FINAL REPORT

Preliminary Environmental Assessment

Remediation of Sediments in Kendall Bay, Mortlake

Prepared for

Jemena Limited

Level 1, 100 Bennelong Parkway
Sydney Olympic Park, NSW, 2127
PO Box 6507 Silverwater NSW 2128

30 October 2008

43217727

URS

Project Manager:

……
Clair Baxter
Environmental Scientist

URS Australia Pty Ltd

Level 3, 116 Miller Street
North Sydney
NSW 2060
Australia
Tel: 61 2 8925 5500
Fax: 61 2 8925 5555

Project Director:

……
Ian McCardle
Principal Environmental Scientist

Author:

(Optional)

……
Francene Mitchell
Principal Engineer

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Executive Summary

In May 2004, the bed of the Parramatta River at Kendall Bay, within 200 m of the shore adjoining the former gasification facility, was declared a remediation site under the *Contaminated Lands Management Act 1997* (CLM Act). The site location is illustrated as **Figure 1**.

Alinta LGA Ltd (previously The Australian Gas Light Company) entered into a voluntary remediation agreement (VRA) with the Department of Environment and Climate Change (DECC) (then DEC), and in August 2004 submitted a voluntary remediation proposal (VRP) supported by a conceptual site model and Workplan. Since 4 August 2008, Alinta LGA Ltd has been trading as Jemena Ltd (Jemena).

Subsequent to the VRP, URS Australia Pty Ltd (URS) was engaged by Jemena to quantify the nature and extent of the contamination, to undertake an Environmental Risk Assessment (ERA) and a Human Health Risk Assessment (HHRA) for the site, and to develop a remediation strategy.

Following the ERA and HHRA investigations, an area for proposed remediation has been identified. A Remediation Order under Section 23 of the CLM Act was issued in June 2007 to the Maritime Authority of NSW (NSW Maritime). This Order was provided to Alinta (now Jemena) under Section 23(4) b of the Act. The proposed remediation works will involve removing sediment from the agreed area**,** transporting the sediment offsite to be treated or disposed and filling of the area with appropriate fill material.

This Preliminary Environmental Assessment (PEA) report has been prepared by URS on behalf of Jemena under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of this document is to provide sufficient information on the Project and its potential environmental impacts to allow the Director-General of the NSW Department of Planning (DoP) to issue environmental assessment requirements for a project approval in accordance with Part 3A of the EP&A Act. This document also acts as a formal request for the Environmental Assessment Requirements (EARs) under Section 75F of the EP&A Act.

The defined remediation areas are shown on **Figure 2** and are in accordance with the NSW DECC agreement as outlined in correspondence attached as **Appendix A**. The two remediation areas, Area A and Area B, occupy approximately 9,300 m^2. The average depth of contamination in Area A is 1.1 m and a total estimated in-situ volume of contaminated sediment within Area A is approximately 9200 m^3. The estimated volume of contaminated sediment within Area B is approximately 1,500 m^3.

The estuary bed and underlying sediments of the Project area are owned by NSW Maritime.

The key operational components of the Project would include sediment removal, transportation, staging, treatment and disposal. The remediation process is considered to be short term and temporary. Further environmental assessments would provide necessary detail for the preparation and implementation of mitigation measures to minimise potential impacts.

The following have been identified as the key issues that will require detailed evaluation in the Environmental Assessment Report:

- environmental and human health risk;
- water quality;
- erosion and sediment control;
- air quality, including odour;
- noise and vibration;

- traffic;
- ecology;
- aboriginal heritage; and
- waste management.

Other issues that will be addressed but at a higher level include:

- land use and ownership;
- hazard and risk;
- visual; and
- socio-economic.

Introduction Section 1

1.1 Background

In May 2004, the bed of the Parramatta River at Kendall Bay, within 200 m of the shore adjoining the former gasification facility, was declared a remediation site under the *Contaminated Lands Management Act 1997* (CLM Act). Alinta LGA Ltd (previously The Australian Gas Light Company) entered into a voluntary remediation agreement (VRA) with the DECC (then DEC), and in August 2004 submitted a voluntary remediation proposal (VRP) supported by a conceptual site model and Workplan. Since 4 August 2008, Alinta LGA Ltd trades as Jemena Ltd (Jemena).

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This document has been prepared taking into consideration:

- Part 3A of the EP&A Act;
- Part 1A of the *Environmental Planning and Assessment Regulation 2000* (the Regulation); and
- Project Applications under Part 3A – Steps in the Process (DoP 2005).

This PEA presents an outline of the project and a preliminary assessment of key environmental issues and includes:

- Background and site location identifying the remediation area (Section 1);
- project description and justification (Section 2);
- statutory planning provisions that apply to the site (Section 3); and
- a preliminary assessment identifying the likely key environmental issues of the proposal (Section 4).

1.2 Site Location

The proposed remediation site is located within Kendall Bay, Mortlake. Kendall Bay is located within the Parramatta River immediately adjacent to Breakfast Point to the west and Cabarita to the East (**Figure 1**). The area of remediation is located within 200 m of the shoreline. The surrounding area is primarily medium density residential dwellings.

1.3 Proponent

The proponent is Jemena Ltd, Level 1, 100 Bennelong Parkway, Sydney Olympic Park, NSW 2127, (PO Box 6507 Silverwater NSW 2128). The Proponent contact is David Donehue, Group Manager Environment, Jemena Ltd.

Project Description Section 2

2.1 Project Area

There are two areas within Kendall Bay proposed for remediation (**Figure 2**). The areas proposed for remediation were agreed with the NSW DECC as outlined in correspondence attached as **Appendix A**.

The main remediation area (Area A) is in the headwaters (southern end) of Kendall Bay and includes areas of contaminated sediment within the mudflats and along the western side of the Bay in rocky areas extending northwards from the mangroves along a sandstone seawall. The second remediation area (Area B) is smaller (approximately 55 m x 20 m) and is in the vicinity of the former wharf along the western side of Kendall Bay where intermittent hydrocarbon sheens have been previously observed on surface waters.

The two remediation areas, Area A and Area B occupy approximately 9,300 m^2. The average depth of contamination in Area A is 1.1 m, providing a total estimated volume of contaminated sediment within Area A of approximately 9200 m^3 in-situ. The estimated volume of contaminated sediment within Area B is approximately 1,500 m^3.

The mudflat profile is relatively flat, dipping downwards to the north at approximately 1 %. The estimated depth of water at the northern extent of the main remediation area varies between 0.5 m and 1.8 m, and a large extent of the mudflat within the remediation area is exposed during low tides.

A stormwater drain outlet is located behind the mangroves and discharges into Kendall Bay.

The estuary bed and underlying sediments of the Project area are owned by the Maritime Authority of NSW (NSW Maritime).

2.2 Evaluation of Remediation Options

2.2.1 Options Considered

A remediation options review was undertaken by as part of the RAP development. The review investigated five options for the remediation of sediments at Kendall Bay (**Table 2.1**).

