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Recycling of Waste Paper from Federal and Provincial Buildings in Toronto

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RECYCLING OF WASTE PAPER
FROM
FEDERAL AND PROVINCIAL
BUILDINGS
IN
TORONTO

Report Prepared By:
Reed Ltd.
July 1977

REVIEW NOTICE

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CONTIENT
DES FIBRES
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ET RECYCLÉES

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The cooperation extended by the offices of the Property Management Branch, Ministry of Government Services of Ontario, and Property Administration, Public Works Canada is gratefully acknowledged. Their assistance with the building survey and sampling program was of particular value to the study.

PREFACE

An Interdepartmental Steering Committee of the Federal Government on Wastepaper Recycling was organized under the auspices of Environment Canada in 1974. The Committee was formed to study, as a first priority, alternatives for increasing the quantities of wastepaper recycled from government owned or operated establishments.

To assist in this effort, the Committee in 1974, initiated a study to determine the feasibility of reclaiming marketable wastepaper from the mixed office waste generated by federal buildings in the National Capital area⁽¹⁾. This study program consisted of six related investigations to satisfy three basic information needs:

- Volume and composition of waste and present waste-handling procedures by building;
- Markets for wastepaper from the National Capital Area;
- Approximate costs associated with waste separation.

Subsequent to, and as a result of this study, a "source-separation" pilot project was commissioned to test and record the effectiveness of this strategy in reclaiming marketable wastepaper from

(1) Environment Canada, Recycling of Mixed Office Waste From The National Capital Area, (September 1975).

the mixed office waste stream. The Environment Canada headquarters at Place Vincent Massey, Hull, Quebec was chosen for this purpose.

Guided by the same objectives applied in the study program noted above, the Committee, in October, 1976, initiated a joint study with the Resource Recovery Branch and the Waste Management Advisory Board of the Ministry of the Environment of Ontario, to determine the feasibility of reclaiming marketable wastepaper from government owned or operated establishments in the Toronto area.

This study program consisted of two contracts. The first contract (DSS file number O1SS K E109-6-6080) respecting a study of the recycling of Wastepaper from Federal and Provincial buildings in Toronto was awarded to Reed Ltd., in association with Leonard & Partners Limited in November 1976.

The second contract (DSS file number O1SS K E109-6-6085) respecting a sample analysis of the mixed office wastepaper was awarded to Consolidated Fibres Ltd.; Mill Paper Fibres Limited, and the Research & Development Department of Reed Ltd.

This report, prepared for the Intergovernmental Committee, sets out the consultants' findings and recommendations.

PREFACE

Sous les auspices d'Environnement Canada, on a créé en 1974 un comité interministériel fédéral chargé d'étudier en tout premier lieu les moyens d'accentuer le recyclage des papiers de rebut des établissements appartenant à ou exploités par l'administration publique.

A cette fin, le comité a entrepris en 1974 une étude en six points sur la possibilité de récupérer les vieux papiers que contiennent les rebuts des immeubles fédéraux de la Région de la capitale nationale ⁽¹⁾. On y recherchait trois types de renseignements:

- Le volume, la composition et les méthodes actuelles de manutention des rebuts de chaque immeuble;
- Les marchés pour les papiers de rebut de la Région de la capitale nationale;
- Les coûts approximatifs de séparation des rebuts.

Suite à cette étude, un projet pilote de séparation des rebuts à la source a été mis sur pied afin d'éprouver et d'enregistrer l'efficacité de cette méthode de récupération des vieux papiers. L'administration centrale d'Environnement Canada, à l'immeuble Vincent Massey, à Hull a été choisie à cette fin.

(1) Environnement Canada, Recycling of Mixed Office Waste From The National Capital Area, (September 1975).

Animé par les mêmes objectifs que lors de l'étude mentionnée précédemment, le comité a entrepris en octobre, en collaboration avec la Direction de la récupération des ressources et le Waste Management Advisory Board du ministère ontarien de l'Environnement, une étude sur la possibilité de récupérer les vieux papiers dans les établissements appartenant à ou exploités par l'administration publique dans la région de Toronto.

Deux contrats ont été passés à cette fin: le premier (dossier du M.A.P. n^o 01SS K E109-6-6080) avec la firme Reed Ltd en association avec la firme Leonard & Partners Limited en novembre 1976 pour étudier le recyclage des vieux papiers provenant des édifices fédéraux et provinciaux de Toronto; l'autre (dossier du M.A.P. n^o 01SS K E1109-6-6085) avec la Consolidated Fibres Ltd., la Mill Paper Fibres Limited et le département de recherche et de développement de la Reed Ltd. pour analyser des échantillons de vieux papiers de bureaux non triés.

Ce rapport, préparé pour le comité interministériel, présente les résultats obtenus par les experts-conseils et leurs recommandations.

RECYCLING OF WASTEPAPER FROM FEDERAL AND PROVINCIAL
BUILDINGS IN TORONTO

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1.0 STUDY SUMMARY

1.1 Objective of the Study

The main objective of this study was to determine the feasibility of increasing the recycling of wastepaper generated from federal and provincial buildings in Toronto.

To achieve this objective, the following work tasks were initiated:

1. Each building was surveyed to collect information on estimated current mixed office waste generation, waste collection and disposal methods employed, activity profile, and a description of any wastepaper recovery program in progress.
2. The office wastes were sampled to determine the composition of the mixed office waste generated.
3. The markets for mixed office wastepaper and high grades were analyzed.
4. Guided by our findings in the previous work tasks, a recovery system that would be practical to implement was recommended.

1.2 Results of Building Survey

The building survey estimated that approximately 18.8 tons per day of office waste is generated by 24 government buildings housing 23,435 people.

The average daily generation per employee was found to range from 1.01 lbs. per day for warehouse complex and office to 1.55 lbs. per day for postal stations.

In general office wastes are collected and disposed of in four ways:

1. Records are retained on file and destroyed at a later date;
2. Confidential information, not retained as records, is source separated and destroyed;
3. High grade wastepapers are source separated and sold to dealers in a few isolated cases; and,
4. The remaining office wastes are discarded into wastebaskets for disposal via the existing solid waste collection and disposal system.

To increase the recovery of office wastepapers, the building survey identified three key problems that must be resolved. First, the high levels of contaminants and out-throws must be separated from the useable grades. Second, each building viewed individually (with the exception of Queens Park Complex) does not provide adequate quantity to justify individual pick-up. Third, in most cases buildings do not have adequate storage space to accumulate large amounts of wastepaper, and hence, require daily pick-up.

1.3 Results of Sampling Analysis

The following table summarizes the results of the sample analysis.

Building Sampled	Waste Generation Tons/Week	Prohibitive Materials (A) %	Out-throw Papers (B) %	Special Consider Paper (C) %
<u>Provincial</u>				
Queen's Park Complex	21.3	24	16	60
George Drew	3.4	28	13	59
M.O.H. (15 Overlea)	4.4	29	15	56
M.O.H. (7 Overlea)	2.8	35	17	48
MOE (St.Clair)	1.9	37	22	41
Sub-total	33.8	27	16	57
<u>Federal</u>				
DSS (Ferrand)	0.9	30	11	59
AES (Dufferin)	3.1	18	29	53
Dominion Public	4.4	28	21	51
A. Meighen	5.0	35	18	47
Gateway MPP	8.1	44	10	46
Lakeview Complex	0.3	48	9	43
City Delivery	25.0	41	21	38
Food & Drugs	0.2	44	17	39
W. Mullock	0.4	52	12	36
Mackenzie	4.4	53	13	34
Weston P.O.	0.3	80	15	5
Sub-total	52.1	40	18	42
TOTAL	85.9	35	17	48

The table shows that the buildings sampled generate approximately 85.9 tons per week or 4,465 tons per year of office waste. Of this total, 35% are contaminants, 17% are out-throw papers and 48% are special consideration papers.

1.4 Markets for Mixed Office Wastepaper

There are no markets for contaminated office waste. Moreover, markets for clean unsorted office wastepaper are minimal and its low market value does not justify the costs associated with recovery.

There is a demand for corrugated containers in the Toronto area. However, apart from the Postal Stations, very little corrugated is being generated from other locations.

Demand presently exists for special consideration papers or high grades. This demand is expected to increase in the short term, with the possible expansion of user mills in both Ontario and Quebec. The existing market for sorted office waste grades is approximately 75,000 tons per year.

The potential market for sorted office waste grades could be as high as 194,000 tons per year in the very near future.

If office waste is sorted into different paper grades, the following prices could be expected based on current market conditions:

Grades	Current Market Price FOB Dealer (\$/Ton)	Price to Generator FOB Generator (\$/TON)
Colour Tab Cards	150	100
White Tab Cards	190	140
Computer Printouts	160	110
Colour Ledger	90	40
White Ledger	125	75

Note: Difference between market value and price to generator reflects collection, final sorting, baling, and marketing costs, as well as an element of profit to the dealer.

1.5 Recommendations

The following guidelines were adopted to design a practical recovery program:

- To achieve optimum results the federal and provincial buildings should be integrated into a common recovery program.
- Mixed office waste should be separated into high grade papers at source.
- A "milk-run" pick-up strategy should be adopted to make the recovery program viable.

- Two part-time coordinators should be appointed to administer the recovery program to overcome the jurisdictional problems pertaining to the involvements of two levels of government and, at the same time, to administer the program and provide feedback to the participants.

In keeping with these guidelines, we have divided the buildings into three categories: Buildings for Special Consideration, Buildings recommended for Source Separation, and Buildings considered unviable.

Buildings for Special Consideration

The following recommendations apply to Buildings for Special Consideration which are defined as buildings that have a concentrated source of recoverable paper.

1. Print Shops & Computer Centres

Paper generated in the form of tab cards, computer printouts and trimmings in the case of print shops, should be collected in 500 lb. lots and sold to dealers. If the material is confidential the dealer should guarantee destruction through shredding.

2. Record Centres & One Time Discards

When records are released for destruction, the Record Centre staff should separate the paper by grade where possible. When 500 lb. lots are accumulated a dealer should be called for pick-up. If the material is confidential the dealer should guarantee destruction through shredding. Similar procedures should be adopted for "spot" discards in other locations.

3. Post Office MMP Centres

These centres generate a considerable amount of corrugated boxes and undelivered 3rd class mail. Since accurate quantities were not available, we recommend that further investigation be initiated to determine these quantities. If sufficient quantities are generated, we recommend that a floor-mounted up-stroke baler be installed and truck-load quantities be accumulated for sale to a dealer.

If undelivered mail requires destruction, we recommend that this material be containerized and shipped loose to dealers for shredding and baling.

The proposed recovery program for Buildings for Special Consideration could result with revenue and savings of approximately \$12,560 per year.

Buildings Recommended for Source Separation

Buildings in this category are defined as having sufficient mixed office wastepaper to warrant implementation of a source separation program.

To ensure that adequate quantities of sorted paper are accumulated, twelve buildings have been recommended for source separation.

The Waste Management Advisory Board has requested that the building in which its office is located, although not sampled, also be included in this proposed program.

We recommend that special desk top trays be supplied to generators. Once full, these trays will be emptied by the generator into special receptacles located strategically on each floor.

The cleaning staff will be instructed to transfer the contents into carts located in the refuse storage area.

To service the removal of the separated paper, a "milk-run" pick-up concept linking the twelve buildings is recommended. Dealers will remove the carts as required and replace them with empties.

The recommended source separation recovery program could result in a recovery of 3.7 tons/day or 957 tons per year of essentially coloured ledger grades, assuming a participation rate of 60%.

We estimate that this could result with revenue and savings of approximately \$36,020 per year.

2.0 INTRODUCTION

2.1 Wastepaper Recycling in Perspective

In its varied forms, wastepaper is the largest single component of municipal waste. Although it is well recognized that the composition of the solid waste varies from day to day and between communities, the paper content is commonly estimated to be in the range of 30 to 50% by weight.

The lack of data does not allow for an accurate measure of the wastepaper that can potentially be recovered in Canada, let alone by grade distinctions. The amount of potentially recoverable wastepaper for reuse is dependent on the volume of paper products consumed and discarded in Canada. Table 1.1 details some relevant statistics for the Canadian Pulp and Paper Industry in 1974-1975.

Since 1975 was a depressed year, average statistics for 1974-75 may be more informative than those for the individual years.

Total production of paper and paper board averaged 12,885,000 tons/year. However Canada is a net exporter of 8,526,000 tons (66%) leaving domestic consumption of 4,359,000 tons (34%).

During the same two years, average consumption of secondary fibre was 783,000 tons (exclusive of internally generated broke). This indicates a "usage rate" of 6.1% (usage divided by total paper and board production).

TABLE 1.1

CANADIAN PAPER & PAPERBOARD
PRODUCTION/CONSUMPTION, 1974 & 1975

<u>PRODUCTION</u>	<u>1974</u>	<u>1975</u>
Newsprint	9,602,000	7,683,000
Other Paper	2,392,000	1,700,000
Paperboard	<u>2,577,000</u>	<u>1,817,000</u>
Total Production:	<u>14,571,000</u>	<u>11,200,000</u>
 <u>EXPORTS</u>		
Newsprint Exports	8,713,000	6,998,000
Paper & Board Exports	1,439,000	945,000
Paper & Board (Imports)	<u>(473,700)</u>	<u>(569,100)</u>
Net Exports	<u>9,678,300</u>	<u>7,373,900</u>
 NET DOMESTIC CONSUMPTION	 <u>4,892,700</u>	 <u>3,826,100</u>
 SECONDARY FIBRE CONSUMPTION (1)		
Domestic	754,000	563,000
Imports	<u>153,600</u>	<u>95,500</u>
Total	<u>907,600</u>	<u>658,500</u>
 USAGE RATE	 6.23%	 5.88%
 RECOVERY RATE	 <u>15.41%</u>	 <u>14.71%</u>

Source: CPPA

Note: (1) For detailed breakdown refer to Table 5.2

Of the 783,000 tons of secondary fibre used, 658,500 ton/year were recovered in Canada, the balance being imported. This indicates a "recovery rate" of 15.1% (domestic recovery divided by domestic consumption of paper and board).

Densely populated European countries that are short of virgin fibre have achieved recovery rates in the 30% range. If this level could be achieved in Canada, 650,000 tons would be added to the domestic secondary fibre supply.

Viewed in this context, it appears that the reclamation of wastepaper as a source of raw materials for the pulp and paper industry constitutes a small portion of the wastepaper potentially available from the solid waste stream. However, increasing the recycling rate is not a simple process. Several interrelated factors serve to restrict the recycling of wastepaper at the present time. For example, with respect to supply:

1. The high level of contaminants and outthrows severely restricts the use of recoverable mixed wastepaper.
2. There are a limited number of mills that can use clean mixed waste paper. To increase its use, the clean mixed waste paper has to be sorted into different grades. At this time, mechanical separation is not available and hand sorting into different grades is uneconomical at the dealer processing facilities.

3. The absence of a comprehensive at-source separation and recovery program in both the public and private sectors limits the supply of high grade wastepaper;
4. The existing solid waste collection and disposal systems are designed to conveniently and efficiently discard wastepaper rather than to recover it separately, and;
5. The underlying problem is one of attitudes. It is difficult to transform the message of conservation into a well conceived course(s) of action, particularly to a society nourished on the principle of abundance.

With respect to demand:

1. The pulp and paper industry that exists today has facilities designed to, and situated in areas, that favour the use of virgin fibres, as their raw material input.
2. North American product specifications have historically been considerably higher than those in Europe and Japan, where fibre supply is tighter. This has precluded Canadian use of technology which is already making acceptable products from secondary fibre in other countries.
3. The pulp and paper industry is concerned with the reliability of supply of waste paper, particularly when evaluating mill expansions.

2.2 Rationale for Wastepaper Reclamation & Recycling

It is apparent from the previous discussion that increased paper recycling is dependent on achievements in two areas.

