From: crgilbert@comcast.net
To: REDICK Daniel; "Brian May"; "Sanderson, Shane"; imacnab@republicservices.com; "Bromann, Bill"; "Mark Yeager"; "Ken Eklund"; "Sam Imperati"; "Rough, Ginger"; "Charles Gilbert"
Cc: "Amelia Webb"; SCHERMER Maren; Benton County Talks Trash
Subject: RE: BCTT Subcommittee Meeting #15 - A.1. Landfill Size/Capacity/Longevity
Date: Friday, March 10, 2023 6:27:18 AM
Attachments: image001.png
A1 Subcommittee Report Draft 030923 crg revision request 030923.docx

Hi Daniel,

Attached are proposed revisions highlighted in yellow for ease of locating for further vetting.

I took the liberty of moving the executive summary to the top of the report in order that a format can be developed to encourage the reader to read further into the subcommittees reports for additional valuable information.

I know we are in the 11th hour for revision, so hopefully the editor board can make the final cut before the next meeting.

Thanks.

Chuck

From: REDICK Daniel <daniel.redick@bentoncountyor.gov>
Sent: Thursday, March 9, 2023 12:42 PM
To: Chuck Gilbert (crgilbert@comcast.net) <crgilbert@comcast.net>; Brian May <BMay@co.marion.or.us>; Sanderson, Shane <ssanderson@co.linn.or.us>; imacnab@republicservices.com; Bromann, Bill <WBromann@republicservices.com>; 'Mark Yeager' <mayeager@gmail.com>; Ken Eklund <futureeverything@writerguy.com>; Sam Imperati <samimperati@icmresolutions.com>; Rough, Ginger <GRough@republicservices.com>; Charles Gilbert <crgilbert@outlook.com>
Cc: 'Amelia Webb' <AmeliaWebb@icmresolutions.com>; SCHERMER Maren <maren.schermer@bentoncountyor.gov>; Benton County Talks Trash <bentoncountytalkstrash@bentoncountyor.gov>
Subject: RE: BCTT Subcommittee Meeting #15 - A.1. Landfill Size/Capacity/Longevity

Greetings BCTT A.1. Landfill Size/Capacity/Longevity Subcommittee,

I have attached the latest subcommittee report in PDF and Word Doc format. Some images were removed temporarily to reduce the file size. I “accepted” many track-changes to improve readability. I also revised the Common Terms and Definitions section, consolidating related definition content

from other areas of the document to that section.

Please review the document ahead of Monday's final subcommittee meeting, and send any proposed revisions to the whole subcommittee. Any revisions I receive by 3pm tomorrow will be incorporated into the document and sent out to the group before the end of the day tomorrow.

Thank you!

Daniel Redick *he/him*
Solid Waste & Water Quality Program Coordinator
Community Development
Phone: 541-766-6819
Email: daniel.redick@co.benton.or.us
www.co.benton.or.us

Community Development has moved to the Kalapuya Building at 4500 SW Research Way, 2nd Floor.
Come see the new space; we are officially open for business!

-----Original Appointment-----
From: REDICK Daniel
Sent: Friday, February 24, 2023 11:19 AM
To: REDICK Daniel; Chuck Gilbert (crgilbert@comcast.net); Brian May; Sanderson, Shane; imacnab@republicservices.com; Bromann, Bill; 'Mark Yeager'; Ken Eklund; Sam Imperati; Rough, Ginger; Charles Gilbert
Cc: 'Amelia Webb'; SCHERMER Maren
Subject: BCTT Subcommittee Meeting #15 - A.1. Landfill Size/Capacity/Longevity
When: Wednesday, March 8, 2023 3:30 PM-5:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Zoom - Registration Required (using the link below)

Please note, this Zoom meeting requires registering with the link below, which is different than previous meetings and may take a couple minutes.

Greetings BCTT A.1. Landfill Size/Capacity/Longevity Subcommittee,

Please join our upcoming subcommittee meeting:

- Meeting #15: March 8, 3:30 PM – 5:00 PM Pacific Time (Zoom Meeting Details Below)

The agenda and supporting documents will be added subcommittee webpage ahead of each meeting.

You are invited to a Zoom meeting.
When: Mar 8, 2023 03:30 PM Pacific Time (US and Canada)

Register in advance for this meeting:
https://us06web.zoom.us/meeting/register/tZYrf-ysqTkoHNcstH69kYNw7xq-NSvzCnD2

After registering, you will receive a confirmation email containing information about joining the meeting.

