INQUIRY INTO WASTE GENERATION AND RESOURCE EFFICIENCY

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1. INTRODUCTION

C&D Recyclers are about the processing and re-use of C&D wastes, the majority of which presently goes to landfill. This submission highlights the current status of C&D waste, what is presently happening with the waste and what is holding back the development of the industry. Our submission includes several proposed initiatives to assist with the further development of the industry and work towards the objective of zero waste to landfill by 2020.

Construction and demolition (C&D) waste represents 50% of the waste that is sent to landfill in Western Australia. The Department of Environment (DoE) estimates that approximately 1,500,000 tonnes of construction and demolition waste is disposed each year in Perth. This waste is generated during the construction of new subdivisions and buildings and the demolition of older buildings. The generation of C&D waste is therefore influenced by the economic activity in the construction sector.

Most of the C&D waste that is generated is disposed to landfill. There are a number of inert (or Class I) landfills in Perth, which tend to be located on the fringe of the metropolitan area. The disposal fees for inert landfills are generally in the $6 to $10 per tonne range. Waste Stream Management located in Kwinana previously crushed and screened incoming concrete so that it can be used as road-base and construction material. However, this equipment has subsequently been sold to the mining industry and has been removed from Perth.

The State Government policy documents that relate to waste management promote the reduction of the amount of waste sent to landfill and encourage the recycling, reuse or reduction of the waste that is generated. Any process that aims to reduce the amount of C&D waste sent to landfill by recycling the waste fulfils the governments stated aims. However, at this stage the acceptance of the recycled concrete as a road-base for construction is somewhat limited.

Following the release of the latest waste management policy document Strategic Directions for Waste Management in Western Australia the acceptance of recycled products in road construction should improve in the future.

2. OUR BUSINESS

C&D Recycling is in the business of recycling C&D waste. It has been operating for the past 2.5 years as a mobile recycler with several local governments including the Cities of Cockburn, Mandurah, Belmont and Armadale and the EMRC.

C&D Recycling recently acquired a site located on Westralia Airport Corporation land located at the corner of Great Eastern Highway Bypass and Abernethy Road, Hazelmere. The 12 hectare site contains an existing 210,000m^3 stockpile of C&D waste material that is being recycled into recycled sand, RCA and roadbase.

C&D Recycling provides clean and safe recycled products for use by industry. Test results are available upon request.

3. C&D WASTE GENERATION

Demolition waste represents the main waste stream that will enter the proposed C&D waste recycling facility. Indeed, the Federal Department of Environment and Heritage indicates that "between 60% and 70% of C&D wastes are generated during the demolition of residential and commercial buildings, while the remainder are generated during construction and other forms of civil engineering and roadworks" (Department of Environment and Heritage, 2003).

3.1 SOURCES OF C&D WASTE

A range of sources generates C&D waste. Typically though, the main sources of C&D waste can be divided as follows:

- The construction of new buildings produces C&D waste from two sources:
    - During preparation of the site, the unsuitable materials are removed. These materials include sand, limestone and/or trees and are often disposed to inert landfill because it is the simplest and most economic option; and
    - The clean up of wastes during and after the construction process. This material is also sent to inert landfill
- The construction of new housing subdivisions and major road networks.
- The demolition of residential buildings, offices and industrial buildings. There is the potential for significant quantities of recyclables to be extracted from this C&D waste. At present however, the majority of the material is removed to inert landfill.
- Reconstruction of roads. Old road pavement and asphalt are being produced from the rebuilding of roads. The majority of waste asphalt comes from the civil construction industry, and in particular the rehabilitation and reconstruction of roadways (for example, road widening and resurfacing projects). As such, the main source of asphalt waste will emanate from companies undertaking major roadworks. There is scarce information relating to the actual quantity of waste asphalt produced in Perth.

3.2 C&D WASTE PER CAPITA PER ANNUM

In excess of one tonne of C&D waste per capita per annum is generated in Perth. This information is displayed in Table 3.2 below.

