LID Consulting Waste Management Plan Report

Proposed demolition and construction work at 61-65 Lucas Ave, 36 McKay Ave & 31 Harvey Ave Moorebank, NSW.

Prepared for A&K Engineering Group.

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Waste Management Outline

Introduction

This report has been prepared on behalf of A&K Engineering Group for proposed demolition and construction works at 61-65 Lucas Ave, 36 McKay Ave & 31 Harvey Ave Moorebank, NSW.

This Demolition and Construction waste management analysis of the project has been undertaken to meet the requirements of the Liverpool City Council's Development and Control Plan 2008 (DCP 2008). The goal of this document (and other related better practice waste management guidelines) is:

- To maximise the reuse and recycling of demolition and construction waste materials; and
- Minimise the volume of material disposed to landfill.

Note this document is not an in-Operation Waste Management Plan nor is it a full Construction Management Plan.

Outline of Proposal

Site address: 61-65 Lucas Ave, 36 McKay Ave & 31 Harvey Ave Moorebank, NSW.

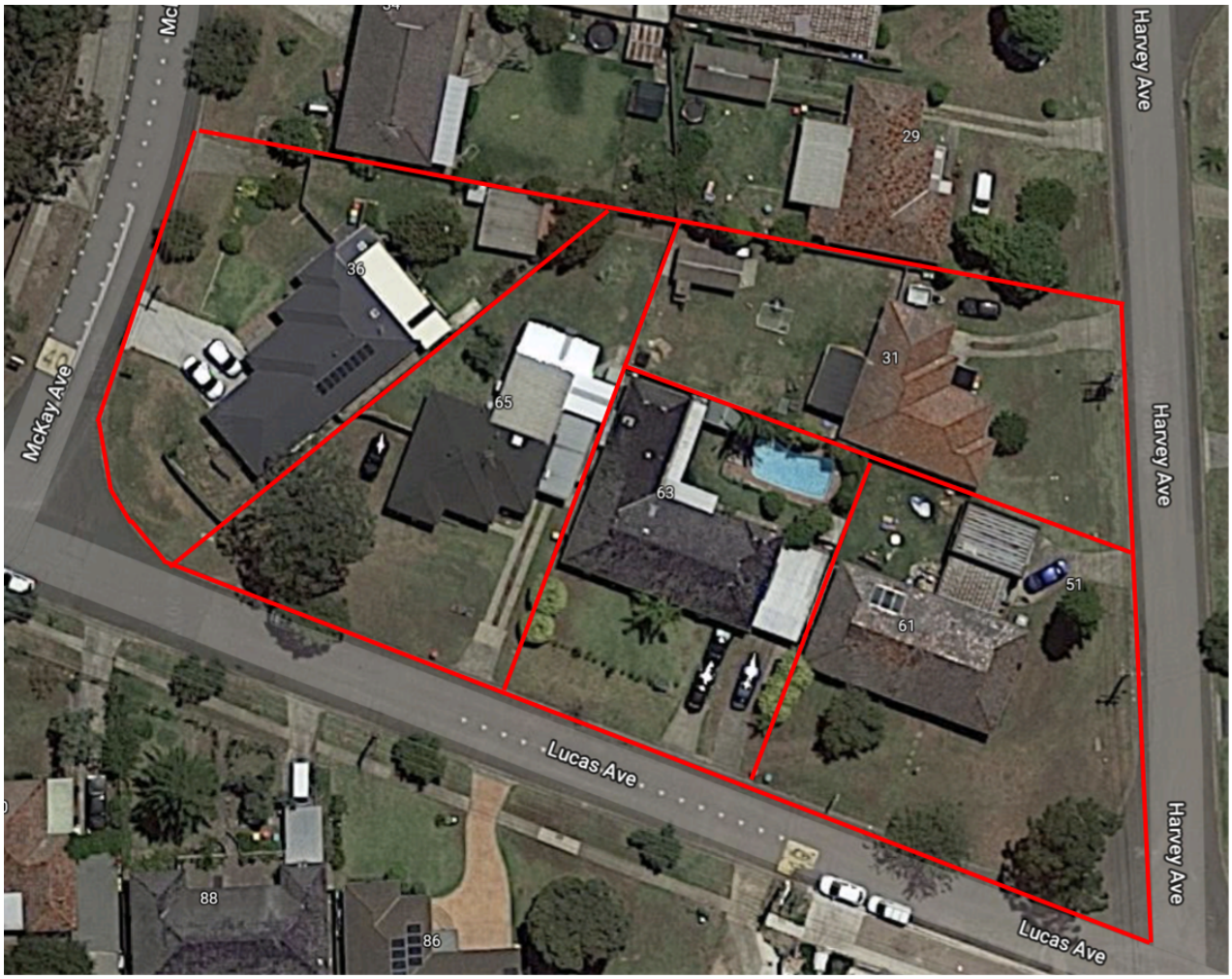

Image Courtesy of Google Maps

Applicant name: A&K Engineering Group

Existing Buildings and other structures:

- The existing subject site takes in the following property addresses: 61-65 Lucas Ave, 36 McKay Ave & 31 Harvey Ave Moorebank, NSW.
- The existing subject site contains 5 residential dwellings.
- Four existing dwellings each accommodate a single storey brick building with a tiled roof.
- One existing dwellings accommodates a single storey brick building with a metal roof.
- The subject site is relatively flat with minimal vegetation.
- The existing buildings do not appear to be of heritage value

Brief description of proposal:

- The project consists of two five-storey towers containing 76 apartments.
- Of the 76 apartments, 28 apartments will be affordable housing.
- Two levels of basement carpark, entering from McKay Avenue, are additional to the five storeys.

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.

