

Handbook for Design and Operation of Rural and Regional Transfer Stations

Case Studies 12-24



Department of **Environment and Conservation** NSW



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12. Case Studies

Representatives of the seven NSW voluntary regional waste groups were consulted to identify sites to include in this Handbook as case studies. It was felt that the case studies would greatly assist councils seeking to develop new facilities by learning from the experiences of other councils who had been through the process.

The sites visited range from rural bin locations (supervised and unsupervised), regional facilities (recently built facilities and new facilities under construction).

A summary of key facts and features of each site are presented at the beginning of each case study. Key features summarised include throughput

(tonnes/year), cost to build, owner, operator, designer, topography (flat, sloping etc), and site (Greenfield or Brownfield). Other features include whether there was a weighbridge on site, MRF, landfill, education centre and reuse centre.

Case studies have been organised into small, medium, and large-scale facilities based on throughput to assist you refer to facilities that are similar in size and function to proposed developments. Facilities are categorised as shown in Table 19.

Table 19. Organisation of case studies

Category	Throughput*	Case Studies	Council	Chapter
Small	< 2,000 tpa	Babinda Resource Recovery Centre	Cairns Water	Chapter 13
		Uranquinty Transfer Station	Wagga Wagga City Council	Chapter 16
		Mangoplah Transfer Station	Wagga Wagga City Council	Chapter 17
		Collingullie Transfer Station	Wagga Wagga City Council	Chapter 18
		Comboyne Transfer Station	Hastings Council	Chapter 23
		Berridale Transfer Station	Snowy River Shire Council	Chapter 25
		Nimmitabel Transfer Station	Cooma Monaro Shire Council	Chapter 26
		Blayney Transfer Station	Blayney Shire Council	Chapter 31
		Baryulgil Transfer Station	Clarence Valley Council	Chapter 33
Medium	2,000 – 20,000 tpa	Wauchope Transfer Station	Hastings Council	Chapter 20
		Port Macquarie Transfer Station	Hastings Council	Chapter 21
		Cairncross Transfer Station	Hastings Council	Chapter 22
		Cowra Waste Management Centre	Cowra Shire Council	Chapter 27



Category	Throughput*	Case Studies	Council	Chapter
Medium continued		South Grafton Transfer Station	Clarence Valley Council	Chapter 32
		Grafton Transfer Station	Clarence Valley Council	Chapter 34
		Maclean Transfer Station	Clarence Valley Council	Chapter 35
		Kempsey Waste Management Facility	Kempsey Shire Council	Chapter 37
Large	> 20,000 tpa	Buderim Resource Recovery Centre	Maroochy Shire Council	Chapter 14
		Gregadoo Waste Management Facility	Wagga Wagga City Council	Chapter 15
		Ballina Waste Management Centre	Ballina Shire Council	Chapter 19
		Taree Waste Management Centre	Greater Taree City Council	Chapter 24
		Orange Ophir Road Resource Recovery Centre	Orange City Council	Chapter 28
		Orange 'HUB' Regional Resource Reprocessing Facility	Orange City Council and Cabonne Shire Council	Chapter 29
		Moss Vale Resource Recovery Centre	Wingecarribee Shire Council	Chapter 30
		Bathurst Waste Management Centre	Bathurst Regional Council	Chapter 36

* Total throughput of facility, may include waste directly disposed to landfill and not managed via the transfer station.



13. Babinda Resource Recovery Centre

Cairns Water

Key Facts	
Throughput (tonnes/year)	280 tpa (general waste) + additional recyclables
Cost to build (\$)	\$0.5M
Owner	Cairns Water
Operator	Council
Designer	Consultant: GHD Pty Ltd
Topography	Relatively flat but in close vicinity to a wet tropic world heritage area. Area subject to very high rainfall.
Site	Former landfill
Key Features	
Single weighbridge	X
Dual weighbridge	X
MRF	X
Landfill	X
Education centre	X
2nd hand store	X

Cairns Water currently owns and operates one landfill and five small transfer stations in the Cairns, Queensland. One of these transfer stations, located in Babinda (approximately 50km south of Cairns), is the Babinda Resource Recovery Centre (RRC). The population of Babinda is approximately 1,200.

Design, construction, and operation of the Babinda Resource Recovery Centre has taken into account the unique environmental surroundings of the area and tropical weather conditions. Babinda is one of the wettest places in Australia receiving more than 4000mm of rain per annum. The transfer station is located 7km east of a wet tropics world heritage area.



Photo 13.1 Babinda Transfer Station Entry



Photo 13.2 Babinda Transfer Station Exit

13.1 Project Drivers

Cairns Water commissioned GHD to undertake the detailed design of the facility in July 2002. Previously there was a temporary transfer station operating from the Babinda Works Depot that was opened after the Babinda landfill was closed.

Drivers for construction of the new transfer station were to provide a permanent waste facility for the community following closure of the Babinda landfill, and to incorporate increased resource recovery activities within the new development. Other drivers included ensuring that waste management in the Babinda district was carried out with best environmental practice principles given the sensitive nature of the surrounding environment.

13.2 Design and construction

To maximise resource recovery at the centre, the site was designed to accept general waste as well as waste oil, white goods, tyres, chemical containers, glass, green waste, steel, and aluminium.

13.2.1 Design throughput

The overall site design was based on an approximate volume of general waste received at the facility (estimated at 280 tonnes per year). This was determined based on population projections and allowing for seasonal fluctuations in waste generation.

As there was limited data available on potential recyclables quantities, estimates of required storage capacity were based on data from the Gordonvale waste transfer station (a similar facility located approximately 25km south of Cairns that services a larger population). Data from the Gordonvale transfer station was used helped to determine approximate volumes of the other wastes (waste oil, glass, aluminium and chemical containers).

13.2.2 Skip bins and transfer station platform

The transfer station has been designed to accommodate two 25m³ skip bins to achieve the desired three-day collection frequency. It also provides some additional storage room for bulky goods and any peaking of demand.

The platform has been designed for the use of shallow, wide skip bins as opposed to taller, narrow bins. This was due to OH&S reasons as well as cost savings associated with having a lower platform.

Guide rails are used for moving the skip bins in and out of position. Whilst these guides are valuable for ensuring the bins are moved into the correct position without damaging the surrounding structures it has been found that they are too far from the platform. This has resulted in waste falling between the platform edge and skip. This increases required cleaning and maintenance time and costs.



Photo 13.3 Side view of transfer station



Photo 13.4 Safety fence on platform

A safety fence has also been placed at the platform edge to prevent potential falls from the elevated drop-off area. However the height of the safety fence has been found too high, and both customers and employees have difficulty in safely lifting waste over the rail and into the skip bins provided.

13.2.3 Resource Recovery

The original design incorporated the following features for resource recovery:

- A 20m² hardstand area for a scrap metal stockpile;
- Sufficient garden organics area to permit storage of separate stockpiles of garden organics and mulched green waste; and
- An open paved area of 20m² for storage of white goods and tyres.

Since commencing operation however a number of modifications have been made due to identified operational constraints or to increase materials handling efficiency. For example, scrap metal is now collected in a skip bin rather than on the ground in a stockpile are to minimise double-handling.



Photo 13.5 Scrap metal storage area

13.2.4 Security

The original design intent for security at the Babinda RRC was to have video cameras monitor the entry and exits with some view of the transfer station areas in order to monitor acts of illegal dumping (commercial waste during the day and dumping outside of the gates outside operating hours). Additional security cameras were located in the site office. However since commencing operation these cameras have been removed to prevent them from being stolen.

In addition to the security cameras, automated gates were installed at this site. The entry gates are opened using a swipe card system and the exit gates are opened using a vehicle detection mechanism. Additional keys are provided to contractors to allow for 24-hour access as required.

13.2.5 Environmental Sensitivities

The Babinda RRC is located within an environmental sensitive region. It is located adjacent to the former Babinda landfill. The site is also near Wet Tropics World Heritage to the north (150m) and east (7km). There is a creek that also passes the property. The site is low lying and water logged in many areas (possibly due to the type of soil on site).

Due to these sensitivities particular environmental management mitigation measures had to be implemented on site. The main mitigation measures consisted of the following aspects:

- Containment of waste and liquids (including run-off) on the site. This was achieved through site fencing and internal collection drains;
- Prevention of windblown litter through the installation of perimeter fencing;
- Designated collection skips for all waste items; and
- All weather access provided via surface bitumen and undercover transfer station for disposal of selected waste items.

Issues with design

Based on the design aspects as mentioned above, several issues with the design of the site have become highlighted since the site commenced operation. These include:

- Water infiltration into the transfer station is a major problem given the high rainfall in the Babinda area. During high rain events water has been known to flow into the office area and the oil storage area (which is lowered) fills up with water.
- > To address this issue Cairns Water is considering putting a 'speed bump' type bund around the facility to assist prevent water infiltration into the transfer station area.
- Problems with the initial site selection – The location of the RRC is proving problematic. The site was selected due to its vicinity to the former Babinda landfill. However in 2005 high rainfall led to access to the facility being cut off for 5 days. During this time a Council-owned property in town needed to be utilised for waste acceptance and storage.
- > Cairns Water is considering potential options on how to protect the site against flooding and access problems by providing protection against overflows of the nearby creek.



Photo 13.6 Bunded oil storage area

13.2.6 Storage and office space

Since becoming operational, it has been found that there is insufficient storage space to efficiently store all tools and equipment that are used on the site. Due to security and OH&S reasons it is preferred that the tools be stored in a sheltered and lockable area. This has resulted in needing to store tools in the bathroom and office. However, office space is in itself limited, and hence this causes further space restrictions.

13.2.7 Gates and access

When locating and sizing access gates it is important to consider the size of vehicles and/or plant that will pass through them (where appropriate). It is also important to ensure that gates are located conveniently having consideration of not only gates and access required for vehicles, but also for people needing to access/exit the site for other purposes.

The importance of these issues has been noted at the Babinda facility with modifications made to the original design to now allow for better access. For example, a gate has been retrofitted into the rear fence so that workers can access the rear area of the facility for cleaning, grass mowing and general maintenance. Prior to this they were required to walk around the perimeter of the site to access this area.

In retrospect the width of the automatic exit gate to the facility (shown in Photo 13.7) has also been found insufficient to safely accommodate the large vehicles that access the site. For example the truck that clears the garden organics has about 30mm of clear space between it and the gate.



Photo 13.7 Automatic exit gate

14. Buderim Resource Recovery Centre

Maroochy Shire Council

Key Facts	
Throughput (tonnes/year)	*30,000 tpa mixed waste, 3,000 tpa garden organics, 2,000 tpa concrete + additional recyclables
Cost to build (\$)	\$2.8M
Owner	Council
Operator	Council
Designer	Consultant: Duggan & Hede Pty Ltd
Topography	
Site	Former landfill
Key Features	
Single weighbridge	✓
Dual weighbridge	✗
MRF	✗
Landfill	✗
Education centre	✗
2nd hand store	✓

* Approximately 15,000 tonnes/year of mixed waste is self-hauled in vehicles less than 3 tonnes capacity. A further 7,000 tonnes/year is self-hauled in larger quantities, and 8,000 tonnes/year commercial and industrial.

Maroochy Shire Council (MSC) owns two landfills, three rural transfer stations and the Buderim Resource Recovery Centre (RRC). The Buderim RRC is located 4kms south of Maroochy and its current throughput is approximately 35,000 tonnes/year. The Buderim RRC incorporates a waste transfer station, materials resale area, MRF, and an education centre

The two main objectives of the strategy that drove construction of the Buderim resource recovery centre were to have ‘flexible and cost effective systems for future management of residual wastes’ and ‘centralisation of waste management facilities with a network of transfer stations accessible to residents.’

14.1 Project drivers

In the late 90’s MSC formulated a strategy to guide waste management in Maroochy Shire into the next century. The Strategy is called ‘Today’s Waste – Tomorrow’s Resource’ and includes 10 key objectives and 40 associated strategies.



Photo 14.1 Buderim Resource Recovery Centre



14.2 Site selection

MSC operates two landfills, three rural transfer stations, and the Buderim RRC in the Maroochy Shire LGA.

The major landfill within the Shire is the Nambour landfill (which has 5 years remaining capacity). The Nambour landfill is approximately 20km from the Buderim facility. A smaller landfill located at Coolum has limited remaining capacity.

