

**City of Joondalup
Waste Management Strategy
Discussion Paper**

Prepared for: City of Joondalup

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1 INTRODUCTION

BSD Consultants have been appointed by the City of Joondalup to undertake a detailed study of the City's waste management services in order to develop a Waste Management Strategy for the City's future operations.

The development of a Waste Management Strategy follows from recommendations outlined in the report prepared by BSD Consultants, "Development of Options for a Regional Waste Management Plan, October 1999," which was commissioned by the Mandarie Regional Council. The Waste Management Strategy for the City of Joondalup will identify future opportunities for waste management within the broader framework of the Regional Waste Management Plan and in conjunction with the options and recommendations identified in that study. The Waste Management Strategy will consider the entire waste stream the City of Joondalup manages.

The process to develop the Waste Management Strategy entails the preparation of a detailed discussion paper encompassing current waste management practices, operations and discussion of the issues. After a workshop with elected members the discussion paper will be released for public comment. A final Waste Management Strategy will then be developed.

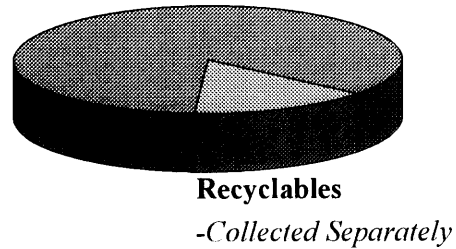
Key tasks will be highlighted for implementation to achieve the Strategy as well as identification of appropriate collection methods for the various components of the waste stream, in relation to the proposed regional waste management plan. Identification of community expectations and a public awareness campaign will be considered. The strategy will highlight infrastructure needs and operational requirements for disposal of waste in the future.

The Final Waste Management Strategy will give clear guidelines as to the tasks required for effective performance of the Strategy and an action plan to program the implementation of these tasks.

The collection and disposal of domestic waste is a core function of the Waste Management Strategy. One of the key issues to be addressed is the collection system for recyclable material, both in terms of the current system and future options. The following diagram is a schematic representation of the collection and disposal aspects of the Waste Management process.

Conventional (landfill) Waste Disposal
Two Bin Collection System

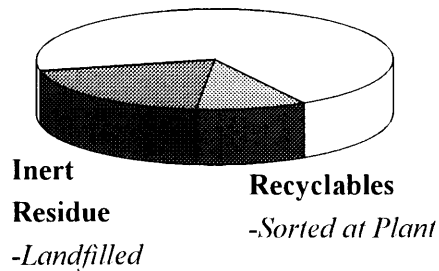
Mixed Domestic Refuse - Landfilled



- Recyclables are recovered from the waste stream via a separate fortnightly collection service.
- Approximately 15% of the domestic waste stream is diverted from landfill.
- The landfilled domestic waste includes a high proportion of organic matter (garden waste, food waste, paper).
- Decomposition of the landfilled organic matter produces leachate and greenhouse gases (methane and carbon dioxide).
- The recyclables diverted are not the cause of significant pollution in a landfill.
- There is likely to be considerable pressure to reduce greenhouse gas emissions from landfills, in order to meet the Kyoto Targets.

Secondary Waste Treatment
One Bin or Two Bin Collection System

Refuse Converted to Compost or Electricity



- Recyclables are separated from the mixed refuse via sorting equipment at the front end of the secondary waste treatment facility.
- Approximately 70% to 90% of the domestic waste stream is diverted from landfill.
- The majority of organic matter is converted to compost or electricity, thus the landfilled residue is relatively inert.
- The landfilled residue therefore produces far less leachate and greenhouse gas emissions. Some greenhouse gases are produced in the waste processing, but the quantity is minor in comparison with the gases produced in a landfill.
- If waste is converted to electricity, further reductions in greenhouse gas emissions are possible due to the reduction in coal-fired power generation.

2 MINDARIE REGIONAL COUNCIL WASTE MANAGEMENT PLAN.

The report for the Mindarie Regional Council “Development of Options for a Regional Waste Management Plan, October 1999” has made several useful recommendations for future waste management directions for the region as a whole and for member councils. The recommendations are summarised below and followed by comments and the MRC resolution regarding these recommendations.

2.1 RECOMMENDATIONS FOR THE REGIONAL WASTE MANAGEMENT PLAN

- *A joint facility for the shredding of green waste should be established by Councils within the region.*

It was recommended that negotiations be conducted between the Cities of Stirling, Wanneroo and Joondalup to establish a regionally based green waste shredding facility at Tamala Park and Badgerup Road. Both facilities should be operated by private contractors and should be available to all member councils. Quality requirements for the production of mulch should be standardised in conjunction with those of the green waste processing industry.

Current Status

The tender process has commenced progressing the regional green waste strategy located at Badgerup Road, Wangara or at Tamala Park.

- *Support trials by the Atlas Group and City of Stirling assessing the viability of waste separation technology.*

The Regional Waste Management Plan proposes to support trials conducted by the Atlas Group and the City of Stirling to determine the viability of separating recyclables from household domestic waste by means of new separation technology.

If these trials are successful, a similar separation system could be incorporated into any secondary waste treatment process that the Mindarie Regional Council may introduce. This would provide the opportunity of operating a cheaper and more efficient one-bin collection system. Depending on the

strategy adopted by the Mindarie Regional Council, member councils would have the opportunity to assess the economic and environmental advantages of a one-bin versus a two-bin collection system for recyclables.

Current Status

The Atlas Group is in the process of resolving operation constraints placed on their operation by the Department of Environmental Protection, however, there is no confirmed date for commencement.

- *The Mindarie Regional Council should negotiate a tipping rate for inert waste at the Atlas Mirrabooka Site to avoid tipping of inert waste at Tamala Park.*

It was recommended that inert waste be disposed of at the Atlas Disposal Site in Mirrabooka and that disposal of inert waste at Tamala Park be discouraged. The travel times for transporting inert waste from Joondalup to Tamala Park are slightly shorter than to the Mirrabooka disposal site. However, the advantages for the region as a whole in maximising the available landfill space at Tamala Park, the only Class II landfill site in the region, will be beneficial to all member Councils.

