RECYCLING MARKET ANALYSIS FOR PINELLAS COUNTY

FIRST DRAFT

PREPARED BY:

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Pinellas County

EXECUTIVE SUMMARY

RRS was contracted to conduct a Recycling Market Analysis for Pinellas County Florida to determine market viability for recyclables most commonly collected in the County. RRS undertook domestic and international market research of mixed recycling commodity markets with the primary objective to understand what markets exist for 'clean', non-contaminated recyclables. The initial goal was to advise the County on existing markets and their behavior; the ultimate goal for the County is to determine the feasibility of a publicly-owned regional MRF by using fact-based information in this report and a planned future study of current recycling practices of municipalities, regional volumes, and waste compositions.

RRS's analysis included the current residential recycling programs within Pinellas County. The commonly recycled materials in Pinellas County were documented and those that demonstrated a value both above $0 and greater than the current Pinellas County tipping fee of $39.75 per ton were further researched. The composition analysis and commodity values were analyzed based on the latest data from the following sources: local municipalities within the County and region, the RRS Internal Recycling Index, the Institute for Scrap Recycling Industries (ISRI), the Association of Plastics Recyclers (APR), and The Recycling Partnership's 2020 State of Curbside Recycling Report. The resulting twelve commodities that demonstrated value were further researched to explain short and long-term forecasts, issues affecting each commodity in the last twelve months, current trends influencing each commodity and current access to recycling markets in the Southeastern United States. A one-page summary exists for each commodity in a FITA (Forecast, Issues, Trends and Access).

RRS Municipal Curbside Recycling Review and Recyclable Material List

RRS reviewed the recycling websites and Acceptable Materials List for each municipality within Pinellas County. Not all municipalities collected the same residential recycling materials and a several had differing residential recycling collection services, i.e. single stream vs. dual stream. The recyclables that were most accepted on the lists included: Glass (3 color mix), Aluminum Cans (UBC), Steel Cans (Tin), Sorted Residential Papers & News (SRPN #56), Mixed Paper (54), Cardboard (OCC # 11), Cartons (52), Polyethylene Terephthalate (PET #1), Natural High Density Polyethylene, (NHDPE #2) and Colored Natural High Density Polyethylene (CHDPE #2). Mixed Plastics (#3-7), including Polypropylene (PP #5) were accepted by some municipalities and were included on our research list due to current market value. Expanded Polystyrene (EPS), Film Plastics, Bulky Rigid Plastics and Aluminum Foil were not explicitly stated on acceptable recycling materials lists; however, some websites included pictures of these types of recyclables. Based on sustained values of the three non-stated recyclables, Bulky Rigid Plastics and aluminum foil have a positive value, are marketed far above the landfill tip fee, and were included in the final list of recyclables (also see Pictogram in the power point presentation), though only some MRFs have them on their list of acceptable materials. 3-7 plastics that do not separate out polypropylene is commonly accepted, has mostly positive value, sometimes suffers from lack of movement, but still has sustained itself as a curbside grade. It is on the list but under the conditions stated:

PLASTIC	PAPER PACKAGING	METAL	GLASS
• Polyethylene Bottles (PET#1) • Natural High-Density Polyethylene Bottles and Jars (NHDPE #2) • Colored Natural High-Density Polyethylene Bottles and Jars (CHDPE #2) • Mixed Plastics (#3-7) • Polypropylene (#5) • Bulky Rigid Plastics	• Sorted Residential Papers & News (SRPN #56) • Mixed Paper (#54) • Cardboard (OCC #11) • Aseptics & Cartons (52)	• Aluminum cans (UBC) • Steel Cans (tin) • Aluminum Foil	• Glass 3 Mix-** ($/ton del. as recyclable/disposable – including environmental fees/battery surcharge

Commodity Value in Relation to Pinellas County Tipping Fee

The first test was to identify negative value commodities (red) and compare prices vs. Pinellas County LF/WTE Tip Fees. Based on national waste composition data provided by the 2020 State of Curbside Recycling Report, the RRS-advised list of commodities was each assigned a per ton value based on 2019 data, 2020 data and a five-year average commodity value. These values were then compared to the current Pinellas County tipping fee, as seen in the following table:

