



# Fairbanks North Star Borough

## Recycling Plan and Analysis Summary Report

PowerPoint Presentation: MACTEC Engineering & Consulting

December 2005

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# Current Borough Recycling and Reuse Program

- Current Program

- Active since the mid 90's
- Residents and Businesses participate in the program

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# Current Borough Recycling and Reuse Program

## ■ Components

- ❑ Waste Paper Recycling-Reuse Program
- ❑ Aluminum Collection
- ❑ Scrap Metal
- ❑ Household Hazardous Waste
- ❑ Reuse Area

# Cost Analysis of Current Borough Recycling and Reuse Program

	Waste Paper	Aluminum	Scrap Metal	HHW	Reuse Areas	Total
Quantities Recycled	1,500 tons	1 ton	666 cars	<ul style="list-style-type: none"> <li>• 16,000 gal. oil</li> <li>• 430,000 lbs batteries</li> <li>• 6,445 gal antifreeze</li> </ul>	Not Quantifiable	
Capital Cost Depreciation	(\$11,929)	(\$3,150)	(\$1,929)	(\$49,171)	(\$3,543)	(\$69,721)
Number of Employees	1/10	0	1/10	1 6/10	4/10	2 2/10
Component Cost	(\$125,638)	(\$3,143)	(\$52,209)	(\$284,830)	(\$32,054)	(\$497,874)

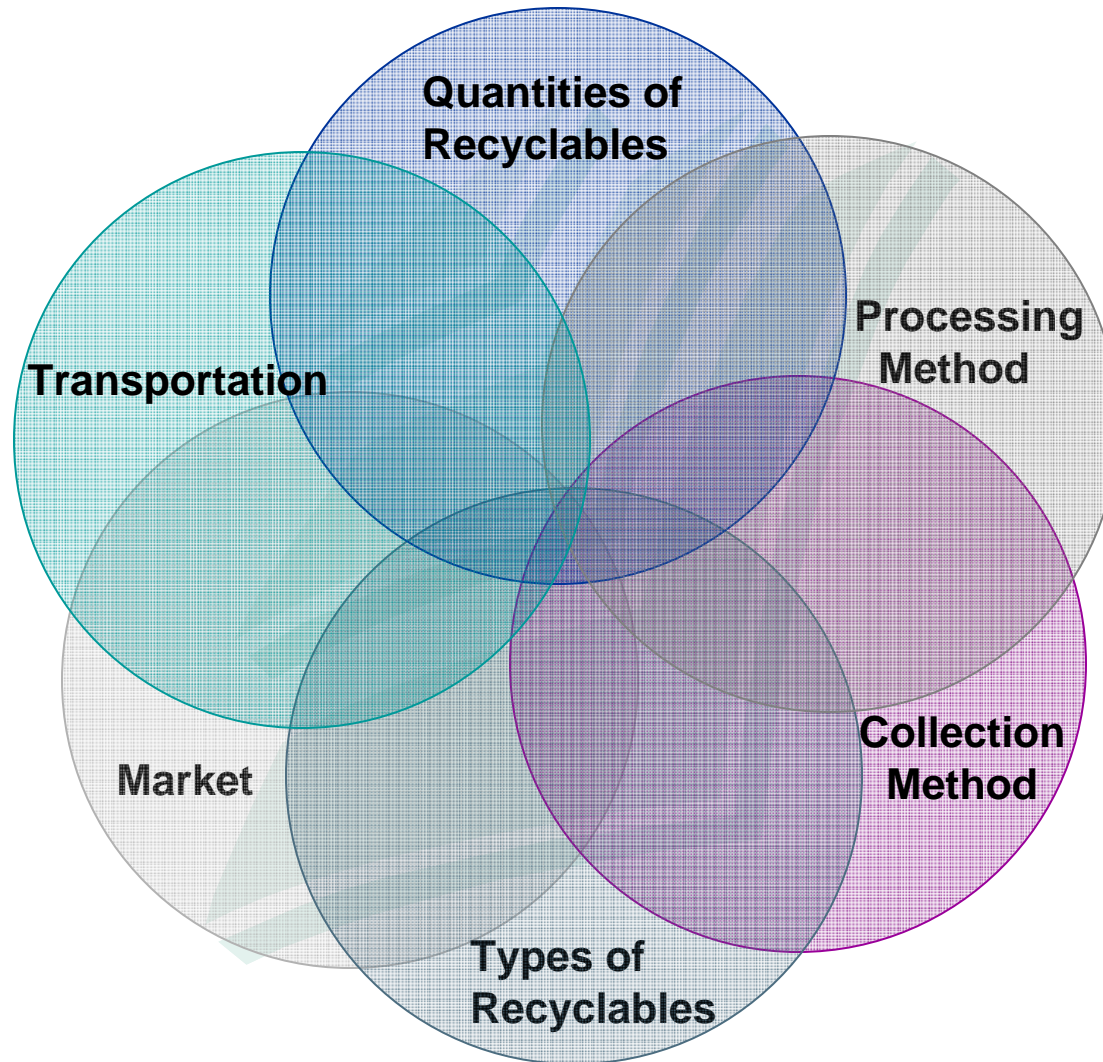
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# Objective

- The purpose of this Recycling Plan and Analysis is to explore *additional* recycling program options and evaluate these options in terms of economic efficiency and public participation potential.