Table 3.2 Construction and Demolition Waste on a Per Capita Basis

Year	Construction and Demolition Waste Quantity (tonnes)	Population	Waste Per Capita (tonnes)
1998/1999	1,532,702	1,352,281	1.13
1999/2000	1,604,064	1,371,060	1.17
2000/2001	1,243,584	1,391,040	0.89
2001/2002	1,166,613	1,407,143	0.83
2002/2003	1,534,134	1,423,306	1.08

Source: Summary Report of Waste to Landfill, Waste Management Board, February 2003

As **Table 3.2** shows, the population grew steadily between 1998/1999 and 2002/2003 while the total C&D waste quantity fluctuated. In 2000/2001 and 2001/2002 the waste per capita was relatively low as a result of the substantial decrease in the total amount of C&D waste produced. The 2002/2003 waste per capita figure is similar to the 1998/1999 figure.

The Australian State of the Environment report indicates that C&D waste from buildings contributes 30-40% of all solid wastes disposed at landfill. This equates to approximately eight million tones nationwide, or 430 kg/year per capita. (Department of Environment and Heritage, 2003). The national average is therefore significantly less than the Western Australian figure and the report does indicate that WA has the highest waste per capita generation in Australia.

3.3 WASTE COMPOSITION OF HOUSE DEMOLITIONS

Research was undertaken several years ago to determine the composition of waste from the demolition of houses. The results of this survey, completed by Nolan ITU in 1999, is represented in **Table 3.3** below.

Table 3.3 Waste Composition During House Demolitions

Material	**Weight (tonnes)**	**Percentage of Recovered Materials (%)**	**Average Qty per household (tonnes)**
Roof/tiles	91.3	4.6	5.7
Roof/Ceiling Timber	55.4	2.8	3.5
Bricks	967.8	48.4	60.5
Ceiling/Wall Plaster	62.0	3.1	3.9
Floor Timber	102.0	5.1	6.4
Wall Timber	56.0	2.8	3.5
Timber Trim & Cardboard	11.8	0.6	0.7
Doors/Windows/Frames	43.6	2.2	2.7
Glass	5.1	0.3	0.3
Plumbing Fixtures	4.8	0.2	0.3
Stove/Heater	2.2	0.1	0.1
Concrete Foundations	125.2	6.3	7.8
Concrete Paths	346.5	17.3	21.7
Out Buildings	100.4	5.0	6.3
Trees	26.8	1.3	1.7
TOTAL	**2000.96**	**100.0**	

Source: Nolan ITU (November, 1999)

The largest contributor, by weight, is bricks (967.8 tonnes). Concrete paths (346.2 tonnes) and concrete foundations (125.2 tonnes) also contribute a large amount of demolition waste. Due to their volume and weight, bricks, concrete paths and concrete foundations also have the highest average tonne per house.

4. C&D WASTE DISPOSAL

Section 3 has highlighted that there is a significant stream of C&D waste. This waste is currently received by a number of landfill facilities and private companies. The price of disposing C&D waste at these operations varies substantially, with the transfer stations charging the highest rate per tonne. The

Class II landfill sites such as Tamala Park that are licensed to accept putrescible or organic wastes, do not offer a discounted disposal cost for inert wastes. Inert wastes are disposed in the same cells as the organic wastes and the disposal costs are therefore the same. Similarly a number of the transfer stations operated by local councils such as Brockway or Balcatta have high waste disposal costs and are not likely to attract large quantities of waste from contractors. They are primarily operated for residents to take trailer loads to a nearby waste disposal facility.

4.1 OPERATING COMPANIES

Capital Demolition is perhaps the closest C&D waste recycling facility to the Perth central business district. Their operations are carried-out in the open in an area surrounded by other industrial premises, particularly salvage yards and scrap recycling facilities. The incoming waste is sorted into different piles according to its contaminant content. An excavator feeds the crusher that deposits the waste into different piles according to the concrete size and contaminant level. It is understood that Capital Demolition also has a screener and a front-end loader. They have one industrial shed that is used mainly to store the equipment when it is not operational.