Current Status

This recommendation has been implemented and Tamala Park no longer receives inert waste.

- *The landfill capacity of Tamala Park should be maximised.*

The Mindarie Regional Council has recognised current constraints may curtail the lifespan of Tamala Park severely. Based on current tipping rates and an increase of 2% per annum in line with anticipated population growth, Tamala Park is expected to have a further fourteen years of life. However, alternative scenarios (depending on the requirements of the Department of Environmental Protection relating to the establishment of a new landfill cell) could see the capacity of Tamala Park reduced significantly. Several actions were suggested to maximise the landfill capacity and increase the lifespan of Tamala Park.

- i. The Mindarie Regional Council should seek Department of Environmental Protection approval to line only the base of cells 13 to 22 as this would allow steeper side slope batters and increase the volume available for landfilling substantially.
- ii. A rational tipping program should be followed in accordance with BSD report “Tamala Park – Report on Landfill Engineering Plan for Cells 1 – 22.”
- iii. The Mindarie Regional Council should negotiate with the Ministry for Planning regarding the constraints of “Perth’s Bushplan” on the northern portion of the site.
- iv. In addition to these proposals, approvals should be sought from the Department of Environmental Protection for the development of an area for landfilling, to the west of the currently approved 22 hectares for landfilling.

Current Status

Continued negotiation with the Department of Environmental Protection on lining of the landfill cells and the constraints of “Perth’s Bushplan”

- *Operations at Tamala Park should be reviewed and optimised.*

The reviewing and upgrading of plant and equipment and the preparation of a Master Plan for Tamala Park to ensure the efficiency of landfilling operations is required.

Current Status

The Mindarie Regional Council has purchased a second hand 140G grader to allow greater flexibility in on site operations at Tamala Park.

- *The Mindarie Regional Council should secure the future use of Tamala Park through negotiations with the owners of Lot 17.*

The leased area that is required for waste management operations needs to be rationalised and the lease secured with the owners of Lot 17 for the future operation of Tamala Park. The Mindarie Regional Council should explore the possibility of purchasing the portions of Lot 17 required for future waste management activities. The portion of Lot 17 to the north of the regional open space zone is required as a buffer zone and this area should be leased from the owners of Lot 17.

- *The Mindarie Regional Council should resolve to implement secondary waste treatment as an alternative to sanitary landfill.*

In particular, it was recommended that the Mindarie Regional Council resolve to implement secondary waste treatment for waste generated by the region as an alternative to sanitary landfill.

- i. Secondary waste treatment technology has the potential to significantly reduce the organic fraction of waste requiring landfilling by as much as 80%. The organic fraction of waste is the primary cause of pollution of both groundwater and air due to the release of leachate and greenhouse gasses. Conservation of existing landfill space is critical as environmental constraints make siting of new facilities more difficult. Targets for waste minimisation and diversion of waste from landfill could be achieved with effective and appropriate secondary waste treatment technology.
- ii. In order to implement a secondary waste treatment strategy, collaboration with the Eastern Metropolitan Regional Council was recommended in order to combine resources and operate a joint secondary waste treatment facility. Several actions would have to be initiated for successful joint operation of a secondary waste treatment facility, such as a public participation and acceptance process, the identification of a site suitable to all parties and detailed feasibility and environmental studies.
- iii. Should a joint secondary waste management facility prove to be impractical, it is recommended that the Mindarie Regional Council establish such a facility at Tamala Park, following similar environmental and planning approvals. After construction and commissioning of a secondary waste treatment facility it is recommended that the waste residue remaining after secondary processing be disposed of at the Tamala Park Landfill facility.

Current Status

The Mindarie Regional Council has called for tenders from consultants for the further investigation of secondary waste treatment and alternative landfill sites. The consultant has been appointed and the report is due in August/September 2000.

2.2 THE MINDARIE REGIONAL COUNCIL RESOLUTION FOR FUTURE WASTE DISPOSAL.

Following the release of the report “Development of Options for a Regional Waste Management Plan, October 1999” and subsequent workshops and presentations to the Mindarie Regional Council and member Councils, the Mindarie Regional Council has resolved to further investigate secondary waste treatment and to compare this with an option to identify an alternative landfill site.

There is thus a possibility that the long term waste management strategy that will be followed by the Mindarie Regional Council will be the continuation of waste disposal by means of landfill or a secondary waste treatment process. The site for secondary waste treatment is yet to be determined. The waste management strategy developed for the City of Joondalup will be dependant on the final waste management option that is adopted by the Mindarie Regional Council.

3 CURRENT SERVICES.

With the partitioning of the two Cities, Joondalup and Wanneroo, it was agreed that plant and personnel for waste collection services would be placed under the control of the City of Wanneroo. The City of Joondalup currently has several service agreements in place with the City of Wanneroo for the provision of waste collection and disposal services. In terms of the Service Agreements between the two parties, the City of Joondalup is the “Principal” and the City of Wanneroo is the “Contractor”.

Waste management services currently performed under these service agreements include domestic waste collection, kerbside recycling collection, bulk waste collection and the provision of a weekend green waste tipping facility located at Badgerup Road for residents.

As part of the report, “Development of Options for a Regional Waste Management Plan, October 1999,” it was determined that the total waste quantity managed by the City of Joondalup is approximately 60,000 tonnes per year. Population trends predicted for the future suggest that this annual amount will remain a typical quantity of waste generated by the City into the future. The average waste tonnage per household for the City of Joondalup is 1.19 tonnes per annum, which is similar to other cities within the Mindarie region.

The diversion of waste from landfill is an important benchmark in determining waste management performance of individual councils. Currently the City of Joondalup is achieving an estimated 12% diversion from landfill of all waste collected. The establishment of a regional secondary waste treatment facility would considerably increase diversion rates for all member councils to at least the 50% diversion from landfill target set by the State and Federal Governments.

