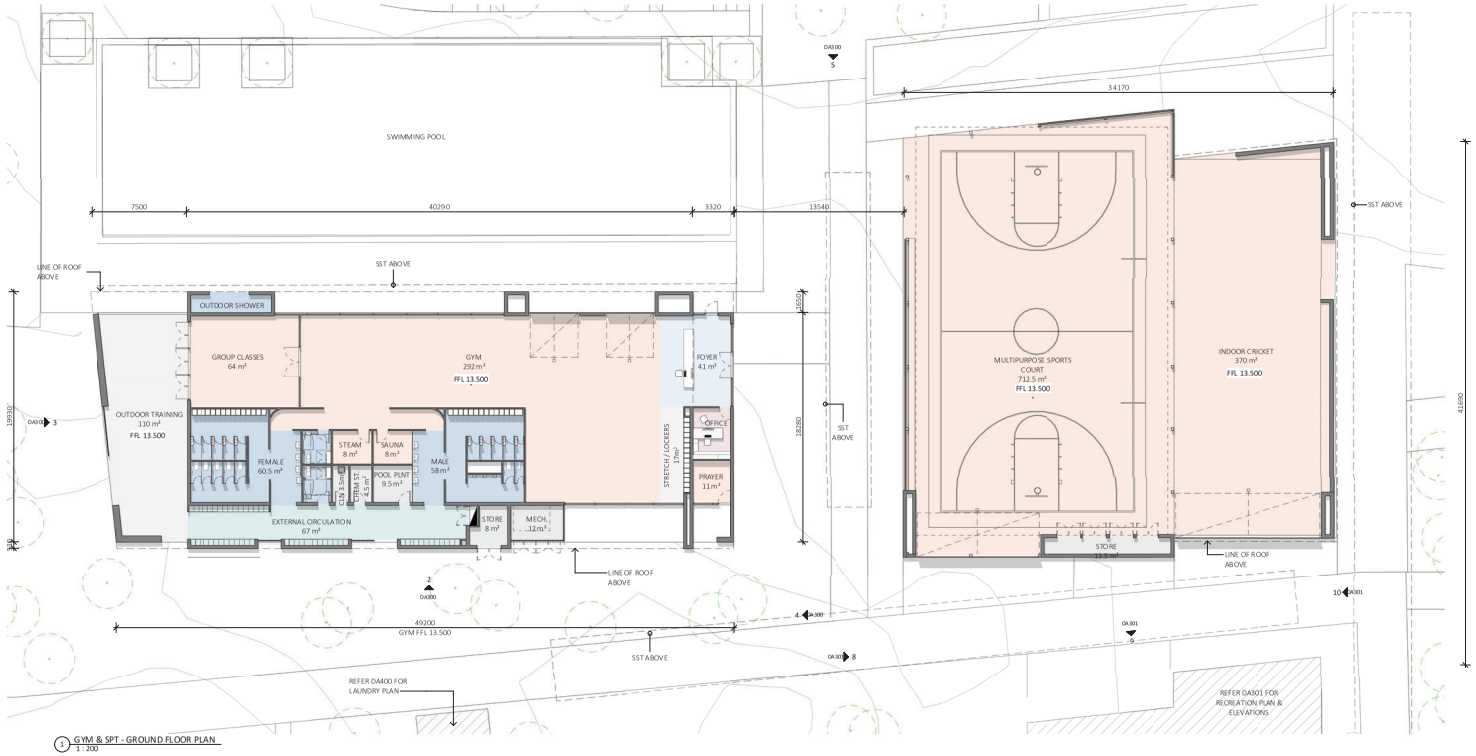
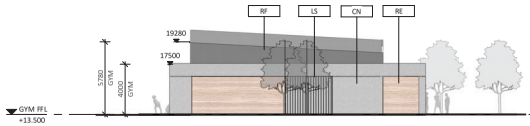


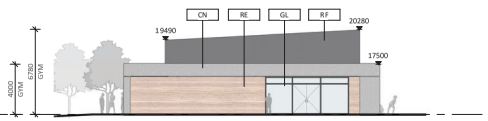
1 GYM & SPT - GROUND FLOOR PLAN
1 : 200

2 GYM - ELEVATION SOUTH
1 : 200

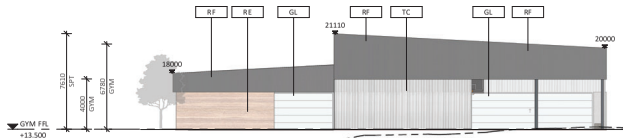
SPT - ELEVATION SOUTH



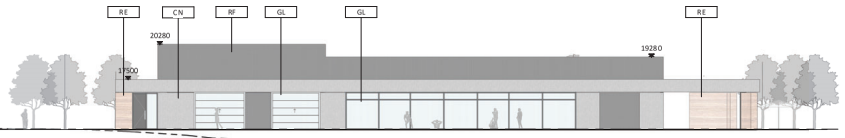
3 GYM - ELEVATION WEST
1 : 200



4 GYM - ELEVATION EAST
1 : 200



5 SPT - ELEVATION NORTH
1 : 200



GYM - ELEVATION NORTH

669

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LEGEND

ADM	ADMINISTRATION
AMEN	AMENITIES
ANC	ANCILLIARY - GATE HOUSE, SURVEILLANCE HUT & STORES
OOT	OUTDOOR CRICKET
FBC	FIRE BOOSTER CABINET
FPR	FIRE PUMP ROOM
GEN	GENERATOR
GH	GATE HOUSE
GLF	MINI GOLF
GYM	GYMNASIUM & SWIMMING FACILITY
IND	TRAINING & INDUCTIONS
IRM	INTAKE RING MAIN
I-REC	INDOOR RECREATION
LCA	LOCKERS, CHANGEROOMS & ABLUTIONS
LDR	LAUNDRY, CLEANING & STORE
MED	MEDICAL & WELLNESS
O-REC	OUTDOOR RECREATION
RST	RESTAURANT
SMSB	SITE MAIN SWITCH BOARD
SPT	MULTI PURPOSE COURTS
SUT	STEP UP TRANSFORMER
SWM	SWIMMING POOL
TVN	TAVERN
VLB	OUTDOOR VOLLEYBALL
WPR	WATER PUMP ROOM
SST	SHADE STRUCTURE

AREA SCHEDULE

ROOM	AREA
AMENITIES	0.00 m²
GYMNASIUM	1560.27 m²
INDOOR RECREATION	671.80 m²
MULTI-PURPOSE COURTS	1096.04 m²

FECA & UCA AREAS

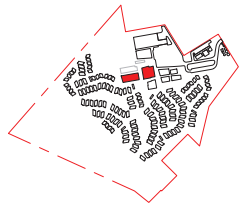
BUILDING	AREA TYPE	AREA
GYM	FECA	549.55 m²
GYM	UCA	190.22 m²
GYM	UCA	71.54 m²
GYM	UCA	50.61 m²
GYM	UCA	961.96 m²
INDOOR RECREATION	FECA	962.47 m²
INDOOR RECREATION	UCA	21.82 m²
INDOOR RECREATION	UCA	7.85 m²
INDOOR RECREATION	UCA	18.75 m²
INDOOR RECREATION	UCA	25.42 m²
INDOOR RECREATION		526.31 m²
MULTI-PURPOSE COURTS	UCA	1111.48 m²
MULTI-PURPOSE COURTS		1111.48 m²
TOTAL: 10		2599.75 m²

MATERIAL LEGEND

CODE	DESCRIPTION
CN	CONCRETE FINISH
GL	FIXED/OPERABLE GLAZING
LS	LIGHTWEIGHT SCREEN
RE	EARTHMED EARTH
RF	METAL DECK ROOF SHEETING
TC	TRANSLUCENT CLADDING

FOH
Circulation
Recreational
Office
Outdoor
Service room
Amenities
Wet Area

KEY PLAN



F	31/08/21	DA ISSUE
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C	10/08/21	DRAFT DA ISSUE
B	04/08/21	ISSUE FOR INFORMATION
A	30/07/21	ISSUE FOR INFORMATION
NO.	DATE	DESCRIPTION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
L1, 49 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieucreative.com

PROJECT
LOT 300 MOCHA BEACH ROAD
ONSLOW WA 6710

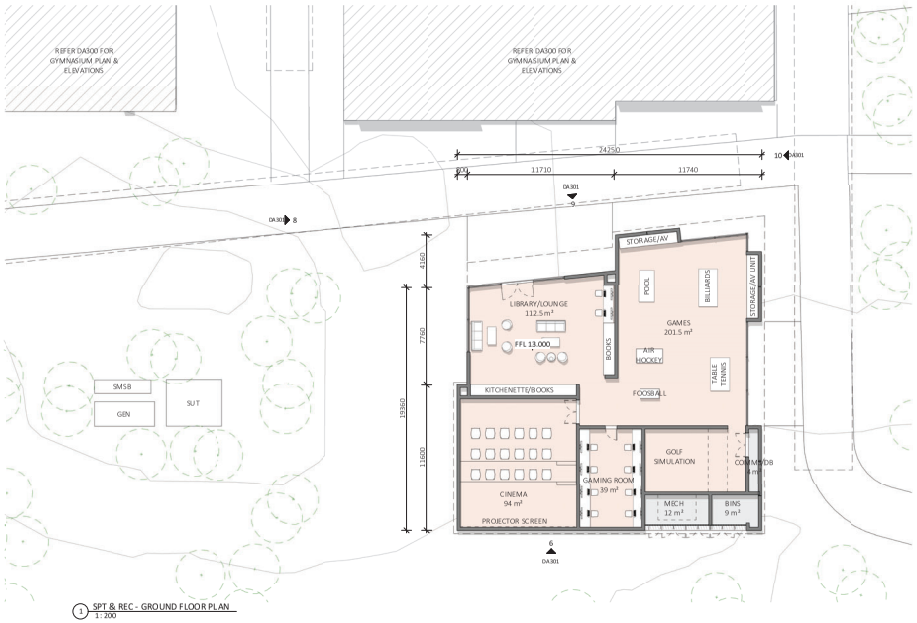
PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
GYM & SPT - FLOOR PLAN & ELEVATIONS

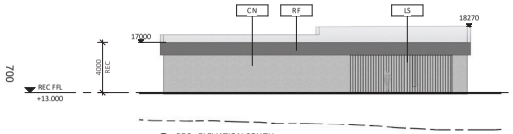
DRAWN	SCALE	DATE	REVISION
MS	As indicated	30/07/21	F
CHECKED	SHEET	PROJECT NO	
JF	A1	2106 01	

DA300

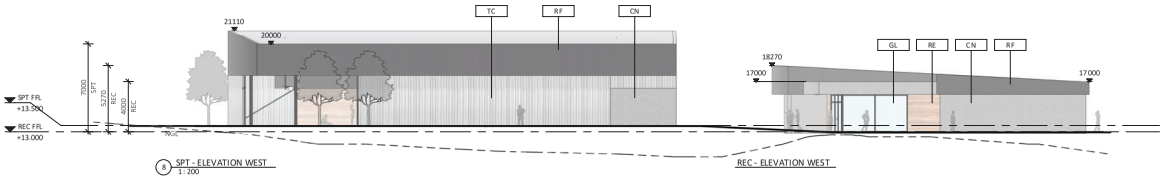
Attachment 13.2A - DAP21/02078 -DA 21-67 | L300 Back Beach Road, Onslow



1 SPT & REC - GROUND FLOOR PLAN
1: 200

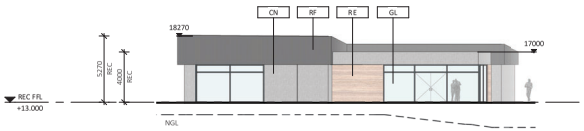


6 REC - ELEVATION SOUTH
1: 200

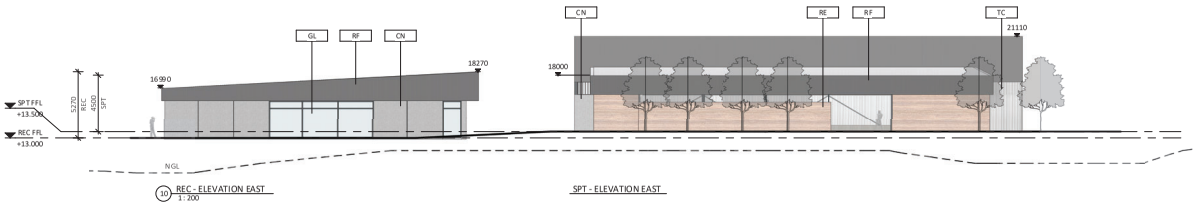


8 SPT - ELEVATION WEST
1: 200

REC - ELEVATION WEST



9 REC - ELEVATION NORTH
1: 200



10 REC - ELEVATION EAST
1: 200

SPT - ELEVATION EAST

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LEGEND

ADM	ADMINISTRATION
AMN	AMENITIES
ANC	ANCILLIARY - GATE HOUSE, SURVEILLANCE HUT & STORES
CRT	OUTDOOR CRICKET
FBC	FIRE BOOSTER CABINET
FPR	FIRE PUMP ROOM
GEN	GENERATOR
GH	GATE HOUSE
GLF	MINI GOLF
GYM	GYMNASIUM & SWIMMING FACILITY
IND	TRAINING & INDUCTIONS
IRM	INTAKE RING MAIN
I-REC	INDOOR RECREATION
LCA	LOCKERS, CHANGEROOMS & ABLUTIONS
LDR	LAUNDRY, CLEANING & STORE
MED	MEDICAL & WELLNESS
O-REC	OUTDOOR RECREATION
RST	RESTAURANT
SMSB	SITE MAIN SWITCH BOARD
SPT	MULTI-PURPOSE COURTS
SUT	STEP UP TRANSFORMER
SWM	SWIMMING POOL
TVN	TAVERN
VLB	OUTDOOR VOLLEYBALL
WPR	WATER PUMP ROOM
SST	SHADE STRUCTURE

AREA SCHEDULE

ROOM	AREA
AMENITIES	0.00 m²
GYMNASIUM	4547.27 m²
INDOOR RECREATION	471.80 m²
MULTI-PURPOSE COURTS	1096.04 m²

FECA & UCA AREAS

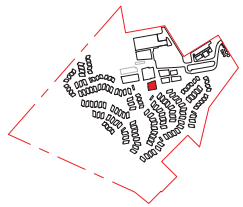
BUILDING	AREA TYPE	AREA
GYM	FECA	649.59 m²
GYM	UCA	190.22 m²
GYM	UCA	71.54 m²
GYM	UCA	311.61 m²
GYM		961.96 m²
INDOOR RECREATION	FECA	462.47 m²
INDOOR RECREATION	UCA	21.82 m²
INDOOR RECREATION	UCA	7.85 m²
INDOOR RECREATION	UCA	8.75 m²
INDOOR RECREATION	UCA	25.42 m²
INDOOR RECREATION		526.31 m²
MULTI-PURPOSE COURTS	UCA	1111.48 m²
MULTI-PURPOSE COURTS		1111.48 m²
TOTAL: 10		2599.75 m²

MATERIAL LEGEND

CODE	DESCRIPTION
CN	CONCRETE FINISH
GL	FIXED/OPENABLE GLAZING
LS	LIGHTWEIGHT SCREEN
RE	RAW FIBRE EARTH
RF	METAL DECK ROOF SHEETING
TC	TRANSLUCENT CLADDING

Recreational
Office
Service room
Amenities

KEY PLAN



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B	04/08/21	ISSUE FOR INFORMATION
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NO.	DATE	DESCRIPTION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
L1, 49 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieucreative.com

PROJECT
LOT 500 ANCHOR BEACH ROAD
ONSLOW WA 6710

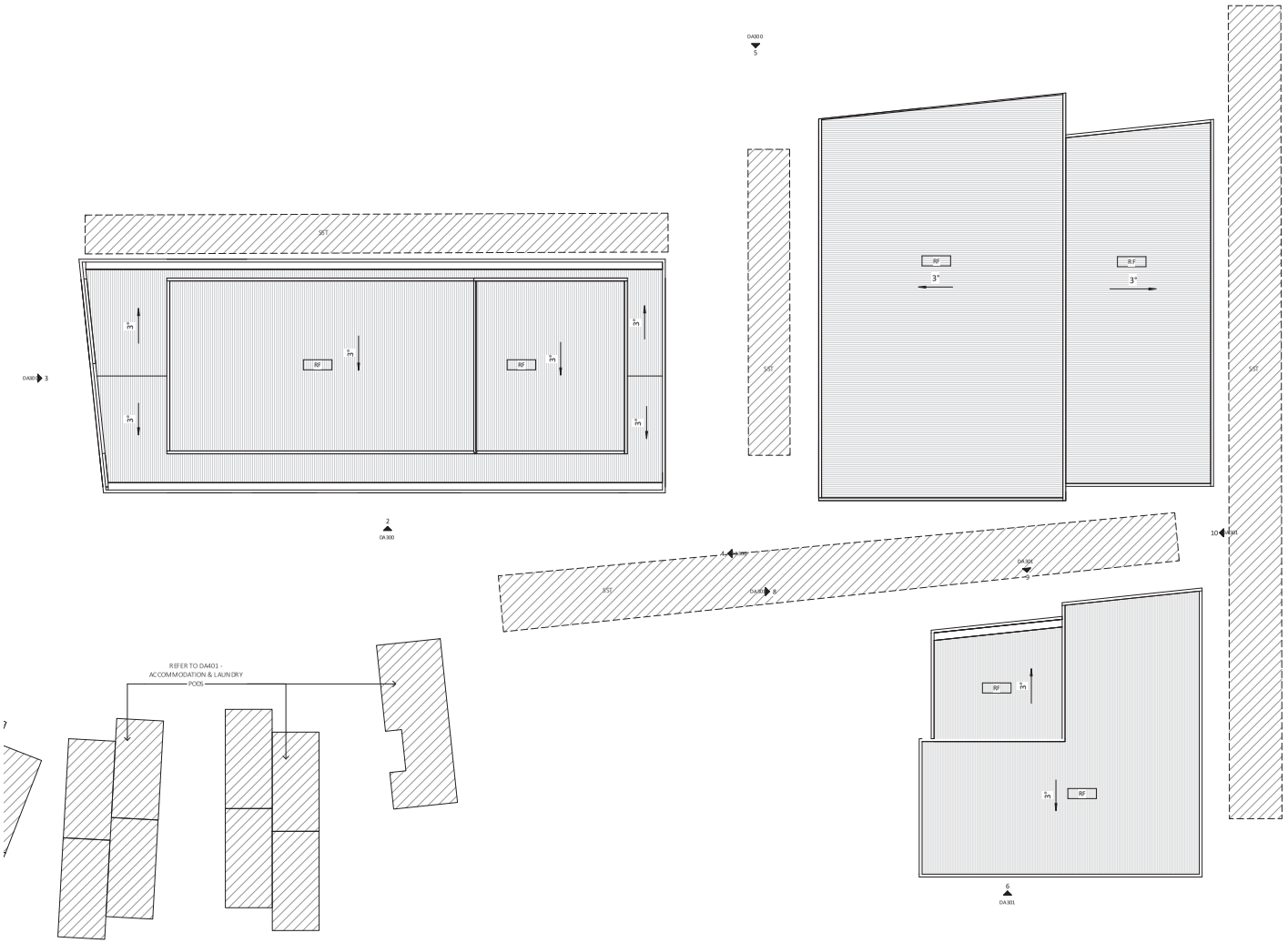
PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
I-REC - FLOOR PLAN & ELEVATIONS

DRAWN	SCALE	DATE	REVISION
MS	As indicated	30/07/21	F
CHECKED	SHEET	PROJECT NO	
JF	A1	2106.01	

DA301

Attachment 13.2A - DAP/21/02078 - DA 21-67 | L300 Back Beach Road, Onslow



1 GYM, SPT & REC - ROOF PLAN
1 : 200

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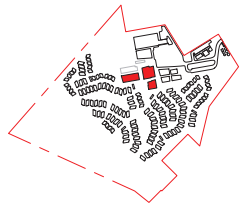
LEGEND

ADM	ADMINISTRATION
AMN	AMENITIES
ANC	ANCILLARY - GATE HOUSE, SURVEILLANCE HUT & STORES
OCT	OUTDOOR CRICKET
FBC	FIRE BOOSTER CABINET
FPR	FIRE PUMP ROOM
GEN	GENERATOR
GH	GATE HOUSE
GLF	MINI GOLF
GYM	GYMNASIUM & SWIMMING FACILITY
IND	TRAINING & INDUCTIONS
IRM	INTAKE RING MAIN
I-REC	INDOOR RECREATION
LCA	LOCKERS, CHANGEROOMS & ABLUTIONS
LDR	LAUNDRY, CLEANING & STORE
MED	MEDICAL & WELLNESS
OREC	OUTDOOR RECREATION
RST	RESTAURANT
SMSB	SITE MAIN SWITCH BOARD
SPT	MULTI-PURPOSE COURTS
SUT	STEP UP TRANSFORMER
SWM	SWIMMING POOL
TVN	TAVERN
VLB	OUTDOOR VOLLEYBALL
WPR	WATER PUMP ROOM
SST	SHADE STRUCTURE

MATERIAL LEGEND	
CODE	DESCRIPTION
RF	METAL DECK ROOF SHEETING

KEY PLAN



NO.	DATE	DESCRIPTION
D	31/08/21	DA ISSUE
C	20/08/21	ISSUE FOR INFORMATION
B	10/08/21	DRAFT DA ISSUE
A	04/08/21	ISSUE FOR INFORMATION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
L1, 49 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieucreative.com

