Town of
Port Hedland

PORT HEDLAND LANDSCAPE GUIDELINES

Prepared for the Town of Port Hedland 29th October 2020

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1 Introduction

These Guidelines have been produced by the Town of Port Hedland, herein referred to as the Town, to provide direction for the design, construction and maintenance of landscape infrastructure in Port Hedland and South Hedland. As development in Hedland continues to evolve it is important that a robust set of guidelines specifies a clear framework to be utilised by internal Council practises as well as designers, developers and residents responsible for creating and maintaining landscapes within the public and private domain.
For the purposes of these Guidelines public open space, herein referred to as POS, and includes parks and civic spaces and urban landscape areas including verges, medians, road reserves, drainage reserves, public access ways and streetscapes. These Guidelines will cover the following subjects in regard to development of landscape infrastructure:

- Development Process and Requirements
- Preparatory Site Works
- Hard Elements
- Soft Elements
- Irrigation
- Maintenance and Handover

This document comprises two sections:

1. **Section A** specifies Landscape Guidelines for residential, commercial and industrial verges where maintenance is the responsibility of the owner or tenant.
2. **Section B** specifies Landscape Guidelines for POS developments and urban landscape areas on land ultimately managed by the Town.

Supporting Appendices for this document include:

1. Town of Port Hedland Verge Treatment Application Form
2. Standard Detail Drawings
3. Preapproved Items
4. Town of Port Hedland Preferred Planting Guide
5. Town of Port Hedland Asset Handover and Checklist

2 Policies and Strategies

The following list identifies the Town Strategies and Plans that most affect the development of POS within the Town and should be referred to in conjunction with these Guidelines:

- 202008 *Town of Port Hedland Policy Manual*
- *Town Planning Scheme No.5 (TPS5) and Amendments*, including the *South Hedland Town Centre Development Plan (SHTCDP)* which is incorporated into TPS5 pursuant to Clause 5.2.1(a)
- *Town of Port Hedland Disability Access and Inclusion Plan*
- *Town of Port Hedland Local Laws*
- *Town of Port Hedland Irrigation System Specification 2014*
- *Town of Port Hedland Public Open Space Strategy*
- *Town of Port Hedland Preferred Planting Guide*
- *Town of Port Hedland Design Guidelines for Specific Precincts (e.g., Kingsford-Smith Business Park and South Hedland Town Centre)*

In addition to the relevant Statutory Guidelines, Council Policies and Plans, the Guidelines reference a range of existing supporting information including:

- Building Code of Australia (BCA), 2010. https://services.abcb.gov.au/abcbshop/index.aspx
- Liveable Neighbourhoods http://www.planning.wa.gov.au/publications/919.asp
- CPTED Design Guidelines http://www.planning.wa.gov.au/dop_pub_pdf/docguidelines.pdf
- Public Parkland Planning and Design Guide https://www.dsr.wa.gov.au/about/plan-for-the-future/public-parkland-planning-and-design-guide-(wa)
- Utility Providers Code of Practise for Western Australia https://www.mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/RoadsideItems/GuidelinesforRoadsideServices/Pages/Utility_Providers_Code_of_Practice_for_Western_Australia.aspx
- Classification Framework for Public Open Space (Department of Sport and Recreation, 2012) http://www.dsr.wa.gov.au/docs/default-source/file-support-and-advice/file-facilitiy-management/framework-for-open-space-online-version.pdf?sfvrsn=4
- DoW Water Sensitive Urban Design https://www.water.wa.gov.au/__data/assets/pdf_file/0018/1809/99294.pdf
- Water Corporation Guidelines https://www.watercorporation.com.au/save-water

3 Scope of Guidelines

These Guidelines are intended for use for the following:

- Communicate expectations and uniform standards for the design, construction and maintenance of landscape infrastructure within the Town to be utilised by internal the Town staff, design consultants, developers, statutory bodies /authorities, community groups and residents.
- Will be referred to by the Town for the application and approval process to develop or redevelop verges by residents or developers.
- Will lay the foundations for the preparation of a greening strategy for the Town and facilitate participation in the 202020 Vision plan.

4 Objective of Guidelines

These Guidelines provide standards and requirements for the implementation of landscape infrastructure with the key objectives to:

- Provide a framework for consistency and clarity within the Town approval process.
- Promote sustainable practices that encourage the preservation of local vegetation and landscape features.
- Encourage and support the development of aesthetically pleasing and sustainable landscape infrastructure that enhances the unique elements of the Town whilst maintaining a level of consistency.
- Provide safe and functional POS for the needs of the community.
- Encourage the use of plant species that will endure the Pilbara environment whilst providing an element of shade and sustenance.
- Ensure the development of infrastructure that regards future maintenance and access requirements.
- Encourage a landscaping form which is economical in its water and maintenance requirements.
- Provide a means for minimising soil erosion.
- Establish a safe landscaping environment by applying Crime Prevention Through Environmental (CPTED) principles.
- Ensure equitable access and inclusion for people with disabilities by applying principles included in the Town's Disability Access and Inclusion Plan (DAIP).
- Encourage the use of local materials that will withstand the Pilbara environment and contribute to sense of place.

5 Design Principles

The following set of design principles underpins the content of these Guidelines:

5.1 Planning Parameters

The provision of the type and character of POS is dependent upon the consideration of current and future needs of the community, local issues, economic climate and environmental parameters. New developments and Capital Works Renewals will be individually assessed by an accessibility consultant.

The development of new subdivisions may entail a cash in lieu component for POS development. Refer to Town of Port Hedland Public Open Space Strategy.

5.2 Sustainability

Sustainable methodologies and best practise are to underpin all aspects of the design, implementation and management of POS. This includes climate, soil and water responsive design considerations that address the specific nature of the Pilbara environment. As well as this the Town is committed to preserving existing significant trees and remnant vegetation.

5.3 Financial Responsibility

The Town must be accountable for the expenditure of public funds and assets and it is essential that the provision of POS is substantiated in terms of the efficient use of resources. These Guidelines outline a responsible approach to the cost of provision and ongoing maintenance of landscape infrastructure.

5.4 Local Character

POS within the Town should reflect a sense of the unique local character of the Pilbara. Use of local plants, materials and finishes that speak of the place and can withstand the harsh environmental conditions and the use of local resources should be a factor in implementation of landscape infrastructure.

5.5 Community Safety

Priority of the Town is the provision of POS that the community can enjoy safely. Principles of Crime Prevention Through Environmental Design (CPTED) should be incorporated into POS design and implementation to assist in reducing crime and improve feelings of safety.

5.6 Access and Equity

The Town is committed to ensuring that the community is an accessible one for people with disabilities, their families and carers. Along with 8/003 Access and Inclusion Policy and the Town's Disability and Inclusion Plan these Guidelines will address particular issues in regard to POS standards to address access for all.

5.7 Cultural Heritage

Hedland has a rich multi-cultural heritage and there is an opportunity for landscape infrastructure to interpret and celebrate this heritage through design responses from plant species and material selection to public art installation.

5.8 Civic Pride

A sense of civic pride and community ownership is to be encouraged via various collaboration initiatives in the design, development and maintenance of POS. By encouraging local ownership through various initiatives, incidence of vandalism can be reduced and more socially sustainable spaces created.

5.9 Longevity

POS design and Implementation must address and account for the cost and requirements of ongoing maintenance to ensure the delivery of a long term viable asset for the Hedland community. This includes the appropriateness of materials and products that should be proven performers in the Pilbara.

SECTION A – LANDSCAPE GUIDELINES FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL VERGES

6 Introduction

The objective of this section of the Guidelines is to ensure that verges are considered a landscape asset to the town and they are designed and maintained to a high level. Verge areas are to be developed to a safe and sustainable standard with the aim of minimising ongoing maintenance. This section outlines permissible verge treatments and standards.

The following definitions pertain to this section:

Road Reserve	The portion of land between the front property boundaries that contains both verges and the road carriageway.
Verge	The section of the road reserve between the property boundary and the road kerb line.
Verge Treatment	Any soft or hard landscaping installed within the area of the verge excluding street trees.
Street Tree	A tree installed within the road reserve.
Crossover	The portion of a driveway within the verge providing access from the road to the property boundary.

7 Application Process for Verge Treatment

Developers and property owners must submit an application to the Town for approval of landscaping treatments prior to commencing any work. Applications may be submitted to the Town via one of the following processes:

1. Submission of a Verge Treatment Application Form. **Refer Appendix 1**
2. Submission of landscaping designs in accordance with a Development Application process

All applications must include a plan showing the layout and location of landscaping, irrigation and information on plant species.

Applications will be assessed in accordance with this Policy, relevant Local Laws and supporting documentation. Applicants will be advised of any known work scheduled by the Town that may impact on their application.

Applicants must not commence any landscaping works until approval is granted in writing by the Town.

The Town offers a design service to assist applicants with their submission. Fees are applicable and quoted for each project.

8 General Conditions

General conditions for the installation of verge treatments are as follows:

- In terms of verge treatments, the property owner agrees to maintain the area free from hazards. Failure to comply may result in removal of the hazard and/or treatment by the Town at the owner's expense.
- In terms of verge treatments, the property owner agrees to indemnify the Town against all claims which may arise as a result of the treatment.
- The Town reserves the right to remove any verge treatment for the purpose of carrying out works. Reinstatement of approved verge treatments shall be carried out by the Town in consultation with the property owner.
- The owner accepts responsibility for removal and reinstatement of landscaping if required by public utility providers.
- No assistance shall be provided by the Town for development, ongoing operation, or maintenance costs, unless specified otherwise during the approval process.
- The property owner shall be responsible for repairs to any damaged infrastructure occurring during the installation of landscaping.

9 Irrigation

All applicable verge treatments must be irrigated through a connection to the property owners' water supply. The following points should be considered when irrigating within the verge:

- Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.
- The Town Irrigation Specification is available as a reference document for irrigation details.
- Design and operation must comply with Water Corporation guidelines and legislation and water restrictions current at the time of development.
- Irrigation design should apply principles to ensure sustainable use of water.
- Irrigation design and operation must not impact on road pavements, footpaths or other infrastructure on the verge.

Refer the *Town of Port Hedland Irrigation Specification* for information on Irrigation standards and construction.

10 Hardscape Elements

For the purposes of these Guidelines, Hardscape elements within the verge refer to all:

- Hardstand
- Structures
- Compacted surfaces

10.1 Hardstand

The Town permits a part of the verge to be sealed with brick paving, concrete or asphalt to form a hardstand. The maximum area to be treated by sealing is 3.0 metres wide, measured from the back of

the kerb and running parallel to the kerb in the verge abutting the property, or alternatively an area of equal size.
The hardstand area shall not compromise pedestrian access.

Refer to the relevant Local Laws and Engineering Guidelines for further information.

Refer Appendix 2 – STD Drawing Details 01, 02, 03, 08 & 09

10.2 Structures

For the purposes of these Guidelines, structures refer to vertical elements such as walls, letter boxes and seats, steps and crossovers in verges.

All structures are to conform to BCA Guidelines and Town approval.

10.2.1 Walls, Letterboxes and Other Structures

Walls, letter boxes, seats and other structures are to be installed within the boundary of the private property and are not permissible on the Town owned verges.

10.2.2 Steps

Location and design of steps will be individually assessed by the Town at the time of application.

10.2.3 Crossovers

Refer to the Town Policy 9/005 Vehicle Crossovers for information on the construction of crossovers.

10.3 Compacted Surfaces

Compacted material is an acceptable treatment on verges adjoining residential properties provided that the material is well graded, cement stabilised, water bound and compacted to a smooth finish. The depth of such material must be an absolute minimum of 100mm.

Gravel shall be fines with a maximum aggregate size of 7mm to 14mm maximum. Permissible materials by the Town include white quartz or blue metal cracker dust and red scoria.

Refer Appendix 2 – STD Drawing Details 04 & 05

Refer Appendix 3 – Preapproved Items 01 & 02

11 Softscape Elements

For the purposes of these Guidelines, Softscape Elements refer to all:

- Verge planting areas and lawn areas
- Mulch areas

11.1 General Conditions for Planting in Verges

Planting permitted within the verge subject to the following:

- Planting shall be kept clear of the footpath to a distance of 1.2m, and shall not pose a hazard or impede on sight lines for vehicles
- An area behind the kerb shall remain clear of gardens and soft landscaping (excluding lawn) to ensure safe pedestrian access where no pathway exists. Due to inconsistent verge widths the size of this area needs to be inspected and approved by a Town Officer prior to planting.

- Planting shall apply CPTED design principles.
- Plant species shall comply with the Town's *Preferred Planting Guide*. **Refer Appendix 4.**
- The garden must be irrigated through a connection to the property owners' water supply.
- The Town encourages the planting of local species to enhance local character, however water wise exotic species that require minimum maintenance shall be permitted.

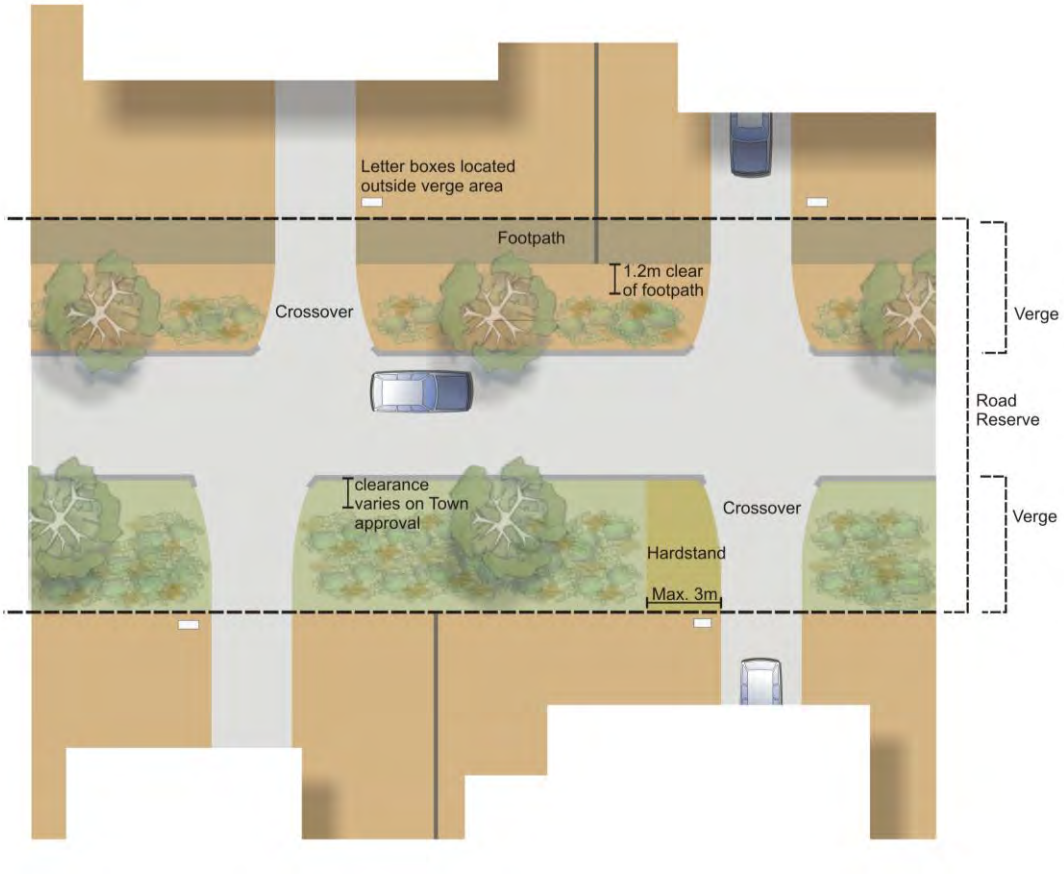


Image 1. Verge Planting

11.2 Mulch

Mulching shall be undertaken to planted areas on verges. 150mm mulch cover shall be maintained to all planting areas. Mulch levels shall be maintained to 25mm below adjacent hard edges at all times. Do not mound mulch levels above adjacent surface levels.

The Town predominantly utilises and encourages pine bark mulch for all planting beds however compacted fines such as white quartz cracker dust, and rock mulches such as river shingles may be utilised with approval from the Town.

Refer Appendix 2 – STD Drawing Details 12 & 17

11.3 Turf

Turf species to be advised by the Town shall be either Winter Green or Santa Ana Couch (Cynodon dactylon) or Empire Zoysia (Zoysia japonica) and shall be supplied and laid as roll on turf.

Artificial turf is permissible but not encouraged by the Town due to excessive heat retention and rapid deterioration

11.3.1 Preparatory Work

Eradicate weeds prior to laying using environmentally acceptable methods, such as a non-residual herbicide at the recommended rate. Remove any weed growth from an area 500mm diameter from around the base of trees and structures. Remove any rubbish and weed growth throughout grassed and planted areas.

Prepare lawn areas by spreading topsoil to a depth of 100mm. Apply *TerraCottem Turf Soil Conditioner* as per manufacturers specifications and incorporate thoroughly to a depth of 100mm with a rotary device, across the length and width of the area. The lawn shall be watered after planting and thereafter as necessary to produce a satisfactory cover.

The Town to approve any substitute soil conditioner.

Refer Appendix 2 – STD Drawing Detail 18

11.4 Shrubs and Groundcovers

The Town encourages the planting of local species to enhance local character; however water wise exotic species that require minimum maintenance shall be permitted. All plant species are to be approved by the Town.

Refer Appendix 4 – *Town of Port Hedland Preferred Planting Guide*

11.5 Street Trees

Street Trees provide an important amenity within the Town by the creation of attractive streetscapes, the provision of shade, contribution to local identity, improved micro climate and habitat

Street trees may be planted within the verge subject to the following:

- The location of trees must not impede on existing infrastructure, underground services, and pedestrian or vehicle safety;
- Plant species shall comply with the Town's Preferred Planting Guide;
- Plant species and form shall comply with CPTED design principles;
- The tree must be irrigated through a connection to the property owners' water supply, prior to planting of the tree;
- Irrigation to the tree must be maintained by the property owner;
- Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing street tree installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.
- No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole, unless root control barrier is installed, at the discretion and approval of the Town.

11.5.1 Street Trees for Residential Verges

The Town will provide and plant a free street tree/s to property owners upon application and subject to the above points. These trees will be subject to a 12 month consolidation period, whereby if the tree is removed, damaged or dies within this period the owner shall be responsible for replacement of the tree or reimbursement to the Town for costs. The distribution of free street trees is based on:

- A standard residential Lot - 1 tree
- A corner residential Lot - 1 tree for the short boundary, 2 trees for the long boundary
- Lot with boundary >70m - 3 trees

Trees within the Town owned or managed properties shall be routinely assessed for disease, hazards or damage and may be removed on approval of the Town's officers.

Residents are not permitted to plant street trees.

Refer to the Towns *Preferred Planting Guide* for information on street tree species selection.

11.5.2 Street Trees for Commercial and Industrial Verges

Tree planting in road reserves controlled by MRWA will comply with MRWA standards.

Spacing of street trees will be based on assessment and approval of plan by the Town.

Refer to the Towns *Preferred Planting Guide* for information on street tree species selection.

11.5.3 Removal of Street Trees on Verges

The Town views street trees as an asset and does not support their removal. Developers can be held liable for reinstatement of street trees where removal has been undertaken without the Town's approval.

11.6 Planting Procedure for Plant Stock and Trees

The Town recommends the following planting procedure be utilised:

1. Thoroughly water all plant-stock before planting. Ensure that roots of plant-stock are not exposed to drying influences such as sun or wind.
2. All plant-stock shall be set plumb and placed to ensure a normal relationship of the crown to the soil surface as per STD Drawing
3. Incorporate *TerraCottem Universal Soil Conditioner* (amounts to manufacturer's instructions according to planting size) mixed thoroughly into backfill soil taken from planting hole. A portion of the mix is to be placed in the bottom of the hole.
4. Cleanly cut roots from the street stock which have spiralled at the base of the pot or bag.
5. Place plant-stock vertical in the centre of planting hole with care to avoid damage to roots.
6. Back-fill the planting hole with remaining excavated site soil amended with TerraCottem and water-in at the same time.
7. Form a raised bank of compacted soil or mulch around the base of each plant to contain watering as per *Standard Drawing Details.*
8. All street trees and large shrubs/trees as required shall be staked. Tree stakes approximately 50 - 70mm square or in diameter and set to 1.5 m height is recommended. Stakes are to be made from Jarrah only. Stakes are to be driven at least 400mm into the ground surface and vegetation main trunks tied with approved industry grade ties.
9. Protect newly-planted areas from pedestrian traffic by suitable methods until the plant-stock is well established. Protection may include three-strand wire fence on steel star pickets.

Refer Appendix 2 – STD Drawing Detail 19, 20 & 21

12 Maintenance

The property owner shall be responsible for maintenance of all landscaping on the verge, unless agreed otherwise during the approval process.

Developers of landscaping treatments on verges of the Town owned or managed properties shall be responsible for the maintenance of the landscaping for a period of 18 months, unless negotiated otherwise. An Asset Management Plan shall be submitted to the Town for approval. Handover of maintenance to the Town after this period shall be conditional on coordinated inspections, approvals, training and supply of all as constructed and warranty information.

12.1 Lawn Maintenance

12.1.1 Insect and Disease Control

It will be the resident/developer's responsibility for insect and disease control: The period of treatment shall be until the problem is solved.

12.1.2 Mowing and Trimming

Remove litter and branches before mowing. Mowing should be consistent with the growth habit of the grass variety and shall be maintained at a height of 25mm-40mm for Zoysia Empire and 15mm–25mm for Winter Green and Santa Ana throughout the year.
Mowing should be on a weekly basis during periods of high growth and at three week intervals at other times. Do not mow under wet conditions.
Edges adjoining plant beds, pathways, base of trees and other obstacles shall be trimmed to coincide with mowing.
Care should be taken not to damage trees or shrubs.

12.1.3 Top Dressing

All wheel tracks and any other sunken areas are to be top dressed to bring them up to level with surrounding areas.

12.1.4 Fertilising

Fertilising shall be applied to correct any nutrient deficiencies.

12.1.5 Irrigation

Shall be programmed to suitably meet the needs of the turf and weather conditions and shall comply with Water Corporation guidelines as to programming.
All costs incurred resulting from fines for breaches of the Guidelines to be the responsibility of the resident/developer.

12.2 Maintenance of Verge Planting

Verges should be maintained in a neat and tidy manner at all times. Dead plants should be removed and replaced.
Plant growth that encroaches on paths, crossovers and roads is to be pruned back so as not to obstruct public access and vehicle visibility.

12.2.1 Irrigation

Shall be programmed to suitably meet the needs of the plant species and weather conditions and shall comply with Water Corporation guidelines as to programming.

All costs incurred resulting from fines for breaches of the Guidelines to be the responsibility of the resident/developer.

12.3 Maintenance of Street Trees

Maintenance of street trees on residential verges is the responsibility of the Town.

Developers of landscaping treatments on verges of the Town owned or managed properties shall be responsible for the maintenance of the Street Trees on verges for a period of 18 months, unless negotiated otherwise.

