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BaptistCare Macquarie Park Concept Master Plan
Mixed Use Development

**CONSTRUCTION & DEMOLITION
WASTE MANAGEMENT PLAN**

18/11/2022
Revision C

Client

BaptistCare

Architect

BVN Architects



SCOPE

A Waste Management Plan (WMP) is to be submitted with all development applications for new and change-of-use developments that will generate construction, demolition and operational waste.

This WMP applies only to the **construction** and **demolition** phases of the proposed development. The requirements outlined in this WMP must be implemented on site during construction and demolition and may be subject to review upon any change to the design. Construction and demolition waste management requirements will also be subject to review as part of the Construction Management Plan.

The waste management for the **operational** phase of the development is not addressed in this report. An operational WMP has been provided in a separate document.

REVISION REFERENCE

Revision	Date	Prepared by	Description
A	21-10-2022	T. McPherson	Draft
B	01-11-2022	T. McPherson	Amendment
C	18-11-2022	T. McPherson	Final

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CONTENTS

LIST OF TABLES.....	4
1 INTRODUCTION	1
1.1 Background	1
1.2 Site Summary	1
1.3 Site Location	2
1.4 Legislation and Guidance	1
1.5 Waste Diversion Targets	1
1.6 Report Objectives	1
1.7 Limitations	2
2 GENERAL WASTE MANAGEMENT PROVISIONS	3
2.1 Stakeholder Roles and Responsibilities	3
2.2 Monitoring and Reporting	4
2.3 Opportunities for Reuse and Recycling	5
2.4 Management of Hazardous Waste Materials	6
2.5 Management of Excavation Waste	6
3 SITE SPECIFIC WASTE MANAGEMENT PROVISIONS	7
3.1 Demolition Waste Volumes and Management	7
3.2 STAGE ONE DEMOLITION	1
3.3 STAGE TWO DEMOLITION	1
3.4 STAGE THREE DEMOLITION	1
3.5 STAGE FOUR DEMOLITION	1
3.6 Construction Waste Volumes and Management	1
3.7 STAGE ONE CONSTRUCTION	1
3.8 STAGE TWO CONSTRUCTION	2
3.9 STAGE THREE CONSTRUCTION	1
3.10 STAGE FOUR CONSTRUCTION	1
3.11 Recycling Directory	1
3.12 Site-Specific Operational Measures	2
3.13 Location and Design of Waste Management Facilities	4
3.14 Architectural Plans	7

LIST OF TABLES

Table 1: Stages with the allocated superlot.....	2
Table 2: Stakeholder Roles and Responsibilities	3
Table 3: Potential Reuse/Recycling Options for Construction Materials	5
Table 4: Demolition Waste Conversion for Stage One	1
Table 5: Demolition Waste Management Stage One	1
Table 6: Demolition Waste Conversion for Stage Two	1
Table 7: Demolition Waste Management Stage Two.....	1
Table 8: Demolition Waste Conversion for Stage Three.....	1
Table 9: Demolition Waste Management Stage Three	1
Table 10: Demolition Waste Conversion for Stage Four.....	1
Table 11: Demolition Waste Management Stage Four	1
Table 12: Construction Waste Conversion Stage One	1
Table 13: Construction Waste Management Stage One.....	1
Table 14: Construction Waste Conversion Stage Two	2
Table 15: Construction Waste Management Stage Two	2
Table 16: Construction Waste Conversion Stage Three	1
Table 17: Construction Waste Management Stage Three.....	1
Table 18: Construction Waste Conversion Stage Four	1
Table 19: Construction Waste Management Stage Four	1

1 INTRODUCTION

1.1 Background

EFC has been tasked to prepare the following waste management plan for BaptistCare for the management of construction and demolition waste generated by the mixed use development located at 157 Balaclava Road, Macquarie Park.

Waste management strategies and auditing are a requirement on construction sites to promote strong sustainability outcomes. It is EFC's belief that a successful waste management strategy contains three key objectives:

- i. **Promote responsible source separation** to reduce the amount of waste that goes to landfill, by implementing convenient and efficient waste management systems
- ii. **Ensure adequate waste provisions and robust procedures** that will cater for potential changes during the operational phase of the development
- iii. **Comply** with all relevant Australian Standards, council codes, policies, and guidelines.

1.2 Site Summary

The proposed development falls under the LGA of Ryde City Council. This report has been prepared to accompany a State Significant Development Application (SSDA) for a Concept Master Plan for the site located at 157 Balaclava Road, Macquarie Park.

Specifically, consent is sought for the following in this Concept SSDA:

- A mixed-use development comprising a maximum GFA of 190,000m² dedicated to a range of land uses including: – Student Housing;
 - Seniors Housing;
 - Build to Rent;
 - Retail;
 - Residential;
 - Mixed uses including commercial and allied health; and
 - A school.
- Maximum building heights and GFA for each development block;
- Public domain landscape concept, including parks, streets and pedestrian connections;
- Vehicular and intersection upgrades.

All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

The proposal consists of existing mixed-use developments including residential dwellings, aged-care facilities and residential flat buildings.

All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

1.3 Site Location

The site is located at 157 Balaclava Road, Macquarie Park and is legally identified as Lot 60 in DP 1107965. The site is located near the corner of Herring Road and Epping Road within the City of Ryde Local Government Area (LGA). It is directly south of Macquarie University and in close proximity to Macquarie Shopping Centre. The surrounding area is characterised by a mix of commercial and education uses, as well as student accommodation and residential dwellings.

