Expressions of Interest

Implementation of a research and development projects for energy, nutrient, metal, fuel or chemical extraction, geotechnical reuse, building material extender, decontamination, stabilisation, or other conversion leading to "Beneficial Use" of biosolids.

Melbourne Water Corporation
100 Wellington Parade
East Melbourne, Victoria 3002

November 2010

Contents

1 Call for Expression of Interest 3

2 Melbourne Water 3

3 Background 3

3.1 General Description 3
3.2 Quantity of Biosolids 4
3.3 Regulatory Framework 4
3.4 Characteristics of MWCs biosolids 5
3.5 Future Uses of Biosolids 5

4 Extent of MWC Support for Resaerch projects 6

5 Process for Selection of Research Projects 6

6 Contents of Expression of Interest 7

6.1 Desktop analysis 7
6.2 Bench-Scale Trials 8
6.3 Pilot Plant Trial 8
6.4 Additional Information 10

7 Evaluation Criteria 11

7.1 Evaluation 11
7.2 Interview And Presentation 11

8 Lodging of Applications 11

9 Enquiries 12

10 Notification 12

11 Limitations of Liability 12

12 Confidentiality 12

Appendix A - Expression of Interest Application Form 13

Appendix B – Treatment Plant Locations 14

Appendix C – Components in the stockpiles at the Treatment Plants 17

Appendix D – Government Funding Initiatives 19

1 Call for Expressions of Interest

Melbourne Water Corporation (MWC) is seeking expressions of interest from suitably qualified and experienced research organisations, industry groups, or industry/research group partnerships who can propose and implement a credible research project focussed on enhancing the potential for beneficial use of biosolids by *energy, nutrient, metal, chemical or fuel extraction, geotechnical reuse, building material extender, decontamination, stabilisation, or other conversion of biosolids.* The process is directed at identifying and fostering technologies still 3-5+ years from commercialisation.

An organisation lodging an expression of interest may be short-listed by MWC to progress through to a competitive Request for Proposal (RFP) process for selection of one or more research projects to proceed to implementation. Only short listed companies will be permitted to progress through to the final selection of research projects.

MWC reserves the right not to proceed with the RFP process, nor to support the implementation of any research projects under existing or alternative arrangements.

Expressions of Interest should be submitted to Melbourne Water via the Tender Box in accordance with the requirements of Section 8 of this document.

2 Melbourne Water

MWC is a statutory corporation wholly owned by the Victorian Government, responsible for the provision of wholesale water supply and sewerage services to the retail water companies - City West Water, South East Water and Yarra Valley Water. In addition MWC also manages the regional drainage services and waterways in the greater Melbourne area.

The three retail water companies manage the system that delivers water to households and business in their respective areas. Trade waste acceptance and water and sewerage connections are also the responsibility of these companies.

Melbourne Water operates two major sewage treatment plants, the Eastern Treatment Plant (ETP) at Bangholme and Western Treatment Plant (WTP) at Werribee that treat approximately 40 percent and 56 percent of Melbourne's sewage respectively (refer to Appendix B for their locations) and generate a combined output of ~60,000 tonnes of biosolids per year..

3 Background

3.1 General Description

Biosolids are the stabilised sewage sludges that remain after sewage treatment. They are viewed as an intrinsic source of nutrients and have historically been used as a soil supplement in land applications. Generally biosolids have an inherent calorific value allowing their potential use as a fuel in energy recovery processes.

The extent to which biosolids are used in these applications depends on cost effectiveness and expenditure required to utilise beneficial properties such as nutrients and/or energy and to effectively manage contaminants.

MWC is committed to maximising the sustainable use for biosolids. MWCs 2010/2011 Corporate Plan states a requirement for a:

"*Strategic focus for the sewerage business is the development, in collaboration with the retail water businesses, of a long-term strategy for managing Melbourne's sewage to protect public health and the environment whilst optimising the use of sewage as a resource for water, energy and biosolids.*"

3.2 Quantity of Biosolids

MWC has 95% of Victoria's biosolid stockpiles at WTP and ETP. Over the total operating period of MWC's Treatment Plants, biosolids have normally been retained on-site in stockpiles of various forms with some minor off-site uses. The current quantity of biosolids that MWC is responsible for is detailed in Table 1.

