

**NSW Government draft Design and Place State Environmental Planning Policy (DP SEPP)
2021 and supporting guides.**

**Submission on Embodied Carbon and Biodiversity
Supplementary Submission on Carbon Emissions and Waste**

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Dear Ms Galvin

Design and Place SEPP: Supplementary Submission on Carbon Emissions and Waste

We thank the Government Architect NSW (**GANSW**) for the opportunity to respond to the draft NSW Government's draft Design and Place State Environmental Planning Policy (**DP SEPP**) 2021 and supporting guides.

In recent years, waste recovery and circular economy principles have become an area of increasing prominence in terms of community interest and NSW Government policy.¹ It is also an area where building infrastructure struggled to keep pace with developments in our understanding of how waste emissions are accelerating global heating.

We are of the view that the DP SEPP provides a unique opportunity for the NSW government to provide an innovative and fit-for-purpose framework to address both waste and climate change through design principles. Further, designing buildings for food waste directly supports the NSW Waste and Sustainable Materials Strategy 2041 (**NSW Waste Strategy**), which has a target of net zero emissions from landfill by 2030.

Incorporating waste management into the DP SEPP enables design principles to address the complexity of waste flows in buildings and avoid future ad-hoc solutions. Various elements that should be considered at the design stage including source separation, handling and storage, street set-out areas, collection, transport and processing. More intentional waste management is important not only for meeting waste targets, but also for improving quality-of-life, public safety, environmental and economic issues.

This supplementary submission focuses on the following questions:

1. How important is the diversion of food waste from landfill important for effective climate policy?
2. How effective is the current policy framework in NSW to address the diversion of food waste from residential and commercial premises?
3. To what extent does the DP SEPP adequately address food waste?
4. How can the provisions of the DP SEPP be strengthened to consider such issues?

¹ State of New South Wales through Department of Planning, Industry and Environment, *NSW Waste and Sustainable Materials Strategy 2041: Stage 1: 2021 – 2027* (June 2021).

In brief, our answers to the above questions are below:

1. Diversion of food waste from landfill is integral to an effective climate policy.
2. The current framework does not adequately address the diversion of food waste.
3. The DP SEPP is an improvement on the current framework but is unlikely to incentivise designers to build buildings capable of efficient diversion of food waste.
4. We make the following recommendations.

Recommendation 1: Points of collection for organics, recycling and general waste to be required at each level for all residential apartment developments,² not just large buildings.

Recommendation 2: Waste management plans to require designers to consider waste as a material flow and design waste management systems that can accommodate 100% diversion of organic waste. This requirement should also apply to commercial and industrial buildings.

Recommendation 3: Remove requirement to limit access by residents to chute areas.

Recommendation 4: The NSW Department of Planning, Industry and the Environment (**DPIE**) to develop an online waste calculator to assist designers to determine waste streams and quantities. The calculator should have recommendations for volume reduction equipment, storage containers and area.

Recommendation 5: The ADG to include an appendix that contains an organic waste management system analysis process and checklist.

² Draft State Environmental Planning Policy (Design and Place) 2021 (NSW) s 5.

1. How important is the diversion of food waste from landfill important for effective climate policy?

1. Australians are estimated to generate 7.3 million tonnes of food waste yearly across our entire supply and consumption streams.³ The United Nations Environment Programme¹⁴ (UNEP) reports a high confidence estimate of Australia's yearly per capita household food waste production rate to be 102 kg/capita/year.⁴ The predominant strategy of managing food waste until now has been to incorporate it into the residual waste stream, and to send it to landfill. Minimal amounts of organics are sorted via advanced waste recovery and decomposed, capturing methane emissions, however the vast majority continues to be sent to landfill.⁵ In NSW it is estimated that food waste or food organics (**FO**) accounts for 38%⁶ to 45%⁷ of the total rubbish in household garbage bins. Food waste contributes significantly to net global emissions due to its decomposition over time into methane, carbon dioxide, and other greenhouse gasses (**GHG**).
2. We refer to recent research by Hunter Wardman⁸, School of Chemical & Biomolecular Engineering, University of Sydney, for two key findings supporting our position: firstly, a quantitative justification for the need to divert food waste; and secondly, the need to increase the ease of access to food waste diversion.

