

LEGEND:

- NEW WATER LINE
- NEW WATER RISING MAIN
- EXISTING WATER RISING MAIN
- EXISTING WATER RISING MAIN
- NEW SEWER LINE
- NEW SEWER RISING MAIN
- EXISTING SEWER LINE
- EXISTING SEWER RISING MAIN
- NEW LOW VOLTAGE
- EXISTING LOW VOLTAGE
- NEW HIGH VOLTAGE
- EXISTING HIGH VOLTAGE

- H** Existing Residential Development (or as highlighted by building sketch layout).
- V** Forecast Residential Lots for Development (up to 2014). Utility Reticulation Services Compliance has been costed for Existing and Forecast Development up to 2014 only.
- F** Future Residential Lots Forecast for Development beyond 2014. Utility Reticulation Services shown for future planning only

Northern Territory Government
 Department of Community Development, Sport & Cultural Affairs

HORIZONTAL DATUM: GDAG4 (ZONE 53) (APPROX)
 VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM (metres)

SCALE: 1:1000

Metres 0 50 100 150 200 Metres

PRODUCED BY:
 DEPARTMENT OF LANDS, PLANNING AND ENVIRONMENT
 DATE OF PHOTOGRAPHY: 22/07/1987

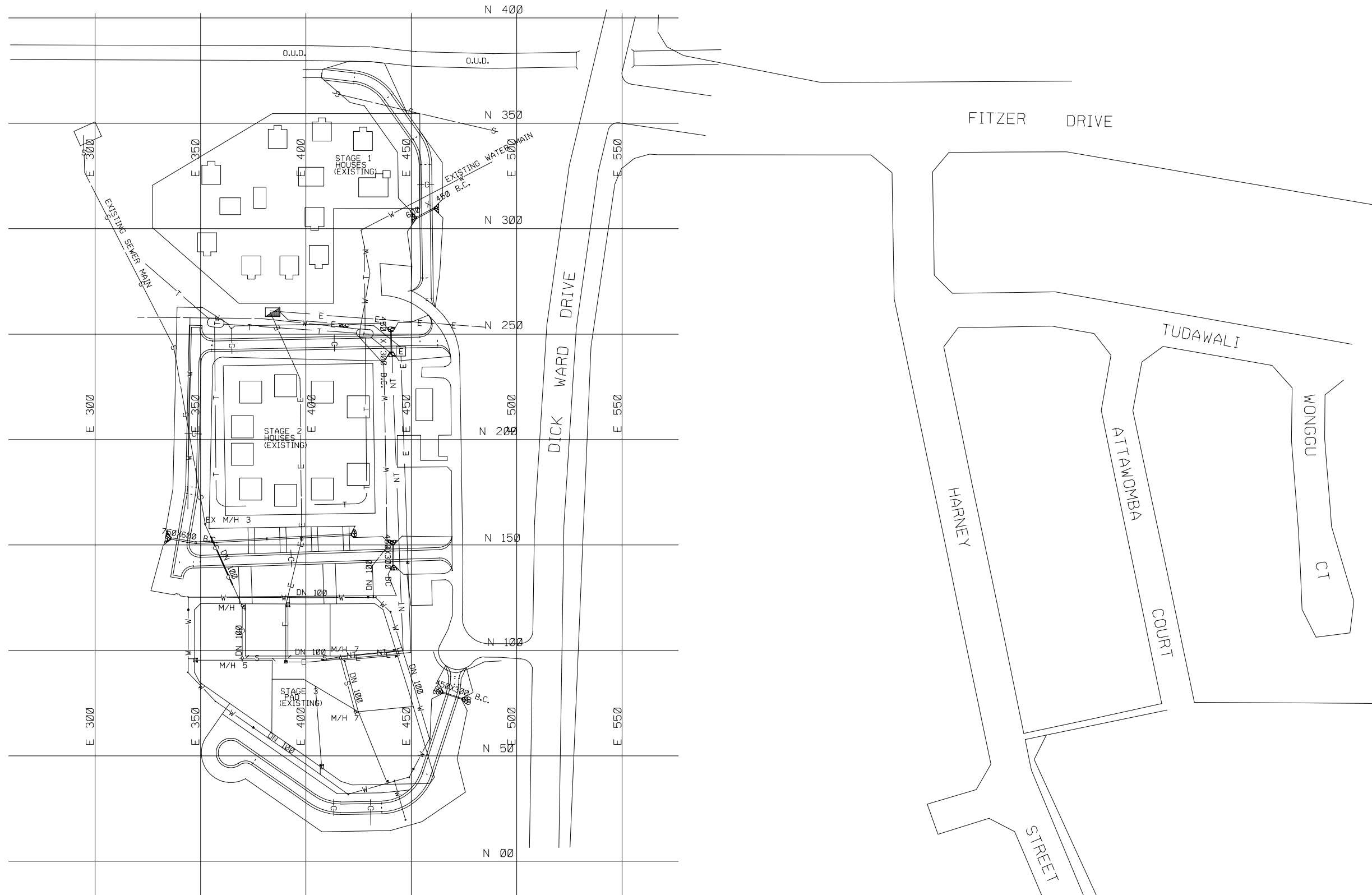
AMENDMENTS			
No.	Date	Amendment	Authorized
1	Feb 01	House Numbers Added	P. Siebert
2	Oct 01	Plan Updated	D.LPE
3	Mar 02	Lots 30-34 added	I. Redmond
4	Jan 04	Houses removed from lots 1 and 6	D. Quickenden
Plan updated by SSJ - 03/03/2004			

GWALWA DARANIKI ASSOC INC

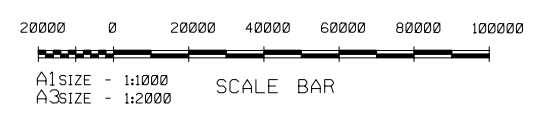
The Services Land Availability Program (SLAP) map system contains planning, engineering and topographical information. This map, called the SIAP map, contains information used for land use planning purposes.

COMMUNITY MAP
MINMARAMA PARK

825



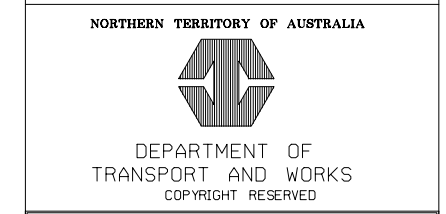
* USITE PLAN
 * USCALE 1:1000



NO.	DESCRIPTION	DATE	INIT.
A	ISSUED FOR CONSTRUCTION	25.10.11	

CIVIL Engineering
 JOB NO. 78338
 82 SMITH STREET
 DARWIN 0800
 TEL: 08 8981 9011
 FAX: 08 8981 4010
 ACN 050 214 894

Scott
 Wilson
 Irwin
 Johnston
 CONSULTING ENGINEERS



PROJECT
 MINMARAMA PARK
 STAGE 3

TITLE
 SITE PLAN

DRAWN RPR	DESIGN B.J.	CHECKED
DATE SEPT 9/11	DATE SEPT 9/11	DATE
PROJECT OFFICER	SUPERVISING ENG. / ARCH.	
DATE	DATE	
FILE NO. 78338C00	SHEET	
SCALE 1:1000	HORIZ.	C0 OF 4
DRAWING NO. R97-3546	AMEND. A	

NOTE:

1. REFER TO SHEET 1 FOR GENERAL NOTES AND LEGEND.
2. EXISTING DN 100 uPVC WATER MAIN TO BE RECONSTRUCTED, UNLESS NOTED OTHERWISE.
3. REFER TO NOTE 15, SHEET 1 FOR MINIMUM COVER.
4. REFER TO TABLE ON SHEET 16 FOR FITTING CO-ORDINATE SCHEDULE



NEW DN 100 x 22½° D.I.C.L BEND WITH THRUST BLOCK REFER TO P.A.W.A. STD DRG W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS.

REPLACE EXISTING DN 25 WATER SERVICE PIPE BY NEW DN 32 PE WATER SERVICE.

NEW FIRE HYDRANT. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-2-03A, W1-2-03C, W1-2-03D & W1-2-03F.

NEW DN 32 PE WATER SERVICE WITH WATER METER BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE AND CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

EXISTING DN 100 SANITARY DRAIN I.L. 3.560

NEW DN 100 x 22½° D.I.C.L BENDS WITH THRUST BLOCKS REFER TO P.A.W.A. STD DRG W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS

CAP AND ABANDON EXISTING REDUNDANT WATER PIPEWORK.

NEW DN 100 SLUICE VALVE AND VALVE BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-2-03C & W1-2-03H

NEW DN 100 x 22½° + 11½° D.I.C.L BENDS WITH THRUST BLOCKS REFER TO P.A.W.A. STD DRG W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS

EXISTING DN 100 WATER MAIN RETAINED

NEW LOT 30

NEW DN 100 x 22½° + 11½° D.I.C.L BENDS WITH THRUST BLOCKS REFER TO P.A.W.A. STD DRG W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS

NEW DN 32 PE WATER SERVICE WITH WATER METER & BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE & CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

PROPOSED TOP OF BATTER

DISCONNECT, CAP, AND REMOVE EXISTING FIRE HYDRANT.

NEW DN 32 PE WATER SERVICE & WATER METER BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE AND CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

JOINS SHEET No. 16

NEW DN 32 PE WATER SERVICE WITH WATER METER & BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE & CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

JOINS WATER SUPPLY LAYOUT PLAN

NEW DN 32 PE WATER SERVICE WITH WATER METER & BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE & CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

EXISTING SERVICE CONNECTIONS TO BE CAPPED AND REDUNDANT PIPEWORK ABANDONED.

PROPOSED TOP OF BATTER

AS CONSTRUCTED

CAP AND ABANDON EXISTING REDUNDANT WATER PIPEWORK.

NEW DN 100 uPVC WATER MAIN



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No.	DESCRIPTION	DATE	INIT.
1	AS CONSTRUCTED INFORMATION AS SUPPLIED BY CONTRACTOR	19/11/01	S.K.
0	ISSUED FOR CONSTRUCTION	21/9/01	S.K.
A	ISSUED FOR INFORMATION	22/8/01	S.K.
AMENDMENTS			



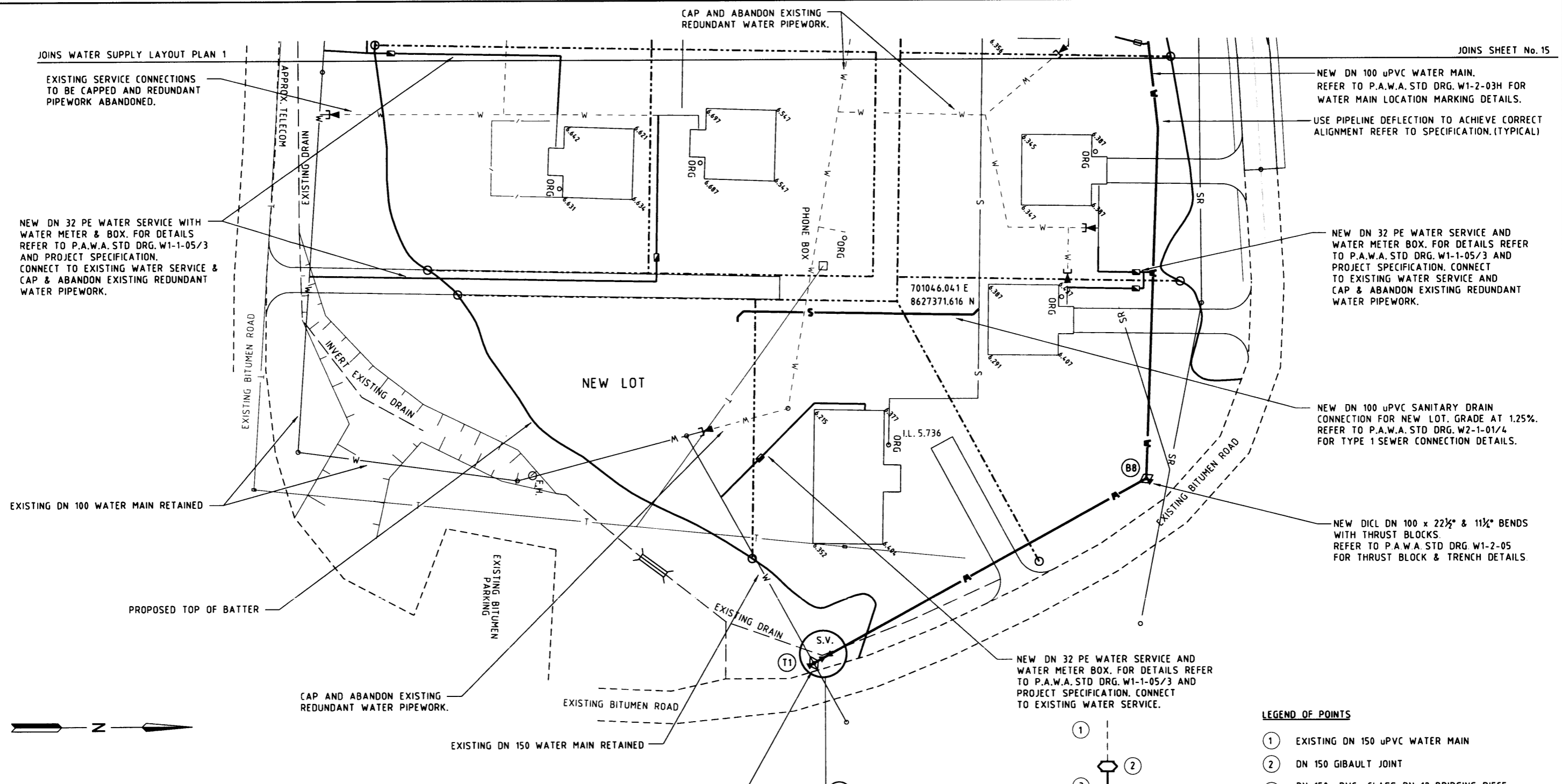
DRAWN D Annesley/D.H.	CHECKED D.A.
DATE Aug. 01	DATE Sept 2001
DESIGNED S Kwan/B.B.	CHECKED
DATE Aug. 01	DATE
DESIGN PROJECT LEADER	PROJECT OFFICER
DATE	DATE

NORTHERN TERRITORY OF AUSTRALIA

DEPARTMENT OF TRANSPORT AND WORKS
CONSTRUCTION DIVISION
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DARWIN - MINMARAMA PARK		REDEVELOPMENT OF STAGE ONE	
WATER SUPPLY LAYOUT PLAN 1			
FILE No. ALD-01330	SHEET No. 15 OF 18	DRAWING NUMBER B01-6209	AMEND. 1
			SHEET A1

JOINS WATER SUPPLY LAYOUT PLAN 1



EXISTING SERVICE CONNECTIONS TO BE CAPPED AND REDUNDANT PIPEWORK ABANDONED.

NEW DN 100 uPVC WATER MAIN. REFER TO P.A.W.A. STD DRG. W1-2-03H FOR WATER MAIN LOCATION MARKING DETAILS.
USE PIPELINE DEFLECTION TO ACHIEVE CORRECT ALIGNMENT REFER TO SPECIFICATION. (TYPICAL)

NEW DN 32 PE WATER SERVICE WITH WATER METER & BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG. W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE & CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

NEW DN 32 PE WATER SERVICE AND WATER METER BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG. W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE AND CAP & ABANDON EXISTING REDUNDANT WATER PIPEWORK.

NEW DN 100 uPVC SANITARY DRAIN CONNECTION FOR NEW LOT. GRADE AT 1.25%. REFER TO P.A.W.A. STD DRG. W2-1-01/4 FOR TYPE 1 SEWER CONNECTION DETAILS.

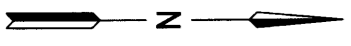
NEW D.I.C.L. DN 100 x 22 1/2" & 11 1/2" BENDS WITH THRUST BLOCKS. REFER TO P.A.W.A. STD DRG. W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS.

EXISTING DN 100 WATER MAIN RETAINED

NEW DN 32 PE WATER SERVICE AND WATER METER BOX. FOR DETAILS REFER TO P.A.W.A. STD DRG. W1-1-05/3 AND PROJECT SPECIFICATION. CONNECT TO EXISTING WATER SERVICE.

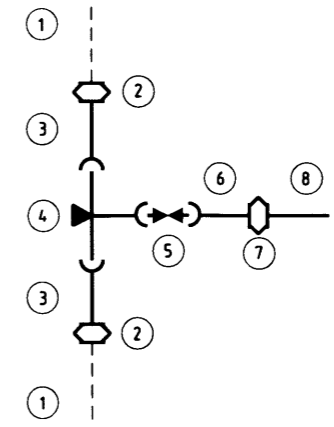
CONNECT NEW DN 100 WATER MAIN TO EXISTING DN 150 WATER RETICULATION MAIN WITH DN 150 x 150 x 100 D.I.C.L. TEE AND THRUST BLOCK. REFER TO W1-2-05 FOR THRUST BLOCK & TRENCH DETAILS.

NEW DN 100 SLUICE VALVE AND VALVE BOX FOR DETAILS REFER TO P.A.W.A. STD DRG. W1-2-03C & W1-2-03H.



LEGEND OF POINTS

- ① EXISTING DN 150 uPVC WATER MAIN
- ② DN 150 GIBALT JOINT
- ③ DN 150 uPVC CLASS PN 12 BRIDGING PIECE - 500mm LONG
- ④ DN 150 x 150 x 100 D.I.C.L. TEE (SP-SP-SO) WITH THRUST BLOCK
- ⑤ DN 100 GATE VALVE AND VALVE BOX (SP-SP)
- ⑥ DN 100 uPVC CLASS PN 12 BRIDGING PIECE - 500mm LONG
- ⑦ DN 100 GIBALT JOINT
- ⑧ DN 100 uPVC WATER MAIN



DETAIL 1 N.T.S.



FITTING COORDINATE SCHEDULE			
FITTING POINT	DESCRIPTION	EASTING	NORTHING
B1	22 1/2" + 11 1/2" BENDS	700973.510	8627293.570
B2	22 1/2" BEND	700946.590	8627347.430
B3	22 1/2" BEND	700946.340	8627362.000
B4	22 1/2" BEND	700953.400	8627378.220
B5	22 1/2" + 11 1/2" BENDS	700961.584	8627386.116
B8	22 1/2" + 11 1/2" BENDS	701067.440	8627392.171
T1	150 x 150 x 100 TEE	701090.200	8627351.000

NOTE:
1. REFER TO SHEET 1 FOR GENERAL NOTES AND LEGEND.
2. EXISTING DN 100 uPVC WATER MAIN TO BE RECONSTRUCTED, UNLESS NOTED OTHERWISE.