Table 1 – Quantity of Biosolids under MWCs responsibility

	Western Treatment Plant	**Eastern Treatment Plant**
Annual Biosolids production	22, 000 dry tonnes, increasing to 25,000 dry tonnes by 2020	35,000 dry tonnes, increasing at 1% p.a.
Estimated Stockpile Quantity[#]	1,573,000 dry tonnes (1,560,000 m^3)	1,609,000 dry tonnes (1,308,000 m^3)

[#]Estimated Biosolids quantities based on surveyed volumes current in 2003 & theoretical dry tonnage conversion factor.

MWC aims for all existing biosolid stockpiles and annual production to have a sustainable beneficial use.

3.3 Regulatory Framework

The Environmental Protection Agency (EPA) Victoria published the *'Guidelines for Environmental Management – Biosolids land application, Publication 943'* in April 2004. The guidelines outline the minimum requirements for biosolids land application. They also prescribe a quality grading system for biosolids based on levels of contamination (C) and the degree of treatment (T).

The level of contaminants present, including heavy metals and pesticides, determines contaminant grade (C). Gradings range from C1, the lowest level contamination category, to the highest contaminant classification of C3 (refer to guidelines for specific levels).

The treatment grade (T) depends on the treatment process used, microbiological criteria and controls in place to minimise odour, vector attraction and bacterial regrowth. The highest treatment grade is given a classification of T1 while the lowest is classified as T4.

The guidelines identify "permitted" end uses as well as the required controls for the various possible combinations of grades. For example, biosolids of grade T1C1 are deemed suitable for "unrestricted use" in agricultural and landscaping applications whereas biosolids of grade T1C2 may also be used in these applications but are deemed "restricted use" and are subject to certain management control

requirements. Biosolids with a C3 contaminant grading are generally not considered acceptable for any land application end uses identified in the guidelines.

In June 2009, EPA Victoria published the *'Guidelines for Environmental Management – Use of Biosolids as Geotechnical Fill, Publication 1288'.* These guidelines apply to a specific group of clay-rich biosolids stockpiled at the Eastern Treatment Plant and allow for the improvement of the geotechnical properties of this material using lime and cement.

3.4 Characteristics of MWCs biosolids

Stockpiled biosolids at MWC treatment plants generally have poor agronomic properties and significant levels of heavy metals and other contaminants. WTP stockpiles are particularly problematic due to the plant receiving 70% of Melbourne's industrial trade waste over the 100 year history of treatment processes.

Stockpiled biosolids are classified under the EPA Biosolids Land Application Guidelines as follows:

- ETP stockpiled biosolids are T1 C2, making them acceptable for "restricted use" in land applications. Some 400,000m^3 of stockpiled biosolids are heavily blended with natural clay as a result of over excavation from the clay-lined biosolids drying pans;
- WTP stockpiled biosolids are T1 C3 and are therefore deemed unacceptable for land application.

Modelling of current influent pollutant levels at each plant indicates that:

- ETP biosolids will remain T1 C2 classification for the foreseeable future and will therefore be acceptable for restricted use in land application;
- WTP biosolids will trend to T1 C2 classification and remain as such for the foreseeable future;

Regular sampling and testing of stockpiled biosolids has identified a variety of components including metals, nutrients and organic compounds (refer to Appendix C for a list of components plus sampling results of metals and organics in biosolid stockpiles at WTP and ETP). Contaminants limit the accumulated amount of biosolids that can be applied to land, depending on the level of metals in the host soil. In Australia, cadmium is usually the limiting contaminant.

3.5 Future Uses of Biosolids

Identified future uses for biosolids are (and not limited to):

- Agriculture
- Landscaping
- Soil and site rehabilitation
- Geotechnical Fill (beneficial use for biosolids from existing ETP stockpiles which contain ~50% clay)
- Building Material extender
- Energy Recovery (beneficial use for biosolids due to their calorific value)
- Conversion to fuel or fertilizer
- Extraction of agronomic nutrients
- Extraction of metals
- Extraction of fuels and chemicals

Future uses for biosolids are compromised by the levels of contaminants present as outlined in section 3.4 and Appendix C. The average calorific value of biosolids stockpiled at ETP and WTP is also provided in Appendix C.