Best,

Daniel Redick *he/him*
Solid Waste & Water Quality Program Coordinator
Community Development
Phone: 541-766-6819
Email: daniel.redick@co.benton.or.us
www.co.benton.or.us

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Come see the new space; we are officially open for business!

Benton County OREGON

Landfill Size/Capacity/Longevity

A.1. Subcommittee

Draft 3/3/23

Executive Summary

The current landfill activities north of Coffin Butte Road consist of a total of 194 acres, with 6 cells used currently for disposal of waste.

In 2003 the End of Life "EOL" of Coffin Butte Landfill was projected to be approximately to year 2074, with a Landfill Life estimate of 71 years.

In 2013 EOL was projected to be years 2053-2062, with a Landfill Life estimate of 40-49 years.

In the current year of 2023 the EOL is projected to be years 2037 -2039, with a landfill life estimate of 14-16 years.

The above landfill progression is a linear economy model that represents a waste management approach in which waste is generated, collected, and disposed of in a linear manner, without much emphasis on resource recovery or reuse. This approach is often characterized by a "take-make-dispose" model, where resources are extracted, processed into products, used, and then discarded as waste by society.

The linear model of a landfill economy is being replaced by more sustainable models, such as the circular economy. In a circular economy, waste is minimized by prioritizing waste reduction and recycling, and by designing products and processes with a focus on sustainability and longevity. In this model, waste is seen as a valuable resource that can be reused, repurposed, or recycled, rather than being discarded into a landfill.

This approach supports the solid waste management plan of Benton County working shoulder to shoulder with a sustainable materials management plan being developed by

Benton County Community Development in conjunction with Oregon Department of Environmental Services, members of Benton County, as well neighboring Counties and municipality using Republic Services waste management services.

In Republic Services 2021 Sustainability Report, Jon Vander Ark, President and Chief Executive Officer reports, "This is our company vision, which is intentionally ambitious because we believe we are uniquely positioned to help our customers achieve their own sustainability goals. That commitment begins with our Elements of Sustainability – Safety, Talent, Climate Leadership and Communities – and these elements anchor our 2030 sustainability goals".

The reader of this executive summary is encouraged to read further into Subcommittees reports to appreciate the wealth of information the members of the community have brought forwarded in the short amount of time granted under the Benton County Talks Trash bridge approach into a needed sustainable landfill economy and transportation plan for waste disposal.

Landfill Life Projections

A. Coffin Butte Site Life Projection: 2023 to closure

The landfill life projections shown below are provided by Republic Services. They are designed to establish a baseline – a simple operational project that more sophisticated scenarios can be built upon.

It presumes:

a) A steady annual tonnage intake of between 1 million and 1.1 million tons for the duration of the landfill's projected remaining site life.
b) Site life is currently projected by Republic Services to be between 14.5 and 16 years, with a closure date between 2037-2039.
   Note: This also presumes that the landfill area known as "the quarry" can be fully excavated. A significant portion of permitted airspace at Coffin Butte is currently unusable due to unexcavated rock.
c) As indicated in the assumptions, this baseline is not a "default future," in that it does not incorporate outside factors.

Scenario 1

Tons per Year	1,000,000	Tons
Projected Remaining Airspace 12/31/22	16,008,557	CY
2022 3-year Density Avg	0.999	Tons/CY
Site Life	15.99	Years

Scenario 2

Tons per Year	1,100,000	Tons
Projected Remaining Airspace 12/31/22	16,008,557	CY
2022 3-year Density Avg	0.999	Tons/CY
Site Life	14.54	Years

Definitions:

Tons per Year: Projected tonnage based off recent history*

Projected Remaining Airspace: Airspace remaining at the end of 2022 based off projected 2022 tons and 2022 3-year density average

2022 3-year Density Avg: Average density measured during 2020, 2021 and 2022 measurements

Site Life: Total site life including the fully excavated quarry area

*Variables can and do impact tonnage and available airspace, and can include changes in disposal and diversion rates, natural disasters and other unforeseen market changes, etc.

The table shown above represents industry-accepted modeling for estimating a Landfill's remaining life. Modeling is based on three factors: remaining permitted airspace, volume, and density. As noted in the text below the graphic, Republic Services acknowledges that a wide variety of variables, independently or in concert with each other, can impact the baseline(s) enumerated above.

