BINGO INDUSTRIES

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# Eastern Creek Recycling Ecology Park

## Energy from Waste Management Plan – Sustainable Fuel (SF)

[DRAFT FOR REVIEW]

# Energy from Waste Management Plan

## Eastern Creek Recycling Ecology Park

| | |
|---|---|
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# 1.0 BACKGROUND

Bingo Industries Limited (Bingo) acquired the Eastern Creek Recycling Ecology Park (& Landfill) (the Facility) in February 2019 and took over the management of the Eastern Creek site in April 2019. The site was previously known as the Genesis Facility. The Facility is located at Honeycomb Drive, Eastern Creek in the central western suburbs of Sydney NSW, approximately 36 km west of the Sydney CBD, 18 km west of Parramatta and 12 km east of Penrith. The site is located wholly within the Local Government Area (LGA) of Blacktown, situated in the area known as the M7 Business Hub. The operational area is approximately 54 hectares (ha) and was a former breccia quarry that closed when it ceased extraction activities.
The existing Facility, including recycling centre/s and landfill were granted approval by the then Minister for Planning under Section 75J of the Environmental Planning and Assessment (EP&A) Act 1979 on 22 November 2009 (MP 06_0139) and commenced operation in June 2012.

The Facility operates under two Environment Protection Licences (EPL) issued by the Environment Protection Authority (EPA); EPL 20121 focusses on resource recovery and EPL13426 covers landfill operations. The Facility has approval to:

- Accept up to two million tonnes per annum (Mtpa) of C&D (construction and demolition) and C&I (commercial and industrial) waste and landfilling of the quarry void of up to 1,000,000 tpa of non-putrescible waste (including asbestos and other non-recyclable waste), excluding residual chute waste from the material processing centre;
- Crushing, grinding and separating works to process waste masonry material located in an area earmarked as the Segregated Materials Area (SMA)
- Stockpile up to 50 tonnes of waste tyres
- Stockpile up to 20,000 tonnes of green waste.

The Facility is operated by Dial-a-Dump (EC) Pty Ltd Industries (DADEC), a fully owned subsidiary of Bingo Industries Pty Ltd.

## 1.1 Energy From Waste Management Plan

This Energy from Waste Management Plan (EfWMP) addresses the typical requirements to ensure full and ongoing compliance with NSW EfW Policy. For the purpose of supporting BINGO's development application modification to for the production of Sustainable Fuels (SF) at Eastern Creek the NSW Department of Planning and Environment have requested a draft EfWMP. This will be refined in consultation with the EPA post-approval. The following table outlines the key content requirements that have been addressed within this EfWMP.

*Table 1. EfWMP contents requirements*

| DPE Requirements | Section of report where addressed |
|---|---|
| Resource recovery criteria in the EfW Policy | Section 1.1 Evidence of higher use in Waste Hierarchy |
| Compliance with Table 4 of the EfW policy | Section 4.0 Compliance with table 4 of the EfW Policy |
| Processing and storage of SF | Section 5.5 Sorting and Processing |
| Technical sampling and testing | Section 5.8 Quality Control |
| Quality Assurance | Section 5.8 Quality Control |

## 1.1 Evidence of Higher Use on Waste Hierarchy

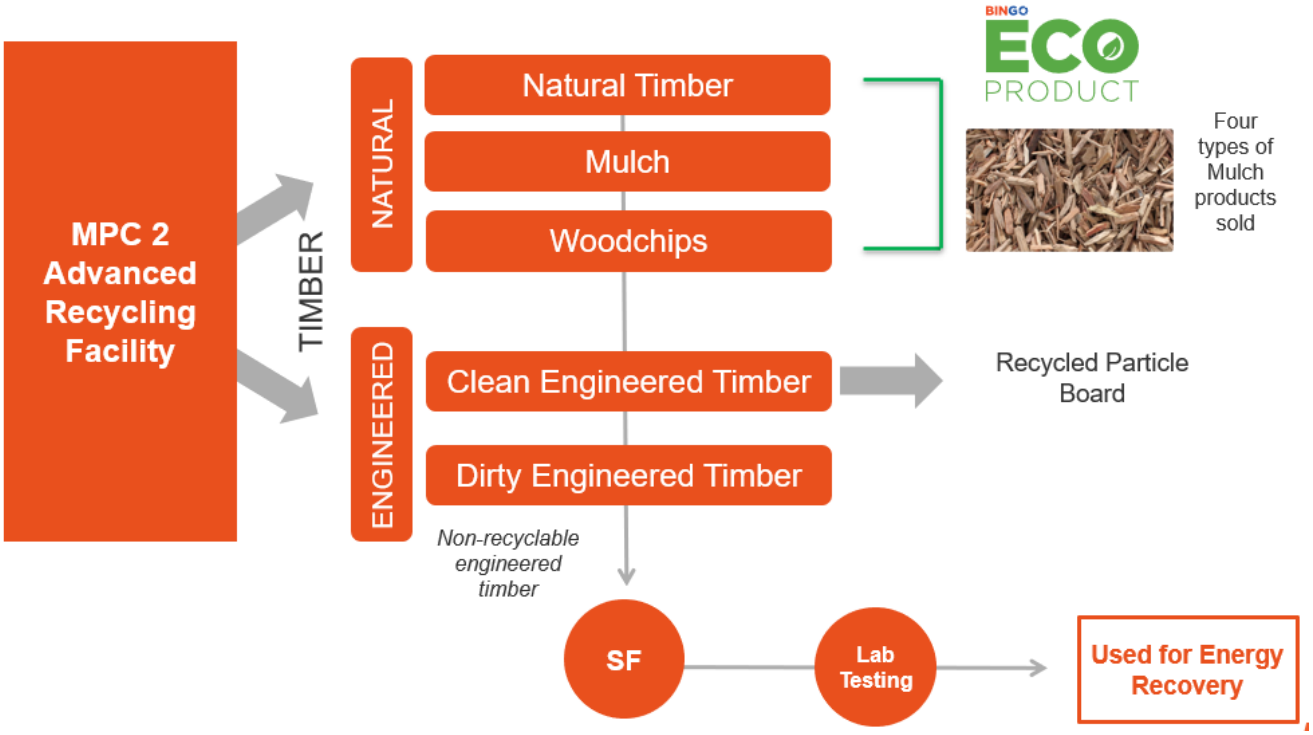
BINGO currently achieves industry leading recovery rates in excess of 80% which are independently audited annually. Arcadis' Audit Report for FY21 determined a resource recovery rate of 81%. BINGO manufacture its own range of recycled products for sale to large scale developments and infrastructure projects under its ECO Product brand. In FY22 BINGO sold over 500ktpa of ECO Product making a significant contribution to the circular economy in NSW.

The approximately 20% residual waste from processing that is unable to be recovered and sold as products is sent to BINGO's REP landfill. This residual waste stream comprises engineered timber currently landfilled. This material has been identified as ideal for use as a fuel. For the purposes of BINGO's operations, we refer to this fuel as a "Sustainable Fuel" (SF).