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# Recycling Program Considerations



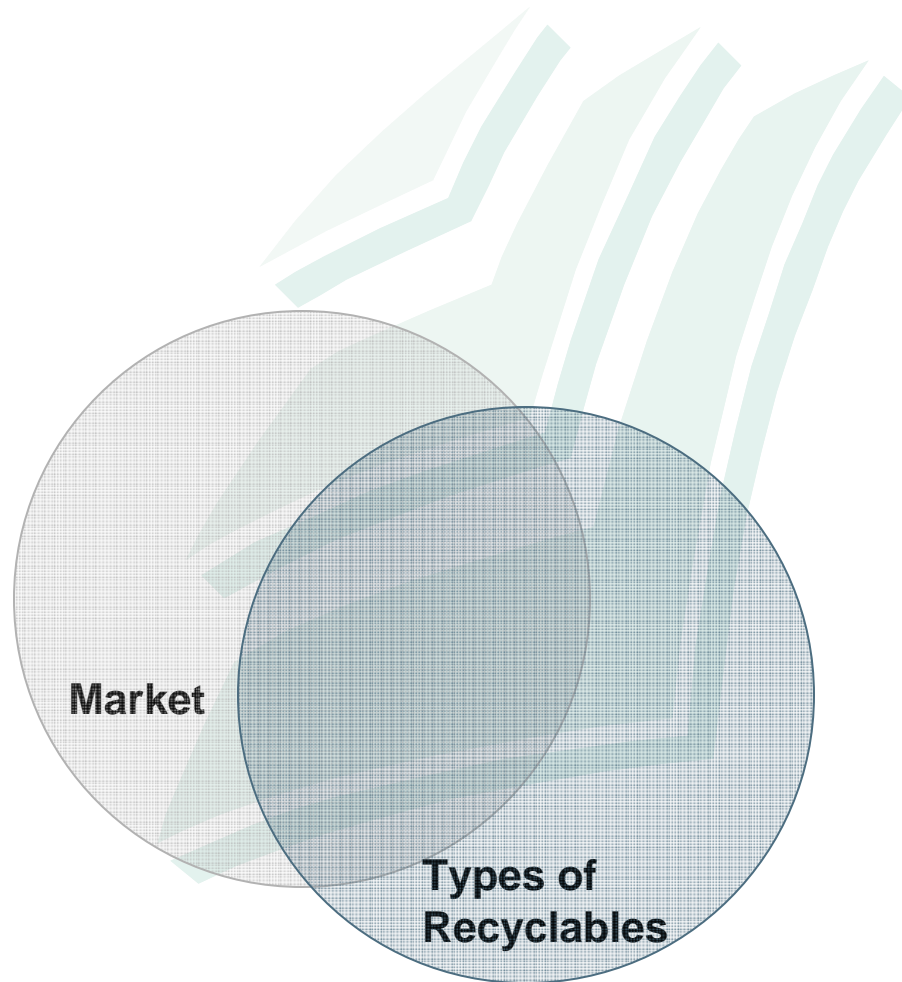
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# Project Approach

- Tour Recycling Facilities in Seattle/Tacoma area
- Contact Transportation Companies
- Contact Recycling Equipment Manufacturers
- Identify Marketable Recyclables and their Values
- Estimate Quantities of Recyclable Materials
  - FNSB Solid Waste Division FY05 Year End Report

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# Recycling Program Considerations



# Current Market Values of Recyclables

Material	Price per Ton
Old Corrugated Cardboard (OCC)	\$75/ton
Mixed Paper	\$65/ton
White Ledger	\$180/ton
Newsprint	\$80/ton
Aluminum	\$0.55/lb=\$1100/ton
Plastic-HDPE Natural	\$0.13/lb=\$260/ton
Plastic-HDPE Colored	\$0.05/lb=\$100/ton
Plastic-PETE	\$0.10/lb=\$200/ton

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# Recycling Program Considerations



**Transportation**



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# Transportation Costs

- Standard shipping rate.... **\$70/ton**
  - Fairbanks to Seattle
  - Includes destination delivery
- Potential for lower rates through ALPAR

