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AIM OF CREDIT

To reward operational practices which reduce the amount of solid waste going to landfill. Such waste may be from typical building operations, including on-going and durable goods, and from refurbishments, construction or demolition works.

CREDIT CRITERIA

Solid Waste and Materials Management Policy	1 point is awarded where a compliant Solid Waste and Materials Management Policy is in place during the performance period* that covers a building's entire waste stream, including, at a minimum the following: • Ongoing Consumables, • Hazardous Materials, • Movable and Electronic Goods and • Construction Waste from Churn and Alterations
Waste Stream Audit of Ongoing Consumables and development of an Operational Waste and Materials Management Plan	1 point is awarded where a building carries out a waste stream audit of the building's entire ongoing consumable waste stream to establish a baseline that identifies the types and amounts of waste making up the waste stream, thereby identifying opportunities for increased waste minimisation, recycling and waste diversion. An operational waste and materials management plan (OWMMP) must be developed on the basis of this audit and to outline clearly opportunities for waste minimisation.
Waste to Landfill Diversion: Operational waste and materials	Up to 3 points are awarded where the following percentages (by mass or volume) of operational waste and materials are diverted from landfill during the performance period*: 25% = 1 point 50% = 2 points 75% = 3 points And where no hazardous waste (e.g. CFL lamps) and batteries enter the operational waste and materials stream and are collected through a separate process. 1 point is awarded where overall operational waste and materials generated (tonnage or volume) has been reduced by at least 10% over the performance period when compared to the baseline month at the beginning of the performance period.
Waste to Landfill Diversion: Movable and/or Electronic Goods	0.5 points are awarded where 75% of all movable goods waste is diverted from landfill during the performance period and where no electronic goods enter the movable goods waste stream and are collected and responsibly managed through a separate collection process.

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Waste to Landfill Diversion: Construction Waste – Churn and Alterations	0.5 points are awarded where 50% of total construction waste from churn and alterations generated during the performance period is diverted from landfill. This portion of the credit is N/A if no churn or alterations took place during the performance period.

All Requirements above relate to waste which is processing under the control of the Building Management Team. Where tenants or contractors are responsible for certain waste streams and this waste thus does not enter the building management's facility, it can be excluded from compliance.

SOLID WASTE AND MATERIALS MANAGEMENT POLICY

N.B. Although it is not necessary for organizations seeking certification to develop separate policies, projects are required to highlight - and where not present in existing policies, amend these to include - all elements of the Green Star SA Policy Model (available from the GBCSA on request) as well as the requirements outlined below.

A Solid Waste and Materials Management Policy, which is a minimum requirement, must be developed and adopted prior to the start of the performance period and must be in place for the building(s) and site throughout the performance period. The Policy must be in line with the Green Star Policy and Programme/Plan Model and cover, at a minimum, the following requirements:

- Standards and Performance Measurements and Metrics:
  - Clearly stipulate the waste minimisation goals for particular waste categories
  - Clearly stipulate the targeted diversion rates from landfill relating to waste streams such as the following:
    - Ongoing operational waste and materials.
    - Food waste
    - Landscape waste
    - Batteries
    - Hazardous Waste (e.g. CFL lamps)
    - Electronic Waste
    - Movable goods
    - Waste from Construction Activities as a result of Churn and Alterations

- Implementation Procedures and Strategies
  - Clearly set out the Standard Operating Procedures which outline the implementation of the waste diversion practices at the project building(s), including onsite waste and materials practices and staff and contractor education
  - Include in the procedures and strategies means to ensure resource use reduction through, for instance, targeted reduction in unnecessary packaging in the building consumables supply chain

- Quality Assurance Control Processes
  - Stipulate the quality assurance control system that must be in place to ensure the implementation of the solid waste and materials policy
  - Include solid waste and materials performance specific wording in tender documentation and/or service level agreements that clearly identifies responsibilities and targets
  - Put processes in place that ensure that the appointed waste contractor(s) comply with all relevant legislation, including being registered on the SAWIS (South African Waste Information System)

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The Solid Waste and Materials Management Policy can be an existing, company-wide policy that covers, at a minimum, the above requirements and is implemented on an individual building level. Although the policy does not have to be developed specifically for the purpose of Green Star SA Performance certification, adherence to the Green Star Policy model is required. Where there are statutory requirements regarding waste diversion of process waste, such as medical waste or industrial/manufacturing waste and others, these requirements must, at a minimum, be referenced in the policy but such waste is not subject to the certification assessment process as part of a Green Star SA certification.

