Waste Management Plan – Stage 1 DA – 85 Carabella Street, Kirribilli NSW

A submission to Artazan Property Group Pty Ltd

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Disclaimer

Executive Summary

MRA Consulting Group was engaged by Artazan Property Group to prepare a Waste Management Plan (WMP) for the development proposed to occur at Loreto Kirribilli, 85 Carabella Street, Kirribilli NSW 2061, in the North Sydney Council local government area. The specific purpose of this WMP is to address the generation and flow of construction and demolition waste that would occur as a result of the proposed redevelopment and expansion of the Western Precinct Learning Hub and Gymnasium.

The proposed development has been deemed to be of State Significance, making the relevant Consent Authority the NSW Department of Planning and Environment (NSW DPE). As such, this WMP complies with the waste management requirements specified in the *Secretary's Environmental Assessment Requirements (SEARs)* issued by the NSW DPE (see Table 1). Additionally, this WMP also considers the construction and demolition waste management requirements of the *North Sydney Development Control Plan (DCP) 2013,* and any other similarly relevant statutory requirements. Because of its more detailed requirements, the North Sydney Council DCP was used as a guideline to address the waste requirements listed in the issued SEARs. Finally, this waste management plan also summarises how the proposed works will merge into the existing system for managing ongoing waste.

A key consideration in the creation of this WMP was to, where feasible, maximise recycling and material reuse to minimise waste to landfill. Again, this approach was guided by the Waste Management Objectives and Provisions of the North Sydney Council DCP (Appendix, Tables 6 & 7), which includes general objectives for Waste Minimisation and Management. With regards to these overarching principles, the lack of space on site for operations presented a significant challenge. Compounding this issue is the bounding of the site by relatively narrow, busy public roadways. Collectively, these challenges make it unfeasible to sort waste on site, and all waste will be dealt with off-site as a result. Specifically, it is expected that all waste will be taken from the site immediately after generation, and sent to a resource recovery centre to facilitate recycling and reuse.

This WMP addresses the requirements of the SEARs issued by the NSW DPE, and was guided by the requirements listed in the North Sydney Council DCP.

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List of Terms and Abbreviations

Abbreviation	Definition
AS	Australian Standard
C&D	Construction and Demolition
s	Section – *in this document refers to the North Sydney Development Control Plan 2013*
DCP	Development Control Plan
DP&E	Department of Planning and Environment
EPA	Environment Protection Authority
LGA	Local Government Area
NSW	New South Wales
WMP	Waste Management Plan
WSP	Waste Service Provider

1. Background

The development proposed by Loreto Kirribilli for Loreto Kirribilli School, located at 85 Carabella Street, Kirribilli NSW 2061 (Lot 200 DP 1166282). This site covers 18,170 m2 of land, consisting of a number of multilevel buildings and surrounding gardens, and is currently used as an educational facility. The purpose of the proposed development is to upgrade existing facilities, and improve their accessibility.

Loreto Kirribilli is an educational establishment located in the local government area (LGA) of North Sydney Council (see Figure 1). The site is predominantly zoned SP2 - Infrastructure, but also encompasses some R2 and R4 zones (Low and High Density Residential respectively). The R2 and R4 land zonings are repeated in the site's surroundings, which consists of multi-story residential buildings. The site fronts onto two roads: Carabella Street to the South West, and Elamang Avenue to the North East. Due to the steep slope of the property – down to the North East – site access is primarily from Carabella Street, although carpark access is available from Elamang Avenue. Both roads are two-way, with parking available on both road sides in some places.

