

IPWEA
Local Government
Guidelines for
Subdivisional Development 2009

DRAFT

Shire of Broome Addendum (**Revision 1 – 16th October 2009**)

Introduction

The Shire of Broome has adopted this document and the IPWEA Local Government Guidelines for Subdivisional Development, Edition 2, 2009 as the basis for subdivisional engineering construction and acceptance.

This document highlights modifications to the IPWEA guidelines, where specific items have been identified to suit local conditions in Broome which differ from the main document. Specific modifications are highlighted in the following clauses as they relate to each module in the guidelines.

This document shall take precedence over the IPWEA guidelines in all subdivision approvals.

(1) Module No 1 – Legal Framework and Contract Administration

(1.17.4.1) Inspection for Roadwork's

Replace IPWEA clause with

An inspection with the contractor, consultant and the Shire will be required as a minimum for each of the following main stages of the construction of roadworks:

- *When the road has been boxed out and the subgrade shaped and compacted to a tightly bound homogeneous surface with no cracking or delamination.*
- *When the base-course has been placed, graded, compacted, water bound and trimmed to the correct shape, level, specifications and finish before sealing takes place. Surface levels to be audited by licensed surveyor with survey and compaction test results provided at the inspection by the Shire prior to seal application.*
- *Prior to placement of sprayed surface or asphalt wearing course;*
- *After sealing and before application of kerbing, especially inspection of all kerb keys on all curve radii.*
- *Prior to construction of any footpaths.*

(1.18) Practical Completion

Add to IPWEA clause

If requested, the contractor shall arrange for the full sweeping of all roads to remove silt, debris and surplus sealing aggregate prior to the final inspection.

(2) Module No 2 – Site Preparation Guidelines

(2.2.1.1) General

Replace IPWEA paragraphs 3 & 4 with

Where it is necessary to fill to the boundary of a subdivision, a suitable retaining wall shall be erected immediately inside the boundary of the subdivision. Alternatively if approved by the Shire of Broome the fill shall be carried beyond the boundary for a minimum distance of 1.0m and battered to a natural ground level at a slope no greater than 1:3. The written consent of the owner of the abutting land shall be obtained before proceeding with earthworks.

All retaining walls proposed for construction in a subdivision shall be designed and certified by a practising structural engineer in accordance with the Building Code of Australia, R Codes and as approved by the Shire of Broome to accept all potential structural loading including construction loads.

(2.2.1.2) Residential Areas

Replace IPWEA paragraphs 1 & 2 with

In all areas when subdivisional development is proposed and the Shire of Broome specifies re-contouring to take place, the gradient from back to front and across the lots boundary to boundary shall generally be from 0.5% to 1%. Any variations or exemptions to these gradients must be specifically agreed to and approved by the Shire of Broome.

(2.2.1.3) Industrial Areas

Replace IPWEA paragraphs 2 & 3 with

In all areas when subdivisional development is proposed and the Shire of Broome specifies re-contouring to take place, the gradient from back to front and across the lots boundary to boundary shall generally be from 0.5% to 1%. Any variations or exemptions to these gradients must be specifically agreed to and approved by the Shire of Broome.

(3) Module No 3 – Road Guidelines

(Table 3.4) Summary of Planning Criteria for Residential Roads

Add in Note 12 to be read in conjunction with Table 3.4

Note 12 Generally seal carriageway widths in residential areas in the Shire of Broome are 7.4m wide with a minimum of 6m allowed on some low trafficked streets. Variations to these seal widths

may be approved in some cases and these will be assessed and approved on a case by case basis with relation to the proposed road layout.

(3.3.2.1) General

Replace IPWEA paragraph 3 with

Generally longitudinal road design grades should be no less than 0.5% minimum. However grades down to 0.35% may be accepted in difficult circumstances.