Waste Stream Management is located in Kwinana and commenced operation recycling C&D waste in 2000. Through its relationship with the Town of Kwinana, Waste Stream Management constructed a 'test' road using recycled concrete aggregate (RCA) for road-base and received significant assistance from the Waste Management Recycling Fund. However, due to competing prices from the traditional quarries and road stone suppliers, Waste Stream Management ceased operations and has sold its equipment.

Eclipse Resources has operations in both Kwinana and Neerabup. Their facilities only accept inert waste, which is land filled. It is understood from an inspection of the site in Neerabup that no recycling of C&D waste is undertaken.

Similarly, the RCG facility is a quarry site that landfills inert waste. RCG does not recycle C&D waste. The majority of inert waste from large companies is sent to RCG and Eclipse Resources, as opposed to householders wishing to dispose of small amounts of waste.

Collex Jandakot operate a sand and concrete recycling facility. This facility accepts skip bins. They operate with high tipping fees and low disposal costs.

Most of the existing players offer cheap disposal rates as they are landfilling the C&D waste delivered to their sites.

The number of licensed premises provides an indication of the number of other operators in the industry. The premises are licensed if they exceed a certain production or design capacity and **Table 4.1** indicates the number of licensed premises in categories of interest.

Table 4.1 Current Number of Prescribed Premises Licences in WA

Category Number	Category Description	Total Number of Licenses	Number of Licenses in this Category Only
13	Crushing of Building Material	6	4
57	Used Tyre Storage	22	10
61A	Solid Waste Facility	13	8
62	Solid Waste Depot	47	28
63	Inert Landfill	42	6

4.2 C&D RECYCLING

C&D Recycling are planning to commence the processing of C&D materials for the production of RCA and other materials for re-use.

The location of the facility on Westralia Airport Corporation land at Perth Airport has advantages in respect of transport costs from the source of the C&D waste and to the location of the markets for RCA. Looking specifically at the location the following points are made:

- It is close to the City (located to the west)
- Roe Hwy provides access to the eastern and southern suburbs
- Tonkin Hwy provides access to the northern suburbs

C&D waste recycling facilities are successfully operated in Queensland, NSW, Victoria and South Australia producing RCA and other recycled products. As mentioned earlier, Waste Stream Management had entered the C&D market in WA in 2000, but due to price reductions in the cost of new products was forced from the marketplace.

5. GOVERNMENT ACTION ON WASTE

The State and Local Governments have introduced a number of initiatives dealing with waste and the potential to minimise, re-use and recycle materials. Waste is now being viewed as a resource that has other uses once its original use has been completed.

5.1 WASTE 2020

WAste 2020 provides a vision for Western Australia to reduce the amount of waste sent to landfill. The aim of the strategy is to have zero waste by 2020, with all waste effectively reused or recovered. *WAste 2020* therefore provides a framework for the establishment of operations to reuse or recycle C&D waste materials.

WAste 2020 establishes a bold vision: "Towards zero waste by 2020". The first of five goals relates to sustainability and states: *"To achieve waste reduction, re-use and recycling outcomes which are environmentally, socially and economically sustainable"*. The integration goal states *"to establish effective frameworks and structures to coordinate and facilitate waste reduction, re-use and recycling, the recovery of resources and the safe management of remaining wastes."*

A key outcome of *WAste 2020* is a *"thriving industry based on the recovery and re-use of resources"*. In relation to C&D waste, it specifically seeks to:

"Develop and implement with relevant stakeholders a plan to reduce waste and maximize resource recovery from construction and demolition material at source, incorporating the:

- *importance of siting, in strategic locations, a number of waste transfer/resource recovery centres within reasonable distance of the CBD or* high density population areas;
- *market opportunities for components of the construction and demolition waste streams; and*
- *need to involve and inform the community, planning and other relevant statutory authorities and industry stakeholders about maximum resource recovery."*

Thus, *WAste 2020* has a clear goal "to maximise the recovery and recycling of resource" from C&D waste and move away from the 'traditional' practice of disposing of a large proportion of the waste stream to inert landfill.