WASTE AND MATERIALS STREAM AUDIT

At the beginning of the performance period and prior to developing an Operational Waste and Materials Management Plan, conduct a waste and materials stream audit at the project building(s) of the entire operational waste and materials stream.

The waste stream audit should be carried out over a period representative of typical operations of the building. E.g. typical week during the building's operations.

The entire waste stream at the project building which would normally leave the site and be directed to landfill, incineration, recycling, composting, or resale or be reused in the building that would otherwise have been considered waste, must be audited. This typically includes the following, but the waste streams will depend on the particular project building and operations:

  - ongoing consumables from normal building operations
  - toners and cartridges
  - ongoing e-waste (e.g. batteries, hazardous waste, such as CFL lamps
  - bathroom waste
  - food waste
  - landscape and garden waste from the project site
- exclude waste streams that require specialist waste diversion measures and are regulated, such as medicinal waste, hazardous waste and others that would not normally enter the operational waste and materials stream
- exclude from the audit movable and/or electronic goods and construction waste resulting from churn and alterations

The audit involves the separation of the waste stream into its individual components and should be in accordance with the NEM:WA waste characterisation criteria and waste classification system. Where possible this can be done by the waste management contractor provided the data is directly linked to the project building and not an estimation of the waste stream components due to co-mingling with waste streams from other buildings, unless these buildings are located on a campus/precinct managed by one entity where a central waste storage and processing system is in place. Where specific data for items such as shredded paper, hazardous waste or other operational waste and materials is available from specialist contractors this can be included in the overall calculations.

Where no accurate waste stream can be obtained from waste management contractors, the waste stream audit must be carried out onsite and can be conducted by facility/in-house staff.

Calculations
Determine the appropriate unit for the waste stream audit, either volume or weight. This unit must be used consistently throughout the audit.

OPERATIONAL WASTE AND MATERIALS MANAGEMENT PLAN

On the basis of the waste stream audit, develop an Operational Waste and Materials Management Plan (OWMMP), which will be an extension of the Solid Waste and Materials Management Policy and must specifically address the treatment of waste and materials disposal and recycling. Such an

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OWMMP must be in place and operational during the performance period. Identify the objectives of the plan, by setting diversion from landfill targets (recycling targets) and/or target for reducing total materials generation (waste materials + recyclable materials);

	Operational Waste and Materials Management Plan -	
1	**Scope**: Identify the areas to which the OWMMP applies. For instance in a shopping centre, some shops may be responsible for their own waste management. Where this is the case, this must be clearly identified within the OWMMP.	☑
2	**Goals**: Identify waste and materials streams. These streams must include at least general waste, paper and cardboard, glass and plastic; in addition, identify waste streams that can be reduced upfront, such as through reusable packaging, refillable toners and others. Such identification must be in line with the waste classification relevant at the time of developing the OWMMP.	☑
3	Identify at least one additional waste and materials stream over and above the waste and materials stream identified in 2 above, that can be recycled and for which recycling facilities are provided during the performance period and where such a waste stream must be of significant volumes as identified during the waste stream audit. Examples of other waste streams that can be recycled include: metal, food waste and kitchen scraps, cooking oil, batteries and electronics.	☑
4	**Procedures and Strategies**: Clearly identify opportunities for waste and materials stream reduction (minimisation) and waste stream diversion and develop strategies accordingly	☑
5	**Responsibilities**: Outline individual roles responsible for reviewing and delivering the OWMMP	☑
6	**Performance Metrics**: Outline monitoring and measurement procedures for waste, materials and recycling streams by weight or volume	☑
7	**Quality Assurance**: Incorporate a review process to assess the success of the OWMMP and make improvements based on lessons learned	☑
8	**Time Period:** Clearly stipulate the time-period during which the OWMMP has to be in place and how often review processes have to be carried out.	☑

Similarly to the Solid Waste and Materials Management Policy, project buildings may already have in place a waste management/operational waste and materials management plan. Regardless, the OWMMP must be in line with the Green Star SA Policy and Plan/Programme Model (available on request from the GBCSA) and the requirements outlined and specifically address the operations of the building seeking certification. The OWMMP may be a standalone plan or be part of a more comprehensive Environmental Management System, as long as it is also implemented at a building level and meets the requirements outlined in this credit.

WASTE TO LANDFILL DIVERSION: OPERATIONAL WASTE AND MATERIALS

Calculations – Waste and Materials Stream Diversion

Waste Diversion includes source reduction, reuse, and recycling. The amount for each method of diversion must be quantified accurately and supported with documentation. The waste contractor can provide the required tracking information and supporting documentation that confirms compliance with the credit criteria.