Key legislation and references

Demolition and waste practices undertaken on site are to be carried out in accordance with the following key regulatory and reference documents:

- AS 2601 - 2001 Demolition of Structures, published by Standards Australia
- Liverpool City Council Development Control Plan 2008
- 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

Liverpool Development Control Plan 2008 » Part 1 General Controls for all Development » 25 Waste Disposal and Re-use Facilities

1.1.1 25 Waste Disposal and Re-use Facilities

This section applies to all applications that propose:

1. Subdivision and excavation of land.
2. Demolition of an existing building.
3. Construction of any development including alterations and additions.
4. Any development that requires a waste bay or the like.

1.1.1.1 Background

The construction and demolition of buildings and excavations generates the need for waste disposal and opportunities to minimise waste disposal and maximise recovery of resources from those activities. For new buildings, the occupation of those buildings generates an ongoing need for waste disposal and recycling. There are potential environmental and human health impacts associated with waste generation, storage and disposal. Under current waste legislation there is a need to minimise disposal of waste to landfill and recover resources to minimise depletion of natural resources.

1.1.1.2 Objectives

1. To minimise waste produced during demolition and construction of new development and maximise resource recovery.
2. To ensure waste management for the end use of the development is designed to provide satisfactory amenity for occupants and provide appropriately designed collection systems.
3. To minimise ongoing waste to landfill and maximise recycling of ongoing waste..

1.1.1.3 Controls

1. A Waste Management Plan (WMP) shall be submitted with a Development Application for any relevant activities generating waste. The WMP is provided in three sections:
   - Demolition
   - Construction
   - On-going waste management.
2. The WMP shall show:
   - Estimated volumes of waste generated according to type

- Information about reuse, recycling and disposal options for all types of waste produced on site during demolition, construction or ongoing waste generation activities.

3. The WMP must then be implemented on site throughout the development process, demolition, construction and use of the development. During demolition and construction the WMP together with proof of lawful disposal for all waste that is disposed of or otherwise recycled from the site must be retained onsite in a Waste Data File. Proof is to include a log book with associated receipt/invoices, waste classification and site validation certificate.
4. All entries in the Waste Data File must include:
   - Time and Date
   - Description and size of waste
   - Waste facility used
   - Vehicle registrations and Company name
5. The Waste Data File must be made available for inspection by any authorised Council Officer at any time during site works and at the conclusion of site works should be retained by the person responsible and made available for inspection by authorised Council Officers.

Risk Assessments

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.

General Recommendations

Waste reduction hierarchy

The waste reduction hierarchy promotes preferable behaviour in the following order

1. Reduce
2. Re-use
3. Recycle
4. Energy recovery (waste as a fuel)
5. Disposal

Actions for good waste minimisation

The following measures help to ensure reduced waste to landfill:

1. Selection of demolition, excavation and head construction contractor. Contractors waste minimisation strategies should be detailed and specific.

2. Selection of demolition contractor who undertakes significant hand demolition rather than demolition by excavator.

3. Selection of contractor and waste processing facilities used: A Greenstar experienced contractor and waste processing facility is preferred. The demolition contractor and waste receiving facility 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.
4. Inclusion of a discussion of the intent to recycle and minimise waste in all site inductions.
5. Inclusion in contract conditions that plasterers supply their own plasterboard recycling bins.
6. Change of contractor behaviour by the inclusion in contract conditions that 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 of metal stud off cuts or cabling for recycling.
7. Commitment to keeping a waste register as required by the relevant DCP.
8. Supervision of waste bins and enforcement of separation of waste types
9. During construction ensuring the labourer stockpiles materials suitable for re-use in work locations daily.
10. Separate bins with lids on for workers food waste and wrappers. Reduces contamination of other recycling loads.

Waste register

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.

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

Council permit applications

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.

Contaminated Land

If Contaminated soil has been identified, a remediation plan should be developed. If additional contamination is identified after demolition and excavation has commenced 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.

Contamination & Hazardous materials

Any contaminated and hazardous materials found on site during demolition should be removed and disposed of in the authorised manner. Refer to the Demolition Phase/ Hazardous Materials section for procedures and indicative locations of asbestos.

Refrigerant removal

Air-conditioners on site are likely to have CFC (ChloroFluouroCarbons), HCFC (HydroChloroFluouroCarbons) or HFC (HydroFluouroCarbons) as the refrigerant. These refrigerants are either very harmful to the ozone layer or very significantly greenhouse gas contributors. If units are not disposed of properly, refrigerant may escape into the atmosphere, contributing significantly to global warming. CFC and HCFCs have been banned for a while now. The alternative, HFCs are being gradually phased out. The federal government has started to cap the amount of refrigerant using HFCs that enters Australia as a start to outlawing such refrigerants including the common R-410A. http://www.environment.gov.au/protection/ozone/hfc-phase-down/hfc-phase-down-faqs

Before disposing of air conditioners, all units are to have the refrigerant 'recovered' by a licensed Australian Refrigeration Council (ARC) member technician https://www.arctick.org/. ARC members must hold a Full Refrigerant and Air-conditioning (Full RAC) licence or Restricted Refrigerant Recoverer licence (RRRL).

The recovered refrigerant is generally returned to a refrigerant gas retailer or wholesaler who will recycle the gas if possible. Where maintenance regimes have not used the manufacturers recommended gases or have used different gases over time, the refrigerant is less likely to be recyclable. If recycling is not possible, when enough gas is collected the retailer/wholesaler will forward the gas to the refrigerant gas product stewardship organisation Refrigerant Reclaim Australia (RRA) https://refrigerantreclaim.com.au/. RRA has a facility in Melbourne (the sole approved facility in Australia) for destroying refrigerant gases in an environmentally friendly manner. Gas is sent to this facility from all over Australia.

This scheme operates under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989, and regulates the handling, trade and disposal of refrigerants which are ozone depleting and synthetic greenhouse gasses.

Without an appropriate licence, operators are operating illegally.

Construction & 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.

Waste charges by volume and 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. For example PVC pipe can take up a large volume and fill bins quickly. Utilising recycling of good volumes of clean PVC pipe is a smart move to save on the number of waste bins or trucks.

