Reducing the volume
of residential construction waste designated for
municipal landfill sites

MAKING A MOLEHILL
OUT OF A MOUNTAIN

Prepared for the Toronto Home Builders' Association by
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EXECUTIVE SUMMARY

The report, "Making a Molehill Out of a Mountain," was commissioned by the Toronto Home Builders' Association in a proactive effort to confront the landfill crisis within the following terms of reference:

- to examine the scope of the landfill crisis within the Greater Toronto Area (GTA), and how it affects THBA members;
- to examine the state of the waste management situation amongst renovators and new home builders;
- to explore alternatives to sending construction and demolition wastes to landfill; and
- to give recommendations for future THBA actions.

The landfill situation within the GTA is becoming worse with current projections suggesting existing sites will be full, and closed, by 1992. Already, bans on certain waste products such as white goods and cardboard, have altered the way in which most THBA members do business. In addition, upcoming bans on wood products and drywall will have a direct impact on renovators and builders, particularly as these two products are among their principal wastes.

The breakdown of renovator and new home builder wastes focuses on the quantities of various types of waste products being produced (both by volume and weight), and puts these numbers in perspective. The construction industry produces approximately 16% of all landfill wastes with new home builders share of the overall total being 2-3%. Although this percentage may seem small, THBA renovators and new home builders have waste management expenditures of over $50 million a year. With increasing tipping fees, this figure has nowhere to go but up, unless THBA members search for alternative waste management practices.

Alternative waste management systems will hinge on finding methods for reducing, reusing and recycling the types of wastes being produced. The report examines some methods which builders and renovators are already employing with success, such as using wood off-cuts for bridging. It also outlines many of the new technical systems available within the recycling sector. Although the study does not endorse any particular product or company, several organizations operating within the Metro area have been identified with a view to setting the wheels in motion.

The report recommends several avenues for further action on the part of THBA. These recommendations, designed to facilitate a move to sound waste management practices, fall into the areas of public relations, education, information, system demonstration, and market research. The THBA has an opportunity to take the lead in this area, and not only reach solutions to ongoing problems but receive significant acknowledgement from the general public in the process.
INTRODUCTION

The following study has been undertaken at the initiative of the Government Liaison Committee of the Toronto Home Builders' Association. It represents a proactive initiative to help home builders and renovators understand the scope of, and find solutions to, the heightening waste management problem. Much of the garbage the residential construction industry produces is currently destined for landfill sites. However, as this report will outline, landfill can no longer be considered as a panacea — hiding society's wasteful practices. While we believe there will remain an ongoing need to dispose of some smaller segment of the construction industry's waste stream using landfill options, it will cease to be the primary option in a few short years. It will either have become too expensive, or the types of waste the industry generates will be redirected from conventional landfill sites to alternative recycling and reuse facilities.

Part One of this report examines the types and volumes of waste products being produced on low-rise residential construction and renovation sites. It also discusses certain on-site problems which will have to be tackled before any system of waste management will be effective.

Part Two of the report outlines the shifting regulatory environment in Metropolitan Toronto and the surrounding regions, as well as listing some of the alternative practices which might be employed to implement the three Rs of waste management; Reduction, Reuse, and Recycling.

Part Three of the report presents some recommendations to the Association for consideration. The report proposes several follow-up initiatives which will result in more specific direction on procedures which can be implemented by the builder.

The authors of this report would like to thank everyone who gave us their time and cooperation during its preparation. Very few studies of this type have been undertaken in North America, so we've had to poke our noses into other peoples' business and, more importantly, into their garbage. We hope that this report will serve as a step in helping them get rid of it.
PART ONE

Before any alternative waste management or disposal plans can be put in place, one needs to know what types of garbage the industry is producing and in what quantities. Obviously, there are differences between building a new home and renovating an existing one; therefore, we've broken this portion of the study into two components. The first component deals with the waste situation on low-rise residential construction sites, and the second, outlines the corresponding situation on renovation sites.

LOW-RISE RESIDENTIAL CONSTRUCTION

The amount of waste produced by the low-rise residential construction industry in the GTA is estimated at more than 90,000 tonnes — based on an average of more than 2.5 tonnes per house for the average 35,000 housing starts annually in the area.

Builders, in general, have seen their waste disposal costs skyrocket over the past few years. Since 1983, tipping fees alone have risen over 600%. Although these costs represent a relatively small proportion of the total construction budget, their actual dollar value is significant. On average, builders are paying $300 dollars per home to dispose of the approximately 2.5 tonnes of garbage. This figure doesn't include all of the incidental costs incurred in the process. Looking into the future, it's unlikely that waste expenses will stabilize, unless the industry adopts new waste management practices.