This call for Expressions of Interest aims to assist MWC to identify viable uses for existing biosolids output as well as potential future uses for biosolids, that may deliver improved Triple Bottom Line outcomes, should future conditions reduce the viability and cost effectiveness of the existing identified outlets. Importantly, the process is aimed at identifying and fostering prospective future technologies for the sustainable reuse of biosolids.

4 Extent of MWC Support for Research Projects

MWC has been approached by various organisations for support in developing concepts that could extract energy, nutrients, metals, fuels or chemicals from the biosolids, decontaminate biosolids, stabilise contaminants in the biosolids or recycle the biosolids in a manner that renders the contaminants inert. Development of these concepts generally requires a desktop investigation, bench scale trial, pilot scale trial then commitment to commercialisation.

MWC has resources available to support the development of some of these projects, prior to commercialisation, regardless of the current stage of development of the concept. However, MWC is unable to provide funds for commercialisation. Moreover, MWC cannot enter into biosolids supply contracts with technology providers until the technology has satisfactory commercial backing and MWC can satisfy its purchasing policy involving market testing and value for money criteria.

Depending on the development stage, MWC may be able to provide the following support:

- Provision of samples, advice and data;
- Support for funding applications through government and industry schemes (refer to Appendix E for examples);
- In-kind support for the pilot plant trial stage of concepts that are supported by an acceptable business case;
- Financial contributions to fund the development of the concept.

MWC will consider the level of support requested in expressions of interest when preparing a short list of applicants to receive a request for proposal. MWC will then enter into discussions with applicants selected from the RFP process to clarify the extent of support available and to finalise an agreement.

Generally, MWC would not provide funds for a project at desk-top analysis stage unless, in MWC's view, the project holds particular promise.

5 Process for Selection of Research Projects

The selection process has three steps.

Step 1 (this current stage) involves the submission of Expressions of Interest from proponents regarding their research and development proposals. A shortlist of prospective technologies will be the output of this stage. Shortlisted proponents will be informed in late February 2011.

Step 2 involves shortlisted applicants from Step 1 submitting more detailed proposals in response to a Request for Proposal to be issued in late February 2011. Applicants will be given 30 working days to prepare and lodge their proposal. The detailed proposal(s) identified by Melbourne Water as successful will be the output of this stage. Successful proponents will be informed in mid April, with negotiations continuing into mid May.

Step 3 involves the execution of a commercial agreement between MWC and the proponent for implementation of selected research projects. Research projects will commence in May 2011.

6 Contents of Expression of Interest

The Applicant's expression of interest shall include the Application Form (Appendix A) duly completed and signed by an officer authorised to sign on behalf of the Applicant, a demonstration of an understanding of the services/works and the information described below.

Failure to submit the Application completed as prescribed may result in it being rejected.

The application must indicate the category for which the technology is applicable from the following categories:

- Land application/nutrient recovery and reuse
- Energy recovery and use
- Metals recovery and reuse
- Chemical recovery and reuse
- Fuel recovery and reuse
- Geotechnical reuse
- Use of Biosolids as building material extender
- Decontamination of biosolids
- Stabilisation of biosolids

The applicant must indicate the current stage of the project and future requirements to proceed to commercialisation. As MWC funding contributions may not be available for all stages of the concept development, financial plans for forward stages should be described to demonstrate how funding will be secured through to full commercialisation..

The Applicant's expression of interest shall include the following information applicable to the stage of concept development and the Applicants corresponding research project:

6.1 Desktop analysis

Applicants may seek support to undertake a desktop analysis or describe a completed desktop analysis to support further desktop work or to support an application to progress to bench-scale trials.

Applicants at an early stage of concept development seeking support for a desktop analysis must submit evidence of their research capability including evidence of successful completion of at least one similar desktop analysis. In addition, Applicants

will need to provide details of the planned study program, outcomes that will demonstrate potential for a viable project (success factors) and deliverables.

Evidence from a literature search and/or related research should be provided to support the application for a desktop study.