The site comprises a significant land holding with street frontages to Balaclava Road and Epping Road. It currently accommodates several low-medium density buildings that are connected via internal footpaths and lower order road networks. The total site area of the BaptistCare landholding is 63,871m².

AREA PLAN

The total GFA of the entire site adds up to 187134 m²



BVN Architects.

The following Stages incorporate the corresponding Superlots:

Table 1: Stages with the allocated superlot

Stage	Superlot
1	4
2	5, 6, 7, 8
3	9
4	1, 2, 3

1.4 Legislation and Guidance

Information provided in this WMP comes from a wide range of construction and demolition waste management guidance at the local, state, and federal levels. The primary sources of guidance include:

- Ryde Development Control Plan 2014
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities. *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain*. (2014, November).
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021
- NSW Waste Classification Guidelines 2014
- Australia's National Waste Policy 2018

1.5 Waste Diversion Targets

To quantify and measure this sustainable approach to waste management, the NSW WARR Strategy 2014-2021 outlines specific targets in order to clarify the state's long-term goals and priorities. These targets were supported by industry, community, state, and local governments during the Strategy's consultation phase, and include:

- Increasing construction and demolition recycling rates to 80%
- Increasing waste diverted from landfill to 75%
- Reducing litter by 40%
- Reduce illegal dumping incidents by 30%

1.6 Report Objectives

Throughout this report, EFC aims to encourage where practical, having regard to the design, the nature of the material to be demolished and the site constraints, the following waste management practices for the duration of the demolition and construction stages of the development:

- Re-use of excavated material on-site and disposal of any excess to an approved site;
- Green waste mulched and re-used on-site as appropriate, or recycled off-site;
- Bricks, tiles and concrete re-used on-site as appropriate, or recycled off-site;
- Plasterboard waste returned to supplier for recycling;
- Framing timber re-used on site or recycled off-site;
- Windows, doors and joinery recycled off-site;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Plumbing, fittings and metal elements recycled off site;
- Ordering accurate quantities of materials and prefabrication of materials where possible;
- Re-use of formwork;
- Careful source separation of off-cuts to facilitate re-use, resale or recycling.

1.7 Limitations

This report has been prepared by EFC for the sole purpose of providing a Construction and Demolition Waste Management Plan (C&D WMP) to support a development application. The report is provided with the following limitations:

- This report is for the sole use of BaptistCare (including their officers, employees and advisers) and should not be used or relied upon by any other party without prior written consent from EFC;
- Drawings, estimates and information contained in this report have been prepared by analysing information, plans and documents supplied by the client, or nominated third parties. Any assumptions based on the information contained in the report are outside the control of EFC;
- The calculations presented in the report are estimates only. The amount of waste generated will be dependent on the approach taken by site management, including the levels of training and education offered to site staff and the actions and attitudes of staff themselves.
- The site manager will make adjustments as required based on actual waste volumes (e.g. if waste volumes are greater than estimated, then waste storage capacity and collection frequencies will increase accordingly) and increase the amount of waste storage and collection frequency accordingly;
- The report has been prepared with all due care and attention; however, no assurance or representation is made that the WMP reflects the actual outcome. EFC will not be liable to for any plans or outcomes that are not suitable for purpose, whether as a result of incorrect or unsuitable information or otherwise;
- EFC offer no warranty or representation of accuracy or reliability of the WMP unless specifically stated;
- Examples of equipment provided in this report should be reviewed by the appropriate equipment supplier who will assess the correct equipment for supply. Reference to any other business or product besides EFC and EFC equipment is for information purposes only, and is not officially endorsed or recommended by EFC.

The staging strategy provided to EFC has been submitted on the basis that it is indicative only. It should not be relied upon to form any conditions of consent for the Master Plan.

2 GENERAL WASTE MANAGEMENT PROVISIONS

2.1 Stakeholder Roles and Responsibilities

All stakeholders have a responsibility for their own environmental performance and compliance with all legislation.

The Construction Contractor will be responsible for implementing this WMP, although site staff have a responsibility to ensure their own compliance at all times. Where possible, an Environmental Management Representative (EMR) should also be appointed for the project to help ensure compliance. The following table demonstrates the primary roles and responsibilities of the respective stakeholders:

Table 2: Stakeholder Roles and Responsibilities

Roles	Responsibilities
Construction Site Management	<ul style="list-style-type: none"> • Organise waste collections as required; • Organise replacement or maintenance requirements for bins; • Investigate and ensure prompt clean-up of illegally dumped waste materials; • Notify the Principal Certifying Authority (Council) of the appointment of waste removal, transport or disposal contractors for waste tracking purposes; • Ensure waste related equipment is well maintained; • Ensure accurate calculations so only the required amount of materials are ordered; • Ensure segregation of materials to maximise reuse and recycling; • Check waste sorting and storage areas routinely for cleanliness, hygiene, contamination and OH&S issues; • Ensure all monitoring and audit results are well documented and are carried out as specified in the WMP; • Ensure effective signage, communication and education is provided to site staff/contractors; • Provide staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities; • Assess any manual handling risks and prepare a manual handling control plan for waste and bin transfers;
Site Staff/Contractors	<ul style="list-style-type: none"> • Ensure adequate separation and disposal of waste streams in compliance with the WMP; • Abide by all relevant OH&S legislation, regulations, and guidelines; • Attend training and inductions as required; • Clean and transport bins as required; • Carry out daily visual inspections of waste storage areas; • Organise, maintain and clean the waste storage areas;
Environmental Management Representative (EMR)	<ul style="list-style-type: none"> • Approach and establish the local commercial reuse of materials where reuse on-site is not practical; • Establish separate skips and recycling bins for effective waste segregation and recycling purposes; • Ensure staff and contractors are aware of site requirements; • Provision of training of the requirements of the WMP and specific waste management strategies adopted for the development; • Contaminated waste management and approval of off-site waste transport, disposal locations and check licensing requirements; • Arrange assessment of suspicious potentially contaminated materials, hazardous materials and liquid waste; • Monitor, inspect and report requirements.
Waste Collection Contractors	<ul style="list-style-type: none"> • Provide a reliable and appropriate waste collection service; • Provide feedback to construction site management regarding contamination of waste streams; • Work with construction site management to customise waste systems where possible.

2.2 Monitoring and Reporting

It is recommended that the following measures be taken to improve demolition and construction waste management in future and to provide more reliable waste generation figures:

- Compare projected waste quantities with actual waste quantities produced.
- Conduct waste audits of current projects (where feasible).
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained. Additionally, dockets/receipts verifying recycling/disposal in accordance with the WMP must be kept and presented to Council or the EPA if and when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists/logs recorded for reporting to the Site Manager on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the Building Contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling/reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training should be undertaken and signage re-examined.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and should include the contact details of the 24-hour EPA Pollution line. Likely incidents to occur during the construction and demolition stage of the development may involve fuel or chemical spills, seepage or mishandling of hazardous waste, or unlicensed discharge of pollutants to environment.

2.3 Opportunities for Reuse and Recycling

There are many opportunities to reduce the volume of waste generated during demolition and construction. Adaptive reuse of building materials should be encouraged, with significant consideration given to methods of reusing or recycling materials onsite as well as sourcing used or recycled materials from elsewhere to be used on site.

The site should facilitate where practical reuse and recycling by 'deconstruction', whereby various materials are carefully dismantled and sorted. Any unwanted reusable materials can be taken to a second-hand building centre, reducing waste disposal costs.

Materials that are individually wrapped should also be avoided where possible, with preference given for materials that can be delivered in returnable packaging such as timber pallets.

The table below gives examples of potential reuse and recycling options for the materials likely to be used/generated in construction and demolition at this development:

Table 3: Potential Reuse/Recycling Options for Construction Materials

Material	Reuse/Recycling Potential
Asphalt	Hot in-place recycling or reprocessed into Reclaimed Asphalt Pavement (RAP).
Bricks	Cleaned and/or rendered for reuse, crushed for fill, sold or provided to a recycled materials yard
Cardboard Packaging	Recycled at a paper/cardboard recycling facility
Carpet	Cleaned and reused for the same purpose, reused in landscaping or garages/sheds, recycled at an appropriate processing facility
Concrete, Masonry, Spoil	Reused on-site as fill, levelling or crushed for road base
Doors, Windows, Fittings	Reused in new or existing buildings or sent to second-hand supplier
Glass	Recycled at a glass recycling facility, aggregate for concrete production, crushed for termite barrier, reused as glazing
Green Waste (Organics)	Mulched, composted for reuse, trees chipped for use in landscaping or removed carefully and reused onsite or sold
Hardwood Beams	Reused as floorboards, fencing, furniture or sent to second-hand timber supplier
Insulation Material	Reprocessed to remove impurities and reused for the same purpose or as off-cuts, compressed for ceiling tile manufacture
Metal, Steel/Copper Pipe	Recycled at a metal recycling facility, melted into secondary materials for structural steel, roofing, piping etc. copper sold for re-use
Other Timber	Reused in formwork, ground into mulch for garden or sent to second-hand timber supplier
Plasterboard	Crushed for reuse in manufacture of new plasterboard, returned to supplier or used in landscaping
Plastics	Reused as secondary materials for playgrounds, park benches etc.
Roof Tiles	Cleaned and reused, crushed for reuse for landscaping and driveways or sold or provided to a recycled materials yard
Soil	Stockpiled onsite for reuse as fill
Synthetic & Recycled Rubber	Reused for the same purpose or reprocessed for use in manufacture/construction of safety barriers, speed humps
Topsoil	Stockpiled onsite for reuse in landscaped areas

2.4 Management of Hazardous Waste Materials

For the purpose of this report, hazardous waste materials include any waste that poses a hazard or potential harm to human health or the environment, particularly asbestos waste and asbestos containing material (ACM). The general advice provided in this report is superseded by any specific hazardous materials or remediation control plans prepared for the project.

During the construction phase of the development, there must be a commitment to engage qualified and certified contractors to remove all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility, where applicable.

In the event that any contaminated or hazardous materials are unexpectedly uncovered during demolition or excavation works, the Site Manager is to stop work immediately in that location and contact the relevant hazardous waste contractor prior to further works being undertaken in the area.

