

Demolition & Construction Waste Management Plan

Multiunit Residential Development

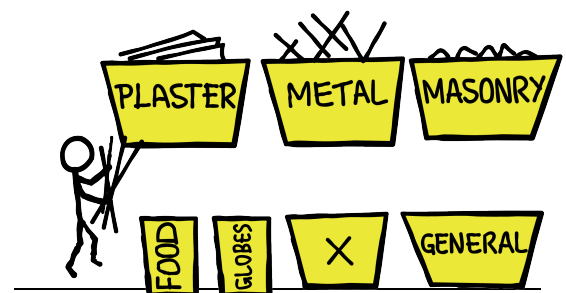
67 Pacific Parade, Dee Why NSW 2099

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 LID acknowledges and pays respect to the Australian Aboriginal and Torres Strait Islander people, to their ancestors and elders, past, present and emerging, as the traditional custodians of the lands upon which we work and live. We recognise Aboriginal and Torres Strait Islander people's deep cultural and spiritual relationships to the water, land and sea, and their rich contribution to society.

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The content of this document represents the entirety of work output or recommendations offered by LID Consulting for this particular project. This content supersedes all other verbal discussions undertaken by LID Consulting representatives in relation to this project.

Commercial waste calculations are based on rates provided by government organisations and adopted and used as an industry standard. Bin numbers and spatial requirements have been calculated in accordance with these guidelines. The end user requirements may vary from this depending on the business use, type and operational practice.

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1 Overview

Low Impact Development (LID) Consulting was engaged by Chris Brasler to assess the proposed development at 67 Pacific Parade, Dee Why NSW 2099 to provide a Demolition and Construction Waste Management Plan / Site Waste Minimisation and Management Plan (as required by Northern Beaches Council's Statutory Planning).

1.1 NSW Requirements

A waste management analysis has been undertaken based on the following documents:

- Northern Beaches Council's Waste Management Guidelines
- AS 2601 - 2001 Demolition of Structures, published by Standards Australia
- Code for the Control & Regulation of Noise on Building Sites NSW
- Environment Protection Authority Guidelines for Removal of Lead Paint & Asbestos
- Waste Avoidance and Resource Recovery Act 2001
- Contaminated Land Management Act 1997
- Refrigerant Handling Code of Practice 2007 (AIRAH/IRHACE)
- NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021
- <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/strategic-direction-for-waste-in-nsw/waste-and-sustainable-materials-strategy>

1.2 Northern Beaches Council requirements

- (a) Minimise the waste sent for disposal
- (b) Minimise the impact and disturbance it has on surrounding amenity, public safety, roadways and natural and built environment
- (c) Comply with relevant legislation (refer to the Introduction xii)
- (d) Send waste materials to a suitably licensed facility
- (e) Identify suitable locations on the site for sorting and storing of materials for re-use, recycling and disposal. (Factors to consider include slopes, drainage and personnel and vehicular access)
- (f) Maintain valid tipping dockets and receipts on site for inspection

1.3 General requirements

The provisions of this demolition & construction waste management plan are to be implemented at all times during the course of this work. Ensure all waste is transported to a place that can lawfully operate as a waste management facility.

Confirm that all waste going to landfill is not recyclable or hazardous.

Implement measures to prevent damage by the elements, odour and health risks, and wind-borne litter. This waste management plan

- (g) details the types of waste and likely quantities of waste to be produced;
- (h) details how waste to landfill is to be minimised (and recycling maximised) within the development;
- (i) includes estimates of quantities and types of materials to be re-used onsite or recycled offsite;
- (j) includes targets for recycling and reuse;
- (k) includes a site-plan showing storage areas away from public access for reusable materials and recyclables during demolition and construction and the vehicle access to these areas.

1.4 Development Outline

Site Address: 67 Pacific Parade, Dee Why NSW 2099

Applicant: Chris Brasler

Type: Multi-unit Residential development

Dwellings: 9 Townhouses

Break up of units: 1 x 2 bed
8 x 3 bed apartments

Key Project Documents:

1. Site Survey Plan, Reference 6213-DET revision 4 dated 21/11/2022 prepared by Usher & Company Surveying & Land Development Consultants.
2. Architectural Drawings DA200-DA206, Revision A, dated 17/7/ 2024 prepared by DKO Architecture.
3. Preliminary Environmental Site investigation dated 3/7/2024 prepared by Environmental Consulting Services Pty Ltd.
4. Geotechnical Investigation Report dated 3 July 2024 prepared by CMW Geosciences.
5. Arboriculture Impact Assessment & site Specific Preliminary Plan of Tree Management prepared by Growing my Way Tree Consultants dated May 2024.

1.4.1 Existing buildings and other structures:

- The subject site is a vacant allotment located in the northern beaches.
- There is a significant slop of 8m down towards Pacific Parade. There is an existing stone retaining wall along the street frontage plus others in and around the property.
- There are 2 adjoining trees that will need protection to the south of the site.
- There is only one vehicular access point via the existing crossover on the western side of the property.