12.3.1 Stakes & ties scheduling

Stakes and ties are to be replaced or repaired as required. Lower ties are to be removed after 12 months and all ties and stakes are to be removed after 18 months or on trees that have a crown height greater than 4m and a trunk diameter in excess of 90mm (measured at the base) whichever occurs first.

12.3.2 Pruning

Vegetation pruning following initial site planting is to be carried out by the Town on an as required to maintain and promote vigorous healthy growth. Trees shall remain free of dead or damaged branches, broken branches shall be pruned in a manner so to prevent further damage to the tree and minimise the risk of injury to the public. Pruning is to encourage plant health and individual species form.

12.3.3 Mulching

150mm mulch cover to all street trees shall be maintained at all times. All mulch areas shall remain weed free.

SECTION B – LANDSCAPE GUIDELINES FOR PUBLIC OPEN SPACE, DEVELOPMENTS AND STREETSCAPES

13 Introduction

The objective of this section of the Guidelines is to ensure that POS is considered a landscape asset and is designed, constructed and maintained to a consistent, appropriate and high level. For the purposes of this section public open space, includes parks and civic spaces and urban landscape areas including verges, medians, road reserves, drainage reserves, public access ways and street scapes.

The Town encourages the design of site responsive urban parkland, delivered through appropriate structure and sustainable design. Good visual amenity through the adoption of CPTED Guidelines is also required to minimise the potential of vandalism and the creation of safe spaces. Passive supervision of the parklands by residents is of high importance especially where children's play equipment is located. The Town requires the POS be designed and constructed to minimise future maintenance costs. The Town is committed to preserving existing significant trees and remnant vegetation. All construction and products supplied to meet the Town specifications and or requirements.

Whilst this section outlines the preferred criteria of the Town for POS, it is expected that variations in design will occur where designs relate to a particular theme, narrative or landscape characteristic. These designs however, shall still adhere to the Design Principles set out in these Guidelines.

14 Public Open Space Framework

The hierarchy for Public Open Space in Port Hedland is adopted from the Department of Sport and Recreation *Classification for Public Open Space 2012*. The hierarchy is divided into four categories that reflect the different roles, both form, function and accessibility served by POS within the context of Port Hedland. The hierarchy consists of:

1. Local Open Space
2. Neighbourhood Open Space
3. District Open Space
4. Regional Open Space

The hierarchy also determines a standard of provision of infrastructure for each of the categories. These are general standards only and variations will occur due to the specifics of a POS including level of use, location and contextual setting.
For further detailed information on hierarchy and level of service refer to *The Town of Port Hedland Public Open Space Strategy.*

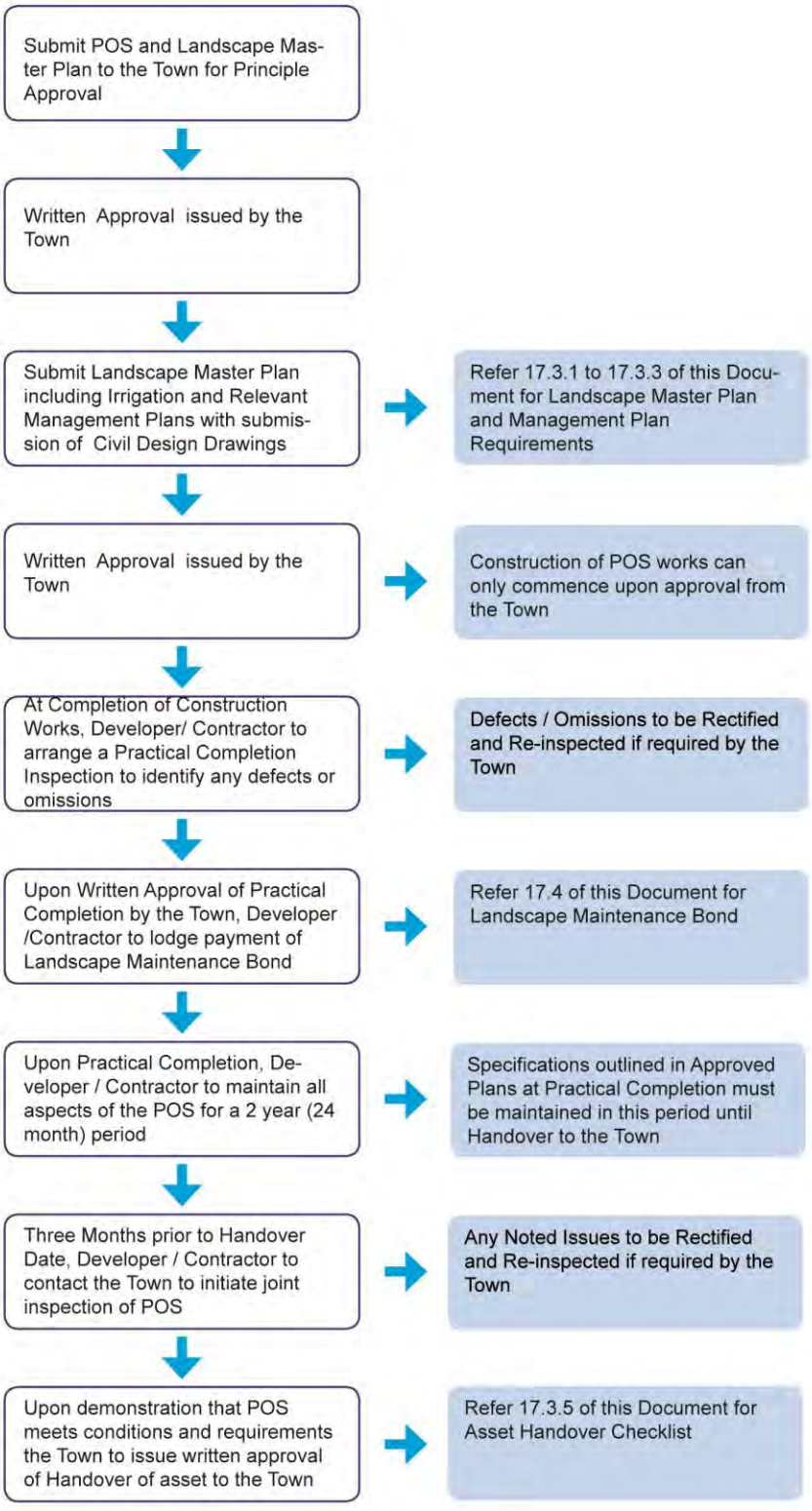
15 POS Development Process and Requirements

15.1 Professional Assistance

To assist in processing a submission for development of POS when it is required, it is recommended that a Landscape Architect or other professional with horticultural / urban design expertise be engaged to provide drawings.

15.2 Development Process

The following chart summarises the process for the development of POS within the Town:



15.3 Required Development Submissions / Documentation

15.3.1 Landscape Masterplan

The Detailed Landscape Masterplan is to include:

- A detailed feature and contour survey
- Location of POS with respect to the boundaries of the development
- Boundaries of the POS
- Landscape theme (If any)
- Adjoining land uses (road, private lots etc.)
- Areas of natural vegetation to be retained
- Areas of natural vegetation to be cleared
- Wetland areas to be protected
- Trees worthy of retention
- Drainage functions including drainage infrastructure
- 10 year and 100 year flood water levels where applicable
- Areas to be planted and or grassed
- Pathway alignments
- Playground locations
- Location of any structures (pergolas, boardwalks etc.)
- Entry statement location and conceptual design
- Fencing
- Reticulation
- Proposed contours (including retaining walls)
- Services
- Species and number of individual plants
- Specifications for all Structures and materials used

15.3.2 POS Masterplan

Details of the POS are to be submitted on a separate set of plans and shall include the following:

- Paths to the Town/Austroads specifications (See www.onlinepublications.austroads.com.au/items/AGRD06A-09)
- BBQ's and Shade Structures if required and to the Town specifications
- Seats and Tables to the Town specifications
- Play equipment to the Town specifications
- Soft Fall to Town specifications
- Reticulation (sprinkler heads, reticulation pipes and solenoids) to the Town specifications (refer the *Town Irrigation System Specification 2014*)
- Garden edging and or kerbs to the Town specifications
- Lawn area. Species to be confirmed by the Town
- Taps and fountains. To the Town specifications
- Plantings including Species and Numbers of Plants
- Lighting including positioning of poles. To the Town specifications
- Fencing to the Town requirements
- Rubbish/Recycling to the Town specifications and requirements
- Bollards and Entrance Gates to the Town specifications

- Any other inclusions to be approved by the Town

15.3.3 Management Plans

- Introduction – preamble of site, management plan objectives
- Maintenance Program – comprehensive 24 month maintenance schedule that covers the 2 year maintenance requirement for all sites
- Recommendations and Management Strategies, incorporating:
    - Weed eradication
    - Nutrient and irrigation management
    - Drainage maintenance program

15.3.4 As Constructed Documentation – OSPEC format

OSPEC will only be required for Major new developments. CAD file and ASCONS will be accepted for minor projects and developments.

15.3.5 Asset Handover Checklist

The Asset Handover Checklist is intended to guide the handover of the asset to operations and the processing of asset information records related to their creation and future operations. It is important that records relating to each asset are available for future reference.

It is the responsibility of the Project Manager to complete this document

Refer Appendix 5 – Asset Handover Checklist

15.4 Landscape Maintenance Bond

Before Practical Completion a landscape maintenance bond is to be provided by the developer to ensure that landscaped POS is handed over to the Town in a satisfactory condition. The bond is to be in the form of either a bank cheque or cash bond. The landscape maintenance bond is to be equal to 5% of the contract value for landscaping works (exc. GST) as accepted by the Town, as security to ensure that the POS is maintained to an acceptable standard and be held in trust until POS handover. During the maintenance period of 2 years, or as negotiated, the Developer and/or his responsible agents shall be responsible for the maintenance of the POS to standard that is acceptable to the Town. Where it becomes apparent to the Town that these standards are not being maintained then the Town will notify the Developer and if the accepted standards aren't met within a timely manner the Town shall carry out maintenance procedures to ensure this is rectified at the Developers expense. In this case the cost of the work shall become a debt due to the Town and the Town may draw on any retention money or bank guarantee being held, without reference to or approval from the Developer and without limiting its right to recover any balance of money due should the security be insufficient to cover the costs of the works.

15.5 Substitutions

Given that these Guidelines are developed to ensure that fit for purpose assets capable of achieving their economic design life with minimal operating and maintenance costs are delivered, the Town has identified accepted proprietary items.

The identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but it does indicate the necessary properties of the item. If alternatives to the documented products, methods or systems are proposed then a written submission to the Town supplying sufficient information to permit a timely evaluation of the proposed alternatives including:

- Evidence that the performance is equal to or better than that specified
- Evidence of conformity to a cited standard
- Samples
- Essential technical information

All substitutions require approval by the Town prior to construction and or installation.

Refer Appendix 3 – Preapproved Items

15.6 Warranty and Defects

Warranty periods commence at the date of practical completion.

The warranty period shall be for 1 year or for such a period as supplied by manufacturer whichever is the greater. A twelve months defects liability period shall apply from the date of practical completion of the POS works. During the Warranty/Defects Period the Developer and/or his responsible agents shall be responsible for ensuring that satisfactory remedial repairs arising from faulty design, workmanship or materials are carried out. The cost of any consequential damage and claims resulting from such defects shall be charged to the Developer and/or his responsible agents. During the warranty/defect period, the Town may, at its discretion carry out remedial repairs where the fault affects the service to customers and/or public safety and the defects are not rectified within the time required by the Town. The cost of the remedial repairs shall be charged to the Developer and/or his responsible agents. Prior to the end of the Warranty/Defects period the Developer and/or his responsible agents will assess whether there are any defects. If so will notify the Town of the list of defects and have them rectified to the satisfaction of the Town. Any defects rectified during the defects liability period shall be subject to a further 12 months defects liability period.

16 POS Disability Access Requirements

To ensure equitable access and inclusion for people with disabilities POS should contain the following:

- Provision of clearly signed accessible parking close to the POS as possible
- Provision of a firm, continuous path free of obstructions and without steep slopes from parking to the entry point of the POS, linking all the accessible POS areas – playground, shaded seating, picnic tables, drinking fountain and barbecues
- Provision of an accessible barbecue, where required – connected to the rest of the POS facilities by an accessible pathway
- Provision of at least one accessible picnic table that is shaded and protected from weather connected to the rest of the POS facilities by an accessible pathway
- Provision of an accessible pathway into the playground to enable children and carers / parents to access the playground facility
- Provision of a shaded seating area adjacent the playground, connected to the rest of the POS facilities by an accessible pathway
- Where long walkways are provided, provision of signage that displays direction, distance and terrain, with resting places along its length
- Where drinking fountains are provided, ensure the provision of one that is accessible to all.

Refer to the *Town of Port Hedland Disability Access and Inclusion Plan* for further information.

17 Preparatory Site Works

17.1 Earth Works and Drainage Works

All works are to comply with the Building Code of Australia and relevant Australian Standards and Codes.

17.2 Protection of Trees

The Town is committed to preserving existing significant Trees and Remnant vegetation.

Before commencing work on site, assess and identify all trees which are indicated to be retained or removed, trees which may need partial cutting back or other work, and trees which are indicated to be removed, or required to be removed, to enable construction or access. Clearly mark trees to be retained with conspicuous plastic ribbon around the trunk, and maintain ribbons until Practical Completion.

Notify the Town of all trees proposed to be removed or cut back and arrange for a site inspection to confirm and approve these trees. Existing trees outside the line of works shall be retained and protected during construction. Do not remove or cut back any trees for site sheds, storage, or access unless and before approved in writing by the Town.

Provide temporary protection to all trees in close proximity to construction work, which may be damaged by such work. Protection may include installation of fencing, barricades, or other suitable procedures.

Take all necessary precautions to protect vegetation, including the following:

- Do not add or remove any soil within the drip line of trees.
- Do not store materials under or near trees.
- Do not drive or park cars or other mechanical plant under trees.
- Do not place spoil from excavations within the drip line of trees.
- Do not damage tree bark or hanging branches etc.
- Do not cut roots exceeding 25mm diameter unless approved by the Town.
- Avoid compaction of ground under trees.

18 Storm Water Drainage Infrastructure

Although rainfall in Hedland is low, averaging just over 300mm a year, it is often concentrated in severe thunderstorms and occasional cyclones during the summer months producing heavy deluges. Therefore stormwater drainage infrastructure must be designed and constructed to cope with these events.
Drainage design within individual development applications for POS will be accessed by the Town on a case by case basis.
Better Urban Water Management Guidelines – Storm Water Management objectives include:

- Limiting negative impacts on existing ecological processes and systems
- Minimising negative impacts on natural hydrologic processes of catchments
- Balancing downstream run off and peak flows from urban development
- Minimising pollution & improving quality of water discharges to the natural environment

Incorporating collection, treatment and re-use of stormwater runoff in design solutions, where appropriate (due to infrequent rain events, collection of water in dryer climates can be impractical and often economically unsustainable - i.e. large infrastructure cost for little return);

- Protecting and enhancing surface and ground water quality
- Limiting demand on reticulated potable water supply systems - e.g. incorporating fit-for-purpose/multiple options into supply and distribution planning
- Limiting wastewater generation - including appropriate treatment/discharge/re-use of effluent Acknowledging the link between water consumption and broader social, economic & community resource
- Increasing social and recreational values in urban areas through integrated green infrastructure
- Adding value while minimising development costs and provide strategies that fundamentally integrate factors previously regarded as separate aspects of urban management (e.g. drainage infrastructure & maintenance costs, multi-use open spaces, cultural and environmental corridors)
- Taking advantage of increased property market interest in environmentally responsible development
- Integrating management practices within and between institutions responsible for waterway and POS management.

At present, 'best practice' in Hedland has urban water run-off being directed from housing lot frontages directly onto the road easements where it is then transferred as close to source as possible (minimal hard pavement drainage) via one way cross falls including flush kerbing and/or kerbed outlet devices into endemically vegetated swales. Linear open space or multi use corridors include a specialised vegetated swale system that has an aim to retard and treat urban water volumes and flow rates. Slowing and filtering urban water minimising the amount of sedimentation (nutrient binding Pindan soils) leaving the site and the transportation of contaminates such as invasive weeds and pollutants.
.
In the North West soil condition positive swale levels work efficiently between the grades of 1:700 - 1:1000. At these grades flow rates and erosion is minimised. **Drop structures** can be used to maintain the flattened grades and are to be located along the swale floor where required.

18.1 Swale Vegetation

Re-vegetation of the swale systems is a critical factor for Hedland drainage conveyance. Vegetation of swales achieves the following Water Sensitive Urban Design outcomes:

- Stabilisation of swale bases and batters
- Filtering of fine Pindan silts that adversely affect conveyance infrastructure
- Filtering of fine Pindan silts that can bind nutrient levels in downstream marine ecologies
- Aids in providing a natural drainage 'roughness' reducing velocity of overland flows
- Filters and minimises the distribution of potential contaminates including exotic weeds.

Vital to water quality, revegetation and protection of the drainage swale system is the immediate application of site mulch and topsoil collected prior to bulk earthworks. Use of local site mulch and topsoil provides a ready source endemic seed bank. This, along with appropriate supplemental planting is fundamental to maintaining local biodiversity within the development area.

19 Hardscape Elements

For the purposes of these Guidelines, hardscape refers to all

- Hardstand
- Edging
- Parking
- Structures

Hardscape elements are the surfaces and objects within a POS that contribute to amenity of the space and are the elements which we directly have interaction with. Because of this they are often subject to wear which can lead to safety issues for the POS user. Therefore consideration for appropriate materials and products tor sustainability and longevity with minimal maintenance requirements for the foreseeable reasonable life of the projects and products is an important one.

The Town has compiled a range of preapproved items that are proven performers in the Pilbara environment.

Refer Appendix 3 - Preapproved Items

It is expected that variations in hardscape elements will occur where designs relate to a particular theme, narrative or landscape characteristic and preapproved items are not suitable. These items however, should still adhere to the Design Principles set out in these Guidelines and will need approval from the Town.

19.1 Hardstand

For the purposes of these Guidelines hardstand refers to all hard surfaces within a POS including:

- Dual use paths
- Concrete Pads for Shelters, Furniture etc.
- Unit paving areas
- Stabilised Gravel Areas

Paths and other paved areas shall be installed in accordance with AS1428.1/2/3/4:2002, Design for Access & Mobility.

19.1.1 Dual Use Pathways

Paths within POS should be constructed for safe and easy access. Paths shall be those of dual use and as such shall be a minimum width of 2.5m wide with a preference for 2.8m. Paths are to be constructed to the same specifications as for paths constructed in road reserves, which includes preparation of base.

Where vehicle access is to be provided construction shall be the same as required for vehicle crossovers. Paths shall be constructed to minimise damage to any retained trees and or vegetation. Where possible, paths shall be utilised as edging to turf /garden/play areas. Location of paths through grassed areas should not negatively impact on the informal active use of those grassed areas. Path alignment and construction details shall be shown on detailed landscape plans. The vertical path alignment design shall consider and accommodate the steepness and length of grades, changes of grade, sight distance and nature of the path. Where practicable, paths shall be constructed to a maximum grade of 1 in 20 to allow for disabled access.

Refer Appendix 2 – STD Drawing Detail 01, 08 & 09

19.1.1.1 Finishes

All surfaces are to be finished to Class 1 standard in accordance with *AS 3610*.

Exposed aggregate including shellcrete is permissible with approval from the Town.

Refer Appendix 3 - Preapproved Items 03, 04 & 05

19.1.2 Concrete Hardstand

Shelters and Furniture in POS should be mounted onto a concrete hardstand pad.

Pads shall be constructed with a cross fall of 2% towards the kerb. Finishes

All surfaces are to be finished to Class 1 standard in accordance with *AS 3610*.

Exposed aggregate including shellcrete is permissible with approval from the Town.

Refer Appendix 2 – STD Drawing Detail 01, 02 & 03

Refer Appendix 3 - Preapproved Items 03, 04 & 05

19.1.3 Relevant Standards for Concrete Hardstand

Concrete is generally specified in accordance with the provisions of Australian Standards AS1379: 2008 Specification and Supply of Concrete and AS3600: 1994 Concrete Structures. The following Standards are also referred to:

- AS1012:2014 Methods of Testing Concrete
- AS2758.1:2014 Aggregate and rock for engineering purposes – Concrete aggregates
- AS3582.1:2016 Supplementary Cementitious Materials – Fly Ash
- AS3582.2:2016 Supplementary Cementitious Materials – Slag – Ground Granulated Blast-Furnace
- AS3582.3:2016 Supplementary Cementitious Materials – Amorphous Silica
- AS3972:2010 General Purpose and Blended Cements
- AS/NZS/ISO 9000 Quality management and quality assurance Standards.

19.1.4 Unit Pavers

Unit paving materials should be selected to allow easy access to underground services. Units should be readily available and replacement of units cost-effective in the occurrence of damage or discolouration. Paved areas need to be designed and constructed to withstand the environmental conditions in the Pilbara with low maintenance requirements. Colour of paver to be approved by the Town.

Refer Appendix 2 – STD Drawing Detail 03

Refer Appendix 3 - Preapproved Items 06

19.1.5 Stabilised Gravel Areas

Compacted material is an acceptable treatment provided that the material is well graded, cement stabilised, water bound and compacted to a smooth finish. The depth of such material must be an absolute minimum of 100mm.

Gravel shall be fines with a maximum aggregate size of 7mm to 14mm maximum. Permissible materials by the Town include white quartz or blue metal cracker dust and red scoria.

Refer Appendix 2 – STD Drawing Details 04 & 05

Refer Appendix 3 - Preapproved Items 01 & 02

19.2 Edging

For the purposes of these Guidelines edging refers to constructed edges used to border a hard or soft ground treatment such as between a garden bed and lawn area. For safety reasons all edging is to be flush to the ground level.

Approved materials for edging in POS are extruded / formed concrete (profile 150 x150mm bullnose) and 4mm galvanised steel edging.

All concrete used shall be supplied by an approved firm in a ready mixed state and shall conform to the requirements of AS 1379.

All joints for steel edging are to be fully welded and finished to achieve smooth even surface. All welding shall be in accordance with relevant Australian Standards.

Refer Appendix 2 – STD Drawing Details 10 & 11

Refer Appendix 3 - Preapproved Items 07 & 08

19.3 Parking

Parking on the verges of parks, recreation reserves, drainage reserves, and foreshore reserves without the express permission of the vested owner/occupier is not permitted. (Refer *Town Parking Local Law 2015*). Adequate parking within or adjacent to any of the above reserves must be allowed for in development plans. This is to include provisions for Disability Parking and to be approved by the Town.

19.4 Structures

For the purpose of these Guidelines, structures refer to vertical built forms within the POS including:

- Shelters
- Fencing and Gates
- Signage
- Retaining Walls
- Board Walks
- Bridges
- Boom gates
- Play spaces

It is a requirement of the Town that separate Building Licences for each structure within a POS need to be obtained, prior to the start of construction.