Two options (A and B), involving either taking no action or using in-situ biological or chemical treatment, were considered to be unsuitable due to the options not addressing the project objectives in a timely manner, likely ongoing liability issues and costs associated with long term monitoring.

Three options were considered to be broadly suitable for the remediation. Two of these options involve the removal of contaminated sediments, either totally (Option C) or partially (Option D), and two options (D and E) involve the placement of an engineered cap to isolate contaminated sediments from overlying water.

Option E would involve the placement of a cap over the existing contaminated material without any of the contamination being removed. This option has the advantages of addressing human health concerns, avoiding the handling and disposal of contaminated sediment and reducing potential impacts (c.f. Options C and D) on nearby residents. The key disadvantage of the option is that the bay's bathymetry will be altered and water depths reduced. NSW Maritime has indicated that it is not in favour of significantly altering the bathymetry of the area. With this Option E, the existing contamination will also remain and there would be a potential ongoing commitment associated with maintenance of the cap. Although this option could be implemented it has been considered unsuitable given the NSW Maritime requirement to maintain bathymetry and the ongoing maintenance requirements.

Options C and D are being pursued for further evaluation and are discussed in more detail below. The key differences between Option C and Option D are related to the volume of sediment to be removed (Option C will have higher excavation costs), and the requirement in Option D of carefully installing an effective cap and ensuring the ongoing integrity of the cap.

Either of Options C or D would require some land based activities to support the project implementation. For example, importation of materials for backfilling through Cabarita Park to the remediation site would be proposed.

Table 2-1 Sediment Remediation Options

Option	Advantages	Limitations / Constraints	Time Frame	Suitability
A. No Action / Natural Recovery				
Sediments left undisturbed to allow natural processes to reduce contaminant concentrations.	- low cost - low impact - no sediment removal - no treatment costs - no resident disruption	- slow - uncertain end result - ongoing human risk - long term monitoring - ongoing liability	Long	Doesn't address human risk in timely manner, ongoing monitoring costs **NOT SUITABLE, DOES NOT MEET REMEDIATION OBJECTIVE OF PROMPT REDUCTION IN POTENTIAL HUMAN HEALTH RISK**
B. In situ Biological / Chemical Treatment (e.g. phytoremediation)				
Addition of micro-organisms and/or modification of environment to promote breakdown of contaminants	- low resident impact - no sediment removal	- unproven methods - unknown outcomes - long term monitoring - ongoing liability	Long	Doesn't address human risk in timely manner, ongoing monitoring costs **NOT SUITABLE, DOES NOT MEET REMEDIATION OBJECTIVE OF PROMPT REDUCTION IN POTENTIAL HUMAN HEALTH RISK**
C. Total Removal of Contaminated Sediment & Backfill				

Contaminated sediment completely removed and replaced with clean materials	- significant reduction of potential human health risk -no ongoing monitoring	- large extraction costs - high waste handling - large *ex situ* disposal & treatment costs - extensive environmental controls required - site access difficult - potential impacts on residents	Medium	Addresses potential human health risk and effectively eliminates ongoing monitoring and maintenance issues. Difficult logistics. **SUITABLE FOR FURTHER CONSIDERATION**

Option	Advantages	Limitations / Constraints	Time Frame	Suitability
D. Limited Removal of Contaminated Sediment & Cap Placement				
Upper layer of contaminated sediment removed and replaced with clean cap	- lower waste handling* - lower *ex situ* disposal & treatment costs* - slightly lower resident impact* **c.f. Option C*	- more precise sediment removal needed - most contamination remains - extensive environmental controls required - careful cap placement - ongoing cap monitoring - difficult site access - ongoing liability	Medium	Addresses human risk by isolating contaminants. Cap integrity essential for success. Difficult logistics. **SUITABLE FOR FURTHER CONSIDERATION**
E. Cap Placement Over Existing Sediment				
Clean cap material is placed onto sediment without any prior removal	- no waste handling - no ex situ disposal & treatment costs - lower resident impact* **c.f. Options C & D*	- contamination remains - bathymetry altered - careful cap placement - ongoing cap monitoring - difficult site access - ongoing liability	Short	Addresses human risk by isolating contaminants. Cap integrity essential for success. Difficult logistics. Bathymetry altered. **NOT SUITABLE FOR FURTHER CONSIDERATION GIVEN BATHYMETRY MODIFICATIONS**

2.2.2 Option C: Total removal of contaminated sediment and backfill

Option C would involve the complete removal of around 9200 m^3 of contaminated sediments from within the remediation area. The depth of removal would vary across the site, from minimal (close to the south-east shoreline) to greater than 1.6 m in the central section of the remediation area. Removal of the sediments would be most likely by either dredging from a barge or excavation in the dry (following the installation of temporary sheet piles and subsequent de-watering of the remediation area) (**Section 2.3**).

Following verification that contaminated sediments have been removed, the void would be backfilled with validated materials to restore the existing bathymetry. Since contaminated sediments would have been removed, resuspension of contaminants would not be anticipated during backfilling. Backfilling operations may be undertaken via a land bridge/coffer dam would could be constructed from the western shoreline in Cabarita Park adjacent to the remediation Area A. The land-bridge/coffer dam would be used as a means of access for backfilling by a long reach excavator or barge.

Table 2.1 lists the key advantages and disadvantages of implementing Option C.

Physical disturbance to contaminated sediments during their removal will lead to the resuspension of contaminants into the water column. Real time monitoring of turbidity during sediment removal would allow potential resuspension to be identified early and facilitate appropriate action to halt or minimise the off-site migration of sediments. There would be minimal requirement for ongoing monitoring after sediment removal and backfilling and unlike Options D and E the backfill material is not intended to isolate underlying contaminated sediments.

The duration of remediation is dependent on the method of remediation. Some methods of dredging would rely heavily on tidal movement for access, limiting operation to several hours per day. Excavation following dewatering of the site would essentially be independent of the tides, allowing up to ten hours of sediment removal per day (assuming staging and disposal areas are able to cope with the sediment volumes). The process of initially isolating and dewatering the site to allow excavation would also take more time (weeks) than mobilising a dredge (days).

The time frame for total removal of contaminated sediment will need to be determined.

2.2.3 Option D: Partial removal of contaminated sediment and capping

Option D would involve the removal of a minimal layer of surface sediment and the placement of a cap. The cap would be engineered to withstand ambient erosion forces and to isolate the underlying contaminated sediments from human exposure. As with Option C, the removal of sediment could be undertaken by dredging (from shore or barge) or excavation after dewatering the site (**Section 2.3**).

