

October 27, 2000

Mr. Michael L. Crist
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**Subject: Recommendations for Revised Layout of Recycling Operations in the
Authority's Existing Building**

Dear Mike:

R. W. Beck is pleased to provide Clinton County Solid Waste Authority with recommendations for the overall layout of recycling operations at the Authority's recycling facility located adjacent to the Authority's. The Authority currently provides curbside collection of source separated recyclable materials and drop-off collection to selected municipalities throughout the County. Collection crews sort and separate materials at the curbside by type, and deliver them to a recycling center owned and operated by the Authority. At the Center, collected materials are processed and marketed along with items dropped off by residents or commercial haulers.

The current facility consists of two attached buildings with a combined processing and storage area of approximately 7,100 square feet. The largest portion of the area (4,600 sq. ft.) is an old maintenance garage that is still periodically used to store vehicles in the colder weather. Given the level of recycling in the County (just under 1,000 tons of recyclables were processed and marketed in 1999) contained in Table 1, the operation had outgrown the garage structure. The Authority added on an area of approximately 2,500 square feet to accommodate storage and off-loading of processed materials onto to transport vehicles. The expansion includes two loading docks. Loose glass, aluminum and tin containers and baled aluminum and tin are stored in bunks built off one end of the maintenance garage.

Currently, the Authority has sufficient area to accommodate the level of recycling and allow for some growth to handle additional quantities of materials. However, the Authority is interested in expanding collection programs to include plastic bottles. To accommodate separating the bottles into resin types and color to maximize market value, the Authority will need to install a horizontal sorting conveyor. The Authority is interested in trying to expand recycling in Clinton County to meet and exceed the diversion goal of 35 percent proposed for Pennsylvania by 2003, and realizes the capture of additional materials will be required to achieve this goal. Additional area at the Recycling Center will be required to accommodate adding a sorting line and storing loose materials and processed bales. This

study will examine the physical changes required to the building, describe equipment requirements and identify associated costs.

**RECYCLING TONNAGE
PROCESSED AND MARKETED BY AUTHORITY**

Material	Tons thru 6/30/00	Tons for 1999
Old Newsprint	227.9	397.5
Office Paper/Magazine	117.4	95.5
Old Corrugated Cardboard	98.5	125.7
Glass	79.8	215.7
Steel	67.9	91.8
Aluminum	0.0	21.2
Plastic	19.9	37.3
Total Tonnage	611.4	984.7

To assist the Authority in configuring the layout of an expanded building for a recycling operation, a R. W. Beck staff person visited the structure on June 30, 2000. Based on observations and discussions with Authority staff, the following factors were taken into consideration:

- Materials collected for processing and marketing include: OCC; clear, brown and green glass containers; aluminum, steel, tin and bimetal containers; newspaper; magazines and catalogs; and office paper;
- Authority will expand collection to capture additional quantities of materials currently being recycled and expand items collected to include plastics and other materials as opportunities arise;
- Authority is immediately interested in collecting plastic bottles (PET and HDPE), and will separate as appropriate to realize higher market value;
- The facility will be laid out to minimize the handling of materials and maximize the efficiency of the operation;
- Reduction in handling will help minimize the cost of the operation; and
- The processing/storage area in an expanded building should bring the total area available for the operation to no less than 10,000 square feet.

PHYSICAL CHANGES TO THE BUILDING

To accommodate handling a new material stream such as plastics the Authority will require additional space for storage of loose materials and baled materials. The amount of space required specifically for the plastics will be a function of the level of separation the Authority decides provides the best value to the program. Plastics (PET and HDPE) can be marketed in completely mixed loads which include both resin types as well as clear and colored bottles, or it can be separated into different categories and realize a higher market price. Table 2 shows the different levels of separation and the prices reported by other recycling programs and select markets for the different categories.

TABLE 2
REPORTED PLASTIC MARKET PRICES
(JULY, 2000 \$0.00/POUND)

Source	Mixed PET/HDPE	Mixed HDPE	Mixed PET	Colored HDPE	Natural HDPE
Centre County SWA	\$0.075	0	0	0	0
Northern Tier SWA	0	0	\$0.15 ¹	\$0.1125	\$0.2025
Wayne County	0	\$0.11	\$0.12	0	0
St. Jude Polymer	\$0.12	0	\$0.14	\$0.12	\$0.18
Graham Plastics	0	\$0.15	\$0.08 ²	\$0.14	\$0.23

As Table 2 illustrates, some level of separation can result in a higher market value. Whether to sort at all and to what is extent then becomes a factor of costs to separate the components being less then the net value of the higher market prices. Another consideration is physical constraints. The facility must be sized to accommodate storage needed to accumulate enough of each component to generate a bale. Baled materials will be stored in the facility as well if the Authority is required by markets to ship a load of each material type separately.