1.1 Quantification of GHG emissions reductions from diverting food waste from landfill

3. Mr Wardman's modelling of differing at-source waste sorting, collection, transportation, and treatment strategies found that through separate collection of food waste as either food organics and garden organics (**FOGO**) or as its own dedicated stream, reductions in emissions per tonne of household waste treated range from 667-774.5 tone CO₂-eq. Using the Life Cycle Assessment approach, it was demonstrated that the impact of household sorting of food waste on GHG emissions from landfill is significant.
4. Three scenarios of household sorting of FO were modelled: 1) Business as usual (i.e. FO is disposed of in the regular garbage, i.e. Red-lid bins); 2) FO is combined with Garden Organics (**GO**) waste streams (i.e., combined FOGO into Green-lid bins); and, 3) FO is collected via a separate bin and processed via anaerobic digestion (i.e., purple/burgundy-lid bins as trialled in certain inner-city council areas such as the City of Sydney and Inner West Council).⁹ Each step of the collection process, from kerbside collection to treatment, disposal, or the on-sell of by-products, was modelled.

³ Arcadis, *National Food Waste Baseline: Final assessment report*, 2019.

⁴ United Nations Environment Programme, *UNEP Food Waste Index Report 2021*, Nairobi, 2021.

⁵ E. P. Authority, Journal, 2014.

⁶ Foodwise, *Fast Facts on Food Waste* <<https://www.foodwise.com.au/foodwaste/food-waste-fast-facts/>>.

⁷ Rawtec, *Analysis of NSW Kerbside Red Lid Bin Audit Data Report: Results of the 2011 - 2019 Audits*, Environment Protection Authority, 2020.

⁸ Hunter John Wardman, *Food Waste Management Alternatives for New South Wales: A Life Cycle Assessment Approach* (Bachelor's thesis, University of Sydney, 2021).

⁹ Ibid 22-23.

- The main findings of the work show that by diverting household food waste from landfill to comingled processing as FOGO, an 84% reduction in GHG emissions is achieved.¹⁰ Further, by implementing a separate FO collection system, a 97% reduction in GHG emissions of the overall household waste disposal system is achieved.¹¹ This is equivalent to a reduction in 667 tonne CO₂-eq, and 774.5 tonne CO₂-eq, respectively, from a baseline of 797 tonne CO₂-eq per tonne of combined food and residual waste disposed of at kerbside.¹²

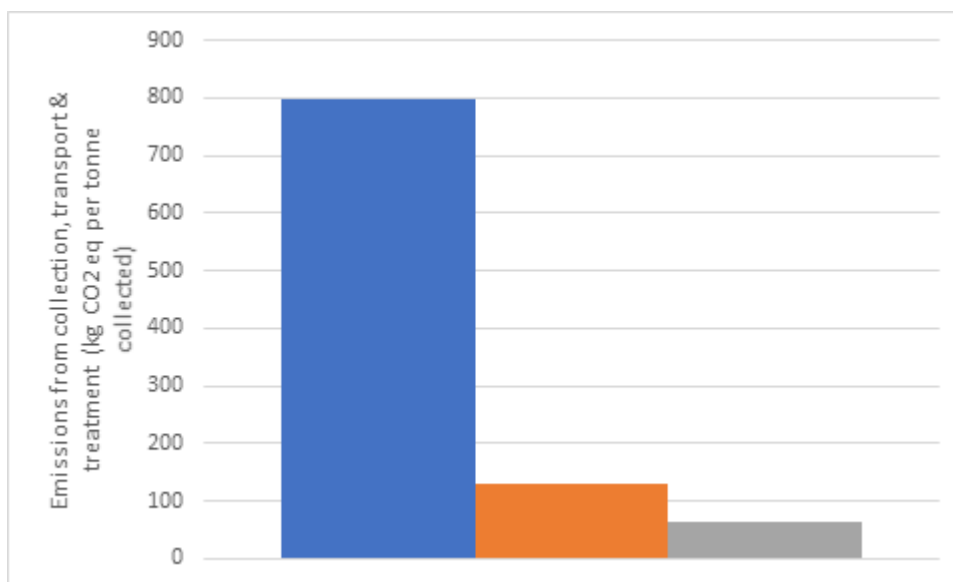


Figure 1: Global Warming Potential of the three scenarios considered, per tonne of total output waste from households. Scenario 1 is comingled disposal of food waste with residual waste. Scenario 2 is comingled composting of food waste with garden waste as FOGO. Scenario 3 is the dedicated establishment of a separate food waste collection and treatment strategy.¹³

