Environment Financial Advisory Board Draft Report

Revenue Options for a

Waste Backhaul Service Program in Rural Alaska

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Source of Photos: Jacqueline Shirley, Rural Community Assistance Corporation and Zender Environmental Health and Research Group

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Executive Summary

EPA Region 10 requested that the Environmental Financial Advisory Board (EFAB) assess revenue options for a program in rural Alaska to backhaul hazardous waste and other materials from villages, particularly remote villages, to reduce the toxicity of landfill leachate and of emissions from open waste burning. EPA asked for a range of revenue options with the potential for supporting backhaul program operations, identification of opportunities for generating revenues through materials recycling, and development of a ten-year business plan showing how the various funding options would progress.

Due to a unique classification system in Alaska, both permitted and unpermitted rural municipal landfills are unlined, are typically uncompacted and uncovered, often use open burning as a volume reduction method, and are often near-capacity. Most rural communities are not connected by road to any urban area, nor to each other, and thus are left without a safe and economical way to dispose of hazardous wastes or bulky materials. One of the few options available is the backhauling of such materials. Backhaul refers to the shipping back of waste from rural Alaska communities by airplanes and barges to larger communities, either in Alaska (such as Anchorage) or outside of Alaska (such as Seattle). The complex and expensive logistics involved in waste backhauling make this option onerous for individual communities, which average just under 350 residents. Backhauling is most efficient when coordinated by a regional entity, but the bulk of communities are not served by a regional coordinative entity and there is currently no inter-regional coordination to capture additional efficiencies through transboundary opportunities presented statewide either

The long-term sustainability of backhaul in Alaska is uncertain. Currently, most rural Alaska communities use an EPA grant (the Indian General Assistance Program, or IGAP) to pay for many or all solid waste activities such as backhaul, landfill operation, and waste collection. Eligibility to use EPA IGAP grant funds for backhaul and other waste services was slated to end after 2020, but Congress acted in 2018 to permit these funds to be used without a sunset date.

The EPA gave the EFAB ***Backhaul Alaska*** Workgroup the charge to develop information and analysis to set ***Backhaul Alaska*** up for long-term financial stability. The Workgroup identified three main focus areas to meet the goals of the charge:

- ***Fee-Based Programs***
- ***Financing and Funding Options***
- ***Options for Involving Outside Entities***

These three areas help address solutions in securing revenue and job opportunities for community residents while addressing concerns related to hazardous waste disposal. The charge questions in the next section help frame these three focus areas.

1 EPA Charge Questions

The first activity of the Workgroup was to discuss the charge in detail, breaking it down to several fundamental questions that could be evaluated based on import to the EPA and best fit to the expertise of the EFAB board members and the timeframe of the project. After much deliberation between the EPA, EFAB board members, and expert witnesses, the charge questions were grouped under three distinct areasincluding: fee-based program options, financing and funding options, and involving outside entities in supporting backhaul activities. These areas and their associated charge questions are described in more detail below.

1.1 Fee-Based Program Options

1. What are the best metrics to assess a service fee knowing the unique circumstances and constraints of the backhaul program?

2. Are there other factors that should be considered when designing a fee-based program such that program administrative costs are minimized and the effectiveness of rural Alaska communities contributions are maximized? For example, what is the most efficient means of moving the money from the community level to the hub level to the haulers?

1.2 Financing and Funding Options

1. Are there other financing or funding options that should be considered beyond a fee? This can include exploring recycling as a commodity, creating a business model or a shared cooperative system.

1.3 Options for Involving Outside Entities

1. Are there opportunities to involve outside entities, such as the federal government, industry, or product producers, in paying for backhaul?

2. What might these opportunities look like?

3. How might these activities best be leveraged?

2 Summary of Problem

2.1 Background

There are approximately 200 rural, isolated, and small Alaska communities that are not on the state's road system and must be accessed by small plane service from one of the state's rural hub cities, which may also have limited or no road access. Due to these logistics, these communities are unable to make use of regional waste processing and storage facilities and must autonomously manage their full waste stream,, which is economically and administratively burdensome. . Whether or not they have been permitted by the State, all rural Alaska community landfills are unlined, face numerous consolidation and cover challenges, are often at- or over-capacity, and allow open burning. These remote landfills, designated as Class III under the state's unique delegated classification system, were also not designed to safely accept hazardous wastes.

One of the few options for managing hazardous waste is to backhaul such materials, which is the practice of shipping waste from Alaska's remote communities by airplane or barge for disposal or recycling at an appropriate facility in Fairbanks or Anchorage, or outside of Alaska (such as Seattle). The complex backhaul logistics make this option onerous for individual communities. For example, while many villages may be serviced by barge one to five times each summer, some are not, and most of these and others are typically not connected with any other village by road by winter Ice-roads to a regional hub are sometimes used in winter but these are not reliable and are only serve a moderate portion of villages. The only reliable, year-round transportation method for goods, services, and people to and from all of these communities is by small plane and even that schedule is frequently disrupted by weather. Regardless of the transportation method and frequency, waste materials must be packaged according to strict requirements or the haulers and end-facilities will not accept them.

Some communities have been able to leverage economies of scale by combining backhaul shipments. Such a complex planning effort has worked most efficiently when coordinated by a central regional entity in a given area, but there is currently no cross-regional coordination to capture additional efficiencies in the trans-boundary opportunities presented statewide. Additionally, there are large tracts of the state where no regional coordinating entity exists in practice.

To address problems associated with waste disposal and backhaul, EPA Region 10, the Alaska Department of Environmental Conservation (DEC), the Solid Waste Alaska Taskforce, rural Alaska communities, industry, and other leaders have contributed to a plan to develop a statewide backhaul service program, called ***Backhaul Alaska***. The program aims to coordinate the transportation of backhaul freight in Alaska and relies on efficiencies gained through collaboration to reduce the cost of backhaul. Ultimately, the program goal is to serve the many public and private entities that create waste in rural Alaska by establishing the capacity for a waste handling and backhaul coordination service. This service would not only assure that unwanted wastes are brought out of communities safely and efficiently, it could also provide a source of program revenue by charging service fees.

2.2 The Problem

The long-term sustainability of ***Backhaul Alaska*** is uncertain. Currently, most rural Alaska communities use an EPA grant (the Indian General Assistance Program, or IGAP) to pay for solid waste disposal activities such as backhaul. However, the EPA IGAP funding is not sufficient for the vast majority of villages to carry out a full backhaul program, and for many villages it is not sufficient to carry out any backhaul. Even with the streamlining envisioned by ***Backhaul Alaska***, it is clear that additional funds from waste producers, consumers, or processors, and/or from third parties, must be sought in order to sustain the program.

A current pilot project to assess cost variables and other factors for the program is taking place through fiscal year 2020. Additional information and analysis is needed to ensure ***Backhaul Alaska*** achieves long-term success and financial stability.

EPA Region 10 requested that the Environmental Financial Advisory Board (EFAB) assess revenue options for a program in rural Alaska to backhaul hazardous waste and other materials to reduce the toxicity of remote landfill leachate and of emissions from open waste burning. Below are the three activities related to Backhaul Alaska that the Workgroup deemed most applicable:

2.2.1 Activities to Assess Backhaul Alaska Financial Support Options

1. Evaluate a range of revenue options and determine their capabilities and potential for supporting backhaul program operations

2. Identify opportunities for generating revenues through material recycling (for example, high-end scrap metal such as aluminum).

3. Develop a ten-year business plan that incorporates a range of revenue sources and outlines the work needed to make the program solvent and/or quantifies the gap between program revenue and program costs.

3 Fee-Based Programs

A primary potential source of revenue for the ***Backhaul Alaska*** program is revenue generated from those who receive backhaul services. The ***Backhaul Alaska*** program must consider multiple factors when structuring its fee program. Local governments have the authority and purview for setting fees on waste generators within their communities. ***Backhaul Alaska*** is tasked with establishing the service fee amount that the community is responsible for contributing and how to assess the fee for services to those very remote communities with low populations equitably.

Each rural Alaska community possesses its own social, geographic, economic, and infrastructure challenges and opportunities affecting the economic viability of fee-based programs, so it is absolutely necessary for each community or regional area to examine its needs and capabilities when considering fee-based programs. The final decision about whether there should be a fee, what that fee structure should be, and how it will be managed should be made at the local level. To assist the communities in making these decisions, EFAB is presenting several fee options in Appendix A for consideration by local communities.

Further Study: *Explore considerations and tradeoffs for designing the* ***Backhaul Alaska*** *village fee program to ensure that the fee program aligns with the program's goals to serve participating communities equitably and support local jobs.*

Further Study: *Assess how rural Alaska communities can best leverage their EPA Indian General Assistance Program Grant funds and any other potential grant funding to make funding for backhaul go further.*

3.1 Can a backhaul program improve environmental conditions and public health?

Protection of health and the environment, including subsistence grounds and waters, will be increased with the removal of the hazardous wastes targeted by ***Backhaul Alaska***. Extending backhaul services to municipal waste can further improve local health and environmental benefits. Over half of Superfund sites today are former municipal solid waste landfills, which points to the dangers of disposing household waste into unlined and lightly managed rural landfills. Previous studies examining rural Alaskan landfills indicate similar health risks as those faced from communities in developing countries living near hazardous waste sites.

Site cleanup is enormously expensive in rural Alaska due to mobilization and demobilization costs of equipment, cover, liners, and management travel, however, the public health benefits may reduce or outweigh the total costs related to proper waste management in rural Alaska.

An accurate description of the societal cost benefits of the program may provide fodder for greater partnering and leveraging opportunities from a wider range of agencies, foundations, and corporations.

> ***Recommendation:*** *Identify the full scope of potential cost savings related to health and environment engendered by Backhaul Alaska, including a quantitative range where possible, and use the information to promote the value of the Backhaul Alaska program.*

3.2 What is the most efficient use of the community contribution and how should it be moved?

The money generated by communities as their contribution to ***Backhaul Alaska*** can be channeled to one or a combination of functions:

- Locally – the funds generated locally would support local programs.
- Hub – the funds could support hub functions.
- State-Level – The funds could support state-level coordination, such as logistics coordination.
- Vendor – The funds could support hauler or recycler fees.

- Program – The funds could support non-designated program shortfalls

> ***Further Study:*** *The question of how community revenue should be used and moved is primary for EPA Region 10 and the Backhaul Alaska program. Revenue will be generated from the communities served and local, regional, and statewide backhaul program costs need to be covered. Whether and how funds are moved from the community and back again is a complicated question and outside the expertise of EPA Region 10 and Backhaul Alaska stakeholders.*

4 Financing and Funding Options

Supporting backhaul programs through financing or third-party resources can alleviate cost pressure on consumers and mitigate fluctuations in program costs. The content on www.BackhaulAlaska.org reflects significant efforts by various parties to bring solutions that are community-based; share responsibilities among the consumer, retailer and recycler; leverage larger scale programs; and use a phased implementation by way of pilot programs. The Workgroup agrees that this is an 'everyone' problem that cannot be solved simply by enhancing existing or introducing new governmental programs. Recurring investment by government can demonstrate to all stakeholders that the relevant governmental entities take the problem seriously, making it increasingly likely that others, such as recyclers and co-op groups, will be more willing to participate.

In addition to publicly funded programs, recycling can help offset costs. Recycling is well-known for its environmental benefits, which include resource conservation, energy conservation, and reductions in water and air pollution, including reductions in greenhouse gas generation. However, it also has significant economic benefits, many of which are often overlooked. Recycling is an important segment of the national and state economy, creates jobs and saves money for generators of waste. Recycling makes both environmental and economic sense.

Any recommendations need to be *at least* cost neutral. Any unfunded program, regulation or new factor that creates additional incremental costs cannot be borne by local consumers without regressive effects and encouraging disincentives. Without such considerations, any such proposed solution would likely be ignored and would ultimately fail, benefitting neither consumer nor improving public health nor protecting the environment. Exploring recycling is one option to help make the ***Backhaul Alaska*** program successful.