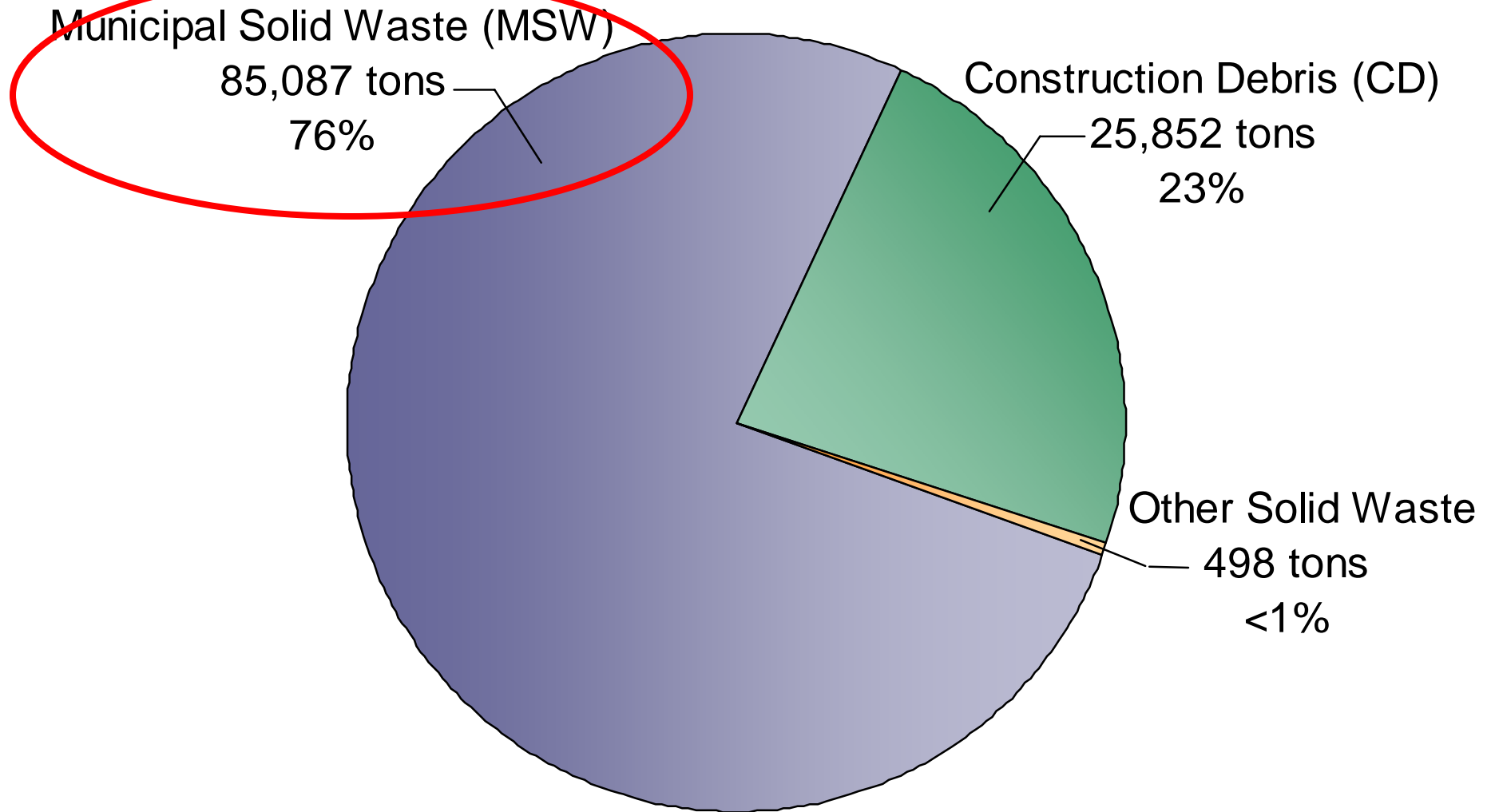
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# Recycling Program Considerations