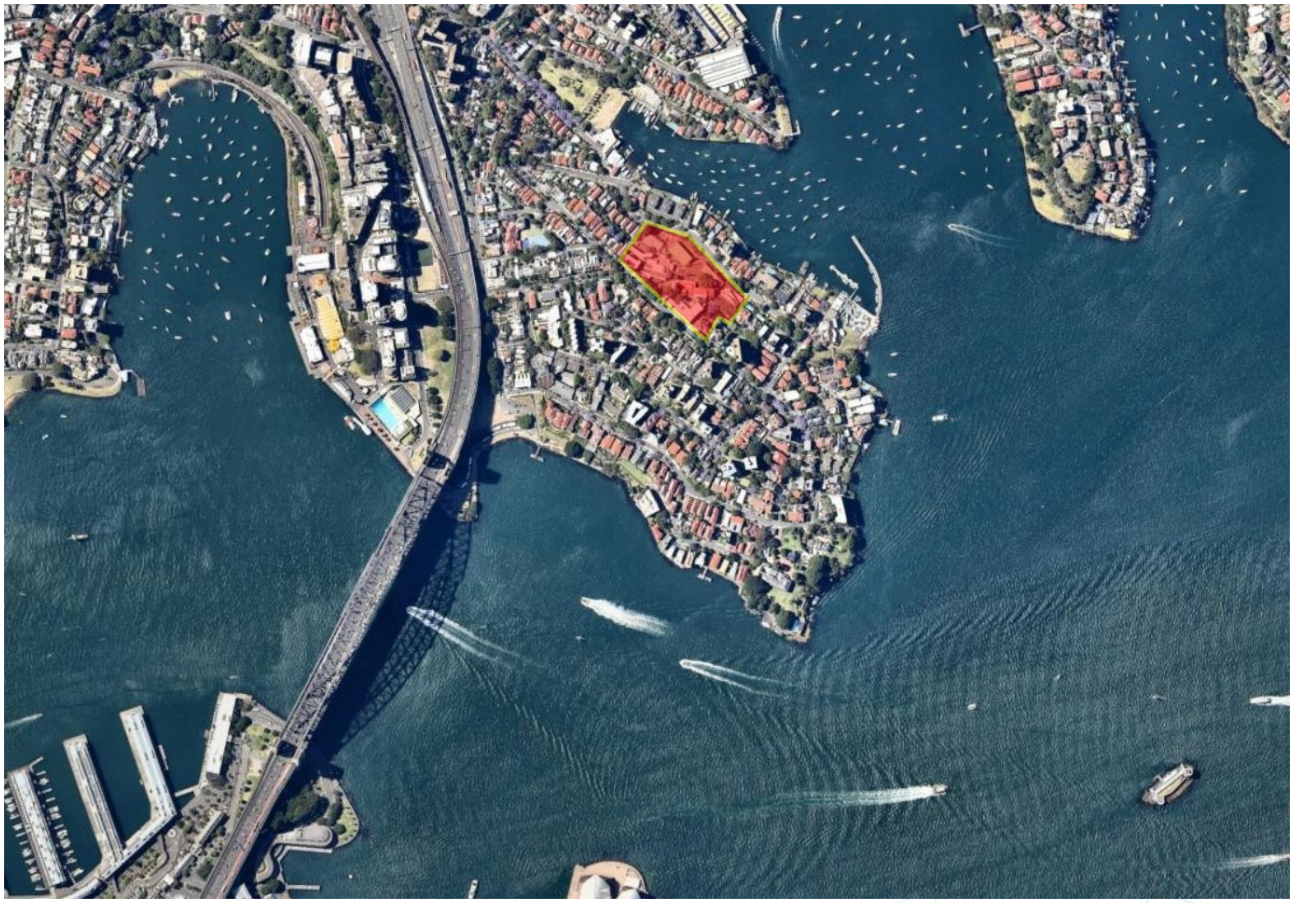

Figure 1 Location of Loreto Kirribilli

This Waste Management Plan (WMP) was created in response to the requirements for Waste in the Secretary's Environmental Assessment Requirements, issued by the Consent Authority, the NSW Department of Planning and Environment (NSW DP&E). Table 1 provides a copy of the requirements for waste management as listed in the SEARs.

Table 1 Waste management requirements of NSW DP&E issued SEARs

SEARs: Key Issues, Stage 1	
7. Waste	*Preparation of a Waste Management Strategy that identifies, quantifies and classifies the likely waste streams to be generated during construction works for Stage 1 and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.*

Additionally, this WMP also considers the Development Control Plan (DCP) of North Sydney Council, which provides specific requirements that essentially fulfil those specified in the SEARs (Tables 6 & 7). By using the North Sydney Council DCP as guidelines, this WMP recognises the Land and Environment Court Planning Principle that *weight to be given to Development Control Plans and to policies which had been adopted by councils although not embodied in DCPs*. Waste management for the site also considers best practice, equipment, and integration with other guidance documents including the *NSW Waste and Avoidance and Resource Recovery Strategy* (NSW EPA 2014) and *National Waste Policy: Less Waste, More Resources* (EPHC 2009). The key policy aims considered include managing waste as a resource, and ensuring waste treatment, disposal, recovery and re-use are undertaken in a safe, scientific and environmentally sound manner.