Where the waste contractor cannot provide this information, calculate the portion of ongoing consumables in the waste stream that have been reused, recycled, or composted, where the following process should be used:

1. Use the waste contractors' reports or similarly reliable data to determine the total weight or volume of waste that was diverted from landfill/conventional disposal through reuse, recycling or composting. Data for this purpose must represent the entire performance period and may not be extrapolated.

2. Calculate the portion of ongoing consumables (as a percentage) which were diverted from the waste stream by means of recycling, reuse or composting.

Confirmation that all batteries and hazardous operational waste and materials, such as CFL lamps, have been diverted from landfill is required

WASTE MINIMISATION

Waste Minimisation focuses on upfront reduction of items that could potentially enter the waste stream, whether ultimately designated for recycling or landfill. Avoided waste remains the best course of action to minimise waste and meet diversion targets. Waste minimisation necessarily goes hand in hand with sustainable procurement and purchasing strategies**,** where numerous strategies can be employed.

Examples include

Waste Minimisation Criteria	**Strategies**
Durability vs Obsolescence	favouring products that are designed for longer life and extending that life span through repair and reconditioning.
Disposables vs. long life products	avoiding products, which are designed for single or short life usage, including items such as non-refillable ball-point pens marker pens, plastic cups and cutlery and replacing these with longer life products.
Procurement Preferences	Contractor take-back scheme for packaging Products with high recycled content and refillable/reusable Products with little or no packaging Concentrated product vs diluted products where feasible Bulk purchasing
Operational Choices	e.g. Double-sided printing, minimising printing and reusing scrap paper

Develop waste minimisation strategies on the basis of the Waste and Materials Stream audit and track these during the performance period, where the Waste Stream Audit forms the baseline for documenting an overall waste reduction over a 12 months period.

Calculations - Waste Minimisation

Where projects already have a waste and materials tracking system in place, compare waste minimisation on a month to month basis, i.e. $month_{1\ year\ 1}$ vs $month_{1\ year\ 2}$.

Where such data is not available, track operational waste and materials over a 13 months period, where the first month ($month_0$) establishes the baseline. Track all operational waste and materials generated on a monthly basis and establish the overall waste reduction as follows:

$$(month_0 – ((month_{1...12})/12))/month_0 \times 100 = \text{overall waste reduction}$$

0.5 points are awarded where a project can document a minimum overall waste reduction of 10%.

WASTE TO LANDFILL DIVERSION: MOVABLE AND/OR ELECTRONIC GOODS

Where a formal diversion programme is already in place, which stipulates and regulates the diversion of movable goods from landfill, proof of this can be submitted in lieu of calculations. Such a programme can be managed in-house or through an external contractor.

Where no formal diversion programme of movable goods exists, please use the following calculations.

Calculations

Waste Diversion is measured by the total amount (volume, weight or replacement value) of items sent for recycling or sold or donated as a portion of total waste generated. The amount for each method of diversion must be quantified accurately and supported with documentation. To calculate the portion of movable and/or electronic goods in the waste stream that have been recycled, donated or sold, use the following process:

1. For all movable and/or electronic goods handled by waste contractors, use the waste contractors' reports or similarly reliable data to determine the total movable and/or electronic goods waste volume, weight or replacement value for the performance period. Data for this purpose must represent the entire performance period and may not be extrapolated.

2. Use the waste contractors' reports or similarly reliable data to determine the total movable goods waste volume, weight or replacement value that was diverted from landfill/conventional disposal through recycling, sale or donation. Data for this purpose must represent the entire performance period and may not be extrapolated.

3. Calculate the portion of movable and/or electronic goods recycled or sold/donated.

For the purpose of this credit, the replacement value of an item is the cost of the item from a shop, reflecting its age and condition.

Waste to Landfill Diversion: Construction Waste – Churn and Alterations

Where projects undergo churn, alterations or additions during the performance period, such waste must be diverted from landfill as per the table below. This credit is only applicable to projects where construction activities as a result of Churn, Alteration or Additions are taking place during the performance period.

Where a formal diversion programme is already in place, which stipulates and regulates the diversion of construction waste from landfill, proof of this can be submitted in lieu of calculations. Such a programme can be managed in-house or through an external contractor.

Where no formal diversion programme of construction waste exists, please use the following calculations.