The Buderim RRC is constructed on a former landfill site. The Buderim landfill was closed in 2003. MSC elected to construct a resource recovery centre (incorporating waste transfer facilities) at the former landfill site as the land was already owned by Council, identifiable as a site used for waste management, and located in relatively close proximity to the main population centre of Maroochydoore.

14.3 Risk and needs assessment

MSC released a waste strategy in 1997 to direct waste management strategies and objectives over the next 10 years. In 2002, MSC commissioned Duggan & Hede Pty Ltd to undertake a report into the 'Planning for the Buderim Waste Recovery and Transfer Station.' This report investigated the following areas:

- Needs analysis for the type of infrastructure required at the site;
- Transport analysis;
- Technology review of transfer station;
- Environmental issues; and
- Comparison of waste transfer/transport systems (including comparison of costs and benefits).

Report outcomes were used to assess the financial and environmental risk associated with the proposed RRC and transfer station, and to identify appropriate technology to be implemented at the facility. The report also assessed the financial impact to Council, residents, and customers of the Buderim facility.

14.4 Design and construction

14.4.1 Technology

The consultants report on the comparison of waste transfer/transport systems recommended the use of a walking floor at the Maroochy facility (see Photo 14.2 and Photo 14.3).

Criteria that were considered in the evaluation of potential waste transfer/transport systems included:

- Operational – capacity, waste compaction, flexibility, reliability, maintenance, capital costs and operating costs;
- Environmental – traffic, noise, odours, air emissions, stormwater quality, vermin, litter; and
- Health and Safety – ergonomics, hazardous equipment, traffic, falls, air quality, hazardous wastes.

The walking floor dimensions are 25m long x 4m wide x 0.8m deep. The storage capacity in the pit is 100m³. The moving floor has been designed with variable speed drives to enable staff to enter the pit and recover recyclable or reusable items before the floor is activated. When the floor is activated, residual waste is discharged into a 4m wide discharge hopper, feeding waste into a heavy duty compactor. The compactor is used to maximise the payload of the residual waste into a 60m³ container for transfer, with waste compacted to a density of 400 kilograms per cubic metre.

The walking floor is supplemented by two 'direct tip' bays for self haul (<3 tonne) vehicles. The additional direct tip bays were also included in the transfer station design to act as a back up in the event of failure (or required maintenance) of the walking floor.

The combination of walking floor and direct tip bays was chosen due to:

- Cost effectiveness when compared to sorting waste tipped onto a floor or in a shallow push pit that would then require reloading into a transfer container;
- Reliability and proven technology;
- Ability to have a second chance of recovering materials, prior to disposal;



- Good ergonomics for customers;
- Ease of operation for staff;
- Low exposure to hazardous equipment;
- Low exposure to falls;
- Low operating noise;
- Minimal civil costs and site preparation; and
- Choice of technology was appropriate for managing waste from small vehicles (walking floor facility is not intended for use by large tipping trucks or compactor vehicles).



Photo 14.2 Walking Floor Technology at Buderim Facility



Photo 14.3 Unloading area Buderim Facility



Photo 14.4 Buderim Resource Recovery Centre during the New Year peak period

14.4.2 Transport and compaction issues

A review of transport and associated potential compaction systems were undertaken for the walking floor technology option. The options considered included:

- No fixed compactor/wheeled excavator;
- Small compactor and 31m³ hook lift containers; and
- Small compactor and 60m³ transfer trailer.

These options were initially assessed against criteria for capital costs, operating costs and the advantages and disadvantages of each option. A financial model was then developed to compare the three options in terms of transport and compaction.

The existing compaction unit and transfer trailers are shown in the photos below.



Photo 14.5 Stationary compactor and transfer container



Photo 14.6 Collection of transfer trailer



Photo 14.7 Compactor



Photo 14.8 Stationary compactor

14.4.3 Site layout

The site layout, constrained by necessity to position all structures on undisturbed land and the absence of such land at the site, was determined after a detailed comparison of various options. Key features of the selected site layout include:

- Gatehouse/weighbridge, resource recovery areas, and waste transfer areas are located as close as practical to each other;
- All vehicles with material to 'drop off' stop at the gatehouse to get directions (reusable materials, recyclables, green waste, concrete and waste for disposal); and
- The reuse shop is located away from all 'drop off' activities and adjacent to the existing roundabout at Syd Lingard and Else Wilson Drives.

Council has advised that the main disadvantages of this site layout include the current position of the single lane weighbridge that makes it difficult to efficiently weigh incoming vehicles as well as certain vehicles leaving the site (ie: bulk sale of processed green waste and concrete, waste for disposal and recyclables).



15. Gregadoo Waste Management Facility

Wagga Wagga City Council

Key Facts	
Throughput (tonnes/year)	20,000 tpa mixed waste* + additional recyclables
Cost to build (\$)	\$700K
Owner	Council
Operator	Council
Designer	Council
Topography	Flat
Site	Greenfield
Key Features	
Single weighbridge	✓
Dual weighbridge	✗
MRF	✗
Landfill	✓
Education centre	✗
2nd hand store	✓

*Includes waste disposed of directly to landfill and not through the transfer station.

Wagga Wagga City Council's main WMF is located at Gregadoo to the south of the City (approximately 20 kms from Wagga Wagga). Current WMF operations include the operation of a weighbridge, landfill, and reuse shop.

Wagga Wagga City Council (WWCC) is currently constructing a new waste transfer station at the Gregadoo WMF to be used by small vehicles and trailers. Commercial trucks and larger vans and trailers will continue to dispose of waste directly at the landfill face. Completion of the transfer station is anticipated mid-to-late 2005.

15.1 Project drivers

The main project drivers for the construction of the transfer station were a combination of attempting to reduce the size of the active landfill area and minimising OH&S risk by reducing the number of small vehicles moving about the landfill. Increasing resource recovery and separation of inert waste from putrescible waste for separate burial (in an inert waste landfill cell) were also motivations for the project.



15.2 Planning and development process

15.2.1 Site selection

WWCC operates five transfer stations in the Wagga Wagga LGA. Four of these facilities are rural transfer stations. The Gregadoo WMF is the major WMF in the Wagga Wagga LGA, servicing a residential population of over 55,000 persons, as well as commercial customers. The Gregadoo WMF was chosen as the site for the transfer station to address safety issues associated with allowing small vehicle access within the active landfilling area. There was also ample space available at the existing WMF site for establishment of a transfer station, and advantages in terms of existing planning and environmental approvals.

15.2.2 Planning and environmental approvals

Rather than banning public access to the Gregadoo WMF and constructing a new transfer station at a greenfield site, it was decided to construct the transfer station within the existing Gregadoo WMF site boundary. This was as development approval for the WMF already included approval for the landfill operation and 'auxiliary waste facilities', meaning that WMCC did not need further development approval for the new transfer station. The existing EPL for the WMF could also be extended to include the operation of the transfer station with relative ease, saving WWCC the inconvenience associated with obtaining a further EPL for a new site.

15.3 Stakeholder consultation

An external consultant undertook stakeholder consultation as part of the preliminary design process. The aim of the consultation was to obtain a better understanding of the needs of potential

users of the new transfer station. The consultant spent time at the Gregadoo WMF to determine typical:

- Types of users (domestic self-haul, commercial);
- Vehicle types accessing the site (trailer, car, van);
- Characteristics of drivers (male/female, age);
- Driving skills (confident parking to other vehicles, reversing a trailer into position);
- Correct / incorrect use of provided facilities (disposal of separated and mixed wastes in designated areas); and
- Current issues and challenges facing users (difficulty controlling children and keeping them away from active areas, scavenging).

The outcomes of this analysis were used in the design process for the transfer station. For example, it was found that there were a low percentage of skilled drivers using the WMF on weekends (i.e. approximately only 20-30% of weekend customers were actually regular trailer users). It was also commonly found that the lesser skilled drivers required a larger turning circle, and preferred to leave as much space as possible between themselves and the next closest vehicle (refer Section 0 for further examples of how the outcomes of consultation was used in the design process).

The consultant also conducted interviews with staff of the Gregadoo WMF and contractors using the site to identify other factors for incorporation into the transfer station design. Council planners were also consulted to determine appropriate estimates for future population and waste generation growth rates for the Wagga Wagga LGA.

No further wider community consultation activities were undertaken during the planning and development phase as the transfer station was to be located within the site boundary of the existing Gregadoo WMF and there are no planned changes to the existing hours of operation.



15.3.1 Education Program

WWCC will be initiating a community education program to coincide with the opening of the new waste transfer station. This will include promotion of the transfer station in the local newspaper.

The education program will be designed to maximise achievement of resource recovery goals by communicating to residents how to minimise waste and correctly separate their waste loads. It is planned to regularly update the education program based on progressive learning about people's behaviours once the transfer facility is in full operation.

15.4 Risk assessment

WWCC began preparing financially for the costs associated with the planning and development of the transfer station many years in advance. Funds for the project were accumulated through the domestic waste management charge and WMF gate fees. WWCC's foresight to commence saving for the project meant that it did not need to borrow funds to undertake the design and construction works. The two main advantages of this were that:

- The project financial risk was minimised due to reduced estimated costs and expenses (no interest repayments on financial loans); and
- Project timing was not delayed due to any requirements to apply or gain approval for capital finance.

Although finances were arranged early for this facility there was no specific amount set aside each year in preparation for the waste transfer station. The project was commenced once sufficient funds were accumulated.

15.5 Design and construction

Only small vehicles and box trailers will be permitted at the Gregadoo waste transfer station. The design has therefore been based around efficient servicing of these vehicles.

15.5.1 Site layout

As the Gregadoo transfer station is still under construction, the likely site layout provided in Figure 15.1 has been drawn based on the original designs and informal briefings provided by Council.

15.5.2 Platform

The transfer station platform has been designed to incorporate five 20m³ skip bins placed in a stepped saw-tooth arrangement on one side of the transfer station platform and a further four skips on the opposite side as shown in Figure 15.1. (see Section 15.5.3 for decision making process for skip number and capacity).

The shortest width across the platform is approximately 18m (largest width 26m), allowing sufficient manoeuvring space (for even inexperienced drivers) to safety back in and out of the loading bays. To prevent potential vehicle accidents, it is proposed that no two skips located directly opposite each other on the platform be utilised at the same time.

The angle of the saw-tooth arrangement has also been deliberately made quite sharp (90°) so that only minimal turning and manoeuvring is required to align trailers into the correct position. As the outcomes of consultation (refer Section 15.3) also determined that customers preferred to maximise the space between themselves and other vehicles double gates will be installed along the edges of the platform. The gates will act as both:

- Safety barriers (when in the closed position); and
- Reversing guides (when in the open position).

The platform is raised approximately 400mm from ground level. This height was selected to help minimise the risk of injury associated with potential falls into the skips, whilst still allowing for relatively easy unloading of cars and trailers (refer Section 15.5.3 for details of bin design).

The design of the platform did not take into account the potential use of the transfer station for large compactor vehicles. This was because the transfer station is co-located with an existing landfill at the Gregadoo WMF, which has many



years estimated remaining operating life. Hence in the short to medium term there would be no advantage in allowing large vehicles to empty loads at the transfer station.

The transfer station platform has been graded towards the platform centre so that stormwater runoff will move towards the platform centre and thus away from the platform edge. The graded design towards the platform centre also means that vehicles are required to back up to skips rather than rolling down towards them. It will also assist in having litter collect at the centre of the platform, rather than falling off the edge of the platform.

