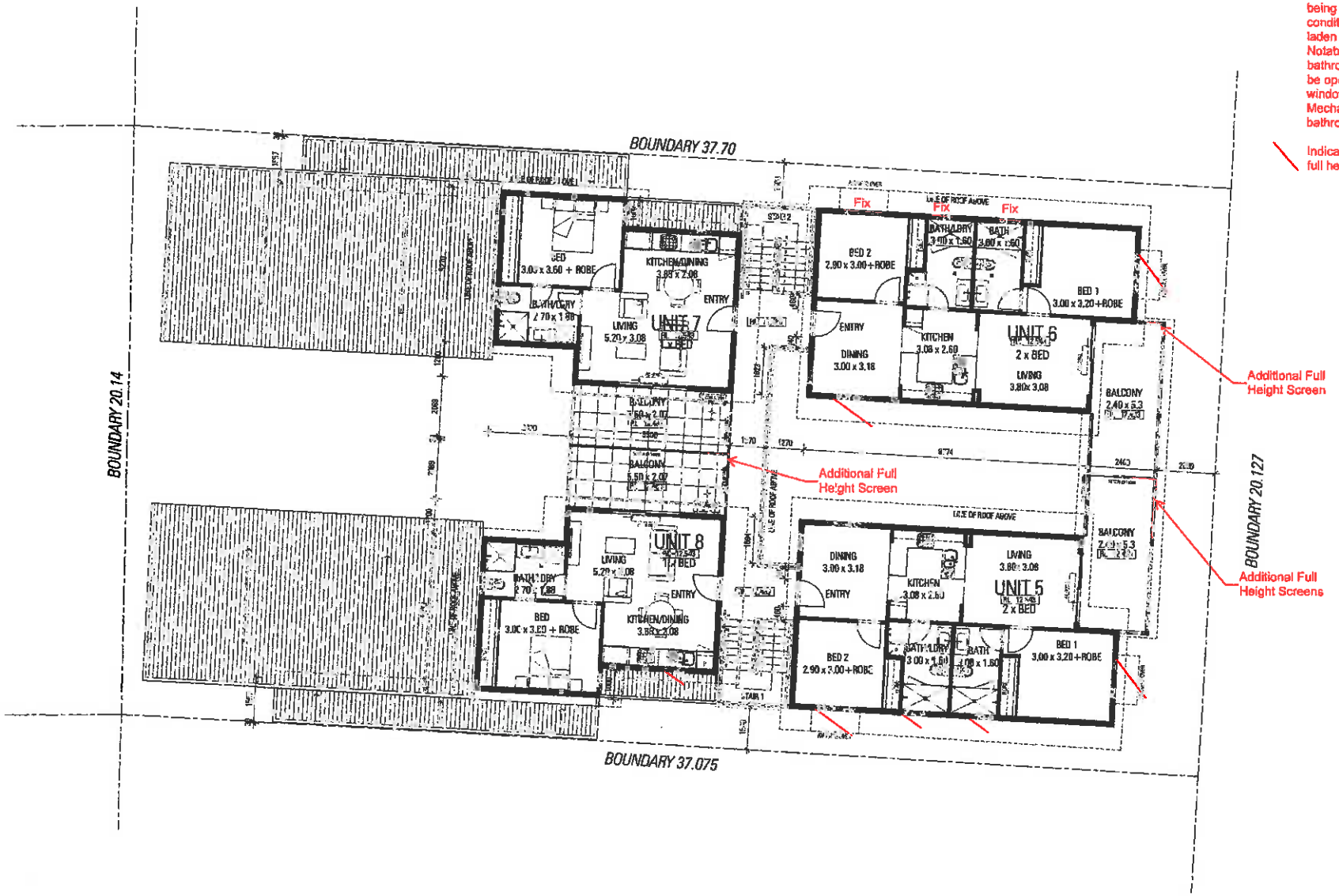
PLANNING APPROVAL

REV	DATE	DESCRIPTION	DR	RZ
B	25.10.13			
A	20.09.13	ISSUED FOR PLANNING	DE	RZ

DRAWN DK | DATE 25.10.13 | SCALE 1:100
CHECKED ..... (RZ) | CAD FILE 1953 sk2.01.dwg
DRAWING NUMBER 1953 SK2.01 | REVISION B

Fix - This window is to be permanently fixed in the closed position. The reason being that it is exposed to the prevailing conditions which are potentially dust laden given the site location.
Notably FIX is noted against toilet and bathroom windows that may already not be openable. Toilet and Bathroom windows are not to be vented type. Mechanical extract will be required to bathrooms and toilet areas.