PROJECT
LOT 300 MACKEREL CH ROAD
ONSLOW WA 6710

PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

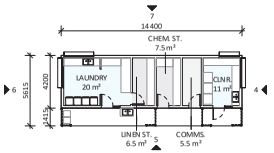
DRAWING
GYM, SPT & I-REC - ROOF PLAN

DRAWN	SCALE	DATE	REVISION
MS	As indicated	04/08/21	D
CHECKED	SHEET	PROJECT NO	
JF	A1	2106 01	

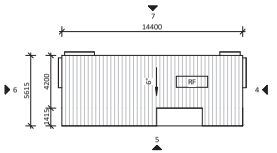
DA302

Attachment 13.2A - DAP/21/02078 -DA 21-67 | L300 Back Beach Road, Onslow

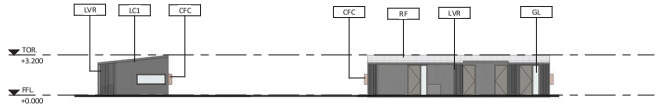
1 ACCOMMODATION PARTIAL PLAN
1 : 200



2 LAUNDRY FLOOR PLAN
1 : 200

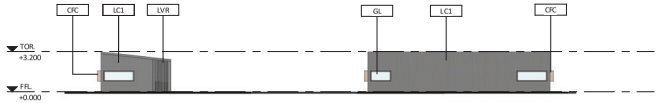


3 LAUNDRY - ROOF PLAN
1 : 200



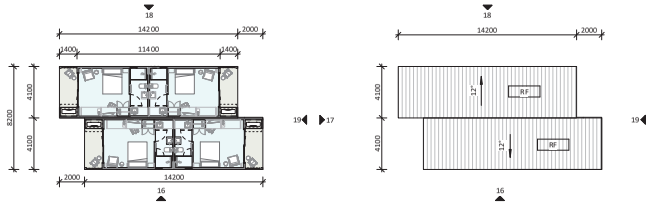
4 LAUNDRY ELEVATION EAST
1 : 200

5 LAUNDRY ELEVATION SOUTH
1 : 200



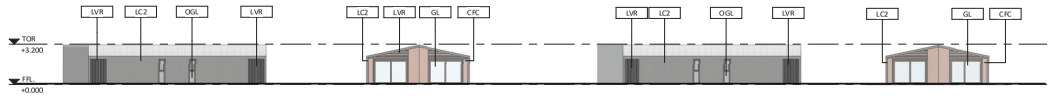
6 LAUNDRY ELEVATION WEST
1 : 200

7 LAUNDRY ELEVATION NORTH
1 : 200



14 ACCOMMODATION TYPE A (DUAL) - FLOOR PLAN
1 : 200

15 ACCOMMODATION TYPE A - ROOF PLAN
1 : 200

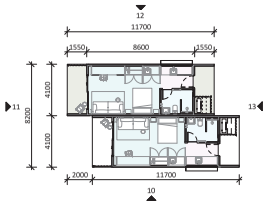


16 ACCOMMODATION TYPE A - ELEVATION SOUTH
1 : 200

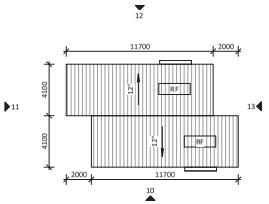
17 ACCOMMODATION TYPE A - ELEVATION WEST
1 : 200

18 ACCOMMODATION TYPE A - ELEVATION NORTH
1 : 200

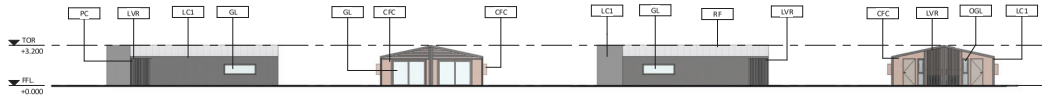
19 ACCOMMODATION TYPE A - ELEVATION EAST
1 : 200



8 ACCOMMODATION TYPE B (SINGLE) - FLOOR PLAN
1 : 200



9 ACCOMMODATION TYPE B - ROOF PLAN
1 : 200

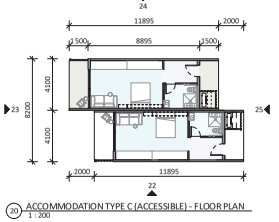


10 ACCOMMODATION TYPE B - ELEVATION SOUTH
1 : 200

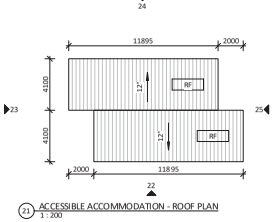
11 ACCOMMODATION TYPE B - ELEVATION WEST
1 : 200

12 ACCOMMODATION TYPE B - ELEVATION NORTH
1 : 200

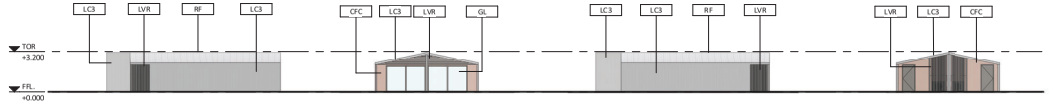
13 ACCOMMODATION TYPE B - ELEVATION EAST
1 : 200



20 ACCOMMODATION TYPE C (ACCESSIBLE) - FLOOR PLAN
1 : 200



21 ACCESSIBLE ACCOMMODATION - ROOF PLAN
1 : 200



22 ACCESSIBLE ACCOMMODATION - ELEVATION SOUTH
1 : 200

23 ACCESSIBLE ACCOMMODATION - ELEVATION WEST
1 : 200

24 ACCESSIBLE ACCOMMODATION - ELEVATION NORTH
1 : 200

25 ACCESSIBLE ACCOMMODATION - ELEVATION EAST
1 : 200

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LEGEND

ADM	ADMINISTRATION	Other
AMN	AMENITIES	Service room
ANC	ANCILLARY - GATE HOUSE, SURVEILLANCE HUT, STORES	
CKT	OUTDOOR CRICKET	Wet Area
FBC	FIRE BOOSTER CABINET	
FPR	FIRE PUMP ROOM	Alfresco
GEN	GENERATOR	
GH	GATE HOUSE	Entry
GLF	MINI GOLF	
GYM	GYMNASIUM & SWIMMING FACILITY	Living/Bedroom
IND	TRAINING & INDUCTIONS	
IRM	IN-STAKE RING MAIN	Wet Areas
I-REC	INDOOR RECREATION	
LCK	LOCKERS, CHANGEROOMS & ABLUTIONS	
LDR	LAUNDRY, CLEANING & STORE	
MED	MEDICAL & WELLNESS	
O-REC	OUTDOOR RECREATION	
RST	RESTAURANT	
SMSB	SITE MAIN SWITCH BOARD	
SPT	MULTI PURPOSE COURTS	
SUT	STEPLIP TRANSFORMER	
SWM	SWIMMING POOL	
TVN	TAVERN	
VLB	OUTDOOR VOLLEYBALL	
WPR	WATER PUMP ROOM	
SST	SHADING STRUCTURE	

MATERIAL LEGEND

CODE	DESCRIPTION
CFC	CARBON FIBRE REINFORCED CARBON
GL	FIXED/OPERABLE GLAZING
LC1	LIGHTWEIGHT CLADDING - WOODLAND GREY
LC2	LIGHTWEIGHT CLADDING - WALLABY
LC3	LIGHTWEIGHT CLADDING - DUNE
LVR	LOUVRE SCREEN
OGL	OBSCURE FIXED/OPENABLE GLAZING
PC	POWDER COAT
RF	METALLOOK ROOF SHEETING

RECA ANDUCA AREAS

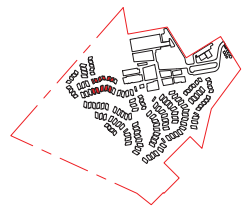
BUILDING	AREA TYPE	AREA
LAUNDRY	RECA	53.20 m²
LAUNDRY	UCA	20.58 m²
LAUNDRY		73.58 m²
TYPE A	RECA	28.81 m²
TYPE A	RECA	28.81 m²
TYPE A	UCA	5.32 m²
TYPE A	UCA	5.42 m²
TYPE A		52.35 m²
TYPE B	RECA	31.54 m²
TYPE B	UCA	5.89 m²
TYPE B	UCA	5.92 m²
TYPE B		43.35 m²
TYPE C	RECA	32.28 m²
TYPE C	UCA	5.70 m²
TYPE C	UCA	5.73 m²
TYPE C		43.71 m²
TOTAL		213.00 m²

ACCOMMODATION CLADDING LOCATION PLAN

LC1 - WOODLAND GREY CLADDING
LC2 - WALLABY CLADDING
LC3 - DUNE CLADDING

NOTE: CLADDING SHOWN ON ELEVATIONS NOT TYPICAL TO ACCOMMODATION TYPE. REFER TO ABOVE PLAN FOR CLADDING COLOUR ZONES

KEY PLAN



NO.	DATE	DESCRIPTION
E	31/08/21	DA ISSUE
D	21/08/21	ISSUE FOR INFORMATION
C	18/08/21	ISSUE FOR PRICING
B	10/08/21	DA DRAFT ISSUE
A	04.08.21	ISSUE FOR INFORMATION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
L1, 48 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieu creative.com

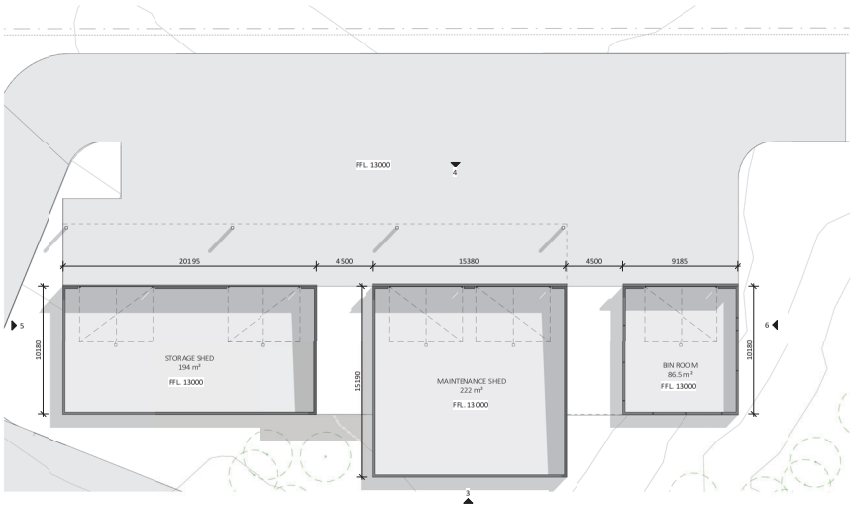
PROJECT
LOT 301, 34 OX BEACH ROAD
ONSLOW WA 6710

PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
ACCOM & LDRY POD - FLOOR PLAN & ELEVATIONS

DRAWN	SCALE	DATE	REVISION
SW	As indicated	04.08.21	E
CHECKED	SHEET	PROJECT NO	
JF	A1	210301	

DA400



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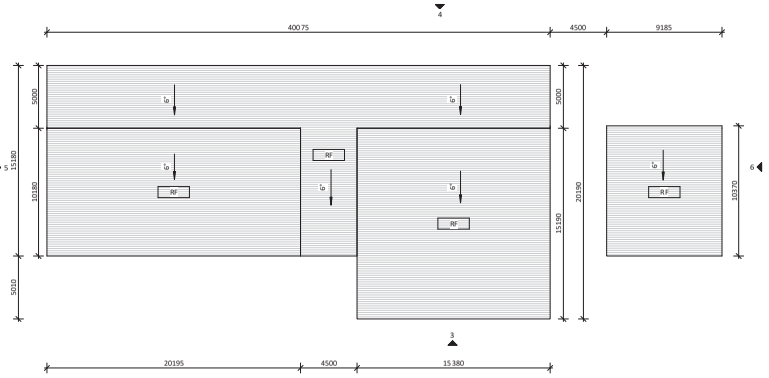

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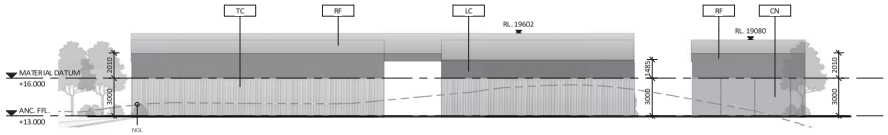

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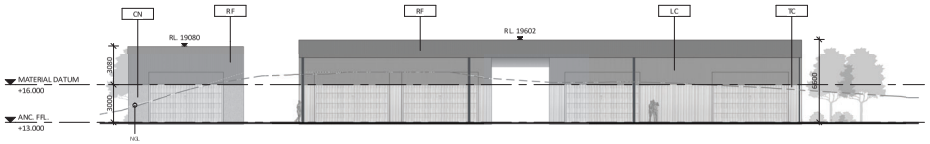

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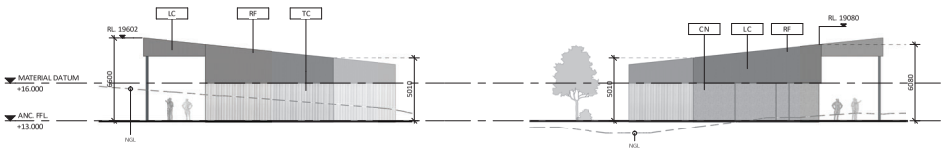


5 ANC - ELEVATION EAST
1 : 200

6 ANC - ELEVATION WEST
1 : 200

LEGEND

ADM	ADMINISTRATION
AMN	AMENITIES
ANC	ANCILLARY - GATE HOUSE, SURVEILLANCE HUT & STORES
OST	OUTDOOR ON CHOST
FBC	FIRE BOOSTER CABINET
FPR	FIRE PUMP ROOM
GEN	GENERATOR
GH	GATE HOUSE
GLF	MINI GOLF
GYM	GYM NASIUM & SWIMMING FACILITY
IND	TRAINING & INDUCTIONS
INM	INTAKE MAINTAIN
I-REC	INDOOR RECREATION
LCA	LOCKERS, CHANGEROOMS & ABLUTIONS
LDR	LAUNDRY, CLEANING & STORE
MED	MEDICAL & WELLNESS
O-REC	OUTDOOR RECREATION
RST	RESTAURANT
SMSB	SITE MAIN SWITCH BOARD
SPT	MULTI-PURPOSE COURTS
SUT	STEP-UP TRANSFORMER
SWM	SWIMMING POOL
TVN	TAVERN
VLB	OUTDOOR VOLLEYBALL
WPR	WATER PUMP ROOM
SST	SHADE STRUCTURE

AREA SCHEDULE

ROOM	AREA
SERVICE ROOM	222.15 m²
SERVICE ROOM	194.09 m²
SERVICE ROOM	86.29 m²

FCA & UCA AREAS

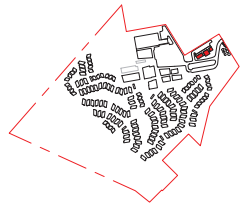
BUILDING	AREA TYPE	AREA
BIN ROOM	FCA	86.29 m²
BIN ROOM		86.29 m²
MAINTENANCE SHED	FCA	222.15 m²
MAINTENANCE SHED		222.15 m²
SHED C COVERED AREA	UCA	246.17 m²
SHED C OVERED AREA		246.17 m²
STORAGE SHED	FCA	194.21 m²
STORAGE SHED		194.21 m²

MATERIAL LEGEND

CODE	DESCRIPTION
CN	CONCRETE FINISH
LC	LIGHTWEIGHT CLADDING
RF	METAL DECK ROOF SHEETING
TC	TRANSLUCENT CLADDING

SERVICE ROOM

KEY PLAN



NO.	DATE	DESCRIPTION
C	23/08/21	DA ISSUE
B	06/08/2021	DRAFT DA ISSUE
A	04/08/2021	ISSUE FOR INFORMATION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
LEVEL 1, 448 STIRLING HIGHWAY, PEPPERMINT GROVE 6011
milieucreative.com

PROJECT
LOT 300, 14 MOKI BEACH ROAD
ONSLOW WA 6710

PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
ANC - FLOOR PLAN & ELEVATIONS

DRAWN	SCALE	DATE	REVISION
CS	As indicated	04.08.21	C
CHECKED	SHEET	PROJECT NO	
JP	A1	210601	

DA500

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VIEW FROM MAIN CARPARK

VIEW ACROSS OVAL TO RESTAURANT & TAVERN

VIEW OF ACCOMMODATION PODS

AERIAL VIEW OF ACCOMMODATION VILLAGE

B	31/08/21	DA ISSUE
A	10/08/21	DRAFT DA ISSUE
NO.	DATE	DESCRIPTION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
LL, 418 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieucreative.com

PROJECT
LOT 501 MACLEOD ROAD
ONSLOW WA 6710

PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
VISUALISATIONS

DRAWN MS	SCALE	DATE 10/08/21	REVISION B
CHECKED JF	SHEET A1	PROJECT NO J210601	DA600

ROWE GROUP

ATTACHMENT 5

COASTAL HAZARD ASSESSMENT

m p rogers & associates pl ABN 14 062 681 252
creating better coasts and ports

R1569 Rev 1

August 2021

Rowe Group

Onslow Township Village Coastal Hazard Risk Management & Adaptation Planning

marinas
boat harbours
canals
breakwaters
jetties
seawalls
dredging
reclamation
climate change
waves
currents
tides
flood levels
water quality
siltation
erosion
rivers
beaches
estuaries

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w: www.coastsandports.com.au

K1905, Report R1569 Rev 1
Record of Document Revisions

Rev	Purpose of Document	Prepared	Reviewed	Approved	Date
A	Draft for MRA review	M Peterson	M Rogers	M Rogers	03/08/21
0	Issued to Client	M Peterson	M Rogers	M Rogers	03/08/21
1	Updated with Client Comments	M Peterson			31/08/21

Form 035 18/06/2013

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1. Introduction

Mineral Resources Limited (MRL) are investigating the feasibility of developing a resort on Lot 300 Back Beach Road, Onslow. It would be used by their fly in fly out (FIFO) workers. As part of this process, a Development Application is required. To assist with the progression of the Development Application MRL engaged Rowe Group (Rowe) to coordinate a consultant team. The proposed development known as Onslow Township Village, is located on the coastline of Beadon Point to the northwest of the Onslow Town Centre (refer Figure 1.1).

Figure 1.1 Approximate Proposed Location of Development

As the development is located on the coast, an assessment of the possible impacts of coastal hazards on the development is required to inform the development application. This assessment of the coastal hazards will be completed through the Coastal Hazard Risk Management and Adaptation Planning (CHRMAP) guidelines in the State Coastal Planning Policy. To complete the CHRMAP, Rowe engaged specialist coastal and port engineers M P Rogers & Associates Pty Ltd.

1.1 State Coastal Planning Policy (SPP 2.6)

Within Western Australia, State Planning Policy 2.6: State Coastal Planning Policy (SPP2.6; WAPC 2019) provides guidance for land use and development decision-making within the coastal zone, including the establishment of coastal foreshore reserves to protect, conserve and enhance coastal values. SPP2.6 also provides guidance on the assessment of coastal hazard risks for assets located in close proximity to the coast.

The objectives of SPP2.6 are wide ranging, however a key component of the policy is the identification of appropriate areas for the sustainable use of the coast. This includes use for recreational, tourism and commercial purposes, which are relevant to the intended future development of the Onslow Township Village.

The guidance on the assessment of coastal hazard risk is provided within SPP2.6 in the form of a methodology to assess the potential extent of coastal hazard impacts, as well as for the development of a CHRMAP report. Further details in this regard are also provided in the CHRMAP Guidelines (WAPC 2019).

The key requirement of CHRMAP is to develop a risk based adaptation framework for assets that could be at risk of impact by coastal hazards over the relevant planning timeframe. Importantly, the balance of these risks needs to be considered with reference to the expected lifetime of the relevant assets.

2. Context

2.1 Purpose

The potential vulnerability of the coastline and the subsequent risk to the community, economy and environment needs to be considered for any coastal development.

SPP2.6 requires that the responsible management authority completes CHRMAP where an existing or proposed development may be at risk from coastal hazards over the planning timeframe. The main purpose of the CHRMAP is to define areas of the coastline which could be vulnerable to coastal hazards and to outline the intended approach to the monitoring and management of these hazards where required.

CHRMAP can be a powerful planning tool to help provide clarity to existing and future developers, users, managers or custodians of the coastline. This is done by defining levels of risk exposure, management practices and adaptation techniques that the management authority considers acceptable in response to the present and future risks posed by coastal hazards.

Specifically, the purpose of this CHRMAP is as follows:

- Determine the specific extent of coastal hazards in relation to the Onslow Township Village development.
- Determine the coastal hazard risks associated with the Onslow Township Village development.
- Establish the basis for present and future risk management and adaptation.
- Provide guidance on appropriate management and adaptation planning for the future, including monitoring.

2.2 Objectives

The key objectives of this CHRMAP are as follows:

- Inform the development of the Onslow Township Village.
- Ensure that MRL, Rowe and key stakeholders understand the potential likelihood of the development being impacted by coastal hazards over the 100 year planning timeframe.
- Outline the required coastal adaptation approach in an Implementation Plan that is acceptable to MRL, Rowe and key stakeholders.

2.3 Scope

The CHRMAP Guidelines (WAPC 2019) provide a specific framework for the preparation of a CHRMAP. This is outlined in the flowchart presented in Figure 2.1 which shows the risk management process adapted to coastal planning.

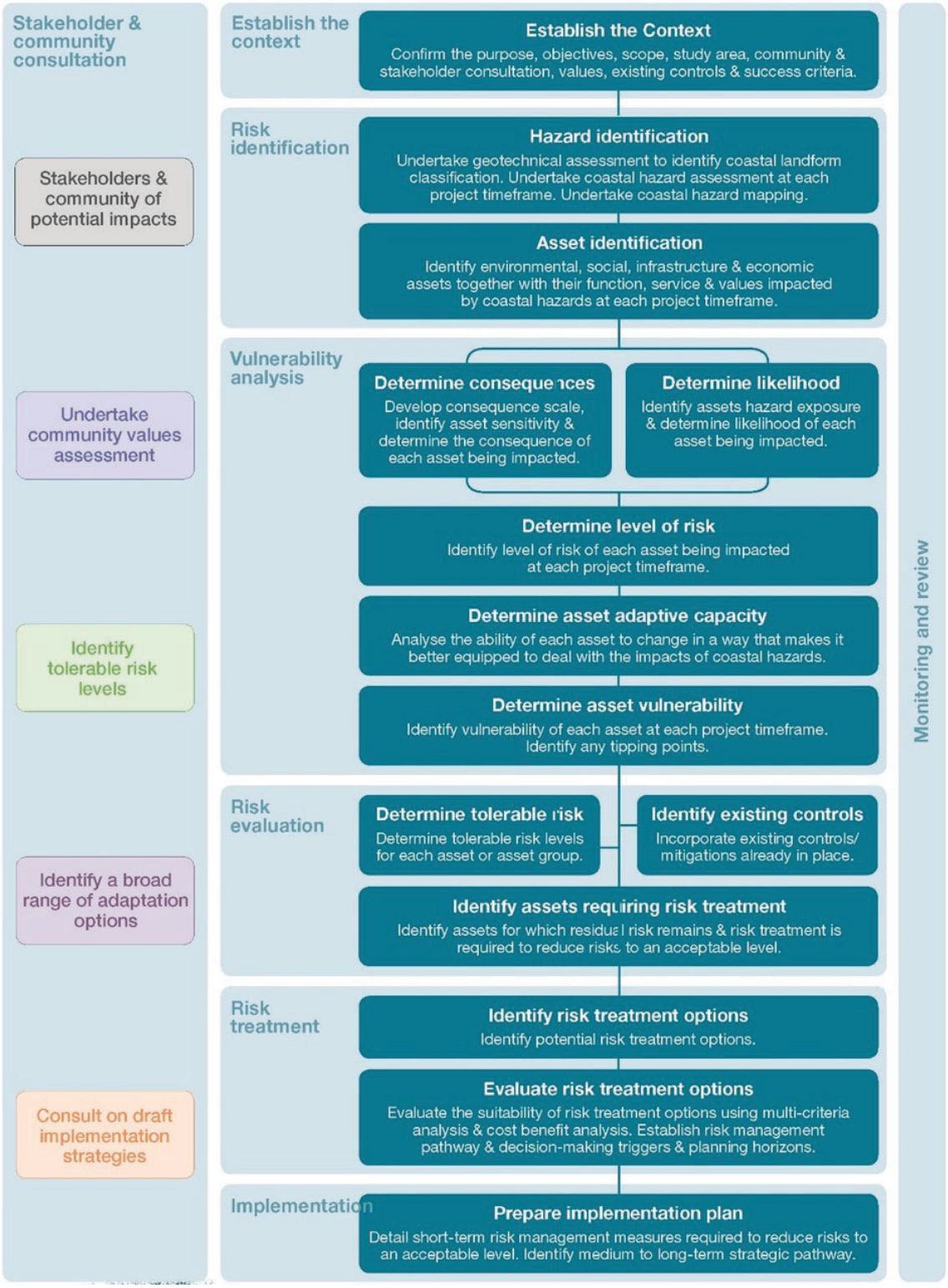


Figure 2.1 Risk Management & Adaptation Process Flow Chart (WAPC 2019)

As presented in the flowchart, the process for the development of a meaningful CHRMAP process requires a number of fundamental inputs. These inputs enable the assessment and analysis of

risk, which should ultimately be informed by input received from key stakeholders, to help shape the subsequent adaptation strategies.