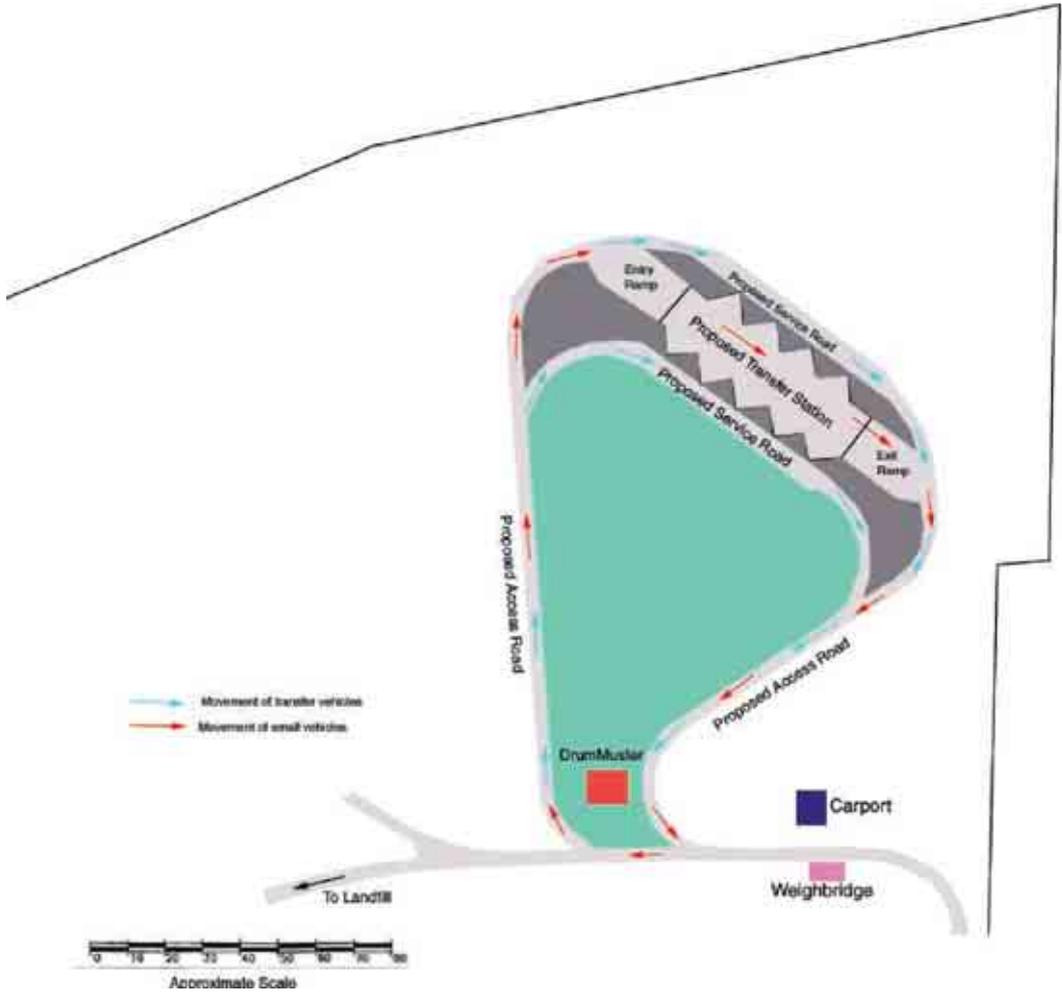


Figure 15.1 Site layout of Gregadoo transfer station(Schematic only, sizes are approximate).



15.5.3 Skip bin capacity and number

Operation of the transfer station requires the use of bulk skip bins. Skip design was an important consideration for this site. Factors taken into consideration when determining the preferred skip size included:

- Outcomes from the initial consultation undertaken with users of the Gregadoo WMF (refer Section 15.3); and
- Desire to minimise OH&S risks associated with potential falls off a high platform into a bulk skip, or risk of injury from manual handling (lifting) of large waste items.

Taking into account the above it was decided to utilise 20m³ skips. The top of each skip will sit above the edge of the platform (to minimise the risk of falling into the skips), however the side of the skips will be lowerable to permit for easy unloading of cars and trailers. There will also be a concrete lip to stop vehicles from backing into the skips, and the need for a rubber flap between the platform and the skip to reduce waste falling between the gaps will be reviewed.

The decision to utilise 20m³ skips was also partially based on skip sizes currently available from the local contractor. WWCC recognise that there is the potential risk that available bin sizes may change in the future, however this is not considered a major issue as future skips can be custom fabricated if required.

The number of saw-tooth positions (and skips) required was determined through an assessment of current weighbridge data, and allowance for future growth in the local area over the next 20-years. Future growth was allowed for to ensure the transfer station would be able to accommodate the number of skips required both now and in the future (for both waste and recyclables) such that customers would not need to queue on the transfer station platform during peak times.

Calculation of the number of skips required also included considering the duration between skip emptying times. To save on operating costs, WWCC is negotiating to have the skips emptied by contractors at the same time as the contractors are accessing the site as part of their own operations. Hence saving the cost of contractors travelling

to the Greagadoo WMF for the sole purpose of servicing the transfer station skips. To ensure the skips are emptied regularly and at a competitive price, WWCC will engage the services of two contractors to undertake the task. The average duration between skip emptying times was thus determined through assessing weighbridge records associated with visits to the site by the relevant contractors.

15.5.4 Roof

WWCC has decided to leave the transfer station uncovered at present. This due to the cost associated with construction of high roof (estimated at approximately \$200K), and the opinion that providing roofing in the short to medium term is not a priority, as many of the small vehicle customers will not visit the Gregadoo WMF when it rains anyway.

Finance permitting however, future plans for the transfer station include covering six of the unloading areas including the skips.

15.5.5 Drainage

The transfer station platform has been graded towards the platform centre so that stormwater runoff will move towards the platform centre and thus away from the platform edge. The intention of this design was to minimise potential stormwater runoff from the platform into the skips and skip storage area, which would be frequented by heavy vehicles.

The platform design incorporates four stormwater drains to prevent ponding. Stormwater runoff will flow from open drainage to an onsite dam (no further treatment).

15.5.6 Security

There will be a CCTV and PA system installed on the waste transfer station platform. This will assist in:

- Permitting supervision of the transfer station by the gatehouse attendant whilst the transfer station platform is itself unattended (note it is proposed that the actual platform be unattended during normal weekdays and attended only on weekends);



- Reduced overall long-term operating costs when considering the cost of the CCTV and PA system compared to providing a full-time staff member on the transfer station platform;
- Installed security cameras can be used by the gatehouse attendant to ensure correct pricing of waste loads and to record non-compliances;
- The gatehouse attendant can provide directions to customers over the PA system without leaving the gatehouse; and
- Better utilisation of staff by limiting requirements for staff to be located on the platform on weekdays. WWCC believe that this in turn will help increase worker esteem through the increased staff utilisation. It will also support training and encouraging weekend transfer station staff to provide a service role (assisting customers), rather than an 'end of road' attitude to working at a waste facility.

The additional security and assistance that can be provided using the system (as opposed to leaving the transfer station unattended) is also part of WWCC's desire to ensure customers have a positive experience when using the facility, which includes receiving helpful and friendly service at all times.

15.5.7 Litter control measures

A 3m high litter control fence surrounds the Gregadoo transfer station. WWCC is considering additional litter control systems such as construction of fixed and moveable screens.

15.5.8 Internal versus external design

Design of the transfer station was largely undertaken in-house, with some assistance from an external consultant for the detailed design.

The decision to largely rely on internal resources was based on a desire to make best (most efficient) use of local knowledge and take advantage of travel cost savings (although small) associated with using local resources.

There was not a significant difference between internal costs versus using an external consultant. However there were significant delays to the project due to the resignation of two key staff involved in the transfer station project from WWCC.

15.5.9 OH&S

OH&S measures that were incorporated in the design of the Gregadoo transfer station include:

- Platform is raised only about 700 mm from ground level;
- Moveable gates to close access to loading bays that are not in use;
- Permanent hand rails installed on all platform edges where there are no skip bins in use below;
- Height of skip bin designed to allow for easy unloading of materials from vehicles and trailers (top of skip bin about 400 mm above platform);
- Security cameras and PA system installed on the platform;
- Concrete lips on platform edge to prevent vehicles backing over the platform edge;
- Signage;
- Angle of saw-tooth arrangement designed to permit easy manoeuvrability in and out of unloading bays;
- Fire fighting equipment including pumps and hoses;
- Groundwater tank installed and used for fire control.

15.5.10 Resource recovery

Aussie Junk currently operates a reuse shop and recycling area outside the Gregadoo WMF. Customers to the WMF are encouraged to drop off recyclables and potentially reusable items at the reuse and recycling area prior to entering the WMF. There is currently only limited shelter available in the reuse shop for storage of items and the reuse shop is unsurfaced. Improvements to this reuse and recycling area are therefore planned to be implemented in conjunction with the new contract with Aussie Junk.



Inside the WMF, the transfer station platform has been designed to accommodate designated skip bins for recyclables including scrap metal and green waste. An existing waste oil drop-off collection system will be moved from its current position in the WMF to the transfer station. Receptacles for collection of other recyclables not accepted at the Aussie Junk reuse and recycling area (for example lead acid batteries) will most likely be placed along the access road leading to the transfer station (exact placement and location of recyclables containers yet to be decided).



Photo 15.1 Cardboard recycling located outside the WMF entrance



Photo 15.2 Shed with electrical items at the reuse centre



Photo 15.3 Reuse centre entrance



Photo 15.4 Outdoor storage at reuse

15.5.11 Weighbridge

Customers to the transfer station will be required to pass through the existing weighbridge (see Photo 15.5). There is only one single lane weighbridge at the WMF, and all customers to the site are required to be weighed on both entry and exit. This has on occasion led to queuing in peak periods at the site. It also has the disadvantage that drivers cannot speak directly with weighbridge staff without leaving their vehicles on entry to the site.

To address these issues WWCC is considering installing a second weighbridge in the future, and is assessing alternative gatehouse and weighbridge alignments given the existing single weighbridge alignment. WWCC believe that the single weighbridge design could be improved by installing an additional passing lane at the weighbridge to permit traffic to more easily pass each other. The weighbridge is fitted with toilet facilities.



Photo 15.5 Single lane weighbridge and gatehouse at Gregadoo WMC

15.5.12 Construction

Construction of the transfer station was let out to tender as a series of separate packages covering:

- Rails and fit out
- Roads; and
- Concrete.

Construction of the rails and fit out and roadworks was awarded to WWCC. The tender for all concrete works was awarded to a local contractor. WWCC reflect that if done again construction would be let as one single tender to avoid the additional management and administration work associated with dealing with multiple contractors. The separation of the above elements of construction was originally done to determine if there would be any cost advantages through increased competition for services.

15.5.13 Costs

The largest cost associated with construction of the transfer station was for roadworks. Significant pre-construction works were required due to an existing decomposed granite base (that became very slushy when wet and unsuitable for heavy vehicle movement) at the site for the new transfer station. Pre-construction works included addition of significant amounts of concrete to increase stabilisation, and construction of a 0.5m thick gravel road.

All internal roads to and around the transfer station are currently constructed of compressed gravel, with future plans to properly surface them in the future. WWCC has elected to build roads progressively for two main reasons:

- To assist in managing construction costs; and
- To permit some current flexibility in road design, which in term will better allow final roads to be set along an optimal path (based on operational experience).

Other costs associated with the construction of the transfer station include:

- Construction of the transfer station platform ~ \$400K;
- Skip bins ~ \$15K each; and
- Installation of a second weighbridge (planned for weighbridge next financial year) ~\$350K for weighbridge, associated road works, and high roof structure over the weighbridge.

15.6 Timing

The required timeline for the planning, design, and construction of the transfer station was originally estimated at 12 months. The actual timeline however was greater than 12 months due to delays caused by:

- Loss of knowledge due to the loss of two key staff from WWCC;
- Wet weather during construction; and
- Use of council staff for internal road works which meant that work on the transfer station was delayed while other council projects were given priority.

WWCC estimate that the design and construction phase alone has taken 12 months. This period included:

- In-house transfer station design by WWCC;
- Engagement of a consultant to undertake a review of design options;
- Review of design options (by consultant);
- Selected design issued for tender; and
- Selection of preferred tenderers (using the Local Government tender assessment process). Note construction was divided into three sections;

1. Rails and fit out
2. Roads; and
3. Concrete.

Recognition of the need for the transfer station, preliminary planning, and a feasibility assessment were undertaken in the 2 years prior to design and construction.

WWCC consider that time (and potentially cost advantages) may be realised where the construction works are tendered as a complete package, rather than broken into the three sections described above.



16. Uranquinty Transfer Station

Wagga Wagga City Council

Key Facts	
Throughput (tonnes/year)	< 500 tonnes/year
Cost to build (\$)	Unknown
Owner	Council
Operator	Local Contractor
Designer	Council
Topography	Flat
Site	Former landfill
Key Features	
Single weighbridge	X
Dual weighbridge	X
MRF	X
Landfill	X
Education centre	X
2nd hand store	X

Uranquinty is one of the larger villages near Wagga Wagga. The Uranquinty transfer station is located at a former landfill site. This transfer station is reportedly well used by local residents and is open 2 days per week for approximately 4 hours per day; Sundays (1:00pm – 4:45pm) and Wednesdays (8:00am – 11:45am).