To support further desktop work or to support an application for the subsequent bench-top stage (6.2), Applicants are to provide a summary of the desk top analysis that has been performed to date. The desktop analysis should demonstrate the fundamental validity of the concept and indicate the originality of the concept as well as the business case that will support progression to bench-scale trials. The concept must be applicable and beneficial to MWC.

A statement must be provided to confirm who the owner will be for intellectual property, if any, generated through the course of the desktop analysis.

6.2 Bench-Scale Trials

Applicants may seek support to undertake a bench-scale trial or describe a completed trial to support further bench-scale work or to progress to a pilot plant trial.
.

Applicants at an early stage of concept development seeking support for a bench-scale trial must submit evidence of their research capability including evidence of successful completion of at least one similar bench-scale trial. In addition, Applicants will need to provide details of the supporting desktop study as outlined in 5.1 above as well as providing details of the planned bench-scale trial program and describing how the deliverables below will be achieved:

- Identified small scale practicability criteria
- Evidence of scalability to commercial operation
- Process flow and all input and output properties
- Mass balance and energy balance forecasts
- Identified design and process obstacles and success parameters
- Total cost estimates of the project
- Anticipated cost per tonne to treat biosolids in a commercialised operation
- A business case that supports progression to pilot-scale trial.

To support further bench-scale work, or to support an application for the subsequent pilot plant stage (6.3), Applicants are to provide a report of the prior bench-scale trial. The report should cover the topics listed above with, in particular, a robust business case to proceed to further work including pilot plant trials.

A statement must be provided to confirm who the owner will be for intellectual property, if any, generated through the course of the bench-scale trial.

6.3 Pilot Plant Trial

Applicants wishing to provide a proposal for the pilot plant trial should include the following in the EOI in sufficient detail to enable comparisons with other submissions. Applicants, if short-listed, will have an opportunity to provide more detail about their proposals..

- Responses to 6.1 and 6.2 above;
- The objective of the trial;
    - o entity responsible for the trial;
    - o financial and technical backing of the applicant

    - plant description and associated infrastructure
- Approvals required including EPA Victoria and Department of Health. The applicant is fully responsible for obtaining all approvals
- Duration of the trial
- Cost Structure of the trial
    - Requirements from the applicant
    - Requirements from MWC (funding can not be guaranteed).
- Use of MWC land, if any, during the trial and removal of all material, plant, equipment, rubbish, contamination or the like from MWC land at the end of the pilot plant trial period. Please note that both ETP and WTP are undergoing major upgrades/new works in the next 5+ years and that the trial would have to be located well away from affected areas. The applicant must advise:
    - What area would be required (x metre by y metre) for the Trial
    - What access would be required
    - Proposals for restoration of land on conclusion of the trial
- Feed stocks:
    - Type
    - Amount (tonne/day) including truck movements per day
    - Preference for ETP or WTP biosolids
    - Any other materials, additives, etc
    - Required stockpile turnover period
- Waste streams
    - Type and composition (liquid, solid, gaseous)
    - Amount (tonne/day or volume/day as applicable)
    - Method of disposal or reuse
- Projected mass and energy balance for the process, including mass balances for contaminants including but not limited to metals and organic contaminants;
- Assessment of the quantity of services required including electrical power and water consumption (total water consumption as Litres/day and the peak rate required as Litres/min) and any other services
- Assessment of environmental risks and mitigations related to issues such as waste streams, air emissions and any other impacts, including an assessment of how the management of each waste stream adheres to relevant environmental legislation
- Assessment of safety aspects, including dust inhalation, combustion and explosion risks, and identification of mechanisms for risk management on immediate site, including an assessment of how safety management adheres to existing relevant safety legislation
- Identify odour and noise impacts and management requirements on the wider community including adjoining properties and operations staff.
- Truck movement
- Chemical movements
- Land contamination
- Identification of project features where further data or research is required to improve the confidence of success of the concept, bench top trial and cost plan
- Future steps necessary or desirable to proceed to commercialisation
- Indicative operating and capital financial arrangements if the project proceeds to commercialisation including;
    - Civil works;
    - Processing equipment including earthmoving machinery and fixed plant;
    - Supply of utilities including power and water;
    - Management of chemicals and waste streams