19.4.1 Siting of Structures

All structures including play spaces are to be kept outside of turfed areas unless given permission by the Town. The placement of structures/facilities is to give consideration to ongoing maintenance of surrounding areas.

19.4.2 Shelters

Shelters within POS are to be constructed to cyclone standards and constructed from robust materials. No Shade Sails are permitted to be used in POS. It is important that the shelter is not

climbable. The necessary building permit shall be applied for and approved by the Town prior to construction. The Town has an approved custom design for 4m x 4m and 6m x 6m shelters from Exterior Street and Park Outfitters. Approved colours are Ironstone and Shale Grey.

Other shelter designs including custom design are to be approved by the Town.

Refer Appendix 2 - STD Drawing Details 16

19.4.3 Fencing and Gates

Boundary fencing and gates in a POS should have visual permeability in accordance with CPTED guidelines to allow for passive surveillance. Fencing is to comply with building codes for cyclone areas.

Fences and gates are to comply with the Australian Standard™ 'Design for access and mobility' (AS1428.1/2/3/4 - 2009).

Fencing to irrigation compounds and other service areas is to be 2.4m black galvanised palisade.

Fencing to POS is to be black galvanised palisade flat top. Height to be approved by the Town.

Other fencing designs including custom to be approved by the Town.

Refer Appendix 3 - Preapproved Items 09 & 10

19.4.4 Signage

Location and design of signage will be individually assessed by the Town at the time of development application.

19.4.5 Retaining Walls

Refer Appendix 2 – STD Drawing Details 07

19.4.6 Board walks

Refer Appendix 3 - Preapproved Items 11

19.4.7 Bridges

Bridge design is to be to site requirements and to be approved by the Town.

Tensile wire side barriers are discouraged due to vandalism issues.

19.4.8 Boom Gates

Boom gates are to be provided to allow access and are to be a single swing half height gate.

Leda Security Products model MSGF or similar is the style approved by the Town. Colour is to be approved by the Town.

Refer Appendix 3 - Preapproved Items 12

19.4.9 Chicanes

Chicanes may be used in pathways to slow bicycle traffic near playgrounds, other pedestrian areas and traffic areas.

Design and placement are to be approved by the Town.

Refer Appendix 3 - Preapproved Items 13

19.4.10 Play Spaces

Play spaces need to ensure the provision of a diverse range of age appropriate, quality play spaces whilst maintaining an effective use of resources and efficient maintenance costs. All proposed play spaces will be individually assessed by the Town based for relevance based on community requirements.

Playgrounds are to be considered as a complete package within any development and prior to their design the intended function and hierarchical classification needs to be established (Refer 15- 16 of these Guidelines). Play opportunities, supporting amenity and landscape elements shall be designed as a whole to maximize the usefulness of each.

Play opportunities shall not be placed within close proximity to hazards such as roads and water bodies or within close proximity of private fences. Play opportunities shall allow for ease of supervision and allow for informal surveillance aligning with CPTED Guidelines.

All play areas to be enclosed by a concrete or approved hardstand edge restraint. Seating shall be provided adjacent to key play areas to enable maximum supervision. All play areas shall have functional shade provided with a preference for permanent shade structures. Equal access and inclusion opportunities shall be provided to all play spaces.

Paths shall be utilised where possible as edging for play areas.

Play spaces are required to adhere to the following Australian Standards:

- AS4685.0:2017 Playground Equipment and Surfacing
- AS4685.1-6:2014 Playground Equipment and Surfacing
- AS4422:2016 Playground Surfacing
- AS4685.11:2014 Playground Equipment

19.4.10.1 Soft Fall

All play areas to utilise rubberised soft fall to the Town specifications and to conform to Australian Standards and be enclosed by a concrete or approved hardstand edge restraint.

All soft fall surfaces shall comply with Australian Standard™ as above.

Refer Appendix 2 – STD Drawing Detail 13

19.4.11 Maintenance of Structures

Developers of POS are required to undertake maintenance of all structures for a period of 24 months and to provide all manuals and schedules for items or as negotiated.

20 Lighting

Design proposals for any lighting within the POS must be designed by a suitably qualified lighting designer and demonstrate compliance with AS 1158.3.1 *Pedestrian Area Category P lighting-performance and design requirements*.

Lighting within a POS should be energy efficient with the Town's priority for solar and led lighting.

Where a proposed POS extends from adjoining roads the POS lighting shall be consistent. POS lighting selection shall consider existing street lights on surrounding roads. Where lighting in a POS is required all poles shall be located outside any turfed areas where possible. Where poles are located within a turfed area the base of the poles shall be surrounded by a concrete collar 600mm in diameter.

Refer Appendix 3 - Preapproved Items 14 & 15

20.1 Siting of Structures and Light Poles

All structures including play spaces are to be kept outside of turfed areas unless given permission by the Town. The placement of structures/facilities is to give consideration to ongoing maintenance of surrounding areas.

21 Bollards

The perimeter of any POS (i.e. parks, foreshore, drainage, etc.) shall be bollarded or where appropriate fenced to prevent vehicle or pedestrian access. Where roads are closed or cul-de-sac heads and roads reserves are not enclosed by private lots, or developed lots, bollards shall be installed to prevent vehicle access to adjacent POS. Provision for bollards or barriers to protect pedestrians from vehicles and bicycle traffic shall be included in footpath construction programs consistent with relevant Australian Standards.

Removable bollards must be installed where maintenance vehicle access is required Posts shall be installed at maximum 1.5m centres. Bollards are to be avoided in areas of turf.

Bollard design and dimensions is to be approved by the Town. Preference is for recycled plastic or steel.

Refer Appendix 3 - Preapproved Items 16 & 17

22 Furniture

For the purpose of these Guidelines, furniture items include but are not limited to the following:

- seats, benches and tables
- boulder seating
- litter bins
- drinking fountains
- bicycle racks
- tree grates, and
- barbeques

It is important that durability and minimal maintenance are considerations with the selection of furniture items for POS. Furniture items should include equal access provision.

Refer *AS1428 Design for Access and mobility parts 1, 2, 3, and 4*.

22.1 Seats, Benches and Tables

Seats, benches and tables shall be installed onto hardstand.

Furniture to be of aluminium construction with fully enclosed Aluminium profiled sections with end caps in an Anodised Finish or similar. Colour options to be provided at plan submission for Town's approval. The use of wood is discouraged by the Town and requires Town approval.

A percentage of furniture within a POS needs to be DAIP compliant.

Exterior Parkway Seat and Garden Table & Boardwalk Bench or similar is the style approved by the Town.

Refer Appendix 3 - Preapproved Items 18 & 19

22.2 Casual Boulder Seating

Large local sandstone boulders can provide casual and robust seating opportunities within a POS. The boulders are not to be quarried to avoid sharp edges. The boulders should be of a light colour to avoid heating.

Refer Appendix 2 – STD Drawing Details 14 & 15

Refer Appendix 3 - Preapproved Items 20

22.3 Litter Bins

The Town has preapproved Bin Surrounds these are to be used wherever possible with the Town supplying the bin surround. Other bin surrounds may be used at the approval of the Town of Port Hedland.

The Town recommends a 240 litre size wheelie bin. A Litter Bin Lockable Post to be used and to be postiioned strategically for use by public as well as for ease of regular servicing.

The number and location of bins required to be determined by The Town.

The Town approves Exterior Street & Park Outfitters – Steel SHS Posts. Hot dip galvanised finish or similar.

Refer Appendix 3 - Preapproved Items 21

22.3.1 Dog Bag Dispensers

A dog bag dispenser may be required where POS has a dog exercise area and is to be approved by the Town.

The Town approves Woodlands AMS Dog Bag Dispenser – Galvanised steel finish or similar

Refer Appendix 3 - Preapproved Items 22

22.4 Drinking Fountains

The Town approves the use of preapproved drinking fountains for ease of maintenance. Other drinking fountains may be used at the approval of the Town of Port Hedland.

Drainage is to be provided away from fountain.

Refer Appendix 3 - Preapproved Items 23

22.5 Bicycle Racks

The Town approves single hoop steel bicycle racks. Number of racks will vary due to POS size and use and to be approved by the Town.

Refer Appendix 3 - Preapproved Items 24

22.6 Barbeques

The Town receives many requests from developers and local residents to install barbeques in POS. The Town will consider these request based upon:

- Proximity to existing BBQ's
- Target demographics (eg. Families)
- Maintenance requirements
- POS Design Principles

Where BBQ's are to be part of a POS they are to be situated in close proximity to play areas so as to enable supervision of such areas. The positioning of such to take into consideration

AS1428 Design for Access and mobility parts 1, 2, 3, and 4.

There shall be suitable shelter provided to enable usage in all weather and suitable lighting shall be provided so area can be utilised during restricted hours at night in summer months. Lighting shall be turned off at 8.00pm.

BBQ areas shall be surrounded by hardstand to a minimum distance of 2.5m from hot plates. Suitable drainage and soak wells, as approved by the Town shall be provided and placed in such a manner as to adequately take away any waste water from the fat trap.

Christies Park Modular Electric BBQ is the preferred style and meets the Town standards. Bench configuration and amount of cook tops will vary depending on POS needs and approval of the Town.

Refer Appendix 3 - Preapproved Items 25

23 Public Art

Public Art has the opportunity to communicate and celebrate the heritage and stories of a place. It can contribute to creating a unique space that relates to a particular theme, narrative or landscape characteristic.

23.1 Definition - Public Art

Public Art is defined in the broadest sense as artistic works or activities created for, located in, or developed as part of a public facility or space. Public Art includes any planning or conceptual contribution of an artist to the design of public facilities and spaces.

23.2 Policy Objective

To allow residents and visitors to discover and to enjoy a unique natural and urban environment that offers a strong sense of local place. In particular to:

- Invigorate the town by increasing its artistic profile, making it a vibrant place in which to live, work and visit
- Promote the works of artists living in or coming from the Port Hedland region
- Contribute to the growth of cultural tourism
- Improve the visual and social amenity of the Town of Port Hedland
- Encourage a greater understanding and appreciation of our cultural heritage
- Create employment and training opportunities for local people in this field.
- Create a framework for the conservation and care of the Town public art
- Create passive recreation opportunities for the community

Refer The Towns Public Arts Policies for more information on Public Art

24 Irrigation

Reticulation is an important element in intensive use areas and systems shall be designed to reflect the importance of this valuable resource. Irrigation design should apply principles to ensure sustainable use of water and the design and operation must comply with Water Corporation Guidelines and legislation and water restrictions current at the time of development. Irrigation design and operation must not impact on road pavements, footpaths or other infrastructure on the verge.

Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.

The Town of Port Hedland Irrigation Specification is available as a reference document for irrigation details.

25 Softscape Elements

For the purposes of these Guidelines, Softscape Elements include;

- All existing vegetation, swale planting, garden bed planting, tree planting and lawn areas
- All mulch areas

26 Relevant Standards

Ensure that all application amount and types of soil conditioners, fertilisers, mulches and wetting agents comply with Australian Standards:

- AS4419: 2018 Soils for Landscaping and Garden Use
- AS4454:2012 Composts, Soil Conditioners and Mulches
- AS3743: 2003 Potting Mix (Pending Review)

27 Existing Vegetation

POS development sites may contain existing vegetation which includes both native and exotic trees and plants. The Town is committed to preserving existing significant trees and remnant vegetation with the exclusion of weed species.

Vegetation to be retained needs to be clearly indicated on any landscape plans and is to be fenced off on site prior to construction works.

Any vegetation to be cleared needs to be pre-approved by the Town.

Refer Item 17.2 Protection of Trees

28 Revegetation

Areas of bare or denuded land may require revegetation to mitigate such factors as erosion, dust, soil loss and aid in the protection of engineered grades and other earthworks.
Establishing long term plant colonies can be undertaken through seeding or the planting of tubestock. The Town recommends that all species chosen for revegetation works be native to the area. Revegetation is generally carried out via direct seeding, tubestock planting or a combination of both.

Refer Appendix 2 – STD Drawing Detail 19

29 Mulch

All garden beds and trees are to be mulched to reduce moisture loss and soil temperature. A minimum of 150mm mulch cover shall be maintained to all shrubs and trees. Mulch on garden beds is to be 150mm thickness and to be measured at practical completion and again 3 months prior to maintenance period expiring.

Mulch levels shall be maintained to 25mm below adjacent hard edges at all times. Mulch is not to be mounded above adjacent surface levels.

Avoid having a thick layer of mulch surrounding the stem as this may induce collar rot. All mulching is to be maintained to ensure that irrigation pipework remains covered.

Organic mulch is preferred by the Town. Mulch should not be fine, but coarse and 'chunky' to avoid compression. Mulch should not contain peat.

The Town predominantly utilises and encourages pine bark mulch for all planting beds, however compacted fines such as white quartz cracker dust, and rock mulches such as river shingles may be utilised with approval from the Town.

Larger feature stone mulch of 200-300mm is accepted by the Town for landscaped areas.

Refer Appendix 2 – STD Drawing Details 12 & 17

30 Turf

30.1 Species Selection

The species to be advised by the Town of Port Hedland but shall be either or:

Winter Green or Santa Ana Couch (Cynodon dactylon) or Empire Zoysia (Zoysia japonica) shall be supplied and laid as roll on turf.

Installation of stolons is not permitted by the Town, unless otherwise agreed. Installation of artificial turf is permissible but not encouraged by the Town.

30.2 Ground Preparation

Eradicate weeds prior to laying using environmentally acceptable methods, such as a non-residual herbicide at the recommended rate. Remove any weed growth from an area 500mm diameter from around the base of trees and structures. Remove any rubbish and weed growth throughout grassed and planted areas.

Prepare lawn areas by spreading topsoil to a depth of 100mm. Apply *TerraCottem Turf Soil Conditioner* as per manufacturer specifications and incorporate thoroughly to a depth of 100mm with a rotary device, across the length and width of the area. The lawn shall be watered after planting and thereafter as necessary to produce a satisfactory cover.

The Town to approve any substitute soil conditioner.

Refer Appendix 2 – STD Drawing Detail 18

30.3 Maintenance

30.3.1 Insect and Disease Control

It will be the contractor's responsibility for insect and disease control: The period of treatment shall be until the problem is solved. Application of any treatments shall occur outside of normal working hours.

30.3.2 Mowing and Trimming

Remove litter and branches before mowing. Shall be mowed consistent with the growth habit of the grass variety and shall be maintained at a height of 25mm-40mm for Zoysia Empire and 15mm–25mm for Winter Green and Santa Ana Couch throughout the year.

Mowing shall be on a weekly basis during periods of high growth and at three week intervals at other times. Do not mow under wet conditions.

Edges adjoining plant beds, pathways, base of trees and other obstacles shall be trimmed to coincide with mowing.

Care should be taken not to damage trees or shrubs.

30.3.3 Top Dressing

All wheel tracks and any other sunken areas are to be top dressed to bring them up to level with surrounding areas as soon as practicable and prior to practical completion and no later than 3 months prior to maintenance period ending.

30.3.4 Fertilising

Fertilising shall be required to correct any nutrient deficiencies and be incorporated into a maintenance program which is to include a granular application in the spring and autumn. Fertilising will be required to be done no later than 3 months prior to maintenance period ending. Type of fertiliser to be approved by the Town.

30.3.5 Irrigation

Shall be programmed to suitably meet the needs of the turf and weather conditions and shall comply with Water Corporation guidelines as to programming.

All costs incurred resulting from fines for breaches of the guidelines to be the responsibility of the contractor.

31 Plant Species Selection

Proposed planting within POS shall be based on climate, soil and water responsive design considerations that address the specific nature of the Pilbara environment. The creation of shaded areas so that POS can be utilised as much of the year as possible is an important factor in planting design. Maintenance and longevity shall also be a consideration in species selection. All planting is to be approved by the Town and no weed species will be approved.

Planting selection and design shall incorporate CPTED principles to ensure the construction of safe POS.

The Town encourages the planting of local species to enhance local character, however water wise other species that require minimum maintenance shall be permitted.

Supply of plant species in the Pilbara can sometimes be limited. It shall be ensured that species selected for POS are readily available.

Refer Appendix 4 – *Town of Port Hedland Preferred Planting Guide*

32 Trees and Garden Bed Planting Procedure

Planting stock should be healthy and undamaged. Trees should be straight, strong and of good shape, all plants should be free of disease and insect damage and not pot-bound.

Feature trees shall be a minimum size of 45 ltr container. Minimum size for general plantings shall be 140 mm pots, unless authorised by the Town.

No plantings of any trees/palms that are susceptible dropping of debris i.e. coconuts not permitted adjacent to playground areas or areas where the public has access to.

No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole unless root control barrier is installed on the approval and discretion of the Town.

Dial 1100 for Dial Before You Dig or go on line to www.dialbeforeyoudig.com.au

Grass, grass roots and weeds should be treated with herbicide and / or removed from the area to be planted.

32.1 Mass Planting

Mass planting beds for small shrubs and annuals should be thoroughly turned over ensuring that there is a good top soil layer of approximately 300mm. Where good top soil is absent this should be imported. *TerraCottem Turf Soil Conditioner* shall be applied as per manufacturer specifications and incorporated thoroughly to a depth of 200mm with a rotary device, across the length and width of the area, before any planting is undertaken.

The Town to approve any substitute soil conditioner.

32.2 Planting Procedure for Plant Stock and Trees

The Town recommends the following planting procedure be utilised:

1. Thoroughly water all plant-stock before planting. Ensure that roots of plant-stock are not exposed to drying influences such as sun or wind.
2. All plant-stock shall be set plumb and placed to ensure a normal relationship of the crown to the soil surface as per STD Drawing
3. Incorporate *TerraCottem Universal Soil Conditioner* (amounts to manufacturer's instructions according to planting size) mixed thoroughly into backfill soil taken from planting hole. A portion of the mix is to be placed in the bottom of the hole.
4. Cleanly cut roots from the street stock which have spiralled at the base of the pot or bag.
5. Place plant-stock vertical in the centre of planting hole with care to avoid damage to roots.
6. Back-fill the planting hole with remaining excavated site soil amended with TerraCottem and water-in at the same time.
7. Form a raised bank of compacted soil or mulch around the base of each plant to contain watering as per *Standard Drawing Details.*
8. All street trees and large shrubs/trees as required shall be staked. Tree stakes approximately 50 - 70mm square or in diameter and set to 1.5 m height is recommended. Stakes are to be made from Jarrah only. Stakes are to be driven at least 400mm into the ground surface and vegetation main trunks tied with approved industry grade ties.
9. Protect newly-planted areas from pedestrian traffic by suitable methods until the plant-stock is well established. Protection may include three-strand wire fence on steel star pickets.

The Town is to approve any substitution in soil conditioner.

Refer Appendix 2 – STD Drawing Detail 19, 20 & 21

32.2.1 Staking and Tying

Small trees and shrubs should not require staking and tying. However, where necessary, the same method as described for large trees in 32.2 *Planting Procedure for Plant Stock and Trees* may be used.

Staking should always be used where mowing or slashing occurs in the vicinity of the plant, for protection. Ties should be inspected regularly to ensure they have not broken or that no injury occurs to the tree. Guying and anchoring may be used on very large trees that have been shifted or trees which have blown over. Each tree should have three guy lines which support the tree at the same point. The guy lines should be enclosed with a material such as rubber hose where they rub the tree. The lines should be connected to stakes or pegs in the ground about 2-3 m from the tree. Guys should be clearly marked for pedestrians and cyclists.

Refer Appendix 2 – STD Drawing Detail 21

32.3 Median Strips

Trees should be clear trunked so as not to impede sight lines. Planting should be set back from back of kerb with the distance to be ascertained by the Town on a case by case basis. No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole unless root barrier is installed as the approval and discretion of the Town.

Refer Appendix 4 – Preferred Planting Guide

32.4 Roundabouts

Trees should be clear trunked so as not to impede sight lines for vehicles. Planting should be set back from back of kerb with the distance to be ascertained by the Town on a case by case basis. No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole.

Refer Appendix 4 – *Town of Port Hedland Preferred Planting Guide*

33 Maintenance

The Town requires that new POS is developed to a minimum standard and where the POS is classified as Local, Neighbourhood, District or Regional POS it is maintained by the developer for a five year period. The Town will consider requests to bond works and maintenance required as part of the development of POS.

Developers of all other POS on the Town owned or managed properties shall be responsible for the maintenance of the landscaping for a period of 18 months, unless negotiated otherwise.

A maintenance schedule shall be submitted to the Town for approval prior to construction. This shall include types of fertiliser and herbicide use, mowing frequency and heights, schedule for maintenance of irrigation equipment, irrigation schedule and types of fertiliser and herbicide use and frequency.

Handover of maintenance to the Town after this period shall be conditional on coordinated inspections, approvals, training and supply of all as constructed and warranty information.

34 Inspection and Testing

Inspections are required to be carried out by a representative of the Town at the following stages:

- Completion of landscaping and irrigation work; and
- Practical completion.

Appendices

1. Town of Port Hedland Verge Treatment Application Form
2. Standard Detail Drawings
3. Town of Port Hedland Preapproved Items
4. Town of Port Hedland Preferred Planting Guide
5. Town of Port Hedland Asset Handover and Checklist

Verge Treatment Application

Town of Port Hedland

Applicant's details

Name		
Applicant's address		
Telephone	Mobile	Fax
Owner's Name		
Telephone	Mobile	Fax
Location/address of the proposed treatment		

Contractor's details

Name		
Contractor's address		
Telephone	Mobile	Fax

Verge Treatment Application

Additional Street Tree	☐	Details:
Lawns	☐	Details:
Reticulation	☐	Details:
Gardens	☐	Details:
Other	☐	Details:

Contractor/ owner shall:

a) Read the Town of Port Hedland Landscape Guidelines and Irrigation Specification
b) Attach a plan or sketch showing location, type and design of treatment
c) Contact Dial Before You Dig or utility service providers and locate services
d) Design proposed treatment as per Town of Port Hedland Landscape Guidelines and Irrigation Specifications
e) Phone Horticultural Technical Officer on 9158 9700 and arrange site inspection (24hrs notice required)

I accept the Terms and Conditions of Policy 10/003 for this Application and agree to abide by them once my request has been approved.