The following general mitigation measures will apply:

- Contaminated material stockpiled on site will be minimised as far as possible and should be stored on HDPE liner, in a bunded location which is protected from inclement weather;
- Sediment fences should be installed around the base of stockpiles and the stockpiles should be covered. Where excavated material requires validations, samples should be taken for NATA laboratory testing as per the requirements of the contamination assessment prior to restoration works, backfilling exercises and disposal;
- Any trucks carrying contaminated materials should be securely and completely covered immediately after loading the materials (to prevent windblown emissions and spillage) and must be licensed by the NSW Environmental Protection Authority (EPA);
- Decontamination of all equipment prior to demobilisation from the site is important so that contaminated materials are not spread off-site.

2.5 Management of Excavation Waste

For the purpose of this report, excavation waste consists of any unwanted material generated from excavation activities such as a reduced level dig, site preparation and levelling and the excavation of foundations, basements, tunnels and service trenches. This will typically consist of soil and rock. The general advice provided in this report is superseded by any specific hazardous materials or remediation control plans prepared for the project.

All excavated material generated on this site may be re-used in the landscaping or used on other sites as fill material, provided no contamination is present. If sandstone is found to be present, this may be sold or incorporated into the building design.

The following measures and safeguards will apply to the development for excavated material:

- Wherever practical, excavation material will be reused as part of the development;
- Excavation material that is not natural (virgin) material will be transported to an approved landfill site or off-site recycling depot;
- A waste classification assessment of the fill material should be undertaken prior to it being acceptable for waste disposal purposes;
- Transportation routes for excavation material removed from site will be identified and used.

3 SITE SPECIFIC WASTE MANAGEMENT PROVISIONS

3.1 Demolition Waste Volumes and Management

The demolition stage of the development provides the greatest opportunity for waste minimisation and resource recovery. The first thing that should be considered is whether it is possible to reuse existing buildings or parts of buildings for the proposed use. With careful on-site sorting and storage and by staging work programs it is possible to reuse many materials, either on or off-site.

The existing buildings at this site will be demolished and a new building will be constructed. Where possible, materials will be reused, such as crushing concrete for use as clean fill. However, the majority of the components of the building will either be reused for the same purpose or disposed of offsite.

A demolition contractor will be engaged during this phase of the project. The contractor will be responsible for ensuring all demolition activities are planned and undertaken in accordance with relevant waste minimisation policies and DA requirements.

The table below illustrates the anticipated volumes of materials generated at this development during the demolition stage. Volumes have been advised by our client. It is noted that the estimated values below are indicative only. This master plan report is analytical only, and no consent for construction or demolition is proposed.

3.2 STAGE ONE DEMOLITION

Table 4: Demolition Waste Conversion for Stage One

Material	Volume (m3)	*Tonnes (t)	**Appx. Percentage Recovered
Excavation Material	200315.1	200315.1	99.8%
Green waste	N/A	N/A	80%
Bricks	1335.434	1602.5208	100%
Tiles	158.1435	158.1435	100%
Concrete	2108.58	3162.87	100%
Timber	492.002	93.48038	33%
Plasterboard	42.1716	8.43432	50%
Metals	351.43	175.715	100%
Asbestos	N/A	N/A	0%
Other waste	N/A	N/A	0%
Totals	204802.9	205516.264	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled demolition waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the demolition materials will be managed, and estimates percentage of materials diverted from landfill.

Table 5: Demolition Waste Management Stage One

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Excavation Material	<input type="checkbox"/>	200315.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	199814.3
Bricks	<input type="checkbox"/>	1335.434	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1602.5
Tiles	<input type="checkbox"/>	158.1435	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	158.1
Concrete	<input type="checkbox"/>	2108.58	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3162.9
Timber	<input type="checkbox"/>	492.002	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	30.8
Plasterboard	<input type="checkbox"/>	42.1716	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4.2
Metals	<input type="checkbox"/>	351.43	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	175.7
Total		204802.9	Total			204948.6
Total Diversion of Waste from Landfill (Minimum 80%)						99.7%

3.3 STAGE TWO DEMOLITION

Table 6: Demolition Waste Conversion for Stage Two

Material	Volume (m3)	*Tonnes (t)	**Appx. Percentage Recovered
Excavation Material	400960.8	400960.8	99.8%
Green waste	N/A	N/A	80%
Bricks	2673.072	3207.6864	100%
Tiles	316.548	316.548	100%
Concrete	4220.64	6330.96	100%
Timber	984.816	187.11504	33%
Plasterboard	84.4128	16.88256	50%
Metals	703.44	351.72	100%
Asbestos	N/A	N/A	0%
Other waste	N/A	N/A	0%
Totals	409943.7	411371.71	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled demolition waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the demolition materials will be managed, and estimates percentage of materials diverted from landfill.