Details of the current waste collection services provided to the residents of the City of Joondalup are as follows.

3.1 DOMESTIC WASTE COLLECTION SERVICE.

The former City of Wanneroo introduced the 240L mobile garbage bin (MGB) for domestic waste collection services in 1988. Labourers physically loaded garbage trucks until single operator side loading trucks were introduced in 1993. At the time of the separation, the City of Joondalup had approximately 50,500 refuse collection services.

The negotiated contract with the City of Wanneroo is for a fixed term of 6 years and commenced on 1 July 1999, with a possible extension of a further 6 years.

The current domestic waste collection service provided to residents of the City of Joondalup comprises a weekly collection of 240 L mobile garbage bins at each specified collection point and includes the conveyance and disposal at Tamala Park or another site agreed upon by the parties.

The City of Joondalup is responsible for the payment of tipping fees. The mobile garbage bins are owned by the City of Joondalup but maintained by the Contractor as part of the contractual arrangements. All residences contributing a domestic rubbish rate fee are provided with a mobile garbage bin and a weekly service.

Approximately 55,000 tonnes of domestic waste was generated in the City of Joondalup in 1998/99.

3.2 KERBSIDE RECYCLING COLLECTION SERVICE

Following the construction of the Badgerup Materials Recovery Facility (MRF), the City of Joondalup introduced a bag recycling collection service. The City of Wanneroo currently provides this service. The contract duration is for eighteen months and commenced on 1 July 1999, with a possible extension of one year.

The fortnightly recycling collection service collects glass, aluminium and plastic where residents are required to place them in the bags provided. Newspaper is placed separately alongside the bin. The City of Joondalup currently has approximately 6,000 split bin recycling MGB's in use as part of a recycling collection system trial.

Glass, plastic, aluminium and newspaper are sorted at the Badgerup Road Materials Recovery Facility. All materials recovered belong to the service provider who is responsible for the marketing of the recovered materials. The current rate of diversion of waste from landfill that the City of Joondalup is achieving is approximately 12 percent and this is largely attributable to the domestic recycling service.

The total quantity of recyclable material collected from the City of Joondalup for 1998/99 was 4,500tonnes.

3.3 COMMERCIAL WASTE COLLECTION SERVICE.

Commercial premises in the City of Joondalup are required to make their own arrangements for the collection of commercial waste. The City of Wanneroo offers a commercial waste collection service to commercial premises in the City of Joondalup in competition with private waste collection companies.

The current status of the collection of commercial waste in the City of Joondalup should remain unchanged, as it is compatible with future waste management planning of the Mindarie Regional Council.

3.4 BULK REFUSE COLLECTION SERVICE.

The City of Joondalup currently offers a nine monthly bulk refuse kerbside collection service to residents. The contract, under the provisions of the service agreement, is for a fixed five year period, commencing 1 July 1999 with an option to extend for a further five years.

Bulk waste is placed on the verge for collection after the service provider issues notification to all residents of the impending bulk waste collection. Bulk waste is separated into “clean green waste” or “rubbish”. Clean green waste is uncontaminated fresh material originating from plants and rubbish is all other waste set out for collection. Disposal of “clean green waste” is at the Badgerup Road Green Waste Disposal Site and “rubbish” is disposed of at Tamala Park.

The total quantity of bulk waste collected in the City of Joondalup for 1998/99 was approximately 7,800 tonnes, comprising approximately 2,300 tonnes of greens and 5,500 tonnes of rubbish.

3.5 LITTER BINS/RESERVES WASTE COLLECTION SERVICE.

The City of Joondalup provides an in-house collection service for public litter bins. Waste is collected on a varying basis from daily to weekly by operations staff. The current collection system is compatible with the waste management planning for the Mindarie Regional Council and can continue to operate unchanged.

3.6 GREEN WASTE PROCESSING.

The City of Joondalup currently provides for the collection of clean green waste as part of the bulk waste collection service described in section 3.4 above. In addition to this, provision is made for ratepayers to dispose of clean green waste at the City of Wanneroo's Badgerup Road waste management facility. The clean greens processing facility has been in operation since 1996.

The green waste tipping service for residents is offered on weekends and certain public holidays and the payment system is by means of vouchers issued by the City. Residents are issued with four tip vouchers per year together with their annual rate notice. The green waste tipping service offered by the City of Joondalup is well utilised by residents.

The green waste processing facility at Badgerup Road is owned and operated by the City of Wanneroo. The processing of green waste involves shredding and stockpiling of the shredded material. The stockpiles are not processed further. Residents can purchase the shredded material for garden mulch at a cost of \$10 per cubic meter, collected at the Badgerup Facility.

The facility currently processes approximately 3,000 tonnes of green waste delivered by residents and others and approximately, 2,500 tonnes of green waste from the bulk collection service. The green waste processing facility has the capacity to process 40 tonnes per day at an estimated cost of approximately \$30 per tonne.

The City has recently resolved to become involved with the regional facility under a tender arrangement organised by the MRC. Greater efficiencies are expected from the initiative.

3.7 HOUSEHOLD HAZARDOUS WASTE.

A drop off facility is provided at Tamala Park for the collection of domestic quantities of household hazardous wastes. The facility is located in the recycling area at the entrance to Tamala Park. Provision is made for residents to deliver their hazardous waste to the drop off area at no charge. The facility accepts pesticides, poisons, old paint, batteries (including car batteries) and old oils. These materials are to be reprocessed/recycled through the initiatives of the Department of Environmental Protection. This service will continue to operate with the future waste management scheme adopted by the Mindarie Regional Council.

The City's contractor also collects waste oils and batteries from the kerbside on recycling days. These materials are then delivered to the Tamala Park drop off facility.