Timber is increasingly becoming one of BINGO's most significant waste streams, representing approximately 15% of the infeed to MPC2. Through BINGO's advanced recycling processes and state of the art technology in MPC2 BINGO recovers it natural timber for use and sale as mulch under its ECO Product brand. Clean engineered timber recovered to appropriate specification is recovered and sent offsite for use in recycled Particle Board. After this recovery process there is a residual timber stream which is unable to be sold as product and is currently sent to landfill. This material meets the specification for the higher use under the waste hierarchy, for use as SF.

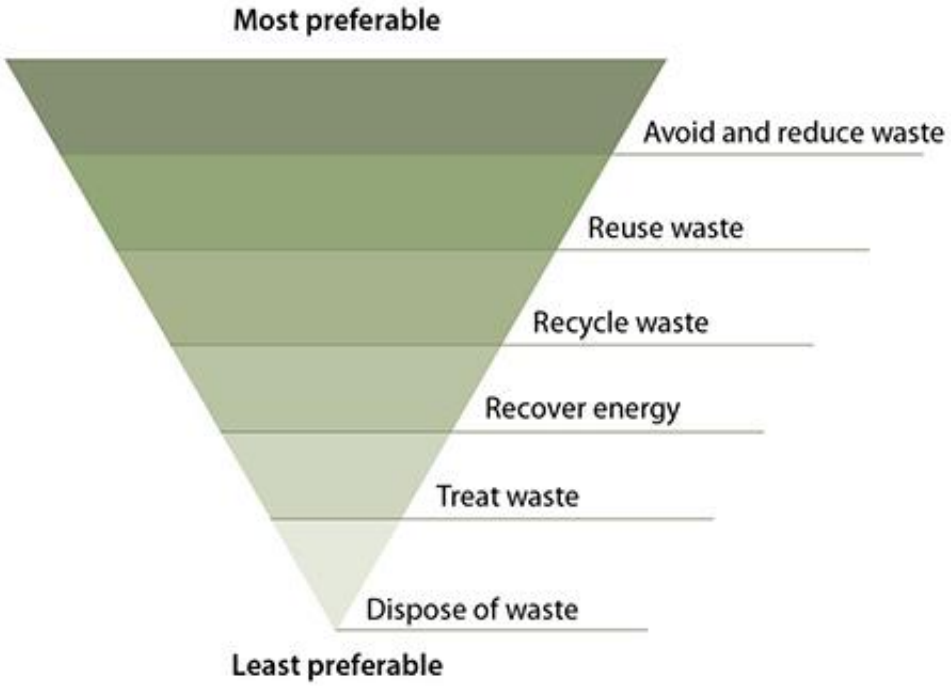
Energy recovery via the combustion of SF is higher on the waste hierarchy than disposal of waste to landfill. As BINGO's residual waste stream from timber and/or chute waste is currently sent to landfill, extracting this material for use as SF will deliver a superior environmental outcome via recycling and energy recovery in accordance with the NSW EPA's waste hierarchy below. Refer schematic below.

*Figure 1. Timber material hierarchy*




Through producing an SF product, BINGO anticipates it will be able to improve its diversion rates and as a result reduce carbon emissions associated with its landfill at REP. Resulting in economic, environmental and community benefits for the state.

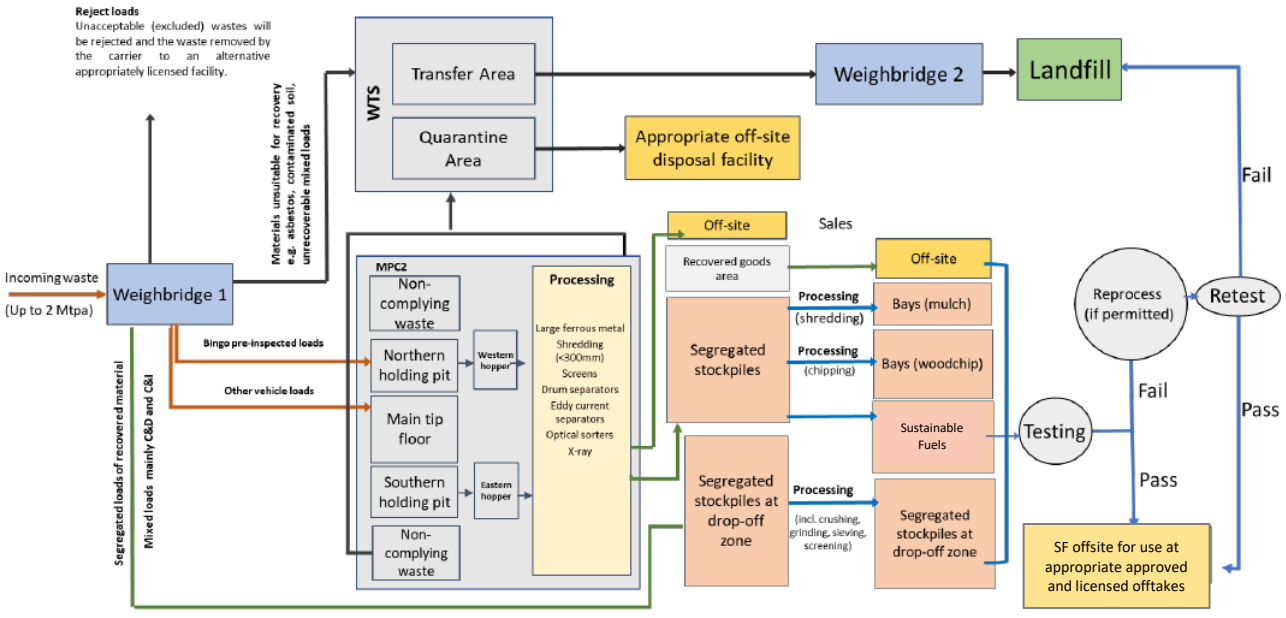
*Figure 2 Waste Hierarchy (Source: NSW EPA, 2017)*




## 2.0 SUSTAINABLE FUELS PROCESS

Figure 3 summarizes the material flow through BINGO Eastern Creek REP and MPC2 for the production of SF including the flow of material that is segregated, processed, stored and sold or disposed at the landfill.

*Figure 3 Material Flow Chart for MPC2.*



## 3.0 REGULATORY COMPLIANCE REQUIREMENTS

BINGO has summarised the regulatory compliance requirements for the manufacture of SF in the table below.