Table 7: Demolition Waste Management Stage Two

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Excavation Material	<input type="checkbox"/>	400960.8	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	399958.4
Bricks	<input type="checkbox"/>	3207.6864	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3207.7
Tiles	<input type="checkbox"/>	316.548	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	316.5
Concrete	<input type="checkbox"/>	6330.96	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6331.0
Timber	<input type="checkbox"/>	187.11504	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	61.7
Plasterboard	<input type="checkbox"/>	16.88256	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8.4
Metals	<input type="checkbox"/>	351.72	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	351.7
Total		411371.71	Total			410235.5
Total Diversion of Waste from Landfill (Minimum 80%)						99.7%

3.4 STAGE THREE DEMOLITION

Table 8: Demolition Waste Conversion for Stage Three

Material	Volume (m3)	*Tonnes (t)	**Appx. Percentage Recovered
Excavation Material	28405	28334.0	99.8%
Green waste	N/A	N/A	80%
Bricks	227.24	272.7	100%
Tiles	11.2125	11.2	100%
Concrete	897	1345.5	100%
Timber	149.5	9.4	33%
Plasterboard	29.9	3.0	50%
Metals	149.5	74.8	100%
Asbestos	N/A	N/A	0%
Other waste	N/A	N/A	0%
Totals	29869.35	30143.54	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled demolition waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the demolition materials will be managed, and estimates percentage of materials diverted from landfill.

Table 9: Demolition Waste Management Stage Three

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Excavation Material	<input type="checkbox"/>	28334.0	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	28334.0
Bricks	<input type="checkbox"/>	272.7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	272.7
Tiles	<input type="checkbox"/>	11.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11.2
Concrete	<input type="checkbox"/>	1345.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1345.5
Timber	<input type="checkbox"/>	9.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.4
Plasterboard	<input type="checkbox"/>	3.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.0
Metals	<input type="checkbox"/>	74.8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	74.8
Total		30143.54	Total			30050.5
Total Diversion of Waste from Landfill (Minimum 80%)						99.7

3.5 STAGE FOUR DEMOLITION

Table 10: Demolition Waste Conversion for Stage Four

Material	Volume (m3)	*Tonnes (t)	**Appx. Percentage Recovered
Excavation Material	43230.7	43230.7	99.8%
Green waste	N/A	N/A	80%
Bricks	345.8456	415.01472	100%
Tiles	17.06475	17.06475	100%
Concrete	1365.18	2047.77	100%
Timber	227.53	43.2307	33%
Plasterboard	45.506	9.1012	50%
Metals	227.53	113.765	100%
Asbestos	N/A	N/A	0%
Other waste	N/A	N/A	0%
Totals	45459.36	45876.65	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled demolition waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the demolition materials will be managed, and estimates percentage of materials diverted from landfill.

Table 11: Demolition Waste Management Stage Four

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Excavation Material	<input type="checkbox"/>	43230.7	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	43122.6
Bricks	<input type="checkbox"/>	415.01472	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	415.0
Tiles	<input type="checkbox"/>	17.06475	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17.1
Concrete	<input type="checkbox"/>	2047.77	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2047.8
Timber	<input type="checkbox"/>	43.2307	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	14.3
Plasterboard	<input type="checkbox"/>	9.1012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4.6
Metals	<input type="checkbox"/>	113.765	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	113.8
Total		45876.65	Total			45735.1
Total Diversion of Waste from Landfill (Minimum 80%)						99.7%

3.6 CONSTRUCTION WASTE VOLUMES AND MANAGEMENT

Waste generated during the construction stage of the development will be managed by the principal contractor and sub-contractors, with materials being reused and recycled wherever possible. Where neither reuse nor recycling are possible, waste will be disposed of as general waste at a licensed landfill site.

Recyclable material generated during construction will largely consist of off-cuts and discarded bricks, timber, steel, concrete, tiles, plasterboard, and piping, as well as packaging materials.

It is important to note that source separation of waste on-site may offer cost savings when compared to the disposal of mixed waste at landfill sites. Further cost savings may be achieved through the use of reusable and recycled-content materials and by reusing materials salvaged from the demolition stage of the development.

The table below illustrates the anticipated volumes of materials generated at this development during the construction stage (E.g., offcuts from plasterboard) based on the initial calculations. Volumes have been advised by our client.

Volumes have been advised by our client. It is noted that the estimated values below are indicative only. This master plan report is analytical only, and no consent for construction or demolition is proposed.

3.7 STAGE ONE CONSTRUCTION

Table 12: Construction Waste Conversion Stage One

Material	Volume (m3)	*Tonnes (t)	**Approx. Percentage Recovered
Excavation Material	N/A	N/A	99.8%
Green waste	N/A	N/A	80%
Bricks	52.4	62.9	100%
Tiles	4.9	4.9	100%
Concrete	725	1087.5	100%
Timber	48.3	9.2	33%
Plasterboard	20.7	4.1	50%
Metals	25.3	12.658	100%
Other waste	N/A	N/A	0%
Totals	876.6	1181.3	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 13: Construction Waste Management Stage One

Table for Construction Waste Management Stage One			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Bricks	<input checked="" type="checkbox"/>	62.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	62.9
Tiles	<input type="checkbox"/>	4.9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.9
Concrete	<input type="checkbox"/>	1087.5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1087.5
Timber	<input type="checkbox"/>	9.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.0
Plasterboard	<input type="checkbox"/>	4.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.1
Metals	<input type="checkbox"/>	12.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12.658
Total		1181.3	Total			1173.1
Total Diversion of Waste from Landfill (Minimum 80%)						99.3