This WMP has two main components:

Component	Description	Report Section
Construction and Demolition Waste	Whole site C&D waste assessment and management, with separate subsections for construction and demolition which presents estimates of the quantities and types of materials to be reused, recycled or removed from the site.	Section 2
Operational Management	How ongoing waste from the proposed development will be adopted into the existing system for waste management.	Section 3

Waste management design and options have been outlined in each section.

1.1 Approach

MRA reviewed the proposed development's site plans to design a WMP which addressed the waste management requirements of the SEARs issued by the NSW DP&E (Table 1). Detailed information that satisfies the requirements of the section for Waste in the issued SEARs has been addressed in this report. Additionally, to further develop this WMP, consideration was also given to the waste minimisation and management guidelines of the North Sydney Council DCP where applicable and feasible.

In Section 2, MRA reviews the project construction and demolition phases and associated activities, and addresses:

- Types and quantities of waste materials generated on-site;

- Any identified specialist waste management requirements; and
- Method of disposal, including opportunities for recycling and reuse.

A key consideration during the development of Section 2 was the nature of the site, which does not provide space for onsite waste sorting and storage, and offers little access to vehicles. Accordingly, material separation will have to be implemented at a suitable site which is licenced to receive and process C&D wastes. In order to maximise material recovery, the waste disposal contract shall include a provision requiring processing of the site's wastes prior to landfilling any materials.

In Section 3, MRA reviews the existing system for managing ongoing waste, how this would be effected by the proposed developments, and how the system would be adapted as a result. This section addresses:

- The nature of the existing waste management system for ongoing waste;
- The extent to which the proposed development would likely modify this system; and
- How the existing system would be adapted to accommodate the proposed development.

1.2 Assumptions

The following assumptions have been made:

- Drawings and information that have been used in waste management planning for this WMP are the final reference/indicative design set from the project architect FJMT (dated 7 July 2017);
- Waste generation volumes have been modelled based on standard methods and assumptions of typical construction and demolition rates. The amount of waste generated in practice is affected by the level of activity and application of waste management methods. Waste management methods include those that are outlined in this WMP and also the specific commercial practices of workers (including contractors). The quantitative information presented in the report is therefore indicative only; and
- The waste management equipment and systems described in this report provide general guidance.

2. Construction and Demolition Waste

This WMP considers waste generation from construction and demolition at 85 Carabella Street, which will encompass major and minor demolition, excavation, building construction and refurbishment (see fjmt plans MP-1101, -1102, -1103 for an overview of the proposed works).

Waste removal from site is anticipated to require a crane to operate in conjunction with waste transport vehicles. In all circumstances, including these, it is expected that appropriate controls will be implemented by site management to ensure safety and efficiency on-site. Examples of appropriate controls relevant to crane and vehicle use have been provided in the Appendix (Table 5).

2.1 Demolition Waste

The table below describes the demolition waste materials expected under the Stage 1 development, including their quantities and management options, and was designed with consideration of the requirements in the North Sydney Council DCP (Tables 6 & 7). Estimates of the amount of material to be excavated during demolition (Excavated Material) were taken directly from the civil estimates provided by Henry & Hymas. For all other waste types, the estimates had to be calculated. This was achieved using the civil estimates of the building area proposed for demolition (Henry & Hymas), in conjunction with the number of levels, which allowed MRA to estimate the total area of building to be demolished. Estimates of the amount of specific waste types generated, per metre squared, during demolition were then applied to estimate waste volumes (Solis-Guzman et al.2009).

The information below presents multiple options for materials reuse, recycling and disposal where applicable (e.g. excavation material may be reused as a construction fill, or disposed to landfill if it is contaminated). All materials are intended to be sent to a suitable, licensed landfill or resource recovery facility.

Table 2 Estimation of demolition materials for reuse, recycling and landfill

Demolition Materials					
Waste Type	Estimated Volume	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Excavated Material	10,117 m^3	✓	✓	✓	Onsite: Testing for contamination. Strategies for minimizing dust, leachate and runoff to be applied where feasible Estimated 103 m^2 can be used as fill on-site. Quarried sandstone to be reused where possible. Stone to be sent offsite for storage, and preparation for later installation. C&D Processor: recycling of VENM and ENM Landfill: disposal based on testing results if contaminated.