Owner's signature _____

Date _____

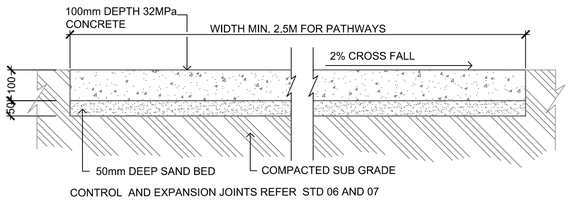
Email address _____

Once this form is completed and signed, please send the application to the below details:
Address: PO Box 41, Port Hedland WA 6721
Email: council@porthedland.wa.gov.au
Phone: (08) 9158 9300

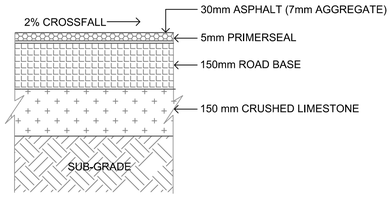
Verge Treatment Application

OFFICE USE ONLY

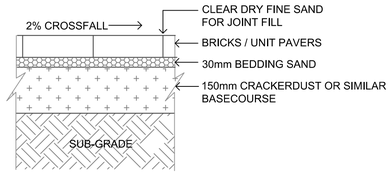
Inspection date	Initial	Final
Officer Name		
Officer's Signature / Date		



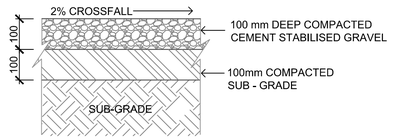
01 CONCRETE HARDSTAND/DUAL USE PATHWAY
SECTION Scale 1:10



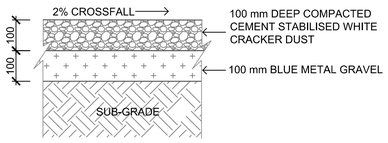
02 ASPHALT
SECTION Scale 1:10



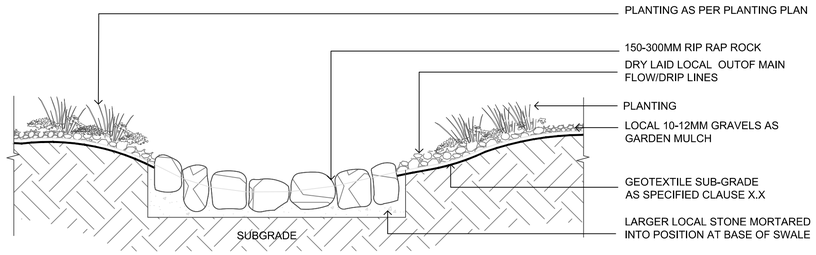
03 BRICK / UNIT PAVING
SECTION Scale 1:10



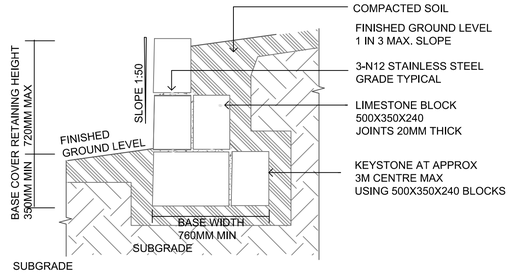
04 COMPACTED CEMENT STABLISED 'GRAVEL
SECTION Scale 1:10



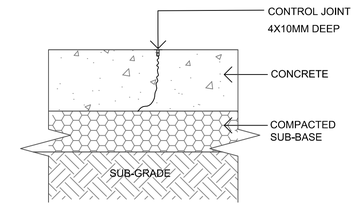
05 COMPACTED CEMENT STABILISED CRACKER DUST
SECTION Scale 1:10



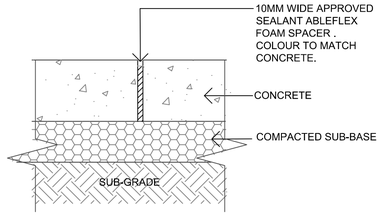
06 TYPICAL PLANTED DRAINAGE SWALE
Section Scale 1:20



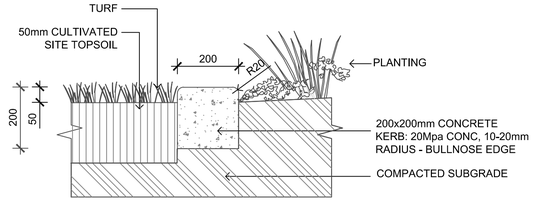
07 TYPICAL RETAINING WALL
Section Scale 1:20



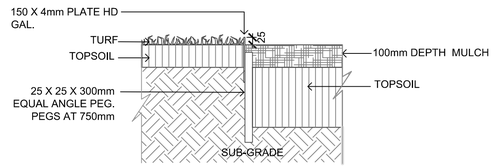
08 TYPICAL CONTROL JOINT
Section Scale 1:5



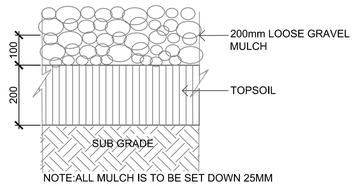
09 TYPICAL EXPANSION JOINT
Section Scale 1:5



10 TYPICAL CONCRETE EDGING
Detail Scale 1:10

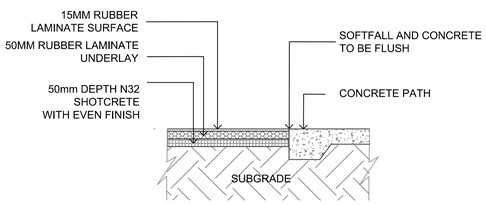


11 TYPICAL STEEL EDGING
SECTION Scale 1:10

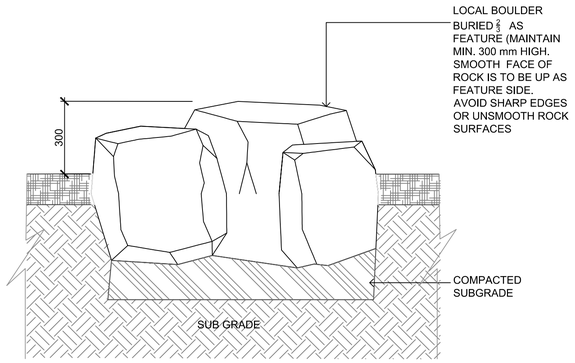


NOTE:ALL MULCH IS TO BE SET DOWN 25MM FROM ADJACENT SURFACES

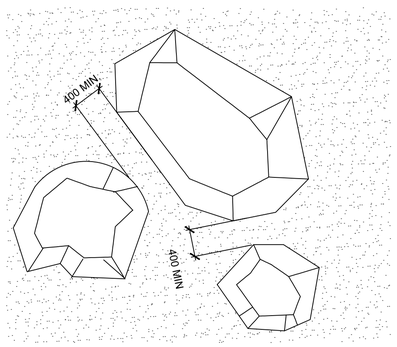
12 LOOSE GRAVEL MULCH
SECTION Scale 1:10



13 TYPICAL SOFTFALL
Section Scale 1:20



14 TYPICAL BOULDER SEATING
Section Scale 1:10



15 TYPICAL BOULDER SEATING
Section Scale 1:10

16 SHELTER
PLANS SECTIONS AND ELEVATIONS

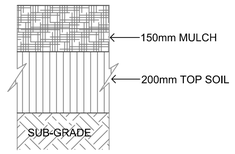
SEE FOLLOWING PAGES

PORT HEDLAND LANDSCAPE GUIDELINES

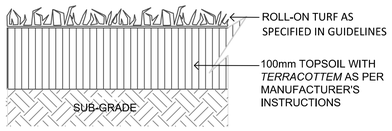
HARDSCAPE ELEMENTS STANDARD DRAWING DETAILS

Drawings	Revision
STD01 - STD15	REV B

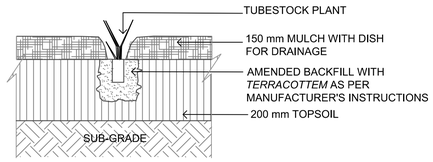
Date	Sheet	Scale
6th Feb 2018	1 of 2	varies @ A1



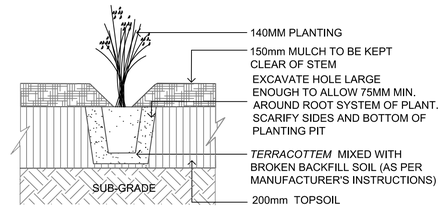
17 MULCH AREAS
Section Scale 1:10



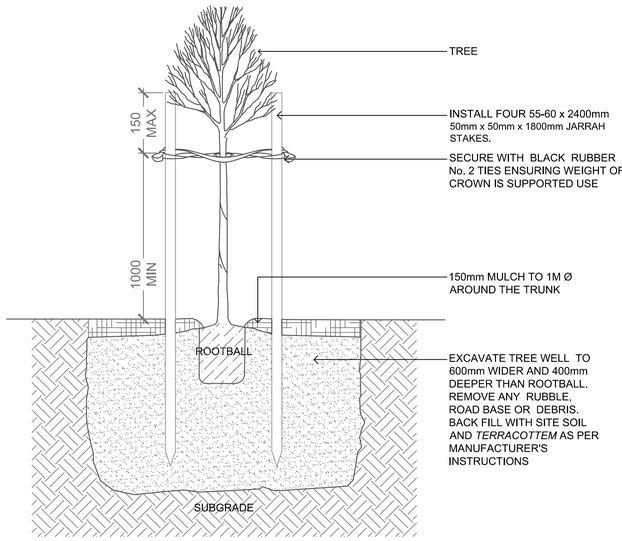
18 ROLL-ON TURF AREAS
Section Scale 1:10



19 TUBESTOCK PLANTING
Section Scale 1:10



20 SHRUB PLANTING
Section Scale 1:10



21 TREE PLANTING
Section Scale 1:20

PORT HEDLAND LANDSCAPE GUIDELINES

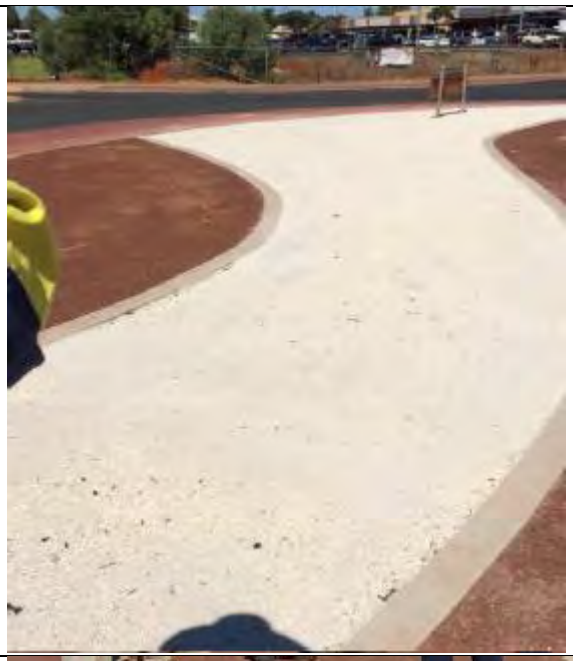
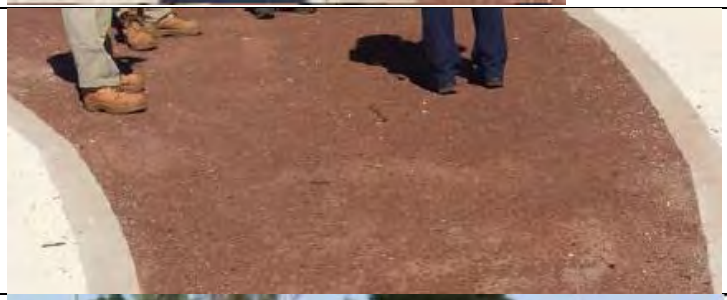
SOFTSCAPE ELEMENTS STANDARD DRAWING DETAILS

Drawings	Revision
STD16 - STD20	REV B

Date	Sheet	Scale
6th Feb 2018	2 of 2	varies @ A1

Appendix 3 – Pre-approved items

Town of Port Hedland

ITEM	DESCRIPTION	PHOTO	APPROVED MODEL/S
01	Compacted Surfaces		White Quartz Cracker Dust
02	Compacted Surfaces		Red Scoria
03	Concrete Finishes		Grey or Red Tint

Appendix 3 – Pre-approved items

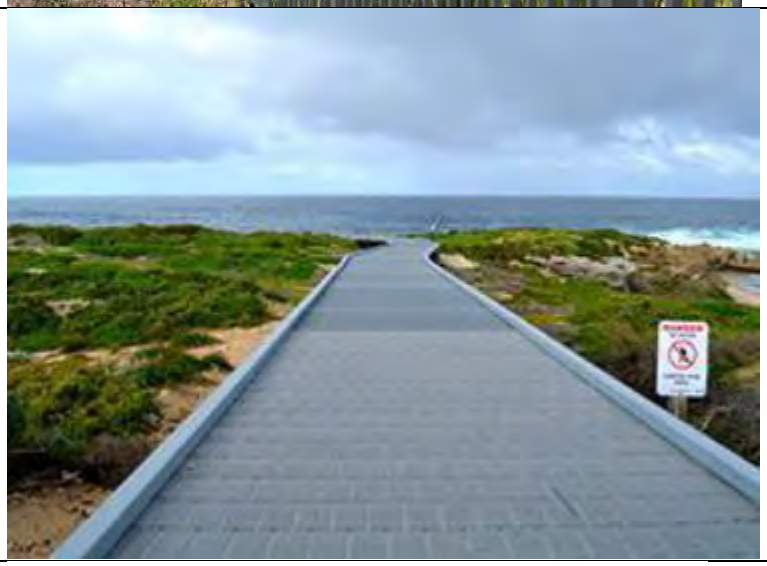
Town of Port Hedland

04	Concrete Finishes		Shellcrete
05	Concrete Finishes		Exposed Aggregate
06	Unit Pavers		'Spinifex' Paving 300x300x60mm

Appendix 3 – Pre-approved items

07	Edging		Extruded Concrete – Bullnose edge
08	Edging		4mm Galvanised Steel
09	Compound Fencing		2.4 black galvanised palisade

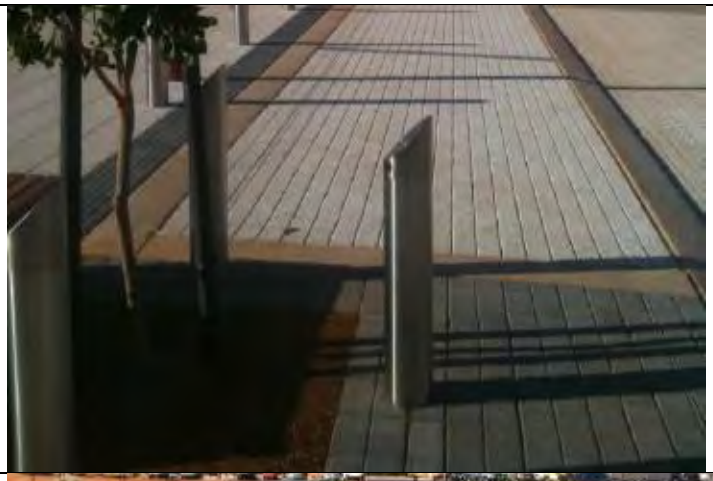
Appendix 3 – Pre-approved items

10	Playground Fencing		2.4 black galvanised palisade – Flat top
11	Board walks		Replas Enduroplank – Grey
12	Boom Gates		Leda Security Products – Model MSGF

Appendix 3 – Pre-approved items

13	Chicanes		
14	Park Lighting – Powered		Greenfrog Systems – Sentinel
15	Park Lighting – Solar		Greenfrog Systems – Stealth

Appendix 3 – Pre-approved items

16	Bollards – Steel		Galvanised Steel
17	Bollards – Recycles Plastic		Flexi Pole Bollards – Charcoal. Dimensions may vary and need Town approval
18	Seats		Exteria Street and Park Outfitters – Parkway Seat Colour to be approved by the Town

Appendix 3 – Pre-approved items

19	Benches and Tables		Exteria Street and Park Outfitters – Garden Table with Boardwalk Bench Colour to be approved by the Town
20	Boulder Seating		Unquarried Sandstone Boulders
21	Litter Bin Post		Exteriror Street & Park Outfitters – Steel SHS Posts Hot dip galvanised finish

Appendix 3 – Pre-approved items

22	Bin Enclosure		ToPH Custom 240lt Bin Enclosure
23	Dog Bag Dispenser		Woodlands AMS Dog Bag Dispenser – Galvanised Steel
24	Drinking Fountains		Foundry Foreshore Drinking Fountain

Appendix 3 – Pre-approved items

25	Bicycle Racks		Single Hoop Galvanised Biocycle Racks
26	Barbeques		Christies Modular Electric BBQ. Bench configurations will vary depending on the POS needs

Preferred Planting Guide

Town of
Port Hedland

Preferred Planting Guide

Town of Port Hedland

CONTENTS

Town of Port Hedland

TREES

Golden Flower Tree – Cassia fistula

The Golden Flower Tree is a fast growing Indian tree to about 6 m high with large compound leaves and about 16 pairs of leaflets per leaf, often deciduous or semi-deciduous. Massed bunches of bright yellow flowers are produced in late spring to early summer, often later in cooler climates. The yellow flowers are arranged in large pendulous sprays and the cylindrical seed pods often exceed 30 cm long. Some old pods can be found hanging on the tree at most times of the year. The pods, seeds and pulp between the seeds should not be eaten. Good wind resistance.

South Hedland Primary School. Weaver Street

Town of Port Hedland

Royal Poinciana – *Delonix regia*

This many-branched, broad, spreading, flat-crowned deciduous tree is well-known for its brilliant display of red-orange bloom, literally covering the tree tops. There is nothing like a Royal Poinciana (or better yet, a group of them) in full bloom. The fine, soft, delicate leaflets afford dappled shade during the remainder of the growing season, making Royal Poinciana a favorite shade tree or freestanding specimens in large, open lawns. The tree is often broader than tall, growing about 15m high and 10m wide. Trunks can become as large as 50 inches or more in diameter. Eighteen-inch-long, dark brown seed pods hang on the tree throughout the winter, then fall on the ground in spring creating a nuisance.

Port Hedland below Water Tower

Yellow Poinciana – *Peltophorum pterocarpum*

This upright, handsome, spreading, semi evergreen tree has a rounded canopy and is capable of reaching 15m in height with a 10m spread. Form can be quite variable from tree to tree. With proper training and pruning in the nursery and in the landscape, a more uniform crown will develop. The dark green, delicate, feathery leaflets provide a softening effect for the tree's large size and create a welcoming, dappled shade. During spring the entire tree's canopy is smothered with a yellow blanket of flowers, appearing in showy, terminal panicles and exuding a delicious, grape-like perfume. These flower clusters are followed by four-inch-long seed pods which ripen to a brilliant, dark, wine-red.

Port Hedland Race Course.

Town of Port Hedland

Summer Red Flowering Gum – *Corymbia ficifolia*

Prefers infertile, sandy soils but it is readily adaptable to most temperate locations, provided it is not exposed to severe frost or sustained tropical damp. It is an ideal street tree as it is hardy, moderately fast growing, and rarely grows large enough to require pruning. Typically it will take about 7 years before it flowers for the first time and 15–20 years to reach something approaching its full size of anything between 2–8 m. For the home gardener, buying a "red flowering gum" from a nursery is something of an adventure: it may or may not be a *ficifolia*, and the flower colour does not breed true - there is no way to find out what colour the flowers will be short of planting a seedling and waiting for it to reach maturity

Pepperflower Way, South Hedland

Coolibah - *Eucalyptus victrix*

The Coolibah is an ideal ornamental small to medium Tree with smooth white trunk to 12m high. It has white flowers in the spring. Dull light green to grey-green lanceolate foliage. Terminally held peduncles in groups of 7 with conical to rounded operculum. Flowers creamy white, Nov–Mar. Bark smooth throughout, white and powdery. Tolerates heavier soils and temporary inundation. Drought tolerant. Generally free of any serious pests or diseases. Attracts honey & seed eating birds

Cadjeput – *Melaleuca leucadendron*

The paperbark tree gets its name from its layered and papery bark. The plant typically grows to about 75 feet in height although it also grows as a smaller shrub in some areas. The tree's new shoots, covered in thick silky hairs, give the tree a somewhat silvery appearance. Stands of paperbark occur in swampy, coastal areas in humid, hot regions. From March to December, the tree produces flowers that grow up to 5 inches in length. Once the flowers fade, small fruits appear with mature seeds ready for collection in October or November. The oil from the tree makes a good antiseptic as well as insect repellent.

Pink Trumpet Tree – T*abebuia rosea (alba)*

Town of Port Hedland

This tree, with rough bark, has compound leaves with 5 leaflets, the lower pair are smaller than the other 3, margins smooth, upper leaflets lanceolate to 15 x 8 cm, midrib pale, flat with surface or slightly raised, lepidote scales present. Flowers with a bilabiate pink calyx, lepidote scales obvious; corolla pink, throat whitish.

Port Hedland Anderson Street

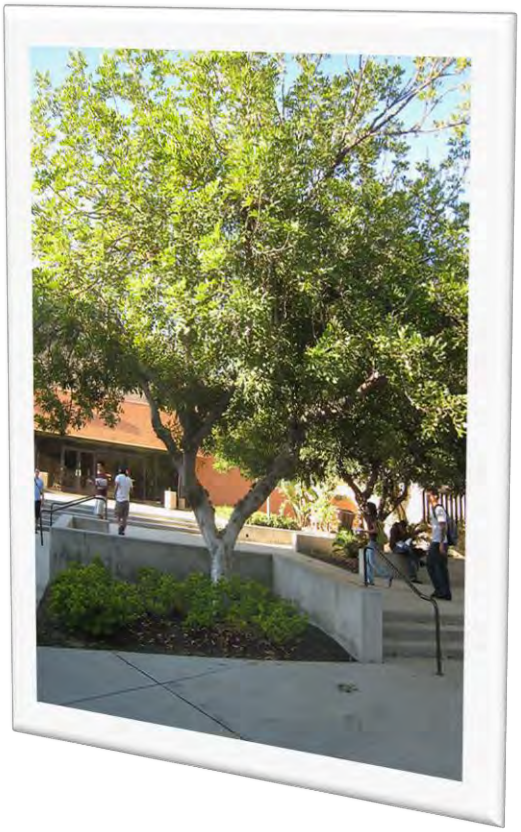
Pundul Tree - *Owenia reticulate*

A Small Tree, 4-14 m high, bark often black and corky. Large leaves comprise smaller smooth leathery mini leaves. Flowers are white, and occur between May and Oct to Nov. The seeds were roasted and extracted, and applied to sores. A leaf infusion was used as a poultice. The nutty fruits were possibly eaten.
Grows best in Coastal areas of tropical Western Australia and the Northern Territory. Sandy soil. Full sun.

Cottier Drive, South Hedland

Tuckeroo - *Cupaniopsis anarcardioides*

A very hardy native tree growing to a height of about 8 m by 5 m wide. It will perform well in harsh conditions including poor soils, salt, and wind exposure and air pollution. It has leathery leaves and produces small creamy-yellow to green-yellow flower clusters on the ends of branches, which are followed by orange-yellow berries. It is an excellent tree for screening and street planting and is also a known host for at least eight species of native butterflies.