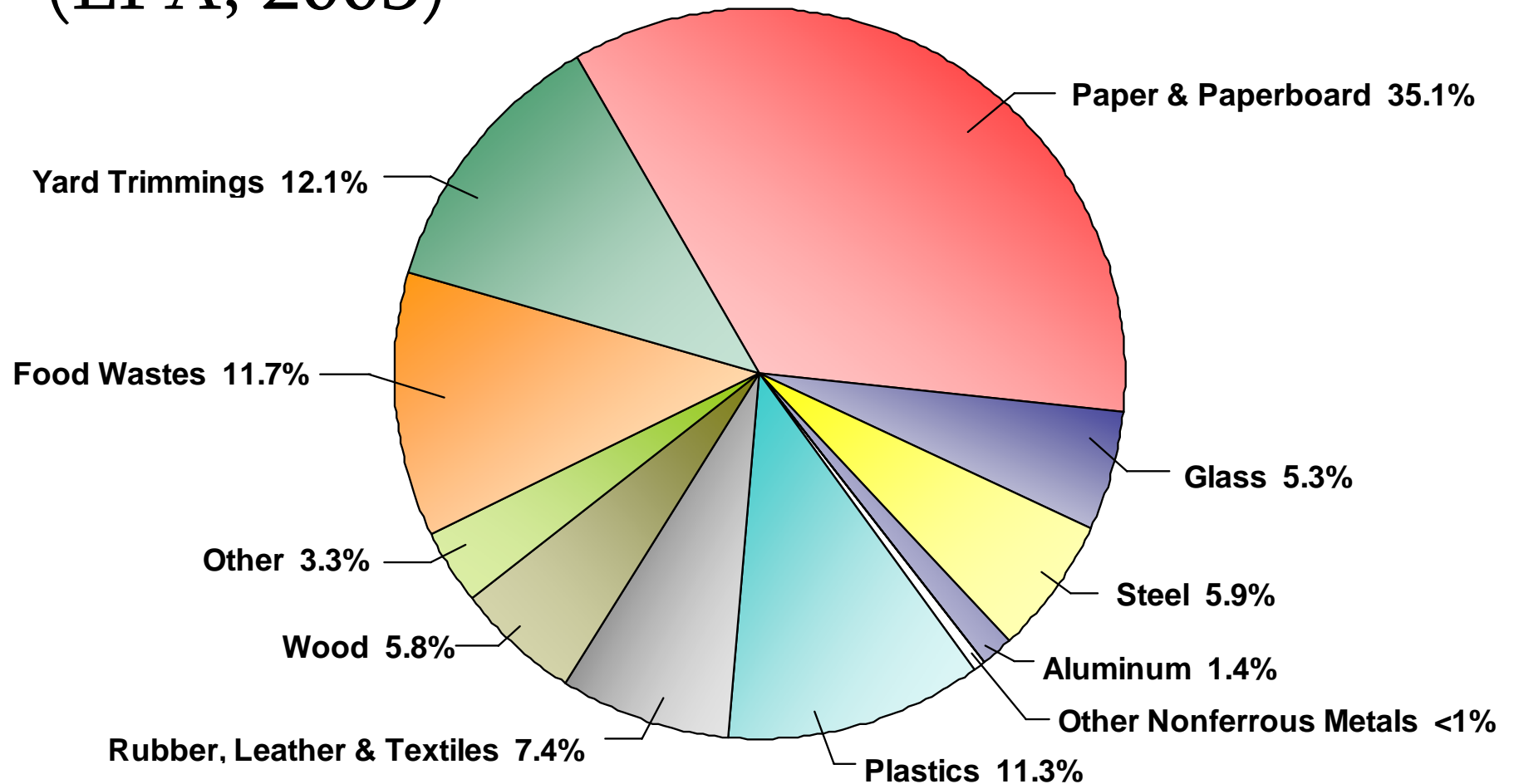


**Quantities of  
Recyclables**




# Background



# Materials in the MSW Stream (EPA, 2003)

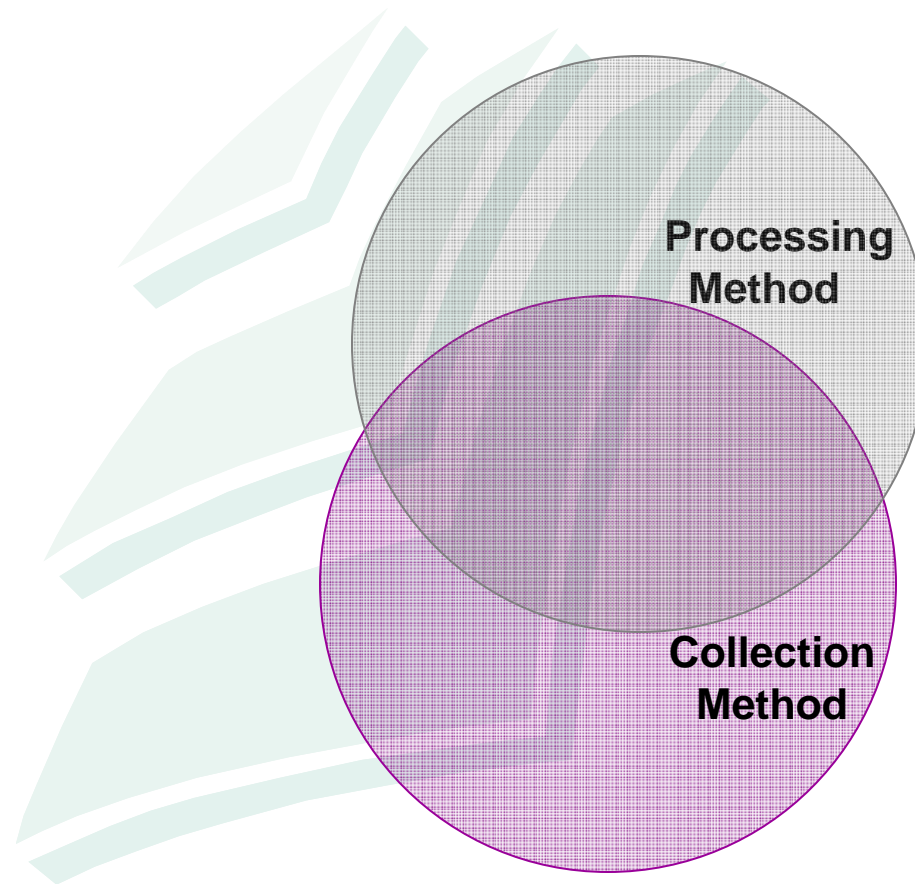


# Estimated Annual Tonnage of Recyclables in the Borough

Materials	Tonnage of MSW Materials in South Cushman Landfill	Recycling Recovery Rates (EPA, 2003)	Total Tonnage Recovered Annually (based on 2003 EPA Recovery Rates)
 Paper & Paperboard	29,866	48.1%	14,365
Glass	4,510	18.8%	848
Steel	5,020	36.4%	1,827
 Aluminum	1,191	21.4%	255
Other nonferrous metals	596	66.7%	397
 Plastics	9,615	5.2%	500
Rubber, Leather & Textiles	6,296	15.0%	944
Wood	4,935	9.4%	464
Other	2,808	12.3%	345
Food Wastes	9,955	2.7%	269
Yard Trimmings	10,296	56.3%	5,796
<i>Total</i>	<i>85,087</i>	<i>30.6%</i>	<i>15,120</i>

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# Recycling Program Considerations



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# Collection Options

## Preparing Recyclables for Collection

- ❑ Drop-Off vs. Curbside
- ❑ Source-Separated and Commingled
- ❑ Facility-Separated

*The level of participation is influenced by each of these issues.*

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# Drop-Off vs. Curbside

- Recyclables will be collected in the same way regular garbage is currently collected:

- Curbside

- City of Fairbanks
- Ft. Wainwright
- Eielson AFB
- UAF

- Drop-Off

- Transfer Sites
- Landfill

# Source-Separated and Commingled

## ■ Source-Separated



Old Corrugated Cardboard (OCC)



White Office Paper



Mixed Paper



Aluminum



Plastics, HDPE-Natural



Plastics, HDPE-Colored

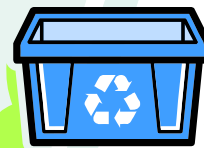


Plastics, PET



Regular Trash

## ■ Commingled



Commingled Recyclables



Regular Trash

# Source-Separated and Commingled

## ■ Source-Separated

- ❑ Requires a greater effort from the generator → Lower participation rate
- ❑ Lower recovery rate
- ❑ Requires intense public education