Demolition Materials					
Waste Type	Estimated Volume	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Brick	406 m^3	✓	✓	-	C&D Processor: crushing and recycling for recovered products.
Concrete	868 m^3	✓	✓	-	C&D Processor: crushing and recycling for recovered products.
Timber (treated and untreated)	17 m^3	-	✓	✓	C&D Processor: timber recovery and recycling.
Plasterboard	88 m^3	-	✓	✓	C&D Processor: recovery and recycling for recovered product or gypsum processing.
Metals	11 m^3	✓	✓	-	C&D Processor: metals recovery and recycling.
Contaminated and / or Hazardous Materials	NIL	-	-	✓	Landfill: Appropriate management methods to be specified by a licensed asbestos and site hygienist or contractor. To be treated and disposed of in accordance with EPA and WorkCover requirements.
Other (paints, glass, toilet, basin and bathtub, drains)	33 m^3	✓	✓	✓	C&D Processor: Recyclable materials to be recovered at Resource Recovery facility.

2.1 Construction Waste

The table below describes the construction waste quantities and management options, and was designed giving consideration to the requirements listed in the North Sydney Council DCP (Tables 6 & 7). Estimates of construction waste have been calculated. This was performed using the civil estimates to calculate the area of each building proposed for construction (Henry & Hymas). This information was used in conjunction with the number of levels in each building, to estimate a total area set for construction. Estimates of the amount of specific waste types generated per square metre during construction were then applied to estimate waste volumes (Solis-Guzman et al.2009).

The information below presents multiple options for materials reuse, recycling and disposal where applicable (e.g. excavation material may be reused as a construction fill, or disposed to landfill if it is contaminated).

Table 3 Estimation of materials generated during construction for reuse, recycling and landfill

Construction Materials					
Waste Type	Estimated Volume	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Brick	40 m^3	✓	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: recovery for reuse where possible, crushing and recycling for recovered products.
Concrete	36 m^3	✓	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: crushing and recycling for recovered products.
Timber (engineered / treated)	< 3 m^3	✓	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: recovery and recycling.
Timber (untreated)	< 3 m^3	✓	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: recovery and recycling.
Plasterboard	< 3 m^3	-	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: recovery and recycling for recovered product or gypsum processing.
Metals	< 3 m^3	✓	✓	-	Onsite: to be kept separate wherever possible to enhance resource recovery. C&D Processor: metals recovery and recycling.
Contaminated and / or Hazardous Materials	NIL	NA	NA	NA	Landfill, or as appropriate depending on material. To be treated and disposed of in accordance with EPA and WorkCover requirements.
Other (paints, glass, toilet, basin and bathtub, light points, drains)	15 m^3	✓	✓	✓	Onsite: to be kept separate wherever possible to enhance resource recovery. Landfill: disposal where materials cannot be separated or for unrecyclable materials (carpet and other). Alternative processing: consideration for energy from waste processing (e.g. Biocoal).

Building types and sizes, structure depths, and typical materials generated during construction and demolition were used for the estimation of C&D waste. It should be noted that the quantities, densities and bulking factors for waste and recyclables may differ on-site based on actual materials and practice.

Signage will be used on site to keep C&D waste separate from commercial and industrial waste that may have putrescible waste present i.e. food waste from site workers.

Site personnel will be educated to dispose of waste properly. Education will be part of, but not restricted to, their site induction. As part of their education, site personnel are to be informed that food and food-packaging waste must be disposed separately from C&D waste, to avoid contamination and enhance recovery of C&D materials.

2.2 Site Documentation

This WMP, inclusive of any revisions, will be retained on-site during demolition and construction phases. Any supporting documentation to facilitate the appropriate application of procedures and statutory requirements will also be retained with this and other waste management documentation.

Responsibility for the WMP, waste documentation and processes during the construction and demolition phases will be with the demolition or builder contractor as appropriate, as the key personnel present on the site and managing C&D waste generating operations.

A logbook that records waste management and collection will be maintained on-site, with entries including:

- Time and date;
- Description and waste quantity;
- Destination waste facility; and
- Vehicle registration and company name.