The USEPA identifies a number of conditions that make sites conducive to capping. Those of relevance to Kendall Bay include:

- suitable types and quantities of cap material are likely to be available;
- water depth is adequate to accommodate the cap for its anticipated use;
- the potential to disrupt the cap, such as through large boat anchoring, is low or controllable;
- long-term reduction in risk outweighs habitat disruption, and / or habitat improvements are provided by the cap;
- hydrodynamic conditions are not likely to compromise the cap or can be accommodated in the design;

- rates of groundwater flow in the cap area are likely to be low and are not likely to create unacceptable contaminant releases;
- the underlying “clean” sediment is likely to have sufficient strength to support the cap;
- contaminants have low rates of flux through the cap; and
- the contamination covers contiguous areas (i.e. to simplify capping).

The majority of these conditions are met by the remediation area at Kendall Bay; however there are several issues that would need further assessment such as source of capping material and supporting capability of contaminated sediment.

The nominal thickness of the cap would be 0.5 m, however, the final thickness will depend on cap design that may include graded layering comprising sand and armouring.

Table 2.1 lists the key advantages and disadvantages of implementing Option D.

Environmental controls would be necessary to limit the dispersal of contaminants during sediment removal and cap placement. As for Option C, the degree of potential resuspension would depend on the method of remediation adopted. Real time monitoring of turbidity during sediment removal would allow potential resuspension to be identified early and facilitate appropriate action to halt or minimise the off-site migration of sediments. As per Option C, backfilling operations via a land bridge/ coffer dam with a long reach excavator or barge loading the backfill to the excavation is being considered.

Medium term monitoring of cap integrity may be required to review cap effectiveness i.e that the cap is not deteriorating with time or sustaining damage through activities such as storm events and stormwater discharge.

The duration for partial removal of contaminated sediment should be slightly shorter than that for Option C, due to the smaller volume. Careful placement of a cap is likely to take longer than the backfilling required as part of Option C.

The time required for the partial removal of sediments and cap placement will need be determined.

2.3 Evaluation of Sediment Handling Options

The removal of sediments could be undertaken by excavation using a grab bucket or by dredging. Both methods would require the installation of temporary pollution control measures to protect water quality outside the work area.

The USEPA identifies a number of conditions that make sites conducive to dredging or excavation. Those of relevance to Kendall Bay include:

- suitable disposal site(s) will become available;
- suitable area is available for staging and handling of dredged material. Limited space is available on shore but the option of staging and handling dredged material on barges within the Bay or other nearby harbour sites has been proposed as a viable option;
- existing shoreline areas and infrastructure can accommodate dredging or excavation needs;
- manoeuvrability and access is not unduly restricted by piers, buried cable, or other structures;
- water depth is likely to accommodate most dredges but not so great as to be infeasible, or excavation in the dry is feasible;

- long-term risk reduction of sediment removal outweighs sediment disturbance and habitat disruption;
- water diversion is practical or current velocity is low to reduce resuspension;
- contaminated sediment overlies clean or much cleaner sediment;
- sediment contains low incidences of debris; and
- contaminants are highly correlated with sediment grain size.

The majority of the abovementioned conditions are met at Kendall Bay. The first two in particular (location of disposal and staging areas) are major determinants of the suitability of the two removal options and suitable areas need to be identified. Alternative options such as staging and stabilising sediments on board barges within Kendall Bay have been suggested, prior to water-based transport to suitable unloading sites for disposal. The actual staging and disposal option will be finalised after input on likely remediation methods have been received from contractors.

Advantages of excavation over dredging

Excavation of exposed (dewatered) sediment has several advantages over dredging including:

- excavation can usually be undertaken using conventional earthmoving equipment which is more easily sourced than dredges;
- operators and supervisors can more easily observe what sediment is being removed;
- the thickness and spatial extent of sediment being removed can be more easily controlled;
- removal of contaminated sediment is usually more complete (visually assessed);
- fewer water borne contaminants are released if the area is dewatered;
- sediment characteristics are typically less important to the process; and
- excavated sediment is usually drier than dredged sediment, resulting in fewer wastewater disposal issues, and may reduce the need for on-site dewatering of sediment prior to transporting to the disposal site.

Advantages of dredging over excavation

Dredging also has several advantages over excavation:

- site preparation is usually faster and less expensive if there is no dewatering;
- if conducted on water (i.e. barges) with off-site sediment transport also undertaken by barge, there may be less impact on local residents in terms of road traffic, noise, odour and the potential for spills of contaminated sediment during handling; and
- excavation is limited to areas with relatively shallow water that can be effectively dewatered, whereas dredging is more suited to areas of deeper water.

The operational aspects of the removal of sediments are similar irrespective of whether all or part of the contamination is removed. The key steps in the remediation process are:

- construction of a temporary access road to the site, security fencing and site office;
- installation of sediment curtains and absorbent booms across the remediation area and Kendall Bay;
- possible construction of a sedimentation pond and water treatment plant if dewatering from a barge is not adopted;

- possible importation of sheet piles via road or barge and installation of the sheet piles via jetting, driving or vibration;
- dewatering of the excavation if adopted;
- mobilisation of an excavator via road or barge, or a dredge;
- excavation of sediments from the shore or barge, or dredge;
- transfer of excavated material to the sedimentation pond or barge, and dewatered;
- trucking or barging of sediments off-site for treatment and disposal;
- trucking or barging of clean fill to site for placement. Possible temporary storage of clean fill if trucked in;
- monitoring of water quality during the remediation process;
- rehabilitation of disturbed areas; and
- monitoring of the remediated site.

Rehabilitation of the site will include the removal of the sedimentation pond, treatment plant and sheet piles (if constructed / installed), removal of the site access road, security fence, office and sediment curtain, and revegetation of any disturbed areas that were previously vegetated.

Monitoring of the site post remediation will involve a period of water quality assessment within Kendall Bay, and post remediation sampling of sediments for validation of remediation success.

2.4 Overview of Preferred Remediation Option

Following evaluation of the benefits, limitations and uncertainties associated with each remediation option, Option C is being further evaluated as the preferred approach being applied to the remediation works required.

This option involves total removal of the contaminated soft sediments within the agreed remediation area of Kendall Bay and backfilling with suitable material within the void to re-establish the bathymetry to pre-removal conditions. Option D is not being further pursued given the ongoing maintenance and potential liability issues relevant to a capping solution and residual impacts underlying the cap.

In consideration of the various site specific issues, a series of remediation tasks has been defined, taking into account possible handling and transport logistic constraints. The detailed scope of each task, in particular handling, treatment and transport logistics may change with work method variations proposed by the nominated Remediation Contractor.