*Table 2. Regulatory Compliance Requirements and compliance approach.*

| Authority | Requirement | How Compliance is Achieved |
|---|---|---|
| NSW Department of Planning & Environment (SEARS requirements) | The NSW Department of Planning and Environment issued Secretary's environmental assessment requirements (SEARs) via email on 15 September 2022.<br><br>**Requirements for the RDF Modification:**<br>Detailed description of the proposed modification – including:<br>• *detailed justification for the proposed modification;*<br>• *maximum quantity of RDF to be produced;*<br>• *a description of how the modification integrates with existing, approved and proposed construction;*<br>• *works and operations of the site, including the conveyor system and timber picking station; and*<br>• *detailed plans of any proposed building works, supporting infrastructure (if any).*<br>• *identification of conditions proposed to be modified* | Modification application submitted which addresses the requirements under SEARS. |
| NSW Department of Planning & Environment (SEARS requirements) | The NSW Department of Planning and Environment issued Secretary's environmental assessment requirements (SEARs) via email on 15 September 2022.<br><br>**Draft EfMP:**<br>• *prepared in consultation with the EPA*<br>• *details of the procedures to ensure full and ongoing compliance with the EfW Policy*<br>• *how the technical and resource recovery criteria in the EfW Policy would be met*<br>• *testing / sampling procedures, locations and thresholds to be used to measure compliance with the technical requirements of the EfW Policy (e.g. chlorine)* | This Energy from Waste Management Plan (EFWMP) provided for review to the DPE and NSWEPA.<br><br>This EfWMP will be refined in consultation with the NSW EPA post-approval. |

| Authority | Requirement | How Compliance is Achieved |
|---|---|---|
| Boral<br><br>Appendix 1 – Specification for Solid Recovered Fuel | *The Supplier shall ensure appropriate regulatory approved procedures are developed, implemented and certified with the aim of qualifying the supply of SRF to Boral and assuring that SRF meets the following requirements:*<br>• *Iodine, pharmaceutical, pesticide and biocide products in any formulation except as a constituent of another material and at levels, which are minimised as far as is reasonably practical;*<br>• *Exclusion of radioactive, nuclear, hospital and clinical waste;*<br>• *Exclusion of explosive materials including propellants and cartridges;*<br>• *Exclusion of railway sleepers, telegraph poles, power poles and other WWDF covered in tar, creosotes and chromated copper arsenate;*<br>• *Take reasonable precaution to minimise wood covered in PVC, pentachlorophenol and avoid high concentrations of MDF and similar Melamine materials containing urea formaldehyde; and*<br>• *All wood wastes will be non-hazardous.* | Implement procedures, processes and adequate quality control measures in accordance with the EfWMP and Quality Control Plan to remove/exclude the materials listed. |
| Boral Appendix 2 – Quality Assurance for Solid Recovered Fuel | *1.1 The Supplier shall ensure that the test methods in the Table 2 – SRF Test Methods below are conducted and reported to Boral for the Parameters listed in accordance with relevant Australian and International standards and used to demonstrate compliance with the Specification:*<br>*1.2. The Supplier shall agree in writing with Boral any changes to the test methods and procedures for testing and sampling SRF as specified in this Appendix 2 – Quality Assurance for Solid Recovered Fuel.*<br>*1.3. The Supplier shall ensure that testing of all parameters in Table 2 – SRF Test Methods is undertaken according to the requirements and by a laboratory certified to NATA for the test procedures specified above. This requirement does not apply to samples tested as per Paragraph 2.5 and 2.6 below.* | Establishment of an on-site laboratory for sample storage and to perform daily testing for: calorific value, chlorine, particle size and moisture, and weekly testing for particle size testing priorto commencement of operation.<br><br>HRL Technology (HRL) engaged to perform all external testing requirements. |

| Authority | Requirement | How Compliance is Achieved |
|---|---|---|
| | *2.3 The sampling will be conducted in accordance with EN14780:2011 "Solid Biofuels – Methods for sample preparation."*<br>*2.4 The Supplier must undertake a routine sampling process as follows;*<br>*(a) Every month, two (2) Composite Samples (one primary and one duplicate sample) will be collected from the Goods prior to despatch.*<br>*(b) Sample will be taken from a belt conveyor, falling stream or truck.*<br>*(c) The monthly samples must be taken from a batch, truckload or stockpile that has not been previously sampled, for the purpose of assessing compliance with the Appendix 1 – Specification for Solid Recovered Fuel. Every Composite Samples will be sealed and labelled. All samples collected during a month will be sent to an independent NATA accredited laboratory. The samples will be prepared with consideration for the guidance provided in EN14780:2011 "Biofuels – Methods for sample preparation". The primary Composite Sample will be tested for all parameters specified in Appendix 2 – Table 2 SRF Test Methods using the corresponding test methods (or equivalent as agreed with Boral). The duplicate Composite Sample will l be retained as a reference for a period of three (3) months stored in a correctly labelled and suitably sealed container.*<br>*2.5 The Supplier shall ensure that the particle size analysis test is carried out at least weekly using a representative composite sample made up from the samples taken during that week and shall provide the test result to Boral by the next working day.*<br>*2.6 The Supplier shall conduct daily monitoring for CV, chlorine and moisture prior to delivery to Boral. The results from this monitoring will be available to Boral upon request and must be maintained in accordance with the Supplier's agreed QA/QC system.*<br>*2.7 The Supplier shall agree with Boral on the details for final procedures of sampling and testing SRF as part of Supplier's QA/QC system.* | |

# 4.0 DESIGN COMPLIANCE WITH TABLE 4 OF THE NSW EFW POLICY

BINGO's advanced processing facility, MPC2, at Eastern Creek REP has been designed to process mixed inert C&D and C&I material. Based on current operations BINGO estimates that the material streams through MPC2 are comprised of approximately:

- 10-20% mixed inert commercial and industrial mixed general solid waste; and
- 80-90% mixed construction & demolition waste from residential, infrastructure and commercial construction.

Notwithstanding Table 4 of the NSW EfW policy provides controls on the types of wastes that are suitable for utilisation as feedstock in energy recovery facilities which is expected to extend to facilities that produce fuel for the purposes of energy recovery, noting:

*"Energy recovery facilities may only receive feedstock from waste processing facilities or collection systems that meet the criteria outlined in Table 4."*

BINGO's Eastern Creek site achieved an industry leading resource recovery performance of 81% in FY21 and meets the definition of a "processing facility" under the NSW EfW Policy[1]. This level of diversion would be expected to increase through processing residual timber to support production of an SF. The key criterion prescribed in Table 4 for mixed waste applicable to the BINGO EC REP operations are detailed in Table 3 below.

*Table 3. NSW Energy from Waste Policy Statement – Table 4 EfW Policy Excerpt*

| Waste Stream | Processing Facility | % Residual Waste Allowed for Energy Recovery |
|---|---|---|
| Mixed commercial and industrial waste (C&I) | Facility processing mixed C&I waste | Up to 50% by weight of the waste stream received at a processing facility |
| | Facility processing mixed C&I waste where a business has separate collection systems for all relevant waste streams | No limit by weight of the waste stream received at a processing facility |
| Mixed construction and demolition waste (C&D) | Facility processing mixed C&D waste | Up to 25% by weight of the waste stream received at a processing facility |

Based on the above BINGO proposes to adopt a conservative approach the lower C&D benchmark and limit SF production to the higher resource recovery standard of 25% of the weight of mixed C&D waste received at MPC2 as opposed to adopting the higher thresholds based on weighted averages for C&I waste also processed by MPC2. BINGO's process and manufacture of SF is consistent with the requirements set out in Table 4 of the NSW Energy from Waste Policy.

## 4.1 Construction & Demolition SF Volume

Under the NSW Energy from Waste policy, the permitted volume of SF is 25% of the waste stream by volume. In accordance with this specification the table below outlines the tonnages based on the tonnages through Eastern Creek Recycling under its existing licence.

[1] Facility undertaking genuine resource recovery operations, producing separate output material streams for reuse or recovery. Facility may be separate to, or on the same site as, an energy from waste facility.