4.1 Exploring Recycling as a Commodity

Recycling commodities came about due to the public awareness of the value and importance of recycling due to the production of the world's goods and services. Scrap recycling in the United States annually saves the CO2 equivalent of 410 million tons of greenhouse gas emissions, according to EPA estimates. In addition to recycling of some materials, electronic scrap recycling is one of the most dynamic and fastest growing segments of the scrap recycling industry and generated an estimated revenue of more than $5.2 billion to the U.S. economy in 2010, employed more than 30,000 full-time employees, and more than 45,000 people; and collected and processed domestically more than 3.5 million of used and end-of-life electronics.

To generate revenue, the backhaul program could stockpile high end metals and recycle the material at a time when metal markets are most favorable. If scrap is drained of fluids and any toxic products and left in place, it does not present the health risks the program prioritizes. Logistical challenges associated with stockpiling material may outweigh benefits. Indeed, the reason ***Backhaul Alaska*** started is because villages had no place to put their hazardous wastes or scrap metal. Additional storage facilities and designed salvage pads were too costly, or the required land was not available. Conditions are very cramped in rural Alaskan communities because of the high construction costs, where building a new road costs a minimum of $1.5 million per mile. Equipment to manage the stored materials and construction of a pad impervious to climatic permafrost melt raises the cost substantially.

E-waste recycling should also be considered as a resource for generating revenue to cover the expense of backhaul. Consolidation of materials at regional hubs will likely be the most advantageous method of improving recycling rates for e-waste. Consolidation provides the economy of scale that may generate revenue for some materials for which recyclers will not otherwise pay. Recycling e-waste provides for avoided cost of disposal in addition to the direct value of e-waste materials. However, it should be noted that there is currently no avoided cost of disposal in rural Alaskan communities because there are currently no user fees, there is no practical enforcement of proper closure, and new landfills are grant-financed or not built at all. Backhaul items, other than scrap that need not be landfilled, are not a large percent of the waste stream (all household hazardous wastes combined comprise between 1% to 5% of typical municipal waste streams).

4.1.1 Recycling Industry Jobs

The Institute of Scrap Recycling Industries (ISRI) produces periodic reports detailing information on the state of the U.S. scrap recycling industry. They estimate 460,000 jobs are supported by the recycling industry in the U.S., and that the industry contributes $90 billion in

annual economic benefit. The organization also tracks jobs created by export of scrap material to overseas markets, where scrap plastics, paper and metal are refined and processed before re-entering the manufacturing stream. According to a study conducted by John Dunham and Associates for ISRI, U.S. scrap exports directly and indirectly support some 162,000 U.S. jobs while having generated $30 billion in export sales in 2010, helping the U.S. balance of trade.

It is important to note that the scrap recycling industry does create jobs in Alaska and has the potential of generating revenue. There are an estimated 778 jobs (FTE) supported by the recycling industry in Alaska that pay average wages and benefits of $79,300. In addition, the scrap recycling industry in Alaska accounts for $21.23 million in federal, state and local taxes.

4.1.2 Scrap Metal Potential for Revenue

The scrap recycling industry's total economic impact in Alaska is $195.03 million. When all scrap materials are considered, the scrap recycling industry accounts for 0.38 percent of Alaska's total economic activity. See Appendix D for the full report.

It should be noted that Alaska's scrap metal activity is currently urban-based, on the State's road system and rail belt, with some hub activity. Scrap-metal companies in Alaska have evaluated the potential for generating revenue from rural Alaskan communities scrap and have thus far determined it is not worthwhile. However, consolidation of materials in the hub, barge sponsorship, and opportunistic transportation of materials all may help to tilt the balance in generating revenue.

> ***Further Study:*** *Estimates of rural Alaskan communities-level scrap metal, electronics, and batteries are available. Further study is needed to understand the metals market futures that would bring net revenue to the program over and above the cost for construction of village and hub infrastructure to store metals during recessional times.*

4.2 Co-Op Business Model

The Workgroup was tasked with researching other business models. One such model is developing a cooperative (co-op) business model that works together to remove the waste in the rural Alaska communities. The cooperative form of business is a distinctive model that has been broadly used worldwide to help groups of people obtain goods and services that would otherwise not be available to them, and to do so in a fair and equitable way. It is the only major business

model that is associated with a specific set of principles and values. Properly understood, these principles provide key insights about how to powerfully and sustainably use the cooperative business model.

Not surprisingly, there can be some misunderstanding about how a group can best go about the process of starting a co-op. The Workgroup's vision of a cooperative economy is one of an inter-dependent dense network of rural communities that allows them to meet their needs through principled democratic ownership of the business, and that provides care for the communities involved, combats injustice and inequity, and promotes conscious self-governance. The cooperative economy is embedded within and helps create a cooperative society aware of its place in a cooperative ecology.

A cooperative, or co-op, allows its members the ability to improve their bargaining power by utilizing the principle of strength in numbers. Co-ops are owned and controlled by the members, a community of people with common interests, who in turn benefit from the convenient format. Frequently, co-op businesses are formed to obtain better prices on local food or common products. However, other types include consumer, worker, producer, and purchasing co-ops. Before starting a co-op, it is highly recommended that the following documents are prepared.

1. Feasibility analysis
2. Business plan
3. Incorporation of co-op group

> ***Recommendation:*** *Evaluate seriously and in greater detail the possibility of a co-op model and how that might work in Alaska. The Workgroup strongly encourages contacting the U.S. Department of Agriculture Rural Development Office in the state of Alaska or the National Cooperative Business Association to connect with someone familiar with establishing cooperatives in the area. Also contacting the Secretary of State to procure literature on the laws affecting co-ops in the state is a helpful resource.*

4.2.1 Feasibility Analysis

The Workgroup recommends conducting a feasibility analysis to determine the financial impact from a decrease or increase in changes in backhaul waste volume or operating costs. The analysis should include factors such as facilities, logistics, equipment, expected operating costs,

labor needs, cash flow requirements, up-front capital, debt capital, debt maintenance, and whether the co-op will operate via stock or non-stock cooperative. The analysis and business plan should then be presented to potential members and agreed upon according to rules established by the cooperative.

> ***Further Study:*** *A detailed feasibility analysis of Backhaul Alaska operations is needed so that potential co-op members understand their fees (or stocks) for which they are responsible.*

4.2.2 Business Plan

A model business plan can be used by the **B*ackhaul Alaska*** group. The model narrative and assumptions are in Appendix B. The Workgroup goal is to ensure that this document is flexible enough to use among the many groups involved, as it is the mindset of the Workgroup that each community will be unique.

The Workgroup suggests that ***Backhaul Alaska*** develop a business plan and determine how to secure financing. Although some of the financing will come from members via stocks or membership fees, the group may be able to procure funding from financial institutions with co-op experience. The local Rural Development Office or the National Cooperative Business Association are good resources for this process.

> ***Further Study:*** *Backhaul Alaska must determine their options for securing financing. A completed business plan is needed to help identify these options and pursue them.*

> ***Recommendation:*** *Although some of the financing will come from fees and other as yet unidentified mechanisms, Backhaul Alaska may be able to procure funding from financial institutions that work specifically with co-ops. Contact the local Rural Development Office or the National Cooperative Business Association to start off in the right direction.*

4.2.3 Incorporation of co-op group

The Workgroup suggests that the communities incorporate a co-op. The co-op group should determine which members would benefit from the type of co-op that is established. This can be done by contacting neighbors, posting flyers on bulletin boards, and contacting local news outlets and radio stations. Once interest is initiated, then it will be necessary to convene the group. Potential members can discuss what a co-op is, the need, solutions, potential benefits, initial financial investment, tax implications and potential financial risks and decide if and how to participate.

The co-op will have to establish bylaws, which should detail membership requirements, member duties and reasons for member expulsion, meeting protocol, elections of officers, term lengths and dissolution of the cooperative. At a minimum, the group should ensure that those engaged can handle the responsibility of managing the co-op. An important part of the process is that members will need to sign a contract that everyone agrees on.

> ***Future Recommendation**: If the feasibility analysis, and the sociocultural, political, and infrastructure implementation considerations, indicate a co-op model is best, incorporate the co-op and develop the necessary paperwork for membership. The contract should detail when and how much money is due, when products need to be picked up and the notice required for opting out of the co-op.*

4.3 Summary of Financing and Funding Options

Other financing strategies are possible with a more detailed evaluation and should be outlined to ensure the correct set of strategies is selected. For example, Backhaul Alaska was originally conceived by Alaska U.S. Senator Lisa Murkowski as being similar to the Adopt a Highway system: private corporations could sponsor a barge. The framing group for Backhaul Alaska additionally envisioned the ability of private corporations to sponsor a region or village(s). This option is worthwhile to evaluate further, particularly with the number of resource development investors and rural Alaskan corporations in the State.

Further study: *The suite of financing mechanisms and models for Backhaul Alaska has yet to be identified. This research is necessary to ensure the greatest chance of program success.*

Regardless of the long-term financial structure for ***Backhaul Alaska***, given the developmental nature of this project, funding opportunities for startup, infrastructure, and planning costs are possible through foundations.

Recommendation: *Assess whether there are opportunities to partner and potentially receive funding from the Bill and Melinda Gates Foundation, Google.org, or other foundation which focuses on economic opportunity, provides tools, and financial assistance. Become a World Bank member to gain support and awareness of the needs for backhaul in Alaska.*

5 Options for Involving Outside Entities

Acknowledging that rural Alaskan communities may have additional initiatives that fit their cultural and social structures better than traditional financing and commercial approaches, this report explores whether there are opportunities to involve outside entities, such as product producers, industry, the federal government, or state government in paying for backhaul. If so, this section explores what some of those opportunities may look like.

5.1 Extended Producer Responsibility

As stated earlier, the Solid Waste Alaska Taskforce (SWAT) is exploring whether a producer responsibility initiative would be possible in Alaska, where manufacturers of products would take on a cradle-to-grave responsibility and cover a portion of the cost of backhaul. SWAT is also looking at programs that might influence consumers to alter purchasing practices or other behaviors that would reduce the volume and/or costs of backhaul.

Currently, Alaska has zero Extended Producer Responsibility (EPR) laws. These types of laws used in other states have product categories that include appliances that contain refrigerants, auto switches, batteries, carpet, cell phones, electronics, florescent lighting, mattresses, mercury thermostats, paint, pesticide containers, pharmaceuticals, and other items that may require special

disposal. Establishing an initiative for Extended Producer Responsibility guidelines will have sustainable economic, health, and air quality benefits.

EPR requirements may encourage manufacturers to eliminate the amount and toxicity of materials during the development of its product to minimize the complexity and cost of final disposal or reuse. Showcasing data from other companies on their increased performance and revenues as a result of reducing waste can incorporate the practice of Extended Producer Responsibility as a systemic core culture. Actions and activities that could be enacted are stated in the article "Extended Producer Responsibility: Making Green from Green" and includes increasing a company's competitive edge, their business process, and efficiencies (Attinger, 2006).

An EPR program could potentially create significant revenue and environmental benefits for Alaskans through a recycling program. The companies engaging and participating in this strategic opportunity would save money by creating a partnership between the state, the government, community and the consumer (Kaye, 2012). Additionally, by working directly with the communities that are negatively impacted by the waste and environmental issues, the environmental concerns could be curtailed, and environmentally friendly waste management practices would be developed and implemented. The start of "cradle to grave" producer practices allows the producer to better assesses, identify, and address issues or needed change more quickly, effectively, and efficiently for reducing environmental impacts currently plaguing communities in Alaska.

A collaborative stakeholder stewardship council for environmental and economic strategic planning could be devised with best practice approaches for statewide policy enactment. Policies could include workforce development programs and up-skilling for sustainable economic capacity building.

EPR diverts spent products to recycling that would otherwise be left in homes or discarded in landfills. Not all of the collected e-waste under EPR Programs is targeted for recycling; some materials are landfilled, and often in ways that contaminate the environment. For example, e-waste recycling and disposal sites in Vietnam and China are associated with adverse impacts to community health. The environmental, health, and monetary cost of non-recycled or poorly recycled materials versus the benefit of EPR should be assessed. For rural Alaska, diverting the e-waste, batteries, and other waste from unlined landfills with open burning will help those rural communities. For urban Alaska, diverting materials to recycling may come with some cost to the environment or health of a community out-of-state. These concerns could be addressed and mitigated by developing a quality control program that targets and outlines the goals and objectives of an EPR program.