First, efforts must continue to expand the consumption of wastepaper by the pulp and paper industry and new product applications for reclaimed paper. The pulp and paper industry in Canada is investigating the possibility of using a larger amount of reclaimed wastepaper, and hence, is seriously committed to substituting wastepaper for virgin fibre wherever practical and economical.

Second, efforts must continue to devise a systematic and coordinated program of wastepaper recovery. Toward this end, the intensity of effort will be guided by the significance attached to the following rationale:

1. The growing remoteness of timber stands and the concomitant increase in costs provides an opportunity for using a greater percentage of reclaimed paper.
2. Society cannot continue to squander its natural resources. Solid waste represents an untapped source of raw material.
3. To cultivate a new morality based on conservation, reclamation, and recycling.

The realization of increased wastepaper recycling will require sustained and concerted action, not only by industry, but by government authorities committed to this objective.

This report will deal with one small area of solid waste generation, more specifically, waste generated by government owned or operated buildings in the Toronto area.

While there are isolated examples of wastepaper recovery operations in some government offices, there are, at present, no comprehensive recovery programs involving all departments in the public sector.

2.3 Objectives of Study

In accordance with the terms of reference, the main objective of this study is to increase the recycling of wastepaper from Federal and Provincial buildings in Toronto. More specifically, to:

1. establish the location-specific quantities and qualities of office waste now emanating from federal and provincial establishments
2. determine which types of wastepaper from the source buildings can be sold to private paper stock dealers and brokers, and at what prices; specific consideration should be given to fluctuations in demand and price

3. identify procedures that might be implemented immediately at various locations to increase wastepaper recovery
4. determine alternate methods for collecting and transporting wastepaper from source buildings;
5. identify alternate methods for "at-source separation" of wastepaper at source buildings and identify associated costs, e.g., designs in new buildings.

The formal terms of reference are attached as an appendix to this report (Refer to Appendix "G").

2.4 Work Program

The task areas were divided into three work components: the building survey; the sampling survey; and a review and analysis of wastepaper recovery systems.

Building Survey

The building survey was initiated on December 6, 1976. In total, twenty-four buildings pre-selected by the Committee were surveyed by the study team. (Refer to Appendix "A").

The content of this work component included pre-arranged visits to each building to collect information on estimated current mixed office waste generation, waste collection and disposal methods employed, activity profile, and a description of any wastepaper recovery programs in progress.

Interviews were conducted with Property Managers, Building Superintendents, cleaning staffs, and in some cases, disposal contractors at each of the buildings surveyed.

Sampling Survey

The sampling survey was initiated on the 17th of January, 1977. In total, seventeen buildings were selected for sampling of mixed office waste. Four postal buildings were excluded to avoid duplicity of effort, and permission was not given to sample waste from the RCMP building on Jarvis Street (Refer to Appendix "B").

The content of this work component was to randomly select a pre-determined quantity of mixed office waste samples from each location. The origin and the number of bags sampled were duly recorded. Each location was sampled once a week for four consecutive weeks. The variability of the mixed office waste generated by days of the week was taken into account by sampling each set of buildings on different days for each week. To illustrate, a set of buildings sampled on Monday of the first week was sampled on Tuesday of the second week, and so forth. Daily samples collected were stored and at the end of the week were delivered to respective firms for analysis.

The purpose of this work component was to determine the composition of the mixed office waste generated from each location. This information served to assess the value of, and the potential markets for, mixed office waste generated from the government buildings sampled in Toronto.

Review & Analysis of Wastepaper Recovery System

This work component synthesized key findings from the previous work components and devised a recovery system reflecting both the economic and market realities that deem such a system practical to implement.

3.0 RESULTS OF BUILDING SURVEY

3.1 Mixed Office Waste Generation

Statistics on mixed office waste generation are not presently gathered by government buildings in a systematic manner. The data presented in Table C-1, Appendix C is based on interviews with building superintendents, members of the cleaning staff, and property managers of Public Works Canada and the Ministry of Government Services.

The building survey estimates that approximately 18 tons per day of mixed office waste is generated from 24 government buildings housing 23,435 people.

In addition, the survey identified approximately 1,225 lbs. per working day of special consideration papers, i.e., tab cards, computer printouts, and ledger grades. This equates to approximately 150 tons per year based on 250 working days. In our attempt to identify the quantity of corrugated containers being generated, the survey showed that some containers were reused internally, some were sold, and others were discarded. Reliable generation estimates were not available.

Table 3.1 which follows, groups the buildings surveyed into four general categories to determine if a consistent pattern of office waste generation per capita can be derived along similar activity profiles. The results show variations in daily per capita generation even within categories.

TABLE 3.1

BUILDING SURVEY PROGRAM
ESTIMATED WASTE GENERATION (1)

<u>BUILDINGS</u>	<u>PER CAPITA</u> <u>(lbs.per day)</u>
I. <u>Postal Stations:</u>	
MPP Progress Avenue	1.23
MPP South Central	1.61
MPP Gateway	1.30
City Delivery/Terminal "A"	1.78
Weston Post Office	.67
Rexdale Post Office	1.25 - 1.67
Downsview Post Office	2.78
Average Daily Generation Per Capita	<u>1.55</u>
II. <u>Laboratory Complex & Office</u>	
Health Protection Branch	.38 - .50
A.E.S.	1.64
Average Daily Generation Per Capita	<u>1.04</u>
III. <u>Warehouse Complex & Office</u>	
Falaise Armoury	1.43
Lakeview Complex	.51 - .64
Average Daily Generation Per Capita	<u>1.01</u>
IV. <u>General Office Complex:</u>	
D.S.S.	1.75
M.O.H. (7 Overlea)	1.31
M.O.H. (15 Overlea)	2.42
M.O.E.	1.88
Sir William Mulock	.50 - .64
R.C.M.P.	.53
Mackenzie	.99
Dominion Public	2.50
A. Meighan	1.43
G. Drew	1.15
Queens Park Complex	1.78 - 2.00
Average Daily Generation Per Capita	<u>1.49</u>
AVERAGE DAILY GENERATION PER CAPITA, ALL BUILDINGS	<u><u>1.42</u></u>

(1) Mixed, special consideration papers.
 Corrugated are excluded. Record Centres
 and Archives excluded.

From this exercise, Postal Stations generate a daily average of 1.55 lbs. of office waste per capita. The bulk of this waste consists of undelivered mail (primarily 3rd class). Moreover, high levels of prohibitive materials were observed in waste containers. The low per capita generation at the Weston Postal Station reflects the phasing out of its administration and mail sorting activities. These activities have been transferred to the recently established Gateway mail processing plant. Both Rexdale and Downsview are expected to follow suit during 1977.

Laboratory Complexes and Offices generate a daily average of 1.04 lbs. per capita of office waste. Laboratory waste are normally treated separately from the normal office stream, and are not included in the above.

Warehouse Complexes and Offices generate a daily average of 1.0 lbs. per capita of office waste. Since a large proportion of the complex is used for storage, the bulk of this waste is not expected to be in the form of office wastepaper.

General Office Complexes, primarily engaged in administration and clerical activities generate a daily average of 1.49 lbs. per capita of office waste. In numerous instances, food or cafeteria wastes were bagged and disposed of in separate metal containers. Therefore, we anticipate a high proportion of the office waste to consist of office wastepaper.

The wide variation in daily per capita generation of office wastes within the general categories should cause one to exercise care in pro-rating the waste flow on this basis alone without due regard for the activity profile within each building.

3.2 Office Waste Collection and Disposal Methods

In general, office papers are collected and disposed of in four ways :

- 1) Records are retained and filed at the source buildings or transferred to central record buildings, i.e., Federal Archives and Provincial Record Centre.
- 2) Confidential information, not requiring retention as records, is source separated by the generators for final destruction, e.g., classified materials and "dead" mail.
- 3) High grade wastepapers are recovered in a few instances, e.g., the Ministry of Health, and the Department of National Revenue.
- 4) The remaining mixed papers are discarded into wastebaskets for disposal via the existing solid waste collection and disposal system.

With respect to records, this material technically remains the property of the generator until approval is given for its ultimate destruction. The accepted procedure for destruction is through either shredding or incineration. At the present time, records are taken to an incinerator by a bonded disposal contractor. In all cases, it is the responsibility of the generator to approve and supervise the destruction of these records.

With respect to classified information, this material is separated at source and destroyed via incineration or shredding. The R.C.M.P. building destroys its own classified records on site. All other buildings hire a bonded disposal contractor to transfer the material to a municipal incinerator. In a few isolated cases, low capacity shredders are available, but the effort and time required to shred rather than incinerate has resulted in favouring the latter method of destruction.

With respect to the recovery of wastepaper, the generators are responsible for separating the high grade papers at source and selling the reclaimed material to a dealer. Specific recovery operations currently underway are discussed in the following section.

With respect to mixed office wastepapers, this material is currently discarded via the existing solid waste collection and disposal system. A typical procedure in this system involves the collection of mixed office waste from individual wastebaskets into a plastic bag which is transported to a special refuse area for storage to await regular pick-up and disposal by a refuse disposal contractor. The majority of this waste is disposed of at a landfill site.

3.3 Recovery Operations in Progress

We found three instances where high grade papers are being recovered :

- 1) The paper recycling program sponsored by the Ministry of Health is presently in operation at the two M.O.H. buildings on Overlea Boulevard and on a smaller scale at the Hepburn Block. This program, which started in 1974 as a pilot project, is the only example of a comprehensive recovery program administered on a sustained basis. High grades, such as tab cards, computer printouts and ledgers, and corrugated boxes are recovered and sold to dealers. In calendar year 1975, this program recovered 66 tons of useable paper and generated a revenue of \$6,146.35.

This program is administered by a part time coordinator with the assistance of supervisors designated for each section. It is the responsibility of the supervisors to ensure that the acceptable grades are source separated and collected into corrugated boxes. The recovered paper is stored on site to await by-monthly pick-up by a dealer. Payment for the paper is made to the Treasury rather than to the Ministry of Health.

In recent months, manpower constraints and difficulties in securing full support from both management and employees are contributing to the deterioration of this program.

- 2) The Federal Department of National Revenue located in the Mackenzie building currently recovers blank taxation forms for resale to dealers. In this case, surplus taxation forms are source separated and stored in boxes in the sub-basement storage area.

When a truckload lot is amassed, the Department of National Revenue informs Crown Disposal Corporation which is responsible for transacting the sale of the recovered paper to a dealer. Payments are made to the Receiver General for Canada to Crown Assets Disposal Corporation rather than to the Department recovering this paper, i.e., National Revenue. The quantity of paper recovered annually was not made available to the study team.

- 3) A recovery operation was initiated on July 26, 1976 by the Resource Recovery Branch and the Waste Management Advisory Board of Environment Ontario. The purpose of this on-going program is to determine the production and recovery of fine papers from these sources. This is considered a pilot project designed to desk sort only the white ledger grades from the office waste. Each staff member received a desk top tray into which he placed the white ledgers of source separated papers. The production of the sorted papers was collected and weighed at the end of each day by a designated coordinator. Records for the last six months for the offices of the Resource Recovery Branch and for the last twelve months for the offices of the Waste Advisory Board were maintained to monitor the per capita production of white ledger grades on a daily basis.

The key results of this controlled recovery experiment are as follows:

Resource Recovery Branch (July 1976 to December 1976)

- Average Per Capita Recovery: 0.11 lbs./day
- Estimated Waste Reduction : 24 - 34 percent

Waste Management Advisory Board (July 1976 to June 1977)

- Average Per Capita Recovery: 0.257 lbs./day
- Estimated Waste Reduction : 29 percent

3.4 Salient Comments

The combined volume of mixed office wastepaper generated by the government buildings surveyed provide a potentially untapped source of secondary fibre. However, this mixed wastepaper is too contaminated to make it acceptable for recycling in its unsorted state. The only method of increasing the recycling of this office wastepaper is to sort the useable paper at source. Moreover, each building viewed individually (apart from Queens Park Complex) does not provide adequate quantity to justify individual pick-up. If these buildings implement a source separation program the recovery of the sorted papers could be made viable by adopting a combined pick-up strategy.

The collection and disposal procedures in each location are designed to discard the office wastepaper as conveniently and efficiently as possible, at minimum cost to the generator, via the existing solid waste collection system. The responsibility for the collection and disposal of the office wastepaper rests with the Ministry of Government Services and Public Works Canada who negotiates and administers the general cleaning and disposal contracts on behalf of the respective tenants. Under this system, there is no consideration for the overall sorting and recovery of office wastepaper generated from government buildings.

As previously noted, the recovery operations in progress are sponsored by the respective Ministries generating the office wastepaper. Given that the office waste is technically the property of the Ministries until final destruction or discard, any sorting of the mixed office paper into recyclable grades must remain the responsibility of the respective Ministries. Therefore, a comprehensive recovery program must involve the coordination of the Ministries, and the building managers, i.e., the Ministry of Government Services and Public Works, Canada, for the collection and transporting of the recovered paper as part of their general cleaning and disposal contracts.

This brings one to the method of transacting the sales of recovered paper to dealers. The procedure to date is that the income generated from a recovery program accrues to the Provincial Treasury and to the Receiver General for Canada to Crown Assets Disposal Corporation, irrespective of the Ministry having to sustain the costs associated with implementing and coordinating the recovery program. In this regard, there is little incentive for the respective Ministries to undertake such a program.

In general, we found that the Ministries were aware of, and interested in, recovering office wastepaper for recycling. However, apart from those currently recovering paper, the majority had little knowledge of the procedures and costs involved in initiating a recovery program.

With respect to the majority of buildings, storage space could pose a problem unless a systematic collection and pick-up concept is adopted for the reclamation of office wastepaper.

4.0 SUMMARY OF THE SAMPLING ANALYSIS

4.1 Quantity and Composition of Mixed Office Waste

A summary of the sampling analysis is presented in this section. The detailed results are referenced in Appendix "D".

Table 4.1 shows the composition of mixed office waste by category for each of the buildings sampled.

Table 4.2 shows the average composition of mixed office waste by category for four broad building groups. Buildings included in the General Office Complex grouping produce 56.9% of the mixed office waste generated by all buildings sampled. This grouping also produced 30.2% of special consideration papers.

Table 4.3 provides estimates of office waste generation per week for each of the buildings sampled. This table indicates that the buildings sampled generate 85.9 tons/week of out-throw papers and 41.0 tons per week of special consideration papers.

Table 4.4 presents the average composition of mixed paper by category. Newspaper (13.57%) makes up the majority of the out-throw papers. Reproduction and computer printout without carbon represents 23.76% of the total office waste and 48.9% of the special consideration papers.