    - Control system integration, including integration into MWCs SCADA system;
    - Provision of fire and dust suppression or other safety measures;
    - Transport system;
    - Project design and construction;
    - Any other identified project requirements
- Who would own the intellectual property (IP) gained by building the plant and its operation during the Trial?
    - What data/reports will be made available to MWC?
    - What would the applicant consider unique IP and not shared with MWC?
    - What limitations, if any, would MWC have regarding access to the pilot plant site?
    - Would construction and operational cost data be available to MWC?
    - What are MWC's rights to utilise the IP during or following the Trial?
    - Confirm that the applicant agrees that MWC could conduct other similar trials at the ETP and WTP, working with other companies, concurrently with the proposed Trial
- Other requirements or inputs from Melbourne Water
- Other issues of importance

6.4 Additional Information to be Submitted

- Corporate Details:
    - Corporate structure of the entity submitting the application including copies of MOU's or other partnering agreements, as applicable.
    - Where a Company applies, the full registered name of the Company and its ABN shall be inserted in the Application Form.
    - Details of professional indemnity and public liability insurance carried by the Applicant including the name of the company providing the insurance, the amounts of cover, policy numbers and the expiry dates.
    - Details of the Applicants management systems including Occupational Health and Safety, Quality Assurance, Environmental and Industrial Relations with evidence of registration with Work Safe Victoria.
    - Where a Company wishes to express an interest it may be required to submit a copy of its previous three financial years audited or professionally prepared trading and profit and loss accounts and balance sheets.

- Qualifications and experience of the organisation submitting the EOI:
    - A statement of the Applicants capabilities for providing the services/works
    - Details of recent relevant experience in undertaking research and development projects of a similar nature including references from organisations for whom the services/works have been provided (including referees contact names and phone numbers)
    - Description of any organisations or individuals who have been significantly involved in the concept development to date but are not now involved.
    - Details of the number and classification of staff employed by the Applicant and resumes of staff who would be engaged in implementing the proposed research project including particulars of

their relevant experience and their functions in the Applicant's organisation.

- Details of the Applicant's organisational structure and the usual method of providing resources and interfacing with clients in the implementation of research projects.

7 Evaluation Criteria

7.1 Evaluation

MWC at its absolute discretion will assess and select suitable Applicants who will be invited to complete a tender in accordance with the tender documents to be provided.

The evaluation criteria for the selection of an Applicant as a tenderer will be based on the elements detailed in Section6. The elements in Section 6 are not necessarily shown in order of importance. MWC will consider all applications equally, regardless of the current stage the project (i.e. desk top analysis vs. pilot plant stage).

7.2 Interview And Presentation

Interviews may be carried out with some Applicants to further evaluate their submissions prior to finalising the short-list of organisations to be taken forward to RFP stage.

8 Lodging of Applications

Expressions of Interest are to be lodged in MWC's Tender Box no later than 1:00pm, on **Wednesday 2nd February 2011**.

> The Expression of Interest shall be enclosed in a sealed plain envelope bearing the Applicant's name and postal address, and endorsed Expression of Interest for "Implementation of a research and development project for decontamination, stabilisation, energy extraction, or other conversion, leading to "Beneficial Use" of Biosolids".

The Expressions of Interest shall be lodged in the Tender Box on the Ground Floor, 100 Wellington Parade, East Melbourne, no later than the time stated above. If forwarded by pre-paid post, the endorsed and sealed envelope enclosing the Application shall be annotated as above and addressed to:

The Tender Box
Melbourne Water Corporation
PO Box 4342
Melbourne, Victoria 3001

Late Applications may not be accepted by MWC and may be returned to the Applicant. However, a late Application, which has been dispatched by prepaid post in time to be received by MWC in the ordinary course of the post by the Expression of Interest nominated closing time (as evidenced by a legible post office stamp) may be accepted. It is the responsibility of the Applicant to ensure that its Application is received by MWC prior to the closing time for receipt of the Application.

9 Enquiries

All enquiries during the expression of interest phase should be directed to the project email portal:

<biosolidsresearch@melbournewater.com.au>

10 Notification

MWC will notify all Applicants in writing regarding the outcome of their Expression of Interest.