Alaska only has materials recovery facilities that ship the prepared product out of state for processing, so all materials collected through an EPR program would be exported. However, there may be potential for a reuse market in the urban centers that would generate revenue and create jobs. Habitat for Humanity already operates a re-use store for housing materials, and according to the largest Anchorage-based electronics recycler, many items come through the waste stream that still have a useful life and are quite valuable. "The Reuse People" located in San Leandro, California might consider partnering to open a type of "re-Store/re-Use," or be willing to share information on how to design a re-use location based on products and markets in Alaska.

See Appendix C for EPR case studies and other related information.

Recommendation: *Develop a stakeholder stewardship council for environmental and economic strategic planning that would evaluate and develop a workable Extended Producer Responsibility program.*

Recommendation: *Consider adopting enabling state and tribal legislation that mirrors EPR policies in force in New York City. Even those that might increase up-front costs by way of deposits would still be refundable and cost-neutral to the consumer. If collection sites are available at or near existing retailers, it would nearly eliminate any inconvenience to the consumer who would be bringing their business to the retailer anyway.*

Recommendation: *The Backhaul Alaska program should reach out to computer manufacturers to inquire if they would be interested in the e-waste that needs to be removed. This could be done on an in-kind basis if the benefits outweigh cost. See Appendix C, case study C.5.*

Furthermore, consider a federal tax credit or other incentive to the commercial/retail entity to minimize or even offset any kind of legitimate capital and operating costs undertaken by the commercial/retail entity to support such programs. This could potentially allow even the smallest such entities to participate, maximizing the reach of the programs. While not comprehensive for items such as durable goods, such policies could still be impactful in at least reducing litter and promoting the collection of some hazardous materials.

5.2 Neutral Cost Incentives

It is important to avoid a cost increase for Alaskans to the point of political infeasibility, or financial hardship on rural communities and low-income households. For example, bottle bills have been tried in Alaska several times and are politically infeasible because they involve an explicit "fee." Producers will also not be in favor of change if the cost to do so is significant. Perhaps a federal tax credit or other incentive for the commercial/retail entity to minimize or even offset any kind of legitimate capital and operating costs undertaken by the commercial/retail entity to support such programs would be a way to make them politically and economically feasible. This could potentially allow even the smallest such entities to participate, maximizing the reach of the programs. While not comprehensive for items such as durable goods, such policies could still be impactful in at least reducing litter and promoting the collection of some hazardous materials. Other mechanisms that could counter or mitigate these costs should also be explored.

Recommendation: *While the Workgroup highly encourages extended producer responsibility (EPR) programs, it comes with a caveat. If such a program results in significant cost increase to the consumer/communities, some other mechanism must be created to counteract that increase so that the net effect on communities is neutral or negligible.*

Further Study: *Identification of promising mechanisms that provide for cost neutrality would be beneficial.*

5.3 Involving the Federal Government - Government Disposition Services

A potential role for the federal government may be to leverage disposition services from the military and GSA to take materials for reuse or recycling and move materials through to buyers.

This is infrastructure that could support ***Backhaul Alaska***. While the Defense Logistics Agency Disposition Services provides services for military installations, GSA provides similar services for domestic agencies. Program cost matching for infrastructure can offer significant cost savings, especially if freight is included. We do not want to imply that this type of use of GSA is likely in Alaska as there may be many barriers to its use. However, it may offer some potential solutions in the future so it should at least warrant a preliminary investigation to see if there might be some potential later on.

> ***Recommendation:*** *Identify the detailed procedures and potential of how the use of GSA disposition services could result in cost savings specific to the infrastructural needs of Backhaul Alaska.*

5.4 Involving the Federal Government - Military Recruit Training

The Workgroup investigated the potential to use military recruit training to help clean up waste in Alaska. While this training theoretically could involve cleaning up a rural Alaska landfill as well as packaging waste for backhaul, the more likely scenario is packaging waste for the backhaul program. Cleaning landfills is highly complex and would be difficult to do in a training environment. Packing waste is much more conducive to a short training exercise and should be considered the more reasonable approach for using the military training. However, this type of resource should only be considered an extremely site specific, and instance specific resource, not a long-term steady source of income. Within these parameters, there may be creative opportunities to leverage military programs to help make ***Backhaul Alaska*** program funding go further. Specific types of programs are outlined below.

5.4.1 Alaska National Guard

The Alaska National Guard could joint venture with other military branches to address needs that align military infrastructure needs with those of Alaskan community infrastructure goals. Below is the stated purpose of the Alaska National Guard civilian education program. Some of the community needs could be aligned by creating programs/development projects in support of assisting the Guard in getting their members combat ready.

> *"Civilian education is related directly to recruiting and retaining quality service members, enhancing their career progression, both military and civilian, and increasing the combat readiness".*

The Guard could provide skilled and knowledgeable workers for needed project development goals. The potential partnership could be presented as an "economic emergency" for Alaskans, which is part of the stated mission of the Alaska National Guard. It is also possible that academic credit could be provided for some of the work, bolstering the mission of the Guard.

5.4.2 Joint Pacific Alaska Range Complex

The *Joint Pacific Alaska Range Complex* received military construction awards totaling $400 million in 2012. These funds directly support the goals of military training and indirectly support the state of Alaska by developing new locations that create revenue for the state. The military provides infrastructure development based solely on the needs of the military. JPARC may consider additional projects that could support the communities' needs if projects are aligned with their military agenda.

> *"Alaskans also benefit from economic support and improved infrastructure. Investments in the JPARC grow a stronger Alaskan economy, including modernized and enhanced infrastructure that makes the state more attractive for businesses and economic growth (JPARC, 2018)".*

5.4.3 Alaskan Department of Military and Veteran Affairs

The U.S. Veterans office could be seeking opportunities for veterans to volunteer in support of addressing their communities' needs. There may be an opportunity to partner with various veteran councils, such as the veterans who organize the veteran leadership conference.

> ***Recommendation:*** *Seek out and partner with various interested veteran councils. They may provide skilled voluntarism for a variety of roles.*

5.4.4 Joint Base Elemendorf-Richardson

As the largest military base in Alaska, Joint Base Elemendorf-Richardson (JBER) offers a technical educational program for its members. JBER has multiple educational partners that include the University of Alaska Anchorage, Embry-Riddle Aeronautics University, Central Texas College, and Wayland Baptist University. The previously mentioned partnership could be a learning resource in building a workforce development program, and more with the potential partner opportunity for development of a new workforce model to up-skill the rural Alaska community workforce for economic sustainability. The new workforce programs could be operated on site as well as within the community setting, building connectedness for long-term

relationships. A work "shadowing" component could be included to strengthen the knowledge base of the workforce program participant.

5.4.5 Alaska Aerospace

Although the aerospace arena is not operated by the military, it could be taken into consideration to seek them out as a community funding partner for the Kodiak region since they are based on Kodiak Island. They may also be able to provide other support, such as human capital and technology for the program.

> ***Recommendation:*** *Communicate with the appropriate military points of contact for Backhaul Alaska leveraging opportunities and assess the potential and scope of military assistance in practice.*

5.4.6 Summary of Military Recruit Training Potential

Potential institutional channels exist within the Alaska-based military branches for leveraging. However, it is not known whether these opportunities are practicable or acceptable from the military's perspective. Prior conversations between military representatives and ***Backhaul Alaska*** developers have generally concluded with an interest from the military only in the case where planned military training aligns specifically with a ***Backhaul Alaska*** opportunity, such as a "one-off" backhaul event at the time and location of the military's choosing. The extent to which leveraging the use of military personnel would reduce the cost burdens for the program would need to be explored.

5.5 Involving the State Government

The Workgroup delved only briefly into ideas for contributions from the state government. These included the following topics:

- **Emergency prevention** – are there benefits to aligning this effort with hazard mitigation or emergency prevention programs in the state beyond using the lens of hazard mitigation as a selling point to support the program?

- **Establishment of fee districts** – what are the tradeoffs for states to establish fee district authorities in the state and what are considerations and recommendations for such an effort in Alaska?

5.5.1 Are there benefits to aligning this effort with the hazard mitigation or emergency prevention programs in the state?

The Alaska Department of Homeland Security and Emergency Management oversees emergency management at the state level. Relevant offices/initiatives include:

1. SERC - State Emergency Response Commission - ensures that state, federal, and local emergency planning and preparedness is established, integrated, and mutually supportive. SERC was formed in response to concerns about oil spills but has expanded its scope to other types of hazards in recent years. SERC "is tasked to address hazardous materials issues and all other hazards and threats that might create an emergency situation in Alaskan communities."
    - SERC works with local planning units to manage hazardous materials. The following statute pertains to management of hazardous wastes: https://ready.alaska.gov/SERC/statute
    - SERC works with and coordinates Local Emergency Planning Committees (LEPCs)
2. The Alaska Department of Military and Veteran Affairs (ADMV) collaborates with the Department of Homeland Security on hazard mitigation planning. ADMV offers hazard mitigation grants to local governments. It is not clear if this grant could fund local-level backhauling based on the announcement.
3. The State of Alaska Hazard Mitigation Plan is the major instrument that informs state actions and strategy on hazard mitigation. While hazardous materials are characterized in sec. 3-93, and analyzed in sec. 5-81, there is no explicit characterization of, nor strategy for, hazardous waste or materials that are already landfilled or stockpiled.
4. A stated goal/action in the plan is to "obtain long-term funding for the Local Emergency Planning Committee (LEPC) and Hazardous Material Emergency Preparedness (HMEP) programs." This goal might align with some aspects of local backhauling management.
5. Alaska SERC Statute on Reporting Hazardous Materials: Alaska Statute 29.35.500 Hazardous Chemicals, Materials, and Waste: This statute stipulates that "the requirements of this section may be imposed by a municipality on a business or government agency that handles hazardous chemicals, hazardous materials, or hazardous wastes outside of the boundaries of the municipality if a fire or other

emergency involving the chemicals, materials, or wastes would be (1) likely to adversely affect persons or property in the municipality; or (2) responded to by emergency response personnel whose service area includes all or a part of the municipality."

Recommendation: *Consult with the Alaska Department of Homeland Security and Emergency Management to see what opportunties there may be to partner or obtain fancial resources.*

5.5.2 What are the tradeoffs for establishing fee district authorities in the state?

EPA's *State Funding Mechanisms for Solid Waste Programs* defines multiple ways that states may divert funds for solid waste management programs such as backhauling. The establishment of local fee districts are one mechanism described in the report—defined as "fees that provide money to the local regulatory body for solid waste activities." The monies collected from fee districts generally fund the district's local solid waste management activities. Fee districts differ from tipping fees or surcharges because the money is retained for statutory purposes established in state code and are collected by and for the district (whereas surcharges or tipping fees may be retained by facility owners or even collected by the state itself). States that have established fee districts include:

1. Indiana: 70 solid waste management districts that both levy a tax and have district fees that charge per ton for solid waste disposal.

2. Ohio: Solid waste districts are authorized by the state to collect tiered fees for disposal at landfills. The tiered fee system provides lower rates for locally generated wastes, higher rates for waste generated within Ohio, and highest for out-of-state waste. The Ohio Revised Code stipulates the types of uses that generation fees may be used for, including implemented solid waste management plans, education and outreach, paying host fees to other counties, supporting health departments and supporting local law enforcement [See Ohio Code Sec 3734.573, ORC Section 3734.57(B) OAC Rule 3745-502-03].

5.5.3 What are possibilities for fee districts given Alaska's existing codes?

Could an ordinance similar to the above be adopted in Alaska, and could it include backhauling? Alaska's solid waste law is: 18 AAC 60 Solid Waste Management Article 6 describes user fees (pg. 84 of above document). Fees apply to:

"The owner or operator of a solid waste disposal facility shall pay the applicable fees as prescribed in Tables E-1, E-2, E-3, and E-4 of this subsection. The owner or operator of a facility subject to the annual fee requirement shall continue to pay the annual fee until the department approves termination of the post-closure obligations under 18 AAC 60.270."

It does not appear that there is any existing rule or code that precludes the establishment of backhaul or solid waste fee districts.

> ***Recommendation:*** *Delve further into the potential for, and tradeoffs of, backhaul/solid waste fee districts.*

6 Conclusion

Backhaul Alaska has the potential to significantly improve the health and environment of the rural Alaska communities it is intended to serve. If successful, it has the potential to create local jobs and economic development locally and throughout the state as a whole. A number of promising finance opportunities and ventures are conceivable and worthy of further study.