Builder Survey Results

The following observations are based on the responses to a waste survey circulated to builder/developer members of the Toronto Home Builders' Association. 82% of the respondents reported that their waste disposal costs were rising at a faster rate than other costs. 65% of the respondents considered waste related costs to be of high concern while 18% felt that they were of the highest concern.

Despite these high levels of expressed concern, fewer than 50% of the respondents were able to give detailed figures for their own waste related expenditures. The most common estimate for waste disposal's percentage of builders' overall budgets, was in the .3% to .5% range. Still, these figures worked out to an average $300/house.

The survey asked the respondents to estimate the percentage levels of different types of wastes being produced. The responses differed dramatically. The following chart gives the average percent figure for each category of waste, and the percentage of responses which fell outside the statistically acceptable range. (This figure was derived by applying standard deviation values to the responses. In short, the number represents the percentage of builders' that gave unusual answers.)

<table>
<thead>
<tr>
<th>Waste Category</th>
<th>% of Total Waste</th>
<th>Percentage of Unacceptable Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensional Lumber</td>
<td>23.11%</td>
<td>35%</td>
</tr>
<tr>
<td>Manufactured Wood</td>
<td>14.7%</td>
<td>35%</td>
</tr>
<tr>
<td>Drywall</td>
<td>11.58%</td>
<td>35%</td>
</tr>
<tr>
<td>Metal Wastes</td>
<td>3.29%</td>
<td>35%</td>
</tr>
<tr>
<td>Asphalt</td>
<td>5.58%</td>
<td>18%</td>
</tr>
<tr>
<td>Masonry</td>
<td>10.82%</td>
<td>18%</td>
</tr>
<tr>
<td>Plastics</td>
<td>4.88%</td>
<td>18%</td>
</tr>
<tr>
<td>Fibreglass</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Corr. Cardboard</td>
<td>9.12%</td>
<td>47%</td>
</tr>
<tr>
<td>Packaging</td>
<td>4.18%</td>
<td>29%</td>
</tr>
<tr>
<td>Other</td>
<td>1.41%</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92.67%</strong></td>
<td>(not 100%, due to respondent error)</td>
</tr>
</tbody>
</table>

While some builders' estimates mirrored our own site observations, the variance in responses over the entire sample, seems to indicate either diverse building practices, or a limited understanding of the waste situation on the part of many builders. Some of the respondents had obviously given a fair amount of thought to waste management issues, and their techniques or suggestions for reduction and reuse are included in the discussion of specific waste products.
Site Observations

Most alternative waste handling practices will focus on specific types of garbage and, to some extent, will hinge on how much waste is produced. The following breakdown is based on observations of a number of sites, over a period of time between July, 1989 and Sept. 1989. While the amount of waste being produced varies from builder to builder, the numbers below represent averages developed from our own observations and through discussions with people involved in the waste disposal and regulation fields.

### Waste Product Breakdown

<table>
<thead>
<tr>
<th>Waste Product</th>
<th>Percentage</th>
<th>Volume</th>
<th>Weight/House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensional Lumber</td>
<td>25.0%</td>
<td></td>
<td>.845 tonnes</td>
</tr>
<tr>
<td>Manufactured Wood</td>
<td>10.0%</td>
<td></td>
<td>.424 tonnes</td>
</tr>
<tr>
<td>Drywall</td>
<td>15.0%</td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>Masonry and Tile</td>
<td>12.0%</td>
<td></td>
<td>1.00 tonnes</td>
</tr>
<tr>
<td>OCC</td>
<td>10.0%</td>
<td></td>
<td>.066 tonnes</td>
</tr>
<tr>
<td>Asphalt</td>
<td>6.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal Wastes</td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic and Foam</td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibreglass</td>
<td>5.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Packaging</td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Wastes</td>
<td>5.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Making a Molchill Cut of a Mountain—5
Specific Waste Streams

Throughout this report, wastes are reported using two different methods of measurement — weight and volume. Wherever possible, statistics are provided using both measurements. Measuring wastes by weight — in either kilograms or tonnes — is the basis for tipping fees at disposal facilities. This represents the basis of the builder costs. Volume figures are the determining factor in how quickly a disposal bin is filled. The figures also allow one to easier visualize the scope of the wastes generated. It is easier to picture a cubic foot of wood than it is to picture 12.76 kgs of wood. At the same time it is the volume of wastes which fills the landfill sites.

The following section of the report provides an overview of the specific types of wastes commonly associated with the residential construction site

Wood

Dimensional lumber and manufactured wood products represent an estimated 35% of all the garbage produced on-site. A conservative estimate of the quantity of lumber waste produced, amounts to .845 tonnes per house. Simplistically, if this volume were represented in dimensioned lumber, it is equivalent to 200 two by four studs per house. If we look at 35,000 housing starts over a year, the industry is producing enough lumber waste to fill an area the size of a football field to a height of five stories, or over 2 million cubic feet. Of more significance is the fact that this wastage amounts to as much as 10% of all the lumber purchased for construction. For most builders, manufactured wood (chipboard, plywood, etc.) constitutes less of a problem, but still accounts for over one quarter of wood wastes, averaging .424 tonnes per house.