Indicates permanently fixed screen to the full height of the window.



AREAS

UNIT 5 & 6		
FLOOR AREA	-	68.22 SQM
BALCONY AREA	-	12.79 SQM
TOTAL	-	80.81 SQM
UNIT 7 & 8		
FLOOR AREA	-	70.00 SQM
BALCONY AREA	-	11.38 SQM
TOTAL	-	81.39 SQM

PROJECT TITLE / CLIENT
PROPOSED DEVELOPMENT OF 8 MULTIPLE DWELLINGS
3 MOORE STREET - PORT HEDLAND

DRAWING TITLE
FIRST FLOOR PLAN

REV	DATE	DESCRIPTION	DRWN	APP
B	25.10.13	ISSUED FOR REVIEW		
A	20.09.13	ISSUED FOR PLANNING	DK	FZ

Richard Q
ZUIDEVELD HUR

DRAWN	DK	DATE	25.10.13
SCALE	1:100		
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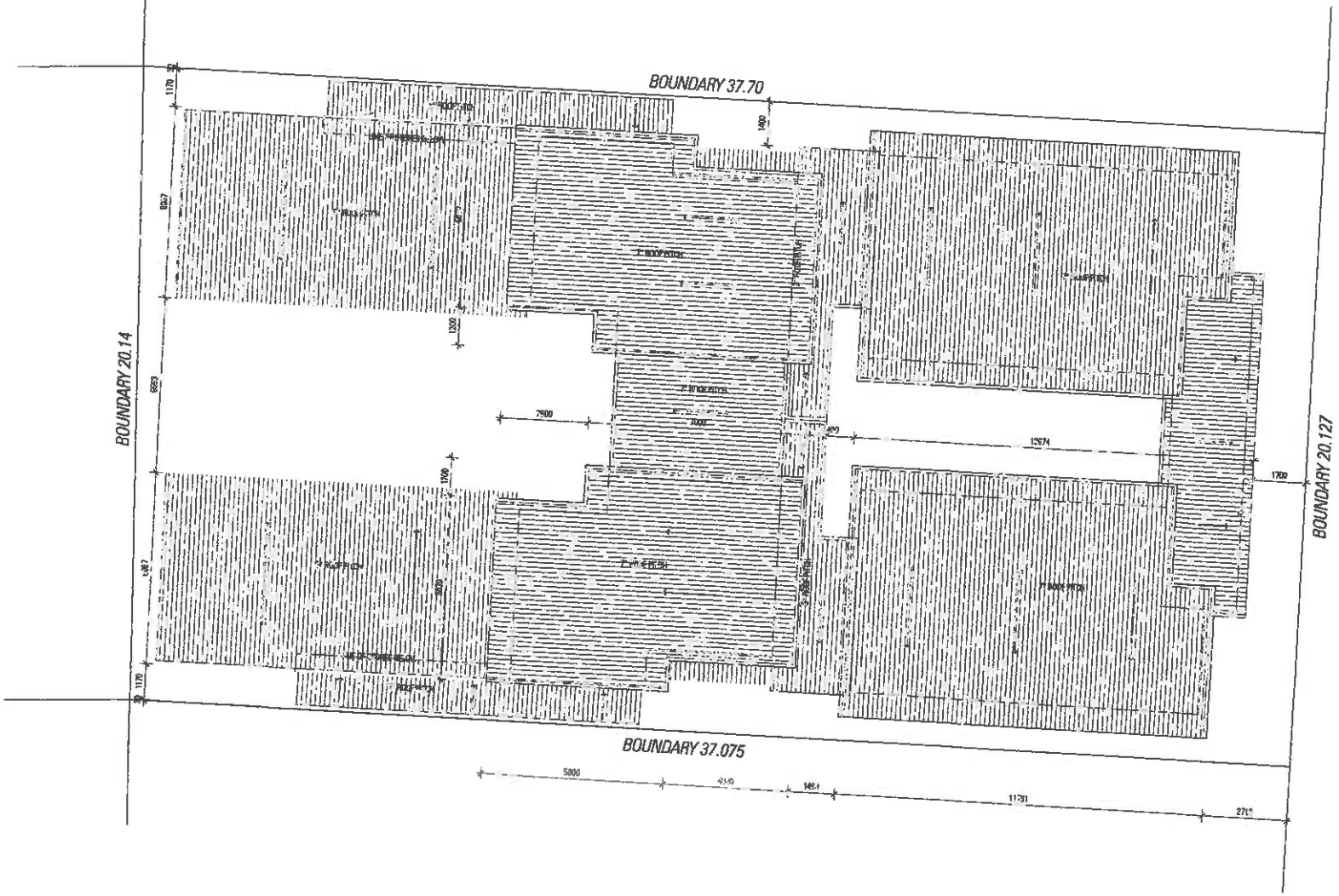
DRAWING NUMBER	1953 SK2.02	REVISION	B