The broad overview of the remediation tasks is as follows:

- installation of environmental controls to mitigate and manage potentially unacceptable impacts on the local environment arising from the works;
- establishment of sheet piling or other similar barrier to facilitate de-watering of remediation area. The purpose of dewatering prior to excavation works is to minimise water volumes requiring management within the remediation area;
- removal of contaminated sediments via water based dredge/excavator positioned on working barge;

- transport of excavated sediments from a working barge to a transport barge via floating pipeline or other suitable transfer process;
- preliminary treatment of sediments (dewatering) to enable more effective treatment and land-filling prior to transport off-site for further treatment and disposal;
- transport off-site by transport barge to third party waterfront site (yet to be identified);
- immobilisation of sediments with contaminant concentrations above landfill acceptance criteria at a third party site, followed by road transport of treated materials to licensed landfill;
- approval for use of Cabarita Park to be arranged with City of Canada Bay Council for transport of material;
- construction of land-bridge/coffer-dam using sheet pile and/or rock or similar from western shoreline in Cabarita Park to the remediation area. Land-bridge/coffer-dam to be used as means of access for backfilling operation with long-reach excavator and/or barge;
- reinstatement of the sediment excavations with clean, validated materials; and
- removal of the sheet piling and site de-establishment.

Figures 3 and 4 conceptualise the general methodology of the preferred remediation approach.

2.5 Project Need and Justification

The proponent, in consultation with DECC, has identified a need for active sediment remediation within the proposed remediation area, and to remove or isolate contaminated sediments in areas accessible to the public and that are currently deemed to provide unacceptable risks to human health. The justification for active sediment remediation is to reduce potential human health risk to an acceptable level in a timely manner, and necessarily involves the disturbance of contaminated sediments within Kendall Bay.

3.1 Commonwealth Legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) states that an action which *has, will have or is likely to have a significant impact on a matter of national environmental significance* may not be undertaken without prior approval of the Commonwealth Minister for Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The Act identifies the following matters as matters of national environmental significance for which Ministerial approval is required:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (including Ramsar Wetlands);
- Listed threatened species and ecological communities;
- Listed migratory species protected under international agreements (CAMBA and JAMBA);
- Protection of the environment from nuclear actions; and
- Commonwealth marine areas.

Preliminary environmental assessment studies indicate that the Project does not involve any of the above matters and consequently the Project would not be a controlled action under the EPBC Act. It is expected that further studies undertaken as part of the Environmental Assessment Report will confirm this.

3.2 NSW State Legislation

3.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (the Regulation) provide the framework for the assessment and approval of proposed developments in NSW.

Part 3A of the EP&A Act provides a process for the assessment of developments which are considered to be 'Major Projects' as declared by State Environmental Planning Policy (Major Projects) 2005 (SEPP MP) or by order of the Minister in the Government Gazette.

The Director General of the Department of Planning under delegation from the Minister of Planning has formed the opinion for the purposes of Clause 6(1) of the SEPP MP that the proposed remediation of sediments in Kendall Bay *is a development of a kind that is described in Schedule 1 of State Environmental Planning Policy (Major Project) 2005 namely Clause 28(1) development for the purposes of remediation of land that is category 1 remediation work on a remediation site – and is thus declared to be a project to which Part 3A of the EP&A Act applies for the purpose of section 75B of the Act*. A copy of this Director General correspondence is included with **Appendix B**.

3.2.2 Environmental Planning Legislation

While the EP&A Act provides the framework for the planning and development approvals system in NSW, there are a number of other Acts and Regulations of relevance to the proposed Project. These Acts and Regulations would be identified and considered during the environmental assessment of the Project. Key Acts of relevance are discussed below. It is noted that Part 3A of the EP&A Act removes the need to obtain some of the approvals under these Acts or Regulations.

Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) provides a framework for the main objective of establishing a process for investigating and where appropriate remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment.

The proposed remediation site in Kendall Bay was declared a remediation site under the CLM Act in May 2004. A Remediation Order under Section 23 of the CLM Act was issued to NSW Maritime in June 2007.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) relates to pollution and waste disposal in NSW and provides for the licensing of certain types of pollution caused by development or operation of developments. It is anticipated that the proposed remediation would require licensing under to PoEO Act to restrict pollution of waters.

Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) relates to the conservation, development and sharing of the fishery resources of the State for the benefit of present and future generations. For approved projects under Part 3A (s75U(b)) of the EP&A Act, a permit under section 201, 205 or 219 of the FM Act does not apply.

Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides for the protection of river and lakeside land in NSW, formerly held under the *River and Foreshore Improvements Act 1948* for areas covered by a Water Sharing Plan. The proposed remediation site is located within the Parramatta River, however, for approved projects under Part 3A (s75U(h)) of the EP&A Act, water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the WM Act does not apply.

Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the conservation of threatened species, populations and ecological communities of animals and plants. It provides a framework for the assessment of any action that may impact on threatened species.

Heritage Act 1997

The *Heritage Act 1997* (Heritage Act) provides for the protection of items of local, regional and State heritage significance. It contains a list of State Heritage Items and outlines the process of assessment of development which may impact items of heritage significance. The proposed remediation site does not contain any items of heritage significance therefore this act would not apply.

Roads Act 1993

The *Roads Act 1993* (Roads Act) provides a framework of provisions, one of which is the regulation of the carrying out of various activities on public roads. Section 138 of the Roads Act requires consent for certain actions in relation to public and classified roads. This Act would not apply to the proposed remediation works.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the preservation of land and the protection of that land, as well as the protection of flora and fauna and aboriginal heritage. For approved projects under Part 3A (s75U(d)) of the EP&A Act, a permit under section 87 or a consent under section 90 does not apply.

3.2.3 State Environmental Planning Policies

SEPP Major Projects

According to SEPP (MP) Major Projects, development referred to as a 'Major Project' requires assessment and approval of the Minister for Planning in accordance with Part 3A of the EP&A Act. The SEPP defines certain types of development as major projects.

The proposed remediation of sediments is considered a Major Project under the provisions of Schedule 1 of SEPP MP pursuant to Clause 28(1). Clause 28(1) Remediation of Contaminated Land provides that a major project is a *development for the purposes of remediation of land that is category 1 remediation work on a remediation site*.

SEPP 55 – Remediation of Land

The object of SEPP 55 is to provide for a Statewide planning approach to the remediation of contaminated land and in particular the policy aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 9 of SEPP55 sets out the criteria for Category 1 remediation, which include:

- remediation that is defined as designated development; or
- remediation carried out or to be carried out on land declared to be a critical habitat; or
- remediation likely to have a significant effect on a critical habitat or a threatened species, population or ecological community; or
- carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument: coastal protection, conservation or heritage conservation, habitat area, habitat protection area, habitat or wildlife corridor, environment protection, escarpment, escarpment protection or escarpment preservation, floodway, littoral rainforest, nature reserve, scenic area or scenic protection, or wetland.

Under the SREP SHC (refer to **Section 3.2.4**) the remediation would occur in a Wetlands Protection Area and consequently would impact on land defined as "habitat protection" and satisfy the criteria for category 1 remediation under SEPP55.