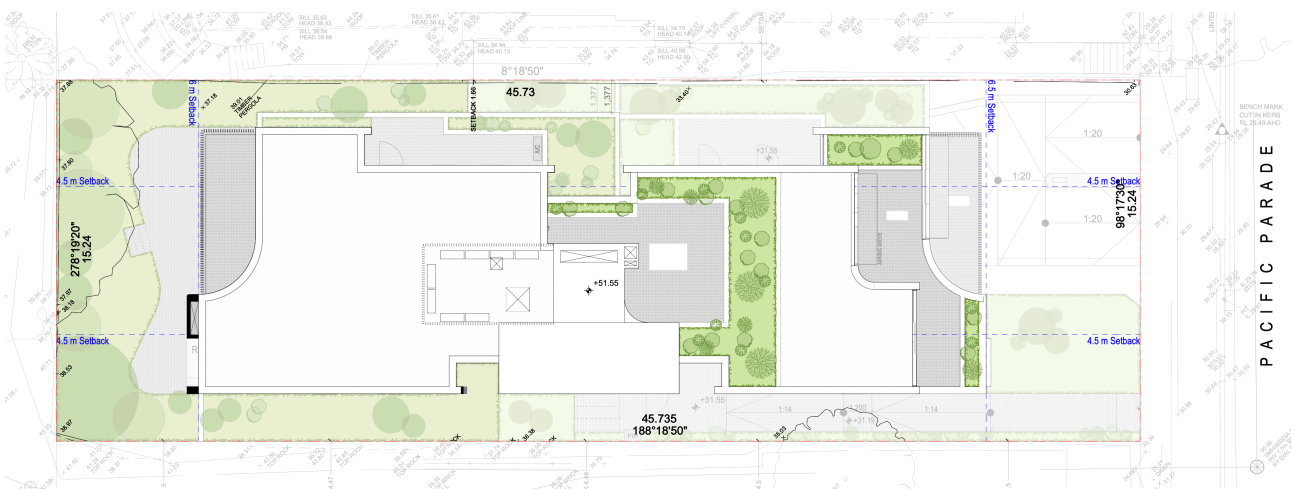


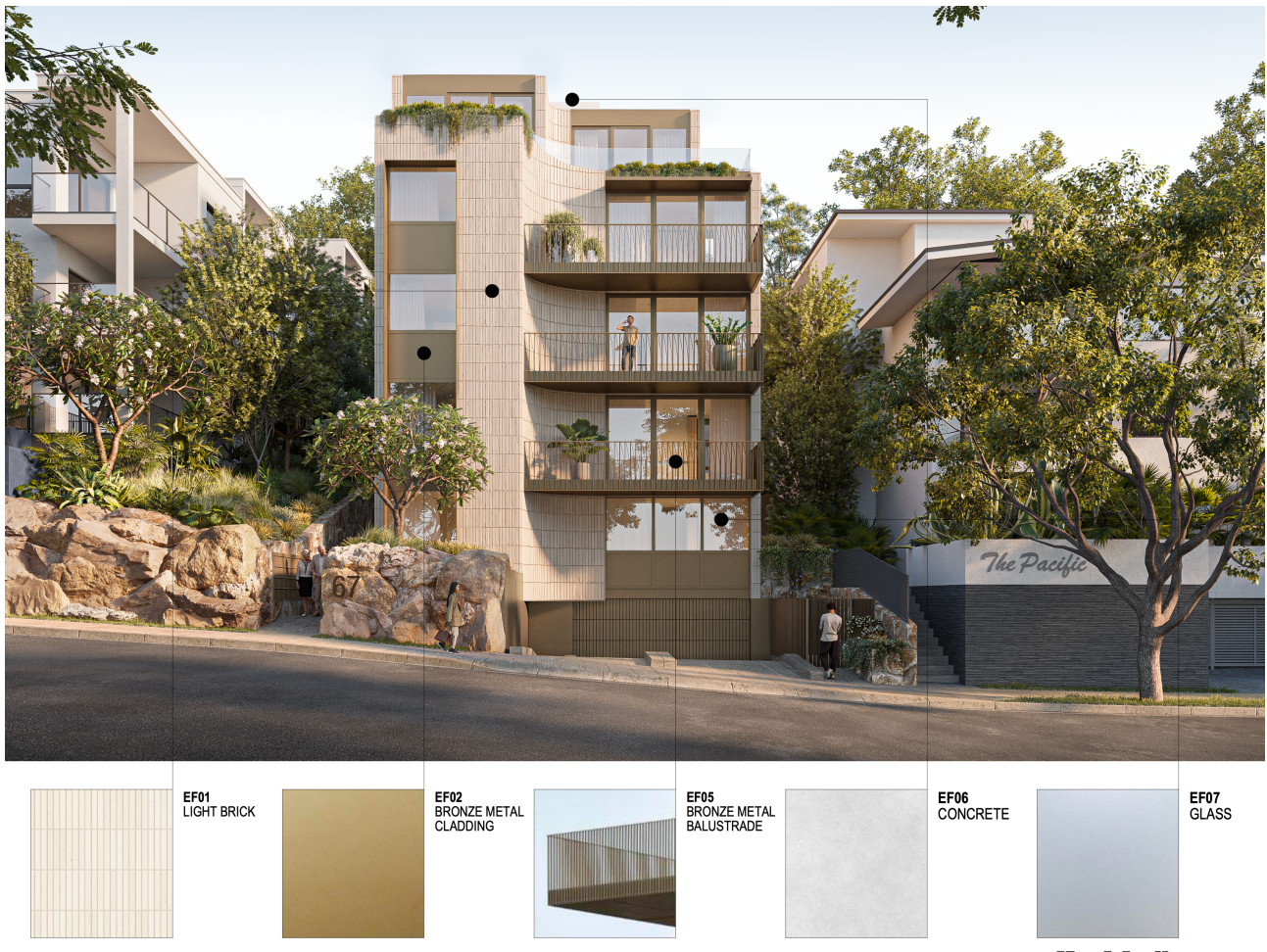


1.4.2 Brief description of proposal:

The proposed 5-storey development comprises of 9 units with shared carpark at the rear. The main vehicular access into the site will be maintained direct from Pacific Parade.

The details provided in this report are the recommendations for better practice management of demolition and construction waste. Generally hand/manual demolition is proposed to effect better recycling and re-use rates. Separation of waste streams is also preferred for improved recycling of excess construction materials and is considered practical given the size of the site and project.





1.5 Waste context

Australia generated 75.8 million tonnes of solid waste in 2018-19, which was a 10% increase over the previous two years (2016-17).

Sectors generating the most waste were:

- Manufacturing: 12.8 million tonnes (16.9%)
- Construction: 12.7 million tonnes (16.8%)
- Households: 12.4 million tonnes (16.3%)
- Electricity, gas and water services: 10.9 million tonnes (14.4%)

Construction

- 16.8% of total waste
- Largest supply of masonry materials (8 million tonnes), 35% of all masonry material waste
- \$2 billion spent on waste services
- Construction waste increased by 22% since 2016-17¹

The intent of demolition and construction waste management plans is to assist in reducing this.

¹ <https://www.abs.gov.au/statistics/environment/environmental-management/waste-account-australia-experimental-estimates/latest-release>

1.6 Actions for Good Waste Minimisation

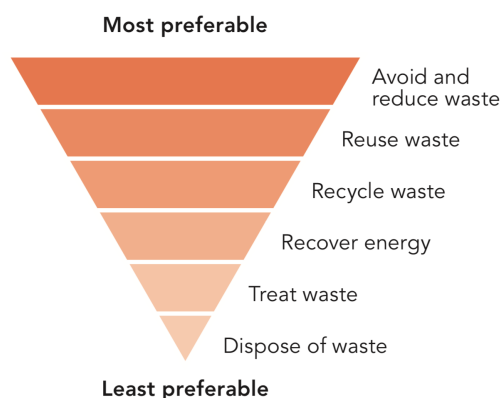
Principles for good waste minimisation have generally followed the waste hierarchy framework shown as the inverted triangle below (from the Environmental Protection Act 2017).

In recent years the concept of waste reduction has also been presented through a circular economy discussion. Both concepts are current, but a circular economy process aims to shift thinking from the predominantly linear model of "take, make and waste" that we have seen in the last few decades and that leads to resource and environmental depletion, to a system where products and services are designed to be reused or ideally be regenerative i.e. to repair the environment.

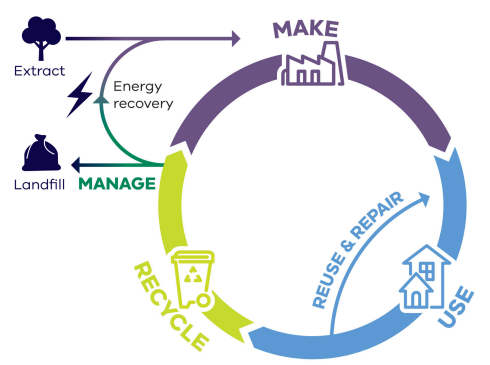
Further, a circular economy allows waste to be avoided in the first instance to reduce environmental impacts of production & consumption. There is now an increasing focus on this across Australia and around the world.

More information can be found at the Australian Circular Economy Hub <https://acehub.org.au>

Waste hierarchy



Circular Economy



Design for retaining and reusing materials

An important component of the circular economy is designing out waste and pollution. Increasing reuse and recovery activities minimises the number of resources used and avoids the generation of waste.

This project design presents many positive resource reuse and retainment opportunities.