1.2 Importance of waste infrastructure for effective climate and waste policy

- Laying the foundation for infrastructure that that can efficiently divert food waste is critical for the effectiveness of NSW’s climate and waste policy. At present, food waste can constitute 70% of the average residential bin.¹⁴ While various local councils have tried to initiate food waste diversion programmes, one of the main barriers to change has been the lack of infrastructure in buildings to support food waste diversion.
- We refer to Mr Wardman’s research, which also investigated differing approaches to kerbside waste collection across the 34 LGAs in Greater Metropolitan Sydney. A recurring theme observed during this process, particularly in densely populated LGAs, was that, whilst Council initiatives encouraged the diversion of food waste from residual waste, community conformity,

¹⁰ Ibid 29.

¹¹ Ibid 29.

¹² Ibid 44.

¹³ Ibid 33.

¹⁴ NSW Environment Protection Authority, *Better practice guide for resource recovery in residential developments*, (April 2019) 90.

education, and ease of access to food waste diversion strategies are of paramount importance.

8. For example, in phone conversation with Mr Wardman, a representative from the Municipality of Strathfield discussed that while Council offered an alternative food waste collection stream, the Council was not in favour of food waste diversion because of the economic cost of such an initiative outweighed any benefits due of low levels of community compliance. Bathurst Regional Council is also understood to be currently performing a study into its community's compliance with food sorting regulations, the results of which are yet to be released.
9. Designing buildings that make it easy for people to divert food increases the likelihood of community compliance with Council food waste initiatives. Such waste management systems may comprise of a food waste stream that is combined in the FOGO stream or is a dedicated separate collection of food waste service. This will enable more effective functioning of residential waste stream treatment processes and the achievement of NSW's net zero goals.

2. How effective is the current policy framework in NSW to address the diversion of food waste from residential and commercial premises?

10. With the exception of the City of Sydney, the current policy framework in NSW to address the diversion of food waste is voluntary and fragmented. This has resulted in minimal take-up of food waste management systems in buildings.
11. The main NSW policy documents that address food waste are:

- a. **NSW Environment Protection Authority, *Better practice guide for resource recovery in residential developments (2019) (Better Practice Guide)***

The Better Practice Guide assists local council planners, architects, and urban designers in the design, establishment and management of waste in residential developments.¹⁵ It is a consultative resource that sets out various options for the diversion of all types of waste, including food waste, in residential buildings.

The Better Practice Guide recommends that communal food waste systems be visible and easily accessible by residents.¹⁶ It sets out different options including in-sink food waste disposer units, onsite composting, worm-farming, machines to rapidly decompose or dehydrate food waste, and macerators.¹⁷ Where households do not have access to council food waste collection services, it discusses when onsite composting and worm farms can be used.

¹⁵ Better Practice Guide, above n14, 10.

¹⁶ Better Practice Guide, above n 14, 21.

¹⁷ Better Practice Guide, above n 14, 21.

b. **NSW Environment Protection Authority, *NSW guide to food waste recovery in multi-unit dwellings (2021) (MUD Food Waste Guide)***

The MUD Food Waste Guide assists designers and planners to address the design and planning of food waste management systems in multi-unit dwellings. These are medium and high density residential with three or more dwellings on the same parcel of land. It is voluntary, without requiring buildings to adopt any of the options it presents.¹⁸

The MUD Food Waste Guide sets out various options for diverting food waste. These include bins, macerators, on-site rapid decomposition units and on-site composting in the diversion of food waste. It also includes information on the advantages and disadvantages of different systems and applicable regulatory requirements for the use/disposal of end products.¹⁹

12. In contrast, the City of Sydney, *Guidelines for Waste Management in New Developments (2018) (Sydney Waste Guidelines)* provides minimum waste management requirements for all development and for completing Waste and Recycling Management Plans for Development Applications. They also set out regulatory requirements for construction and demolition waste in the form of a Waste and Recycling Management Plan. In particular:

a. **Residential single dwellings including single-dwelling houses, small-scale villas, townhouses and small-scale residential developments**