Alternatives Suggested By Builders

- Some builders are reusing wood off-cuts (re-cutting as bridging).
- Use manufactured wall-framing components, produced off-site.
- A number of builders would like to see the onus for managing wood wastes shifted to framing contractors — in the same way that drywall is handled on most sites. While this change would not solve the disposal problem, it might result in more consideration resulting in reduced wastage.

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3 Estimate based on Peel Waste Study figures (1988), and confirmed by on-site evaluations. The Canadian Wood Council provided representative weights for a cubic foot of lumber; based on average M.C of lumber in the GTA.

4 Average weights for square footage of manufactured wood products, provided by Macmillan Bloedel
Drywall

Estimates for drywall wastes from residential construction sites vary widely according to the source. Officials at Peel region, as well as representatives of New Westminster Gypsum, a company building a drywall recycling facility in Peel, are quoting a figure of one pound of drywall waste per square foot of finished floor area of housing — averaging 2,500 pounds (1135 kg.) per house. Estimates from Metro drywall contractors, on the other hand, have consistently fallen between 10-12 sheets/house — approximately 500 to 600 pounds, or 227 to 272 kg, per house. Exact figures have been difficult to obtain because contractors are generally responsible for removing the waste themselves.

Based on site observations however, our estimates for drywall wastage average out at approximately 15% of the total volume of construction garbage headed for landfill, with an average weight of 400 kg.

Suggested Alternatives

- Although shifting responsibility for disposal to the contractor hasn't solved the problem, it may have reduced the amount produced by virtue of making the people working with the drywall more conscious of wastage.
- Recycling facilities being built in Oakville and Caledonia are specifically designed to handle drywall. Peel Region officials, and Domtar have indicated that they will accept loads from throughout the Greater Toronto Area. (See the outline of regulations and alternatives in Part Two of the study)

Masonry and Tile (brick, quarry tiles, concrete block etc)

This category represents approximately 12% of the total volume of waste produced on-site. While considered part of the waste stream, it doesn't end up in the bin and is not destined for landfill. During the construction of an average house, 1 tonne of masonry and tile products is wasted, (primarily brick), working out to the equivalent of 400 standard bricks. A majority of builders use these materials as fill, for example, to level the area under garage floors. Backfilling is allowed under the building code but the builder must ensure that the materials used won't degrade and create structural problems. We might add that brick is an expensive source of fill, and reduction or reuse would represent a more economical alternative.

5 Weight and dimension of standard brickling provided by the Brampton Brick Company.
Corrugated Cardboard

Old corrugated cardboard (OCC) is already under partial ban at most landfill sites in Southern Ontario and most builders are actively separating it from other waste materials. It accounts for approximately 10% of industry garbage, by volume, or roughly 66 kg. per house. Because OCC represents many builders' first attempts at site separation, it serves as an interesting test case. In some instances, poor separation practices have led to friction with hauling companies — and increased costs for the builder. Recyclers can be quite particular about what they will and will not accept. A load of soggy cardboard, or one with some wood in it, will likely be refused. This load will also be refused at most landfills which can lead to any number of complications.

Asphalt (shingles, roofing paper, etc.)

Asphalt products amount to roughly 6% of the total volume of wastes, with shingles being the primary material. As with the case of bricks, the sheer volume of undamaged shingles which can be found on many sites after homes are completed, suggests that there are likely ways of reducing the amount wasted. Although separating these waste products out may not be as feasible as it is with wood, there are certain options open for recycling. (See Part Two of the study)

Metal, Plastics and Foam, Fibreglass, and Non-OCC Packaging

Each of these categories accounts for approximately 4% of the total volume of wastes. Separating these waste products on-site would be costly and time consuming; therefore, keeping them out of landfill will hinge on the availability of a mixed-waste sorting station, and initiatives to reduce the amount wasted. (It's uncertain what pressures the industry could bring to bear on manufacturers, but many builders have commented on the over-packaging of many of the goods and materials being brought onto the site.)

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6 Weight per cubic foot provided by Atlantic Packaging.
Other Wastes

Non construction related wastes can represent as much as 5% of the total volume of wastes accumulated in bins located on construction sites. The majority is comprised of the garbage that other people toss into construction bins. Couches and mattresses, among other items, can be expensive nuisances, particularly when placed in bins destined for a recycler who will only accept pure loads. If someone discards an old appliance in an on-site bin, it will be rejected at landfill in which case the builder will inevitably carry the cost.

Suggested Alternatives

- It's been suggested that keeping the bins close to a well-lit and marked site-trailer could discourage would-be dumpers.