4 INERT WASTE.

The inert waste generated by the City of Joondalup consists mostly of fill and pavement material from roadworks projects. In the past the former City of Wanneroo has disposed of inert waste at the, now closed, Badgerup Road landfill facility. As per the recommendations from the report for the Mindarie Regional Council “Development of Options for a Regional Waste Management Plan, October 1999,” inert waste is no longer disposed of at Tamala Park. The City of Joondalup’s inert waste is disposed of at a private Class I landfill facility on Flynn Drive, Neerabup.

The current quantity of inert waste disposed of by the City of Joondalup is approximately 500 tonnes per annum. The City of Joondalup is in transition from a growth phase to a refurbishment phase and will continue to generate large quantities of inert waste in the future. This can be expected to be disposed of at the quarries to the North of the City.

Opportunities also exist for the recycling and reuse of suitable inert waste for building and construction materials. The quantities generated by the City of Joondalup would not be an economical quantity for recycling. If recycling of the inert waste was to occur, it would most likely be undertaken by a private Contractor.

5 KERBSIDE RECYCLING SERVICE

The kerbside recycling service provided by the City of Joondalup is a critical component of the Waste Management Strategy and an area of the waste management services that should be addressed in a careful and pragmatic manner. Issues to be addressed by the Strategy will be the appropriateness of the current collection system and the suitability of the collection system in terms of the future waste management initiatives that will be adopted by the Mandarie Regional Council.

5.1 WASTE REDUCTION TARGETS

The strategic management of municipal solid waste in Australia is influenced by policies such as that adopted by the Australian and New Zealand Environment and Conservation Council (ANZECC). The ANZECC initiatives proposed in 1992, recognised issues of land alienation, diminishing land availability suitable for landfilling, the significant environmental impacts caused through landfilling and the amenity issues associated with this activity.

The *National Waste Minimisation and Recycling Strategy* proposed a 50% reduction of waste going to landfill by the year 2000, based on the 1990 per capita waste levels. This objective was not achieved because most local authorities have concentrated their efforts in reducing the quantity of waste to landfill by removing the recyclables from the domestic waste stream. The recyclables represent only 15 to 20 percent of the domestic waste stream, so removal of recyclables, via the kerbside collection service, has not met the target reduction of 50%.

5.2 BENEFITS OF KERBSIDE RECYCLING

Historically, kerbside recycling has been given a great deal of publicity and therefore a high priority for resource recovery and diversion of waste from landfill. This has been a very important aspect of the public's introduction to waste management issues and the participation rates achieved by kerbside recycling show the significant public concern not only for recycling but for environmental issues generally.

Kerbside recycling has become very popular with most waste collection services, but the effective reduction in waste to landfill has been less significant and the target of a 50% reduction in waste to landfill has not and cannot be achieved by kerbside recycling alone.

To achieve this target, the reduction of putrescible waste by means of secondary waste treatment is required. Secondary waste treatment provides the opportunity to treat a far greater proportion of the waste stream and therefore divert it from landfill.

Wastes diverted from landfill through kerbside recycling include aluminium and metal cans, plastics, paper and cardboard. These wastes are far less degradable than organic wastes and their diversion from landfill has subsequently had little reduction in the production of landfill pollutants, which are the major environmental concerns of landfill management. Waste management services will need to address these concerns. However, there are other benefits in recycling, most notably being the savings in energy consumption.

The energy requirements of the subsequent processing of recyclables is much greater than that of the collection, transport and sorting operations. The energy requirements for reprocessing recycled materials are, however, significantly less than for processing raw materials. The energy costs of processing raw versus recycled materials is compared in **Table 1** below. These values are from the BSD report “Environmental Impacts, Costs and Energy Balance of Kerbside Recycling and Greenwaste Processing, March 2000”

As can be seen from **Table 1** the most significant saving in energy per tonne of recyclables is achieved in the recycling of aluminium, while glass and paper achieve lower savings. The savings achieved in recycling of materials demonstrate that recycling is viable and should be continued. However, with the introduction of the secondary waste treatment process these savings can be achieved by ways other than a separate kerbside collection service. This is because it is possible to introduce waste separation technology at the front end of the secondary waste treatment process. Such an opportunity does not exist with the continuation of sanitary landfill disposal. A separate waste collection system is required if landfilling continues to be the principal means of waste disposal.

Table 1 : Energy Costs and Savings of Recycling

	Energy cost using raw materials (MJ/tonne)	Energy cost using Recycled Materials (MJ/tonne)	Saving in Energy (MJ/tonne)
Aluminium	210,000	20,000	190,000
Paper	110,000	30,000	80,000
Plastics	67,000	11,000	56,000
Steel (Tin-plate)	51,400	6,400	45,000
Glass	3,460	900	2,500

An important aspect of secondary waste treatment technology, using a one bin collection system, is that paper is not recycled as it is consumed in the composting or waste to energy process. While paper has a relatively high energy benefit from recycling, the environmental benefit of recycling paper are likely to be offset by the environmental benefits of secondary waste treatment. For example, the paper may need to be retained in the waste stream to ensure an appropriate calorific value for a waste to energy system. If it is desired that paper recycling should continue, then consideration may be given to introducing a less frequent (say monthly or bi-monthly) newspaper recycling collection system.

The percentage of recyclables separated from a general waste stream (one bin collection system) passing through a secondary waste treatment process is estimated to be lower than the rate achieved for recyclables separated from collected kerbside recycling material. However, this will be countered by the separation process having access to all of the waste. Therefore, it is assumed that the actual quantity of recyclables recovered from the general waste stream will be similar to that currently recovered from kerbside recycling.

The accuracy of these assumptions should be able to be tested when the City of Stirling commences a one bin collection system later this year.

The separation of waste at a secondary waste treatment facility as opposed to separation of recyclables at source allows flexibility with regard to the markets for recovered materials. If the market price for recovered materials does not justify their recovery and their non-recovery has no detrimental environmental effect (in terms of greenhouse gas emissions and leachate production), they may not necessarily be recovered from the waste stream but processed through the waste processing system and used as either energy or compost. The decision to recycle or process can then be made on a cost-benefit basis rather than being locked into recycling because of a dedicated recyclables collection system.