To arm the program with the financial tools and information required to succeed, the following areas need further study, development, and analysis:

1. Identification of options and tradeoffs for moving program fee payments from rural Alaskan communities to the program.
2. Further identification and detailing of financing options possible for the program.
3. Options for organizational governance structure, including a feasibility analysis for a potential co-op association.
4. Further development of the program business plan.
5. Model optimizing regional and rural Alaskan village storage infrastructure for future metals, e-waste, and battery market highs with construction, maintenance, and land space constraints.
6. Role of federal agency-funded rural development programs in paying local solid waste programs fees to cover disposal of waste from infrastructure projects.

7. Options and tradeoffs for establishing fee districts to fund solid waste programs and backhaul.

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Appendix A. Community Fee-Based Programs

A.1. Introduction

The main focus of this report is to develop recommendations for EPA and the ***Backhaul Alaska*** program. To attain funding, ***Backhaul Alaska*** will set fees for services at the community level. In order to pay ***Backhaul Alaska*** service fees, communities will need to determine how to generate that income from households within the community. While neither EPA nor ***Backhaul Alaska*** will be responsible in assessing the actual fees at the household levels, both groups can provide a range of options for communities to consider. The information in this appendix is provided for that purpose. A range of options that can be considered by communities is included. The EPA and/or ***Backhaul Alaska*** program can provide a copy of this appendix to communities who may be interested in seeing the various options available to fund the program at the household level.

One of the main considerations with any community level payment system is that it is a highly local decision and one that needs to be developed with a lot of local input. This appendix considers three main factors that are important to setting local fees to ensure success:

1. Understand there is a challenge that requires a local solution.
2. Communicate through a collective voice.
3. Consider the best metrics before choosing a fee.

Each of these considerations is described further below.

A.2. Understand there is a challenge that requires a local solution

The most important step in developing local solutions to a problem is to establish general agreement from its constituents (the potential fee payers) that there is a problem that requires a solution. Within each community, ensuring that there is some level of consensus and general agreement that backhauling wastes is a challenge requiring some type of local solution should be the starting point. This includes identifying and clearly articulating the extent of backhaul waste concerns and the need for revenue.

In most communities, residents are intimately aware of their waste problems because they see, and often smell, their uncovered landfills every day. The vast majority of landfills are within one mile of homes and the school. Elected leaders, respected elders, passionate community

members, and environmental staff often have the greatest success at convincing the public to pay for solid waste fees. They share a common understanding of their community's culture and they grapple with the same harsh realities of hazardous waste risks. For those communities where sufficient support for fees has not been garnered, it may help to bring in experts or important stakeholders who can share their knowledge and/or expertise about backhaul waste, the need for a financial solution (namely rate payer fees) and the need for near-term investments to prevent the problem from worsening and becoming more costly later. Defining the problem clearly will help create a common vision that will lead to successful solutions. Proceeding with a common understanding of the need for waste backhaul and of the shortfall in funds can reduce resistance to local cost burdens.

A.3. Communicate through a collective voice

One way for communities that seek to develop residents' understanding of the local backhaul financing need is to establish a Citizens Advisory Committee (CAC), or another similar local group. For example, many rural Alaska communities have Environmental Committees comprised of City and Tribal Council members, elders, business owners, youth, and the public-at-large. The CAC can specifically examine the issue of financing backhaul waste before choosing to implement a fee to pay for backhaul waste. A potential structure of the CAC is given below:

Establishing a CAC for Financing Backhaul Waste:

- The CAC should be initiated by either a tribal or city official, Tribal Council, or another person of authority, such as a respected elder, to give weight and credibility to the recommendations coming from the CAC.

- Members should be comprised of citizen leaders and representatives from various sectors of the community to represent different opinions and interests. For rural Alaska communities these sectors are generally represented by a single entity/institution, and include the health clinic, the school, the store, the church, the Tribal and City Councils, and the Village Corporation[1]. Representatives from these entities should be a range of ages, gender, and household income. It is important to

[1] Alaska Native lands and villages are managed by regional or local, quasi-governmental, private corporate entities known as Alaska Native Regional Corporations and Village Corporations: "(j) 'Village Corporation' means an Alaska Native Village Corporation organized under the laws of the State of Alaska as a business for profit or nonprofit corporation to hold, invest, manage and/or distribute lands, property, funds, and other rights and assets for and on behalf of a Native village in accordance with the terms of this chapter." (43 U.S. Code § 1602 – Definitions). For additional information on these entities, refer to 43 U.S. Code Chapter 33 - Alaska Native Claims Settlement Act.

recruit elders and youth if they are not already represented. Additionally, other community groups, businesses, or regional entities that may be present in the larger communities are often helpful.

- The total number of members should be as large as possible and determined by the community establishing the CAC. Group dynamics should be considered when determining the maximum and minimum sizes determined by the community.
- The group should work to understand the gaps in the existing backhaul program and focus on addressing how to finance these gaps in a sustainable way.
- Initially, all fee options should be considered, along with the pros and cons of each as they relate to the specific community. Once all options are assessed, the CAC will be in a better position to recommend the best option for the community to help ensure the necessary community buy-in.
- The CAC should have a good understanding of the costs associated with managing a backhaul waste program. Every possible cost should be included in this calculation, including operations and maintenance, contracts, administration, etc. Resources exist to help the CAC understand these costs.
- The CAC should have a good understanding of how the costs of a backhaul program integrate with their overall solid waste management program, and the role of each line item in attaining the community's goals of health and safety protection. For example, a reduction in landfill operator hours to pay for battery recycling could place the community in a worse situation than before.

A.4. Consider the best metrics before choosing a fee

Solid waste fees evolve based on costs, community acceptance, and other factors. Previously in the United States, solid waste programs tended to be funded through a government's general funds or other income not specifically associated with the solid waste program. Later, solid waste program fees became standard, but they were not typically tied to the amount of waste generated or collected, nor the level of service. Now, while not the case in rural Alaska, most programs link fees to waste volumes and/or service level. When attempting to determine the best level of service offered and fee basis for waste backhaul in Alaska, various metrics, as described below, may be considered. Each should be thoroughly discussed by the CAC.

A.4.1 Charge per person.

A charge per person attempts to link a fee to the amount of waste generated. However, a per person charge is based on the false premise that each person, regardless of age, generates the same amount of waste, and that the amount of waste a person generates remains the same regardless of the size of the household and level of product sharing. Household sizes in rural Alaskan communities often change with the season or due to other undocumented changes in living arrangements. Assuming it is the household that receives the bill, administering and tracking this metric would be difficult due to fluctuations in household size and membership.

A.4.2 Charge based on household income.

The fee could be based on household incomes, with higher income households paying more and lower income households paying less. This methodology relies on the belief that higher income households have more disposable income to make purchases, which results in the production of more waste. This theory would indicate that these higher income/higher waste producing households should pay more. Research not specific to rural Alaska also indicates the willingness to pay for services is related to the level of income, with higher income levels being more willing to pay.

While this approach may seem to have some merit, it has considerable challenges when it comes to implementation. Monitoring and tracking income may be difficult, and it may be hard to gain political acceptance for an approach of this type, particularly because it is alien to rural Alaskan cultures. Structuring the fees may prove problematic since the incremental contribution may not be linear, and household incomes may fluctuate greatly from year to year, as many jobs are seasonal or temporary in nature. In addition, the income disparity in rural Alaskan communities may not be sufficient for this approach to work well. Finally, while income might correlate to some degree with the total amount of trash generated, it would tie less well with backhaul goods which are special wastes and tend to be non-luxury items, such as vehicle batteries and electronic goods. Rural Alaskan homes are small, and regardless of income, most households own the same number of appliances, televisions, and computers.

A 4.3 Charge per Household.

This is likely the most simplistic approach to assessing fees. A charge would be assessed per account, regardless of size or persons per household. If a consumer is paying another utility account such as energy or water, the fee could be assessed as part of that bill. This type of approach is used by several villages successfully now to collect their waste fees. Residents pay a flat environmental fee regardless of the number of trash bags produced. Access to all solid waste services could be available to rate payers paying a mandatory solid waste fee assessed in the utility

bill. For example, in San Antonio, Texas, anyone is allowed to use the bulky waste collection center for free with proof of residency. Parallel to this, village residents could drop off computers, batteries, and even tires and appliances for free. A point to keep in mind is that the number of persons per household would not be considered here. This could lead to subsidization when households of different sizes are charged the same. However, that has not seemed to present an issue in rural Alaskan communities, who tend to have more group-oriented attitudes.

A.4.4 Charge per Unit of Waste.

Charging by unit of waste allows for a direct relationship between consumption and cost, potentially encouraging lower consumption, however, in rural areas with little enforcement it could encourage illegal dumping to avoid the use fee. Additionally, this method requires significant oversight and infrastructure, for example an appropriate scale and staff to weigh or count trash and record it.

A.4.5 Charge per Unit of Consumption.

Charging for each unit of waste during purchase can encourage lower consumption without the explicit link to disposal, potentially avoiding an encouragement for illegal dumping. This assessment may be seen as a tax and imposes a burden on the sales points for collection and processing of a use fee. It does not make sense in rural Alaskan communities because there is often a single local store, generally owned by the local tribal corporation. The only backhaul wastes sold there are vehicle batteries. However, if the price is raised there, people will purchase in the hub city, negatively affecting local revenue and potentially driving the sale of batteries to locations where no surcharge is assessed.

A.4.6 Charge per Unit of Consumption with Rebate for Proper Disposal.

This metric is similar to a bottle or can deposit that has been successfully used in many states: For each unit consumed, a buyer pays a deposit which is redeemed in cash upon proper disposal/collection. Similar systems are in place throughout the United States for car batteries, tires, and other items that pose a significant environmental impact when improperly discarded. This metric imposes a burden on the sales point during sale and upon the collection point where refunds are provided. Some consumers see this as a tax due to the immediate increase in initial sales cost when a deposit is added to the sale price.

A significant advantage to this type of program is that it encourages entrepreneurialism in non-consumers to seek and collect improperly discarded items so that they can collect refunds at the proper disposal/collection site. For this metric to fund backhaul services, a portion of the "deposit" should be held for the backhaul service, effectively making it a tax or charge per unit of

consumption with incentive for proper disposal. This system may also fail to capture fees on items purchased outside local sales points and brought into the community from areas where no fee is charged, and encourage these purchases due to the lower cost of goods without disposal fees and deposits. Also, many villages without a city government do not have the ability to impose a charge at point of sale even at their local store. For this method to work, it must be performed at the state-level, and in fact, is being explored as a funding option through a relatively new Extended Producer Responsibility Workgroup.

A.4.7 Other factors.

Factors such as tax rate, property size, etc. are likely a form of the main metrics described above for attempting to identify household size and/or waste contribution by linking to income or number of people per household. These indirect links are more difficult to justify as a basis. The most direct nexus between cost of service and benefit is key to assessing an equitable charge.

The metric used to assess bills should consider community acceptance, understanding and administrative feasibility. For a new fee being designed, the set up should be as simple and straightforward as possible in order to get the concept accepted and implemented. As the system matures, future adjustments can be made to target different goals and objectives.

When dealing with solid waste management, reduction of the waste stream is generally always considered a goal. The issue of reducing waste is fast becoming one of the more pressing environmental problems and has been recognized worldwide. As a result, the concept of pay as you throw is increasingly popular. A quantity-based fee forces households to consider their own waste production and disposal. However, the communities examined in this report generate much less waste than urban Alaska or Lower-48—as little as 1lb. per person per day, compared with 4.5 lbs per person per day. Still, they have unlined dumpsites and are at risk of breathing untreated waste smoke. The less trash, the less potential for health risks. Any program that can link waste to cost of disposal sends an appropriate price signal to reduce trash generation where possible.

In the case of ***Backhaul Alaska***, households may find it difficult to significantly reduce their use of the waste of interest, but maintenance of batteries, appliances, and electronics may extend product life, thereby reducing waste generation.

A.5. Other questions to consider

A.5.1 Should the fee system be built to try to reduce the waste stream?