3.2.4 Regional Environmental Plans

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (SREP SHC) covers the area of Sydney Harbour, including Parramatta River and its tributaries and the Lane Cove River. The aim of the plan is to establish a balance between promoting a prosperous working harbour, maintaining a healthy and sustainable waterway environment and promoting recreational access to the foreshore and waterways. It establishes planning principles and controls for the catchment as a whole. The plan consolidates and replaces the following instruments: - Sydney Regional Environmental Plan No. 22 - Parramatta River (SREP 22); - Sydney Regional Environmental Plan No. 23 - Sydney and Middle Harbours (SREP 23); and amends State Environmental Planning Policy No. 56 Sydney Harbour Foreshores and Tributaries (SEPP 56).

Pursuant to the SREP SHC, the site is within the Foreshore and Waterways Area Boundary, zoned W1 Maritime Waters and within a Wetlands Protection Area. The SREP SHC establishes guidelines for development within these areas and would need to be considered with a development application.

3.2.5 Local Environmental Plans

Canada Bay Local Environmental Plan 2008

The aims of the *Canada Bay Local Environmental Plan 2008* (CBLEP) are: to create a land use framework that allows detailed provisions to be made, including; *to maintain and enhance the existing amenity and quality of life of the local community; to ensure development embraces the principles of: ecological sustainability; to identify and conserve those items and localities that contribute to the local, built form, environmental and cultural heritage of Canada Bay; to protect and manage areas of remnant bushland, natural watercourses and threatened species; to provide measures to retain, and where possible to extend, public access to the foreshore areas of Canada Bay and to control development in those areas; to provide effective community participation and consultation for planning and development; to provide clarity and certainty for the community and development applicants, while allowing flexibility to respond to changing needs*.

The proposed remediation site is owned by NSW Maritime, however, the surrounding land use zonings include general residential, low density residential, medium density residential and public recreational.

Key Environmental and Social Issues

Section 4

4.1 Key Issues Associated with Option Implementation

The preferred remediation option currently being considered is the total removal of contaminated sediment with subsequent backfilling of clean suitable material. Possible options for the physical removal of sediments being considered include either excavation or dredging. Work is continuing to firm up the preferred combination of options including seeking constructability advice input from experienced contractors. This PEA identifies the likely environmental and social impacts associated with the above options. Once prepared, the Environmental Assessment Report will address the preferred option.

The key environmental and social issues associated with option implementation are summarised in **Table 4.1**.

Table 4-1 Key Environmental and Social issues Associated with Option Implementation

Excavation	Dredging	Issues
Site establishment		
Construct access road		Clearing, erosion and sediment control, noise, dust, vehicle movements, waste
Install sediment curtain and absorbent booms		Noise, vehicle movements
Possible construction of sediment pond and water treatment plant		Clearing, erosion and sediment control, noise, dust, vehicle movements, waste
Import sheet piles or filter fabric via road or barge		Noise, vehicle movements
Install sheet piles via jetting, driving or vibration or alternatively installing floating filter barrier		Noise, vibration, sediment plume, contaminant release
Dewater excavation		Noise, sediment plume, contaminant release
Mobilise excavator via road or barge		Noise
	Mobilise dredge	Noise
Materials handling		
Excavate from barge	Dredge	Noise, sediment plume, contaminant release, odour
Sediments deposited in barge and dewatered		Noise, sediment plume, contaminant release, odour, spillage
Dewatered sediments barged off-site for disposal		Noise, sediment plume, contaminant release, odour, spillage
Clean fill trucked or barged to site for placement		Noise, sediment plume
Possible temporary storage of clean fill if trucked in		Noise, erosion and sediment control, dust, vehicle movements
Rehabilitation and monitoring		
Rehabilitation of disturbed areas		Noise, erosion and sediment control, dust, vehicle movements, waste
Monitoring of the remediated site		

Key Environmental and Social Issues

Section 4

The following sections discuss the extent of potential impacts that could be expected from the proposed remediation in Kendall Bay and identify the work proposed to be carried out to support the Project Application.

The following have been identified as the key issues that will require detailed evaluation in the Environmental Assessment Report:

- environmental and human health risk;
- water quality;
- erosion and sediment control,
- air quality, including odour;
- noise and vibration;
- traffic;
- ecology;
- aboriginal heritage; and
- waste.management

Other issues that will be addressed but at a higher level include:

- land use and ownership;
- hazard and risk;
- visual; and
- socio-economic.

4.2 Environmental and Human Health Risk

The Preliminary Remediation Planning report (URS, 2008) by URS examined the existing sediments, underlying lithology and the potential for acid sulfate soils to occur within Kendall Bay. The results found that the surficial sediment within the main remediation area consists of a low density, sandy mud. The sediment is hydrous, disaggregated and probably represents material deposited over a period of hours to days. The thickness of the unit is considered highly variable, typically 10 to 20 cm, however is thin or absent close to the seawall.

The Environmental Risk Assessment (ERA) (URS, 2006) focused on chemicals associated with coal gasification and included the analysis of surficial sediments and water samples for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylene (jointly termed BTEX), napthalene, polyaromatic hydrocarbons (PAHs) and cyanide (free and total). The analytical results were used to assess the potential for sediment contamination to cause adverse effects to benthic organisms. Contaminant concentrations of sediment and water were screened against the ANZECC (2000) Interim Sediment Quality Guideline (ISQG) values and 95 % trigger values (marine). In addition, sediment stability was investigated in order to assess the potential for resuspension and transport of contaminated sediments from the remediation site.

A Human Health Risk Assessment (HHRA) (URS, 2007) was undertaken in accordance with Department of Environment and Climate Change (DECC) recognised guidelines published by enHealth and the National Environment Protection Council. Key aspects of the HHRA were presented to, and discussed with; DECC, NSW Health Department (NSW Health) and independent input on the technical scope and methodology from Peter DiMarco of Golder Associates. The relevant toxicity data, exposure scenarios, exposure assumptions and

models were developed through this process with DECC and NSW Health. The HHRA used average and worst case exposure assumptions for adults and children and assumed prolonged (ie lifetime) exposure to contaminants in the investigation area. The HHRA focused on gasworks-related chemicals, namely TPH, BTEX, PAHs and cyanide, with identification of chemicals of potential concern (COPC) based on reported concentrations from within Kendall Bay.

The findings of the investigations were that PAHs were the primary chemicals of potential concern (COPC) in sediments within the investigation area. Concentrations of PAHs in sediment exceeded the Interim Sediment Quality Guidelines (ISQG) within the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000). Concentrations of PAHs in sediment exceeded the ISQG-High and Low values in 17 % and 57 % of the investigation area respectively and have potential to pose adverse effects to benthic organisms in some areas.

The contaminated sediment, identified as sediment contaminated by coal tar residue has been identified to a depth of greater than 1.6 m in parts of the remediation area.

An assessment for potential acid sulfate soils (PASS) to occur within Kendall Bay was undertaken as part of the Preliminary Remediation Planning report. The findings from the investigations were that there was an exceedance of the action criteria trigger values for the samples indicating that the sediments have characteristics that suggest they are PASS and along with the high volume of sediment which is likely to be disturbed (> 1,000 tonnes), triggers the need for a detailed Acid Sulfate Soils Management Plan.