These dwellings are required to have space for a food caddy in the kitchen and space for a FOGO bin in the relevant property.²⁰

b. **Non-residential developments including industrial and commercial developments**

These developments are required to have dedicated space (in or attached to the waste and recycling storage area) for the storage and collection of food waste. Kitchens, office tearooms and service and food preparation areas are required to have sufficient dedicated space to collect and recycle food waste and these areas must be indicated on plans.²¹ All businesses must include provisions in their waste contracts that allow for the collection of various waste streams including food

¹⁸ State of New South Wales and NSW Environment Protection Authority, *NSW guide to food waste recovery in multi-unit dwellings, (2021)*.

¹⁹ MUD Food Waste Guide, above n 18, 7.

²⁰ MUD Food Waste Guide, above n 18, 19.

²¹ MUD Food Waste Guide, above n 18, 20.

waste.²² Further, there are specific provisions that govern the collection and separation of food waste from food retailers and producers.²³

Significantly, the Sydney Waste Guidelines set out ambitious and measurable targets for waste reduction. These are set out below.

Table 1: City of Sydney Food Waste Targets

Our Targets
By June 2021
<p>Targets for our residents</p> <ul style="list-style-type: none"> To divert 70 per cent of waste (with a minimum of 35 per cent as source-separated recycling) away from landfill
<p>Targets for our operations</p> <ul style="list-style-type: none"> To divert 50 per cent of waste from City parks, streets, and public places away from landfill To divert 70 per cent of waste from City-managed properties away from landfill To divert 80 per cent of construction and demolition waste, generated and managed by City operations, away from landfill
<p>Targets for our businesses</p> <ul style="list-style-type: none"> To divert 70 per cent of waste from operating businesses in the local government area away from landfill To divert 80 per cent of waste from construction and demolition activities in the local government area away from landfill
By 2030
<p>Targets for our residents</p> <ul style="list-style-type: none"> To divert 90 per cent of waste (with a minimum of 35 per cent as source-separated recycling) from landfill
<p>Targets for our operations</p> <ul style="list-style-type: none"> To divert 90 per cent of waste from City parks, streets, and public places from landfill To divert 90 per cent of waste from City-managed properties from landfill To divert 90 per cent of waste from construction and demolition, generated and managed by City operations, from landfill
<p>Targets for our businesses</p> <ul style="list-style-type: none"> To divert 90 per cent of waste from operating businesses in the local government area from landfill To divert 90 per cent of waste from construction and demolition activities in the local government area from landfill

13. There are a number of issues with a voluntary framework that depends on developers to implement food waste management systems in new buildings:
- a. There is little incentive for developers to implement such systems because they increase costs and take up space that can otherwise be used to generate revenue;
 - b. There is little incentive for architects to incorporate such systems because they take up space that can otherwise be used to improve the amenity of buildings; and
 - c. Individuals and businesses are unlikely divert food waste in buildings that do not have convenient and efficient systems for doing so. Further, in MUDs, individuals often do not have sufficient space in their units to compost food waste.

²² MUD Food Waste Guide, above n 18, 21.

²³ MUD Food waste Guide, above n 18, 22.

14. For these reasons the DP SEPP functions on a voluntary basis, it is unlikely to result in systemic change and food waste diversion rates in NSW will remain minimal. In order to be effective, we believe that the Design and Place SEPP should require food waste diversion infrastructure in all buildings. This is discussed further in the following sections.

3. To what extent does the DP SEPP adequately address food waste?

15. Architects routinely strive to reduce energy and water usage in their designs. On a similar basis, good building design should seek to reduce ongoing waste that is generated and managed within buildings. This is because design can change human behaviour by creating easy access to waste facilities and enabling effective management of waste in buildings.

16. We appreciate the comprehensive design guidance in the draft Apartment Design Guide (**ADG**) to minimise and manage waste. However, we note that the design guidance uniformly applies to all waste streams and we have concerns about its practical application to organics in certain circumstances.

17. The nature of organic waste is fundamentally different from other waste and recycling streams. Organics present new challenges for design for three main reasons:

- a. They are heavier than other recycling streams, such as plastic and paper;
- b. They decompose, which means they need to be kept in containers and have to be ventilated and collected more often; and
- c. They cannot be mixed with other recycling streams because of contamination.