Education programs can be included in the cost of doing business as a means of reducing the fee. Volume based fees send the most direct price signal. There were several options discussed

in the committee and further explained in the case studies, such as a white goods disposal fee or a paint disposal fee, putting the responsibility of disposal during point of purchase by consumer or producer. The issue with this type of fee is that they generally require support from national or state law.

Reduction of waste may also take different forms. In Japan, there exists a culture to not waste and there are limited places to dispose of waste, so the philosophy of recover and reuse what you can in the community is encouraged. For those who are resourceful, there is a place on site to separate materials and it is encouraged to take material, glass, metal and/or other goods and repurpose them. It is free to drop materials off and free to take them away.

Similarly, in rural Alaskan communities, using all resources is embedded in the culture. For example, cardboard is used over and over again for anything from a table to a surface for cutting fish. The dumpsite salvage/scrap metal pad is used as a sort of hardware store because there are no other on-site options. A growing number of communities operate a reuse shed to provide a safe place for residents to drop-off and pick up usable items. This number is still relatively small, but the concept has great potential to spread if communities can overcome the limits on space and building materials that are necessary for any new infrastructure.

A.5.2. Would a higher rate bring more fraud or illegal dumping?

It is possible that charging higher rates would increase illegal dumping for those communities that have forested areas and some local roads. It is a fine balancing act that communities must monitor as their program is implemented. Education is imperative. The environmental cost to the community where illegal dumping occurs will likely be higher than a fee over the long-term. However, monetarily, it is unlikely that the community would ever be forced to pay for cleanup, so in these communities, that incentive is not present.

A.5.3. Should community education be considered when evaluating the rate?

The body of research is consistent when discussing importance of community involvement. The importance of community, community leaders and resident groups has been stressed, with the effectiveness of community leaders based on increasing the strength of norms (Dunne, 2004). Social norms are behaviors people expect of each other and personal norms are the actions people feel an obligation to do. Minton and Rose (1997) found the personal norm has the most influence on actual behavior. When people believe that an existing condition poses a threat of harm to others, or their own personal action or inaction has the power to prevent harm, then individuals may change their own behaviors.

While the local population in rural Alaska communities is aware of the dump and concerned about its impact on their subsistence, it is not clear that all individuals understand the full health risk posed by poor waste management. It is also not clear that community members believe they have the power to change the situation themselves.

A.5.3. Should the fee be based on each individual waste item or per trip to disposal site?

Linking a charge to weight, volume, or tag system has been shown to give people responsibility and ownership of their waste and as a result control of their charges.

The flat fee paid in San Antonio appears to be successful as customers were getting something (free bulky waste disposal) for what they paid for regardless if they actually used the site or not. It was the City's method to help control illegal dumping. For Alaska, enforcement is a challenge as landfill sites generally have no gates or fencing and are only staffed during a few hours each week when an operator or technician is actively engaged in site operations. The volume of the community's waste generation warrants only part-time landfill maintenance operations.

A.5.4. What is the appropriate timing of implementing the fee?

Backhaul is not needed on a regular basis. For small communities, the backhaul packaging and shipping event itself can be just a few days once per year. The fee must be regular to consistently support a system over the long-term. A regular fee should also keep the fee lower as it is collected regularly over time rather than inconsistently and subject to more peaks and valleys depending on timing of costs. Regular fees can be accumulated in a reserve (saved) to cover periodic large costs, such as occasional container shipments.

A.6. Rate Structure/Cost Distribution

A.6.1. Flat rate

Under a flat rate program, all customers (household or business) would pay a flat rate for backhaul services. This could be billed at any frequency from monthly to annually. Under this approach, it may be appropriate to assess a different fee for businesses than households. This rate structure is easy to understand and explain, and billing is straightforward for both separate billing and placing the rate on another utility bill. Decisions on the billing approach (separate bill versus billed with other utility services) will help inform appropriate billing frequency. Due to the simplicity of this approach, distinction cannot be made for those who dispose of little versus those who dispose of significant amounts of material. The fee would be established based on estimated program costs and adjusted on a regular basis to account for unexpected shortfalls or savings.

A.6.2. Tiered rate

Tiered rates are more complicated, and are normally assessed based on criteria such as household size, income, or some other metric. This approach is more difficult to implement due to the need for data specific to each customer. In addition, such data would have to be validated periodically, and the administrative cost of such updates would need to be balanced with equity concerns as changes occur. In addition, this approach also carries the risk of misaligning projected costs with actual participation in the program, which could result in inadequate funding and a significant increase in the tiered rate structure in subsequent years.

A.6.3. Variable rate, where fee increases incrementally based on need

A variable rate is normally established to reflect a subscription for disposing of a specified amount of waste. With curbside solid waste collection/disposal, for example, customers subscribe to a specified level of service (e.g., one 30-gallon can, one 90-gallon tote, etc.). This option is best in areas where costs are well understood. This approach may be problematic for a backhaul program given the infrequent need for the service, particularly if the fee is only for backhaul services and not for ongoing local waste disposal. Households themselves would have difficulty determining when their vehicle batteries and electronics would give out and thus would be unable to decide the best service level.

A.6.4. Purchase a pass to bring backhaul waste to a drop-off depot or collection center

A per-use pass, similar to a pre-paid health club pass with a fixed number of uses per pass, offers a simple use-related fee structure. The items being charged to the pass can be staggered. For example, if you bring an appliance to the depot, it will cost you more than batteries or light bulbs. Those products with a recycle value may add a credit to your account. The community could allocate some of the money collected towards surveillance cameras or towards an attendant. This method of billing, along with other potential "pay as you throw" approaches, is perhaps the most equitable, defensible, and easiest to implement of all options. However, challenges with enforcement are a disadvantage of this structure. As most landfills are not secure, it would be a challenge to manage illegal dumping at the site. Surveillance cameras are likely to be disabled in some locations, particularly if successful education is not completed prior to the initiation of the program. In addition, administrative processes would need to be developed to manage the distribution of the passes and allow for either "reloading" of electronic passes or purchasing new paper-based punch card passes. The former would require infrastructure to allow customers to swipe the card at the gate/location. The latter would require an attendant to be present to punch the card. Both require costs that would not be necessary under some of the other options discussed herein.

A.6.5. Will credits or reductions be offered?

Programs that promote engagement and participation, such as credits for volunteering at the waste site or fee reductions for payment made a year in advance, could be considered. Credits are useful in raising awareness or as an incentive to change behavior. Credits reduce revenues, so caution should be used when considering what can be used for credit. If credits are offered, care must be taken to avoid fraud and there must be willingness and capacity to enforce the credit program. Also, credits should be set up to help the system so that it manages waste or reduces overall costs. Note, the same is true for volunteering, although this requires organization and training for all volunteers. The community's environmental program, or other program or staff that operates the current solid waste or honey bucket collection program, is well positioned to help manage volunteer training and administer a credit program. Additional groups to consider would be the local youth booster or club program, church group, search and rescue team, environmental committee, and regional tribal consortia programs. Statewide organizations may be helpful in designing training or setting up the credit program.

A.7 Rate Collection

As part of the consideration of a fee structure for the backhaul program, consideration must be made regarding how the fee will be collected. Factors that should be considered include administrative ease, enforcement, revenue stability, and cost effectiveness. The following are potential options for structuring the billing and collection of a backhaul fee.

A.7.1. Tie the collection to an existing fee structure.

For several of the fee structures discussed, a cost-effective method of billing could be to partner with the electric utility or water service. As communities are served by other utilities, such as electric cooperatives, consideration should be made as to the feasibility of the fee being placed on the electric bill (or other utility bill). This approach provides efficiencies in the administration of the fee, including billing system development/maintenance, bill generation/mailing, processing of payments, and enforcement of non-payment. Depending on applicable laws and ordinances, this approach could provide more assurance of payment if enforcement is tied to other utility service such as electricity or water service.

A.7.2. Tie the collection to a nonprofit or independent entity that can manage the bill payment process and be accountable for collections and distribution.

Another option could be to contract with an independent organization to bill/collect fees from customers. As an example, there are regional tribal health organizations throughout rural

Alaska, providing a wide range of services focused on health care of their region's communities. Many of these organizations employ a local resident in the community to represent them, particularly in the case of larger communities. Partnering with community organizations could be particularly attractive for a punch card/bag/tag type fee structure, as these organizations could manage the sales and collection of revenues.

A.7.3. Pay at the time of disposal or an advance fee at time of purchase

This option becomes relevant for fee structure options including punch cards, bag/tag fees, etc. Under this billing/rate approach, a process would be required to determine authorized vendors of the cards/bags/tags, and for how sales are documented and revenues transferred to the backhaul program. Depending on the volume of purchases, such transfers should happen no longer than on a monthly basis, and perhaps as often as weekly to ensure sound accounting of the revenues and management of the revenue stream.

A.7.4. Phase in a fee

Depending on the level of fee required for the program, implementation of an adequate fee in the first year may not be possible, due to the impact on household budgets. At the same time, the costs of the program need to be planned so that sufficient funding is available as backhaul events are scheduled. Therefore, any phase-in of the fee should be calculated and planned for with a comprehensive business plan.

A.7.5. Regional collection or some sort of combination of collection system.

Regionally-administrated collection of materials is also possible. While the design can change if another model is more efficient, ***Backhaul Alaska*** tentatively envisions regional collection of materials from the port or other collection depot in each rural Alaskan community, with the local programs administered to move materials from the households to the community collection points.

A.8 Fee Design Considerations

When designing a fee for backhaul, certain things must be considered, including the following:

A.8.1. Consider the financial impact on the payer of backhaul fees in terms of fairness

As discussed above, the selected rate structure should be developed in a way that the rate payer perceives as fair and equitable. For example, a flat rate may seem fair, but it may be

perceived as inequitable if a small household is paying the same rate as a large household. A thorough understanding of each local community's culture and demographics can help inform the extent to which each rate option may pose concerns. For instance, a community with a multi-generational family may not necessarily generate more of the type of waste that is problematic and expected to be addressed through the backhaul program. Many elders, for instance, may adhere to historical, sustainable lifestyle and not generate such types of waste. As such, it could be perceived that such households could be unfairly burdened under a rate structure based on household size. Again, a thorough understanding of the community is necessary to evaluate the advantages and disadvantages of each rate structure and to develop a structure that best meets the community's needs.

A.8.2. A fee cannot allow too many potential payers to not pay

Given the unique demographics of many rural Alaskan communities, with households often living a subsistence lifestyle with limited wage income, care must be taken to develop fee programs with support for those who truly cannot afford the fee.

A.8.3. A fee or rate should be proportional to the burden of the haul

The fee should be designed to cover real costs of the backhaul. This is challenging for the backhaul program, given that items are disposed (stockpiled) for a period of months (or years, depending on volume received and weather conditions) until there is sufficient material to warrant a backhaul event. During the time that ***Backhaul Alaska*** would negotiate hauling rates, such contracts could be expected to change.

Therefore, the establishment of the fee should entail a comprehensive analysis of current and potential future costs, including all costs associated with the program that are not recovered through other funding sources. This analysis should include a sensitivity analysis of potential impact due to fluctuating costs, participation rate, revenue generation (e.g., potential non-payment/delinquencies, impact of credit/incentive programs, etc.), and/or additional costs associated with illegal dumping. In addition, an analysis of the impact of any credit/incentive program may have on both revenues and costs (e.g. volunteer work, which could reduce costs).

Based on this analysis, a range of fee levels can be evaluated in parallel with key assumptions regarding such things as those evaluated in the sensitivity analysis to determine an appropriate fee level. This analysis should then be conveyed as part of the overall communication/ education outreach conducted before, during and after roll-out of the program.

A.8.4. A fee should be stable and not subject to wide fluctuations in revenue collection.

Stable revenue streams, fee structures, and costs are essential to ensuring a successful backhaul program. As previously discussed, this is a challenge for the backhaul program, given the many uncertainties in rate setting. The program should have a fee that is stable, yet flexible enough to be adjusted over time as necessary while still avoiding "rate shock" for customers. In addition, because materials are stockpiled over a period of time, the program should avoid having early customers paying one fee, and late customers (for a given backhaul) paying a substantially different fee. While funding of a reserve fund, such as a rate stabilization fund, would help moderate fluctuations in program costs, this will need to be balanced with a perception of the program "sitting on money." This is another important topic for customer outreach/education, so that there is an understanding of how rates are set, and the importance of any reserve funds.