Site training in WMP

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.

Vehicle management

All of the demolition vehicles including waste removal trucks will be able to access the site via Lucas Avenue. Existing crossovers will be retained during the works to facilitate access.

Trees

There are minimal trees to be removed/relocated, as shown on the Demolition Plan Rev B Dwg No DA12 Job No 16/007. To minimise interference from foliage during demolition works, trees to be removed should be removed prior to demolition commencing.

Removed trees should be chipped/mulched on site and disposed of by green waste contractor.

Services

All services running to and from the site need to be identified and confirmed as terminated offsite as appropriate in the approved manner to ensure worker safety and to avoid damages to external services.

Runoff, spills, siltation and 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.

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

Vehicular 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.

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.

Site waste 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 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.

Silt Fencing

Drain Filtering / Sediment trap

Demolition Phase

Contractor(s)

The choice of demolition and excavation contractors and attitude to waste has a significant impact on the waste performance of a project site. Tendering contractors should 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.

The demolition and excavation contractors are to confirm or improve on re-use or recycling options in this plan, or document an explanation if otherwise.

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

Sequence

The general sequence to be followed for completing the demolition stage is as follows:

1. Installation of hoardings & fencing and boundaries to protect the public and significant vegetation.

2. Installation of temporary access roads, washdown and other site safety protection measures

3. Asbestos and hazardous materials removal. A Hazmat report will be conducted and is to be reviewed and enacted prior to commencement.

4. Demolition methods

- By hand or machine – trees and vegetation
- By hand - Services - to be disconnected and terminated by licensed contractors
- By hand - Windows and glass panels to be removed separately
- By hand - Fixtures & fittings (doors, cabinets, sanitary-ware, skirting, architraves etc.) to be dismantled and removed
- By hand or machine - tiling to be removed
- By hand or machine- Plasterboard removed
- By hand or machine - Roof timbers, floor & wall framing removed
- By machine - Bricks and concrete dismantled and removed

5. Demolition of existing buildings

- All demolished materials are to be moved to the waste bin storage area with subsequent separation and loading of material into separated bins for recycling as appropriate – See Table 1.
- Demolition would most likely occur building by building starting with 31 Harvey Avenue. The bin storage area will be placed in the garden area of 31 Harvey Ave, as this building is demolished more space can be created to facilitate further bin storage and/or materials sorting onsite. Much of the demolition would occur mechanically as would separating demolished materials for loading into trucks and removal to recycling yards as appropriate – See Table 1.

Contaminated Land

See section above – Contaminated Land.

Hazardous Materials

Asbestos is present in the buildings. Details of removal procedures and risk management are detailed in the ACM report that will be submitted by the applicant to council (see Appendix 4 for a reprint of the finding). Additional sampling may be required to areas that were not accessible at the time the report was undertaken.

An approved licensed removal contractor will be engaged to remove the product with air monitoring undertaken throughout the process.

Any previously unidentified suspected asbestos material identified during the demolition should halt works until such time the material can be inspected and classified by an experienced consultant.

Asbestos is commonly contained in older buildings built prior to 1985 and may occur in the following locations:

- Cement sheet walls
- Backing to floor tiles
- Lagging insulation for hot water pipes
- Backing to old switchboards
- External cladding (Fibro)
- Corrugated cement sheet roofing

Windows audit

An audit must be taken of all windows to be removed during demolition. This is to enable the sale of any windows not required. This should include:

- the outside dimensions of each window,
- confirmation of the frame type (aluminium, timber, PVC, or composite, domestic, semi commercial or commercial, fixed glazed, awning, sliding, bifold),
- glazing type (single or double glazed, clear, tinted or low e), and
- a picture for each window.

This audit must be undertaken two months before demolition is scheduled to commence and the items be placed on a marketplace website (such as Gumtree, Freecycle, Zilch, Oz Recycle etc) for sale or take away for free. This audit may need to be undertaken by the project design team.

Materials to be recycled

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

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

Materials on Site			Destination		Contractor#
Type of Material	**Location / examples**	**Estimated Qty – TBA by contractor**	**Reuse and recycling**	**Disposal**	**Operating in the local area**
Concrete	Ground slabs, suspended floor slabs, driveways, paving, swimming pool,	235m^3	• Removal and delivery to recycler for filling, levelling material, road base		Metro Demolitions, Boral, Concrete Recyclers, Bingo, Benedict Industries
Bricks / masonry	Brick walls and blockwork, stone benchtops.	74m3	• In the event that the mortar is able to be separated from the bricks then there is opportunity for reuse of the bricks in external construction. • Alternatively, in the event that the demolished brick cladding will not be in a feasible condition for re-use; there is opportunity to recycle crushed brick into other building materials. • Demolished brick walls will need to be broken down into suitable sized pieces (as accepted by recycling contractor) and transported to a concrete recycling facility.		Metro Demolitions, Boral, Concrete Recyclers, Bingo, Benedict Industries
Tiles - Roof	Roof tiles on 4 houses	38 -40 tonne	• Reclaimed for second hand roof tile suppliers. • Can be crushed for road base.		Roof Tile Recyclers
Hardwood timbers	Studs, framing, hardwood floorboards	36m^3	• Reclaimed for second hand timber suppliers OR reused on site as flooring, fencing, furniture. • Any hardwood floorboards are highly sort after. • Re-used on site as formwork, bridging, blocking & propping	Woodchipping for mulch	Heritage Building Centre, Bingo,