(3.3.4) Verge and Property Grades

Replace IPWEA paragraph 1 with

Verge grading shall be 2% from the top of kerb to the property boundary, any lot level to verge level transitions to this grade must occur within the property itself and be graded up to surface at a maximum of 1:6.

(3.3.5) Kerbing

Replace IPWEA paragraph 2 with

The minimum kerb radius on all Broome urban intersections shall generally be 10m, smaller radii on lower speed and traffic volume roads may be approved on a case by case basis. The minimum kerb radius on all industrial intersections shall be 12m.

Replace IPWEA Table 3.6 with

Generally all kerbing for subdivisions in Broome shall be as follows:

Flush Kerbing

- *Adjacent to public open space, median islands and non-active areas to achieve Water Sensitive Urban Design outcomes.*
- *The edges of through carriageway abutting eyebrow treatments and to form an edge for brick paved thresholds etc.*
- *May be approved for minor access streets and laneways.*

Mountable Kerbing

- *Outer rings of roundabouts (note: needs to be fully trenched into the pavement 100mm deep)*
- *Other locations specifically approved by the Shire of Broome.*

Semi-Mountable

- *All kerbing associated with roads in both urban, rural and industrial subdivisions shall be semi mountable unless specifically nominated otherwise by the Shire of Broome.*

Barrier Kerbs

- *Integrator Arterial Roads in some circumstances.*
- *Outside kerbs on dual carriageways*
- *Roads abutting public open space.*

Full details of approved kerbing profiles for the Shire of Broome are as shown in attached Appendix A at the end of this document.

(3.3.8) Design Life of Pavements

Replace IPWEA paragraph 3 with

In both urban and rural situations all sealed roads are to be designed to provide a pavement design life of 40 years and the wearing course design life to be 15 years where it is a seal. Where dense graded asphalt is used as the wearing course a design life of 20 Years shall be used.

(3.3.9) Urban Base Course Profiles

Replace IPWEA clause with

Notwithstanding the design thickness obtained using the above guidelines, a generally accepted minimum pavement for urban subdivisional urban roads in the Shire of Broome is as follows:

Pavement construction to consist of the preparation of existing sub grade and a base course of approved road base mix a minimum of 150mm depth and shall be constructed to 600mm behind the face of kerb.

Sub Grade

Sub grade preparation shall be carried out in all areas where pavement is to be constructed and compacted to not less than 95% MDD, all allowances shall be made with the mixing and adjustment of moisture content of the naturally occurring Pindan material to achieve the compaction required and level tolerance (-30mm + 5mm) to design levels. The final finish shall be a tightly bound homogeneous surface with no cracking or delamination. If the in situ material is of such a nature, that finish and compaction density cannot be achieved, then new "clean pindan " material shall be installed and the in situ material removed from site. Alternatively the existing material be modified to obtain the required density and quality requirements.

- *Compaction testing (Min 95% MDD)*
- *Surface levels to be strung and inspected prior to basecourse application.*

Base Course

A 150mm layer of approved base course material (Crushed Rock) will need to be constructed and compacted to 98% MDD and meet a tolerance of (+10 –10mm) of design levels. Surface finish shall be sufficiently dried back, tightly bound, smooth and with minimal surface irregularities ready to accept the bitumen seal coats. All finished levels require to be audit-surveyed by a licensed surveyor at approximately 10m intervals prior to acceptance by the Shire of Broome and subsequent bitumen application.

- *Compaction testing (Min 98% MDD) and results provided at inspection by the Shire prior to seal application.*
- *Surface levels to be audited by licensed surveyor and results provided at inspection by the Shire prior to seal application.*

Bituminous Seal

(a) The seal for all roads shall consist of 3 layers of hot applied bitumen, with application rates proposed by the engineering consultant and approved by the Shire.

- *A 50/50 prime*
- *A first coat seal binder with an application of 14mm approved aggregate (10mm for carpark construction).*
- *A second coat seal binder with an application of 10mm approved aggregate (7mm for carpark construction).*

(b) Or a primer seal followed by an application of 25mm minimum Hot Mix Asphalt to specification.