The development of the Onslow Township Village will require an adaptation plan that is acceptable to all stakeholders. As a result, the approach that has been taken for this plan is to develop a management methodology that allows for flexibility into the future, given the inherent uncertainties associated with long term coastal behaviour.

The development of the adaptation plan will be informed by the assessment of the coastal erosion and inundation hazards at the site. The identification of the coastal erosion and inundation hazards for the Onslow Township Village is presented within Section 3 of this report.

This CHRMAP will consider the potential risks posed by coastal hazards over a range of horizons covering the 100 year planning timeframe. This planning timeframe is required by SPP2.6 for development on the coast, though it is noted that the lifetime of a structure on the coastline is unlikely to span this 100 year planning timeframe without requiring reconstruction.

Based on the results of the risk assessment, risk mitigation strategies will be developed, where required, in order to provide a framework for future management. However, it is important to realise that the risk assessment will be based on the outcomes of the coastal vulnerability assessment, which, by their nature, are justifiably conservative. This is due to the uncertainty around coastal dynamics when predicting impacts over long timeframes. As a result, the framework for future risk management strategies should be considered to be a guide of future requirements.

2.4 The Site

The Onslow Township Village is planned to be located on Lot 300 Back Beach Road in Onslow. Lot 300 is located adjacent to the coast on Beadon Point and as such provides easy access to both the beach and Onslow's town centre. The highest part of the site is located in the northeast corner with the remainder of the site slopping towards the west and south. The south western portion of the site is culturally significant to the local Thalanyji people and as such will not be developed.

A preliminary masterplan for the proposed development prepared by Milieu Creative is presented in Figure 2.2.

Figure 2.2 Preliminary Masterplan (Provided by Milieu Creative 2021)

The preliminary masterplan includes the following.

- A culturally significant area in the south western portion of the site which is not being developed.
- Approximately 500 accommodation pods.
- Recreational facilities including an oval, a pool, a gym and a recreation room.
- Administrative and service facilities including a restaurant, a medical centre and administration.

3. Coastal Hazards

The Shire of Ashburton (Shire) engaged Cardno to complete a CHRMAP report for the Onslow Coast (Cardno 2017). As part of this process Cardno completed a coastal hazard assessment of the Onslow Coast which includes the coastal area of the Onslow Township Village (Cardno 2016). The methods, assumptions and results of the coastal hazard assessment are detailed in Cardno (2016), a summary is provided below for context.

3.1 Coastal Erosion Hazard

At the Onslow Township Village site, Cardno calculated the Horizontal Shoreline Datum (HSD) to be the 2.4 mAHD contour.

As part of their assessment Cardno broke the Onslow Coast into a number of sections, the Onslow Township Village is located across sections 1 and 2. The extent of erosion in a 100 year Average Recurrence Interval (ARI) storm event was calculated by Cardno to be 19 m behind the HSD in section 1 and 7 m behind the HSD in section 2.

Using historical aerial images of the coastline between 1969 and 2015, the long term trends of beach accretion and erosion were examined. Cardno adopted an historical accretion rate of 0.6 m/year for section 1 and an historical erosion rate of 0.03 m/year for section 2. To adopt a conservative approach Cardno adopted an accretion rate of 0.2 m/year for section 1. SPP2.6 allows for half of the long term accretion trend to be used in the calculation of the erosion hazard. As such Cardno adopted long term shoreline movement allowances of 0.1m/year accretion for section 1 and 0.03 m/year erosion for section 2 over the 100 year planning horizon.

The potential impacts of sea level rise due to climate change was also examined by Cardno. Cardno adopted a recession of 0.9 m/year over the 100 year planning horizon.

SPP2.6 also recommends an allowance of a further 0.2 m/year to account for uncertainty.

The total coastal erosion hazard allowances determined by Cardno are displayed in Table 3.1.

Table 3.1 Total Coastal Erosion Hazard Allowances

Section	2040	2070	2110
1	49 m	79 m	119 m
2	41 m	75 m	120 m

Note1: Values determined from Cardno (2016).

A coastal erosion hazard map of the Onslow Township Village site has been prepared using the values determined by Cardno and is included in Appendix A.

3.2 Coastal Inundation Hazard

The State Coastal Planning Policy requires consideration of the inundation of the 0.2% annual probability of the ocean flood level being reached or exceeded in any one year. This is the same probability as the 500 year ARI ocean storm surge event occurring in any one year. Due to the

location of the Onslow Township Village the 500 year ARI event is assumed to be caused by a Tropical Cyclone event.

To determine the 500 year ARI water level event Cardno conducted a Monte Carlo study comprising 10,000 years of synthetic cyclone tracks. These cyclones were then ranked, and the severe events modelled using Delft3d to determine the water levels for Onslow. An extreme analysis was of the water levels was conducted to determine the water level corresponding to the 500 year ARI event.

This water level was then increased using an allowance for wave set up and an allowance for sea level rise over the 100 year planning horizon. The resulting inundation levels determined by Cardno are displayed in Table 3.2.

Table 3.2 Inundation Levels

Year	Inundation Level
2040	3.51 mAHD
2070	3.85 mAHD
2110	4.57 mAHD

Note1: Values determined from Cardno (2016).

A coastal inundation hazard map of the Onslow Township Village Site has been prepared using the inundation levels determined by Cardno and the most recent available survey of the site. This is included in Appendix B. It should be noted that the Cardno assessment included fluvial inundation of the site. This has been ignored in this assessment as it is assumed that as part of the development appropriate drainage will be installed, preventing this fluvial inundation.

4. Coastal Hazard Adaptation & Mitigation Strategy

4.1 Coastal Hazard Risk

Based on the coastal hazard allowances determined by Cardno (2016) and shown in the coastal hazard maps included in Appendices A and B, there is a minimal risk to the key assets of the proposed Onslow Township Village development. All of the development's assets are located outside of the Inundation allowance. The only area likely to be affected by inundation is the culturally significant area which will not be developed.

There are approximately eight of the accommodation pods that have approximately 10% of their footprint within the erosion hazard allowance. Given the low likelihood of the coastal erosion reaching this position, the low consequence if it does and the high adaptive capacity of the accommodation pods the coastal erosion hazard risk for these assets was determined to be very low.

As such the coastal erosion risk to all of the assets has been determined to be minimal and has been excluded from the adaptation planning. However, an allowance of 30 m for a foreshore reserve to provide a recreation area has been included in the coastal erosion hazard map. When this additional allowance is added to the 2110 erosion hazard allowance approximately 32 of the accommodation pods and part of the oval fall within this area. As such adaptation planning has been completed for these assets.

4.2 Mitigation Strategy

The overarching strategy for the Onslow Township Village development is a combined strategy of avoid and managed retreat / removal. The majority of the development's assets will be located outside of the required foreshore reserve area thus avoiding the coastal hazards. The assets that had to be located within the required future foreshore reserve will be subject to managed retreat.

MRA have been advised that the 500 accommodation pod resort has a proposed lifespan of approximately 30 years which will coincide with MRL's nearby mining operations. At the end of this 30 year period the development will be handed over to the Thalanyji people and will likely be converted into a more traditional tourist resort. As part of this handover to the Thalanyji people the number of accommodation pods will be reduced to suit the erosion situation and forecasts at that time.

As such by 2055 a portion of the accommodation pods will likely have been removed essentially enacting a managed retreat / removal strategy. The accommodation pods located within the foreshore area will be among the pods that are likely to be removed. The coastal erosion hazard map included in Appendix A includes an erosion line for 2070 which is located between 41 and 45 m seawards of the 2110 line. This demonstrates that there will be ample room to fit a reserve area for recreation throughout the 100 year timeframe.

In addition to the managed retreat / removal of the accommodation pods, the pods will also be designed to be easily relocatable. As such if the coastal hazard risks change the accommodation pods can easily be relocated to a safer location.

When the development is handed over to the Thalanyji people in approximately 30 years a portion of the site may need to be ceded to the Shire to ensure that an adequate foreshore reserve is maintained.

5. Implementation Plan

The risk adaptation and mitigation strategies outlined in Section 4 set out the general proposed coastal management approach for the development. Direct guidance on when, what, how and by who these processes will be completed is provided within this implementation plan. For ease of reference, these details have been broken down to outline the requirements for each stage of the project and / or asset life.

5.1 Planning & Initial Construction

Where possible assets will be located in areas outside of the identified coastal hazard areas and the reserve for recreation over a 100 year planning horizon. The assets that cannot be located outside of these areas will need to be designed to be easily relocatable to allow managed retreat.

Table 5.1 Implementation Plan Summary – Planning & Initial Construction Stage

Requirement	Timing	Responsibility
Acceptance of coastal hazard risks where avoidance was not possible.	Planning Stage	MRL
Appropriate design of assets to ensure that risks are managed as best as possible.	Planning & Design Phase	MRL (supported by design team)

5.2 Operation Over the Resort Design Life

Over the design life of the resort there will be a requirement to monitor the shoreline to ascertain whether the risk to assets is increasing. Further details of the monitoring requirements are outlined in Section 5.4. This monitoring will be the responsibility of the MRL before handover and the Thalanyji people afterwards.

Table 5.2 Implementation Plan Summary – Operation Over the Infrastructure Design Life

Requirement	Timing	Responsibility
Monitoring of coastal hazard risk to assess if risk becomes untenable and assets need to be relocated. (Refer Section 5.4)	Operation over design life	MLR / Thalanyiji People

5.3 Resort Handover

At the end of the initial 30 year period the resort will be handed over to the Thalanyji people and at this time a portion of the accommodation pods may need to be removed. During this process the pods that are currently located within the 2110 reserve for recreation area would be removed (refer Appendix A). At this time it may be necessary for the most seaward portion of the site to be ceded to the Shire to ensure that an adequate foreshore reserve can be maintained throughout the remainder of the 100 year planning horizon.

It is recommended that at this time an updated CHMRAP be completed to quantify the risk to any remaining and / or proposed additional assets.

Table 5.3 Implementation Plan Summary – Resort Handover

Requirement	Timing	Responsibility
Complete a revised coastal hazard risk assessment to quantify the risk level at that time.	Resort Handover	MRL / Thalanyji People
Remove portion of the accommodation pods.	Resort Handover	MRL

5.4 Monitoring & Review

Coastal monitoring and review are essential in order to track changes to the shoreline over time. Whilst the coastal hazards discussed in Section 3 provide an indication of the potential changes to the shoreline (and incorporate a justifiable level of conservatism), the system is inherently complex, and the actual shoreline response could be different to that presented.

Should the HSD or coastal vegetation line retreat to within 30 m of the cadastral boundary of Lot 300, then the following shoreline monitoring plan should be initiated.

The shoreline monitoring should be completed using a combination of onsite measurements and photo-monitoring as well as review of aerial photography captured by Landgate and others. The recommended monitoring plan for the site is presented in Table 5.4 below. The responsibility for the shoreline monitoring will rest with the development owner at that time.

Table 5.4 Shoreline Monitoring Plan – When Required

Monitoring Event	Timing	Responsibility
Photo Monitoring.	Yearly	MRL / Thalanyji People
Review of aerial imagery.	Every 5 years	MRL / Thalanyji People
Detailed survey of the shoreline and Development.	Following severe erosion events OR Following the retreat of the shoreline (HSD) to within 20 m of an asset	MRL / Thalanyji People

5.5 Review of CHRMAP Guidelines

Should the State Government guidance for the determination of the required coastal hazard allowances change as a result of new information becoming available, the Coastal Hazard Assessment and this CHRMAP should also be reviewed. This is especially the case for information regarding climate change and projected sea level rise, however this may also apply

for the calculation of inundation allowances. The responsibility for both of these actions would rest with the MRL prior to handover and the Thalanyji People afterwards.

6. Summary

MRL wish to develop the Onslow Township Village on Lot 300 Back Beach Road, Onslow.

Rowe engaged MRA to conduct a CHRMAP assessment of the proposed Onslow Township Village development to inform a development application. This CHRMAP has been completed to provide guidance on the coastal hazards and the required adaptation and management actions associated with the proposed development. It has been completed in line with the recommendations of SPP2.6 and WAPC (2019).

Coastal hazards determined from Cardno's coastal hazard assessment for Onslow show that there is a very low risk of coastal hazards adversely impacting the proposed development. However, with the addition of a 30 m wide foreshore reserve area for recreation, a number of the accommodation pods included in the initial development may be within the foreshore reserve after about 30 years. As such a managed retreat / remove strategy will be implemented for these assets. All other assets maintain an avoid adaptation strategy. After approximately 30 years MRL will hand over the development to the Thalanyji people and in the process a portion of the accommodation pods may be removed. In this way the managed retreat / removal adaptation strategy will be implemented, and an adequate foreshore reserve maintained.

7. References

Cardno 2016. *Coastal Hazard Assessment CHRMAP for the Onslow Coast.* Prepared for the Shire of Ashburton, Western Australia.

Cardno 2017. *Coastal Hazard Risk Management & Adaptation Plan CHRMAP For the Onslow Coast.* Prepared for the Shire of Ashburton, Western Australia

Department of Transport 2010. *Sea Level Change in Western Australia – Application to Coastal Planning.* Prepared by the Department of Transport, Western Australia.

Milieu Creative 2021. *Onslow Township Resort Lot 300 Back Beach Road, Onslow Proposed Masterplan Presentation.* Prepared for Mineral Resources Limited.

Standards Australia 2009. *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines.*

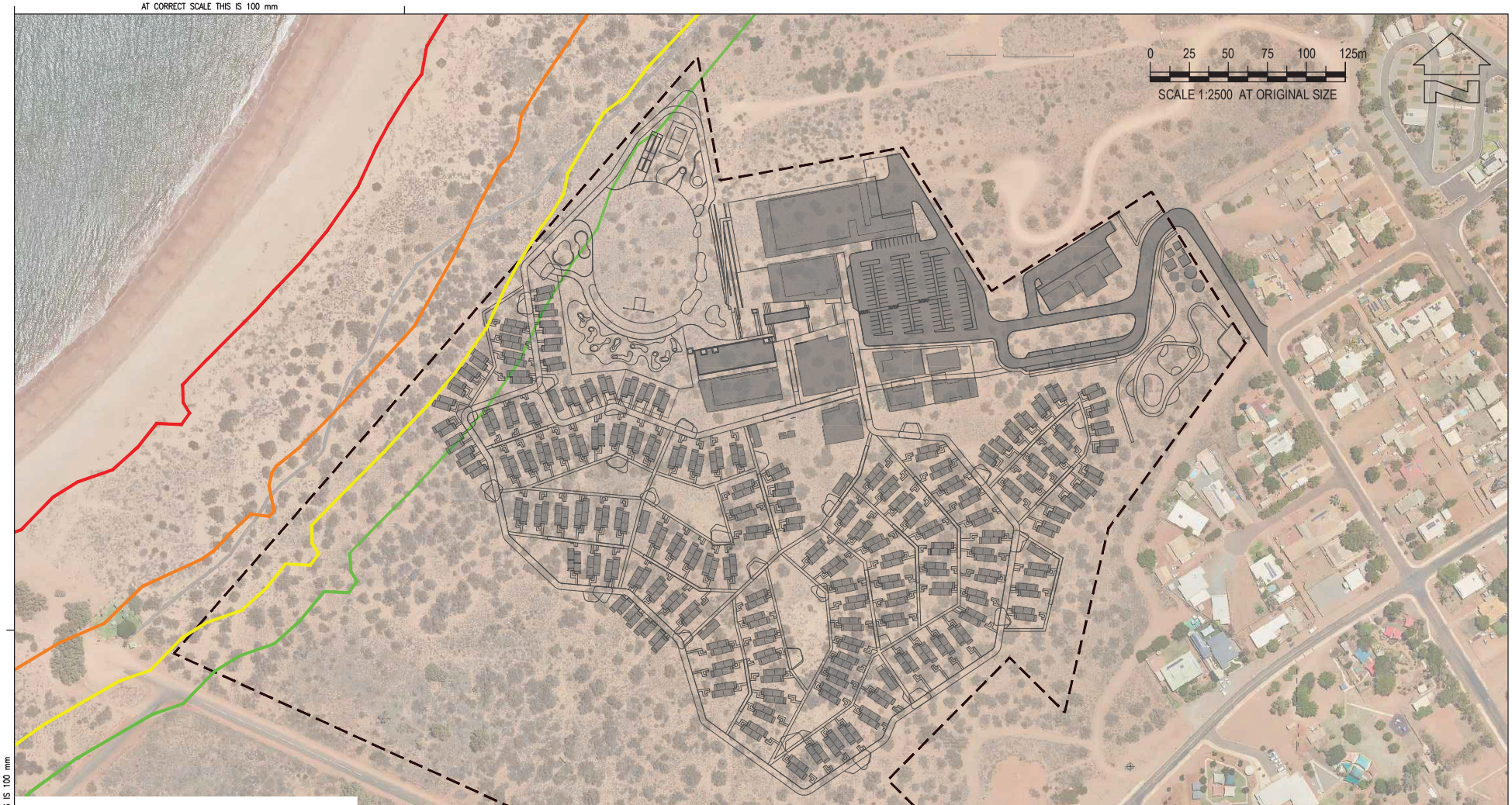
WAPC, 2013. *Statement of Planning Policy No. 2.6 – State Coastal Planning Policy.* Western Australian State Government, Perth.

WAPC 2019. *Coastal Hazard Risk Management and Adaptation Planning Guidelines*. Government of Western Australia, Perth.

8. Appendices

Appendix A Coastal Erosion Hazard Map

AT CORRECT SCALE THIS IS 100 mm



NOTES:

1. AERIAL PHOTOGRAPH PROVIDED BY LANDGATE TAKEN IN FEBRUARY 2020.
2. HORIZONTAL SHORELINE DATUM, 2070 AND 2110 COASTAL EROSION ALLOWANCE TAKEN FROM CARDNO COASTAL HAZARD ASSESSMENT (2016).
3. SITE PLAN PROVIDED BY MILIEU CREATIVE IN AUGUST 2021.

LEGEND:

- HORIZONTAL SHORELINE DATUM
- 2070 COASTAL EROSION ALLOWANCE
- 2110 COASTAL EROSION ALLOWANCE
- 2110 PUBLIC RESERVE ALLOWANCE (30m)
- LOT 300 BOUNDARY

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coastal and port engineers
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Western Australia admin@coastsandports.com.au

DRAWN M PETERSON
CHECKED M ROGERS

COASTAL EROSION HAZARD ALLOWANCE
ONSLOW TOWNSHIP VILLAGE

SCALE AT A3 1:2,500

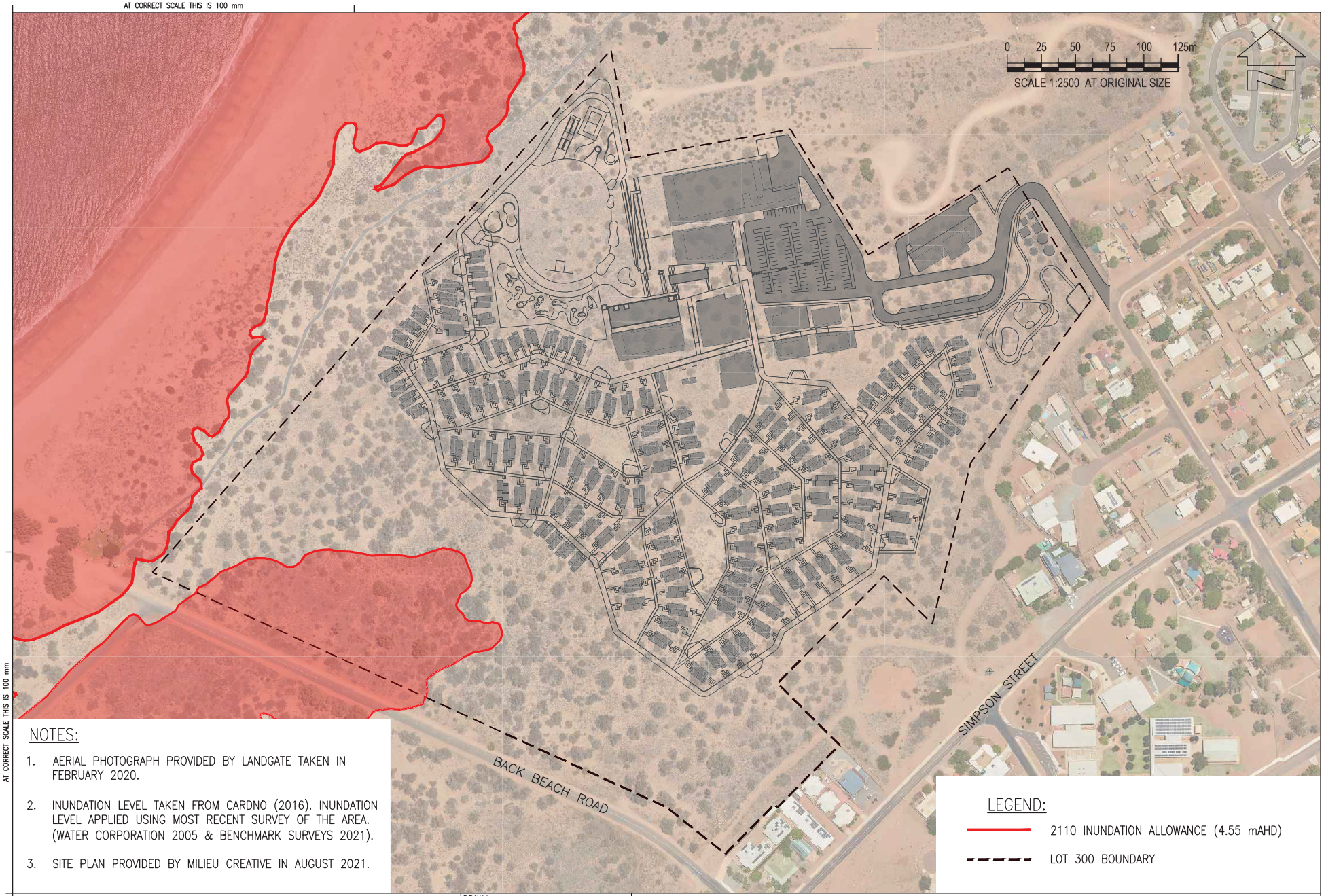
AUGUST 2021
SK1905-01C

P:\MRA Paying Jobs\K1905 CONF Rowe - Onslow CHRMAP\5 MRA Dwgs\Sketches\SK1905-01

AT CORRECT SCALE THIS IS 100 mm

Appendix B Coastal Inundation Hazard Map

AT CORRECT SCALE THIS IS 100 mm



AT CORRECT SCALE THIS IS 100 mm

NOTES:

1. AERIAL PHOTOGRAPH PROVIDED BY LANDGATE TAKEN IN FEBRUARY 2020.
2. INUNDATION LEVEL TAKEN FROM CARDNO (2016). INUNDATION LEVEL APPLIED USING MOST RECENT SURVEY OF THE AREA. (WATER CORPORATION 2005 & BENCHMARK SURVEYS 2021).
3. SITE PLAN PROVIDED BY MILIEU CREATIVE IN AUGUST 2021.