*Table. 4 Tonnage permitted based on tonnage throughput at Eastern Creek Recycling.*

| | Mixed C&D 25% by weight of the waste stream | Eastern Creek Recycling throughput (tonnes per annum)[2] | Available volume for SF (tonnes per annum) |
|---|---|---|---|
| Eastern Creek Recycling | 25% | 1,000,000 | 250,000 |

*2. Based on current licence and consent BINGO can recycling up to 1mpta. Development modification currently underway to increase throughput limit. The above tonnages of SF will increase in line with the changes to the licence.*

## 5.0 MANUFACTURING SF

The below process steps set out how the activity is conducted, in a manner that ensures that all regulatory and customer specifications are met, whilst ensuring the health and safety of our people and protection of the environment. For further information regarding processes and procedures for SF material please refer to the Quality Control Plan (QCP_SF Product 1).

### 5.1 Permissible waste

The Facility has the capacity to receive up to 2 Mtpa general solid waste (non-putrescible) types, as as approved under development consent MP06_139 and as modified. Including:

- Construction and demolition (C&D) waste
- Commercial and industrial (C&I) waste.
- Waste streams complying with acceptable waste for general solid waste (non-putrescible) facilities and assessed to be inert waste or solid waste following the technical assessment procedure outlined in Part 1 of the Waste Classification Guidelines (NSW EPA, 2014).
- Green waste.

Materials received will comprise both segregated materials and mixed materials, which will include but not be limited to, brick, concrete, virgin excavated natural material (VENM), terracotta roof tiles, soils, green waste, timber, metals, paper, and plastics. Materials incapable of economic separation or later sale, or which is the residue from recycling processes, are taken to the landfill for disposal.

Materials suitable for recycling include, but not be limited to sand, soil concrete, brick and tile and also specified materials e.g. metals (including steel), plastics, paper, timber, vegetation, carpet and mattresses etc. Materials recycled for sale will meet specifications prescribed by the POEO Act and the relevant Resource Recovery Orders and Exemptions for aggregate, soils, fines, mulch and urban wood waste or the Boral SWDF specification.

### 5.2 Weighbridge

Waste material is delivered to the site by a combination of light, medium and heavy vehicles, with loads typically varying from about 1 tonne (t) to 40 t in weight. The vehicles will access the Facility via Kangaroo Avenue.

Preliminary waste acceptance and visual screening is undertaken at the weighbridge. All incoming vehicles and wastes are directed through the waste reception area and the loads inspected by the weighbridge operator via cameras (CCTV). The weighbridge is manned by a suitably trained operator. Waste is weighed on the weighbridge in gross tonnes, or in the case of the small vehicles the weight is calculated using published weight factors in accordance with the NSW EPA method.

The vehicles proceed beyond the weighbridge area along the main haul road where they are directed by appropriate signage for unloading.

Trained traffic controllers located at various locations throughout the facility, direct vehicles to the correct location for tipping and loading after further determining the load contents or purchase. They assist in the determination of load weights and contents and will redirect the vehicles if required to the appropriate area i.e. segregated stockpiles, MPC, WTS and landfill. The vehicles are weighed out over the (exit) weighbridge when exiting the Facility. Any unacceptable (excluded) wastes are rejected.

The weighbridge will be operated and maintained in accordance with the procedure Weighbridge Operation and Maintenance (SOP-BDR005). If the weighbridge is not operational the Procedure for Converting Waste to Tonnes when Weighbridge Not Operational (SOP-BDR003) will be followed.

## 5.3 Weighbridge Waste Recording

The weighbridge load cell is linked to a computerised system that provides accurate records of the weight of incoming wastes on a vehicle-by-vehicle basis. The system is capable of being operated by a single user within the weighbridge office and data obtained from the site can be transferred directly to Bingo's Head Office. If loads are overweight, they will be managed in accordance with the Overweight Load Procedure (SOP-BDR002).

The weighbridge operator is responsible for the overall management and maintenance of weighbridge systems and the related preparation of management reports. This includes the detail of materials classified as non-recyclable wastes which enter the site for the purposes of landfilling. This information will be provided to the NSW EPA in the form of returns under the waste 'contributions' levy (S88 of POEO Act).

The weighbridge operator is responsible for recording all details required by law to be kept by a waste facility including details of all loads of waste accepted at and transported from the Facility.

## 5.4 Management of non-conforming waste at tip floor (QC Point 2 & 3)

Vehicles are checked for non-conforming waste (NCW), in staging area, prior to tipping. If NCW is identified loads are redirected to landfill (waste permitting) or rejected from site. Vehicles are not permitted to leave the tip floor area until they have been checked and cleared for NCW post tipping. If NCW's are identified, they will be immediately reloaded into the incoming vehicle and directed to return to the weighbridge. Bingo will record details of the waste and carrier and communicate this information to the weighbridge office and then to the NSW EPA under the provisions of the POEO Act. This will be done in accordance with the procedure Visual Inspection and Management of Non-Conforming Waste (SOP-BDR007) and Process for Non-Conforming Waste (SOP-BDR011).

If tipping has occurred then the operator will, segregate and isolate and/or remove any NCW and transport the wastes to a designated quarantine area (within the MPC) or other suitable location, where the wastes will be securely stored until off-site disposal arrangements are made by the original carrier.

If the carrier or owner of the waste does not make arrangements for the waste to be collected Bingo will make arrangements for the waste to be tested and disposed at an appropriate licensed facility and the owner or carrier of the wastes will be billed for the costs involved.

Notification of NCW and Reload/ Rejected Load forms will be completed in accordance with Bingo's reject loads procedure, Visual Inspection and Management of Non-Conforming Waste (SOP-BDR007) and Process for Non-Conforming Waste (SOP-BDR011), Reject Load Certificate (SF055) and Notification of Non-Complying waste and Rejected Reload Rejected Load (SF106) filed in the facility Reject Load Register. A formal advice that the load contains materials that cannot be accepted at the Facility will be provided to the Customer (Driver).

BINGO has an offtake agreement with a PVC recycler which incentivises BINGO to remove this waste stream at all transfer sites and at EC from the tip floor prior to processing in MPC2, reducing chlorine content in the SF product stream.

## 5.5 Sorting and Processing

### 5.5.1 Mechanical Waste Processing (MPC2 QC Point 4)

Material is processed in MPC2 Plant and subject to mechanical sorting through screens, magnets, blowers, air separators, drum separators and optical sorters. The material is sorted at the different sorting procedures, based on their properties such as, size, density, gravity, magnetism, electric conductivity, or combinations thereof. MPC2 density separators and MPC2 optical sorters screen PVC away from Boral SF stream.

The SF feedstock will consist of the dry calorific fractions derived from the waste which usually contains plastics, timber, paper, cardboard, rubber and textiles. These materials will be separated on-site, shredded, stored loose prior to being transported as feedstock to a third-party user. This process ensures the SF generated on-site does not consist of recyclable or hazardous materials.