3.8 STAGE TWO CONSTRUCTION

Table 14: Construction Waste Conversion Stage Two

Material	Volume (m3)	*Tonnes (t)	**Approx. Percentage Recovered
Excavation Material	N/A	N/A	99.8%
Green waste	N/A	N/A	80%
Bricks	1123.1	1347.8	100%
Tiles	533.5	533.5	100%
Concrete	224.7	336.9	100%
Timber	786.2	149.4	33%
Plasterboard	1684.7	336.9	50%
Metals	1010.8	505.4	100%
Other waste	N/A	N/A	0%
Totals	5362.9	3209.9	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 15: Construction Waste Management Stage Two

Table 10: Construction Waste Management Stage 1b			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Bricks	<input type="checkbox"/>	1347.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1347.8
Tiles	<input type="checkbox"/>	533.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	533.5
Concrete	<input type="checkbox"/>	336.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	336.9
Timber	<input type="checkbox"/>	149.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	49.3
Plasterboard	<input type="checkbox"/>	336.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	168.5
Metals	<input type="checkbox"/>	505.413	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	505.413
Total		3209.9	Total			2941.4
Total Diversion of Waste from Landfill (Minimum 80%)						91.6%

3.9 STAGE THREE CONSTRUCTION

Table 16: Construction Waste Conversion Stage Three

Material	Volume (m3)	*Tonnes (t)	**Approx. Percentage Recovered
Excavation Material	N/A	N/A	99.8%
Green waste	N/A	N/A	80%
Bricks	669.8	803.8	100%
Tiles	318.155	318.2	100%
Concrete	133.96	200.9	100%
Timber	468.86	89.1	33%
Plasterboard	1004.7	200.9	50%
Metals	602.82	301.41	100%
Other waste	N/A	N/A	0%
Totals	3198.3	1914.3	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 17: Construction Waste Management Stage Three

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Bricks	<input type="checkbox"/>	803.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	803.8
Tiles	<input type="checkbox"/>	318.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	318.2
Concrete	<input type="checkbox"/>	200.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	200.9
Timber	<input type="checkbox"/>	89.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29.4
Plasterboard	<input type="checkbox"/>	200.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100.5
Metals	<input type="checkbox"/>	301.41	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	301.41
Total		N/A	Total			1754.1
Total Diversion of Waste from Landfill (Minimum 80%)						91.6%

3.10 STAGE FOUR CONSTRUCTION

Table 18: Construction Waste Conversion Stage Four

Material	Volume (m3)	*Tonnes (t)	**Approx. Percentage Recovered
Excavation Material	N/A	N/A	99.8%
Green waste	N/A	N/A	80%
Bricks	590.52	708.6	100%
Tiles	110.7	110.7	100%
Concrete	14500	21750	100%
Timber	777	147.6	33%
Plasterboard	116.55	23.3	50%
Metals	253.2	126.6	100%
Other waste	N/A	N/A	0%
Totals	16347.95	22866.9	

*The conversion of materials from volume to tonnes is based on the information provided in a consultation paper published by WA Department of Water and Environmental Regulation

<<https://www.der.wa.gov.au/images/documents/our-work/consultation/current-consultation/Consultation%20Sheet%20Approved%20method%20for%20recyclers.pdf>>

**The percentage of recycled waste is estimated by BINGO, and is based on the average quantities of materials received and recovered at their facilities.

The table below illustrates how the construction materials will be managed, and estimates percentage of materials diverted from landfill.

Table 19: Construction Waste Management Stage Four

			How Waste will be Managed			
Type of Material	Less than 10m³	Estimated Tonnage	Reuse On-Site	Recycle	Landfill	Estimated Tonnage of Material Diverted from Landfill
Bricks	<input type="checkbox"/>	708.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	708.6
Tiles	<input type="checkbox"/>	110.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	110.7
Concrete	<input type="checkbox"/>	21750.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21750.0
Timber	<input type="checkbox"/>	147.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	48.7
Plasterboard	<input type="checkbox"/>	23.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11.7
Metals	<input type="checkbox"/>	126.58	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	126.58
Total		22866.9	Total			22756.3
Total Diversion of Waste from Landfill (Minimum 80%)						99.5%

3.11 Recycling Directory

Construction and demolition materials removed from site will need to be managed in accordance with the provisions of current legislation and may include segregation by material type classification in accordance with NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* and disposal at facilities appropriately licensed to receive the particular materials.

Please find the below recommendations for recycling drop off locations for all materials likely to be generated at this development. Only the nearest locations are provided. See www.businessrecycling.com.au for additional locations:

	Business Name	Suburb	Distance (km)
Excavation Material	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	AE Biggs	Oxford Falls	11.7
	Bingo Recycling Centre	Atarmon	5.7
Green waste	Bingo Recycling Centre	Auburn	11.6
	Sydney Transwaste Facilities	Homebush West	11.7
Bricks	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	Concrete Recyclers (Group) Pty Ltd	Camellia	9.6
Tiles	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	Concrete Recyclers (Group) Pty Ltd	Camellia	9.6
Concrete	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	Concrete Recyclers (Group) Pty Ltd	Camellia	9.6
Timber	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	Bingo Recycling Centre	Auburn	11.6
Plasterboard	Bingo Recycling Centre	Atarmon	5.7
	Bingo Recycling Centre	Auburn	11.6
Metals	AE Biggs	Oxford Falls	11.7
	Cleanaway Ryde Resource Recovery Centre	North Ryde	0.8
	Bingo Recycling Centre	Atarmon	5.7
	Bingo Recycling Centre	Auburn	11.6

3.12 Site-Specific Operational Measures

Training/Site Inductions

All staff employed during the demolition and construction stages of the development must undertake site-specific induction training regarding the procedures for waste management. Employees of the head contractor will undertake a specific induction outlining their duties and how they are to enforce the waste management procedures.

