

WASTE MANAGEMENT PLAN

50 Wyllie Road, Kembla Grange NSW

prepared for

Bicorp Pty Ltd

April 2014



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1.0 INTRODUCTION

Benviron Group on behalf of Bicorp Pty Ltd was appointed to conduct a Waste Management Plan as part of an Environmental Impact Statement for the proposed upgrade of a Resource Recovery Facility at the property located at 50 Wyllie Road, Kembla Grange, NSW (Lot 10 in DP 878167).

This management plan is designed in accordance to relevant waste regulatory criteria including the NSW DECC “Waste Avoidance and Resource Recovery Strategy” (2007), and the NSW DECC “Waste Classification Guidelines” (2009):

2.0 OBJECTIVES

The aims of the waste management plan is to:

- Identify, classify and quantify the likely waste streams that would be handle/stored/disposed of at the facility;
- Describe how this waste would be treated, stored, use, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and
- Describe the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy (2007).

3.0 SITE DESCRIPTION

The proposed works are to be undertaken at the site identified as 50 Wyllie Road, Kembla Grange, NSW (Lot 10 in 878167). The site is located within the Wollongong City Council Area. Surrounding properties are zoned as recreation (RE2 and RE1), light industrial (IN2) and environment conservation (E2).

The upgrade of the Resource Recovery Facility is proposed to occur at the south-western portion of the site near Wyllie Road. This proposed development area is currently zoned as light industrial (IN2).

The site is bound to the north by an existing ridgeline. To the west the site is bounded by industrial facilities. To the south and east the site is bordered by vacant land.

4.0 OPERATIONAL OVERVIEW

The existing and proposed operation of the site is a Resource Recovery Facility that accepts selective material from building and demolition sites. Materials are transported to the site in trucks ranging in size from 10-25t in capacity. The materials are sorted and separated in sections within the site, processed, and then recycled or disposed of off-site.

The following figure describes the process of the assessment of waste arriving/generated at the site.

Figure 1: Assessment and Handling of waste arriving/generated at the site

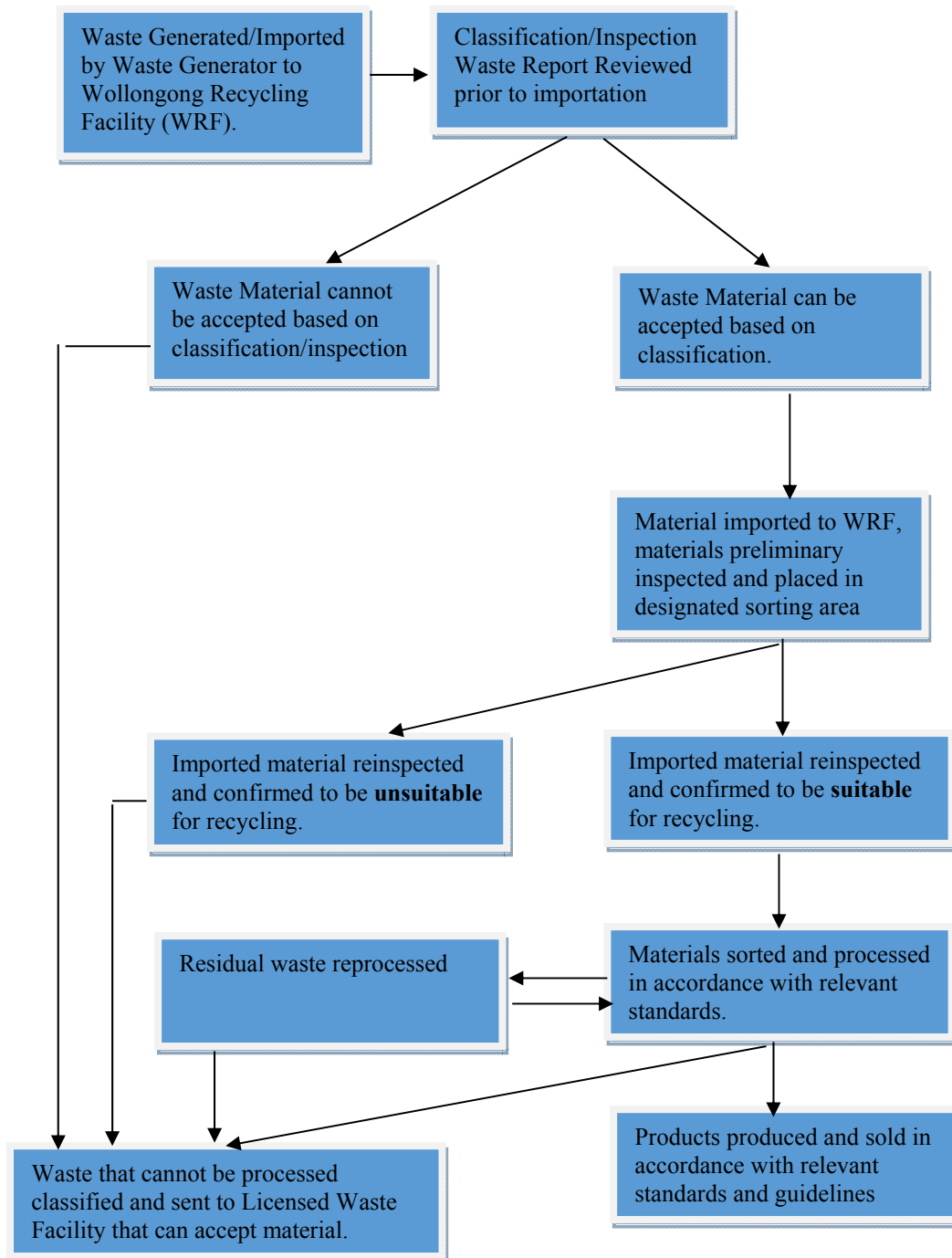
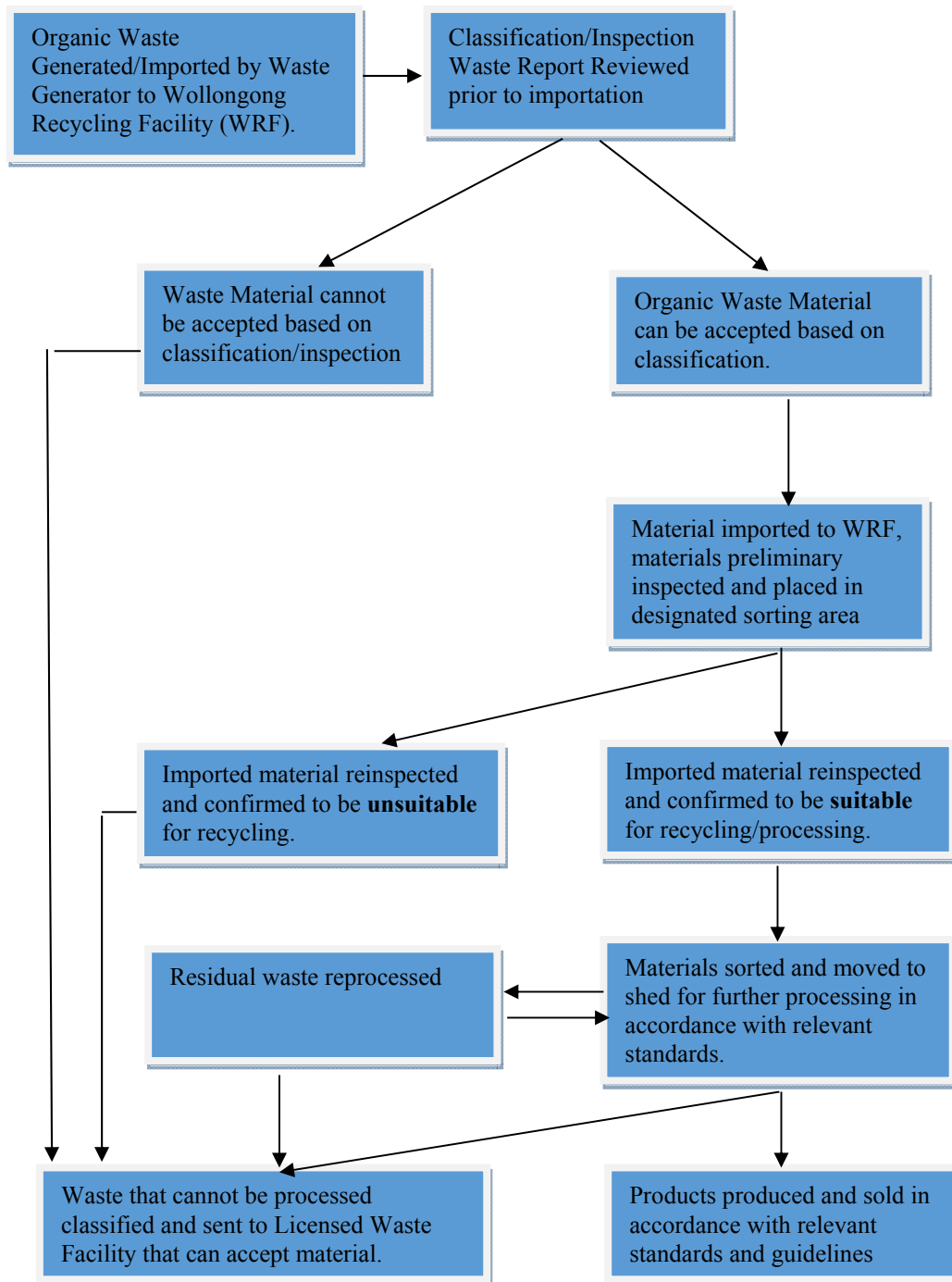