18. Objective 3.3.2 of the ADG is to “minimise occupants' waste to landfill by providing safe and convenient onsite organic and inorganic waste and recycling facilities”. The Design Guidance for this Objective provides the following guidance for waste collection and storage:

- a. Integrate waste management infrastructure to facilitate separation of waste, recycling and organics at the point of disposal – for large buildings, on each residential level.
- b. Prepare an operational waste management plan for residents (and other occupants in mixed-use developments) addressing waste collection, separation and storage, including locations of collection points, bin cart routes and equipment such as chutes.
- c. For safety, limit direct resident access to any areas that house chute systems and compactors.
- d. Locate communal waste and recycling storage rooms in convenient and accessible locations for each vertical circulation core.
- e. For onsite waste storage facilities, provide: — hot and cold water — drainage connected to the sewer — self-closing, sealed and outward-opening dual doors — automated lighting — mechanical ventilation — waterproofing.

- f. Where applicable, allow for vehicle access (as required by Australian Standards) on site for local council or contracted waste collection service vehicles for council within the within close dock to collection.
- g. Locate collection infrastructure waste collection services wholly development's basement and proximity to the onsite loading permit unobstructed access for contractors.²⁴

19. Our specific comments on the above points are as follows:

- a. Integrated waste management – The design of integrated waste management infrastructure should incorporate points of disposal at each level for all residential apartment developments,²⁵ not just large buildings.

In effect, the ADG in its proposed form encourages designers and developers to choose is the cheapest and space efficient waste management option, which is collection at a central location (Figure 2 below)



Figure 2: Collection at a central location²⁶

Unfortunately, this is the option that is least likely to achieve high rates of waste diversion because:

- i. Residents who can't routinely carry waste out due to time constraints are likely to dispose of organics in general waste because of the inconvenience; and

²⁴ NSW Department of Planning, Industry and Environment, 'Draft Apartment Design Guide', 2021, 91.

²⁵ *Draft State Environmental Planning Policy (Design and Place) 2021* (NSW) s 5.

²⁶ American Institute of Architects, *Zero Waste Design Guidelines* <<https://www.zerowastedesign.org>>.

- ii. Behavioural constraints may limit diversion rates. For example, people are less likely to carry food waste long distances or down lifts due to smells and leaks from compostable bags, which are more fragile than plastic bags.
- b. Operational WMP – While the ADG specifies various components of a waste management plan such as the “locations of collection points, bin cart routes and equipment such as chutes”, it does not require designers to take into account material flows within buildings.

Planning for waste as a material flow will require architects to calculate the type and quantity of discarded materials. Plans should also be flexible enough to accommodate changing waste streams and diversion procedures. This is of particular importance because buildings must be able to accommodate substantial increases in organic waste streams for NSW reach net zero landfill emissions from food waste by 2030.²⁷

Lack of appropriate planning may result in significant downstream costs as repurposing systems that were originally designed to accommodate other waste streams may prove challenging and expensive. We note that organics have distinct requirements as compared to more conventional waste streams. For example, organic chutes require more frequent washdown and must be able to handle compostable bags that break more easily than plastic bags. Organic storage areas will also require sufficient ventilation to protect buildings from corrosion from moisture and to protect personnel from gas, odours and microbes.

- c. Resident access to chute systems – We note that limiting direct resident access to chutes limits design options for the diversion of organic waste streams. For example, a building with collection points at each level that limits resident access to chute systems is likely to require staff to operate a separate service collection on each floor. In such buildings, residents generally place their waste in bins or bags directly outside their apartment doors. While this type of system is safe for residents, it has the disadvantage of requiring separate service corridors and being labour-intensive as waste must be picked up by building personnel from every apartment.

²⁷ NSW Department of Planning, Industry and Environment, *NSW Waste and Sustainable Materials Strategy 2041: Stage 1: 2021-2027* (2021) 14.