11 Limitations of Liability

MWC does not warrant and shall not be liable in contract, tort or to the extent permitted by law under any statute or otherwise for any costs, losses, expenses or damage suffered or incurred by the Applicant, arising out of or in connection with:

- any representations made by MWC;

- the completeness, adequacy, accuracy or content of the information or the interpretations, deductions or conclusions which are given in any reports, maps, drawings, diagrams or other information made available or disclosed to the applicant by MWC prior to the closing date for the submission of the expression of interest.

The Applicant acknowledges and confirms that it has not submitted the expression of interest in reliance on any representation, warranty, promise or statement made by MWC or any person on behalf of MWC. MWC reserves the right without advance notice, without explanation and for any cause whatsoever:

- not to proceed with the expression of interest for all or any part of the services/works;
- to change the terms and procedures relating to the expression of interest process;
- to terminate negotiations with any Applicant prior to the dispatch of MWC's notification of registration or non-registration, as the case may be;
- to register or not register (as the case may be) any Application.

MWC shall not be liable for, nor reimburse any applicant for any costs directly or indirectly incurred by the Applicant in connection with the expression of interest.

12 Confidentiality

All Expressions of Interest and any accompanying documents become the property of MWC. Subject to the provisions of the Freedom of Information Act, all documents provided by the applicant will be held in confidence so far as the law permits.

Appendix A - Expression of Interest Application Form

Applications close at 1:00 pm on Wednesday 2nd February 2011

To: Tender Box
Melbourne Water
100 Wellington Parade
East Melbourne, Victoria 3002

I/We……..…….
(Registered Name of Firm or Company)

of……
……..……..……
……...……
(Address of Registered Office)

DO HEREBY APPLY for registration as a proposer for the Expression of Interest for "Implementation of energy, nutrient, metal, fuel or chemical extraction, geotechnical reuse, building material extender, decontamination, stabilisation, or other conversion leading to "Beneficial Use" of Biosolids".

In support of this Application, information and documents as required are submitted. The information contained herein is to the best of my knowledge true and correct.

IN WITNESS WHEREOF this Application was executed on the

..……..……. day of……..…….. 200

Signature of Authorised Person…….……..…….

Office Held ……..……...……..…..……..

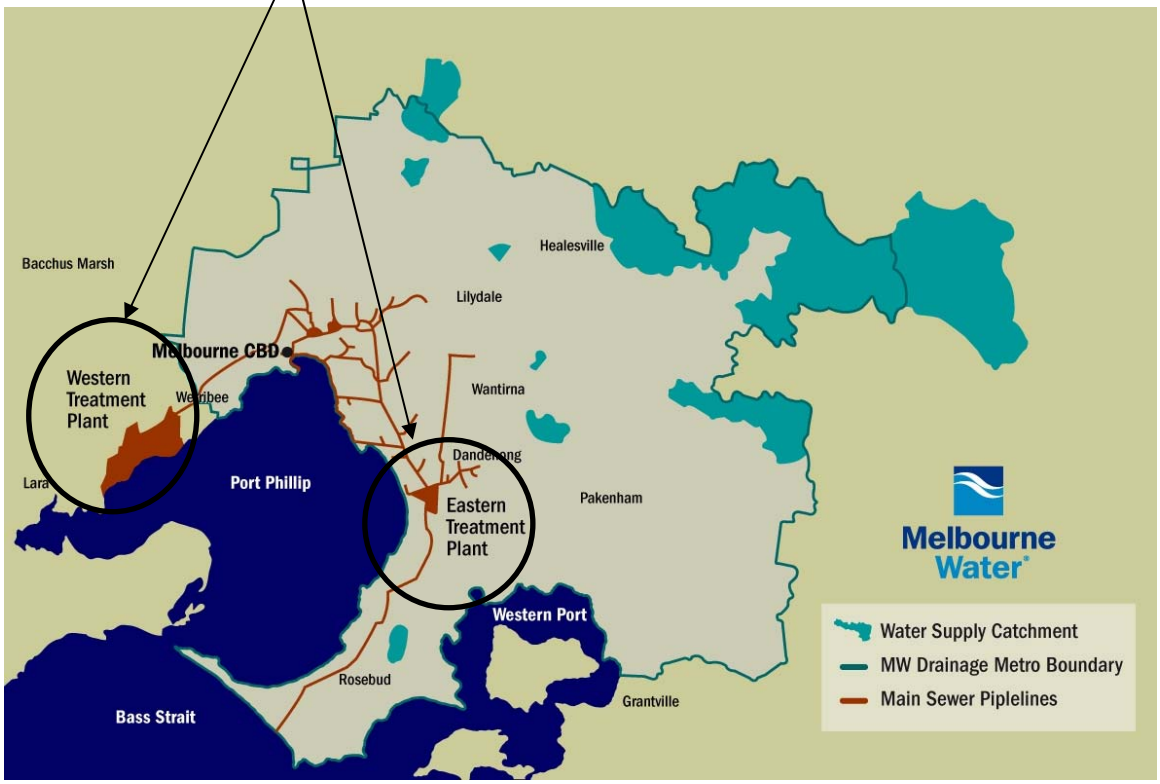
Name of Authorised Person ……..……...……...….