## ■ Commingled

- ❑ Requires less effort from the generator → Higher participation rate
- ❑ Higher recovery rate
- ❑ Requires less public education

# Facility – Separated

## Materials Recovery Facility (MRF)



# Facility-Separated



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# Facility - Separated

- **Materials Recovery Facility (MRF)**
- Most convenient to the generator...higher participation rate
- Facility has control over quality of separation
- Mixing waste can contaminate recyclables reducing their marketability
- Large capital investment

# Facility - Separated

- Based on our research, a *facility-separated program* is not feasible for Fairbanks and *is not considered in our analysis.*
- ✓ ■ Source-Separated
- ✓ ■ Commingled

# Estimated Annual Tonnage of Recyclables in the Borough

Materials	Tonnage of MSW Materials in South Cushman Landfill	Recycling Recovery Rates (EPA, 2003)	Total Tonnage Recovered Annually (based on 2003 EPA Recovery Rates)
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<i>Total</i>	<i>85,087</i>	<i>30.6%</i>	<i>15,120</i>

# Source-Separated Collection

Customer	Potential Tons of Recyclables	% of Total
✓ Commercial Haulers	4,466	30%
✓ Transfer Sites	7,565	50%
✓ Residential Self-Haul to Landfill	187	1%
✗ City, FTWW, EAFB, and UAF Residents	2,902	19%
<i>Total</i>	<i>12,218</i>	<i>100%</i>

# Commingled Collection

Customer	Potential Tons of Recyclables	% of Total
✓ Commercial Haulers	4,466	30%
✓ Transfer Sites	7,565	50%
✓ Residential Self-Haul to Landfill	187	1%
✓ City, FTWW, EAFB, and UAF Residents	2,902	19%
<i>Total</i>	<i>15,120</i>	<i>100%</i>

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# Source-Separated or Commingled Collection...The 3 Program Options

- A Source-Separated Recycling Program requires the transfer sites to be manned. It is assumed other entities will not participate.
  - Option 1
  - Option 2
- A Commingled Recycling Program offers the other entities the opportunity to participate and does not requiring manning the transfer sites
  - Option 3

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# Participation Rate

Option 1, 2, and 3:

*Estimate 3.5 out of 10 people will participate*

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## Option 1: Source-Separated Collection

### *Manning the 5 Largest Transfer Sites*

- 5 largest sites = 80% of MSW from transfer sites
  - ❑ Separate fenced area for recycling bins
  - ❑ Personnel shelter at each site (small camp trailer)
  - ❑ 7 categories: OCC, white office paper, mixed paper, aluminum, HDPE2-natural, HDPE-colored, PET
  - ❑ Contract Hauler makes separate trips for each material
- Recyclables Recovered... **2,118 tons**

# Option 1: Source-Separated Collection

## *Manning the 5 Largest Transfer Sites*

- 9 remaining sites = 20% of MSW from transfer sites  
→ *service these sites via a mobile recycling center*
  - Pick-up and 5<sup>th</sup> wheel trailer equipped with collection bins
  - 7 categories: OCC, white office paper, mixed paper, aluminum, HDPE2-natural, HDPE-colored, PET
  - Mobile recycling center hauls recyclables
- Estimate 50% reduction in collection due to sites being serviced once a week
- Recyclables Recovered... **265 tons**

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# Option 1: Source-Separated Collection