16.1 Design and construction

The transfer station retaining wall was previously constructed from timber but this was found inadequate to provide long-term stability and strength. Recent improvements have seen it be reconstructed using precast concrete blocks. Welded steel has also been added to increase the

strength of the platform. There is also concrete platform (hardstand) underneath the bins and safety rails located on the side of the platforms.

There are two 30m³ skip bins for mixed garbage, which are only emptied once full (see Photo 16.1).



Photo 16.1 Two-bin staggered arrangement



Photo 16.2 Height of bin compared to the platform

Transfer bins are located on a reinforced cement base. The retaining walls are reinforced with concrete and steel which has been found to be a cost effective option for construction materials (see Photo 16.3).

Currently Council's recycling contractor (Aussie Junk) picks up all recycling materials from the rural transfer stations in the Wagga Wagga LGA. Recyclables are collected in old used oil drums, crates, or woolsacks.

There is limited signage at this transfer station. The site is uncovered and hence there is no protection from rain. There is an uncovered gap between the platform edge and the skip meaning that litter can easily drop into the gap. The surface of the platform is made up of gravel materials. There is a concrete lip on the transfer platform to prevent vehicles from backing into the transfer bins (see Photo 16.4).

The transfer station has neighbours within the 500m buffer zone, however there has been no complaints about noise or odour from the site. Trees around the transfer station perimeter provide some visual screening for the neighbours.



Photo 16.3 Cement base under transfer bins, concrete and steel reinforced retaining walls



Photo 16.4 Concrete lip to prevent vehicles backing over the platform edge



17. Mangoplah Transfer Station

Wagga Wagga City Council

Key Facts	
Throughput (tonnes/year)	< 500 tonnes/year
Cost to build (\$)	Unknown
Owner	Council
Operator	Local Contractor
Designer	Council
Topography	Flat
Site	Former landfill
Key Features	
Single weighbridge	X
Dual weighbridge	X
MRF	X
Landfill	X
Education centre	X
2nd hand store	X

Mangoplah is a small village located about 40km out of Wagga Wagga. Supervisors of the Mangoplah transfer station are normally members of the general community under contract to Council. There is one person supervising the site at all times when the site is open. The site is open from 9:00am-12:00pm on Sundays only.

There is no concrete hardstand for the skip bins. There is a ramp up and down to allow access on and off the transfer station platform. The transfer station has been designed to allow for up to 3 skip bins to be used however currently only one is required. Rubber tyres have been placed at the ends of the skip area to assist preventing damage to the platform retaining wall from the movement of the large bins (see Photo 17.1).

17.1 Design and construction

The transfer station has been constructed on a former landfill site in an area with plenty of natural bushland screening. However gullies are forming around the site due to natural land erosion and WWCC is working to ensure these gullies are soon filled in.





Photo 17.1 Staged platform arrangement, no safety barriers

The platform is slightly higher than the height of the skip bin which causes some OH&S risk, particularly as there is no barrier to prevent customers reversing over the platform edge. Future planned development works at the Mangoplah transfer station therefore include providing concrete lips to cover the gap between the platform and the skip bin, concreted hardstand areas for the skip bins, and safety rails along the platform edges. These works are estimated to cost approximately \$10-\$15K in total since WWCC would do the work in-house.

There are a number of recyclables collected at the site using used oil drums and wool stacks (see Photo 17.3 and Photo 17.4). There is various signage indicating where to place separated recyclables.



Photo 17.2 Tyres used for protection of the platform retaining wall



Photo 17.3 Used oil drums used to collect recyclables



Photo 17.4 Wool sacks and drums used for recyclables



18. Collingullie Transfer Station

Wagga Wagga City Council

Key Facts	
Throughput (tonnes/year)	< 250 tonnes/year
Cost to build (\$)	Unknown
Owner	Council
Operator	Local Contractor
Designer	Council
Topography	Flat
Site	Former landfill
Key Features	
Single weighbridge	X
Dual weighbridge	X
MRF	X
Landfill	X
Education centre	X
2nd hand store	X

Collingullie is a small village in the Wagga Wagga LGA, located approximately 30 minutes out of the main Wagga Wagga township. It is currently open on Sundays (8:00am - 11:45am) and Wednesdays (1:00pm - 4:45pm). The transfer station was constructed approximately 4 years ago on a former landfill site.

18.1 Design and construction

Construction of the Collingullie transfer station was relatively inexpensive due to its simple construction and use of recycled materials where possible, including recycled steel for rails and support beams. The transfer station consists of a single ramp up and down to/from an unloading area.

Waste is unloaded into a 30m³ skip bin, which is emptied as required by a contractor (on-call). The transfer station was constructed by WWCC. The main cost of construction was for gravel and fencing materials.





Photo 18.1 Single skip bin, ramp with hand rails



Photo 18.2 Single ramp up and down to single skip bin



Photo 18.3 View to site access gate from the top of the transfer station platform

WWCC have adopted a pragmatic approach which has resulted in:

- A low establishment cost;
- No formal drainage system or litter controls implemented;
- Limited OH&S controls in place to prevent customers from falling from the top of the drop-off area into the large skip bin;
- Limited facilities for recyclables (see Photo 18.4); and
- Old drums and woolsacks used for collection of recyclables (however it is WWCC's intention to ensure that these be replaced by the contractor in the future with more suitable containers, potentially skips or wheelie bins).



Photo 18.4 Collection of recyclables



19. Ballina Waste Management Centre

Ballina Shire Council

Key Facts	
Throughput (tonnes/year)	60,000 tpa mixed waste* + 6,000 tpa recyclables
Cost to build (\$)	\$1.2M
Owner	Council
Operator	Council
Designer	External
Topography	Flat
Site	Greenfield
Key Features	
Single weighbridge	✓
Dual weighbridge	✗
MRF	✓
Landfill	✓
Education centre	✓
2nd hand store	✓

*Includes waste disposed of directly to landfill and not through the transfer station.

Ballina Shire Council (BSC) operates a WMC at Ballina, which incorporates a MRF, landfill, education centre and transfer station. This is the major waste management facility in the Ballina LGA, handling all kerbside collected waste and recyclables from 17,000 households, as well as self-hauled waste, and commercial loads. Total waste throughput is equivalent to approximately 60,000 tonnes per annum of solid mixed waste and 5,000 tonnes per annum of recyclables as well as garden organics and waste oil. In 2003/2004 there were over 70,000 customers who used the WMC.

19.1 Project drivers

Prior to 1995 there were four landfill sites within the Ballina LGA. Closure of the three rural landfill sites outside of the main Ballina centre (including Alstonville, Lennox Head, and Wardell) resulted in operation of a single site at Ballina.

Construction of the transfer station at the Ballina WMC coincided with the construction of the MRF in 1997. The MRF was constructed to allow for sorting of a kerbside collected commingled recyclables stream from the newly introduced MGB kerbside service⁷. This MRF would also process recyclables from Lismore City Council and Richmond Valley Council areas.

⁷ Kerbside collection of recyclables previously was undertaken using a crate based system for collection of sorted recyclables.



Drivers for the construction and operation of the transfer station included:

- OH&S issues associated with small vehicles accessing the active landfill area; and
- The desire to increase resource recovery and conserve landfill airspace.

BSC elected to not build transfer stations at other closed landfill sites, preferring to manage all waste through one centralised, integrated WMC. This resulted in decreased requirements for new infrastructure as services and infrastructure (including a public weighbridge and gatehouse) already existed at the Ballina facility. This decision was also based on minimising waste management costs through having less requirements for onsite supervision and ongoing management by operating one rather than four transfer station sites.

19.2 Planning and development process

19.2.1 Site selection

As BSC had made a decision to operate only one WMC located at Ballina, the site for the transfer station by default was selected as the Ballina WMC. There was sufficient area available at the Ballina WMC to permit construction of a MRF, education centre, and transfer station in the space between the existing weighbridge and landfill. An EIS was not required for this site.

19.3 Community consultation

No formal community consultation was undertaken as part of the transfer station development process. The smaller rural landfills were unlicensed and so it was a conscious decision BSC to close these sites and have one integrated and licensed facility in Ballina. There was little community input into deciding whether the smaller rural landfills would be closed.

Locating additional transfer stations at the former rural landfill sites was deemed unfeasible. The opening hours of the Ballina WMC however were extended to compensate for the closure of the smaller sites.

19.3.1 Education program

The WMC incorporates an education centre (part of the MRF building). The centre serves as a community education resource and school group tours are often undertaken. There is also a viewing platform from the education centre looking into the MRF, which plays an important part in explaining the recyclables recovery process.

19.4 Risk assessment

BSC considered it advantageous to operate a transfer station to minimise risk of injury by having small vehicles accessing the landfill tip face directly. Financially, it was also considered advantageous to consolidate four landfill sites down to one and to develop that site to include a MRF and a transfer station. The cost of constructing the transfer station and MRF was met through a financial loan.

19.5 Design and construction

Only small vehicles and trailers are permitted at the Ballina waste transfer station (see Photo 19.1). The design has therefore been based around efficient servicing of these vehicles since commercial vehicles go directly to the landfill tipping face.



Photo 19.1 Ballina Waste Transfer Station.

19.5.1 Site layout

The current site layout is designed so that small vehicle traffic is directed clockwise via a roundabout up and around the transfer station (see Photo 19.2). Vehicle movement around the transfer station is one-way traffic flow only.

The reuse centre is located on the left-hand side of the entrance road before the roundabout; hence customers can easily visit the reuse centre prior to accessing the transfer station. However many customers wish to visit the reuse centre after dropping off waste at the transfer station, and hence a difficulty with the current layout is that customers wishing to do this are required to turn right (from the transfer station) across oncoming traffic flow. The relocation of the reuse centre to a larger area (currently vacant land) adjacent to gatehouse on the exit road from the transfer station will help to eliminate this safety issue.⁸



Photo 19.2 Roundabout directing traffic to the transfer station

19.5.2 Design for supervision and security

Staff facilities on the transfer platform have been incorporated into its design. This includes a small office area located at the end of the transfer station platform, adjacent to the waste oil storage area (see Photo 19.3). Supervision is currently undertaken by maintaining at least one WMC staff on the transfer station platform, however BSC proposes to implement a CCTV and PA system in the future.



Photo 19.3 Staff office located on the transfer station platform

19.5.3 Skip bin capacity

The transfer station is designed in a saw-tooth pattern, allowing for the placement of six bulk skip bins in the 'teeth', and an additional bulk bin at the end of the transfer station platform (see Photo 19.4).

Bulk bins are approximately 17m³ each in capacity, with dimensions of approximately 2m (high), 4m (breadth) and 2m (wide). Bins are designed to be collected by transfer vehicles using a hook-lift loading mechanism.

Bins have been specially engineered by local manufacturers to meet BSC's requirements. A top section (approximately 0.4m) of the wider bin side is hinged, allowing for this section to be lowered over the edge of the transfer station platform. There is a raised concrete edge on the platform that prevents vehicles from backing over the platform edge, and which also allows for placement of the folded-down bin side (see Photo 19.5 and Photo 19.6).

This system prevents gaps between the bin and the transfer station platform and has the advantages of:

- Preventing litter falling between the bin edge and platform;
- Preventing injuries from customers requiring to lift loads above the bin lip; and
- Allows for customers with trailers to easily unload and sweep out waste into the bins.

⁸ This assumes that customers will continue to be charged for all waste at the weighbridge (including salvageable items) and hence they will be required to enter the site via the weighbridge as per current practice ie: customers will not be permitted to access the reuse centre prior to entering the WMC gate and weighbridge.



Photo 19.4 Skip bins located at the transfer station



Photo 19.5 Hinged side of bin



Photo 19.6 Hinged side of bin

However, the trade off between allowing easier access to the skip bins is the increased risk of customers falling from the transfer station platform into the bins as they are unloading waste and recyclables. This has led to BSC revising waste tipping practices resulting in raising the bin lip to the closed position and installing safety rails along the transfer station platform for two of the drop-off skip bin bays (the cardboard and mixed plastics and glass bins) (see Photo 19.7).