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0 Section 0: Background

A. Charge

i. Workgroup charter and bylaws 8-23-2022

From the "Benton County Talks Trash" Workgroup Charter and Bylaws document, Topic A:

A. Develop Common Understandings to form the basis of the work.

1) A chronological history of key Coffin Butte Landfill topics:

a. Size;

b. Specific locations;

c. Conditions of past land use approvals;

d. Compliance with prior land use approvals and SWMP;

e. Reporting requirements;

f. Assumptions (e.g. when will the landfill close;)

g. Economics (i.e. Benefit – Cost, etc.;) and

h. Examples from other jurisdictions hosting landfills, e.g.:

i. Typical land use conditions of approval; and

ii. Issue sequencing, (e.g. in what order are landfill versus hauling approvals done, etc.

Subcommittee A.1 charge

The A.1 subcommittee was charged with a subset of the tasks listed above. Specifically, per the A.1 Subcommittee web page:

Charge A: Common Understandings Tasks

1) A chronological history of key Coffin Butte Landfill topics:

1. Size;
2. Specific locations;
3. Assumptions (e.g. when will the landfill close;)

Thus the A.1 subcommittee addresses components 1(a), 1(b) and 1(f) of the workgroup charter Topic A tasks.

Charge 3 "Assumptions" is interpreted to mean estimation of the landfill operational lifetime including the assumptions behind this estimation.

Note that for the A.1 subcommittee, "chronological history" is limited specifically to these three topics; a more general history of the landfill will be addressed by another body.

Common Terms and Definitions

Landfill: Landfill means a facility for the disposal of solid waste involving the placement of solid waste on or beneath the land surface. ORS 459.005(14)

Sanitary Landfill: Sanitary landfills are intended as biological reactors (bioreactors) in which microbes will break down complex organic waste into simpler, less toxic compounds over time.

Disposal Site: Disposal site means land and facilities used for the disposal, handling or transfer of, or energy recovery, material recovery and recycling from solid wastes, including but not limited to dumps, landfills, sludge lagoons, sludge treatment facilities, disposal sites for septic tank pumping or cesspool cleaning service, transfer stations, energy recovery facilities, incinerators for solid waste delivered by the public or by a collection service, composting plants and land and facilities previously used for solid waste disposal at a land disposal site. ORS 459.005 (8)

Regional Disposal Site: Regional disposal site means a disposal site that receives, or a proposed disposal site that is designed to receive more than 75,000 tons of solid waste a year from outside the immediate service area in which the disposal site is located. As used in this subsection, "immediate service area" means the county boundary of all counties except a county that is within the boundary of the metropolitan service district. For a county within the metropolitan service district, "immediate service area" means the metropolitan service district boundary. ORS 459.005 (22). From all particular measures, a landfill is a subset of a disposal site.

Landfill Cell: Landfill cell means a discrete volume of a landfill which uses a liner system to provide isolation of solid waste from adjacent cells of solid waste. (RI 250-RICR=140-05-1)

Coffin Butte Landfill: Coffin Butte Landfill is a regional disposal site and an engineered sanitary landfill in Benton County, north of Corvallis, located off Coffin Butte Road. In progress: Verify that this

Landfill airspace: Landfill airspace refers to the amount of space available within a landfill for the disposal of waste. It is measured in terms of volume, typically in cubic yards or cubic meters. When waste is disposed of in a landfill, it takes up physical space, and the amount of space available for future waste disposal is gradually reduced as the landfill fills up. The amount of airspace remaining in a landfill is an important consideration for landfill operators, as they must manage the landfill to ensure that it has enough space to continue accepting waste for the duration of its expected lifespan. Once a landfill reaches its maximum capacity, it must be closed and properly maintained to prevent environmental damage.

Landfill Life ≡ Expected time remaining in which the landfill will continue to accept waste, typically in Years. Landfill Life (longevity) in a landfill linear economy model is the consumption of its resources in reserve as well as ancillary resources thereby extinguishing its maximum capacity to further dispose refuse?

End of Life (EOL) ≡ Expected calendar date when the landfill ceases to accept waste, typically in Calendar Years AD.

Remaining Landfill Life (longevity): The available timeline a landfill will remain open to accept waste placement into it's permitted capacity.

