WATER SENSITIVE URBAN DESIGN

DETAILED WORKPLAN

FINAL

Prepared for the Northern Territory Department of Planning and Infrastructure
GPO Box 2520
Darwin NT 0801

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1 INTRODUCTION

1.1 Background and Purpose for this Detailed Workplan

This workplan describes in detail the key tasks and reports that will be undertaken as part of the Darwin Harbour Water Sensitive Urban Design project. This workplan is based on focussed interviews with key stakeholders in the Darwin Harbour region, which identified the needs of Territory Government, Local Government, developers and the broader industry.

The WSUD Strategy is progressing in accordance with the Workplan shown in Table 1 below. This workplan has been developed as part of Task 11 (Stage 4) of the Workplan.

1.2 Outline of the document

This document is organised into the following sections:

- Section 1 explains the purpose and scope of the document.
- Section 2 provides an overview of the workplan and introduces the key task in the workplan
- Section 3 provides details on the main components of the workplan.

Table 1: WSUD Strategy for Darwin Harbour - Workplan

STAGE	TASK #	Activity
1	1	Refine workplan
	2	Establish project working group.
2	3	Develop WSUD Strategies for case studies in suitable format for communication and identify case studies for sub-catchment scale application of WSUD treatment train. • *WSUD Showcase - Bellamack residential sub-division conceptual WSUD Strategy is complete* • *Design development of Bellamack WSUD Strategy is about to commence (see Task below)*
	4	Identify potential WSUD objectives for Darwin • *Stakeholder workshop held on 14th and 15th June 2007* • *WSUD Objectives for Darwin – Discussion Paper (EDAW, Oct 2007)*
	5	Critical Analysis of WSUD/Stormwater Treatment Options for Darwin • *Stakeholder workshop held on 14th and 15th June 2007* • *Water Sensitive Urban Design Stormwater Treatment Options For Darwin - Discussion Paper (EDAW, Oct 2007)*
3	6	Prepare a stakeholder communication and consultation strategy (including establish website, fact sheets, presentations). *About to commence in collaboration with WQPP*
	7	Prepare and communicate a definition of WSUD within Darwin *About to commence in collaboration with WQPP*
	8	Review and report on policy, programme, technical and decision-support systems for WSUD in Australia (including any barriers to uptake of WSUD and respective jurisdictional responses). About to commence in collaboration with WQPP
	9	Identify potential barriers to uptake of WSUD in the NT. Develop strategy to address barriers. *Much of this work is complete as part of the Darwin Harbour Regional Plan of Management and WSUD projects elsewhere in Australia. This is to be summarised in a discussion paper. If the Working Group identify the need to further define the barriers a stakeholder workshop and interview process will be undertaken.*

STAGE	TASK #	Activity
4	10	Develop WSUD Strategies for case studies in suitable format for communication and identify case studies for sub-catchment scale application of WSUD treatment train. *WSUD Showcase - Complete design development of the Bellamack WSUD Strategy* *Identify and scope work associated with "retrofit" WSUD case study*
	11	**Prepare detailed workplan for development of NT WSUD policy, objectives, design manual, performance standards and decision-support tools.**
5	12	Prepare draft NT WSUD policy and objectives for Darwin including understanding existing legislation, workshops etc.
	13	Assess application of WSUD objectives and management practice options across a range of development situations and/or catchment-scale treatment-train & confirm set of objectives.
	14	Undertake consultation of draft WSUD policy and WSUD objectives to stakeholders and barriers to WSUD.
6	15	Define requirements of WSUD Guidelines and Tools (workshop to define design needs in detail and assess whether exiting guidelines satisfy this need)
	16	Document Draft WSUD Guidelines and Tools in including High Level and Conceptual Design Guideline, Technical Design Guideline and Design Tools (MUSIC Guidelines, Deemed to Comply Solutions, Standard Drawings etc.)
	17	Prepare Draft WSUD decision support tools for Darwin Harbour, consistent with WQPP, linking policy, objectives and guidelines
7	18	Undertake stakeholder consultation of WSUD Policy, WSUD design manual and performance standards, and decision support Tools and seek approval.
	19	Finalise WSUD design manual, decision support tools and performance standards
8	20	Seek NT Government approval for WSUD Policy, WSUD design manual and performance standards and decision support tools.
	21	Develop and publish stormwater management plans for key subcatchment in Darwin to illustrate application of WSUD Policy/Framework, design manual and decision support tools.
9	22	Develop an implementation strategy for incorporating policies and provisions for WSUD within NT planning policies, strategic plans and development approval processes as well as local government instruments
	23	Ongoing communication and website management
	24	Capacity Building and Training including government, local authorities, developers and industry practitioners
10	25	Incorporate policies and provisions for WSD into NT government planning policies, strategic plans and development approval processes, as well as relevant local government instruments. Implement agreed strategy to address barriers to uptake of WSD.