Figure 2: Assessment and Handling of Organics arriving/generated at the site



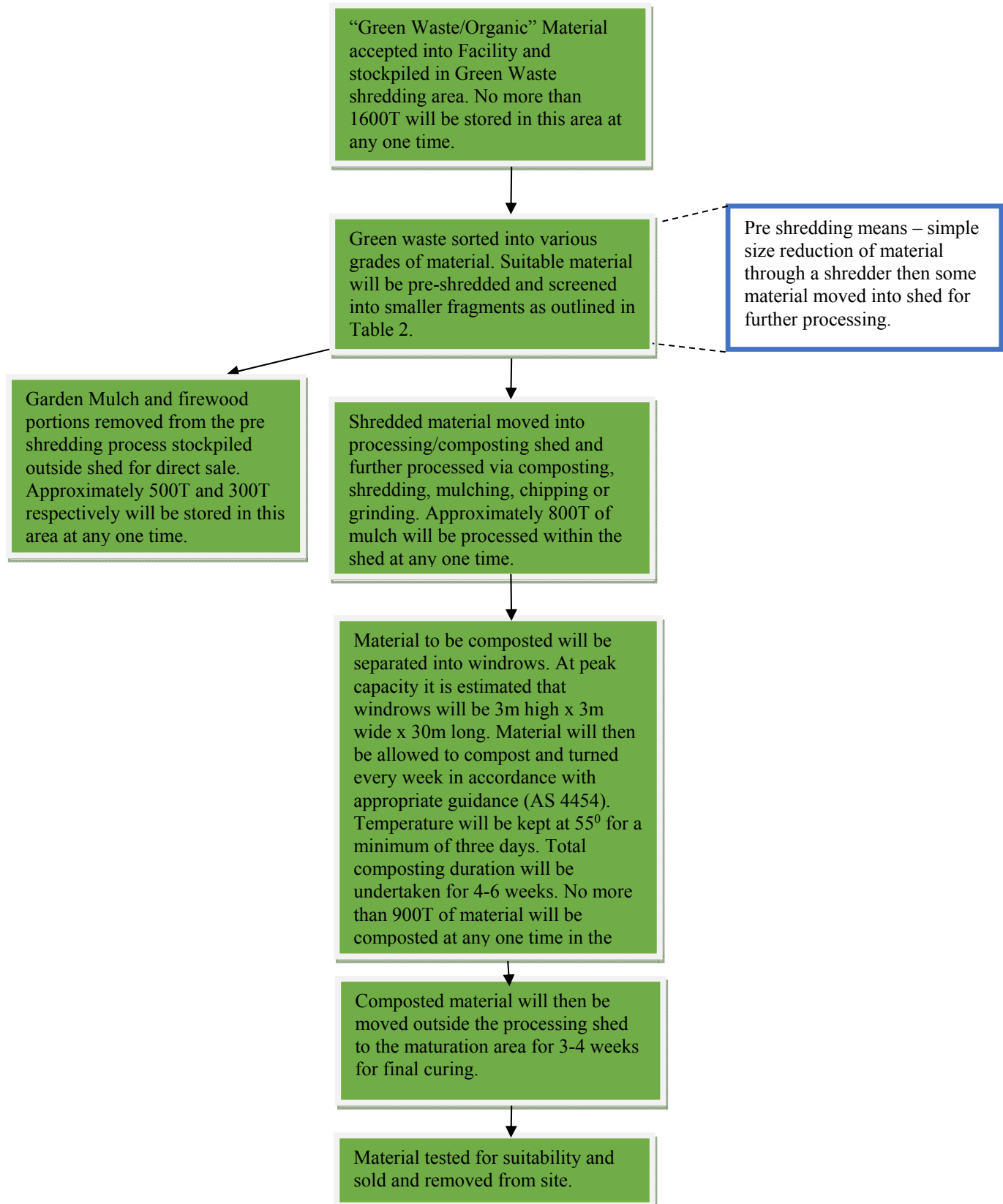
Organics Processing and Composting

As organic wastes constitute the largest fraction of the waste stream going to landfill, the composting of these materials will serve to reduce the demands on landfills and recycle resources to produce compost and other materials

The facility is proposed to undertake composting for Class/Category 1 Organic material which include Garden and landscaping material, untreated timber, natural fibrous material.

It is to be noted that any organic (green) wastes that will be processed on site will be undertaken generally as per figure 2, and more specifically as outlined in the flowchart as follows:

Figure 3: Specific Organics handling process within the site



Organic Storage and Waiting Areas

Material stored within the “green waste” shredding area will be processed every four-five weeks. During this time material will be stockpiled on site and unprocessed material will be covered with a tarpaulin to minimise breakdown and leachate generation where material is not for direct sale.

It is not expected that material that is shredded for direct sale will be cause for concern due to the rapid turnover of the material and the chance for biological breakdown within this area will be minimal.

Detailed Composing Process

Pre shredded organic green waste will be transported to the composting shed and will be stockpiled in trapezoidal aerated windrow stockpiles approximately 3m high x 4m wide by 30m long with a capacity for up to 900T to be processed at any one time. Material will then be processed as follows:

1. Material will be thoroughly mixed using a front end loader prior to pile formation. If not correctly mixed initially turning of the pile during composting can redress this issue.
2. Static Aerated windrows will be formed in the above described dimensions (3x4x30).
3. The ingredients to be used are to be non-putrescible organics such as garden waste, timber, wood, etc which should be easily accommodated by this method because aeration lessens the chance of oxygen deficiency within the pile. However too much aeration can limit processing capacity and form an unstable pile which can allow for pathogens to survive, therefore it

recommended that moisture conditions be strictly monitored. Good management of these conditions limit any odour generation.

4. Moisture content should be near the water holding capacity for the material and measurement of this should be undertaken in accordance with AS4454.
5. As temperature gradients will naturally occur within windrows it is important to maintain temperature across the pile to prevent pathogens from remaining in the pile. Turning on a weekly basis using a front end loader will help to minimise this risk and allow the natural heating and pasteurising process to eliminate any pathogens.
6. In order to increase aeration of the pile perforated pipes will be installed at the base of the pile or within the concrete floors of the shed. This will be used in turn with temperature monitoring in order to maintain pile heat and composting stability and reduce potential for anaerobic composting conditions to form.
7. Composting will be undertaken for approximately 4-6 weeks with 1-2 turns per week depending on pile conditions. Once the composting process has become stable the material will be removed from the composting shed and placed in the composting curing area for a further month. During this time the material will be covered with a tarpaulin to prevent leachate runoff.
8. Material will be tested for compliance with AS4454 and will be sold to the market accordingly.

Detailed Composting Process

The shed will be designed to be negative pressure (refer to preliminary ventilation shed design plans Appendix A) in order to minimise the escape of any potential odours escaping through the roller doors. The air will be drawn into the building through the roller doors and will be vented through a stack (as per GHD 2014 Report) in the roof of the structure. Air that is vented through a pressurised pipe for

the windrow composting building will be pumped into the building and will be vented as described above.

Leachate Control

The leachate will be managed in accordance with the KFW Development plans (See Appendix B). The process is generally as follows

- The green waste shredding area will have an impervious concrete or asphalt concrete layer to prevent infiltration from the shredding surface.
- The green waste shredding area has a perimeter drain to collect and direct runoff to the green waste runoff collection pond.
- Composting and storage will be undertaken in a weatherproof shed which will have a concrete floor.
- The composting process will occur under cover in a weather-proof building and will produce no or at worst a small volume of leachate.
- The composting process shed will have a concrete floor underlain by a polyethylene membrane in order to prevent leachate infiltration into the groundwater.

The compost process leachate collection system will consist of the following:

- A primary concrete tank with a volume of 5,000 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness.

- A secondary concrete tank with a volume of 2,500 litres. The concrete tank will be fitted with a watertight lid and internally sealed with an epoxy coating to ensure watertightness.
- The secondary tank will be connected to the primary tank at the level where the primary tank is at 4,000 litre storage (80%) capacity.
- The primary collection tank will be fitted with a sensor to indicate 75% capacity (ie 3,750 litres. At this point the site manager shall arrange to have the primary tank pumped out by a liquid waste tanker and disposed of at an appropriate treatment facility.

Stockpile Heights

Stockpile heights have been based on those outlined in the South Australian Environmental Protection Agency (EPA SA September 2010) and will be as follows in order manage fire, dust and odour –

- Stockpiles of inert material such as concrete, brick, soil etc will be stockpiled to a maximum of 5m in height. Height Poles to the exact length (5m) will provide on-site guidance for stockpile management.
- Stockpiles of organic material such as timber, garden waste, composting material etc will be stockpiled to a maximum of three (3m) in height. Again height poles (3m) will be used for on-site guidance for stockpile management.

5.0 PROPOSED DEVELOPMENT

Currently the Resource Recovery Facility operates at a maximum annual volume capacity of 30,000 tonnes. The proposed development is to operate at a maximum annual volume capacity of 230,000 tonnes.

6.0 MATERIAL TO BE ACCEPTED

The following table outlines the materials received on-site, the processes to recycle the material, the end-product, final destination of the material, and output material generated.

