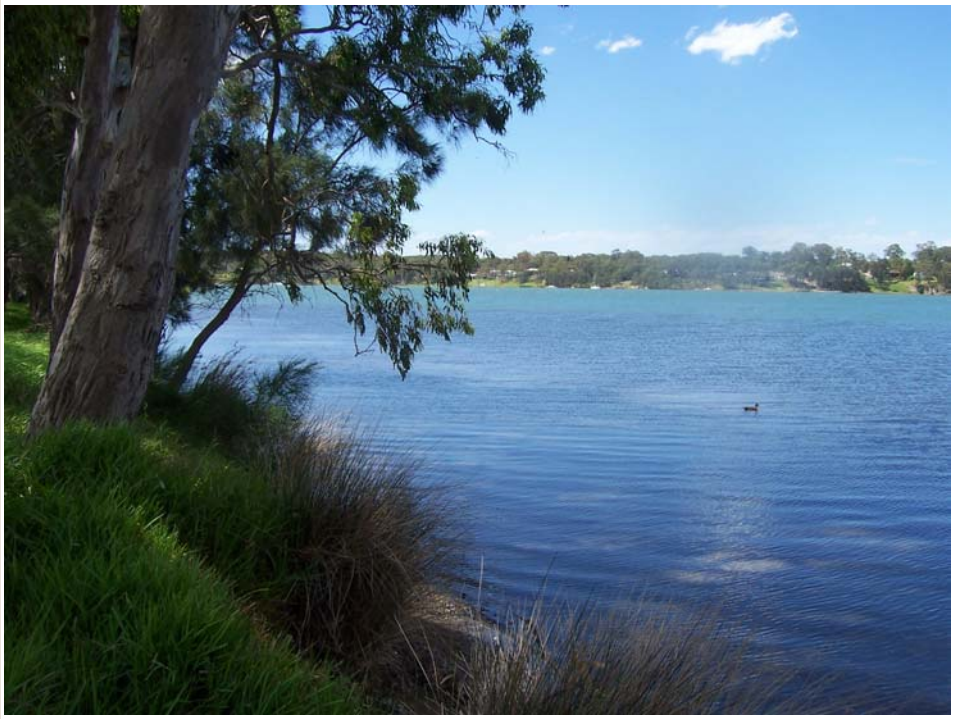
Appendix AC
Trinity Point Marina – Sediment Sampling Analysis Plan

Johnson Property Group

Trinity Point Marina Development

Sediment Sampling Analysis Plan (SAP)



Issued: December 2007

Patterson Britton
& Partners Pty Ltd
consulting engineers

Sediment Sampling and Analysis Plan

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2	Final	Chris Kuczera 14/12/07	Dan Messiter 17/12/07	

Issue No 2

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1 INTRODUCTION

The proposed Trinity Point Marina Development involves the construction of a marina, to be located at the entrance to Barden's Bay in Lake Macquarie. The location of the proposed Trinity Point Marina is shown on **Figure 1**.

Both the construction and the operation of the proposed marina have the potential to disturb the lake bed sediments, resulting in the possible release of any contaminants bound to sediments. Hence, a sediment Sampling and Analysis Plan (*SAP*) has been prepared to assess the sediments in the vicinity of the proposed marina site for potential contaminants. Testing will be undertaken in accordance with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* [(2)]

The purpose of the proposed methodology for the SAP is firstly to ascertain whether contamination exists on the site. If contamination is detected, bio-availability testing will be undertaken to assess the potential impact of contaminant release. Depending on the results, further sampling and more comprehensive testing may be required to confidently understand the extent of contamination and the potential bioavailability and toxicity of contaminants.

This report outlines the proposed Sampling and Analysis Plan (SAP) for the sediment sampling program for the Trinity Point Marina site. The SAP includes the following elements:

- evaluation of the site history and available data;
- objectives of the SAP;
- proposed sampling locations;
- proposed number of samples including duplicates;
- methods and procedures for sampling;
- details of methods for sample handling, preservation, storage and quality assurance and quality control (QA/QC); and
- list of analyses required and laboratory QA/QC procedures.