2 WORKPLAN OVERVIEW

A detailed workplan has been developed to outline the key tasks that will be required to undertake the broad institutionalisation of WSUD across the greater Darwin region. The workplan describes the broader enabling environment that is required to implement WSUD by linking objectives and policies to locally relevant technical design guidelines and tools. The workplan is detailed in section 3 and it outlines the key tasks that are required to implement the whole strategy from initial development of objectives to capacity building and communication strategies.

The core driver for a WSUD Strategy is the development pressures in the Darwin Region and the potential impact this will have on these near pristine receiving environments. To ameliorate the impacts of this development on Darwin Harbour WSUD has been identified as a key design principle for new development. To implement WSUD as a broad strategy on all new developments requires an integrated approach to the development process at all levels of government as well as a number of enabling guidelines and tools to help developers implement WSUD. The Road Map in Section 2.2 outlines this process.

While the WSUD strategy is predominantly focussed on new development the WSUD strategy will also broadly address improving stormwater runoff from existing developments. For existing developments, sub-catchment management plans will be developed which address water quality objectives developed by the Water Quality Protection Plan for Darwin Harbour. The sub-catchment management plans will also need to be developed in conjunction with the plans that are being developed as part of the Stormwater Management Strategy developed by the Darwin Harbour Advisory Committee.

2.1 Workplan

A conceptual diagram of the workplan for WSUD has been developed. The WSUD strategy addresses both new and existing development and the overall framework is illustrated in Figure 1 and illustrates how the overarching WSUD strategy encompasses both existing development and new developments and how these tasks relate various stages.

