Waste

Management Plan

Portside Wharf, Hamilton

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EnviroCom Australia

Project Undertaken by

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1.0 Introduction

A Waste Management Plan (WMP) has been prepared by EnviroCom Australia® (EnviroCom) and pertains to a current and proposed development at Portside Wharf, Hamilton by Brookfield Multiplex Developments (Brookfield). The development will ultimately include:

- Seven towers – two residential buildings and five retail/residential or retail only buildings.
- One to two garbage chutes servicing the residential floors for each residential tower
- Retail tenancies, such as restaurants and cafes, retail shops, cinemas, a food store and public open space
- Basement car parking

Brookfield's commitment to sustainability and liveability has created a well planned waste management system throughout the operational towers in Portside, reducing waste to landfill and increasing recycling participation.

This WMP is a strategic plan designed to further enhance this commitment to reducing waste to landfill through the provision of recycling services and the sustainable treatment and disposal of non-recyclable waste. It recognises one distinct phase in the development; the fully operational phase once all buildings are online. The principles of the waste hierarchy have been applied in the consideration of operational activities to be undertaken on site. The waste management hierarchy is a framework that is specified in Queensland's Waste Reduction Strategy 2010-2020 and associated legislative instruments for prioritising waste management practices to achieve the best environmental outcome. The following waste management practices form the hierarchy and are listed in the preferred order of adoption –

1. Waste avoidance – preventing the generation of waste or reducing the generation of waste. Examples include better purchasing choices, design around standard product sizes and avoiding over-ordering of materials;
2. Waste reuse – reusing waste without substantially changing its form. Examples include reusing concrete, timber, bricks, wall tiles, roof tiles or green waste for a secondary purpose;
3. Waste recycling – treating waste that is no longer usable in its present form and using it to produce new products. Examples include recycling cardboard and metal and substituting products made from virgin materials for products made from waste materials;
4. Energy recovery from waste – recovering and using energy generated from waste by selecting waste contractors that service energy recovery systems;
5. Waste disposal – treating and disposing of waste in a manner that causes least harm to the environment. Examples include ensuring hazardous wastes are correctly disposed of using a specialist waste disposal company who will treat the waste prior to landfilling.

2.0 Experience in waste management planning

EnviroCom Australia® (EnviroCom) is a highly experienced environmental consultancy with a strong history in waste management planning, data collection and research. For more than ten years EnviroCom has provided waste stream and waste service assessment and recommendation services to local government and other government agencies. Our reputation in the field of waste management consultancy services has resulted in EnviroCom holding various standing offer arrangements and pre-qualified service provider status to local government and state government organisations.

In recent years, our extensive knowledge of waste stream composition, waste generation rates, waste minimisation behaviours and activities and waste service options has been applied to the production of waste management plans for development applications. EnviroCom draws upon industry standards, knowledge of best practice waste servicing options and extensive internal data describing the composition and generation rates of waste from residential and commercial sources in the development of this Waste Management Plan.

The personnel who prepared this document include:

Personnel	Role and experience
Glenn Eales (Qld Manager)	Glenn has extensive experience as a waste auditor and has provided waste stream assessment, planning and reporting services to public and private organisations since 1998.
Greg Buckler (Environmental Consultant)	Environmental consultants utilise experience in infrastructure planning, waste stream assessment and reporting arising from his practical knowledge of waste management. Each officer has been involved in the delivery of waste reduction services within a variety of industries.
Emma Lochran (Snr Consultant)	Emma is the Senior Consultant responsible for the development of the Waste Management Plan. Emma has extensive experience in assessing Waste Management Plans whilst employed by Redland Shire Council. At EnviroCom she is responsible for preparing Waste Management Plans in response to Development Application Information Requests for developers/project managers/property managers. Her Council policy and State Legislative waste knowledge, along with background waste collection contractor requirements and communication with clients results in the delivery of compliant and timely Waste Management Plans. Emma has prepared a number of Waste Management Plans for project managers in the Gold Coast, Redcliffe, Hervey Bay and Brisbane areas. These plans were for similar projects (multi-use, high rise apartments) and were delivered through close liaison with Council to ensure compliance and EnviroCom's industry knowledge of best practice waste minimisation and waste management. Emma is also a Green Star accredited professional and has assisted a number of developments achieve Green Star ratings

3.0 Waste generation

Generation rates used in all calculations are based on best industry practice guidelines with consideration of Brisbane City Council's Subdivision and Development Guidelines Part B Infrastructure Elements Chapter 9 Refuse Collection. All waste generation should be monitored to determine the specific requirements in practice.