Customers using these bins are now required to lift waste over the safety rail and into the bins (see Photo 19.8). The top of the bins (and safety rail) are approximately at waist height meaning that there are still OH&S issues associated with current waste drop-off procedures, particularly when the recyclables are lifted and emptied from heavy bins or crates into the bulk skips.



Photo 19.7 Safety rail in front of skip bin



Photo 19.8 Customer emptying recyclables over safety rail



19.5.4 Platform

The height of the platform is approximately 2m above ground level. This height was designed to allow for use of the specially designed skip bins. The platform is approximately 8-10m wide (not including the access ramp), allowing for vehicles with trailers to easily reverse into the bin bays (see Photo 19.9 and Photo 19.10). The provision of a designated lane as an access ramp has the advantage of ensuring that vehicles are required to turn into the transfer station platform to dispose of waste and recyclables and they are therefore prevented from parking in the access lane and potentially blocking traffic flow.



Photo 19.9 The undercover platform



Photo 19.10 Vehicles lined up at the appropriate drop-off bins

19.5.5 Roof

The transfer station is covered by an aluminium roof located approximately 7m above the base of the transfer station (about 5m above the transfer station platform). The roof extends to the edges of the transfer station platform, covering both the drop-off area, skip bins, and most of the large-vehicle access area (where the skip bins are collected).

The roof height will allow for emptying of large waste compaction and collection vehicles into the transfer station bins should the need arise. The height and size of the roof was also selected because it allows for collection of the bins by transfer vehicles undercover.

19.5.6 OH&S

Staff facilities have been incorporated into the design of the platform and are part of the OH&S measures that BSC have implemented at the site. This enables supervision at all times of customers using the transfer station, the staff can also assist with the unloading of wastes into the skip bins.

Other OH&S measures considered in the design are the use of safety rails on some of the drop-off areas to prevent customers from falling from the transfer station platform, and the use of a lowered-edge on general waste bins to permit easy unloading of waste from trailers and vans.

As Ballina is a population tourist area, there are many caravan park and other business owners that bring waste and recyclables to the WMF in garbage bins. There is a risk of injury from the emptying of these bins into the transfer station skips (as shown in Photo 19.11). The lowered skip edge has been incorporated in the site design to assist minimise this risk



Photo 19.11 Small business owner emptying bins into transfer skip

19.5.7 Timing

The education centre (see Photo 19.12) and MRF (see Photo 19.13) commenced operation along with the transfer station in 1997. The timeline for the planning, construction, and operation of the transfer station from initial feasibility assessment to commissioning was approximately two years.



Photo 19.12 Ballina Education Resource Centre



Photo 19.13 Ballina MRF

19.5.8 Resource recovery

Resource recovery activities undertaken at the transfer station include:

- Scrap metal is collected in skip bin, which once full is then taken to the large scrap metal pile located near the Ballina landfill (on-site).
- Salvaged items are stored on the waste transfer platform and then transported to the reuse centre. It is felt that there is insufficient storage space for these items on the platform.
- The reuse centre itself is currently very limited for space. It will soon be relocated to a larger area closer to the gatehouse.
- Gas bottles are currently stored on the waste transfer platform near the scrap metal and salvageable items.
- Fridges are accepted and after degassing, added to the scrap metal stockpile. Prior to degassing fridges are stored at the rear of the transfer station platform near the site office.
- There is a waste oil drop-off area on the transfer station platform, located near to the site office.
- Cardboard and paper are collected in one of the 17m³ bulk skips at the transfer station.
- Mixed plastics and glass are collected in one of the 17m³ bulk skips at the transfer station.
- Garden organics is collected in two of the 17m³ bulk skips at the transfer station. There is garden organics stockpile located near the Ballina landfill (on-site).

The largest constraint with resource recovery at the transfer station is limited space available for efficient collection and storage of gas bottles, lead acid batteries, and salvage items. The expansion and relocation of the reuse centre will however hopefully help to address this issue.





Photo 19.14 Scrap metal and salvageable items



Photo 19.17 Waste oil collection



Photo 19.15 Gas bottles



Photo 19.16 Fridges waiting to be degassed

19.5.9 Construction

The transfer station is built on a section of the WMC that was not previously landfilled. As this section of the site is reasonably flat, fill was used to build up the area for construction of the raised platform. Council day labour undertook the construction of the waste transfer station.

19.5.10 Construction cost

The largest cost associated with the construction was the concrete required for the platform retaining walls. Total cost of construction is estimated at about \$1.2M.

19.6 Operation

19.6.1 Litter control

Litter is managed using a manual litter collection system, consisting of a WMC staff member walking around the site collecting litter using a special vacuum fitted to a bin. Since there is a MRF also on site, there can be significant windblown litter generated by the open area of the MRF operation. Litter fences surround the site to assist preventing litter escaping the site boundary.

19.6.2 Weighbridge

Commercial and large customers (over 300 kg) are required to be weighed on entry and exit (see Photo 19.18, Photo 19.19, and Photo 19.20). The WMC has only a single weighbridge, so to assist in minimising potential queuing regular customers have an account with BSC and their vehicles are tared (known empty weight entered in the computer system). Tared vehicles do not need to be weighed on exit.

Small vehicles are not weighed and pass through a separate entry lane to large commercial vehicles which is fitted with a boom gate (see Photo 19.21).

There are windows on both sides of the gatehouse meaning that the gatehouse attendant can talk directly to vehicle drivers without needing to leave the gatehouse, or have the customers get out of their vehicles. However as only one staff member mans the gatehouse, this means that the attendant must move between the two windows to speak to either incoming or outgoing traffic. The main disadvantage of this design is that it is difficult for the gatehouse attendant to see incoming traffic when they are facing the opposite direction to speak to outgoing customers, and vice versa.

The separate entrance and exit lanes help regulate traffic flow however it also means that gatehouse staff need to be very diligent in ensuring they know when a vehicle is approaching in either direction. Since the gatehouse attendant has two windows to service this can be an issue. There is a boom gate installed on the small vehicles entrance to assist manage traffic entering the site, however sometimes the boom gate is not used.



Photo 19.18 Large vehicle entry via weighbridge



Photo 19.19 Large vehicle exit via weighbridge



Photo 19.20 Overall entry/exit layout



Photo 19.21 Small vehicle entry/exit lane with boom gate

19.6.3 Resource recovery

To increase resource recovery during normal operation, transfer station attendants are allowed to recover recyclables and salvageable items from the transfer bins using a hook.

19.6.4 Reuse centre

In addition to the above, customers can separate items potentially suitable for resale at the onsite reuse centre (see Photo 19.23). These items are checked by the reuse centre operator prior to acceptance, rejected items are placed in the mixed waste skips for landfill.

The design and location of the reuse centre is currently being rethought due to space constraints.



Photo 19.22 Limited space within the reuse centre



Photo 19.23 Expansion of sale items from the reuse centre onto the pathway

19.6.5 Signage

Signage has been provided at the site to help customers identify key operational areas and to follow the required traffic direction.

There are various signs on the transfer station platform itself to help customers separate their waste into the correct areas (see Photo 19.26 and Photo 19.27). It was noted by BSC WMC staff that words such as 'commingled' and 'inert' are not well understood by many members of the general community.

Use of easily understood terminology as well as symbols would perhaps assist customers understanding the appropriate use of the transfer station, and would assist in increasing resource recovery and minimising contamination.



Photo 19.24 Sign at entrance directing traffic flow



Photo 19.25 Lights and signs are used to control traffic across the weighbridge



Photo 19.26 OH&S Requirements for customers using the transfer station



Photo 19.27 Signs indicating the use of the skip bins

19.6.6 Supervision and safety

At least one staff member is present on the transfer station platform during opening hours to ensure customers are using the facility appropriately, this includes ensuring:

- Waste is disposed of in the appropriate bin;
- OH&S requirements are adhered to (see Photo 19.26); and
- Screening of waste prior to disposal.



20. Wauchope Transfer Station

Hastings Council

Key Facts	
Throughput (tonnes/year)	2,000 tpa mixed waste + 700 tpa green organics + other recyclables
Cost to build (\$)	\$0.5M (estimated)
Owner	Council
Operator	Council
Designer	Consultant – Allen Taylor and Associates
Topography	Flat
Site	Greenfield
Key Features	
Single weighbridge	X
Dual weighbridge	X
MRF	X
Landfill	X
Education centre	X
2nd hand store	X

Hastings Council is currently constructing a new transfer station in Wauchope. The township of Wauchope, located approximately 21 kilometres from Port Macquarie, serves as the regional centre for the inland Hastings area, particularly for the rural communities and the associated agricultural industries. Wauchope has a population of approximately 5000 people.

The construction of the new transfer station coincides with the closure of the Wauchope landfill. The transfer station is being constructed at a Greenfield site in the industrial area of Wauchope. Completion of the transfer station is anticipated mid-to-late 2005.

20.1 Project drivers

The Wauchope landfill reached operational capacity in early 2005. The intention of the landfill was to provide a waste service to Wauchope residents. However as the landfill was located approximately 7km from Port Macquarie on the Oxley Highway, which is the main road between Port Macquarie and Wauchope, it was actually more accessible to residents of Port Macquarie.

Following the landfill closure, Hastings Council still wishes to provide a waste service to Wauchope residents. Thus there was a drive to establish a waste transfer facility at a Greenfield location closer to the Wauchope township rather than at the existing Wauchope landfill.



20.2 Planning and development process

20.2.1 Site selection

The decision to locate the new transfer station at a Greenfield site closer to the Wauchope township was based on:

- Desire that the new transfer station should service the residents of Wauchope, and hence be easily accessible and located as close as possible to main residential areas;
- Existing access to the Wauchope landfill was problematic as it required vehicles to turn into the site from the busy Oxley Highway which has only one lane flowing in each direction, and no provisions for turning lanes into the site; and
- Continued use of the current Wauchope landfill site for ongoing waste management was unfavourable to surrounding residents and landowners due to the potential sterilisation of land for further development (due to need to maintain adequate buffers).

The site selection process included consulting with the local community surrounding the existing Wauchope landfill regarding the potential ongoing use of that site for waste management services.

Following consultation, and having due consideration of the issues with the existing location of the Wauchope landfill (as listed above), Hastings Council determined to seek a Greenfield site for the transfer station development.

Prior to searching for potentially suitable real estate, a preliminary design and layout of waste transfer station was undertaken to determine the minimum site area required. An appropriate site was selected in the 'Wauchope Enterprise Park', an existing industrial subdivision. This site was selected due to:

- Vicinity to main areas in Wauchope;
- Location within an industrial subdivision for which permitted;
- Transfer vehicles not required to travel through residential areas;

- Site is located in the rear of the industrial division and is bounded by the North Coast Railway to the east and a main road (King Creek Road) to the south, hence there would be minimal additional noise impacts from the site; and
- Site was zoned 4(a) General Industrial (under the Hastings Local Environment Plan 2001). Development of a waste management facility within this zone was therefore permitted with consent.

20.2.2 Planning and environmental approvals

There were a number of advantages in selecting a site that was appropriately zoned to permit development of waste management facilities. One of the most significant of these was that the DA process required only a Statement of Environmental Effects rather than a full-blown Environmental Impact Statement. Hence there were both cost and time savings.

20.3 Design and construction

The design of the Wauchope transfer station was determined through a collaborative process between Council's waste management team and associated operational staff. Operational staff were consulted throughout the design process to ensure that the selected design took into consideration known operational issues based on operational experience at other transfer stations in the Hastings LGA. This process has resulted in a final design for the site that is supported by both management, operational staff, and waste and recyclables collection contractors.

20.3.1 Site layout

The site layout of the new Wauchope transfer station provides for one-way traffic flow in an anti-clockwise direction throughout the entire facility (other than at the site entrance/exit). An overview of the site layout is shown in Figure 20.1.



Only small vehicles and trailers will be permitted at the Wauchope waste transfer station. The design has therefore been based around efficient servicing of these vehicles.

Customers to the site will be required to drive up a ramp to the transfer station platform where there will be provisions for hazardous materials, green waste, metals, recyclables, and lastly mixed waste. Moving down the transfer station ramp and in a counter-clockwise direction the customer will then come across the construction and demolition materials drop-off area and other recyclables/recoverables stockpiles prior to returning to the site exit.