5.2.1 Waste Separation Technologies

There have been significant advances made in recent years in the field of waste separation technology. Several technologies now exist that can effectively sort a single waste stream into its various components, allowing recovery and sorting of recyclables as well as separation of the putrescible waste fraction for further processing.

The sorting technologies available to separate the entire waste stream include:

- Rotating trommels, which break down the plastic bags holding the waste together, then sort waste material according to size
- Air classifiers, which blow lighter recyclables, such as plastic bottles and aluminium cans, from the mixed waste stream
- Eddy currents, which blow aluminium cans into a separate collection stream
- Electro-magnetic conveyors, which remove steel cans from the mixed waste.

Paper, due to its organic content, would generally be included in the organic feedstock to the composting or waste to energy process. In the case of some waste to energy plants, plastics may also be included in the feedstock as they possess a high calorific value and thus would increase the power generated by the facility.

The recovery of intact glass items in most secondary waste treatment separation processes is difficult and a high proportion of glass is broken. The energy balance in the recovery of glass is not as high as for other recyclable materials. The composting secondary waste treatment processes can either remove glass chips from the compost by means of a screening process prior to sale of the compost or by reducing it to a powder like state by crushing and then pelletising the compost.

5.3 ESTABLISHMENT OF KERBSIDE RECYCLING.

In 1995 the residents of the City of Joondalup (then Wanneroo) were consulted on the development of an Ecologically Sustainable Waste Minimisation and Recycling Strategy. The results of the process indicated wide support for the Council to adopt a pro-active role in environmental matters, with continued community participation. Recycling of waste was seen as an effective measure in countering the perceived environmental threat and there was significant community support for a user pays recycling service. No other user pays systems were in operation at the time and a bag system for the kerbside collection of recyclables was introduced.

The introduction of the kerbside recycling service received support, with most residents making use of the service. Protection of the community's health and the environment was seen as key responsibilities of the Council and the waste management and recycling

services provided, generally met the community perceptions regarding these criteria, although many residents expressed a desire to use a separate 240L bin for recycling.

The current collection system requires the separation at source of newspaper, placed in secured bundles by the side of the domestic bin, and other recyclable materials are placed in the bags provided. Batteries and used engine oil are collected at the same time provided they are left separately by the kerbside. There are approximately 6000 divided recycling bins currently being trialed in the City of Joondalup.

5.4 CHANGES TO KERBSIDE RECYCLING

Since the introduction of the kerbside recycling system using bags, many other Councils in the Perth metropolitan area have introduced kerbside recycling using a dedicated 240L mobile garbage bin (MGB) for the recyclables. Within this MGB, all recyclables (ie paper, cardboard, aluminium, glass, steel and plastic) are collected. The term used to describe the contents of this MGB is “commingled recyclables.” The different recyclable materials are separated at a Materials Recovery Facility, which is set up to separate out each of the recyclable components.

The City of Joondalup has come under pressure from the public to introduce this system for its residents. The arguments being presented for introducing the dedicated MGB for recyclables include:

- MGB’s are easier for residents to use than bags.
- The set-out rates for MGB’s are greater than for bags.
- The recovery rate of recyclables (ie the weight of recyclables collected per household) is greater for MGB’s than for bags.
- Based on the above points, the MGB’s would attract more recyclables, therefore having a beneficial environmental effect.

The provision of MGB’s for recyclables for each household in the City of Joondalup has not been introduced. Consideration has been given to the following:

- Given the number of ratepayers in the City of Joondalup, the significant cost of purchasing an additional MGB for each household (approximately \$3.0M) as well as the additional collection costs.
- The cost of upgrading the Badgerup Road MRF to accept commingled recyclables, or the additional cost of installing bin dividers, to separate paper from other materials at source.
- The cost of alterations required to the collection trucks.
- The likelihood of the establishment of a secondary waste treatment process which incorporates separation technology that would permit the collection of all household waste in a single MGB with recyclables being recovered in the process.

5.5 BADGERUP MRF.

The Materials Recovery Facility (MRF) at Badgerup Road was constructed to process the recyclables collected by the former City of Wanneroo. Within the MRF, plant was provided to process two separate streams of recyclables. One stream consists of newspaper, while the other stream consists of plastic, glass, aluminium and steel. Both these streams of recyclables are separated at source by the householders. They are collected by manual labour and sorted into separate compartments of a purpose built truck and delivered to separate processing areas at the Badgerup MRF as the bins are emptied.

The current recycling trial approved by the former City of Wanneroo involves a divided MGB collection system for recyclable materials to meet the requirements of the Badgerup Road MRF. The divided bin separates paper from other recyclables and is collected by a modified side loading collection truck. Separate chutes on the truck keep the paper separate from the other recyclable materials.

The MRF at Badgerup can be upgraded to accept a single stream of recyclables, however, this will involve expenditure of approximately \$300,000. There has been some interest shown from neighbouring Councils to process recyclables at the Badgerup MRF, however, most other Councils collect “commingled” recyclables. The cost to upgrade the MRF to process commingled recyclables could be shared with other Councils.

The City of Wanneroo, who engage a contractor to operate the MRF on their behalf, owns the Badgerup Road Waste Facility.

It is estimated that the Badgerup Road MRF has capacity to process another 5,000 tonnes of recyclables per year with minor modifications.

5.6 CURRENT RECYCLING TRIAL.

The Cities of Joondalup and Wanneroo are currently monitoring their levels of recycling and waste minimisation, and are conducting a trial using divided MGB's for the collection of recyclables, as described above.

The trial involves measurement of the quantities of recyclables and also contaminants that are placed in the divided MGB's. These measurements are taken from households in the different suburbs within the Cities of Joondalup and Wanneroo. The trial also involved supplying the divided MGB's to two groups of households:

- Voluntary participants.
(Those who volunteered to participate in the trial and paid a \$30 fee to receive the divided MGB.)
- Compulsory participants.
(Those who did not volunteer but were provided with a divided MGB at no charge.)