## *Manning the 5 Largest Transfer Sites*

### Landfill Collection

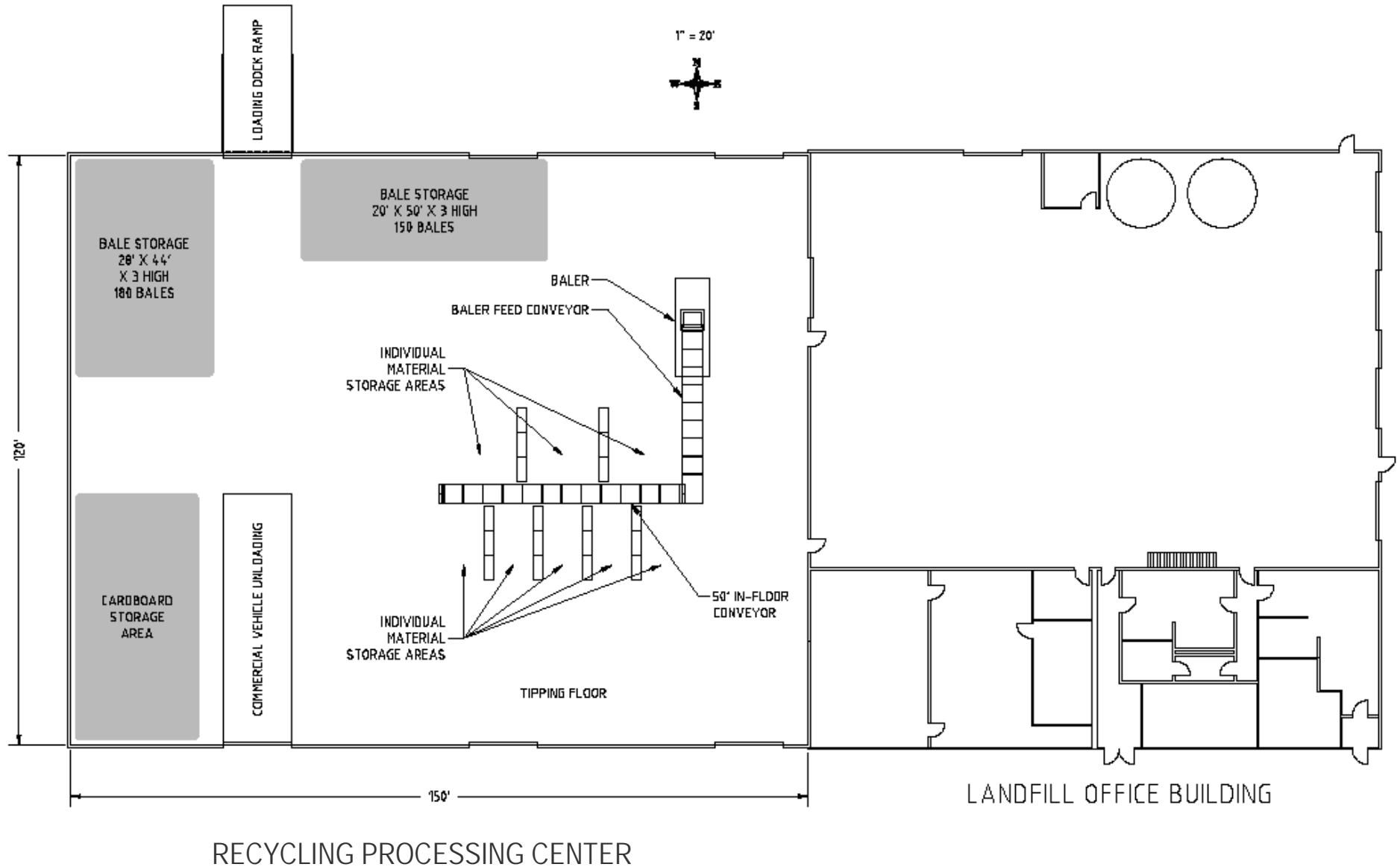
- Self-Haul Residents

Recyclables Recovered: **65 tons**

- EAFB Waste Paper Program

- ❑ 1,500 tons of paper historically recovered
- ❑ With public education we estimate *125% increase*
- ❑ Recyclables Recovered: **1,875 tons**

# Option 1: Processing Source-Separated Recyclables



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# Option 1: Source-Separated Collection

## *Manning the 5 Largest Transfer Sites*

- Total Recyclables Recovered.....4,323 tons
- Capital Costs
  - at the Landfill.....\$2,225,000
  - at the Transfer Sites.....\$220,000
- Operational Costs
  - Collection Costs.....\$553, 718
  - Processing Costs.....\$334,080
  - Transportation Costs.....\$302,610
- Value
  - of Recyclables.....\$440,442
  - of Saved Landfill Space.....\$43,987
- *Total Annual Cost (not including capital costs) .....(\$705,979)*

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## Option 2: Source-Separated Collection

### *3 Mobile Recycling Centers at the 5 Largest Transfer Sites*

- Farmer's Loop East & West and North Pole will be visited *4 days/week*
- Chena Pump - *2 days/week*
- Badger - *1 day/week*
- Estimate *50% reduction* in collection for those sites serviced once or twice a week
- Recyclables Recovered.. **1,810 tons**

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# Option 2: Source-Separated Collection

## *3 Mobile Recycling Centers at the 5 Largest Transfer Sites*

- This portion of Options 1 and 2 are identical
  - 9 Remaining Sites.....265 tons
  - Self-Haul to Landfill.....65 tons
  - EAFB Waste Paper Program.....1,875 tons

# Option 2: Source-Separated Collection

## *3 Mobile Recycling Centers at the 5 Largest Transfer Sites*

■ Total Recyclables Recovered.....	4,015 tons
■ Capital Costs	
□ at the Landfill.....	\$2,225,000 ✓
□ at the Transfer Sites.....	\$220,000 ✓
■ Operational Costs	
□ Collection Costs.....	\$358,499 ↓
□ Processing Costs.....	\$334,080 ✓
□ Transportation Costs.....	\$281,050 ↓
■ Value	
□ of Recyclables.....	\$409,062 ↓
□ of Saved Landfill Space.....	\$40,853 ↓
■ <i>Total Annual Cost (not including capital costs) .....</i>	<i>(\$523,715)</i>

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# Option 3: Commingled Collection

## Transfer Sites

- All 14 sites would be Unmanned
  - Separate fenced area for recycling
  - Recycling attendant to lock/unlock the recycling area
  - Contractor to haul the recyclables to the landfill
- Increase in participation (more convenient) offset by decrease in tonnage of quality recyclables recovered (contamination from commingling)
- Recyclables Recovered... **2,648 tons**

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# Option 3: Commingled Collection

## Landfill

- No change in Self-Haul and EAFB Waste Paper Program from Source-Separated Program