Transfer bins will be collected by vehicles that will also move about the site in a counter-clockwise direction. The transfer vehicles travel behind the

transfer platform and around the site perimeter with no requirement to pass on top of the platform.

Site amenities, an office, and staff parking will be located at the site entrance.

Due to the relatively small quantity of materials to be received at the site (less than 10,000 tonnes/year in total for mixed waste and recyclables) it is not proposed to initially install a weighbridge. However provisions for future installation of a weighbridge at the site entrance have been allowed for in the site design. The additional cost of a weighbridge installation (~\$80K) and gatehouse operator (~\$50K/year) were the main factor in determining whether or not installation of a weighbridge was feasible given predicted customer patronage.

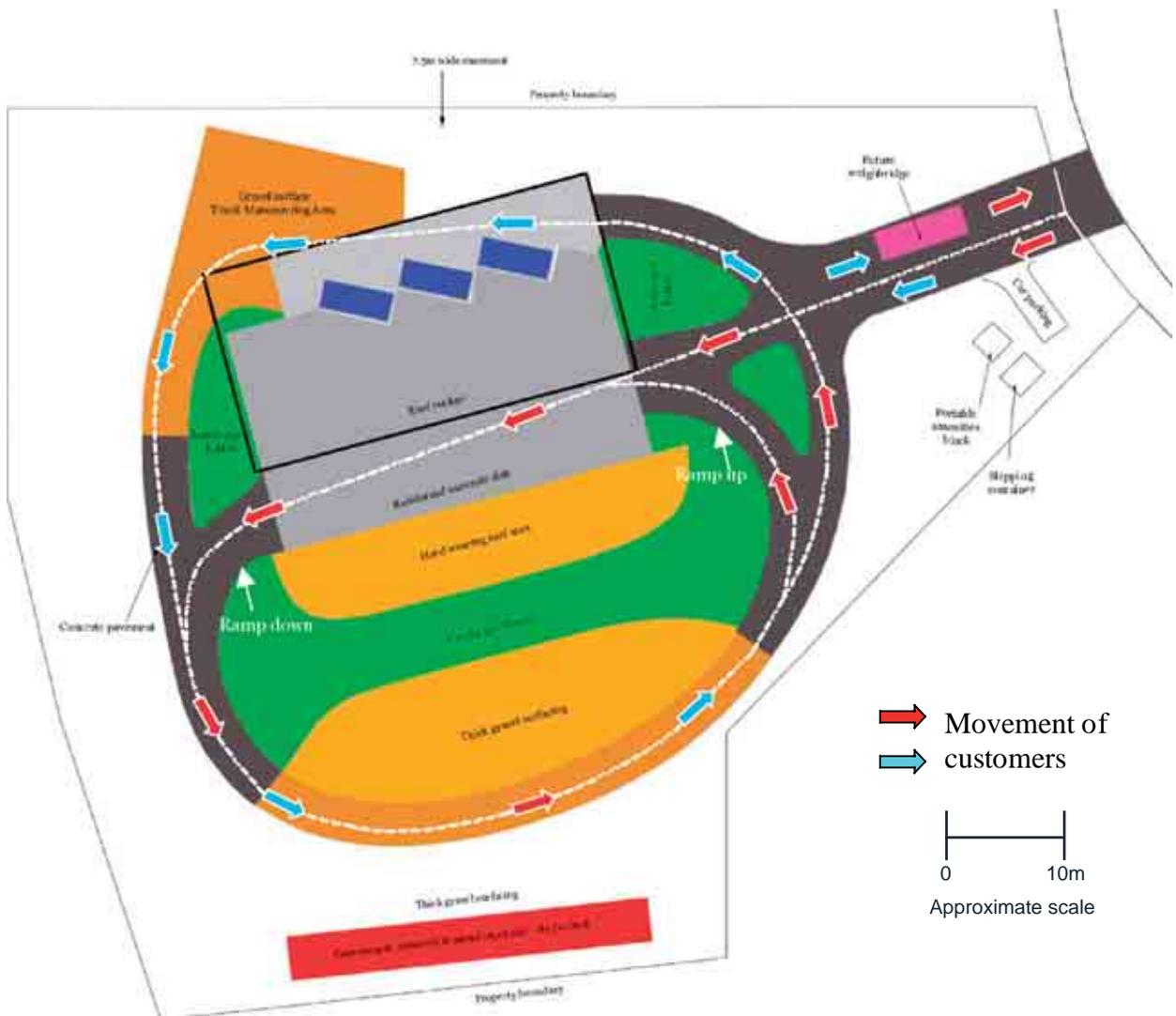


Figure 20.1 Site layout of Wauchope transfer station (Schematic only, sizes are approximate).

20.3.2 Roof

Recyclables located on the transfer station platform will be collected in skip bins using a rear load chain-lift collection vehicle. The tallest operational height of plant and equipment predicted to occur on the transfer station platform will therefore be the operational height of the recyclables collection vehicle. The roof height over the transfer station platform has therefore been sized to accommodate these types of vehicles as well as small vehicles and commercial vans.

20.3.3 Platform

When constructed, the height of the transfer station platform will be about 1m from ground level. A safety rail 0.7m high will be located along the edge of the platform to prevent falls into the skip bins. The height of the skip bins will exceed the safety rail. However to allow for easy unloading of wastes one side of the skip bin will be moveable, allowing the edge to be folded over the safety rail.

This combination of lowered platform height and hinged skip bins was determined as the preferred option due to the reduced OH&S risk associated with having a lowered platform (compared to say Port Macquarie where potential falls of up to 2m are possible, see Chapter 21) and still relatively easy access for waste unloading.

20.3.4 Skip bin capacity and number

The Wauchope transfer station has been designed to accommodate three 30m³ in a saw-tooth arrangement. The number of saw-tooth positions required was determined through an assessment of waste data for the Wauchope landfill. The outcomes of the assessment indicated that two bins of this size (30m³) would be sufficient to service the facility, however allowance has been made for three to provide for future growth in the local area over the next 20-years.

Calculation of the number of skips required also considered the duration between skip emptying times. Hastings Council has indicated that it will be a requirement of the future collection contract to have the general waste skip bins emptied every 2 hours.

Council have opted to use 30m³ skip bins fitted with hydraulic lids and one hinged side as they are available from the local contractor, of an appropriate height (not too high given the design requirement to minimise OH&S risk), and of sufficient volume to manage the expected waste throughput.

20.3.5 Construction

Construction of the transfer station is currently being undertaken at an estimated cost of approximately \$0.5M.



Photo 20.1 Covered drop-off area



Photo 20.2 Drop-off bays for mixed waste



Photo 20.3 Skips for recyclables

21. Port Macquarie Transfer Station

Hastings Council

Key Facts	
Throughput (tonnes/year)	2,000 tpa mixed waste + 10,000 tpa concrete + green organics + other recyclables
Cost to build (\$)	\$900,000
Owner	Council
Operator	Council
Designer	James McMahon and Associates
Topography	Sloping
Site	Greenfield
Key Features	
Single weighbridge	✓
Dual weighbridge	✗
MRF	✓
Landfill	✗
Education centre	✗
2nd hand store	✗
(Recovery and sale of salvageable items does however occur on the transfer station platform)	

The Port Macquarie waste transfer station was established approximately 9 years ago. Since commencing operation a number of issues have been identified with the current site design and layout. Future re-development/enhancement of the site has therefore been earmarked by Hastings Council.

21.1 Site design and layout

A schematic of the existing site layout at Port Macquarie transfer station is shown in Figure 21 1. Current issues with the design and operation of the Port Macquarie waste transfer station include:

- The site weighbridge is located at the top of the hill a significant distance from the transfer station and MRF. Therefore the gatehouse attendant is required to remain at all times within the gatehouse, even during slow periods when potentially they can be better utilised;



- Vehicles are required to complete two complete loops of the transfer station circuit to dispose of both general waste and either source-separated garden organics or concrete. This is undesirable as it is both inconvenient for customers and can be confusing if the customer is new to the site and unsure of which drop-off area to be using;
- Transfer vehicles and general small vehicle customers are required to travel and manoeuvre in the same area;
- Insufficient turning space is available for large vehicles accessing operations located to the west of the transfer station. This has meant that large vehicles often need to manoeuvre around and across the transfer station access driveway, blocking small-vehicle access to the transfer station, and increasing the risk of both vehicle accidents, and physical damage to the site infrastructure (as shown in Photo 21.1);
- The skip unloading bays are angled such that they are better suited for unloading from vehicles travelling across the transfer station in the opposite direction to required vehicle traffic flow; and
- Hazardous materials are appropriately collected within the undercover storage area, however they are still wet during rain periods as the rain blows into the area through the open sides of the structure (see Photo 21.2).

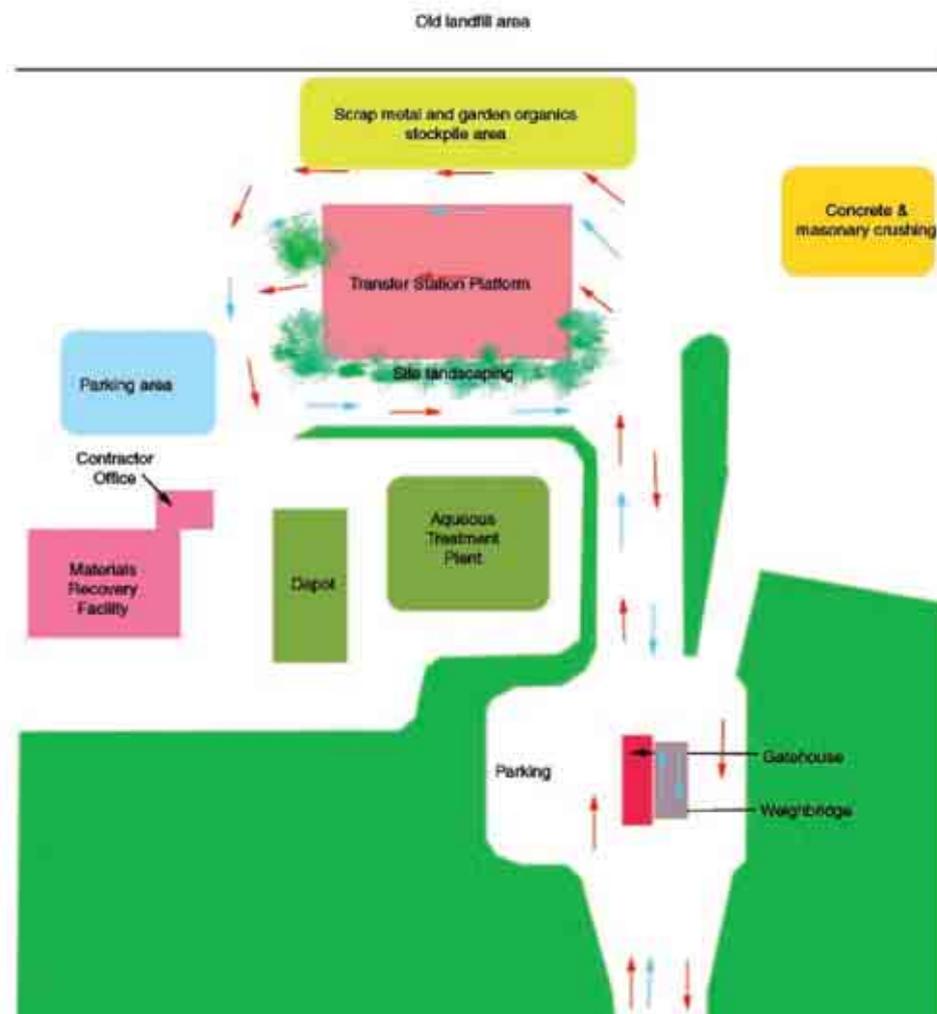


Figure 21.1 Schematic overview of Port Macquarie transfer station site layout.



Other issues identified with the existing site design include inefficient barriers to prevent potential falls into the skip bins (see Photo 21.3). This is particularly dangerous as the height of the transfer station platform is over 2m high (see Photo 21.4). Photo 21.4 also shows how vertical roof support beams and drains in the area where transfer vehicles are required to manoeuvre the bins into position. The location of these beams makes them susceptible to damage, as shown in Photo 21.5.