Waste management documentation, the logbook and associated receipts must be made available for inspection by an authorised Council Officer at any time during site works.

3. Ongoing Waste Management

3.1 Site Operation

The proposed works, once completed, are not expected to change the operation of the site. As such, the generation rate and composition of ongoing waste is not expected to be significantly different post-works. Consequently, waste management associated with the new works will need to integrate into the already established system. This section of the WMP briefly outlines the existing strategy for ongoing waste management, and how the new works should be incorporated into these operations.

3.2 Existing Strategies

Operational Waste from the proposed development will be incorporated into the existing system for ongoing waste management, i.e. the daily operations and activities of the site.

Under the existing management plan for ongoing waste, operational waste is separated on site into three separate categories: general waste, commingled recyclables, paper and cardboard. To facilitate waste disposal and separation, bins are stationed across the site, and their contents collected daily by cleaners. Additionally, paper and cardboard recycling bins are available in each room. The cleaners deposit the collected waste into a bin area where the waste is collected from site by a waste management contractor. Maintenance and grounds staff use the primary waste bins directly. The bin area is located next to the carpark, although space dictates that the paper and cardboard recycling bin be kept adjacent, in the carpark (Table 4). Due to the location of the bin area, the waste is collected from Elamang Avenue.

Additionally, the site also has two battery recycling stations, and three printer cartridge recycling bins, located at reception, IT and the Junior School. These are managed by the school's administration and collected on an as-needs basis. Battery buckets are supplied and collected by Suez, and recycling bins for printer cartridges are supplied and collected by Planet Ark.

Table 4 Existing Waste Bins

Waste Category	Bin Infrastructure	Infrastructure Location	Collection Frequency
General Waste	3 x 1100 litre	Bin room, adjacent to carpark entrance.	5 x per week
Commingled Recycling	6 x 140 litre	Bin room, adjacent to carpark entrance.	1 x per week
Paper and Cardboard	8 x 660 litre	Carpark dock area.	1 x per week

4. Compliance

This waste management plan is to be submitted with the Stage 1 DA and will be used to assess and monitor the waste management process within the State Significant development.

This WMP pertains to the building design and site drawings (fjmt plans MP-1101, -1102, -1103). By identifying, quantifying and classifying the likely waste streams to be generated, and describing measures for managing, reusing, recycling, and safely disposing of this waste, this WMP complies with the NSW DP&E issued SEARs.

5. References

Australian Department of Sustainability, Environment Water, Population and Communities, 2011. Construction and Demolition Waste Guide - Recycling and Re-use Across the Supply Chain.

Land and Environment Court, 2016. Planning Principles.

North Sydney Council, 2013. North Sydney Development Control Plan.

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NSW Department of Planning and Environment, 2016. Secretary's Environmental Assessment Requirements.

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NSW Government, 1979. Environmental Planning and Assessment Act.

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NSW Government, 2000. Environmental Planning and Assessment Regulation.

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NSW Government, 2013. North Sydney Local Environment Plan.

Solís-Guzmán, J., Marrero, M., Montes-Delgado, M.V. and A. Ramírez-de-Arellano. 2009. A Spanish model for quantification and management of construction waste. Waste Management. 29:2542-2548.

6. Appendix

Table 5 Example Waste Removal Controls

Principle	Practice
Appropriate vehicle access and collection	- Signage for access routes and sorting and disposal areas will be clearly displayed; - On-site access routes for vehicles will be safe and accessible, with sufficient space for vehicles to drive to the collection point, manoeuvre, and pick up bins if relevant; - Vehicles will only enter the site if necessary, and maximum dimensions of vehicles permitted on site will be established; - Collection timing and frequency will be managed so that waste and recycling bins and space are appropriately utilised. This includes scheduled and as-needed emptying of bins so that there is sufficient space to deposit materials. Bins will be emptied at appropriate times so that there minimal disruption to work and bin availability; and - Reporting information including waste dockets will be retained on site to assist in the management of collection. Dockets and logbooks can be provided to Council to confirm the equipment, facilities and contractors used for recycling and disposal.
Safe and appropriate plant operation	- Cranes, hoists, concrete pumps and other plant to be operated in a safe manger, and wholly within the work zone area unless otherwise permitted; - No plant to be placed in public areas unless appropriate approval has been granted; - Sufficient space will be provided around all plant to ensure the safety of all passersby; - Hoardings and overhead protection to be provided where necessary, following appropriate approval; - Appropriate signage, including but not limited to those specifying exit routes, safety and operation procedures, will be erected around all plant; - Plant to only operate within the agreed hours, as signposted in the work area zone; - A logbook will be kept for each plant, which will include but not be limited to the hours of operation, and which staff were involved.
Noise, dust and odour mitigation	- Potential for noise and odour to be minimized; - Effect of wind on odour and dust transportation to be considered. Demolition during adverse weather conditions will be avoided; - Implementation of dust controls to the site prior to and during demolition; - Waste loads arriving and leaving the site, such as in trucks and trailers, will be adequately covered. Signage must indicate cover requirements at pick-up / drop-off spots.