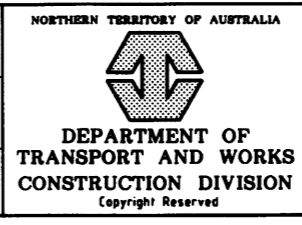
AS CONSTRUCTED

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1 0 A	AS CONSTRUCTED INFORMATION AS SUPPLIED BY CONTRACTOR ISSUED FOR CONSTRUCTION ISSUED FOR REVIEW	19/11/01 21/9/01 21/8/01	S.K. S.K. S.K.
No.	DESCRIPTION	DATE	INIT.
AMENDMENTS			



DRAWN D Annesley/D.H.	CHECKED D.A.
DATE Aug. 01	DATE Sept 2001
DESIGNED S Kwan/B.B.	CHECKED
DATE Aug. 01	DATE
DESIGN PROJECT LEADER	PROJECT OFFICER
DATE	DATE



DARWIN - MINMARAMA PARK REDEVELOPMENT OF STAGE ONE	
WATER SUPPLY LAYOUT PLAN 2	
FILE No. ALD-01330	SHEET No. 16 OF 18
DRAWING NUMBER B01-6210	AMEND. 1
DATE A1	

Transformer data

Group	Com Id	Location	Community Name	Dwellings No. (Funded Dwellings)	Dwellings No. (Bennett Design)	New Houses ** (Future Demand)	Primary Voltage Level (KV)	PWC Substation ID	PWC Test Number	Transformer size (KVA)	KVA Total dwellings @ 4.5KVA	KVA Total dwellings @ 7KVA	Comments
1	290	Darwin	Bagot	55	55		11	1924	1735	300	247.5	385	
	344	Darwin	Knuckey Lagoons	18	19	2	11	1771	2163	100	85.5	133	
	347	Darwin	Kulaluk	19	19		11	1092	10607	50	85.5	133	
	403	Darwin	Palmerston Town Camp	20	16		22	10196	10245	100	90	140	Two transformers for this Town Camp. Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
	412	Darwin	Railway Dam (One Mile Dam)	5	6	2	11	1041	4378	200	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	427	Adelaide River	Amangal	9	9		22	216	12187	100	40.5	63	Two transformers for this Town Camp.
	687	Jabiru	Manabadurma	10	12		11	5050	11107	200	54	84	
	825	Darwin	Minmarama Park	24	24		11	2147	11372	100	108	168	
2	606	Katherine	Warlpiri Transient Camp	9	9		22	6416	4886	100	40.5	63	Two transformers for this Town Camp.
	621	Katherine	Miali Brumby (Kalano)	47	31		22	6074	4695	25			
	640	Pine Creek	Pine Creek Compound	4	4		22	6133	12247	315	211.5	329	
	971	Mataranka	Mulggan	12	9	4	22	6666	3147	25	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
						22	6819	5296	16				
						22	6818	5297	16	54	84		
						22	6384	11028	25				
3	215	Tennant Creek	Blueberry Hill (Munji-Marla)	2	2		22	7079	1868	200	9	14	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	223	Tennant Creek	Dump Camp (Marla-Marla)	7	7		22	7181	11088	200	31.5	49	
	224	Elliott	Elliott South Camp	12	12		11	7504	4718	200	54	84	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	225	Elliott	Elliott North Camp	36	25		11	7505	4715	100	162	252	
	238	Tennant Creek	Kargaru (East Side Camp)	12	12	1	22	7572		200	54	84	
	246	Tennant Creek	Ngalpa Ngalpa	18	21		22	7179		200	94.5	147	Two transformers for this Town Camp.
							22	7033	10904	315			
	271	Tennant Creek	Village Camp	12	12	1	22	7183	11107	200	54	84	
681	Tennant Creek	Tingkarli	12	12		22	7180		200	54	84		
684	Tennant Creek	Wuppa	15	15	1	22	7141	11092	100	67.5	105	Two transformers for this Town Camp.	
						22	7182	11095	200				
4	3	Alice Springs	Akngwertnarre (Morris Soak)	11	15		11	8596	11336	300	67.5	105	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	16	Alice Springs	Anthelk Ewlpaye (Charles Creek)	17	10		11	8569	315	315	76.5	119	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	17	Alice Springs	Anthepe	15	15		22	8598	5874	200	67.5	105	Data extracted from PWC asset information. There was not access to this Town Camp due to ceremony on inspection day.
							22	8597	11244	315			
	19	Alice Springs	Aper Alwerrkng (Palmers)	7	6		11	8405	2939	200	31.5	49	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	35	Alice Springs	Ewyenper Atwatye (Hidden Valley)	47	47		11	8622	11202	100	211.5	329	
							11	8623	11203	100			
							22	8625	11205	63			
							11	8626	11204	100			
	47	Alice Springs	Ilparpa	13	13		22	8611	11702	200	58.5	91	
	48	Alice Springs	Ilperle Tyathe (Walpiri)	10	9		11	8001	11209	315	45	70	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	50	Alice Springs	Ilyperenye (Old Timers)	10	10		22	8145	3323	100	45	70	
	64	Alice Springs	Bassos	2	2		11	8002	10946	50	9	14	
	69	Alice Springs	Karnte	19	19		22	8282	2345	100	85.5	133	
	87	Alice Springs	Yarrenty Altere (Larapinta Valley)	34	34		11	8617	11334	100	153	238	
						11	8618	11200	63				
						11	8619	11335	100				
						11	8620	11201	100				
90	Alice Springs	Inarlange (Little Sisters)	16	22		22	8137	2925	100	99	154	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
108	Alice Springs	Mpwetyerre (Abbotts)	6	6		11	8093	11703	315	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
113	Alice Springs	Mount Nancy (Nyewente)	11	12		11	8405	2939	200	54	84		
129	Alice Springs	Nyewente (Trucking Yards)	26	26		11	8629	11312	300	117	182		
675	Alice Springs	Hoppys	15	19						85.5	133	There is not any Transformer in boundary of Town Camp. Also it's not shown in PWC asset information.	
676	Alice Springs	Ipiye Ipiye (Golders Camp)	15	14		11	8314	369	50	67.5	105		
1029	Alice Springs	Kunoth	4	4		11	8569	315	315	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
5	222	Borrooloola	Mara	28	29	2	11	6187	12610	100	130.5	203	Two transformers for this Town Camp.
							11	6545	10203				
	229	Borrooloola	Garawa 1	16	14		11	6546	10166	100	72	112	Two transformers for this Town Camp.
							11	6332	4890	100			
	278	Borrooloola	Yanyula	29	29		11	6162	10496	200	130.5	203	Data extracted from PWC asset information. It's outside of Twon Camp, shown only Transformer to this Town Camp.
992	Borrooloola	Garawa 2	11	11		11	10167					This transformer is not shown in PWC asset information. It's installed in Boat Ramp Road near to Town Camp and connected to Electrical reticulation of Town Camp.	

** For New house's demand calculation see section 13.4 "Future Demand".

Knuckey Lagoons

Knuckey Lagoon

1 Design

The infrastructure reviews have been undertaken against current relevant standards for typical sub-divisions. The following standards have been used in undertaking the reviews.

Sewerage and water supply

- Water Services Association of Australia – Sewerage Code – WSA 02 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 02
- Water Services Association of Australia – Sewerage Pumping Station Code – WSA 04 -2005 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 04
- Water Services Association of Australia – Water Supply Code – WSA 03 2002 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 03
- Power and Water Corporation Indigenous Community Engineering Guidelines (2008)
- Department of Housing and Community Development Indigenous Community Engineering Guidelines (ICEG 2014, updated September 2016)
- Power and Water Corporation Essential Services Infrastructure Assessment and Upgrade Guidelines (for Town Camps in Urban Communities, 2009)
- Power and Water Corporation Standard Drawings
- Australian Standards

Electrical services

Electrical infrastructure has been assessed against AS/NZS3000 Wiring Rules and against PWC Service, Installation and Metering Rules and Urban Residential Development (URD) Design Standards where possible.

With one exception, town camps are each a single lot and compliance with AS/NZS3000 is sufficient to address potential safety concerns.

As such application of PWC URD Design Standards will mainly apply to the incoming supply and bulk or initial multi-metering panels if provided.

URD Design Standards for internal reticulation and street lighting appear to have been applied in many cases for convenience rather than compliance.

For the purposes of this report, the demand per dwelling allowances of URD Design Standards have been used to estimate incoming supply and overall distribution capacity requirements.

The following standards apply:

- Australian Standards
- Power Networks Design and Construction Guidelines, Power and Water Corporation
 - NP001.1_Design and Construction of Network Assets – General Requirements
 - NP001.3_General Specification for Overhead Electrical Reticulation
 - NP001.6_General Specification for URD Subdivisions
 - NP003_Installation Rules_V3
 - NP007_Service Rules
 - NP027_Capture of Newly Installed Street Lighting Information
 - NP041_Guidelines for Electrical Design Consultants

Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

Communications

- National Broadband Network Website viewed 21 January 2017 (<http://www.nbnco.com.au/>) – NBN rollout maps

Council Guidelines

In addition to the above standards, the following Council guidelines will be used where applicable.

- Darwin City Council – Subdivision and Development Guidelines, September 2005

General

It should be noted that if the town camps are proposed to be subdivided and services assets gifted to Power and Water Corporation (PWC) for operation and maintenance, all of these services will need to fully meet PWC standards. With the exception of a few town camps that have recently been upgraded, this will require the full replacement and/or realignment of most services

2 Condition assessment

2.1 Rating assessment matrix

A condition rating matrix was developed and used to assess all municipal infrastructure. The same rating was used for all services to maintain consistency in assessments. Table 1 Below shows the condition rating and operability.

Table 1 Condition rating

	Condition rating	Operability
1	Very Poor	Not operational
2	Poor	Not fully operational or requires immediate maintenance to keep operational
3	Good	Fully operational, may require routine maintenance
4	Very Good	Fully operational, may require maintenance in the next six months
5	Excellent	New, fully operational

2.2 Civil assessment limitations

The civil infrastructure condition investigations were subject to a number of limitations. These include:

- Only accessible services have been investigated. This includes inspecting the top of sewer manholes, side entry pits, etc., however, does not include opening pits to inspect infrastructure below ground.
- No physical testing of the sewer, water or stormwater network was undertaken.
- No survey or service locating was undertaken.

As there was no survey, potholing or CCTV undertaken on the underground infrastructure there is insufficient information to make determinations on the asset condition. The condition assessments discussed in this report are only for the accessible services and do not necessarily represent the condition of the underground infrastructure. For the majority of the town camps, other than a few that have recently been upgraded it was found that the underground services are generally undersized and it is likely, due to their age, that the these services are in poor condition. Either factor would trigger the need for a complete replacement to meet current relevant standards.

2.3 Electrical assessment limitations

The electrical infrastructure condition investigations were subject to a number of limitations. These include:

- Inspections were carried out without the assistance of an electrical tradesman.
- Only accessible services were investigated. Assessments were of a visual nature and no pit covers were removed.
- Overhead equipment was assessed from ground level.
- Switchboards were not opened and no assessment of the internal connections or bus ratings was made.
- Electrical infrastructure was assessed down to the meter for multi-meter panels and down to the termination, overhead pole or distribution pillar, of the supply cable to a meter located at a dwelling.

3 Current infrastructure issues

Power and Water Corporation (PWC) have advised of the following concerns and issues in regard to the sewerage, water and electrical infrastructure at all town camps.

3.1 Ownership and maintenance

PWC stated there has always been confusion regarding the ownership and responsibilities of the internal sewer, water and electrical infrastructure. PWC have advised that they have no legal tenure on the majority of assets in any town camps and that the owner is essentially that of the land owner or leaseholder. This is further discussed for each type of infrastructure for each town camp.

The ownership and who is responsible for the maintenance of the sewage pump stations and street lighting is a major concern. In most town camps it was found that PWC have been maintaining the assets on an in-kind basis, although there are no maintenance or access agreements in place and the infrastructure is generally not compliant to PWC standards.

3.2 Access to infrastructure

PWC advised that due to the uncertainty surrounding ownership and responsibility of the sewerage, water and electrical infrastructure, each town camp is seen as a single lot with multiple houses on it. There are no formal road reserves or easements where the municipal infrastructure should be located. PWC therefore have no legal right to enter the town camps to work on the infrastructure, nor can PWC stop others from working on the infrastructure. There is a risk that the maintenance undertaken by others may be to a lower standard than PWC.

It should be noted that there are currently no legal services easements within the town camps, except for a few cases where a town service passes through the town camp. Therefore it is recommended that easements are created over any infrastructure owned by PWC and any future assets to be gifted to PWC, to allow the service providers access to the infrastructure.

3.3 Existing infrastructure

PWC have stated that although the existing sewerage and water infrastructure appears to comply with relevant standards in some locations, the capacity cannot be assumed to meet PWC requirements due to the potential for underground substandard condition and/or grading of pipework. It is likely that these assets will need to be fully replaced to PWC standards to ensure sufficient capacity.

The planning process currently allows construction within the town camps on Commonwealth land without requiring service authority (PWC) approvals. This means that there has been no opportunity for PWC to recover contributions towards required upgrades to headworks servicing the developments and these upgrades have been paid for by PWC in the past. This inconsistency needs to be addressed for future developments within the town camps to ensure PWC are able to continue to provide adequate services.

3.4 Safety concerns

PWC have expressed concerns with safety of PWC staff and contractors working within the camps. PWC have employed procedures such as multiple people / vehicles to attend the site, with police or housing safety officers as required. This

generally leads to a delayed response time and increased cost to respond to and remediate emergency situations.

PWC have also raised the concern that if others work on water infrastructure within the town camps and do not apply the correct sanitation procedures they not only risk contaminating the entire water supply network within the town camp, at some town camps with direct connections to the town supply, they risk contaminating the entire town's water supply.

4 Available information

As the site investigations were limited to accessible / visible services, information on below ground services (such as electrical cables, sewer pipes, water supply pipes, etc.) were determined from available information. This information included:

- Serviced Land Availability Program (SLAP) maps,
- Department of Family & Community Services - Connecting Neighbours Program – Essential Services Scoping Study Report Volume 1 April 2005,
- Connecting Neighbours Project – Infrastructure Assessment and Recommendation Report - Arup Pty Ltd, April 2005,
- Drawings supplied by NT Department of Infrastructure - Technical Records,
- Drawings supplied by Power and Water Corporation,
- Bennett Design inspection reports and population data.

Aurecon undertook a site investigation of the Knuckey Lagoon community on 16 December 2016 to inspect roads, stormwater drainage, electrical services, sewerage and water supply, and community structures. The following sections detail the outcomes of this investigation and the assessments of the infrastructure.

The civil and electrical inspection reports can be found in the Appendices.

5 Sewerage

5.1 Ownership and boundaries

The town camp is currently not serviced by a reticulated sewer main. The currently sewer disposal is via septic tanks and absorption trenches. It appears as though there is one septic tank to service 2 to 3 houses. These assets are believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yilli Rreung Housing Aboriginal Corporation to maintain.

5.1.1 Connection methods and billing

It is assumed that it is the responsibility of Aboriginal Development Foundation to organise for the septic tanks to be emptied and maintained. It is not known what contribution the residents make towards this.

5.2 Existing infrastructure condition assessment

The sewer infrastructure inspection was limited to inspecting the condition of septic tank covers, as all other sewerage infrastructure is below ground. A total of seven septic tanks were inspected, with condition ratings as follows:

Table 2 Sewer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Septic tanks	1		6			7



Figure 1 Septic tank outside
ablution block



Figure 2 Septic tank

The septic tanks were rated from very poor to good condition. It is not recommended that any maintenance works are undertaken on these as the sewer network should be upgraded with a reticulation main, as per PWC standards.

5.3 Current performance and risks

The current capacity of the septic tanks was not assessed. To be in accordance with PWC guidelines, a DN150 PVC reticulation main and pump station to the nearest town sewer should be installed.

The nearest connection point would need to be further analysed to determine capacity and most suitable location, however it is estimated approximately 800 m of rising main would be required to connect to town sewer and approximately 650 m of DN150 PVC reticulation main within the community.

5.4 Future demands

The future demand analysis showed that two additional houses are required to provide permanent accommodation for residents that are currently living in non-house dwellings. The type and location of house, number of bedrooms, etc. will need to be determined by the Department of Housing and Community Development when this work is undertaken.

An allowance of 9 EP has already been provided for each temporary house (caravans, structures, etc.) in the current demand calculations, so the future EP will

not increase since the residents from the temporary housing will be living in the new accommodation and the number of tenants will not be increased.

The location of the new houses is assumed to be close to the existing houses such that significant extension of the existing sewerage infrastructure would not be required. This means that no additional sewerage infrastructure upgrades would be required to cater for the new houses, other than what has already been recommended for the current demand, and not including a new house drain and connections to the existing network. The cost estimates for these works have been allowed for in the upgrades for current demand.

5.5 Recommended works

5.5.1 Works required to existing infrastructure for current demand

As discussed in Section 5.3, a new sewer network should be installed at Knuckey Lagoon, including 800 m of rising main, 650 m of gravity main, a pump station, house connections, and associated works.

5.5.2 Works required to existing infrastructure for future demand

The upgrades required for the two new houses include a new house drain and new connections to the existing network.

6 Water supply

6.1 Ownership and boundaries

The water main servicing Knuckey Lagoon community is DN100 PVC dead end main with a single supply point, (refer Appendices).

The water supply assets within Knuckey Lagoon are believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yilli Rreung Housing Aboriginal Corporation to maintain. The water is supplied from PWC owned water mains outside of the community.

Figure 3 shows the water services surrounding Knuckey Lagoon.



Figure 3 Water services surrounding Knuckey Lagoon

6.1.1 Connection methods and bills

PWC advised that they currently charge a single water bill to the Aboriginal Development Foundation Inc. (Yili Rreung Housing). It is not known what contribution the residents make towards the water bills. It is understood that the water usage is measured at the bulk water meter located on the community boundary.

It is proposed that PWC continues to measure the water supply to the entire community with bulk meters, as opposed to individual lots within the community (other than for identifying water usage for each lot to assist with billing arrangements). Under this scheme, the water bill for the entire community is the responsibility of the governing body, being Aboriginal Development Foundation Incorporated for Knuckey Lagoon. It will be up to governing body to assign bills to residents accordingly.

It is recommended that the installation of individual lot meters is included to assist with the governing body distributing bills, identifying leaks in the network and so the network meets PWC standards should the community become a formal subdivision in the future. Up to 19 residential water meters are required to ensure each house has its own meter.

6.2 Existing infrastructure assessment

The site investigation for the water infrastructure included assessing the condition of any air valves, fire hydrants, tanks, taps, and water meters. The assessment was limited to services that could be accessed above ground; no excavation of below ground services was undertaken.

Table 3 Water supply condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Air valve			1			1
Fire hydrant		1	3			4
Water meter (bulk)				1		1



Figure 4 Sign, condition: *very good*



Figure 5 Air valve, condition: *good*



Figure 6 Fire hydrant, condition: *poor*

One fire hydrant was assessed as being in poor condition due to overgrown grass, debris around the access lid, and faded paint. This fire hydrant requires some minor maintenance works to repair.

6.3 Current demands

The current capacity of the water supply was calculated based on the following design assumptions:

- The nominal peak day flow is 1100 L/capita/day, based on PWC’s supplement to WSA 03 2002. This value is for the northern region of NT. It was assumed that the nominal peak day flow of 1100 L/capita/day also applies to water usage within the community, although it is possible that this value could be higher in real life due to a lack of controls to reduce water usage.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The maximum flow velocity used for calculating the incoming flow capacity is 1.4 m/s. PWC supplement to WSA 03-2002 states that flow velocities should generally not exceed 1.4 m/s during peak hour demand.
- The peak hour factors are listed in PWC’s Supplement to WSA 03-2002, and they depend on the population range of the community. The peak hour factor of 3.0 has been adopted, for populations less than 500.
- The water meter has PWC’s minimum pressure guaranteed value of 15 m.

Table 4 shows the properties used to analyse Knuckey Lagoon water supply demand.

Table 4 Current water demand

Total dwellings	EP	Demand (l/s)	Peak hour demand (l/s)	Fire flow demand (l/s)	Pipe size & type	Total length (m)
19	171	2.18	6.53	25	DN100 PVC	600

Table 5 Current water demand analysis

Demand	Velocity (m/s)	Headloss (m)	Pressure (m)
Peak hour demand	0.83	4.58	10.42
Fire flow demand	3.18	67.13	-52.13

The current network has capacity to supply adequate pressure throughout the community under peak hour conditions however, does has insufficient capacity for fire flow demands.

The assessment of water supply for firefighting has been based on the size of the water mains and the condition of the accessible fire hydrants. Additional hydrants have been recommended where it appears the existing number of hydrants are insufficient. In the case of Knuckey Lagoon it is expected that additional fire hydrants will be required to provide required coverage. Three new fire hydrants have been incorporated into the cost estimates.

Ultimately the existing water main does not provide sufficient capacity for fire flow demand and is non-complaint with PWC standards.

6.4 Future demands

The future demand analysis showed that two additional house are required to provide permanent accommodation for residents that are currently living in non-house dwellings. The type and location of house, number of bedrooms, etc. will

need to be determined by the Department of Housing and Community Development when this work is undertaken.

An allowance of 9 EP has already been provided for each temporary house (caravans, structures, etc) in the current demand calculations, so the future EP will not increase since the residents from the temporary housing will be living in the new accommodation and the number of tenants will not be increased.

The location of the new houses is assumed to be close to the existing houses such that significant extension of the existing water supply infrastructure would not be required. This means that no additional water supply infrastructure upgrades would be required to cater for the new houses, other than what has already been recommended for the current demand, and not including new residential water meters. The cost estimates for these works have been allowed for in the upgrades for current demand.

6.5 Recommended works

6.5.1 Works required to existing infrastructure for current demand

The infrastructure that was assessed as poor is recommended to be upgraded to prevent failure in the future. The following maintenance works are recommended;

- Repaint one fire hydrant and clear debris from surrounding area.

It is proposed that the existing water main is replaced with a DN150 PVC looped main, with bulk water meter at the community boundary. The cost estimates for upgrades at Knuckey Lagoon include;

- Install DN150 PVC looped main, approximately 1800 m.
- New fire hydrants, estimated three required.
- Install new bulk water meter at community boundary.
- Install up to 19 new residential lot meters.

6.5.2 Works required to existing infrastructure for future demand

The upgrades required to supply and monitor water to the two new houses include new residential lot meter and connections to the networks.

7 Roadworks

7.1 Ownership and boundaries

The roadworks assets within Knuckey Lagoon are believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yilli Reung Housing Aboriginal Corporation to maintain.

7.2 Existing infrastructure condition assessment

The road network within Knuckey Lagoon community consists of spray sealed roads and unsealed roads. The main road going in to the community is in good to poor condition, however the condition of the road worsens further into the community, with the last section of road in very poor condition. There are also numerous tracks which appear to be used frequently which are not included in the inspection and report. Road furniture such as signs are present throughout the community. Table 6 below summarise the condition of the road furniture as assessed during the site inspection.

Table 6 Roadworks condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Signs		1	5			6

The six signs around Knuckey Lagoon are all good condition with the exception of one. The five good signs can simply be cleaned and all graffiti removed whereas the poor condition sign needs to be replaced.



Figure 7 Sign, condition: *poor*



Figure 8 Pavement, condition: *very poor*

There are two speed bumps throughout the community and these are rated with the pavement that they are situated on. Aside from six signs there was no other road furniture such as footpaths or carparks at Knuckey Lagoon. As there are no kerbs along the road, the access to properties is informal and there are no layover kerbs.

Figure 9 below shows a map of the road network with the associated condition rating.