Actual Seal and aggregate application rates achieved shall be supplied to the Shire prior to Practical Completion.

(3.3.12) Wearing Course

Replace IPWEA paragraph 1 with

Generally the wearing course on urban roads in the Shire of Broome is a 3 coat bituminous seal. An asphalt wearing course however is preferred if economically available and may be requested in any case on some intersections and roads of high importance such as Integrator arterials, neighbourhood connectors, coloured parking embayment's and through town centres.

(3.3.13) Traffic Management Urban Roads

Replace IPWEA paragraph 3 with

Intersections except those being treated with roundabouts shall be generally channelised as indicated in Table 3.7. Some specific locations and industrial areas may need to allow for semi-trailer or higher class heavy vehicle (triple road train) access and intersection channelisation as directed by the Shire of Broome.

(3.4) Material Specifications

Replace IPWEA clauses 3.4.1 to 3.4.8 with

As noted in the IPWEA clause 3.4 the specified guidelines refer to pavement materials generally unavailable within the Shire of Broome and consultants should use the following basecourse specifications in choosing materials for

subdivision construction. IPWEA Bitumen and asphalt specifications should be used as a general guide for selection of these materials in Broome. Any specific changes such as varied sealing aggregates or bitumen classes etc. will be provided to the consultants at design approval stage.

(A) Shire of Broome Gravel/Crushed Rock Blend Basecourse

Blended gravel crush rock mix shall consist of durable stone in a granular soil matrix. The gravel shall be free of lumps of clay, stumps, roots, organic matter or other deleterious material and conform to the following specifications. Basecourse material to have a minimum CBR value of 80.

Atterberg Limits

The portion passing 0.425mm sieve shall conform to the following requirements.

Property	Requirement	Test Method (MRWA)
Liquid Limit shall not exceed	25	WA 120.2
Plasticity Index shall not exceed	6	WA 122.1
Linear Shrinkage shall not exceed	3%	WA 123.1

Grading (Particle Size Distribution)

Test Method MRWA 115.1

Sieve Size	Percent by weight passing
37.5mm	100%
19mm	71 – 100%
9.5mm	50 – 81%
4.75mm	36 – 66%
2.36mm	25 – 53%
1.18mm	18 – 43%
0.425mm	11 – 32%
0.075mm	4 – 19%

Dust Ratio

The Dust Ratio, defined as the ratio of the percentage passing by weight the 0.075mm sieve to the percentage passing by weight the 0.425mm sieve, shall not exceed 0.67.

Other Limits

Property	Requirement	Test Method (MRWA)
Maximum Dry Density	2.0t/m ³ min	MRWA 324.1, MRWA 324.1
Dry Compressive Strength	1.7Mpa min	MRWA 140.1
Total Soluble Salts	0.2% Max. Limit	W.A. 910.1

(4) Module No 4 – Drainage Management Guidelines

(4.2.2) Standards/Guidelines

Add additional dot points to IPWEA clause

- *Shire of Broome Guidelines for Design and Construction of Stormwater Drainage Systems (Engineering Services September 2009)*
- *Shire of Broome Policy 7.8, Environmental Initiatives Stormwater Management.*

(4.3.2.4) Stormwater Drainage Design – General Principles

Replace IPWEA paragraph 11 & 12 with

The Consulting Engineer shall design the drainage network using recurrence intervals and overland flow requirements as specified in the Shire of Broome Guidelines for Design and Construction of Stormwater Drainage Systems (Engineering Services September 2009).

SHIRE OF BROOME

GUIDELINES FOR THE DESIGN OF STORMWATER DRAINAGE SYSTEMS

ENGINEERING SERVICES
SEPTEMBER 2009

Design:

General

Land owners/developers subdividing or developing land for residential, commercial or industrial developments are required to provide a stormwater drainage system. The subdivision of rural land may also require the provision of a similar system and in low-lying areas, filling or other drainage may be required.