Signature of Witness ……..……....…….

Name of Witness ……..……...……...…….

Appendix B – Treatment Plant Locations

Melbourne Water's Sewerage Treatment Plants



Appendix C – Biosolids Characterisation Data at the Treatment Plants - Sheet 1 of 4

Metal Contamination at ETP										
mg/kg dry	Digested Sludge Contaminant History - Average over all Stockpiles									
All Biosolids	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Thallium	Zinc
Count of Result	514	539	478	539	514	514	539	380	34	539
Average of Result	4.81	5.08	123.5	289.8	122.6	1.01	48.5	2.62	<5.00	466.1
Max of Result	25	16	392	4200	5600	6.1	144	13	<5.00	4700
Min of Result	<1.00	0.1	5	6	6	<0.05	2	<0.50	<5.00	8
Standard Deviation of Result	2.02	2.84	58.9	241.2	272.0	0.61	23.0	1.46	N/A	332.2
95% Upper Confidence Interval	5.70	6.33	149.4	396.0	242.3	1.28	58.6	3.26	N/A	612.3

Metal Contamination at WTP										
mg/kg dry	Digested Sludge Contaminant History - Average over all Stockpiles									
All Biosolids	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Thallium	Zinc
Count of Result	86	96	44	96	86	86	96	86	20	96
Average of Result	24.0	17.5	847.0	833.8	524.8	5.59	141.9	5.13	0.145	1542
Max of Result	109	107	2900	1870	1510	19.9	589	8.8	0.4	4590
Min of Result	7	2	122	95.5	64.4	0.2	36	1	<0.10	276
Standard Deviation of Result	16.7	15.3	673.7	319.2	349.9	3.36	87.8	1.81	0.083	692.7
95% Upper Confidence Interval	31.30	24.2	1143.4	974.3	678.8	7.07	180.6	5.93	0.181	1846.8

Appendix C – Biosolids Characterisation Data at the Treatment Plants – Sheet 2 of 4

Organic Chemicals (mg/kg) - Over all Stockpiles (Dioxin/ Furans pg/g)							
All Biosolids	**ETP**				**WTP**		
	Samples	Min	Max	Mean	Samples	Min	Max
Aldrin	3 (300)	<0.0005			14	<0.10	None Detected
Chlordane	3 (300)	<0.0005			14	<0.10	None Detected
Dieldrin	3 (300)	<0.0005			14	<0.10	None Detected
DDD	3 (300)	<0.0005			14	<0.10	None Detected
DDE	3 (300)	<0.0005	0.0036		14	<0.10	None Detected
DDT	3 (300)	<0.0005			14	<0.10	None Detected
Heptachlor	3 (300)	<0.0005			14	<0.10	None Detected
Heptachlor Epoxide	3 (300)	<0.0005			14	<0.10	None Detected
Hexachlorobenzene	3 (300)	<0.0005			14	<0.10	None Detected
Lindane	3 (300)	<0.0005			7	<0.10	None Detected
Polychlorobiphenols	3 (300)	<0.0050			21	<0.50	5.98
Dioxins/ Furans/ PCB	19.0	6.7	30.0	15.3	7	230	660
300 Samples were taken at ETP at detection levels of 0.1 mg/L which obviously resulted in no detectable concentration							