Pilbara Jam – *Acacia citrinoviridis*

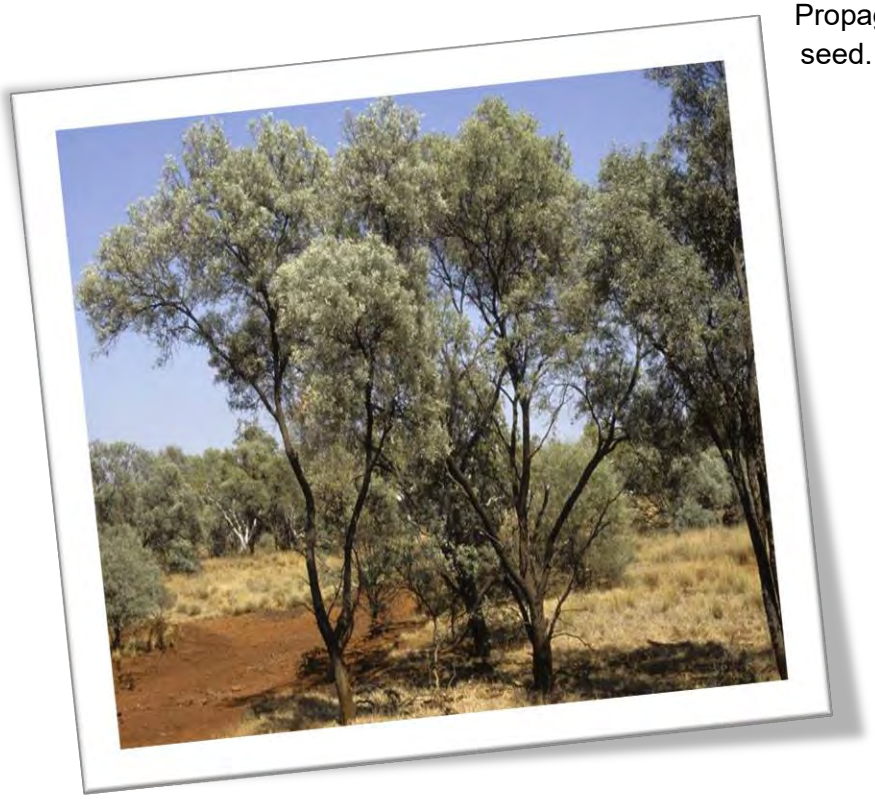
Town of Port Hedland

Acacia citrinoviridis, commonly known as Pilbara jam, black mulga, river jam, milhan or wantan. Endemic to Western Australia it occurs along creeks and rivers in semi-arid land. Black mulga grows to a height of about eight meters. It usually has just one trunk. Like most acacias species, it has phyllodes rather than true leaves. These are a grey-olive colour, and may be up to 12 centimeters long and about one centimeter wide. The flowers are yellow, and held in cylindrical clusters. The pods are around 8 centimeters long and have a lemon-green felty covering.

Manggurda Wattle – *Acacia distans*

Town of Port Hedland

Shapely trees with silvery grey- grey green crown 2-10 m high, bark dark grey, fissured. Flowers yellow, Mar to May. Clay, red sand, alluvium, loam. Floodplains, hardpans, river beds. The common name Manggurda Wattle is from the Banyjima name for the Fortescue River. Most acacias are fast growers and are useful plants for restoring vegetation to denuded areas, as well as being suitable for ornamental or landscape use though their quick growth habit is offset by a short life. Plant in a position in full sun with light free-draining soil. Although drought tolerant, once established most grow better with reliable summer moisture. Acacias can be given a light prune once flowering is over. Many species are short-lived and some may self-sow too freely, becoming weeds. Propagation is mostly from seed.



Town of Port Hedland

Western Gidgee – *acacia pruinocarpa*

Acacia pruinocarpa (Black or Western Gidgee) is a thornless, Australian, shrub to small tree, native to dry hot inland areas.

The trees mature height and width ranges from 3 to 8 meters with leathery grey green phyllodes. In Spring a brilliant display of bright flower cover the tree. It is a newly introduced ornamental shade For dry climate. It is one of the few Pilbara Wattles that flowers During the summer months.

Native Bauhinia - *Lysiphyllum cunninghamii*

The trees are up to six meters tall with dark, coarsely flaking bark. The leaves have two lobes which are joined like a butterfly's wings. This back-to-back positioning of the leaves gives rise to the Aboriginal name for this tree – "Jiggle" tree. Jiggle means mother-in-law and according to Aboriginal custom, mother-in-law and son-in-law must not directly face each other. The seed pods are large and reddish brown, becoming darker as they mature. The flowers are bright red and full of nectar, making it a popular tree with honeyeaters. Another name given to this tree is "Turkish Delight" because the sap, when dry, forms a chewy gum which when eaten with the nectar resembles this sweet. The Bauhinia trees flowers spasmodically between April and August and fruits appear between November and January. It makes an ideal shade tree and is used for nesting in by native bees. A medium-sized tree, usually with a short, stout trunk, its outer branches hang down giving it a characteristic weeping appearance. The leaves of the Bauhinia are its most distinctive feature. Each consists of a paired leaflet resembling a butterfly. They are high in protein and are relished by many grazing animals, especially cattle.

River Sheoak - *Casuarina equestifolia*

The River Oak is an attractive evergreen tree with fine greyish green needle-like foliage that grows to a height of 10–35 m with a spread of about 10 meters. The trunk is usually erect, with dense rough bark. Flowers are reddish-brown in the male and red in the female. Cones are small, nearly round to elongated and about 10 mm across. Trees are usually found in sunny locations along stream banks and swampy areas. It's widely recognized as an important tree for stabilizing riverbanks and for soil erosion prevention accepting wet and dry soils. Suited to windy sites and coastal areas.

Town of Port Hedland

Desert Bloodwood – *Corymbia opaca*

Desert Bloodwood grows on the plains of the Great Sandy Desert. The tree grows up to 30 feet in height. The tree features rough bark and sap that looks like thick red blood while its leaves appear tough and leathery. The roots store water for use in dry periods. In April through October, the tree produces yellow and white flowers with nectar that provides food for several desert animals including opossums and insects. This tree has been a supermarket, pharmacy and hardware store for desert Aboriginal people. You can eat the plump, green grubs from the gall (bush coconut) and grubs that live under the bark; collect honey or "sugarbag" from the hives of stingless native bees; make a sweet drink from the nectar, make carrying bowls from the bumps (boules) on the bark, obtain medicine from the red sap and collect drinking water from hollows and the roots. The red sap was also used to tan kangaroo-skin water bags; the dead wood is one of the most favored firewood's, regarded as burning with a steady, hot flame; fruit capsules are used in necklaces and as toys

Broome Bloodwood - *Corymbia zygophylla*

Tree to 6m with bark that is rough and persistent; mature leaves dull green. Flowers are white. Often contains sugarbag (bush honey).

Yulbar - *Erythrin vespertilio*

Deciduous tree that grows 3-15 m high. Flowers are orange-red and occur from May to Nov. Grows in sand, clay, and loam over basalt or limestone. Gorges, along rivers & creeks. It's a tree native to north and north-east Australia. Its common names are Grey Corkwood or Bats Wing Coral Tree. Traditionally used by Aboriginals for a wide range of things including using the wood to make shields and the bark for medicinal purposes. This species' alternative common name of 'grey corkwood' refers to the grey colour of its lightweight timber.

Town of Port Hedland

White Gum - *Eucalyptus alba*

White Gum (*Eucalyptus alba*) is a small tree with broad leaves and creamy flowers.

It has got a dull white bark, creamy-white flowers and narrow leaves.

Town of Port Hedland

Snappy Gum - *Eucalyptus luecophloia*

Across the Pilbara grows a small twisted eucalypt known as Snappy Gum. So called because the dead branches snap cleanly across the grain when cracked across a rock or log. This makes them ideal for fire wood. The young trees are smooth and graceful, but as they age, develop into fantastic, knotted, and twisted shapes.

Port Hedland Airport

Ghost Gum - *Corymbia aparrerinja*

Formerly Eucalyptus papuana and reclassified as Corymbia aparrerinja, this evergreen is known as the ghost gum because of its smooth white bark. It lives in red sand flats, dry creek beds and rocky slopes. Aborigines use its bark to treat colds, and it is prominent in their myths and stories.

Red Mallee - *eucalyptus socialis*

Mallees are Eucalyptus plants whose common feature is that they are multi-stemmed from the ground. There are a few other eucalypt groups like Mallets, and woodland eucalypts, that have the branching habit, but they start branching from the trunk above the ground level, while mallees most often don't have one single trunk. Red Mallee (*Eucalyptus socialis*) is a mallee or small tree with yellow to creamy flowers, narrow leaves and dark grey bark. It is found in inland areas of South Australia, New South Wales, Western Australia and Northern Territory.

Lebbek Tree – *Albizia lebbek*

Albizia lebbeck is a species native to Indomalaya, New Guinea and Northern Australia and widely cultivated and naturalized in other tropical and subtropical regions. English names for it include Lebbeck, Lebbek Tree, Flea Tree, Frywood, Koko and Woman's tongues Tree. The latter name is a play on the sound the seeds make as they rattle inside the pods. Being one of the most widespread and common species of Albizia worldwide. It is a tree growing to a height of 18–30 m tall with a trunk 50 cm to 1 m in diameter. The leaves are bipinnate, 7.5–15 cm long, with one to four pairs of pinnae, each pinna with 6–18 leaflets. The flowers are white, with numerous 2.5–3.8 cm long stamens, and very fragrant. The fruit is a pod 15–30 cm long and 2.5-5.0 cm broad, containing six to twelve seeds

South Hedland

Town of Port Hedland

Cottonwood – *Hibiscus tiliaceus*

Hibiscus tiliaceus is a tree native to the shores of the Pacific and Indian oceans, today cultivated or naturalized throughout the tropical and subtropical regions of the world, particularly in coastal areas. It is grown mainly as an ornamental tree for landscaping, although its wood, bark and flowers have been used for various purposes. *Hibiscus tiliaceus* can attain a height of up to 8-10 m (26'-32') and can grow just as wide if not pruned. It is suitable for sandy and moist soils, although it will also grow well under drier conditions and in a variety of soils. It can also stand brackish water and is tolerant of salt spray, and therefore it is an excellent species for coastal areas. The trees are very ornamental, with large heart-shaped leaves and a dense foliage. The leaves are usually dark green, but there are selections available with variegated or purplish foliage. The hibiscus-like flowers are bright yellow with a crimson center, and usually point down on the tree or slightly sideways. In winter there may be few or no flowers in mild-tropical or subtropical climates, but the flowers may remain on the tree for more than a single day, creating an interesting effect as both yellow and reddish flowers can be seen on the trees at the same time.

RFDS at Airport

Rain tree – *Albizia saman*

The rain tree is member of the pea family and is found in tropics and tolerates dry periods. Tolerates a range of soils from heavy clays to infertile or waterlogged soils. Grows best in moist well fertilized soil. The leaves fold in rainy weather and in the evening, hence the name "rain tree" and "five o'clock tree" (Pukul Lima) in Malay. Several lineages of this tree are available, e.g., with reddish pink and creamish golden colored flowers. Can reach a height of 25 meters with a large symmetrical Crown. Early discoveries of these trees were made in 1800 and are still alive today.

South Hedland Bypass Street

Jacaranda – *Jacaranda mimosifolia*

This deciduous or semi-deciduous tree is originally from South America. It has feathery foliage and clusters of pale mauve, trumpet-shaped flowers in September and October There are 4 stamens, as well there is an unusual elongated, glandular-pubescent staminode. The fruits are round flattened, woody capsules that usually remain on the tree for quite a few months.

Town of Port Hedland

African Mahogany – *Khaya senegalensis*

African mahogany is a medium-sized tree which can grow up to 15–30 m in height and 1 m in diameter. The bark is dark grey to grey-brown while the heartwood is brown with a pink-red pigment made up of coarse interlocking grains. The tree is characterized by leaves arranged in a spiral formation clustered at the end of branches. The white flowers are sweet-scented; the fruit changes from grey to black when ripening. African Mahogany is recommended to be located away from infrastructure due to invasive root system.

Indian Beech - *Mellitia pinata*

A very hardy, fast-growing coastal native tree that is found naturally throughout Asia (Pantropic). The Pongamia is long-lived and thrives in wet and dry tropical areas and will even grow with its roots in saline water of river estuaries. In India it has been cultivated for over 3000 years as a useful source of lamp oil (biofuel) and a natural medicine. It produces terminal clusters of pink flowers that stand well clear of the broad, glossy green leaves. Useful as a shade tree, it may reach a height of about 15 m, with a similar spread and is suitable for small to medium-sized gardens.

McDonalds South Hedland

Spanish Cherry - *Mimusops elengi*

A most beautiful evergreen medium height tree with an elegant growth habit and shapely crown. Mimusops is a native of India, Burma, Sri Lanka. The tree bears highly fragrant small whitish flowers in February-March. It is also known as India's 'sacred garland tree', and 'maha gandh raj' or 'emperor of fragrance trees'. The fragrance of the flowers can be described as a combination of tuberose and gardenia. These Trees have been planted in the South Hedland CBD redevelopment.

Town of Port Hedland

African Tulip - *Sapthodia companulate*

A most attractive tree when flowering, this African tree is a weed in the wet tropics. In moist areas the seeds germinate readily, as well suckers arise from damaged roots. The opposite, pinnate leaves up to about 20 cm long with 8-18 leaflets are leathery, shiny green above but with some hairs on the lower surface. The large 8-12 cm long, flowers are grouped in large clusters, when the calyx splits then the orange to red crinkly petals unfold. The freshly opened flower and the buds are filled with copious nectar, popular with birds. The fruit is an elongate follicle, up to about 20 cm long that is usually held upright. At maturity it splits along the side to release numerous winged seeds.

Native Almond - *Terminalia canescens*

More or less a deciduous shrub or tree that grows from 1-10 m high. Flowers are a cream-white/white-green, Jan to Jul. Stony soils, red sand, sandstone, laterite. Variety of habitats

Beach Almond - *Terminilia cattapa*

Beach Almonds are large, handsome trees growing to 35 m tall, with an upright, symmetrical crown and horizontal branches, as the tree gets older, its crown becomes more flattened to form a spreading, vase shape. The leaves are large, 15-25 cm long and 10-14 cm broad, ovoid, glossy dark green and leathery. The leaves form a rosette and are found only at the end of a branch. During the dry season, the leaves turn into autumn colors of red, copper and gold before falling. The green almond-shaped fruit turns red to purple when ripe, the smooth outer skin covers an inner layer of corky fiber's which surround the nut, the seeds are dispersed by water. The nuts are edible and taste like almonds.

South Hedland- Kybra Close

Wild Plum-*Terminilia platyphylla*

Small tree with large broad leaves. Cream colored flower spikes. The fruit is edible. Also, the hardened exudate from the trunk is eaten as toffee. Native to tropical western Queensland and the Northern Territory.
Often found along watercourses. Full sun.

Paper Bark - *Melalueca luecadendra*

Melaleuca luecadendra or Cadgeput Tree is widely distributed in northern parts of Western Australia. It has been used as a Street Tree in Parts of South East Asia. It has a thick spongy bark, bright green foliage and a slightly weeping habit. It seems to be tolerant of extreme water-logging, clay soils and seems able to withstand cyclones with the greatest of ease.

Silver Cadjeput - *Melaeluca argenta*

Although this tree can grow large, it will flower as a shrub. It is a very useful ornamental but requires moisture for best results. Its foliage is a silvery colour with the cream, perfumed 'bottle brush' flowers attracting numerous birds. Usually grows into a medium-sized tree and is usually found along creeks and watercourses. Bark has the usual papery texture.

Quandong - *Santalum acuminatim*

The Native Peach is a small Tree that can grow up to 8mtrs but usually around 3mtrs. It is a parasitic plant with roots attaching themselves to the root of another shrub. The leaves are distinctly grey-green and are leathery and variable in size. The flowers are small, white, and occur in clusters at the ends of branchlets. The greenish or yellow fruit is about 3cm in diameter and becomes bright red when ripe. The edible fruit is high in vitamin C and various minerals, and is made into jams, pies, or eaten raw. The ground seed kernels have been used as a liniment. The root was ground and an infusion was drunk to treat rheumatism. The leaves were crushed and a poultice was made to treat sores and boils. **:** Native to semi-arid and arid regions of mainland Australia. Prefers full sun and sandy soils.

Town of Port Hedland

Locust Shademaster- *Gleditsia triacanthos*

Gleditsia are proven as hardy street and shade trees, being fast-growing, heat and drought tolerant and well-suited for the demands of urban environments. Trees grow with an open, spreading canopy and have attractive, fine, somewhat weeping foliage. The 'Shademaster' variety is a thornless, medium to large tree distinctive for its spreading upper canopy, persistent dark-green foliage and golden-yellow autumn colour. Suitable for lawn sites. Tolerates root covering. Urban environments. Heat and drought tolerant when established. Mildly frost tolerant.

Town of Port Hedland

SMALL TREES

Mulga- *Acacia anuera*

The common name, ***Mulga"*** is an Australian Aboriginal word that means dream seed, both the tree and its seed are part of their mythology. The tree has a moderate growth rate with a mature height of approx. 4m. It grows well in a variety of settings but prefers full sun and well drained soils. The densely arranged needle-like, silver -gray (leaves) give the canopy an airy, lacy quality that contrasts with the dark reddish brown branches. The canopy can extend to the ground. Typically bottom branches are trimmed to expose the trunk(s) and give the tree an umbrella form.

Town of Port Hedland

Dogwood- *Acacia coriacea*

Spreading shrub or tree 1–10 m high. Bark fibrous, hard or thick-spongy. Young new growth yellow-green. Flowers are pale yellow to cream colored and often occur all year round.

Curly-bark Wattle - *Acacia monticola*

Also known as Red Wattle or Scratchy Wattle, this large shrub is a common component of the pindan vegetation especially around the Dampier peninsular. It has reddish brown bark that continuously peels in small curly flakes leaves the tree looking like it has a coat of red curly hair. Traditionally used to make digging and clapping sticks, boomerangs and spear heads out of the wood.

Pilbara Weeping Wattle - *Acacia orthocarpa*

Often weeping or sometimes bushy and low-spreading, resinous shrub or small tree to 4 m high. Bark smooth or flaky, grey, dark grey or grey-brown. Yellow flower spikes often occur all year round.

Pindan Wattle - *Acacia tumida*

When this wattle flowers in the dry season, the air is heavily scented with a sweet perfume. The pollen, however, can cause hay fever. It often forms dense thickets in red sand with spinifex, described as Pindan country around the Pilbara area. Acacia tumida is a short-lived spreading shrub or tree up to nine meters. The upper bark is smooth, white and sometimes waxy, but the lower bark is dark and ruptured.

Desert Kurrajong - *Brachychiton gregorii*

A small tree found in Northern and Western Australia grows from between 3-12m with cream-yellow/green flowers occurring between Novembers to January. Prefers Red sandy loam and grows in sand dunes as well as rocky ridges and slopes.

Town of Port Hedland

Callistemon - *Kings Park Special*

'Kings Park Special' is a seedling that was raised at Kings Park and Botanic Gardens in Perth. The origin of the seed is not known. This cultivar grows into small bushy trees from 3 to 5m tall by 3 to 4m wide. The inflorescences are in multiple heads on branch terminals and are bright red in colour. The flowering season in Western Australia is from mid-September to October with a smaller flowering in autumn.

Silver Cassia - *Cassia artemisioides*

This is a shrub that grows up to 3 meters in height. It has pinnate leaves with between 1 and 8 pairs of leaflets. It produces an abundance of yellow flowers in winter and spring which are about 1.5 cm in diameter, followed by 2 to 7 cm long flat green pods which age to dark brown. The species adapts to a wide range of climatic conditions, although it is susceptible to frost, particularly when young. It prefers dry, well drained sites with full sun.

Green Cassia - *Cassia chatelainiana*

Shrub that grows from .6 to 3m tall. Yellow flowers appear in April through to September. Grows in red sandy, loamy, clayey often stoney soils.

Limestone Cassia - *Cassia oligophylla*

Can be used as an informal clipped hedge, background, screen, xeric garden accent. Moderate fast grower to 2m with equal spread, rate of growth strongly influenced by water availability. Golden pea flowers in late to early spring but not fragrant.

Town of Port Hedland

Desert Poplar – *Codonocarpus cotinifolius*

Red sandy soils in drier inland regions. Small erect short lived tree or tall shrub, up to 4 m tall. Smooth pinkish trunk. Leaves: Broad oval tapering to a point 2-5cm long. Dull waxy bright grey-green. Borne on long stalks Flowers: Small insignificant attached to long stalks near ends of branchlets.

Rough Leaf Ghost gum – *Corymbia aspera*

A ghost gum tree of wide distribution across drier monsoonal areas of northern Australia from near Halls Creek and Kununurra in Western Australia through the Northern Territory between Wauchope and the Roper River catchment. It occurs on sandstone and quartzite ranges and ridges. *Corymbia aspera* has a trunk entirely smooth-barked or with a short tessellated stocking of rough bark.

Desert Bloodwood – *Corymbia deserticola*

Tree (mallee), 2-6 m high, bark rough, tessellated. Flowers are cream-yellow. Adapts well to stony plains, rocky hills & mountains

Pilbara Bloodwood – *Corymbia hamersleyana*

Tree (rarely mallee) that grows from 3-10 m high, bark rough, tessellated. Flowers are white to cream and appear from April to August. Red sandy loam or sand. Drainage lines, stony hillsides, plains.

Twin Leaf Mallee – *Eucalyptus gamophylla*

Mallee, occasionally almost prostrate growing 1.5-7 m high. The bark can be smooth or rough. Flowers are white and appear between Nov to Feb. Grows in red sand, sandplains & dunes, stony spinifex country.

Town of Port Hedland

Silver Leaf Grevillea - *Grevillea refracta*

Grevillea refracta grows mainly in sandy, gravelly open country such as spinifex plains and on sandstone ridges. It is a common sight along roads and creeks. Flowers between March and October.

Wickhams Grevillea - *Grevillea wickhamii*

Grevillea wickhamii is an erect small tree that can reach up to 6m tall which is endemic to Western Australia. It has grey green leaves which have a holly like shaped leaves. There are a number of sub species which have a wide range of colors including red, pink, orange and yellow.

River Tea- tree - *Melaleuca bracteata*

Melaleuca bracteata or 'river tea tree' is large shrub or small tree native to the northern regions of Australia and as the name suggests it is found growing along rivers and water courses. This species is also known variously as 'snow in summer' and 'white cloud tree' because in summer it produces a massive flowering display which envelopes the entire canopy. It is tough, has a compact canopy, single straight trunk and doesn't grow large enough to threaten overhead power lines. Good specimen tree.

Hummock Honey Mrytle - *Melaleuca eleuterostachya*

Erect shrub or tree that will grow up to 4m high. Flowers are white and occur between July through to Jan. grows on sandy or clayey soils, often over limestone. Mostly seen on plains, low hills, and moist depressions.

Town of Port Hedland

Native Myrtle - *Myoporum montanum*

Attractive, hardy low growing small tree to 4m with deep green foliage and white flowers with purplish dots appearing most of the year. A very tough plant tolerating most well-drained soils and situations, frost and extended dry periods. Also tolerates alkaline soils. Prefers full sun but will grow in partial shade, not as dense as full sun. Can be rejuvenated by pruning or cutting back hard if it becomes too woody. Excellent for embankment and erosion control and is a good fire retardant plant.