The designer shall examine the total drainage catchment area, and ensure that any upstream drainage that may pass through the particular subdivision is included in the design, and that the drainage system for the subdivision is capable of carrying the ultimate design flow from the upstream catchment, in addition to the actual subdivision or development land.

Developers are responsible for negotiating their own cost sharing arrangements, if this involves parts of a catchment owned/occupied by others, unless this has been arranged by Council as part of an overall catchment drainage plan.

Developers whose land shares a common drainage catchment have a shared responsibility for ensuring that the whole of the catchment, including the major roads, are drained. Where development is to be staged, an overall drainage plan for the whole of the catchment is required before approval will be given to any individual stage.

In cases where stormwater is proposed to be discharged into private land downstream of a subdivision or development, arrangements shall be made by the developer with the owner of the downstream land to provide an easement over the route of the drain and to construct and/or improve the drainage outlet. As directed at time of subdivision or development, the easement shall be in favour of the Shire of Broome or a "private easement" shall be created over the affected lot.

All drainage systems shall be designed to include water sensitive design principles where possible and the use of innovative methods to reduce flows

by way of longitudinal drains with low flow weirs, compensating basins, slowing of flows, bunds, altered land use practises or the like. Permanent wet storage basins are not considered desirable due to safety and mosquito breeding problems. However, some form of controlled outlet compensating basins should be utilised for infiltration and silt removal purposes.

All open drainage systems shall have maintenance access requirements considered in the design. Vegetation of batters and swales is essential for a sustainable asset.

Drainage system design shall take into consideration the requirements of future maintenance activities including the provision for safe plant access for cleaning and silt removal. All systems shall be fully revegetated.

Water Sensitive Design Principles

Subdivision and Development design should ensure that:

- Road alignments follow contours wherever possible in order to reduce stormwater flow velocities.
- Roofs, pavements and other “hard” surfaces should discharge runoff to detention storages and “soft” surfaces such as garden beds, grassed, earth or gravel swales and similar landscaping features, prior to discharge from site. Infiltration to the natural ground in to be encouraged and used wherever possible.
- Where overland flood paths are defined through allotments, loss of amenity is minimised and at least 0.3m freeboard is provided between the major design event flood level and the finished floor level (FFL) of buildings on site.
- Proposed development Finished Floor Levels (FFL) are designed at least 0.5m above the crown of the adjacent road to which site floodwaters will discharge.
- Building envelopes are located so as to provide opportunity for effective onsite detention of stormwater, to minimise peak flows and to improve the quality of water discharged from the site.
- Visible stormwater management works are constructed of materials, which harmonise with the planned character of the area.
- Detailed consideration is given to the nature, location, effectiveness and staging of on site stormwater management system.

Design Parameters Subdivisions

The drainage system and all associated structures including compensating basins, are to be designed to collect and convey an Average Recurrence

Interval (ARI) storm event of one in 50 year storm event occurrence). Provision shall also be made for flows associated with a major 100-year ARI storm such that the floor level of all buildings shall be a minimum of 300mm above the ARI 100-year flood level and be retained within the road reserve. Flows from subdivisional areas shall be compensated to predevelopment levels.

All designs to generally in accordance the “Australian Rainfall & Runoff - 1995.”

Coefficient of runoff can be taken as 90% for road reserves, with 70% for residential sites, 40% for vegetation/bush and 90% for mixed/commercial use. A coefficient of runoff of 90% shall be used for commercial and industrial sites.