3.1. Building 1 (Infinity)

Building 1 "Infinity" is currently operational and contains only residential apartments. As such, it primarily generates two solid waste streams which are collected by Brisbane City Council:

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass

A waste stream estimation has been conducted for the residential tenancies and is summarised in Table One below.

Table One - Waste volume estimates for Building 1 residential tenancies

	Waste Type	No. of Units	Rate L/Unit/Week	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Residential Building 1	General	63	180	11340	11.3
	Recycling	63	40	2520	2.5

3.2. Building 2 (Hamilton)

Building 2 is currently in the Development Application stage and will contain 168 residential units plus a150m^2 of retail tenancy (Café). As such, it will primarily generate two solid waste streams which will be collected by Brisbane City Council:

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass

Waste stream estimation has been conducted for the tenancies and is summarised in Table Two.

Table Two - Waste volume estimates for Building 2 tenancies

	Waste Type	No. of Units/ GFA	Generation Rate	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Building 2	Residential - General	168	180	30240	30.2
	Residential - Recycling	168	40	6720	6.7
	Commercial - Café General waste	150	100L/100m^2 GFA per day	1050	1.1
	Commercial - Café Recycling waste	150	100L/100m^2 GFA per day	1050	1.1

3.3. Building 3 (Loft)

Building 3 is operational and contains 12 residential units and ground floor retail tenancies. It generates three solid waste streams which will be collected by Brisbane City Council (for residential waste) and by private contractor (commercial wastes):

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass; and,
3. Glass (commercial separation only)

Waste stream estimation has been conducted for the residential tenancies and is summarised in Table Three below:

Table Three - Waste volume estimates for Building 3 residential tenancies

	Waste Type	No. of Units	Rate L/Unit/Week	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Residential Building 3	General	12	180	2160	2.16
	Recycling	12	40	480	0.48

A good working relationship has been created between Brookfield Multiplexes Facilities Management team and the waste contractor, thereby resulting in increasing the variety of recycling collections for the commercial tenancies (i.e. cardboard and glass). The contractor also advises Facilities Management if improvements can be made to servicing frequencies, weights and volumes of the compactor.

Irrespective of current waste generation levels, an estimation of the waste generation from the retail tenancies has been made below:

Table Four - Waste volume estimates for Building 3 commercial tenancies

	Commercial Type	Waste Type	Floor Area	Rate L or m^3/day	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Commercial Building 3	Restaurant	General	586	0.1m^3/100m^2 GFA	4000	4
	Restaurant	Recycling	586	0.1m^3/100m^2 GFA	4000	4

3.4. Building 4 (Promenade)

Building 4 is in the construction phase and will contain 172 residential units and a lower retail ring. It will generate three solid waste streams which will be collected by Brisbane City Council (for residential waste) and by private contractor (commercial wastes):

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass; and,
3. Glass (commercial separation only)

Waste stream estimation has been conducted for the residential tenancies and is summarised in Table Five below:

Table Five - Waste volume estimates for Building 4 residential tenancies

	Waste Type	No. of Units	Rate L/Unit/Week	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Residential Building 4	General	172	180	30960	20.64
	Recycling	172	40	6880	6.9

An estimation of the waste generated from the commercial tenancies within Building 4 has been conducted and is summarised in the table below:

Table Six - Waste volume estimates for Building 4 commercial tenancies

	Commercial Type	Waste Type	Floor Area	Rate L or m^3/day	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Commercial Building 4	Restaurant	General	609	$0.1m^3/100m^2$ GFA	4200	4.2
	Restaurant	Recycling	609	$0.1m^3/100m^2$ GFA	4200	4.2
	Retail	General	640	$50L/100m^2$ GFA	2240	2.24
	Retail	Recycling	640	$50L/100m^2$ GFA	2240	2.24
	Office	General	212	$0.01m^3/100m^2$ GFA	106	0.11
	Office	Recycling	212	$0.005m^3/100m^2$ GFA	53	0.05
	TOTAL	GENERAL				6.55
	TOTAL	RECYCLING				6.49

3.5. Building 5

Building 5 has not been constructed but will contain approximately 127 residential units plus 49m^2 of retail space. It will generate two solid waste streams which will be collected by Brisbane City Council for residential waste:

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass.