Commentary

- The variance in the amount of garbage being produced from site to site suggests that many builders have room to reduce their wastage. There is also a variance in costs which doesn't necessarily correspond with the difference in tipping fees between regions. Some builders appear to be more efficient than others.

- Many of the alternative waste management practices which builders might implement, will involve some site-separation. If this process is to be effective, there will have to be a general shift in attitudes. Although waste issues represent only a fraction of the concerns which site supervisors and labourers have to juggle, they are often approached haphazardly. Even if there wasn't a need to find waste disposal alternatives, paying more attention to how the garbage is processed on-site could cut costs.

- Having observed a number of different types of homes under construction, we've discovered that high-end projects (homes over $800,000) often produce less waste than projects involving average cost homes. This discrepancy could be due to the amount of customized material being used, but it clearly shows that waste disposal costs aren't just the fault of regional regulators.
RESIDENTIAL RENOVATIONS

The waste situation for renovators is somewhat different than that of new-home builders. First of all, a significant proportion of renovation waste is generated during the demolition process. Secondly, renovators face space limitations which make it difficult to implement any efficient method of site separation. Furthermore, unlike builders, they usually work in close conjunction with their clients and often in close proximity. Maintaining solid ongoing relations necessitates that the site be kept as clean as possible at all times.

Waste disposal costs are as pressing for renovators as they are for builders, if not more so. They're experiencing the same crunch, but with the added factors of demolition wastes and problems associated with economies of scale, waste expenses for renovators, constitute a higher percentage of their overall budgets. Based on responses to our survey, the average renovator has annual waste disposal expenditures of just under $40,000 per year. Metro currently has more than 10,000 licensed renovation firms. If we assume that even a thousand of them have figures similar to our survey average, annual waste disposal costs for the industry are over $40 million.

Reusable Wastes

As we've mentioned, reuse is one of the corner stones of modern waste management. Renovators, in particular, could benefit by implementing reuse strategies. The number of reusable items varies from project to project, but even averaged over 100 representative firms, the totals are impressive. Using the average figures obtained from our survey, these 100 representative firms would have produced the following number of reusable products last year.

- 711 Kitchen Sinks
- 455 Bathtubs
- 510 Refrigerators
- 3777 Interior Doors
- 2611 Exterior Windows

Clearly, when our survey results are projected over a modest fraction of overall renovation activity in the Greater Toronto Area, the volumes are significant. Unfortunately, a majority of these items are currently being damaged or destroyed in the demolition process. In order, for reuse to be an option, renovators would have to implement some system of site-stripping up-front.
INFILL PROJECTS

Infill projects are the largest per project waste producers in the renovation sector. The increasing moves to intensification in the urban environment, with a resulting increase in demolition, poses a considerable problem for local landfill sites. Based on North York statistics for infill housing (correlated to other GTA municipalities) there were an estimated 1500 infill projects in Metropolitan Toronto in 1989.

Demolition Wastes

Demolition wastes coming from renovation and infill sites constitute a majority of all the wastes these contractors produce. As with builders, there is a wide variance in levels of efficiency. Many demolition contractors receive a set fee for a project, out of which they must pay for hauling and tipping fees. In these cases, the demolition teams have an incentive to minimize their costs, and many of them have become highly efficient at stripping various types of wastes out in phases. This practice will inevitably enable them to take advantage of recycling opportunities, because the technique serves as a form of site separation.

Construction Wastes

The waste materials being produced in the construction phase of renovation projects parallel those produced on new home sites. Dimensional lumber, manufactured wood products and drywall are the principle leftovers constituting a corresponding percentage breakdown. However, renovators, perhaps due to the customized nature of their work, appear to be more efficient than new home builders, producing fewer wastes per square foot. Similarly, we found that companies building customized homes tended to produce fewer wastes.
PART TWO

Part Two of the study outlines current and projected regional regulations which, to some extent, govern what builders and renovators in the Greater Toronto Area (GTA) can and cannot do with their wastes. It also examines some of the alternative practices and systems which might be implemented to help solve the industry's looming garbage problems.

LEGISLATIVE REVIEW

The Province of Ontario has instituted a policy calling for a 25% reduction in waste from all sectors of the economy by the turn of the century. Acting on waste management issues now could help avert serious problems down the line. The legislative review will show that a change in waste practices is going to be unavoidable. Tipping fees have already skyrocketed and further bans and landfill closures are imminent.