Opportunities can include:

- Retaining a large portion of the structure and/or fit-out saves energy and material use and avoids waste as part of the highest component in the waste hierarchy.
- Designing to minimise excavation
- Designing to standard material sizes
- Specifying the use of second-hand recycled materials
- Designing for deconstruction – use mechanical fixings that allow easy disassembly rather than glues

Waste minimisation on site

The following measures help to ensure reduced site waste to landfill:

1. **Selection of head contractor** - demolition, excavation and/or construction.
 - a. At tender time contractors should be asked to demonstrate in detail, in writing how they:
 - i. minimised waste on previous jobs – must be specific with job details and initiatives
 - ii. propose to minimise waste on this job
 - iii. stream (separate) specific waste items for recycling or use a waste contractor that will maximise recycling
 - b. Favour demolition contractors who undertake significant demolition by hand rather than excavator.
 - c. A Greenstar experienced contractor and GreenStar accredited waste processing facility are preferred. Both should hold a Green Star Compliance Verification Summary issued by a suitable qualified auditor, confirming compliance with the Green Star Construction and Demolition Waste Operational and Reporting Criteria.
2. **A pre-demolition audit** (or waste management audit) before any renovation or demolition project will help identify any materials to be re-used or recycled, as well as for hazardous waste. Similarly carefully **consider all construction materials** to be used prior to construction.
3. **Waste minimisation addressed in all site inductions** – site inductions must include a discussion of the intent to recycle and minimise waste and the implications of poor waste minimisation practices.
4. **Setting targets for maximum number of mixed waste bins** to leave the site. Note items taken directly to a recycling station or a recycling contractor collection will reduce total bin numbers.
5. **Inclusion in contract conditions for trades to minimise waste.** Set cost penalties where the target number of bins is exceeded. Measures that change of contractor behaviour include:
 - a. plasterers supply their own plasterboard recycling bins.
 - b. other trades such as studwork framers and electrical supply their own bins and clean up their own work at the end of the day, placing waste into their own bins – specifically timber or metal stud off cuts or cabling for recycling.
 - c. ensuring contract conditions confirm contractors nominated waste minimisation strategies. These should be detailed and specific.
 - d. contractors being required to provide records of waste bins sent offsite.
6. **Keeping a waste register** that records waste types and volumes as they leave the site as required by Councils DCP (Development Control Plan).
7. **Supervision and monitoring of waste bins** and enforcement of separation of waste types
8. **Active waste separation of waste streams** - During construction ensuring the labourer stockpiles materials suitable for re-use in work locations daily.
9. **Bins with lids** on for workers food waste and wrappers or other waste that may blow out of bins and around on site. Reduces contamination of other recycling loads.

1.7 Risk Review

Per industry practice detailed, specific risk assessments should be prepared by the individual contractors responsible for demolition, excavation, the construction of the structure, services, fitout and finishes phases. The risk assessments should take into account but not be limited to waste related activities such as below:

- Worker, pedestrian and traffic hazards created by movement of waste to waste bins and movement of waste bins and vehicles on and off site.
- Excavation risks
- Safe handling of hazardous and toxic waste materials if they are identified on the site, such as asbestos.

2 Measures to manage and reduce waste

This section details measures to minimise and manage reducing demolition and construction waste.

2.1 Accurate Estimation

The design involves common construction methods and can be readily estimated with accuracy by experienced contractors for material take-offs.

Careful estimation, ordering and prefabrication offsite prior to site construction will ensure that minimal excess material is wasted and that variations on site that result in waste are minimised.

2.2 Waste Charges by Volume & Weight

Most demolition and construction waste is charged by volume (set price for the bin or per standard size truck), and also by weight. This means that even some lightweight voluminous products are expensive to be disposed of – which may improve the incentive to recycle more.

Products like polystyrene or **PVC pipe** can take up a large volume and fill bins quickly. Recycling of polystyrene and clean PVC pipe is a smart move to save on the number of waste bins or trucks.

2.3 Waste removal options

Waste removal may occur via the following options

- Demolition – sorting and loading onto trucks for carting off-site
- Excavation – moving around the site or loading onto trucks for removal offsite
- Construction
 - Placement in co-mingled bins for separation off site at waste contractors or other sorting facility
 - Separation on site into different cages/bins to reduce the need for off-site separation
 - Placement in contractors' utes or trailers for removal off-site.

2.4 Streaming waste (waste separation)

Separation on site is the simplest way to reduce recycling costs as it simplifies sorting of waste at the processing yard. In most cases mixed loads of recyclable and non-recyclable products that requires extensive sorting can incur a significant premium price compared to a site pre-sorted load.

During demolition and construction unless use of a mixed load bin contractor is proposed, separate bins or stockpiles for recycling should be established as follows:

- All clay roof tiles, brickwork, concrete and rock for removal and recycling as road base or similar
- All timber framing for recycling or for mulching
- All metal
- PVC pipes for recycling where quantities warrant (for metropolitan areas where recycling is possible)
- Electrical cabling

- Capet tiles if present are to be stockpiled and kept dry
- Other materials as relevant

2.5 Waste Bin / Cage Guidelines incl Signage

All waste containers / skip bins are to be clearly visible, accessible and labelled in a well-lit area to ensure use. Labels are to clearly indicate the correct waste that can be placed in each bin. No hazardous, flammable or explosive materials are to be disposed of within skip bins. Storage of skip bins is not to cause disturbance to normal stormwater flow.

2.6 Contractors

The choice of contractor and attitude to waste has a significant impact on the waste performance of a building site.

Tendering demolition, excavation and construction head contractors are to identify their planned waste minimisation strategies. Waste minimisation strategies should identify which products are to be recycled and where they are to be taken to, and which are not to be recycled and where they will be sent to.

In NSW there is currently a requirement that waste operators and transporters that receipt more than 5,000 tonnes per year be EPA NSW licensed and therefore under greater EPA scrutiny. Accordingly larger waste transporters and operators are more likely to be living up to their commitments. (The Waste Management Association of Australia – WMAA is looking to also have this threshold reduced to 1000 tonnes). Larger waste transporters and operators:

- **Metro Demolitions** - <http://www.metrodemo.com.au/demolition/>
- **Benedict** - <http://www.benedict.com.au/locations/>
- **Bingo Industries** - <https://www.bingoindustries.com.au/recycling-centres/nsw/>
- **Suez** - <http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW>
- **Dial a Dump** – <http://www.dadi.com.au/recycling-landfill/genesis-eastern-creek>
- **Brandown** - <http://www.brandown.com.au/>
- **Hi Quality** - <http://www.hiquality.com.au/resource-recovery/company-overview>
- **Regroup** - <http://www.municipalenvironmental.com/regroup/service/recycling>
- **Concrete Recyclers** - <http://www.concreterecyclers.com.au/location.html>

2.7 Waste Register – recording waste disposal

Council requires a register is to be kept for recording types and quantity of waste taken off site, waste contractor used and destination for the treatment or disposal of the waste. Evidence of waste disposal trips (weighbridge dockets or invoices) is to be retained and available.

Monthly waste and recycling contract reports provided by the waste processing facilities, indicating the amount of waste received, and a breakdown of materials recycled or sent to landfill will form the basis of the waste register.