Waste stream estimation has been conducted for these tenancies and is summarised in Table Seven below:

Table Seven - Waste volume estimates for Building 5 tenancies

	Waste Type	No. of Units/ GFA	Generation Rate	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Building 5	Residential General	127	180 L/Unit/Week	23400	22.9
	Residential Recycling	127	40 L/Unit/Week	5200	5.1
	Retail General	49m^2	$50L/100m^2$ GFA	171.5	0.2
	Retail Recycling	49m^2	$50L/100m^2$ GFA	171.5	0.2

3.6. Building 7 (Retail)

Building 7 currently contains the cinema, a variety of restaurants and retail shops. It primarily generates four solid waste streams collected by a private contractor:

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass;
3. Glass (commercial separation only); and,
4. Cardboard.

A waste generation estimation has been conducted based on the commercial tenancies onsite and is summarised in Table Eight.

Table Eight - Waste volume estimates for Building 7 commercial tenancies

	Commercial Type	Waste Type	Floor Area	Rate L or m^3/day	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
Commercial Building 7	Restaurant	General	2062	100L/100m^2 GFA	14434	14.4
	Restaurant	Recycling	2062	100L/100m^2 GFA	14434	14.4
	Retail	General	1370	50L/100m^2GFA	4795	4.8
	Retail	Recycling	1370	50L/100m^2 GFA	4795	4.8
	Office	General	38	10L/100m^2 GFA	27	0.0
	Office	Recycling	38	5L/100m^2 GFA	13	0.0
	Function room*	General	497	100L/100m^2 GFA	2609	2.6
	Function room*	Recycling	497	100L/100m^2 GFA	2609	2.6
	Supermarket	General	684	100L/100m^2 GFA	4788	4.8
	Supermarket	Recycling	684	240L/100m^2 GFA	11491	11.5
	Cinema	General	1901	100L/100m^2 GFA	13307	13.3
	Cinema	Recycling	1901	100L/100m^2 GFA	13307	13.3
	Terminal space^	General	775	100L/100m^2 GFA	5425	5.4
	Terminal space^	Recycling	775	100L/100m^2 GFA	5425	5.4
	Office	General	494	10L/100m^2 GFA	346	0.3
	Office	Recycling	494	5L/100m^2 GFA	173	0.2
	TOTAL	**WASTE**				**45.7**
	TOTAL	**RECYCLING**				**52.2**

*Function room assuming an occupancy rate of 75% throughout each week (averaged).
^It is proposed that the area named terminal space will be utilised as either retail or restaurant area, and as such, restaurant waste generation rates were used.

3.7. Building 8 (Flare)

Building 8 is currently operational and contains only residential apartments. As such, it primarily generates two solid waste streams which are collected by Brisbane City Council:

1. General waste – putrescibles and non-recyclable wastes;
2. Commingled recyclables – plastics, paper and glass

A waste stream estimation has been conducted for the residential tenancies and is summarised in Table Nine below.

Table Nine - Waste volume estimates for Building 8 residential tenancies

Residential Building 8	Waste Type	No. of Units	Rate L/Unit/Week	Estimated Waste Generation (L/week)	Estimated waste generation (m^3/wk)
	General	96	180	17280	17.28
	Recycling	96	40	3840	3.8

4.0 Current and proposed waste management systems

4.1. Waste areas and servicing Building 1 & 8

All residential general waste is disposed of via the garbage chute on each level and is collected in the basement level chute room in bulk bins (2x $3m^3$ bins are used in a rotation system ensuring a bin is under the chute at all times). Each floor level has access to the rubbish chute for general wastes only.

Recycling bulk bins are located either within each waste storage room or immediately outside of the waste storage room for use by residents. It is recommended that clear signage on each floor adjacent to the chute to direct residents to use the recycling service be erected, giving directions on recyclable items and where to find the disposal point. Clear, large signage is displayed at the recycling collection areas.

Due to the low overhead clearance and no access between basement car parks, the bulk bins from Building 1 are towed to the waste storage area outside of Building 1 where they are serviced by Brisbane City Council. Bulk bins for Building 8 are towed to the rear access loading docks for collection by Council.