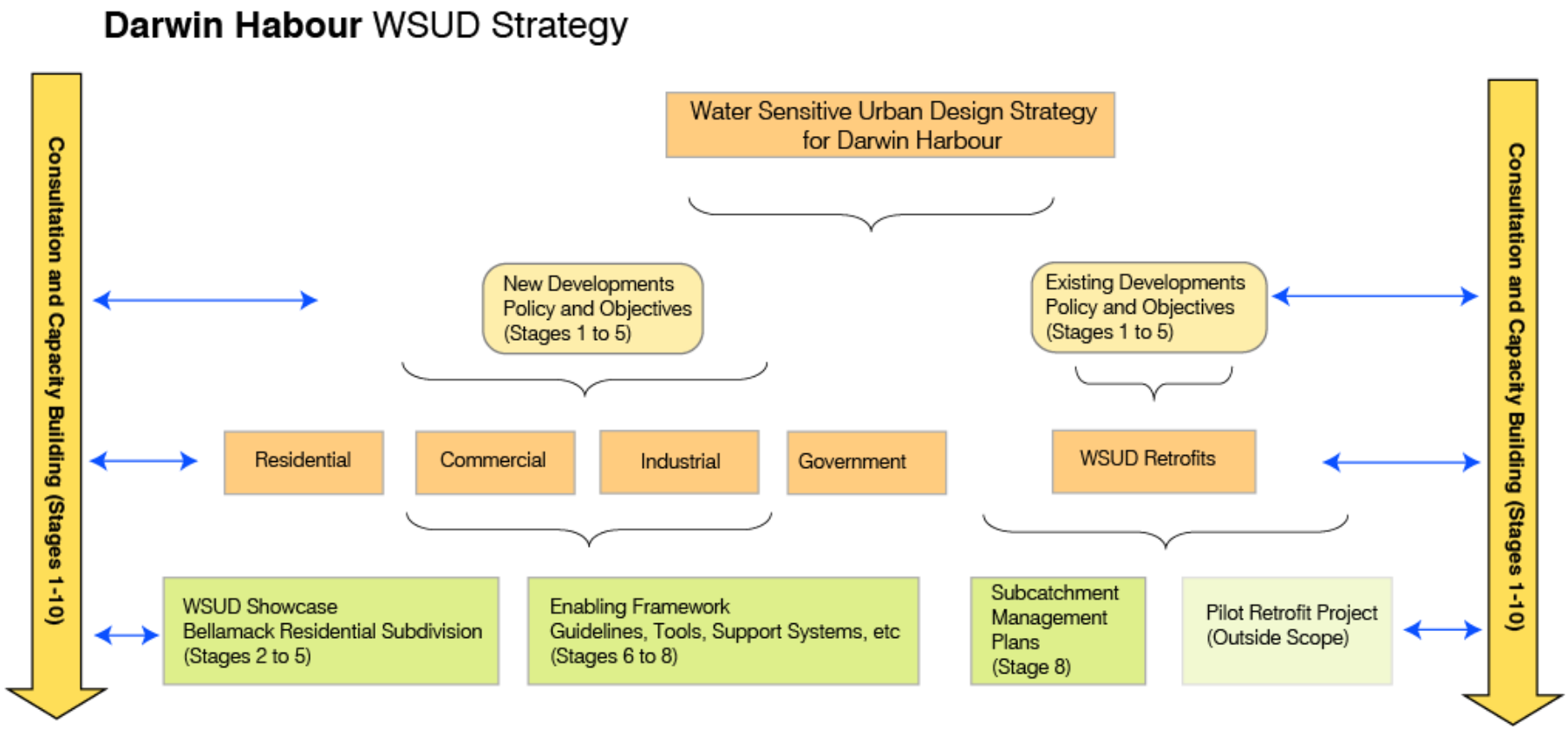

Figure 1 Broad Framework

The major goal of the WSUD Strategy for Darwin Harbour is the adoption of WSUD in all new development in the region. The three key overall phases of implementing the WSUD Statetgy for new developments are:

- setting and adopting WSUD Objectives
- development of an enabling framework
- industry and whole of government communication and capacity building

These phases are discussed in more detail in the following sections

2.1.1 Setting and Adopting WSUD Objectives

Setting WSUD objectives for new development and the adoption of these objectives into policy and legislation. Currently Interim Objectives have been developed in the early stages of this project (these are included in the Implementation Framework Discussion Paper). The next stage of this project will seek stakeholder agreement on these interim objectives and determine the most appropriate way of adopting these interim objectives into policy and legislation in the local context. Tasks that will be required to implement the WSUD objectives include:

1. Further development of technical and economic feasibility of waterway objectives
2. Further development of an appropriate water conservation target and the technical and economic feasibility. This task involves an analysis of current water consumption data, the potential of demand management measures to reduce water consumption and the feasibility of non-potable water supplies such as rainwater tanks, aquifer storage and reuse and wastewater reuse.
3. Revision of the water quality performance targets, using the Darwin Harbour receiving water quality model and associated decision support tool to ensure that the water quality targets are consistent with the receiving water quality objectives.
4. Further development of the water quality targets and their application to various developments including industrial developments, high density urban residential developments and various government developments.
5. Whole of Government engagement strategy to support adoption of WSUD objectives.
6. Analysis of existing legislation and policies in relation to its current support and potential modification to incorporate WSUD objectives.
7. Incorporation of WSUD objectives into existing legislation and policy.

This phase of the project broadly encompasses Stages 1 to 5 outlined in Table 1.

2.1.2 Enabling Framework

Development of a broad enabling framework including, guidelines and tools to assist new development implement the WSUD principles and meet the objectives developed in section 2.1.1. This phase of the program is discussed in detail in section 3.

This phase of the project broadly encompasses Stages 6 to 8 outlined in Table 1.

2.1.3 Communication and Capacity Building

Communication and capacity building is the principal component of the final phase of the project. Capacity building, consultation and communication is integrated throughout the project there is a

significant increase in capacity building in the latter phase to ensure widespread adoption of the WSUD strategy.