Franchisee, landfill owner, landfill operator = Republic Services/ Valley Landfills, Inc. Republic Services has been the owner/operator of Coffin Butte Landfill since 2008.

Intake Tonnage: The total quantity of solid waste accepted at the landfill in US short Tons (1 Ton = 2000 lbs.). Conversion to airspace volume in cubic yards (yd^3) is obtained by mathematically dividing the Intake Tonnage value by the density figure provided by the franchisee for the relevant period (stated in Tons/yd^3).

Permitted space: The physical volume available for the placement of solid waste. Benton County approves the land use for the landfill's footprint. However, DEQ and the franchisee (Valley Landfills Inc.), approve the cell design that determines the physical volume available. "Airspace" is the resulting volume left within the permitted space for the disposal of solid waste. Permitted airspace refers to the maximum amount of space that is authorized by regulatory agencies for use as a landfill. It is typically specified in a landfill's permit issued by the relevant regulatory agency, and it represents the total volume of waste that the landfill is permitted to accept over its operating life. The permitted airspace takes into account various factors, such as the size of the landfill, the type of waste it can accept, the geology and hydrology of the area, and the potential environmental impacts of the landfill. It is important for landfill operators to carefully manage their landfill to ensure that they do not exceed their permitted airspace and to minimize the environmental impact of their operations. Exceeding permitted airspace can result in fines or other regulatory actions, and can also have significant environmental consequences.

Service Area: Total geographic area from which waste feeds into Coffin Butte Landfill. These areas represent the geographic area of the landfill's customer base, which is not constant and may change over time based on business choices of the landfill.

Limit[1]: "1. a point or level beyond which something does not or may not extend or pass. "the success of the coup showed the limits of monarchical power". 2. a restriction on the size or amount of something permissible or possible. "an age limit"."

Threshold[2]: "the magnitude or intensity that must be exceeded for a certain reaction, phenomenon, result, or condition to occur or be manifested. "nothing happens until the signal passes the threshold"."

Landfill threshold: A landfill threshold, also known as a fill line, is the designated level or height within a landfill at which waste is no longer allowed to be deposited. It represents

[1] Definition from Oxford Languages via Google
[2] Definition from Oxford Languages via Google

the maximum height to which a landfill can be filled, as determined by regulatory agencies and landfill permits. The threshold is typically marked by a physical barrier or layer of soil, and is designed to ensure that the landfill does not exceed its permitted airspace or pose a risk to public health and the environment.

2000 Landfill Franchise Agreement: The 2000 Landfill Franchise Agreement between Benton County and Valley Landfills Inc., signed December 31, 2000 and effective from December 31, 2000 until December 31, 2020.

2000 Intake Threshold: The intake tonnage level specified mathematically in the 2000 Landfill Franchise Agreement. If the volume of solid waste accepted at the landfill in any calendar year exceeded the annual level, or if the cumulative volume of solid waste accepted at the landfill in any two consecutive calendar years exceeded the two-year level, the County was allowed, at its expense, to perform a new Baseline assessment, and if the County determined this assessment indicated an adverse impact relative to the 2001 Baseline Study an immediate renegotiation of the Franchise Fee and/or Host Surcharge was required.

2001 Baseline Study: The assessment of environmental and infrastructure conditions and areas of potential impacts from the volume of solid waste accepted at the landfill, as mandated in the 2000 Landfill Franchise Agreement. This assessment was completed by the Benton County Health Department with results documented in a report released in 2001. This study included the following elements: Traffic, Soil Conditions and Contamination Levels, Air Quality, Surface and Groundwater Conditions and Contamination Levels, Noise, Odor, Visual Screening, Litter, Hours of Operation, Solid Waste Control Systems and Compliance with all Solid Waste Permits.

2020 Landfill Franchise Agreement: The 2020 Landfill Franchise Agreement between Benton County and Valley Landfills Inc., signed December 21, 2020 and effective from January 1, 2021 until December 31, 2040.

Tonnage Cap: The 1.1 M Tons/year "Limit on Solid Waste" defined in the 2020 Landfill Franchise Agreement, in place until "Franchisee's governmental applications to expand the landfill onto the Expansion Parcel are granted" and stipulated as the level which the total tonnage of solid waste deposited by the franchisee "shall not exceed" during any calendar year, with exceptions for fire, flood, other natural disaster or any Force Majeure event.