N

PROJECT TITLE / CLIENT
PROPOSED DEVELOPMENT OF 8 MULTIPLE DWELLINGS
3 MOORE STREET - PORT HEDLAND

DRAWING TITLE
ROOF PLAN

PLANNING APPROVAL

REV	DATE	DESCRIPTION	DWN	APPR
B	25.10.13	ISSUED FOR PLANNING	DK	FZ
A	20.09.13	ISSUED FOR PLANNING		

ZUIDEVELD HUR

DRAWN	DK	DATE	25.10.13
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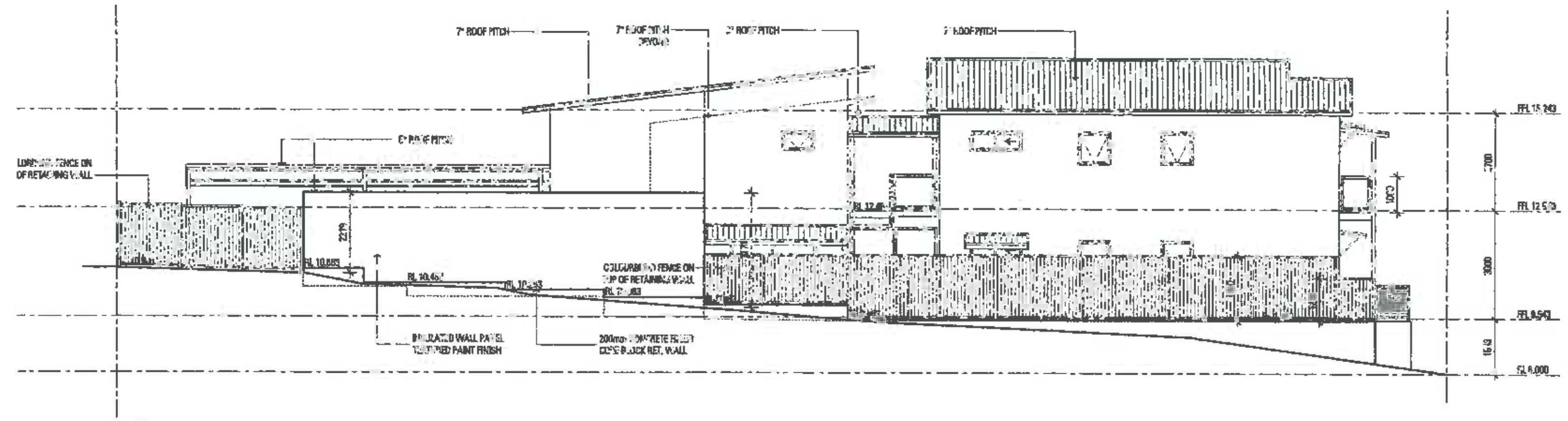
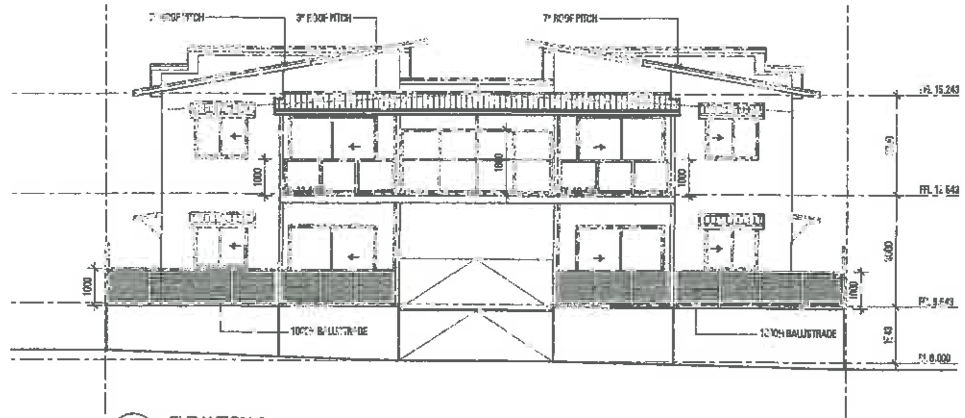
REVISION	B		