A series of formalised workshops and training sessions are proposed to disseminate information to a broader audience. This includes

- The training of local Council and Territory government staff.
- Industry training for practitioners of WSUD, primarily those responsible for the implementation of WSUD which includes government engineers and ecologists, consultants and Utility companies.
- Information sessions for the development industry.
- General information sessions open to the broader community.

The training will form an important element of the dissemination and roll-out of the implementation guidelines and tools. A training program will be developed to ensure knowledge transfer and application of the WSUD objectives, guidelines and tools. The training workshops will be interactive with participants, involving problem based learning, through training modules, whereby the implementation strategies suggested can be trialled by staff.

The training modules will be developed through consultation with government and involve appropriate groups based on the type of activities and skill levels. These different groupings will involve different types of training and are likely to include:

- General public (information)
- Senior managers and developers (information),
- Planning and assessment officers (assessment and compliance processes),
- Operation and maintenance staff (ensuring efficient maintenance), and
- Stormwater / engineering managers and designers (design and application of WSUD and water recycling, harvesting technologies).

For more information on the communication and stakeholder engagement strategy see the WSUD Communication and Consultation Strategy developed for the program. This phase of the project broadly encompasses Stages 9 to 10 outlined in Table 1.

2.2 Road Map

The core driver of WSUD strategy is the amelioration of development pressure. Thus the core focus of the WSUD Strategy is the development process and the required support material and framework that is required to adopt WSUD into all new developments.

As part of the detailed Work Plan a Road Map has been developed which will assist in the identification of the key requirements for Government and the broader industry to adopt WSUD in new development. The Road Map outlines the process of development from project initiation to completion and highlights the supporting information available to implement WSUD to government and the development industry to assist in meeting the required WSUD Objectives. The road map is shown in Figure 2 and is explored in detail in section 3.

This Road Map does not address retrofit of WSUD into existing urban areas. The process for adopting WSUD in existing urban areas will need to be different to that for new development, and will be addressed as part of Task 21 (Stage 8).