### 5.5.2 Mixed Engineered Picking Line (QC Point 5)

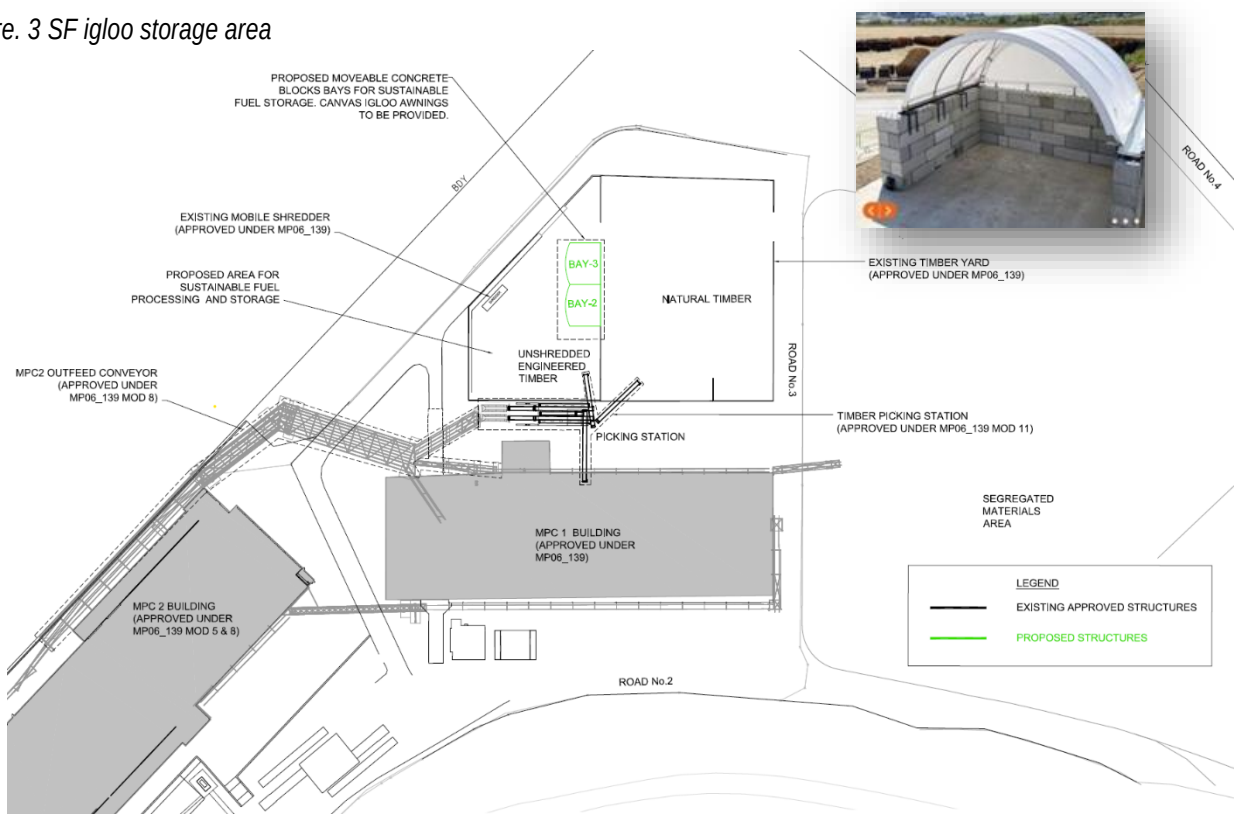
Post processing through MPC2 plant, material passes through Mixed Engineered Picking Line, located in timber Yard. Trained quality controllers remove any material that is not SRF as per Boral SF specification. Unacceptable wood products such as preservative-treated and coated wood residues (e.g. Copper Chrome Arsenate treated timbers) and heavy plastics (e.g PVCs) are removed prior to stockpiling in the area and are not stored in the timber yard.

## 5.6 Waste Storage – Segregated Stockpiles

As required by Schedule 3 Condition 55 of the Project Approval, all stockpiles will be maintained to a level below the height of the amenity berms (<10 m) to minimise visual impacts to surrounding areas. Stockpiles will be managed in accordance with the relevant site operational plans. Stockpiles of different waste types are separated by a minimum distance of 3 metres at the base of the stockpile.

SRF material is conveyed and stockpiled in Timber Yard where it is periodically inspected by QC5 Leading Hand and Timber Yard Manager. Processed SF awaiting testing / validation will be stored in designated concrete block bays in the Timber processing yard, under an igloo awning cover as proposed under Mod 13. SF igloo storage area (Figure 3) is labelled and signposted in the Timber Yard.

*Figure. 3 SF igloo storage area*




## 5.7 SF Offtakes

BINGO may consider additional offtakes to appropriately approved and licenced facilities for its increasing volume of SF produced including export opportunities as they arise. To ensure future receival facilities of SF are permitted to receive the material, BINGO will ensure the lawful place requirements outlined in the Energy from Waste Policy are met.

The type of SWDF that is produced at BINGO's Eastern Creek REP is a SF. The term SF is defined in the Berrima Cement Works Development Consent No. 401-11-2002-I (Cement Works Development Consent) to mean:

*Sustainable Fuel - A fuel produced by processing the residues of waste by sorting and shredding (particle size reduction), dehydrating (moisture removal), and removal of recyclable and hazardous materials.*

BINGO has met the pre-qualification requirements set out in the approved Quality Assurance and Control Procedure for Receipt of Solid Waste Derived Fuels, outlined in **Attachment A**: Specification for Solid Recovered Fuel.

## 5.8 Quality Control

### 5.8.1 On-Site Laboratory and Sampling

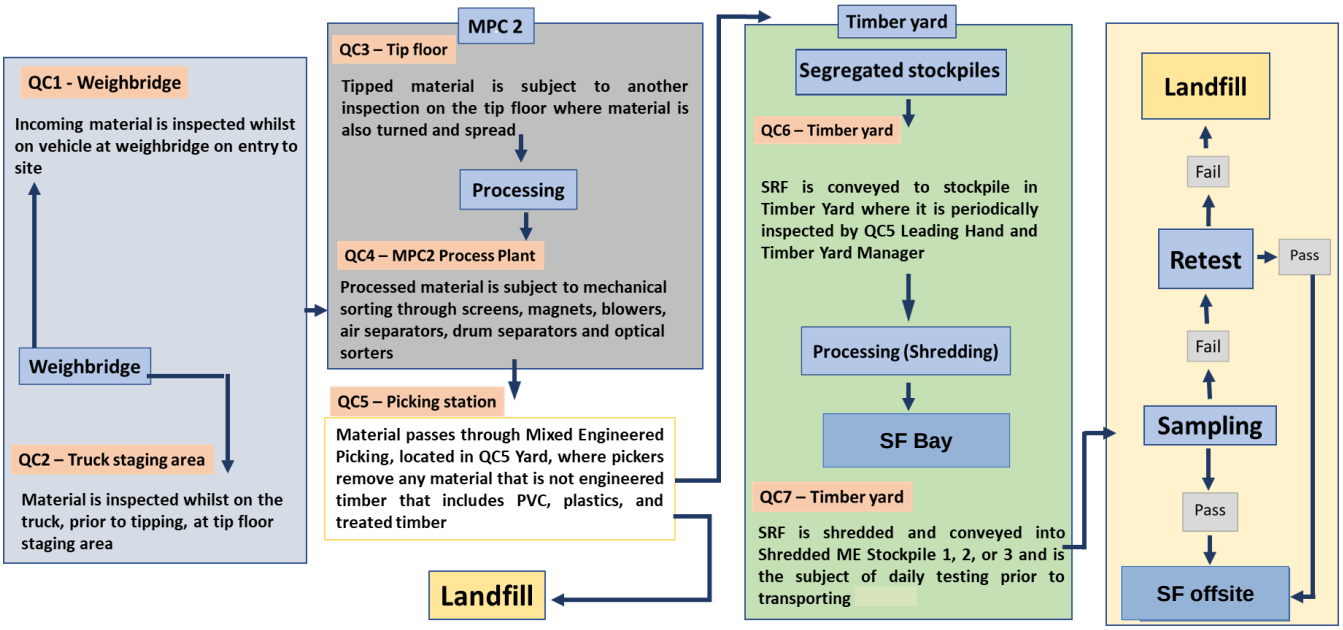
Sampling shall be conducted in accordance with this Sampling Plan and EN14780:2011 "Solid Biofuels – Methods for sample preparation" to ensure that the samples represent, as far as practicable, the true nature of the lot or the section of the main body of material from which they were drawn. The procedures are Eastern Creek Recycling Ecology Park '*QUALITY CONTROL PLAN – BORAL - PRODUCT 1 SF'* designed to achieve this objective, with measures in place to ensure traceability and integrity of the samples throughout the process. The Sampling Plan at Appendix D of the QCP sets out the sampling methodology. Mixed SRF is shredded and conveyed into Shredded Mixed Engineer Stockpile 1, 2, or 3 and is the