The property manager will also be responsible for moving the bulk bins back to the individual waste storage rooms once emptied.

4.2. Waste areas and servicing Building 2

4.2.1. Residential waste

All residential general waste is disposed of via the garbage chute on each level and is collected in the basement level chute room in bulk bins (2x $3m^3$ bins are used in a rotation system ensuring a bin is under the chute at all times). Each floor level has access to the rubbish chute for general wastes only.

Recycling bulk bins are located either within each waste storage room or immediately outside of the waste storage room for use by residents. It is recommended that clear signage on each floor adjacent to the chute to direct residents to use the recycling service be erected, giving directions on recyclable items and where to find the disposal point. Clear, large signage is displayed at the recycling collection areas.

Due to the low overhead clearance and no access between basement car park, the bulk bins will be towed to the collection point between Buildings 1 and 2.

The property manager will also be responsible for moving the bulk bins back to the individual waste storage rooms once emptied.

4.2.2. Commercial wastes

Commercial tenancies within Building 2 are anticipated to generate approximately $1.0m^3$ of waste from the general waste and the recycling waste streams per week. This would be disposed to wheelie bins placed in the back of house areas and transported to the collection services at Building 4.

Colour coding of bins to represent the different waste streams shall be utilised along with clear signage to reduce the risk of contamination.

4.3. Waste areas and servicing Building 3

4.3.1. Residential waste

Only 12 residential tenancies exist within Building 3. Waste and recycling is bought to the Building 3 waste storage room located in the car park by tenants (no chute exists) for transport to service location by Property Manager.

4.3.2. Commercial wastes

Commercial tenancies within Building 3 dispose of their wastes within a ground floor waste storage room located on the western wall. The general waste bulk bins located in this room are then transported by facilities management to the loading dock located within Building 7 (loading dock B) where general waste 660L bulk bins are tipped into a general waste compactor.

Once full, recycling bulk bins and glass 240L bins are transported to and stored within Loading Dock B until collection by the relevant waste contractors.

Colour coding of bins to represent the different waste streams is utilised along with clear signage to reduce the risk of contamination.

It has also been identified that the wastes from B3 can be taken to the B4 loading dock for collection, thereby reducing the need to transport the wastes via the board walk (with high pedestrian usage).

4.4. Waste areas and servicing Building 4

4.4.1. Residential waste

All general waste is to be disposed of via the garbage chute on each level within Building 4 and will be collected in the basement level waste storage rooms in 2-3m^3 bulk bins (2 bins will be required to rotate for servicing ensuring a bin is under the chute at all times). Each floor level will have access to the rubbish chute for general wastes only.

Similar to the operational residential Buildings 1 and 8, recycling waste is to be collected within bulk bins located adjacent to the waste storage room within the podium level. Clear signage on each floor adjacent to the chute will direct tenants to use the recycling service available, giving directions on recyclable items and where to find the disposal point.

A property manager will be responsible for towing the general waste and recycling bins from the waste storage room to the service point behind Building 7. They will also be responsible for moving the bulk bins back to the individual waste storage rooms once emptied.

4.4.2. Commercial wastes

Commercial tenancies within Building 4 will dispose of their wastes within a ground floor waste storage room located within the Building 4 loading dock where they will be collected.

As commercial waste from Buildings 2 & 5 will also be transported to this location for servicing it is recommended that general waste services be provided in bins not smaller than 2m^3 and be serviced approximately 4-5 days per week. The recycling services provided should also be in a 2m^3 bulk bin and serviced 2-3 days per week. Additional services for source separated materials such as glass may also be appropriate for this location.

4.5. Waste areas and servicing Building 5

4.5.1. Residential waste

All residential general waste is disposed of via the garbage chute on each level and is collected in the basement level chute room in bulk bins (2x $3m^3$ bins are used in a rotation system ensuring a bin is under the chute at all times). Each floor level has access to the rubbish chute for general wastes only.

Recycling bulk bins are located either within each waste storage room or immediately outside of the waste storage room for use by residents. It is recommended that clear signage on each floor adjacent to the chute to direct residents to use the recycling service be erected, giving directions on recyclable items and where to find the disposal point. Clear, large signage is displayed at the recycling collection areas.

Due to the low overhead clearance and no access between basement car parks, the bulk bins will be towed to the collection point behind Building 7.