WAste 2020 provides a framework for the C&D Recycling to establish operations to reuse and recycle C&D waste materials in the Perth metropolitan area.

5.2 STRATEGIC DIRECTION FOR WASTE MANAGEMENT

The State Government's Strategic Direction for Waste Management in Western Australia was released in August 2003. This report represents the first step towards an action plan for achieving the WAste 2020 vision. It identifies the main outcomes to be accomplished during the 2003 to 2005 period. Outcome 3 states: "All wastes are segregated and sorted close to source in a way that optimises resource recovery for higher end uses". Outcome 5 states: "A comprehensive and diverse range of sustainable treatment facilities exist to treat and recover resources from all waste streams and manage residuals in an environmentally acceptable manner". Between the 2003 and 2015 period, the report aims to recover 100 percent of the inert (e.g. C&D) waste stream. In this process, "The Government's

role will include improving the recovery of resources and increasing the alternative use of these resources. The development of strong markets will also contribute to driving investment in innovative practices and technologies and industry development."

In this manner, the *WAste 2020* and Strategic Direction for Waste Management in Western Australia documents present a pathway for achieving zero waste by 2020. Both suggest that the principles of 'reuse' and 'recycle' will be central to the C&D waste sector in the near future. Operations to reuse and recycle C&D waste materials will be encouraged and facilitated (as appropriate) by the State Government.

5.3 WASTE MANAGEMENT AND RECYCLING FUND

In 1998, the Western Australian Government introduced a levy on waste disposal to landfill. The aim of this levy was to discourage the disposal of waste to landfill and to generate funds for the rebate scheme and grants program in the State (Waste Management Board, September 2003). The scope and operation of the landfill levy is detailed in the Environmental Protection Act 1986.

There is a statutory requirement for a review into the effectiveness of the Levy after three years of operation. This was carried-out in 2003 (see Economics Consulting Services, 2003) and the Waste Management Board (of Western Australia) in turn produced a number of recommendations for the review of the levy (Waste Management Board, September 2003).

The Waste Management Board argues that the levy is too low (currently at $1/cubic metre for inert waste) to provide an economic incentive to divert waste from landfill and is not adequate enough to fund the Government's *Strategic Direction for Waste Management in Western Australia*.

Consequently, the following recommendations are made:

Recommendation 6: "the rate of landfill levy should be increased to $6/tonne for waste to putrescible landfill, and to $3/cubic metre for waste to inert landfill. Variations to these rates should be determined in future years";

Recommendation 7: "the levy should be raised over time so that it provides an increasing disincentive to dispose of waste to landfill and gives industry time to adjust to the costs"; and

Recommendation 8: "a differential levy rate between putrescible and inert materials needs to be maintained" (Waste Management Board, September 2003: iii).

These recommendations to continue with the landfill levy at an increased rate are in line with one of the overarching aims of the levy: that is, to encourage the reuse and recycling of inert waste. C&D companies will have an economic incentive to deposit their waste material at recycling facilities. The expected gradual increase in the landfill levy in future years will further prompt C&D companies to use recycling facilities in the metropolitan area.

5.4 C&D WASTE POLICY

In early 2002, the then Department of Environment Protection was working towards the development of a policy document for the C&D waste sector that met the requirements of *WAste 2020*. A workshop was held on January 23rd, 2002 that identified a range of issues that needed to be addressed to reduce the amount of C&D waste sent to landfill. A summary of the issues identified in the workshop is provided below:

- Landfill Levy (equitable; significant; incremental increase; to be used to improve the industry – not for Government coffers);
- Local Governments and State Governments to work together (guidelines for demolition; create viable markets; contract specifications; illegal dumping needs harsher penalties and better policing);
- Education;
- Virgin Material (cost of virgin material too low and doesn't reflect real cost);
- Planning & Development (applications and tenders to incorporate resource recovery);
- Markets (innovation; MRWA recognise product via its engineering specification 501.11). There is a need to make the marketplace more aware of the availability of these products;
- Cost Benefit analysis of disposal to landfill and other options (recognise cost implications of solutions); and
- Weighbridges at all Landfill sites.