The results to date indicate that participants are using the divided MGB's with very little contamination being recorded. Compared to the bag collection system, a greater quantity of recyclables is recovered from the second recyclables bin system. Therefore, with the second bin system a greater quantity of recyclables are extracted from the waste stream and diverted from landfill. The trial has yet to be finalised.

The main indications from the trial to date are:

- More waste is diverted from landfill using the second recyclables bin collection system, in comparison with the bag collection system.
- The residents using the second bin collection system prefer the convenience and additional capacity rather than the bag collection system.

These indications provide evidence that a second MGB collection system has advantages over a bag collection system in these important areas. These preliminary findings are consistent with the results of the Melville Recycling Trials, comparing bags with commingled 240L bins. However, these indications do not take into account the full implications of the recycling service on the waste management services offered by the City of Joondalup. As such, these indications are not considered to be sufficient evidence for the City of Joondalup to adopt a divided MGB collection system for kerbside recycling at this stage.

Viewing the issue in perspective, the question for the City of Joondalup to consider is not whether a divided MGB collection system is better than a bag system, but rather:

Is a second bin collection system for recyclables the most appropriate method of collection for the City of Joondalup beyond the short term, in view of the significant recent progress in waste treatment and separation technology?

Following the trial using the divided MGB collection system, the City of Joondalup shall have to decide whether this collection system is to be implemented throughout the City, as a replacement for the bag collection system. Whether or not a split bin is used will be determined by the separation process used in the MRF.

The decision to introduce a 240L MGB recycling collection service is required to be made with the knowledge that the members of the public who have participated in the trial have indicated a preference for such a collection system. However, the decision should be made with consideration to the long term effect that introducing a second MGB may have on the collection of recyclables.

As discussed in section 2 above, there is a strong possibility that a secondary waste treatment process may be established in the future by the Mandarie Regional Council. This will create the opportunity to operate a one bin collection service while still separating out the recyclables.

If this was to eventuate after a 240L MGB recycling collection service was introduced, the second MGB's may become redundant. Alternatively, the option exists to continue to provide a two bin collection system when a secondary waste treatment facility is operating, but this is obviously a more costly option.

Currently, no other member Councils of the Mandarie Region collect recyclables using MGB's. There is concern over the implementation of a kerbside recycling collection system that involves a divided MGB, as this system is inconsistent with directions being

followed by other member Councils, in particular the single bin collection system that is to be commenced shortly by the City of Stirling.

In light of this it would be prudent to delay any major changes to the recycling service until some of the matters are clarified, ie the future plans of the MRC and the effectiveness of the one bin collection system.

5.7 FUTURE OPTIONS.

Currently the Atlas Group and the City of Stirling are preparing for the introduction of a single bin waste collection system. It is proposed that this collection system shall be introduced upon the recommencement of operations at the Atlas Group's secondary waste treatment plant at Mirrabooka. It should be noted that this programme of implementation is subject to several external influences and it may not be achieved as early as anticipated.

The City of Stirling currently collects domestic waste in MGB's and operates kerbside recycling through a bag system, similar to the operations of the Cities of Joondalup and Wanneroo. The Atlas Group's secondary waste treatment plant at Mirrabooka contains waste separation technology that may effectively separate recyclables from the domestic waste stream, even though they are placed in the same MGB.

Advice received from the City of Stirling indicates that the Atlas process uses a single bin collection system for all household waste and separates aluminium, steel and plastic(both HDPE and PET). Intact glass bottles are also collected by manual sorting at the start of the process. Paper and cardboard are organic materials and are composted in the windrow composting system. Broken glass is screened at the composting facility, however, there is very little value in collecting broken glass and it is included with the baled inert material. Bottle banks will also be set up at shopping centres and other community centres, for the collection of intact glass and plastic bottles.

If a one bin collection system proves to be viable for the collection of all domestic waste, including recyclables, this will have important ramifications for all Councils within the Region. There are considerable economic and environmental advantages to a weekly one bin collection system for the whole waste stream, compared with providing a separate recycling service. The added convenience for residents in not having to separate out the recyclables as well as the reduced operational costs are obvious benefits. The actual quantity of recyclables collected has the potential to be similar to a separate recyclable collection system, because this waste separation technology has access to the entire waste stream, although the recovery rate may be lower.

If this system does not prove to be suitable, the current bag system could be retained and a user pays second bin introduced. Whether the bins are split or not will depend on the materials recovery facility sorting process used. The commingled system is a cheaper option than the divided bin system, however with the current configuration of the Badgerup MRF the difference between the two systems, divided or commingled is marginal.

5.8 METHOD OF INTRODUCING A CHANGED SERVICE

The implementation of a change to the current collection system for recyclables by the City of Joondalup is an issue that will require very careful management. Residents involved in the divided MGB recycling trial considered the cart superior to the bag collection system and has raised the expectations of interested residents for the implementation of a similar system. The implementation of a one bin system may be perceived to be a downgraded service unless the public have already been made aware of recent developments in waste separation technology and the environmental benefits of such systems.

It will be considerable time before any decision on waste processing is made. In view of this and other factors previously discussed, it is considered that residents should be given the opportunity to volunteer to purchase a recycling MGB on a user pays system.

There is a limit to the number of additional properties that can be serviced with the MGB's without having to purchase extra collection trucks. The City of Wanneroo have advised that they could accommodate an extra 5-10,000 properties across both cities without having to purchase extra trucks, provided this is a commingled system.

If in the future a secondary waste treatment system, which incorporates the separation of recyclables, is established for the Mindarie Region, a regional or state wide public education and awareness campaign will need to be launched to explain the advantages of the system as opposed to the current household separation of recyclables. General public perception is that separation of recyclables is a means of contributing to environmental awareness and a pro active way in which individuals can contribute to reducing the effect of their waste on the environment. People feel good about recycling as demonstrated by the wide support and acceptance of existing recycling programs.