A.8.5. A fee should be flexible to allow for future changes in priorities or costs

The rate should be established in a manner that allows frequent monitoring of program costs and revenues, allowing program managers to evaluate needs as the program evolves, and adjust the rate(s) as necessary. A fee is designed for services provided so that the fee structure must be very clear in terms of what the exact, tangible service is that is being offered. It should also be proportional to the burden of providing the service.

A.8.6. A well-organized outreach and education campaign should be part of any fee structure

It is critical that stakeholders understand that they helped create the need for a backhaul service and they are part of the solution. Communications and outreach should be centered on culturally based education. One issue that may arise is that the community may not have set a waste reduction goal. Having a collective goal can be useful as part of the overall education program.

A.8.7. Is the administration of the fee system going to be placed out for bid or tied to an existing entity that already implements a fee-based program?

Placing the administration contract out to bid helps ensure the cost of the service is appropriate. However, depending on the rate structure and other program elements, it may not be feasible to have a truly competitive bidding process, as there may only be one potential bidder. In such cases, the program managers should work with the service provider to identify costs for services and help ensure that costs are reasonable.

A.8.8. Has the proposed fee been vetted for legal sufficiency?

It is important that the draft fee schedule be compared to all existing national, state and local regulations pertaining to taxation, fee implementation, and solid waste handling to determine compatibility and to prevent legal challenges.

A.8.9. Is the proposed fee equitable and proportional to the level of service?

It is important to review the type of wastes generated within a specific community, and by whom, when developing a fee structure. By the community's definition of "fairness," will the waste generators be paying their share of handling, disposal, and backhaul expenses? If not, the community should determine if potentially inequitable payment is a concern or whether equitable payment affects the community's ability to pay for the services they want. The equitability in terms of waste generation among community members may not be an issue. Rural Alaskan communities are group-oriented and do not typically view fairness in terms of individuals, or even individual families. They also tend to see things in context, so that if a household cannot afford a fee, that circumstance can warrant an exception. However, it is common for certain business and institutions in rural Alaskan communities to not contribute, or contribute less than their waste amount or type might otherwise suggest. A waste stream analysis can help the community allocate their fees.

A.8.10. Is the fee set up to offer flexibility to be able to adjust to changing conditions?

As the backhaul program in a community matures more will be learned and the fee structure will most likely need to be adjusted over time. The structure selected at the startup should allow for adjustment as more is learned through experience and with changing ecological conditions.

A.8.11. Will the fee be costly to administer during the initial set up and for oversight?

As with any program there will be planning, startup, and implementation expenses for a backhaul program and careful consideration should be made to quantify these as much as possible to provide a realistic overall cost of the program. Funding for the start-up costs should also be identified prior to initiation of the process for set-up. Costs associated with on-going monitoring of the program state-wide should be identified and either funded through a state-wide source, or allocated to local programs. Such allocation methodology would have to be determined, either based on population, estimated waste generation, or other basis.

A.8.12. Is the fee consistent with other local funding rates?

Other utility rates for the community should be reviewed when determining the rates for backhaul. These utility rates should be evaluated for fee per service and for overall cost to the

customer when added together with any additional fees backhaul may add to determine affordability for the community.

A.8.13. Is the proposed fee considered stable, i.e. consistent?

Will the fee, if collection is consistent, bring in a stable and reliable revenue stream to the backhaul program? The stable income stream is necessary to support program expenses, including personnel.

A.8.14. Can the fee be used to create opportunities for improvement and/or expansion?

The fee structure may need to include a rate to cover the cost of system or facility improvement or program expansion if the program plan includes goals.

A.8.15. Are there incentives for payers to reduce their fees?

Careful consideration should be made to incentive programs which can create community buy-in and help alleviate economic burdens on customers, while acknowledging that this can also reduce the revenue stream necessary to support the program.

A.8.16. Are you able to describe to ratepayers exactly what the fee will cover?

Prior to fee structure development, a backhaul program plan should be developed and formally adopted by the community that includes the goal of the program, objectives to be achieved, tasks to meet objectives, resources needed, implementation timeline, and assessment method.

A.8.17. Is there a start-up strategy in place to follow?

A well-designed startup process will help ensure accountability and program success.

A.8.18. What organizational structure will administer the fee?

Is there a written contract or other type of legally binding agreement? When researching options for program fee/collection administration, consistency and longevity of work within local communities should be considered. When an administrator has been selected, a written legal contract should be executed.

A.8.19. Could the backhaul program further economic development including job creation?

Job creation is a key goal of ***Backhaul Alaska***. A community backhaul program has the potential to create local work. The community backhaul program can also provide skills training

programs to train local residents rather than importing external workers. Workers with new skills could take their skills to obtain employment elsewhere in the state, including to regional backhaul facilities developed under this program.

A.8.20. Can a backhaul program improve environmental conditions and public health?

Protection of health and the environment, including subsistence grounds and waters, will be increased with the removal of the hazardous wastes targeted by ***Backhaul Alaska***. Extending backhaul services to municipal waste can further improve local health and environmental benefits. Over half of Superfund sites today are former municipal solid waste landfills, which points to the dangers of disposing household waste into unlined and lightly managed rural landfills. Previous studies examining rural Alaskan landfills indicate similar health risks as those faced from communities in developing countries living near hazardous waste sites.

Site cleanup is enormously expensive in rural Alaska due to mobilization and demobilization costs of equipment, cover, liners, and management travel, however, the public health benefits may reduce or outweigh the total costs related to proper waste management in rural Alaska.

An accurate description of the societal cost benefits of the program may provide fodder for greater partnering and leveraging opportunities from a wider range of agencies, foundations, and corporations.

> ***Recommendation:*** *Identify the full scope of potential cost savings related to health and environment engendered by Backhaul Alaska, including a quantitative range where possible, and use the information to promote the value of the Backhaul Alaska program.*

A.9 What is the most efficient use of the community contribution and how should it be moved?

The money generated by communities as their contribution to ***Backhaul Alaska*** can be channeled to one or a combination of functions:

- Locally – the funds generated locally would support local programs.
- Hub – the funds could support hub functions.

- State-Level – The funds could support state-level coordination, such as logistics coordination.
- Vendor – The funds could support hauler or recycler fees.
- Program – The funds could support non-designated program shortfalls

Further Study: *The question of how community revenue should be used and moved is primary for EPA Region 10 and the Backhaul Alaska program. Revenue will be generated from the communities served and local, regional, and statewide backhaul program costs need to be covered. Whether and how funds are moved from the community and back again is a complicated question and outside the expertise of EPA Region 10 and Backhaul Alaska stakeholders.*

Appendix B. Backhaul Alaska Business Model

B.1 Purpose:

This model provides a brief overview of the Backhaul Alaska program business model and serves to:

- Show broad financial implications of the program
- Show fundraising needs
- Provide a tool for revising projections as more information becomes available

B.2 Methods:

The major components of this model are:

- Aggregate regions
    - This model includes nine regions: Bering Stratis, Nana, Bristol Bay, Calista, Koniag, Doyon, Sealaska, Aleut, and Arctic Slope. The costs for each region account for all communities and households within that region.
- Linear projection
    - This model projects cost increases over ten years from costs at program inception in 2018 to maintenance costs according to a linear growth formula.
- Data from the ***Backhaul Alaska*** Budget program
    - This model draws all initial costs at program inception and maintenance costs from the ***Backhaul Alaska*** Budget program. These costs include:
        - Personnel
        - Supplies
        - Shipping

        - Trucking
        - Connex containers
        - Fringe
    - This model also draws the number of households in each region from the ***Backhaul Alaska*** Budget program.

- Summary costs
    - This model includes summary costs for each region calculated using the above listed costs. Summary costs include:
        - Subtotal
        - Indirect
        - Total regional program cost/value per year
        - Household cost of regional program support
        - Total village program value
        - Total regional backhaul value/cost
        - Annual household cost of village/regional programs

- Program revenues
    - This model includes program revenues projected from program inception in 2018 over a ten-year period. Maintenance revenues at full operation are drawn from the ***Backhaul Alaska*** Budget Program.

B.3 Assumptions:

This model makes the following assumptions:

- The ***Backhaul Alaska*** Budget Program cost calculations are accurate and up-to-date.
- There are no capital expenses. This model accounts only for operation expenses and does not factor in extra costs at program inception for capital, such as connex containers that are a one-time purchase.
- There is no inflation. This model does not account for inflation over the ten-year projected growth period for any costs except personnel.
- There is a linear cost structure within each region. This model accounts for all villages and households in the same way disregarding any differences that may alter costs.
- There is a linear projection of personnel. This model projects personnel costs linearly which may result in unrealistic costs. For example, some projected personnel costs account for less than one half of a full-time employee.
- The cost of supplies, shipping, trucking, and connex containers remains constant from program inception onward.

B.4 Limitations:

This model is subject to the following limitations:

- This model cannot be used to influence decisions on a village level. It accounts for villages and households within a region in a uniform way and does not account for differences among villages that may alter costs and influence decision making.
- This model can only be used to influence decisions on a programmatic or regional level. It provides enough detail on a regional level that can be used to influence regional decision making which can then influence programmatic decision making.

- This model only includes operation expenses.
- This model does not include capital expenses.
- This model projects program adoption by region linearly. It assumes that all villages within a region will join the program at once. Villages within a region will likely join the program at different times.
- This model does not account for inflation.

B.5 Notes:

- Actual costs for each region would likely be less early on and increase as smaller and more expensive villages join the program.
- Several mistakes in the ***Backhaul Alaska*** Budget Program were corrected for in this model and the original values adjusted to fit the correct formulas. These adjusted values are highlighted in yellow on the model. For example, the total regional program cost/value per year for the Nana region did not equal the sum of the subtotal and indirect costs.
- For some regions, the cost per household remains constant across all years. This is the case because the number of households and other expenses increase linearly at the same rate pursuant to this model's formula causing the per household cost to stay the same.

B.6 Backhaul Alaska Business Model as of June 2018

The model shows the ***Backhaul Alaska*** program operating at a deficit that will increase each year from a range of approximately $100,000 to $280,000 per year. The Backhaul Alaska program will require new sources of revenue to attain program solvency.

REVENUES	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Community Contribution		-$45,144.95	-$90,289.89	-$135,434.84	-$180,579.78	-$225,724.73	-$270,869.67	-$316,014.62	-$361,159.56	-$406,304.51	-$451,449.45
School Contribution		-$5,699.49	-$11,398.97	-$17,098.46	-$22,797.94	-$28,497.43	-$34,196.92	-$39,896.40	-$45,595.89	-$51,295.37	-$56,994.86
Federal Agency Waste Contribution		-$2,467.08	-$4,934.16	-$7,401.24	-$9,868.32	-$12,335.41	-$14,802.49	-$17,269.57	-$19,736.65	-$22,203.73	-$24,670.81
Lead Acid Battery Revenue Total		-$2,285.82	-$4,571.64	-$6,857.46	-$9,143.28	-$11,429.10	-$13,714.92	-$16,000.74	-$18,286.56	-$20,572.38	-$22,858.20
Total Revenues		**-$55,597.33**	**-$111,194.66**	**-$166,792.00**	**-$222,389.33**	**-$277,986.66**	**-$333,583.99**	**-$389,181.32**	**-$444,778.66**	**-$500,375.99**	**-$555,973.32**

Household Cost of Regional Program Support	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Bering Straits	$35.48	$38.46	$41.43	$44.40	$47.38	$50.35	$53.33	$56.30	$59.27	$62.25	$65.22
Nana	$37.63	$39.20	$40.77	$42.34	$43.91	$45.48	$47.05	$48.62	$50.19	$51.76	$53.33
Bristol Bay		$148.25	$148.25	$148.25	$148.25	$148.25	$148.25	$148.25	$148.25	$148.25	$148.25
Calista		$52.70	$52.70	$52.70	$52.70	$52.70	$52.70	$52.70	$52.70	$52.70	$52.70
Koniag		$178.77	$178.77	$178.77	$178.77	$178.77	$178.77	$178.77	$178.77	$178.77	$178.77
Doyon		$96.15	$96.15	$96.15	$96.15	$96.15	$96.15	$96.15	$96.15	$96.15	$96.15
Sealaska		$17.93	$17.93	$17.93	$17.93	$17.93	$17.93	$17.93	$17.93	$17.93	$17.93
Aleut		$46.49	$46.49	$46.49	$46.49	$46.49	$46.49	$46.49	$46.49	$46.49	$46.49
Arctic Slope		$85.93	$85.93	$85.93	$85.93	$85.93	$85.93	$85.93	$85.93	$85.93	$85.93
Program Total Cost/Total Number of Households	**$36.38**	**$40.33**	**$42.10**	**$43.11**	**$43.76**	**$44.22**	**$44.56**	**$44.81**	**$45.02**	**$45.19**	**$45.32**