MATERIAL	2019 RRS INDEX VALUE	PINELLAS LF/WTE FEE	VALUE ABOVE LF/WTE	2020 RRS INDEX VALUE	PINELLAS LF/WTE FEE	VALUE ABOVE LF/ WTE	RRS INDEX 5-YEAR VALUE (APRIL 2015-MARCH 2020)	PINELLAS LF/WTE FEE	VALUE ABOVE LF/ WTE	TRP VALUE	PINELLAS LF/ WTE FEE	VALUE ABOVE LF/ WTE
MIXED PAPER (#54)	$(2.08)	$39.75	$37.67	$(4.17)	$39.75	$35.58	34.47	$39.75	$74.22	$(1.88)	$39.75	$37.87
SORTED RESIDENTIAL PAPERS AND NEWS (SRPN #56)	$22.50	$39.75	$62.25	$17.50	$39.75	$57.25	51.68	$39.75	$91.43		$39.75	$39.75
CARDBOARD (OCC #11)	$44.17	$39.75	$83.92	$38.33	$39.75	$78.08	90.04	$39.75	$129.79	$24.69	$39.75	$64.44
ASEPTICS AND CARTONS (#52)	$27.92	$39.75	$67.67	$31.98	$39.75	$$71,73	$36.04	$39.75	75.79	Neutral Value	$39.75	$39.75
GLASS 3 MIX-** ($/TON DEL. AS RECYCLABLE / DISPOSABLE - INCL. ENVIRONMENTAL FEES/BATTERY SURCHARGE)	$(22.50)	$39.75	$17.25	$(32.50)	$39.75	$7.25	$(21.29)	$39.75	$18.46	$(20.70)	$39.75	$19.05
PET BOTTLES	$266.68	$39.75	$306.43	$218.33	$39.75	$258.08	253.22	$39.75	$292.97	$188.60	$39.75	$228.35
OTHER PLASTIC PACKAGING* (MIXED PLASTICS #3-7)	$(30.00)	$39.75	$9.75	$(30.00)	$39.75	$9.75	$(3.37)	$39.75	$36.38	$5.00	$39.75	$44.75
BULKY RIGID PLASTICS	$52.50	$39.75	$92.25	$37.14	$39.75	$76.89	48.87	$39.75	$88.62	$48.80	$39.75	$88.55
POLYPROPYLENE (#5)	$234.58	$39.75	$274.33	$120.00	$39.75	$159.75	222.92	$39.75	$262.67	$-	$39.75	$39.75
STEEL CANS (TIN)	$99.38	$39.75	$139.13	$88.33	$39.75	$128.08	107.07	$39.75	$146.82	$80.63	$39.75	$120.38
ALUMINUM CANS (UBC)	$1,083.43	$39.75	$1,123.18	$986.67	$39.75	$1,026.42	1241.98	$39.75	$1,281.73	$1,025.00	$39.75	$1,064.75
HDPE COLORED BOTTLES AND JARS (NHDPE #2)	$286.25	$39.75	$326.00	$201.67	$39.75	$241.42	347.42	$39.75	$387.17	$262.00	$39.75	$301.75
HDPE NATURAL BOTTLES AND JARS (HDPE #2)	$674.58	$39.75	$714.33	$1,055.00	$39.75	$1,094.75	673.60	$39.75	$713.35	$1,008.00	$39.75	$1,047.75

**Other plastic packaging was valued as plastics #3-7; ** 3-Mix Glass changed definitions in March 2020*

Second, RRS is providing full FITA sheets for each researched commodity that outlines short and long-term forecasts, commodity trends, current issues and market access in the Southeast. Following is a summary table for each commodity with a focus on Past Market Behavior, Impact of COVID-19, and RRS's forecast for the future.

MIXED PAPER (#54)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Florida has longest freight for mixed paper (MP) and there are historical movement issues, especially in January and February. • National Sword eliminated most significant market resulting in extreme oversupply over 4M TPY. • Domestic mills did not have the cleaning equipment to use the new supply from MRFs. • Some programs have removed MP or are landfilling MP. • Domestic capacity has absorbed some of the oversupply. • Over a million tons of new capacity will come online in the next two years for this grade.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • Online consumption has increased. MP can be substituted for OCC, but persistent oversupply still has poor price. • In April and May 2020, "paper panic" spreads and Mixed Paper pricing soared from a negative value to +$13 per ton.	• SHORT TERM: MP may see some modest increases in coming months, if OCC continues to climb. • LONG TERM: Market will recover in 1-3 -years from increasing demand with dwindling supply and domestic mill capacity increase. With the loss of commercial sorted grades and new international demand in Asia, grade will be in supply demand balance in 1-3 years. • Keep in Programs

SORTED RESIDENTIAL PAPERS AND NEWS (SRPN #56)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• After initial oversupply due to National Sword, demand has returned for SRPN and price is significantly more than mixed paper. • Market was shrinking for SRPN, due to loss of newspaper and increased e-commerce communication, now has movement for all the sorted tons that can be made.	• Mills consuming SRPN have shut down. • GDP is down approximately 35%, recovery estimates are for late Q4. • Daily newspapers have shut down. • In April and May, SRPN was sought as a cleaner mixed paper during the "paper panic", +80% change from mid-point of 2019.	• SHORT TERM: All sorted grades, including SRPN, if it can be sorted to 2% contamination or less, will see price increases in coming months due to supply shortages both domestic and export. • LONG TERM: SRPN pricing has separated from mixed paper with good market balance. True mixed ONP (SRPN, #8 ONP) will have a differential of $25 or more compared to mixed paper because of lower contaminants from more sorting, and because it can be used in groundwood applications. • Keep in programs.