TABLE 4.1
COMPOSITION OF MIXED OFFICE WASTE

Building Name	Prohibitive Materials (A) %	Out-Throw Papers (B) %	Special Consideration (C) %
<u>Provincial</u>			
Queens Park Complex	0.242	0.163	0.595
George Drew	0.283	0.131	0.586
MOH (15 Overlea)	0.294	0.148	0.558
MOH (7 Overlea)	0.357	0.169	0.474
MOE (St. Clair)	0.373	0.218	0.409
<u>Federal</u>			
DSS (Ferrand)	0.304	0.111	0.585
AES (Dufferin	0.179	0.291	0.530
Dominion Public	0.280	0.207	0.513
A. Meighen	0.356	0.180	0.464
Gateway MPP	0.441	0.097	0.462
Lakeview Complex	0.479	0.066	0.455
City Delivery	0.412	0.208	0.380
Food & Drugs	0.477	0.160	0.363
W. Mullock	0.524	0.126	0.350
Mackenzie	0.527	0.136	0.337
Weston P.O.	0.794	0.151	0.055

Source: Statistical Analysis by the Department of
Fisheries & Environment, Appendix D, Table D.5

TABLE 4.2

AVERAGE COMPOSITION OF MIXED OFFICE
WASTE BY BUILDING TYPE

<u>Building Types</u>	<u>Prohibitive Materials (A) %</u>	<u>Out-throw Papers (B) %</u>	<u>Special Consideration Papers (C) %</u>	<u>Total %</u>
General Office Complex	17.4	9.3	30.2	56.9
Warehouse/Office	0.2	0.1	0.1	0.4
Laboratory/Office	0.8	1.1	2.0	3.9
Postal Stations	16.4	7.0	15.4	38.8
	<u>34.8</u>	<u>17.5</u>	<u>47.7</u>	<u>100.0</u>

TABLE 4.3
OFFICE WASTE GENERATION AND COMPOSITION
BREAKDOWN

Building Name	Office Waste Generation Tons/Week	Prohibitive Materials Tons/Week	Out-Throw Papers Tons/Week	Special Consideration Papers Tons/Week
<u>Provincial</u>				
Queens Park Complex	21.3	5.1	3.5	12.7
George Drew	3.4	1.0	0.5	1.9
MOH (15 Overlea)	4.4	1.3	0.7	2.4
MOH (7 Overlea)	2.8	1.0	0.5	1.3
MOE (St. Clair)	1.9	0.7	0.4	0.8
Sub-total	33.8	9.1	5.6	19.1
<u>Federal</u>				
DSS (Ferrand)	0.9	0.3	0.1	0.5
AES (Dufferin)	3.1	0.6	0.9	1.6
Dominion Public	4.4	1.2	0.9	2.3
A. Meighen	5.0	1.8	0.9	2.3
Gateway MPP	8.1	3.6	0.8	3.7
Lakeview Complex	0.3	0.1	0.0	0.2
City Delivery	25.0	10.3	5.2	9.5
Food & Drugs	0.2	0.1	0.0	0.1
W. Mullock	0.4	0.2	0.1	0.1
Mackenzie	4.4	2.3	0.6	1.5
Weston P.O.	0.3	0.2	0.0	0.0
Sub-total	52.1	20.7	9.5	21.8
TOTAL	85.9	29.8	15.1	41.0

OVERALL FINE SORTED PROPORTIONS

Prohibitive Materials (A)	0.3052
Out-throw Papers - (B)	
1. Magazines and hard cover books	0.0201
2. Newspapers	0.1357
3. Candy and gum wrappers	0.0000
4. Paper towels and facial tissues	0.0264
5. Paper cups and plates	0.0019
6. Fiberboard	0.0201
7. Corrugated Medium	0.0035
8. Red-brown covers and folders	0.0010
SUB-TOTAL	0.2087
Special Consideration Papers - (C)	
9. Reproduction paper (Xerox, IBM, Dennison 3M, etc.)	0.1213
10. Writing paper, scratch paper	0.0925
11. Padded sheets (individual) sheets - excluding backing or adhesive)	0.0356
12. Envelopes	0.0538
13. Manilla folders	0.0095
14. Binder dividers	0.0001
15. NCR papers	0.0000
16. Computer tab cards - white	0.0034
17. Computer tab cards - coloured	0.0056
18. Computer printout without carbon	0.1163
19. Computer printout with carbon	0.0188
20. Drawings	0.0000
21. Mapping paper (wet-strength material)	0.0008
22. No.1 hard white shavings	0.0001
23. No.1 soft white shavings	0.0010
24. Index cards (3" x 5", 4" x 6")	0.0059
25. Cancelled money orders and cheques	0.0214
SUB-TOTAL	0.4861
TOTAL	1.0000

Source: Statistical Analysis by the Department of Fisheries & Environment, Appendix D, Table D.4.

These ratios indicate that source separation of high grade papers can generate a significant quantity of recyclable papers.

4.2 Mill Comments

The following highlights the key findings of the three firms who analyzed the office waste samples.

Mill Paper Fibres Limited

- "Generally speaking, each building had paper which could be recycled by a board, fine paper, or roofing mill. Unfortunately, this paper was mixed in with many contaminants such as food, bottles, metal, plastic and washroom waste".
- "Only when an effort is made to separate the paper at the source, e.g., wastepaper baskets, computer room, etc., can there be any hope of bringing the paper into the main stream".
- "If we had to separate the paper as we received it in our trial, there would be no way that it would be worth our time and expense".
- "Since we saw in many bags sufficient weight of computer printout paper and tab cards, this is the obvious place to start separating the paper".

Consolidated Fibres of Ontario Ltd.

- "Our findings in the sorting of the wastepaper from the government buildings have been that in its present state and with the present method of handling, it is too costly to properly process this paper into grades that would be acceptable to mills in their paper-making programmes".

- "We have established that there is good fibre that is worth recovering but this can only be brought about by "separation at source". What we refer to is that the high grades should be kept separately from the low grades and contaminants and, with proper instruction and supervision, a programme could be instituted that would bring this about".

Reed Ltd.

"The quality of any mixed waste paper is mainly determined by the following points:

- A. Contamination by "pernicious" contraries, e.g. plastics, adhesives, carbon paper, etc.

The data collected throughout the survey indicate that there is a significant potential to upgrade the quality of mixed office waste, if precautions were taken to exclude the prohibitives. As is, a portion of this material could be processed only into low grade building or construction products such as, for instance, roofing felts. A reduction in

prohibitives to less than 2% and in total outthrows to 10% would put this waste paper in the category of no. 2 mixed paper. In that case the papers could be processed into paperboard filler.

B. Groundwood Content

As evident from fibre analysis results, the paper waste contains a high proportion of chemical fibre. If newspapers and magazine type of papers were separated from the main paper streams, the mechanical fibre would be practically eliminated. Thus, a substantial portion of waste paper would be used as a deinking grade and/or in some particular cases as a pulp substitute while newspaper material would find an established market.

C. Brightness of Repulped Stock

In general the brightness of a mixture of waste papers depends on many factors such as the amount of ink, colors, bleached fibres, dirt, etc. Nevertheless it is particularly affected by the unbleached kraft fibres as their brightness is below 30% while the brightness of semi- and fully-bleached fibres is greater than 55 - 60%. The unbleached kraft papers can be easily identified and eliminated from the paper stream. The coloured grades may not be objectionable providing the waste paper would be used as a deinking grade. "

5.0 MARKETS AND SUPPLY OF RECLAIMED PAPER FROM THE MIXED OFFICE WASTE

5.1 Historical Consumption - Canada

Secondary fibre consumption by the pulp and paper industry in Canada is presented in Table E-1, in Appendix "E". These statistics relate to wastepaper consumed by the pulp and paper industry, and hence, exclude other uses, e.g. insulation and energy generation.

The consumption of office waste grades is not isolated in these statistics due to a revised reporting format since 1974 which aggregates these grades into the "Brown Kraft" and "Soft White and Ledger" categories. For example, tab cards are reported as "Brown Kraft". This category also includes the Brown Kraft Mill and converter wastes. During the the 1971-1973 period, when grade details were available, tab cards averaged 35% of the Brown Kraft category. It is likely that the consumption of unbleached mill and converter waste is concentrated in Linerboard, while the use of tab cards is primarily in Boxboard and Tissue. Furthermore, White Ledger and Coloured Ledger are now reported in the "Soft White and Ledger" category, which also includes printer and envelope wastes. Use of this grade is in the Boxboard and Tissue industries in addition to one large Fine Paper Mill with deinking capability. In the 1971-1973 period, White Ledger averaged 14% of the total and Coloured Ledger averaged 53%.

Therefore, applying the 1971-1973 average content of tab cards and white and coloured ledger grades to their respective Brown Kraft and Soft White and Ledger categories, the 1975 and 1976 estimates of total Canadian office grade consumption are presented in Table 5.1.

TABLE 5.1
ESTIMATED CANADIAN CONSUMPTION
OF OFFICE GRADES
(QUANTITY IN TONS)

Office / Years Grades/	1971	1972	1973	1974	1975	1976
Tab Cards	14,271	19,862	16,915	N/A	11,300	21,30
White Ledger	8,245	6,437	7,103	N/A	6,266	8,14
Coloured Ledger	23,580	20,980	38,510	N/A	23,719	30,84
Total Office Grades	46,096	47,279	62,528	N/A	41,285	60,31

Source: CPPA, See Table E-1

Note: 1971-1973 Actual Statistics
1974 Not Available
1975-1976 Estimates

5.2 Consumption of Secondary Fibre by End Products

Boxboard

The boxboard industry is currently the most important consumer of secondary fibre. The industry consumes approximately 430,000 tons per year of secondary fibre, primarily concentrated in the low grades (corrugated, news, boxboard and No. 1 mixed paper which represents approximately 6% of the total low grades).

High grade consumption is generally limited to 15% of total furnish, i.e., the top of seven plies in a sheet. However, because of total volume, boxboard production provides a large market for "office grades".

Linerboard

The volume of secondary fibre for linerboard production is approximately 180,000 tons per year. Grades consumed are old and new corrugated, and unbleached kraft pulp substitutes. Use of office waste grades is minimal, and only in conjunction with bleached kraft substitutes in making specialty liners.

While the economics have traditionally favoured virgin mills, in recent years consumption of secondary fibre has been on the increase. This increasing trend is a result of both incremental usage, and expansions and new mills coming on stream.

Corrugating Medium

Secondary fibre based corrugating medium is technically equivalent to semi-chemical, and is cost competitive. Secondary fibre usage will increase with the advent of new mill capacity. Consumption, however, is basically limited to old and new corrugated, with no potential for office grades. Total secondary fibre consumption is currently about 90,000 tons per year.

Newsprint

Technically, production of newsprint from secondary fibre is comparable to virgin, but recycling is not yet well established. In Canada, a major deterrent could be recoverability and stability of supply of furnish, (over-issue and old news). Secondary fibre consumption is less than 10,000 tons per year.

Tissue

This product while low in total production, has a high secondary fibre utilization rate which would include sorted office grades. Its prime requirements in order of priority are bleached kraft, brown kraft, soft white and ledger grades, unprinted news and new corrugated cuttings. Short supply of these grades is a limiting factor on increased utilization. Current secondary fibre consumption is approximately 45,000 tons per year.

Printing and Writing

While secondary fibre is low as a percentage of total furnish, it is concentrated in the soft white and ledger grades. While technical problems exist related to quality variations, the main limitation is the supply shortage in these grades. Current consumption is approximately 55,000 tons per year.

Roofing Felt and Building Products

Consumption of secondary fibre is spread over the low cost bulk grades, with virtually no potential for office wastes. Current reported consumption

is approximately 55,000 tons per year. However, this industry may be a larger user of secondary fibre than indicated by published statistics, as certain mills do not report.

Other End-Uses

Recently a new market has been developed for using old newspapers to produce an insulation medium. Also investigations are proceeding to evaluate the potential of using old newspapers for animal bedding. Due to its recent development reliable consumption figures are not available at this time.

5.3 Specific Potential Markets

As previously noted, the major market potential for separated office waste papers lies in mills producing Boxboard, Tissue and Fine Papers. Of immediate interest would be mills located in the Province of Ontario due to the low-cost freight-haul from a Toronto source. However, since these grades command a high value, it would be reasonable to extend the market radius to include similar mills in the Province of Quebec.

Table 5.2 shows production capacity for Ontario and Quebec mills which could be potential users of source separated office waste paper.

Based on Canadian Pulp & Paper Association statistics, the consumption of brown kraft and soft white and ledger grades for these Ontario mills is estimated to be 28,000 tons in 1975 and 35,000 tons in 1976.

TABLE 5.2
 SPECIFIC OFFICE WASTE PAPER GRADE USERS
 ONTARIO & QUEBEC

<u>Mill</u>	<u>Approximate Production Capacity</u>	
	<u>Ontario (tons/year)</u>	<u>Quebec (tons/year)</u>
<u>Boxboard</u>		
Continental Can (Toronto) ⁽¹⁾	105,000	
Strathcona (Strathcona)	44,000	
Trent Valley (Glen Miller) ⁽²⁾	33,000	
Sonoco (Brantford)	47,000	
Consolidated Bathurst (Grand Mere)		35,000
Domtar (East Angus)		50,000
E.B. Eddy (Ottawa)	56,000	
Reed (Quebec City)		<u>35,000</u>
	<u>285,000</u>	120,000
<u>Tissue</u>		
Kimberley Clark (St. Catherines)	31,000	
Kimberley Clark (Huntsville)	35,000	
E.B. Eddy (Hull)		61,250
Perkins (Candiac)		15,750
Scott (Crabtree)		59,500
Lennox (Lennoxville)		<u>21,000</u>
	<u>66,000</u>	157,500
<u>Fine Paper</u>		
Abitibi (Thorold) ⁽³⁾	90,000	
Domtar (St. Catherines)	49,000	
Domtar (Cornwall)	210,000	
Domtar (Don Valley)	11,000	
E.B. Eddy (Hull)		73,500
Domtar (Beauharnois)		<u>14,900</u>
	<u>360,000</u>	88,400

Notes:

1. Mill in startup, and not yet at planned capacity
2. Capacity expected to expand to 68,000 T/Y by January 1978
3. Deinking capability is approximately 1/3 of total production.

Source: Lockwood's Directory of the Paper & Allied Trades, 1977

The corresponding estimated consumption for the Quebec mills identified is 24,000 tons in 1975 and 40,000 tons in 1976. The combined consumption of the two grade groups for Ontario and Quebec mills was approximately 52,000 tons in 1975 and 75,000 tons in 1976.

Under the present marketing system, it would appear that the supply of the two grade groups, i.e., Brown Kraft and Soft White and Ledger, is the limiting factor in increased usage. This is supported by Table 5.3 on the following page, which lists the various waste paper grades, and their domestic or imported content. This table shows that the low-value bulk grades (news, boxboard and mixed), are supplied from domestic sources. On the other hand, high grades such as brown and bleached kraft and unprinted news, rely very heavily on imports. The rationale for this is that mills and converters (the main sources of high grades), are already recovering virtually all of their wastes. Post-consumer sources, on the other hand, are generally uneconomical, and even at high prices, are slow to respond to demand. The result is price volatility, and a heavy reliance on imports in times of shortages.

Of significance to this report would be the following summary. (Table 5.4)

TABLE 5.3

SECONDARY FIBRE SOURCES (TONS)

	1975		1976	
	DOMESTIC	IMPORT	DOMESTIC	IMPORT
'Old Corrugated	220,836 (86%)	36,827 (14%)	255,830 (72%)	97,664 (28%)
New Corrugated	95,099 (90%)	10,526 (10%)	115,276 (84%)	21,867 (16%)
Old News	54,239 (96%)	2,279 (4%)	69,522 (96%)	2,982 (4%)
Unprinted News	7,298 (62%)	4,441 (38%)	9,012 (50%)	9,065 (50%)
Boxboard	55,434 (96%)	2,390 (4%)	61,684 (95%)	3,234 (5%)
Mixed	47,515 (96%)	655 (1%)	46,090 (98%)	1,021 (2%)
Brown Kraft	19,558 (60%)	12,999 (40%)	22,160 (34%)	42,330 (66%)
Bleached Kraft	22,338 (58%)	16,472 (42%)	20,443 (42%)	28,724 (58%)
Soft White & Ledger	37,163 (81%)	8,770 (19%)	46,650 (77%)	14,318 (23%)
Other	9,448 (98%)	163 (2%)	8,727 (98%)	219 (2%)
TOTAL	568,928 (86%)	95,522 (14%)	656,182 (75%)	221,424 (25%)

Source: CPPA

TABLE 5.4

MIXED AND OFFICE WASTEPAPER GRADES
DOMESTIC AND IMPORT CONTENT

<u>GRADES</u>	1975		1976	
	<u>Domestic</u>	<u>Import</u>	<u>Domestic</u>	<u>Import</u>
Mixed	99%	1%	98%	2%
Brown Kraft	60%	40%	34%	66%
Soft White & Ledger	81%	19%	77%	23%

Source: Table 5.3

This clearly shows that low-value bulk grades are in ample supply from domestic sources while the sorted office waste paper grades are in short domestic supply. This shortage becomes particularly acute when increased requirements must continue to be satisfied by imports.