2 COMPILATION & REVIEW OF EXISTING DATA

2.1 Site History

Historic landuse information complied in the site contamination *Validation Report* [3] was reviewed in order to determine if there is any anecdotal evidence of potentially contaminating landuses on the land adjoining the Trinity Point Marina site. Previous geochemical assessments identified the following potentially polluting landuses:

- Onsite effluent and irrigation of wastewater;
- Orchard growing;
- Cattle grazing and loading facilities; and
- Cemetery.

Additionally, historic records indicate that "*approximately 15,000 tonnes of fly ash and fill material were bought in and used as fill material for the lower western portion of the site and bank reclamation area, in early – 1990*" [3]

The site also incorporated above and below ground diesel/petroleum tanks as well as petroleum bowsers [3].

Several site assessments analysed the extent of contamination on the Trinity Point site. The results of these investigations are discussed in **Section 2.2**

2.2 Sediment Data

There is no known over water geochemical investigation of the contamination in sediments in the proposed Trinity Point Marina site or the Barden's Bay area. However, several geochemical investigations have been undertaken on the proposed Trinity Point development site, which is the sole landmass adjoining the proposed marina site. The investigations relevant to this SAP are as follows:

- **Phase 1 – Environmental Site Assessment (Parsons Brinkerhoff**) [5] – Investigated the suitability of the site for residential and recreational landuses. It identified some potential sources of contamination from historic landuses, but recommended the site would be considered a low risk property in terms of potential contamination;
- **Phase 2 – Environmental Site Assessment (Parsons Brinkerhoff, 2004)** [4] – Included 18 samples which recorded the presence of asbestos material. However, no other contaminants were found to be above EPA requirements. The report recommended remediation of potentially contaminated areas. Remediation was undertaken based on the report recommendations;
- **Validation Report (DLA, 2007)** [3] – DLA conducted a site validation report to confirm that the site remediation undertaken was successful and that any soil contamination on the site was below EPA requirements. The investigation included 130 samples which did not observe any exceedance to EPA assessment criteria. The study concluded that the identified contamination areas of the site had been satisfactorily remediated and was suitable for residential land-use; and

- **Site Auditors Report** – A site audit report was undertaken by *JBS Environmental Pty Ltd* and concluded "***There is unlikely to be migration of contaminants from the site which may result in any unacceptable risk to surrounding human or ecological receptors***."[7]

Geochemical investigations involved a number of field and laboratory analysis of the chemical and physical properties of the soils. Results from the analysis indicate that apart from asbestos contamination (*which has been remediated*) there is no evidence to suggest the Trinity Point site is contaminated.

2.3 Potential for Sediment Contamination

With reference to **Figure 1**, the proposed Trinity Point Marina site is adjoined solely by the proposed Trinity Point development site. As discussed in **Section 2.2**, two geochemical assessments, a site validation assessment and a site auditors report have been undertaken on the land portion of the site. The most comprehensive was the site validation assessment [3], which involved 130 samples. Laboratory analysis indicated that levels of all analytes assessed were below EPA assessment criteria[3] (*for residential land-use*). (*refer to Summary of Site Validation report* [3] *for results).* In addition, as discussed above, a site auditors report was undertaken by *JBS Environmental Pty Ltd* and concluded "***There is unlikely to be migration of contaminants from the site which may result in any unacceptable risk to surrounding human or ecological receptors***." [7]

A review of current and historical aerial photographs indicates that the Bardens Bay area currently and historically incorporated a combination of residential, rural and naturally forested land-uses. It is unlikely that any of these land-uses would be a source of lakebed sediment contamination in the Bardens Bay area.

Historical photographs indicate that a number of swing moorings were located in the vicinity of the proposed marina. Hence, there is potential for contamination associated with the leaching of anti-fouling paints (*namely Tributyltin (TBT)*) and hydrocarbon related chemicals. However, considering the low density of the moorings, historic boat use in the vicinity of the site would be considered low risk in terms of being a potential source of lakebed sediment contamination.

Analysis conducted as part of the *Lake Macquarie Coastal Estuary Process Study* [9] found the coal fired power stations to the south of the site to be a source heavy metal contamination, particularly selenium. While the identified contaminated areas are to the south of the site there is potential that some contamination may have migrated to the proposed marina site.

