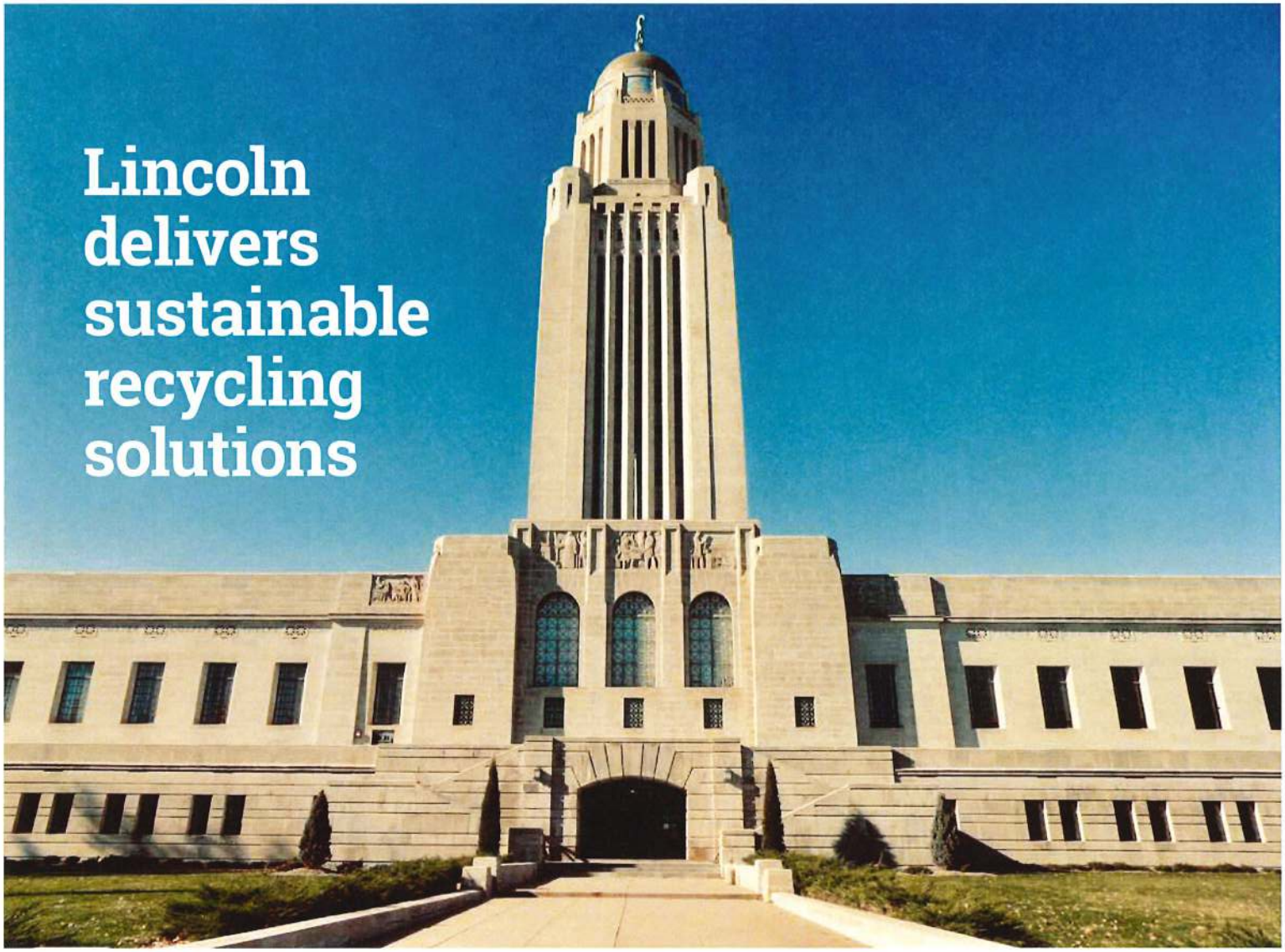
Lincoln delivers sustainable recycling solutions



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The City of Lincoln is the geographic center of Lancaster County, a county that is located in southeastern Nebraska about 50 miles west of the Missouri River. The county, like other surrounding counties, is primarily agricultural but the city is a large, urbanized area that also serves as the state capital. Lancaster County covers a geographic area of approximately 847 square miles; Lincoln has corporate limits of approximately 80 square miles; and the total population of the Planning Area (county in its entirety) is approximately 320,000.