At the existing rate, this condition is likely to worsen with the realization of additional mill capacity in the Provinces of Ontario and Quebec. To date, the following five mills could potentially increase the demand for "office paper grades" of secondary fibre.

- Scott (Crabtree) - Equipment on order which would enable the use of 40,000 tons per year of Soft White and Ledger grades. Start-up planned 1978.
- Perkins (Candiac) - Studying second tissue machine which would add 13,000 tons of secondary fibre consumption capacity, mainly Soft White and Ledger.

- Lennox (Lennox-ville) - New deinking tissue mill still in start up phase, but has potential of using 21,000 tons per year of secondary fibre, mainly Soft White and Ledger.
- Trent Valley (Glen Miller) - Expansion of Boxboard mill from 35,000 tons per year to 68,000 tons per year capacity. Potential use of Soft White and Ledger and Brown Kraft will depend on new grade mix.
- E.B. Eddy (Hull) - Expansion of Tissue mill, and rumored addition of deinking capability. Anticipate 12,000 tons per year of Soft White and Ledger potential.

Thus, the potential market for sorted office wastepaper grades, i.e., Brown Kraft and Soft White and Ledger, recovered in the Toronto area would be as follows:

POTENTIAL MARKET FOR SORTED OFFICE WASTEPAPER GRADES				
		(TONS PER YEAR)		Future (1) Potential Market
		<u>1975</u>	<u>1976</u>	<u> </u>
Ontario Mills	-	28,000	- 35,000	68,000
Quebec Mills	-	24,000	- 40,000	126,000
TOTAL		<hr style="border-top: 1px solid black;"/>		<hr style="border-top: 1px solid black;"/>
		52,000	- 75,000	194,000
		<hr style="border-top: 1px solid black;"/>		<hr style="border-top: 1px solid black;"/>

Note: (1) Arrived at by adding the expected additional mill capacity to the 1976 consumption figures.

5.4 Paper Stock Dealers

The Toronto market is served by 10 - 15 dealers, depending upon market conditions. However, the list of dealers with facilities to handle pickup and processing of office waste is dominated by three companies who have controlling interests in several dealers.

1. Consolidated Fibres Ltd. (2 plants)

This company controls two formerly independent operations - Canadian Paper Fibres Co., and Buscombe and Dodds Ltd.

2. D. Benedetto Inc. (2 plants)

This company controls Mill Paper Fibres, Toronto Paper Fibres, Canadian Wastepaper and Levis Paper Fibres. Main responsibility is the supply of Continental Can's paperboard mill.

3. Reed Ltd. (2 plants)

Reed has its own plant in Toronto, (the former Krever Paper Stock Co.), as well as a 50% interest in Textile and Paper Waste Sales Ltd. Bulk grades, mainly container, are provided to Reed's containerboard mills, while other grades are processed for external markets.

These dealers, (and their total of six plants), have the capability to collect, sort, bale, store and market all grades, including the grades generated in Toronto office waste. Table E-2 in Appendix "E" lists other dealers servicing the Toronto market.

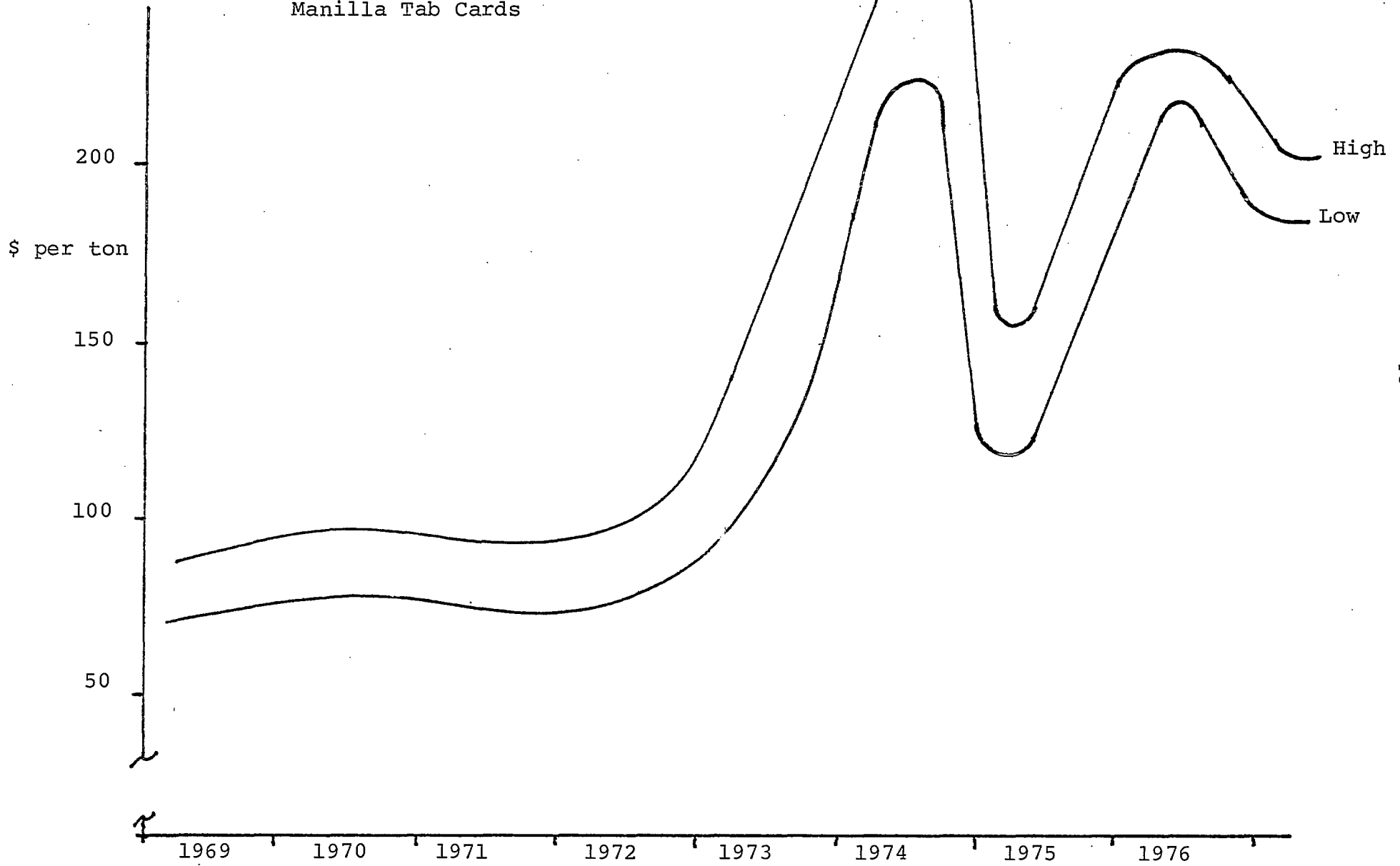
5.5 Pricing

Secondary fibre prices have in recent years been quite volatile. This is borne out by Figures 5.1 and 5.2 on the following pages, which show published market prices of Tab Cards and White Ledger over the past seven years.

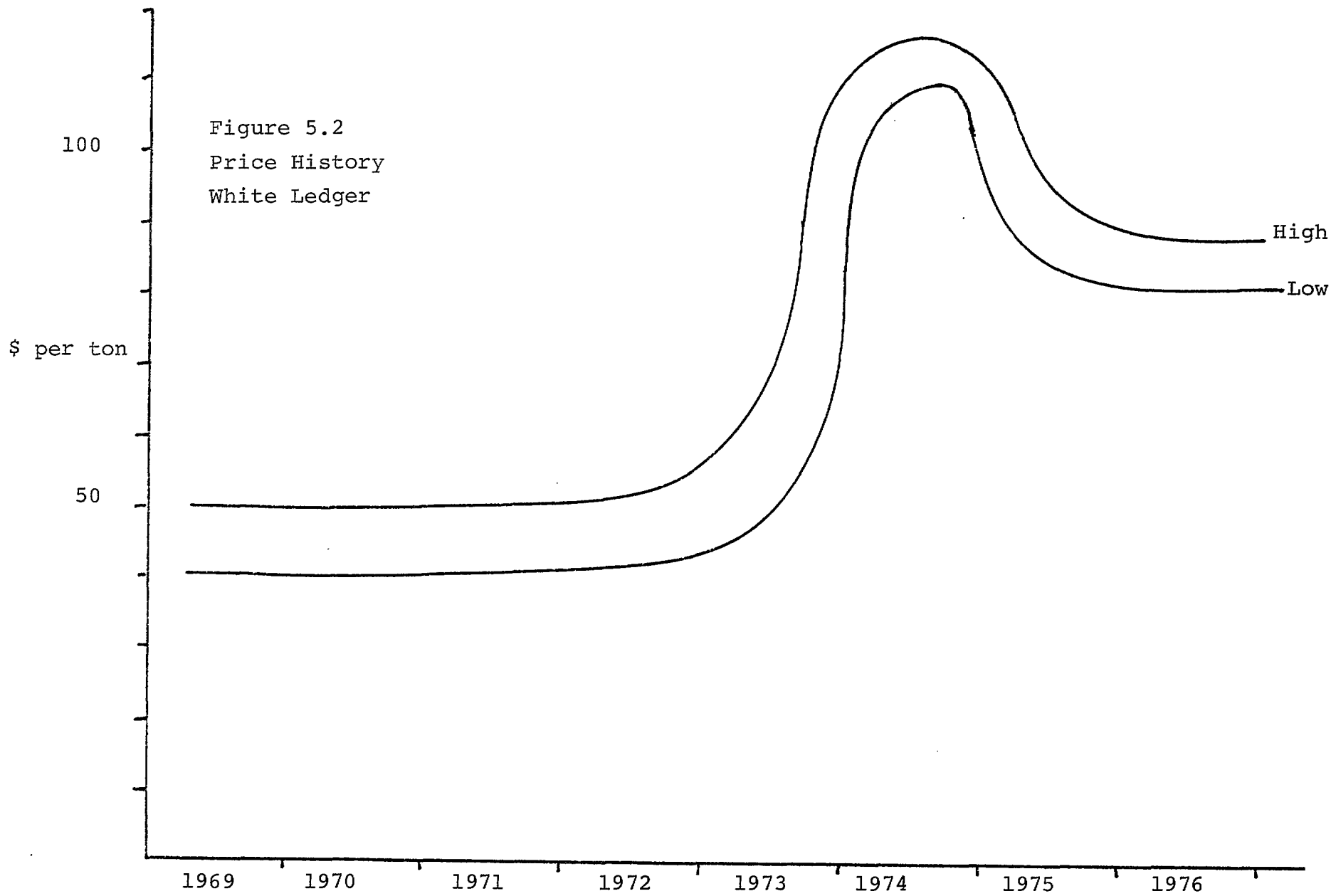
The graphs clearly highlight the dislocation of 1973 - 1974, and the subsequent correction. They also show a "mini-dislocation" for Tab Cards in mid-1976.

However, aside from these exceptions, which coincided with a Pulp and Paper Industry boom, and economic volatility in many areas, prices have been remarkably stable.

FIGURE 5.1
Pricing History
Manilla Tab Cards



Source: Refer to Appendix E, Table E-3



Source: Refer to Appendix E, Table E-3

It would appear that prices of the two grades have now stabilized at approximately twice their pre-1973 levels.

However, should all or even a major part of the potential capacity expansion be realized, a severe strain would be placed on the domestic sources' ability to supply. If this indeed occurs, it would result in local price increases, as well as applying pressure on northern U.S. prices due to the increased demand for imports.

5.6 Marketing - Conclusions

The sampling program estimated that the building surveyed will generate about 4,500 tons per year of mixed office waste. However, this volume includes high levels of groundwood (newspaper), magazines, rubber and carbon paper, styrofoam cups and food wastes. As generated, it is felt that this material is unmarketable because of contaminant and outthrow levels, and costs of transportation, handling, sorting, baling and waste disposal. Outthrows cause secondary fibre products to be severely downgraded because of strength and appearance problems in a mill's end product. Contaminants not only cause these problems, but also can cause manufacturing problems such as clogging pipes, breaking machine wires, and sticking to driers. For these reasons, contaminated grades are simply unacceptable to paper mills.

Even if unsorted office wastepaper were contaminant free, it would probably qualify only as "mixed paper". The ultimate market price of this grade presently at \$15 to \$20 per ton, is insufficient to cover

normal pickup, handling and baling costs which is estimated to be \$40 to \$50 per ton. A practical solution to this problem is the removal of contaminants and grade sorting at source for offices which generate large volumes of mixed waste, as well as special consideration papers such as Tab Cards and Computer Printout paper.

Sorted office wastepaper could be picked up loose in cartons or boxes in truckload lots for final sorting, baling and storage at a waste paper plant.

A "milk run" collection concept as recommended in the following chapter would provide an economic and efficient collection system.

Revenue to the generator would be a function of market value of the sorted office wastepaper in mill acceptable form, less cost of pickup, final sorting, baling, handling and marketing, as well as an element of profit. These costs and profit elements typically total approximately \$50 per ton for this type of operation. Thus, such a pickup program would have to concentrate on the high grade products which would command a high enough selling price to justify the costs.

If this material were sorted by grade the following prices could be expected based on current markets:

<u>Grade</u>	<u>Market Value (FOB Dealer)</u>	<u>Price to Generator (FOB Generator)</u>
Coloured Tab Cards	\$150	\$100
White Tab Cards	\$190	\$140
Computer Printout	\$160	\$110
Coloured Ledger	\$ 90	\$ 40
White Ledger	\$125	\$ 75

The only significant potential for low grades such as old corrugated boxes, clean mixed paper, and newsprint, would be in buildings that have sufficient volume to justify sorting and baling on site.

6.0 RECOMMENDED PAPER RECOVERY PROGRAM

6.1 Setting for Paper Recovery Program

To develop a strategy for recovering papers from federal and provincial government buildings in Toronto, we have been guided by the following objectives:

- To increase the recovery of marketable office wastepaper.
- To provide an attractive package in terms of revenue generation, reduced disposal cost and minimum capital requirements.
- To develop a practical system of recovery with a high probability of success.

However, in order to realize these objectives, five key problems identified during the course of the study, had to be addressed.

First, while the combined volume of wastepaper generated from all government buildings surveyed in Metro Toronto provide an attractive source for secondary fibre, each building viewed individually, (with the exception of the Queens Park Complex) does not provide adequate quantity to justify individual pick-up.

Second, the office waste is mixed with high levels of contaminant. In its present form, this wastepaper has no value. Thus brokers and dealers will not be motivated to handle this wastepaper "as is",

since the demand for bulk mixed grades will not cover the cost associated with processing. Brokers will deal only in high grade papers such as tab cards, computer paper, white and coloured ledger grades, preferably in truck load lots as these grades can be sold at a price which would cover the cost of pick-up, final sorting, baling, and shipping as well as provide for an element of profit to a dealer.

Third, storage space for recovered office waste-paper is limited since the buildings have been designed for daily pick-up of the refuse from designated areas.

Fourth, under the present structure, no one body is responsible for a recovery operation. The jurisdictional responsibilities are divided amongst a number of Ministries. To illustrate, MGS or Public Works Canada are responsible for administering the general cleaning and disposal contract, Crown Assets Disposal or the Provincial Treasury have jurisdiction over the revenues accruing from a recovery program.

Fifth, the present recovery programs are not well supported.

In view of the problems noted above, the following guidelines were adopted to design a practical recovery program:

1. To achieve optimum results the federal and provincial buildings should be integrated into a common recovery program.

2. Mixed office waste should be separated into high grade papers, e.g., white and colour ledger grades, tab cards, etc. Table 6.1 lists the acceptable and non-acceptable papers.
3. A combined pickup strategy (milk run) should be adopted so that trucks can pick up paper from a number of locations to provide truck load lots. Daily pickup schedules should be devised to overcome the lack of storage space.
4. Recognizing that the recovery program will differ from floor to floor and building to building, a comprehensive promotional program will be required to increase generator interest and participation.
5. Recognizing the jurisdictional problems that may arise between two levels of government, i.e., Provincial and Federal, two part-time coordinators should be appointed to administer the common recovery program suggested herein. Jointly, they would be responsible for implementing, coordinating, monitoring and providing feedback to the participants to maintain a high level of interest.