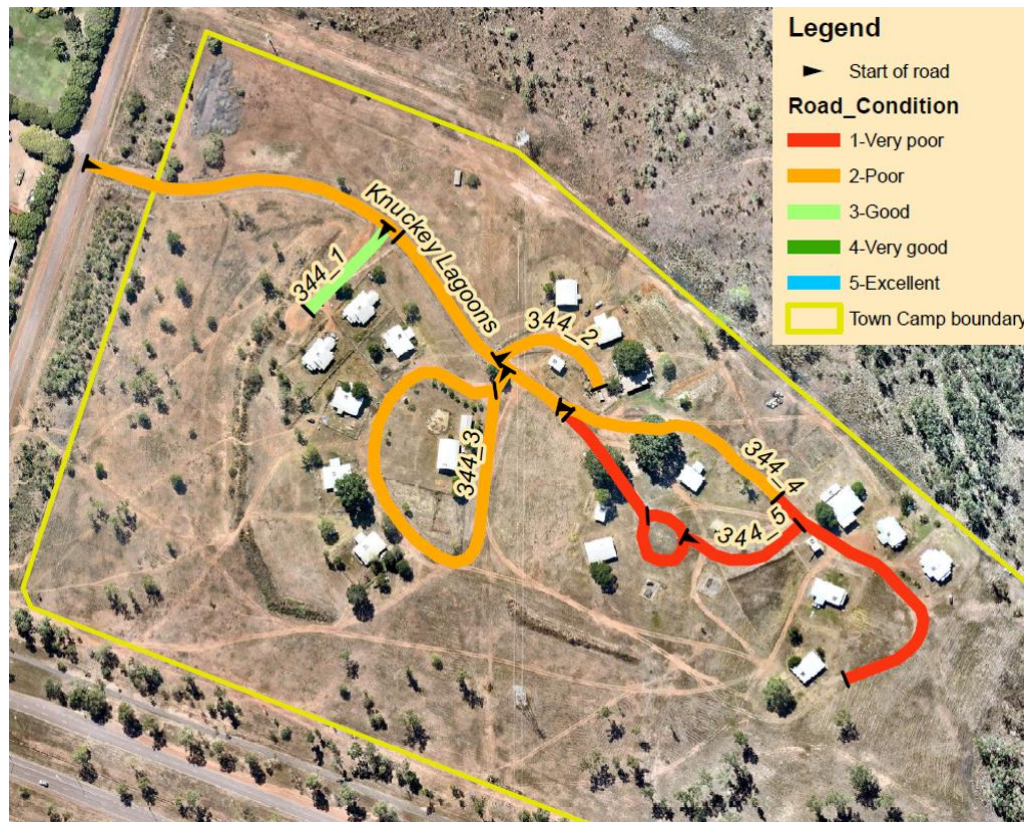


Figure 9 Knuckey Lagoon road conditions

Table 7 below details the condition and defects of the roads within Knuckey Lagoon community for specific segments.

Table 7 Road network condition assessment

Road Name	Chainage start (km)	Chainage end (km)	Road segment condition (1-5)	Defects and associated condition (1-5)
344_1	0	0.07	3	-20% of road has edge breaks (2)
344_2	0	0.08	2	-5% of road has potholes (2) -20% of road has stone loss (2) -50% of road has graffiti or rubbish (wheelie bin on the road) (2)
344_3	0	0.34	2	-5% of the road has potholes (2) -30% of road has stone loss (3)

Road Name	Chainage start (km)	Chainage end (km)	Road segment condition (1-5)	Defects and associated condition (1-5)
				-20% of road has edge breaks (2)
344_4	0	0.15	2	-5% of road has undulations (2)
	0.15	0.33	1	-40% undulations (1)
344_5	0	0.08	1	-30% surface failure (1)
Knuckey Lagoon	0	0.2	2	-60% of road has edge breaks (2) -5% of road has surfacing cracks (2) -10% of road has stone loss (2)
	0.2	0.35	2	-20% stone loss (2) -30% edge breaks (2) -5% surfacing cracks (2)
	0.35	0.51	1	-10% stone loss (1) -5% surfacing cracks (2) -20% edge breaks (2)

7.3 Current performance and risks

The road network is currently not sufficient for the number of houses. There are six houses that currently do not have a sealed road leading to them so residents are using multiple unsealed roads to drive to their house. It is recommended that a road is constructed to provide sealed road access to all properties.

7.4 Future demands

The addition of two new house will not require any upgrades to the road network. The additional house will require minor upgrades to the kerb to provide a layover kerb for a driveway.

7.5 Recommended works

7.5.1 Works required to existing infrastructure for current demand

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following works are recommended to upgrade the current infrastructure;

- Construct new section of road to service houses in east section of town camp. Approximately 300 m required, however this will require further engineering design.
- Replace one traffic speed sign
- Clean three signs to erase graffiti
- General tidy up of road reserve approximately 920 m
- Fill and reseal approximately 10 potholes
- Repair edge breaks approximately 235 m
- Crack sealing 65 m²
- Upgrade road to two lanes with kerbs and footpaths

In order to allow for a longer term sustainable road network a significant upgrade would be required. It is recommended that a long term design which incorporates a full two lane road network, with all appropriate road furniture, line-marking, kerbs and gutters is constructed. A cost estimate to reinstate the base and subbase material, reseal with a two coat spray seal surface, construct subsoil drainage, line marking and signage has been included. Note that these works will need to be fully designed, the cost estimate is for budgetary purposes only and only indicates the construction phase. A footpath next to the road is also recommended to provide a safe trail for pedestrians.

As the maximum road width within the Knuckey Lagoon community is 6 m, this means that all of the existing road network will need to be upgraded to a 7.2 m wide road. The stormwater drainage infrastructure upgrades that are closely associated with the road upgrade i.e. kerb and gutters, side entry pits and underground drainage pipes are included in the stormwater section of this report.

7.5.2 Works required to existing infrastructure for future demand

Works required to provide for two additional house include upgrading the existing kerb to a layover kerb.

8 Stormwater drainage

8.1 Ownership and boundaries

There were no stormwater drainage assets at Knuckey Lagoon town camp.

8.2 Current performance and risks

During the inspection several roads were subject to ponding from recent rains. It is expected that this is a common and reoccurring issue at Knuckey Lagoon community. Current flooding issues cannot be fully analysed without significant hydraulic modelling, which is outside the scope of this project. It was noted during the inspection that shallow berms had been constructed adjacent road 344_1 which appears to be for flood mitigation.

The City of Darwin's general design philosophy for stormwater drainage is that the design is to be based on a system of sealed roads, kerb and gutter, side entry pits and underground drainage. This infrastructure currently does not exist at Knuckey Lagoon and there would be major headworks required if stormwater drainage is to be incorporated. It is recommended that formal stormwater drainage, including underground pipes, kerbs and gutters, side entry pits, etc are constructed to reduce the impact of flooding within the community.

8.3 Future demands

The inclusion of two new houses at Knuckey Lagoon does not affect the stormwater drainage requirements. No further upgrades are required as a result of the new houses.

8.4 Recommended works

The recommended upgrades include constructing and underground drainage network, including kerbs and gutters, side entry pits, headwalls and culverts and open drains as required. This will require further engineering design to determine the size, type and location of new infrastructure.

9 Community structures

9.1 Ownership and boundaries

The community structure assets within Knuckey Lagoon are believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yilli Rreung Housing Aboriginal Corporation to maintain.

9.2 Existing infrastructure condition assessment

The site investigation for the community structures included assessing the condition and features of a structure that appears to have been a playground. Table 8 shows the condition rating.

Table 8 Community structures condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Playground	1					1



Figure 10 Playground, condition: *very poor*

9.3 Current performance and risks

It appears that there was previously a playground however there is currently no playground equipment and no shade cloth. The structure was rated very poor for these reasons.

As there are no other community structures or playgrounds within the community, it is recommended that a playground is constructed in this location and a new shade cloth installed.

9.4 Future demands

The population of Knuckey Lagoon is not expected to increase with the addition of one new house, as this house will provide permanent accommodation for residents that currently live in temporary housing. No additional community structures are required.

9.5 Recommended works

9.5.1 Works required to existing infrastructure for current demand

The following works are recommended to upgrade the current infrastructure;

- Build new playground in what appears to be the location of a previous playground
- Investigate the existing shade structure framework and if viable install new shade sail on it
- General tidy up around structure to remove debris and overgrown flora
- Installation of appropriate playground flooring (i.e. sand or rubber matting) for long term use

10 Electrical services

10.1 Ownership and boundaries

The following points, from Network Policy NP003 Installation Rules Section3, define the typical shared ownership of electrical infrastructure by Power and Water Corporation (PWC) and customers.

- The point of supply is defined as the point where PWC makes the electrical supply available. For domestic supply, this is normally one of the following:
- A point of attachment of an overhead service on to a building or pole on which a metering panel is fitted.
- A point of attachment of an overhead service on to a pole forming part of unmetered aerial consumer's mains.
- A nominated point on a distribution substation located on the customer's lot.
- A point of connection of an underground service in a metering panel, including underground services originating at an overhead line.
- A point of connection of an underground service in a pillar or junction box forming part of unmetered consumer's mains, located on the customer's lot.
- A point on a Power and Water pillar located on the customer's lot.

Typically, distribution infrastructure upstream of the point of supply is owned and maintained by PWC and infrastructure below the point of supply is owned and maintained by the customer.

In many cases PWC have defined a Point Of Supply to ensure that they retain responsibility for aerial high voltage infrastructure to minimise the possibility of the community or its contractors coming into contact, either deliberately or inadvertently, with aerial high voltage infrastructure.

In other cases isolation facilities are present or desired by PWC to define the Point of Supply at or near the boundary of the town camp.

The Knuckey Lagoon community electrical reticulation systems is supplied from the PWC network to pole transformer. Unmetered consumer's mains run to a main to a low voltage switchboard that connects to the low voltage metering board. The low voltage metering board distributes outgoing LV feeders to LV distribution pillars and underground reticulation to prepaid meters on dwellings.

Some dwellings have multiple prepaid meters, presumably because they supply other dwellings or are multiple dwellings.

PWC advise that the Point Of Supply is the LV terminals of the substation and that they own and are responsible for the pole mount substation and upstream infrastructure.

PWC advise that street lighting is supplied from unmetered LV infrastructure and is the responsibility of the lot holder and not PWC.

All meters, whether pre- or post-paid are the property of PWC.

Knuckey Lagoon community are responsible for maintain all unmetered and metered LV infrastructure including the main switchboard, metering panel (excluding meter), underground distribution feeders, distribution pillars, consumers mains and consumer switchboards and street lighting.

10.2 Existing infrastructure condition assessment

Table 9 shows the condition rating given to the distribution switchboards and distribution pillars. The distribution pillars have 100% operational rating and 85% of the pillars had minor maintenance issues to address, including bolt replacement and labelling, refer to Appendices.

Table 9 Distribution panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Distribution panels			6	1		7

Table 10 shows the condition rating given to the street lights. The street lights are supplied via underground LV reticulation and are generally eight (8) metres high with sodium lamp S250C00 and with lamp covers protected by cages.

The street lights have 78% operational rating, from daytime visual inspection.

Table 10 Street light condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light	1	2	8	3		14

Table 11 shows the condition ratings given to the transformer. The transformer is a pole mount substation with LV unmetered consumer's mains to a main switchboard.

The transformer was assessed to be in poor condition, termination insulation boots were not evident and the age of the transformer from the construction type to be approximately 30 years.

Table 11 Transformer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Transformer		1				1

Table 12 shows the condition ratings given to overhead power poles. The overhead poles are of Weld Construction (Universal Pole construction). The overhead poles have 100% operational rating from visual inspection.

Table 12 Overhead pole condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Overhead pole			3			3

Table 13 shows the condition ratings given to pits. LV supply connection pits were constructed of concrete.

Table 13 Pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pit		2				2

Table 14 shows the condition rating given to the metering panels. All assessed meters in this community are prepaid digital meters.

Table 14 Meter Panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pre-paid meter		1	14			15
Switchboard	1	11	2			14

Table 15 shows the condition rating given to the switchboards associated to dwellings.

Table 15 Switchboard condition assessment (Housing footprint)

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Playground	1					1

The details of the individual inspections and photographs of each infrastructure item are included in Appendices.

10.3 Current performance and risks

The electrical infrastructure evaluation was conducted against the following criteria

- Number of dwellings on tenure, the higher value of the funded dwelling and as quoted in the population report was utilised.
- Urban area, NP001.1, 4. Definitions.
- General Specification for URD Subdivisions, NP001.6, 4.3 Substation Size.
- Normal ADMD (After Diversity Maximum Demand) of 4.5 kVA and high cost subdivisions at 7 kVA.
- Transformer ratings were assumed to be correct in Dekho (PWC asset information system) and compared against photographs of test or transformer numbers collected.
- Substation loads were compared against transformer sizes only. No load flow analysis was conducted.
- No load calculations were performed or assessment conducted on overhead or underground cable, visual inspection from the ground only.
- Streetlighting loads were ignored as they are not significant.

The calculated maximum demand of the Knuckey Lagoon community transformer is 85.5% of rated capacity based on 4.5kVA/dwelling.

Table 16 Knuckey Lagoon current demand load vs transformer ratings

Com Id	Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA
344	Knuckey Lagoon	19	100	85.5	133

A tabulated summary of all community transformers is included in Appendices.

There is a risk of equipment not being maintained associated with the non-standard division of responsibilities between the customer and PWC.

The following points from the PWC Metering Rules should be noted:

- The routine maintenance of metering installations and the replacement of any faulty meters is the responsibility of PWC.
- The property owners are responsible for the maintenance and upkeep of meter rooms, boxes and panels (including lids, doors and locking mechanisms).
- The installation of pre-paid metering is a cost to the customer, refer NP010 Meter Manual-Maintenance of Metering Installations, Power and Water Corporation.

10.4 Future demands

There are two new developments are currently planned for Knuckey Lagoon.

Calculated future maximum demand of the Knuckey Lagoon community transformer is 94.5% of rated capacity based on 4.5kVA/dwelling.

Table 17 Knuckey Lagoon future demand load vs transformer ratings

Com Id	Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA
344	Knuckey Lagoon	21	100	94.5	147

10.5 Recommended works

The following maintenance works and upgrades are recommended:

- Replace three 70W street lights.
- Replace 1x100kVA transformer
- Replace two electrical pit covers.
- Replace one prepaid digital meter
- Replace twelve switchboards inside the metering panel
- Replace four switchboards associated to dwellings
- Install new street lighting - approximately 71 poles

The following should be carried out since the estimated site maximum demand reaches 85% of the substation capacity:

- Preparation of layout and schematic record drawings of the electrical reticulation system.
- Load monitoring to determine the detailed demand profile of each transformer.
- Modelling of the reticulation system to confirm load flow and voltage drop.
- Preparation of design documentation for modification of existing infrastructure to rectify issues found and incorporate provisions for two additional dwellings.

11 Communications

11.1 Ownership and boundaries

Details of Telstra pit and conduit infrastructure within the town camp boundaries were sought but were not forthcoming.

11.2 Existing infrastructure condition assessment

The telecommunications infrastructure assessed included pits and telephone booths. The individual inspection reports can be found in Appendices.

Table 18 Telecommunication pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Telecommunication pit						0

Table 19 Phone booth condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Phone booth						0

11.3 Current performance and risks

No details of the performance of communications infrastructure were obtained.

11.4 Future demands

The current availability of broadband services at Knuckey Lagoon is displayed in the Figure 12 below. NBN is available to residents via a fixed telecommunication line on application to an appropriate NBN access provider.

Explore the nbn™ network rollout map

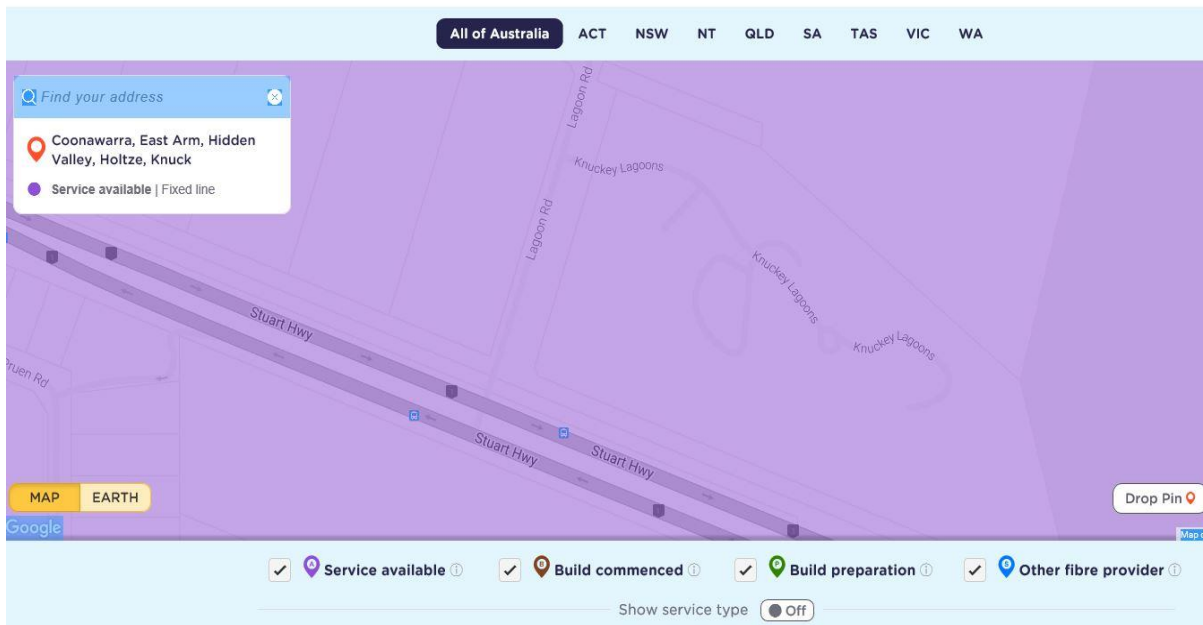


Figure 11 NBN network availability map

The NBN rollout map confirms that NBN is planned to be made available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

11.5 Recommended works

Representatives from NBN’s Land Access and Stake Holder management teams are currently engaged with Yilli Housing and NT Housing to look at how camps will be serviced. It is expected that any existing premises in these camps will have some type of NBN service via the NBN brownfields rollout in the future.

No works are required at Knuckey Lagoon because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

12 Cost estimates

Table 20 below shows a summary of the cost estimates to undertake the maintenance required to fix the existing infrastructure, to upgrade the existing network to meet current design standards, and to upgrade the existing network to cater for the future design (included in current cost estimates). The estimates take into account a 30% contingency and are inclusive of GST.

Table 20 Cost estimates

Infrastructure	Maintenance of existing infrastructure	Upgrades to meet current design
Sewerage	\$ 0	\$ 1,379,000
Water supply	\$ 1,000	\$ 1,195,000
Roadworks	\$ 410,000	\$ 1,680,000
Stormwater drainage	\$ 0	\$ 1,516,000
Community structures	\$ 3,000	\$ 18,000
Electrical	\$ 111,000	\$ 1,003,000
Communications	\$ 0	\$ 0
Miscellaneous provisions	\$ 73,000	\$ 824,000
Total (including GST)	\$ 598,000	\$ 7,615,000
Grand total	\$ 8,213,000	

The cost estimates are a preliminary estimate only. Since Aurecon has no control over the cost of labour, materials, equipment or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Aurecon cannot guarantee actual costs will not vary from these estimates.

13 Summary

A summary of the works required at Knuckey Lagoon community is as follows;

Sewerage

- Requires full sewerage upgrade including.
 - 800 m of rising main
 - 650 m of gravity main
 - Pump station
 - House connections, manholes and other associated works

Water supply

- Install new DN150 water main, approximately 1800
- Install new bulk water meter at community boundary
- Install up to 19 new residential lot meters
- Repaint one fire hydrant and clear debris from surrounding area
- Install three new fire hydrants

Road and road furniture

- Replace one traffic speed sign.
- Clean three signs to erase graffiti.
- General tidy up of road reserve approximately 920 m.
- Fill and reseal approximately 10 potholes.
- Repair edge breaks approximately 235 m.
- Crack sealing 65 m²
- Construct new section of road to service houses in east section of town camp. Approximately 300 m required, however this will require further engineering design.
- It is recommended that the road is upgraded to a two lane network with all appropriate road furniture, line marking, kerbs, footpaths, etc.

Stormwater drainage

- Install new underground drainage network, including; kerbs and gutters, side entry pits, headwalls and culverts and open drains as required.