Program Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Item											Value at full operation
Personnel , FTE=	$24,000.00	$52,400.00	$80,800.00	$109,200.00	$137,600.00	$166,000.00	$194,400.00	$222,800.00	$251,200.00	$279,600.00	$308,000.00
Fringe	$5,850.00	$18,335.00	$30,820.00	$43,305.00	$55,790.00	$68,275.00	$80,760.00	$93,245.00	$105,730.00	$118,215.00	$130,700.00
Supplies (safety gear (glove, goggles), shrinkwrap, totes, vermiculite, shipping to get totes back to villages)[3]	$2,500.00	$3,376.67	$4,253.33	$5,130.00	$6,006.67	$6,883.33	$7,760.00	$8,636.67	$9,513.33	$10,390.00	$11,266.67
Flatbed truck (insurance, fuel, and maintenance (this truck is used to pick up materials from airport and take to storage area and also to pick up materials around town)[3]	$2,000.00	$2,645.00	$3,290.00	$3,935.00	$4,580.00	$5,225.00	$5,870.00	$6,515.00	$7,160.00	$7,805.00	$8,450.00
Shipping											
connexes/yr of ewaste, lights, batteries[4, 7]	$8,072.05	$16,856.37	$25,640.68	$34,425.00	$43,209.31	$51,993.63	$60,777.94	$69,562.26	$78,346.57	$87,130.88	$95,915.20
Shipping from villages to hub[5]	$35,443.55	$40,947.02	$46,450.49	$51,953.96	$57,457.43	$62,960.90	$68,464.38	$73,967.85	$79,471.32	$84,974.79	$90,478.26
Recycling fees for ewaste/lights[6]	$7,834.07	$13,165.10	$18,496.14	$23,827.18	$29,158.21	$34,489.25	$39,820.29	$45,151.32	$50,482.36	$55,813.40	$61,144.44
Subtotal	$85,699.67	$147,725.16	$209,750.65	$271,776.14	$333,801.63	$395,827.12	$457,852.60	$519,878.09	$581,903.58	$643,929.07	$705,954.56
Indirect,(on personnel and fringe)	$8,955.00	$21,220.50	$33,486.00	$45,751.50	$58,017.00	$70,282.50	$82,548.00	$94,813.50	$107,079.00	$119,344.50	$131,610.00
Total Regional Program Cost/Value per year	**$94,654.67**	**$168,945.66**	**$243,236.65**	**$317,527.64**	**$391,818.63**	**$466,109.62**	**$540,400.60**	**$614,691.59**	**$688,982.58**	**$763,273.57**	**$837,564.56**
Number of households[8]	2,602	4,190	5,777	7,365	8,953	10,541	12,129	13,716	15,304	16,892	18,480
Household Cost of Regional Program Support	**$36.38**	**$40.33**	**$42.10**	**$43.11**	**$43.76**	**$44.22**	**$44.56**	**$44.81**	**$45.02**	**$45.19**	**$45.32**
Total Village Program Value	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,174,235.29
Total Regional Backhaul Value/Cost	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$3,061,373.57
Annual Household Cost of Village/Regional Programs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,362.93

Net Cashflow	($94,654.67)	($113,348.33)	($132,041.98)	($150,735.64)	($169,429.30)	($188,122.96)	($206,816.61)	($225,510.27)	($244,203.93)	($262,897.58)	($281,591.24)
Average Shortfall/Household	($36.38)	($27.06)	($22.86)	($20.47)	($18.92)	($17.85)	($17.05)	($16.44)	($15.96)	($15.56)	($15.24)

Appendix C. Case Studies

It is recognized that the challenges of ***Backhaul Alaska*** are unique. Nowhere in the United States are small rural communities as fully isolated and remote, and without access to regional/county facilities. Nowhere are the hauling costs to appropriate disposal or recycling facilities as excessive, nor the cost to build additional infrastructure and the logistics needed as daunting. However, some similarities for various parameters exist between Alaska's struggles and other venues, and it is illustrative to examine these cases for potential Alaska-based solutions. Note where costs are provided, they are not intended to suggest that Alaska would achieve a similar cost structure. At most, these costs represent a relative affordability within the local jurisdiction of the case study and all costs would need to be reviewed in the context of rural Alaskan communities.

C.1 Bottle Bills

While not technically a form of EPR, "bottle bills" are a common related concept that is relatively easy for the public to understand. There are programs in place in other states that have had some successes, such as California, Connecticut, Hawaii, Iowa, Maine, Massachusetts, Michigan, New York, Oregon, Vermont and the territory of Guam. These locales have approved "bottle bill" legislation whereby a small refundable deposit, typically 5 to 10 cents per bottle, is included in the price of containers such as soft drinks and other beverages. The consumers receive a refund of the deposited amount when they bring the container back for disposal, which in most cases involves recycling. The intent of such a program in Alaska would be to create a cost-neutral incentive to the consumer to return beverage containers to a point of sale location for collection and incorporation into a backhaul or recycling program. To date, there have been unsuccessful attempts to start a bottle bill in Alaska because they are considered politically infeasible because they involve an explicit "fee." However, over time, the politics of the issue may change and allow such an approach to be used. Furthermore, t the Municipalities of Anchorage, Wasilla, and Palmer have all passed recent plastic bag bans.

C.2 Charleston County, South Carolina

Charleston County developed a holistic approach to waste services that includes a user fee that covers a wide variety of waste services, including: curbside recycling, drop off sites and convenience centers, waste transfer and disposal, material recovery, composting, household hazardous waste, and administration. Fees for single family are $99 (including mobile homes); multi-family $70 per unit (including apartments) and commercial $172 per cubic yard of garbage.

The fee is billed as part of the annual real property tax bill. While these fees may be prohibitively high for rural Alaska communities, there may be some value in investigating fees to cover a wide array of solid waste services.

C.3 Prince William County, Virginia

A solid waste fee was established in the rural county of Prince William, Virginia in 1998. The fee was established to fund trash disposal, composting, recycling operations and to repay debt for the purchase of additional land to expand the landfill. The fee is set up as a separate line item on the property tax bill and billed semi-annually. Prince William charges different rates depending on the type of resident. For example, single-family homes are billed $70/year, Town homes, $63/year, mobile homes, $56/year and condos and apartments are charged $47/year. For business and non-profits, fees are assessed based on the actual amount of refuse that is generated per year based on actual records or by number of pickups. If this information is not available, the County will estimate a fee based on the type and square footage of a business or non-profit. This system works for collection at homes, but residents and businesses can opt to haul their trash to the landfill without paying a fee for most items. This system made it easier for residents and the county.

C.4 North Carolina Disposal Fee

North Carolina imposes a $3.00 disposal fee on each white good sold within North Carolina. White goods include refrigerators, ranges, water heaters, freezers, unit air conditioners, washing machines, dishwashers, clothes dryers and other similar domestic and commercial large appliances. It is essentially a disposal tax on all **new** white goods sold by a retailer or purchased for storage, use, or consumption in the state. It includes all new white goods with or without chlorofluorocarbon refrigerants and is an addition to all other taxes. The purpose of the program is to discourage the illegal disposal of white goods and to encourage the recycle of refrigerant gasses.

The program is funded by the taxes that come from the sale of the white goods, and these funds are redistributed back to North Carolina counties. Revenue and grants a county receives from these funds must be spent on activities associated with white goods or management of white goods disposal and recycling. The activities funded can be in one of three areas: 1) daily operating expenses (salaries, training, equipment maintenance, fuel, etc.), 2) capital improvements spent on infrastructure and equipment (concrete pads, sheds, and buildings,)) and 3) clean-up of illegal dumps. Grants are available for counties for capital improvements and to fund cost overruns.

Since the passage of the Solid Waste Management Act of 1989, in which North Carolina asked local governments to achieve a waste reduction goal of 40% by a given date, many counties have developed their own system of disposal and charges. For example, Wake County, North Carolina requires each household to pay a fee of $20.

Johnston County, NC sells decals online for residents to purchase to dispose of their household garbage. For this decal, a resident can bring one standard half-ton pickup truckload of household garbage to the Convenience Centers once a week. Additional trips are charged an extra per-ton disposal fee. The charge for a decal is $100 and the fine for disposing of waste without a decal is $500.

C.5 Oregon Paint Recycling Fee

Oregon's legislature enacted a program to impose a fee of 75 cents per gallon of paint that is added to the price of the gallon of paint at the retail store. The fee is intended to support collection centers and promote recycling options for left-over household paint. The program was supported by paint retailers and addresses the collection, processing and disposal of leftover paint. Oregon was the first state in the nation to pass such legislation

Oregon PaintCare is a nonprofit organization that is implementing the pilot program. The program intends to provide awareness about the proper use of the product, reducing the leftover paint, incentivizing buying the proper amount and properly managing what is not used. The fee is intended to cover the costs of collection centers and recycling.

The fees range from no fee for a half-pint of paint or less to $1.60 for more than a gallon of paint. There are 80 collection sites/retailers in Oregon in which leftover paint is stored in a bin before being transported to Portland and sorted by good latex, not-so-good latex and oil-based paint. Dried and empty paint cans can be thrown out with the trash. Oil-based paint is burned for energy; the good latex paint is recycled and the not-so-good latex is processed in California and used as an additive in concrete.

This model, of charging a slight fee to encourage disposal and recycling of a specific product or type of product may have some applicability for ***Backhaul Alaska*** if the issue of a "fee" could be resolved.

C.6 Computer Recycling and Reuse

While many computer companies may be examining the possibility of computer and computer component recycling and reuse, this case study focuses on Dell as one example. Dell is

currently investigating the possibility of the circular economy – where waste materials are continuously restored to use – by sourcing recycled plastic for new products, closing the loop on electronic waste and examining packaging innovations. Through its "legacy of good" program, the company has plans to cut waste, create more eco-friendly products and inspire its stakeholders to adopt "circular" thinking. In particular, it plans to use 50 Million lbs. (22.7m kg) of recycled plastic and other sustainable materials by 2020, create 100% recyclable or compostable packaging, and recover 2 Billion lbs. of electronic waste. In 2014, Dell sourced 4.5 Million kilos of recycled plastic to build monitors and desktops. It also began capturing waste materials from customers' old computers to incorporate in new products. People in 78 countries are already taking advantage of its free take-back program to recycle end-of-life electronics, with 560 Million kilos of e-waste recycled so far. Now, the company is transforming some of the collected plastic waste into new materials for its OptiPlex 3030 desktop computer, creating the industry's first certified "closed loop" recycling system. Elsewhere, Dell eliminated 20 Million pounds of packaging between 2008 and 2012, generating more than $18m (£12.3m) in cost savings. Its intention to reduce packaging waste has seen the company replacing non-biodegradable, oil-based materials with organic alternatives such as bamboo and mushrooms. Its wheat straw packaging uses 40% less and encourages others to see waste as a valuable resource. Dell formed a partnership with the United Nations Industrial Development Organization to collaborate on developing recycling models for e-waste in developing countries. This builds on its work to empower people in Kenya to generate additional income by collecting e-waste, and a roadmap it created for other organizations to prosper by recycling waste.

C.7 The Occupational Training Center (O.T.C)

The Occupational Training Center maintains recycling collection contracts with three large military bases in southern New Jersey. The recycling center is located at the McGuire Air Force Base (AFB) and collects recyclables from the offices, military installations, and houses at McGuire AFB, Ft. Dix Military Installation and Lakehurst Naval Station.

The O.T.C. military recycling facility collects and processes paper, food and beverage containers, scrap metal, florescent lighting tubes, and tires.