The register should also include tracking of contaminated wastes generated on site that include but may not be limited to:

- Contaminated soils
- Materials containing asbestos or older electrical equipment including lighting controls containing PCBs (possible within garage building on site)
- Waste oils, oil and fuel filters from machinery used on site, oily water
- Solvents, paints and adhesives and their containers

2.8 Site Induction Training in Waste Management

All contractors on site should be trained in the contents of this waste management plan as part of site induction procedures, to maximise the use of recycling storage provided on site and the diversion of demolition and construction waste from general landfill.

Waste inclusions in site induction:

1. Identify if different waste types are to be separated (streamed) on site and placed in different enclosures or to go into one shared load bin for offsite sorting.
2. Identify small mobile bins with lids will be moveable and located around the site for food scraps and small waste items to be kept out of waterways
3. Confirm signage will be provided at each different waste bin type
4. Confirm waste recycling rates are recorded for this job
5. Advise contractors will be penalised with costs for incorrect placement of waste in the incorrect bins

2.9 Additional Council Bin Permits

Waste bins are proposed to be fully within the fenced off-site boundary. Should additional waste skips be required outside of the property on the roadway or nature strip a permit would be required from council.

2.10 Pollution Control Measures

Pollution control measures should be identified and documented, prior to work commencing. This should identify where pollution control measures will be installed, and how erosion and loose waste will be managed. Examples of measures to be applied during works follow:

- Capping / properly sealing off all pipe ends to underground stormwater and sewer connections either at ground level, as the pipes leave the site or at the mains.
- Drain filters/sediment traps in front of side entry pits or over grated pits (see image below)
- Silt fences on the down slope side of the site where the site has a slope steeper than 1:20 (see image below)
- Silt bunds in swales to retain site erosion materials but allow water flow through
- Erosion control blankets over mounded earth
- Installation of tarps/coverings on site waste bins during non-work hours to prevent blown material leaving the site.



Example – Silt Fencing



Example – Drain Filtering / Sediment trap

2.11 Runoff, Spills, Siltation & other Pollutants

Suitable measures are to be taken to ensure the possibility of pollutant runoff from the site is contained and managed. Containment fencing and silt management measures at the boundaries are recommended.

Once excavation is below street level run-off externally from the site should not occur. Ground infiltration could still occur but should be minimised if onsite water is minimised.

The following are some indicative measures that can be implemented for runoff management and spill containment.

2.11.1 Vehicle Spills

Spill and sediment tracking off the site from vehicles leaving the site should be managed to minimise pollutant and sediment loads that could otherwise enter street stormwater catchment.

2.11.2 Truck / Bin Clean-up

For the majority of the work, demolition will be carried out on a concrete pavement. Trucks will need to be inspected to ensure broken glass, shards of metal and brick rubble is not transported off-site on to the roadways.

During the excavation works trucks will potentially collect soil on wheels.

The use of crushed rock on internal roadways will reduce this, as will the use of rumble grids. Washing down trucks and storage bins prior to leaving site is another method that may be required to prevent silt and pollutants leaving the site, All measures reduce the need to clean down roadways.

3 Excavation Stage

The following outlines the general sequence and waste streams identified for the excavation phase and recommends appropriate methods for recovery and disposal.

3.1 Contaminated Land

No contamination report has been provided at the time of writing this report. Should any contamination be found, during the planned excavation, it is to be remediated and disposed of to an approved contaminated/remediated soil facility per the Contaminated Land Management Act as required by NSW EPA.

Potential contamination sources include:

- Former onsite commercial / industrial activities
- Imported fill materials
- From pesticides applied around the building
- Infiltration from offsite sources

With no buildings to be demolished, asbestos in buildings will not be a concern.

3.2 Trees

There are 2 significant trees to be protected on the adjoining property to the south prior to works commencing – refer Arboriculture Impact Assessment & site Specific Preliminary Plan of Tree Management prepared by Growing my Way Tree Consultants dated May 2024..

3.3 Sequence

The general sequence to be followed for completing the demolition and excavation stages is as follows:

1. Installation of hoardings & fencing and boundaries to protect the public and significant vegetation.
Checking to ensure existing fences are sufficient and complete to prevent unauthorised public access.
2. Installation / identification of access roads, washdown and other site safety protection measures
3. Hazardous materials removal. If hazardous materials are detected a these will be removed by accredited contractors.
4. Demolition methods
 - By hand or machine – vegetation – minimal.
 - By hand - Services - to be disconnected and terminated by licensed contractors
6. Excavation
 - Top soil can be stockpiled on site in the southern corner if required.
 - Much of the site is composed of sandstone (up to 95%). Much of this will be retained and re-used on site or able to be taken and re-used elsewhere.
 - Any excavated soil unable to be re-used on site should be inspected with the hope that it can be sent to a clean fill site for re-use.

3.4 Table 1 Demolition phase waste analysis – Site Establishment, Demolition, and Excavation

All materials suitable for recycling must be forwarded to an appropriate registered business to the satisfaction of the Principal Certifying Authority.

Materials on Site			Destination		
Type of Material	Location / examples	Estimated Qty – TBC by contractor	Reuse and recycling options and recyclers	Disposal and landfill sites	Volume of material diverted from landfill
Vegetation	Trees/shrubs	16m ³ approx	<ul style="list-style-type: none"> Mulching by green waste contractors 		16m ³
Concrete / Bricks / masonry / rocks	Ground slabs, suspended first floor slabs, driveways, paving, Brick walls and blockwork.	0m ³ approx	<ul style="list-style-type: none"> Removal and delivery to concrete/masonry recycler for filling, levelling material, road base 	Metro Demolitions, Boral, Concrete Recyclers, Bingo, Benedict Industries	<0m ³
Total waste (excluding excavation) and percentage diverted		16m³			16m³ 100%
Excavated fill & sandstone	Basement Carpark	3,210 m ³ approx	<ul style="list-style-type: none"> Excavated fill is often able to be re-used so long as the fill is clean and uncontaminated. Excavated sandstone is to be re-used on site or taken offsite for re-use. Excavated fill can often be used on construction projects by the main contractor or external contractor, depending on the project subsequently occurring at the time. 	If no avenues for re-use, or if the fill is unclean or an insufficient soil type, it may be disposed of in a commercial landfill site.	3,210m ³

For further information regarding each contractor refer to the Waste Contractors section of this report.

4 Construction Stage

For Bin Placement and Vehicle Collection Path see: Appendix 1 Demolition and Construction Waste Bin Collection Location Plan.

4.1 Construction System & Take-offs

Materials are to be delivered on an 'as needed' basis to reduce the chance of damage /degradation through weathering and moisture damage.

Items to be pre-fabricated off-site in controlled yards or factories and delivered complete to site will reduce on-site waste significantly. Pre-fabricated products include:

- Precast panels
- Roofing sheets cut to length
- Windows
- Lifts
- Joinery
- Screens

Further; waste is generally reduced at off-site fabricators for economic benefits.

Contractors can further reduce waste by the selected building system. Pre-cast panels generate less waste than blockwork structures. Prefabricated walls reduce waste in comparison to site built framed walls. In-addition careful and accurate ordering of materials, along with clean-up and retention of re-useable materials will assist to reduce on-site waste.