subject of the requirement testing (daily, weekly, and monthly). If the test results meet the RFD specification the material will sent offsite for use.

BINGO intends to establish an on-site laboratory to perform routine daily testing on its SF material. key parameters to comply with Boral's Specification for Solid Recovered Fuel (SRF) (refer to **Attachment A**: Specification for Solid Recovered Fuel). Given the nature of the equipment layout and the variability in incoming waste streams, BINGO will collect composite samples from the shredded SF stockpile at the end of the processing line. All samples will be prepared with consideration for the guidance provided in EN14780:2017 "Solid Biofuels – Sample Preparation" as detailed in Boral's specifications.

BINGO consulted NATA accredited lab HRL regarding appropriate storage requirements for SF samples. BINGO will place samples for on-site testing in poly bags 600mm (W) X 870mm (L) with 100uM thickness, or equivalent non-porous plastic bags. If samples are not tested immediately, they will be double bagged to preserve moisture integrity and stored within the on-site laboratory prior to testing. All samples will be labelled at the time of sampling.

*Figure 4. Quality Control Process Map*




### 5.8.2 Material Testing

In line with the Quality Control Plan and Specification, daily and weekly analysis while be undertaken on-site at Eastern Creek REP. Monthly testing will be undertaken by a NATA accredited lab.

### Bingo Laboratory

| Responsible | Qualifications |
|---|---|
| Fezeh Lotfi (Environmental Manager) | PhD of Environmental Engineering<br>Over 10 years sampling and laboratory testing experience |

### Monthly analysis

- HRL Laboratory, HRL (HRL is the only NATA accredited laboratory for the approved methods of analysis of Biomass and Refuse Derived Fuel (SF) in Australia)– Routine analysis

### 5.8.3 Laboratory Equipment

BINGO intends to fit-out its on-site laboratory with the below equipment to facilitate the quality control program for daily testing of SF material against Specification. The equipment is detailed in Table 5 below.

*Table 5. Eastern Creek Key Laboratory Equipment*

| Supplier | Equipment | Purpose |
|---|---|---|
| Leco | Leco AC500 Calorimeter & Scales | Measuring calorific value |
| Retsch | Retsch cutting mill | Shred sample for testing |
| Shimadzu | Shimadzu UV-1900 | Chlorine detection |
| Lab direct | Laboratory oven | Moisture content |
| Matcivtest | Shaker & sieves | Grading product |

All relevant equipment suppliers will provide on-site training to personnel who will be responsible for the daily and weekly product testing regimes. HRL will also provide on-site training for use of the equipment and testing procedures for BINGO personnel as part of the commissioning of the on-site laboratory.

## 5.9 Records and Document Management

Results of laboratory testing are to be uploaded to Bingos ESDAT system. ESDAT is an environmental data warehouse facilitating direct reporting by the laboratory to Bingo. The system is enabled with alarms when threshold values are triggered.

Bingo will work with relevant laboratories to establish reporting via ESDAT (ESCIS software). Sampling and inspection record will be established, recorded and retained in Intelex (Figure 4).

# 6.0 MEASURING NSW ENERGY FROM WASTE POLICY COMPLIANCE DURING OPERATIONS

To ensure that the design compliance with the NSW Energy form Waste Policy is achieved whilst in operation, the following formula will be used to determine the % of input tonnes that can be converted into SF on a monthly basis.

Permitted SF Production (%) = Up to 25% of total tonnes into MPC2.

### 6.1 EPA Reporting

Bingo will use the above methodology to calculate a total allowable SF quantity for manufacture and provide the measured tonnes produced for submission to the EPA on a quarterly basis to ensure compliance with the NSW EfW Policy resource recovery criteria.

The EPA will also receive monthly summaries of the SF produced through Bingo's submission of the Waste Contribution Monthly Report (WCMR) via the Waste and Resource Reporting Portal (WARRP) to track the quantities of SF supplied.

## 7.0 REFERENCES


- New South Wales Energy from Waste Policy Statement: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/21p2938-energy-from-waste-policy-statement.pdf
- New South Wales Environment Protection Authority – page 6 2014-21 Waste Strategy


## 8.0 ATTACHMENTS

- APPENDIX A: Specification for Solid Recovered Fuel

# Appendix 1 – Specification for Solid Recovered Fuel

## 1. Specification

The following specification forms the basis for which SRF is to be supplied to Boral. These details are subject to change to ensure compliance to regulatory requirements and the achievement of the optimum outcomes in the processing and use of SRF as agreed between the Parties.

1.1. The Supplier is responsible for sampling and testing SRF in accordance with the requirements of this Agreement.

1.2. The Supplier shall ensure appropriate regulatory approved procedures are developed, implemented and certified with the aim of qualifying the supply of SRF to Boral and assuring that SRF meets the following requirements:

- Iodine, pharmaceutical, pesticide and biocide products in any formulation except as a constituent of another material and at levels, which are minimised as far as is reasonably practical;
- Exclusion of radioactive, nuclear, hospital and clinical waste;
- Exclusion of explosive materials including propellants and cartridges;
- Exclusion of railway sleepers, telegraph poles, power poles and other WWDF covered in tar, creosotes and chromated copper arsenate;
- Take reasonable precaution to minimise wood covered in PVC, pentachlorophenol and avoid high concentrations of MDF and similar Melamine materials containing urea formaldehyde; and
- All wood wastes will be non-hazardous.