Photo 21.1 Problems with movement of large vehicles through the site



Photo 21.2 Undercover storage of separated hazardous items



Photo 21.3 Insufficient barriers to prevent falls into transfer station skips



Photo 21.4 Staggered arrangement of transfer station bins



Photo 21.5 Damage to drains from transfer vehicles

The site however is very well screened with vegetation and is aesthetically pleasing (see Photo 21.6).



Photo 21.6 Landscaping around the transfer station

22. Cairncross Transfer Station

Hastings Council

A small vehicles drop-off area is provided at the Cairncross WMF to minimise the risks associated with these types of vehicles accessing the active landfill area. The transfer station was incorporated into the original design of the Cairncross WMF, which was opened 4 years ago.

The skip bins are fitted with hydraulic lids (see Photo 22.2 and Photo 22.3) which have a number of advantages:

- Bin lids (in raised position) help prevent thrown waste over-flying the bins and landing on the ground behind;
- Assists preventing wind-blown litter during waste transport from the transfer station to the landfill; and
- Additional safety – lids can be left in closed position when the skips are not being used, thus preventing falls into the skips.



Photo 22.1 General waste drop-off



Photo 22.2 Skip bins as seen from the base of the transfer station platform



Photo 22.3 Small vehicle unloading area



The original design of the Cairncross small-vehicles drop-off area did not incorporate sheltered areas for storage of recyclables. Recyclables are thus stored in the open as shown in Photo 22.4 and Photo 22.5. Hastings Council is considering establishing a shelter in the future, however this is not considered a priority given the quantities of recyclables received at the site. Since opening, a shelter has been added over the dangerous goods and lead acid battery store (shown in Photo 22.6).



Photo 22.4 Glass recycling



Photo 22.5 Cardboard Recycling



Photo 22.6 Hazardous goods store

The Cairncross WMF is no longer open on Sundays (it was previously open on Sundays however this was not found to be very cost effective). Recycling bins for glass are also located outside the gates to the WMF to allow for disposal of recyclable items outside normal operating hours (as shown in Photo 22.7).



Photo 22.7 Recycling bins outside the entrance to the Cairncross WMF

23. Comboyne Transfer Station

Hastings Council

Comboyne transfer station is a rural transfer station in Hastings servicing a small local rural community. Hastings Council continues to provide the service of the transfer station to the local Comboyne community despite making no fee revenue from the operation.

To continue providing the service whilst minimising operational costs the Comboyne transfer station has a simple design and operational philosophy. There are nine skips (each of either 3m³ or 4m³ capacity) provided for general waste, and further 3m³ skips provided for cardboard, glass, plastics, and scrap metal recycling (see Photo 23.2). There is a portable office and toilet provided for the transfer station attendant (see Photo 23.3 and Photo 22.4). Council's waste collection contractor

collects the general waste from all nine skips at the same time using a front-lift waste collection vehicle. This assists minimising operating costs. Frequency of emptying the bins is approximately one per month.

The Comboyne transfer station is only open on Sundays (10:00am to 4:00pm). It is supervised during opening hours by the local Lions Club (a community group) at no cost to Council. In exchange for supervising the site, the Lions Club is permitted to keep revenues generated from waste disposal. This arrangement has benefits for both Council and the Lions Club in terms of reduced operating costs for the transfer station and providing financial support to local community groups.



Photo 23.1 Signage at entrance



Photo 23.2 Use of bulk skips for collection



Photo 23.3 Portable office for attendant



Photo 23.4 Rainwater tank and toilet facilities

24. Taree Waste Management Centre

Greater Taree City Council

Key Facts	
Throughput (tonnes/year)	35,000 tpa mixed waste* + 5,000 tpa garden organics + 5,000 tpa other recyclables
Cost to build (\$)	\$1.1M
Owner	Council
Operator	JR Richards
Designer	Combination: in house and sub-consultant
Construction	Contractor: Geoffrey Stewart Constructions Pty Ltd
Topography	Hilly
Site	Greenfield
Key Features	
Single weighbridge	✓
Dual weighbridge	✗
MRF	✓
Landfill	✓
Education centre	✗
2nd hand store	✓

*Includes waste disposed of directly to landfill and not through the transfer station.

Greater Taree City Council (GTCC) has recently opened a new transfer station at its WMC located at 'The Bucketts Way' (half way between Tinonee and Taree South). The Bucketts Way WMC incorporates a landfill, reuse centre, and transfer station. The WMC is the major waste management facility in the Taree LGA, handling all kerbside collected waste and recyclables from households, as well as self-hauled waste, and commercial loads. Total waste throughput is equivalent to approximately 26,000 tonnes per annum of solid mixed waste, 9,000 tonnes per annum of fill, 16,000 tonnes per annum of recyclables as well as garden organics and waste oil. The population of Taree LGA is approximately 45,000.

24.1 Project drivers

Prior to 1994 there were several small landfill sites within the Greater Taree LGA. However these were all progressively closed because they were either unmanned or became a health and environmental issue for surrounding communities.

Instead, GTCC provided several 1.5m³ steel skips, free of charge, for the communities to dispose of their household waste. These skip bin stations were gradually removed and a rural roadside garbage collection service introduced as roads improved and population increased in these areas. Only one rural bulk bin station is retained for the district of Bulga/Elands to transfer household wastes to the 'The Bucketts Way' landfill.



In 1994, pressure from the EPA and other various agencies saw the landfill at the Bucketts Way WMC upgraded to become the only site licensed by the EPA for waste disposal throughout the entire Greater Taree LGA. This coincided with the introduction of a new weekly kerbside collection system for domestic waste.

Since this time GTCC has decided to build a new transfer station at The Bucketts Way WMC in order to increase waste diversion rates through increased recovery of recyclables. The transfer facility will allow customers to more efficiently separate waste materials and dispose of items in the designated areas. The new facility will also mean that small vehicles are kept away from the active landfill tipping face.

24.2 Planning and development process

The need for a transfer station was identified as part of Councils 10-year financial plan (written in 2000). Visits to facilities of similar size and purpose were visited by GTCC's Waste Manager (including Nelsons Bay, Port Macquarie, Ballina and Newcastle) as part of the planning process for the Bucketts Way transfer station.

Having anticipated the need for this transfer station, GTCC was able to raise enough money through waste fees and charges over a number of years (part of fees set aside in a restricted asset account) to fund the design and construction of the transfer station.

GTCC advised that the original DA approved for the WMC provided for the development and operation of waste management facilities. It was determined that the construction and operation of the transfer station was encompassed within the activities already approved on the site. This greatly simplified the approvals process.

24.2.1 Site selection

Prior to 1994 the current site of the WMC at Bucketts Way was solely used as a quarry. Quarry activities still continue on part of the site along with the operation of the Bucketts Way landfill. The site was chosen for landfill operations due to the availability of the quarry void.

24.3 Community consultation

There was no community consultation undertaken for the new transfer station since consultation was undertaken for the initial selection and development of the Bucketts Way WMC and landfill site.

24.4 Design and construction

24.4.1 Site layout

Entrance to the site is via a boom gate (small vehicles) or weighbridge (large vehicles). There is no separate gatehouse building/structure at the site entrance, rather the WMC attendant is located in an office within the reuse centre, located adjacent to the entrance driveway as shown in Photo 24.1. The office is fitted with cameras to identify when a customer has arrived.

Both lanes entering the site pass the site office (see Photo 24.1). The entrance design means that both small vehicle customers and commercial (large-vehicle) customers may need to get out of the car in order to speak with the site attendant. This would occur for example when the attendant is assisting a customer in the reuse centre and has not noticed a vehicle drive up to the boom gate or weighbridge.

The WMC attendant must cross traffic (the small vehicle access lane) in order to talk to drivers in commercial vehicles. However, as many of the commercial customers have accounts with GTCC and the weight of their vehicles are tared and already in the computer system, the need for the attendant to directly talk to these customers is not often required.

Bulky items for reuse can be dropped off prior to entering the WMC as there is a separate parking area outside the entrance boom gate for reuse centre customers. Once inside the WMC, drop off areas for all recyclables, scrap metal, green waste, mixed waste, lead acid batteries, waste oil, etc will be provided on the transfer station platform. Hence, there will be no need for small vehicles to double-back around the WMC. New signage and roadworks have been installed and constructed to direct all small vehicles to the new transfer station drop-off area and larger vehicles to the landfill via a roundabout. Movement about the transfer station will be maintained in a counter-clockwise direction (see Photo 24.3 and Photo 24.4).





Photo 24.1 View of entry to WMC

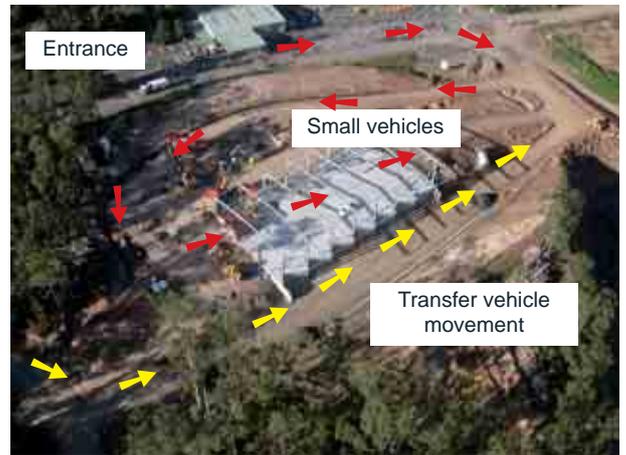


Photo 24.4 View of traffic flow in relation to transfer station (Photo taken during construction phase)



Photo 24.2 Commercial vehicle being weighed on entry



Photo 24.5 Saw tooth arrangement



Photo 24.3 View of traffic flow including roundabout that directs the traffic flow

24.4.2 Platform

The transfer station platform has been designed to incorporate six 30m³ skip bins placed in a stepped saw-tooth arrangement on one side of the transfer station platform. Cages and bins for recyclables not collected in skips will be positioned along the other side of the platform. The number of saw-tooth positions required was determined through an assessment of current weighbridge data, and allowance for future growth in the local area (see Photo 24.5).

Future growth was allowed for to ensure the transfer station would be able to accommodate the number of skips required both now and in the future (for both waste and recyclables) such that customers would not need to queue on the transfer station platform during peak times.

Whilst allowance for up to six 30m³ skips has been provided for, the exact mix of skips for mixed waste and recyclables will be better determined once the transfer station is fully operational.

The platform is approximately 20m wide, allowing sufficient manoeuvring space (for even inexperienced drivers) to safety back in and out of the loading bays. It is approximately 1400m² in floor area.

The angle of the sawtooth arrangement has also been deliberately made quite sharp so that only minimal turning and manoeuvring is required to align trailers into the correct position. Fixed safety barriers are in place on the platform along most edges. Where there is no fixed safety barrier there are clips for provision of a rope or chain across the drop-off bays to help prevent customers from falling into the skips (see Photo 24.6). There is also concrete lip to stop vehicles from backing into the skips.



Photo 24.6 Platform edge, safety rails and hardwood buffers

24.4.3 Roof

The transfer station is covered by an aluminium roof located approximately 7m above the transfer station platform). The roof extends to the edges of the transfer station platform, covering both the drop-off area, bins but does not extend out to the driveways (see Photo 24.5).

The roof height will allow for emptying of large waste compaction and collection vehicles into the transfer station bins should the need arise in the future. The height and size of the roof was also selected because it allows for collection of the bins by transfer vehicles undercover.

24.4.4 OH&S Measures

OH&S measures that were incorporated in the design of the Taree waste transfer station include:

- Ropes/chains in front of the skip bin bays whilst not in use;
- Permanent hand rails installed on all platform edges except where there are provision for ropes/chains (see Photo 24.5);
- Platform attendant on platform (see Photo 24.7);
- Concrete lips to prevent vehicles backing over the platform edge;
- Signage;
- Security system;
- Angle of saw-tooth arrangement designed to permit easy manoeuvrability in and out of unloading bays;
- One way traffic flow around the transfer station and most parts of the WMC;
- Separate access roads for small vehicles and large transfer vehicles; and
- Two rainwater tanks are installed for drinking and for fire control purposes.

24.4.5 Supervision and Security

Staff facilities are located on the transfer station platform including a tearoom, bathroom facilities, and office space (see Photo 24.7). The location of a staff office on the transfer station platform provides for ongoing supervision of the transfer station, which in turn enables the attendant to assist customers with separation of waste into the correct skip bins.