LEGEND:

2110 INUNDATION ALLOWANCE (4.55 mAHD)

LOT 300 BOUNDARY

m p rogers & associates pl
coastal and port engineers

Suite 1, 128 Main Street
Osborne Park 6017 t: +61 8 9254 6600
Western Australia admin@coastsandports.com.au

DRAWN M PETERSON
CHECKED M ROGERS

COASTAL INUNDATION HAZARD ALLOWANCE

ONSLOW TOWNSHIP VILLAGE

SCALE AT A3 1:2,500

AUGUST 2021

SK1905-02C

P:\MRA Paying Jobs\K1905 CONF Rowe - Onslow CHRMAP\5 MRA Dwgs\Sketches\SK1905-01

m p rogers & associates pl

www.coastsandports.com.au

ROWE GROUP

ATTACHMENT 6

SERVICING REPORTS

Onlsow Township Village

Engineering Servicing Report

Project No: 21-195

Table of Contents

Revision	Description	Author	Date
0	Issued For Review	Andrew Tucker	05/08/2021
1	Issued For Review	Andrew Tucker	27/08/2021

1 Introduction

At the request of Milieu Creative, on behalf of the Mineral Resources Pty Ltd team lead by Rowe Group, Pritchard Francis have prepared this engineering servicing report to identify existing site conditions, existing services and potential upgrades required in order to facilitate the development of the Onslow Township Village.

The nominated development area, part of Lot 300 Back Beach Road, is located within the Shire of Ashburton, situated on the western side of the Onslow town centre. The proposed site is bordered by Lookout Point to the north, First Street to the east, Back Beach Road to the south and the Ian Blair Memorial Boardwalk/beach to the west. It is noted that part of the area facing Back Beach Road is being separated for potential use as a cultural centre.

Please refer to Appendix 1 for the Concept Plan prepared by Milieu Creative.

Figure 1 – 2020 Aerial photograph of Lot 300 Back Beach Road

1.1 Report Qualifications

In line with this report, Pritchard Francis make the following qualifications:

- This report was prepared exclusively for the Mineral Resources. Unless otherwise stated, the use of this report by third parties is not permitted.
- The information provided in this report may be considered valid for three (3) months from the date of the report.
- The information provided in this report is based upon the information and documentation provided by the consultant team and project architect. Pritchard Francis have relied on such information and documents. Where we are uninformed of developments outside of this report, Pritchard Francis cannot be held responsible or liable for any problems or issues that may arise as a consequence.
- Assumptions have been made which, if incorrect, have the potential to impact the recommendations of this report. Major development implications existing through avenues which cannot be assured at the time of this report, including the upgrading and provision of utility services, WAPC Conditions, DA Conditions, Local Authority Scheme Requirements, timing of adjacent developments, etc.
- Unless otherwise stated, the capacity of existing services has not been verified via engineering calculations. Where required, external consultants may need to be engaged to provide accurate assessments of existing and future servicing capacity.
- A site visit has not been conducted as part of this desktop study. An underground service scan has not been completed and information containing existing service information may differ from the physical service locations. Where possible, Pritchard Francis recommend verifying existing service locations and conditions.
- The civil designs presented in this report are conceptual in nature, and by no means depict the ultimate design solution. Detail design and documentation will be necessary to validate all design levels and gradients to ensure compliant with the client brief, Australian Standards, Austroads and relevant authority guidelines.

2 Site Conditions

2.1 Geology

The Australia 1:250,000 Geological Series map of Onslow (SF50-5) classifies the site as 'Qs: Beaches and coastal dunes – Light grey, unconsolidated and poorly consolidated quartzose calcarenite'.

The previously undertaken Golder Desktop Study indicates greenfill in the location of the proposed township. Proof rolling will be undertaken where possible. It is assumed that standard building footings for the area will be adequate after site preparation. Some infiltration is expected based on the geological series of the area.

Further geotechnical testing would be required to confirm site characteristics such as infiltration rate and site classification.

Please refer to Appendix 2 for the Geological Series Map of Onslow.

2.2 Topography/Earthworks Concept

The site generally falls from the north-east to the south-west, with levels undulating significantly within the bounds of the high points of approximately RL 17.0m and the low points of approximately RL 3.0m.

Pritchard Francis, in coordination with the Architect and Landscape Architect have implemented a design such that impact on existing topography is minimised in order to maintain the natural characteristics of the site. Natural contours and have been utilised in the development of the stormwater concept plan.

Limited site disturbance will be achieved by localising necessary changes to areas with key structures, access carpark and bus bay.

Review of the Lidar survey and concept plan indicate that earthworks (cut/fill) can be balanced on site, eliminating the need for import and/or export of fill.

The development will share a border with a proposed cultural centre to the south. The cultural centre will be bound by the Iron Ore township on the northern side, and Back Beach Road on the southern side. The access track shall double as a wellness track to achieve vehicle access for bushfire compliance purposes.

Please refer to Appendix 3 for the Lidar survey, Appendix 4 for the Pritchard Francis Earthworks, and Appendix 5 for the Landscape concept plan.

2.3 Groundwater Levels

It is not expected that groundwater levels will impact earthworks on site. Groundwater levels may impact the sewer discharge upgrade during construction and may need to be managed at such time.

2.4 Contamination

The Department of Water and Environmental Regulation contaminated site database indicates that no sites within the land development area are registered as contaminated sites. The publicly available database lists classified sites under the categories 'Remediated for restricted use', 'Contaminated – remediation required' and 'Contaminated – restricted use'.

DFES has placed the site under the UXO category 'Slight Potential', citing 'Anti-aircraft artillery live firing practices using high explosive ammunition during WWII. Aerial bombing also highly likely'.

The site is listed as not impacted by contamination according to Landgate.

2.5 Bushfire Risk

The Department of Fire and Emergency Services (DFES) bushfire risk mapping indicates that the site is within a bushfire prone area.

Reporting has been completed by Linfire, and the findings used as part of the overall submission.

Pritchard Francis has made provisions for relevant vehicle access requirements and duplicated the function as part of the perimeter wellness track under section *A3.5 Private driveway longer than 50 metres* of *SPP 3.7*.

3 Infrastructure

3.1 Stormwater Drainage

Stormwater is to be managed primarily via overland flow. The proposed development aims to minimise changes to the existing site and as such, overland flow paths have been chosen to utilise the existing depressions in the topography.

Based on the minimal disturbance intended, the catchment areas have not been changed despite the addition of impervious areas.

Please refer to Appendix Six for the Modelled Catchments and Appendix Seven for the 1% AEP Inundation Event plans.

All stormwater flows from vehicle access ways shall be captured and treated as part of the first flush. All other run-off from impervious areas within Catchment C will be directed via overland flow to Storage C for infiltration and discharge.

Minor event (20% AEP) and Major Event (1% AEP) events will be managed via overland flow to the existing natural depressions for storage and infiltration. Refer to the 1% AEP Inundation Event for storage locations.

The pods orientated around the main buildings will require confirmation of free drain discharge for 1% AEP events.

Please refer to the 360 Environmental Urban Water Management Plan Report for more information.

3.2 Wastewater Reticulation

The Water Corporation esinet data obtained on 20 July 2021 indicates there is wastewater servicing potential around the site. Wastewater services are viable from two locations near First St, on the eastern side of the site:

- Ø150mm at the intersection of First St and Third Avenue.
- Ø150mm on Simpson St, IL 0.93, near the intersection of First St and Simpson St.

Pritchard Francis believe the most efficient option to be the connection point within Simpson St. This location enables servicing of the main facility and pods with adequate cover and allows for a main sewer line. This will enable connection of the minor lines before discharging at Simpson St. This strategy compliments the natural topography and will minimise excavation.

Servicing of the internal sewer has been validated in accordance with AS3500 by Stantec to achieve gravity discharge.

Please refer to Appendix Eight for the Wastewater Plan.

Water Corporation has advised that it is expected to have treatment capacity for the increased demand (nominated above the likely ultimate use). Pritchard Francis are awaiting advice regarding potential need for in line upgrades to the McGrath Ave pump station and associated pressure main and whether this will be completed under headworks or customer funded works agreements.

3.3 Water Reticulation

The Water Corporation esinet data obtained on 20 July 2021 indicates that the development can be served by the following services;

- 250AC water reticulation main located within the 'Lookout Point' on the north-eastern boundary of the site.
- 150AC Water reticulation main in the Simpson Street road reserve, accessible from First St.

A concept plan based on utilisation of the Third Ave service. Connection to the site is expected to have a tank to buffer peak flows. Capacity of the service is to be coordinated with Water Corporation. The intent would be to disguise this in the landform or via screening.

3.4 Fire

Hardstand and fire appliance accessway shall be provided in accordance with the BCA and shall be designed and constructed in accordance with AS2419.1 and has been provided for.

3.5 Gas Supply

There is currently no available gas service in proximity to the site.

3.6 Electrical Supply

Pritchard Francis is awaiting confirmation of availability of electrical services from the electrical consultant. It is expected that capacity will need to be made available generation capacity and that of the existing network.

3.7 Communications

There is nearby Telstra cabling located in Simpson St and Third Ave on the eastern side of the development site.

NBN access mapping confirms the site is serviceable.

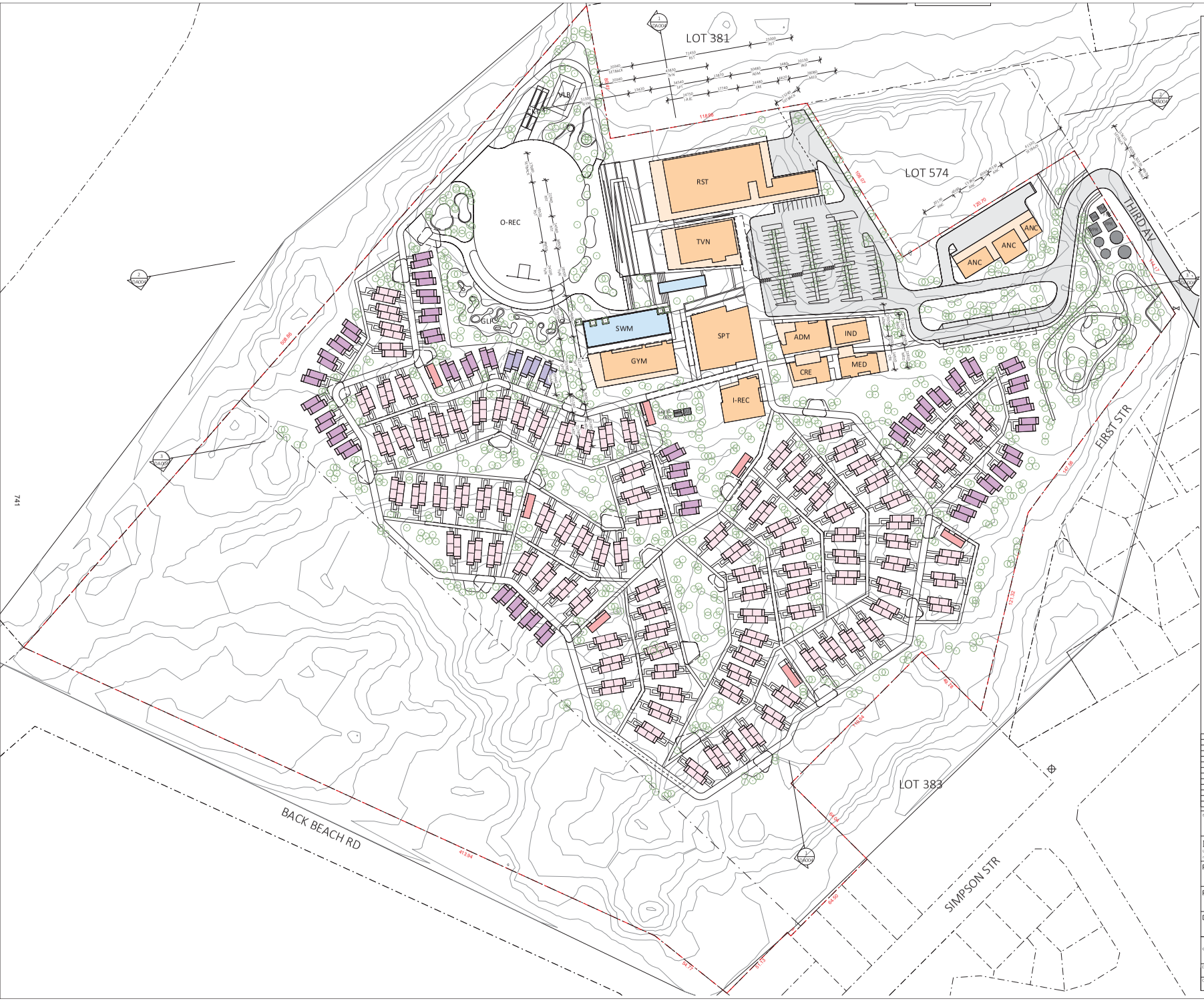
4 Conclusion

This report outlines the existing physical conditions and existing road/infrastructure capable of servicing the proposed development site. Pritchard Francis confirm that the site is accessible and can be served with roads, electrical, water, sewer, stormwater drainage and communications infrastructure.

Appendices

Appendix One:	Architectural Plan
Appendix Two:	Geological Series Map
Appendix Three:	Lidar Survey
Appendix Four:	Civil Concept Plan
Appendix Five:	Landscape Concept Plan
Appendix Six:	Modelled Catchments
Appendix Seven:	1% AEP Inundation Extent
Appendix Eight:	Wastewater Plan

Appendix One: Architectural Plan



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SYMBOL LEGEND

- SITE BOUNDARY
- BUILDING
- COVERED OUTDOOR SPACE
- SERVICES
- WATER BODY
- ROAD/CARPARK
- FIELD STORE (WITH LAUNDRY)
- ACCOMMODATION PODS (SLEEPS 4)
- ACCOMMODATION PODS (SLEEPS 2)
- ACCESSIBLE ACCOMMODATION PODS (SLEEPS 2)
- EXISTING WATER CONNECTION POINT
- EXISTING SEWER CONNECTION POINT
- PLANTING - REFER LANDSCAPE DRAWINGS FOR DETAILS

CODE LEGEND

ADM	ADMINISTRATION
AMEN	AMENITIES
ANC	ANCILLIARY - GATE HOUSE, SURVEILLANCE HUT & STORES
CKT	OUTDOOR CRICKET
CRE	ORCHID & CINEMAS
FBC	FIRE BOOSTER CABINET
FPR	FIRE PUMP ROOM
GEN	GENERATOR
GH	GATE HOUSE
GLF	MINI GOLF
GYM	GYM MASIUM & SWIMMING FACILITY
IND	TRAINING & INDUCTIONS
IRM	INTAKE PING MAIN
I-REC	INDOOR RECREATION
LDR	LAUNDRY, CLEANING & STORE
MED	MEDICAL & WELLNESS
O-REC	OUTDOOR RECREATION
RST	RESTAURANT
SMSB	SITE MAIN SWITCH BOARD
SPT	MULTI PURPOSE COURTS
SUT	STEP UP TRANSFORMER
SWM	SWIMMING POOL
TVN	TAVERN
VLB	OUTDOOR VOLLEYBALL
WPR	WATER PUMP ROOM

NO.	DATE	DESCRIPTION
E	31/08/21	DA ISSUE
D	20/08/21	ISSUE FOR INFORMATION
C	18/08/21	ISSUE FOR PRICING
B	10/08/21	DRAFT DA ISSUE
A	04/08/21	ISSUE FOR INFORMATION

ISSUE

DEVELOPMENT APPLICATION

milieū creative
L1, 430 STIRLING HIGHWAY, PEPPERMINT GROVE, WA 6011
milieucreative.com