Based on a review of historic land-uses and geochemical investigations undertaken, there is potential for heavy metal and hydrocarbon related contamination to occur on the site. However, given the nature of the potential sources, the site is considered low risk in terms of potential lakebed sediment contamination.

3 PROPOSED SEDIMENT SAMPLING & ANALYSIS

3.1 Objective

The objective of the sampling and testing program is to provide an initial evaluation to ascertain whether contamination is present within the proposed Trinity Point Marina site. Analysis of samples will determine the chemical characteristics of the sediment through testing the total concentrations of a range of contaminants. If analysis indicates that contamination is above acceptable levels, then elutriate testing will be conducted to assess the bioavailability of any contaminants. The results from the initial investigation will indicate if the site is contaminated and provide a framework for a more comprehensive investigation if contamination is identified.

3.2 Sampling Strategy

A staged sampling and analysis strategy has been adopted for the initial evaluation of contamination in the lakebed sediment in the vicinity of the proposed marina. As discussed in **Section 2.3**, a review of historic on-land uses in the Barden's Bay area and geochemical investigations conducted on the adjoining land mass determined that it is unlikely that contamination would be present. Hence, the objective of the initial sampling and analysis stage would be to ascertain whether contamination exists. This would be achieved through sampling and analysis programme incorporating 15 samples.

ANZECC (2000) Water Quality Guidelines for Fresh and Marine Waters [(2)] define sediment quality guidelines that provide low and high Interim Sediment Quality Guidelines (*ISQG*) trigger values for a range of contaminants. Statistical analysis of the results for each analyte would be undertaken to calculate the mean, and standard deviation and the 95% upper confidence limit of the mean (*95% UCL*). The 95% UCL will be used for comparison to the *ANZECC* guideline levels.

The results from the initial sampling and analysis round will be compared to the ISQG Low trigger values for each contaminant. If observed 95% UCL are below the ISQG low trigger levels, it is unlikely that there is potential for any biological disturbance for organisms inhabiting that sediment. However, if the observed 95% UCL of any contaminant exceeds the ISQG Low trigger value, than there is potential for that contaminant to adversely effect biological receptors. If this occurs, then the potential bioavailability of the contaminant would be assessed through elutriate testing.

Results from the total contaminant concentration and elutriate testing (*if required*) would then be analysed to determine if the lakebed sediments in the vicinity of the marina are contaminated. If sediments are identified as being contaminated, then a more comprehensive sampling and analysis programme would be required to confidently define the extent of contamination and determine whether remediation is required. Conversely, if the samples indicate contamination is not present, it will be concluded that the site is not contaminated, and no further investigation would be recommended.

As the total concentration of contaminants in the sediment is unknown, initial samples must obtain adequate sediment volumes to conduct both contaminant concentration tests and elutriate tests.

Importantly, as this is a staged investigation, it is imperative that all samples are preserved at the laboratory until the investigation is concluded (*to be advised by Patterson Britton and Partners*)

3.3 Sample Locations

Sample locations were selected having regard to the guidelines in the *Contaminated Sites :Sampling Design Guidelines* (*EPA, 1995*) [(6)] as well as the *ANZECC Guidelines for the Assessment and Management of Contaminated Sites* (*1992*) [(8)]. The methodology adopted to determine the sampling locations is described as follows.

As discussed in **Section 2,** a review of review of historic land-uses in the Barden's Bay area and geochemical investigations conducted on the adjoining land mass determined that it is unlikely that contamination would be present at the proposed marina site. However, this can only be verified by a sampling and analysis program. As no potential contamination sources have been identified, there is no reason to suspect any part of the site would be more likely to contain contaminants. Hence, a systematic grid incorporating 15 sampling locations is proposed. Proposed sampling locations (*and GPS co-ordinates*) are defined in **Figure 2**.

GPS and measurements/bearings from fixed structures will be used to position the sampling vessel at the nominated sampling locations. The sampling should have an accuracy of approximately +/- 1 m.

3.4 Sample Collection

Collection of the sediment samples will be undertaken by SCUBA divers operating from a sampling vessel supervised by engineers from Douglas Partners (*DP*). DP engineers will have the responsibility of sample processing once divers bring the samples from the lakebed to the sampling vessel. Prior to use, the sampling vessel will be thoroughly inspected and washed down. Any evident sources of contamination would be cleaned and covered in plastic to avoid accidental contamination of any samples.