Table 6 North Sydney DCP, Section 19 – Waste Minimisation

Objectives and Principles	
General Objectives (s 19.1.1)	**O.1** Reduce the demand for waste disposal.
	O.2 Maximise reuse and recycling of building and construction materials, as well as household, industrial and commercial waste.
	O.3 Assist in achieving Federal and State Government waste minimization targets in accordance with regional waste plans.
	O.4 Minimise the overall environmental impacts of waste.
	O.5 Require source separation, design and location standards which complement waste collection and management services offered by Council and private providers.
	O.6 Encourage building design and construction techniques which will minimize future waste generation.
Demolition Waste Objective & Provisions (s 19.2.1 & 19.2.2)	**O.1** To ensure that the reuse and recycling of demolition materials is maximized.
	P.1 A Waste Management Plan must accompany all development applications involving demolition. The WMP must provide details of all on-site sorting areas and vehicular access.
	P.2 Section 1 of the WMP must be completed providing the following details. a) The volume and type of waste to be generated, including excavation materials, green waste, brick, concrete, timber, plasterboard and metals; b) How was is to be stored and treated on site; c) How residual waste is to be disposed of.
Construction Waste Objective & Provisions (s 19.3.1 & 19.3.2)	**O.1** Waste generation is minimized and reuse and recycling of construction materials is maximized in construction projects.
	P.1 A Waste Management Plan must accompany all development applications involving demolition. The WMP must provide details of all on-site sorting areas and vehicular access.
	P.2 Section 1 of the WMP must be completed providing the following details. a) The volume and type of waste to be generated, including excavation materials, green waste, brick, concrete, timber, plasterboard and metals; b) How was is to be stored and treated on site; c) How residual waste is to be disposed of.
	P.3 To ensure that construction waste is minimised, consideration should be given to the following matters: a) Order the right quantities of materials; b) Prefabricate materials where possible;

Objectives and Principles	
	c) Reuse formwork; d) Use modular construction and basic designs to reduce the need for off-cuts; e) Separate off-cuts to facilitate reuse, resale or efficient recycling; f) Minimise site disturbance, limit unnecessary excavation; g) Reuse of recycle materials from demolished buildings; h) Choose landscaping which reduces green waste; and i) Coordinate and sequence trades people to minimise waste.

Table 7 North Sydney DCP, Other Sections Relevant to Waste

Objectives and Principles	
Other Additional Information for Development Applications (Part A, s 3.3.3)	Where applicable, applicants should supply: k) A Waste Management Plan that has been prepared in accordance with Part B: Section 19 – Waste Management of this DCP.
Waste Management (Part B, s 2.6.6 & 2.6.10); as repeated in Waste Management and Minimisation (Part B, s 3.5.6)	**O.1** To minimise material usage and waste during building, construction and demolition.
	O.2 To minimise the level of waste during operation reduce new building material usage and minimise volume of demolition materials.
	P.1 A Waste Management Plan for the demolition, construction and operation of the building must be provided in accordance with Part B: Section 19 - Waste Management of the DCP.
	P.2 The building should be designed to encourage waste minimisation (e.g. source separation, reuse and recycling).
	P.3 Adequate recycling systems must be provided in the design of the garbage room.
	P.4 Materials with long lives and low maintenance needs are encouraged to be incorporated.
	P.5 Contractors and sub-contractors employed to undertake proposed construction works and waste removal should be educated about the waste objectives of the development.
	P.6 The storage of any hazardous waste materials must be adequately secured.