6.2 Suggested Recovery Programs

Table F-1, in Appendix "F" groups the buildings surveyed into three categories. Buildings for special consideration, buildings recommended for source separation and buildings considered unviable.

TABLE 6.1

ACCEPTABLE AND NON ACCEPTABLE PAPERS

A. Acceptable as White or Coloured Ledger Grade
(In general non ground wood containing papers)

Reproduction (Dry copier)
Writing Paper
Note Paper
Scratch Paper - (non groundwood)
Padded Sheets (without backing)
Envelopes (white)
Manilla Folders
Binder Dividers
Computer Tab Cards
Index Cards
Computer Printout (W/O Carbon)

B. Non-Acceptable

Scratch Paper (groundwood)	Carbon Paper
Magazines	Wax Paper
Newspapers	Metal
Candy and Gum Wrappers	Food
Paper Towels	Glass
Cups and Plates	Foil
Books in General	Plastic
Facial Tissue	Adhesives
Cardboard	Textiles
Diazos	Elastic Bands

Buildings for special consideration is defined as having a concentrated source of recoverable paper that can be treated separately.

Buildings recommended for source separation is defined as having sufficient mixed office waste paper to warrant implementation of a source separation program.

Buildings considered unviable is defined as having too little office waste paper to make a recovery program economical.

Buildings for Special Consideration

1. Print Shops and Computer Centers

Trimnings from print shops, computer printout and tab cards from computer centers should be collected in bins for sale to dealers on a call basis. Facilities such as the computer areas in the Queens Park Complex and the M.O.H. buildings are already recovering paper but others such as the A.E.S. print shop which throws out its trimnings could be included in a recovery program. Where practical, carts of approximately 4 ft. x 7 ft. x 4 ft. should be provided for the on-site storage and pick-up.

2. Records Center

The record center disposes an average of about 4 tons of records per week. Some source separation into tab cards, computer printout and white ledger is possible here. The main obstacle to paper recovery at this location

is that the files are the responsibility of individual Ministries and approval must be obtained from the respective Ministry.

Moreover, files must be destroyed by shredding or incineration. Presently, files are taken to an incinerator for disposal. Previous attempts to recover paper at this location have failed. Two reasons were cited for this failure. First, high grade papers were not separated from the mixed waste to justify the costs associated with a recovery program; and second, there was inadequate shredding capacity. To implement a recovery program from this location, we suggest that the records become the property of the Records Center after the Ministries responsible approve its disposal. The high grades can then be separated into bins and delivered to a dealer for destruction under the supervision of a Record Center employee.

3. Post Office MPP Centers

These locations reportedly generate a considerable volume of corrugated boxes and undelivered mail (mostly 3rd Class). However, in both cases, the exact quantity is not known. At present, corrugated boxes are disposed of in compactors or loose in metal refuse containers. Undelivered mail is picked up daily by a bonded carrier and incinerated under supervision.

With respect to corrugated boxes, if sufficient quantity is generated we recommend that a floor mounted up-stroke baler be installed on the site and truck load quantities be accumulated for sale.

With respect to undelivered mail it is not clear whether this material has to be destroyed. If the material does not have to be destroyed, we recommend that an investigation be undertaken to evaluate baling of this material for sale. (The same baler recommended for corrugated boxes could be used). On the other hand, if third class mail has to be destroyed, we recommend that an investigation be undertaken to evaluate the viability of delivering this material loose to a dealer for destruction and baling.

4. One Time Discards

From time to time papers are discarded on a spot basis as opposed to on a regular basis. For example, during the course of our building survey, we found several such cases: The Post Office store destroyed 1 - 1½ tons of manilla tab cards due to a change in coding format; the Department of Supply and Service destroys an estimated 2 tons of computer printouts each month.

We recommend that in cases where the quantity of discards exceed 500 lbs. this material be sold to a dealer.

Estimates of marketable paper recoverable from these special consideration buildings are not available since records are not maintained on a systematic basis. However, assuming a conservative estimate of 4 tons per week, the revenue/cost profile on a first approximation basis for paper recovered from Buildings for Special Consideration could be as follows:

Estimate of Revenue from Sales

4 tons/week x 52 weeks x \$50/ton ⁽¹⁾	=	\$10,400
Net Disposal Cost Savings ⁽²⁾		
4 tons/week x 52 weeks x \$20/ton	=	<u>\$ 4,160</u>
Total Annual Revenue & Savings	=	<u>\$14,560</u>
Estimate of Operating Costs: ⁽³⁾		Ø
Salary of Coordinators (Part-time)		<u>\$ 2,000</u>

Notes:

(1) Recoverable paper may include tab cards, computer printouts, white ledger, coloured ledger, baled mixed paper and baled corrugated. The quantity and composition specifics are not available. Thus, we have assumed an average price of \$50.00 per ton as reasonable to quantify the potential.

(2) Refers to pick-up, landfill, etc. Estimated at \$20.00 per ton, this assumes that a disposal credit can be reflected in the disposal contract.

(3) Manual sorting by existing personnel. Therefore, no extra cost. This assumes that no additional time and cost from the existing staff would be required other than the part-time coordinators who will be responsible for implementing and maintaining the program.

Buildings Recommended for Source Separation

To ensure that sufficient quantities of sorted paper are accumulated, twelve buildings have been recommended for separation at source.

Table 6.2 lists the buildings recommended for source separation. The total mixed office waste generation and the special consideration paper generation in tons/week are indicated. These figures are derived from tables D-1 and D-5 in Appendix "D". The table shows that buildings recommended for source separation would generate approximately 31 tons/week of special consideration papers.

Based on a 60% participation rate (efficiency recovery rate) the estimated special consideration paper that could be recovered is as follows:

	Recovery Rates		
	<u>Tons/Day</u>	<u>Tons/Week</u>	<u>Tons/Year</u>
Provincial Buildings	2.8	13.8	718.0
Federal Buildings	0.9	4.6	239.2
TOTAL	<u>3.7</u>	<u>18.4</u>	<u>957.2</u>

The 957 tons per year volume provides sufficient quantity to support a viable recovery program.

TABLE 6.2
 BUILDINGS RECOMMENDED FOR SOURCE SEPARATION
 OFFICE WASTE GENERATION & SPECIAL CONSIDERATION
 CONTENT

Buildings	Waste Generation Tons/Week	Special Consideration Paper Tons/Week
<u>Provincial</u>		
Queens Park Complex	21.3	12.7
Whitney Block	3.8	2.2
Drew	3.4	2.0
M.O.E.	1.9	0.8
North Frost	1.7	1.0
South Frost	1.0	0.6
M.O.H. (7 Overlea)	2.8	1.3
M.O.H. (15 Overlea)	4.4	2.4
Sub-total	40.3	23.0
<u>Federal</u>		
Meighen	5.0	2.3
Mackenzie	4.4	1.5
Dominion Public	4.4	2.2
South Central MPP	3.7	1.7
Sub-total	17.5	7.7
TOTAL	57.8	30.7

Note:

The Waste Management Advisory Board has requested that the building in which its office is located, although not sampled, also be included in this proposed program.

The source separation program should be implemented on a building to building basis over a three to six month period starting with the Queens Park Complex. As previously noted, it is vital that the proposed recovery program be properly organized, implemented and monitored.

Nature of Recovery Program

Due to the variation in activity and wastepaper generation, each floor of a building will have to be evaluated separately to design an optimum system. A typical floor system could consist of special bags attachable to frames and located strategically on each floor. Individual trays for desk top separation would be furnished to one or several generators depending on the floor plan. The onus is on the generators to transfer the content of their trays into the special bags on a daily basis. In general, the system should strive to be as simple as possible.

The cleaning staff would be instructed to transfer the contents of the special bags from each floor to the designated shipping area where coded carts (4' x 4' x 7') will be furnished to dispose of the paper content. To expedite this process, the cleaners would require dual sets of the special bags, i.e. when one bag is taken off the frame for disposal an empty bag would be attached in its place. Trips to the shipping area will be carried out in conjunction with the disposal of the remaining office waste. Therefore special trips are not required to service the recovery program.

The above proposed program is recommended for the recovery of non-confidential office wastepaper.

For the recovery of confidential office wastepaper we recommend that it be accumulated in bag or box lots. When sufficient quantity is accumulated, it can be sold directly to a dealer for guaranteed destruction through fine shredding.

A "milk-run" pickup schedule is recommended, to provide daily pickup and minimize the number of carts required. The milk-run route is listed on Table 6.3. Figure 6.1 illustrates this route.

The pickup schedule thus depicted requires the carts to be placed in the shipping area. As noted in Table F-2, the number of carts would vary from one to a maximum of nine for the Queens Park Complex. The carts would be filled at night and picked up the following day. To minimize space problems, the first pickup would be made at the Queens Park Complex. The truck would pick up the full carts and leave the empty ones behind. As a number of buildings are not equipped with a loading dock a truck equipped with a hydraulic tailgate would be required. If space is a major problem, collapsible carts or bags may be a possible solution.

The dealers picking up these carts would record both date of pickup and location. These carts will be weighed at the plant and a record of the wastepaper (in quantity and origin) will be maintained to properly credit the two levels of government. These records would also assist the coordinators to maintain quality control.

TABLE 6.3

"MILK-RUN" BUILDING PICK-UP
SCHEDULE

1. Queens Park Complex and Whitney Block.
This group would require two truck trips to pick up the paper waste each day.
2. Drew, Meighen, MOE, North and South Frost.
This group would require 1 truck load to pick up daily.
3. Mackenzie, Dominion Public, South Central P.O.
Pick up once daily 1 truck load.
4. M.O.H. Building 7 - 12 Overlea
Pick up twice weekly one truck load.

Note: Truck load and number of carts were calculated on the basis that a truck could hold 6 carts of 4'x4'x7' dimension and each cart would hold an average of 500 lbs. of paper.

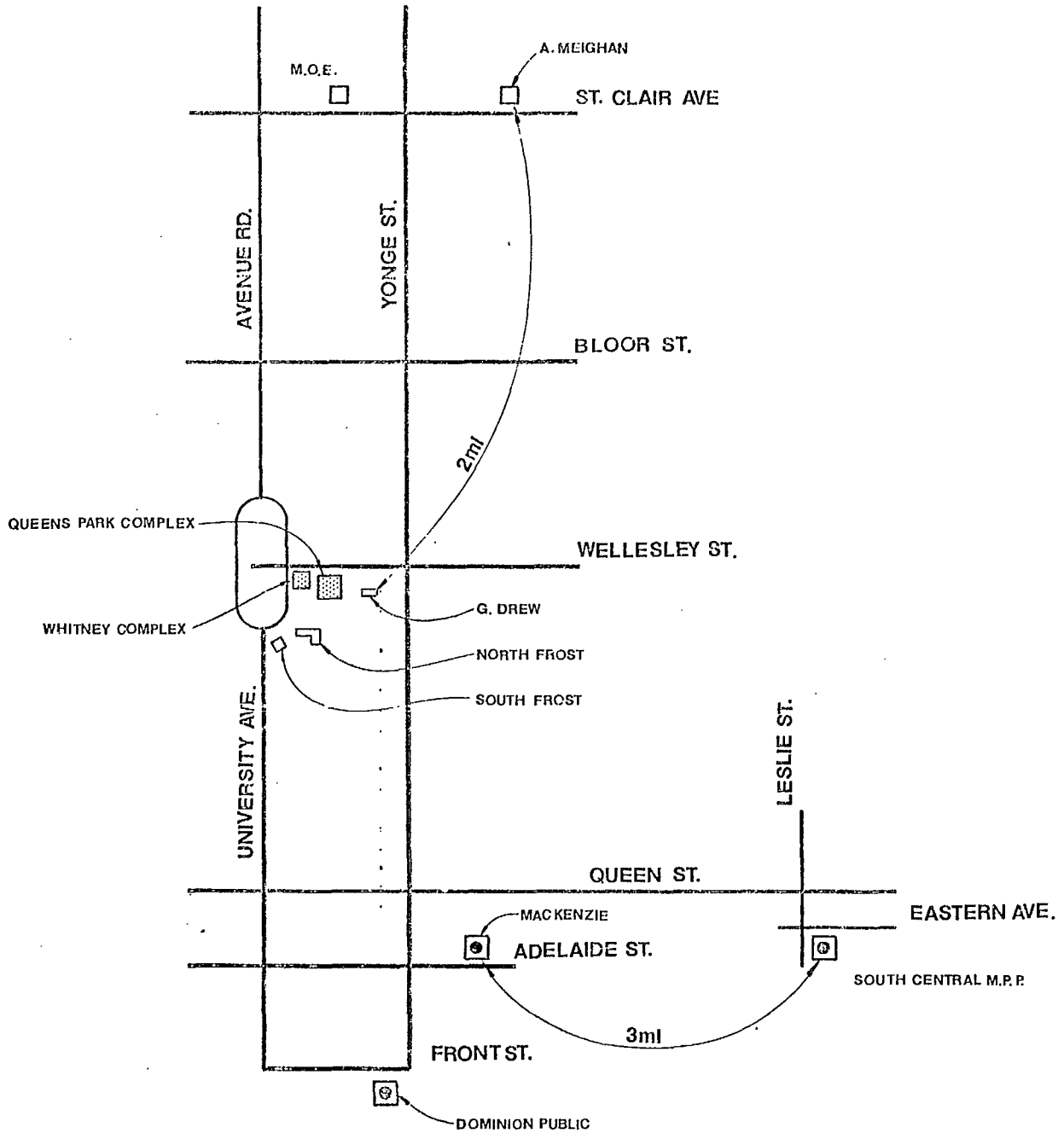





FIGURE 6.1

PROPOSED ROUTES DOWNTOWN

-  GROUP A - QUEENS PARK COMPLEX WHITNEY COMPLEX
-  GROUP B - NORTH FROST, SOUTH FROST, G. DREW, A. MEIGHAN, M.O.E. 135 ST. CLAIR AVE.
-  GROUP C - DOMINION PUBLIC, MACKENZIE, SOUTH CENTRAL M.P.P.

In order to realize a sustained effort, the program must be supported by management, employee and cleaning staff alike. Less than full cooperation will not suffice. The program must also include a comprehensive and purposive educational and promotional strategy. Among others, the former would essentially include a strategy of informing the participants with respect to the program, i.e., its objectives, its operational features, the wastepaper grades to be sorted, its usage, benefits, etc. The latter would essentially include the strategy of generating and maintaining interest in the program. For example, apart from visual appeals advertising the program, regular feedback on the outcome of the program, inter-departmental or inter-ministry rivalry, etc., could be a worthwhile tactic to sustain interest and hence cooperation.

As noted earlier, the quantity of marketable paper recoverable from the buildings designated for source separation is estimated at 3.7 tons per day or 957 tons per annum. Based on this recovery rate, the revenue/cost profile for the proposed program, on a first approximation basis, could be as follows:

Estimate of Revenue from Sales:	
957 tons x \$40 per ton ⁽¹⁾	\$38,280
Net disposal cost savings ⁽²⁾	
957 tons x \$20 per ton	\$19,140
	<hr/>
Total Annual Revenue & Savings	<u>\$57,420</u>
Implementation Costs: ⁽³⁾	
50 Carts supplied by dealer	\$ 0
750 Receptacles @\$20 each	\$15,000
1,500 Canvas Bags @\$6 each	\$ 9,000
5,000 Desk Trays @\$2 each	\$10,000
Promotion and Miscellaneous	<u>\$10,000</u>
	\$44,000
Annual Operating Costs:	
Amortization	\$ 4,000
Canvas Bag Replacement (10%)	\$ 900
Miscellaneous Expenses	\$ 3,500
Coordinators (part-time)	<u>\$13,000</u>
Total Operating Costs	<u>\$21,400</u>

Note:

- (1) This assumes that the office waste would be sorted into a coloured ledger grade which could be sold for \$40/ton.
- (2) Net disposal cost savings assumes that a disposal credit can be reflected in the cleaning contract. This would only be realized after 1 or 2 years after implementation once the actual quantities of waste reduction are known.