Surface roughness coefficient (n) to be generally:

- Asphalt roads $n = 0.014$
- Bare earth channels and verges $n = 0.030$
- Natural bush/vegetation/sports grounds $n = 0.0100$
- Concrete culverts $n = 0.014$
- Concrete drop structures $n = 0.014$
- Stone pitch drop structures $n = 0.020$

General subdivisional roads are to be designed as depressed road drains capable of accommodating a 1:10 year storm event between kerbs. If this is not possible underground drainage should be installed to take the excess flow. Absolute minimum longitudinal grade to be 0.35%. Where it can be obtained, a 0.5% minimum grade is preferred. A maximum water depth of 175mm at the pavement edges is to be designed for, with all flows in excess of this to be transferred to open drains or pipes as applicable. Where rear lot drainage infrastructure is included in the subdivision, these must also be capable of accommodating a 1:10 year storm event.

In areas of high pedestrian activity such as neighbourhood or town centres, a higher level of drainage service will be required, extra underground drainage may be required to lower the level of flooding in the roads.

The rainfall intensity for a calculated time of concentration and recurrence interval shall be determined using Bureau of Meteorology rainfall Intensity, Frequency, Duration (IFD) charts for Broome.

Local dry basins (compensating) should attenuate design flows with base outflow to prevent long-term water retention. Compensating basins to be generally designed to retain a maximum water depth of 1.2 metres, batter slopes to be maximum of 1:6 to allow for safe egress.

Piped drainage systems

Where necessary, piped stormwater drainage shall be installed incorporating grated combination side entry pits. Pipes shall not run directly under the kerb.

Combination side entry pits shall be placed at low points, the upstream side of intersections if the flow warrants it and at intermediate positions to limit flow widths.

Manholes shall be constructed at all pipe junctions and where the pipe changes direction or grade. The maximum distance between manholes shall be 90m and the location shall not unduly restrict the future access to residential lots.

Manhole covers shall be of an approved kind, but generally, to be purpose built heavy duty trafficable reinforced concrete surrounds a minimum of 150mm thick. If located in a carriageway, it shall be fitted with a cast iron frame and lid. They will be equipped with a square or circular access point with tapered inserts and approved lifting points installed.

All piped drainage lines shall be designed in accordance with the recommendations of the pipe manufacturer and the appropriate Australian Standards. The minimum pipe diameter shall be 300mm and Class 2 concrete external rubber band joint are the minimum standard to be used in the road reserves. Pipe Class and cover must take into account all loads from construction traffic.

Drainage lines within road reserves shall generally be laid on a alignment in accordance with the Utility Providers Code of Practise for Western Australia.

The minimum velocity in pipes shall be 1.0m/sec and maximum velocity 6.0m/sec.

Where a piped drain interfaces with an open drain, a suitable headwall structure with rock or concrete scour protection shall be provided to prevent entry of loose material into the pipe and the erosion of surrounding ground.

Headwalls located on outlet pipes shall include suitable erosion protection in the form of aprons and edge beams and rock pitching.

Formal POS / Drainage Areas

When incorporating approved drainage flow paths through formal POS areas, developers shall investigate concepts of locating swales and their concrete inverts to one side so as to achieve the maximum amount of usable play space.

Inverts should be constructed with concrete slab only or in larger areas grass invert only with no associated kerbing. Kerbing areas not only divide the play space but create an unacceptable safety risk.

Batter slopes should be as flat as possible with no batters steeper than 1:10.

Open drains

In general open drains should be:

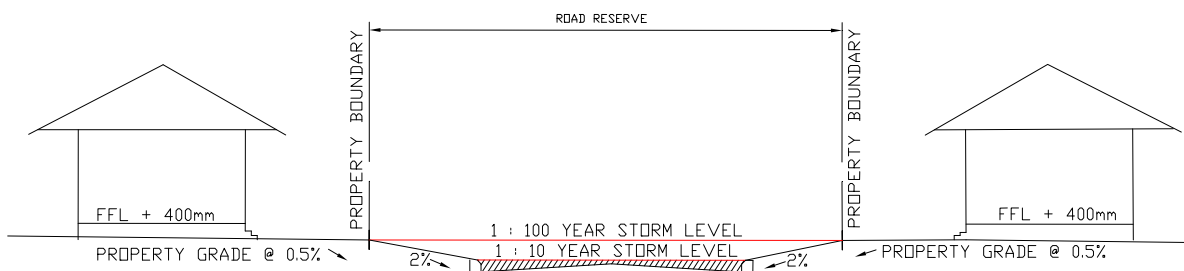
- Designed to imitate natural systems.
- Be meandering and curvilinear in design
- Be designed as a series of natural landscape features utilising natural materials where possible.
- Be designed as a series of smaller interconnecting compensation basins with low flow outlets installed between each.
- Batter slopes to be ideally no steeper than 1:6 , with 3m wide floors and grades of drains generally to be no steeper than 1:700. Grades may be adjusted by drop structures along the length of the drain if required.
- Maintenance of drains to be carried out by slashing and silt removal at nominate drop out locations with access for plant provided.
- All batter slopes to be fully mulched and revegetated with natural endemic species to prevent erosion
- Mortared stone pitching shall be provided at all structures, junctions and bends. No structures are to be used that hold or trap water in them to reduce the risk of mosquito breeding and children playing in them.

Stormwater Basins in Subdivisions

Retardation or compensating basins shall be provided at suitable locations to reduce peak flow rates to the downstream facilities to predevelopment flows and to provide silt traps prior to the outlet. All basins shall be designed for the 1:50 storm event.

All drainage basins shall be designed to blend in and be a feature in the landscape, be designed to be curvilinear or irregular shaped with silt traps provided to main flow outlets with access for future cleaning. All batter slopes to be ideally 1:6, the basin sides and floor should be fully vegetated with endemic species and have mechanisms incorporated to help with nutrient stripping and weed seed removal. “

Replace IPWEA Figure 4.4 Stormwater Infrastructure Requirements As A Function Of Road Hierarchy with the following Diagram.



TYPICAL BROOME STORMWATER CROSS-SECTION DETAIL
FOR SUBDIVISIONAL CONSTRUCTION
(N.T.S)

(4.3.3.1) Drainage Systems

Replace IPWEA paragraph 1 with

All piped drainage lines shall be designed in accordance with the recommendations of the pipe manufacturers and the appropriate Australian Standards. The minimum pipe Diameter shall be 300mm and pipes shall be a minimum of Class 2 concrete used in the road reserve or other Local Government areas. Pipe Class to be calculated based on expected construction plant loadings.

Replace IPWEA paragraph 5 with

Approved drainage infrastructure located within property allotments as either rear or side drains shall be generally laid centrally in easements in favour of the adjacent upstream landholders. Easement widths shall be approved by the Shire of Broome and will generally be a minimum of 3m.

(4.3.3.2) Grated Gullies and Side Entry Pits

Replace IPWEA paragraph 1 with

It is the Shire of Broome preference that combination type grated gully side entry pits are used in all subdivisions .

Delete IPWEA paragraphs 6,7& 8.

Replace all drainage typical details with those shown in Appendix A:

(5) Module No 5 – Streetscape Guidelines

(5.3.1) Pedestrian and Bicycle Facilities

In addition to IPWEA section Developer to note the following:

Where this section refers to footpaths / shared paths, as a minimum the Shire of Broome requires “all” paths to be ” 2.0m wide in situ concrete. The exception to this would occur on neighbourhood connectors and other major traffic routes where a shared path on one side of the road is 2.5m, the path on the opposite side may be reduced to 1.5m .Final path widths shall generally conform with Liveable Neighbourhoods and Austroads Guide to Traffic Engineering Practice Part 14..

The developer is to only construct paths and pram ramps on curves, roundabouts etc. from TP to TP and sections along POS areas that will not be subject to house construction traffic. The full actual installation cost (current Broome industry standard) by the Shire (plus 20% plus GST) and future reticulation reinstatement cost of the remaining paths will then need to be paid (non refundable) to the Shire of Broome prior to clearance. These paths will then be constructed in the future at completion of the majority of houses in the subdivision by the Shire, using the funds paid by the developer.