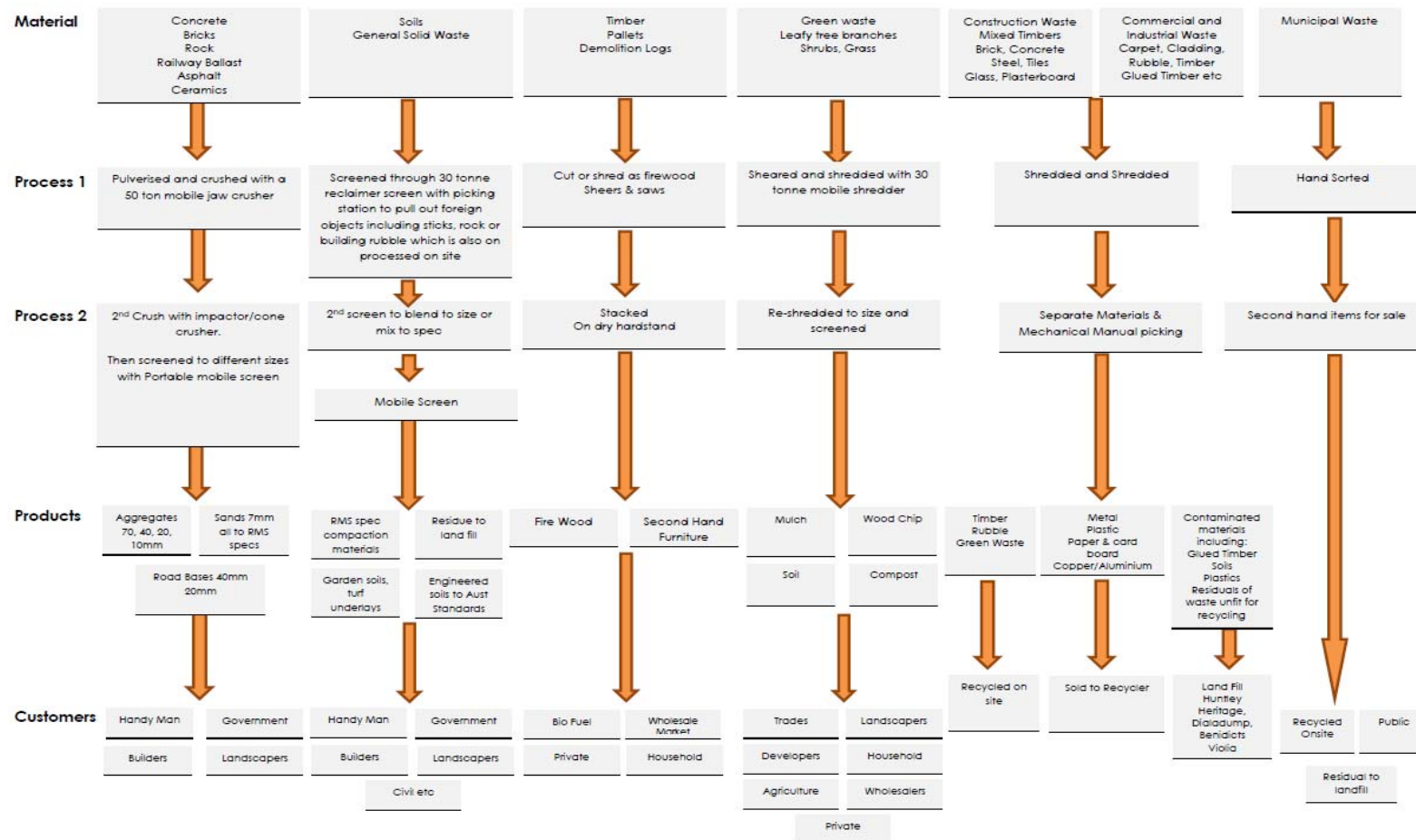
Table 1: Materials to be accepted for Recycling and Processing

Waste Materials to be received	Waste Classification	Estimated Total Per Annum (Tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
Glass	General Solid Waste	2500T	Material washed, crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Plastic	General Solid Waste	2500T	Material sorted into various types	Sorted material stockpiled on site	Sold to plastic recycler for reprocessing	Nil
Plasterboard	General Solid Waste	1000T	Material crushed and gypsum removed. Paper backing is separated for recycling.	Sorted material stockpiled on site	Sold to manufacturer for reprocessing or to landscapers as soil amendments.	Some Paper material may not be able to be recycled
Ceramics	General Solid Waste	1000T	Material crushed and screened into various products	Granular material graded to various sizes and	Sold for road aggregate and drainage backfill	Nil

Waste Materials to be received	Waste Classification	Estimated Total Per Annum (Tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
				stockpiled on site		
Brick	General Solid Waste	15,000T	Material crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold as second hand building material or Sold for road aggregate and drainage backfill	Nil
Concrete	General Solid Waste	20,000T	Material crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Metals – Including steel, iron, aluminium, copper, lead etc.	General Solid Waste	10,000	Metal – sorted into sizes and types	Sorted material stockpiled on site	Sold as second hand building material or sold to metal recycler	Nil
Paper/Cardboard	General Solid Waste	5000T	Material sorted into various types	Sorted material stockpiled on site	Sold to paper/cardboard recycler for	Nil

Waste Materials to be received	Waste Classification	Estimated Total Per Annum (Tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
					reprocessing	
Household Waste from municipal cleanup	General Solid Waste	7,500T	Sorted into various materials that can be recycled - metal, timber, plastic etc	Sorted material stockpiled on site	Sold as second hand building material or to redistributed to relevant recycling area.	Material that cannot be recycled sent to landfill.
Organics (non putrescible) Garden/Vegetative Waste, Timber	General Solid Waste	30,000T	Green/Wood waste mulched/ composted. All handled within processing shed.	Sorted material stored on site as either mulch or compost	Sold as recycled building material or as landscaping material.	Unsuitable green waste must be disposed of to landfill.
Virgin Excavated Natural Material (VENM)	General Solid Waste	20,000T	Soils and rock are processed into landscaping material.	Sorted material stockpiled on site	Sold as landscaping material.	Nil
Building and Demolition Waste	General Solid Waste	30,000T	Sorted into various materials that can be recycled - metal, timber, plastic etc	Sorted material stockpiled on site	Sold as second hand building material or to redistributed to relevant recycling area.	Material that cannot be recycled sent to landfill.
Asphalt Waste & Railway	General Solid	5,000T	Material crushed and	Material made to	Sold for road	Nil