Frangipani - *Plumeria obtuse*

The attractive flowers are most fragrant at night in order to lure insects and moths to pollinate them. The flowers have no nectar, however, and simply dupe their pollinators. The insects/moths inadvertently pollinate them by transferring pollen from flower to flower in their fruitless search for nectar.

Orange Bells - *Tecoma smithii*

Orange Bells is an attractive plant that is cultivated as an ornamental it has sharply-toothed, lance-shaped green leaves and bears large, showy, bright golden orange trumpet-shaped flowers. It is drought-tolerant and grows well in warm climates.

Yellow Bells - *Tecoma stans*

Yellow Bells is an attractive plant that is cultivated as an ornamental it has sharply-toothed, lance-shaped green leaves and bears large, showy, bright golden yellow trumpet-shaped flowers. It is drought-tolerant and grows well in warm climates.

Simple Leaf Chastetree - *Vitex trifolia*

Vitex trifolia is a large coastal shrub small tree less than 5 m in height with the stems covered by soft hairs.Grows on sand, coral, gravel or shale. Simple leaf chaste tree is occasionally found in clay over limestone but this is rare. It also grows on beaches and along the inland edge of mangrove swamps, in grasslands and in forest and secondary vegetation. It is often found near watercourses.

SHRUBS:

Silky Wattle – *Acacia acradenia*

A spindly shrub to 5m high with smooth to fibrous bark. Flower are yellow and appear from July through to August. Often growing on Stony/ rocky grounds.

Grey Whorled Wattle – *Acacia adoxa*

Acacia adoxa is a spreading shrub up to 1.2 m high with yellow flower appearing August- September. It occurs around red sandy soils, sandstone, stony plains & ridges.

Edible grubs occur in the rootstock. Seeds are harvested by ants.

Salt Wattle – *Acacia ampliceps*

Shrub or small tree 2-8 m high with a spreading canopy. Flowers are White or cream appearing between May and August. Can be found on sandy or loamy alluvial soils with an alkaline reaction and is highly tolerant to salinity.

Arid Wattle – *Acacia arida*

Arid Wattle is an erect shrub to growing to 3 m high branching from base. The bark is smooth and grey or grey-brown with rod like yellow flowers appearing from Mar through to late July-August.

Cape Honeysuckle – *Tecoma capensis*

An erect, scrambling shrub, it grows to 2–3 m in height and a similar width. Normally evergreen it may lose its leaves in colder climates. In certain habitats it may scramble, meaning that it shoots out long growth tips which lean on the stems and branches of other plants, as well as boulders, trellises, fences and walls; this can lead to the plant appearing untidy. The flowers are tubular, narrow, about 7.5 cm long, and are produced at different times throughout the year. The flower colour ranges from orange to orange-red to apricot.

Town of Port Hedland

Atkins Wattle - *Acacia atkinsiana*

Open, spreading, rounded shrub that grows to 4 m high. Flowers are yellow and appear Dec or Jan to Mar or May to Jul. Rocky loam. Stony grounds, plains, ironstone hills.

Two Nerved Wattle - *Acacia bivenosa*

Widespread in the Arid Zones of Western Australia it grows in a variety of soils, including coastal sand, and on rocky hillsides and gullies, in shrub land, open shrub land and open woodland, and is often associated with spinifex.

Coles Wattle - *Acacia colei*

Coles Wattle is a native perennial bush or tree. It grows to a height of up to 9 m. and blooms from June through July and the flowers are bright yellow. Grows in a variety of soil types; frequently forms dense stands along dry, stony or sandy drainage lines. It is a component of many semi-arid, subtropical plant communities, especially the *Acacia* - dominated scrubs and tall open shrub lands of north-western Australia.

Wathmallu - *Acacia cowleana*

Acacia cowleana is a shrub to small tree up to 8 meters high. The bright yellow flowers occur in elongated spikes up to 300 mm long and occur during winter and spring. The flowers are followed by slender, straight seed pods about 75 mm long. Usually grows in arid and semi-arid areas on sandplains and along creek lines.

Red Mulga - *Acacia cyperophylla*

Red mulga is a tree that grows to a height of about 7 meters and is endemic to Western Australia where it grows on the banks of rivers and creeks on the semi-arid plains. It is most readily identified by its distinctive bark which constantly peels off in small curling flakes making it look like the tree has a coat of curly hair.

Town of Port Hedland

Maiden Wattle - *Acacia ancistrocarpa*

Multi stemmed, resinous shrub that grows 1–4 m high and up to 4 m diam. Bark is smooth on upper trunk and grey to bluish on the trunk. Spikes of golden flowers 2.5–4.5 cm long.

Waxy Wattle - *Acacia dictyophleba*

Widespread in arid zones where it extends from the Pilbara region in W.A. eastwards through southern N.T. and north-eastern S.A. to south-west Qld. It is particularly common in the region of the Simpson Desert. Grows mainly in deep red or red-brown siliceous sand, on dunes or interdunal areas; sometimes found on shallow stony soils.

Woodstock Wattle - *Acacia levata*

Spreading, multi-stemmed shrub growing up to 1-3 m high, to 5 m wide. Flowers are yellow and usually appear around May-June. Prefers sand or sandy loam over granite and grows well on hillslopes. Grows alongside *Acacia hilliana* and *A. stellaticeps* and spinifex.

Maitlands Wattle - *Acacia maitlandi*

Maitland's Wattle, is a perennial tree native to Australia. It has an open and spindly habit, with a height between 0.7 - 3.0 meters. Flowers are yellow and occur sometime between May and October. The favored soil type is red sand, or stony ground, the habitat is sandy or stony plains, and on hills. The species is used to make boomerangs and spear throwers, the gum produced is edible

Ranji Bush - *Acacia pyrifolia*

Obconic (inverted cone shaped), rigid, erect shrub, to 4.5 m high, bark smooth grey on main stems, upper branches yellow; flower heads globular. Flowers are yellow and occur Jul or Aug. Alluvial sand, coarse red-brown sand, pebbly sand, brown loamy clay, skeletal soil, sandstone. Undulating plains, along rivers and creeks, in creek beds.

Limestone Wattle - *Acacia sclerosperma*

Commonly known as limestone wattle or silver bark wattle it is endemic to Western Australia, it occurs on floodplains and along water-courses throughout the arid north-west corner of the State. Limestone wattle grows as a spreading, tall shrub up to four meters high and six meters wide. Like most Acacia species, it has phyllodes rather than true leaves. These are bright green, oval in cross-section, and may be up to seven centimeters long. The flowers are yellow, and held in cylindrical clusters about five millimeters in diameter.

Curry Wattle - *Acacia spondylophylla*

Spreading shrub to 2 m high. Pods linear, curved, 20–40 mm long, 6–8 mm wide, with nerve-like margins. Occurs commonly in the Pilbara region and at scattered localities E to the Rawlinson Ra., W.A., in the Macdonnell and Musgrave Ranges, N.T. and E to Dajarra, Qld. Grows in shallow, sandy or rocky soil.

Northern Star Wattle - *Acacia stellaticeps*

Occurs in W.A. from the north-west coast between Exmouth Gulf and Broome E across parts of the Great Sandy Desert to the Sturt Creek area and into N.T. in the Tanami area; recorded between 1800'S and 2330'S. Grows in red, sometimes clayey sand over quartzite, limestone, laterite or ironstone, on hills or sandplains, often on flats between parallel sand dunes, in open savannah, scrub heath, grassland or shrub land, often with spinifex. Flowers Feb.–Sept.

Pilbara Minni Ritchi - *Acacia trachycarpa*

An arid to tropical Australian tree ideal for planting in frost free regions. Cold damage or death can occur at temperatures below 25 degrees F. The trunk has a curling, 'minni ritchi' bark texture with a pine scent very unique and interesting for an arid type tree. The leaf, made up of soft, pine needle-like, narrow phyllodes 1/2 to 2 inches long that are very graceful in the breeze. In bloom, during the spring, a yellow, rod shaped flower brightens up the landscape.

Town of Port Hedland

Poverty Bush - *Acacia translucens*

A low, spreading shrub, varying in height from 50 cm to 2 m. The thick phyllodes are obliquely elliptical or obovate and up to 2.5 cm long. The bright yellow ball flowers are borne on stalks to 2 cm long. A hardy plant for tropical areas when used in a sunny well-drained site.

Wanyu - *Acacia wanyu*

Bushy shrub or tree that grows 1.5-5 m high. Flowers are yellow and appear from March to July. Often in stony clay or loam, red sand. Along creek lines & drainage lines, sand plains.

Paper Flower - Bougainvillea glabra

Named in honour of the explorer and scientist, Louis Antoine de Bougainville. Known for their brilliant floral displays and ground-covering power, bougainvilleas originate from the tropics and subtropics of South America these scrambling shrubs that can become vigorous climbers in favourable conditions resembling the climate of their native habitat. While the thin-textured, downy, tapering leaves and small, tubular, ivory to yellow flowers play a role in the overall attractive appearance of these plants, it is the brilliantly coloured petal-like bracts that create its dramatic impact. All species do well in warm to hot climates and some species will tolerate light frosts. For best results, plant bougainvillea's in a light well-drained soil in a sunny position. Although drought tolerant, they need plenty of moisture during the flowering season.

Caper Bush - *Capparis spinosa*

The caper bush requires a semiarid or arid climate. A rainy spring and a hot dry summer are considered advantageous. This drought-tolerant perennial plant has favorable influence on the environment and it is used for landscaping and reducing erosion along highways, steep rocky slopes, sand dunes or fragile semiarid ecosystems.

Town of Port Hedland

Dumara Bush – *Cynanchum floribundum*

A herb with erect branches, twining or bent in opposite directions, up to 1 m. Leaves: opposite, long-petiole, heart-shaped, tapered at both ends, 2, 5-5 cm. The wheel-like corolla is deeply 5-lobed, and the corona has twenty lobes. Flowers: white, spike-like on separate petioles. Fruit: dry, cigar-shaped, more or less winged, 2,5-5 cm long.

Spotted Emu Bush – *Eremophila maculate*

Eremophila maculata is probably the most common species both in the wild and in cultivation. It is usually a shrub to about 1 meter in height but occasionally grows taller. Flowers occur in the leaf axils and are tubular in shape to about 25 mm long. Flower colour is variable and may be pink, mauve, red, orange or yellow, often with a pale, spotted throat. Flowering occurs mainly through winter and spring but some flowers may also be seen at other times. Widely cultivated in many areas and, although best suited to dry climates, can be successfully grown in more humid areas. Full sun is preferred and, once established, the plant tolerates extended dry periods.

Turpentine Bush – *Eremophila fraseri*

Shrub, 0.5-3 m high. Flowers range from white-cream-pink-red-purple-brown, Mar to Nov. Sandy or stony soils, alluvium. Colluvial & riverine flats, rocky hills. ***Eremophila fraseri*** is used as a topical medicine, the liquid derived from a preparation of the leaves is used for skin complaints.

Desert Fuchsia – *Eremophila macdonnelli*

A small spreading shrub that has leaves that are small and thick and covered in short hairs. It has solitary pink to purple flowers produced on long stalks in winter, spring and summer.

Town of Port Hedland

Emu bush - *Eremophila compacta*

A small compact shrub with grey/ green lance shaped foliage and a profusion of tubular yellow flowers. A versatile plant that offers foliage contrast in plantings. Grows in full sun to part shade in most well drained soils - including coastal

Silver Poverty Bush - *Eremophila pterocarpa*

Shrub or tree that can get up to 4m tall. Flowers are red-pink-orange-yellow and flower from June to September. Tolerates a range of soils from red sandy clay, clay, limestone. Clay depressions, salt or alkaline flats, salty patches.

Tar Bush - *Eremophila glabra*

This is a striking Emu Bush that develops into a dense ground cover that will cover an area of at least a square meter. The leaves are soft and silver-grey. Tubular flowers are yellow and rich in nectar. Spring and summer are the main flowering periods but flowers will appear at other times. Spent flowers carpet the ground around plants. *Eremophila* Kalbarri Carpet is one of our favorite Emu Bushes. It has proved to be extremely drought and frost hardy.

Emu Bush – *Eremophila hygrophana*

This is a compact shrub reaching less than 1m tall which has soft silvery appearance. During spring and summer the silvery foliage contrasts with many purple flowers. Very little maintenance required once established, requires well-draining soil.

Royal Mulla Mulla - *Ptilotus rotundifolius*

A Shrub which grows from 0.4-2 m high. Flowers are pink-purple and can be up to 20cm long. Flowers between Jul to Oct. And grows in its natural habitat in stony soils preferring rocky hills & rises. Recently appointed as the floral emblem of the Pilbara.

Town of Port Hedland

West Pilbara Grevillea - *Grevillea pyramidalis*

Caustic Bush, Blister Bush, West Pilbara Grevillea is a small tree to 10m. Blue-green leaves and bright yellow/white flower clusters. The greenish inner bark was mashed in water until it turned white, and then rubbed around women's breasts to induce lactation.

Ixora species - *Ixora coccinea*

A fairly small, bushy shrub, usually only 5-10ft tall. There are dwarf varieties that are much smaller. Ixora will flower when only a few inches high. It is commonly used a hedge or small garden plant. Ixora is too ten der to grow outside of the tropics and subtropics. It prefers a warm, humid climate.

Tall Mulla Mulla - *Ptilotus exaltatus*

An annual herb growing in height from 0.1–1.2m high. Its flowers form a cone of pink or purple with many cones or heads on one plant, making this a showy species, especially when many are found growing together over large areas. It flowers between April and October. It is a member of the Amaranthaceae family and is found over most of Western Australia, except in the south-west corner and along the south coast. This distinct herb appears to favour clay and loamy soils, but is also found on coastal areas.

Thick Leaf Fan Flower- *Scaevola crassifolia*

Scaevola crassifolia with its large, almost succulent leaves (crassifolia = thick leaves grows up to 1.5 meters wide and 3 meters wide and produces white, blue or pale purple flowers from July to February in its native range. It prefers limestone or dune areas and coastal distribution ranges from beyond Karratha in the north all along the western coast and beyond Esperance.

Town of Port Hedland

Bird of Paradise - *Strelitzia reginae*

A clump forming plant which produces large and dramatic evergreen, banana like leaves and long, straight flower stems culminating with a boat like bract at the top. Several orange and blue spiky flowers arise from these bracts and give an appearance resembling exotic birds. Flowers are borne through the warmer months of spring and summer. The blooms are fantastic for use in floral arrangements because of their unique and magnificent flower display. The plant grows to a height of 1.8 meters and over 1 meter in width.

Cockies Tongue - *Templetonia retusa*

This lovely shrub is very hardy and well worth a place in a shrubbery. It can grow to 2m high and 3 m wide although I have never seen this size in garden conditions. It can be pruned and this will keep it to a reasonable size. There are large, red pea shaped flowers very attractive to birds and butterflies, during winter and spring. This is a hardy plant suitable for front line coast and inland situations. It is moderately frost tolerant and requires good drainage.

Grey Germander - *Teucrium racemosum*

Commonly known as 'Grey Germander'. It is a small grey-leaved shrubs with white flowers that appear during spring to summer. A perennial herbaceous plant it can be found growing in many parts of Australia, along creeks, muddy depression, grassy wetlands and woodland. In central Australia, they grow in or near clay pans.

Inland Tea-tree – *Melalueca glomerata*

Fast growing screening plant 2-5m tall with whitish paper bark and grey green leaves and cream to white honey scented flowers. Tolerates shade and salt and is a good screening plant and long lived.

Regal Bird Flower- *Crotalaria cunninghamii*

This small shrub of about 1 meter has stout woolly branches and rounded dull green leaves. Its green flowers resemble a bird attached by its beak to the central stalk of the flower head. Flowering occurs from winter to spring, and sometimes in autumn. The fruit is a club-shaped pod, about 4-5cm long, which is swollen, hard and velvety. This plant is moderately common, occurring on unstable sand dunes in mulga communities.

GRASSES AND GROUNDCOVERS:

Fire Cracker Plant - *Russelia equisetiformis*

A multi-branched subshrub with slender, rush like stems that are angled with ridges and leaves that are reduced to little more than small scales. The wiry branches start out erect then fall over to cascade down in lengths as long as 1.2 m. Produces hanging clusters of scarlet tubular flowers about 2.5 cm long that look like little firecrackers inspiring the plant's common name, firecracker plant.

Red Fountain Grass- *Pennisetum setaceum (rubrum)*

This tropical annual produces mounds of narrow burgundy-red foliage and purple plumes to 1 foot long. It is invaluable for containers and stunning, annual foliage color in a border. It rarely sets seed. Grow in light, average, well-drained soil in full sun. Cut back previous year's foliage by early spring.

Feathertop Threeawn- *Aristida inaequiglumis*

Feathertop Threeawn is a leafy erect long lived perennial grass that can grow to 60-90 cm tall, forming dense tussocks. The leaves are long and flat but tend to curl or twist with age.

Town of Port Hedland

Curly Mitchell Grass – *Astreba lappacea*

Tussocky perennial grasses growing to 1 m tall. Native of heavy clay soils of the downs in the arid zone of much of northern and central Australia. Extremely drought -tolerant due to their robust root system.

Variable Daisy – *Brachyscombe ciliraris*

Geographically speaking, it is very widely distributed, occurring in every Australian state. It is somewhat restricted in terms of habitat, however, favouring red earths and grey sands over limestone or clay, in disturbed areas and on the margins of salt pans.

Pilbara Daisy – *Brachyscombe iberidifolia*

Widespread, found on sands or clay, and tolerant of salinity. It favours watercourses and depressions near granite, but is widespread on sandhills and other harsh coastal environ. North to the Pilbara region, extending into Murchison, Gascoyne, Coolgardie regions, and recorded in the Gibson Desert.

Lemon Scent Grasses – *Cynbopogon species*

Alternately called scented grass or Australian lemon-scented grass (Cymbopogon ambiguus), Australian lemon grass grows throughout most of Australia, with the exception of the cooler areas. Like the other lemon grass plants, this plant emits a lemon-like citrus odor when cut or crushed, and is adaptable to different soil types. Australian lemon grass is often used in landscaping as ground cover or in places where watering is difficult. The plant grows to about 3 feet in height, and is drought- and frost-resistant.

Namana- *Euphorbia australis*

Prostrate annual or perennial herb that grows to 0.02-0.1 m high. A native West Australian plant that has red-pink flowers form around April to November. Will grow in a variety of soils.

Gin Gem - *Grevillia obtusifolia*

Rapid growing and hardy dense ground cover with a 3m spread. Has bright green foliage with small pinkish spider flowers in winter and spring. Likes good drainage and full sun to part shade.

Sea Spray - *Grevillia thelemanniana*

A fast growing, spreading ground covering shrub that grows to approx. 1 m high and 3m across. Has small red flowers during winter and spring. Grows in full sun or part shade and grows in a variety of soil types and tolerates coastal soils.

Native Sweet Potato - *Ipomoea costata*

Commonly known as Rock Morning Glory, is an Australian native plant. It is found in northern Australia, from Western Australia, through the Northern Territory, to Queensland. It is the source of bush potato, a bush tucker food for Aborigines. Bush potatoes are cooked in the hot earth beside the fire, and potato is still eaten in the desert today. It is a fast-growing creeper with large purplish-pink trumpet flowers.

Beach Morning Glory- *Ipomoea brasiliensis*

Goat's Foot is a primary sand stabilizer being one of the first plants to colonize the dune. It grows on almost all parts of the dune but is usually found on the seaward slopes sending long runners down towards the toe of the dune. The sprawling runners spread out from the woody rootstock but the large two-lobed leaves are sparse and a dense cover on the sand is rarely achieved except in protected situations. This plant grows in association with sand spinifex grass and is a useful sand binder thriving under conditions of sand blast and salt spray.

Native Morning Glory – *Ipomoea muelleri*

Sprawling perennial ground cover up to 3 m wide, with twining stems. Heart shaped dark green leaves are up to 4 cm long and 2 to 3 cm wide. Lilac or pink flowers have a darker throat and are shaped like a funnel or trumpet. Flowers are up to 4 cm long and 5 cm in diameter.

Creeping Boobialla – *Myoporum parvifolium*

This is a ground-cover plant with fleshy green leaves and white flowers in summer, both frost and drought tolerant. This plant has trailing stems to about 1m or more and the leaves are green or grey in colour. Its flowers are white and are borne in summer. Grows to about 1m in height and the width is unlimited. The plant can be effectively hedged and formally shaped.

Sturts Desert Pea – *Swainsona formosa*

Is famous for its distinctive blood-red leaf-like flowers, each with a bulbous black center, or "boss". It is one of Australia's best known wildflowers. It is native to the arid regions of central and north-western Australia, and its range extends into all mainland Australian states with the exception of Victoria.

Dampier Pea – *Swainsona pterostylis*

Small semi-prostrate shrub. The leaves are compound. The beautiful flowers are violet, with a sweet fragrance. The whole plant was mashed up and a boiled poultice was made to treat bruising and inflammation. A native to hot semi-arid areas of northern Western Australia and NW Northern Territory. Full sun.

Town of Port Hedland

Kangaroo Grass – *Themeda triandra*

This attractive grass can be used as an ornamental in rockeries, as part of a native habitat garden or can be grown in a more formal garden for its interesting colour and texture. It grows in full sun to part shade on sandy to clay soils and needs little water once established. Because of its large distribution, growing conditions for *T. triandra* can be quite variable so it is best to source seeds or nursery stock native to your local area.

Snake Vine - T*inospora smilaciana*

Communities in Central Australia used to crush sections of the vine to treat headaches, rhumatoid arthritis and other inflammatory-related ailments. The sap and leaves were sometimes used to treat sores and wounds. The leaves are triangular to arrow-shaped, up to 10 x 6 cm. 5 prominent veins arise from the base. Flowers unisexual, males are greenish, females have white sepals; fruits are ovoid, red berries to 10 x 9 mm.

Spinifex- *Triodia sp.*

Spinifex thrives on the poorest, most arid soils Australia has to offer. It is Spinifex that has prevented our deserts from becoming a Sahara-like world of bare, shifting sand.

Spinifex roots go down a long way: approximately 3 meters. Generally the roots develop from the same nodes as the shoots so that each shoot has its own personal water supply. The spiky leaves contain a lot of silica which makes them stiff and rigid.

Spinifex is tough and indigestible to most animals except termites. These tiny grazers thrive on the Spinifex litter. A grass that's very poor in nitrogen and phosphorus poses no problems for them. Desert Aboriginal people collect certain species of Spinifex and bash it with a stick on a clean surface to begin the extraction of resin which occurs at the base of the stems. The chaff is heated with a fire stick causing the resin to melt. It is then rolled into a ball and used as an adhesive, mainly for attaching stone cutting chips to wooden implements such as spears.