Expansion Parcel: As specified in the 2020 Landfill Franchise Agreement, ~~the~~ "expansion parcel" is tax lot 104180001107, listed as 59.23 Ac.

What is a Circular Economy?

~~An~~ expansion of a landfill alone without a circular economy would only consume valuable landfill reserve resources in a traditional linear economy model, which operates on a "take, make, use, dispose" model.

A circular economy is an economic model where the waste and pollution generated by society is minimized, and resources are conserved and regenerated by reusing and recycling materials and products. It aims to reduce dependency on finite resources, eliminate waste, and create a more sustainable economy. The circular economy model is in contrast to the traditional linear economy model.

In Republic Services 2021 Sustainability Report, Jon Vander Ark, President and Chief Executive Officer reports, “This is our company vision, which is intentionally ambitious because we believe we are uniquely positioned to help our customers achieve their own sustainability goals. That commitment begins with our Elements of Sustainability – Safety, Talent, Climate Leadership and Communities – and these elements anchor our 2030 sustainability goals”.

A solid waste management plan is a comprehensive plan for the collection, transport, processing, and disposal of solid waste, such as household trash, industrial waste, and construction and demolition debris. The purpose of a solid waste management plan is to ensure that waste is managed in an environmentally responsible and sustainable manner, while also considering economic and social factors of a circular economy.

In the 2020 landfill franchise agreement under article 5a Benton County and the Franchisee acknowledge that there may be adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of solid waste accepted at the landfill.

In other words, a solid waste management plan needs to work shoulder to shoulder with sustainability goals in a circular economy within Benton County’s proposed sustainable materials management plan and transportation plan.

What is the economical principal of demand and supply equilibrium?

The economic principle of demand and supply equilibrium is a fundamental concept in economics. It states that in a free market, the price of a good or service will settle at a level where the quantity demanded by buyers is equal to the quantity supplied by sellers.

What are the economics of a franchise?

A franchise is a business model in which a franchisor grants a franchisee the right to use its trademarks, products, services, and business methods for a specified period of time in exchange for an initial fee and ongoing royalty payments. The economics of a franchise depend on various factors, including the type of franchise, the market conditions, and the terms of the franchise agreement.

What is the economics of a landfill?

The economics of a landfill refers to the financial costs and benefits associated with operating and managing a landfill. Landfills are a type of waste management facility where garbage and other forms of solid waste are buried underground in order to minimize their impact on the environment.

The economics of a landfill can be broken down into several components:

1. Capital Costs: These are the costs associated with building the landfill, including site preparation, infrastructure development, construction of waste cells, and installation of monitoring systems.
2. Operating Costs: These are the ongoing costs associated with running the landfill, including labor costs, equipment maintenance, waste collection, transportation, and disposal costs.
3. Revenues: These are the revenues generated from the landfill, which may come from tipping fees charged to waste generators or from the sale of recovered materials such as metals, plastics, or glass.
4. Environmental Costs: These are the costs associated with the environmental impact of the landfill, including pollution, greenhouse gas emissions, and impacts on local ecosystems.
5. Regulatory Costs: These are the costs associated with complying with local, state, and federal regulations governing the operation of landfills, including permitting, monitoring, and reporting requirements.

Overall, the economics of a landfill depend on a number of factors, including the size, capacity and location of the landfill, the amount and type of waste it receives, the regulatory environment, and the cost of alternative waste management options. Proper management of a landfill can result in a profitable operation, but this must be balanced with the potential negative environmental impacts and the costs associated with mitigating them.

What are resources in reserve in a landfill?

In the context of a landfill, resources in reserve typically refer to the remaining capacity of the landfill to accept waste before it reaches its maximum capacity. This can be estimated by conducting periodic surveys and measurements of the landfill's remaining space, as well as assessing the rate at which waste is being deposited.

The resources in reserve of a landfill are a key consideration in waste management planning, as they determine how long the landfill can continue to accept waste before it reaches its maximum capacity and must be closed. Once a landfill reaches its maximum

capacity, it must be closed and monitored for an extended period of time to ensure that it does not pose a threat to human health or the environment.

In addition to the remaining capacity of the landfill, other resources in reserve in a landfill may include materials that can be recovered and reused, such as metals, plastics, and other recyclable materials. Landfills may also be equipped with systems for capturing and utilizing landfill gas, which is a byproduct of the decomposition of organic materials in the landfill.