The Environmental Assessment Report will:

- document the studies undertaken to quantify the extent and volume of contamination;
- describe the studies undertaken to quantify the risk to the environment and to human health;
- describe the protocols to be put in place to minimise environmental and human health risk including sediment containment, water treatment, monitoring and the identification of trigger levels against which compliance will be measured; and
- provide a Acid Sulfate Soils Management Plan.

4.3 Water Quality

The proposed remediation site is located within the Parramatta River at Kendall Bay. The contour of the estuary bed is relatively flat dipping towards the north at approximately 1 % and with water depth varying between 0.5 and 1.8 m. The majority of the mudflat is exposed during low tide. There is a stormwater drain outlet located behind the mangroves, which discharges to Kendall Bay.

Remediation would involve either dredging or excavation and both of these methods have the potential to impact on the water quality in the immediate vicinity of the site. Environmental controls would be required to limit the dispersal of sediments and the release of contaminants into the environment. These would include the installation of silt curtains and absorbent floating booms, sheet piling (if dry excavation is adopted) and treatment of process water.

The Environmental Assessment Report will:

- describe the physical and chemical processes likely to result in sediment mobilisation and contaminant release;
- document the controls that will be implemented to minimise contaminant release; and

- develop a monitoring program and identify trigger levels against which compliance will be measured.

Consultation would be carried out with DECC during the development of the monitoring program and the establishment of trigger levels.

A Water Quality Management Plan would be prepared and implemented for the project.

4.4 Erosion and Sediment Control

The proposed works would involve various construction activities that would require the implementation of erosion and sediment control measures. The minimisation of the dispersion of turbid plumes potentially containing elevated levels of PAH into Kendall Bay is the key environmental management issue associated with the works.

Measures to reduce the spread of turbid plumes would be adopted to allow tidal flushing whilst preventing unacceptable movement of disturbed sediments to other parts of Kendall Bay. The natural turbidity of shallow waters in Kendall Bay during ebb tides, especially when subject to wind action, precludes turbidity monitoring as an effective monitoring tool

An Erosion and Sediment Control Plan would be prepared and implemented for the project.

4.5 Air Quality & Odour

The proposed remediation works would involve the exposure of contaminated sediment that has a coal tar odour. Odour emissions have the potential to occur during physical handling and stockpiling of the sediments, from the sedimentation pond or barge, during the trucking or barging of sediment from the site and from sediment handling at the ultimate disposal location.

Given the close proximity of residences, odour will be a key issue requiring management.

There is also the potential for dust to be emitted during on-shore site establishment works such as construction of an access road and sedimentation pond.

The Environmental Assessment Report will:

- identify the likely sources of odour;
- document the controls that will implemented to minimise odour release such as covering exposed sediments or chemical treatment; and
- develop a protocol for reducing odour should odour levels exceed an acceptable level.

An Air Quality Management Plan would be prepared and implemented for the project.

4.6 Noise and Vibration

Short term temporary noise and vibration impacts are likely to be generated during the remediation of sediments in Kendall Bay. Noise may be generated from construction machinery, installation of sheet piles, excavation and dredging activities, the loading of sediment into trucks and vehicle movements..

The Environmental Assessment Report will:

- identify the likely sources of noise and vibration;
- model noise and vibration to quantify the likely impact against appropriate standards and guidelines; and

- if needed, identify management measures to reduce noise emissions to an acceptable level.

A Noise and Vibration Management Plan would be prepared and implemented for the project.

4.7 Traffic

The remediation works will generate traffic from a number of activities including initial site establishment (construction traffic), importation of materials (e.g. sheet piles if adopted and backfilling materials), staff vehicle movements, and the transport of dewatered sediment to a treatment facility (if barge based transport is not adopted).

Further assessment of traffic impacts would be undertaken once the final method of remediation is decided.

The Environmental Assessment Report will:

- identify the number and make-up of traffic generated as a result of the project;
- qualitatively assess the impacts of traffic on the local road network; and
- if needed, identify management measures to reduce traffic impacts to an acceptable level.

A Traffic Management Plan would be prepared and implemented for the project.

4.8 Ecology

The proposed remediation site is located within a disturbed aquatic environment. There are existing mangroves that border part of the foreshore area adjacent to the remediation site.

A search on the Atlas of NSW Wildlife listed three records for threatened fauna species and two records for threatened flora species within the Canada Bay LGA. Of the species listed, none were recorded within the vicinity of the proposed remediation.

A search on the EPBC Act Protected Matters for the proposed site listed a number of threatened and migratory species or species habitat that may occur within the area of the proposed remediation site.

The Environmental Assessment Report will:

- conduct site specific ecological studies to fully characterise the terrestrial and aquatic environments;
- quantify the impact of the project on terrestrial and aquatic ecology including impacts on species and communities of significance; and
- identify management measures to reduce any unacceptable impacts to an acceptable level.

4.9 Aboriginal Heritage

It is unlikely that items of Aboriginal significance exist within the project area due to previous site disturbance.

The Environmental Assessment Report will:

- conduct a literature review of any previously recorded aboriginal items; and
- define a protocol to be applied in the event that aboriginal items are uncovered at the site.

4.10 Waste Management

The activities undertaken as part of the proposed remediation works would generate several waste streams from general waste from site personnel to the contaminated sediments being remediated.

The following waste management control measures will be considered as part of the Environmental Assessment Report:

- preparation of a comprehensive Waste Management Plan (WMP) for waste materials handling and recycling by the appointed Remediation Contractor.
- identification of appropriately licensed waste transporters and waste management facilities for each waste stream; and
- implementation of a system for tracking of all waste movements including contaminated sediments..

A Waste Management Plan would be prepared and implemented for the proposed project.

4.11 Hazard and Risk

The Environmental Assessment Report will consider the applicability of SEPP 33 – Hazardous and Offensive Development. At this stage we believe that SEPP 33 will not apply and hence a preliminary hazard analysis will not be required.

4.12 Visual

The surrounding area includes medium density residential dwellings and public recreational areas along the foreshore of the Parramatta River. The proposed project will be visible although it will be short term and temporary.

It is not proposed to undertake further assessment of this issue as a component of the Environmental Assessment Report.

4.13 Stakeholder Consultation

As part of the project development, community and Government Agency stakeholders will be consulted to ensure that potential issues and concerns are identified and addressed. The stakeholder consultation and communications process for the Project will ensure key project stakeholders have an opportunity to participate in project development.