1.3. The Supplier shall ensure that the results for each monthly composite sample of SRF delivered under this agreement as sampled in accordance with Appendix 2, Paragraph 2 - Sampling and tested in accordance with Appendix 2, Paragraph 1 – SRF Test Methods complies with the Specification in Table 1 – SRF Specification

1.4. The Supplier must ensure that any testing of samples required under this agreement is undertaken by analytical laboratories accredited by the National Association of testing Authorities (***NATA***) or equivalent for such testing.

**Table 1. SRF Specification**

| **Parameter**[1] | **Specification** |
|---|---|
| Gross Calorific Value (MJ/kg) | ⩾15.0 |
| Ash | ⩽15.0% m/m |
| Moisture (as $H_2O$) | ⩽20.0% m/m |
| Chlorine (as Cl) | ⩽0.12% m/m |
| Total Fluorine, Bromine, Iodine (as F, Br, I) | ⩽0.2% m/m |

| Parameter[1] | Specification |
|---|---|
| Sulphur (as S) | ⩽1.0% m/m |
| Particle size | ⩽ 50 mm in any direction with >95% passing 35mm. No dimension to be >50mm. |
| $K_2O$ (%) | 1.0 |
| $Na_2O$ (%) | 0.5 |
| Mercury (Hg) (mg/kg) | ⩽1.2 |
| Cadmium (Cd) (mg/kg) | ⩽20 |
| Thallium (Tl) (mg/kg) | ⩽20 |
| Total Group II metals (mg/kg)<br>Cadmium (Cd) + Thallium (Tl) | ⩽30 |
| Copper (mg/kg) | ⩽500 |
| Lead (mg/kg) | ⩽1000 |
| Total Group III metals (mg/kg)<br>Antimony (Sb) + Arsenic (As) + Cobalt (Co) + Copper (Cu) + Chromium (Cr) + Lead (Pb) + Manganese (Mn) + Nickel (Ni) + Vanadium (V) | ⩽3000 |
| PCB's (Polychlorinated biphenyls) | <10mg/kg |
| PCP's (Phencyclidines) | <100mg/kg |

*[1]All parameters to be reported on an as received basis*

1.5. During the OPP for Product 1 SRF, the Supplier will use best endeavours that the Goods through the monthly composite sample will meet the Table 1 chlorine specification and will be permitted to exceed this chlorine specification from time to time during this OPP but at all times not exceed a chlorine specification ⩽ 0.15% m/m.

At all times, the Supplier acknowledges and agrees it will minimise the moisture content of the Goods.

The Supplier is permitted for just two (2) of the gross calorific value or moisture results in any of the twelve (12) consecutive monthly composite samples to be outside the values specified in Table 1. SRF Specification but any such result must comply with the following limits:

- Gross calorific value ⩾ 12.0 MJ/kg
- Moisture (as H20) ⩽ 25.0% (m/m)

1.6. In the event that ongoing non-compliance or inconsistency occurs throughout the duration of this agreement, the parties agree to use best endeavours to work together to resolve the inconsistencies and reduce variability in the quality of the Goods delivered.

# Appendix 2 – Quality Assurance for Solid Recovered Fuel

The following information forms the basis for which testing, sampling and reporting of SRF is to be conducted for products supplied to Boral. These details are subject to change to ensure compliance to regulatory requirements and the achievement of the optimum outcomes in the processing and use of SRF as agreed between the Parties.

## 1. Test Methods

1.1. The Supplier shall ensure that the test methods in the Table 2 – SRF Test Methods below are conducted and reported to Boral for the Parameters listed in accordance with relevant Australian and International standards and used to demonstrate compliance with the Specification:

**Table 2 – SRF Test Methods**

| Parameter | Test Method |
|---|---|
| Gross and Net Calorific Value | EN 15400:2011 |
| Moisture content | EN 15414:2010 |
| Chlorine | EN 15408:2011 |
| Sulphur | EN 15408:2011 |
| Nitrogen | EN 15407:2011 |
| Carbon Content | EN 15407:2011 |
| Biomass | EN 15440:2011 |
| Ash | EN 15403:2011 |
| $K_2O$, $Na_2O$ | EN 15410:2011 |
| Particle Size | EN 15412-1:2011 |
| Metals – Mercury, cadmium, thallium, copper, lead, Total Group II metals, Total Group III metals including Selenium (Se), Tin (Sn) and Beryllium (Be) | EN 15411:2011 |

1.2. The Supplier shall agree in writing with Boral any changes to the test methods and procedures for testing and sampling SRF as specified in this Appendix 2 – Quality Assurance for Solid Recovered Fuel.

1.3. The Supplier shall ensure that testing of all parameters in Table 2 – SRF Test Methods is undertaken according to the requirements and by a laboratory certified to NATA for the test procedures specified above. This requirement does not apply to samples tested as per Paragraph 2.5 and 2.6 below.

1.4. The Supplier acknowledges that Boral have the right to perform visual inspection of the material being delivered as well as monitor samples of that material at any time prior to acceptance of the Goods.

## 2. Sampling

2.1 Prior to the commencement of the OPP the Supplier will be required to conduct sampling of each type of Goods to determine the characterisation of the fuel for composition and variability to ensure conformance with the Appendix 1 – Specification for Solid Recovered Fuel.

2.2 Twenty (20) Composite Samples will be collected and analysed for all parameters specified in Appendix 1 – Table 1 – SRF Specification to establish a baseline (characterisation) data set. A ***Composite Sample*** is defined as a sample that combines four (4) discrete sub-samples of equal size into a single sample for the purpose of analysis.

2.3 The sampling will be conducted in accordance with EN14780:2011 *"Solid Biofuels – Methods for sample preparation."*

2.4 The Supplier must undertake a routine sampling process as follows;

(a) Every month, two (2) Composite Samples (one primary and one duplicate sample) will be collected from the Goods prior to despatch.

(b) Sample will be taken from a belt conveyor, falling stream or truck.

(c) The monthly samples must be taken from a batch, truckload or stockpile that has not been previously sampled, for the purpose of assessing compliance with the Appendix 1 – Specification for Solid Recovered Fuel. Every Composite Samples will be sealed and labelled. All samples collected during a month will be sent to an independent NATA accredited laboratory. The samples will be prepared with consideration for the guidance provided in EN14780:2011 "Biofuels – Methods for sample preparation". The primary Composite Sample will be tested for all parameters specified in Appendix 2 – Table 2 SRF Test Methods using the corresponding test methods (or equivalent as agreed with Boral). The duplicate Composite Sample will l be retained as a reference for a period of three (3) months stored in a correctly labelled and suitably sealed container.

2.5 The Supplier shall ensure that the particle size analysis test is carried out at least weekly using a representative composite sample made up from the samples taken during that week and shall provide the test result to Boral by the next working day.

2.6 The Supplier shall conduct daily monitoring for CV, chlorine and moisture prior to delivery to Boral. The results from this monitoring will be available to Boral upon request and must be maintained in accordance with the Supplier's agreed QA/QC system.

2.7 The Supplier shall agree with Boral on the details for final procedures of sampling and testing SRF as part of Supplier's QA/QC system.

## 3. Reporting

3.1. The Supplier shall ensure that tests for all parameters in Appendix 1 Table 1 – SRF Specification are carried out on each monthly composite sample of SRF using the test methods define in Paragraph 1 – SRF Test Methods. The Supplier shall provide Boral in writing with the individual monthly composite sample results within 21 days of the collection of the last sample within the month.