4.2 Waste Recovery on site

Timber stud offcuts will be re-used where possible (a good labourer stockpiling materials in work locations can help re-use of materials) or stockpiled for the public use or recycled as timber mulch.

4.3 Contamination of soil during construction

Contamination of soil or surrounding spaces, which then needs to be removed off site, often occurs and can be addressed in the following ways in *italics*

- small items such as discarded fasteners, food scraps packaging and straws – *locate small easy to find bins with lids around the site*
- broken polystyrene – *cut and sweep up immediately then place in bins with lids*
- rubble mixed into soil that might otherwise become a garden bed – ensure crushed rock for ground stabilisation is placed in locations that will be covered by paths and not garden beds.

4.4 Sequence

The general sequence to be followed for completing the construction stages is as follows:

1. Foundations and basement construction

Expected to include in-situ poured concrete footings, columns and basement floor slab(s)

- Slab and column in situ concrete - Experienced concreters order loads accurately, ordering on a load by load basis near the end of the pour. Waste concrete would be a fraction of one load per pouring day i.e. approx. 1-2m³ at most on the last delivery of the pour. Waste is to be crushed and used for ground stabilisation, behind retaining walls as broken up aggregate, or removed and crushed for re-use in road base or similar.

- If precast concrete panels or sprayed shotcrete retaining walls around the perimeter of the basement were used, similarly no or minimal onsite waste anticipated from these options.

2. Upper structure construction and windows

Expected to include blockwork/brickwork, or pre-cast concrete and/or timber and fire rated plasterboard party walls, blockwork, precast or in-situ concrete lift core(s), steel columns and/or beams, timber floor joists and flooring or poured concrete suspended slabs, timber or metal non-party walls and aluminium windows.

- Blockwork/brickwork and mortar waste will be minimal and can be reused in other locations on site, or recycled off site.
- Precast concrete panels involve minimal waste.
- Structural steel will be ordered to length to minimise offcuts.
- Timber joists will be ordered to length to minimise offcuts.
- Timber chipboard or similar flooring will go to landfill waste.
- Suspended slabs are poured on site. Excess or trimmed reinforcing steel is to be sent off site to mixed metal recycler.
- Maximum waste anticipated from poured concrete slabs would be no more than 1m³ per pour, to be spread and crushed for re-use on site as base for pedestrian paving, road base or similar.
- After stripping, formwork is cleaned in most cases and where possible, reused again. It is in concreters financial interests to re-use formwork. Residual formwork offcuts will be placed in general waste to landfill.
- If used timber stud offcuts will be re-used where possible (a good labourer stockpiling materials in work locations can help re-use of materials).
- Damaged or off-cut metal stud framing to be recycled in metals bin on site.
- Windows come to site prefabricated so only generate waste from plastic, cardboard and timber protective packaging. Separate cardboard and plastics bins or enclosures should be provided to capture this waste.

3. Roof

Metal roofing is usually ordered cut to size to reduce off-cuts on site and improve the finishes of edges.

- Metal sheet, guttering offcuts, damaged downpipes can easily be recycled.
- Installation of the ground level downpipes should be delayed until the end of the job to reduce the chance of damage. Temporary plastic downpipes reduce wastage of metal downpipes, and can be re-used.



4. Services installation

- **Electrical** - Installation of electrical systems. Wire waste should not end up in general waste bins on site but should be removed, stored and sent for recycling of the copper.
- **Fire services** - If installed, leftover steel pipe offcuts from the fire system can be recycled.
- **Lifts** will be prefabricated offsite and installed with minimal waste.
- **Plumbing** and drainage would include water, sewer piping, and PVC drainage pipe installation. Accurate ordering of quantities will ensure minimal pipe waste. If clean-up is thorough, some pipework can be recovered for use on other jobs. Significant volumes of clean PVC and HDPE drainage pipe can be separated for collection and may be recovered for granulation and reuse. Otherwise it may be disposed to landfill.
- Waste solvents from pipe gluing are to be tracked in the contaminated waste register and disposed to a suitable landfill for solvent container disposal.

5. Cladding and fitout

Application of external and internal linings: including external cladding and features, awnings, plasterboard linings, insulation.

- **Lightweight steel battens** for supporting cladding fixed to the outside of the frame will be recyclable.
- **Metal cladding** and feature metal screening will be pre-cut for size although some cutting and waste may be required on site.
- **Cement sheet or composite cladding** materials will go to landfill.
- **Masonry type cladding materials** will be recyclable.
- **Insulation** - Experienced insulation installers should be able to estimate quantities accurately, with small cut-offs being reused elsewhere on site in small gaps. Leftover insulation can also be taken offsite by the contractor for reuse in other jobs. Small amounts of damaged insulation may be generated and should be disposed of to landfill.
- **Plaster** - The plastering contractor will generate an economically recyclable quantity of plasterboard waste from clean offcuts and damaged clean sheet, therefore a bin for recycling plasterboard offcuts should be provided on site. The bin should be clearly marked for clean plasterboard as it can be readily recycled (see 'Waste Contractors' section below).
- **Lighting, cabinetry, and fittings** will generate plastic and cardboard packaging waste. Separate cardboard and plastics bins or enclosures should be provided to capture this waste.
- **Ceramic tile** offcuts can be recycled with masonry waste. Carpet and carpet tile offcuts cannot readily be recycled. Vinyl flooring cannot currently readily be recycled.
- **Flooring** installed in units will result in small quantities of trimmed material. This should be sent to a mixed waste offsite processing centre where it can be disposed to landfill if not recoverable.

6. Finishes

Work includes painting and rendering, detailing of architectural façade features, floor sealing and finishes, cleaning.

- **Render** - Where specified, render waste generated by rendering contractors may be cement based or mixed with synthetic binder. As for mortar, cement render waste can be removed and crushed for re-use in road base or similar. Synthetic bound render waste will need to be disposed of to landfill.
- **Paint and floor sealing** contractors will produce waste containers that are contaminated solvent-based waste, requiring tracking and disposal to an approved landfill facility. A bin for paint, adhesive and solvent containers will be used to store this waste and movements should be recorded in the waste register for contaminated materials.

7. Restoration

Re-establishment of kerbing, vehicle crossings and footpaths. Involves concrete pouring, and paving.

Contract conditions on trades and subcontractors

Trades on site that are likely to produce waste as a result of their activity, where recycling is possible, should be required to recycle waste that is recoverable, through contract conditions requiring the use of marked bins provided by the primary contractor for recoverable material, and including the waste management plan content as part of the contractor site induction conditions.