Opportunities exist for the use of the Levy to support industries establishing themselves and to gain a market share, thereby re-using a resource that would otherwise be landfilled.

6. POTENTIAL MARKETS

The main marketplace for RCA, as pavement materials, is in road construction on main and local roads. It is estimated, based on current C&D waste, about 800,000 tonnes of RCA could be produced each year.

The potential exists for the re-use of recycled asphalt, either produced by the asphalt manufacturers or specialised C&D waste processing companies

6.1 MAIN ROADS WESTERN AUSTRALIA (MRWA) SPECIFICATION 501

RCA meets MRWA standards and is able to be used on road projects other than freeway construction. To date, MRWA has not used any RCA material due to its restricted availability.

6.2 LOCAL GOVERNMENTS

At present, RCA is not widely used by the Local Governments throughout the Perth metropolitan area. The majority of Local Governments continue to use limestone for road and pavement base rather than RCA. The Town of Kwinana and Waste Stream Management carried out the only notable project involving Local Government use of RCA since 2000. Waste Stream Management provided the Town of Kwinana with 1,500 tonnes of free material to build a test road in the Hope Valley area, which Council engineers and MRWA will monitor in collaboration for a number of years. The road and the road-base currently meet MRWA standards.

However, the fact that most Local Governments do not use RCA highlights its market potential. The 2003/04 to 2007/08 MDP shows that most future development will occur in a limited number of local governments.

7. REQUEST

C&D Recycling make their submission based on the content of this submission and in particular, make the following key points detailed in the following sections.

7.1 BENEFITS OF USING C&D RECYCLED PRODUCTS

The re-using of C&D materials has a number of benefits:

- Works towards the diversion of the next biggest source of material from going to landfill and is working towards the vision of *WAste 2020* of zero waste to landfill by 2020;
- Re-use of natural resource thereby extending its life before its final disposal. This also reduces the rate of resource extraction;
- More efficient use of resources, as materials extracted from one development site can be used in the development of another. By recycling C&D waste, the materials are potentially close to their final destination;
- Employment opportunities in the rapidly developing resource recovery industry;
- Potential to be cheaper than products produced from virgin materials as C&D waste attracts a disposal fee as well as a saleable product price. However, this does not always work due to the barriers listed in Section 7.2 below; and
- Reduced waste to landfill as per the State Governments policies. Whilst C&D is not particularly risky to the environment, its disposal to landfill remains problematic as landfills become increasingly difficult to site and thus less available. This in turn creates a situation of a few very large landfills, thus concentrating the market in the hands of a few players

7.2 BARRIERS TO IMPROVED RECYCLING OF C&D WASTE

Working in the C&D waste recycling industry, we have identified a number of barriers, these being:

- Recycling of C&D waste materials generally requires more labour per tonne of resource than either the raw materials extraction and crushing or the disposal of C&D waste to landfill;
- Whilst recycled C&D materials in the form of RCA should be cheaper than raw materials processing, this does not generally happen because of the cost pressure from both supply and disposal sites. The supply of raw material, such as aggregate is concentrated to a few key players and these have substantial market power. This power has been used in the past to drive competitors, including C&D recyclers, out of business. Refer to earlier discussion about Waste Stream Management. On the disposal side, as landfill operators have a very low cost structure, they can also undercut C&D recyclers. This is further complicated by the movement of resource companies such as Hanson and Boral into landfill operations;
- The most efficient means of C&D recycling is for materials to be sorted at the source resulting in relatively homogeneous materials being delivered to the C&D recycler. To date this rarely happens as the builder is more concerned with the clearing of the site to commence construction rather than the composition of the waste leaving the site. There may be insufficient room to segregate or to store waste materials prior to removal;
- Many specifications for road construction require quarried products, thereby precluding any RCA. RCA can be produced to outcome oriented specifications and so the prohibition of recycled products is unnecessary;
- The community generally dislikes waste management facilities, even recycling facilities. This may result in attempts to relocate recycling facilities from industrial areas, preferring them to be out of town. This removes a key advantage the recyclers have over quarries and landfills as they are close to the source and destination of the product, proving improved logistics and lower transportation costs;
- Extensive approvals processes required for waste management facilities. These are often more extensive than those required for industries that conduct similar activities such as raw material processing. Environmental regulators cover the waste industry whereas infrastructure or industry departments control the approval of new resources. Each has a very different focus; and
- Waste management facilities are generally held to more stringent standards than facilities producing raw products. For example, a recycled product is generally required to conduct chemical contaminant testing of stockpiled product to demonstrate that the material produced meets strict limits. This is rarely required for raw materials. The testing is unlikely to identify materials of concern, however the testing is a further cost that has to be met in the sale of the recycled product.

7.3 INITIATIVES TO SUPPORT C&D REPROCESSING

The initiatives required to support C&D reprocessing and re-use would include:

- Mandatory use of recycled materials by inclusion within procurement practices for both State and Local Government. Targets of initially 2% raising to 5% over a five year period of total procurement could be established to support the re-use of recycled materials including C&D wastes;
- Increased levy for deposing of C&D waste to inert landfills, at similar levels as other wastes going to landfill;
- Monies collected from the levy be paid back to the industry to assist with the establishment of industries and markets for the use of RCA;
- Ensure all wastes from demolition sites be segregated at the source and delivered to the appropriate recycling location. As a minimum, the following be separated out:
    - Greenwaste for processing into mulch and/or compost;
    - Bricks and concrete for re-crushing;
    - Timber for re-use or further processing; and
    - Iron and steel to metal recyclers.
- Encourage the separation of waste at source by issuing demolition licences with a requirement to recycle materials
- Streamline the approvals process, making State and Local Government action on resource recovery consistent with what it says, by bringing C&D recyclers under the same regulatory framework as those processing raw materials;
- Closely monitor the use of market power by large quarrying companies. Their practice of dumping prices to drive out competitors creates long term costs for the community as it prevents a diverse marketplace from developing;
- Introduction of a levy on the extraction of raw materials for the domestic market, such as sand, clay and rock. This would cover some of the externalities in resource extraction such as losses of diversity, sterilising land for future uses, other than for landfill. Income from the levy could be used to develop specifications and industry awareness of alternatives to the particular quarried products being levied;
- Increasing landfill levies, directing the funds into the development of markets for all types of recycled products. Ultimately, the recycling industry will be driven by the strength of markets creating demand; and
- Ultimately, the banning of C&D waste suitable for recycling being banned from going to landfill.

8. CONCLUSION

In Western Australia and throughout most Australian States, there is a growing desire to move towards ‘zero waste’. In Western Australia, the objective of ‘zero waste’ was put forward in the *WAste 2020* report. This philosophy is predicated on the goal of producing zero waste; a situation where products are reused and recycled and not disposed to landfill.

The waste recycling industry will play a major role in determining the success of the zero waste strategy. It will need to develop technologies to treat those items that are currently considered a ‘waste’ and establish new markets to make the entire waste recovery process profitable. In particular, the recycling of plastics, timber and fittings represent three broad areas where there is the possibility to develop a niche market in WA.

Mandatory use of recycled product in construction projects would provide a significant increase on the demand for market products. This key initiative will assist with the rapid establishment of the RCA industry and associated products. This will meet the objective of diverting more of the C&D waste stream from going to landfill.

Footnote:
The material for this submission has been drawn from the BSD Consultants report titled *“Industry Overview of the Construction and Demolition Waste Sector”* prepared for C&D Recycling in 2003. This report provided background research on the status of the C&D waste stream in Perth and where the material was being disposed.