Metropolitan Toronto

• Tipping fees at both landfill sites and transfer stations have risen 600% since 1983. They are currently $83.33/tonne, and $100.00/tonne, respectively.
• As of January 1, 1989, all white goods (metal appliances) have been banned from all sites.
• As of March 1, 1989, all bin loads containing more than 50% by volume of recyclable OCC, have been banned from all sites. This will change to more than 20% as of Sept. 1.
• Within Metro, clean fill and concrete rubble can be taken to seven sites including the two lakefill sites, although loads are now subject to more rigorous random testing. The tipping fee for clean fill is $24 while concrete, rubble brick, and asphalt can be dumped for free. The Harbour commission only has lakefill plans up to 1992.
• Wood wastes will be banned as soon as a local recycling facility, capable of handling the quantities generated in Metro, has been opened.
• If recommendations currently being considered by Metro are implemented, builders involved in any new development larger than 25 units will be required to table a detailed plan for managing solid wastes, including reuse and recycling objectives. These plans will have to be approved before the project can proceed.
• Metro has produced a Recycling Markets Directory available through the Works Department.
• It's estimated that Metro's landfill capacity will be exhausted by 1992.
• Metro has approached the Ministry of the Environment to impose corresponding regulations on any new private landfills.
Region of Peel

- All OCC has been banned since January, 30, 1989.
- Drywall and wood bans are expected before the end of 1989. The region currently has agreements with two private companies for the recycling of both of these classes of materials; New Westminster Gypsum for drywall and Waste Conversions Inc. for wood.
- Peel has also produced a Recycling directory, as well as a clean fill directory.
- Tipping fees will increase to $95.00 as of July, 1990.

Region of Halton

- They're involved, along with Peel region, in the drywall recycling facility and will impose a landfill ban as soon as the facility is operational.

Region of Durham

- Because Durham currently relies on Metro's landfill sites, the same regulations will apply.
- They are also looking into a wood waste processing facility.

Region of York

- York currently uses Metro's Keele Valley Landfill and will have to comply with Metro regulations.
TECHNICAL REVIEW

In this section, various companies and technologies which might be employed in the reuse and recycling of construction waste, will be identified and described.

Mixed Construction Waste Sorting and Recycling

Lindemann Recycling Equipment —

Lindemann operates two mixed construction and demolition recycling facilities in New York City. The facilities separate out OCC, wood, metals, plastics, and a clean rock fraction through a combination of machines that screen, trommel, sort and crush the various types of waste. The company is currently negotiating for two more facilities in New York City and one in Boston. They have two different sized operations. The smaller system could process 250 tons per day (tpd) while the larger system handles 1300 tpd. The cost of these two systems ranges from $700,000 to $1.3 million respectively. The company is anxious to move into the Toronto area.

The Bezner System —

New England Crinc is the North American representative for the Bezner system from West Germany. The facility uses a bucket screen which separates off larger pieces such as OCC, wood, and metals. The smaller fraction is further sorted, screened, and magnetically separated to produce different sizes of aggregate-like material. The prototype facility operating in Ravensburg is experiencing 60% to 80% recovery. The facility can process approximately 40 tons of construction and demolition waste per hour, and costs in the neighbourhood of $1.2 million. New England Crinc has a promotional videotape of the facility available for interested clients.

Harkow Aggregates —

Harkow Aggregates operates a construction and demolition transfer station in the Commissioners Street area of the Toronto waterfront. Waste that is bought to the transfer station is manually sorted to recover any recyclables such as OCC, metal scrap, copper, and tin. Large pieces of concrete and rubble are taken to the Leslie Street Spit for lakefill. The remaining waste is loaded onto trucks and taken for disposal to the Steetley private landfill in Dundas. It is estimated that the manual sorting recovers only about 5% of the waste stream. Harkow is waiting for Ministry of the Environment (MOE) approval for a wood shredder and recovery system.
Harkow, together with Environment Watch Consulting, has recently submitted a proposal to Metro works, for the development of two construction and demolition waste processing facilities. One site would be the present Harkow facility down by the waterfront, and the second proposed site would be at an abandoned gravel pit in Uxbridge which is owned by Harkow. Details on the facilities are sketchy, but each is expected to handle 130,000 tpy and recover approximately 90% of the waste stream. The proponents are eager to discuss their proposal in more detail.

**Miller Paving**

Miller Paving is a large asphalt paving company located in Markham. They are currently using old concrete, bricks, and asphalt for road aggregate and in their hot-mix asphalt production. Miller owns Spademan Disposal and Markham Disposal which operate a small construction and demolition waste transfer facility adjacent to Miller Paving at Woodbine Avenue and Highway 7. At the transfer facility, OCC is separated for recycling while concrete, brick, and asphalt wastes are provided to Miller Paving. Spademan Disposal, as operators of the transfer station, are looking into expanding their facility to be able to handle wood, drywall, metal, and aggregate material.

**Lenco Recycling**

Lenco is a recycling company that currently deals with OCC and office paper, as well as designing waste reduction systems. Lenco has ties with a waste hauler that handles construction and demolition waste, and they are interested in putting together a comprehensive construction and demolition waste recycling proposal, however, no details have been given.