Overall, the resources in reserve of a landfill are an important consideration in waste management planning, as they determine the landfill's remaining lifespan and its potential for resource recovery and utilization.

What are ancillary resources in a landfill?

Landfill ancillary resources are the resources that can be extracted or generated from a landfill in addition to its primary function of waste disposal. These resources can include both tangible and intangible assets that have value for the landfill operator or for other entities.

Examples of landfill ancillary resources include:

1. Landfill gas: Landfills generate methane and other gases as waste decomposes. This gas can be captured and used to generate electricity, heat, or fuel.
2. Recoverable materials: Certain materials, such as metals, plastics, and glass, can be recovered from the waste stream and sold or recycled.
3. Compost: Some landfills may have the capability to compost organic waste, such as food and yard waste, which can be sold as a soil amendment or fertilizer.
4. Land: Once a landfill has reached the end of its useful life, the land can be repurposed for other uses, such as parks, recreation areas, or commercial or industrial development.
5. Environmental credits: Landfills that reduce their greenhouse gas emissions or implement other environmentally beneficial practices may be eligible for credits that can be sold on carbon markets or other environmental markets.
6. Water: Some landfills may have groundwater resources that can be used for irrigation or other purposes.

Overall, landfill ancillary resources can provide additional revenue streams for landfill operators, reduce the environmental impact of landfill operations, and provide value to the broader community.

What is a landfill linear economy?

A landfill linear economy refers to a waste management approach in which waste is generated, collected, and disposed of in a linear manner, without much emphasis on resource recovery or reuse. This approach is often characterized by a "take-make-dispose" model, where resources are extracted, processed into products, used, and then discarded as waste.

In a landfill linear economy, waste is typically sent to landfills for disposal, without much effort to recover or recycle materials from the waste stream. This can result in the depletion of natural resources and the generation of significant amounts of waste that can pose environmental and health hazards.

In contrast, a circular economy approach to waste management emphasizes resource recovery and reuse, with the goal of reducing waste and conserving natural resources. In a circular economy, waste is treated as a valuable resource, and materials are reused, recycled, or repurposed, rather than being disposed of in landfills or incinerators.

Overall, the concept of a landfill linear economy highlights the need for more sustainable waste management practices that prioritize resource recovery and reuse over disposal. By adopting a circular economy approach to waste management, it may be possible to minimize waste, conserve natural resources, and reduce the environmental impact of waste disposal.

What is refuse?

Refuse is a term used to describe any material or object that is thrown away or discarded because it is no longer wanted or needed. Refuse typically includes waste, garbage, trash, or other types of discarded materials, such as food scraps, old papers, empty containers, and broken household items.

Refuse can take many forms and can come from a variety of sources, including households, businesses, and industrial processes. Proper disposal of refuse is important to prevent environmental pollution, reduce health risks, and conserve resources. Recycling, composting, and other waste reduction strategies can help to minimize the amount of refuse that ends up in landfills or incinerators.

What is consumption of resources in a landfill?

The consumption of resources in a landfill refers to the use of resources, such as energy, water, and raw materials, that are required to operate and maintain a landfill. Landfills consume resources in several ways, including:

1. Construction and operation of the landfill facility: This includes the use of energy and raw materials to construct the landfill, install infrastructure (such as access roads and monitoring systems), and operate heavy equipment (such as bulldozers and excavators) to manage and compact waste.

2. Transportation of waste: Waste must be transported to the landfill from its point of origin, which requires energy and resources to operate vehicles, such as garbage trucks and hauling equipment.

3. Leachate management: Landfills generate leachate, which is liquid that is generated as water percolates through the waste. Leachate must be collected and treated to prevent contamination of the surrounding environment, which requires energy and resources.

4. Gas management: Landfills also generate methane gas, which must be collected and managed to prevent it from escaping into the atmosphere, where it can contribute to climate change.

The consumption of resources in landfills can have environmental impacts, including air pollution, water pollution, and greenhouse gas emissions. Therefore, landfill operators must carefully manage their operations to minimize resource consumption and environmental impacts. This may include implementing a circular economy using in part energy-efficient practices, which use renewable energy sources, and implementing waste reduction and recycling programs to reduce the amount of waste that enters the landfill.