			&/OR reclaimed by second hand timber suppliers • Floorboards in good condition to be hand recovered and collected by recycled timber /building products contractor		
Other timbers	Architraves, skirtings, floorboards stud walls, bathroom, bedroom and kitchen cabinetry, timber decking fencing, wall panelling, timber shutters,	48m3	• Re-used on site as formwork, bridging, blocking & propping &/OR reclaimed by second hand timber suppliers • Kitchen Cabinetry can be sold on buy swap and sell websites.	Woodchipping for mulch	Benedict Industries, Bingo, www.Gumtree.com www.Ziilch.com
Metals	metal roofs, roller doors, fences, sinks, baths, copper pipes, chrome fixtures, metal awning supports, garden sheds.	10 tonne	• Any metal from structures on the existing site and delivered to metal recyclers • Copper and older iron piping in good condition to scrap metal merchant. Stainless and chrome tap ware accepted by some merchants.		www.Gumtree.com www.Ziilch.com www.Greys.com One Steel, Sell & Parker, Veolia, Benedict Industries, Liverpool Scrap Metal
Other Metals	a/c ducting, sinks, baths, chrome fixtures, light fittings, A/C units, Rigid A/C Ducting, ceiling fans.	18m^3	• Any metal from structures on the existing site and delivered to metal recyclers • Stainless Steel and chrome tapware accepted by some merchants. • Heating units can be recycled. • Non-ferrous metals are recyclable. • Corroded / poor condition piping, ductwork and other metals may need to be sent to either a mixed recycling waste facility or landfill as appropriate.	Disposal of Refrigerant from AC needs to meet EPA standards.	Onesteel, Benedict Industries Sell & Parker, Liverpool Scrap Metal
Windows	Timber and aluminium windows,	145m^2	• Limited potential with second hand building suppliers. • Will be advertised on second hand market websites prior to demolition. • Potential re-use as glazing OR	Separation of glass and framing is generally not economic so not commonly undertaken	

			crushed for aggregate in concrete production. • Some windows are double glazed, the older windows are single glazed.		
Timber Doors	External & Internal doors	70 No	• Limited potential with second hand building suppliers. • Muclhed up for use – eg BioGrow type use or painted MDF acceptable		Gumtree, Ebay, Ziilch. Bingo.
Lights	Fluorescent, Downlights, Oyster	150 No	• Lightweight Steel sheet in fixtures • Copper Cabling • PCB's • Fluorescent tubes • Non-ferrous metals • Steel sheet and castings recycled • Copper Cabling recycled • Mercury collected for medical industry.	Landfill Disposal of Fluorescent tubes needs to meet EPA requirements,	Ecocycle, Liverpool Community Recycling Centre, Lamp Recyclers.
Vitreous china	Toilets, shower bases, vanities,	30 No toilets/vanities/showers	• Crushed up and mixed with masonry products		Bingo, SCE Recycling, KLF,
Poly Carbonate Sheeting	Alfresco dining areas	5m^3	• If in good condition it can be sold or given to recycled building suppliers The older the sheeting the less likely it can be re-used.	Landfill	Gumtree, Ebay, Ziilch. Bingo.
Plasterboard	Internal Walls and ceilings	60m^3	• Plasterboard recycling service		ReGyp
Rigid PVC	Downpipes, conduit.	5m^3	• Clean rigid PVC pipe and conduit can go be recycled. • PVC sheathing around electrical or data cabling not accepted	Landfill	Ipex Pipelines
Foil Insulation	Roof Insulation	Roof Area 850 m^2	• Older insulation is unlikely to be recyclable. • Insulation at No 36 McKay should be in good condition and possibly reclaimed for reuse on another job.	• Landfill	Benedict Industries, Bingo.

Cabling	Electrical, IT	24m^3	• Non-ferrous metals are accepted at recyclers.		Benedict, Bingo.
Water tank	Water tank	1 No	• If in reasonable condition advertise on buy swap sell websites		www.Gumtree.com www.Ziilch.com
Floor & window finishes	Carpet, carpet squares, underlay, tiles, lino floors, timber venetians blinds, fabric curtains, metal venetian blinds	40m^3	• If in reasonable condition advertise on buy swap sell websites for larger runs, make available to community groups • Curtains can be recycled as painter's rags and painter's furniture protection. • Carpet can be used as weedmat in gardens.	• Landfill	www.Gumtree.com www.Ziilch.com

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

Construction Phase

For Bin Placement and Vehicle Collection Path see: Appendix 3 Demolition and Construction Waste Bin Location Plan.

Contractors

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

The construction contractor is to confirm or improve on re-use or recycling options in this plan, or document an explanation if otherwise.

Table 2 below outlines the waste streams identified for the construction stages and recommends appropriate methods for recovery and disposal to be followed, particularly where individual trades contractors are to be appointed.

Prefabrication to reduce waste

With many items to be pre-fabricated off-site in controlled yards or factories and delivered complete to site, on site waste is significantly reduced. 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.

Construction system and take-offs

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.

Waste recovery by the public

Waste off-cuts, spare parts or reusable items can be made available to the local public such as excess timber studwork suitable for firewood, before being sent to recycling waste bins. This is best done by advertising and arranging set collection times.

Waste container guidelines

All waste containers / skip bins are to be clearly visible, accessible and labelled in a well-lit area to ensure use.

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.

Construction Phase

Contractors

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Construction system and take-offs

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.

Waste recovery by the public

Waste off-cuts, spare parts or reusable items can be made available to the local public such as excess timber studwork suitable for firewood, before being sent to recycling waste bins.

The provision of a collection area on site but outside of the site fencing can be allocated for collection of such items by the public (see Appendix 3 for indicative location).

Waste container guidelines

All waste containers / skip bins are to be clearly visible, accessible and labelled in a well-lit area to ensure use.

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.

Sequence

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

1. Foundations and carpark construction

Expected to include in-situ poured concrete footings, columns and carpark slab

- 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. 1-2m^3 at most. Waste to be crushed and used for ground stabilisation or removed and crushed for re-use in road base or similar.
- Expected precast concrete retaining walls around the perimeter of the basement. No onsite waste anticipated from the use of precast wall panels.

