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**Northern Territory Government,
Department of Planning and
Infrastructure**

Darwin City Waterfront
Public Domain Infrastructure Precinct
Environmental Audit Report

Kitchener Drive, Darwin

May 2009



Statement of Environmental Audit

This Statement provides a summary of the findings of an Environmental Audit of the site located on **Kitchener Drive, Darwin**, Northern Territory in accordance with Section 47d of the *Waste Management and Pollution Control Act (NT)*.

Name of Auditor	Dr Peter Nadebaum of GHD Pty Ltd
Term of appointment of Auditor (under the Victorian Environment Protection Act 1970)	16 May 1990 to 29 November 2011
Date Audit requested	September 2003
Owners of the site	Northern Territory Government under the Administration of Department of Planning and Infrastructure.
Person requesting a Certificate	Terry O'Neill of the Northern Territory Government Department of Planning and Infrastructure.
Municipality	Town of Darwin
Title Information	Part Lot 7769, registered as CT Vol 735 Fol 642 as defined on survey plans LTO2008/91A to C (attached in Appendix A)
Area of the Site	51 500 m ²
Zoning	Central Business under the Northern Territory Planning Scheme

The audit has had regard to, amongst other things:

- ▶ The Waste Management and Pollution Control Act (NT),
- ▶ The National Environment Protection (Assessment of Site Contamination) Measure (NEPM 1999),
- ▶ Water Act (NT),
- ▶ Advice provided by the Northern Territory Environment Heritage & Arts Division, Department of Natural Resources Environment & the Arts (EHA/DNRETA), and
- ▶ Guidance provided by the Victorian Environment Protection Authority.

Summary of Findings

The Site is historically a marine area reclaimed through uncontrolled and controlled filling and was previously utilised for industrial purposes. Pollution control measures have been implemented to make the Site suitable for its intended purpose, subject to certain conditions and a Site Management Plan (Environment) and Groundwater Management Plan attached to the Site Audit Statement, and the following information is relevant:

- ▶ Underlying fill can include glass, concrete, metal and wood pieces in the fill material at some locations. These have been removed where they have been encountered in the top 1.0 m of the site and all areas not covered by buildings or paving have been covered in 0.3 m of clean topsoil. The Site Management Plan specifies the actions required should such materials be encountered during future works.



- ▶ Sampling and analysis has not detected any significant concentrations of asbestos in the fill in the waterfront area; however, due to the nature of the fill such material (particularly pieces of asbestos cement sheet) may be present at some localised areas of the Site. If excavations take place in the future, the work will need to be managed in accordance with the Site Management Plan (Environment) and material disposed of off Site in accordance with regulatory requirements.
- ▶ Heavy metal contamination is generally not present at concentrations that would adversely affect the health of persons working at the Site. Some metals concentrations were detected at depth exceeding the ecological criteria, but not the applicable human health criteria. Areas of open space have been covered with 0.3 m of clean topsoil.
- ▶ Hydrocarbon contamination can be present in the fill and natural soil and rock, particularly in the northern region of the site. The contamination is generally several meters beneath the surface and in the vicinity of the groundwater, and can give rise to contamination of the groundwater. This contamination is odorous and may be judged to be objectionable particularly if exposed and may be hazardous to persons if they come into direct contact with the material, and if excavated will be required to be managed and disposed of off Site in accordance with regulatory requirements and the Site Management Plan (Environment).
- ▶ Groundwater at the Site is contaminated with petroleum hydrocarbons, and this may be evident by a thin film or sheen on the groundwater in some locations. This could adversely affect the lagoon if it were to drain into the lagoon. A drainage system is provided to avoid this occurring, and it is proposed that this system will remain in operation until monitoring shows that contamination has reduced to a level where the drainage system can safely cease operation. Groundwater should be managed in accordance with the Groundwater Management Plan.
- ▶ There are some minor exceedences the ANZECC 2000 ISQG-Low metals criteria for sediments within the recreational lagoon. However these are not expected to impact the relevant beneficial uses of the lagoon.
- ▶ Consideration has been given as to whether further clean up should take place. It has been determined that clean up has been carried out to the extent practicable, and EHA/DNRETA has been consulted to confirm that it is in agreement with the determination. Natural biodegradation of residual hydrocarbon contamination will continue to occur and the sub-soil drain will continue to remove hydrocarbons from the site. It can be expected that, at some time in the future, controls such as the subsurface drain will no longer be required to operate. The assessor infers that this might occur within a decade; however, the audit concluded that there is considerable uncertainty in such an estimate.
- ▶ Potential Acid Sulphate Soil (PASS) and Actual Acid Sulphate Soil (AASS) were identified predominately along the central portion of the proposed development (Warehouse Area) and the Recently Reclaimed area. Generally, the PASS and AASS were identified within the mud/marine sediments underlying the fill material. Any works undertaken that may aerate or otherwise disturb these soils (such as excavation or dewatering) must be undertaken in accordance with a PASS management plan prepared by a qualified and experienced professional as specified in the Site Management Plan (Environment).
- ▶ There is potential for unexploded ordnance to be present, and for this to pose a risk if detonation should occur. This is outside the scope of the audit, and the risk associated with UXO is managed through other means.