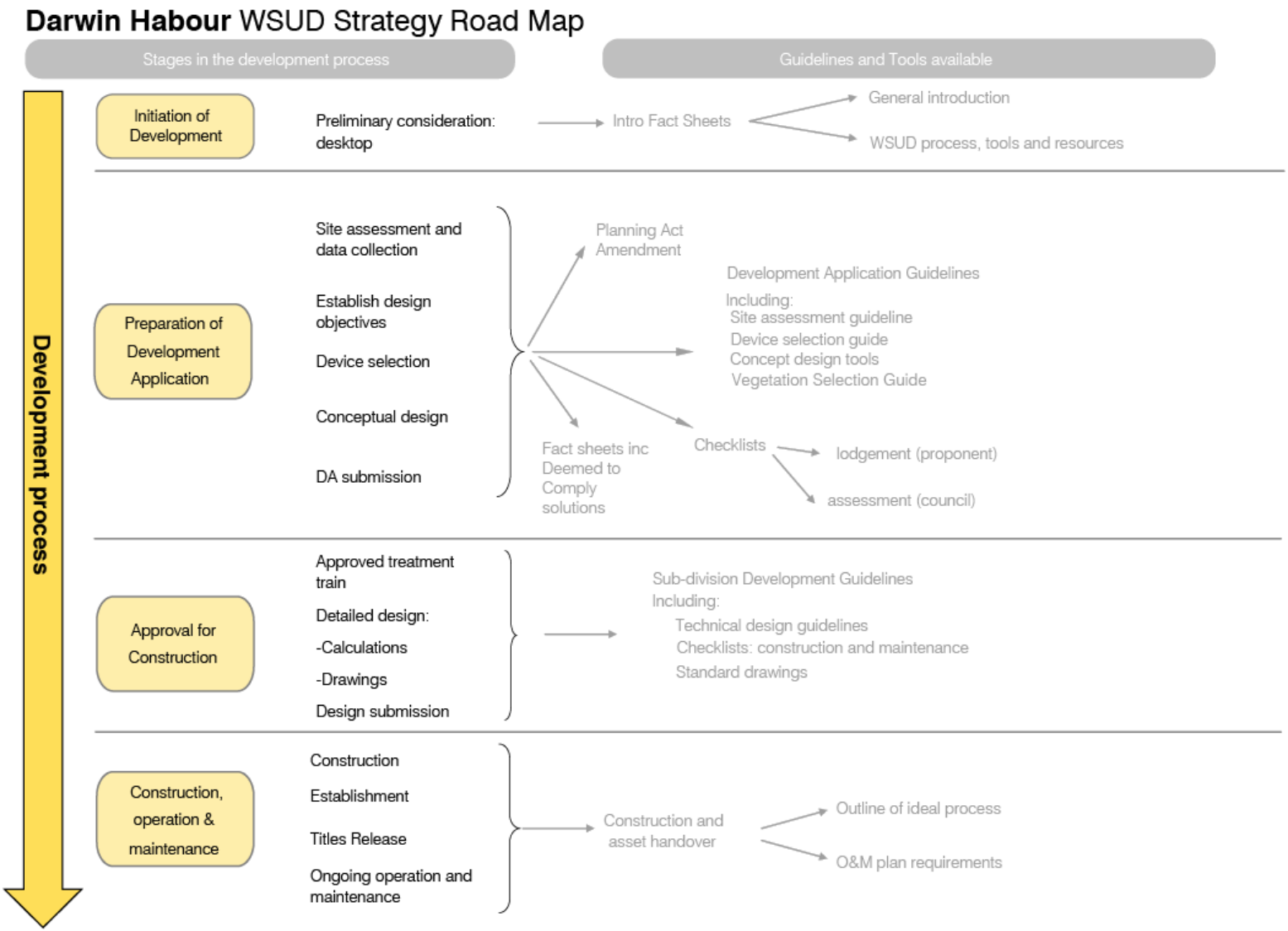

Figure 2 Road Map

3 DESCRIPTION OF KEY TASKS IN WORKPLAN

A description of each of the tasks identified in the Road Map in Figure 2 is outlined below.

3.1 Introductory Fact Sheets

The fact sheets will introduce developers to WSUD and provide a high level description in plain text the aims and goals of WSUD and how it applies to Darwin. Two Fact Sheets are proposed:

- A general introduction to WSUD as it applies in Darwin. This Fact Sheet will explain the relationship between WSUD and the protection of Darwin's aquatic environments, so that developers may understand the purpose and intent of the WSUD policy and legislation.

- Outline of the process for implementing WSUD and introduce developers to the guidelines and tools available. This Fact Sheet will include the road map that has been prepared already, along with explanatory text, and would also ensure that small developers are directed to the Deemed to Comply solutions, while others are directed to start with the DA Guide.

3.2 DCA Guide

This Development Consent Application (DCA) Guide will be compiled to assist developers who need to prepare a WSUD Strategy under NT Government DCA Process. It will form one of a set of guidelines and tools that are available to support the implementation of the WSUD Guidelines and tools, as shown in the road map. The DCA Guide, will include background information on the WSUD DCP objectives and targets, and a road map for developers to guide the preparation of a WSUD Strategy.

The preparation of a WSUD Strategy involves several steps and this document will provide a broad outlines of those steps. It will also includes key background information on the objectives in the WSUD DCA process.

3.3 Site Assessment guidelines

Site assessment is required to:

- Determine what site-specific objectives apply (e.g. the objectives for stream-forming flows depend on the presence and nature of streams downstream of the development)

- Provide information on physical constraints that will guide the concept and detailed design of WSUD measures such as stormwater treatment devices and storage systems.

Site assessment will involve some fieldwork and some desktop investigation. Important considerations to be addressed in a site assessment include:

- The site context (climate; natural capital; ecology; landscape attributes; regional physical infrastructure and development imperatives)

- The physical setting (topography and drainage; geology, soils and groundwater; existing development)

- Site assessment for WSUD should incorporate a catchment analysis and a water balance for the existing and future development scenarios.