Standard operating procedures for the sediment sampling and sub sampling are included in **Appendix A.** Samples would be collected from approximately the top 300 mm of surface sediment. The SCUBA divers will collect a 1.6 L sample at each location.

3.5 Sample Handling

Sample processing will take place on the sampling vessel immediately following recovery of the sample.

Samples will be homogenised in a stainless steel bucket. Sub-samples will be taken for chemical and physical analysis and elutriate testing as needed. A summary of the sample size and containers required for each test is provided in **Table 3-1**.

Table 3-1 Sample size and containers required for each test

Description	Sample Size	Sample Container
physical analysis	100 mL	plastic bag
chemical analysis	250 mL x 2	glass jars
elutriate	1 L	plastic jar

The sub-samples for chemical analysis will be transferred to laboratory prewashed 250 ml glass sampling jars with teflon lined lids using a stainless steel spoon. The sub-samples for physical analysis will be transferred to 100 ml plastic sampling jars using a stainless steel spoon. The jars will be completely filled (no head space) and then capped tightly with the lid. The jar will be labelled with a unique identification number.

The sub-samples collected for bioavailability testing (*elutriate testing*) will be transferred into plastic bags using a stainless steel spoon. Each of the plastic bags will be sealed properly to reduce the amount of air inside the bags and labelled with a unique identification number. The plastic bags will be placed in an extra plastic bag to avoid puncture and cross contamination.

Sediment will typically adhere to the outside of the sample containers. To avoid cross contamination, the outside of each sample container will be washed with estuarine water.

Protective gloves will be worn at all times while sub-sampling.

The sampling will be supervised by a suitably experienced engineer or scientist.

3.6 Sample Preservation

All samples will be packed with ice in an Esky immediately after sampling to maintain the temperature below 4°C. Samples will be submitted to the analytical laboratory within 48 hours (*preferably 24 hours*).

Importantly, as this is a staged investigation, it is imperative that all samples are preserved at the laboratory until the investigation is concluded.

3.7 Estimated Number of Samples

As discussed in **Section 3.2**, the total concentration (*chemical testing*) of all contaminants (*except Tributyltin*) will be determined for all 15 samples. *ANZECC (2000) Water Quality Guidelines for Fresh and Marine Waters* [(2)] provides sediment quality guidelines with low and high interim sediment quality guideline (ISQG) trigger values. If the observed 95% UCL is below the ISQG low trigger value for a particular contaminant, it is unlikely that it will result in any disturbance for biological receptors in contact with the sediment. However, if the 95% UCL exceeds the ISQG low trigger values, than elutriate testing will be required to assess the potential bioavailability of contaminants in the lakebed sediments.

After review of initial chemical results, Patterson Britton and Partners would advise on the appropriate samples to conduct elutriate testing on. Note: should a significant number of samples exceed ISQG low trigger values, a maximum of 5 elutriate tests would be required. As

the elutriate test samples would be selected after review of the initial results, a sufficient volume of sediment will be required at each sampling location to conduct the required physical, chemical and elutriate testing. A summary of the estimated number of samples for analysis is provided in **Table 3.2**. As part of QA/QC procedures, it is proposed to submit one split duplicate[1] sample and one field blank sample.

Table 3-2 - Estimated number of samples

Description	Number of samples for analysis
chemical analysis	15 + 1 (split duplicate) + 1 (blank)
physical analysis	15
elutriate	Maximum of 5 out 15 ^

^ If the observed 95% ULC of any analyte exceeds the ISQG low trigger values, then elutriate testing of that sample will be undertaken. As the total concentrations are unknown, sufficient sediment to conduct an elutriate test must be obtained at each sampling location

3.8 Equipment Decontamination Procedures

All sampling equipment will be decontaminated between each sampling event. Decontamination procedures will include rinsing equipment in estuarine water to remove visible sediment, followed by a Decon 90 rinse and a final rinse in estuarine water.

3.9 Sample Shipment

All sample containers will be clearly labelled with unique sample identification numbers. Samples for chemical analysis, bioavailability testing and toxicity testing will be transported in an Esky in ice to the nominated NATA registered analytical laboratory. All samples will be transported under DP chain of custody procedures.