PROJECT
LOT 383 ON BACK BEACH ROAD
ONSLOW WA 6710

PROJECT NAME
ONSLOW TOWNSHIP VILLAGE

DRAWING
SITE MASTER PLAN

DRAWN	SCALE	DATE	REVISION
MC	1 : 1000	04/08/21	E
CHECKED	SHEET	PROJECT NO	
	A1	21061	

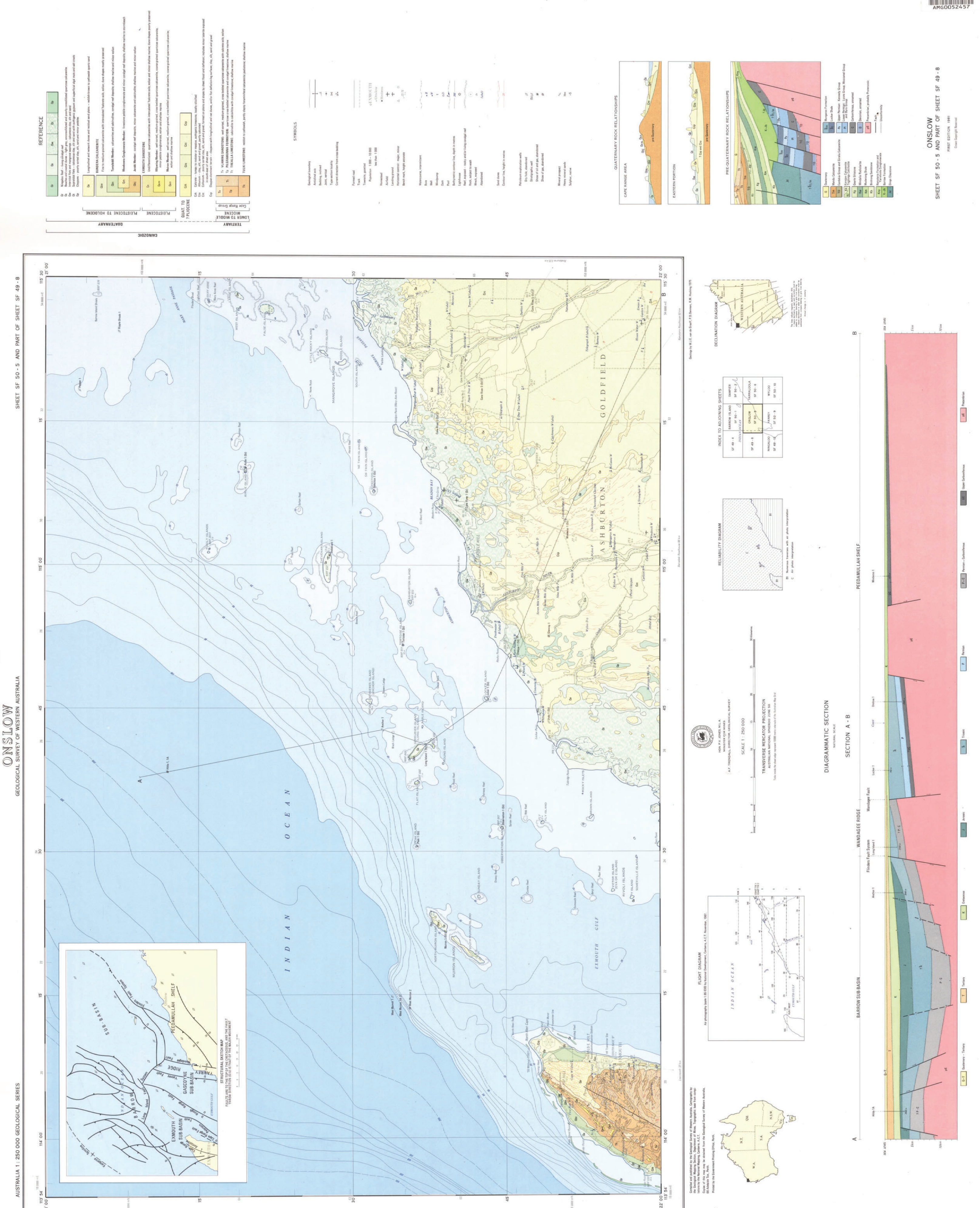
DA002

741

Attachment 13.2A - DAP21/02078 -DA 21-67 | L300 Back Beach Road, Onslow

Appendix Two: Geological Series Map

AGSO LIBRARY
AMG0052457



Appendix Three: Lidar Survey

REV	AMENDMENTS	APP'D	DATE
0	FOR REVIEW	RME	19/07

GENERAL NOTES / REFERENCES

Benchmark Surveys

PROJECT LOCATION
PROJECT TYPE
PROJECT SITE

MINERAL RESOURCES

DRAWN / SURVEYED BY: RME
CHECKED BY:
VERIFIED BY:
COORD SYSTEM / VERT DATUM: MGA94 | AHD

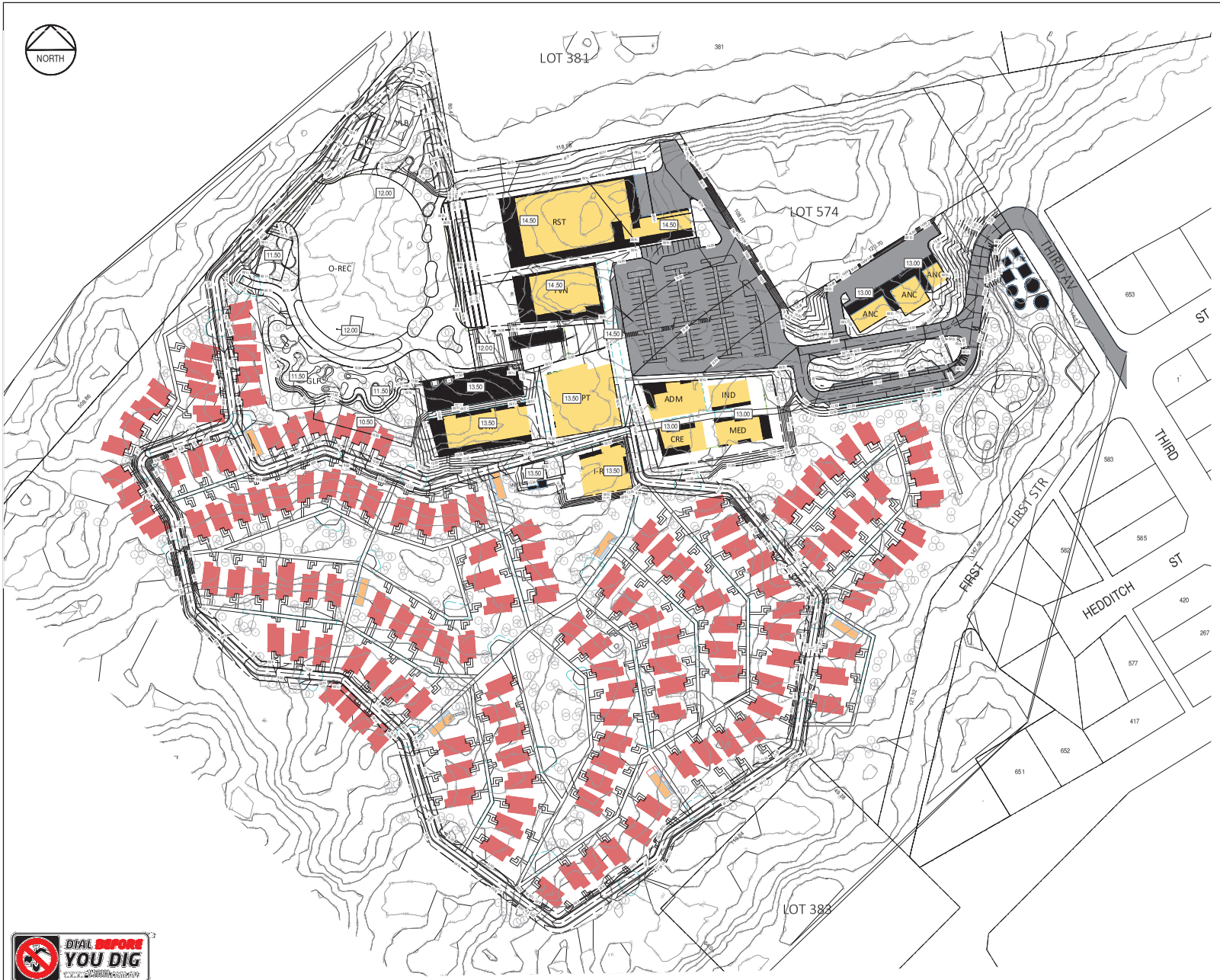
PLOT DATE: 19/07/2021 LOCATION: Onslow
Lot 300 Survey
Feature Survey

DRAWING STATUS: Information
DRAWING NO: BMS-MRL-D101-FS-DG-102
REV: 0

DWG LOCATION: C:\Onslow\Reporting\Benchmark TitleBlock A1- MRL.dwg

Attachment 13.2A - DAP/21/02078 - DA 21 67 | Lot 300 Back Beach Road, Onslow

Appendix Four: Civil Concept Plan



NOTES

1. ALL DIMENSIONS SHOWN ARE IN METRES U.N.O.
2. ALL CO-ORDINATES AND LEVELS SHOWN ON THIS DRAWING SHALL BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT WITH IN SEVEN DAYS.
3. SURVEY INFORMATION SUPPLIED BY BENCHMARK SURVEYS W.A..
4. ALL HEIGHTS ARE TO AUSTRALIAN HEIGHT DATUM (AHD) AND ALL LEVELS SHALL BE DERIVED FROM ESTABLISHED BENCHMARKS.
5. ALL BENCHMARKS ARE TO BE PROTECTED AND PRESERVED UNLESS NOTED ON PLANS.
6. FINISHED CONTOURS AND VOLUMES ARE TO ROAD BOXOUT.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND ALSO THE REQUIREMENTS OF THE SHIRE OF ASHBURTON.
8. THE CONTRACTOR SHALL LIAISE WITH ALL RELEVANT AUTHORITIES TO LOCATE ALL EXISTING SERVICES WITHIN THE CONTRACT AREA PRIOR TO THE COMMENCEMENT OF WORK. SERVICES INFORMATION SHOWN ON THE DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. WHERE EXISTING AND PROPOSED WORKS CONFLICT, LEVELS ARE TO BE TAKEN AND SUPPLIED TO THE SUPERINTENDENT IMMEDIATELY.
9. CONTRACTOR SHALL OBTAIN COUNCIL APPROVAL AND PAY ALL FEES/BONDS PRIOR TO COMMENCEMENT OF WORKS.
10. CONTRACTOR SHALL NOTE THAT NON-TRAFFICABLE SUBTERRANEAN STRUCTURES (SOAKWELLS ETC.) MAY EXIST ON SITE. PRIOR TO EARTHWORKS COMMENCING, CONTRACTOR SHALL LOCATE ANY SOAKWELLS, SEPTIC TANKS, DELETERIOUS MATERIALS AND OTHER SUBTERRANEAN STRUCTURES. THESE MATERIALS AND STRUCTURES ARE TO BE REMOVED AND THE LOCATION BACKFILLED IN ACCORDANCE WITH PROCEDURES SET OUT IN SPECIFICATION (IF APPLICABLE). THE SUPERINTENDENT IS TO BE ADVISED OF ANY UNUSED PIPE WORK ENCOUNTERED.
11. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING TO EXISTING LOTS AS REQUIRED.
12. THE CONTRACTOR SHALL PREPARE A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (D.E.C.) GUIDELINES SITE CLASSIFICATION 3 AND OBTAIN APPROVAL FROM THE LOCAL AUTHORITY FOR THE DUST MANAGEMENT PLAN.
    DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR DURING EARTHWORKS OPERATIONS IN ACCORDANCE WITH THE APPROVED MANAGEMENT PLAN.
13. NO CLEARING TO OCCUR UNTIL SUPERINTENDENT HAS IDENTIFIED TREES TO BE RETAINED.
    13a. ALL TREES TO BE RETAINED SHALL BE FENCED OFF FOR THE DURATION OF THE WORKS.
    13b. ALL TREES AND VEGETATION NOT FOR RETENTION SHALL BE MULCHED AND STOCKPILED FOR REUSE OR REMOVAL AS NOTED.
14. THE CONTRACTOR SHALL MAINTAIN PROPER SITE DRAINAGE TO ALL AREAS THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL BE RESPONSIBLE FOR MAINTAINING EXCAVATIONS IN A SAFE AND STABLE CONDITION AT ALL TIMES.
15. TOPSOIL IS TO BE STRIPPED AND MANAGED IN ACCORDANCE WITH THE SPECIFICATION OR AS NOTED ON THE DRAWINGS.
16. ALL ROOTS, BOULDERS AND ANY OTHER DELETERIOUS MATERIAL SHALL BE TOTALLY REMOVED TO A DEPTH OF 600mm BELOW THE LOWER OF THE NATURAL/CUT SURFACE.
17. MINOR AMENDMENTS TO THE EXTENT OF EARTHWORKS MAY OCCUR TO PRESERVE IDENTIFIED TREES.
18. ALL BATTERS TO BE NOMINALLY 1 IN 6, OR FLATTER, UNLESS SHOWN OTHERWISE (U.S.O.).
19. ALL FILL SHALL BE CLEAN AND BE FREE FROM DELETERIOUS AND/OR ORGANIC MATERIAL.
20. FILL MATERIAL TO BE TESTED BY A REGISTERED MATERIALS TESTING LAB AND RESULTS PROVIDED TO THE SUPERINTENDENT PRIOR TO THE IMPORTATION AND PLACEMENT OF MATERIAL.
21. PENETROMETERS USED FOR TESTING MUST BE CALIBRATED FOR SITE AND RECALIBRATED FOR IMPORTED FILL AS REQUIRED.
22. ALL FILL SHALL BE PLACED IN UNIFORM LAYER NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% M.M.D.D. REFER TO SPECIFICATION FOR DETAILED INFORMATION.
23. CONTRACTOR TO COMPLETE ALL BACKFILLING AND EARTHWORKS REQUIRED TO ACHIEVE LEVELS SHOWN.
24. THE SITE IS TO BE LEFT CLEAN AND FREE OF RUBBISH/DEBRIS UPON COMPLETION OF WORKS.
25. TIE INTO ADJACENT BOUNDARIES AND FEATURES TO BE SEAMLESS.
26. 'AS CONSTRUCTED' DRAWINGS ARE TO BE PREPARED IN ACCORDANCE WITH THE SPECIFICATION AND PROVIDED TO THE SUPERINTENDENT PRIOR TO PROCEEDING TO THE NEXT STAGE OF WORKS.

LEGEND

- 15.00 — PROPOSED EARTHWORKS CONTOUR (1.0m)
- 15.50 — PROPOSED EARTHWORKS CONTOUR (0.50m)
- EXISTING SURFACE CONTOUR
- 6.80 — FINISHED PAD LEVEL

DIAL BEFORE YOU DIG www.1100.com.au Time, Essential Work Stage

R/V	DATE	DESCRIPTION	BY	CHKR
C	27/08/21	REVISED DA ISSUE	DL	AT
B	09/08/21	CONTOURS REVISED TO SUIT ARCHITECT COMMENTS	JS	AT
A	04/08/21	INITIAL ISSUE	JS	AT

pritchard francis
civil and structural engineering consultants
430 Roberts Road
Subiaco WA 6008
PO Box 2150
Subiaco WA 6904
Telephone: (08) 9382 5111
admin@pfeng.com.au

DRAWING STATUS: NOT FOR CONSTRUCTION

DATE: AUGUST 2021 | GRID: MGA | DATUM: AHD

DESIGNED: JS | DRAWN: JS | CHECKED: AT | APPROVED: AT .... / ...

M.A.P. C.: N/A | SCALE/ U.N.O.: 1:1000 @ A1

CLIENT & JOB: MINERAL RESOURCES ONSLOW TOWNSHIP VILLAGE

TITLE: EARTHWORKS CONCEPT OPTION 2

SHEET SIZE: A1 | DRG No.: 21195-C9-SK-05 | REVISION: C

Appendix Five: Landscape Concept Plan

2.0 Landscape Plan

PROGRAM

1	Bus Stand (Pickup/Dropoff)
2	Sheltered Community Playground
3	Dedicated Dropoff (Small Vehicle, Short Term)
4	Terraced Entry Plaza
5	Water Feature
6	Recreation Turf
7	Outdoor Gym
8	Cricket Nets & Beach Volley Ball
9	Relax Zone (BBQ, Hammocks, Furniture, Shade Structure)
10	Mini Golf
11	Alfresco Deck With Terraced Embankment
11	Pedestrian / Maintenance Vehicle Access (with shade structures and comfort nodes)
12	Pedestrian Access (Boardwalk with shade structures and comfort nodes)
13	Security Fence
14	Entry Statement Wall

GENERAL

	Site Boundary

SURFACES

	Pedestrian Access Paving
	Plaza Paving
	Asphalt (Carppark)
	Asphalt (Maintenance Access)
	Composite Timber Boardwalk
	Fibre Reinforced Plastic Boardwalk
	Stabilised Gravel
	Pool

PLANTING

	Lawn
	Native Dune Mix Planting - Managed Sparse
	Native Swale Mix - Managed Sparse
	Native Shrub Mix - Managed
	Proposed Native Tree

- Refer to Civil Engineers drawings for grading plan

Attachment 13.2A - DAP/21/02078 -DA 21-67 | L300 Back Beach Road, Onslow

Appendix Six: Modelled Catchments

Legend

- Survey Area Boundary
- Catchment A
- Catchment B
- Catchment C

Sub Catchments

- Access Track
- Building
- Oval
- Road
- Road A
- Road B
- Road C
- Swimming Pool

360 environmental
a 10 Bermondsey St, West Leederville, 6007 WA
t (08) 9388 8360
f (08) 9381 2360
w www.360environmental.com.au

0 40 80 120 Meters
1:3,500 @ A4

N

LOCALITY MAP

PROJECT ID	DATE
4757	27/08/2021

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	NC	NC	0

Rowe Group c/o Mineral Resources Limited
Lot 300 Back Beach Road, Onslow

Urban Water Management Plan

Figure 7
Modelled Catchments

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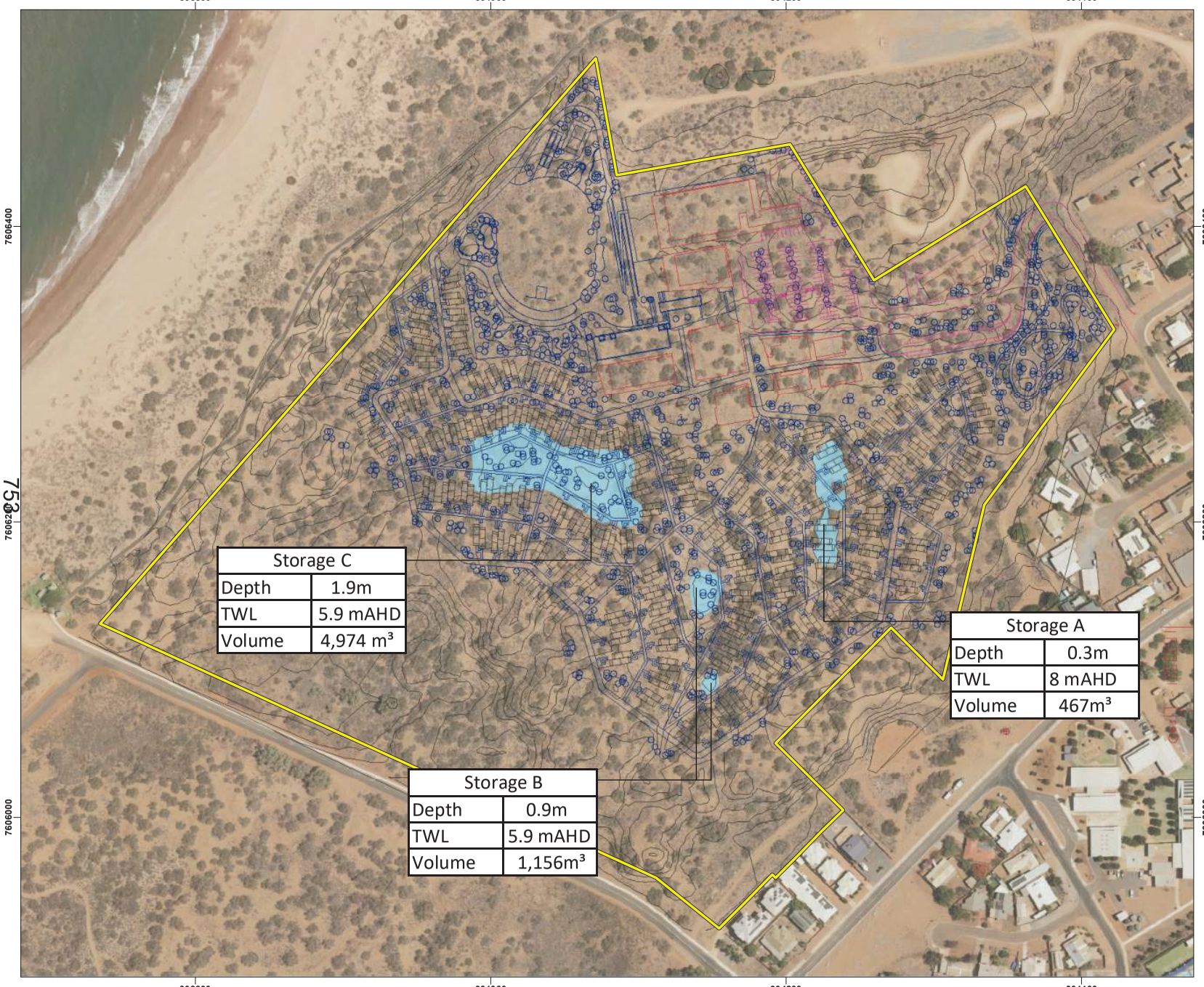
K:\Projects\10. WAM\4757 Lot 300 Back Beach Rd, Onslow\4757 F07 Modelled Catchments.mxd

Appendix Seven: 1% AEP Inundation Extent



Legend

- Survey Area Boundary
- 1%AEP Inundation Extent

Indicative Site Master Plan

- Access and Parking
- Landscaping
- Accomodation Pods
- Buildings
- Major Topographic Contour

360 environmental
a 10 Bermondsey St, West Leederville, 6007 WA
t (08) 9388 8360
f (08) 9381 2360
w www.360environmental.com.au

0 40 80 120 Meters
1:3,500 @ A4

N

LOCALITY MAP

PROJECT ID	DATE
4757	27/08/2021

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	PD	PD	0

Rowe Group c/o Mineral Resources Limited
Lot 300 Back Beach Road, Onslow

Urban Water Management Plan

Figure 9
1% AEP Inundaton Extent

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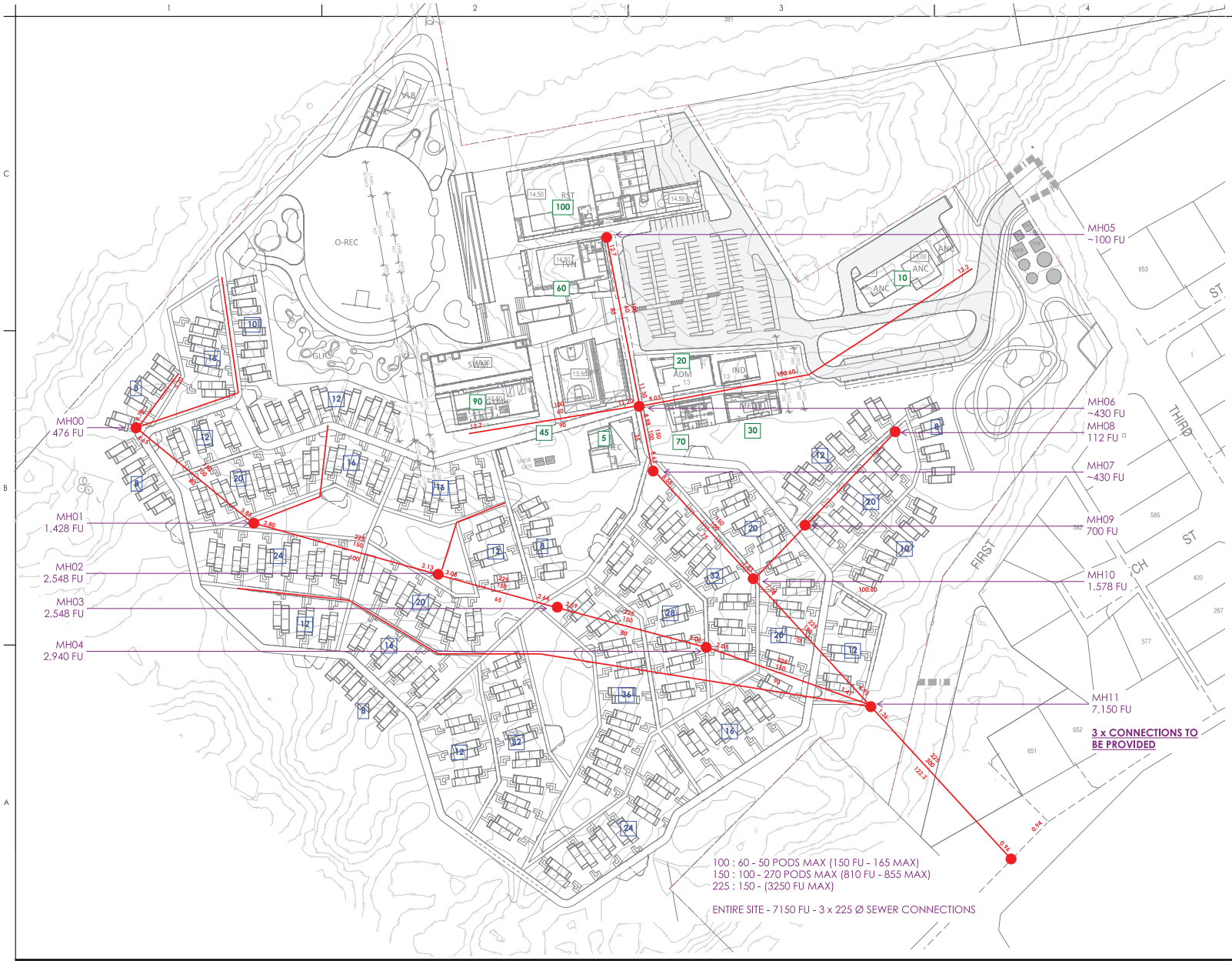
K:\Projects\10. WAM\4757 Lot 300 Back Beach Rd, Onslow\4757 F09 1% AEP Inundation Extent.mxd

Appendix Eight: Wastewater Plan



Revision	By	Appd	YYYY.MM.DD
C REVISED DA ISSUE	ESV	ESV	2021.08.25
B ISSUED FOR FINAL	ESV	ESV	2021.08.05
A ISSUED FOR PRELIMINARY REVIEW	ESV	ESV	2021.07.30

ORIGINAL SHEET - ISO A1

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

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Notes

Stantec

Stantec
Ground Floor
226 Adelaide Tce
Perth WA 6000
08 6222 7000
www.stantec.com

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Client/Project Logo

milieū creative

Client/Project
ROWE GROUP

ONSLOW TOWNSHIP VILLAGE

File Name:

Dwn. | Dsgn. | Chkd. | YYYY.MM.DD

Title
SITE PLAN
SEWER SERVICES

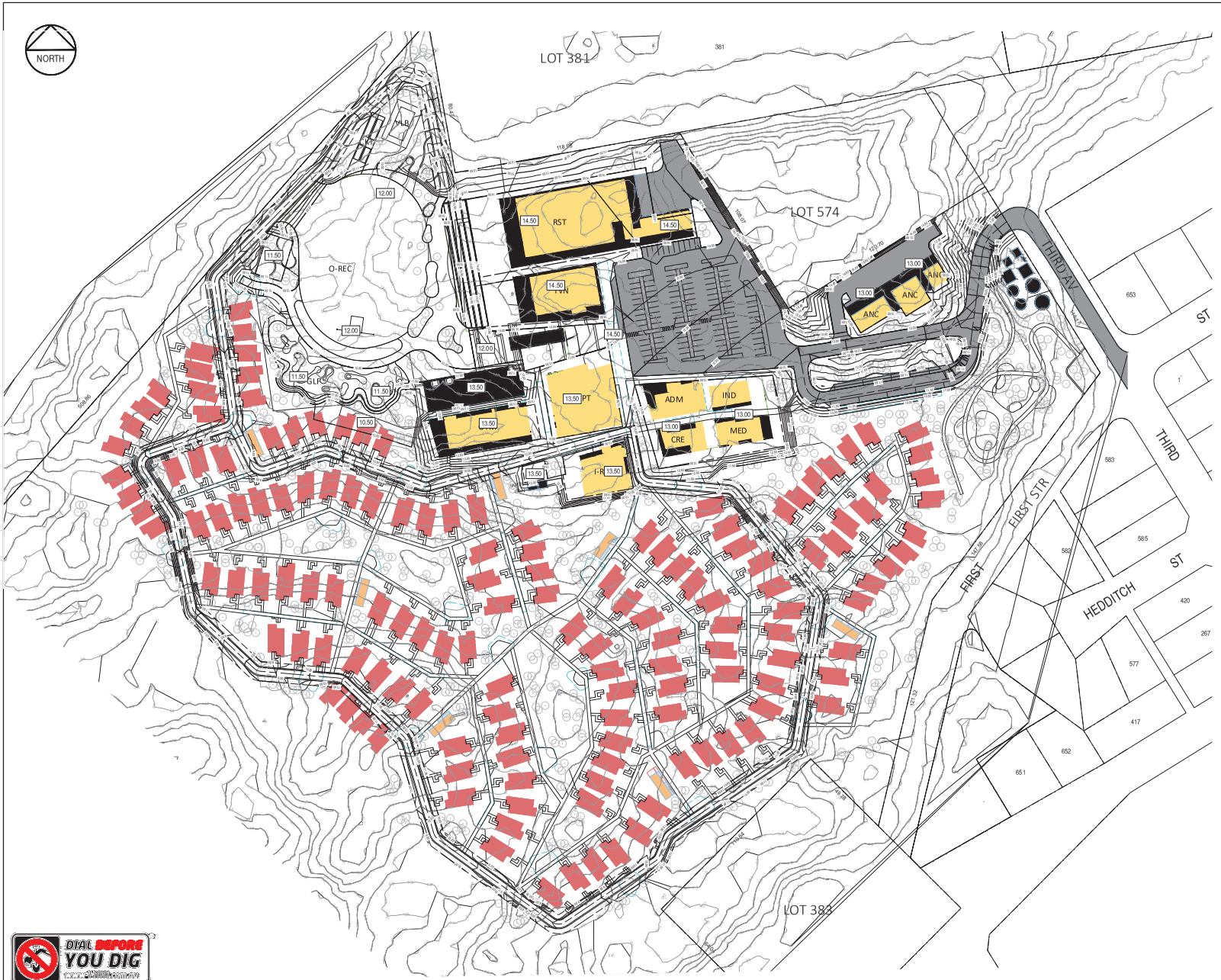
Project No.
301250498

Scale
1:1000

Revision
C

Drawing No.
HY-1-00

Attachment 13.2A - DAP21/02078 -DA 21-67 | L300 Back Beach Road, Onslow



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6. FINISHED CONTOURS AND VOLUMES ARE TO ROAD BOXOUT.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND ALSO THE REQUIREMENTS OF THE SHIRE OF ASHBURTON.
8. THE CONTRACTOR SHALL LIAISE WITH ALL RELEVANT AUTHORITIES TO LOCATE ALL EXISTING SERVICES WITHIN THE CONTRACT AREA PRIOR TO THE COMMENCEMENT OF WORK. SERVICES INFORMATION SHOWN ON THE DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. WHERE EXISTING AND PROPOSED WORKS CONFLICT, LEVELS ARE TO BE TAKEN AND SUPPLIED TO THE SUPERINTENDENT IMMEDIATELY.
9. CONTRACTOR SHALL OBTAIN COUNCIL APPROVAL AND PAY ALL FEES/BONDS PRIOR TO COMMENCEMENT OF WORKS.
10. CONTRACTOR SHALL NOTE THAT NON-TRAFFICABLE SUBTERRANEAN STRUCTURES (SOAKWELLS ETC.) MAY EXIST ON SITE. PRIOR TO EARTHWORKS COMMENCING, CONTRACTOR SHALL LOCATE ANY SOAKWELLS, SEPTIC TANKS, DELETERIOUS MATERIALS AND OTHER SUBTERRANEAN STRUCTURES. THESE MATERIALS AND STRUCTURES ARE TO BE REMOVED AND THE LOCATION BACKFILLED IN ACCORDANCE WITH PROCEDURES SET OUT IN SPECIFICATION (IF APPLICABLE). THE SUPERINTENDENT IS TO BE ADVISED OF ANY UNUSED PIPE WORK ENCOUNTERED.
11. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING TO EXISTING LOTS AS REQUIRED.
12. THE CONTRACTOR SHALL PREPARE A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (D.E.C.) GUIDELINES SITE CLASSIFICATION 3 AND OBTAIN APPROVAL FROM THE LOCAL AUTHORITY FOR THE DUST MANAGEMENT PLAN.
    DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR DURING EARTHWORKS OPERATIONS IN ACCORDANCE WITH THE APPROVED MANAGEMENT PLAN.
13. NO CLEARING TO OCCUR UNTIL SUPERINTENDENT HAS IDENTIFIED TREES TO BE RETAINED.
    13a. ALL TREES TO BE RETAINED SHALL BE FENCED OFF FOR THE DURATION OF THE WORKS.
    13b. ALL TREES AND VEGETATION NOT FOR RETENTION SHALL BE MULCHED AND STOCKPILED FOR REUSE OR REMOVAL AS NOTED.
14. THE CONTRACTOR SHALL MAINTAIN PROPER SITE DRAINAGE TO ALL AREAS THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL BE RESPONSIBLE FOR MAINTAINING EXCAVATIONS IN A SAFE AND STABLE CONDITION AT ALL TIMES.
15. TOPSOIL IS TO BE STRIPPED AND MANAGED IN ACCORDANCE WITH THE SPECIFICATION OR AS NOTED ON THE DRAWINGS.
16. ALL ROOTS, BOULDERS AND ANY OTHER DELETERIOUS MATERIAL SHALL BE TOTALLY REMOVED TO A DEPTH OF 600mm BELOW THE LOWER OF THE NATURAL/CUT SURFACE.
17. MINOR AMENDMENTS TO THE EXTENT OF EARTHWORKS MAY OCCUR TO PRESERVE IDENTIFIED TREES.
18. ALL BATTERS TO BE NOMINALLY 1 IN 6, OR FLATTER, UNLESS SHOWN OTHERWISE (U.S.O.).
19. ALL FILL SHALL BE CLEAN AND BE FREE FROM DELETERIOUS AND/OR ORGANIC MATERIAL.
20. FILL MATERIAL TO BE TESTED BY A REGISTERED MATERIALS TESTING LAB AND RESULTS PROVIDED TO THE SUPERINTENDENT PRIOR TO THE IMPORTATION AND PLACEMENT OF MATERIAL.
21. PENETROMETERS USED FOR TESTING MUST BE CALIBRATED FOR SITE AND RECALIBRATED FOR IMPORTED FILL AS REQUIRED.
22. ALL FILL SHALL BE PLACED IN UNIFORM LAYER NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% M.M.D.D. REFER TO SPECIFICATION FOR DETAILED INFORMATION.
23. CONTRACTOR TO COMPLETE ALL BACKFILLING AND EARTHWORKS REQUIRED TO ACHIEVE LEVELS SHOWN.
24. THE SITE IS TO BE LEFT CLEAN AND FREE OF RUBBISH/DEBRIS UPON COMPLETION OF WORKS.
25. TIE INTO ADJACENT BOUNDARIES AND FEATURES TO BE SEAMLESS.
26. 'AS CONSTRUCTED' DRAWINGS ARE TO BE PREPARED IN ACCORDANCE WITH THE SPECIFICATION AND PROVIDED TO THE SUPERINTENDENT PRIOR TO PROCEEDING TO THE NEXT STAGE OF WORKS.

LEGEND

- 15.00 — PROPOSED EARTHWORKS CONTOUR (1.0m)
- 15.50 — PROPOSED EARTHWORKS CONTOUR (0.50m)
- EXISTING SURFACE CONTOUR
- 6.80 — FINISHED PAD LEVEL

DIAL BEFORE YOU DIG 1100 www.1100.com.au
Time, Essential Work Stage

R/V	DATE	DESCRIPTION	BY	CHKR
C	27/08/21	REVISED DA ISSUE	DL	AT
B	09/08/21	CONTOURS REVISED TO SUIT ARCHITECT COMMENTS	JS	AT
A	04/08/21	INITIAL ISSUE	JS	AT

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DRAWING STATUS: NOT FOR CONSTRUCTION

DATE: AUGUST 2021 | GRID: MGA | DATUM: AHD

DESIGNED: JS | DRAWN: JS | CHECKED: AT | APPROVED: AT ..... / ....

M.A.P. C.: N/A | SCALE/ U.NO.: 1:1000 @ A1

CLIENT & JOB: MINERAL RESOURCES ONSLOW TOWNSHIP VILLAGE

TITLE: EARTHWORKS CONCEPT OPTION 2

SHEET SIZE: A1 | DRG No.: 21195-C9-SK-05 | REVISION: C

Onslow Township Village

Revision

Revision	Date	Comment	Prepared By	Approved By
001	26.07.2021	Draft Update Issue	ESV, ML, AD, SK	ESV
002	30.07.2021	Preliminary Issue for Review	ESV, ML, AD, SK	ESV
003	06.08.2021	Final Issue	ESV, ML, AD, SK	ESV
004	25.08.2021	Revised DA Updates	ESV, ML, AD, SK	ESV

1. Introduction

This Multi-Disciplinary Services Brief has been prepared at the request of Rowe Group for the development of the Onslow Township Village in Onslow, WA. It has been prepared in order to outline our understanding of the Electrical, Fire Protection, Hydraulic and Mechanical services Works and to support the servicing strategy for the project's Development Application process.

This document services as a benchmark which our services much achieve. We request that you read this carefully so that you have a clear understanding of the scope of our works.

We would welcome any comments or queries you may have on the information provided in this Brief.

This Brief has been prepared based on the following information:

- Thalanyji Presentation Package by Milieu Creative
- Functional Brief Revision 1 incorporating MRL Comments
- Drone images and videos of the proposed development site
- OIP-0000-GE-SOW-0001 – Onslow Iron Project Facilities Requirements dated 12th February 2021
- Project kick of meeting held at Rowe Group on the 7th July 2021
- Architectural Drawings by Milieu Creative on the 20th August 2021

2. Project Overview

The Onslow Township Village, located at Lot 300 in Onslow WA, will be the permanent village style accommodation facility and will be designed and built as long-term accommodation and facilities to cater for the mine operations workforce.

The Village will be designed to support up to 500 rooms including central facilities and utilities and incorporate the following major elements:

- Accommodation Pods
- Laundry / Field Storage
- Restaurant
- Tavern
- Administration
- Induction & Training Rooms
- Lockers & Creche
- Medical Centre
- Gate House
- Storage Sheds
- Gymnasium
- Wellness Spaces
- Swimming Facility
- Multi-Purpose Sports Courts
- Indoor and Outdoor Cricket
- Golf Facilities
- Recreation & Common Rooms
- Carparks
- Service Compounds

3. Critical Issues

The following list itemises the critical issues for the project's building services:

- Redundancy of services (no single point of failure)
- Ease of maintenance
- Systems design being cognisant of site location being within a cyclonic region (i.e. floor mounted plant/equipment)
- Coordination of site infrastructure to achieve functionality at a reasonable level of cost
- To provide a design that minimises initial capital cost without excessively compromising quality or ongoing maintenance costs.
- To provide adequately sized plant/infrastructure services that allows an acceptable level of flexibility for future development/redevelopment.
- Operational requirements of the Cyclone Shelter

4. Electrical Services

4.1 General Overview

The Electrical Services encompasses the following key subsystems:

- Electrical power distribution from utility (Horizon Power interface) to final outlet or fitting.
- Reticulation of structured communications cabling (Fibre and copper) form Retail Service Provider (RSP) termination point to end distribution outlet or rack.
- Provision of internal and external lighting services.
- Allocation in conjunction with client requirements for electronic access control and camera surveillance systems.

The Electrical Services shall be designed to comply with current National Construction Codes (Building Code of Australia), Safety in Design requirements, Worksafe Regulations, WA Electrical Requirements and the following Standards and Codes amongst others:

- AS/NZS 1670 Fire detection, warning, control and intercom systems - System design, installation and commissioning
- AS/NZS 1680 Interior and Workplace lighting (all parts)
- AS/NZS 1768 Lightning Protection
- AS/NZS 2293 Emergency escape lighting and exit signs for buildings
- AS/NZS 3000 Wiring Rules
- AS/NZS 3008.1 Electrical Installations - Selection of Cables - Cables for Alternating Voltages Up to and Including 0.6/1 kV - Typical Australian Installation Conditions
- AS/NZS 3084 Telecommunications Installations, Telecommunications Pathways and Spaces
- AS/NZS 61439 Low Voltage Switchgear and Control Assemblies
- AS/NZS 11801 Information Technology - Generic Cabling for Customer Premises (series)
- AS 4806.1 Closed Circuit Television (CCTV) – Management and Operation
- AS/NZS 61000 Electromagnetic compatibility (EMC)

(in the case of discrepancies with user requirements) is to be advised as the design of the building is progressed.

4.2 Incoming Service Connections

4.2.1 Power

The preliminary maximum demand for the site has been calculated to be 941 kVA. This would require a provision of a 1MVA utility connected substation. Given the anticipated long runs of low voltage submain cables, Stantec proposes that a sole use substation be sought to be located centrally to the site.

The requirements around a sole use substation will require provision of the following:

- Horizon Power High Voltage (HV) Ring Main Unit (RMU) on site boundary.
- Horizon Power underground HV cable along entry road.
- Horizon Power owned and maintained sole-use substation including 1 MVA transformer located central to main facilities area.

Sole-use substations are only approved on request, so subsequent development approval an application for the feasibility of this proposal is to be sought with Horizon Power.

A preliminary layout and nominal locations have been shown on the masterplan appended to this report to allow for the provision of space.

The ability for the Horizon Power distribution network to deliver the required power to the site is yet to be confirmed but recent town upgrades including inclusion of renewable energy sources suggest there is capacity available.

On sites with a very long cable runs an assessment of the suitability of a high voltage connection could be considered. Initial recommendation is that long term maintenance and operations would make an exclusively low voltage distribution system more suitable for this application.

The above is provided for concept information as it is understood that MRL will manage the site power supply and engagement with the authority for the final details around there assets. It has been confirmed that MRL will manage the liaison, approvals and commercial negotiations with Horizon Power or the chosen electrical distributer.

4.2.2 Telecommunications Lead-In

This development is within an area shown has being ‘ready to connect’ to a NBN service. However, this service is not shown to be a wired solution and is detailed as a ‘NBN Satellite’ service.

The previous engineering services report dated 2012 indicates there is a legacy pit and pipe network throughout the town for copper services, as well as recent town subdivisions appear to have been serviced with pit and pipe for Telstra connection.

Provision for a Fibre-ready connection to the main communications room will be made as is required for all new developments. This provision references dedicated ducts pits and power provisions for utility services in this space. Unlike power, the connection of a communications utility required engagement from the end-client through the appropriate services provider, likely Telstra in this case.

Advice from the client in conjunction with their communications providers will indicate any additional pipe, ducts that need to be allocated for site connectivity.

4.3 Main Distribution and Site Wide Electrical Infrastructure

4.3.1 Power

Preliminary allocation of electrical distribution board infrastructure has been considered with respect to submain cable lengths and feasibility of a centrally located sole-use substation.

Refer to appendix for the power distribution plan for the site.

The following provisions for electrical distribution boards has been identified and will form the primary power distribution for the facility:

- Site Main Switchboard (SMSB) – Contiguous to Substation and will be primary distribution node for all buildings.
- Accommodation Unit Neighbourhood Main Distribution Boards (MDB) 1, 2, 3 & 4 – Each board to support in order of 125 Accommodation units as well as common lighting and power services through neighbourhood areas.
- Administration Building MDB
- EOT and Medical MDB
- Training Distribution Board (DB)
- Restaurant MDB
- Tavern MDB
- Restaurant DB 1, 2 & 3
- Gymnasium MDB
- Multipurpose Court DB
- Pool and Oval site DB
- Gatehouse DB
- Stores and Maintenance DB
- Accommodation Unit Load Centre (1 -500)

Mechanical Services switchboard (MSSBs), sewer pump station (SPS) control panels, motor control centres (MCCs) are all electrical switchboards provided by the vendor or engineering service responsible for their design and construction.

Additional switchboards for interfaces with solar and diesel generation systems may be required as design development. Equally additional electrical distribution infrastructure may be added following detailed load and cable sizing calculations that will enable the technical and cost factors to be considered appropriately.

4.3.2 Metering

Provision of a single supply authority meter is recommended at the site main switchboard and the use of appropriately rated and certified billing meters be provided for the central facilities, should future leasing be incorporated.

Final alignment with sustainability initiatives will required a networked metering system to be deployed with energy meters allocated through MDB, DB’s and other electrical control panels and plant.

4.3.3 Power Generation

Provision for connection of diesel generator is to be allocations at the customer-owned Site Main Switchboard. This allocation of a permanent 600-800 kW generator should only be made on a provisional basis until confirmation of the following items can be resolved:

- Horizon Power Onslow Town distribution grid capacity.
- Allocation of safety services from and engineering system design perspective.
- Allocation of requirements for back-up around the cyclone shelter.

4.3.4 Structured Cabling Distribution – Communications

The allocation of space currently indicated within the EOT, Lockers and Medical building as defined by the project brief is suitable for the main incoming interface point as well primary communications racks and distribution nodes. IT services and active equipment will also be stored within this space. The current assumption is that the end-client or operator will provide all active equipment (servers, computers, switches, routers/modems, wireless access points etc.) throughout the facility.

Given the current requirement in the project brief for internet/data based services within each accommodation unit; Stantec's recommendation is that fibre optic services be provided to each accommodation unit. This is provided over a network known as a GPON network. This active network design scope and delivery will need to be resolves through the next design phase. This network will enable the site to utilise a converged network with security, entertainment and data/internet services to share the same physical cabling. ***This approach is one a few for camp/villages of this nature, the client may have prior experience that informs a preference for this type of a solution and as such a review on this item and direction is requested prior to initiation of detailed structured cabling design activities.***

Under the solution above a multi-core fibre optic cables will be distributed from the main communications to laundry facilities then onto each accommodation unit. As such, each laundry unit will require a communications room as detailed below:

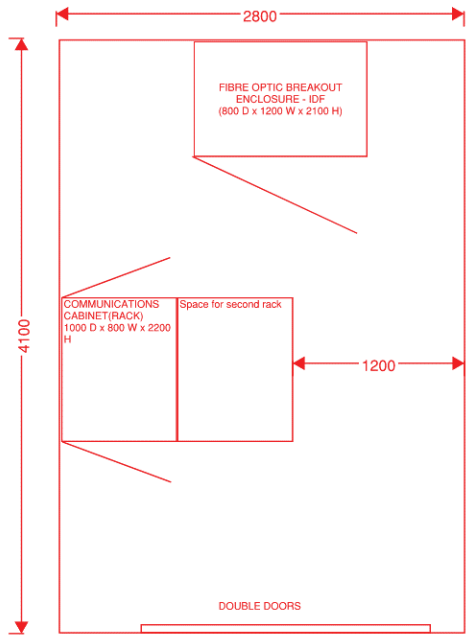


Figure 1: Laundry Communications Room - Space Planning

4.3.5 External Lighting

External carpark lighting will be designed in accordance with AS/NZS 1158, be controlled through the utilisation of time clock and photo-electric sensors.

External car park lighting depending on council and end-user requirements can often be switched off between at night time to reduce the risks surround obtrusive light to surrounding residents. Typically this would be between the hours of 11pm and 2am, although normally adjustable based on client preferences, pending council advice.

4.3.6 Site Electronic Access Control and CCTV System

The site is currently provisioned with a gatehouse and current design assumes the use of a electronic access card for vehicle access and provision of VOIP-based intercom system for time this gatehouse is unattended. Other external non-accessible areas may utilize similar systems as well as access control plant rooms and pedestrian gates. Physical security elements are not part of the electrical services package.

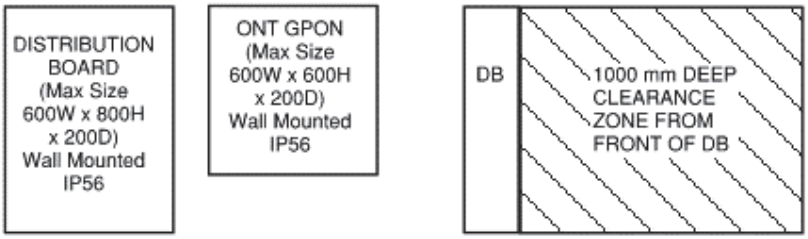
In conjunction with the external electronica access control points a site wide CCTV system is anticipated for all entry and exit points to buildings and main site entry points. In addition, CCTV coverage throughout common areas and main thoroughfares of accommodation unit neighborhoods is also to be provisioned.

4.4 Buildings Works

4.4.1 Accommodation Units

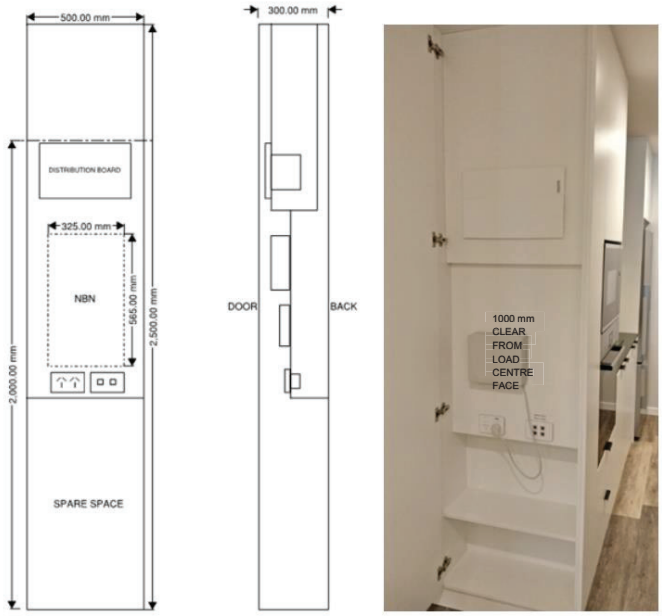
Internal fit-out of the accommodation units is understood to be aligned with the procurement of modular unit. Irrespective interior requirement will developed further in future design stages.