This level of site assessment goes beyond that typically done at the moment for new developments in the Darwin Region, and includes a greater emphasis on the local environment, including the downstream receiving environment. While the WSUD objectives (discussed in Section 2.1.1) will

be the same for the whole Darwin Harbour catchment, the emphasis on local site context encourages consideration of the specific needs of local receiving environments.

All stormwater treatment devices can be subject to site-specific constraints. Stormwater treatment devices should be first selected based on matching the pollutant removal capability of a device with target pollutants in the stormwater. The physical constraints of the site (e.g. slope, soils, groundwater, etc) then need to be incorporated into the design of the selected device.

3.4 Device Selection Guide

This guideline is intended to assist in the sizing and conceptual design of stormwater treatment measures at the Development Application stage. It should be used for:

- Selection of appropriate water cycle management measures for a development
- Initial sizing and location of water cycle management measures
- Integration of water cycle management measures with the urban design

3.5 Conceptual Design Tools

This document will assist planners, urban designers, engineers, landscape architects and NT Government and Local Council development assessors to incorporate adequate provisions for WUSD through the phases of design and approval. The basis of this document will be the stormwater quality (MUSIC) modelling guidelines

The conceptual design tools are relevant to the conceptual design stage of the design and approval process. Other useful tools, more relevant to the detailed design stage of the process.

3.6 Vegetation Selection Guide

The vegetation selection guide is an indicative plant species list for vegetated WSUD elements. The WSUD elements include:

- Swales and buffer strips
- Wetlands
- Bioretention systems

Most of the plants selected are Australian natives that occur naturally in the wet-dry tropics. The majority of the plant species listed will be those that occur naturally in the Darwin Region. Incorporating these plants into urban areas will add considerable biodiversity and ecological habitat value to urban areas. Vegetation can perform many important functions in urban areas, such as visual amenity, soil stabilisation, microclimate control, fauna habitat, natural borders, and water pollution filtration and uptake. Advice from land managers and landscape architects should be sought to determine that the plants used in each specific situation meet the needs of all the other site users.

3.7 DA Checklists

Two DA lodgement checklist are proposed including:

- a checklist suitable for proponents,
- a checklist suitable for assessor's.

The lodgement checklist will specify what information needs to be lodged as part of a DA. It will include sections relevant to both small developers undertaking Deemed to Comply solutions, and large developers preparing WSUD Strategies.

The assessment checklist will allow assessment staff to readily determine whether a DA meets the relevant objectives. It will also include guidance on when a DA needs to be directed to other sections of government for more detailed assessment.

3.8 Sub-division Development Guidelines

The key resource for implementing WSUD at the construction approval stage is the WSUD Technical Design Guidelines which is outlined in section 3.9

The sub-division development guide includes two other main components:

- Design assessment checklists for swales, bioretention swales, bioretention basins, sediment basins and wetlands. These checklists include a quick reference guide for the key criteria that need to be considered when developing a detailed design of a WSUD element.

- Standard drawings for various WSUD components including swales, bioretention swales, bioretention basins, sediment basins and wetlands. The standard drawings facilitate the adoption of WSUD elements, and demonstrate the key components of the WSUD elements that need to be considered for construction drawings.

3.9 Technical Design Guidelines

The technical design guidelines provide advice on detailed design of WSUD elements. It will provide a consistent approach to design that incorporates WSUD technologies into urban developments. The technical design guidelines provide support to the detailed design of WSUD elements by providing a set of design procedures that can be used by designers and referral authorities when checking designs.

3.10 Construction and Asset Handover Processes

Experience with WSUD construction and implementation has demonstrated the need to ensure that infrastructure dedicated to local authorities through development applications is well-constructed, well-maintained and fully functional. This requires clear procedures outlining the requirements at each stage of the process:

- Construction

- On maintenance (defects liability period)

- Asset handover

- Ongoing maintenance

These guidelines typically require checklists for construction inspection, maintenance and asset transfer, however these are insufficient on their own to guide the construction, maintenance and asset handover process. Guidelines complement the checklists by providing key information on each stage of the process and involve the development of a series of tools such as maintenance manual templates, standard maintenance schedules, maintenance resource requirements and the development of a series of tools such as maintenance manual templates, standard maintenance schedules, maintenance resource requirements.