Community structures

- Build new playground in what appears to be the location of a previous playground.
- Install new shadecloth
- General tidy up around structure to remove debris and overgrown flora
- Installation of appropriate playground flooring for long term use

Electrical services

- Replace three 70W street lights
- Replace 1x100kVA transformer
- Replace two electrical pit covers
- Replace one prepaid digital meter
- Replace twelve switchboards inside the metering panel
- Replace four switchboards associated to dwellings
- Install new street lighting - approximately 71 poles

Communications

- No works are required because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

Civil inspection reports

Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016



Legend

- Town Camp boundary
- Sewerage**
- Manholes (7)

A3 scale: 1:4,000

0 20 40 60 80 100 m

Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Sewerage

344 - Knuckey Lagoon Indigenous Village (Darwin)

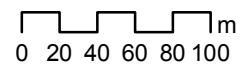
Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016



Legend

- Town Camp boundary
- Water**
- Air Valves (1)
- Fire Hydrants (4)
- Water Meter (1)

A3 scale: 1:4,000



Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Water 344 - Knuckey Lagoon Indigenous Village (Darwin)

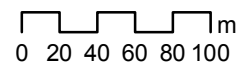
Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016



Legend

- Town Camp boundary
- Community structures**
- Playground (1)
- Road furniture**
- ▲ Signs (6)

A3 scale: 1:4,000



Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments
Road furniture, stormwater drainage & community structures
344 - Knuckey Lagoon Indigenous Village (Darwin)

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:28:53 AM

Insp ID: 2028

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Water Asset Are you Capturing: Air Valves

Air Valve Diameter (mm): 20

Air Valve Make:

Air Valve Leak: Yes

Air Valve Condition: 3 - Good

Air Valve Comments: Sings of light surfacerust from previous leak



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:18:07 AM

Insp ID: 2030

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 2 - Poor

FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:18:07 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:22:09 AM

Insp ID: 2039

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single
Sluice Valve: No
Above or Below ground: Below ground
FH Leakage: No Access
Bollards around hydrant: Yes
FH Condition: 3 - Good
FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:22:09 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:39:27 AM

Insp ID: 2051 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:17:28 AM

Insp ID: 2057 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Water Asset Are you Capturing: Fire Hydrants

Single or Double:

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Post near hydrant



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:47:11 AM

Insp ID: 2032

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape:

Manhole Cover Diam (mm):

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:47:11 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:45:43 AM

Insp ID: 2034

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Square

Manhole Cover Diam (mm):

Manhole Length (mm): 600

Manhole Width (mm): 600

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:45:43 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:23:45 AM

Insp ID: 2038

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1300

Manhole Width (mm): 700

Manhole Condition: 1 - Very Poor

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:23:45 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:50:54 AM

Insp ID: 2049

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape:

Manhole Cover Diam (mm):

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:35:19 AM

Insp ID: 2053

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape:

Manhole Cover Diam (mm):

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:34:33 AM

Insp ID: 2055

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape:

Manhole Cover Diam (mm):

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:21:44 AM

Insp ID: 2056

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Sewerage Asset are you capturing: Manholes

MH Cover Shape:

Manhole Cover Diam (mm):

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition:

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:30:47 AM

Insp ID: 2027 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.2

Road Type: Sealed - spray seal

Section Width (m): 3.6

Road Condition: 2 - Poor

General Comment: 1 speed hump

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Edge Breaks	60	2 - Poor	Percent
Surfacing Cracks	5	2 - Poor	Percent
Stone Loss	10	2 - Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed		70			

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

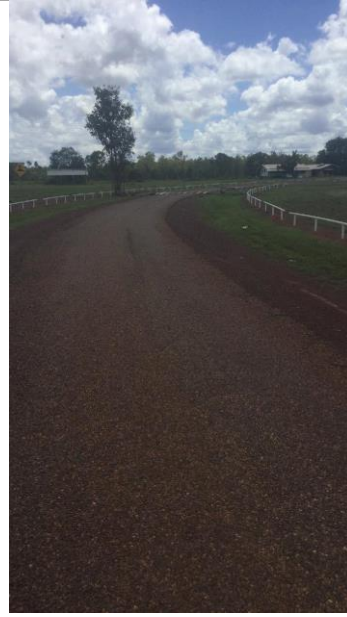
Inspection Date 16/12/2016 11:30:47 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:30:47 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:57:39 AM

Insp ID: 2031 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Pavements

Ch From (km): 0.2

Ch To (km): 0.35

Road Type: Sealed - asphalt

Section Width (m): 3.6

Road Condition: 2 - Poor

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Stone Loss	20	2 - Poor	Percent
Edge Breaks	30	2 - Poor	Percent
Surfacing Cracks	5	2 - Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed		70		2	

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:57:39 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:57:39 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:38:37 AM

Insp ID: 2035 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_4

What are you inspecting: Pavements

Ch From (km): 0.15

Ch To (km): 0.33

Road Type: Unsealed

Section Width (m): 6

Road Condition: 1 - Very Poor

General Comment: Flooded

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Undulation/Settlement	40	1 - Very Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
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Unsealed

Linemarking Section

Obstruction Section

Road Obstruction Other Road Obstruction

Debris

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:38:37 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:38:37 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:32:30 AM

Insp ID: 2036 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Pavements

Ch From (km): 0.35

Ch To (km): 0.51

Road Type: Sealed - spray seal

Section Width (m): 3.6

Road Condition: 1 - Very Poor

General Comment: Speed hump just prior to round about

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Stone Loss	10	1 - Very Poor	Percent
Surfacing Cracks	5	2 - Poor	Percent
Edge Breaks	20	2 - Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed		30			

Linemarking Section

Obstruction Section

Road Obstruction Other Road Obstruction

Trees

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:32:30 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:32:30 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:32:30 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:28:00 AM

Insp ID: 2037 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_4

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.15

Road Type: Unsealed

Section Width (m): 3.6

Road Condition: 2 - Poor

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Undulation/Settlement	5	2 - Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Linemarking Section

Obstruction Section

Road Obstruction Other Road Obstruction

Trees

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:28:00 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:28:00 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:19:25 AM

Insp ID: 2040 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_5

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.08

Road Type: Unsealed

Section Width (m): 4

Road Condition: 1 - Very Poor

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Surfacing Failure	30	1 - Very Poor	Percent

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed				2	

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:19:25 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:19:25 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:14:30 AM

Insp ID: 2047 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_1
What are you inspecting: Pavements
Ch From (km): 0
Ch To (km): 0.07
Road Type: Sealed - spray seal
Section Width (m): 4
Road Condition: 3 - Good
General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Edge Breaks	20	2 - Poor	% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:14:30 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:14:30 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:42:58 AM

Insp ID: 2050 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_2

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.08

Road Type: Sealed - spray seal

Section Width (m): 6

Road Condition: 2 - Poor

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Potholes	5	2 - Poor	5% of road
Stone Loss	20	2 - Poor	% of road
General Appearance	50	2 - Poor	Graffiti, rubbish, wheelie bin on road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:42:58 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:42:58 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:26:31 AM

Insp ID: 2052 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Road Name: 344_3

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.34

Road Type: Sealed - spray seal

Section Width (m): 5

Road Condition: 2 - Poor

General Comment: Sealed and unsealed sections

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Potholes	10	2 - Poor	5% of road has potholes
Stone Loss	30	3 - Good	30% of road
Edge Breaks	20	2 - Poor	20% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:26:31 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:26:31 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:26:31 AM



Northern Territory Camps

Civil Infrastructure

Inspection Date 16/12/2016 10:35:36 AM

Insp ID: 2054 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

Inspection Type: Shade Structure
Shade Structure Type: Play ground
Shade Floor Type: Sand
Roof Type: Shadecloth
Width (mm):
Length (mm):
Appearance: 2
Appearance Comment:
Condition: 1 - Very Poor
Comment: Looks like old playground area, no playground, no shadecloth



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:28:25 AM

Insp ID: 2041

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Warning prescribed area

Sign Condition: 3 - Good

Sign Comment: Graffiti

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:26:55 AM

Insp ID: 2042 **Group 1 - Darwin, Jabiru, Adelaide River** **Knuckey Lagoons**

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Speed traffic sign and private property

Sign Condition: 2 - Poor

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:25:18 AM

Insp ID: 2043

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Give Way

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:24:28 AM

Insp ID: 2044

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Stop, report to office

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:21:36 AM

Insp ID: 2045

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Speed bump

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:12:07 AM

Insp ID: 2048

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

Road Name: Knuckey Lagoons

What are you inspecting: Signs

Type of Sign: Office

Sign Condition: 3 - Good

Sign Comment:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:26:37 AM

Insp ID: 2029

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Bulk

Bulk Water Meter Size (mm): 100

Bulk Water Meter Condition: 4 - Very Good

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition:

Lot Water Meter Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 16/12/2016 11:26:37 AM

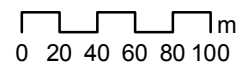


Electrical inspection report

P:\GIS\Projects\253963_NT_Town_Camps\253963_004_Elec_DDP_report.mxd 23/02/2017 12:22
Map by: DMCP



A3 scale: 1:4,000



Date: 23/02/2017 Version: 3
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Electrical 344 - Knuckey Lagoon Indigenous Village (Darwin)

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:18:51 AM

Insp ID: 1130 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method: Outdoor

Is the distribution panel labelled: No

What is Distribution Panel main CB Rating: Unknown

What is the main incoming cable type/Size to Distribution Panel: Unknown

What is the condition of switchboard: 3

Condition Comments:

What is the condition of cables/glands into switchboard: 3

Cable/Gland Condition Comments:

Distribution Panels name plate access: No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:06:42 AM

Insp ID: 1135

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

3

Cable/Gland Condition Comments:

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:01:51 AM

Insp ID: 1138 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method: Outdoor

Is the distribution panel labelled: No

What is Distribution Panel main CB Rating: Unknown

What is the main incoming cable type/Size to Distribution Panel: Unknown

What is the condition of switchboard: 3

Condition Comments:

What is the condition of cables/glands into switchboard: 3

Cable/Gland Condition Comments:

Distribution Panels name plate access: No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:09:54 AM

Insp ID: 1139 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Is the distribution panel labelled: No

What is Distribution Panel main CB Rating:

What is the main incoming cable type/Size to Distribution Panel:

What is the condition of switchboard: 3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Distribution Panels name plate access: No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:55:12 AM

Insp ID: 1143

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

3

Cable/Gland Condition Comments:

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:56:18 AM

Insp ID: 1150

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

What is the main incoming cable type/Size to Distribution Panel:

What is the condition of switchboard:

4

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Distribution Panels name plate access:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:50:48 AM

Insp ID: 1156 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method: Outdoor

Is the distribution panel labelled: Yes

What is Distribution Panel main CB Rating:

What is the main incoming cable type/Size to Distribution Panel:

What is the condition of switchboard: 3

Condition Comments:

What is the condition of cables/glands into switchboard: 3

Cable/Gland Condition Comments:

Distribution Panels name plate access: No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:50:48 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 9:30:24 AM

Insp ID: 3315

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 2, Blank plates are missing on CB sl

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 9:26:41 AM

Insp ID: 3316

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 9:46:49 AM

Insp ID: 3317 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 9:51:43 AM

Insp ID: 3318

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

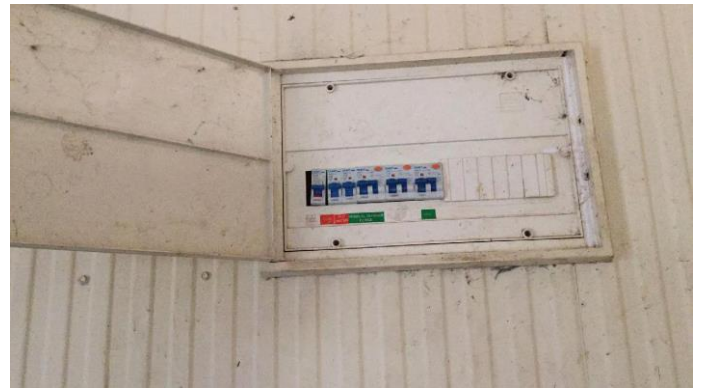
Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 9:59:11 AM

Insp ID: 3319

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: CBs are in poor condition.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:14:03 AM

Insp ID: 3320

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 3

Meter Condition: 3

Meter Comment: Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:29:38 AM

Insp ID: 3321 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 3

Meter Condition: 2

Meter Comment: Meter box is damaged. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:55:12 AM

Insp ID: 3322

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 11:13:29 AM

Insp ID: 3323 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 1

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 11:23:09 AM

Insp ID: 3397 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 11:36:51 AM

Insp ID: 3398

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 2, Blank plates are missing on CB slot

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 11:46:55 AM

Insp ID: 3399

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:29:29 AM

Insp ID: 3401

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 2, Blank plates are missing on CB slot.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:53:09 AM

Insp ID: 3412

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 2, Blank plates are missing on CB slot

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 18/11/2016 10:39:59 AM

Insp ID: 3413

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:21:29 AM

Insp ID: 1129

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Concrete

What is the Condition of plant: 3

Is street light fitted: NA

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service: Combined

What is the HV voltage level: 11000

What is the arrangement of connected cables: Parallel

Are there isolators on the pole: No

What is the Condition: 3

How many Lots are connected to this pole: 0

Overhead Pole Comments: Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:21:29 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:17:16 AM

Insp ID: 1137

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Overhead Poles

What is Pole Material type: Welded

What is the condition of pole: 3

How is the pole planted: Direct

What is the Condition of plant: 3

Is street light fitted: No

Street Light Power Supply:

Street Light Type

Street Light Watts

Street Light Condition

Street Light Height

What is the type of service: Combined

What is the HV voltage level:

What is the arrangement of connected cables: Parallel

Are there isolators on the pole: NA

What is the Condition:

How many Lots are connected to this pole:

Overhead Pole Comments: No ID

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:17:16 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:50:40 AM

Insp ID: 1147

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Overhead Poles

What is Pole Material type:	Welded
What is the condition of pole:	3
How is the pole planted:	Concrete
What is the Condition of plant:	3
Is street light fitted:	No
Street Light Power Supply:	
Street Light Type	
Street Light Watts	
Street Light Condition	
Street Light Height	
What is the type of service:	Three
What is the HV voltage level:	400
What is the arrangement of connected cables:	Parallel
Are there isolators on the pole:	No
What is the Condition:	3
How many Lots are connected to this pole:	0
Overhead Pole Comments:	Surface rusted

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:50:40 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:58:11 AM

Insp ID: 1148 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Pits and Conduits

Comments: Poor condition



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:58:11 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:54:47 AM

Insp ID: 1152

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Pits and Conduits

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:50:50 AM

Insp ID: 1126 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70D 13

What Wattage is the lamp:

70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:48:03 AM

Insp ID: 1127 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80d 06

What Wattage is the lamp:

80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:45:00 AM

Insp ID: 1128 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80d 06

What Wattage is the lamp:

80

What is the condition of street lights:

2

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:26:52 AM

Insp ID: 1131 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70 D. 13

What Wattage is the lamp:

70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

8



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:17:13 AM

Insp ID: 1132 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70D 13

What Wattage is the lamp:

70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:09:08 AM

Insp ID: 1133 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S150C 13

What Wattage is the lamp:

150

What is the condition of street lights:

2

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:05:14 AM

Insp ID: 1136 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

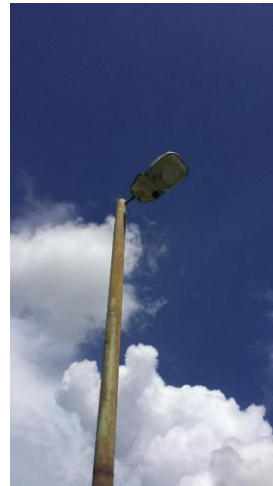
What is power supply method: Underground

What is the lamp type: S150C 13

What Wattage is the lamp: 150

What is the condition of street lights:

What is Street Lighting pole installation height (approximate): 6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:00:01 AM

Insp ID: 1140 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S150C 13

What Wattage is the lamp:

150

What is the condition of street lights:

1

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:57:22 AM

Insp ID: 1141 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80d 04

What Wattage is the lamp:

80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:07:32 AM

Insp ID: 1142 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70 D 13

What Wattage is the lamp:

70

What is the condition of street lights:

4

What is Street Lighting pole installation height (approximate):

8



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:06:59 AM

Insp ID: 1144

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70 D 13

What Wattage is the lamp:

70

What is the condition of street lights:

4

What is Street Lighting pole installation height (approximate):

8



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:00:27 AM

Insp ID: 1145 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70 D13

What Wattage is the lamp:

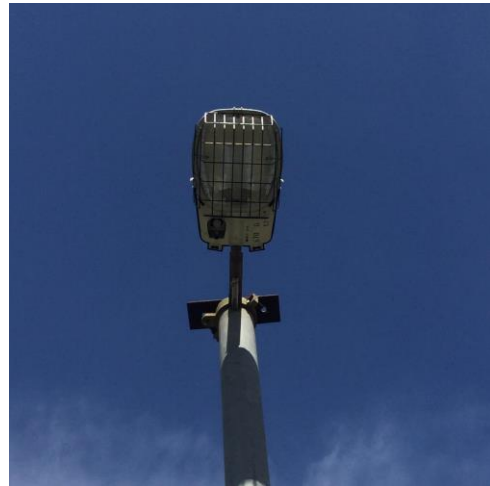
70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:52:59 AM

Insp ID: 1146 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70D 13

What Wattage is the lamp:

70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:47:00 AM

Insp ID: 1149 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70D 13

What Wattage is the lamp:

70

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 10:53:21 AM

Insp ID: 1154 Group 1 - Darwin, Jabiru, Adelaide River Knuckey Lagoons

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

S70 D13

What Wattage is the lamp:

70

What is the condition of street lights:

4

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:21:57 AM

Insp ID: 1134

Group 1 - Darwin, Jabiru, Adelaide River

Knuckey Lagoons

What Category are you capturing: Transformers

What is Transformer installation method:

Pole

If method know:

11SS1P

What is the condition of the mounting:

3

What is Transformer Rating:

Is there access to transformers name plate to take a photo:

No Access

What is the condition of transformer:

2

What is cable type to transformer:

Single core black insulated

What is cable size to transformer:

Is there switch gear or fusing associated with the transformer:

Drop out fuses

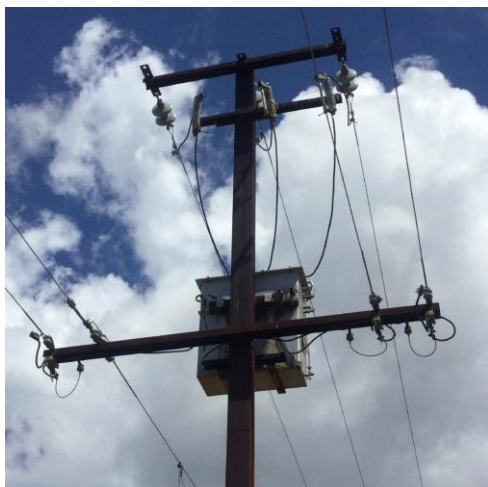
Transformer Comment:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 16/12/2016 11:21:57 AM



Road map

Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Roads_DDP2.mxd 20/02/2017 16:41 Imagery: Nearmap 11/06/2016



Legend

- Start of road
- Road_Condition**
- 1-Very poor
- 2-Poor
- 3-Good
- 4-Very good
- 5-Excellent
- Town Camp boundary

A3 scale: 1:4,000

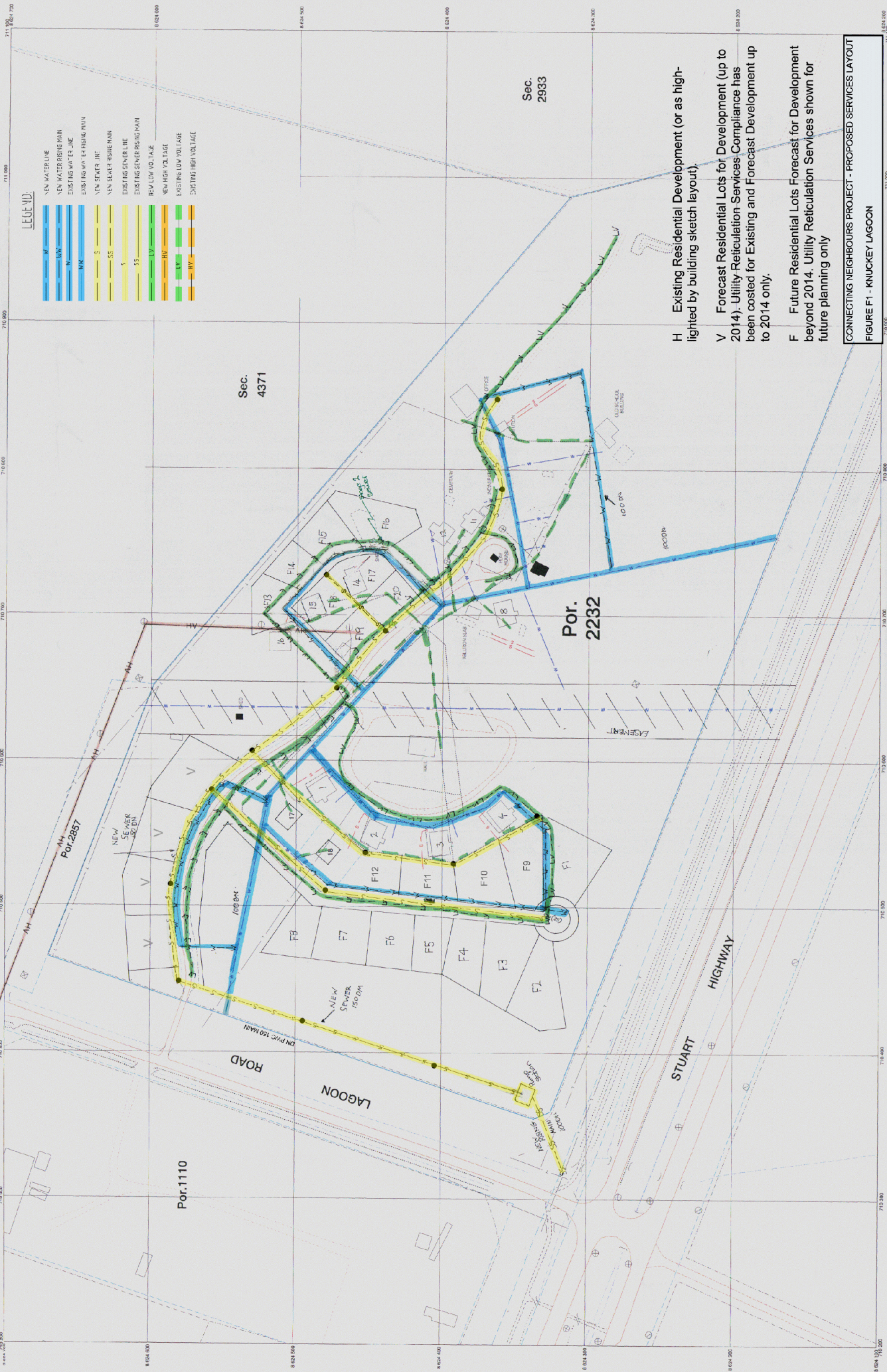
0 20 40 60 80 100 m

Date: 20/02/2017 Version: 1
Coordinate system: MGA52

NT Town Camp Road Assessments

344 - Knuckey Lagoon Indigenous Village (Darwin)

Existing drawings



LEGEND:

W	NEW WATERLINE
WV	NEW WATER PIPING MAIN
WV	EXISTING WATERLINE
WV	EXISTING WATER PIPING MAIN
WV	NEW WATER SERVICE MAIN
S	NEW SEWER LINE
S	EXISTING SEWERLINE
S	EXISTING SEWER PIPING MAIN
S	NEW LOW VOLTAGE
LV	NEW HIGH VOLTAGE
LV	EXISTING LOW VOLTAGE
LV	EXISTING HIGH VOLTAGE

- H Existing Residential Development (or as highlighted by building sketch layout).
- V Forecast Residential Lots for Development (up to 2014). Utility Reticulation Services Compliance has been costed for Existing and Forecast Development up to 2014 only.
- F Future Residential Lots Forecast for Development beyond 2014. Utility Reticulation Services shown for future planning only.