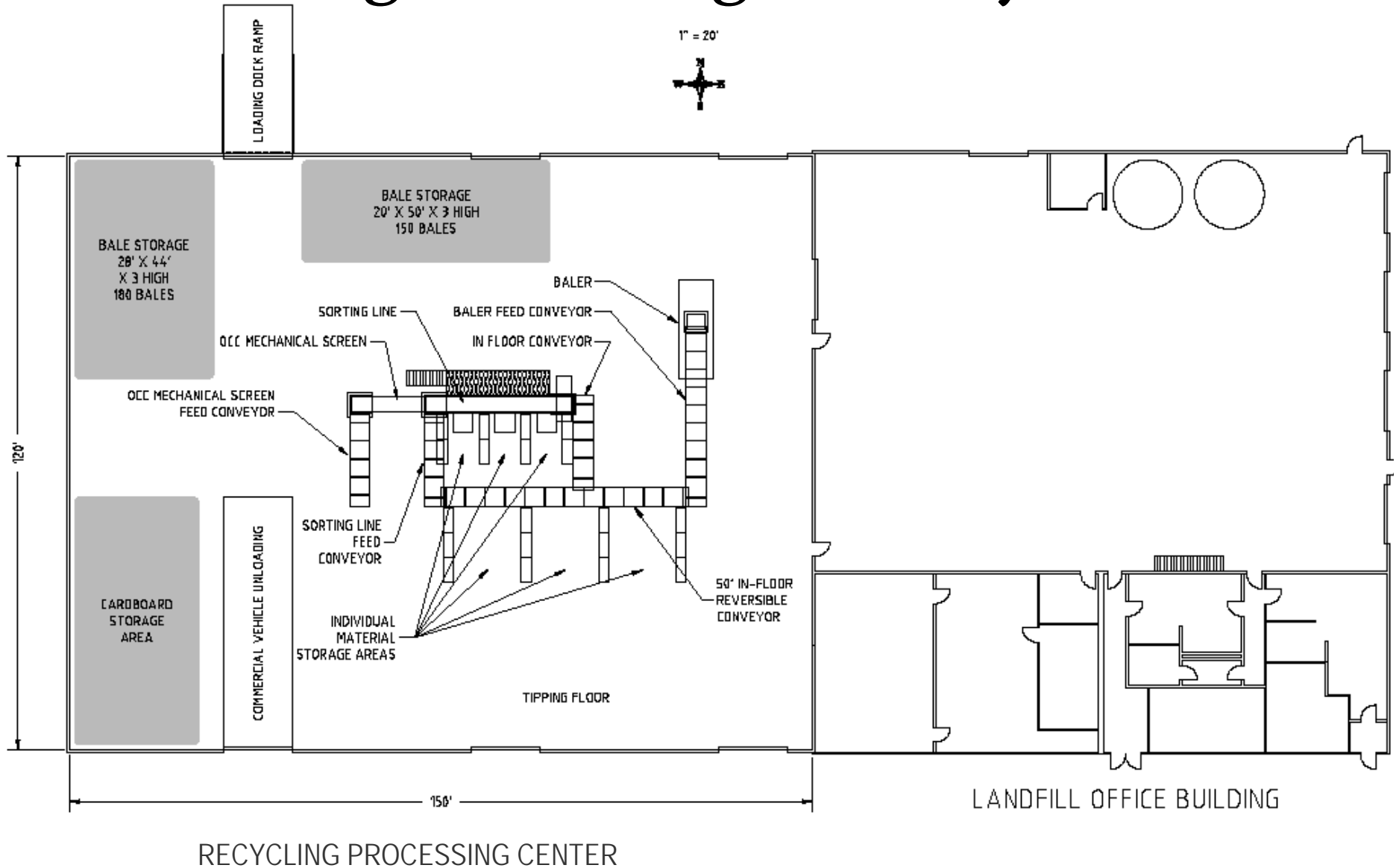
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# Option 3: Commingled Collection

## Landfill

- City of Fairbanks, FTWW, EAFB, UAF
  - ❑ Commingling recyclables allows these entities to participate
  - ❑ Each entity can collect recyclables and garbage in two trips
  - ❑ Recyclables Recovered with participation from all entities... **1,016 tons**

# Processing Commingled Recyclables



# Option 3: Commingled Collection

■ Total Recyclables Recovered.....	5,605 tons	
■ Capital Costs		
□ at the Landfill.....	\$2,880,000	↑
□ at the Transfer Sites.....	\$130,000	↓
■ Operational Costs		
□ Collection Costs.....	\$286,102	↓
□ Processing Costs.....	\$603,465	↑
□ Transportation Costs.....	\$392,280	↑
■ Value		
□ of Recyclables.....	\$570,954	↑
□ of Saved Landfill Space.....	\$57,021	↑
■ <i>Total Annual Cost (not including capital costs) .....</i>	<b>(\$653,872)</b>	

# Economic Analysis Comparison of Options

Option	1. Source-Separated, Manning 5 Largest Sites	2. Source-Separated, Mobile Recycling Centers	3. Commingled
Estimated Tons of Recyclables	4,323	4,015	5,604
Capital Cost	\$2,445,000	\$2,445,000	\$3,010,000
Number of New Employees	11	9	11
Total Annual Program Cost (not including Capital Cost)	(\$705,979)	(\$523,715)	(\$653,872)

# Economic Analysis Summary

Option	1. Source-Separated, Manning 5 Largest Sites	2. Source-Separated, Mobile Recycling Centers	3. Commingled
Total Annual Program Cost (not including Capital Cost)	(\$705,979)	(\$523,715)	(\$653,872)
Annual Cost for Current Borough Recycling and Reuse Program	(\$497,874)	(\$497,874)	(\$497,874)
Annual Cost for Current Waste Paper Recycling included in new Options	\$125,638	\$125,638	\$125,638
Total Annual Cost for Existing Program and Implementing New Option	(\$1,078,215)	(\$895,951)	(\$1,026,108)

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# Recommendations

## ■ Alternative 1

- Continue existing recycling program
- Quantities of Materials Recovered
  - Scrap Metal 630 tons
  - Used Oil 16,000 gallons
  - Batteries 430,000 pounds
  - Antifreeze 6,450 gallons
  - Waste Paper 1,500 tons
- Total Annual Cost (\$497,874)
- Capital Cost \$0