An APWA-accredited agency since late 2018, Lincoln Transportation and Utilities (LTU) Department/Solid Waste Management Division is a City-owned and operated utility. The division operates the Waste Diversion Office (and associated public recyclables collection sites), the Bluff Road Municipal Solid Waste Landfill and Yard Waste Composting Facility, and the North 48th Street Transfer Station and Construction & Demolition Waste Landfill.

The LTU Solid Waste Management Division is committed to providing responsible management of all solid waste generated within its service area for the protection of

health, safety and welfare of the public, and environment in a cost-effective manner and in compliance with its solid waste management plan, *Solid Waste Plan 2040*, which was updated in 2020 through a planning process facilitated by SCS Engineers.

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One of the primary goals from *Solid Waste Plan 2040* was a reduction in the pounds per capita per year (p/c/y) disposal rate for MSW with a goal of 1,720 p/c/y by 2025 and 1,510 p/c/y by 2040. To achieve the 2025 goal, based on projected population, an additional 10,400 tons of waste annually will need to be diverted from the landfill. To reach these disposal reduction goals, the City has put forth significant effort into educating the public about waste reduction and reuse and the City has taken action to improve recycling participation rates and to improve recycling practices.

As an example, in 2017 the City Council passed an ordinance requiring licensed waste haulers to offer curbside recycling to residential and commercial customers. That same year, the City undertook a comprehensive residential and commercial recycling communication, education, engagement, and behavior change initiative. This initiative lasted three years with an objective to increase recycling in the Planning Area and a focus on encouraging curbside recycling services and proper recycling practices. Further, the City refocused the Recycling Coordinator role to Waste Diversion Coordinator

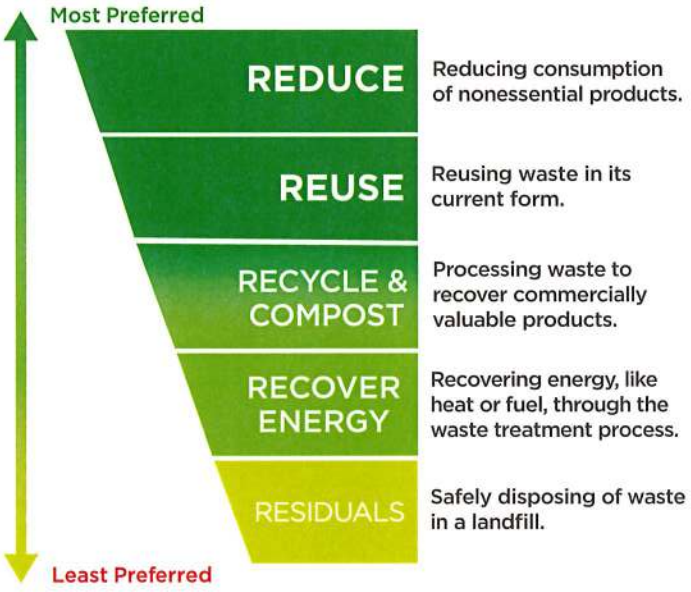

Figure 1

1 2 3 4 5 6 7

Measuring Success at the Landfill:

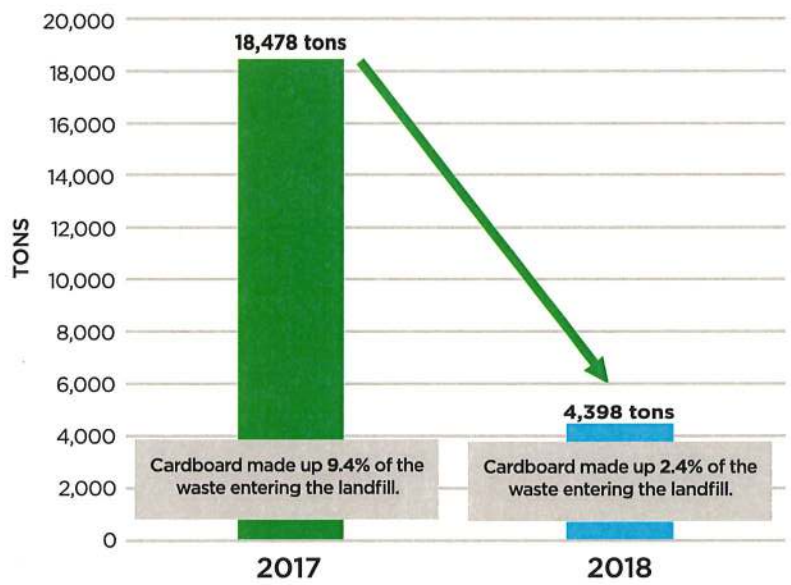

Figure 2

Our community reduced corrugated cardboard at the landfill by 76 percent.

In 2018, 14,080 fewer tons of corrugated cardboard were sent to the landfill than in 2017. This 76% reduction saved over 120,000 cubic yards of space, further extending the landfill's life.

This reduction is the result of significant commitments by residents, businesses, and the garbage and recycling collectors who serve them.

in 2019, and began promoting more significantly the Reduce, Reuse, and Recycle & Compost elements of the Integrated Waste Management Hierarchy (see Figure 1).

Another significant contributor to reducing the p/c/y disposal rate was the ban on corrugated cardboard from landfill disposal. The ban, approved by City Council, became effective April 1, 2018, and immediate reductions were realized as shown in Figure 2.

Recent efforts aside, LTU Solid Waste Management Division has been providing environmentally-friendly recycling opportunities for the general public dating back to the 1970s when the City assumed recycling collection site operations from the private sector. In 2012, when the *Solid Waste Plan 2040* effort commenced, there were 29 multi-material recyclables collection sites and four newspaper-only recyclables collection sites in the Planning Area. As of 2019, there were 19 recyclables collection sites in the city and nine in the county. But then, the perfect storm for the industry and the City occurred and Lincoln's Recyclables Collection Sites program received a one-two punch.

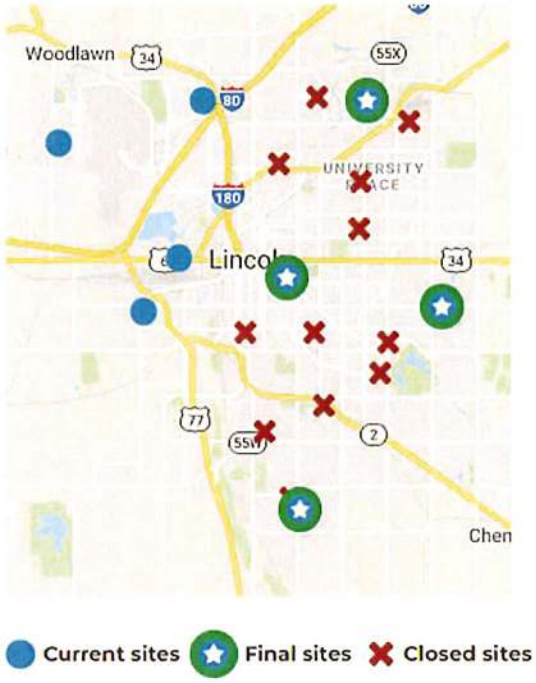

Figure 3

> The City is realizing cost efficiencies and is still achieving the landfill diversion necessary to continue the journey to meeting their *Solid Waste Plan 2040* goals

First, like many municipalities and the industry as a whole, the first punch was China's "National Sword" which set extremely low contamination rates and essentially eliminated and disrupted Asian markets for recycling commodities. Between 2000 and 2018, the United States sent almost 80% of recyclable plastics to Asia. Recyclables which once provided a small revenue stream to the City to offset collection and processing costs were severely impacted and the City was now faced with a $60 per ton payment for processing. This represented an approximate half million dollar impact to Lincoln's Recyclables Collection Sites program.