Waste Materials to be received	Waste Classification	Estimated Total Per Annum (Tonnes)	Process/Handling	Storage	Use/Sold as	Residual Waste to be disposed to landfill
Ballast	Waste		screened into various products	various sizes and stockpiled on site	aggregate and drainage backfill	
Cured Concrete Waste	General Solid Waste	5,000T	Material crushed and screened into various products	Granular material graded to various sizes and stockpiled on site	Sold for road aggregate and drainage backfill	Nil
Mixtures of above materials.	General Solid Waste	10,000T	Sorted into various materials that can be recycled - metal, timber, plastic etc	Sorted material stockpiled on site	Sold as second hand building material or to redistributed to relevant recycling area.	Material that cannot be recycled sent to landfill.
Waste Accepted under NSW EPA Resource Recovery Exemptions.	As per relevant exemption	15,000T	Soils and rock are processed into landscaping material.	Sorted material stockpiled on site	Sold as landscaping/earthworks material.	Nil
Soils	General Solid and Restricted Waste	50,000T	Soils and rock are processed into landscaping material.	Sorted material stockpiled on site	Sold as landscaping/earthworks material.	Nil

Table 2: Generalised Recycling and Processing within the Site

7.0 OUTPUT PRODUCTS

The following table outlines the specifications for the output products.

Table 3: Output Materials produced and their characteristics

Processed Output Products to be Sold	Relevant Standards to assess products	Physical Characteristics	Chemical Characteristics	Biological Characteristics
Recycled Roadbase and associated Bedding and Drainage Materials.	NSW EPA Recovered Aggregate Exemption, NSW RMS QA 3051 Specification, IPWEA Specification for Supply of Recycled Material	Granular material from graded to various sizes ranging between 9mm -70mm.	Generally Inert but have some contaminant concentrations of Heavy Metals, Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Recovered aggregate Exemption	Nil
Excavated Natural Material (ENM)	NSW ENM Exemption	Soil material made up of silt, clay, sand or rock.	May have some contaminant concentrations of Heavy Metals, TRH/BTEX, PAH or Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA ENM Exemption	Minimal biological activity as should have minimal organic material within soils.
Recycled Glass Sand	NSW EPA Recovered Glass Sand Exemption	Granular material graded to various sizes and stockpiled on site between 2mm and 5mm	Generally Inert but have some contaminant concentrations of Heavy Metals, Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Recovered glass sand Exemption.	Nil

Processed Output Products to be Sold	Relevant Standards to assess products	Physical Characteristics	Chemical Characteristics	Biological Characteristics
Second Hand Building Supplies	N/A - material is sorted and suitable material is stored for sale.	Sorted material such as second hand timber, metal, pipe, furniture etc.	N/A	N/A
Mulch/Compost	AS4419, AS4454 NSW EPA Mulch Exemption.	Material consists of shredded wood and timber.	N/A	High level of biological activity. Processing requires material is pasteurised in order to prevent spread of pathological organisms
Blended Soil Mixes	AS4419, AS4454, NSW ENM Exemption, NSW EPA Recovered Aggregates Exemptions.	Blended soils consisting of sand silt, clay & aggregates.	May have some contaminant concentrations of Heavy Metals, TRH/BTEX, PAH or Foreign Materials Final products will have contaminant concentrations less than those outlined in NSW EPA Exemptions. Material will also conform to relevant Australian standards.	Biological activity should have stabilised as organic portions should have already been broken down.

This list covers most of the materials to be produced, however this is not an exhaustive list of materials that may be produced within the site and in the future additional products may be introduced based on market trends. It is important to note that should relevant guidelines and/or Australian/NSW Legislation be changed/amended and the following definitions (see table 1, 2 and 3) are added to,

amended or are no longer relevant, it is intended that this report will proactively incorporate these changes (where possible and relevant) into this report in accordance with the new guidance/legislation criteria.

8.0 WASTE MATERIALS

NSW Recycling targets

As shown in Table 1, 2 & 3, minimal waste is generated from the Resource Recovery Facility. The recycling facility will allow the following outcomes to be achieved in accordance with the NSW Waste and Resource Recovery Strategy through the continued operation and processing of waste material and these areas as follows:

1. Preventing and avoiding waste;
2. Increasing recovery and use of secondary materials;
3. Reducing toxicity in products and materials; and
4. Reducing litter and illegal dumping

It will also help the NSW government to achieve the following targets:

- Municipal waste – from a baseline 26% to 66%
- Commercial and industrial (C&I) waste – from a baseline 28% to 63%
- Construction and demolition (C&D) waste – from a baseline 65% to 76%

Wollongong City Council Recycling Strategy

It was identified that Wollongong Council has adopted the NSW Waste and Resource Recovery strategy as part of their own waste recovery strategy and are currently preparing a waste action plan for the council area. This is expected to be finalised within the next few years.

Estimated Quantity of Waste Diverted during 10 Year Startup Phase

Municipal Waste Stream

Year	Estimated Tonnes diverted per annum						
	Mixed dry recycling	Paper/Cardboard	Plastics	Glass	Wood/timber	Metals	Mixed residual waste
Capacity of recycling Yard	N/A	5000	2500	2500	30000	10000	N/A
2014/15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2015/16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2016/17	N/A	1500	100	100	2000	3000	N/A
2017/18	N/A	2000	200	200	2500	3500	N/A
2018/19	N/A	2200	300	300	2700	3700	N/A
2019/20	N/A	2500	500	500	3000	4000	N/A
2020/21	N/A	2500	500	500	4000	4000	N/A
2021/22	N/A	2500	500	500	5000	4000	N/A
2022/23	N/A	2500	500	500	5000	4000	N/A
2023/24	N/A	2500	500	500	5000	4000	N/A
2024/25	N/A	2500	500	500	5000	4000	N/A
Total	N/A	20700	3600	3600	34200	34200	N/A