3.10 Analysis schedule

3.10.1 Chemical Analysis

Chemical testing of the sediment sample will include:

- a suite of eleven (*11*) heavy metals;
- Polycyclic Aromatic Hydrocarbons (PAH),
- Organochlorine Pesticides (OCP's);
- Organophosphorous Pesticides (OPP's);
- Polycholorinated Biphenyls (PCB);
- Total Organic Carbon (TOC); and
- Tributyltin (TBT).

As discussed in **Section 3.2,** total concentration tests for all of the above analytes except TBT will be conducted on all samples while TBT analyses would conducted on 3 of the 15 samples

[1] sample will be split into two containers to assess variation associated with subsample handling

(*20% of all samples*). The three sampling locations selected for TBT testing are indicated in **Figure 2**. **Table 3-3** defines all the analytes proposed for the chemical analysis of sediment samples. As the observations are to be compared against the recommended sediment quality guidelines defined in ***Table 3.5.1*** in the *ANZECC (2000)* [(2)]. The ISQG low values are to be adopted as the maximum Practical Quantification Limit (*PQL*) levels. These are also defined in **Table 3-3.**

Table 3-3 - Proposed Chemical Analysis of Sediment Samples

Contaminant	Units	Maximum PQL
Heavy Metals		
Antimony	mg/kg dry weight	2
Cadmium	mg/kg dry weight	1.5
Chromium	mg/kg dry weight	80
Copper	mg/kg dry weight	65
Lead	mg/kg dry weight	50
Mercury	mg/kg dry weight	0.15
Nickel	mg/kg dry weight	21
Silver	mg/kg dry weight	1
Zinc	mg/kg dry weight	200
Arsenic	mg/kg dry weight	20
Selenium	mg/kg dry weight	2
Tributyltin	µg/Sn/kg dry weight	5
OCP,OPP,PCB and PAHs		
Acenaphthene	µg/kg dry weight	16
Acenaphthalene	µg/kg dry weight	44
Anthracene	µg/kg dry weight	85
Fluorene	µg/kg dry weight	19
Naphthalene	µg/kg dry weight	160
Phenanthrene	µg/kg dry weight	240
Low Molecular Weight PAHs	µg/kg dry weight	552
Benzo(a)anthracene	µg/kg dry weight	261
Benzo(a)pyrene	µg/kg dry weight	430
Dibenzo(a,h)anthracene	µg/kg dry weight	63
Chrysene	µg/kg dry weight	384
Fluoranthene	µg/kg dry weight	600
Pyrene	µg/kg dry weight	665
High Molecular Weight PAHs	µg/kg dry weight	1700
Total PAHs	µg/kg dry weight	4000
Total DDT	µg/kg dry weight	1.6
p.p' -DDE	µg/kg dry weight	2.2
O,p'-+p,p' –DDD	µg/kg dry weight	2
Chlordane	µg/kg dry weight	0.5
Dieldrin	µg/kg dry weight	0.02
Endrin	µg/kg dry weight	0.02
Lindane	µg/kg dry weight	0.32
Total PCBs	µg/kg dry weight	23

3.10.2 Physical Analysis

Douglas Partners are to undertake the physical analysis of the samples.

One sample will be collected from each location. The testing will include determination of the mud, sand and gravel content. If a visual inspection of the samples retrieved indicates that the samples are uniform in texture, physical analysis will not be required for all samples. This will be up to DP discretion. Any remaining samples will be stored for possible future testing if required.

3.10.3 Bioavailability Testing

As discussed in **Section 3.2,** if the observed 95% UCL of any contaminant exceeds the ISQG Low trigger value, elutriate testing will be required to assess the bioavailability of the contaminant. A maximum of five elutriate tests will be required. After review of the initial total concentration results, Patterson Britton and Partners will advise on which samples and analytes requiring further elutriate testing.

3.10.4 Toxicity Testing

Toxicity testing will not be undertaken during this initial investigation. If the site is found to be contaminated, toxicity test may be required in future, more comprehensive investigations.

3.10.5 Data Management Procedures

Validation of data will include evaluating the results from laboratory blanks, standard samples, replicate samples and duplicate samples. After data validation, the data will be tabulated and the 95% UCL of the mean for each contaminant will be calculated.