Acceptance of a one bin system is likely to meet with public concern because the recycling ethos has become so strongly entrenched in the public mindset. The recovery rate of recyclables in a one bin system, versus a separate recyclables collection system is

difficult to quantify. It is assumed that the actual quantity of recyclables collected will be similar for both because the one bin system has access to the entire waste stream.

Another issue that is unresolved is whether the quality of recyclables collected in a one bin system will be as readily marketable as for the separate collection system due to a possible reduction in the quality of the materials. These environmental issues will only be answerable once the Atlas Group's waste separation system has been operating for some time.

There is a possibility that a secondary waste treatment process will not be implemented for the region, or not implemented for quite some time. The timing of any change to the waste treatment process is a critical issue. For example if it is decided that a secondary waste treatment system will be introduced, but in say seven years time, then it may be suitable to introduce the improved recycling service on the basis that such a timeframe would allow the economic use of this infrastructure. Any decision to change the existing system should be postponed until the Mandarie Regional Council has finalised their waste management strategy.

6 METHOD OF PROVIDING WASTE COLLECTION SERVICES.

The Mindarie Regional Council considered the possibility of establishing a regional collection system to take advantage of economies of scale of a large collection system, however, this option was not recommended and collection of waste in the region is likely to remain the responsibility of the member Councils. The responsibility for the safe and ordered disposal of waste will remain with the Mindarie Regional Council.

The implementation of a secondary waste treatment process by the Mindarie Regional Council will have implications for all member Councils. Current collection methods and regimes may be required to change to suit the disposal methods adopted by the Mindarie Regional Council. The most important issue to be resolved will be the method of collection for recyclables.

Secondary waste treatment has demonstrated significant environmental advantages over landfilling for the disposal of waste. In addition to this, a major concern identified in the report “Development of Options for a Regional Waste Management Plan, October 1999” is the threat of a reduced lifespan for Tamala Park Landfill Site. The treatment of organic wastes in a secondary waste treatment facility will have a substantial effect on prolonging the life of Tamala Park.

If a secondary waste treatment process is introduced, it will be a number of years before it is available and a strategy should be developed for the collection of waste in the interim. In addition to this, the current recycling collection contract with the City of Wanneroo should be renewed on a short term basis in order to be in a position to adjust the contract service agreements to suit the final decision on the future disposal method selected by the MRC for the Region.

The report “Development of Options for a Regional Waste Management Plan, October 1999” recommends that regionally based green waste shredding facilities be established at Tamala Park and the Badgerup Road facility. Current collection methods for the City of Joondalup are consistent with the recommendations of a regionally based greenwaste shredding facility. A network of greenwaste processing facilities will benefit the region and increase the potential lifespan of Tamala Park.

The current bulk waste collection services, litter bin collections and inert waste collection and disposal services are consistent with the recommendations of the report. These services will require minor or no alteration to suit the final waste disposal method adopted by the MRC.

7 PUBLIC EDUCATION.

When household recycling was introduced, a broad based public education campaign was undertaken, Australia wide, to inform the public of the benefits of recycling and encourage use of the facilities provided. The campaign was undertaken at a time when recyclables had to be separated by householders to enable successful processing. The main thrust of the campaign was that the effort that householders spent in separating the recyclables would be rewarded by environmental benefits.

This campaign was very successful, in that it started the process of household recycling, which had previously been the domain of the “marine collectors” who collected empty bottles from households. In comparison, the household recycling undertaken nowadays is far more extensive and has evolved into a number of efficient processes. Another important facet of the campaign was that it raised public awareness of the environmental issues surrounding waste management. Community participation and interest in waste management has been heightened and the public expect recycling as a minimum level of waste management services.

The collection system used should be implemented to meet the requirements of the waste disposal system selected for the Region. However, the waste collection process is probably the most direct contact that each household has with its local authority and is therefore an important issue to be managed. A change from the current bag system, to a second bin (either divided or not), or to a single bin for the entire waste stream will require careful implementation.

If a one bin system was introduced, some householders may appreciate not having to separate recyclables from other waste. Others, who have embraced the recycling issues, may be reluctant to be convinced that their reduced effort (ie not having to separate recyclables) will result in further environmental benefits.

The City of Stirling has recognised this as part of its strategy to implement a single bin collection system for all household waste. It is proposing an extensive education and awareness campaign to inform the public of the cost and environmental benefits of the system they are introducing.

There are several important aspects to be addressed in the public education programme. The public should be made aware of the various new waste treatment technologies now available, including the environmental advantages and disadvantages of this new technology. The essential link between a collection system and the type of disposal

system that is proposed should also be made clear. The benefits of recycling must also be demonstrated in more detail than in the past. Also, the implications of separation technology in conjunction with a secondary waste treatment process need to be clarified. Finally the education programme should also focus on minimising the amount of waste generated in the future.

The education and promotion programme should be guided and managed at State and Regional level to ensure that universal waste management policies are promoted and encouraged throughout the region. There is an education and promotion strategy currently being developed for the State Recycling Advisory Committee. The outcomes and policies proposed by this committee will form the basis of the regional education programme.

The comprehensive education and promotion campaign will advise the public of the benefits of the waste management strategy chosen for the region and especially how the community can contribute to its effective implementation. A lack of public participation in the implementation of a waste collection and management strategy will be likely to result in opposition and possible failure of the chosen strategy.

8 RECOMMENDED WASTE MANAGEMENT STRATEGIES.

The development of a Waste Management Strategy for the City of Joondalup should take the findings and recommendations of the Regional Waste Management Plan for the Mindarie Region into account when determining the future waste management requirements. To gain maximum benefit from the implementation of the Regional Waste Management Plan, the City of Joondalup should align aspects of its waste management operation with those of the Region.