- (3) Costs will vary according to the degree of sophistication of the system but the indicated costs give a rough perspective.

These cost calculations assume that no additional internal costs would be incurred by the present staff with the exception of the coordinators whose costs have been included. This assumption is based on Environment Canada's source separation pilot project currently underway in Ottawa.

The recovery program as proposed would meet the main objective of recovering valuable resources which are presently being destroyed, and at the same time, could generate a net revenue and savings of \$36,020 per year.

APPENDIX "A"

LIST OF GOVERNMENT BUILDINGS SURVEYED

FEDERAL

MPP
280 Progress Avenue

City Delivery
Terminal "A"
16 Bay Street

Food & Drug
2301 Midland Avenue

Falaise Armoury
429 Lakeshore

DSS
24 Ferrand Drive

A Meighan
25 St. Clair Ave East

South Central MPP
969 Eastern Avenue

Lakeview Complex
1191 Cawthra Road

Sir W. Mullock
241 Jarvis Street

Gateway MPP
4567 Dixie Road

R.C.M.P.
225 Jarvis Street

Weston Post Office
2050 Weston Road

Mackenzie
36 Adelaide Street East

Rexdale Post Office
2110 Kipling Avenue

Dominion Public
1 Front Street West

Downsview Post Office
2800 Keele Street

A.E.S.
4905 Dufferin Street

Archives
77 Grenville Street

PROVINCIAL

Ministry of Health
7 Overlea Boulevard

Ministry of Environment
135 St. Clair Avenue West

Ministry of Health
15 Overlea Boulevard

Record Centre
3215 Erindale Station Road

G. Drew
25 Grosvenor

Queens' Park Complex
Wellesley & Bay

APPENDIX "B"

LIST OF GOVERNMENT BUILDINGS SAMPLED

FEDERAL

Food & Drug
2301 Midland

Dominion Public
1 Front Street West

DSS
24 Ferrand Drive

South Central MPP
969 Eastern Avenue

Sir W. Mullock
241 Jarvis Street

City Delivery
Terminal "A"
16 Bay Street

Mackenzie
36 Adelaide Street East

A. Meighan
25 St. Clair Avenue East

Lakeview Complex
1191 Cawthra Road

Gateway MPP
4567 Dixie Road

Weston Post Office
2050 Weston Road

A.E.S.
4905 Dufferin Street

PROVINCIAL

Ministry of Health
7 Overlea Boulevard

Ministry of Environment
135 St. Clair Avenue West

Ministry of Health
15 Overlea Boulevard

G. Drew
25 Grosvenor

Queens Park Complex
Wellesley & Bay

APPENDIX "C"

BUILDING SURVEY STATISTICS

PRINCIPAL STATISTICS BY LOCATION
BUILDING SURVEY PROGRAM

Location	Federal Provincial	Population	Gross Rentable Sq. Ft.	Estimated Waste Generation		Waste Disposal Contractor & Service	Remarks
				Mixed Waste	Special Consider- ation Papers		
1. MPP 280 Progress Avenue	Federal	750	69,386	2.31	N.S.	Econo Disposal Systems. Roll-off container with compactor 14 cu.yd.	Mixed waste consists of wastes from cafeteria/ lunch rooms, general office and mail processing plant. Plant wastes consists of non-returnable corrugated cartons, papertowels, and 3rd class mail. Plant operates 24 hours per day, 7 days per week. No recovery program in progress. No shredding or baling on site.
2. Health Protection Branch 2301 Midland Avenue	Federal	200	85,270	0.20-0.25	N.S.	Clairwin Disposal Inc. Rear-end packer. Laboratory waste disposed separately.	Laboratory complex & office. Two sources of waste treated separately. (1) solvents and food samples originating in laboratories (2) mixed office waste. Classified records & files are shredded on-site and discarded once a year. (approximately 0.3 tons/year). No recovery program in progress.
3. DSS 24 Ferrand Drive	Federal	300	52,780	0.90	0.45	Olympia & York Front-end loader 5 cu.yd. container	Principal activity is processing and mailing of family allowances and old age cheques. Approximately 2 tons of computer print-out papers and cheque ends generated each month. These special consideration paper formerly shredded and baled on-site. Currently destroyed via incinerator. No recovery program in progress.
4. MPP South Central 969 Eastern Avenue	Federal	900	557,508	3.63	N.S.	Econo Disposal Systems. Roll-off container (14 cu. yd.) with compactor. Front-end loader 5 cu.yd. container	Refer to remarks for 1. above. Large volume of corrugated but no estimates available. No recovery program in progress.
5. Sir W. Mullock 241 Jarvis Street	Federal	350	110,000	0.83-0.50	0.10	Sub-contract by rapid maintenance rear-end packer	Multi-tenant general office building. Special consideration papers consists of computer print-outs, envelopes, and classified records. At one time corrugated cartons estimated at 1/2 ton per year recovered. Now discontinued. No recovery is in progress.

PRINCIPAL STATISTICS BY LOCATION
BUILDING SURVEY PROGRAM

Location	Federal Provincial	Population	Gross Rentable Sq. Ft.	Estimated Waste Generation		Waste Disposal Contractor & Service	Remarks
				Mixed Waste	Special Consider- ation Papers		
6. R.C.M.P. 255 Jarvis Street	Federal	800	170,000	1.00	N.A.	Superior Sanitation. Front-end loader 5 cu.yd. container	General headquarters and barracks. Non-security mixed office wastes are discarded via normal refuse disposal. Security waste-papers are source separated and incinerated on-site. No recovery program in progress.
7. Dominion Public 1 Front Street W.	Federal	700	334,375	4.38	N.S.	Modern Building Cleaners Ltd. Rear-end packer	General office & post office. Multi-tenant. In addition to generation of mixed office waste, the post office generates an estimated 1.5 tons of 3rd class mail daily. This is collected and disposed of separately from the general office waste. No recovery program in progress.
8. Mackenzie 36 Adelaide St.E.	Federal	1,800	402,102	4.44	N.A.	Y & R properties. Rear-end packer. Classified records hailed to incineration by Attripco.	General offices (National Revenue) & Post office. Waste generated from this building consists of mixed office waste, corrugated, classified records and blank non-carbonized taxation forms. Classified records are stored at the Archives with some on-site separation for destruction via incineration. Blank taxation forms are currently being recovered and sold to dealers once a year. Quantity not provided. In this sense some recovery is in progress.
9. City Delivery/ Terminal "A" 16 Bay Street	Federal	4,500	800,000	20.0	N.S.	Manor Building Services. Rear- end packer	Postal station. Soon to be moved to Gateway, MPP and South Central MPP. Operates 6 days a week. Primarily undelivered 3rd class mail. Substantial quantities of corrugated cartons (approximately 6 tons per week). No recovery operation in progress.

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 PRINCIPAL STATISTICS BY LOCATION
 BUILDING SURVEY PROGRAM

TABLE C-1

Location	Federal Provincial	Population	Gross Rentable Sq. Ft.	Estimated Waste Generation		Waste Disposal Contractor & Service	Remarks
				Mixed Waste	Special Consider- ation Papers		
10. Falaise Armoury 429 Lakeshore	Federal	70	38,000	0.25	N.S.	Canadian Imperial Roll-off container 14 cu.yd.	Post office store. Mixed waste consists of letter- heads, information packages and general office waste. Corrugated estimated at 3 tons per year. Building lease expires in 1977. Operation to be moved to City Delivery Building. Very little high grades which can be source separated
11. A. Meighen 25 St. Clair Ave E.	Federal	1,400	400,372	5.0	N.A.	A. Smith Haulage & Disposal. Roll- off container 14 cu.yd.	Multi-tenant. General offices and postal station. No recovery operation in progress.
12. Lakeview Complex 1191 Cawthra Road	Federal	195	359,433	0.25-0.30	N.S.	Northwest Maintenance Systems. Rear-end pick-up tr cks.	Complex consists of eight buildings, 5 warehouses, an area parcel post depot, a central heating plant, and a warehouse/office building. The office complex consists of DSS clerical, print shop, data communications and Crown assets disposal corporation. No recovery operation in progress.
13. MPP Gateway 4567 Dixie Road	Federal	2,500	1,127,200	8.12	N.S.	Econo Disposal Systems. 2 Roll- off containers 40 cu.yd. One compactor, one loose.	Refer to remarks for 1. Large volume of corrugated suggested but no estimate available. No recovery program in progress.
14. Weston Post office 2050 Weston Road	Federal	150	30,630	0.25	N.S.	North York Maintenance. Front end loader. 5 cu. yd.	Area postal station. Administration and letter and bulk mail processing to be moved to Gateway MPP in 1977. Mail delivery and wicket operation only. Very little high grades which can be separated at source.

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 PRINCIPAL STATISTICS BY LOCATION
 BUILDING SURVEY PROGRAM

TABLE C-1

Location	Federal Provincial	Population	Gross Rentable Sq. Ft.	Estimated Waste Generation		Waste Disposal Contractor & Service	Remarks
				Mixed Waste	Special Consider- ation Papers		
15. Rexdale Post Office 2110 Kipling Road	Federal	60	22,192	0.20-0.25	N.S.	Etobicoke Borough Wooden Box 4" x 6"	Refer to 14. above.
16. Downsview Post Office 2800 Keele Street	Federal	90	23,030	0.63	N.S.	K & T Janitorial Service. Front- end loader	Refer to 14. above.
17. A.E.S. 4905 Dufferin	Federal	760	339,000	3.10	N.A.	Disposal Services Ltd. Roll-off container 20 cu.yd. with compactor. Laboratory wastes disposed separately.	Atmospheric Environment station. Office & Laboratory complex. Print shop and computer facility. General wastes include mixed office waste, print shop cuttings, computer print-outs and tab cards, lab wastes and general warehouse wastes (cartons, parcels, cans, etc). Estimates of special consideration papers not available. Tab cards presently recovered and picked up by broker. Quantity not available. In this sense some recovery in progress.
18. Archives 77 Grenville	Provincial	N.A.	N.A.	N.S.	N.S.	N.A.	Storage of historical records. Volume of discards not signi- ficant. Corrugated cartons (1 cu.ft.) discarded once a year during the summer - estimated 5 to 6 thousand cartons. No recovery program in progress.
19. Ministry of Health 7 Overlea Blvd.	Provincial	1,000	312,245	2.81	1.0	Disposal Services Ltd. Rear-end packers for office waste. Front-end loader for cafe- teria waste 5 cu. yd. Recovered wastepaper picked up by Data Surplus Cards.	Principally geared to administering and processing OHIP, medical plan, claims, ambulance reports, etc. Guarantees large quantity of paper, most of which are confidential records. These records are kept on file or stored at the Record Centre. Computer print-outs, tab cards and white & coloured ledger grades are presently recovered and sold to dealers. No shredder or baling on- site. Recovery program in progress.
20. Ministry of Health, 15	Provincial	800	312,245	4.38	included with 19.	Refer to 19.	Refer to remarks for 19.

PRINCIPAL STATISTICS BY LOCATION
BUILDING SURVEY PROGRAM

TABLE C-1

Location	Federal Provincial	Population	Gross Rentable Sq. Ft.	Estimated Waste Generation		Waste Disposal Contractor & Service	Remarks
				Mixed Waste	Special Consider- ation Papers		
21. Ministry of Environment 135 St. Clair Ave W.	Provincial	400	114,000	1.81	0.06	Disposal Services Ltd. Rear-end packer.	Mixed office waste consists of general office and print shop wastes. Very little high grades which can be separated at source. Consideration paper are computer print-outs. No recovery program in pro- gress.
22. G. Drew 25 Grosvenor	Provincial	1,200	375,000	2.20	1.25	Disposal Services Ltd. Rear-end packer	Multi-tenant building occupied by Coroner's offices, Ontario police arbitration board, police commission and MGS. Large quantity of mixed office waste (mostly paper) computer print-outs. No recovery program in progress.
23. Queens Park Complex Wellesley & Bay	Provincial	4,500	1,658,900	20.0-22.5	0.31	Clarwin Disposal Rear-end packer.	Mixed office waste gener- ation considerable. M.O.H. recovering high grade papers and sold to dealer. M.G.S. recovering computer print-outs for pick-up by broker. (No sales trans- action in this case). No recovery operation in progress. Prime candidate for source separation of high grade papers.
24. Record Centre 3215 Erindale Station Road	Provincial	10	226,000	3.63	N.A.	N.A.	Storage of records. Records are discarded twice a year - at fiscal and calendar year end. Discards are destroyed via incinerator. At one time manual low capacity shredder was used to destroy records. Process too time consuming and required two full-time staff. No recovery operation in progress.
Federal Sub-Total		15,525	4,921,278	55.0-55.3	0.55		
Provincial Sub- Total		7,910	2,998,390	34.8-37.3	2.60		
TOTAL		23,435	7,919,668	89.8-92.6	3.15		

SOURCE: Special Building Survey

NOTE: N.S. - Not Significant
N.A. - Not Available.

APPENDIX "D"

SAMPLING PROGRAM
STATISTICAL ANALYSIS
AND
COMMENTS FROM FIRMS

TABLE D.1

ASSOCIATED VOLUME OUTPUT IN H.H. UNITS* PER WEEK

<u>Building Name</u>	<u>H.H. Units/Week</u>
City Delivery	2000
Queens Park Comp	1700
Gateway MPP	650
A. Meighen	400
MacKenzie	355
Dominion Public	350
M.O.H. (15 Overlea)	350
G. Drew	275
A.E.S. (Dufferin)	250
M.O.H. (7 Overlea)	225
M.O.E. (St. Clair)	150
D.S.S. (Ferrand Dr.)	70
W. Mulock	33
Lakeview Comp.	23
Weston P.O.	20
Food & Drugs	18

* Household Unit (H.H. Unit) = 25 lbs. of refuse or 11.34 kg.