**Thermal Waste Recovery**

TWR is a company in Markham that demonstrates the Swedish technology of the thermal friction press or extruder. The company operates a facility in Scarborough to demonstrate the various applications of the technology. They have used the machine for processing tires, wood, and roofing shingles. The technology is capable of handling construction and demolition waste. Waste would be sorted upon arrival to the facility. Concrete, bricks, and asphalt would be separated and recycled into aggregate by D. Crupi & Sons paving company. The remaining waste stream would be sorted into various components using different methods. A medium-scale facility could handle 30,000 tpy and recover approximately 85% of the waste stream. TWR is available for further discussion, and a tour of the Scarborough facility is possible.
Wood Waste Processing

Markets for wood wastes have been uncertain until recently. The Metropolitan Toronto Recycling Markets Directory provides an updated list of companies that are now working in this area. The specifications and requirements for each company vary, and each firm should be approached separately.

Waste Conversions Inc. (WCI) —

By November 1989, WCI and the Region of Peel plan to open a wood processing facility in Brampton. The facility will handle approximately 40,000 tpy of wood waste from the Region. It will utilize primary and secondary shredders together with magnetic separation to produce wood chips of various sizes. The National Research Council and the University of Toronto have grants to undertake market research and development for the resulting product. WCI has made a proposal to Metro Toronto for two facilities; one at the Keele Valley Landfill and the second at the Bermondsey Transfer Station. They've indicated that they will be proposing a mixed construction and demolition waste processing facility in the near future.

On-Site Wood Chipping —
There has been some discussion of the possibilities of chipping wood wastes and then using the chips as on-site ground cover. Unfortunately, decomposing wood requires large amounts of nitrogen; something found with abundance in grass. If chipped wood was used as ground cover, there is a strong possibility that it would kill the sod laid down over it — on account of the high levels of tannic acids in SPF lumber. Using these chips for surface treatment such as on hiking paths or bike trails is a feasible option.

White Rose Nurseries —

White Rose is currently operating a wood waste composting operation in Pickering. The compost produced is used in their growing operations. They'd be interested in construction lumber off-cuts if they could be delivered in a near sawdust form (1cm x 0.5cm). White Rose has indicated that there is a strong market for wood chips and shavings amongst horse breeders and racetrack operators.

Wood Waster —

Wood Waster is a machine that burns wood, stump, and shrub waste using a pit burning method. As a waste reduction technology, the Wood Waster has some applications. However, if a local facility is available for recycling wood wastes, the Wood Waster is counterproductive.
Drywall Recycling

New Westminster Gypsum —

New Westminster is currently operating a drywall recycling facility in Langley B.C. that accepts drywall waste from the Greater Vancouver Area. New Westminster is in the process of constructing a similar facility in Oakville which will draw from throughout the GTA. The facility is planned to open in January 1990 with a capacity of 35,000 tpy. At this time, the tipping fee at the facility will be $65 per tonne for clean loads of drywall waste. Mixed loads that require sorting and disposal of waste material will cost an additional $10 per tonne (a clean-up fee). Waste drywall will be separated into its gypsum and paper components, and the gypsum will be reused as the basis for drywall, while the low grade paper might be used as chicken-scratch material.

Domtar —

Domtar is in the planning stages of constructing a drywall recycling facility in Caledonia — outside of Hamilton. The facility is planned to open in the spring of 1990 with a capacity to be determined.

Old Corrugated Cardboard (OCC)

OCC is currently banned, or will be banned from all GTA landfills by September 1989. There are numerous waste haulers and paper recyclers that will pick it up. With a number of these companies, the pick-up is still free of charge as long as there is 500 lbs. of flattened (approximately 8ft x 4ft x 5ft), non-contaminated OCC. A majority of the waste haulers now offer OCC pickup as part of their service. Metro’s Recycling Market Directory lists many of the companies that are involved in OCC recovery.

Demolition Reusables

For items such as reusable doors, windows, sinks, bathtubs, refrigerators etc., some of which are banned at landfill (white goods), there are several potential alternatives. The Canadian Red Cross is interested in the possibility of taking certain items and using them for disaster relief as well as other work projects in which they’re involved. The Mennonite Central Committee has expressed interest in using workable appliances and other items to help refugees starting out in the Metro area.
Goodwill Industries —

Goodwill has indicated that they might be willing to open a new suburban store that would accept, refurbish and resell many of the reusable items being stripped out in the demolition phase of renovation. If the Association could guarantee consistent volumes, they would be interested in working on a proposal.
Low-Rise Residential Construction Waste Overview

The amount of waste produced by the low-rise residential construction industry in the GTA is estimated at more than 90,000 tonnes — based on an average of more than 2.5 tonnes per house for the average 35,000 houses built annually in the area. Of this total, roughly 60% by weight, or 54,000 tonnes of it, is currently destined for landfill: this represents approximately 2-3% of the GTA's total landfill input for the year.