The installation of standard side entry pits basically reduces the width of 2m paths at the pit location, please ensure all paths are widened appropriately at these locations to ensure 2m width is maintained (note this is not shown on the design drawings).

In nominated locations paths that cross drainage chutes may be required to be provided with steel bridged sections approved by the Shire of Broome, not pram ramps down into and out of the chutes.

(5.3.8) Streetscape Maintenance Bond

Replace IPWEA paragraph 1 with

Where the developer arranges for landscaping to take place it shall be supported by a maintenance and irrigation period of at least 2 years after practical completion to ensure that the vegetation is properly established. This condition shall be guaranteed by way of a bond in the form of cash or a guarantee from a financial institution acceptable to the local authority. This bond will be returned when the maintenance period has been satisfactorily completed. The amount of the bond is detailed in Module 1, section 1.20: Bonding Outstanding Works.

(6) Module No 6 – Public Open Space Guidelines

Throughout this module where it refers to “maintenance for two summers” this shall mean maintenance for a minimum of 2 years from practical completion.

(6.2.2) Standards

Add additional dot point to IPWEA clause

- *Shire of Broome Guidelines and Specification for Reticulation Systems and Associated Works in Public Open Spaces (Engineering Services – September 2009)*

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SHIRE OF BROOME
GUIDELINES AND
SPECIFICATION FOR RETICULATION SYSTEMS AND ASSOCIATED
WORKS IN PUBLIC OPEN SPACE AREAS
ENGINEERING SERVICES
SEPTEMBER 2009

The following specification is to be used by all developers and other parties who are installing irrigation and associated works in public open space areas as part of their developments or subdivisions.

1. Water Corporation Connection

Developer to arrange and install Water Corporation water supply with approved backflow preventer TYCO brand and isolation valves. As a general rule a minimum 50mm supply and meter is required (# II 18173 160l/min) and all enclosed in a suitable below ground valve box. The developer will need to provide a water supply that can facilitate a watering schedule for all lawn areas contained in the POS, within a maximum 4 hour duration.

2. Main Feed Line

If tanks are required as part of the project main feed line to irrigation tanks shall be PVC / CL 9 all solvent weld jointed to Australian Standards, size is generally 40 or 80mm depending on hydraulic requirements. An 858 Emflow Master Valve to be placed on main feed line between water meter and tanks. This master fill valve will be controlled via the float switch in the tank and via MAXICOM central control controller and programming. A hydraulic valve shall be fitted on the infill side of the tank (if tanks are required) for overflow protection on the rising fill line.

3. Tank and Pump & Control Units

Should the watering schedule of approx. 4 hours for lawn areas not be able to be met from the inlet flow, then installation is to be provided with appropriate number of 32,000 litre Beige “Team Poly” tanks (minimum capacity), tanks to be connected and setup as per existing Shire of Broome POS layouts.

Proposed poly tank is to be provided with a reinforced concrete base slab 100mm thick with a 200mm deep x 300mm wide thickening around the full perimeter. It shall be 400mm diameter larger than tank with F62 mesh throughout.

Pump station is to be 1 x Grundfos Hydro Solo E, pump sized to suit installation
Pump and associated filter, valves and anti syphon loop to be all heavy duty galvanised fittings. Note – all in ground pipe work associated with the tank pump connections to be PVC Class 18 UV protected , manual Y filter to have a 80 mesh/200 micron screen.
Controller (Maxicom compatible) shall be “Rainbird” ESP SITE 12 Station Controller with 1 x Maxon GSM Modem with cables, antenna and Power Pack for GSM modem. Also the controller will be fitted with an RCT radio receiver card and antenna kit. Allow for setting up and programming the site onto the Shires Maxicom central control system located at the shire

depot so that all irrigation/faults etc can be logged, and the site operates off the weather station E.T.