The Site Management Plan (Environment) provides information on the requirements for management of materials that may be encountered if sub-surface works are carried out at the Site. The Groundwater Management Plan provides information on the requirements for ongoing monitoring of groundwater at the Site.

The audit considers only contamination of the soil, groundwater, surface water and sediment by potentially hazardous substances, and does not consider or advise on the geotechnical conditions, the requirements for management of UXO or other aspects of the suitability of the land for the development, or the presence of substances or organisms in surface water at the site other than those caused by soil and groundwater contamination.

Suitability of the Site

On the basis of the work undertaken, the auditor is of the opinion that the Site is suitable for the intended purpose, that being:

Public Domain Infrastructure including open space, a wave lagoon including the associated plant room, amenities building and recreational lagoon, in accordance with the site development plan (attached to the Site Audit Statement as Attachment A) and used subject to the following conditions:

1. All future development and maintenance works at the site involving excavation, and disposal of soil and fill shall be carried out in accordance with the Site Management Plan (Environment) attached to this summary.
2. Buildings shall be designed to prevent oily water from entering the basement, and other potentially occupied sub-surface structures, where there is a likelihood of oily water being present.
3. Groundwater at the site shall be managed in accordance with the Groundwater Management Plan attached to this summary to avoid contaminated groundwater discharging to the lagoon, and any sub-surface space.
4. Groundwater at the site shall not be used for any beneficial purpose other than environmental monitoring and for site remediation.
5. Although fishing is not a permitted use, it is possible that some incidental fishing and consumption of fish might occur. Although some uptake of contaminants by fish is possible, particularly from the boating lagoon (which is outside area of this audit), it is recommended that monitoring of fish in the recreational lagoon be carried out to confirm that the concentrations of contamination in the fish are not at levels that would pose a risk to persons who might catch and consume the fish.

The Site Management Plan (Environment) and the Groundwater Management Plan are subject to review and may be revised. The Darwin Waterfront Corporation should be contacted to obtain the current version of these documents.



This statement should be read in conjunction with the full audit report "*Northern Territory Government, Department of Planning and Infrastructure, Darwin City Waterfront, Public Domain Infrastructure Area, Environmental Audit Report, Kitchener Drive, April 2009*".

DATED: 30 April 2009

SIGNED: 

PETER NADEBAUM

Environmental Auditor (Appointed Pursuant to the Victorian *Environmental Protection Act 1970* and recognised in the Northern Territory under section 68 of the *Waste Management and Pollution Control Act Northern Territory*).