Commercial and Industrial Waste Stream

Year	Estimated Tonnes diverted per annum						
	Mixed dry recycling	Paper/Cardboard	Plastics	Glass	Wood/timber	Metals	Mixed residual waste
Capacity of recycling Yard	10000	5000	2500	2500	30000	10000	10000
2014/15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2015/16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2016/17	1000	1000	500	500	5000	5000	500
2017/18	2000	2000	1000	1000	7000	6000	1000
2018/19	3000	2200	1500	1500	10000	6000	1000
2019/20	4000	2500	2000	2000	10000	6000	1000
2020/21	5000	2500	2000	2000	15000	6000	2000
2021/22	7000	2500	2000	2000	15000	6000	2000
2022/23	10000	2500	2000	2000	20000	6000	2000
2023/24	10000	2500	2000	2000	20000	6000	2000
2024/25	10000	2500	2000	2000	30000	6000	2000
Total	52000	20200	27500	27500	132000	53000	13500

"Yellow highlight" indicates construction phase of proposed recycling yard"

The above tables outline an estimated resource recovery for the recycling facility for targeted waste streams by the NSW Government. It must be noted that these estimates are very conservative and are likely to be much more efficient.

Suitable Material to be removed off-site

Any material that is **suitable** for sale or re-use will be dealt with in accordance with the Protection of the Environment and Operations Act 1997. The material that is deemed suitable will first be tested and classified in accordance with the NSW EPA Resource Recovery Guidelines and also along with any other soil specification guidelines relevant in order to protect human health and the environment. Based on this classification material will be transported to a licensed facilities that can accept such materials or material with appropriate development permissions and only in accordance with specified uses in the NSW EPA Resource Recovery Exemptions.

Unsuitable Material required for Disposal Off-site

Any material that is **not suitable** for sale or re-use will be dealt with in accordance with the Protection of the Environment and Operations Act 1997. The material that is deemed unsuitable will first be tested and classified in accordance with the NSW EPA Waste Classification Guideline 2009 and based on this classification will be transported to a licensed landfill facilities that can accept such materials in order to protect human health and the environment. These facilities may be:

- Dunmore
- Huntley Heritage
- Benedict's
- Dial a Dump
- Veolia

Any material that is classified and is deemed trackable waste as outlined in Schedule 1, Part 1 of the Protection of the Environmental and Operations Regulation (2005) will be managed in accordance with the NSW EPA guidance on Trackable Waste.

Though it is expected that less than 15-20% of material received on site will be unable to be recycled.

9.0 WASTE LICENSING

Due to the amount of tonnage the site is proposed to accept it can be seen in Schedule 1 of the Protection of the Environment and Operations Act 1997 that these thresholds would exceed the scheduled activity criteria for Resource Recovery, Waste Storage, Composting etc. Based on this an EPA Licence will be required under the Protection of the Environment and Operations Act 1997 for operation of the site over and above the thresholds outlined in Schedule 1.

10.0 CONTINGENCY PLANNING

The table below summarises conditions that can be reasonably expected and the resulting problems they may cause and how these problems may be resolved within the context of the resource recovery operation.

Anticipated Problem	Corrective Action By Contractor
Chemical spill / exposure	Stop work, refer to Occupational Health, Safety and Rehabilitation Plan and immediately contact Benviron Group.
Excessive rain	Maintain access roads, cover high-traffic areas with gravel; or cover working areas/stockpiles with plastic during off-shifts; or shut down operations until runoff is more manageable. Inspect & maintain sediment control pond & filter fences.
Unmanageable mud in excavation zone	Improve drainage collection system; add geotextile/gravel in problem areas; or strip off mud/slurry materials; or excavate from the top of the fill.
Excessive drainage	Minimise active/contaminated work area; or improve diversion clean run-on; or maintain sufficient on-site wastewater storage capacity; or mobilise additional storage and/or treatment systems as needed.
Excessive dust	Use water sprays or biodegradable dust sprays, or cease dust-generating activity until better dust control can be achieved, or apply interim capping systems.
Sediment pond water for discharge – analytical results exceed site response levels	Perform in-situ treatment, e.g. flocculant dosing, until response levels are met. Alternatively arrange off-site disposal by a licensed Contractor.

Leachate Pond capacity exceeded	Arrange off-site disposal by a licensed Contractor.
Excessively wet materials	Stockpile and dewater on-site; or add absorbents.
Excessive stockpiling of material within site.	Minimise input of material by refusing to accept material for a period of time to be defined by Site Director. Focus on eliminating wastes of concern from the site through processing or disposal.
Equipment failures	Maintain spare equipment or parts; or maintain alternate rental options; or shut down affected operations until repairs are made.
Release of fuel/oil from machinery	Remove source, use absorbent booms to remove oil and make any repairs as required.
Silt fence fails	Stop work and repair fence to specifications.
Excessive noise	Identify source and review noise attenuation equipment and as necessary provide silencers on noisy equipment.
Excessive odours	Monitor for volatiles using PID and upgrade PPE if necessary. Use odour and volatile suppressing agents to eliminate or reduce odours as required and/or cover odorous material if practicable.

11.0 CONCLUSION

This report has identified, classified, and quantified the likely waste streams that would be handled/stored/disposed of at the Resource Recovery Facility. Table 1 outlines that minimal waste material is generated by the facility and is disposed at a licensed landfill able to accept such materials.

In accordance with the NSW DECC “Waste Avoidance and Resource Recovery Strategy” (2007) goals, the proposed development facilitates the prevention and avoidance of waste by increasing and promoting the recovery and use of secondary materials.

Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

For and on behalf of

Benviron Group



Ben Buckley

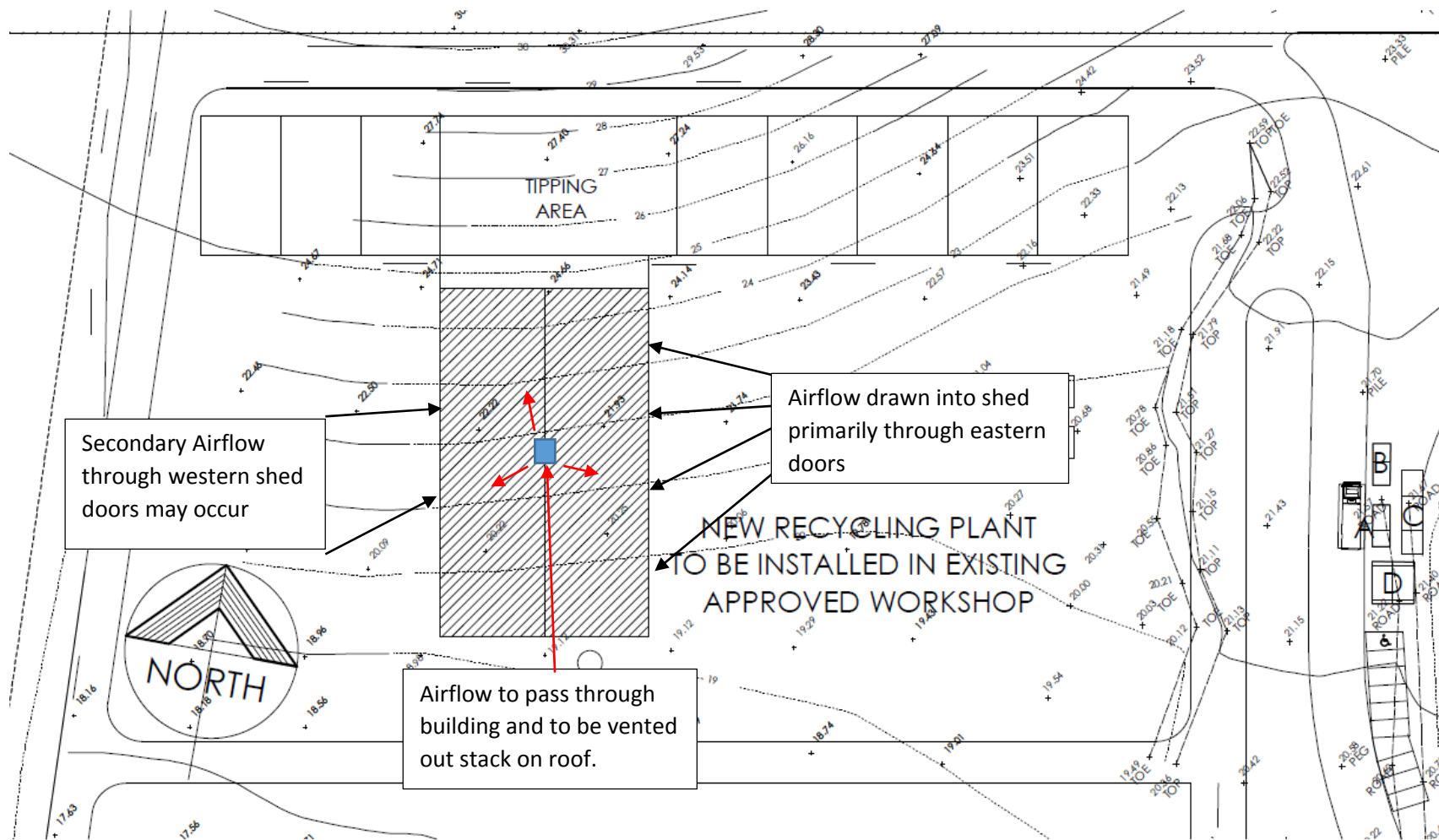
Director

Senior Environmental Forensic Scientist

References

- NSW DECC *“Waste Avoidance and Resource Recovery Strategy”* (2007).
- NSW DECC *“Waste Classification Guidelines”* (2009).
- EPA SA *“Guidelines for Stockpile Management: Waste and Waste derived products for recycling and reuse”*. (2010)
- GHD (2014) Air Quality Assessment, June 2014
- KFW (2014) Leachate Control Procedure

APPENDIX A – SHED VENTILATION DRAWINGS



Figured dimensions to be used in preference to scaling this drawing.
Do not assume - If in doubt ASK.

Site Plan

Plot Date
Fri 04 Apr 2014



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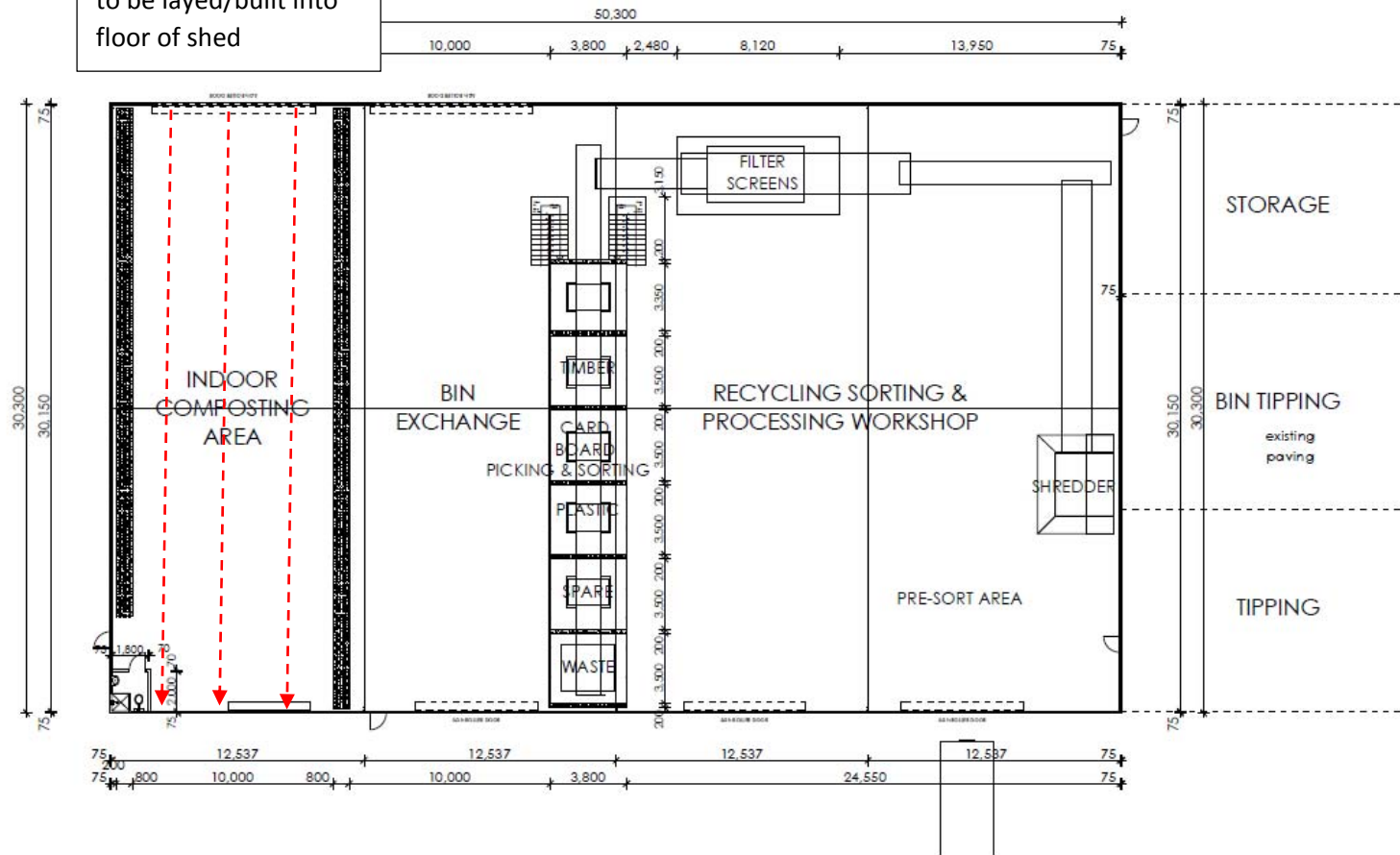
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Proposed Recycling Shed
Lot 10, No. 50
Wyllie Road
Kembla Grange