CARDBOARD (OCC #11)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• OCC historically tracked significantly higher in price in the Southeast than the national average. • Imports to China continued to decline with ban in 2021, and other markets continued restrictions. • China's need for highly sorted #12 grows demand for this grade.	• Reports indicate that virus can live on OCC for 24 hours. However, conflicting reports are emerging. • Sharp increase in demand and loss of commercial OCC supply. This is due to surge in online grocery delivery, and medical, sanitary and PPE Supplies coupled with loss of commercial OCC. • E-commerce orders up 62% in March. • "Paper panic" loss of commercial OCC have pushed prices over $120 per ton currently.	• SHORT TERM Pricing will continue to increase in the short-term. • LONG TERM: OCC will have increased demand for containerboard but much less than predicted. Market will be steady. • Keep in programs. Capture more OCC through better sorting of small format materials.

ASEPTICS AND CARTONS (52)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Consumption and recycling of cartons has shown growth, but volumes are still low (~.5% by volume). • Limited MRFs sort as a separate grade and many incorporated into Mixed Paper bales.	• Cartons are an additive or a substitute for SOP in tissue mills. • Tissue mills reported as running at 120% capacity due to COVID-19 related demand. • SOP is generated from offices that are closed during stay-at-home orders, and mills are struggling for supply. • Concerns with virus on human-consumed containers is present with this grade as well.	• SHORT TERM: Cartons will have good pricing in the near term due to supply shortage of SOP paired with extremely high tissue demand, especially since the base of aseptics/cartons is long-strand, high quality white sulfate. • LONG TERM: Cartons have maintained a positive value since the grade was tracked. Markets in the Southeast are likely to improve as supply for sorted grades of material increases. • Keep in programs with dwindling supply problem of SOP, SWL.

GLASS 3 MIX

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• MRF quality of recovered glass had been a significant issue. • Glass container market was losing share to other types of packaging or use of virgin alternatives.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. Numbers are changing. • Deposit states have ceased redemption. Glass cullet for recycling is not available from these sorted sources.	• SHORT AND LONG TERM: 3-mix glass will continue to trade low and may decrease further, as fiberglass for construction slows with the economy, and glass packaging continues to decline. Premiums are paid for better clean-up of glass. • Arglass facility in Valdosta and adoption of pozzolon by state will improve markets. • However, glass is popular to recycle and the public expects to have convenient access. • Keep in programs but evaluate if markets disappear completely.

PET BOTTLES (#1)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Low cost virgin resin historically had capped pricing on recycled PET. • Nationally, PET recycling rate had been flat for the past 10 years at around 30%. • Brands made pledged to increase recycled content of packaging.	• 8 of 10 deposit states have temporarily shut down deposit system, hand sort MRFs closing throughout country causing a decreased in supply.	• SHORT TERM: Volatile soft oil market and virgin PET oversupply- offset by loss of deposit PET bales and rPET demand. Pricing is uncertain given volatility in the energy sector. • LONG TERM: Low cost virgin PE oversupply will push market down countered by demand driven increase in rPET (recycled PET). Should eventually delink market with virgin PET within 3 years, similar to NHDPE, and pricing will trend up. • Keep in programs.

OTHER PLASTIC PACKAGING* (MIXED PLASTICS #3-7)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• National sword significantly decreased imports to China. • Residential programs began deleting #3-7 from programs. • Some markets collected mixed plastics to separate PP (#5) due to higher value.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. .	• SHORT AND LONG TERM: #3-7 bales will continue to trade at or below zero for the next 2-5 years. However, plastics industry is responding through chemical recycling initiative which deconstructs polymer molecules. Megatrend will grow markets for mixed plastic. • Cost of sorting with no markets for 3, 6, and 7, is not justified. However, balance decision with likelihood of major company investments in chemical recycling.

BULKY RIGID PLASTICS

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Mixed bulky rigids were a casualty of National Sword. • Markets that sourced mixed bulky rigids do so primarily to target HDPE and PP.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • COVID-19 Response: Oil drop, propane cracking market erodes. • Decrease demand for products made from Bulky Rigid Plastics due to slowing economy.	• SHORT AND LONG TERM: Increase virgin capacity and low oil and natural gas prices will result in a glut of cheap virgin PP and HDPE, keeping bale prices low. • Keep in programs.