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# Recommendations

## ■ Alternative 2

- Continue existing recycling program except for the Waste Paper
- Implement Option 2 – Source-Separated Collection at Transfer Sites by Mobile Recycling Centers
- Install baler and conveyor at the Recycling Processing Center
- Lowest Capital and Operating Cost Option
- Collection is controlled entirely by the Borough
- Program can be easily reduced or expanded when participation changes
- Paper, Plastic, and Aluminum Recycled 4,015 tons
- Total Annual Cost (\$895,951)
- Capital Cost (\$2,445,000)

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# Recommendations

## ■ Alternative 3

- ❑ Continue existing recycling program except for the Waste Paper
- ❑ Implement Option 3 – Commingled Collection at Unmanned Transfer Sites
- ❑ Install baler, sorting line, mechanical screen, and conveyor at the Recycling Processing Center
- ❑ Highest Capital and Operating Cost Option
- ❑ Collection is available to entire Borough, if other entities choose to participate
- ❑ Program can not be easily reduced when participation drops
- ❑ Program can be expanded by adding additional recycling personnel when participation raises
- ❑ Paper, Plastic, and Aluminum Recycled 5,600 tons
- ❑ Total Annual Cost (\$1,026,108)
- ❑ Capital Cost (\$3,010,000)

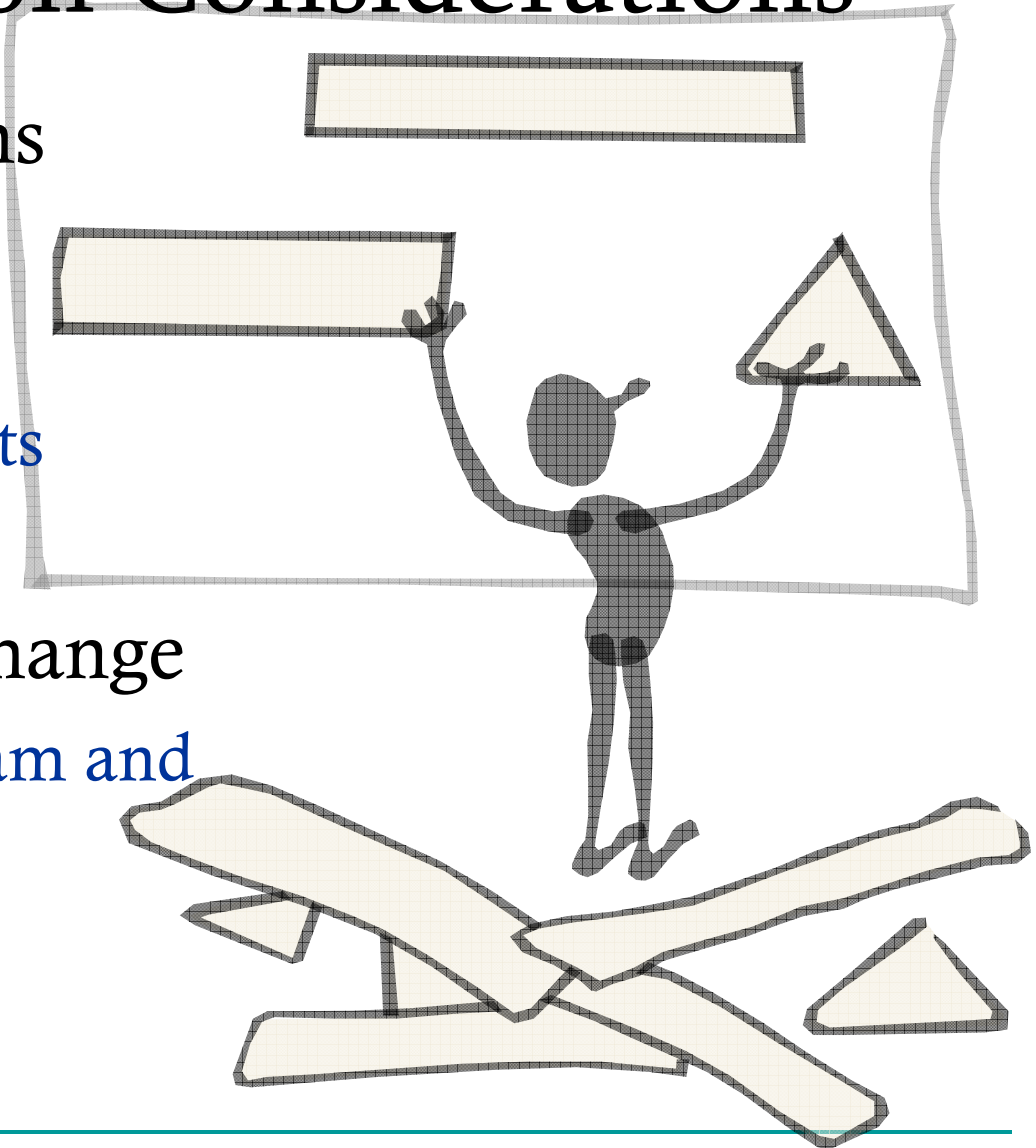
# Implementation Considerations

- Establish a Recovery Goal as an initial step



# Implementation Considerations

- Verify Assumptions
  - No tipping fee
  - Fuel costs
  - Transportation costs
  - Market values
- Change requires change
  - Monitor the program and adjust it as needed



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# Implementation Considerations

- Educate the Public
  - The program's success is dependent on the public's participation and input