The second punch, and certainly the more significant to the City from a financial perspective, was when the City's hauling contractor responsible for servicing the 28 recyclables collection sites in the city and the county went out of business. Managing this many facilities, hosted primarily through private property owners and memorialized through annual agreements, was a financial and logistical challenge for the LTU Solid Waste Management Division. Monitoring this many sites so that they didn't become dumping sites for non-recyclable materials was a challenge and resource intensive. However, the City was committed to the cause and was proud of their 40-plus years of providing these services.

Backfilling the insolvent contractor with City staff and resources as well as hiring different contractors to provide the work proved too much and the "system" costs ballooned with an estimated fiscal year impact of more than $2.4 million. The City had a decision to make—optimize their program and continue to provide sustainable solutions for residents to recycle or discontinue these services altogether.

As previously stated, Lincoln has had an ordinance since 2017 which requires that curbside recycling services be offered by licensed haulers. But the ordinance doesn't require that citizens participate in (and pay for) curbside recycling. Today there is about a 40% participation rate at the curb leaving the recyclable collection sites as the only viable option for some citizens to participate in recycling. This fact, combined with the recent cardboard ban, provided a compelling case to the City that a consolidated system must be sought to continue to provide a sustainable mechanism for residents without curbside recycling access to recycling services.

For this reason, the City retained SCS Engineers to assist in evaluating their alternatives. SCS Engineers adapted and refined a proprietary waste collection and handling numeric

model to fit the city/county geographic area. As part of the evaluation, multiple collection scenarios were modeled and cost estimates were developed to project the likely system costs on an annual basis; costs which included direct labor (driver, support, and management staff) at fully burdened rates including overtime; vehicle expense (trucks) including depreciation, capital, and maintenance expense; fixed stock (containers) including depreciation, capital, and maintenance expense; and other system costs. Also included in the alternatives evaluation was a baseline of greenhouse gas emissions (GHG emissions) for the current system of 19 recyclables collection sites in the city and nine in the county and GHG emission estimates for the alternatives.

Based on the evaluation support provided and the alternatives considered, the City elected to discontinue services in the County and to standardize and consolidate the City recyclables collection sites down from 19 to a total of five larger sites. Standardized sites eliminated use of two-yard rear-load containers; four- and eight-yard front-load containers; and consolidated sites into larger footprints that accommodated 40-yard roll off containers. The City expected to save an estimated $2 million per year through implementation of the consolidation plan and saw this as an opportunity to run an efficient and financially healthy program to better serve the community. As of this writing, the City has closed 11 sites, has constructed four larger sites, and is in the process of siting the fifth site which once sited will result in the closing of four remaining smaller sites; see Figure 3.

Monthly collection costs have been reduced almost 60%, as modeled and expected, but equally as exciting is that the volume of collected materials at the recycling collection sites has remained steady and there has been no drop-off in the volumes collected, as some had feared might occur. The City is realizing cost efficiencies and is still achieving the landfill diversion necessary to continue the journey to meeting their *Solid Waste Plan 2040* goals for p/c/y disposal rates. Moreover, through site selection and design, and standardization and improvements to the collection bins and equipment, the City is providing a better and safer citizen experience. Through lighting and site surveillance through a networked camera system, the City is additionally saving on operational costs through reduced illegal dumping and vandalism; efforts which were previously estimated at more than 60 hours per week! The City is also able to avail 24/7/365 access to these sites which are hosted through cooperative agreements with Lincoln Public Schools and Lincoln Parks and Recreation. These agreements further support the long-term sustainability of the system since the "host sites" are public property and not likely to be subject to sale or property repurposing.

In conclusion, in the face of the one-two punch, the City of Lincoln and its LTU Solid Waste Management Division did the hard work to preserve and deliver sustainable recycling solutions to the citizens of Lincoln and Lancaster County. Change is hard and isn't always welcomed, but through perseverance the division is positioned to continue providing environmentally friendly recycling opportunities for the general public for years to come—delivering the triple bottom line of people, planet and prosperity.

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