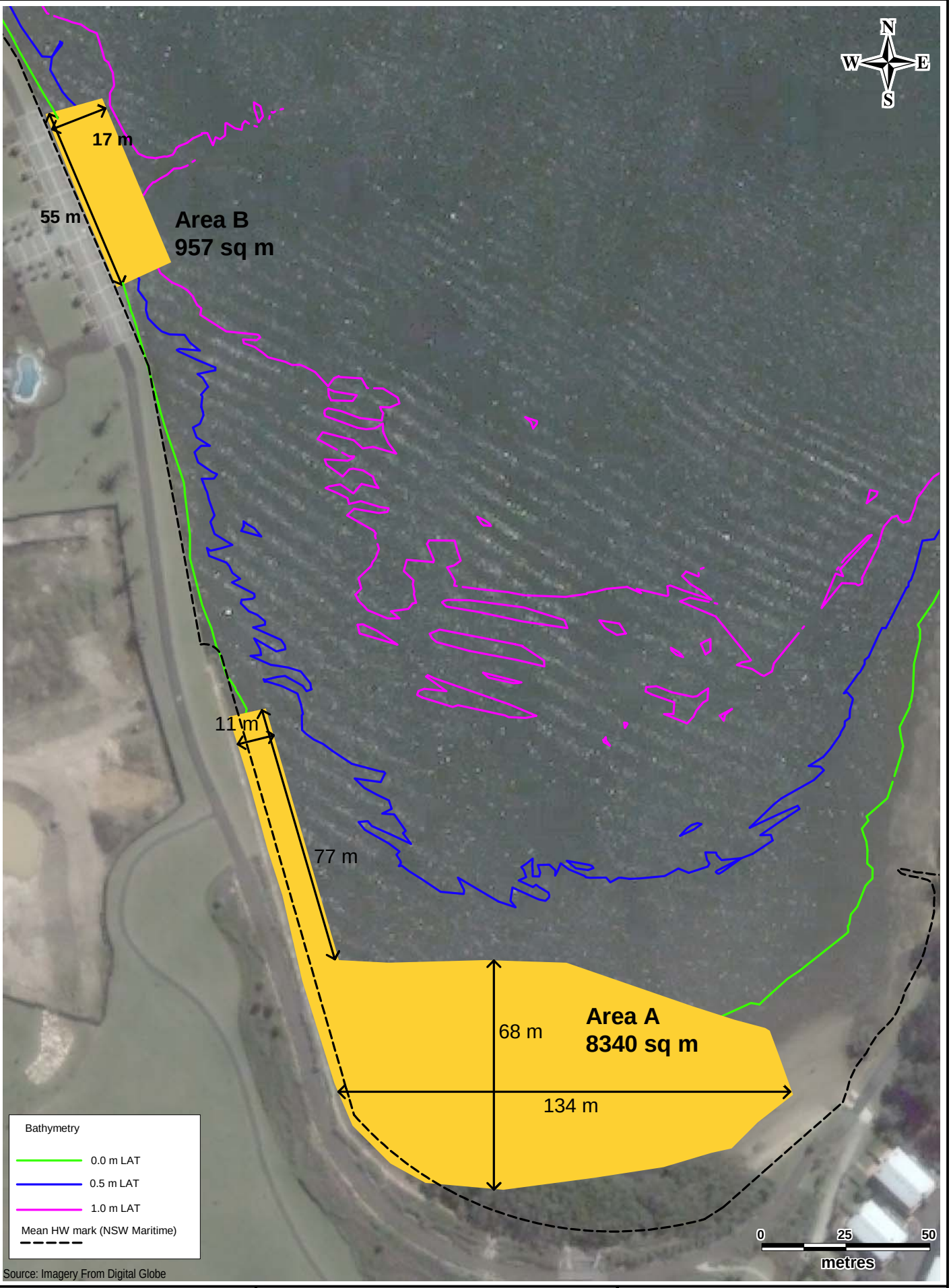
Figures

Source: Imagery from Digital Globe
Datum: GDA94, Projection: UTM, Grid: MGA Zone 55

Legend

Remediation Site

Client	JEMENA
Project	KENDALL BAY SEDIMENTS
Title	**SITE LOCATION**
URS	
Drawn: AJW	Approved: FM	Date: 30/10/2008
Job No: **43217727**	File No: 43217727-013.wor
Figure: 1	



Client: **JEMENA**	Project: KENDALL BAY SEDIMENTS	Title: **REMEDIATION AREAS**
URS	Drawn: SET · Approved: FM · Date: 09-09-2008 · Job No: **43217727** · File No: 43217727.014.wor	Figure: 2

TO TREATMENT SITE BY
TRANSPORT BARGE

BREAKFAST
POINT

BREAKFAST POINT

LAND BRIDGE FOR
LOADING BACKFILL

CABARITA
PARK

N
W
E
S

0 50 100
metres

Source: Imagery from Digital Globe
Datum: GDA94, Projection: UTM, Grid: MGA Zone 55

Legend

Proposed Remediation Area

Mean High Water Mark (MHWM)

Bathymetry

0.0 m LAT

0.5 m LAT

1.0 m LAT

Steel Sheet Pile

Containment Booms/Curtains

Floating Pipeline

Transport Barge to Treatment Site

Working Barge

Client	Project	Title	
JEMENA	KENDALL BAY SEDIMENTS	PREFERRED REMEDIATION OPTION EXCAVATION OF SEDIMENTS	
URS	Drawn: AJW	Approved: FM	Date: 30/10/2008
	Job No: **43217727**	File No: 43217727-011.wor	Figure: 3

BREAKFAST POINT

BREAKFAST POINT

CABARITA PARK

LAND BRIDGE FOR LOADING BACKFILL

N
W
E
S

0 50 100
metres

Source: Imagery from Digital Globe
Datum: GDA94, Projection: UTM, Grid: MGA Zone 55

Legend

Proposed Remediation Area

Mean High Water Mark (MHWM)

Bathymetry

0.0 m LAT

0.5 m LAT

1.0 m LAT

Working Barge

Backfill Stockpile in Park

Steel Sheet Pile

Containment Booms/Curtains

Client: JEMENA

URS

Project: KENDALL BAY SEDIMENTS

Drawn: AJW | Approved: FM | Date: 30/10/2008

Job No: **43217727** | File No: 43217727-012.wor

Title: **PREFERRED REMEDIATION OPTION BACKFILLING**

Figure: 4

NSW Department of Environment and Climate Change Correspondence – Remediation Areas

Appendix A

Our reference : DOC07/48160
Contact : Helen Davies , 02 99955613

Mr David Donehue
Alinta Ltd,
PO Box R 1465
Royal Exchange NSW 1225

Dear Mr Donehue

I refer to your e-mail dated 14 November 2007 requesting written confirmation of the Department of Environment and Climate Change (DECC) acceptance of the area of sediments off the former Mortlake gas works to be remediated.

Based on our review of the URS report titled *Human Health Risk Assessment of estuarine sediment adjacent to the former AGL site, Mortlake* dated June 2007 we consider that the area of sediments to be remediated as outlined in the map drawing titled *Proposed remediation area Kendall Bay, Mortlake* (Job number 43217439) dated 4 July 2007 is appropriate to address the human health risks identified in the URS report. A copy of the proposed area to be remediated is attached.