There will be an interim period before the introduction and availability of the chosen waste disposal scheme adopted by the Mindarie Regional Council for its future regional waste management strategy. A strategy should be developed for waste management during this time period that can easily be adapted at a later stage to suit the long term Regional disposal strategy.

8.1 COLLECTION OF RECYCLABLES

The most critical issue to be resolved for the City of Joondalup waste management strategy is the collection of recyclables. The most effective way of dealing with the collection of recyclables is to follow an interim strategy until the MRC waste management plan is finalised

8.1.1 Interim strategy

Until the Regional waste management strategy is finalised and implemented, little change should be made to the collection systems currently operating in the City of Joondalup. The interim strategy to be adopted should consider the following issues:

- Maintain the current bag system for the collection of recyclables. This will be included in the normal rubbish charge.
- Those residents in the split bin trial should keep their second bin, but pay an annual fee for the fortnightly collection. The rubbish charge for this option will be approximately \$145.00.
- Other residents can order a recycling 240L bin service but should pay for the bin at the full cost recovery rate and should pay the annual fee for collection. They should be informed that the bin may become redundant in the future. The rubbish charge for

this option will be approximately \$222.00 (Cost of the recycling cart is subject to GST) for the first year and approximately \$145.00 thereafter. Service charges are based on the 1999/2000 rubbish charge as the service charge for 2000/2001 has not been fully costed at the time of printing this report. It is expected the mix and the volumes of recyclables may have an impact on the service charge. Residents will be advised of actual costs at the time of ordering recycling carts. The service fee component of the rubbish charge for the initial year, will be on a pro rata basis depending on the date of implementation of the service.

- The current contract with the City of Wanneroo for the collection of recyclables should be extended on a short term basis or in line with the timing of the Mindarie Regional Council waste management strategy in order to remain adaptable to future changes to the Regional disposal strategy. To go to tender for this service would mean a long term commitment, as the contractors would require long term contracts associated with establishing the new service.
- The long term strategy should be implemented once the results of the City of Stirling's one bin system are known and the Mindarie Regional Council strategy is finalised.

It is envisaged that this interim strategy will entail minimal additional cost for waste collection services in the City of Joondalup.

8.1.2 Long term strategy

The collection of recyclables is fundamental to the long term waste management strategy. There are three possible scenarios.

1. Maintain the current bag system.
2. Introduce a two bin system.
3. Revert to a one bin system for the entire household waste stream.

The bag system for recyclables is not recommended for the long term. Recovery rates in the current second bin trial have been shown to be higher than for bags and residents have shown a distinct desire to use a second bin for recyclables.

The one or two bin system for collection of waste is the critical issue that is required to be resolved for the long term strategy. This decision is entirely dependant on the final waste disposal and management scheme to be undertaken by the Mindarie Regional Council. If the MRC elect to continue to dispose of waste by means of landfill, then a two bin collection system should be introduced. If a secondary waste treatment process is introduced the opportunity may exist to have a one bin collection system.

8.1.2.1 Two Bin System

The introduction of a two bin system can be implemented in a number of ways for example, by borrowing or providing for a reserve fund in advance.

A user pays system is possible, whereby the resident pays for the bin and a collection service fee. For this system to be equitable, it should be compulsory for all residents to pay for the bin and collection service as part of their rates. Otherwise, those residents who choose not to purchase a second bin end up paying less for their service, while being environmentally less responsible in managing their waste.

A pay by weight system for the organics bin only could be introduced. This would encourage more recycling but it is also open to abuse and the likelihood of the recyclable bin being contaminated is very high. This system would be very unpopular, is fraught with severe administration difficulties and is open to abuse from unscrupulous neighbours dumping into their neighbour's bin. It is not recommended. Such a system would be a possibility only with some kind of a State-wide waste minimisation programme and funding.

The best way of introducing a user pays second bin for recyclables would be to introduce the bins through the Service Agreement and after a settling in period, go to open tender for the collection of bins. This would allow the City of Joondalup to test the market for value and service in the collection of recyclables, an area that a number of companies have experience and expertise in.

8.1.2.2 One Bin System

If the Mindarie Regional Council elect to dispose of waste by means of a secondary waste treatment process, which includes waste separation technology, then a one bin collection system could be introduced.

The one bin collection system would mean the discontinuation of the current bag system for the collection of recyclables. As discussed, a comprehensive public awareness and education campaign would be required for the implementation of this scenario. The one bin system would have the advantage of added convenience and would require no additional capital expenditure by the City of Joondalup for the purchase of bins.

Should the region choose to implement a secondary waste treatment processing facility, then the timeframe for implementation is more than likely to occur in a 5 to 10 year period.

8.2 OTHER WASTE STREAMS AND ISSUES

The collection and disposal of other waste streams such as inert waste, litter bins and commercial waste should continue unaltered in the interim as they are in line with the waste management planning for the region.

The tender process has commenced for a regional green waste processing. The cooperative approach through the Mindarie Regional Council should be continued. The City should continue to offer free tip passes to the Badgerup Facility for the disposal of clean green waste. This will help to encourage the separation and treatment of this waste and its diversion from landfill.

The City of Joondalup as a part owner of Lot 17 should support the recommendation identified in the report “Development of Options for a Regional Waste Management Plan, October 1999” regarding the proposal for the Mindarie Regional Council to secure the future use of Tamala Park by negotiating with the owners of Lot 17 for the purchase of portions of the property for waste management purposes. Securing the lease/ownership of Lot 17 will allow Tamala Park to develop according to the proposals and recommendations being followed by the Mindarie Regional Council. Negotiations on the future of Tamala Park are crucial to the regional waste management plan and the future of the site should be determined as soon as possible. The City of Joondalup should continue to be an active participant in the Regional Council activities and decision making process.

The current service agreements with the City of Wanneroo for all waste collection services other than the collection of recyclables should be kept in place until the completion of the term of contract. During the contract term the City of Joondalup should undertake a benchmarking exercise to determine the value and quality of the service that they receive from the City of Wanneroo in order to determine if the contracts should go to open tender.