3.11 Equipment and Personnel

The equipment required for the sampling program is summarised as follows:

- survey vessel;
- GPS;
- Phosphate free detergent (*Decon 90*)
- stainless steel spoon and bucket;
- sample containers;
- eskies and ice; and
- data forms for recording field measurements and logging samples.

Experienced engineers or scientists from Douglas Partners will coordinate the sampling program.

3.12 Health and Safety Precautions

The sampling program will adhere to DP OH&S systems.

3.13 Contingency Plan

The sampling program is unlikely to be affected by weather or equipment failure. In the event of adverse weather or critical failure of equipment, the sampling would be recommenced following improvement in the weather or fixing of the equipment.

4 QA/QC PROCEDURES

4.1 Field QA/QC Procedures

Field QA/QC procedures will include the following:

- Sample Location: A GPS will be used to locate the sampling locations;
- Decontamination of Sampling Equipment. Prior to use, the vessel will be thoroughly inspected and washed down. Any evident sources of contamination would be cleaned and covered in plastic to avoid accidental contamination of any samples. All sampling equipment that comes into contact with the sediment samples will be decontaminated (*using Decon 90*) prior to each sampling event;
- Duplicates. A split duplicate sample will be recovered and analysed from one sampling location;
- Field Documentation: Each sample location will be numbered on a sampling plan in the field logbook. All other observations including weather, time, date of sampling and appearance of the sediments eg texture, colour, odour and the like, will be noted in the field logbook;
- Cross Contamination: Following sampling, to avoid cross contamination, each sample jar will be washed with estuarine water to remove sediment adhering to the outside of the sample containers;
- Field Blank: one field blank sample will be submitted for analysis; and
- Sample Control: Each sample will have a unique identification number, which will be recorded in the field log book and chain of custody form. A chain of custody form will accompany the sediment samples at all times and will include the analysis method required of the laboratory.

4.2 Laboratory QA/QC Procedures

Douglas Partners will engage a certified laboratory for the chemical analysis of the sediment samples and CSIRO for the bioavailability analysis. Laboratory QA/QC procedures typically include the following:

- Analysis Blanks: One per analytical run or one in every 20 samples, whichever is the smaller;
- Laboratory Duplicate: One in every 10 samples or client batch, whichever is the smaller.
- Laboratory Control Standard: One per analytical run or one in every 20 samples, whichever is the smaller;
- Laboratory Matrix Spike: One in every 20 samples or client batch, whichever is the smaller;
- Matrix Spike: One in every 20 samples or client batch, whichever is the smaller;
- Surrogate Spike: For determinations that are appropriate, surrogate spikes will be added to all samples for analysis; and

- Calibration Blank and Mid Range Calibration Verification: One per analytical run or one in every 20 samples, whichever is the smaller.

5 REPORTING

A report will be prepared by DP presenting the outcomes of the sampling and analysis program. The report will include:

- a description of the sampling program;
- tabulation of all laboratory results and a copy of the original laboratory sheets;
- statistical analysis of the results for each analyte to calculate the mean, and standard deviation and the 95% upper confidence limit of the mean (*95% UCL*). The 95% UCL will be used for comparison to the guideline levels;
- where values are less than the PQL, a nominal value of one half of the PQL will be used in the statistical analysis of the results;
- comparison of the results of the bioavailability testing to relevant guideline levels; and
- reporting of all QA/QC.

6 REFERENCES

1) ANZECC & ARMCANZ (*2000*);

2) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, (*Australian and New Zealand Environment and Conservation Council, 2000*);

3) Validation Report, 59 Lakeview Road, Morisset Park, David Lane Associates (*2007*);

4) Phase 2 – Environmental Site Assessment (*Parsons Brinkerhoff, 2004*);

5) Phase 1 – Environmental Site Assessment (*Parsons Brinkerhoff, no date specified*);