CONNECTING NEIGHBOURS PROJECT - PROPOSED SERVICES LAYOUT
 FIGURE F1 - KNUCKEY LAGOON

COMMUNITY MAP
 KNUCKEY LAGOONS
 (11 MILE ELEVEN MILE)
 344

ABORIGINAL DEVELOPMENT
 FOUNDATION ASSOCIATION

The Standard Land Availability Program (SLAP) map system contains this map, called the SLAP map, contains information used for land use planning purposes.

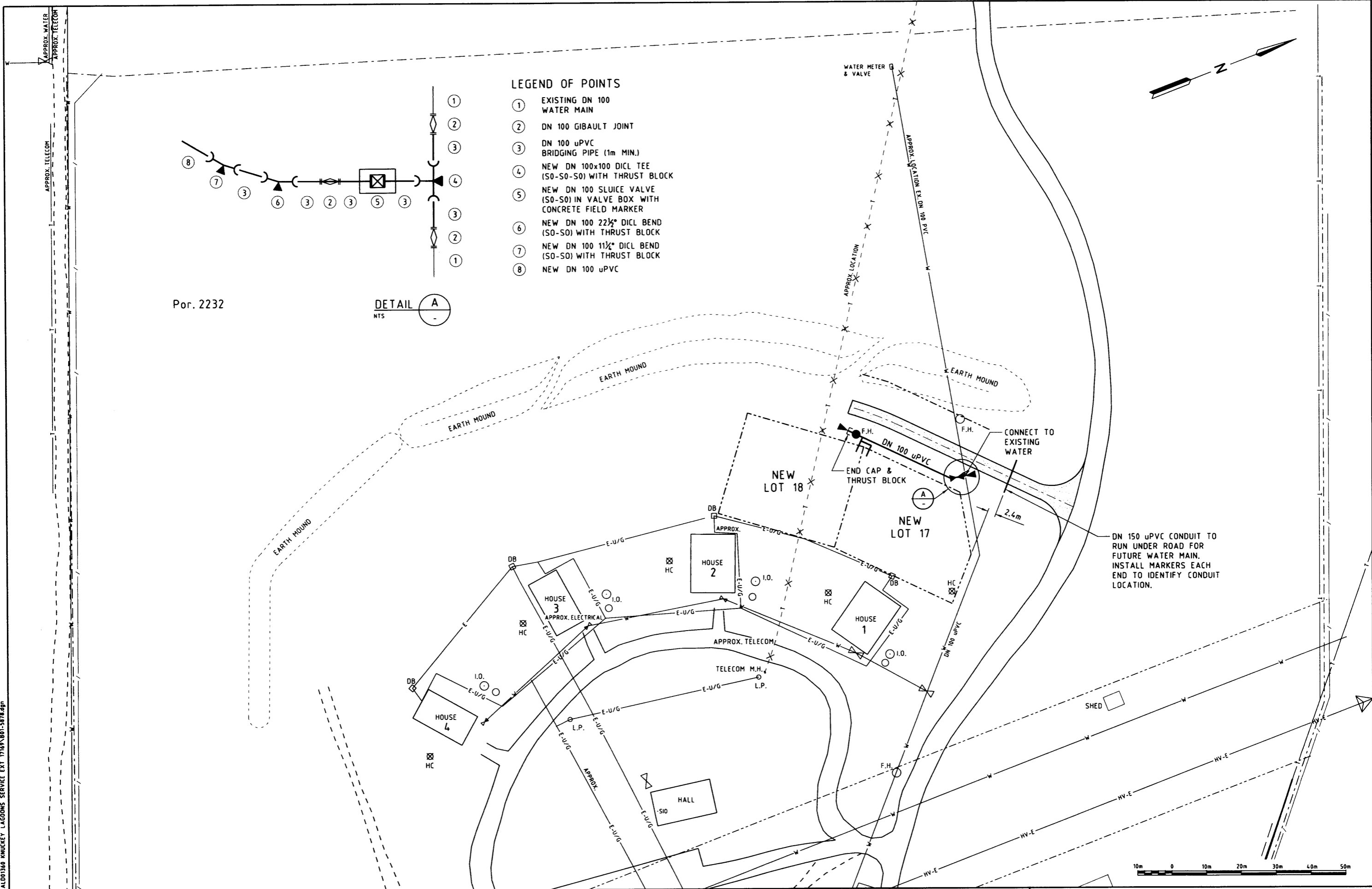
No.	Date	Description	Approved
1	18/10/2010	FINAL LAYOUT FOR APPROVED DEVELOPMENT	RECORDED

REFERENCE DRAWINGS
 DEPARTMENT OF LANDS & WATER RESOURCES
 PROFESSIONAL ENGINEERING (PE) PLAN
 PROFESSIONAL ENGINEERING (PE) PLAN
 WATER RETICULATION
 WATER PIPING
 ELECTRICAL
 CIVIL
 ROADWAY

HORIZONTAL DATUM: GDA84 (ZONE 53) (APPROX)
 VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM (MHD)

SCALE: 1:11000

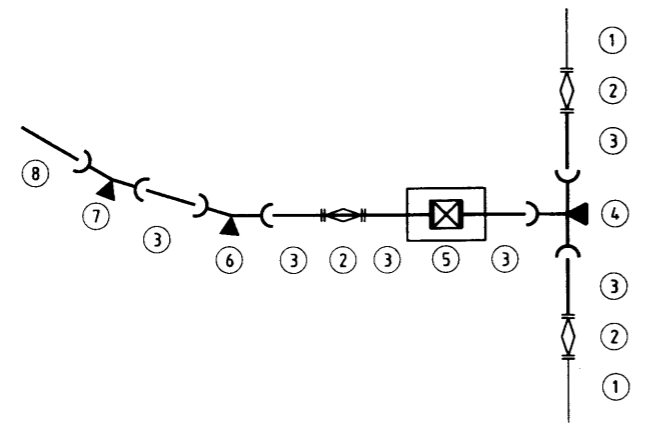
CONTRIBUTORS: ABORIGINAL DEVELOPMENT FOUNDATION ASSOCIATION
 DATE OF PREPARATION: 1/10/2010



Por. 2232

DETAIL A
NTS

- LEGEND OF POINTS**
- ① EXISTING DN 100 WATER MAIN
 - ② DN 100 GIBALT JOINT
 - ③ DN 100 uPVC BRIDGING PIPE (1m MIN.)
 - ④ NEW DN 100x100 DICL TEE (SO-SO-SO) WITH THRUST BLOCK
 - ⑤ NEW DN 100 SLUICE VALVE (SO-SO) IN VALVE BOX WITH CONCRETE FIELD MARKER
 - ⑥ NEW DN 100 22½° DICL BEND (SO-SO) WITH THRUST BLOCK
 - ⑦ NEW DN 100 11½° DICL BEND (SO-SO) WITH THRUST BLOCK
 - ⑧ NEW DN 100 uPVC



17/08/01 15:3126 W:\NR\ALD01360 KNUCKEY LAGOONS SERVICE EXT 17149\B01-5878.dgn

0	ISSUED FOR CONSTRUCTION	10/08/01	B.M.
A	ISSUED FOR 90% DESIGN REVIEW	-	B.M.
No.	DESCRIPTION	DATE	INIT.
AMENDMENTS			


TERRITORY HOUSING
 NORTHERN TERRITORY GOVERNMENT

DRAWN N. CERCARELLI DATE AUG 01	CHECKED D. ANNESLEY DATE AUG 01
DESIGNED B. MEELKY DATE AUG 01	CHECKED DATE 21/08/01
DESIGN PROJECT LEADER DATE 21/08/01	PROJECT OFFICER DATE 4/9/01

NORTHERN TERRITORY OF AUSTRALIA

DEPARTMENT OF TRANSPORT AND WORKS
CONSTRUCTION AGENCY
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DARWIN - KNUCKEY LAGOON'S TOWN CAMP			
SERVICE EXTENSIONS			
WATER LAYOUT			
FILE No. ALD-01360	SHEET No. 3 OF 4	DRAWING NUMBER B01-5878	AMEND. 7/3/01 A1

Transformer data

Group	Com Id	Location	Community Name	Dwellings No. (Funded Dwellings)	Dwellings No. (Bennett Design)	New Houses ** (Future Demand)	Primary Voltage Level (KV)	PWC Substation ID	PWC Test Number	Transformer size (KVA)	KVA Total dwellings @ 4.5KVA	KVA Total dwellings @ 7KVA	Comments
1	290	Darwin	Bagot	55	55		11	1924	1735	300	247.5	385	
	344	Darwin	Knuckey Lagoons	18	19	2	11	1771	2163	100	85.5	133	
	347	Darwin	Kulaluk	19	19		11	1092	10607	50	85.5	133	
	403	Darwin	Palmerston Town Camp	20	16		22	10196	10245	100	90	140	Two transformers for this Town Camp. Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
							22	265	11645	25			
	412	Darwin	Railway Dam (One Mile Dam)	5	6	2	11	1041	4378	200	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	427	Adelaide River	Amangal	9	9		22	216	12187	100	40.5	63	Two transformers for this Town Camp.
							22	184	5646	63			
	687	Jabiru	Manabadurma	10	12		11	5050	11107	200	54	84	
	825	Darwin	Minmarama Park	24	24		11	2147	11372	100	108	168	
2	606	Katherine	Warlpiri Transient Camp	9	9		22	6416	4886	100	40.5	63	Two transformers for this Town Camp.
							22	6074	4695	25			
	621	Katherine	Miali Brumby (Kalano)	47	31		22	6133	12247	315	211.5	329	
	640	Pine Creek	Pine Creek Compound	4	4		22	6666	3147	25	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	971	Mataranka	Mulggan	12	9	4	22	6819	5296	16	54	84	
							22	6818	5297	16			
							22	6384	11028	25			
3	215	Tennant Creek	Blueberry Hill (Munji-Marla)	2	2		22	7079	1868	200	9	14	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	223	Tennant Creek	Dump Camp (Marla-Marla)	7	7		22	7181	11088	200	31.5	49	
	224	Elliott	Elliott South Camp	12	12		11	7504	4718	200	54	84	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	225	Elliott	Elliott North Camp	36	25		11	7505	4715	100	162	252	
	238	Tennant Creek	Kargaru (East Side Camp)	12	12	1	22	7572		200	54	84	
	246	Tennant Creek	Ngalpa Ngalpa	18	21		22	7179		200	94.5	147	Two transformers for this Town Camp.
							22	7033	10904	315			
	271	Tennant Creek	Village Camp	12	12	1	22	7183	11107	200	54	84	
	681	Tennant Creek	Tingkarli	12	12		22	7180		200	54	84	
	684	Tennant Creek	Wuppa	15	15	1	22	7141	11092	100	67.5	105	Two transformers for this Town Camp.
						22	7182	11095	200				
4	3	Alice Springs	Akngwertnarre (Morris Soak)	11	15		11	8596	11336	300	67.5	105	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	16	Alice Springs	Anthelk Ewlpaye (Charles Creek)	17	10		11	8569	315	315	76.5	119	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	17	Alice Springs	Anthepe	15	15		22	8598	5874	200	67.5	105	Data extracted from PWC asset information. There was not access to this Town Camp due to ceremony on inspection day.
							22	8597	11244	315			
	19	Alice Springs	Aper Alwerrkng (Palmers)	7	6		11	8405	2939	200	31.5	49	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	35	Alice Springs	Ewyenper Atwatye (Hidden Valley)	47	47		11	8622	11202	100	211.5	329	
							11	8623	11203	100			
							22	8625	11205	63			
							11	8626	11204	100			
	47	Alice Springs	Ilparpa	13	13		22	8611	11702	200	58.5	91	
	48	Alice Springs	Ilperle Tyathe (Walpiri)	10	9		11	8001	11209	315	45	70	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].
	50	Alice Springs	Ilyperenye (Old Timers)	10	10		22	8145	3323	100	45	70	
	64	Alice Springs	Bassos	2	2		11	8002	10946	50	9	14	
	69	Alice Springs	Karnte	19	19		22	8282	2345	100	85.5	133	
							11	8617	11334	100			
	87	Alice Springs	Yarrenty Altere (Larapinta Valley)	34	34		11	8618	11200	63	153	238	
						11	8619	11335	100				
						11	8620	11201	100				
90	Alice Springs	Inarlange (Little Sisters)	16	22		22	8137	2925	100	99	154	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
108	Alice Springs	Mpwetyerre (Abbotts)	6	6		11	8093	11703	315	27	42	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
113	Alice Springs	Mount Nancy (Nyewente)	11	12		11	8405	2939	200	54	84		
129	Alice Springs	Nyewente (Trucking Yards)	26	26		11	8629	11312	300	117	182		
675	Alice Springs	Hoppys	15	19						85.5	133	There is not any Transformer in boundary of Town Camp. Also it's not shown in PWC asset information.	
676	Alice Springs	Ipiye Ipiye (Golders Camp)	15	14		11	8314	369	50	67.5	105		
1029	Alice Springs	Kunoth	4	4		11	8569	315	315	18	28	Transformer is not in boundary of Town Camp [The nearest transformer data to Town Camp is highlighted in yellow].	
5	222	Borrooloola	Mara	28	29	2	11	6187	12610	100	130.5	203	Two transformers for this Town Camp.
							11	6545	10203				
	229	Borrooloola	Garawa 1	16	14		11	6546	10166	100	72	112	Two transformers for this Town Camp.
							11	6332	4890	100			
	278	Borrooloola	Yanyula	29	29		11	6162	10496	200	130.5	203	Data extracted from PWC asset information. It's outside of Twon Camp, shown only Transformer to this Town Camp.
						11		10167				This transformer is not shown in PWC asset information. It's installed in Boat Ramp Road near to Town Camp and connected to Electrical reticulation of Town Camp.	
992	Borrooloola	Garawa 2	11	11		11	6189	2669	25	49.5	77		

** For New house's demand calculation see section 13.4 "Future Demand".

Palmerston Town Camp

Palmerston Town Camp

1 Design

The infrastructure reviews have been undertaken against current relevant standards for typical sub-divisions. The following standards have been used in undertaking the reviews.

Sewerage and water supply

- Water Services Association of Australia – Sewerage Code – WSA 02 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 02
- Water Services Association of Australia – Sewerage Pumping Station Code – WSA 04 -2005 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 04
- Water Services Association of Australia – Water Supply Code – WSA 03 2002 Part 1: Planning and Design
- Power and Water Corporation supplement to WSA 03
- Power and Water Corporation Indigenous Community Engineering Guidelines (2008)
- Department of Housing and Community Development Indigenous Community Engineering Guidelines (ICEG 2014, updated September 2016)
- Power and Water Corporation Essential Services Infrastructure Assessment and Upgrade Guidelines (for Town Camps in Urban Communities, 2009)
- Power and Water Corporation Standard Drawings
- Australian Standards

Electrical services

Electrical infrastructure has been assessed against AS/NZS3000 Wiring Rules and against PWC Service, Installation and Metering Rules and Urban Residential Development (URD) Design Standards where possible.

With one exception, town camps are each a single lot and compliance with AS/NZS3000 is sufficient to address potential safety concerns.

As such application of PWC URD Design Standards will mainly apply to the incoming supply and bulk or initial multi-metering panels if provided.

URD Design Standards for internal reticulation and street lighting appear to have been applied in many cases for convenience rather than compliance.

For the purposes of this report, the demand per dwelling allowances of URD Design Standards have been used to estimate incoming supply and overall distribution capacity requirements.

The following standards apply:

- Australian Standards
- Power Networks Design and Construction Guidelines, Power and Water Corporation
 - NP001.1_Design and Construction of Network Assets – General Requirements
 - NP001.3_General Specification for Overhead Electrical Reticulation
 - NP001.6_General Specification for URD Subdivisions
 - NP003_Installation Rules_V3
 - NP007_Service Rules
 - NP027_Capture of Newly Installed Street Lighting Information

- NP041_Guidelines for Electrical Design Consultants

Further referral to the guidelines in this report will be designated by the guidelines number, NP001.1.

Communications

- National Broadband Network Website viewed 21 January 2017
(<http://www.nbnco.com.au/>) – NBN rollout maps

Council Guidelines

In addition to the above standards, the following Council guidelines will be used where applicable.

- City of Palmerston – Development Guideline, June 2015

General

It should be noted that if the town camps are proposed to be subdivided and services assets gifted to Power and Water Corporation (PWC) for operation and maintenance, all of these services will need to fully meet PWC standards. With the exception of a few town camps that have recently been upgraded, this will require the full replacement and/or realignment of most services.

2 Condition assessment

2.1 Rating assessment matrix

A condition rating matrix was developed and used to assess all municipal infrastructure. The same rating was used for all services to maintain consistency in assessments. Table 1 below shows the condition rating and operability.

Table 1 Condition rating

	Condition rating	Operability
1	Very Poor	Not operational
2	Poor	Not fully operational or requires immediate maintenance to keep operational
3	Good	Fully operational, may require routine maintenance
4	Very Good	Fully operational, may require maintenance in the next six months
5	Excellent	New, fully operational

2.2 Civil assessment limitations

The civil infrastructure condition investigations were subject to a number of limitations. These include:

- Only accessible services have been investigated. This includes inspecting the top of sewer manholes, side entry pits, etc., however, does not include opening pits to inspect infrastructure below ground.
- No physical testing of the sewer, water or stormwater network was undertaken.
- No survey or service locating was undertaken.

As there was no survey, potholing or CCTV undertaken on the underground infrastructure there is insufficient information to make determinations on the asset condition. The condition assessments discussed in this report are only for the accessible services and do not necessarily represent the condition of the underground infrastructure. For the majority of the town camps, other than a few that have recently been upgraded it was found that the underground services are generally undersized and it is likely, due to their age, that these services are in poor condition. Either factor would trigger the need for a complete replacement to meet current relevant standards.

2.3 Electrical assessment limitations

The electrical infrastructure condition investigations were subject to a number of limitations. These include:

- Inspections were carried out without the assistance of an electrical tradesman.
- Only accessible services were investigated. Assessments were of a visual nature and no pit covers were removed.
- Overhead equipment was assessed from ground level.
- Switchboards were not opened and no assessment of the internal connections or bus ratings was made.
- Electrical infrastructure was assessed down to the meter for multi-meter panels and down to the termination, overhead pole or distribution pillar, of the supply cable to a meter located at a dwelling.

3 Current infrastructure issues

Power and Water Corporation (PWC) have advised of the following concerns and issues in regard to the sewerage, water and electrical infrastructure at all town camps.

3.1 Ownership and maintenance

PWC stated there has always been confusion regarding the ownership and responsibilities of the internal sewer, water and electrical infrastructure. PWC have advised that they have no legal tenure on the majority of assets in any town camps and that the owner is essentially that of the land owner or leaseholder. This is further discussed for each type of infrastructure for each town camp.

The ownership and who is responsible for the maintenance of the sewage pump stations and street lighting is a major concern. In most town camps it was found that PWC have been maintaining the assets on an in-kind basis, although there are no maintenance or access agreements in place and the infrastructure is generally not compliant to PWC standards.

3.2 Access to infrastructure

PWC advised that due to the uncertainty surrounding ownership and responsibility of the sewerage, water and electrical infrastructure, each town camp is seen as a single lot with multiple houses on it. There are no formal road reserves or easements where the municipal infrastructure should be located. PWC therefore have no legal right to enter the town camps to work on the infrastructure, nor can PWC stop others from working on the infrastructure. There is a risk that the maintenance undertaken by others may be to a lower standard than PWC.