01 ELEVATION 1
SCALE 1:100



02 ELEVATION 2
SCALE 1:100

PROJECT TITLE / CLIENT
PROPOSED DEVELOPMENT OF 8 MULTIPLE DWELLINGS
3 MOORE STREET - PORT HEDLAND
DRAWING TITLE
ELEVATIONS

PLANNING APPROVAL

REV	DATE	DESCRIPTION	DWN	APPR
B	25.10.13	ISSUED FOR REVIEW		
A	20.09.13	ISSUED FOR PLANNING	DK	FZ

ZUIDEVELD

HUB

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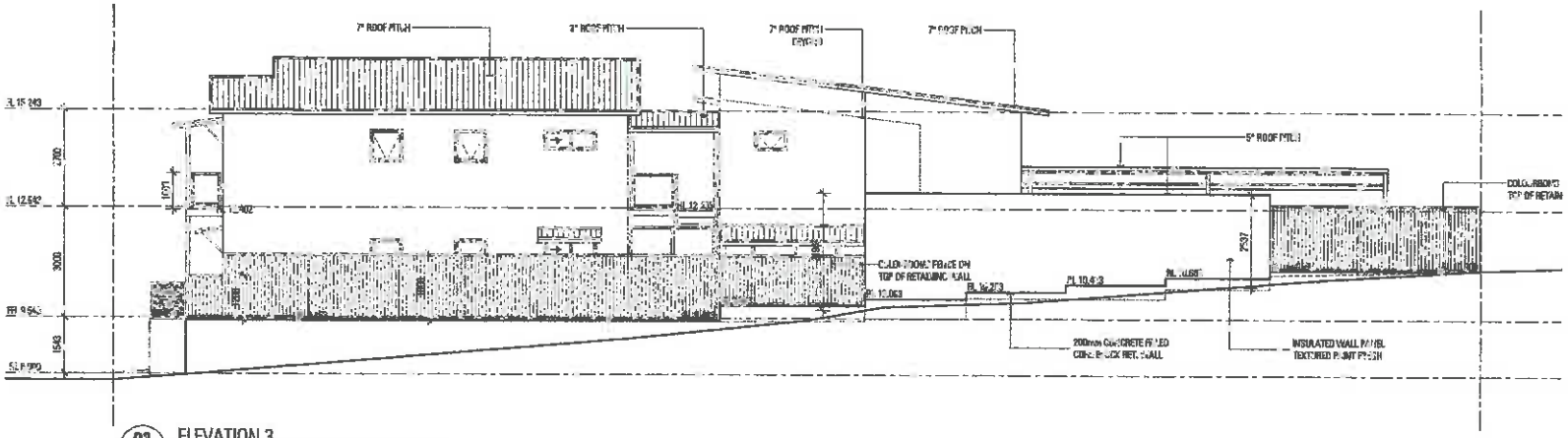
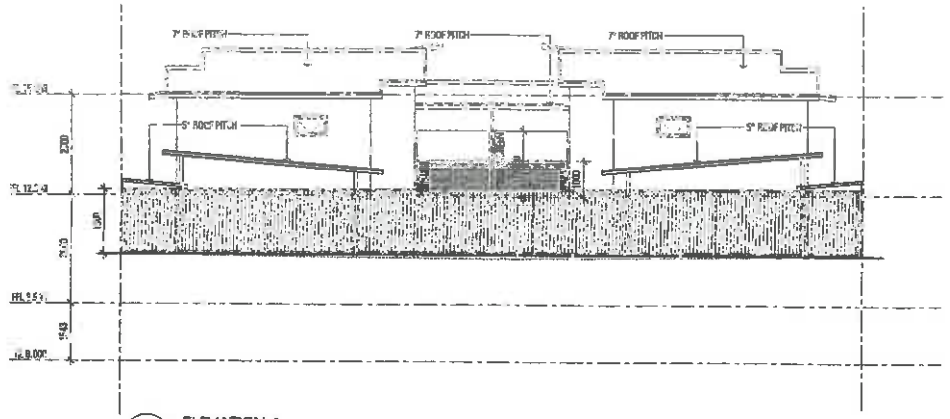
REVISION A