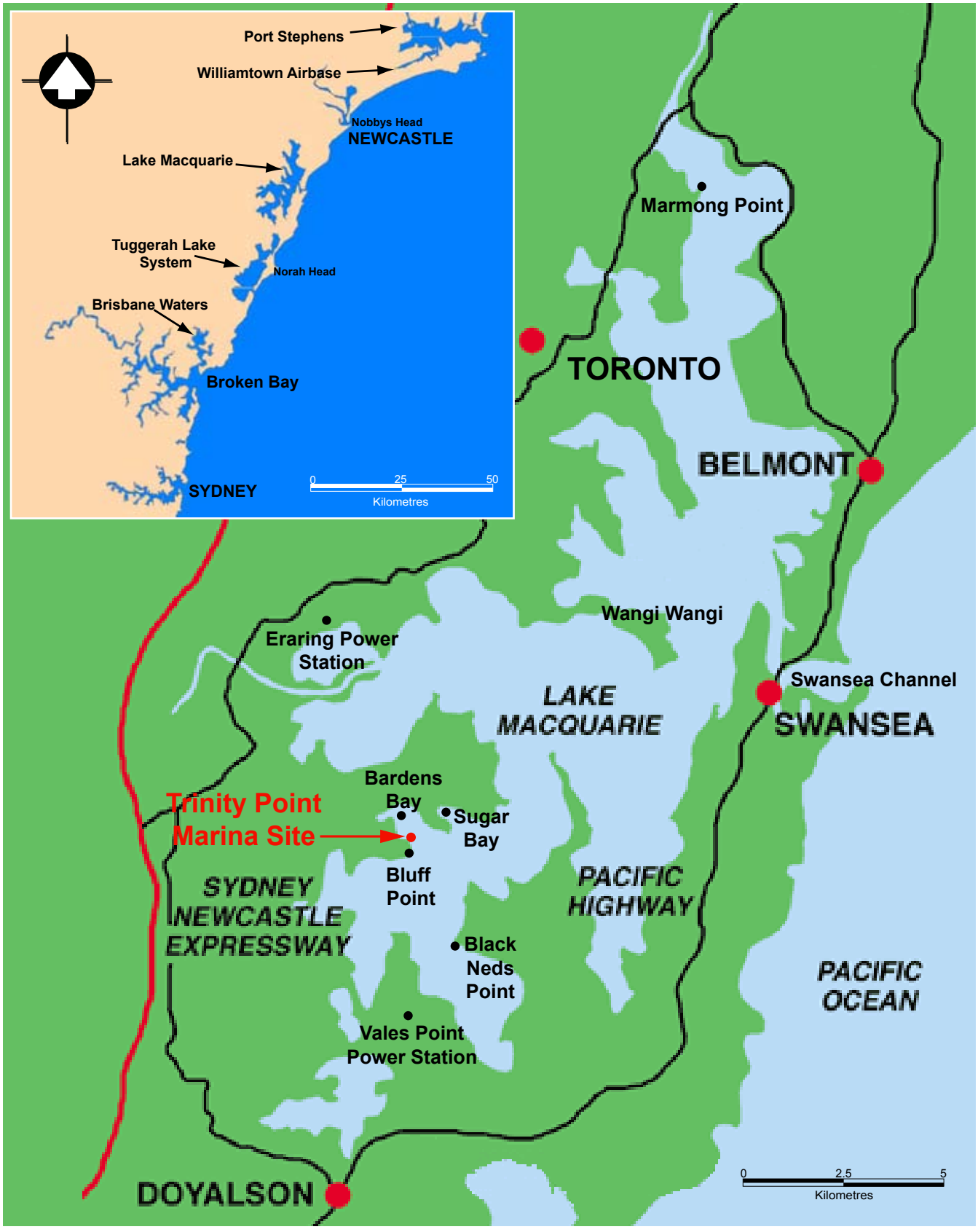
6) Contaminated Sites :Sampling Design Guidelines (*EPA, 1995*);

7) Site Audit Report (0503.0615) Lots 1-2 DP1107753, 59 Lakeview Rd, Morisset Park NSW 2264 (*JBS Environmental Pty Ltd, 2007*);

8) ANZECC Guidelines for the Assessment and Management of Contaminated Sites (*1992*); and

9) Australian Water and Coastal Studies (*November 1995*) – *Lake Macquarie Estuary Process Study – Volume 1 – Report*, Report 94/25