Source: Statistical Analysis by the Department of Fisheries
& Environment

ORDERED COARSE DATA

- Kilograms -

<u>Building Name</u>	<u>Sampling Week</u>	<u>Bldg.No</u>	<u>A. (Prohibitive)</u>	<u>B. (Out-throw)</u>	<u>C. (Special Consideration)</u>
Food & Drugs	1	1	0.0	0.0	10.660
Food & Drugs	2	1	14.170	1.790	1.330
Food & Drugs	3	1	10.560	7.220	5.180
Food & Drugs	4	1	4.990	0.907	5.443
D.S.S. (Ferrand Dr.)	1	2	6.536	3.629	11.608
D.S.S. (Ferrand Dr.)	2	2	6.950	2.210	13.800
D.S.S. (Ferrand Dr.)	3	2	1.890	0.990	11.790
D.S.S. (Ferrand Dr.)	4	2	8.165	1.814	8.165
M.O.H. (7 Overlea)	1	3	17.010	0.680	13.608
M.O.H. (7 Overlea)	2	3	9.700	8.380	9.970
M.O.H. (7 Overlea)	3	3	4.960	9.270	30.930
M.O.H. (7 Overlea)	4	3	18.598	5.443	12.247
M.O.H. (15 Overlea)	1	4	11.752	6.123	22.948
M.O.H. (15 Overlea)	2	4	14.470	5.840	10.380
M.O.H. (15 Overlea)	3	4	7.540	7.330	22.920
M.O.H. (15 Overlea)	4	4	6.350	0.907	19.958
Queens Park Comp	1	5	25.401	12.927	95.483
Queens Park Comp	2	5	14.560	27.950	50.780
Queens Park Comp	3	5	8.430	20.510	74.880
Queens Park Comp	4	5	58.968	11.340	43.092
M.O.E. (St.Clair)	1	6	9.525	4.763	9.979
M.O.E. (St.Clair)	2	6	9.320	8.740	15.580
M.O.E. (St.Clair)	3	6	4.810	7.650	13.630
M.O.E. (St.Clair)	4	6	20.412	4.536	9.072
A. Meighen	1	7	11.113	2.495	21.319
A. Meighen	2	7	7.910	6.940	12.420
A. Meighen	3	7	6.040	8.080	11.770
A. Meighen	4	7	27.216	9.072	22.680
W. Mulock	1	8	6.084	0.454	8.618
W. Mulock	2	8	8.860	1.290	2.250
W. Mulock	3	8	3.540	3.260	5.280
W. Mulock	4	8	9.072	1.814	2.722

MacKenzie	1	10	21.319	2.268	24.040
MacKenzie	2	10	10.500	11.520	15.870
MacKenzie	4	10	34.020	3.175	2.268
Dominion Public	1	12	8.618	15.423	18.709
Dominion Public	2	12	5.380	1.280	27.840
Dominion Public	4	12	15.876	5.443	8.165
City Delivery	1	13	41.277	18.144	46.266
City Delivery	2	13	1.880	8.960	3.969
City Delivery	3	13	27.320	8.510	14.700
G. Drew	1	14	11.113	7.258	27.443
G. Drew	2	14	18.430	3.380	36.260
G. Drew	3	14	14.860	11.260	23.340
G. Drew	4	14	5.443	1.134	16.103
Lakeview Comp.	1	15	15.422	0.227	8.618
Lakeview Comp.	4	15	2.722	2.268	8.619
Gateway MPP	1	16	17.690	1.588	8.618
Gateway MPP	2	16	25.500	5.020	28.960
Gateway MPP	3	16	13.380	2.820	36.700
Gateway MPP	4	16	27.216	9.072	13.608
Weston P.O.	1	17	9.525	0.680	0.228
Weston P.O.	2	17	5.260	3.580	0.620
Weston P.O.	4	17	17.237	1.814	1.361
A.E.S. (Dufferin)	1	18	2.268	6.577	4.990
A.E.S. (Dufferin)	2	18	3.850	2.970	13.120
A.E.S. (Dufferin)	3	18	1.580	10.520	4.951
A.E.S. (Dufferin)	4	18	5.443	1.361	15.876

Source: Statistical Analysis by the Department of Fisheries & Environment

TABLE D.3

COARSE DATA ANALYSIS

- Percent -

<u>Building Name</u>	<u>Bldg.No</u>		<u>A.</u>	<u>B.</u>	<u>C.</u>
Food & Drugs	1	Mean	0.477	0.159	0.363
		S.E.	0.168	0.067	0.203
D.S.S. (Ferrand Dr.)	2	Mean	0.304	0.111	0.585
		S.E.	0.066	0.021	0.076
M.O.H. (7 Overlea)	3	Mean	0.357	0.169	0.474
		S.E.	0.099	0.058	0.080
M.O.H. (15 Overlea)	4	Mean	0.294	0.148	0.558
		S.E.	0.061	0.038	0.082
Queens Park Comp	5	Mean	0.242	0.164	0.595
		S.E.	0.097	0.048	0.081
M.O.E. (St.Clair)	6	Mean	0.373	0.218	0.409
		S.E.	0.090	0.035	0.055
A. Meighen	7	Mean	0.356	0.181	0.464
		S.E.	0.049	0.053	0.048
A. Mulock	8	Mean	0.524	0.126	0.350
		S.E.	0.100	0.050	0.089
Mackenzie	9	Mean	0.527	0.136	0.337
		S.E.	0.174	0.081	0.137
Dominion Public	10	Mean	0.280	0.207	0.513
		S.E.	0.121	0.094	0.157
City Delivery	11	Mean	0.412	0.208	0.380
		S.E.	0.121	0.145	0.053
G. Drew	12	Mean	0.283	0.131	0.586
		S.E.	0.020	0.043	0.049
Lakeview Comp.	13	Mean	0.479	0.066	0.455
		S.E.	0.218	0.079	0.139
Gateway MPP	14	Mean	0.441	0.097	0.462
		S.E.	0.082	0.030	0.097
Weston P.O.	15	Mean	0.794	0.151	0.055
		S.E.	0.109	0.101	0.015
A.E.S. (Dufferin)	16	Mean	0.179	0.292	0.530
		S.E.	0.031	0.132	0.103

Source: Statistical Analysis, Department of Fisheries
& Environment

TABLE D.4

OVERALL FINE SORTED PROPORTIONS
(PERCENT)

<u>Out-throw Papers - (B)</u>	
1. Magazines and hard cover books	0.0201
2. Newspapers	0.1357
3. Candy and gum wrappers	0.0000
4. Paper towels and facial tissues	0.0264
5. Paper cups and plates	0.0019
6. Fiberboard	0.0201
7. Corrugated medium	0.0035
8. Red-brown covers and folders	0.0010
	0.2087
<u>Special Consideration Papers - (C)</u>	
9. Reproduction paper (Xerox, IBM, Dennison, 3M, etc.)	0.1213
10. Writing paper, scratch paper	0.0925
11. Padded sheets (individual sheets - excl. backing or adhesive)	0.0356
12. Envelopes	0.0538
13. Manilla folders	0.0095
14. Binder dividers	0.0001
15. NCR papers	0.0000
16. Computer tab cards - white	0.0034
17. Computer tab cards - coloured	0.0056
18. Computer printout without carbon	0.1163
19. Computer printout with carbon	0.0188
20. Drawings	0.0000
21. Mapping paper (wet-strength material)	0.0008
22. No.1 hard white shavings	0.0001
23. No.1 soft white shavings	0.0010
24. Index cards (3" x 5", 4" x 6")	0.0059
25. Cancelled money orders and cheques	0.0214
	0.4861

Source: Statistical Analysis, Department of
Fisheries & Environment

TABLE D.5

ORDERED C PROPORTIONS FROM HIGH TO LOW

<u>Building Name</u>	<u>C</u>
Queens Park Comp	0.595
G. Drew	0.586
D.S.S. (Ferrand Dr.)	0.585
M.O.H. (15 Overlea)	0.558
A.E.S. (Dufferin)	0.530
Dominion Public	0.513
M.O.H. (7 Overlea)	0.474
A. Meighen	0.464
Gateway MPP	0.462
Lakeview Comp	0.455
M.O.E. (St. Clair)	0.409
City Delivery	0.380
Food & Drugs	0.363
W. Mulock	0.350
MacKenzie	0.337
Weston P.O.	0.055

Source: Statistical Analysis, Department of Fisheries
& Environment

TABLE D.6

ORDERED (B+C) PROPORTIONS FROM HIGH TO LOW

<u>Building Name</u>	<u>B+C</u>
A.E.S. (Dufferin)	0.821
Queens Park Comp	0.758
Dominion Public	0.720
G. Drew	0.717
M.O.H. (15 Overlea)	0.706
D.S.S. (Ferrand Dr.)	0.696
A. Meighen	0.644
M.O.H. (7 Overlea)	0.643
M.O.E. (St. Clair)	0.627
City Delivery	0.588
Gateway MPP	0.559
Food & Drugs	0.523
Lakeview Comp	0.521
W. Mulock	0.476
MacKenzie	0.473
Weston P.O.	0.206

Source: Statistical Analysis, Department of Fisheries
& Environment

APPENDIX "D"

REED LTD.

TECHNICAL GROUP, R & D DEPARTMENT

DETERMINATION OF OFFICE WASTES

COMPOSITION AND POTENTIAL MARKETS

1. OBJECTIVES

The overall objective is to determine the value of mixed office waste, generated by the government establishments in the Toronto area.

Specifically, the objectives are :

- i) Identification of three coarse categories of wastepaper A, B and C, and if required, twenty five subcategories of B and C, as per request DSS File 01SS KE109-6-6085.
- ii) Recommendations and suggestions concerning the improvement in marketability of wastepapers.

In addition to these principal objectives it had been agreed to perform supplemental tests in order to fully assess the potential of office wastepaper to the processor. These include :

- Recyclability tests
- Hot liquid extraction with trichlorethylene to determine a total amount of extractives including polyolefins, hot melt adhesives, laminating adhesives, etc.

- Determination of main physical characteristics of the pulps produced from the office waste
- Fibre analysis of the pulps

2. OFFICE WASTE SAMPLES

Two shipments of office wastepaper, originating in the government establishments in Toronto area, were received by the Research Department, Reed Ltd., Quebec, on February 4 and February 9, 1977. The deliveries consisted of three and two large bales respectively representing the second and third week of sample survey. Office waste samples were contained in plastic bags, tagged for identification. In proportion to the volume of waste generated at each sampled location, the sample size varied from 2 bags to as many as 20 bags.

3. EXPERIMENTAL APPROACH AND METHODS OF TESTING

The samples were hand-sorted in compliance with the DSS request, File 01SS KE109-6-6085. In order to test the recyclability of the material and to prepare samples for hot liquid extraction, determination of physical characteristics of pulps and fibre analysis, the following procedure was adopted :

Throughout the sorting period, the specimens of the original office waste material and the sample of special consideration papers from category C (hereafter referred to as "Original Sample" and "Sample C" respectively), have been collected, each amounting to approximately 30 kg of material. The samples represented an average of all the buildings surveyed in proportion to the amount of waste generated. For the purpose of further testing, all the coarse foreign contaminants such as cans, glass containers, metal particles, plastic containers, etc. were removed from the original sample.

Other contraries, the presence of which would not present any danger to the repulping operation (plastic films, styrofoam, aluminum foil, cellophane, as well as all the contraries adhering to the paper portion of the sample) were left in the sample. "Sample C" was repulped as such, excepting the elimination of all carbon paper from the furnish.

The sample size was reduced to 2 kg per batch and a Recyclability Test conducted by repulping the material in the laboratory pulper at 2% consistency for 25 min. at ambient temperature. The conditions of repulping were chosen such as to allow all the regular paper or board samples to be defibred, whereas other components exhibiting greater resistance to repulping, such as wet-strength papers and boards, plastic coatings, laminated products, etc., were not disintegrated completely. The pulp was then screened on the Weverk Flat Screen.

Accepts were used for determination of pulp physical characteristics (freeness, opacity, brightness and breaking length) and fiber composition.

The amount of rejects was measured and the same used for hot-liquid extraction, consisting of boiling an approximately 20 g of oven-dried rejects per sample in trichlorethylene for the period of 12 hrs. A gravimetric analysis was used to determine the amount of extractives which consisted of polyolefins, hot melt, adhesives, laminating adhesives, wax, bitumen, etc., collectively referred to as pernicious contraries.

Fibre analysis of the pulps was made according to a standard microscopic method and the results reported to a closest 5% figure.

4. RESULTS

The experimental data are listed in Tables 1-19, with first eight tables pertaining to the first delivery, and the remaining ten tables to the second delivery. Tables containing data on fine sorting are placed after coarse sorting tables for a given delivery.

The comments shown with coarse sorting data refer to the components which are typical in each sorting category for a building in question.

The results in Tables 1-19 show that the composition of mixed office waste varied within large limits amongst the buildings sampled. The lowest quality waste (highest content of prohibitives) was found in samples collected from Food & Drugs, Gateway, City Delivery, W. Mulock and M.O.H. In contrast, buildings such as Queen's Park, Dominion Public, A.E.S., generated waste with high proportion of good office papers.

Variations in waste composition depended not only on the building of origin, but also on the time of collection, as evident by almost twice as many fine sortings required in the second delivery as compared to the first one.

The data on supplemental tests which included Recyclability, Hot Liquid Extraction, Physical Characteristics and Fibre Composition pertaining to the Original Sample and Sample C are shown in Table 20.

As evident from results on fibre analysis, the paper waste contains a high proportion of chemical fibre, namely softwood and hardwood bleached kraft, with only a small amount of mechanical fibre. More than 80% of Original Sample is composed of chemical pulp of which some 60% is bleached.

"Sample C" is made up almost exclusively of chemical bleached pulp. High Opacity figures reflect upon the presence of fillers in pulp.

Brightness data are heavily influenced by the presence of coloured grade, and, to a lesser extent, contraries. An elimination of colours brings up the brightness of Sample C to a 68 - 75% range.

Flat Screen rejects from the Original Sample consisted of a broad variety of materials, the most prominent of which were - carbon paper, wet strength papers, aluminum foil, plastic fibre, cellophane and styrofoam. Sample C rejects were made up exclusively of wet-strength paper, originating with envelopes and other specialty papers. Therefore, strictly speaking, neither the Original Sample nor the "C category" sample were recyclable under the normal (non-alkaline) conditions specified by the American Paper Institute.

Figures on hot liquid extractives indicate a relatively high level of pernicious contraries present in the original sample, arising from the prohibitive materials present.

Freeness and Breaking Length data are within a range of high grade mixed waste papers with low proportion of groundwood. As would be expected, Sample C shows higher strength than the Original Sample.

5. COMMENTS

The quality of any mixed wastepaper is mainly determined by the following points :

- A) Contamination by "pernicious" contraries
e.g., plastics, adhesives, carbon paper, etc.

The data collected throughout the survey indicate that there is a significant potential to upgrade the quality of mixed office waste, if precautions were taken to exclude the prohibitives. As is, a portion of this material could be processed only into a low grade building or construction products such as, for instance, roofing felts. A reduction in prohibitives to less than 2% and in total out-throws to 10% would put this waste paper in the category of no. 2 mixed paper. In that case the papers could be processed into paper-board filler.

- B) Groundwood content

As evident from fiber analysis results, the paper waste contains a high proportion of chemical fibre. If newspapers and magazine type of papers were separated from the main streams, the mechanical fiber would be practically eliminated. Thus, a substantial portion of wastepaper would be used as a deinking grade and/or in some particular cases as a pulp substitute while newspaper material would find an established market.

C) Brightness of repulped stock

In general the brightness of a mixture of wastepapers depends on many factors such as the amount of ink, colours, bleached fibers, dirt, etc. Nevertheless, it is particularly affected by the unbleached kraft fibers as their brightness is below 30% while the brightness of semi-and fully-bleached fibers is greater than 55-60%. The unbleached kraft papers can be easily identified and eliminated from the paper stream. The coloured grades may not be objectionable providing the waste paper would be used as a deinking grade.

In view of the above the following options of waste-paper segregation could be evaluated :

<u>Option I</u>	<u>Two basket system</u>	<u>Potential End-Use</u>
	Basket A. Garbage*	Disposal
	Basket B. Papers	Paperboard filler
<u>Option II</u>	<u>Three basket system</u>	<u>Potential End-Use</u>
	Basket A. Garbage*, packaging waste, un- bleached kraft, advertising papers.	Disposal
	Basket B. Newspapers, magazines	Deinking Newsprint Tissue
	Basket C. White and coloured grades	Deinking grade fine papers tissue top and under- liner (paperboard test liner)

<u>Option III</u>	<u>Four basket system</u>	<u>Potential End-Use</u>
	Basket A. Garbage*, advertising papers	Disposal
	Basket B. Magazines, newspapers	Deinking Newsprint Tissue
	Basket C. Packaging waste, un- bleached kraft papers	Linerboard Paperboard
	Basket D. White and coloured papers	Deinking grades Fine papers Tissue Top and under- liner (paperboard test liner)

*Any items containing paper products in combination with plastics, wax, polymer coatings, bitumen, aluminum foil, etc. and all non-paper items.

6. RECOMMENDATIONS

The choice of any particular system is not limited only to the three options mentioned above. The final choice will depend on :

- 1) Type of waste generated (source, building)
- 2) Market for waste papers

Our experience with a multiple basket system has confirmed the results of other studies reported in a literature specifically in respect of the limitations set up by human factors.