It should be noted that there are currently no legal services easements within the town camps, except for a few cases where a town service passes through the town camp. Therefore it is recommended that easements are created over any infrastructure owned by PWC and any future assets to be gifted to PWC, to allow the service providers access to the infrastructure.

3.3 Existing infrastructure

PWC have stated that although the existing sewerage and water infrastructure appears to comply with relevant standards in some locations, the capacity cannot be assumed to meet PWC requirements due to the potential for underground substandard condition and/or grading of pipework. It is likely that these assets will need to be fully replaced to PWC standards to ensure sufficient capacity.

The planning process currently allows construction within the town camps on Commonwealth land without requiring service authority (PWC) approvals. This means that there has been no opportunity for PWC to recover contributions towards required upgrades to headworks servicing the developments and these upgrades have been paid for by PWC in the past. This inconsistency needs to be addressed for future developments within the town camps to ensure PWC are able to continue to provide adequate services.

3.4 Safety concerns

PWC have expressed concerns with safety of PWC staff and contractors working within the camps. PWC have employed procedures such as multiple people / vehicles to attend the site, with police or housing safety officers as required. This

generally leads to a delayed response time and increased cost to respond to and remediate emergency situations.

PWC have also raised the concern that if others work on water infrastructure within the town camps and do not apply the correct sanitation procedures they not only risk contaminating the entire water supply network within the town camp, at some town camps with direct connections to the town supply, they risk contaminating the entire town's water supply.

4 Available information

As the site investigations were limited to accessible / visible services, information on below ground services (such as electrical cables, sewer pipes, water supply pipes, etc.) were determined from available information. This information included:

- Serviced Land Availability Program (SLAP) maps,
- Department of Family & Community Services - Connecting Neighbours Program – Essential Services Scoping Study Report Volume 1 April 2005,
- Connecting Neighbours Project – Infrastructure Assessment and Recommendation Report - Arup Pty Ltd, April 2005,
- Drawings supplied by NT Department of Infrastructure - Technical Records,
- Drawings supplied by Power Water Corporation,
- Bennett Design inspection reports and population data.

Aurecon undertook a site investigation of the community to inspect roads, stormwater drainage, electrical services, sewerage and water supply, and community structures. The following sections detail the outcomes of this investigation and the assessments of the infrastructure.

The civil and electrical inspection reports can be found in the Appendices.

5 Sewerage

5.1 Ownership and boundaries

Palmerston Town Camp is serviced by a DN150 PVC pipe that disposes the sewer via septic tanks and absorption trenches at the north-east of the community. There is also a temporary pump station that pumps to the absorption trenches. The sewer network is currently not connected to any trunk mains, so there are no assets owned by PWC.

The sewer infrastructure within Palmerston Town Camp is believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yili Rreung Aboriginal Corporation to maintain.

A layout plan (designed in 2007) of the existing and proposed future sewer network was made available. This plan shows the pipe sizes, house connections, temporary pump station, and details of the septic tanks and absorption trenches.

5.1.1 Connection methods and billing

PWC have advised there is currently no customer for Palmerston Town Camp that sewerage bills are charged to.

5.2 Existing infrastructure condition assessment

The sewer infrastructure inspection was limited to inspecting the condition of manholes covers, as all other sewerage infrastructure is below ground. A total of twelve manholes and one pump station were inspected, with condition ratings as follows:

Table 2 Sewer condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Manholes			7	5		12



Figure 1 Temporary sewage pump station at Palmerston Town Camp



Figure 2 Sewer manhole (good condition)

The manholes were rated as 'good' and 'very good' and do not require any maintenance works at this stage. During the inspection it was noted that some of the manholes had some rust on the lid, or the lid was not sitting properly.

5.3 Current performance and risks

5.3.1 Current sewer network performance

The current capacity of the sewer network was calculated based on the following design assumptions:

- The adopted minimum grade for the pipework is 1.0%, as advised by Power and Water Corporation.
- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.

- The capacity has been assessed by calculating the current flow rate, and the maximum flow rate when the sewer pipe flows full. The result is then a percentage of how much of the pipe is currently being used.
- Manning’s roughness coefficient of the pipework is 0.012, as recommended by PWC for PVC pipes.
- Where the sewer pipe grade, size or material is not known, it is assumed to be non-compliant to PWC standards.
- As Palmerston Town Camp disposes to a pump station and absorption trench, the capacity of the pump station has also been assessed.

The current number of houses in Palmerston Town Camp is 18, this multiplied by 9 EP per house gives a total current EP of 162. The capacity of the existing sewer was then calculated. The percentage shows how much of the pipe capacity is currently being used.

Table 3 Existing sewer capacity

Catchment	Current total EP	Diameter of connection (mm)	Adopted PWC minimum slope (%)	Q _{full} (L/s)	Current Q (L/s)	Current capacity (%)
Catchment 1	162	150	1.0	16.50	1.98	12%

Table 3 above shows that the capacity of the existing sewer network is adequate for the current peak population.

5.3.2 Current sewage pump station performance

The capacity of the pump station was checked against the following criteria, based on PWC guidelines:

- Less than 12 pump starts per hour (for pumps less than 15kW),
- Minimum velocity 0.9 m/s,
- Maximum velocity 2.5 m/s,
- Overflow storage equal to three hours of peak dry weather flow.

The dimensions of the pump station were taken from drawing R07-1508-C, refer Appendices, which shows the operational volume of the wet well was 1900 L, and the outgoing pipe size is 90 mm. The duty and head of the pump were estimated based on the elevations on the drawing.

The pump station was found to be within PWC guidelines with regard to the minimum and maximum velocity and number of starts per hour. The overflow storage was not assessed as the sewage is disposed through absorption trenches.

5.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

5.5 Recommended works

It is recommended that the septic tank and absorption trench arrangement is upgraded by replacing it with a main connecting to a trunk main in Palmerston. For the purpose of the cost estimates, 1200 m of DN150 PVC rising main, and a new sewage pump station have been allowed for.

overgrown flora or restricted property access. As there are 18 dwellings in Palmerston Town Camp, up to 15 additional residential lot meters should be installed to ensure each lot has its own meter.

It is proposed that PWC measures the water supply to the entire community with a bulk meter, as opposed to individual lots within the community. Under this scheme, the water bill for the entire community is the responsibility of the governing body, being Aboriginal Development Foundation Incorporated for Palmerston Town Camp. It will be up to governing body to assign bills to residents accordingly. It is not known what contribution the residents make towards the water bills.

It is also recommended that the installation of individual lot meters is included. This will assist with the governing body distributing bills to residents, the identification of any leaks in the network, and meeting PWC standards should the town camp is subdivided in the future.

6.2 Existing infrastructure condition assessment

The site investigation for the water infrastructure included assessing the condition of any air valves, fire hydrants, tanks, taps, and water meters. The assessment was limited to services that could be accessed above ground; no excavation of below ground services was undertaken.

Table 4 Water supply condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Fire hydrant			1	3		4
Taps	6	1	1			8
Water meter (residential lots)			3			3



Figure 4 Fire hydrant, condition: *good*



Figure 5 Tap, condition: *very poor*



Figure 6 Water meter (lot), condition: *good*

Several taps were found to be in very poor and poor condition. In total, seven taps need replacing.

6.3 Current performance and risks

The water supply network requires detailed hydraulic modelling to accurately analyse the capacity.

The current peak hour demand was calculated based on the following design assumptions:

- The nominal peak day flow is 1100 L/capita/day, based on PWC's supplement to WSA 03 2002. This value is for the northern region of NT. It was assumed that the nominal peak day flow of 1100 L/capita/day also applies to water usage

within the community, although it is possible that this value could be higher in real life due to a lack of controls to reduce water usage.

- The Equivalent Population (EP) has been calculated assuming one household equates to 9 EP, based on discussions with Power and Water Corporation.
- The peak hour factors are listed in PWC’s Supplement to WSA 03-2002, and they depend on the population range of the community. The peak hour factor of 3.0 has been adopted, for populations less than 500.

Table 5 shows the peak hour water demand.

Table 5 Current water demand

Total dwellings	EP	Demand (l/s)	Peak hour demand (l/s)
18	162	2.06	6.19

It is expected that the existing network has sufficient capacity to supply adequate pressure under peak hour demands.

The assessment of water supply for firefighting has been based on the size of the water mains and the condition of the accessible fire hydrants. Additional hydrants have been recommended where it appears the existing number of hydrants are insufficient. In the case of Palmerston Town Camp no additional hydrants were noted as being required at this stage.

The system currently has a dead end which is non-compliant with PWC standards. The design, (refer Appendices) shows the intent to install a connection from the dead end back to the water main. It is recommended this is constructed to meet PWC standards.

6.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

6.5 Recommended works

The infrastructure that was assessed as very poor or poor is recommended to be upgraded to prevent failure in the future. The following maintenance works are recommended;

- Replace seven taps

A dead end within the existing water reticulation network should be extended to create and reconnected to the DN150 water main creating a loop. The community is viewed overall as a large single lot and as previously detailed proposed have the water usage measured accordingly. In order to measure the water usages as a single lot, a bulk water meter should be installed. The cost estimates for the upgrades at Palmerston Town Camp include:

- Extend water main with DN150 PVC creating a loop, approximately 150 m
- Install bulk water meter at community boundary
- Install up to 15 new residential lot water meters

7 Roadworks

7.1 Ownership and boundaries

It is the current understanding that the roadwork assets within Palmerston Town Camp are owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yili Rreung Aboriginal Corporation to maintain.

7.2 Existing infrastructure assessment

The road network within the Palmerston Town Camp consists of primarily sealed roads. Table 6 and Table 7 below summarise the condition of the road furniture and roads, respectively, as assessed during the site inspection.

Table 6 Roadworks condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Car park			1			1

The carpark at the time of inspection was in good condition and therefore no recommendations have been made to upgrade it.

There was no other road furniture (such as signs or footpaths) found at Palmerston Town Camp.



Figure 7 Carpark, condition: *good*



Figure 8 Pavement edge breaks, condition: *poor*



Figure 9 Pavement, condition: *good*



Figure 10 Road condition map

Table 7 below details the condition of the roads within Palmerston Town Camp for specific segments. Figure 10 shows a map of the road network with the road number and chainage direction with relation to Table 7.

Table 7 Road network condition assessment

Road name	Chainage start (km)	Chainage end (km)	Condition (1 to 5)	Defects and the associated condition (1-5)
403_1	0	0.1	3	-70% of the road has blocked gutters and therefore causing dirt on the road (3)
	0.1	0.25	4	-20% of the road has edge breaks (2)
	0.25	0.39	3	-20% of the road has edge breaks (2)
403_2	0	0.05	4	Nil
Palmerston Town Camp Access	0	0.5	4	-5% of the road has stone loss (3)
	1	1.02	4	Nil

7.3 Current performance and risks

The road network is sufficient for the current number of houses. It was noted during the site inspections that a number of unsealed 'short-cuts' had been created and were regularly used. It is not recommended that these paths are formalised.

Overall the road network is in good to very good condition, however maintenance is required to remove dirt from gutters.

7.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

7.5 Recommended works

The following maintenance works are recommended to upgrade the current infrastructure;

- General clean of 390 m of road
- Repair 10 m² of cracks on pavement surface
- Repair 30 m of edge breaks
- Cleaning of 390 m of kerbs

8 Stormwater drainage

8.1 Ownership and boundaries

The stormwater drainage assets within Palmerston Town Camp are believed to be owned by Aboriginal Development Foundation Incorporated, but are the responsibility of Yili Rreung Aboriginal Corporation to maintain.

8.2 Existing infrastructure condition assessment

The site investigation for the stormwater infrastructure included assessing the condition of swales, culverts and side entry pits (SEP). Only the above ground infrastructure was assessed. Consequently, the underground stormwater pipes were not investigated. As the inspection was undertaken outside of a storm event, flooding due to blockages or damages to the underground infrastructure could not be assessed. The following table summarises the condition of the stormwater assets as assessed during the inspection.

Table 8 Stormwater drainage condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Culvert			2	1		3
SEP			3	8		11



Figure 11 Side entry pit, condition: *good (structure good, blockage very poor)*



Figure 12 Side entry pit, condition: *good*



Figure 13 Headwall DN375, condition: *good*



Figure 14 Headwall DN375, condition: *very good*

As shown in **Error! Reference source not found.** to Figure 12, the condition rating is based on the structural integrity of the side entry pit or headwall, it does not necessarily take into account how blocked the asset is. It is recommended that the side entry pits and culverts are cleared out so they work effectively and to reduce flooding/ponding.

8.3 Current performance and risks

The current performance of the stormwater network cannot be fully analysed without significant hydraulic and hydrodynamic modelling, which is outside the scope of this project.

The hydraulic effectiveness of the side entry pits and culverts is reduced when the asset is blocked, so removal of weeds and debris so the assets are not blocked is important.

8.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

8.5 Recommended works

The following works are recommended to upgrade or improve the current infrastructure:

- Two side entry pits are unblocked (currently blocked 90 – 100%)
- Seven side entry pits are unblocked (currently blocked 10 – 40%)

9 Community structures

9.1 Ownership and boundaries

The community structures within Palmerston Town Camp are owned by Aboriginal Development Foundation but are the responsibility of the Yili Rreung Housing Aboriginal Corporation to maintain.

9.2 Existing infrastructure condition assessment

The site investigation for the community structures included assessing the condition and features of the playground and basketball court. Table 9 shows the condition rating given to the community structures.

Table 9 Community structures condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Basketball court			1			1
Playground		1				1



Figure 15 Basketball court, condition: *good*



Figure 16 Playground, condition: *poor*

9.3 Current performance and risks

The playground was rated with poor appearance, due to the paint peeling, debris and weeds. The condition was rated similarly as poor due to the lack of a shade cloth.

The basketball court was rated as being in good appearance and condition.

9.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

9.5 Recommended works

The following works are recommended to upgrade the current infrastructure;

- Repaint areas of faded paint and graffiti on playground
- Repaint basketball court lines
- General clean of playground and basketball court
- Shade structure over the existing playground
- Install nets on basketball rims
- Landscape maintenance of both basketball court and playground.

10 Electrical services

10.1 Ownership and boundaries

The following points, from Network Policy NP003 Installation Rules Section3, define the typical shared ownership of electrical infrastructure by Power and Water Corporation (PWC) and customers.

- The point of supply is defined as the point where PWC makes the electrical supply available. For domestic supply, this is normally one of the following:
- A point of attachment of an overhead service on to a building or pole on which a metering panel is fitted.
- A point of attachment of an overhead service on to a pole forming part of unmetered aerial consumer's mains.
- A nominated point on a distribution substation located on the customer's lot.
- A point of connection of an underground service in a metering panel, including underground services originating at an overhead line.
- A point of connection of an underground service in a pillar or junction box forming part of unmetered consumer's mains, located on the customer's lot.
- A point on a Power and Water pillar located on the customer's lot.

Typically, distribution infrastructure upstream of the point of supply is owned and maintained by PWC and infrastructure below the point of supply is owned and maintained by the customer.

In many cases PWC have defined a Point Of Supply to ensure that they retain responsibility for aerial high voltage infrastructure to minimise the possibility of the community or its contractors coming into contact, either deliberately or inadvertently, with aerial high voltage infrastructure.

In other cases isolation facilities are present or desired by PWC to define the Point of Supply at or near the boundary of the town camp.

The Palmerston community electrical reticulation systems is supplied from the PWC network by two overhead points at this property .The first PWC transformer supplies to an unmetered consumer mains to a low voltage switchboard that connects to the consumer low voltage metering board. The second point of supply from PWC connects via unmetered consumer mains with outgoing LV feeders to LV3 distribution pillars and underground reticulation to prepaid meters on dwellings.

Some dwellings have multiple prepaid meters, presumably because they supply other dwellings or are multiple dwellings.

PWC advise that the Point Of Supply is the LV terminals of the substations and that they own and are responsible for the polemount substations and upstream infrastructure.

PWC advise that street lighting is supplied from unmetered LV infrastructure and is the responsibility of the lot holder and not PWC.

All meters, whether pre- or post-paid are the property of PWC.

Palmerston community are responsible for maintain all unmetered and metered LV infrastructure including the main switchboard, metering panel (excluding meter), underground distribution feeders, distribution pillars, consumers mains and consumer switchboards and street lighting.

10.2 Existing infrastructure condition assessment

Table 10 shows the condition rating given to the distribution switchboards and distribution pillars. The distribution pillars have 100% operational rating and 100% of the pillars had minor maintenance issues to address, including bolt replacement and labelling. Refer to Appendices.

Table 10 Distribution panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Distribution panels			11			11

Table 11 shows the condition rating given to the street lights. The street lights are supplied via underground LV reticulation and are generally seven (7) metres high with mercury vapour lamp M80 and with lamp covers protected by cages.

The street lights have 57% operational rating based on daytime visual inspection.

Table 11 Street light condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Street light	3		4			7

Table 12 shows the condition rating given to the Metering panels.

Table 12 Meter panel condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Pre-paid meter			8			8
Post-paid meter			1			1
Switchboard		3	2			5

Table 13 shows the condition rating given to the switchboards associated to dwellings.

Table 13 Switchboard condition assessment (housing footprint)

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Switchboard		2	6			8

The details of the individual inspections and photographs of each piece of infrastructure are in Appendices.

10.3 Current performance and risks

The electrical infrastructure evaluation was conducted against the following criteria

- Number of dwellings on tenure, the higher value of the funded dwelling and as quoted in the population report was utilised.
- Urban area, NP001.1, 4. Definitions.
- General Specification for URD Subdivisions, NP001.6, 4.3 Substation Size.
- Normal ADMD (After Diversity Maximum Demand) of 4.5 kVA and high cost subdivisions at 7 kVA.
- Transformer ratings were assumed to be correct in Dekho (PWC asset information system) and compared against photographs of test or transformer numbers collected.
- Substation loads were compared against transformer sizes only. No load flow analysis was conducted.
- No load calculations were performed or assessment conducted on overhead or underground cable, visual inspection from the ground only.
- Street lighting loads were ignored as they are not significant.

The calculated maximum demand of the Palmerston Town Camp transformers are 72% of total rated capacity based on 4.5kVA/dwelling. A recommended detail audit to be performed to ascertain the exact reticulation and load demand.

Table 14 Palmerston Town Camp current demand load vs transformer ratings

Community name	Dwellings	Transformer (kVA)	kVA Total @ 4.5kVA	kVA Total @ 7kVA	Comments
Palmerston Town Camp	20	100	90	140	Transformers are not in boundary of Town Camp [The nearest transformers data to Town Camp are highlighted in yellow].
		25			

A tabulated summary of all community transformers is included in Appendices.

There is a risk of equipment not being maintained associated with the non-standard division of responsibilities between the customer and PWC.

The following points from the PWC Metering Rules should be noted:

- The routine maintenance of metering installations and the replacement of any faulty meters is the responsibility of PWC.
- The property owners are responsible for the maintenance and upkeep of meter rooms, boxes and panels (including lids, doors and locking mechanisms).
- The installation of pre-paid metering is a cost to the customer, refer NP010 Meter Manual-Maintenance of Metering Installations, Power and Water Corporation.

10.4 Future demands

As no new developments are currently planned for the Palmerston Town Camp, there are no additional upgrades required to cater for future demand.

10.5 Recommended works

The Palmerston Town Camp transformer is owned by PWC who are aware of the loading of this transformer and have assessed the load does not require that this transformer be upgraded or replaced.

The following maintenance works and upgrades are recommended:

- Replace three 80W street lights.
- Replace three switchboards inside the metering panel
- Replace two switchboards associated to dwellings

11 Communications

11.1 Ownership and boundaries

Details of Telstra pit and conduit infrastructure within the town camp boundaries was sought but was not forthcoming.

11.2 Existing infrastructure assessment

The telecommunications infrastructure assessed included pits and telephone booths.

Appendices contains the individual reports.

Table 15 Telecommunication pit condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Telecommunication pit			11			11

Table 16 Phone booth condition assessment

Asset	1 Very Poor	2 Poor	3 Good	4 Very Good	5 Excellent	Total
Phone booth						1

11.3 Current demands

No details of the performance of communications infrastructure were obtained.

11.4 Future demands

The current availability of broadband services at Palmerston Town Camp is displayed in the Figure 17 below. NBN is available to residents via a fixed telecommunication line on application to an appropriate NBN access provider.