2. Upper structure construction

Expected to include poured concrete suspended slabs and columns and pre-cast concrete and blockwork walls, with metal stud internal framing

- Suspended slabs will be 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 1m^3 per floor, to be crushed for re-use on site as base for pedestrian paving, road base or similar
- After stripping, formwork is cleaned and where possible, reused again. Formwork offcuts will be placed in general waste to landfill.
- Blockwork and mortar waste will be minimal and can be reused in other locations on site, or recycled off site.
- If the lift core is to be precast concrete walls, the structure will generate little to no waste from correct order of quantities and no off cuts with the additional benefit of using re-useable formwork.
- Precast concrete walls, lift core and structure will generate little to no waste from correct order of quantities and no off cuts. Pre-cast concrete panels will also generate minimal waste, with the additional benefit of requiring no formwork.
- Damaged or off-cut metal stud framing to be recycled in metals bin on site. 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) or stockpiled for the public use, or recycled as timber mulch.

3. Roof

- Metal roofing is usually 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

- 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.
- 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. PVC drainage pipe may be processed at a mixed waste treatment facility, where it may be recovered for granulation and reuse or disposed to landfill.
- Waste solvents from PVC drainage gluing are to be tracked in the contaminated waste register and disposed to a suitable landfill for solvent container disposal.

5. Fitout and cladding

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

- 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 readily be recycled (see 'Waste Contractors' section below).
- Lighting, cabinetry, aluminium windows and fittings will generate plastic and cardboard packaging waste. Separate cardboard and plastics bins or enclosures should be provided to capture this waste.
- Any large quantities of unframed damaged glass should be recycled
- 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.
- 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.
- Experienced cladding installers should be able to estimate quantities accurately with small cut-offs being reused elsewhere on site in small gaps. Leftover cladding can also be taken offsite by the contractor for reuse in other jobs. Small amounts of damaged cladding may be generated and should be disposed of to landfill.

6. Finishes

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

- 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. Landscaping

Work includes planting lawns, trees, shrubs, installing fixed outdoor furniture and mulching. Almost all leftover materials are recyclable with very little, if any, packaging.

8. 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, for example the plastering contractor, 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.

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

Materials On Site and Collection Bin			Destination		
			Reuse and Recycling		Disposal
Type of Material	Bin / Container	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill)
Concrete Waste masonry / blockwork Paver offcuts Waste cement render.	Concrete / Masonry bin	12m^3	The small volumes of waste concrete and blockwork expected may be reused onsite as ground stabilisation or binned for offsite recycling.	A concrete recycler can receive waste concrete and blockwork hauled off site. Separating masonry / concrete / bitumen attracts reduced charges from offsite recyclers compared with mixed materials.	Boral, Concrete Recyclers, Bingo, Benedict Industries
Metals (roof sheet offcuts, steel framing, metal cladding, privacy screens)	Metals - ferrous	24m^3		Recycled building products contractor or scrap metal merchant	One Steel, Sell & Parker, Veolia, Benedict Industries
Fibre Cement Cladding	General	24m3		Generally not recycled due to finishes. Limited reuse is possible but often not implemented due to low cost of new materials and deconstruction damage.	Landfill
Timber – timber cladding, cabinetry,	Timber	18m^3	Re-used on site as formwork, bridging, blocking & propping &/OR reclaimed by second hand timber suppliers.	Mulching by Waste contractors	Benedict Industries, Bingo,

Materials On Site and Collection Bin			Destination		
			Reuse and Recycling		Disposal
Type of Material	Bin / Container	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill)
Plasterboard clean wall and ceiling lining trimmings / damaged sheet	PB	12m^3		Plasterboard recycling service	Sydney Gyprock Recycling, ReGyp,Veolia
Glass – balustrading, windows	Glass	12m^3		Large unframed pieces can be recycled as glass or smaller pieces can be crushed and included in road base products.	Glass Recycling NSW
Electrical cabling/wiring offcuts	Mixed metals or separate wiring bin	12m^3		A copper wire recycling facility such as will accept quantities from 2kg upwards, with better prices for large quantities of wire.	
Plastic and cardboard packaging	Plastic / cardboard recycling	24m^3		To general recycling waste as handled by council's recycling trade waste service	Liverpool Community Recycling Centre
Paint / Solvent / Adhesive waste	Solvents	100L	Disposal to paint and solvent tin facility.	Paintback	Liverpool Recycling Centre.
Finishes	Carpet, carpet squares, underlay, tiles,	10m^3	Carpet can be laid underneath mulch as a weedmat.	Generally cut to size on the job, waste is minimal.	Bingo

Materials On Site and Collection Bin			Destination		
			Reuse and Recycling		Disposal
Type of Material	Bin / Container	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill)
Rigid Plastic (PVC pipe offcuts, plastic wiring cable reels)	Plastic / Mixed recycling	5m^3		Can be processed by a mixed waste recycling contractor,	Benedict Industries

Recycling, Reuse Possibilities

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

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.

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. Fabric Curtains can be given to Opportunity shops as Painter's rags.

Glass

Some contractors will crush glass with concrete and/or bricks for road base. Due to poor prices and 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

Currently not known to be recyclable

Waste Contractors

Recycling, reuse and recovery guiding principles

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 very significant premium price compared to a site pre-sorted load.

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).

The following larger waste transporters and operators are recommended:

- **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
- **Fairfield City Council -** 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

Selection of Demolition contractors

When selecting demolition contractors, details of their experience and proposed recycling methods must be requested. Contractors with greater recycling experience and demonstrated application of recycling methods should be selected to quote.

For larger projects Green Star accredited and experienced demolition contractors would be expected to provide better recycling outcomes. This rating verifies that the Contractor has met the standards of the Green Building Council of Australia (GBCA). The CBCA's objective is to minimise Construction and Demolition Waste that is disposed of to landfill.