Appendix C – Biosolids Characterisation Data at the Treatment Plants - Sheet 3 of 4

Gross dry Calorific Value of Biosolids (MJ/kg)				
	ETP	WTP	WTP Wet	ETP Wet
Count of Result	9	76	4	No Data
Average of Result	2.3	9.84	14.67	No Data
Max of Result	10.8	16.9	16	No Data
Min of Result	<0.2	3.4	14.2	No Data
Standard Deviation of Result	3.3	2.6	0.9	No Data
Median	1.5	10.1	14.3	No Data
Wet solids are directly from the process and have not been dried				
ETP Wet: Data not available.				

Nutrients in Biosolids				
(% dry basis)	ETP	ETP Fresh	WTP	WTP Wet
Total Nitrogen Min	0.25	2.93	0.34	2.3
Total Nitrogen Max	0.94	8.54	2.6	4.7
Total Nitrogen Ave	0.65	4.19	1.56	3.75
Total Phosphorus Min	0.17	2.62	0.15	0.56
Total Phosphorus Max	1.6	6.78	1.5	0.99
Total Phosphorus Ave	0.77	3.8	0.7	0.77
Total Carbon	23.4	No Data	21.9	32.6
Total Hydrogen	3.4	No Data	2.6	4.4
Total Sulphur Ave	No Data	No Data	0.8	1.55
Total Oxygen Ave	No Data	No Data	No Data	15.3
ETP Fresh is the newly produced Biosolids Wet solids are directly from the process and have not been dried				

Appendix C – Biosolids Characterisation Data at the Treatment Plants - Sheet 4 of 4

Proximate analysis				
	WTP	**ETP**	**WTP Wet**	**ETP Wet**
Moisture	37.93	28.21	88.75	No Data
Volatile matter	33	14.7	48.87	No Data
Ash	59.04	85.3	41.84	No Data
Fixed Carbon	7.96	0	9.29	No Data
SiO2 in Ash	63.7	No Data	No Data	No Data
Ultimate Analysis				
Ash	59.04	59.9	41.8	No Data
Carbon	21.88	23.4	43.5	No Data
Hydrogen	2.64	3.4	4.5	No Data
Nitrogen	1.65	3.7	3.2	No Data
Sulfur	0.81	No Data	1.6	No Data
Oxygen	13.78	9.6	15.4	No Data
Chlorine	0.2	No Data	No Data	No Data
WTP: Oxygen by Difference, Fixed Carbon by difference, Data from entire database, All values as % w/w db				
ETP: Oxygen by Difference, Fixed Carbon by difference, Sulphur not measured, Data from entire database, All values as % w/w db, Chlorine not measured, Proximate analysis from entire database, Ultimate analysis from single sample of fresh biosolids.				
WTP Wet: Data from entire database, All values as % w/w db, Chlorine not measured.				
ETP Wet: Data not available.				

Appendix D – Government Funding Initiatives

The Australian Government has established *AusIndustry* which is the Australian Government's business program delivery division which delivers a range of more than 30 business products and $2 billion in benefits each year to about 10,000 small and large businesses. For further information, contact the hotline on 13 28 46 or visit the website www.ausindustry.gov.au. The grant products include:

- Low Emissions Technology Demonstration Fund (LETDF)
- Renewable Energy Development Initiative (REDI)
- Renewable Energy Equity Fund (REEF)

State Government Funding options include:

- Smart Water Fund (http://www.smartwater.com.au) - *"The Smart Water Fund was established to encourage and support innovative development of water, biosolids recycling and water saving projects within the community"*
- Sustainability Victoria (http://www.sustainability.vic.gov.au) has several grants including:
    - Sustainability Fund: *"The Sustainability Fund encourages projects that increase resource efficiency while improving sustainable practices"*
    - Renewable Energy Support Fund – *"This fund encourages innovative applications of medium-scale proven renewable energy technologies in Victoria."*

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