Wood
- Dimensional Lumber — 25% of waste volume — average 845 kg/house.
- Man. Wood Products — 10% of waste volume — average 424 kg/house.
- Total Wood — average 1.25 tonnes of waste/house — 43,750 t/industry.

Drywall
- 15% of total waste volume.
- Contractor Estimates — 10-12 sheets wasted/house — 200-300 kg/house.
- Recyclers Estimates — 1lb of waste/sq. ft. of house.
- Our Results — roughly 400kg/house.
- Industry Totals — over 14,000 tonnes.
- Landfill ban imminent.

Masonry and Tile
- 12% of total waste volume.
- average 1 tonne of waste/house — materials usually used as fill on site.
- figures amount to the equivalent of 400 bricks wasted/house.
- Total Masonry and Tile — 35,000 tonnes wasted/industry.

Old Corrugated Cardboard
- 10% of total waste volume.
- average 163 kg wastage/house — 57,050 tonnes/industry
- Partial landfill ban in effect — leading towards complete ban.

Asphalt
- accounts for 6% of total volume wastes.

Metal Wastes
- accounts for 4% of total volume wastes.

Plastic and Foam
- accounts for 4% of total volume wastes.

Fibreglass
- accounts for 5% of total volume wastes.

Other Packaging
- accounts for 4% of total volume wastes.

Other Wastes
- accounts for 5% of total volume.
RECOMMENDATIONS
OVERVIEW

The following recommendations have grown out of THBA's waste management study, *Making a Molehill Out of a Mountain*. They represent what the authors believe are the first steps towards dramatically reducing the amount of renovation and new home construction waste destined for landfill. The measures outlined in this document are designed to educate, motivate and provide a course of action for the Association's members. The recommendations themselves are broken down into seven steps.

1. Present THBA as a proactive organization, taking a leading role in dealing with their own wastes as part of a broader waste management program.


3. Conduct an Awareness Seminar for members:

4. Develop a pilot demonstration project for Association members:

5. Prepare a handbook and video:

6. Identify and Investigate Potential End Markets for Association Wastes.

7. Introduce an ongoing waste management information system for members.
1. "UPGRADE - THBA PROFILE"

The Toronto Home Builders' Association should assume a proactive stance in dealing with waste management and broader environmental concerns.

It is recommended that the Association undertake a campaign to show the public:

- Association member companies are actively attempting to reduce the amount of construction debris destined for existing landfill sites;
- Association member companies are actively engaged in seeking means to reduce their waste stream through waste management strategies premised on reducing waste generation, reusing materials when practical, and recycling construction wastes;
- Association member companies subscribe to a waste management Code of Ethics; and
- Association member companies are working hand in hand with municipal, provincial and federal agencies in an attempt to develop ways of minimizing the environmental impacts of house construction.

The campaign should include, but not be limited to:

- A press conference hosted by the President of the Association in a location suitable for photo opportunities;
- Production of a press kit — including press release and backgrounder;
- Making Association executive members available to local radio and television stations seeking further information;
2. CODE OF PRACTICES

Many organizations and associations are now adopting environmental codes of practices. These formal codes are the starting point in unifying an industry's environmental efforts. It's recommended that THBA adopt a code relating to waste management practices. Such a code would give the Association's members a point of reference from which to coordinate their own activities. It would also demonstrate the membership's commitment to working towards a sustainable future. Increasingly, the general public looks favourably on those organizations that take on these responsibilities proactively. The following code has been developed as a starting point for discussion. Clearly, the Association will require further input and approval from its members.
THE TORONTO HOME BUILDERS' ASSOCIATION AND WASTE MANAGEMENT

Over the past few years, environmental concerns have risen to the forefront of the public's consciousness. We've all started to realize the fragility of our natural ecosystem, and begun to understand that we're all responsible for sustaining it. With this in mind, the Toronto Home Builders' Association would like to reaffirm its commitment to public health and safety, environmentally sound planning, and to conscientious waste management practices. The following code outlines some of the Associations' key commitments to responsible management of the waste situation.

CODE of PRACTICE
This code of practice is based on the three Rs of modern waste management; reduction, reuse and recycling. THBA members endeavour to implement strategies in all three of these areas, in an active effort to dramatically reduce the amount of waste being sent to landfill. These endeavours go beyond simple compliance with the letter and the spirit of the law, and involve taking the initiative to employ advanced waste management techniques.

Reduction
THBA members endeavour to:
• incorporate waste management considerations into the planning of their projects;
• ensure that individuals and contractors in their employ are aware of THBA's commitment to reducing the waste stream;
• investigate building techniques which produce less waste;
• target systemic factors which contribute to the waste problem, for example the overpackaging of construction materials;
• eliminate unnecessary over-purchasing of construction materials; and,
• implement conservation procedures in their offices.