Client:	BiCorp P/L
Scale:	
Design:	Warehouse2
Job No. 21407	Sheet 1 of 6

Airflow pressure pipes
to be layed/built into
floor of shed



Figured dimensions to be used in preference to scaling this drawing.
Do not assume - if in doubt ASK.

Lower Floor



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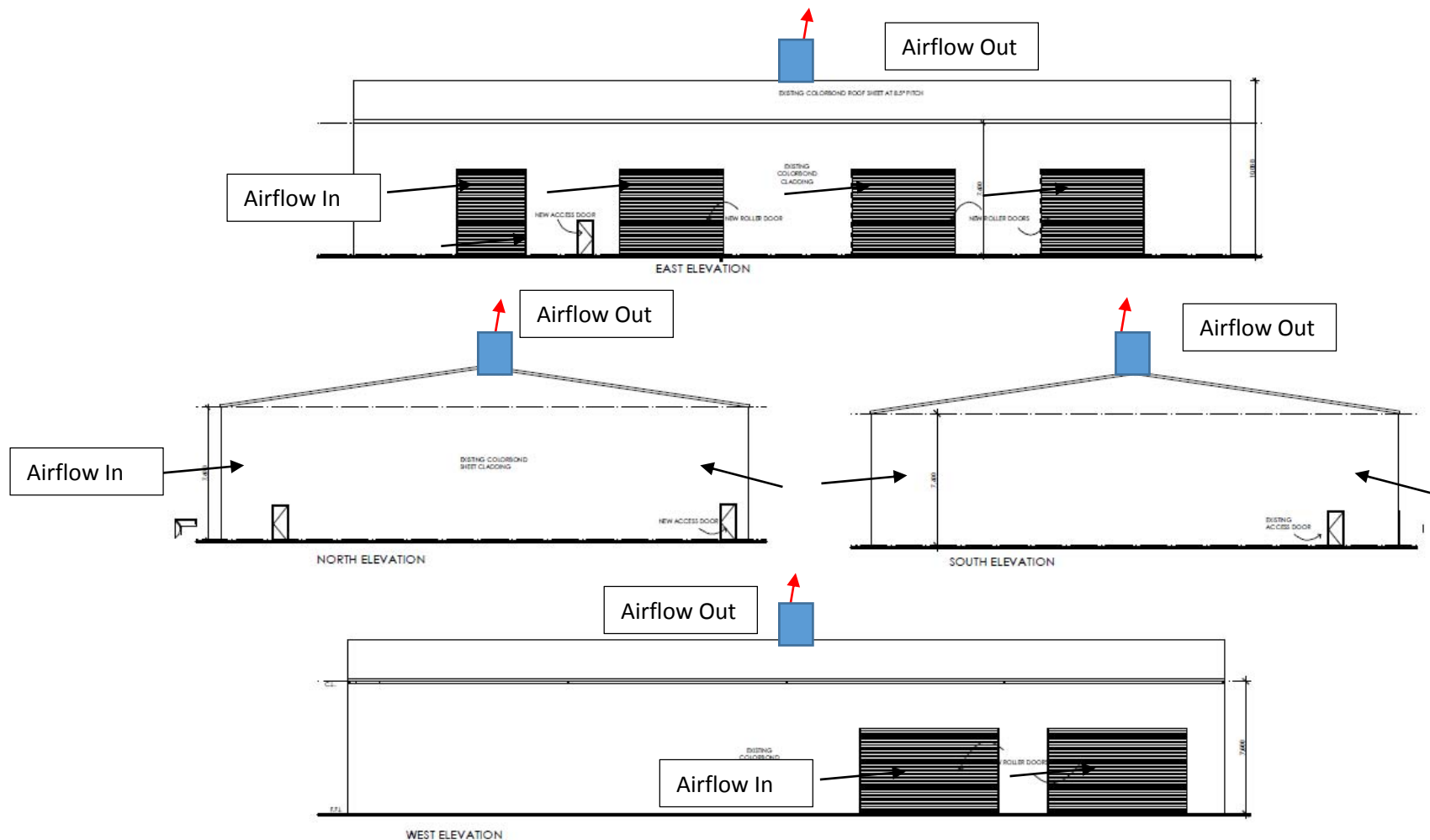
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Proposed Recycling Shed
Lot 10, No. 50
Wyllie Road
Kembla Grange

Plot Date
Fri 04 Apr 2014

Client:	BiCorp P/L
Scale:	
Design:	Warehouse2
Job No. 21407	Sheet 2 of 6



Figured dimensions to be used in preference to scaling this drawing.
 Do not assume - if in doubt ASK.

Elevations

Plot Date
 Fri 04 Apr 2014



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Proposed Recycling Shed
 Lot 10, No. 50
 Wyllie Road
 Kembla Grange

Client:	BiCorp P/L
Scale:	
Design:	Warehouse2
Job No.	21407
Sheet	3 of 6

APPENDIX B – KFW LEACHATE DESIGN PLANS