There is an opportunity to expand the existing facility by building an addition onto the front of the maintenance garage portion of the facility (see Exhibit 1). The proposed dimensions for the addition are 70'Lx 50'Wx 26'H. The length is a function of the addition matching up with the existing garage structure, while the width is to ensure sufficient area

¹ Price for clear PET only

² Graham brokers the PET which is not used in their processes

inside and leave the drive area outside the building large enough to maneuver vehicles. The height is to allow for collection vehicles to tip inside the building. The area added with the expansion is 3,500 square feet, bringing the total space inside for processing and storing materials up to 10,600 square feet.

The intent would be to primarily use the new area for tipping and storage of loose materials specifically, OCC, ONP and plastic bottles. The newsprint and OCC would be stored on the office side of the addition and plastics on the opposite side. Two pits will be sunk into the new floor of the extension to submerge the feed conveyor for the baler and for the plastic sorting line to allow material to be pushed easily onto the feed conveyors. This eliminates the need for the material to be scooped onto the feed conveyors which is the present system used at the facility for the baler. The expectation is to rotate the baler 90 degrees so that the feed conveyor extends into the new area through an existing overhead door, enabling the Authority to add the pit feature with out tearing up existing flooring. Also, this orientation will allow the loose materials stored in the addition to be pushed directly onto the feed conveyor (see Exhibit 2).

To determine the costs associated with constructing the addition the following assumption were made:

- The building will be pre-engineered steel frame with corrugated steel exterior walls, with three large overhead door and two man-doors, eight foot concrete side walls on either end of the building to serve as push walls and a six inch steel reinforced floor with two pits.
- The addition will be tied into the front side of the existing maintenance garage leaving a driveway access to the metals separating area of the operation.
- An estimated cost of \$70.00/square foot to construct the addition are based on bid prices recently quoted to Wyoming County, Pennsylvania for a building meeting similar specifications.
- Total estimated cost for the addition is expected to be approximately \$70.00 x 3,500 square feet or \$245,000.

R. W. Beck recognizes that the Authority was able to have the existing addition constructed for less than \$70.00/sq. ft., however, if the project was contracted out and met the specification defined above it is expected to cost more in the \$245,000 range.

MODIFICATIONS TO PROCESSING OPERATIONS

The only positive sorting taking place at the facility is the magnetic separation of steel cans from mixed loads of steel and aluminum cans. All other sorting is limited to negative sorts, or the removal of contaminants as materials are fed up the conveyor into the baler.

With the addition of plastic bottles to the collection systems, the Authority is anticipating expanding the positive sorting to include manual separation of plastics by resin type and potentially color. This would be accomplished on a horizontal sorting conveyor that would be positioned over containers or bunks for each of the separated plastic categories.

Of the three different County programs shown in Table 2, there are three different levels of separation. Centre County is currently not separating, but expects to after they are expand and upgrade the current facility and operations. For not separating, they are receiving as little as \$0.035/lbs or as much as, \$0.1275/lbs less for each pound of plastic shipped to a market.

Wayne County separates by resin type and shipped two loads of PET at an average weight of 18.75 tons and three loads of HDPE at an average weight of 17.75 tons. In total, Wayne County shipped approximately 91 tons or 182,000 pounds of plastic bottles to markets in 1999 and received approximately \$20,770 in material revenues. Had they shipped mixed baled loads of PET/HDPE the revenues gained from the sale of the mixed plastics would have been approximately \$13,650 or \$7,120 less than what they received for the plastic being separated by resin type. Had they further separated the HDPE to natural and colored bottles, the revenue realized from the sale of the HDPE would be even greater given that the price paid for natural is nearly double the price paid for the mixed HDPE or bales of only colored HDPE. Again, the factors to determine the value of additional sorting is the physical (facility) constraints and the costs associated with making the additional sorts.

To determine the economic value of Clinton County separating mixed plastics into the three categories used by Northern Tier this analysis evaluates the operating and capital costs associated with manually sorting mixed loads of plastic bottles.

Operating Costs

Operating costs in this instance will largely be the labor associated with the manual separation of material across a horizontal conveyor. To determine the labor costs the following assumptions are made:

- Clinton County will receive at least 100 tons of plastic bottles per year based on the quantities reported by Wayne County (a more rural county);
- The breakdown by category is as follows based on figures from Wayne County and Northern Tier: 41 tons of PET, 27 tons of colored HDPE and 32 tons of natural HDPE;
- Market value of material sold is calculated based on 41 tons of PET selling for \$0.12/lbs, 27 tons of colored HDPE selling for \$0.11/lbs and 32 tons of natural HDPE selling for \$0.20/lbs, yielding a total revenue of \$28,580;
- One day per week is allocated to separating the mixed plastics;

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- Two individuals are assigned to the process at a rate of \$12.50 per hour including benefits;
- Total labor cost to separate plastics would be approximately \$9,750 for 2000.