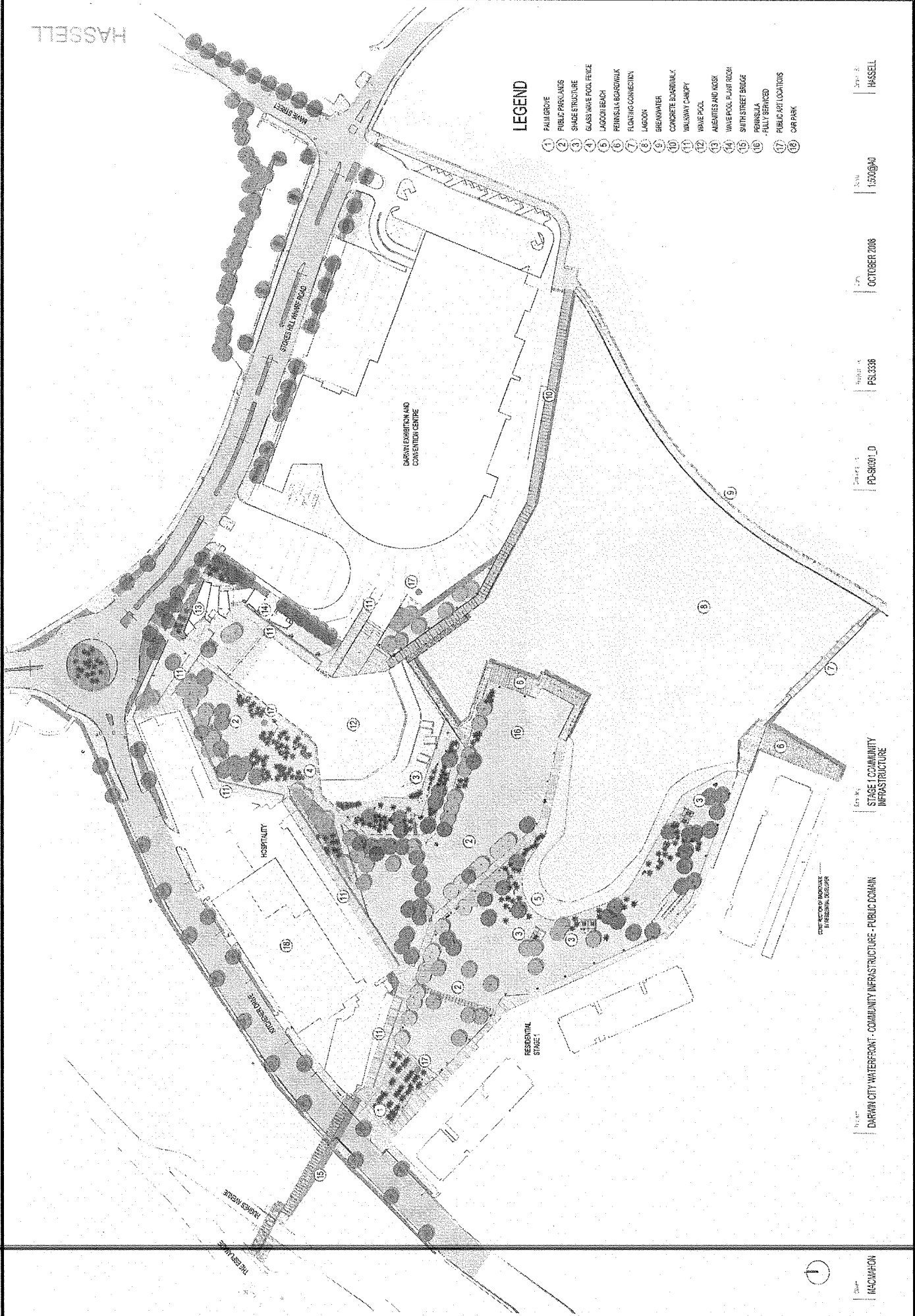
Statement Attachments:

- Statement Attachment A: Site Development Plan and Surveyed Plan of Site Boundaries
- Statement Attachment B: Site Management Plan (Environment) – Current version as at 30/4/2009
- Statement Attachment C: Groundwater Management Plan – Current version as at 30/04/2009



Statement Attachment A

Site Development Plan and Surveyed Plan of Site Boundaries



LEGEND

- 1 PALLI GROVE
- 2 PUBLIC PROGRAMS
- 3 SHADE STRUCTURE
- 4 GLASS WAVE POOL FENCE
- 5 LAGOON BEACH
- 6 PENINSULA BOARDWALK
- 7 FLOATING CONNECTION
- 8 LAGOON
- 9 GREENWATER
- 10 CONCRETE BOARDWALK
- 11 WALKWAY CANOPY
- 12 WAVE POOL
- 13 AMBITES AND ARCH
- 14 WAVE POOL PLANT BEDS
- 15 SWIRL STREET BRIDGE
- 16 PENINSULA - FULLY SERVICED
- 17 PUBLIC ART LOCATIONS
- 18 CAR PARK