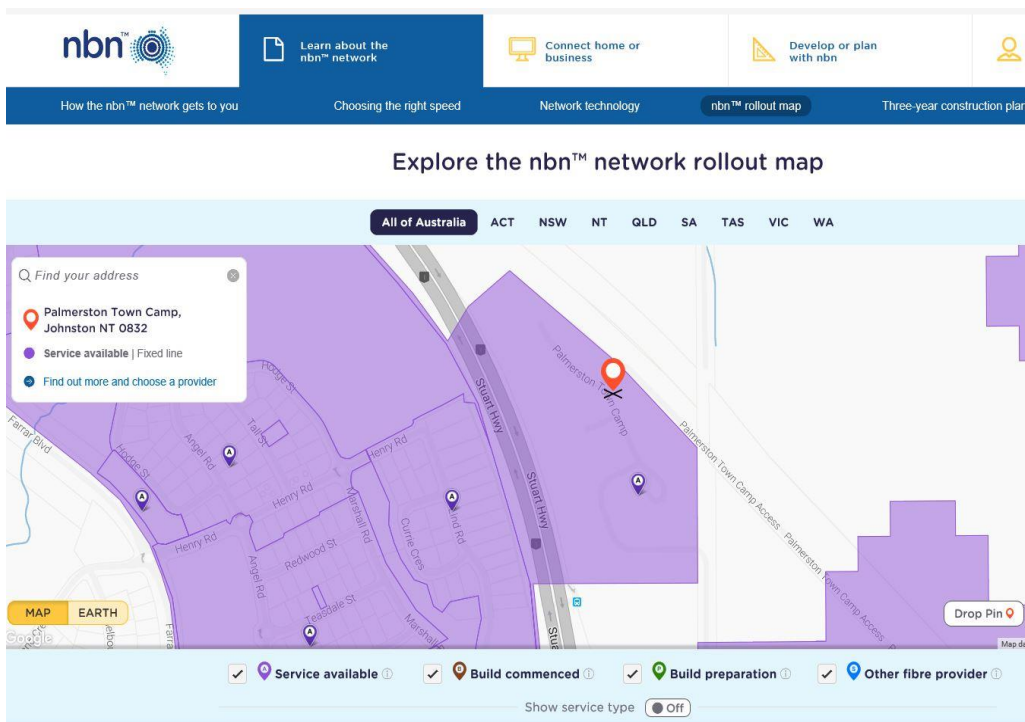


Figure 17 NBN network availability map

The NBN rollout map confirms that NBN is planned to be made available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

11.5 Recommended works

Representatives from NBN’s Land Access and Stake Holder management teams are currently engaged with Yilli Housing and NT Housing to look at how camps will be serviced. It is expected that any existing premises in these camps will have some type of NBN service via the NBN brownfields rollout in the future.

No works are required at Palmerston Town Camp because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.

12 Cost estimates

Table 17 below shows a summary of the cost estimates to undertake the maintenance required to fix the existing infrastructure and to upgrade the existing network to meet current design standards. There are no works required for the future design. The estimates take into account a 30% contingency and are inclusive of GST.

Table 17 Cost estimates

Infrastructure	Maintenance of existing infrastructure	Upgrades to meet current design
Sewerage	\$ 0	\$ 1,244,000
Water supply	\$ 2,000	\$ 162,000
Roadworks	\$ 30,000	\$ 0
Stormwater drainage	\$ 8,000	\$ 0
Community structures	\$ 12,000	\$ 11,000
Electrical	\$ 45,000	\$ 0
Communications	\$ 0	\$ 0
Miscellaneous provisions	\$ 21,000	\$ 180,000
Total (including GST)	\$ 118,000	\$ 1,597,000
Grand total	\$ 1,715,000	

The cost estimates are a preliminary estimate only. Since Aurecon has no control over the cost of labour, materials, equipment or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Aurecon cannot guarantee actual costs will not vary from these estimates.

13 Summary

The following works are recommended for Palmerston Town Camp:

Sewerage

- 1200 m of DN150 PVC rising main
- New sewage pump station

Water supply

- Replace seven taps
- Extend water main with DN150 PVC creating a loop. Approximately 150m
- Install bulk water meter at community boundary
- Install up to 15 new residential lot water meters

Roadworks

- General clean of 390 m of road
- Repair 10 m² of cracks on pavement surface
- Repair 30 m of edge breaks
- Cleaning of 390 m of kerbs

Stormwater drainage

- Two side entry pits are unblocked (currently blocked 90 – 100%)
- Seven side entry pits are unblocked (currently blocked 10 – 40%)

Community structures

- Repaint areas of faded paint and graffiti on playground
- Repaint basketball court lines
- General clean of playground and basketball court
- Shade structure over the existing playground
- Install nets on basketball rims
- Landscape maintenance of both basketball court and playground.

Electrical services

- Replace three 80W street lights.
- Replace three switchboards inside the metering panel
- Replace two switchboards associated to dwellings

Communications

- No works are required because NBN is available to residents via fixed telecommunications line on application to an appropriate NBN access provider.


Civil inspection reports

Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016





Legend

Town Camp boundary

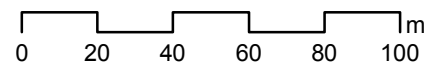
 Town Camp boundary

Sewerage

 Manholes (13)

 Pump Station (1)

A3 scale: 1:2,000



Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Sewerage
403 - Palmerston Indigenous Village (Palmerston)

Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016



Legend

Town Camp boundary

Town Camp boundary

Water

Fire Hydrants (4)

Water Meter (3)

Taps (8)

Water

What Water Asset Are you Capturing

Air Valves

Fire Hydrants

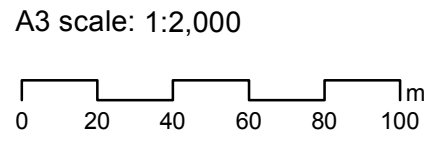
Pumps

Scour Valves

Tanks

Water Meter

Taps



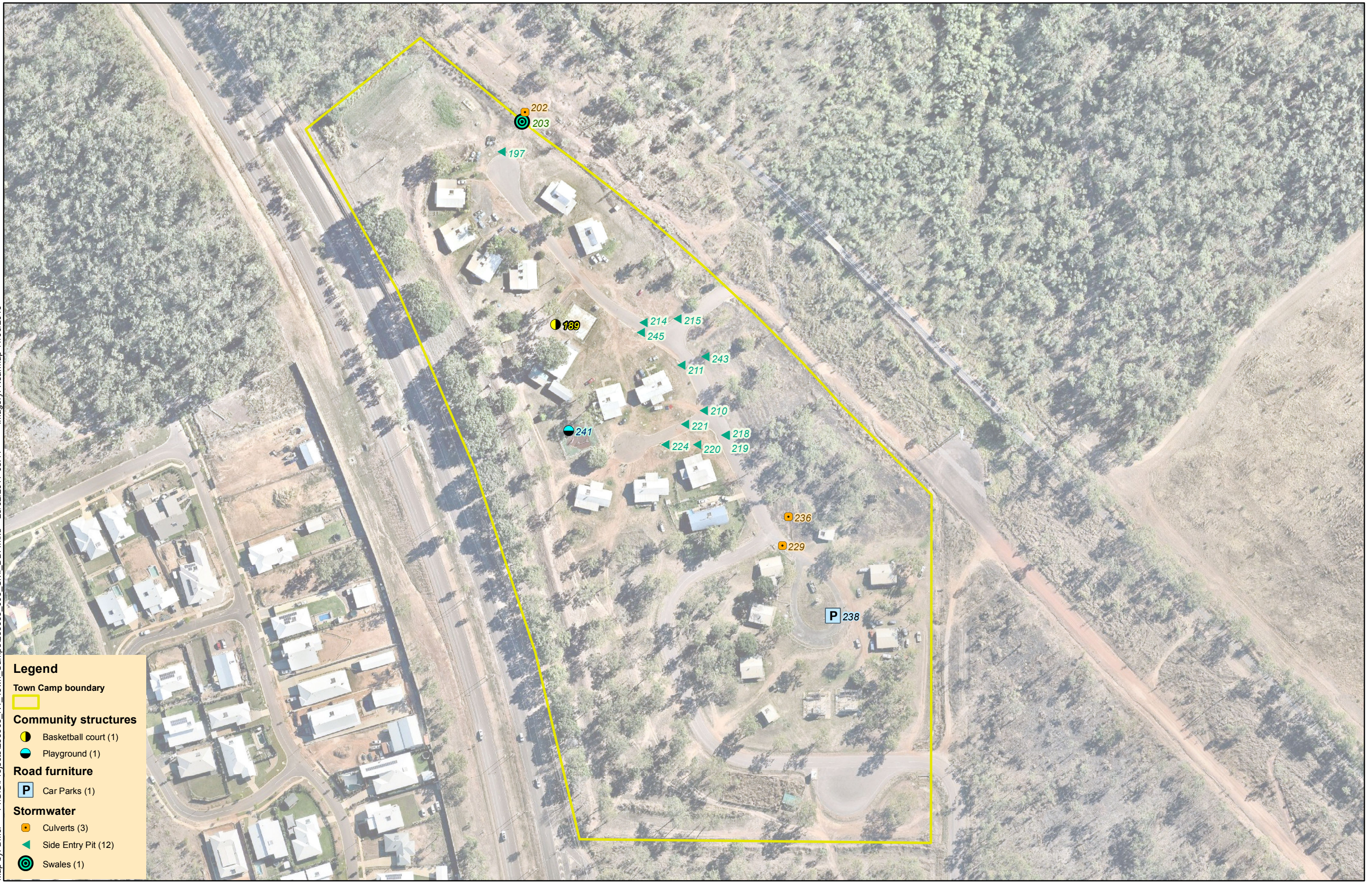
Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Water 403 - Palmerston Indigenous Village (Palmerston)

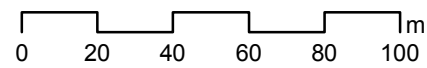
Map by: DMCP P:\GIS\Projects\253963_NT_Town_Camps\253963_003_Civil_DDP.mxd 23/02/2017 08:41 Imagery: Nearmap 11/06/2016



Legend

- Town Camp boundary
- Community structures**
 - Basketball court (1)
 - Playground (1)
- Road furniture**
 - Car Parks (1)
- Stormwater**
 - Culverts (3)
 - Side Entry Pit (12)
 - Swales (1)

A3 scale: 1:2,000



Note:
Label numbers refer to survey IDs



Date: 23/02/2017 Version: 1
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments
Road furniture, stormwater drainage & community structures
403 - Palmerston Indigenous Village (Palmerston)

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:39:26 AM

Insp ID: 238

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Road Name: 403_1

What are you inspecting: Car Parks

Carpark Width (m): 5

Carpark Length (m): 20

Carpark Type: Sealed - asphalt

Carpark Condition: 3 - Good

Line marking:

Kerbs:

General Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:29:17 AM

Insp ID: 202

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	Culverts
Culvert Type:	RCP
Diameter (mm):	600
Width (mm):	
Culvert Depth (mm):	
Culvert Length (m):	
Culvert Condition:	3 - Good
Culvert Blockage (%):	
Culvert Comments:	Upstream side not accessible, length unknown
Culvert Head Wall:	No Access
Safety Grate:	No Access
Headwall Blockage:	
Headwall Condition:	
Headwall Comment:	
End Wall:	Yes
End Wall condition:	3 - Good
EW Comment:	Overgrown and fenced off



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:01:31 PM

Insp ID: 229

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	Culverts
Culvert Type:	RCP
Diameter (mm):	375
Width (mm):	
Culvert Depth (mm):	
Culvert Length (m):	12
Culvert Condition:	4 - Very Good
Culvert Blockage (%):	
Culvert Comments:	
Culvert Head Wall:	Yes
Safety Grate:	No
Headwall Blockage:	
Headwall Condition:	4 - Very Good
Headwall Comment:	Some concrete damage
End Wall:	Yes
End Wall condition:	4 - Very Good
EW Comment:	



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:01:31 PM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:01:49 PM

Insp ID: 236

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	Culverts
Culvert Type:	RCP
Diameter (mm):	375
Width (mm):	
Culvert Depth (mm):	
Culvert Length (m):	18
Culvert Condition:	3 - Good
Culvert Blockage (%):	10
Culvert Comments:	
Culvert Head Wall:	Yes
Safety Grate:	No
Headwall Blockage:	20
Headwall Condition:	4 - Very Good
Headwall Comment:	
End Wall:	Yes
End Wall condition:	4 - Very Good
EW Comment:	



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:01:49 PM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:15:35 AM

Insp ID: 194

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:45:50 AM

Insp ID: 207

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single

Sluice Valve: No

Above or Below ground:

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 4 - Very Good

FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:04:37 PM

Insp ID: 234

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single
Sluice Valve: No
Above or Below ground: Below ground
FH Leakage: No Access
Bollards around hydrant: No
FH Condition: 3 - Good
FH Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:04:37 PM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:27:14 AM

Insp ID: 240

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Fire Hydrants

Single or Double: Single

Sluice Valve: No

Above or Below ground: Below ground

FH Leakage: No Access

Bollards around hydrant: No

FH Condition: 3 - Good

FH Comment: Covered in dirty, not clearly visabl



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:02:19 AM

Insp ID: 188

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 370

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 3 - Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:09:53 AM

Insp ID: 192

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid: 1/B

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:25:20 AM

Insp ID: 199

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes
MH Cover Shape: Rectangular
Manhole Cover Diam (mm):
Manhole Length (mm): 1000
Manhole Width (mm): 700
Manhole Condition: 3 - Good
Notes on Lid: 1/AA
Comments: Some rust



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:27:14 AM

Insp ID: 200

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:29:41 AM

Insp ID: 209

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes
MH Cover Shape: Rectangular
Manhole Cover Diam (mm):
Manhole Length (mm): 1000
Manhole Width (mm): 700
Manhole Condition: 3 - Good
Notes on Lid: 1/D
Comments: Some rust



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:52:13 AM

Insp ID: 213

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 370

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 3 - Good

Notes on Lid:

Comments: Lid is not sitting properly



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:55:50 AM

Insp ID: 216

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes
MH Cover Shape: Rectangular
Manhole Cover Diam (mm):
Manhole Length (mm): 1000
Manhole Width (mm): 700
Manhole Condition: 3 - Good
Notes on Lid: 1/C
Comments: Some rust



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:13:41 AM

Insp ID: 223

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid: 2/A

Comments: Some dirt and rust



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:16:44 AM

Insp ID: 225

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 370

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 4 - Very Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:20:33 AM

Insp ID: 226

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 370

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 4 - Very Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:04:56 PM

Insp ID: 230

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 3 - Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:07:43 PM

Insp ID: 232

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Round

Manhole Cover Diam (mm): 370

Manhole Length (mm):

Manhole Width (mm):

Manhole Condition: 4 - Very Good

Notes on Lid:

Comments:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:05:32 PM

Insp ID: 233

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Manholes

MH Cover Shape: Rectangular

Manhole Cover Diam (mm):

Manhole Length (mm): 1000

Manhole Width (mm): 700

Manhole Condition: 4 - Very Good

Notes on Lid:

Comments: Partially covered by grass



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:06:37 AM

Insp ID: 193 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

Road Name: 403_1

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.1

Road Type: Sealed - spray seal

Section Width (m): 6

Road Condition: 3 - Good

General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Drainage	70	3 - Good	70% of road has blocked gutters. Dirt on road.

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Layback Kerb	3 - Good	Gutters are blocked with dirt

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:06:37 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:06:37 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:48:00 AM

Insp ID: 212	Group 1 - Darwin, Jabiru, Adelaide River	Palmerston Town Camp
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Road Name: 403_1
What are you inspecting: Pavements
Ch From (km): 0.1
Ch To (km): 0.25
Road Type: Sealed - asphalt
Section Width (m): 6
Road Condition: 4 - Very Good
General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Surfacing Cracks	2	3 - Good	2%

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Layback Kerb	4 - Very Good	

Shoulders Section

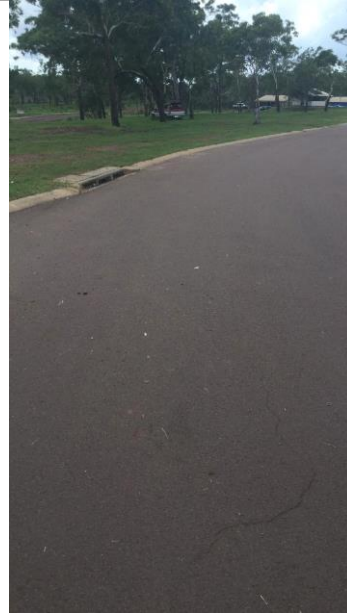
Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:48:00 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:48:00 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:09:43 PM

Insp ID: 231	Group 1 - Darwin, Jabiru, Adelaide River	Palmerston Town Camp
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Road Name: Palmerston Town Camp Access

What are you inspecting: Pavements

Ch From (km): 0

Ch To (km): 0.5

Road Type: Sealed - asphalt

Section Width (m): 7.2

Road Condition: 4 - Very Good

General Comment: New access road, different from marked access road, spoon drains either side of road

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Stone Loss	5	3 - Good	<5% of road

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed	1				

Linemarking Section

Line Type	Other Line Type	Line Cond	Line Comments
Broken lane line		4 - Very Good	
Edge line		3 - Good	

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

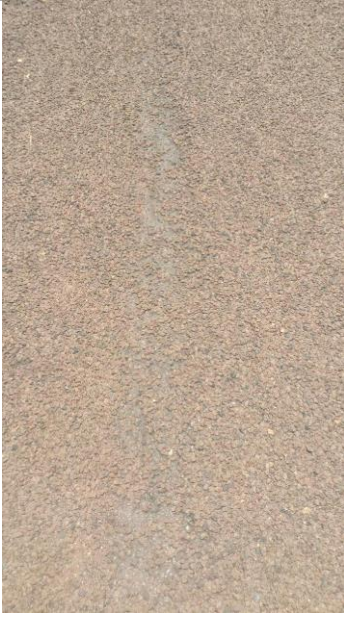
Inspection Date 11/11/2016 12:09:43 PM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 12:09:43 PM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:33:02 AM

Insp ID: 239 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

Road Name: 403_1
What are you inspecting: Pavements
Ch From (km): 0.25
Ch To (km): 0.39
Road Type: Sealed - asphalt
Section Width (m): 3.5
Road Condition: 3 - Good
General Comment:

Road Defects Section

Defect Type	Defect QTY	Defect Condition	Defect Comments
Edge Breaks	10	2 - Poor	20%

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
No kerb		

Shoulders Section

Shoulder Type	Width	Dropoff(mm)	Erosion	Condition	Shoulder Comments
Unsealed		50		3	

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:33:02 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:33:02 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:07:58 AM

Insp ID: 242 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

Road Name: 403_2
What are you inspecting: Pavements
Ch From (km): 0
Ch To (km): 0.05
Road Type: Sealed - asphalt
Section Width (m): 6
Road Condition: 4 - Very Good

General Comment:

Road Defects Section

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Layback Kerb	1 - Very Poor	

Shoulders Section

Linemarking Section

Obstruction Section

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:07:58 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:07:58 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:55:04 AM

Insp ID: 244 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

Road Name: Palmerston Town Camp Access

What are you inspecting: Pavements

Ch From (km): 1

Ch To (km): 1.02

Road Type: Sealed - asphalt

Section Width (m): 6

Road Condition: 4 - Very Good

General Comment:

Road Defects Section

Kerbs Section

Kerb Type	Kerb Cond	Kerb Comments
Layback Kerb	4 - Very Good	

Shoulders Section

Linemarking Section

Obstruction Section

Road Obstruction Other Road Obstruction

Trees

Debris

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:55:04 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:55:04 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:20:25 AM

Insp ID: 198

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Sewerage Asset are you capturing: Pump Station

No of Pumps in Pump Station: 1

Cabinet Condition: 3 - Good

Cabinet Comment:

Alarm Light: Yes

Alarm Light Condition: 3 - Good

Overhead Light: No

Overhead Light Condition:

Light Comments:

Davit Crane Present: No

Davit Crane Capacity (kg):

Davit Crane Condition:

Davit Crane Comments:

Fence TYPE: No Fence

PS Fence Height (m):

PS Gates Locked: NA

PS Fence Condition:

Fence Comment:

Flow meter type:

Flow meter condition:

Flow meter comments:

Macerator Pump Make/Model:

Manufacturers Date:

Macerator Pump:

Macerator Pump Condition:

Macerator Pump Comments:

Outgoing Pipe Diameter (mm):

Valves:

Outgoing Pipe Comments:

Water Supply to pump station: No

Fire hose reel: No

Access cover locked: No

Safety grid beneath access cover: No Access

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:20:25 AM

Condition:

Cabinet Locked: Yes

Cabinet Lock Condition: 3 - Good

Hand rails around entrance: No

Fixed or removable:

Rail Condition:

Safety Comments:

Pump Station Pumps section



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:20:25 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:19:32 AM

Insp ID: 197

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 4
On grade or sag pit:
Both sides of road: Left
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:49:24 AM

Insp ID: 210

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 1
On grade or sag pit:
Both sides of road:
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:50:18 AM

Insp ID: 211

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road:
Condition: 4 - Very Good
Blockage (%): 30
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:52:22 AM

Insp ID: 214

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 3
On grade or sag pit:
Both sides of road: Left
Condition: 4 - Very Good
Blockage (%): 0
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:52:22 AM

Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:54:02 AM

Insp ID: 215

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	SEP
Number of Bays:	1
On grade or sag pit:	On Grade
Both sides of road:	Left
Condition:	2 - Poor
Blockage (%):	90
Comment:	



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:06:10 AM

Insp ID: 218

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road: Left
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:07:20 AM

Insp ID: 219

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 4
On grade or sag pit:
Both sides of road: Right
Condition: 4 - Very Good
Blockage (%): 20
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:08:57 AM

Insp ID: 220

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	SEP
Number of Bays:	2
On grade or sag pit:	
Both sides of road:	Left
Condition:	3 - Good
Blockage (%):	0
Comment:	Some concrete damage