Applying the above assumptions, Clinton County SWA could have revenues from plastic sales exceeding the labor cost by an estimated \$18,830 if the system was in place for 2000. Not yet factored into the cost of separating plastics is the capitalized costs the Authority will incur to purchase a sorting line. For the purposes of this analysis that cost will be only ten percent (ten percent match on Recycling Grants) of the cost to purchase and install the required conveyors system to facilitate separating the plastics.

Capital Costs

The equipment required for sorting will include an inclined feed and a horizontal sorting conveyors. The equipment costs will include installation and performance testing. To determine the estimated equipment cost the following assumptions were made:

- The line will be installed at a height of at least ten feet above floor level to enable the sorters to drop the separated plastic directly into bunks or cages below for storing loose bottles until a sufficient amount is available to bale;
- The incline conveyor will have a pitch of approximately 45 degrees and will be 48 inches wide and 30 feet long;
- The inclined conveyor belt will have 8 inch heavy duty cleats positioned on the belt at 18 inches on center;
- The inclined conveyor will be powered by a 2 hp, 240v, one phase electric motor;
- The sorting conveyor will be 36 inches wide and 40 feet long;
- The sorting conveyor will be equipped with emergency stops and variable speed control;
- There will be a platform on one side of the conveyor for sorters to stand on with railing;
- Stairs or a ladder will access the sorting area; and
- The estimated price for this equipment, based on a recent bid quote to Wyoming County is \$150,000 (this was confirmed with a verbal estimate from the equipment vendor 8/15/00), with the Authority's share projected at \$15,000 or ten percent grant match. If the Authority depreciates the \$15,000 over ten years the annual capitalized cost will be no more than \$1,500.

It is expected that the sorting area will be positioned inside the existing garage portion of the building, along the wall opposite the baler. This side of the building was chosen for two reasons. First, the baler, if placed on the wall opposite its current location, would obstruct the direct flow of traffic through the building. Additionally, if the Authority should ever elect to process loads of commingled materials, an out feed conveyor could be installed to convey separated materials to existing outside storage bunks and the metal processing area located on that side of the building. Unfortunately, this does not allow the Authority to take advantage of the existing loft as a second story to elevate the sorting process.

One additional capital cost to factor into the analysis is the cost to install bunks or purchase cages to store loose sorted material. Cages on caster wheels fashioned after those used by Northern Tier would cost the Authority an additional \$20,000 for four. Again, match share of ten percent puts the cost of the cages to the Authority at \$2,000 or a depreciated cost of \$200 annually.

The total capital cost of the processing equipment and installation is approximately \$170,000 with an estimated annual cost to the Authority of \$1,700 assuming a Section 902 grant funds 90 percent of the overall capital cost.

Project Development

Another cost associated with the Project and eligible for grant reimbursement is the Project Development costs. These include preparation of drawings and bid specifications for the building and equipment, review and selection of successful bidders, construction oversight and equipment acceptance testing. A factor of ten percent of the overall project cost of \$415,000, or \$41,500, is used to estimate project development costs.

SUMMARY

Total project costs are projected to be approximately \$456,500 and are summarized below in Table 3. The actual cost to the Authority is estimated to be, \$45,650 or ten percent of the total project cost provided the project is awarded grant funding. The extra space the new addition offers the operation is sufficient to enable the Authority to store loose plastic bottles, separate and process materials and store baled materials.

To determine the economic value of the Authority sorting the plastic bottles the operating and capital costs for this process were determined above. Combined the estimated annual cost starts at \$11,500. The expected market value of the plastic if sorted into the three categories presented above, based on 2000 market prices would be \$28,600 or \$17,100 more than the projected costs that will be incurred. Therefore it appears there is economic value for the Authority to separate plastics as long as the markets continue to value separated natural HDPE. Also, some markets cannot handle mixed bales of PET and HDPE, so not separating plastics to at least this level will restrict the markets available to the Authority for accepting their product.

TABLE 3
SUMMARY OF PROJECT TOTAL DEVELOPMENT COSTS

BUDGET ITEM	BUDGET ITEM COST	DEP SHARE	APPLICANT MATCH (Budget item cost less DEP share)
A. PROJECT DEVELOPMENT	\$41,500	\$24,900	\$16,600
B. PUBLIC EDUCATION			
C. COLLECTION EQUIPMENT			
D. PROCESSING EQUIPMENT	\$170,000	\$165,450	\$4,550

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E. CONSTRUCTION, ACQUISITION AND MODIFICATIONS OF BUILDINGS	\$245,000	\$220,500	\$24,500
F. LAND ASSOCIATED COSTS			
G. OTHERS			
TOTAL COSTS	\$456,500	\$410,850	\$45,650

RECOMMENDATIONS

Given the findings of this analysis, the Authority should expand the facility to accommodate handling PET and HDPE plastic bottles. The expansion should include the installation of an elevated sorting line to separate plastic bottles by resin type and color. There should be at least three sorts of the plastic to take advantage of the higher market value of natural HDPE. The system should be set-up in a manner to allow additional sort categories in the future. An Act 101 Section 902 grant should be prepared and submitted sometime in the future to secure State funds to assist the Authority with this endeavor.