The property manager will also be responsible for moving the bulk bins back to the individual waste storage rooms once emptied.

4.5.2. Commercial wastes

Commercial tenancies within Building 5 are anticipated to generate less than 1 x 240l MGB of waste within the general waste and 1 x 240l MGB from the recycling waste streams per week. This would be disposed to wheelie bins placed in the back of house areas and transported to the collection services at Building 4.

Colour coding of bins to represent the different waste streams shall be utilised along with clear signage to reduce the risk of contamination.

4.6. Waste areas and servicing Building 7

Similarly, tenancies within Building 7 (excluding the fish and chip shop and the IGA) dispose of their general wastes within bulk bins located within Loading Docks A and B. These bulk bins are then decanted into the general waste compactor situated in Loading Dock A.

Cardboard is collected in $4m^3$ bulk bins collected 3 times a week. Facilities management identified that the collection frequency could be dropped to 2 times a week with improved user interaction (flattening of boxes and positioning within bin to utilise space more efficiently).

Each tenancy has access to a 240L bin to take to their café/restaurant for the separation of glass. Once full, these bins are brought to Loading Dock A for collection by a contractor.

The IGA has a $3m^3$ general waste bin and a $4m^3$ recycling bin for their sole use.

The fish and chip shop, due to the nature of their business, has their own general waste bulk bin. It is unclear whether they segregate recyclables from the general waste stream and dispose of recyclables within the communal bulk bins/240L glass bins. It is recommended that facilities management undertake a visual assessment of the fish and chip bulk bin to assess whether they are diverting their recyclables from general waste. If they are not separating their waste, Brookfield should approach management to discuss the environmental impacts and the success and willingness to recycle by other tenants and to show them the recycling options available at the back of house loading docks.

In the future, the baggage hall within the terminal building may be converted to a restaurant or retail space. Waste estimations have been based on the greatest waste generation (i.e. restaurant) in order to sufficiently estimate maximum waste generation.

5.0 Waste servicing specifications

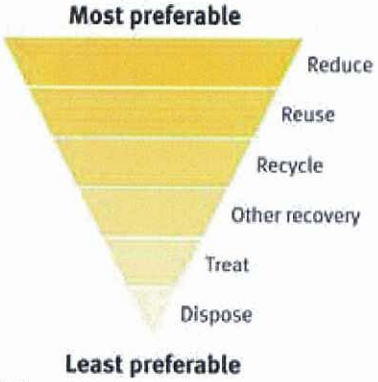
In order to have a proposed internal waste collection service, the development must have and maintain the following design elements:

- Concrete slab have a load capacity of 28 tonne;
- Have a height clearance of 6.5m at the bin service point;
- The waste collection vehicle must be able to enter and exit the development in a forward manner only;
- The waste collection vehicle must not be required to reverse more than one truck length within the development;
- The bin storage area is easily accessible by the waste collection vehicle to minimise the amount of waste container manoeuvring from the service point to the vehicle. The service point is of sufficient size to manoeuvre and rotate the bins easily. Also, the sizes of the bins allows for safe handling and manoeuvring.

6.0 Waste minimisation

In addition to the recycling services mentioned in this report above, it is recommended that management and tenants of the site are proactive by investigating and promoting opportunities for waste minimisation. These may include:

- Introduce a staff/tenant/contractor education program specific to uses within the building focusing on reducing waste generation and correct recycling procedures;
- Introduce signage on all waste containers to prevent contamination;
- Regularly undertake waste audits in order to review recycling processes and to identify opportunities for further waste minimisation and recycling;
- Management regularly monitoring servicing requirements and change the frequency as required;
- All retail and commercial tenants are encouraged to participate in a waste minimisation program for the site. This strategic program encourages linkages to state and local government business efficiency programs including programs such as ecoBiz. The strategic waste minimisation program should comply with the waste minimisation principals provided in Queensland's Waste Reduction Strategy 2010-2020. These include:
    - The waste and resource management hierarchy



    - Resource efficiency
    - Sustainability
    - Engagement
    - Capacity building

    - The strategy should also consider (over time) management of priority waste as defined within the strategy. These include:
        - Packaging
        - Computers and televisions
        - Batteries and fluoro lights
        - Tyres
        - Organic – green & garden
        - Organic – processing & food scraps
        - Timber, concrete
        - Gas bottles
        - Higher hazard regulated