Even from a highly motivated and educated group of people one cannot expect to follow the sorting instructions completely. Moreover, any given grade of sorted papers will be downgraded to the greater extent by the presence of small amount of prohibitives rather than by the presence of other paper grades. For that reason, it would be impractical to aim at high grades of waste paper in a multiple basket system. Another drawback is due to the limited number of Canadian paper mills capable of processing "dirty" papers.

Considering those limitations and having in mind that a decision concerning the system should be made for each specific case, we recommend that a feasibility of a waste paper segregation at source be investigated. A system aimed at recovering maximum value of waste papers should be set-up at selected locations :

- In office buildings to introduce a multiple basket system to segregate the waste materials depending on market needs of the area.
- In buildings generating large volumes of high quality paper such as computer centers, printing houses, etc., the waste paper produced should be kept clean and apart of any other waste generated in those locations.

CONSOLIDATED FIBRES LIMITED

SAMPLING ANALYSIS COMMENTS

April 29th, 1977

Environmental Protection Service		
Ontario Region		
EPL MAY 04 1977		
RE 4666-6		
TO	INITIALS	DATE
V.S.	<i>[Signature]</i>	

Environment Canada
Environmental Engineering Section
EPS - Ontario Region
135 St. Clair Avenue, West
TORONTO, Ontario
M4V 1P5

Attention: Mr. V. Shantora

Gentlemen:

In reply to some specific questions posed to me in your letter of April 7th regarding waste paper separation in government buildings in Ontario.

Firstly, the material in its pre-sorted stages would not be acceptable for mill consumption at the present time. Markets for separated stock appear good in the foreseeable future, bearing in mind that the paper industry reflects general economic conditions, and is prone to all the fluctuations that occur with any product responding to a supply and demand situation. Significant contaminants that appear in office waste are plastics, carbon paper, and food leavings, and a minimum quality of waste paper would be the unsorted papers free from these contaminants which would become a roofing mill grade.

Our markets are not restricted to Toronto but predominantly range over Ontario and Quebec.

In any movement of substantial tonnage on a continuing basis, co-operation between dealers, mills and suppliers of fibre is most significant. Dealers must use all their marketing ability to maintain a steady flow to as many mills as possible so that no blockage occurs at any one mill.

I believe government people should insist on a percentage of recycled fibre in all paper goods purchased. This will spill over to general industry and encourage mills to use more waste fibre than they are presently consuming.

Finally, I don't believe any dealer can receive mixed office waste in its original state. Separation is too costly but a programme initiated at source is the simplest way to prepare and market waste paper from office buildings.

I hope this opinion will prove helpful.

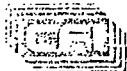
Yours very truly,

CONSOLIDATED FIBRES OF ONTARIO LTD.

[Signature]
Paul Clarfield
Manager

PC/ai

**CONSOLIDATED
FIBRES LTD.**



April 1st, 1977

5920

Environmental Protection Service	
Ontario Region	
APR 05 1977	
H666-6	
TO	DATE
K.S.	

Mr. V. Shantora
Environmental Engineering Section
Department Fisheries & The Environment
135 St. Clair Avenue, West
2nd Floor
TORONTO, Ontario
M4V 1P5

Dear Mr. Shantora:

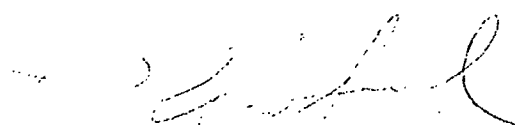
Please accept our apologies for the delay in replying regarding the "Analysis of Mixed Office Waste Paper From Government Establishments in the Toronto Area" performed recently by Consolidated Fibres of Ontario Ltd.

Our findings in the sorting of the waste paper from the government buildings have been that in its present state and with the present method of handling, it is too costly to properly process this paper into grades that would be acceptable to mills in their paper-making programmes. We have established that there is good fibre that is worth recovering but this can only be brought about by "separation at source." What we refer to is that the high grades should be kept separately from the low grades and contaminants and, with proper instruction and supervision, a programme could be instituted that would bring this about. I believe that the demand for the paper produced from these sources, and the marketability of these grades, should remain good in the foreseeable future.

We are enclosing herewith our report covering the material we sorted and trust that these findings will be useful to you in your project.

Yours very truly,

CONSOLIDATED FIBRES OF ONTARIO LTD.


Paul Clarfield
Manager

PC/ai
Encl.

MILL PAPER FIBRES LIMITED

SAMPLING ANALYSIS COMMENTS

MILL PAPER FIBRES LIMITED

20 TRINITY STREET, TORONTO M5A 3C5

Telephone (416) 364-6255

5966

April 6, 1977

Mr. V. Shantora,
Environmental Protection Service,
135 St. Clair Avenue West,
Toronto, Ontario.
M4V 1P5

Environmental Protection Service		
Ontario Region		
RECEIVED APR 07 1977		
FILE 4666-6		
TO	BY	DATE
V.S.		

Dear Mr. Shantora:

After examining the paper received from various government buildings, we would like to make the following observations.

Generally speaking, each building had paper which could be recycled by a board, fine paper, or roofing, mill. Unfortunately this paper was mixed in with many contaminants such as food, bottles, metal, plastic, and wash-room waste.

As it has been mentioned to you before, only when an effort is made to separate the paper at the source, e.g., waste paper baskets, computer room, etc., can there be any hope of bringing the paper into the main stream.

If we had to separate the paper as we received it in our trial, there would be no way that it would be worth our time and expense.

Since we saw in many bags sufficient weight of computer printout paper and tab cards, this is the obvious place to start separating the paper.

We realize that when you are dealing with many departments and many people, it is very difficult to control what goes into the waste paper baskets.

We wish to thank you for extending us the opportunity to work with you on this trial separation. If there is any way in which we could be of assistance to your department, we would be glad to hear from you.

Yours very truly,

P. Mateer

P. Mateer

lw

*8/4/77
forward further info.
from P.M.
-G.L.*

Course re



Recycle

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APPENDIX "E"

MARKET STATISTICS

SECONDARY FIBRE CONSUMPTION BY
THE CANADIAN PULP & PAPER INDUSTRY
1971 - 1976

(Quantity in Tons)

<u>GRADES</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Old Corrugated	240,173	296,565	247,557	330,499	252,078	341,999
New Corrugated	91,278	117,519	141,906	124,571	101,740	134,265
Old & Overissue News	94,758	109,714	130,251	92,285	56,827	71,409
Unprinted News	12,590	14,810	309		6,736	17,599
Boxboard Cuttings	69,372	87,863	88,147	85,088	56,935	66,965
Mixed	93,578	109,716	110,382	129,500	54,827	47,535
Brown Kraft	42,002	47,268	57,340	145,633	32,286	60,913
Bleached Kraft	53,377	27,299	41,613		37,253	50,520
Soft White & Ledger	47,607	45,747	63,729		44,753	58,204
Other	74,505	3,526	11,788		15,017	8,410
	<hr/> 819,240	<hr/> 860,027	<hr/> 893,022	<hr/> 907,576	<hr/> 658,452	<hr/> 857,819
Newsprint Rolls	n/a	170,268	120,906	n/a	n/a	n/a
Other Rolls & Broke	n/a	126,432	95,601	n/a	n/a	n/a
		<hr/> 1,156,717	<hr/> 1,109,529			

Source: CPPA Statistics

TABLE E-2

OTHER PAPER STOCK DEALERS
SERVICING THE TORONTO MARKET

- 1) Axler Waste Control Systems Inc.
- 2) Command Records Centre
- 3) Dominion Recycling
- 4) Elliot Krever & Associates
- 5) Stantor Waste

Price History

	<u>Manilla Tab Cards</u>	<u>White Ledger</u>
1969	77-82	42-47
1970	80-97	42-45
1971	80-90	42-45
1972	80-92	42-45
1973 (first half)	95-140	45-57
1973 (second half)	130-190	45-80
1974 Q1	205-210	110-115
Q2	225-260	110-115
Q3	225-250	110-115
Q4	150-275	110-115
1975 Q1	120-160	85-115
Q2	120-150	85-90
Q3	145-180	85-90
Q4	185-200	85-90
1976 Q1	190-225	85-90
Q2	220-225	85-90
Q3	220-225	85-90
Q4	190-225	85-90
1977 Q1	190-205	85

Note: Broken line boxes indicate periods of price instability

Source: Official Board Market for Buffalo and Eastern Regions.

APPENDIX "F"

BUILDINGS RECOMMENDED FOR
RECOVERY PROGRAM

BUILDINGS SURVEYED
GROUPED INTO CATEGORIES

A. Buildings for Special Consideration

1. Department of Supply and Services
24 Ferrand Dr. Don Mills.
2. Ministry of Environment Print Shop
135 St. Clair Ave. West
3. Post Office Mail Processing Plants
Gateway, South Central and Progress Ave.
4. Queens Park Complex -
Computer Centers and Print Shop
5. Drew - 25 Grosvenor - Computer Centers
6. A.E.S. 4905 Dufferin - Print Shop
7. Provincial Records Center, Mississauga
8. M.O.H. 7 & 15 Overlea Blvd.

B. Buildings Recommended for Source Separation

1. Queens Park Complex
2. G. Drew, 25 Grosvenor
3. M.O.H. 7 & 15 Overlea (1)
4. M.O.E., 135 St.Clair Ave. W.
5. A. Meighen, 25 St.Clair Ave. E.
6. Mackenzie, 36 Adelaide St. W.
7. Dominion Public, 1 Front St. W.
8. A.E.S., 4905 Dufferin St.
9. Mail Processing Plants (Gateway,
Eastern Ave. Progress Ave.)

(1) Source separation in progress

C.

Buildings Considered Unviable

1. City Delivery/Terminal A - Operations Moving
2. Food and Drugs, 2301 Midland - Quantity too small
3. Sir W.Mulock, 241 Jarvis St - Quantity too small
4. RCMP, 225 Jarvis St - All Waste Classified
5. Falaise Armory - Moving and Quantity too small
6. Lakeview Complex - Quantity too small
7. Weston P.O. - Quantity too small
8. Rexdale P.O. - Quantity too small
9. Downsview P.O. - Quantity too small

APPENDIX "G"

FORMAL TERMS OF REFERENCE

APPENDIX "G"

TERMS OF REFERENCE FOR
MIXED OFFICE WASTE STUDY
IN THE TORONTO AREA

MIXED OFFICE WASTE SURVEY AND STUDY

OBJECTIVES

An Intergovernmental Committee is presently studying alternatives for increasing the quantities of wastepaper recycled from government owned or operated establishments. The following study is being considered to assist in this effort.

The principal objectives of this contract will be:

- (a) to establish location specific quantities and qualities of the office wastes now emanating from federal and provincial establishments;
- (b) to determine which types of wastepaper from the source buildings can be sold to private paper stock dealers and brokers and at what prices. Specific consideration should be given to fluctuations in demand and price;
- (c) to identify procedures that might be implemented immediately at various locations to increase wastepaper recovery;
- (d) to determine alternate methods for collecting and transporting wastepaper from source buildings;
- (e) to identify alternate methods for "at source" separation of wastepaper at source buildings and identify associated costs, e.g. designs in new buildings.

STATEMENT OF WORK

1.0 Field Work

1.1 The consultant will be responsible for all time and materials required to conduct a sampling survey program.

Involvement will include working with the Project Manager or his representatives who will be providing the consultant with the survey schedule and sampling and tagging procedures. Contact will be made at each location prior to the sampling schedule.

1.2 The predetermined quantity of mixed office waste to be sampled will be selected randomly, placed in a sample container, both suitably tagged by the consultant and handled as required.

Records will be kept for all samples including locations, time of collection, nature of original container and any other data identified in the forms developed with the Project Manager.

1.3 The consultant will be responsible for visiting all locations identified. For each location the consultant will review and tabulate the following:

- (a) the facilities available for wastepaper handling or storing, and;
- (b) the procedures employed internally and externally for handling of the wastepaper. It is expected that DPW or other building managers together with private firms servicing these buildings will be contacted to reduce the burden of collecting this information. All such people will be notified in advance of the study by the Project Manager.

- (c) shredding and/or baling equipment;
- (d) areas within the building that generate large quantities of special consideration papers, especially computer cards, computer printout and corrugated;
- (e) refuse contractor's name and/or wastepaper dealer's name (if applicable).
- (f) current cost of removal and/or current price of any wastepaper that is being sold for recycling.

NOTE: (i) Specific attention should be given to the sub-classifications of good wastepaper (special consideration papers)

(ii) It may be that some of the special consideration wastepapers contain wet-strength resins or other prohibitive materials. Such items must be identified with the wastepaper by location.

2.0 Other

2.1 Marketability Study

The consultant will review the current and expected price and demand of mixed wastepapers and special consideration papers, both with and without prohibitive material removal.

The above analysis will be performed at the dealer and broker level and at the paper mill level. The requirements of the mills will be identified and the costs incurred to sell at this level will be developed.

2.2 Procedures for Implementing Immediate Paper Recovery

The consultant will identify alternate procedures for implementing a waste paper recovery program at various locations and the associated costs.

Normal office cleaning procedures will be examined and changes in these procedures will be identified in the handling, processing and storage of both mixed office wastepapers and special consideration papers to facilitate their recovery.

2.3 Collection & Transportation of Wastepapers

The consultant will develop alternative methods for the handling and transporting of wastepapers from source buildings. Particular attention will be given to special handling or processing requirements (shredding, baling, etc.). Consideration should also be given to the current inter-building movement of government vehicles as well as those of private dealers or haulers with a view to their use in transporting wastepapers.

2.4 "At-Source" Separation Techniques

The consultant will identify methods for "at-source" separation and will recommend buildings at which these techniques could be evaluated. The consultant will recommend design modifications at new buildings to facilitate wastepaper recovery.

3.0 REPORT

3.1 The consultant will compile all data, including sampling analysis data by others, statistical tabulation of data, by others, and report upon his investigations providing the following information:

- (a) for each location outlined, the quality and quantity of the wastepaper streams;
- (b) for each location, the recommendations as to how wastepaper recycling might be increased - this will include everything from separate handling of special consideration grades through to facilities, equipment or the like changes, i.e., procedures which can be implemented immediately.
It is not intended that this should cover things such as multiple basket systems or similar "at-source" separation systems for mixed wastes.
- (c) the data as previously outlined and requested in 2.0.
- (d) recommendations with substantiation as to the desirability and feasibility of having a subsequent study performed on "at-source" separation of mixed office wastepapers.

4.0 GENERAL

- 4.1 Some information is still presently being collected. The Project Manager reserves the right to alter somewhat the work statement, while recognizing that this may necessitate a re-negotiation of the contract.
- 4.2 Any suggestions or alternatives, offered by the bidder that will help to achieve the overall objectives outlined, are welcomed. Any expectations to the work statement should be clearly identified with separate pricing if appropriate.

4.3 Minimum meetings:

- (a) Start-up in October, 1976
- (b) Just prior to survey in October, 1976
- (c) Draft report in February, 1977.
- (d) Final report presentation in March 31, 1977.

5.0 TENTATIVE TIME SCHEDULE

This contract to be let by week of October 25, 1976.

Contracts for paper sampling analysis to be let by mid-October, 1976.

Sampling schedule November 1, 1976 to November 28, 1976.

Paper Analysis Data to be submitted by December 30, 1976.

Draft form of final report in 15 copies by February 15, 1977.

Final report in 100 copies by March 15, 1977.

CONFIDENTIALITY CLAUSE

In the process of analyzing the wastepaper samples, the workers employed by the consultant will be exposed to information that could be considered confidential or of a proprietary nature by the Federal Government.

Highly confidential wastepapers will not be sampled; however, prior to accepting the contract the consultant must accept two conditions:

- (1) The printed information on the wastepapers will not be duplicated or used in any other fashion than that requested in the contract, and
- (2) The wastepapers will be disposed of or rendered illegible after completion of the project.

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