Needle Grass- *Triraphis mollis*

A tufted perennial grass-like herb. Grows 0.3-0.45 m high. Flowers are purple-green from May to Sep. Red sand, loam, clay, sandstone. Coastal sand dunes, creek flood outs.

TURF

Winter Green Couch

Although the Wintergreen variety is more commonly utilized within commercial applications due to its hard wearing characteristics, it is also suitable to many domestic applications, especially in tougher environmental conditions. The Wintergreen lawn is ideal for high wearing areas such as golf courses, tennis courts, bowling greens, parks and gardens, sports ovals, soil stabilization areas, roadsides, urban in-fill areas or where hard wearing or close mowing is required. With its low maintenance qualities it is also great for your rental property or home!

Santa Ana Couch

Santa Ana Couch is a warm weather turf commonly used as a commercial turf. It is extremely hard wearing and as a result is common on sports fields, golf courses, tennis courts, cricket wickets and bowling greens it respond extremely well short mowing Approx. 20mm. Santa Ana is a fine leaf turf requiring full sun it is also a medium growth creeping perennial with above ground runners therefor making it less invasive than other species of Couch.

Zoysia

Zoysia is a genus of creeping grasses native to southeast and east Asia (north to China and Japan) and Australasia. These species, commonly called Zoysia or zoysia grass, are found in coastal areas or grasslands. The genus is named after the Austrian botanist Karl von Zois. Because they can tolerate wide variations in temperature, sunlight, and water, these grasses are among the most widely used for lawns in temperate climates. Zoysia grasses stop erosion on slopes, and are excellent at repelling weeds throughout the year. They resist disease and hold up well under traffic. 'Empire Zoysia' is particularly popular.

Asset Management Improvement Program Handover May 2016

TO:	**ToPH Responsible Asset Management Custodian**
DEVELOPED:	**Aaron Patterson, Asset Manager**
DIVISION:	**Works & Services**
LOCATION:	**Depot**
DATE:	**30 May 2016**
SYNERGY REFERENCE:	**[xxxxxxxxxx]**
PROJECT SPONSOR:	**Work & Services Director; Brendan Smith**

1.0 EXECUTIVE SUMMARY

This handover document details the core essential requirements for managing and executing the Town of Port Hedland (ToPH) Asset Management Improvement Program (AMIP) and general asset management responsibilities. Since there is no current staff managing these activities in a delivery or technical function that is a real and apparent risk to the organisation that the AMIP will stall and general asset management, functions will not function.

2.0 PURPOSE

The purpose of this document is to handover the Asset Management Improvement Program and key asset management responsibilities and functions of the Town of Port Hedland (ToPH) to the authorised custodian. Since at the time of writing this document there is not an assigned ToPH asset manager nor asset engineer these responsible are held in custody of the Works & Service Director.

This document provides asset management background, risks, programs, activities lists, systems, support reference material and documents with locations.

2.0 BACKGROUND

The Town of Port Hedland commenced development of a strategic Asset Management Improvement Program (AMIP) in March 2016. The AMIP is essentially to a two (2) year focussed implementation project plan with prioritised scheduled tasks that are resources, costed and deliverables are timeline. The purpose of the AMIP is to improve the Town's core abilities in managing its assets for financial sustainability. The Town's asset management maturity's has been measured via the National Assessment Framework (NAF) and is well below the national average. The NAF measures maturity in alignment to the Department of Local Government and Communities Integrated Planning Reporting Framework. Refer to Figure 1.

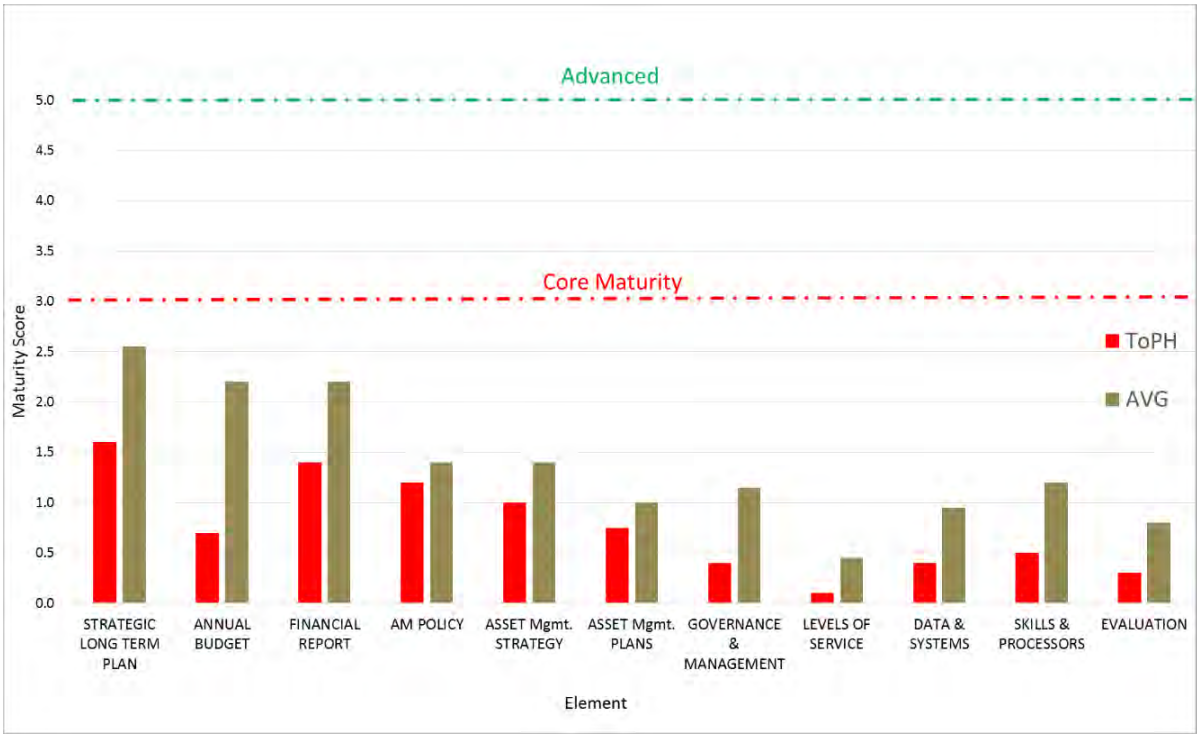


Figure 1. Town of Port Hedland Asset Management Maturity National Assessment Framework

The current exposed risk events to the organisation are:

1. The Town is losing in excess to $7m pa in perpetuity poor asset management resulting in higher annual costs in maintenance, administration and capital renewal costs
2. It is possible that an asset catastrophic failure could occur that may result in a catastrophic injury to member(s) of the community

It is vital for the Town to commits to the asset management improvement journey in doing to these risks will be significantly reduced and translate to cost benefits in excess of $7m pa in perpetuity.

The Town scored an overall average score is 15% compared which is well below the national average of 28% of scored participants.

3.0 RISKS

3.1 ASSET MANAGEMENT RISK

Asset Management Risk due to low maturity have been measured in accordance to the Town's corporate level risk matrix. Refer to Table 1: ToPH Asset Management Risk Assessment Summary.

Risk No	Risk Event	Likelihood	Dominant Consequence(s) - Catastrophic	Current Risk Score	Target Risk Score
1	Asset mismanagement	Almost certain	* **Financial:** Losing >$7m pa, * **Reputation:** Significant strain on stakeholder relations and adverse community standing, state media coverage	**20**	**15**
2	Asset catastrophic failure	Possible	* **Political**: Coronial inquiry / royal commission * **Safety:** Fatality or permanent loss injury * **Financial:** Losing >$7m pa, reputation * **Business Continuity:** unplanned outage for more than 3 days * **Reputation:** Significant strain on stakeholder relations and adverse community standing, state media coverage	**15**	**10**

Table 1. Town of Port Hedland Asset Management Maturity National Assessment Framework

The causation factors for both these events are the same:

i. Failure to effectively manage assets
ii. Ineffective asset management system
iii. Failure to fund renewals
iv. Failure to effectively maintain assets
v. Unrealised asset ownership
vi. Specification / design non compliance

Whilst the Town has a number of current controls to mitigate these risks these are only partially effectively. The only way to mitigate these risk is by improving controls through improved asset management. Please refer to the Asset Management Risk Assessment for additional details.

3.2 SPECIFIC ASSET MANAGEMENT IMPROVEMENT PROGRAM RISKS

Due the inherent nature and complexity of the AMIP there are a number of risks that can impede on the success of the delivery. These specific risks to the AMIP are:

i. **Project commitment:** if there is no commitment to the AMIP the program may be stalled or may not be resumed
ii. **Available resources:** is critical that resources are made available and managed effectively. The asset management plan requires adequate funding and the required human resources. Tight budget constraints, high staff turnover, and adequately skilled staff all pose changes. Failing to have adequate resources will disable the ability to of the team to effectively execute

iii. **Internal appetite for change:** if change management is not carefully managed there may be no internal buy in, support or appetite

iv. **Knowledge & skills:** if AIMP is not resources with personal with adequate skills or knowledge then deliverables are likely to be delayed and or with quality reduced

v. **Communication:** the AMIP requires an Asset Management Working Group (AMWG) of technical asset custodians and an Asset Management Leadership Group (AMLG) with executives for cross interdepartmental communication, synergy and fostered collaboration for asset management change management.

vi. **Fighting fire mentality:** asset management focussing on reactive works rather long term strategic benefits will be hijacked off the AMIP.

vii. **Non prioritised or improperly staged sub programs**: Value engineering must be applied with a "bang for buck" emphasis with long term maximum benefit in alignment to leveraging as platform with subsequent tasks.

viii. **Deliverable must drive real tangle outputs:** it is a real risk that if the AMIP is outsourced that "boiler plate" asset management plans for example are published that do not actually drive any real outputs.

ix. **ToPH Knowledge Loss:** in the recent organisation restructure / re-alignment of 27th of May 2016 there are no staff are currently employed in asset management and now no current knowledge is retained in the business this poses a real risk in that continuity is likely to be lost in asset management resulting in a steep le4raning curve for any subsequent asset management personnel.

x. **Project Constraints:** There are a number of critical path constraint activities that are the responsibilities of other team and departments or at the very least require sign off and engaged input from stakeholders. Managing these items may be difficult and if they are not delivered they will impede some sub projects of the AMIP. Examples of some identified constraint include:

    a. Service charter
    b. Asset roles responsibilities and accountabilities
    c. Poor Governance controls including clear ownership and responsibilities and organisation accountabilities
    d. Levels of Service
    e. Intervention levels and Service Targets Manual and compliance
    f. GIS interface and functionality
    g. Timesheet interfaces
    h. Schedules, treatments and tactics, inspections
    i. Standards work orders (processors procedures)
    j. System linkages and capabilities; The business enterprise system and the interwoven siloed systems that the ToPH is currently using
    k. Chart of Accounts

xi. **Project Constraints:** There are a number of critical path constraint activities that are the responsibilities of other team and departments or at the very least require sign off and engaged input from stakeholders. Managing these items may be difficult and if they are not delivered they will impede some sub projects

xii. **Asset Management Systems:** Often referred to as computerised maintained management systems or work management systems are the interwoven information systems that effectively functional the asset management system. The Systems must have accurate data, be interwoven with linkages and be able to serve the asset management functions that are needed. Current systems include

RAMM, Intramaps GIS, Mydata, Synergy and excel. The area is targeted specifically for significant improvement to enable;

a. Customer service – raising works requests
b. Works scheduling and dispatching
c. Asset failure and defects management
d. Renewal management
e. Job ticketing with procedures
f. Asset register, and condition management
g. Asset accounting and revaluations
h. Geo spatial asset data available to all staff
i. Mobile inspections, mobile requests

The Town cannot effectively manage its asset without proper functional asset management system. Refer Appendix 4 Asset Management System Function Analysis.

xiii. **Effective Decision Making at Council Level**; Council must be well informed, educated and understanding asset management term of long term financial planning so that decisions are made in awareness to the long term impacts and not made in isolation.
It councillors do not understand the importance in asset management resources (money) may not be appropriately applied.

xiv. **Levels of Service**; In simple terms assets are linked to levels of service. Without formal documented levels of service the Town does not know to what level to manage its assets

xv. **Executive Strategic Direction:** The Executive Leadership Team must lead strategic direction and own the journey in asset management improvement. The Executive Leadership Team are a critical to the success for stakeholder engagement and organisational asset management change management.

xvi. **Financial Sustainability:** It is vital that financial sustainability and modelling is achieved so that long term financial planning can be obtained for maintenance and renewal budgeting so that resources are made available, money is not wasted and necessary works are completed.

xvii. **Asset must be safe:** It is critical that assets are maintained so that assets provide a safe service to the public. Failing to do so could cause injury or death with subsequent investigations and public relations damaging to the ToPH image.

4.0 CURRENT PROGRESS

The Town has made significant progress in asset management in the last three (3) months. Refer to Table 2: Asset Management Improvement Program Progress

OUR OBJECTIVES	ACHIEVEMENT	COMPLETE
1. Develop AMIP	1.1. Develop 2 Year Asset Management Improvement Project Plan and Budget	✓
2. Develop Capital Works Priority List	2.1. Develop a forward planned Capital Works Priority List	✓
	2.2. Develop Capital Budget for Fy16-17	✓
	2.3. Develop Renewals Budget for Fy16-17	✓
3. Analyse City Assets	3.1. Determine Data Level of Confidence	✓
	3.2. Analyse and Modell Asset Financials	✓
4. Risk Assessment	4.1. Complete corporate risk assessment for asset management	✓
5. Establish Asset Management Core Performance	5.1. Measured Asset Management Maturity (ACELG NAF)	✓
	5.2. Capital and Renewal Expenditure Analysis	✓
	5.3. Renewal Backlog Analysis	✓
	5.4. Asset Financials - Long Term Financial Plan Analysis	✓
6. Condition Assessments	6.1. Sealed roads for 230km sealed, 459km unsealed roads	✓
	6.2. Open drain 580 km and Kerb 280km	✓
	6.3. 1450 Road Defects identified with GIS locations for maintenance planning	✓
	6.4. 43 Buildings inspections with 380 Defects identified maintenance planning	✓
	6.5. Sample audits on playgrounds	✓
	6.6. Sample audits on footpaths	✓
	6.7. Level 1 Bridge Inspections (MRWA)	✓
7. Maintenance Scheduling	7.1. Unsealed roads	✓
	7.2. Buildings	✓
8. Inspection Templates	8.1. Developed Tem unsealed roads	✓
	8.2. Developed for footpath and accessibility	✓
9. Ownership	9.1. Draft Asset Management Responsibility Matrix	✓
10. Knowledge & Skills	10.1. Developed and Published Training Matrix	✓
11. Engineering investigations	11.1. Marque Park	✓
	11.2. 22 x Structures	✓
	11.3. Stadium HVAC	✓
12. Asset Management System	12.1. Develop Order of Magnitude of Project	✓
	12.2. Preliminary Product Research	✓
	12.3. Project Risk Assessment and Constraint Identification	✓

Refer to Table 2: Asset Management Improvement Program Progress

5.0 AMIP BUDGET REQUIREMENTS

The operational budget for the AMIP including business as usual actives are listed in Table 2: Asset Management Budget Submission.

Asset Management Operational Budget Fy16 - 17		
Category	**Item**	**Cost**
Employee Expenses	Asset Engineer	$100,000
Employee Expenses	Asset Engineer	$100,000
Employee Expenses	Graduate Engineer	$70,000
Employee Expenses	Asset Manager	$165,000
Employee Expenses	Asset Senior Engineer	$140,000
Consultancy Services	Asset Management Consultant	$230,000
Training	Various	$45,000
Tools & Materials	Various	$20,000
Software Systems		$65,000
TOTAL		**$935,000**

Table 3: Asset Management Budget Submission.

6.0 AMIP LONGTERM GOAL

It is forecasted that with an investment of $1m pa it will take five (5) years to obtain the ACELG NAF core maturity. Refer to Table 4 as follows.

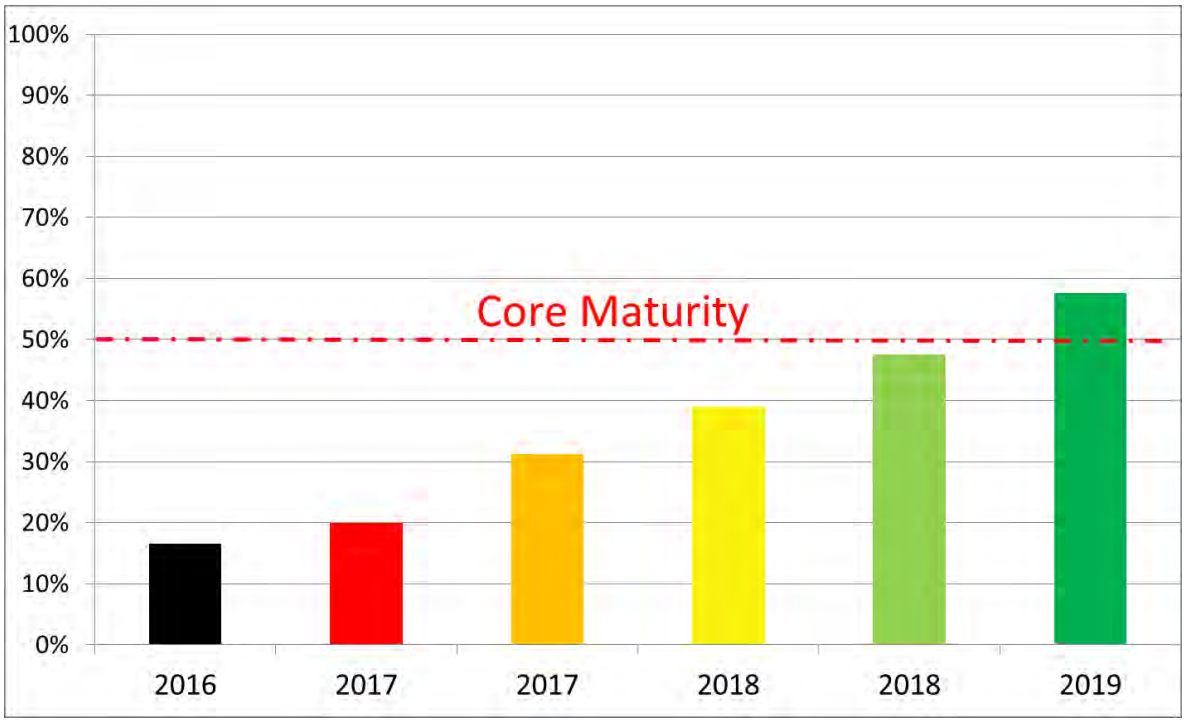


Table 4. Asset Management Improvement Forecast

7.0 ASSET MANAGEMENT MATURITY AND AREAS FOR IMPROVEMENT

Asset management maturity has been calculated via the ACELG NAF with Table 5 below being tabulated. These elements with sub components are scored as either; not started, in progress, well progressed and advanced. This status check effectively provides a gap analysis on where the ToPH needs to improve that can be subsequently programmed for improvement.

ELEMENT	SUBCOMPONENTS	STATUS
Asset Data Management	▪ **Asset register:** consolidated, integrated, accurate, up to date and complete componentised annually revised with disposals and acquisitions	▪ In progress
	▪ **Asset Hierarchy** integrated for all asset groups applied across all systems	▪ In progress
	▪ **Asset Condition Data:** accurate, up to date and complete componentised	▪ In progress
	▪ **Asset Data Availability:** available to operations, design and planning staff across services areas when planning and undertaking works.	▪ In progress
	▪ **Asset Performance Management:** Data is available and accessible to enable performance measurement and reporting against Key Performance Indicators used to measure levels of service.	▪ Not started
	▪ **Data enable Projections / Modelling:** allow projections which inform a range of service provision scenarios and costs.	▪ Not started
Asset Management Systems	▪ **Asset Management System Integration:** integrated with other corporate knowledge systems such as the finance, GIS and property information systems.	▪ In progress
	▪ **Maintenance Programs:** asset management systems can functionally generate	▪ In progress
	▪ **Renewal Programs:** asset management systems can functionally generate	▪ In progress
	▪ **Asset Management Systems Data Operations:** systems and processors are in place where data is automatically updated from works done in field	▪ In progress
	▪ **Asset Management System Drives Maintenance Schedules:**	▪ Not started
	▪ **Asset Management System is generates Standard Work Orders**	▪ Not started
Controls	▪ **Asset Management Maturity:** measured and benchmarked	▪ Advanced
	▪ **Asset Rates:** Documented and applied unit rates, design lives, residuals	▪ In progress
	▪ **Team Meeting:** Formal minuted and regular scheduled meetings	▪ In progress
	▪ **Management Reporting:** formal meetings and progress reporting	▪ Advanced
	▪ **Director Reporting:** formal meetings and progress reporting	▪ In progress
	▪ **External Government Reporting:** submitting annual accurate and timely reporting to WALG, LGA, ACLG and other agencies	▪ Advanced

ELEMENT	SUBCOMPONENTS	STATUS
	▪ **Asset Management Improvement Program:** well defined, project planned, resourced and budgeted 2 year asset management plan aligned to executive direction	▪ **Advanced**
	▪ **Key Performance Indicators:** a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Longer Term Plan	▪ **In progress**
	▪ **State of the Assets Report:** includes a statement on "State of the Assets" and the financial sustainability of services provided by its infrastructure assets including any proposed adjustment to services/assets to address issues and risk as they arise.	▪ **Not started**
	▪ **Asset Criticality List:** formal council endorsed asset management criticality list with contingency plans	▪ **Not started**
	▪ **Asset Issues Register:** formal register that lists known asset defects and issues	▪ **Not started**
Framework	▪ **Policy:** Council has an adopted up to date advanced Asset Management Policy defining the Council's vision and service delivery objectives for AM	▪ **In progress**
	▪ **Asset Management Business Plan**: up to date detailed plan	▪ **Not started**
	▪ **Asset Management Strategy:** Council has an adopted up to date advanced Asset Management Strategy defining the Council's vision and service delivery objectives for AM	▪ **In progress**
	▪ **Asset Management Plans:** up to date detailed AMP for each asset class containing 2yr focussed implementation plans and 20 years modelling and **defined Levels of Service**	▪ **Not started / In progress**
	▪ **Asset Management Leadership Team and Asset Management Working Group:** establish the groups with cross functional representation and clearly defined and documented terms of reference, focussed on coordinating the linkages between service delivery and asset management implementation. Council involves all its departments in Asset Management.	▪ **In progress**
Processors	▪ **Asset Handover Process**	▪ **Well developed**
	▪ **Asset Disposal Process**	▪ **Not started**
	▪ **Asset Management Responsibilities:** Council has a process to identify operational risks, assign responsibilities and monitor risk treatment actions all recorded within a risk register.	▪ **In progress**
	▪ **Asset Management Process Calendar**: an annual calendrer that timelines, high level activities and their timings	▪ **Not started**
Asset Financial Management	▪ **Asset Valuations & Revaluations:** annual publication of asset valuation data, CRC,FV, Dep for all assets with high level of confidence	▪ **In progress**
	▪ **Long Term Asset Financial Modelling:** annual publication of asset financial modelling; CRC,FV, Dep, renewal budget demand, maintenance budget demand, age profiling, with high level of confidence	▪ **Well developed**

ELEMENT	SUBCOMPONENTS	STATUS
	▪ **Asset Financial Ratio Modelling:** analysis, modelling and publishing key asset financial and performance ratios	▪ **Not started**
Asset Engineering	▪ **Asset Engineering Investigations:** responding to work requests for asset investigations	▪ **Well developed**
	▪ **Root Cause Analysis:** asset failure investigations in identifying underlying causes and developing improvement opportunities	▪ **In progress**
	▪ **Asset Risk Analysis:** documenting and reporting asset risks and publishing to management and director	▪ **Not started**
	▪ **Life Cycle Analysis:** analysing asset condition and life cycle trends to enable establishing useful lives, condition, risk, tactics and strategies	▪ **Not started**
	▪ **Maintenance Tactics Development:** implementing the principles of **Reliability Centred Management (RCM)** and **Failure Mode and Effects and Criticality Analysis (FEMCA)**	▪ **Not started**
	▪ **Total Cost of Ownership Analysis:** analysing and establishing asset costs of the life of the asset or all assets	▪ **Not started**
Asset Skills & Knowledge	▪ **Asset Management Team Training:** annual training programs are developed and implemented	▪ **In progress**
	▪ **Internal Stakeholder Asset Management Training / Knowledge Transfer**: annual training	▪ **In progress**
	▪ **Councillor Stakeholder Asset Management Training / Knowledge Transfer**: annual training	▪ **In progress**

Table 5. Asset Management Maturity Gap Analysis

8.0 ASSET MANAGEMENT IMPROVEMENT PROGRAM

The AMIP currently has 53 sub programs prioritised scheduled from starting March 2016 ending in June 2018. Refer to Figure 3 for AMIP Summary and Table 6: AMIP Legend as follows.