POLYPROPYLENE (#5)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Was an emerging grade with volatile demand. • Market Tracked with virgin PP and oil markets as a lower quality, low-cost substitute. • Pricing was at historic low, but Pricing in SE tracks consistently higher than the national average due to high relative demand.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers.	• SHORT AND LONG AND TERM: New virgin PP capacity and low oil / natural gas markets will keep #5 bale pricing low for next 1-3 years. • Keep in programs. Begin sorting in all programs. Expect low prices until clear rPP market emerges.

HDPE COLORED BOTTLES AND JARS (CHDPE #2)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Mixed plastics were key target of China waste import ban in 2018 and alternative export markets. • Plastic exports overall saw historic lows, down 38% in 2019 compared to previous year and 60% compared to 2017 creating an oversupply.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers.	• LONG AND SHORT-TERM FORECAST: New, virgin capacity natural gas "cracking" markets and Chinese polyethylene will keep CHDPE bale pricing low for the next 1-3 years. However, similar to NHDPE, long-term trend is emergence of a rCHDPE bale with higher demand. • Keep in programs. rCHDPE will eventually become more valuable for recycled content.

HDPE NATURAL BOTTLES AND JARS (NHDPE #2)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Strong domestic end markets, particularly in Southeast have usually absorbed all the supply in the U.S. • Recycled content commitments in single use plastics from CPG brands demonstrated a boost in demand for NHDPE. • Domestic consumption has dominated.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • Increasingly soft oil market and distraction of CPGs from sustainability issues may result in lower pricing.	• SHORT TERM: Increasingly soft oil market and distraction of CPGs from sustainability issues may result in lower pricing in the coming months. • LONG TERM: Lower consumption of consumer goods linked to economic downturn may soften demand for HDPE in packaging. • Increase in capacity and low oil and natural gas prices will result in a glut of cheap virgin PE. • rNHDPE continues to decouple pricing from the linkage with virgin resin markets due to consumer company commitments, recycled content certification, and policy. • CPG commitments and minimum recycled content policy prevail and pricing should increase over time. • Keep in programs.

STEEL CANS (TIN)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• Steel in U.S. comes from recycled scrap, rather than ore. • China has command of steel market. • MRF-generated steel cans were discounted due to contamination.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • Steel market decimated with closure of many manufacturing operations, including Automakers and parts with scrap flows down 60-75 percent in final two week in March.	• SHORT TERM: Disruption to supply and demand brings market further down through outbreak. • LONG TERM: There will be some recovery once factories get back to work, but any extended recession will result in the market to remaining low. • Keep in programs. Has always been a positive market.

ALUMINUM CANS (UBC)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• World demand for all aluminum went down for the first time in 10-years. • Plastic had been replacing aluminum packaging. • Large U.S. mills, Novelis and Constellium, stopped making can sheet and produces automotive body sheet.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • Pure Aluminum is a world market. Price is off 10% (LME) and 6% in U.S. (COMEX). • To shelter in place, 8 of 10 deposit states shut down deposit system-1/3 of total U.S. UBC supply.	• SHORT TERM: Supply disruption-may be short term price gain, dissolves as mills get back to work. • LONG TERM: Though aluminum cans have a home both for going back to can sheet or secondary aluminum, pricing will remain low through 18 months • Required to help fund programs, even at 40% of its recent price.

NON-UBC ALUMINUM (FOIL, AEROSOLS AND CAT FOOD CANS)

PAST MARKET BEHAVIOR	IMPACT OF COVID-19	RRS FORECAST AND RECOMMENDATIONS
• World demand for all aluminum went down for the first time in 10-years. • Foil bales are currently trading around $.10-$.15/lb, if clean, and tracks below UBC, which is $.40/lb as of April 2020. This is down 24% in 2019. • In late 2018, early 2019, large US mills, Novelis and Constellium, stop making can sheet and produce automotive body sheet, requiring strict engineering tolerances and cannot be made using bales with UBC, Foil or other MRF derived aluminum.	• Reports indicate that virus can live on hard surfaces, causing closure of some hand sorted MRF's or drop-off centers. • Pure Aluminum is a world market. Price is off 10% (LME) and 6% in U.S. (COMEX).	• SHORT TERM: Supply disruption-may be short term price gain, dissolves as mills get back to work. • LONG TERM: Like UBC, though non UBC scrap aluminum has a home both for going back to can sheet or secondary aluminum, pricing will remain low through 18-months. • Clean foil is a justifiable market. Quantities in MRFs are low but since it needs to be pulled from UBC, it is worth recycling whether or not on the list.