Please feel free to call me at (717) 730-0404 if you have any questions on the recommendations provided in this letter report.

Sincerely,

R. W. BECK, INC.

Richard M. Schlauder
Director, Environmental Services Pennsylvania Office

cc: Kathleen Kilbane, SWANA
Carl Hursh, PA DEP

Exhibit 1

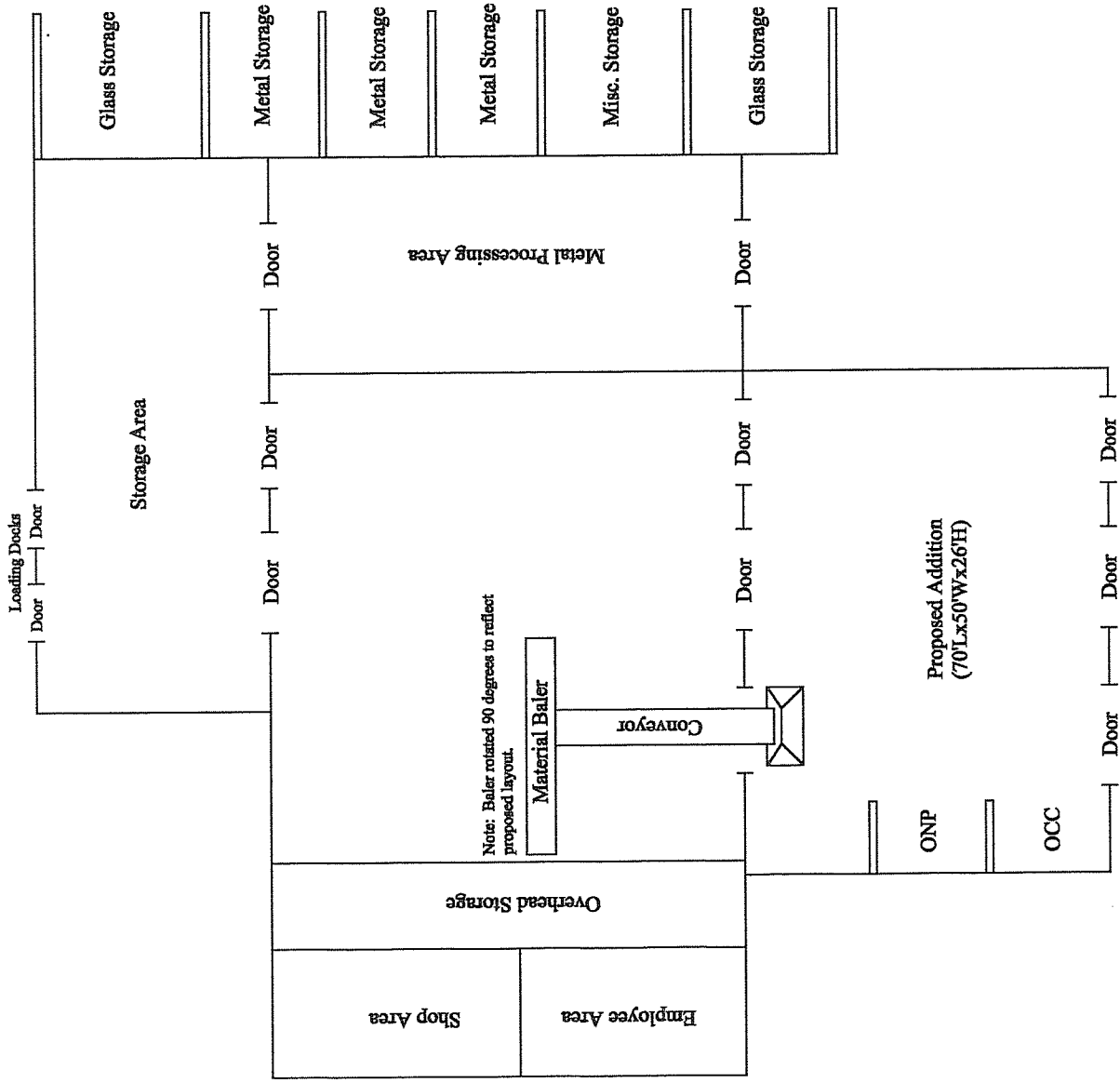


Exhibit 2