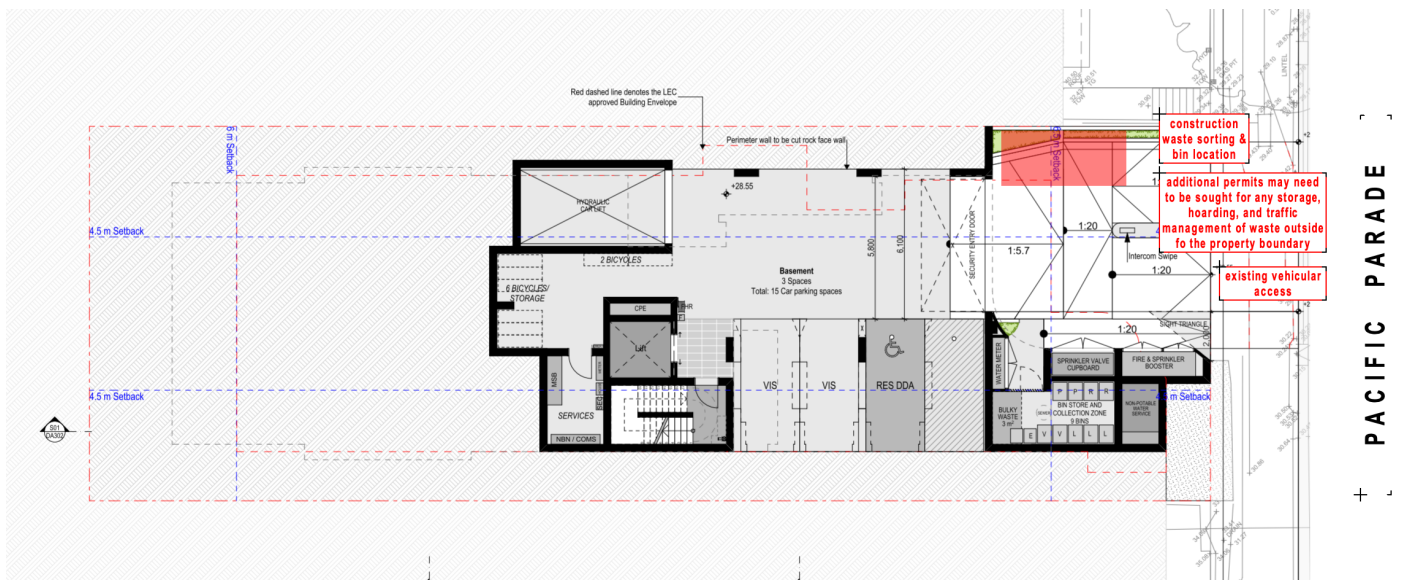
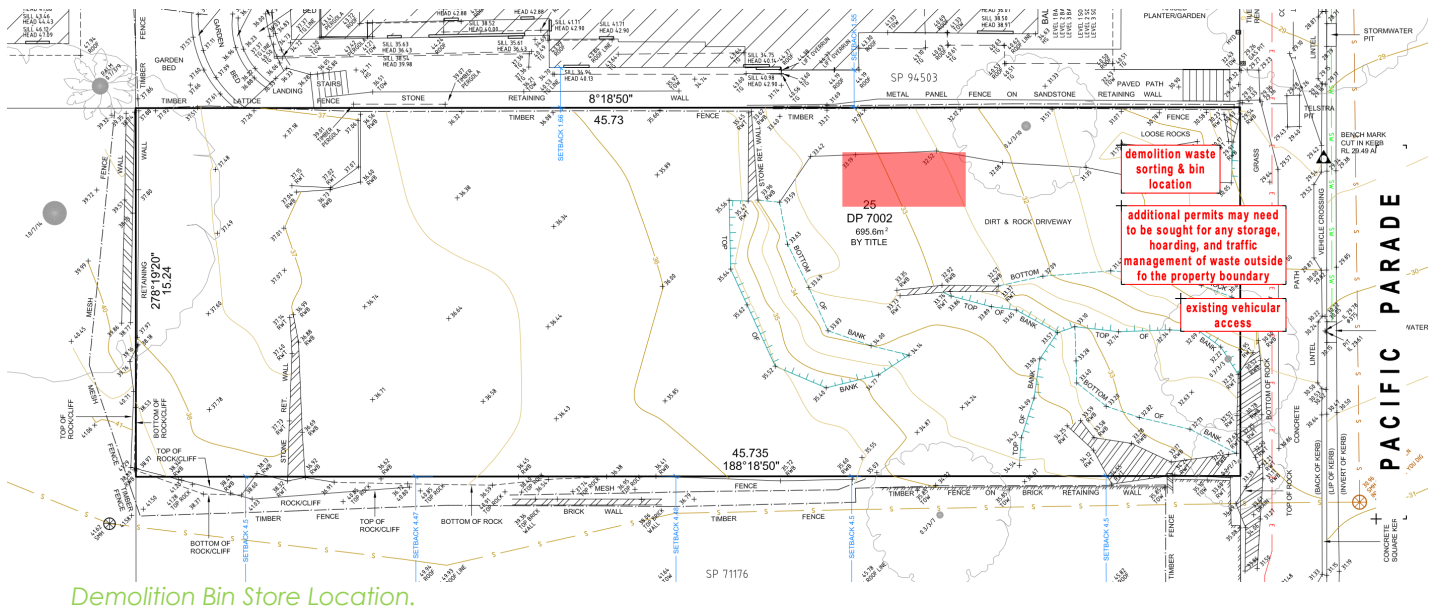
4.5 Table 2 Construction phase waste analysis – Structure, Services, Fit-out and Finishes

Basement, suspended slab and timber and/or masonry walls apartment development						
Stage of Construction	Destination					
	Reuse and Recycling				Disposal	Volume of material diverted from landfill
	Type of Material	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill site)	
Under-slab plumbing pipework to bin store waste etc	Plastic pipes	Minimal <1m ³	-	-	Builders bins to landfill	0m ²
Poured insitu Concrete footings, columns, slab on ground, driveway ramp	Concrete	Minimal waste expected <1m ³	Can be used under driveways or paths as a base if any excess waste from the last pour of the day is left		NA	
Blockwork walls to lift shaft and building walls	Masonry	8m ² approx		- Recycled (often Council) waste transfer facility when separated. Placed dedicated bin	Not to be added to builders landfill bin	8m ²
Timber or metal framework	Pine timber	12m ³ approx	.	- Recycled (often Council) waste transfer facility when separated. Placed dedicated bin	Not to be added to builders landfill bin	12m ²
Upper timber floor	MDF or similar	6m ³ approx	-	-	Builders bins to landfill	0m ²
Roofing	Metal sheets and gutters	2m ³ approx	.	- Recycled (often Council) waste transfer facility when separated. Placed dedicated bin	Not to be added to builders landfill bin	2m ²
Roof, floor & Wall Insulation	Bulk insulation	6m ³ approx	-	-	Builders bins to landfill	6m ²
Building wrap/ sisalation	sisalation	2m ² approx	-	Larger pieces to be re-used on other sites -	Builders bins to landfill	0m ²

Basement, suspended slab and timber and/or masonry walls apartment development						
Stage of Construction	Destination					
	Reuse and Recycling				Disposal	Volume of material diverted from landfill
	Type of Material	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill site)	
Windows / fixtures / finishes packaging	Cardboard	6m ³ approx	.	Cardboard and plastic recycled (often Council) waste transfer facility when separated. Stored on site until sufficient waste quantities are generated	Not to be added to builders landfill bin	6m ²
	Plastic / Styrene	12m ³ approx	-		Not to be added to builders landfill bin	12m ²
Masonry/brickwork	Bricks	9m ³ approx	-	Recycled (often Council) waste transfer facility when separated. Placed dedicated bin	Not to be added to builders landfill bin	9m ²
Lightweight Cladding and Eave soffits	FC sheets or composite materials cladding	12m ³ approx	-	-	Builders bins to landfill	0m ²
Plumbing pipes in walls and conduit	Plastic pipework	4m ³ approx	-	-	Builders bins to landfill	0m ²
Electrical and IT cable	Cabling	2m ³ approx	-	-	Builders bins to landfill	0m ²
Plasterboard	Gypsum Plasterboard	12m ³ approx	Large off cuts can be readily used on site	Plasterboard recycling service facility • ReGyp	Not to be added to builders landfill bin	12m ²
Skirtings/architraves/timber trimmings	Pine wood/ MDF	2m ³ approx	-	Wood is recycled if separated from MDF	MDF to builders bin and landfill	0m ²
Wet area tiling	Tiles	4m ³ approx	-	Recycled (often Council) waste transfer facility when separated. Placed dedicated bin and at substantial quantities	Not to be added to builders landfill bin	4m ²
Adhesive containers	Containers	<1m ³			Builders bins to landfill	0m ²