Induction training will include the following at a minimum:

- Legal obligations;
- Emergency response procedures on site;
- Waste storage locations and separation of waste;
- Litter management in transit and on site;
- The implications of poor waste management practices;
- Correct use of general-purpose spill kits;
- Responsibility and reporting (including identification of personnel responsible for waste management and individual responsibilities).

Materials Selection and Ordering

- Selection of all materials will be undertaken by architectural designers;
- Prefabrication of materials off-site where possible;
- Materials requirements are to be accurately calculated to minimise waste from over-ordering;
- Materials ordering process is to aim at minimisation of materials packaging;
- Material Safety Data Sheets (MSDS) are to accompany all materials delivered to site, where required, to ensure that safe handling and storage procedures are implemented.

Waste Avoidance Opportunities

- Limiting unnecessary excavation;
- Selection of construction materials taking into consideration to their long lifespan and potential for reuse;
- Ordering materials to size and ordering pre-cut and prefabricated materials;
- Reuse of formwork;
- Planned work staging;
- Use of naturally ventilating buildings to reduce ductwork;
- Reducing packaging waste on-site by returning packaging to suppliers where possible, purchasing in bulk and requesting cardboard or metal drums rather than plastics;
- Requesting metal straps rather than shrink wrap and using returnable packaging such as pallets and reels;
- Reduction of PVC use;
- Use of low VOC (volatile organic compounds) paints, floor coverings and adhesives;
- Use of fittings and furnishings that have been recycled or incorporate recycled materials;
- Use of building materials, fittings and furnishings with consideration to their longevity, adaptation, disassembly, reuse and recycling potential.

Site Procedures

- Excavated materials will be used onsite where practical;
- Green waste will be mulched and reused in landscaping either onsite or offsite;
- Concrete, tiles and bricks will be reused or recycled offsite;
- Steel will be recycled offsite; all other metals will be recycled where economically viable;
- Framing timber will be reused on-site or recycled off-site;
- Windows, doors and joinery will be recycled off-site where possible;
- Plumbing, fittings and joinery will be recycled off-site where possible;
- Plasterboard will be re-used in landscaping on-site or returned to the supplier for recycling where possible;
- All used crates will be stored for reuse unless damaged;
- All glass that can be economically recycling will be;
- All solid waste timber, brick, concrete, rock, plasterboard and other materials that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with WorkCover Authority and EPA requirements;
- Provision for the collection of batteries, fluorescent tubes, smoke detectors and other recyclable resources will be provided on site;
- Beverage container recycling will be provided on-site for employee use;
- All waste and recycling will be disposed of via council approved systems.

3.13 Location and Design of Waste Management Facilities

General Requirements

All waste management facilities onsite should:

- Be conveniently located to enable easy access for on-site movement and collection;
- Be incorporated with other loading/unloading facilities;
- Have sufficient space for the quantity of waste generated and careful source separation of recyclable materials;
- Have sufficient space to contain any on-site treatment facilities, such as compaction equipment;
- Have adequate weather protection and, where required, be enclosed or undercover;
- Be secure and lockable;
- Be well-ventilated and drained to the sewer;
- Be clearly sign-marked to ensure appropriate use.

Waste and Recycling Receptacles

A sufficient quantity of skip bins should be provided for the separate storage of each type of C&D material generated on site. This will assist in maximising source separation and resource recovery, while reducing the costs and quantity of materials disposed of at landfill.

The size of the receptacles should be appropriate to the nature of waste generated and the available storage area. In general, the following options would be acceptable:

Bin Size	Access	Dimensions
2.5m	Top loading	
3m	Drop door walk-in	
4m	Drop door walk-in	
5m	Drop door walk-in	
6m	Double doors walk-in	

Source: Aussie Bins

If the developer chooses to adopt a traditional waste management strategy, whereby waste is deposited into comingled skip bins to be sorted offsite, a single skip bin would be considered sufficient for purpose. However, if the site is to pursue source separation, dedicated skips for the following materials are recommended:

- Timber;
- Plasterboard;
- Concrete;
- Bricks;
- Scrap metal;
- General waste.

Separate receptacles for the safe disposal of hazardous waste types (i.e. light bulbs, batteries, etc) will also be provided where applicable. Where possible, additional bins will be provided in common areas for the collection of comingled recyclables such as beverage containers (glass, plastic, aluminium), paper products, recyclables food containers, etc. Specialised bins for cigarette butts should also be provided.

Safety and Signage

The following safety measures should be considered for the waste storage area:

- Location should not interfere with sight lines of drivers entering or leaving the site;
- Skip bins should be clearly visible and located in well-lit areas;
- Safe paths of travel should be designated using reflective tape, barriers and cones;
- Skip bins must be secured and must not be over-filled to reduce risk of injury through bins moving and falling objects.

Standard signage will be installed in all waste areas, with all skip bins colour coded and labelled appropriately on all sides to allow clear identification of the type of waste to be deposited into each bin.