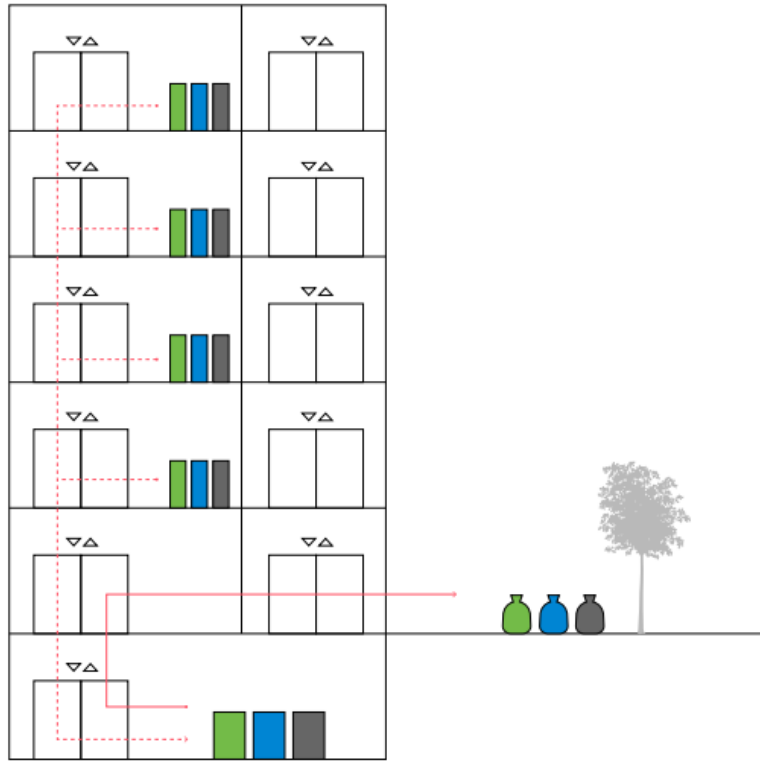


Figure 3: WMS with service areas and lifts²⁸

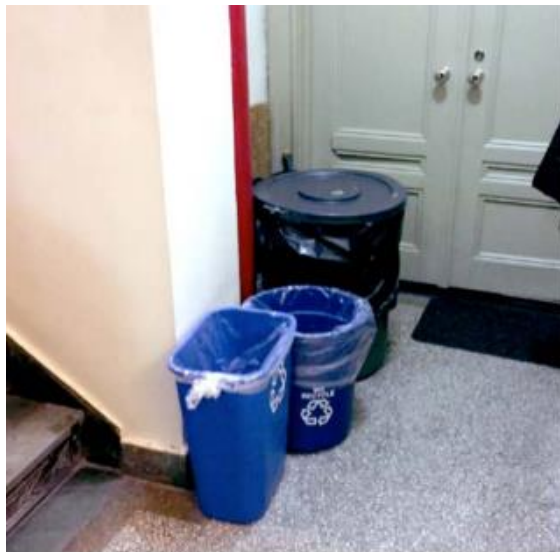


Figure 4: Waste left by residents outside apartment doors²⁹

²⁸ Ibid.

²⁹ Ibid.

Removing the requirement to limit resident access to chute systems opens up other design for waste management systems such as trash rooms with chutes and bins (Figure 5), single chutes with sorters (Figure 6) and multiple chutes (Figure 7).