We thank AGL/Alinta for its help and patience in addressing the issues associated with the *Contaminated Land Management Act 1997* regulatory actions. We understand that Alinta is undertaking technical investigations for input into the development of a draft remedial action plan (RAP). We also understand that the technical investigations will be finalised by late 2007 with the draft RAP to be submitted for review to NSW Maritime and DECC by mid 2008. We suggest that it would be beneficial to workshop the findings of the technical report with NSW Maritime, DECC, the Department of Planning and Canada Bay Council in a meeting in January 2008. Please contact Helen Davies on 9995-5613 to arrange a date for the workshop.

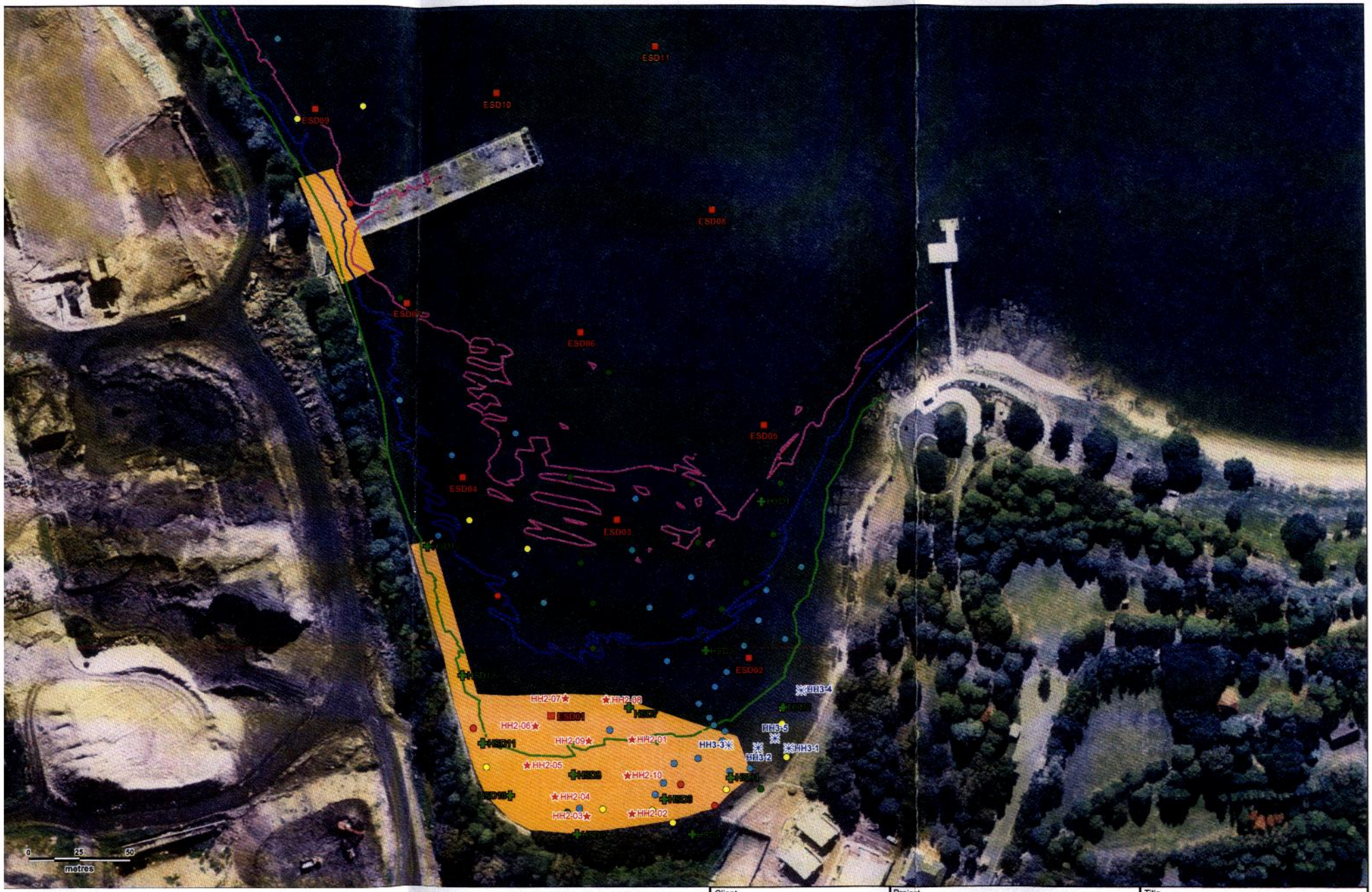
Yours sincerely

27/11/07

ERWIN BENKER
Acting Head Regulatory Unit (Metro)
Contaminated Sites Section

The Department of Environment and Conservation NSW is now known as the Department of Environment and Climate Change NSW

PO Box A290 Sydney South NSW 1232
59-61 Goulburn St Sydney NSW 2000
Tel: (02) 9995 5000 Fax: (02) 9995 5999
TTY (02) 9211 4723
ABN 30 841 387 271
www.environment.nsw.gov.au



Legend

- Proposed Remediation Area
- HH Sediment Stage 1 (n=18)
- HH Sediment Stage 2 (n=18)
- HH Sediment Stage 3 (n=11)
- Ecological Sediment Sample (n=102)
- Ambient Water Sample (n=10)
- Oyster Sample (n=3)

Bathymetry

- 0.0 m LAT
- 0.5 m LAT
- 1.0 m LAT

Thickness of Clean Sediment (m)

- >0.2
- 0.1 to 0.19
- 0.05 to 0.09
- <0.049

Client: **Alinta**

URS

Project: Human Health Risk Assessment of Sediment at Former AGL Site, Mortlake

Drawn: SET | Approved: DRAFT | Date: 04-07-2007

Job No: **43217439** | File No: 43217439-052.wor

Title: **Proposed Remediation Area Kendall Bay, Mortlake**

Figure:

NSW Department of Planning Correspondence with Director

Appendix B

NSW GOVERNMENT
Department of Planning

Record of Minister's opinion for the purposes of Clause 6(1) of the State Environmental Planning Policy (Major Projects) 2005

I, the Director-General of the Department of Planning, as delegate of the Minister for Planning under delegation executed on 31 October 2005, have formed the opinion that the development described in the Schedule below, is development of a kind that is described in Schedule 1 of *State Environmental Planning Policy (Major Projects) 2005* – namely Clause 28(1) development for the purposes of remediation of land that is category 1 remediation work on a remediation site - and is thus declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies for the purpose of section 75B of that Act.

Schedule

A proposal to remediate sediments at Kendall Bay, Cabarita, generally as described in a letter prepared by URS Australia Pty Ltd on behalf of Alinta Limited and submitted to the Department of Planning dated 17 December 2007.

S Haddad

Sam Haddad
Director-General

Date: 9. 1. 2008.