Refer to the EPA's website for standard construction waste and recycling signs:

www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

Space and Siting Requirements

The waste storage area will be located adjacent to the entrances to the site to enable access and allow sufficient space for the required skip bins and servicing requirements. The storage area will also be flexible in order to cater for change of use throughout demolition and construction works.

Where space is restricted, dedicated stockpile areas will be allocated onsite, with regular transfers to the dedicated skip bins for sorting and collections.

The position of the designated waste holding area onsite may change according to building works and the progression of the development. Access, visual amenity and WHS will always be integral to the selection of waste storage area locations. Any stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

Servicing and Transport

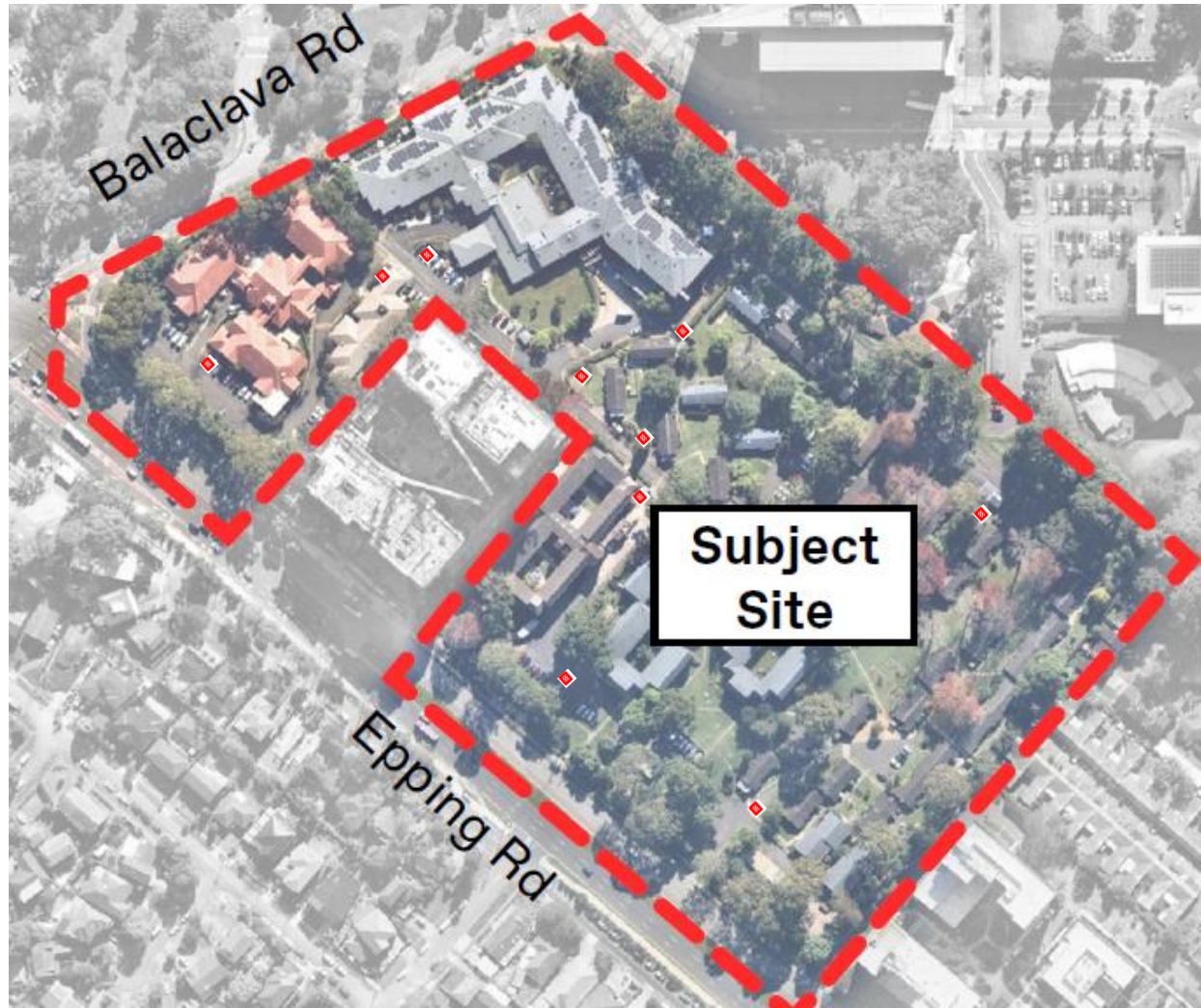
The frequency of waste removal from site will be determined by the volume of materials deposited into the dedicated skip bins. Skip bins will be monitored on a daily basis by the Construction Site Manager to ensure they do not overflow. If skip bins are reaching capacity, removal and replacement should be organised for within 24 hours.

All skip bins leaving the site will be covered with a suitable tarpaulin to reduce spillage of waste while in transit.

All waste collection for construction works will be conducted between approved hours as per Council requirements (typically between 7am and 7pm Monday to Friday, and between 7am and 1pm on Saturdays). All waste generated on site will be transported to an approved and appropriately licensed resource recovery facility and/or landfill site.

3.14 Architectural Plans

Existing Structures



Proposed Bin Storage Areas

Source: BVN Architects.

Proposal



 **Proposed Bin Storage Areas**