Calculations

Waste Diversion is measured by the total amount (volume, weight or replacement value) of items sent for recycling or sold or donated as a portion of total waste generated. The amount for each method of diversion must be quantified accurately and supported with documentation. To calculate the portion of construction waste in the waste stream that have been recycled, donated or sold, use the following process:

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1. For all construction waste handled by waste contractors, use the waste contractors' reports or similarly reliable data to determine the total construction waste volume or weight for the performance period. Data for this purpose must represent the entire performance period and may not be extrapolated.
2. Use the waste contractors' reports or similarly reliable data to determine the total construction waste volume, weight or replacement value that was diverted from landfill/conventional disposal through recycling, sale or donation. Data for this purpose must represent the entire performance period and may not be extrapolated.
3. Calculate the portion of construction waste recycled or sold/donated.

Base building elements	Minimum diversion from landfill rate by weight or volume
Numerous building materials and components can be recovered or recycled. Common materials and reuses include: • Bricks and concrete used for clean-fill; • Timber to be salvaged for new structural or material use; timber waste ground into mulch or garden compost; • Crushed concrete used as road-base; • Plasterboard crushed for soil conditioner or for the manufacture of new plasterboard; • Steel, aluminium and other metals for reuse in the manufacture of new metal products; • Foam insulation and packaging for new insulation or soft structural forms; • Pallets for reuse • Clean plastic from packaging for new packaging materials; • Carpet and ceiling tiles may be taken back for reconditioning/recycling by the manufacturer; • Light fixtures for cleaning and reuse; • Furniture for refurbishing and reuse; and • Crushed tiles for paving or landscape decoration.	50%

DOCUMENTATION REQUIREMENTS

Criteria	Documentation
All	• Completed **Submission Template**
Solid Waste Management Policy	• Copy of the **Solid Waste and Materials Management Policy**
Waste Stream Audit & Operational Waste and Materials Management Plan	• Copy of the **Waste Stream Audit Report and results** • Copy of the **Operational Waste and Materials Management Plan**, confirming the content of the elements that need to be covered in this audit.
Waste to Landfill Diversion: Operational Waste and Materials	• **Calculations of Diversion Rate** OR • **Supply Waste Contractor Report** confirming compliance and confirming that no hazardous waste (e.g. CFL lamps) and

	batteries enter the operational waste stream and are collected through a separate process. • **Supply Waste Contractor Receipts** confirming the diversion rate
Waste to Landfill Diversion: Movable and/or Electronic Goods	• **Calculations of Diversion Rate** OR • **Supply Waste Contractor Report** confirming compliance • **Supply Waste Contractor Receipts** confirming the diversion rate OR • **Evidence of Formal Diversion Programme** for movable & electronic goods.
Waste to Landfill Diversion: Construction Waste – Churn and Alterations	• **Calculations of Diversion Rate** OR • **Supply Waste Contractor Report** confirming compliance • **Supply Waste Contractor Receipts** confirming the diversion rate OR • **Evidence of Formal Diversion Programme** for construction waste.

ADDITIONAL GUIDANCE / RESOURCES

The availability waste management services and options varies from Province to Province and must be researched and implemented on a case-by-case basis. Engage with your current waste management contractor to establish clear roles and responsibilities and review their ability to meet the building's solid waste and materials management goals.

Solid Waste and Materials Management Policy

Drafting and agreeing a policy is a collaborative effort, which requires input from the building owner, facilities management, procurement officers and product suppliers. Often the Facilities Manager heads up the development of a Solid Waste and Materials Management Policy and is often responsible for the implementation. Developing and implementing a solid waste and materials management policy can set the overall tone for waste minimisation and diversion and is the first step in ensuring successful and sustained implementation.

Waste Stream Audit

Becoming aware of a building's actual waste stream generated on a regular basis can help identify opportunities for source reduction, reuse, recycling, composting and other means of diversion and help identify appropriate infrastructure that will aid in the upfront collection and separation of waste streams and can tailor service provider responses to the waste stream of a particular project. In addition, with building users being made aware of actual waste stream information, appropriate mechanisms can be put in place that a) reduce upfront waste generation (packaging etc.), b) target reuse strategies and c) improve recycling rates.

Waste to Landfill Diversion

Although putting in place an effective and successful recycling programme with associated ongoing tracking may require time, effort and additional capital expenses (recycling infrastructure), the benefits usually associated with successful recycling programmes can far outweigh the costs. Such benefits tend to include reduced costs associated with materials purchases (e.g. packaging); reduced waste

collection and disposal fees and/or income derived from recycling companies. A long-term commitment to tracking, monitoring and maintenance is essential.