The following Demolition Contractors have Green Star project experience:

Green Star Demolition Contractors

- **Liberty Industrial** – http://libertyindustrial.com.au/ Stephen Hartnett 0447 013 432 – Significant warehouse demolition experience. Recently demolished a 500,000m2 of warehouse in Moorebank. Unrestricted demolition and asbestos removal licences.
- **Metropolitan Demolitions** - http://www.metrodemo.com.au/ Shane Morris 0450 788 845 Green. Unrestricted demolition and asbestos removal licences.
- **Matt Dalley Demolition** - http://www.dalleydemo.com.au/ Alan O'Neil 0497 849 183. Unrestricted demolition and friable asbestos removal licences.
- **Perfect Contracting** - https://perfectcontracting.com.au/ Luke Hamblyn 0452 249 271

Recycling, reuse and recovery services

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.

- **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 is 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.

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 –** Banksmeadow Depot
  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.

- **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, e Waste and Battery collection service.

- **Glass Recycling NSW** – Ingleburn
  http://glassrecyclingnsw.com.au ph. 02 9618 0400
  Only new, clean window glass is accepted. They provide bins.

- **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

- **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.

- **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
  - Fluorescent globes and tubes
  - Green Waste
  - Paintback - an authorized collection point scheme to recycle architectural and decorative paint. 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**
  http://www.regyp.com.au/waste/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

- **Roof Tile Recyclers** – Smithfield
  Ph (02) 9756 3350

- **Sell and Parker** – Banksmeadow, Kings Park, Ingleburn
  www.sellparker.com.au (02) 9829 4033
  All types of scrap metal. An accredited supplier to Bluescope steel.

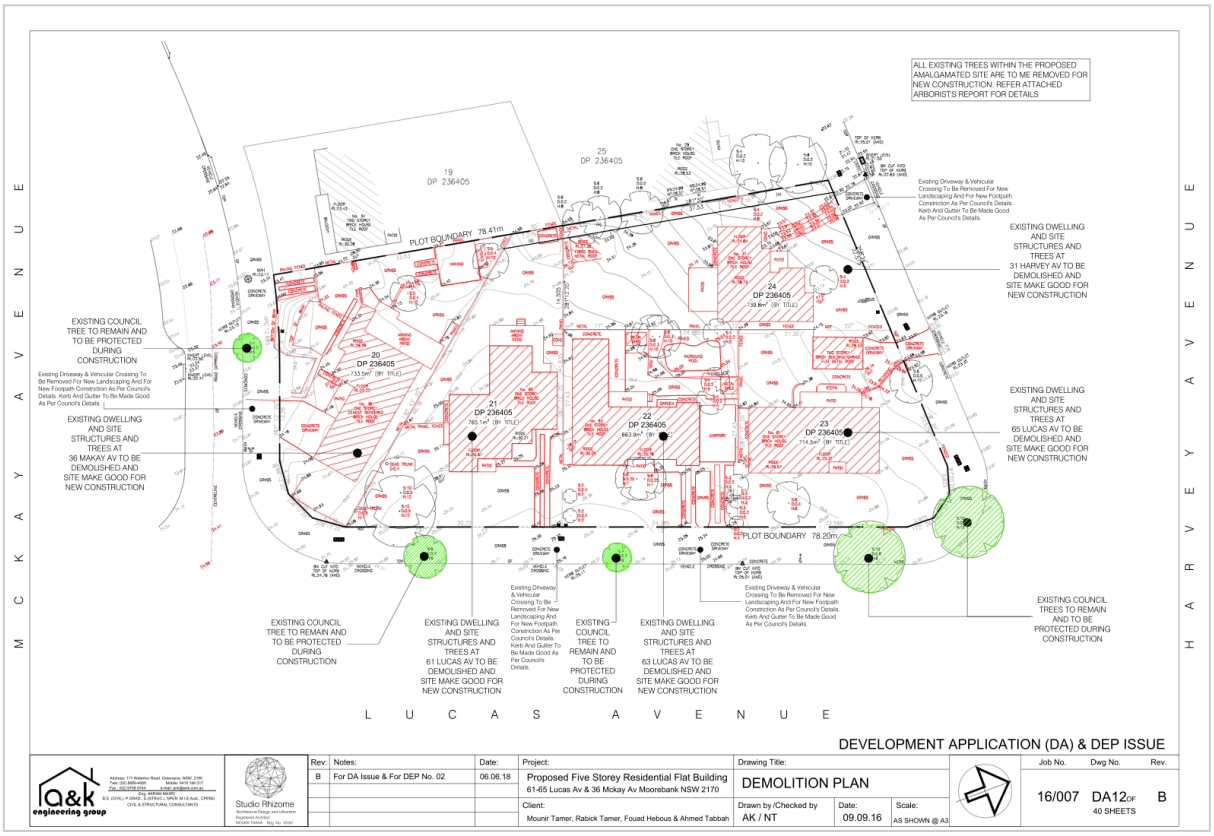
- **Suez -** http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW
  Soft plastics from packaging

- **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.
  Bin collection service is not provided. Tipping fees are applicable.
  Materials recycled (nothing else):
  - Terracotta roof tiles, Clay bricks
  - Clean concrete (with or without steel), and
  - Asphalt - ripped and profiled