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:10:26 AM

Insp ID: 221

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	SEP
Number of Bays:	2
On grade or sag pit:	
Both sides of road:	Right
Condition:	4 - Very Good
Blockage (%):	40
Comment:	



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:15:00 AM

Insp ID: 224

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 2
On grade or sag pit:
Both sides of road:
Condition: 3 - Good
Blockage (%): 100
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:58:59 AM

Insp ID: 243

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 3
On grade or sag pit:
Both sides of road: Left
Condition: 4 - Very Good
Blockage (%): 10
Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:53:42 AM

Insp ID: 245

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure: SEP
Number of Bays: 3
On grade or sag pit:
Both sides of road: Right
Condition: 3 - Good
Blockage (%): 40
Comment:



Northern Territory Camps

Civil Infrastructure

Inspection Date 11/11/2016 9:56:48 AM

Insp ID: 189

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Inspection Type:	Shade Structure
Shade Structure Type:	Basket Ball Court
Shade Floor Type:	Concrete
Roof Type:	Not Covered
Width (mm):	18
Length (mm):	8
Appearance:	3
Appearance Comment:	
Condition:	3 - Good
Comment:	



Northern Territory Camps

Civil Infrastructure

Inspection Date 11/11/2016 9:56:48 AM



Northern Territory Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:12:37 AM

Insp ID: 241

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

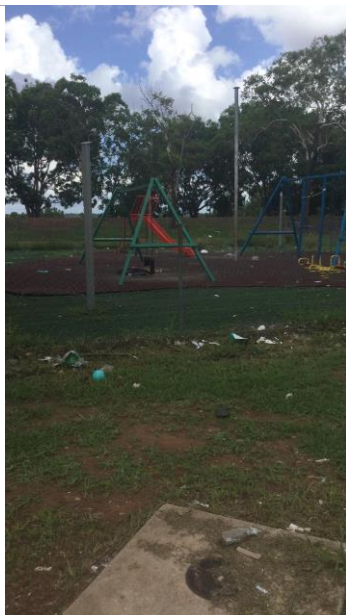
Inspection Type:	Shade Structure
Shade Structure Type:	Play ground
Shade Floor Type:	Rubber Mats
Roof Type:	Not Covered
Width (mm):	20
Length (mm):	20
Appearance:	2
Appearance Comment:	Rubbish, paint peeling
Condition:	2 - Poor
Comment:	



Northern Territory Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:12:37 AM



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:22:58 AM

Insp ID: 203

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

Stormwater Infrastructure:	Swales
Type of lining:	No Lining
Are dimensions uniform along drain:	Yes
Base Width (m):	0.7
Overall Width (m):	0.7
Swale Depth (m):	1
Length of Batter 1 (m):	0
Length of Batter 2 (m):	0
Swale Condition:	3 - Good
Swale Ponding:	No
Drain flooded at time of inspection:	No
Swale Comments:	Overgrown, fenced off



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:16:43 AM

Insp ID: 195

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 30

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment: No tap handle



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:18:35 AM

Insp ID: 196

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 30

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment: Broken tap



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:33:27 AM

Insp ID: 204

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 20

Tap Leakage: Yes

Tap Condition: 2 - Poor

Tap Comment: Good condition other than constant leaking



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:35:35 AM

Insp ID: 205

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 30

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment: No tap connected



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:43:45 AM

Insp ID: 208

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 20

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:58:02 AM

Insp ID: 217

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm):

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:23:34 AM

Insp ID: 227

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 30

Tap Leakage: No

Tap Condition: 1 - Very Poor

Tap Comment: No tap



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:41:39 AM

Insp ID: 237

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Taps

Diameter(mm): 20

Tap Leakage: No

Tap Condition: 3 - Good

Tap Comment:



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:04:04 AM

Insp ID: 190

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition: 3 - Good

Lot Water Meter Comment: Has a tap as well, tap doesn't work



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 10:05:05 AM

Insp ID: 191

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size: 20

Lot Water Meter Condition: 3 - Good

Lot Water Meter Comment: 4 lot water meters



Northern Territory Town Camps

Civil Infrastructure

Inspection Date 11/11/2016 11:38:38 AM

Insp ID: 228

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Water Asset Are you Capturing: Water Meter

Water Meter Type: Lot

Bulk Water Meter Size (mm):

Bulk Water Meter Condition:

Bulk Water Meter Comment:

Lot Number:

Lot Water Meter Size:

Lot Water Meter Condition: 3 - Good

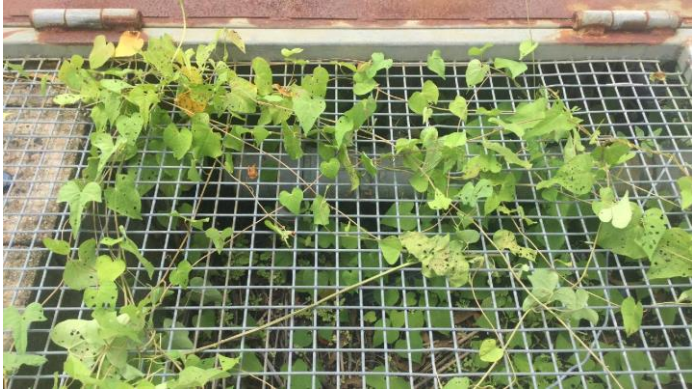
Lot Water Meter Comment:



Northern Territory Town Camps

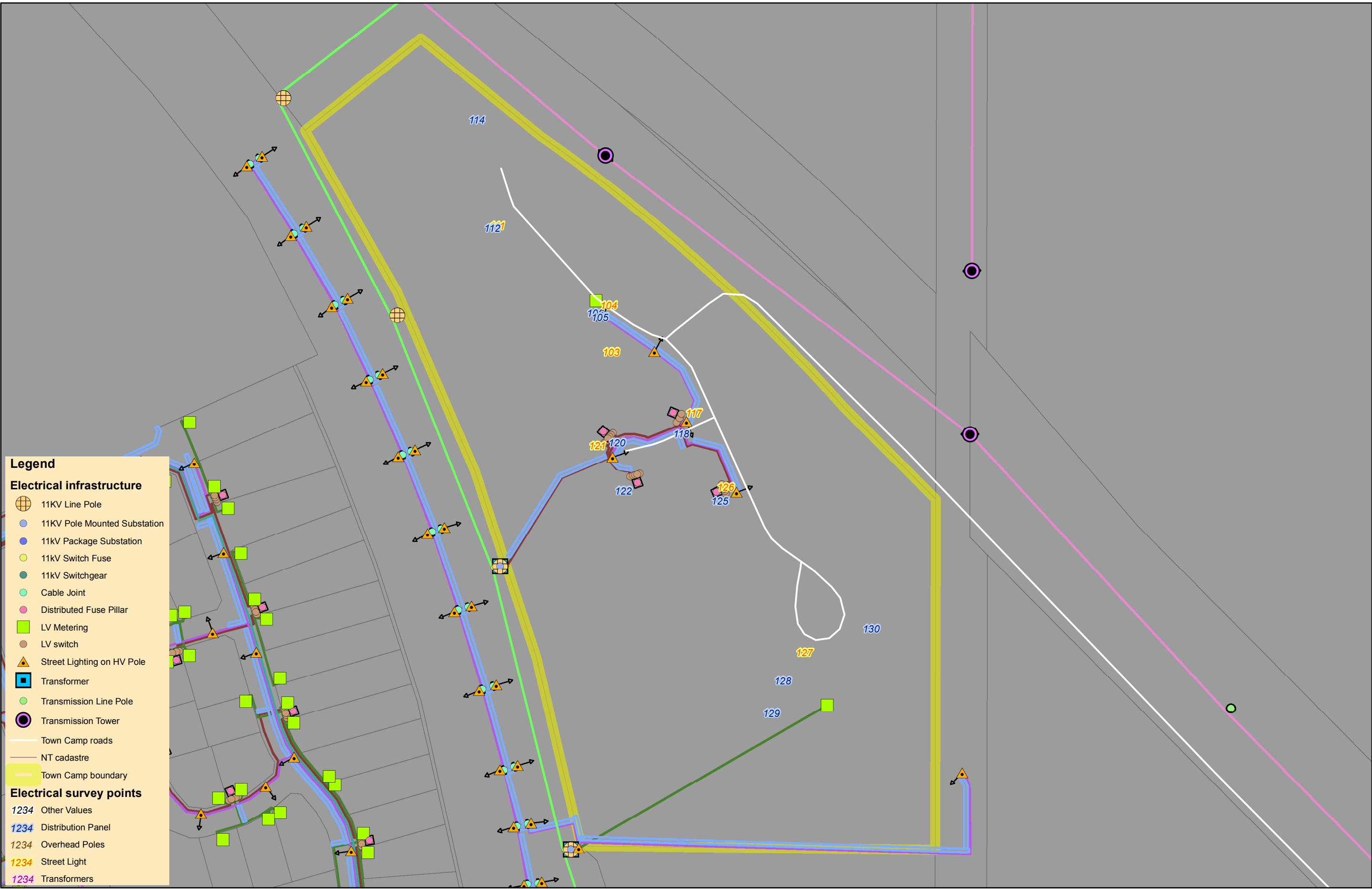
Civil Infrastructure

Inspection Date 11/11/2016 11:38:38 AM



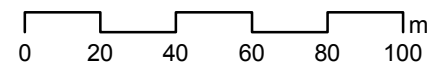
Electrical inspection report

P:\GIS\Projects\253963_NT_Town_Camps\253963_004_Elec_DDP_report.mxd 23/02/2017 12:22
Map by: DMCP



- Legend**
- Electrical infrastructure**
- 11KV Line Pole
 - 11KV Pole Mounted Substation
 - 11kV Package Substation
 - 11kV Switch Fuse
 - 11kV Switchgear
 - Cable Joint
 - Distributed Fuse Pillar
 - LV Metering
 - LV switch
 - Street Lighting on HV Pole
 - Transformer
 - Transmission Line Pole
 - Transmission Tower
 - Town Camp roads
 - NT cadastre
 - Town Camp boundary
- Electrical survey points**
- 1234 Other Values
 - 1234 Distribution Panel
 - 1234 Overhead Poles
 - 1234 Street Light
 - 1234 Transformers

A3 scale: 1:2,000



Date: 23/02/2017 Version: 3
Coordinate system: MGA94 Zone 52

NT Town Camp Infrastructure Assessments: Electrical
403 - Palmerston Indigenous Village (Palmerston)

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:35:30 AM

Insp ID: 102

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:47:25 AM

Insp ID: 105

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

Door needs repairs

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:51:41 AM

Insp ID: 106

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:51:41 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:53:19 AM

Insp ID: 107

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments: Cover cracked.



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:55:40 AM

Insp ID: 108

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:56:56 AM

Insp ID: 109

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:58:06 AM

Insp ID: 110

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:06:40 AM

Insp ID: 112 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

Needs cleaning around.

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:06:40 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:08:24 AM

Insp ID: 113

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:12:15 AM

Insp ID: 114

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

Control panel

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:17:33 AM

Insp ID: 115

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments: Two pits.



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:21:45 AM

Insp ID: 116

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:28:44 AM

Insp ID: 118

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

Yes

What is Distribution Panel main CB Rating:

Unknown- locked

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

Damage on body

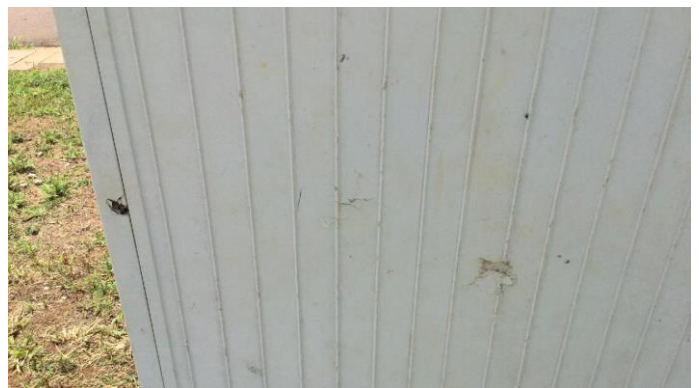
What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:30:52 AM

Insp ID: 119

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:45:32 AM

Insp ID: 120

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

Yes

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:45:32 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:55:00 AM

Insp ID: 122

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

Yes

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:55:00 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:56:25 AM

Insp ID: 124

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments: Needs cleaning around.



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:03:10 PM

Insp ID: 125 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

Yes

What is Distribution Panel main CB Rating:

Unknown -locked

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:20:33 PM

Insp ID: 128 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method: Outdoor

Is the distribution panel labelled: No

What is Distribution Panel main CB Rating: Unknown

What is the main incoming cable type/Size to Distribution Panel: Unknown

What is the condition of switchboard: 3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments: Unknown

Distribution Panels name plate access: No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:22:52 PM

Insp ID: 129 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

Yes

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:26:46 PM

Insp ID: 130

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Distribution Panel

What is Main Distribution Panel installation method:

Outdoor

Is the distribution panel labelled:

No

What is Distribution Panel main CB Rating:

Unknown

What is the main incoming cable type/Size to Distribution Panel:

Unknown

What is the condition of switchboard:

3

Condition Comments:

Needs cleaning

What is the condition of cables/glands into switchboard:

Cable/Gland Condition Comments:

Unknown

Distribution Panels name plate access:

No



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:28:43 PM

Insp ID: 131

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing: Distribution

What is distribution method to households: Underground

Is it Shared with PWC:

Is there Anti-climb barrier provided for this pole:

What is Pole construction type:

Is street light fitted:

Is there concrete collar around the base of pole:

What is the condition of tap off to house:

What is the condition of pole:

How many Lots are connected to this pole:

Is there access to Pits to take a photo: No

What is Pit Condition: 3

Underground Comments:



Northern Territory Town Camps

Communications Infrastructure

Inspection Date 11/11/2016 10:33:11 AM

Insp ID: 101

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Comms Category are you capturing:

General

Telstra Comms Drawing Available:

No

Facility upgrade not in drawings:

NA

Which telecoms carriers are present in the town camp:

Telstra

How many Communications Pit(s) are allocated in this town camp:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:33:11 AM

Insp ID: 3287

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond:

Meter Condition:

Meter Comment: Switchboard

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:03:27 AM

Insp ID: 3288

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Post Paid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Analogue Meter. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:36:19 AM

Insp ID: 3289

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

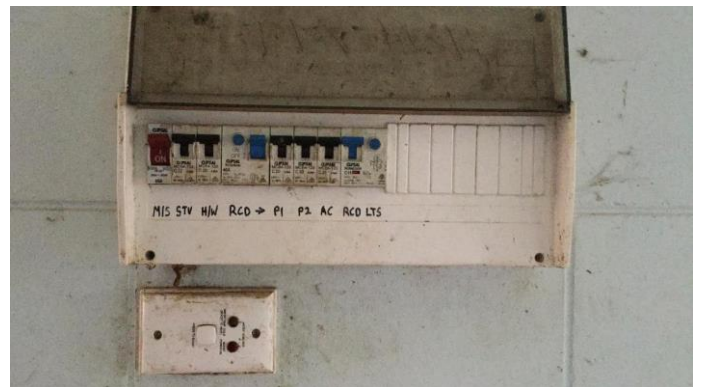
Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:48:30 AM

Insp ID: 3290

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond:

Meter Condition:

Meter Comment:

Comments:

Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:48:51 AM

Insp ID: 3291 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 3

Meter Condition: 3

Meter Comment: Indoor SB, Cond 2, Blank plates are missing on CB slot.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:55:41 AM

Insp ID: 3292

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond:

Meter Condition:

Meter Comment: Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:06:34 AM

Insp ID: 3297 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:49:36 AM

Insp ID: 3298

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond: 2

Meter Condition:

Meter Comment: Indoor SB, Cond 2, Blank plates are missing on CB slot.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:10:22 AM

Insp ID: 3299

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

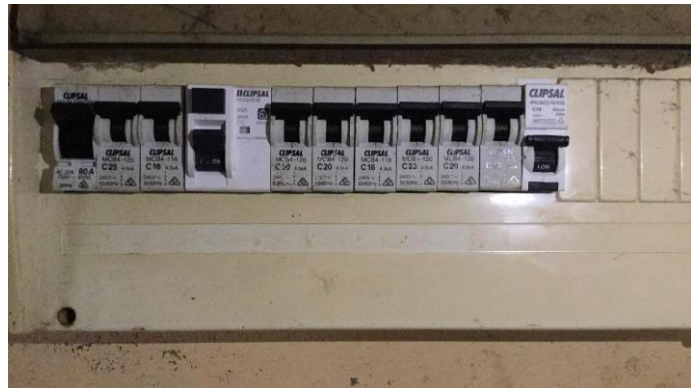
Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:06:03 AM

Insp ID: 3300

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 2

Meter Condition: 3

Meter Comment: Blank plates are missing on CB slot.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:29:28 AM

Insp ID: 3301

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond:

Meter Condition:

Meter Comment: Switchboard

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:35:46 AM

Insp ID: 3302

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Prepaid

Meter Switchboard Cond: 3

Meter Condition: 3

Meter Comment:

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:30:15 AM

Insp ID: 3303

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

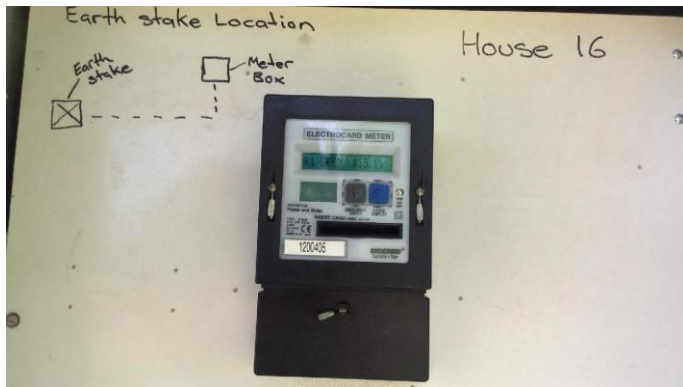
Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed.

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:41:35 AM

Insp ID: 3304 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Electrical Meters

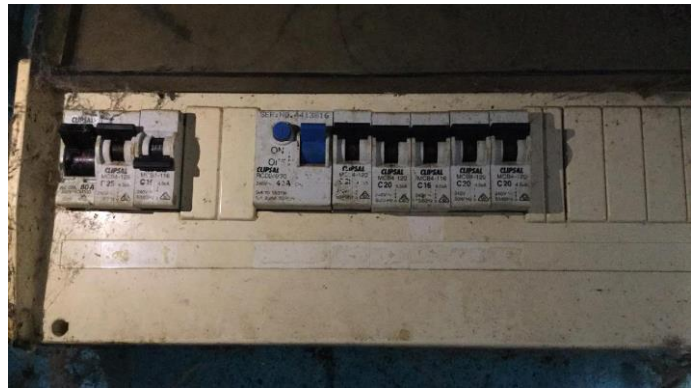
Meter Type: Prepaid

Meter Switchboard Cond:

Meter Condition: 3

Meter Comment: Condition of CB not assessed. Indoor SB, Cond 3

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:33:11 AM

Insp ID: 3305

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Electrical Meters

Meter Type: Electrical

Meter Switchboard Cond:

Meter Condition:

Meter Comment: Switchboard

Comments:



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:39:01 AM

Insp ID: 103

Group 1 - Darwin, Jabiru, Adelaide River

Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 02

What Wattage is the lamp:

80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 10:42:44 AM

Insp ID: 104 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 14

What Wattage is the lamp:

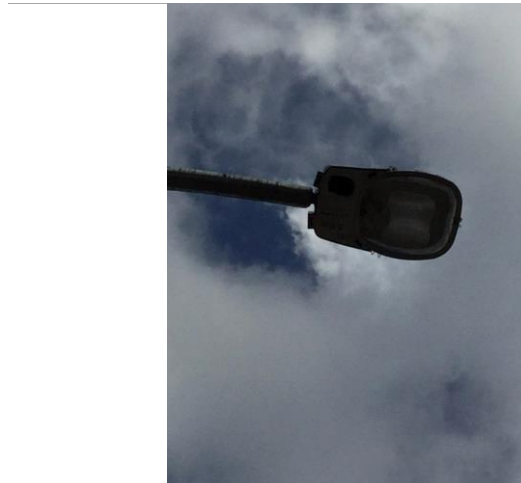
80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:02:44 AM

Insp ID: 111 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

Unknown

What Wattage is the lamp:

What is the condition of street lights:

1

What is Street Lighting pole installation height (approximate):

6



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:25:03 AM

Insp ID: 117 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 07

What Wattage is the lamp:

80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:25:03 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:50:15 AM

Insp ID: 121 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 07

What Wattage is the lamp:

80

What is the condition of street lights:

1

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 11:50:15 AM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:05:47 PM

Insp ID: 126 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 07

What Wattage is the lamp:

80

What is the condition of street lights:

3

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:05:47 PM



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:18:39 PM

Insp ID: 127 Group 1 - Darwin, Jabiru, Adelaide River Palmerston Town Camp

What Category are you capturing: Street Light

What is power supply method:

Underground

What is the lamp type:

M80D 04

What Wattage is the lamp:

80

What is the condition of street lights:

1

What is Street Lighting pole installation height (approximate):

7



Northern Territory Town Camps

Electrical Infrastructure

Inspection Date 11/11/2016 12:18:39 PM



Road map