Pertinent to initial space planning is the allocation of distribution board and GPON network Optical Network Termination Device (ONT). Please find typical arrangement below:



ELEVATION - DISTRIBUTION BOARD AND ONT - EXTERNALLY MOUNTED

SECTION - DISTRIBUTION BOARD AND ONT - EXTERNALLY MOUNTED



ELEVATION, SECTOIN AND IMAGE OF INTERNAL DB AND ONT ARRANGMENT

Figure 2: Internal & External DB/ONT Arrangements

4.4.2 Central Buildings

The small power, communications, lighting and security provisions for these buildings will be developed in conjunction with the functional requirements, client briefings as well as BCA and Australian Standards as the project progresses.

5. Fire Protection Services

5.1 Incoming Service Connection

The fire protection services design assumes that the incoming mains will be capable of supplying the required flow rate for the fire hydrant system (20 L/s) at a residual pressure of at least 200 kPa.

Flow testing is yet to be carried out in the street mains and at this stage we are unable to determine the available infill to the site. We recommend that this is undertaken as early as practicable during the design. At this stage we are assuming that we are required to provide full storage to the development, with an additional tank suction line required to provide water to the attending fire brigade.

5.2 Bushfire Advice

The following advice has been provided by the project Bushfire Consultant

- Recommend we allow 50kL additional firewater for bushfire fighting purposes, with a minimum onsite firewater storage of 200kL
- The standard booster and hardstand arrangements should be sufficient.
- There are existing street hydrants nearby but unsure of what flow and pressure these have.

5.3 Design Standards

- Fire services to comply with the National Construction Code of Australia 2019.1
- Fire services to comply with all current statutory requirements and guidelines
- Fire Services to comply with current Australian Standards where applicable and particularly the following:

Standard	Year	Name	
AS 1851	2012	Routine Service of Fire Protection Systems and Equipment	
AS 2419.1	2005	Fire Hydrant Installations	Part 1: System Design Installation and Commissioning
AS 2441	2005	Installation of Fire Hose Reels	
AS 2941	2013	Fixed Fire Protection Installations – Pump Set Systems	
AS 3500.1	2003	Plumbing and Drainage	Part 1: Water Services

5.4 Design Criteria

5.4.1 Fire Hydrant System

Fire hydrant protection is provided for the non-accommodation buildings only exceeding 500m² fire compartment floor area.

The fire hydrant system is to be designed based on the following:

- Number of operating hydrants — 2 outlets
- Minimum flow rate – pumped — 5 L / s each
- Minimum residual pressure — 700 kPa
- Minimum flow rate – boosted — 10 L / s each
- Water Storage — 2 x Cylindrical Tanks 7.768 m diameter x 3.6 m high each
  Minimum effective capacity 144 kL

5.4.2 Fire Hose Reels

Fire hose reels are to be designed based on the following, supplied from the fire hydrant system:

- Protected areas — all areas as outlined in BCA advice
- Nominal Hose Diameter — 19 mm / 25 mm
- Minimum flow rate — 0.33 L / s each / 0.41 L/s each
- Minimum residual pressure — 220 kPa
- Number of operating hose reels — 2 most hydraulically disadvantaged

5.4.3 Portable Fire Extinguishers

Portable fire extinguishers are to be provided based on the following:

- Protected areas — Areas nominated in BCA Table E1.6 only
- Design Standard — Primary Protection
- Additional Requirements — Extinguishers provided to suit Fire Engineering requirements

5.5 Primary Fire Protection Spatial Requirements

Outlined below, and in associated mark-up drawings are the key spatial requirements for the fire protection services:

Item	Location	Size	Comments
Fire Booster Cabinet	Adjacent Main Street Entrance	3000 (w) x 800 (d) x 1800 (h)	Location to be confirmed with Fire Brigade. Can be free-standing withing sight of main site entry but no less than 10m from the building unless additional fire rating is provided to building external wall.
Fire Pump Room	Adjacent Fire Tanks	6000 (w) x 6500 (d) x 2400 (h)	Location requires direct Fire Brigade access, or alternative solution required. Preferably located with good access to roadways/pathways.
Fire Water Tanks	Adjacent Pump Room	7768Ø x 3600 (h)	Tank requires minimum 600 mm clearance all sides.
Fire Indicator Panel	Internal wall inside main building entry	700 (w) x 350 (d) x 2100 (h)	Location to be confirmed with Fire Brigade.

6. Hydraulic Services

6.1 Standards

- Hydraulic services to comply with the National Construction Code of Australia 2019.1.
- Hydraulic services to comply with all current statutory requirements and guidelines including the Shire of Ashburton, Water Corporation of Western Australia, Department of Fire and Emergency Services, Department of Health and the Department of Environmental Protection.
- Hydraulic Services to comply with current Australian Standards where applicable and particularly the following:

AS 3500	:	National Plumbing and Drainage Code incorporating:
Part 1	:	Water Supply
Part 2	:	Sanitary Plumbing and Drainage
Part 4	:	Heated Water Services
AS 2419	:	Fire Hydrant Installations
AS 2441	:	Fire Hose Reel Installations
AS 5601	:	Gas Installations

6.2 Design Criteria

- Hot Water : Storage Temperature (domestic use) minimum 60°C
  : Supply Temperature (commercial use) minimum 65°C
  : Supply Temperature (domestic use) maximum 50°C
  : Supply Temperature to disabled facilities maximum 45°C
- Stormwater:

We note that it is not expected to provide rainwater catchment roof gutters in this region due to rainfall intensities and cyclone wind region requirements. We are not proposing to provide roof rainwater downpipes and are proceeding on the basis that the roof edges will be designed to allow rainwater to cascade on to hardstand or appropriately managed surfaces.

6.3 Fixtures & Taps

- Provision for first grade commercial quality sanitary fixtures, fittings, and tapware are to be made for the development.
- Provision of fixtures and tapware conforming to the WELS (Water Efficiency Labelling Standards) which identifies the following maximum flow rates. Further to this, we expect that additional reductions in flow rates are to be proposed by the sustainability consultants for the project.

-	Showers	@	9 L/min
-	Hand Basins	@	6 L/min
-	Sinks	@	6 L/min
-	Toilets	@	Dual Flush 4.5/3 L

Nomination of sanitary fixtures and tapware will be determined in consultation with the architect for client sign off during the project detailed design.

6.4 Sewer

A conceptual sewer layout has been provided to the project Civil Engineer for inclusion into the site Authority mains extensions required to service the project.

With circa 500 Pods including a bathroom, kitchenette and laundry of 14FU's, the development is expected to service around 7,150FU for sewer. While the below layout is achievable, there is a possibility that site levels may require the installation of pump stations to achieve sewer falls. These are to be avoided where possible to reduce ongoing maintenance of mechanical pumps and control panels.

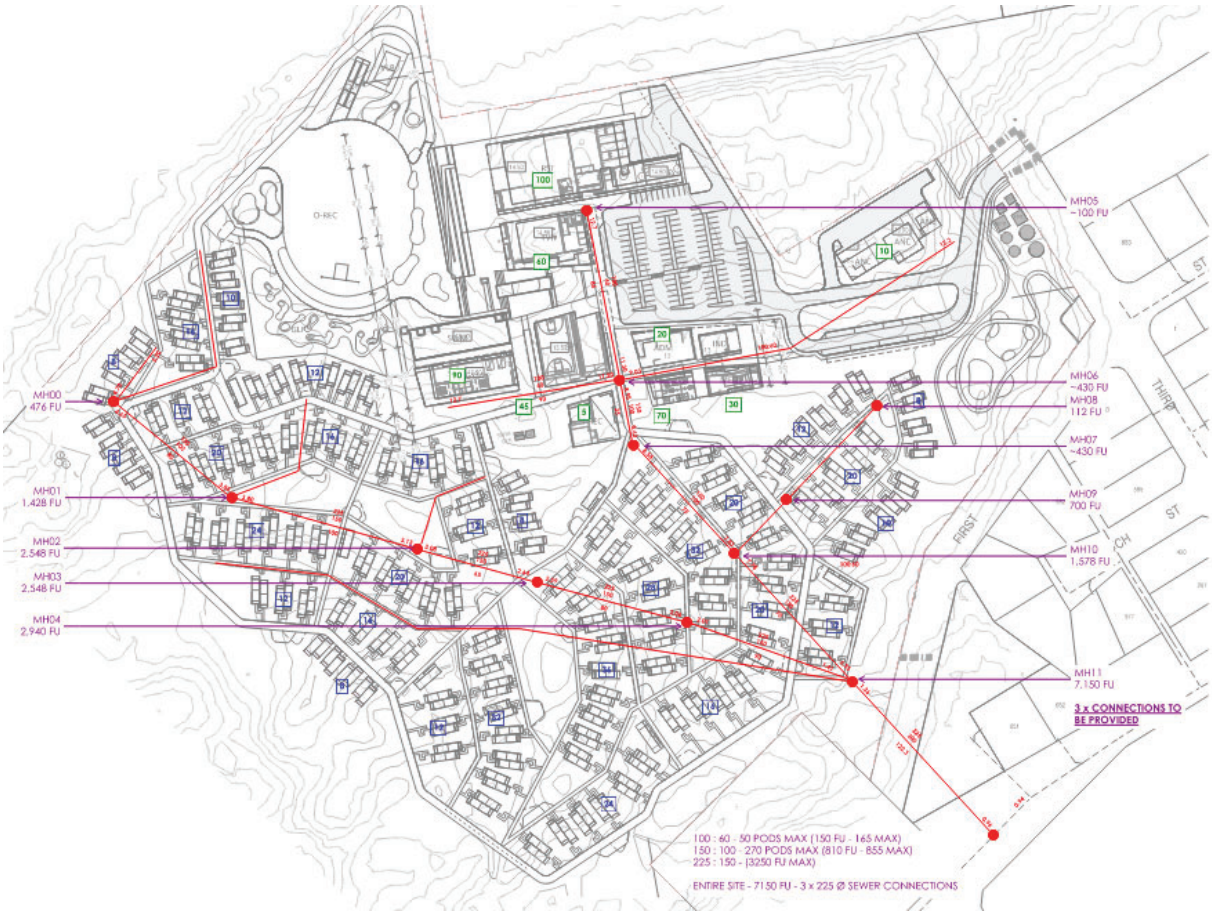


Figure 3: Conceptual Sewer Layout

6.5 Stormwater Collection

- No provision will be made for eaves and box gutters, gutter sumps, overflows, expansion joints and downpipes.
- We note that due to cyclonic conditions in the region the common design practice for roof drainage is not to provide guttering and associated downpipes. Typically, roofs drain onto graded concrete pathways or designed swales to avoid soil erosion whilst still dispersing roof water flow. In our experience, the primary reasons for not providing roof stormwater collection systems are:
  - Due to rainfall intensities experienced in the region, gutter and downpipe sizing is excessive.
  - The excessive sizing of gutters exacerbates the issue of appropriately fixing guttering to roof structures to withstand cyclonic winds.

6.6 Trade Waste

6.6.1 Kitchen/Greasy Waste

- Provision for the collection of all grease waste from kitchen cooking and food preparation areas via fixture wastes from food preparation sinks, hand wash basins, bain maries, cool room/freezer washdown and condensate waste drains, bucket traps and industrial floor wastes discharging to a suitably sized filtered grease arrestor

  Note: Fixture wastes from glass washers, dishwashers and pre-rinse sinks will discharge directly to the domestic sanitary drainage system so that excessive and high temperature wastewater discharges bypass the grease trap

- Provision for a 15mm hose connection tap located within 6m of the grease arrestor to assist maintenance cleaning and complete with required backflow prevention device
- Provision for a 240 V, 10 A, 3 pin weatherproof GPO to be located within 2m of the grease arrestor industrial waste sampling point to assist the Authorities use of sample and monitoring process equipment
- Provision for independent venting to atmosphere of grease arrestor

6.6.2 Medical Waste

- A dilution chamber may be required for the medical clinic dependent on the testing and materials used on site.
- An application to discharge form will need to be completed to ensure that appropriate pre-treatment devices are installed prior to connection to the sewer network.
- Typically, we expect the requirement of a small below ground dilution chamber adjacent the medical clinic.

6.6.3 Commercial Laundry Operations

- Laundry pods for commercial uses (i.e. linens and heavy washing) may require lint/cooling pits prior to discharge into the site sewer network.
- Provision for the collection of all commercial laundry discharges to a suitably sized lint/cooling pit.
- Provision for a 15mm hose connection tap located within 6m of the lint trap to assist maintenance cleaning and complete with required backflow prevention device
- Provision for a 240 V, 10 A, 3 pin weatherproof GPO to be located within 2m of the lint trap industrial waste sampling point to assist the Authorities use of sample and monitoring process equipment
- Provision for independent venting to atmosphere of lint trap/cooling pit.

6.7 Cold Water

Water is available to the development via the 200AC Water Corporation water main in Third Avenue. We understand discussions with this Authority are ongoing to determine the location and availability of water take off.

- Provision for reticulated cold water supplies to all sanitary fixtures, fittings and tapware as required incorporating all required maintenance isolation valves throughout the development, with a large cold water ring main providing redundancy and continuity of pressure availability.

6.7.1 Potable Water Storage

As outlined in the *Onslow Iron Project – Facilities Requirements* section on water treatment plant, the site requirements allow for 250L/person/day. While this is typical for mining camps, this allowance on a per person basis will also cover for additional usage at the central facilities of the development. We also understand that it may only be a 6-12 month period where the camp is fully occupied, and that during general operations the development will operate at a lesser capacity. The difference between these scenarios is presented in the table below.

Water storage services have been sized to minimise the main incoming water service connection size to the Authority infrastructure, and to allow a 6-hour refill of half a day of water storage outside of peak demand times. This allows a morning showering peak to be refilled with 50% of the days potable capacity available for other uses.

Table 1: Site Water Demands

	Site Full Capacity	Site General Capacity
People	500	300
Daily Potable Water Use	250L/person/day	250L/person/day
Storage Tank Capacity	125kL	75kL
Site Potable Water Connection (6 hr 50% tank refill)	50mm @ 230L/min 208 L/min (3.47L/s)	40mm @ 120L/min 104 L/min (1.74L/s)
Monthly Potable Water Use	3,802 kL/month	2,281 kL/month
Annual Potable Use	45.625 ML/annum	27.281 ML/annum

Note: Demands reflect potable use only and excludes irrigation demand.

Figure 4: Conceptual Water/Fire Layout

6.8 Hot Water Services

Whilst recognising there is to be no or minimal gas supply to the site available to heat potable water, our design intent is to deliver the most energy efficient hot water generation system.

To this end, our design solution involves the use of heat pump technology for all hot water plant, with small local hot water demands possibly being met with the use of local electric storage units.

Further, we have conducted some preliminary investigations into solar contribution to hot water generation. Given the location of the site (being in a cyclonic region) we consider that, due to the extra requirements for structural robustness of the solar panel array support system, this may prove to be cost prohibitive. Further, initial investigations have revealed that a large “solar field” area would be required, which would be best placed to be utilized for solar PV electricity rather than hot water generation.

Given the above, we have not considered solar to be a viable alternative, particularly given the inherent energy efficiencies associated with the proposed heat pump units.

Table 2: Hot Water Supply Matrix

Area Served	Design Assumptions		Hot Water Plant
	Peak Demand	Hot Water Usage	
Pod Option 1 One Unit/2 Pods	Max two showers in operation at the same time	Average shower of 5-7 minutes per person at same time	Residential style heat pump, 200L capacity serving two pods.
Pod Option 2 One Unit/4 Pods	Max 3/4 showers in operation at the same time	Average shower of 5-7 minutes per person at same time	Residential style heat pump, 300/340L capacity serving four pods
Laundry Pods		Heavy Dirt Personable item washing	Commercial heat pumps with storage tanks to final demand requirements
Central Facilities Buildings			
Administration	Tea prep use or amenities only	-	Allow electric instantaneous hot water unit at point of use.
Medical Centre	Individual sinks/basin and amenities use	-	Allow electric instantaneous hot water unit at point of use.
Restaurant	Kitchen equipment to prepare meals for breakfast and dinner for 300-500 people	Allow 4L hot water per meal prepared. 2,000L per peak.	Commercial heat pumps with storage tanks. Gas backup optional if gas is considered for kitchen use. Each system manifolded to enable independent isolation of equipment to ensure no single point of failure. Electric or Gas water boost heaters in series for high temperature boosting if required.

Area Served	Design Assumptions		Hot Water Plant
Tavern	Kitchen equipment to prepare basic 'tavern' meals for 100 people + Alfresco	Allow 4L hot water per meal prepared. 600L per peak.	Commercial heat pumps with storage tanks. Gas backup optional if gas is considered for kitchen use. Each system manifolded to enable independent isolation of equipment to ensure no single point of failure. Electric or Gas water boost heaters in series for high temperature boosting if required.
Laundry		Linens	Commercial heat pumps with storage tanks to final demand requirements
Stores/Maintenance	Individual sinks/basin and amenities use	-	Allow electric instantaneous hot water unit at point of use.
Gymnasium/Wellness	Assume 44 people showering (2 football teams) over a period of 30 minutes	Assume an average shower length of 3 minutes per person	Commercial heat pumps with storage tanks. Each system manifolded to enable independent isolation of equipment to ensure no single point of failure. T
Recreation Room	Tea prep use or amenities only	-	Allow electric instantaneous hot water unit at point of use.

Note: Commercial Heat pumps are controlled by single electronic control module that is effectively a single point of failure for the system. Typically, a redundant module would be stored on site for changeover in the event of a failure in order to provide redundancy.
(Failure of this component would result in a short down time of the hot water system).

The Hot Water Supply Matrix sets out the hot water demand and equipment provisions for each building requiring hot water within the development as individual buildings with separate hot water plants.

6.9 LP Gas Services

With no reticulated gas available to the development, LPG is an option for providing a gas supply to the kitchen. LPG is available in Onslow and can be set up with a bulk cylinder or through a gas tank manifold.

We look forward to internal kitchen advice to provide additional options.

7. Mechanical Services

7.1 Design Standards

7.1.1 Statutory Design Standards

The National Construction Code (NCC) 2019 and, in particular, the "deemed to satisfy" conditions of:

- NCC 2019 Section J3.5 "Building Sealing - Exhaust Fans"
- NCC 2019 Section F4.5 "Ventilation of rooms"
- NCC 2019 Section J5 "Air Conditioning and Ventilation Systems"
- NCC 2019 Specification J5.2 "Ductwork Insulation and Sealing"

Australian Standards as follows:

- AS 1530 Methods for fire tests on building materials, components and structures
- AS 1668.1 The use of mechanical Ventilation and Air Conditioning in buildings -Fire and Smoke control in multi-compartment buildings
- AS 1668.2 The use of mechanical Ventilation and Air Conditioning in buildings - Mechanical Ventilation in buildings
- AS 5149 Refrigerating Systems
- AS 1682 Fire Dampers
- AS 1851 Maintenance of Fire Protection Systems
- AS 3000 SAA Wiring Rules
- AS 3666.1&2 Air Handling and Water Systems of Buildings – Microbial Control
- AS 4254.1 Flexible Ductwork – Fire resistance & Sealing only
- AS 4254.2 Solid Ductwork – Fire resistance & Sealing only

Client to advise requirements and guidelines including SHIRE / CITY COUNCIL (listed on DA Approval), Fire and Emergency Services Authority, Health Department and Department of Environmental Protection.

7.1.2 Safety in Design - Design Standards

These standards may be referenced in Safety in Design reports, compliance with these standards will be used to mitigate the relevant Health and Safety Risks.

Australian Standards as follows:

- AS 1668.1 The use of mechanical Ventilation and Air Conditioning in buildings -Fire and Smoke control in multi-compartment buildings
- AS 1668.2 The use of mechanical Ventilation and Air Conditioning in buildings - Mechanical Ventilation in buildings
- AS 1677 Refrigerating Systems
- AS 3000 SAA Wiring Rules
- AS 3666.1&2 Air Handling and Water Systems of Buildings – Microbial Control
- AS 2865 Confined Spaces HB213 Guidelines for Working in Confined Space

- AS 2896 Medical Gas Systems
- AS 2568 Medical Gasses – Purity of Compressed Breathing Air
- AS 1894 Storage and Handling of Non-Flammable Cryogenic and Refrigerated Liquids
- AS 1940 Storage and Handling of Flammable Combustible Liquids
- AS 5601 Gas Installations
- AS 3500 Plumbing & Drainage Codes
- AS 1228 Pressure Equipment - Boilers
- AS 2593 Boilers – Safety Management & Supervision Systems
- AS 1271 Safety Valves

7.1.3 Best Practice Design Standards

These standards will be followed where practical, Client to advise any standards which must be followed.

Australian Standards as follows:

- AS 1324 Air Filters for use in air conditioning and general ventilation
- AS 2107 Acoustics
- AS 3013 Electrical installations, wiring systems for specific applications
- AS 4254.1 Flexible Ductwork
- AS 4254.2 Solid Ductwork

7.2 Design Criteria

Air conditioning systems shall be designed to meet the following design criteria during normal operation with due allowance for solar loads, transmission loads, internal loads, occupancy level and infiltration loads.

All cooling and heating loads may incorporate a design/safety factor of 10%, which is to be added to the calculation of cooling and heating loads.

The design criteria proposed for the mechanical services will be based on the following parameters:

7.2.1 Design Temperatures

Max recorded ambient conditions - (Based on client brief)

Summer (maximum)	49.2°C DB 53%RH (assumed that RH recorded at 3pm Feb is coincident with Max daily temp)
Winter (minimum)	3.5°C DB

Mean ambient conditions – (Based on Bureau of Meteorology data)

Summer (maximum)	36.5°C DB 53%RH (assumed that RH recorded at 3pm Feb is coincident with Mean Max daily temp)
Winter (minimum)	13.1°C DB

Ambient conditions – (Based on AIRAH Weather data set for Comfort Conditions)

Summer (maximum)	36.5°C DB 53%RH (assumed that RH recorded at 3pm Feb is coincident with Mean Max daily temp)
Winter (minimum)	13.1°C DB

Internal Environmental Conditions

Air Conditioned Areas Only

Cooling	:	Nominal 24°C Dry Bulb
	:	40 - 60% relative humidity anticipated by virtue of cooling coil performance
Heating	:	21°C Dry Bulb
Control Tolerance	:	Plus or minus 1.5°C at the point of control for heating and cooling.
Humidity Tolerance		40-60% anticipated by virtue of cooling coil performance No specific humidity control provided.