The site has employment opportunities that create jobs for adults with disabilities. The recycling team for McGuire AFB, Ft. Dix and Lakehurst consists of four specially trained individuals who are skilled at collecting recyclables, separating and sorting recyclables, and operating baling machines. In addition to providing recycling services to the military, this work also gives these adults opportunities to work towards self-sufficiency, provides a sense of pride

and accomplishment, and helps create additional programs for other adults with disabilities at O.T.C.C.7 Joint Base Langley-Eustis (JBLE)

Joint Base Langley-Eustis' America Recycles Day (ARD), a national program which began in 1997 by Keep America Beautiful, is celebrated every Nov. 15 and encourages Americans to recycle and buy recycled products.

This day promotes environmental, social and economic benefits of recycling, and encourages Americans to create a better, natural environment for everyone to enjoy. ARD also raises awareness in local communities.

Recycling reduces the amount of waste going to crowded landfills, while conserving natural resources and saving money. In 2012, Joint Base Langley-Eustis diverted roughly 1,650 tons of recyclables, including cardboard, mixed and shredded paper, scrap metal, toner cartridges, single-stream recyclables and mattresses. Both installations provide recycling containers at facilities to collect single-stream recycling for weekly pickup. Single-stream recycling refers to a system in which all paper fibers, plastics, metals and other containers are mixed in a collection truck, instead of being sorted by the resident into separate commodities and handled separately throughout the collection process. The JBLE also holds a recycling event on Earth Day, which is normally celebrated in April. These types of programs that promote an idea may provide a model for Backhaul Alaska to consider when thinking about ways to encourage the use of the program.

C.8 Pearl St. Co-Op

Pearl St. Co-Op, owned and operated by College Houses, and KXAN share a space-constrained alley in West Campus. For years, both businesses managed their own waste services and struggled to combat continuous illegal dumping. It was also commonplace for parked cars to block dumpsters, resulting in missed pick-ups.

In 2015, College Houses' operations director, Ken Mills, attended a zero-waste conference hosted by Austin Resource Recovery (ARR). Inspired, he began ramping up diversion efforts at his properties and used ARR's Zero Waste Business Rebate to increase diversion during 2016 move-out. These efforts prompted thoughts about larger illegal dumping solutions.

College Houses approached KXAN about using service consolidation as an opportunity to move the dumpsters to a centrally shared location and build an enclosure to deter illegal dumping.

Despite upfront costs and labor, both businesses are benefiting from improved mobility in alleyway and additional parking space for KXAN, increased service reliability (fewer missed pick-ups), decreased monthly service costs for both businesses, minimized illegal dumping and labor/fees associated with extra pick-ups, and increased cleanliness and safety of alley.

A tenacious operations director, a collaborative approach between the organizations and a desired common interest to alleviate shared challenges helped make this a successful project. Involving the hauler from the beginning and working closely throughout the process also helped ensure success. Buy-in from the Co-Op board members and both businesses was also critical. This case study demonstrates the benefits that can occur when organizations work together to solve a common challenge.

C.9 Linden Hills Co-op Leadership Capacity Development

Linden Hills Co-op was formed over 20 years ago by a group of Quaker families who wanted their co-op to take an active and committed role in the growth of the independent businesses now thriving in the Linden Hills business district in Minneapolis.

Over the years, the co-op's board and management have continually asked a simple but all-important question—what do people want from us as an organization? In order to answer the question, they understood they needed to continually assess their leadership capacity. The co-op has invested in the training and opportunities that have allowed the co-op to continue to meet the needs of their neighborhood and beyond.

The board adopted policy governance eight years ago that has greatly enhanced the leadership of the co-op as a whole. The board is focused on improving themselves and the store and has benefited from the strength of a succession of excellent board presidents, and the board consistently invests in grooming people for the role.

The Linden Hills board is also very interested in expanding their leadership to the wider food co-op community. The board sees the expansion of their role in cooperatives as a natural part of its evolution.

Operationally, the store benefits from this cultural emphasis on leadership. Staff are encouraged to become leaders, to step forward and take a role in the leadership of the whole store. This is also enhanced by the co-op's participation in the Midwest Purchasing Co-op's Leadership Development Training—a year-long management preparation program designed to enhance professionalism and retention of excellent employees in search of a career path. The co-op has sent at least two staff members every year for three years.

The board and staff view the work they are doing at Linden Hills as something they are "creating," not things that are "happening" to them. This view is attributed to a paradigm shift brought on by consistent leadership.

C.10 Take it Back NYC

New York City has established both voluntary and mandatory programs towards collection and recycling of post-consumer waste as well as hazardous materials. While New York City is the opposite of rural Alaska in terms of density, development and demographics, it is relevant because it also involves not only successful EPR programs that take into consideration the impact to small business, but by its very nature solid waste disposal is handled by barge and other off-site land-filling. New York City's collection is also unique, as garbage often piles very high on city sidewalks during peak business hours, until it can be collected overnight to minimize vehicular and pedestrian traffic interruptions.

Mainly by way of a multitude of enabling state and local legislation that goes as far back as 1982, New York City has some of the most comprehensive EPR laws in the United States. The "Take It Back NYC" program includes mandatory programs for plastic bags, electronics and cellular phones, rechargeable and auto batteries, sharp items such as medical needles, beverage containers, tires and motor oil. For many items, retailers are required to have on-site collection mechanisms, such as clearly labeled boxes or even reverse vending machines. For auto batteries ($5.00), tires ($2.50) and beverage containers ($0.05), per-item deposits are collected when new items are purchased and refunded when the used items are returned in an attempt at keeping the programs cost-neutral to the end-user. All other items on this list are required to be accepted at no charge to the customer. Exceptions are made for businesses under a certain size.

The program also has voluntary take-back programs for items containing mercury, such as fluorescent bulbs and thermostats, as well as unused medication and for printer ink and toner cartridges. All the guidelines were last updated in 2016 as part of the city's ultimate strategy of moving to zero waste to landfills by 2030.

New York City does not have as profound a lower-income population as rural Alaska, but it does have large pockets of poverty and is a microcosm of the overall income disparity in the U.S., with median household effective buying income (i.e. disposable or 'take-home' pay) ranging from 64% that of the U.S. in the Bronx to 129% of the U.S. in Manhattan. Given that the five boroughs comprise some of the most expensive real estate in the U.S., policy makers do incorporate a sensitivity to those with lesser means in one of the highest cost of living metropolitan statistical areas (MSA) in the U.S. Public education plays a large role too, including public service announcements, signs and billboards prominently displayed in or near stores, and policy

recommendations such as the proposal to include an acceptable on-site waste management facilities part of each new or remodeled multi-family residential and commercial building if the building plans are to be approved by the city.

C.11 Guam Waste Programs

As far back as 1986, the EPA issued an administrative order directing the Government of Guam ("GovGuam") to address runoff leaching from its solid waste landfill, ultimately polluting the Lonfit River and violating the federal Clean Water Act. The problem persisted, and the EPA and GovGuam eventually entered into a consent decree in 2004. Because of a number of challenges that included lack of political consensus and inadequate funding (part of which was attributed to poor collection rates), the U.S. District Court of Guam in 2008 appointed a receiver to achieve resolution to the consent decree.

Guam in 2011, created enabling legislation that focuses on beverage container collection and recycling. Conceding that a 210 square mile island in the western Pacific with a median temperature of 81° F also does not appear on first glance to be a useful comparable to rural Alaska, it is important to note that the native Chamorro population is also characterized by unemployment rates higher and income indicators lower than that of the general population, and parts of the island are rural and difficult to navigate. The general government's Department of Public Works has been under a federal consent decree since 2004 and since 2008 has been in receivership. One of the factors that led to the federal environmental infractions and receivership was the poor financial condition of the solid waste system, in large part because of poor collections of residential service charges.

Guam, with income indicators well below that of mainland U.S., has since opened a new landfill in 2011, in 2013 put in place recycling and bulky trash collection, and in 2015 dedicated a new household hazardous waste (HHW) facility. There is no charge to the residents of Guam for the drop-off of household hazardous waste, as the cost of the program is embedded in the per-ton tipping fee. Curbside recycling is also provided to existing residential solid waste customers at no additional cost to the existing $30 per month fee. Residential customer collections are generally good at about 99% of the $6.7 million in annual billing, which differs very materially from rural Alaska. However, accounts receivable are substantial: as of fiscal 2016, the most recent independently audited year for the solid waste fund, accumulated receivables were just under $1.7 million, indicating that delinquent accounts are unlikely to ever be collected, a similar challenge to that of rural Alaska.

Aside from the above HHW program, GovGuam created two additional programs with the expressed intent of reducing both litter and diverting recyclable solid waste from ultimately ending

up in the new landfill. Both programs have aspects that align with EPR, but both also have committed public sector revenue streams. In 2010, Guam passed the Beverage Container Recycling Act, in which a 5 cent per container deposit (an amount which can be adjusted by legislative action) is paid to GovGuam by the beverage distributor. Up to 80% of the deposit is refundable to anyone returning the beverage containers to any approved location, rather than compelling the consumer to return to the same store from which it was purchased. The Guam EPA (GEPA) collects 20% of the deposit to help defray administrative costs. Forfeited deposits are returned to the program.

Guam also established a recycling revolving fund (RRF), funded from a portion of motor vehicle registration fees and administered by GEPA. In fiscal 2018, GEPA appropriated over $2 million from the RRF directly to the island's villages (via Guam's Council of Mayors) for litter removal, including abandoned vehicles, white goods such as appliances, and tires. Some of the recurring revenues from the RRF are used to pay recycling companies (currently $30 per ton). An idea to pay consumers $5 for each tire turned in from RRF funds, rather than the current law in which Guam residents pay a tire disposal fee of $5, has thus far not made it past the alternative ideas stage.

For larger solid waste, Guam also provides two curbside collection dates per year – free to customers in good standing – of up to five items considered bulky or metallic waste (such as a mattress or an appliance), also to divert these items from ultimately ending up at the landfill or being abandoned in place.

This case study shows a method that Backhaul Alaska may want to consider that encourages local collection, jointly with producers and retailers, and eventually to central facilities that can ultimately backhaul the waste or send it to recycling facilities. The below table is merely illustrative of how the state could create small recurring revenues to dedicate to its portion of any new program.

Based on FY 2017 data

State of Alaska	current	example of increase
passenger vehicles	470,000	470,000
pickups	225,000	225,000
commercial trucks	43,000	43,000

motor vehicle registration fee ($)	100.00	102.50
annual revenue ($) ^	36,900,000	37,822,500
incremental new revenues, annually ($)		**922,500**

^ each vehicle registration is valid for 2 years

Table 1. Example of a way to create some dedicated funding for a backhaul program based on actual state of Alaska statistics.

C.12 Organization for Economic Cooperation and Development (OECD) Research

The OECD has in its library a compendium of case studies, mainly in Europe and Asia, that hold some comparability to rural Alaska in terms of lower density or poorer communities. Germany in the mid 1990's was one of the first to introduce EPR, so it is also possible to observe and take away lessons learned from someplace in which this has been a part of consumer and producer behavior for decades.

The OECD defines EPR as "an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle." Contributing research (see, among others, "EPR Policies and Product Design: Economic Theory and Selected Case Studies", Nils-Axel Braathen, 2006) notes that the most effective programs have tended to use some combination of what OECD calls advance recycling fees (some kind of up-front cost to the producer) and a recycling subsidy from the government. Regulations, such as Germany's mandatory take-back laws passed in the 1990's, could be more difficult to achieve in the United States, although have had varying degrees of success in other countries. The research goes on to note greater success rates in places where Producer Responsibility Organizations (PRO) are formed, whereby producers with common products or services collectively make arrangements to comply with the government's mandatory take-back requirements, which not only creates the efficiencies of scale but also informal infrastructure by way of coordination of efforts.

One of the more established examples of this is the waste electronics and electrical equipment (WEEE) program in the Netherlands. WEEE Nederland is one of two of the more established Dutch PROs, offering (for a fee) to register products for manufacturers and producers coordinate with municipalities for the waste collection to be passed along to the recyclers.

Essentially this PRO acts as the ultimate facilitator and liaison between producer, recycler and community.

It is important to recognize that EPR programs are only one tool in the toolbox, and that academic and other research suggests that they can be even more successful when combined with participation by the consumer, retailer and local or regional government

Appendix D. ISRI report on recycling industry jobs (State of Alaska)