DATE: 2008-10-08

SCALE: 1:500 @ A0

DATE: OCTOBER 2008

DRAWN BY: PS-3336

CHECKED BY: PD-SCHOOL

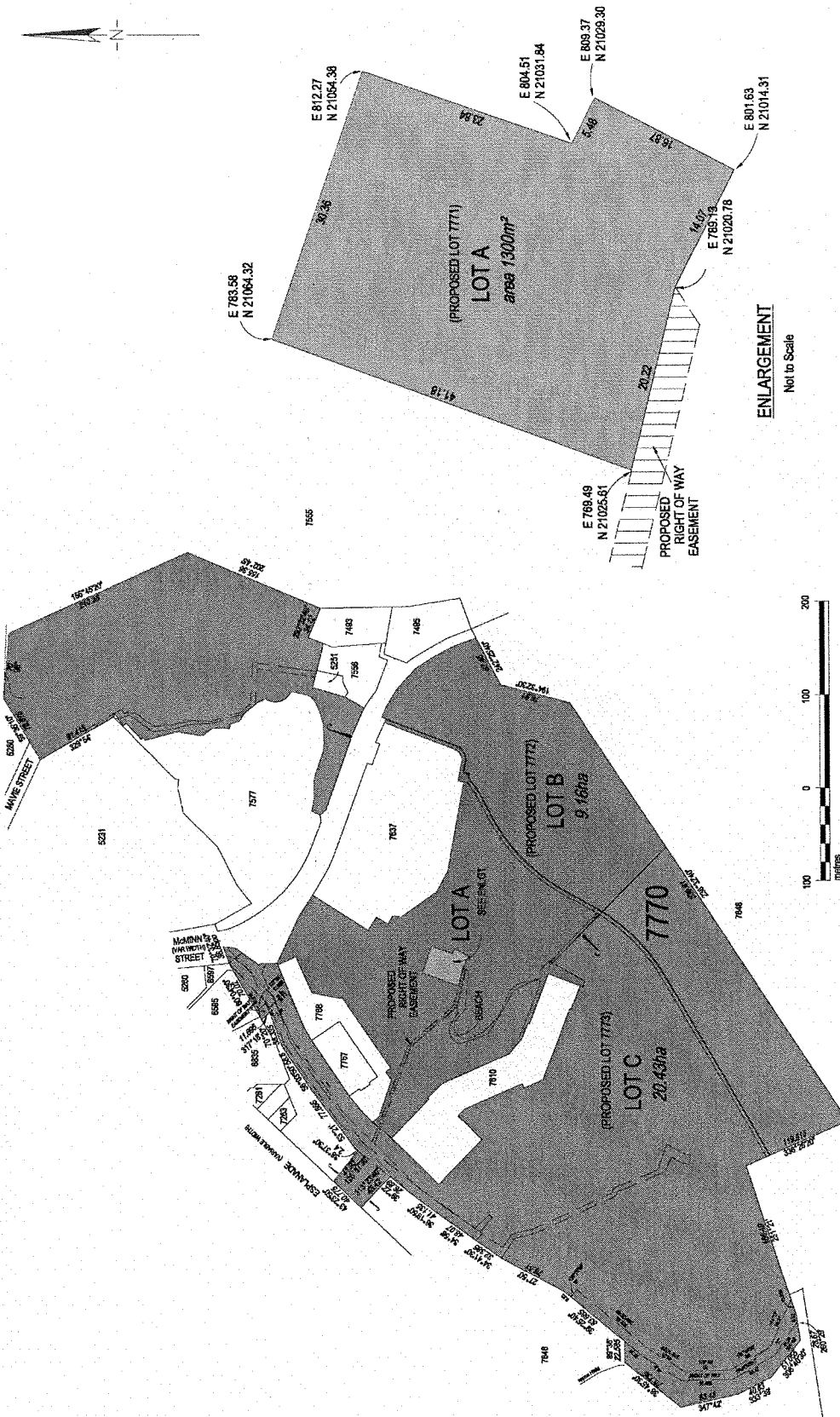
PROJECT: STAGE 1 COMMUNITY INFRASTRUCTURE

PROJECT: DARWIN CITY WATERFRONT - COMMUNITY INFRASTRUCTURE - PUBLIC DOMAIN

DATE: 2008-10-08



AS THIS DRAWING TO BE READ IN CONJUNCTION WITH THE COMPLETE PROJECT DOCUMENTATION SET INCLUDING THE SPECIFICATIONS.



Notes
All areas and dimensions are subject to survey

ENLARGEMENT
Not to Scale



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Sydney NSW 2000
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Designated ID	Checked
Drawn JD	
Checked TS	
Approved TS	
Notes	

DEPARTMENT OF PLANNING AND INFRASTRUCTURE

DARWIN WATERFRONT REDEVELOPMENT

Project Title: PUBLIC DOMAIN INFRASTRUCTURE CIVIL LOT 7770 TOWN OF DARWIN
 Job Number: 42213719-018.dgn
 Date: 30/03/2009
 Revision: A
 Draft: 1



Northern Territory Government Department of Planning and Infrastructure
 Darwin City Waterfront Development

Job Number | 31-14369
 Revision | A
 Date | 20 April 2009

Survey Plan - Lot 7770

Attachment A

URS Australia Pty Ltd
 Data source: URS Phase 2 (A Detailed Site Contamination Investigation Report - Darwin Waterfront Project October 2004). Created by: R. Newman
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Statement Attachment B

Site Management Plan (Environment)
– Current version as at 30/4/2009

**SITE MANAGEMENT
PLAN
(ENVIRONMENT)**

SMP - Darwin Waterfront Precinct

Prepared for

Darwin Waterfront Office

GPO Box 4000
Darwin NT 0801

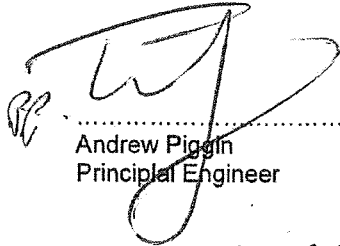
30 Apr 2009

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SMP - DARWIN WATERFRONT PRECINCT

Project Manager:

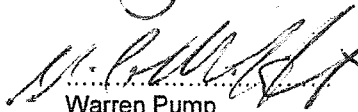


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Senior Principal

Date: 30 Apr 2009
Reference: Rev H
Status: Issued