Basement, suspended slab and timber and/or masonry walls apartment development						
Stage of Construction	Destination					
	Reuse and Recycling				Disposal	Volume of material diverted from landfill
	Type of Material	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill site)	
Painting	Paint	200L approx	-	Taken to Paintback facility	Not to be added to builders landfill bin	
Joinery/kitchen and bathroom cabinets	MDF	N/A (prefabricated offsite)	-	-	NA	NA
Floor finishes	Composite Floorboards, carpet, vinyl	2m ³ approx	If offcuts are standard sized, those can be re-used on site in other dwellings	-	Builders bins to landfill	0m ²

Appendix 1 - Demolition & Construction Bin Locations



Appendix 2 - Recycling & Reuse of Materials

There are many ways that demolished building materials can be reused or recycled. Technology is developing constantly to increase and improve the options already available. Following are some of the ways that demolished building materials can be reused and recycled.

- **Concrete, blockwork, bricks, porcelain, bitumen / asphalt**

Concrete slabs/panels and bitumen/asphalt paving can be readily recovered and recycled for reuse or reconstitution in other construction products. Bricks can be crushed for reuse as aggregate and other products.

- **Plasterboard / Gypsum**

Clean plasterboard / paper lined gypsum board can be readily recovered and recycled for construction and agricultural use when crushed.

- **Metal**

Metal recycling generally falls into ferrous and non-ferrous metal categories
Numerous recyclers exist to handle both types in mixed and separated loads

- **Non painted, untreated, non-glue laminated timber**

Many re-use opportunities as well as recycling and at the very least chipping for gardening.

- **Rigid PVC pipework and conduit**

Since PVC is a thermoplastic PVC pipe can simply be reground, pulverized and returned to the extrusion process to make new pipe. There are companies in NSW, Victoria, Queensland and Western Australia that take back and recycle construction industry PVC pipe or conduit. Conditions for take back are:

Accepts:

- mixed building, construction and demolition waste of PVC and P.E. pipe
- pipe with glue and dirt

Won't accept:

- pipe lengths under 1.5m
- mud clumps on pipe– mud will clog up the granulating machines
- connectors pieces – elbows or angles.
- Screws, rivets or metal brackets connected
- rubber seals
- painted pipe
- stickers

For details of companies that take back PVC see:

- Vinyl Council of Australia <https://www.vinyl.org.au/find-a-recycler>
- PIPA - Plastics Industry Pipe Association <https://pipa.com.au/recycling/>

- **Cardboard + Polystyrene**

As with cardboard, polystyrene is completely recyclable and can be used to produce a number of plastic products.

- **Globes – Fluorescent and High Bay**

Various elements of a light globe can be re-used which requires a more specialised process for separation. The mercury can be used for medical purposes, Lightweight Steel sheet in fixtures, copper cabling, castings can all be separated and recycled.

- **Finishes**

Carpet can be used as a weed mat.

- **Paint tins**

Old paint tins can be recycled at one of over 160 locations around Australia. See more details at Paintback www.paintback.com.au where the following paints are accepted:

- Interior and exterior architectural paint
- Deck coatings and floor paints
- Primers, undercoats and sealers
- Stains and shellacs
- Varnishes and urethanes (single component)
- Wood coatings

- **Glass**

Some contractors will crush glass with concrete and/or bricks for road base. Due to poor prices for as well as an abundance of recycled glass, glass is generally currently not recycled separately. Window glass predominantly goes to landfill.

- **Green waste**

Green waste is very recyclable and easy to do so. Depending on the composition of the green waste – it can be used as Mulch or compost in many different formats. Depending on the waste it may even be sought after by the local zoo!

- **MDF**

MDF and particleboard is being recycled by some particleboard manufacturers but this is still limited and wide scale collection is currently not practiced.

Appendix 3 - Recycling, Reuse & Recovery Services Directory

Refer to The Western Sydney Recycling Directory – Construction and Demolition Waste 2017 located:

https://www.liverpool.nsw.gov.au/_data/assets/pdf_file/0019/114319/Western-Sydney-Recycling-Directory-CD-Updated-Nov-2017-1.pdf

The following is an indicative only list of Sydney based contractors that provide various services for handling the recycling, reuse and disposal of demolition and construction waste from the proposed project. This list has been assembled not in recommendation of any particular contractor but to demonstrate the general availability of recycling services around Sydney.

- **1300RUBBISH**
www.1300rubbish.com.au, ph. 1300 78 22 47
Bin only company - collects plasterboard for delivery to recycling centre.
- **AE BIGGS** Oxford Falls.
02 9453 2990 sales@biggs.net.au
A building and construction drop off recycling centre specialising in recycling bricks and concrete to make 10mm, 20mm & 40/70 aggregate, roadbase and crusher dust.+
- **Australian Native Landscapes** – Seven Hills, Terrey Hills, North Ryde,
www.anlscape.com.au, ph. 131458
Green waste off-site composting.
- **Benedict Industries** - Chipping Norton, Belrose, Banksmeadow
www.benedict.com.au ph. 02 9986 3500. Contact Matthew Rooke 0431 737 444 matthew.rooke@benedict.com.au or Gay Willis 0427 087 897 for more details.
Primarily a rubble recycling company but will manage a wider waste stream per below. Benedict will separate loads by hand or machine, screen some loads and crush masonry products. Non-recyclable elements will go to landfill.
 - Bitumen / Asphalt
 - Clean concrete, blockwork, brick, mortar (masonry), porcelain at Chipping Norton
 - Rubble+ soil – concrete/masonry and dirt mix
 - Mixed load – concrete rubble and mixed in non-recyclables (incl mixed demolition waste, vegetation, timber, plastics)
 - Steel loads – not mixed with other materials that requires sorting. (A One Steel bin is supplied in their yard and collected periodically by One Steel)
 - Electrical cable – not mixed with other materials that requires sorting. (A One Steel bin is supplied in their yard and collected periodically by One Steel)
 - Cardboard – not mixed with other materials that requires sorting. (A Remondis bin is supplied in their yard and collected periodically by Remondis)
 - Clean timber – pine or hardwood. Can contain nails or nail plates (no engineered timber such as laminated products, or MDR; no treated timber; no stumps). Timber is mulched at the Benedict Menangle plant.
 - Green waste – bushes, branches, ground covers, some soil ok - (vegetation but no manmade material or tree stumps) is mulched at the Benedict Menangle plant.
 - Clean and laminated MDF, laminated timbers, stumps and plastics will generally go to landfill.
 - Do not accept paints, liquids or food waste. Food waste on site should go into separate bins with lids. Delivery of any of these or other non-recyclable

materials will ensure a load is considered a mixed load of potentially rejected.