03 ELEVATION 3
SCALE 1:100



04 ELEVATION 4
SCALE 1:100

PROJECT TITLE / CLIENT
PROPOSED DEVELOPMENT OF 8 MULTIPLE DWELLINGS
3 MOORE STREET - PORT HEDLAND

DRAWING TITLE
ELEVATIONS

PLANNING APPROVAL

REV	DATE	DESCRIPTION	DRWN	AUTH
B	22.10.13	ISSUED FOR REVIEW		
A	20.09.13	ISSUED FOR PLANNING	DK	EZ

ZUIDEVELD HUR

DRAWN DK	DATE 25.10.13	SCALE 1:100
CHECKED ..... (PZ)		CAD FILE 1953 sk3.01.dwg
DRAWING NUMBER 1953 SK3.02		REVISION B

3. APPENDIX B

Extract from CA&MJ Lommers Pty Ltd

Report Pages 56-57.

The following figure 3 illustrates how air flows around rectangular buildings. It can been established from the streamlines, in the illustration, that wind velocities on the leeward side of the building are lower than the windward side due to the re-circulating of wind down-wind from the building.

This reduction in wind velocity may provide air-borne dust opportunity to settle out of the air and not be drawn into the building.

3. WINDOW AND DOOR ORIENTATION (cont.)

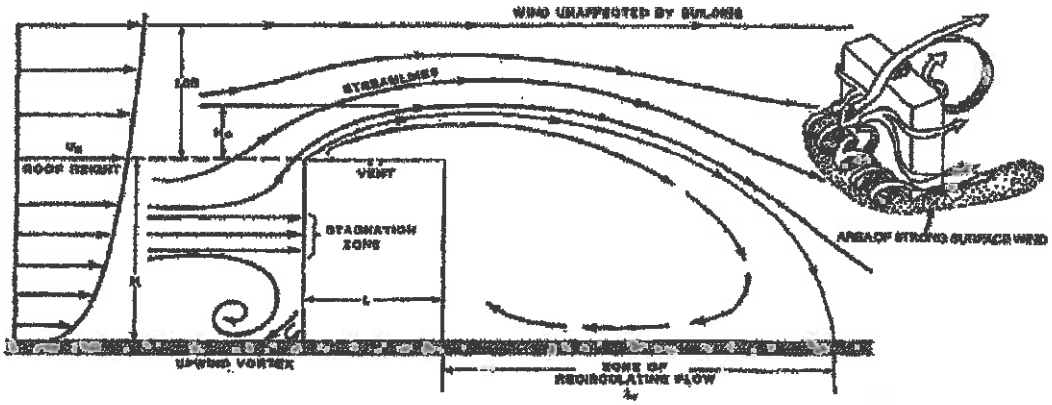
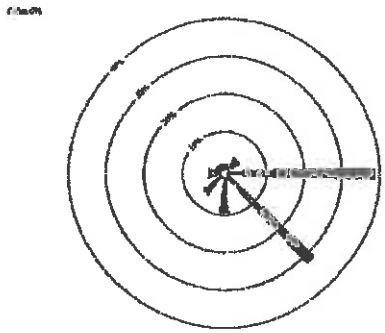