Photo 24.7 Waste transfer platform including site office

24.4.6 Skip Capacity

Operation of the transfer station requires the use of skip bins. The decision to utilise 30m³ skips with hydraulic lids (shown in Photo 24.8) was partially based on skip sizes currently available from the local contractor as well as the desire to use large bins to reduce the number of times each skip needed to be emptied. The hydraulic lids will allow for greater control of litter during waste transport, as well as providing for bins to be fully closed when not in use for safety purposes.

GTCC recognise that there is the potential risk that available skip bin sizes may change in the future, however this is not considered a major issue as future skips can be custom fabricated if required.

The top of each skip will sit just below the edge of the platform. There are moveable metal plates attached to the edge of the transfer station platform that will fold over to cover the gap between the skip bin and the platform (see Photo 24.6). The plates, which are required to be moved manually, will assist in controlling litter falling between the skip bin and the platform.



Photo 24.8 Skip bin with hydraulic bin lid to be used at transfer station

24.4.7 Drainage

Rainwater is collected from the roof and diverted into buried storage tanks. The design features of the drainage system mean that the drains are on the outside of the vertical beams to prevent them from being damaged from vehicles using the transfer station (see Photo 24.9).

Roof drainage pipes on the transfer vehicle side of the platform have been built into the platform itself so there are no drainage pipes exposed to potential damage from transfer station vehicles.

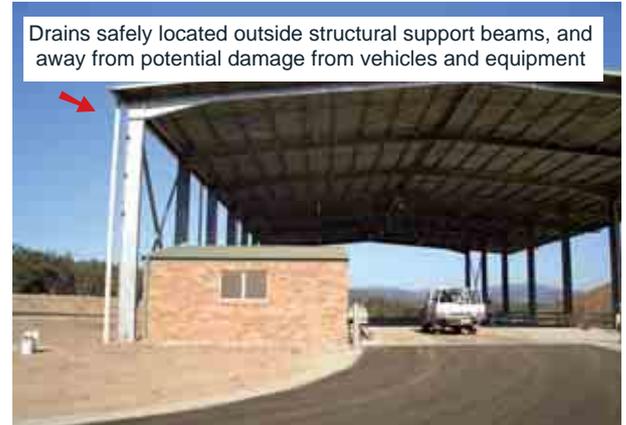


Photo 24.9 Location of drainage pipes

24.4.8 Power

Electrical outlets have been provided at every bin bay post. This is to provide for future technical innovation that may require power, for example a portable hydraulic unit that could be plugged into the bins hydraulics and allows the lids to be raised and lowered each time a customer requires its use. This feature would ensure total safety of an unsupervised unit and control of windblown litter.



Photo 24.10 Power outlet at bin bays

24.4.9 Resource Recovery

JR Richards currently operates the reuse centre and recycling area outside the Taree WMC. WMC customers are encouraged to drop off potentially resalable items at the reuse centre (shown in Photo 24.11) prior to entering the WMC.

Inside the WMC, the transfer station platform has been designed to accommodate designated skip bins for recyclables including cardboard and paper, scrap metal, and green waste.

An existing waste oil drop-off collection system (shown in Photo 24.12) will be moved from its current position in the WMFC to the transfer station. Lead acid batteries (shown in Photo 24.13) will also be moved to a bunded area located on the transfer station platform (see Photo 24.14).



Photo 24.11 Inside the reuse centre



Photo 24.12 Current waste oil storage



Photo 24.13 Current battery storage



Photo 24.14 New bunded area on platform for lead acid batteries and waste oil

24.4.10 Construction

Geoffrey Stewart Constructions Pty Ltd undertook construction of the transfer station. This company also leases the quarry and is the sub-contractor commissioned to bury and compact the waste at the landfill.

Having the construction contractor's main business operations located on site lead to a number of efficiencies in the construction phase. These included being able to utilise equipment and labour whenever it became available (rather than needing to specially arrange to have it brought it from another site), and increased communication and liaison throughout the construction period.

In addition, as the construction work was let to a single contractor there were savings in administration and management compared with dealing with multiple contractors. Photos from the construction phase of the transfer station development are shown in Photo 24.15 to Photo 24.17.



Photo 24.15 Construction of the waste transfer station platform



Photo 24.16 Construction of the roof



Photo 24.17 Aerial view of platform construction

24.4.11 Costs

The total cost of construction was \$1M with the largest component being earthworks and steelworks. Construction costs were met from Council reserves. Allocation of funds to the reserve from waste management charges in years leading up to the transfer station construction was based on an earlier identified need for its development.⁹

24.4.12 Timing of Planning, Design, and Construction

The initial scoping and feasibility stage associated with the development of the transfer station lasted approximately 8 months. During this time several visits were taken to other transfer stations, preliminary cost estimates were obtained, and the design of the transfer station was determined. Approximately 6 months was allowed for the construction period.

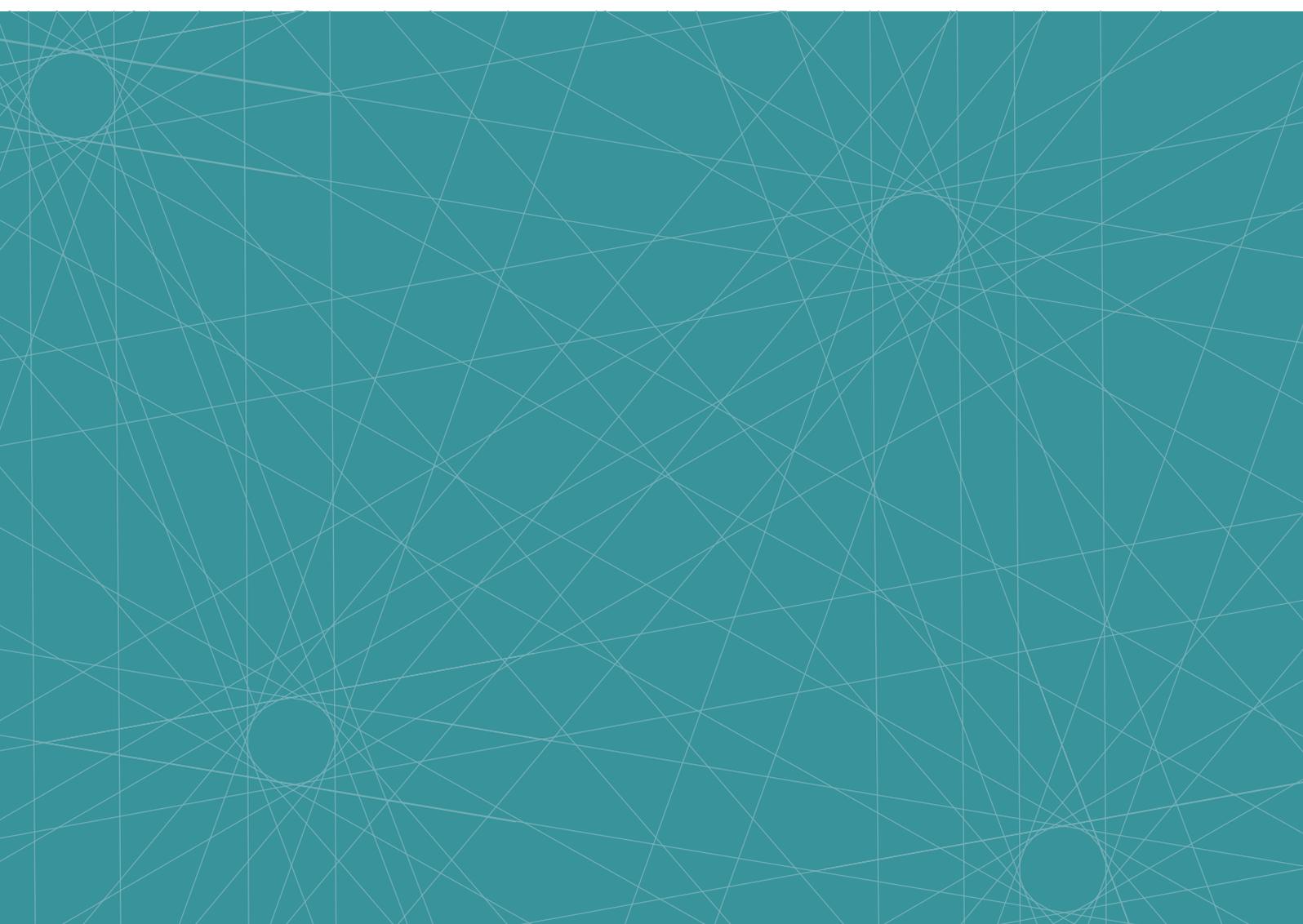
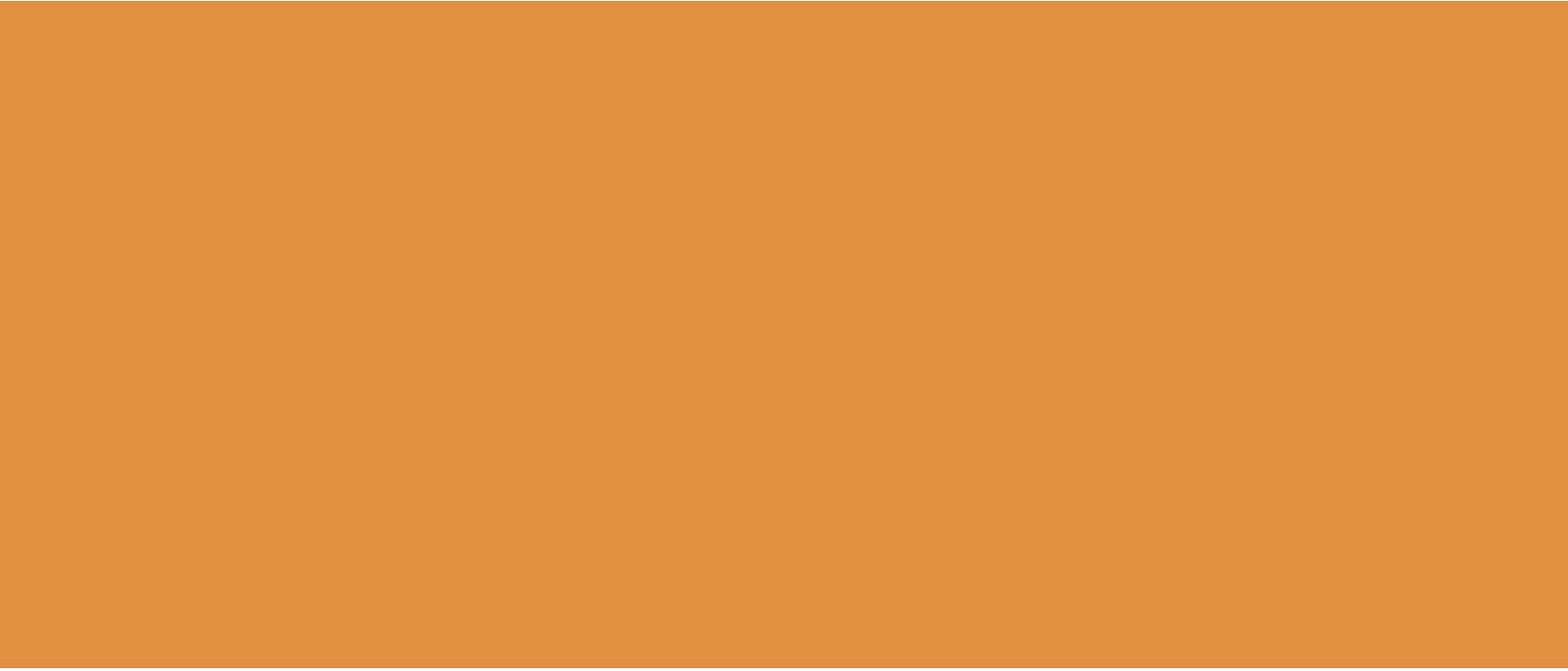
24.5 Operation

The site has only recently opened (August 2005) and staff are currently working through operational and commissioning issues.

⁹ A Waste Management Strategy was prepared in 1992 titled 'A Strategic Plan for Waste Management in Greater Taree 1990's and Beyond.'

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Continued... Refer to Part 3 for Sections 25-38



Department of **Environment and Conservation** NSW