3.2. The Supplier shall provide written notification to Boral of any exceedances of the limits provided in Appendix 1 - Table 1 as soon as reasonably practicable. If an exceedance is

reported for any material that has already been received by Boral from the Supplier, Boral will review the causes of the exceedance with the Supplier with a view to the Supplier making changes to prevent further exceedances.

3.3. Any dispute as to the quality or specification of the SRF which cannot be amicably resolved between the Supplier and Boral within 60 days either party may refer such dispute for determination by an Expert agreed between the parties. Such person shall act as expert and not arbitrator and make such determination within 20 days of his appointment and his determination shall be final and binding on both parties. The expert shall determine the issue of costs, which shall also bind the parties.

# Appendix 3 – Operational Requirements

The below Operational Requirements will be reviewed in accordance with the timeframes agreed in Part B Paragraph 9 - Operational Management Meetings.

At the commencement of the Agreement, any items without agreed specifications listed will be confirmed between the parties for the commencement of the OPP. Throughout the OPP and beyond, these operational requirements can be reviewed for compliance and suitability to the requirements of Boral. Where necessary, the below agreed specifications can be amended, as agreed between the parties, to reflect the optimal operational requirements of the operation during the OPP and beyond.

Any changes agreed in the below format will constitute an amendment to the specifications in the Agreement and will be applicable unless revised and agreed between the parties.

**Operational Management Meeting**

| | | | |
|---|---|---|---|
| **Date:** | | | |
| **Location:** | | | |
| **Supplier Name:** | | | |
| **Attendees:** | | | |
| | | | |
| | | | |
| | | | |
| **Status:** | On Track | At Risk | Non-compliant |

| Item | Criteria | Agreed Specification | Status Supplier | Status Boral | Comments or amendments agreed to specifications. |
|---|---|---|---|---|---|
| **1** | **Delivery and Packaging as per Part B paragraph 1.3** | | | | |
| 1.1 | Delivery frequency and timing SRF | | | | |
| 1.2 | Packaging compliance | Loose delivered | | | |
| 1.3 | Delays | Nil | | | |
| **2** | **Product volume as per Part B paragraph 1.1** | | | | |
| 2.1 | Quantity delivered as per weighbridge data SRF per month | Tonnes | | | |
| 2.2 | DIFOT | 100% | | | |

| Item | Criteria | Agreed Specification | Status Supplier | Status Boral | Comments or amendments agreed to specifications. |
|---|---|---|---|---|---|
| **3** | **Invoicing and Payment** | | | | |
| 3.1 | Invoicing on time | 100% | O | O | |
| 3.2 | PIFOT | 30 days EOM | O | O | |
| **4** | **Testing Methods** | | | | |
| 4.1 | Gross and Net Calorific Value | EN 15400:2011 | O | O | |
| 4.2 | Moisture content | EN 15414:2010 | O | O | |
| 4.3 | Chlorine | EN 15408:2011 | O | O | |
| 4.4 | Sulphur | EN 15408:2011 | O | O | |
| 4.5 | Nitrogen | EN 15407:2011 | O | O | |
| 4.6 | Carbon Content | EN 15407:2011 | O | O | |
| 4.7 | Biomass | EN 15440:2011 | O | O | |
| 4.8 | Ash | EN 15403:2011 | O | O | |
| 4.9 | $K_2O$, $Na_2O$ | EN 15410:2011 | O | O | |
| 4.10 | Particle Size | EN 15412-1:2011 | O | O | |
| 4.11 | Metals – Mercury, cadmium, thallium, copper, lead, Total Group II metals, Total Group III metals including Selenium (Se), Tin (Sn) and Beryllium (Be) | EN 15411:2011 | O | O | |
| **5** | **Sampling – SRF -** In accordance with EN14780:2011 *"Solid Biofuels – Methods for sample preparation."* | | | | |

| Item | Criteria | Agreed Specification | Status Supplier | Status Boral | Comments or amendments agreed to specifications. |
|---|---|---|---|---|---|
| 5.1 | Frequency | On a monthly basis | O | O | |
| 5.2 | Batch size | Two (2) Composite Samples | O | O | |
| 5.3 | Method | Two Composite Samples as per EN14780:2011 *"Solid Biofuels – Methods for sample preparation"*.<br>The primary Composite Sample will be tested for all parameters<br>The duplicate Composite Sample will be retained as reference for 3 months. | O | O | |
| 5.4 | Daily Monitoring | CV<br>Chlorine<br>Moisture | O | O | |
| **6** | **Specification – SRF as per Appendix 1** | | | | |
| 6.1 | Gross Calorific Value (MJ/kg) | ⩾15.0 | O | O | |
| 6.2 | Ash | ⩽15.0% m/m | O | O | |
| 6.3 | Moisture (as $H_2O$) | ⩽15.0% m/m | O | O | |
| 6.4 | Chlorine (as Cl) | ⩽0.05% m/m | O | O | |
| 6.5 | Total Fluorine, Bromine, Iodine (as F, Br, I) | ⩽0.2% m/m | O | O | |

| Item | Criteria | Agreed Specification | Status Supplier | Status Boral | Comments or amendments agreed to specifications. |
|---|---|---|---|---|---|
| 6.6 | Sulphur (as S) | ⩽1.0% m/m | O | O | |
| 6.7 | Particle size | ⩽ 50 mm in any direction with >95% passing 35mm. No dimension to be >50mm. | O | O | |
| 6.8 | $K_2O$ (%) | 1.0 | O | O | |
| 6.9 | $Na_2O$ (%) | 0.5 | O | O | |
| 6.10 | Mercury (Hg) (mg/kg) | ⩽1.2 | O | O | |
| 6.11 | Cadmium (Cd) (mg/kg) | ⩽20 | O | O | |
| 6.12 | Thallium (Tl) (mg/kg) | ⩽20 | O | O | |
| 6.13 | Total Group II metals (mg/kg)<br>Cadmium (Cd) + Thallium (Tl) | ⩽30 | O | O | |
| 6.14 | Copper (mg/kg) | ⩽500 | O | O | |
| 6.15 | Lead (mg/kg) | ⩽1000 | O | O | |
| 6.16 | Total Group III metals (mg/kg)<br>Antimony (Sb) + Arsenic (As) + Cobalt (Co) + Copper (Cu) + Chromium (Cr) + Lead (Pb) + Manganese (Mn) + Nickel (Ni) + Vanadium (V) | ⩽3000 | O | O | |
| 6.17 | PCB's (Polychlorinated biphenyls) | <10mg/kg | O | O | |
| 6.18 | PCP's (Phencyclidines) | <100mg/kg | O | O | |

| Item | Criteria | Agreed Specification | Status Supplier | Status Boral | Comments or amendments agreed to specifications. |
|---|---|---|---|---|---|
| **7** | **Other** | | | | |
| | | | O | O | |
| | | | O | O | |
| | | | O | O | |
| | | | O | O | |
| | | | O | O | |
| | | | O | O | |

**Signed as acceptance of the above information**

| Name | Company | Date | Signature |
|---|---|---|---|
| | Boral | | |
| | <Vendor> | | |