Detailed information about the acceptable and non-acceptable materials can be found at <http://benedict.com.au/wp-content/uploads/Benedict-Recycling-Acceptable-Waste-Streams.pdf>

Benedict Industries do not provide a bin collection service. Materials need to be delivered to Benedict Industries. Benedict are regularly serviced by good (smaller) bin suppliers and transporters as recommended by them depending on the location of the job.

- **Bingo Industries** – Auburn
www.bingoindustries.com.au 02 9737 0351 Daniel Spiteri 0409 900 743 (Recycling Sales Manager), Natasha 0406 182 626, Jean Yi 0450 081 600
Concrete, blockwork, Bricks, Porcelain, Bitumen / Asphalt. Primarily a rubble recycling service similar to Benedict however they also provide their own bins.
- **Boral Recycling** – Wetherill Park
<https://www.boral.com.au/locations/boral-recycling-wetherill-park>
ph. 02 9604 9101. Concrete, asphalt, roof tiles, bricks and masonry blocks are accepted.
- **Bower Reuse & Repair Centre** – Parramatta
<https://bower.org.au> ph (02) 9568 6280
The facility accepts materials, from small customers upwards. Leftover renovation and building materials are on-sold. Bin collection service is not provided. Collection fees are applicable in this case as Brookvale is just outside their pickup area.
- **CMA Eco Cycle** <https://www.cmaecocycle.net> 1300 32 62 92
A full lighting recycling service – all lights and all volumes.
- **Concrete Recyclers** – Camellia www.concreterecyclers.com.au
ph. 02 8832 7400
Concrete, brick, asphalt
- **Ecocycle** – St Mary's www.ecocycle.com.au
Lighting, eWaste and Battery collection service.
- **Greenwood Landfill** – St Ives ph.02 9450 2288
A licensed waste facility that accepts building and demolition materials. Recycling as much as possible prior to committing not recyclables to the soil. It accepts the following materials: Mixed waste, brick, concrete, raw timber, tiles, Asphalt, Bitumen, steel, trees and logs.
- **Gyprock** – Wetherill Park www.gyprock.com.au/Pages/About-us/Recycling.aspx,
ph. 131744 Only new, clean Gyprock product plasterboard waste is accepted. They do not provide bins.
- **Heritage Building Centre** www.heritagebuilding.com.au/products/recycled-timber/
02 9567 1322 Rear 432b, West Botany Street, Rockdale 2216
Recycled Building materials

- **Plastics Recycling Hub** (Sydney and Melb) <https://www.plasticrecyclinghub.com.au/what-we-recycle>. Will recycle the following when clean and free of mud, steel, screws, metals, liquids or concrete.
 - PE Polypipes – resin code 2
 - Plastic chairs – resin code 2
 - PVC pipe and conduit – resin code 3
 - Dincel formwork – resin code 3
 - Storage tubs and baskets – resin code 5
 - Plastic fold up tables – resin code 5
 - Corflute signs – resin code 5
- **IPlex Pipelines** - <http://www.iplex.com.au/>. Simon Laffan on 07 3881 9246
 IPex requirements:
 - clean rigid PVC pipe and conduit is accepted.
 - Large volumes can be recycled
 - Arrange an inspection of pipe prior to sending to IPex – contact Simon
 - Below ground PVC must be clean for recycling
 - Pipes manufactured pre 2005-06 may contain lead. Excessive lead will cause problems with recycling.
 - PVC sheathing around electrical or data cabling not accepted.
- **Kimbriki Resource Recovery Centre** – Terrey Hills <http://www.kimbriki.com.au> ph. (02) 9486 3512 The facility accepts materials, from small customers to large civil construction industries. Bin collection service is not provided. Tipping fees are applicable.
- **KLF Holdings** – Camellia and Asquith <http://www.klfholdings.com.au/> – Porcelain, concrete and bricks
- **Lamp Recyclers** – Statewide <https://www.lamprecyclers.com.au> 1300 789 917
 Lamp Recyclers is both a Collector and a Recycler of globes, lamps and fluorescent tubes. The method of disposal is dependant on the volume to be recycled. In this case, the volume is relatively small, so a Corflute Ezy-Return™ reply-paid lamp recycling pack should be requested and disposed of as per the instructions.
- **Liverpool Scrap Metal** – Moorebank <http://www.liverpoolscrapmetal.com.au> ph. 02 9602 4330
 Mixed metals recycling,
- **Liverpool City Council Community Recycling Centre**
 99 Rose Street, Liverpool. Ph: 1300 362 170
 The centre accepts materials such as:
 - Cardboard
 - Polystyrene
 - Paints
 - Fluorescent globes and tubes
 - Green Waste
 - has an authorized collection point scheme to recycle architectural and decorative paint named 'Paintback'. The following is accepted:
 - ⇒ Interior and exterior architectural paint
 - ⇒ Deck coatings and floor paints

- ⇒ Primers, undercoats and sealers
- ⇒ Stains and shellacs
- ⇒ Varnishes and urethanes (single component)
- ⇒ Wood coatings

Further information can be found at www.paintback.com.au

- **Metropolitan Demolitions Group** – St Peter's
www.metrodemo.com.au.
Concrete, blockwork, Bricks, Porcelain, Bitumen / Asphalt. Accept waste similar to Benedict Industries, but they have their own recycling facility. Glass is crushed in with brick and concrete. For larger projects Metro send bulk rubble for recycling overseas.
- **Onesteel Recycling** – Chipping North, Wetherill Park
www.onesteel.com
Mixed metals recycling, full site clean-up and bin services.
- **ReGyp – Kurnell**
www.regyp.com.au, ph.1300 473 497
Regyp provide and collect their own bins for new and old plasterboard per below:
 - Plasterboard and cornice off-cuts
 - Plasterboard with paint or wallpaper
 - Non-laminated plasterboard tiles
 - Gypsum blocks, gypsum prefab wall panels eg RFC rapid wall
 - Chemical precipitate gypsum (eg FGD)
 - Suitable industrial gypsum waste
 - Detailed acceptable and non-acceptable waste information can be found at <http://www.regyp.com.au/waste/>
- **Sell and Parker** – Banksmeadow, Kings Park, Ingleburn
www.sellparker.com.au
Metal
- **Suez** - <http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW>
Soft plastics from packaging
- **Sustainable Resource Centre** – Fairfield City Council
http://www.fairfieldcity.nsw.gov.au/directory_record/129/src
ph. 02 9725 0750
The facility accepts materials, from small customers to large civil construction industries.
Materials recycled (nothing else):
 - Terracotta roof tiles, Clay bricks
 - Clean concrete (with or without steel), and
 - Asphalt - ripped and profiled
- **Sydney rubbish services** Surrey Hills
<http://sydneyrubbishservices.com.au/plasterboard-gyprock-waste-removal/>
02 9785 5526
Bin only company - collects plasterboard for delivery to recycling centre
- **Veolia**
<http://www.veolia.com.au>, ph. 132 955
All waste metal in large volumes.