An Aluminium Power/Irrigation cabinet shall be provided that is large enough to accommodate all controls including irrigation controller, CCunit, GSM Modem and other associated switchboard etc. The cabinet shall be provided with (2) welded Hasp and staple type locks top and bottom suitable to accommodate the standard Shire padlocks and shall be located near to the tank and pumpsite. A new mini pillar will also be required near the site to supply power to the irrigation controller/pump cubicle. The controller is to be fitted with a 240-volt plug and supplied by (2) double GPO with surge arrestor fitted. A two metre earth stake is to be installed outside the cabinet inside a separate concrete box with galvanised lid and "cadbond" connection to the cabinet main earth cable/bus bar. Resistance to earth shall be less than two ohms. The cabinet electrics is to have RCD protection, fan and heat resistant special white paint.

Full area of pump compound is to be supplied with a compacted shire spec roadbase hardstand and shall be 2m wider than the tank and pumps and incorporate two vehicle parking and turnaround.

The pump and associated electrical equipment cabinet is to be supplied with a structurally certified and cyclone rated pump house similar to existing installations at POS are in Januburu Stage 4. Minimum dimensions are to be 2.5m x 2.5m with a minimum roof height of 2.2m. Please note these dimensions are a minimum and final measurements must allow for maintenance work to be carried out. Pumphouse floor shall be 100mm thick with 200mm deep x 300mm wide thickening along all edges, final design shall be cyclone rated to category C.

4. Ring Main-SWJ

All feed lines from pump shall be PVC / CL 9 and sized to suit the hydraulic design. They shall all be solvent weld jointed to Australian Standards and to be formed into a continuous ring main with flushing points. All joints are to be primed with red pipe primer for inspection purposes.

5. Irrigation Components

The following irrigation components will generally be used:

- 40mm or 25mm "Rainbird Scrubber" solenoid valves with PRS including "Philmac" isolation poly ball valve in 1419 valve boxes. All valve boxes are to be bricked out with no load bearing surfaces on the main line. All valve box lids are to be installed at level with final turf grade. All solenoid valve wiring shall be laid in conduit and be continuous from the irrigation controller to the respective solenoid valve, without any joins in between. They shall be a minimum of 1.5mm², common to be 2.5mm². All wiring joins to be done with 3MDBY wire joiners ONLY.
- "Hunter Ultra" 120 full circle sprinkler to suit
- "Hunter Ultra" 120 part circle sprinkler to suit
- "Hunter Ultra" PGP's to suit
- All lateral lines shall be class 9 PVC solvent weld jointed to Australian Standards and primed as required.
- Isolation butterfly valves and or air release valves shall be provided in 1419 valve boxes and bricked out as required. All lids to be level with finished turf grade.

- All irrigation components in garden beds shall be fed by low-density 25mm poly pipe with "Netafim" 8 l/hr pressure compensating drippers with three drippers per tree and one per shrub. (No sprinklers to be located in garden beds). The three tree drippers shall be installed in a 19mm poly pipe ring offset from the tree base.

Please also note that all 25mm Rain Bird Scrubber solenoid valves with PRS to garden beds shall be fed off the main tank 80/9 PVC feed line prior to the tank fill.

Where sprinklers run parallel to the road kerbing all PVC sprinkler feed pipe work and fittings are to be setback off the road kerb a minimum of 400mm. A separate piece of PVC pipe will then connect to the sprinkler articulated riser so that no damage occurs to any feed pipes when run over, etc. All sprinklers are to be installed on articulated risers and set level with the finished grade.

6. As Constructed Drawing.

An as constructed accurate GPS irrigation CAD drawing is required on hand over to the Shire along with a CAD copy to be recorded on a CD disk for future reference. "

Shire of Broome Addendum (Revision 1 – 21st September 2009)

APPENDIX A – STANDARD DRAWINGS