Client to confirm internal design conditions

Evaporative Cooling

It is understood that evaporative cooling is to be avoided due to climatic location and relatively high ambient humidity levels during periods of the year.

7.2.2 Zone Sizes

Accommodation Rooms

Each room shall be treated as an independent zone capable of controlling the temperature in the space independent of the operation of other rooms.

Office Areas

Internal Zones	125m^2
Perimeter Zones	80m^2

Each office area shall be treated as an independent zone capable of controlling the temperature in the space independent of the operation of other zones. The above zone sizes are based on A-grade commercial office guidelines and will be used as a guide where practical.

Client to confirm zoning provisions.

Other Areas

Perimeter and internal zones within the air conditioned areas shall be capable of controlling the temperature independently.

7.2.3 Internal Loads

Accommodation

Occupancy	As per architectural drawings. (Typically 1 person per room).
Lights	10W/m^2
Equipment	25W/m^2

Office Areas

Office occupancy	10m^2/person
Lobby occupancy	5m^2/person
Lights	10W/m^2
Equipment	25W/m^2

Food & Beverage

Occupancy:	Dining area	1.5m^2/person
	Kitchen area	3.5m^2/person
Lights		10W/m^2
Equipment		5W/m^2

Gym & Recreation

Occupancy:	***Client to confirm***
Lights	10W/m^2
Equipment	***Subject to further client clarifications***

Cyclone Shelter (Restaurant area)

Occupancy:	***500 people – Client to confirm***

7.2.4 Outside Air Flow Rates

Accommodation

All Areas	Natural ventilation. Compliance to be confirmed by Architect/Building Certifier

Office Areas

General	7.5l/s/person (based on high efficiency filtration)

Food & Beverage

General	7.5l/s/person (based on high efficiency filtration)
Makeup air	Via pre-treatment air conditioning systems

Gym & Recreation

General	7.5l/s/person (based on high efficiency filtration)

7.2.5 Exhaust Air Rates

Accommodation

Room Ensuite Exhaust	40l/s minimum
Common Laundry	10l/s/m^2

Other

Toilet exhaust	10l/s/m^2
Locker Rooms	5l/s/m2
Cleaners Rooms	10l/s/m2
Substation	To meet Western Power requirements
Switchroom	To meet Electrical Consultants requirements
Kitchen Exhaust	to AS 1668.2
Simple Café (No cooking)	Kitchen exhaust system not required
Simple Café (Cooking)	10l/s/m2
Restaurant Cooking	Dedicated commercial kitchen exhaust system to AS 1668.2
Photocopying areas	10 l/s/m^2 (minimum)
Sick rooms	15-20 Ach/hr
Café kitchen hood	In compliance with AS 1668.2 to be confirmed by Architect/Client
General ventilation	Materials tech workshops, excluding technology process equipment, by Specialist.

7.2.6 Acoustic Criteria

The following criteria is indicative and subject to Acoustic Consultant review (ongoing).

Living areas	30-40 dB(A)
Sleeping areas	30-35 dB(A)
Work areas	35-40 dB(A)
Common areas	40-45 dB(A)
Restaurant	45-50 dB (A)
Toilets	50-55 dB (A)

7.2.7 Glazing and Building Fabric

Architect to advise building fabric.

7.3 Mechanical Services Scope

7.3.1 Air Conditioning

Air conditioning will be provided to all occupied areas. The method of delivery will be dependent on the type and size of the space. Broadly the systems fall into the following categories;

- High Occupancy / High Capacity Areas
- Large Office and Common Areas
- Accommodation and Small Standalone Areas

High Occupancy / High Capacity Areas

This includes areas such as the Restaurant, Tavern, Gymnasium and Recreation Buildings subject to further clarification of occupancy and room loads.

These areas will require large capacity systems and high outside air loads. To manage these requirements it is recommended that central packaged units be used for each space to reduce overall plant size and complexity.

This type of equipment is typically located on the roof directly above the areas served, although in this application it is recommended that the equipment be located at ground level to remove roof access maintenance and provide better protection from cyclone events.

Large Office and Common Areas

These spaces are proposed to be catered for using conventional split systems but utilising central outdoor equipment connected to multiple indoor units.

This will minimise the number of outdoor units whilst still providing individual temperature control to the required spaces within the building.

The indoor fan coil units are proposed to be fully ducted systems to enable flexible fitout and future reconfiguration.

Accommodation and Small Standalone Areas

Given the relatively small spaces associated with the accommodation rooms and the likelihood of these highly repetitive structures being modular, we recommend standalone split systems for each room.

These systems are proposed to utilise wall mounted indoor fan coil units to mitigate costs, both upfront capital and replacement cost at end of life.

Given that the accommodation areas are expected to remain unchanged, the limited flexibility of wall mounted units is not considered to be an issue for this project.

7.3.2 Ventilation

Ventilation systems will be provided to address code compliance. This will include:

- Dedicated ventilation fan to each accommodation room ensuite
- Central ventilation system to large toilet blocks within each building where applicable
- Specific minor systems to storage rooms and the like (dangerous goods consultant input will be required for areas where chemicals or the like are being stored)
- General ventilation to services rooms such as pump rooms, switch rooms, etc.
- Commercial kitchen exhaust systems to kitchen areas associated with the Tavern and Restaurant including commercial kitchen hoods and associated make up air supply

7.3.3 Refrigeration

Cool rooms and freezer rooms will be conditioned by dedicated refrigeration systems. All connected through a central monitoring system to track room conditions and alarm if room conditions drift from setpoints.

Indoor units are physically mounted within the rooms, whilst the outdoor units should be located externally but within screen plant areas to protect from cyclone events

7.3.4 Cyclone Shelter

Cyclone shelter accommodation needs to be suitably constructed to withstand the required storm events. This needs to be addressed by the Structural consultant and the Architect.

From a mechanical services perspective, the shelter must also include sufficient means for ventilation to ensure occupancy is not compromised for the potentially long periods associated with sheltering from a major cyclone event.

The recommended approach is to include manually operated ventilation openings to all sides of the shelter structure. This will enable occupants to configure the openings as and when required to best mitigate the impact of the external winds whilst ensuring the internal space remains well ventilation.

7.3.5 Local Climate

The local climate for Onslow is subject to high humidity for periods throughout the year. High humidity can result in condensation issues if due consideration is not given to thermal insulation and moisture barriers.

The incorporation of moisture barriers forms part of the building construction and is understood to be part of the architectural documentation.

The mechanical services will include all necessary insulation to prevent cold bridging due to humid air contacting cold surfaces of the mechanical services equipment. Where this is not possible, such as at valve or drain connections, appropriate condensate trays and/or drains will be provided.

In addition to protecting cold surfaces and moisture infiltration through the building fabric, infiltration through building openings must also be managed. For all large spaces (i.e. other than accommodation rooms) outside air for ventilation shall be introduced via the A/C systems to ensure the air being introduced into the building can be pre-treated to reduce humidity levels where required.

For accommodation rooms, the ventilation rates are relatively low. Condensation will be managed by separation of the infiltration source (typically via the entrance door and/or windows) from the A/C unit. To achieve this, the wall mounted indoor A/C unit is proposed to be located on the opposite side of the room to external doors and windows.

7.4 Mechanical Services Example Systems

7.4.1 Air Conditioning – High Occupancy / High Capacity Areas

System		Stantec Comment	Typical Spatial	Appearance
Multiple Indoor Units to Single Outdoor Unit (Multi-Head or Variable Refrigerant Volume) – Outdoor Unit				
Proposed system	Air Cooled Ducted Packaged Units	High capacity systems for large areas High sound levels Require dedicated plant area – recommended to be at ground level and screened for protection during cyclone event)	2m x 3m footprint 1.5m high Typically, 1m access off one side and rear of the unit. May also need additional space in front for duct connections pending plantroom layouts.	
Grilles for Ducted Unit				
Proposed system	Swirl Diffuser	Ceiling Mounted Relatively flexible Provides high level of air distribution Recommended		
Alternative system	Linear Slot Diffuser	Limited Airflow Ceiling Mounted		
Alternative system	Square Pattern Diffuser	Ceiling Mounted		

System		Stantec Comment	Typical Spatial	Appearance
Alternative system	Wall Register	Wall Mounted		
Controller				
Proposed system	Central Controller	Recommended for office and common areas Pros: Capability to control all fan coil units. Provide time scheduling, remote temperature adjustment and is centrally located for ease of access by authorised personnel and maintenance technicians. Cons: Additional costs to install and commission		
Proposed system	Standard Wall Controller	Recommended for office and common areas. Located within each area for local user control. Pros: Provide occupant control: temperature, ON/OFF and fan speed, which may be set within limits via the central controller. Cons: One per fan coil unit wall mounted in area served.		
Alternative system	Local Push Button	Pros: Simplified local control to prevent any changes Cons: Occupants have On/Off Control Only Requires additional controls cost given that proprietary controller still required for maintenance		

7.4.2 Air Conditioning – Large Office and Common Areas

System		Stantec Comment	Typical Spatial	Appearance
Multiple Indoor Units to Single Outdoor Unit (Multi-Head or Variable Refrigerant Volume) – Outdoor Unit				
Proposed system	Heat recovery	Simultaneous Heating and Cooling for Separate Indoor Units	1.25m x 800mm footprint 1.8m high Typically requires 1m access of front of unit and 300mm off rear of unit. Must be able to access both sides but multiple units can be installed adjacent to each other.	
Multiple Indoor Units to Single Outdoor Unit (Multi-Head or Variable Refrigerant Volume) – Indoor Units				
Proposed system	In ceiling ducted Unit	Requires Clear void within the ceiling Can provide Outside Air Future Flexibility Recommended for office areas and public spaces	250 – 400mm deep 700 – 1500mm wide 900mm long All units require min 600mm clear access within ceiling void off one side as well as 600mm square ceiling access panel	
Alternative system	Under Ceiling Mounted Unit	Requires Clear Space under Ceiling Limited Ability to provide Outside Air Limited Future Flexibility	200mm deep 900 – 1500 wide 600mm long No additional access provisions – maintained from within the space	
Alternative system	Cassette Unit	Requires Clear Space within Ceiling Void Limited Ability to provide Outside Air Limited Future Flexibility	900mm square 300mm high Requires 600mm square access panel adjacent unit	

System		Stantec Comment	Typical Spatial	Appearance
Grilles for Ducted Unit				
Proposed system	Swirl Diffuser	Ceiling Mounted Relatively flexible Provides high level of air distribution Recommended	Nominally 500mm diameter	
Alternative system	Linear Slot Diffuser	Limited Airflow Ceiling Mounted	Typically 1200mm long and 120mm wide (2 slots) But can be custom length and can have additional slots depending on air flow	
Alternative system	Square Pattern Diffuser	Ceiling Mounted	Nominally 600mm square	
Alternative system	Wall Register	Wall Mounted	Custom sizes	
Controller				
Proposed system	Central Wall Controller	Recommended for office and common areas <u>Pros</u>: Capability to control all fan coil units. Provide time scheduling, remote temperature adjustment and is centrally located for ease of access by authorised personnel and maintenance technicians. <u>Cons</u>: Additional costs to install and commission		

System		Stantec Comment	Typical Spatial	Appearance
Proposed system	Standard Wall Controller	Recommended for office and common areas. Located within each area for local user control. Pros: Provide occupant control: temperature, ON/OFF and fan speed, which may be set within limits via the central controller. Cons: One per fan coil unit wall mounted in area served.		
Alternative system	Local Push Button	Pros: Simplified local control to prevent any changes Cons: Occupants have On/Off Control Only Requires additional controls cost given that proprietary controller still required for maintenance		

7.4.3 Air Conditioning – Accommodation and Small Standalone Areas

SYSTEM		Stantec Comment	Typical Spatial	Appearance
Single Split System - Outdoor Services				
Proposed system	Slimline Outdoor Units	Limited Maximum Capacity Only Available in Heat Pump	900mm wide 300mm deep 1000mm high (small - shown in adjacent image – proposed for accommodation modules) 1600mm high (large – may be used for other standalone spaces pending heat loads)	
Single Split System - Indoor Units				
Proposed system	Wall Mounted Unit	Low cost Requires Space on Wall Limited Ability to provide Outside Air Limited Future Flexibility Recommended for accommodation rooms	900mm wide 300mm high 200mm deep	
Alternative system	Under Ceiling Mounted Unit	Requires Clear Space under Ceiling Limited Ability to provide Outside Air Limited Future Flexibility	200mm deep 900 – 1500 wide 600mm long No additional access provisions – maintained from within the space	
Alternative system	Cassette Unit	Requires Clear Space within Ceiling Void Limited Ability to provide Outside Air Limited Future Flexibility	900mm square 300mm high Requires 600mm square access panel adjacent unit	

SYSTEM Controller		Stantec Comment	Typical Spatial	Appearance
Proposed system	Standard Wall Controller	Recommended for office and common areas. Located within each area for local user control. Pros: Provide occupant control: temperature, ON/OFF and fan speed, which may be set within limits via the central controller. Cons: One per fan coil unit wall mounted in area served.		
Proposed system	Standard Wireless Controller	Recommended for accommodation rooms Pros: Provide occupant control: temperature, ON/OFF and fan speed, which may be set within limits via the central controller. Cons: Portable controller can be misplaced. Requires battery changes		

7.4.4 Ventilation – Outside Air Systems

System		Stantec Comment	Typical Spatial	Appearance
Bathroom Exhaust Fans				
Possible system	In Ceiling Heat recovery Ventilator	Pre-Conditions Outside Air Require access on both sides for maintenance	1000m long 350mm high 700mm wide Requires 600mm clear ceiling void on both sides of the unit as well as 600 square ceiling access panel on both sides	
Possible system	Direct Connection Roof Cowl	Requires Roof Cowl/wall grille to be located in close proximity of Fan Coil Unit. Only Suitable Ducted Fan Coil Units		
Possible system	In-Line Booster Fan	Suitable for small amounts of Outside Air.	250mm diameter (small systems) 600mm diameter (large systems) Requires ceiling access panel below	
Controls				
Proposed system	Interlocked with A/C	Typical configuration to ensure outside air system runs automatically. This assumes that A/C will be on when area is occupied		

7.4.5 Ventilation – Exhaust

System		Stantec Comment	Typical Spatial	Appearance
BATHROOM EXHAUST FANS				
Proposed system	Inline Ducted Fan	Requires ceiling Void Protected from cyclone event	200 diameter (stand alone toilet or similar) 600 diameter (toilet block or similar) Requires ceiling access panel below	
Alternative system	Roof Mounted Fan	Requires Roof access Vulnerable to cyclone event	600mm square 800mm high	
Alternative system	Header Box Fan	Higher Noise Level than ducted. Limited Capacity Suitable for Ensuite applications	300mm square 250mm high No additional access	
Grilles for Ducted Fan				
Proposed system	Half Chevron	Easy to clean. Typically Aesthetically preferred		
Alternative system	Circular Adjustable Diffuser	Larger grille Adjustable from within space. Plastic Construction		

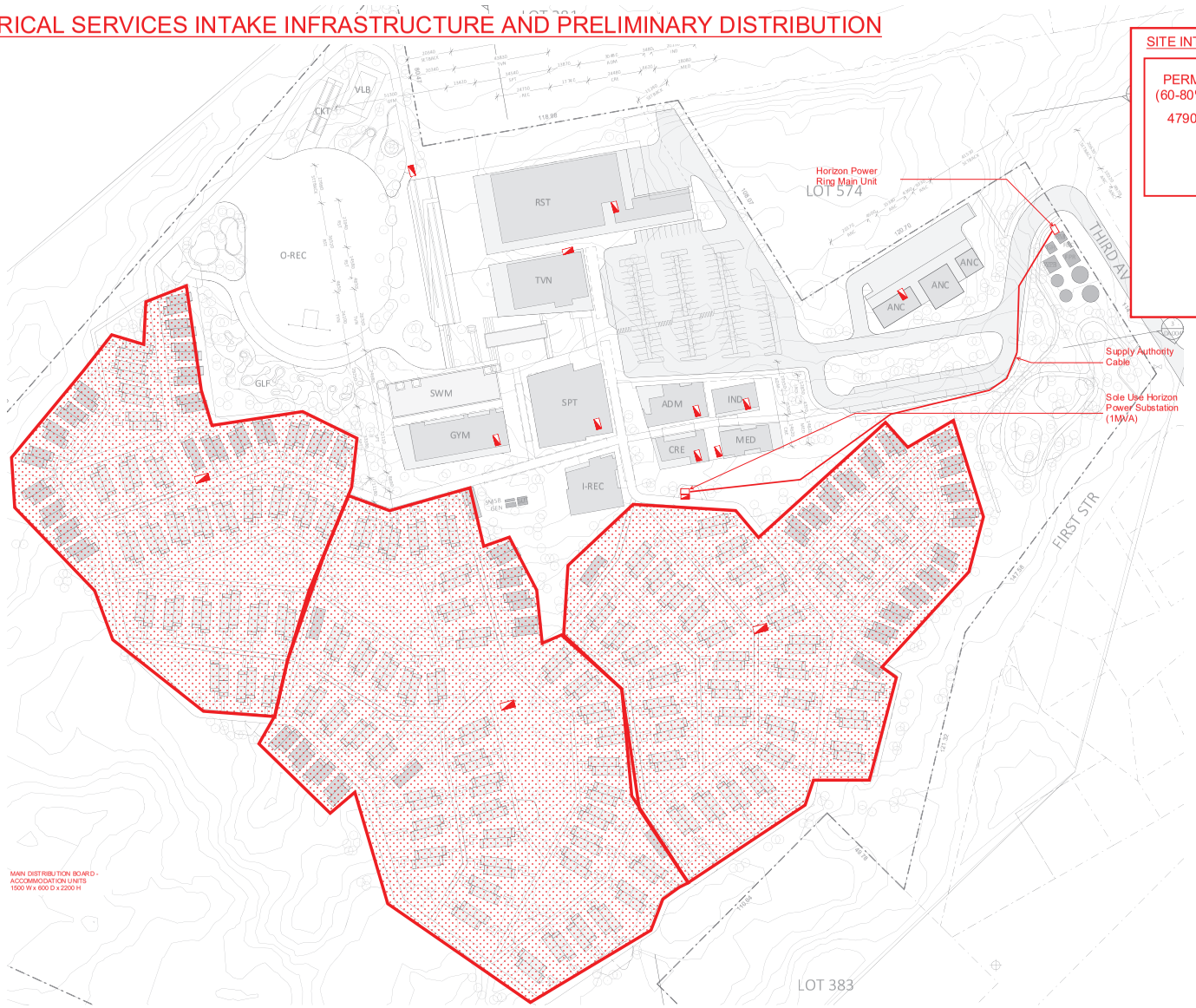
System		Stantec Comment	Typical Spatial	Appearance
Alternative system	Egg Crate	Difficult to Clean Allows Line of Sight through Grille		
Controls				
Proposed system	Switched with Lights	Typical configuration to associated fan use with occupancy (coupled with motion sensors and run-on timer) Recommended for public areas		
Alternative system	Switched Power Supply	Requires users to operate Recommended for Ensuites		

7.4.6 Ventilation – Commercial Kitchen Exhaust

System		Stantec Comment	Typical Spatial	Appearance
Commercial Kitchen Exhaust Fans				
Proposed System	Adjustable Pitch Axial Fan – Duct mounted	High Noise Level requires attenuation Located within ceiling void or plantroom to protect from cyclone event	800mm diameter Ceiling access panel required adjacent	
Alternative system	Roof Mounted Exhaust Fans	Roof access required, Cannot be attenuated externally – requires screens Vulnerable to cyclone event	1000mm square 1000mm high	

Appendix A – Electrical Drawings

ELECTRICAL SERVICES INTAKE INFRASTRUCTURE AND PRELIMINARY DISTRIBUTION



SITE INTAKE POWER SUBSTATION

L

PERMANENT GENERATOR
(60-80% OF FULL SITE LOAD)
4790 mm L x 1950 mm W x 2660 mm H

SOLE USE TRANSFORMER
4500 mm L x 3800 mm W

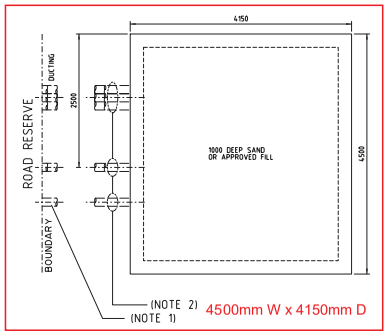
SUBSTATION TO BE LOCATED 6M AWAY FROM THE NEAREST BUILDING FOR FIRE RATING REQUIREMENTS.

W

P P
DISTRIBUTION PITS

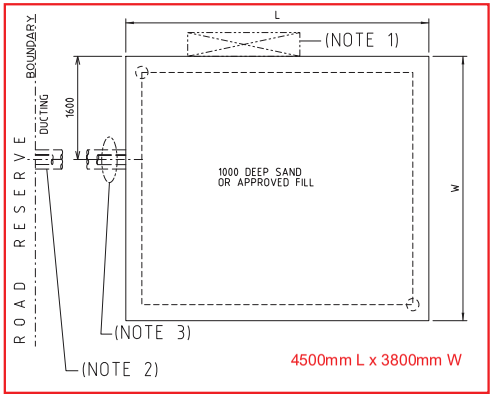
SMSB (APPROX)
4500 mm W x 1200 mm D x 2200 mm H

INTAKE HORIZON POWER RING MAIN UNIT ON LOT BOUNDARY



4500mm W x 4150mm D

INTAKE HORIZON POWER SOLE USE SUBSTATION AS SHOWN ON PLAN



4500mm L x 3800mm W

Revision: B ISSUED WITH BACKGROUND AMENDMENTS (M, ESV, 2021.08.25); A ISSUED FOR FINAL (M, ESV, 2021.08.05)	Issue Status: PRELIMINARY — NOT FOR CONSTRUCTION — This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.	Notes	Stantec — Stantec — www.stantec.com — Copyright Reserved	Client/Project Logo: milieu creative	Client/Project: ROWE GROUP — ONSLOW TOWNSHIP VILLAGE — File Name: — Dwn. — Dsgn. — Chkd. — YYYY.MM.DD	Title: SITE PLAN ELECTRICAL SERVICES — Project No. 301250498 — Scale 1:1000 — Revision B — Drawing No. EL-1-00	

ORIGINAL SHEET - ISO A1

Attachment 13.2A - DAP21/02078 -DA 21-67 | L300 Back Beach Road, Onslow

Appendix B - Hydraulic & Fire Drawings