FIGURES



SITE LOCATION PLAN

SOIL SAMPLING LOCATIONS

POINT	EASTING	NORTHING
SS1	363784.597	6334243.987
SS2	363847.599	6334254.192
SS3	363906.767	6334211.222
SS4	363845.090	6334327.106
SS5	363920.202	6334292.803
SS6	363974.724	6334232.104
SS7	363858.172	6334409.481
SS8	363930.552	6334374.533
SS9	363999.749	6334322.284
SS10	364046.111	6334251.047
SS11	363868.769	6334484.301
SS12	363952.688	6334461.034
SS13	364022.182	6334409.479
SS14	364077.600	6334337.746
SS15	364104.762	6334264.720

JET PROBE LOCATIONS

POINT	EASTING	NORTHING
JP1	363784.597	6334243.987
JP2	363906.767	6334211.222
JP3	363845.090	6334327.106
JP4	363974.724	6334232.104
JP5	363930.552	6334374.533
JP6	363999.749	6334322.284
JP7	363868.769	6334484.301
JP8	364022.182	6334409.479
JP9	364104.762	6334264.720

6334400mN

6334300mN

MARINA DEVELOPMENT FOOTPRINT

BARDENS BAY

DENOTES TBT SAMPLING LOCATION

0 20 40 60 80 100m

1:1000 (A1) 1:2000 (A3)

DRG STATUS : PRELIMINARY, NOT FOR CONSTRUCTION

Issue	Details of Issue	Des'd	Drn	Chk'd	Approved	Date
A	ISSUED FOR REVIEW	AHP	SAC			17.9.07

INITIALS SHOWN IN THE ADJACENT ISSUE RECORDS INDICATE THE STAGES UNDERTAKEN IN THE DRAWING APPROVAL PROCESS. DRAWINGS ARE ONLY TO BE USED WHEN APPROVED BY PATTERSON BRITTON & PARTNERS AND THEN ONLY AS NOTED FOR DRG STATUS. THE ORIGINAL SIGNATURES CAN BE FOUND ON THE REVERSE SIDE OF THE ORIGINAL OF THE DRG REGISTER/TRANSMITTAL FORM No.5.2.2. HELD BY PATTERSON BRITTON & PARTNERS

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Patterson Britton & Partners Pty Ltd
consulting engineers

Client: JOHNSON PROPERTY GROUP

Project: TRINITY POINT MARINA

Title: SEDIMENT SAMPLING AND JETPROBE LOCATIONS

Drawing No. 6759.10-SL

Issue A

Cad File No. 6759-10-SL

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APPENDIX A

STANDARD OPERATING PROCEDURES FOR
SEDIMENT SAMPLING & SUB SAMPLING

Standard Operating Procedures for Sediment Sampling & Subsampling

One sub-sample chemical analysis (2 x 250 ml glass jars), one sub-sample for physical analysis (100 mL plastic jar), one sub-sample for elutriate (1 L plastic bag), one.

At the duplicate location, a sample should be recovered and placed in a stainless steel bowl. The sample should be thoroughly homogenised and split into two sample jars each with a unique label.

1. location of sampling to be confirmed by GPS
2. the coordinates of the sample location, date, time, weather conditions and water depth should be recorded in the field log book
3. SCUBA diver deployed and 1.6 L sample recovered from the seabed
4. from each sample one 250 ml sub-sample should be taken for chemical analysis, one 100 ml sub-sample should be taken for physical analysis and one 1 L sub-sample should be taken for elutriate testing.
5. the sub-samples should be transferred to laboratory prewashed 250 ml glass sampling jars with teflon lined lids, to a 100 ml plastic jar or to plastic bags (as specified) using a stainless steel spoon
6. the lid of each sample container should be tightly screwed on to avoid loss of sample and the jar and lid labelled with a unique identification number
7. to avoid cross contamination, the outside of each sample container should be washed with marine water
8. All samples should be packed in ice in an esky immediately after sampling to maintain the temperature below 4°C
9. the characteristics of the sediment recovered in each grab should be noted in the field log book, eg texture (coarse, medium or fine grained), type (mud, sand, muddy sand etc) colour, odour and the like
10. all sampling equipment should be decontaminated before the next sampling event by rinsing equipment in marine water to remove visible sediment, followed by a Decon 90 rinse.