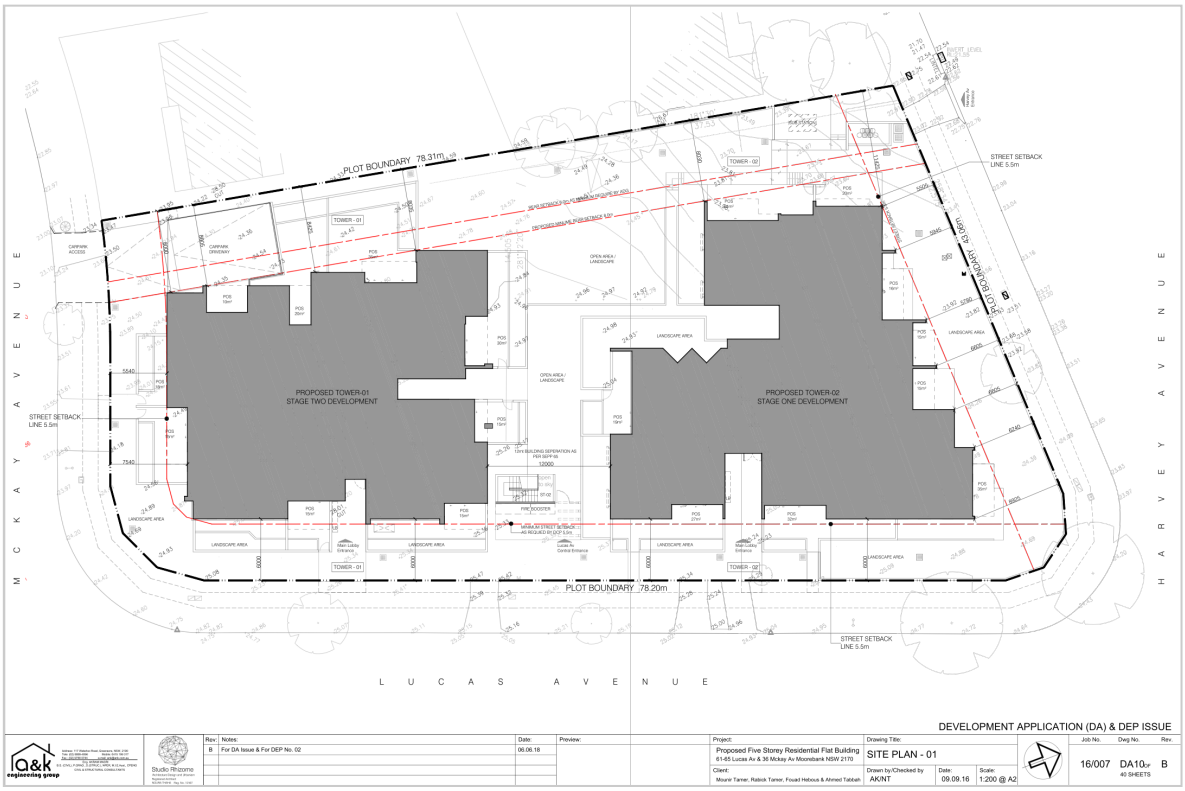
- **Sydney rubbish services** Surrey Hills
  http://sydneyrubbishservices.com.au/plasterboard-gyprock-waste-removal/
  02 9785 5526
  Bin only company - collects plasterboard for delivery to recycling centre

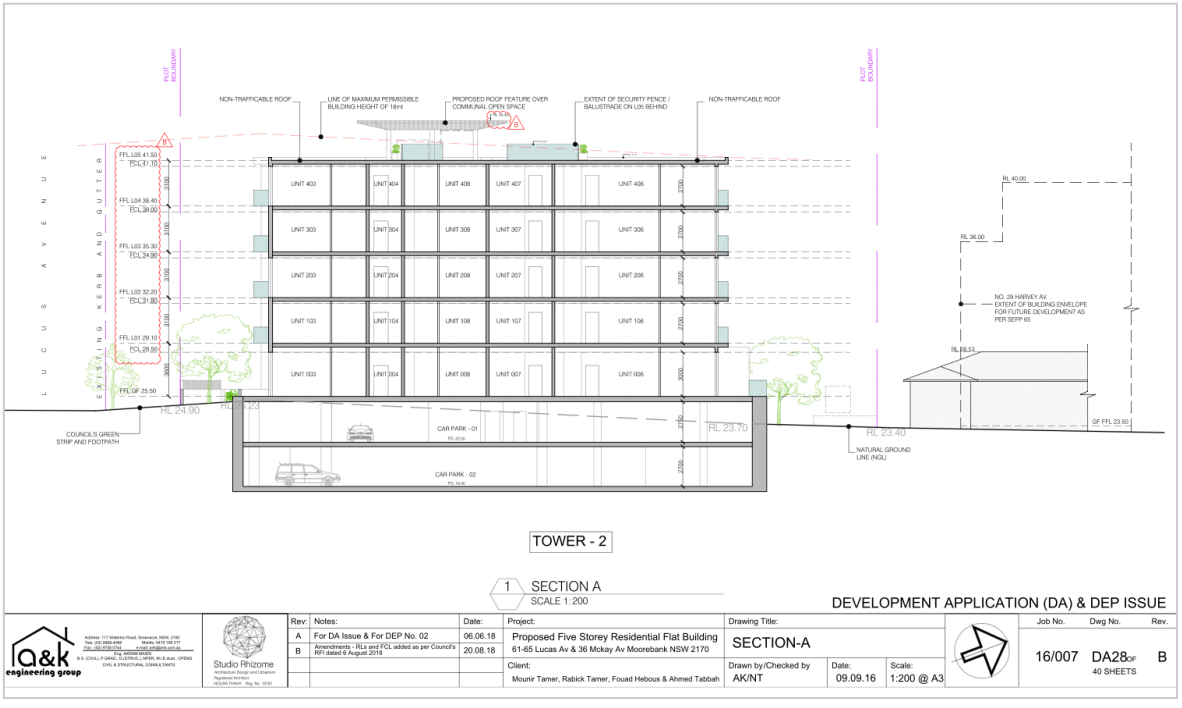
- **Veolia**
  http://www.veolia.com.au, ph. 132 955
  All waste metal in large volumes

Appendix 1 - Demolition Plan



Appendix 2 - Proposed Works





Appendix 3 - Waste Bin Locations.

Demolition Bin Store Location.