BACKGROUND

Normal building operations and maintenance as well as churn and alterations can generate substantial quantities of waste. By reducing the overall waste stream to landfill through source reduction, reuse, recycling and other waste diversion strategies the demand for new materials and related harvesting and extraction of natural resources can be reduced. Furthermore, reducing the amounts of waste going to landfill will help reduce the impact of landfills on greenhouse gas emissions and the overall impact that landfills have on land resource, air and water quality.

South African households, commerce, institutions and manufactures generate 13.5-15million tonnes of waste per year (1998). This is increasing due to population and economic growth. Gauteng, the most urbanised province, is responsible for 43% of the total waste generated in South Africa. Each person generates on average 760 kg of waste per year. (DEAT, 2006).

Disposal of waste generally has negative impacts on the environment. These impacts include contamination of surface and ground water resources and soil; emissions (methane, CO2 and others) due to natural decomposition processes, incineration and illegal burning; health and safety risks; unsightly landfill sites, etc. Processing waste provides a large scope for creating employment opportunities. Sorting of waste allows products that have a high reuse or recycle value to be extracted from conventional waste streams turning the burden of waste into a potential resource which reduces use of virgin material (DEAT, 2006).

Waste produced through the operation of a building arises from the daily processes of the building, management and maintenance activities and refurbishment associated churn (Terry & Moore, 2008). The majority of this waste is the consumables associated with the daily functions of the business, but significant environmental impacts can also arise from smaller waste streams. An example of this smaller waste stream is the replacement of the building's fluorescent lights, which commonly is on a time/cost rather than utility basis. Sent to landfill, a single fluorescent light, containing 10mg of mercury, can contaminate 30,000 litres of water beyond safe drinking standards (MTP, 2005).

According to the Paper Recycling Association of South Africa the recyclable paper recovery rate in 2006 for South Africa, as a percentage of paper consumption, was approximately 44%. When segmented, 'Offices' were performing at a recovery rate of 42%, whereas 'Homes' at only 14%. World total recovery levels showed slightly higher than the SA average at approximately 47%, with countries like Switzerland, The Netherlands and Germany at the top of the list with levels between 70% and 80%.

In addition to the environmental benefits from an effectively managed waste and recycling plan, there can be considerable economic savings. Sustainability Victoria's (2006) WasteWise programme reports that only 10% of the cost of waste is in its disposal. The other 90% is hidden costs including the costs associated with unproductive waste management work, storage and clean-up costs and the loss of valuable materials as waste. Effectively managing waste can result in reduced business risks and an enhanced social and corporate responsibility profile, which leads to in improved public relations and business continuity (Wasiluk, 2007).

To make recycling schemes more economic, it is beneficial for waste to be collected quickly and efficiently. A convenient, purpose-designed storage space ensures that sufficient waste is accumulated before it is collected, and helps occupants to store material. The purpose of this credit is to encourage and recognise the inclusion of storage space in the physical attributes of the building, regardless of the tenant operational policies such as contracting another company to segregate waste off-site.

Construction Waste during Churn and Alterations: Traditionally, the bulk of construction waste has gone to landfill, and it has been estimated by the Gauteng Provincial State of the Environment Report

(SoER), June 2004, that construction and demolition waste within South Africa makes up approximately one fourth of all waste generated. This occurs despite the fact that much of the waste can be considered as a valuable resource for reuse or recycling.

Waste management on building sites is becoming increasingly common. As the availability of suitable land for landfill diminishes, and concerns about the environmental implications of waste become more widespread, reuse and recycling practices increase.

At the National Waste Summit held in Polokwane in September 2001, the Polokwane Declaration was adopted which commits South Africa to a reduction of 50% in the amount of waste being land filled by 2012 and a plan for zero waste by 2022. Future waste legislation will promote reuse and recycling, and require manufacturers to develop products that do not create waste and that can easily be recycled.

South African Waste Information System: The Waste Act was implemented on 1 July 2009, and section 60(1) of the Waste Act requires the Minister to establish a national waste information system for the recording, collection, management and analysis of data and information on waste management. As such, the South African Waste Information System (SAWIS) was developed to support the reporting framework for the generators, recyclers, exporters and disposers of waste. Through its implementation, the SAWIS has proved to be a useful tool in informing waste management decisions. The SAWIS is a web-based system, which enables waste managers to register new waste activities and submit quarterly information on the following web-link www.sawic.org.za.

REFERENCES & FURTHER INFORMATION

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TECHNICAL CLARIFICATIONS AND ERRATUM

There are currently no Technical Clarifications or Errata issued for this credit.