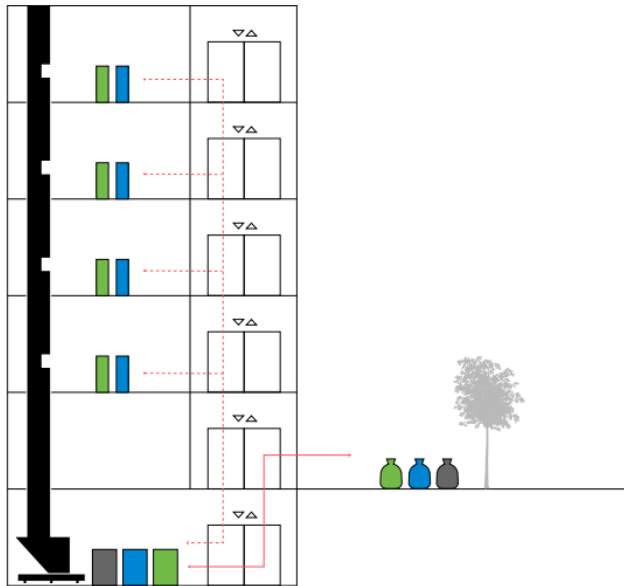


Figure 5: WMS with trash rooms with chutes and bins³⁰

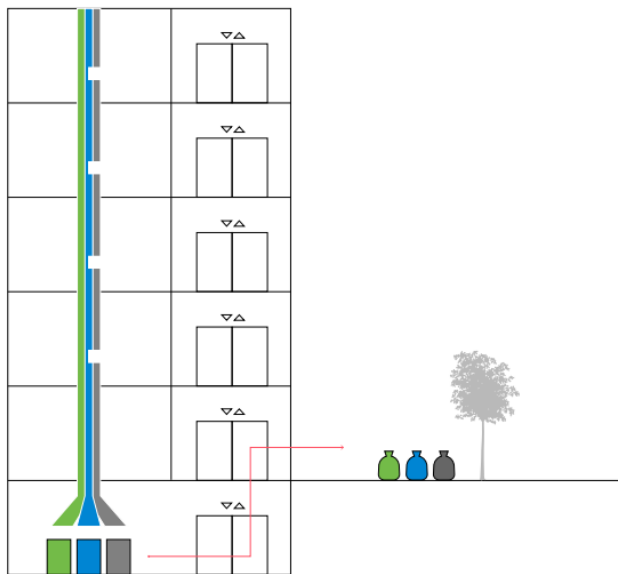


Figure 6: WMS with single chutes

³⁰ Ibid.

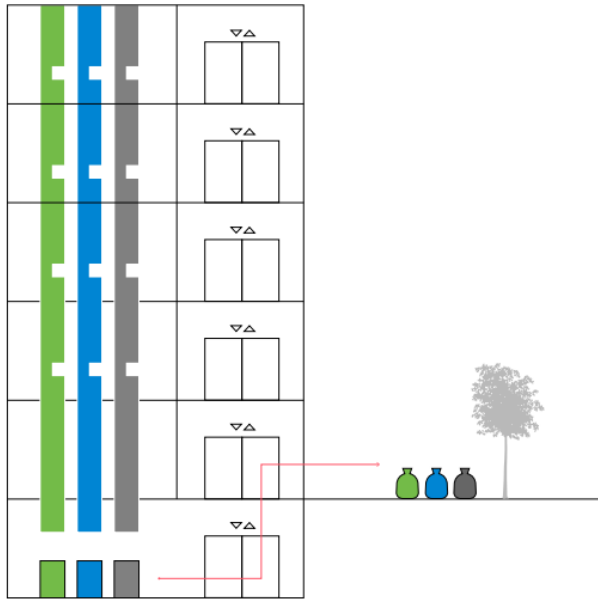


Figure 7: WMS with multiple chutes³¹

20. Finally, it is worth noting that designing buildings for material flows will not only reduce waste sent to landfill but will also improve accessibility and convenience for residents, the quality of public space in the building, staff working conditions and the efficient operation of the entire WMS.

Recommendation 1: Points of collection for organics, recycling and general waste to be required at each level for all residential apartment developments,³² not just large buildings.

Recommendation 2: Waste management plans to require designers to consider waste as a material flow and design waste management systems that can accommodate 100% diversion of organic waste. This requirement should also apply to commercial and industrial buildings.

Recommendation 3: Remove requirement to limit access by residents to chute areas.

4. How can the provisions of the DP SEPP be strengthened to consider such issues?

21. We consider that the design guidance for waste should specify the overarching design purpose, in line with other environmental considerations in the ADG such as rooftop solar,³³ rainwater re-use³⁴ and stormwater discharge.³⁵

³¹ Ibid.

³² *Draft State Environmental Planning Policy (Design and Place) 2021 (NSW) s 5.*

³³ ADG, above n2, 86.

³⁴ ADG, above n2, 89.

³⁵ ADG, above n2, 89.

22. We also make the following recommendations:

Recommendation 4: The NSW Department of Planning, Industry and the Environment (DPIE) to develop an online waste calculator to assist designers to determine waste streams and quantities. The calculator should have recommendations for volume reduction equipment, storage containers and area.

Recommendation 5: The ADG to include an appendix that contains an organic waste management system analysis process and checklist.