Figure 3 – Flow Patterns around a Rectangular Building (ASHRAE – Fundamentals 2001)

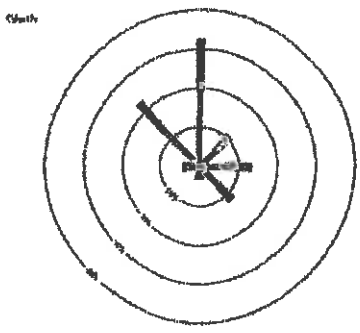
For this reason, openings should be limited to walls on the leeward side of the prevailing winds in Port Hedland.

We have assessed wind rose data for the area, provided by the Bureau of Meterology, and as such it can be concluded that operable openings on Northern or Eastern facades should be avoided to reduce direct ingress of airborne dust particles.

The prevailing winds in the Northern Dry Season (May to September) indicate the vast majority of the time the wind comes from East-South-Easterly in the morning swinging around to North-Nor-Westerly in the afternoon.(5)



Wind Rose - Dry Season – 9am



Wind Rose - Dry Season – 3pm

Figure 4a & 4b – Wind Rose Illustrations for Port Hedland (Bureau of Meteorology)

Protective screens or louvers may be implemented to reduce the direct impact of winds onto the windows and produce slow moving re-circulating air zones such as those depicted in Figure 3. In the same manner, eaves provided at roof level are expected to function in a similar way.

By reducing the localised wind velocity, it expected more dust will settle out from the air, lessening ingress into the dwelling.

3. WINDOW AND DOOR ORIENTATION (cont.)

Windows on the west facades should be protected on the left hand side of the opening, windows on the south facade should be protected on the right hand side of the opening.

These screens should be the full height of the windows and designed such that wind may be directed away from the window whilst still maintaining vision out of the window.

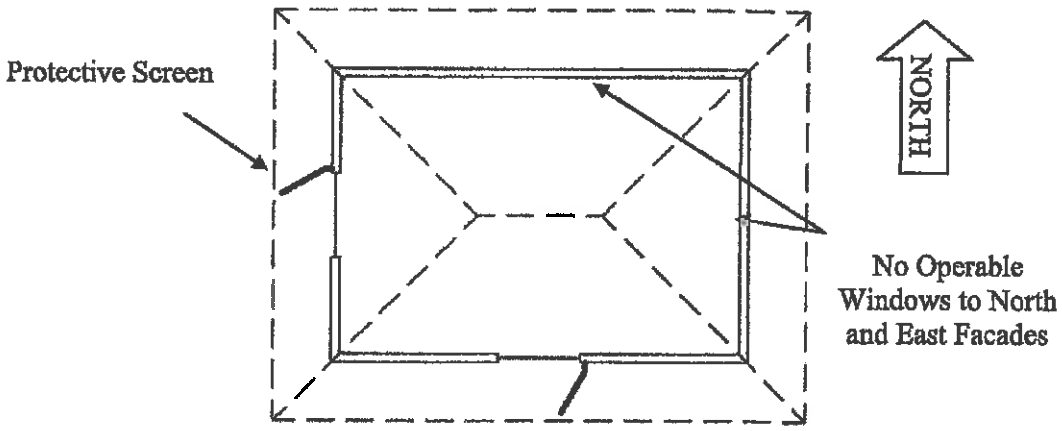


Figure 5 – Window and Deflection Screen Locations

High density developments and high roofs of buildings can be effective to create a building boundary layer that may reduce the direct air-flow into the building. (4)

By grouping dwellings together atmospheric boundary layers are formed, reducing the local wind velocity in proportion to the height and density of building.

Orienting buildings such that wind-tunnelling effects of prevailing winds amplifying wind velocity should be avoided.

Protective screens and porticos in front of the main building entrance may be of assistance to reduce the direct impact of wind onto the opening.