Reuse
THBA members endeavour to:
• investigate and implement methods of reusing waste products being produced;
• separate waste materials on site for reuse purposes;
• strip reusable materials out of buildings before demolition;
• ensure that all waste materials being used as on-site fill, are environmentally benign; and,
• investigate the market for potential uses of waste materials.

Recycling
THBA members endeavour to:
• investigate and implement methods of recycling waste products being produced in construction and demolition, such as wood, drywall, cardboard, etc.;
• separate waste materials on site for recycling purposes;
• encourage use of recyclable materials;
• emphasize recycling schemes in their offices; and,
• work, in cooperation with local officials, to eliminate recyclables from landfill.
4. DEMONSTRATION PROGRAM

It is recommended that the Association conduct a pilot demonstration project for its new home builder and renovator members. The object of the program is to encourage builders and renovators to implement new waste management practices which adhere to the Code of Practices and reduce the waste stream destined for landfill. The project could be conducted as a challenge between participating companies — aimed at determining the company which has implemented the most comprehensive program, resulting in the greatest reduction in the waste stream. The new home builder and renovator who accomplish the most in this direction will be acknowledged by their peers and rewarded by the resultant publicity. A cash prize might be considered as an inducement to the site super or individual within the company responsible for implementing the measures.

The THBA will need to establish the following:

A) RULES

- the contest objective, (reduction of wastes destined for landfill);
- parameters for achieving the goal, (ie. no burning etc.); and,
- contest duration.

B) RESULTS

- a method for adjudication;
- a system for collecting results; and,
- a system for ensuring their validity.

C) AWARDS

- the nature and size of prizes;
- the method of presentation; and,
- a campaign for publicizing winners and the contest itself.
5. INFORMATION PROGRAM

Based on the activities and results of the demonstration program, it is recommended that the Association develop an information transfer program for dealing with construction wastes. The Association could — in conjunction with other funding agencies co-sponsor the production of a handbook and video based on the results of both the demonstration project.

The information program should be designed to meet the information needs of the THBA membership — and by extension of builders across the country. The should be produced in a manner which can be utilized by members wishing to educate their work force or the firms they employ on a contractual basis. By making these materials available across the country, other companies and associations will be able to learn from the example being set.

The information program would also be an effective vehicle for publicizing the Association's efforts beyond the bounds of its membership. Both the Ontario Ministry of the Environment and CMHC have expressed an interest in being involved in this type of project.
6. INVESTIGATE FIRM MARKETS

It is recommended that the Association investigate the feasibility and potential of pooling certain waste products in order to gain greater leverage in terms of recycling and reuse options. These options would pertain to the waste materials produced in large quantities during construction, and also the reusable items obtained during demolition on renovation projects.

The Association should examine:

- the willingness of members to participate in such a program;
- the commitment;
- the availability of the necessary equipment — either from a service company or directly from manufacturers, (bailers, wood chippers, etc.);
- the costs involved in setting up the project — whether through service companies, or through administration and equipment purchases on the part of the Association;
- the availability of alternative funding sources for the project, (MOE has expressed an interest); and,
- potential markets for pooled materials — examples, (wood offcuts to energy producer in New York State, chipboard manufacturers, sawdust manufactures; drywall to Domtar facility in Hamilton).

On behalf of renovators, the association should investigate:

- the availability of segmented bins, either for hire or purchase. (Segmented bins will be necessary for site separation on renovation sites. There is usually only room for one bin, so renovators will require a special system. Another question which will need to be answered is whether these bins can be emptied at a central depot, or will each compartment of the bin have to be emptied at separate facilities.); and,

- the potential markets for reusable items stripped out during the demolition phases of renovation projects. (Organizations which have expressed interest in taking part in this process include Canadian Red Cross, Mennonite Central Committee, and Goodwill Industries.*

* Goodwill has indicated that they might be willing to set up a suburban store that would accept, refurbish, and sell items such as used sinks, bathtubs, doors, windows, stoves, etc. If a certain level of input can be guaranteed, they would be interested in working out a proposal.
7. THE INFORMATION NETWORK

It is recommended that THBA set up a communications system which will be capable of keeping members abreast of the latest developments in the waste management field — a regular newsletter, either separate or included in existing membership communication strategies.

This publication will serve several specific purposes, including:

- keeping the membership informed of the rapidly evolving regulatory climate surrounding waste management and landfill in the GTA;

- allowing builder members to more accurately reflect the cost of waste disposal as a component of project costs;

- informing Association members about innovative techniques and systems being used within the construction industry to reduce the volumes of waste produced on residential construction sites;

It is proposed that the newsletter be mailed out as a supplement to Spotlight — or that it be provided a permanent location within the publication. In developing the content for the publication and/or pages, a network of officials in the waste management field — regulators, consultants, planners and practitioners — will need to be regularly consulted, ensuring that all information is accurate and current.