Ghent Chart Legend	
Item	Meaning
☺	Project On track
😐	Project delayed at risk monitor
☹	Project in late, critical needs realignment

Table 6: AMIP Legend.

It is important that a fully detailed project plan is not yet developed that identities all task steps and critical paths with assigned resource allocation. The 'flag ship' project within the AMIP is the Asset Management System Project, this is denoted as yellow in the AMIP in Figure 3. In addition to the high level program summary there is Asset Management Action List with ninety five (95) priorities actionable items. **In this list is a number of immediate required actionable items.** The asset management journey is illustrated in Figure 4.

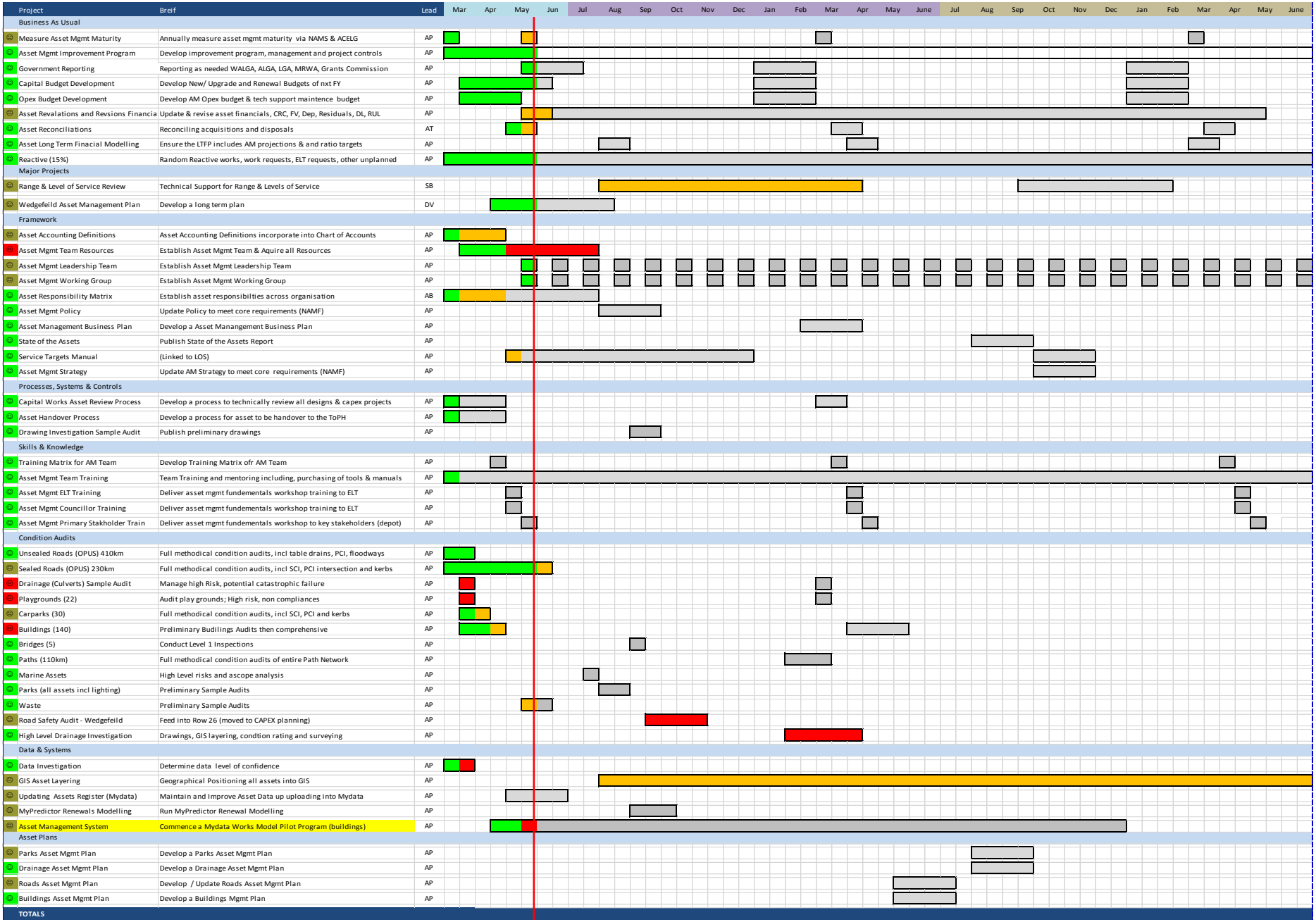


Figure 3: Asset Management Improvement Program

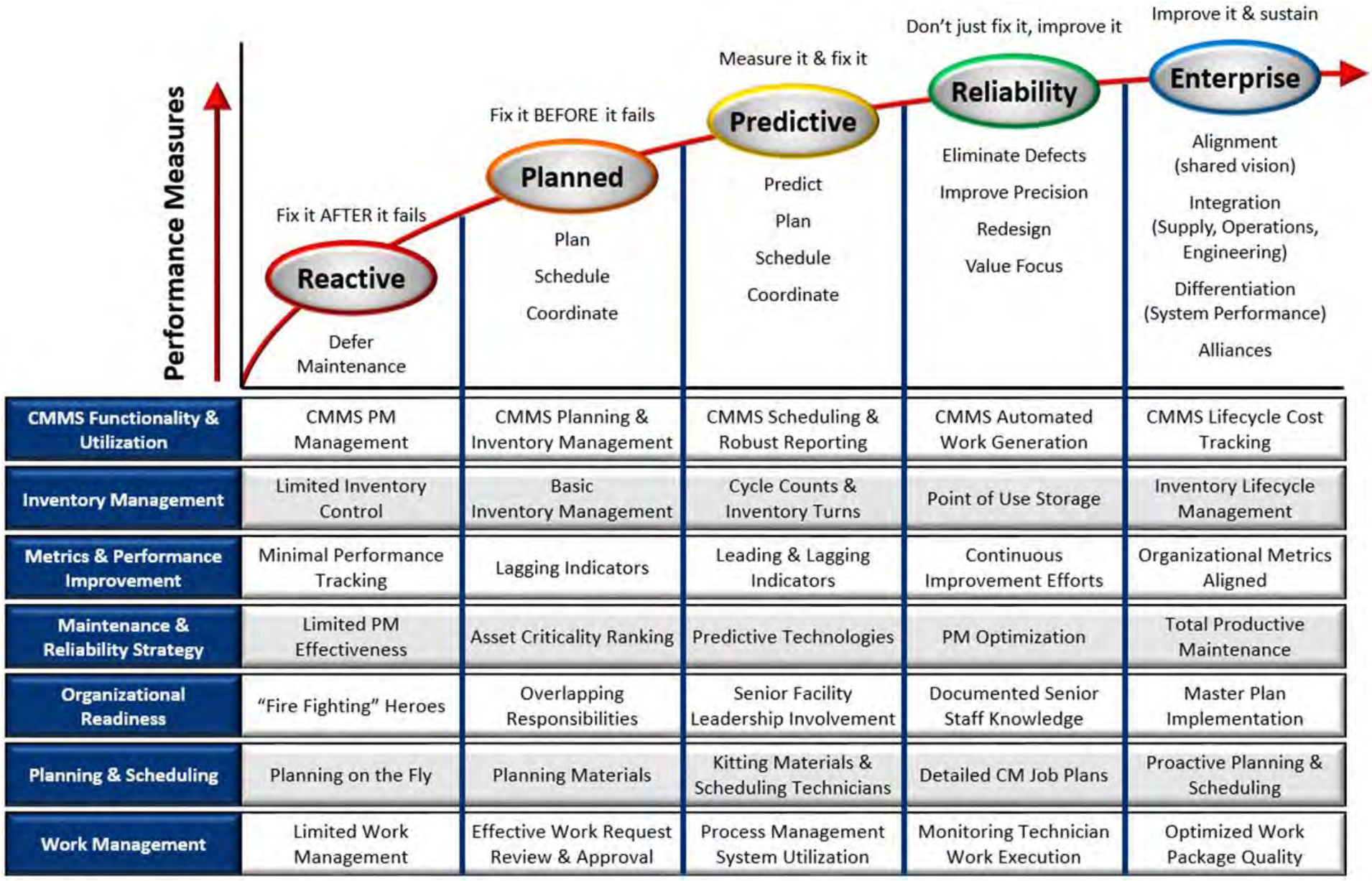


Figure 4: Asset Management Journey

9.0 ASSET MANAGEMENT SYSTEM PROJECT

The ToPH currently has numerous systems being used to manage assets and asset information, and in some cases ad-hoc approaches to systems (excel, etc.) are being utilised. These systems are being used across the various asset lifecycle stages, which include the planning for, maintaining, renewal, upgrading and operation of assets.

Some of the challenges and issues the Town faces as a result of numerous systems include:

a. Quality and control of information.
b. Completeness and centralisation of information
c. Integration of information
d. Time inefficacies and double handling
e. Capability limitations associated with reporting, modelling, asset information, etc.
f. Information maintenance/upkeep
g. Supporting process surrounding systems

The Asset Management System Project has previously stated is the 'flagship project' that will successfully connect asset management with strategy, tactics, and scheduling, geographical information systems, with resources, maintenance staff, works requests and accounting.

The project introduces systemic change in a way never previously seen in the ToPH and will provide a modern effective and efficient computerised maintenance management system for managing assets. The project will enable:

i. A consolidated, integrated, accurate, up to date and complete componentised asset register with the required functionality to ensure security and data integrity, which includes all information about each asset sorted by asset group.
    a. Improved data quality and access
    b. Asset Hierarchy
    c. Centralised asset information
    d. Integrated asset information systems (refer to figure 1)
    e. Documented and planned data framework used across all asset groups
    f. Asset data is available to operations, design and planning staff across services areas when planning and undertaking works.
    g. Asset Management systems have risk management functionality available to predict criticality of assets, record risk assessments, risk treatment, treatment costs and residual risk.
    h. Records the results of asset condition surveys and defect assessments against individual assets
    i. City's Asset Management system is integrated with other corporate knowledge systems
ii. Asset management systems have the functionality to generate maintenance and renewal programs
iii. Asset Financials and accounting
    a. Accurate asset financials enabling improved planning for sustainability
    b. Automatic generation of asset valuations including deprecation

c. Automatic RUL updating
d. Long Term Financial Plan includes sensitivity analysis and scenario
e. Automatic capture and creation of asset capex and renewals translated into assets including contributed such as gifted or land developments assets.

iv. Asset financial accuracy and modelling capability
a. The cost of maintenance and operational activities are reported against adopted levels of service.

v. Improved governance
a. Mechanisms to ensure that City resources are used optimally to strategic asset management objectives
b. Roles and responsibilities tagged to assets
c. Asset hierarchy as a basis for consistent reporting across the organisation.
d. Enable effective audit
e. Asset failures and causes of failures are recorded and analysed to identify failure trends and asset group rectification strategies.
f. City has a process whereby community enquiry and operational response issues are linked to individual assets.
g. Quantitative Key Performance Indicators (KPI's) are set for Technical levels of service. KPI's are monitored, measured and reported to the City against time based 'targets'.

vi. Reduce risk of asset failure

vii. Asset life cycle management e.g.: creating,

viii. Capture of asset utilisation and availability

ix. Asset Management systems are able to predict asset life based on various assessment factors and compare actual against predicted deterioration behaviour.

x. The City's Asset Management system can generate works orders based on intervention levels and customer requests which are also linked to the asset register. It has the capacity to monitor completion targets and perform facilities management functions.

xi. Utilising accepted innovative asset management capabilities such as:
a. Mobile audit device
b. Mobile works requests
c. Mobile job closures

xii. Data is available and accessible to enable performance measurement and reporting against Key Performance Indicators used to measure levels of service.

xiii. Enable Asset engineering analysis:
a. Condition modelling
b. Life cycle modelling and optimisation
c. Asset financial modelling (asset management expenses represent 75% of current costs)
d. Tag service plans to assets

xiv. Store historic asset data such as works, issues, HSE, expenditure linked to a specific asset

xv. The City has a process to identify operational risks, assign responsibilities and monitor risk treatment actions all recorded within a risk register.

xvi. Proactivity improvements in Operational management via a:

a. Reduce data double handling
b. A job ticket system
c. Fully scheduled maintenance programs with uploading of Maintenance Optimisation Project data

xvii. Increase in asset management maturity

Figure 5 on page 13 displays the primary business functions of the various areas of a typical Local Government Body. When developing the diagram, the focus was on identifying asset management functions. It is not intended to be comprehensive, but to give a general overview, with the focus being on asset management. All of these functions are essential to the day to day operation of the Town, and to the c correct functioning of its administration.

Figure 5: Business Functions, Asset Management Focus (Denoted in Orange)

10.0 INTERGRATED PLANNING & REPORTING FRAMEWORK

The AMIP is hinged and aligned to the requirements of the Integrated Planning & Reporting Framework. Refer Figure 6. The ToPH has a number of these key strategic documents which are current expired or soon to be expired, hence any changes to these Plans will have effect on the AMIP.

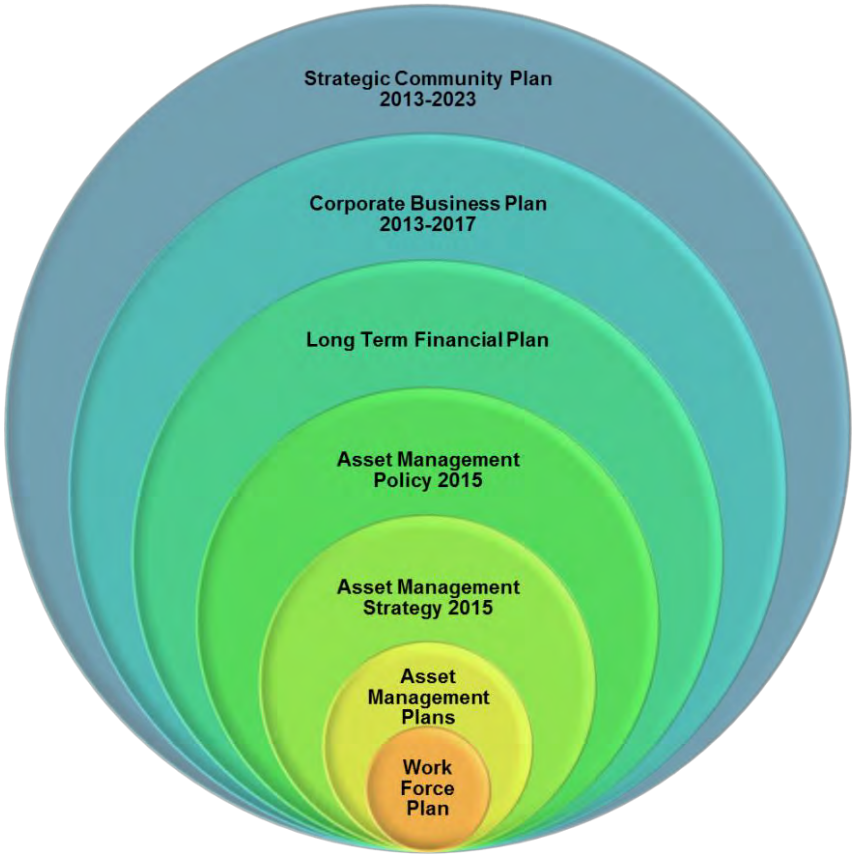


Figure 6: Integrated Planning Reporting Framework

11.0 ITEMS THAT REQUIRE URGENT ACTION / CLOSE OUT

The primary file locations for all asset management data are as detailed in table 1.

i. Confirm allocation of road funding
ii. Obtain *Talis* Quote and engage for Condition Data Load and Intersection Digitising / Segmentation to complete road condition audits and defect assessments
iii. Obtain *Technology One* Quote and engage Luke Hancock to upload GIS data into Intramaps.
iv. Raise purchase order for Road Safety Awareness Training on 10th of June 2014
v. Finalise Capital Budget for Fy16-17 upon receiving Council Budget and Project endorsement
vi. Obtain all asset handovers for project constructed Fy15-16
vii. Complete asset management maturity assessment NAF improvement template
viii. Complete Asset Management Risk Assessment
ix. Commence Asset Management System Project (gap, and function, and product analysis)
x. Complete Data Level of Confidence Project
xi. Obtain endorsement for Asset Management Responsibility / Custodian Matrix
xii. Analyse work requests

12.0 EXTERNAL ORGANISATIONAL REPORTING

The ToPH is required to submit mandatory asset management external reporting on an annual basis to various bodies. Table 7 contains a list of some of the reporting requirement, but is by no means exhaustive.

ORGANISATION	REQUIREMENT	WHEN
Australian Local Government Association (ALGA)	State of the Assets Report	July to Sept
Western Australia Local Government Association (WALGA)	Road Financial Data	July to Sept
Main Roads Western Australia (MRWA)	Road Network Data	July to Sept
Financial Auditors	Asset Financial Data	March
Regional Roads Group, MRWA	Road Grant Submissions	February
Roads to Recovery	Road Grant Submissions	Post Cyclone
MRWA Direct Grants	Road Grant Submissions	tbc
MRWA Black Spot Program	Road Grant Submissions	December

Table 7: External Organsiational Reporting

12.0 INTERNAL ORGANISATIONAL REPORTING

The asset management team is required to perform the following internal reporting.

STAKEHOLDERS	REQUIREMENT	WHEN
Director Works & Services	AMIP Updates	Monthly
Finance	Asset Financials including revaluations	March
Executive Leadership Team	Capital Work Priority List	March
Executive Leadership Team	Capital (New & Upgrade)Budget Submission	March
Executive Leadership Team	Renewal Budget Submission	March
Director Works & Services	Asset Management Operational Budget	March
Finance	Asset Capitalisations	March
Executive Leadership Team	Annual State of the Assets Report	December
Executive Leadership Team	Integrated Planning Framework Documents (Asset Management Plans, Policy, Strategy,)	As per AMIP
Director Works & Services	Annual Condition Assessment	As per AMIP
Works & Services Supervisors	Handover asset condition data for maintenance tactic development	As per AMIP
Finance	Asset Financial Modelling for Long Term Financial Plan	

Table 8: Internal Organsiational Reporting

13.0 REACTIVE WORKS

Due to the ToPH low asset management maturity, reactive work request can be demanding and can come from various internal stakeholders. Examples of some reactive works include:

i. Technical peer reviews of concept and detailed design
ii. Technical peer reviews of land development applications
iii. Asset engineering investigations including;
    a. Root cause analysis
    b. Asset handover inspections
    c. Asset condition inspections
    d. Asset compliance, risk and safety inspections
iv. Technical master planning project ideations
v. Providing Net Present Value Total Costs of Ownership Analyses for Project Business Cases
vi. Reviewing technical reports and submissions
vii. Technical asset engineering; failure mode, effects and criticality analysis
viii. Asset GIS validation and analysis
ix. Technical maintenance scheduling

14.0 REFERENCES

The primary file locations for all asset management data are as detailed in Table 9.

DOCUMENT	FILE / FOLDER NAME	FILE LOCATION	FILE	FOLDER
Parent File: Asset Management Improvement Program	*Asset Management Improvement Program*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management Improvement Program		☑
Parent File: Asset Management	*Asset Management Working Group (sb)*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management Improvement Program		☑
Asset Management Improvement Program	*Asset Management Improvement Program Summary 2yr +Budget AP.xls*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management Improvement Program	☑	
Asset Management Task List	*Asset Management Task List AP 30.05.2016 v01*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement	☑	

DOCUMENT	FILE / FOLDER NAME	FILE LOCATION	FILE	FOLDER
		Fy15-16\Asset Management Improvement Program\Asset Management Task List		
Asset Management Maturity	Asset Management Maturity	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\AM Maturity		☑
Asset Management Risk Assessment	*Asset Management Risk Assessment*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management Risk Assessment	☑	
Asset Management System	*Asset Management System*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management System		☑
Capital Works Priority List	*Capital Budget Submission*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\CAPITAL BUDGET DEVELOPMENT		☑
W&S Engineering Staff Training Matrix	*H:\Corporate_Services\Asset Management Working Group (sb)*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Training Matrix	☑	
Asset Data Level of Confidence	*Asset Data LOC*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Data LOC	☑	
Asset Management Responsibility Matrix	*Data Level of Confidence Asset Register 2016-03-16 AP Working Version 5*	H:\Corporate_Services\Asset Management Working Group (sb)\Asset Management Improvement Fy15-16\Asset Management Responsibility Matrix	☑	

Table 9: Primary Reference Documents and Filing Folder

14.0 ADDITIONAL INFORMATION SUPPORT

For referral to current champion of ToPH asset management please contact the **Director for Works & Services**. For additional historical support you may contact the previous asset management team members as listed in Table 10.

NAME	POSITION	CONTACT	LINKEDIN PROFILE
Aaron Patterson	Asset Manager	0407 886 887	http://www.linkedin.com/pub/aaron-patterson/37/80a/7a5
Chris Taylor	Asset Engineer	0407 886 887	https://au.linkedin.com/in/chris-taylor-23020a2b

Table 10: Additional Support Contacts.