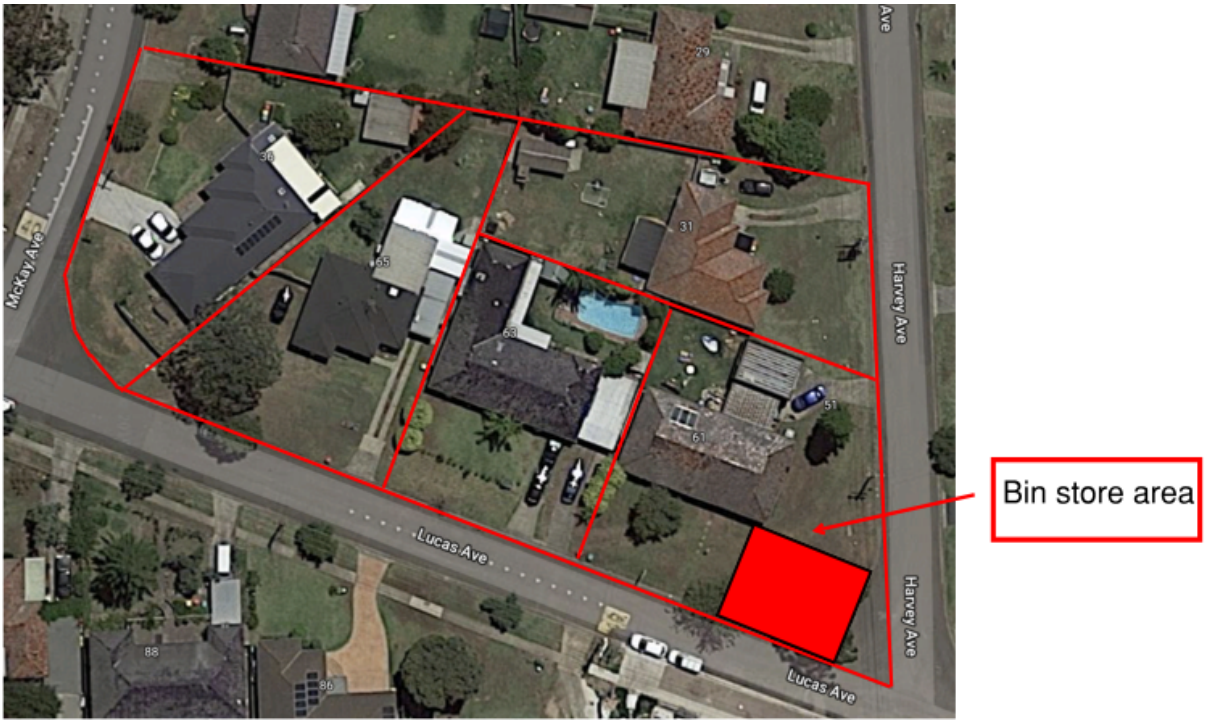
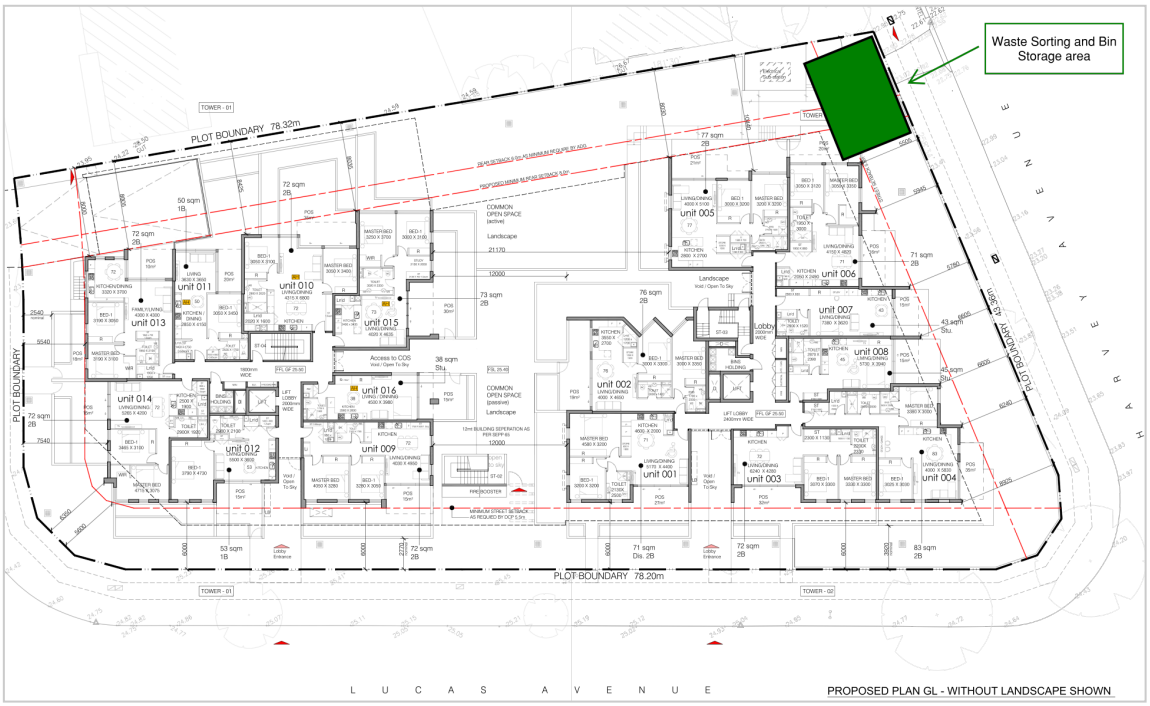


Image Courtesy of Google Maps

Construction Bin Store Location.



Appendix 4 - ACM Report Findings.

Reproduced from ACM Report produced by Jim's Asbestos Removals.

31 Harvey Ave, Moorebank 2170

Location of suspected ACM	Class	Condition
• **Eave lining**	B (non friable)	Good
• **Detached single garage walls and roof**	B (non friable)	Poor
• **Wet areas should be suspected as containing ACM products even though they have been recently renovated**	B (non friable)	Good
• **Garage interior lining**	B (non friable)	Good