B. Membership Composition

The A.1 Subcommittee membership is composed of four primary representative groups:

1. Franchisee: 3 members (Ian Macnab, Ginger Rough, Bill Bromann, all of Republic Services)
2. Benton County community members: 4 members (Chuck Gilbert*, Mark Yeager*, Ken Eklund*, Paul Nietfeld)
3. County governments: 3 members (Daniel Redick (Benton County), Brian May (Marion County), Shane Sanderson (Linn County))

Daniel Redick, a Benton County Community Development Department staff member, acts as Chair of this subcommittee.

Sam Imperati, the workgroup facilitator, normally attends subcommittee meetings and provides guidance in regard to aligning with workgroup objectives.

* Also members of the Solid Waste Advisory Council and the Disposal Site Advisory Committee for Benton County

C. Document Organization

This document is organized into sections that correspond to the "Charge" items assigned to the A.1 Subcommittee (i.e. Sections 1, 2, 3 correspond to Charges 1, 2, 3). Section 4 provides additional detail on factors which may impact landfill life.

References to specific sections in this document are in the format <Section #>.<Subsection Letter>.<Subpart Designation>. Thus this location would be referenced as 0.C, and the A.1 Subcommittee Charge may be found in 0.A.ii.

Please note that staff have incorporated other subcommittee member's additions, edits, and comments by copying and pasting text from various draft reports received from subcommittee members into the current draft. While staff did provide suggested changes and comments in addition to those received by subcommittee members, the "Track Changes" view, will show that all edits were made by staff, however, much of the changed content was submitted by non-staff subcommittee members. Each draft represents staff's attempt at combining the entire group's suggested edits into a single document, and the draft content has not been vetted by the subcommittee. The draft in the full work group report is a simplified version to help with readability, which staff developed by removing redlined content, using the current "draft" content, and only keeping comments that are considered by staff to be essential to the understanding of the draft in the current form. The full subcommittee draft working document includes all of the unresolved comments and edits made over time, which is the document version that the subcommittee will continue to refine.

1 Table of Findings

Key Findings:

The A.1. Landfill Size, Capacity, and Longevity subcommittee proposes 36 findings as part of its overall charge. The committee is not in agreement on all findings, and the following findings have **NOT BEEN REVIEWED** by the full subcommittee. To help guide the reader, the findings are generally grouped by topic. These recommendations do not represent consensuses of the subcommittee, and they may be revised by the subcommittee further.

Landfill Estimated Remaining Life, Projected End of Life (EOL)

LSCL-F-1: In 2003 EOL was projected to be approximately 2074, with a Landfill Life estimate of 71 years (2003 East Triangle CUP document, Benton County file PC-03-11.pdf). Twenty years later EOL is projected to be 2037-2039 with a Landfill Life of 14.5-16 years, a reduction of approximately 36 years of estimated life in 20 elapsed years. In 2013 Valley Landfills Inc. reevaluated an area of Landfill Site zoned property in the northeast corner of the site for waste placement stability engineering. This area was removed from the landfill's site development plan based on updated state seismic guidance for landfill stability.

LSCL-F-2: In 2013 EOL was projected to be 2053-2062, with a Landfill Life estimate of 40-49 years[3]. Ten years later EOL is projected to be 2037-2039 with a Landfill Life of 14-16 years, a lower and upper range reduction of approximately 16 and 23 years respectively.

LSCL-F-3: Current (1Q2023) estimate for landfill EOL = CY 2037 – 2039, with a landfill life estimate of 14-16 years, based on an annual intake level of 1.0 – 1.1 MTons/year and a density of 0.999 Tons/yd3, assuming the quarry area will be fully excavated by the time the current disposal areas are full. Valley Landfills, Inc. has represented that this nominal life projection ("baseline") is derived from a few data points in annual measurements, and is the product of a modeling process that is standard in the landfill industry. Valley Landfills, Inc. acknowledges that a variety of factors, including human factors, can impact landfill site life, but are not included in this baseline calculation. Valley Landfills, Inc.'s baseline projection of a 2037-2039 closure date is based both upon existing demand and Valley Landfill Inc.'s efforts to maintain and/or grow its service area and business in the market.

LSCL-F-4: The 2021 Site Development Plan is a registered engineer of record stamped and dated plan set which includes but not limited to a projected 2039 EOL based on an annual intake of approximately 846,000 Tons/year, but this intake tonnage is not considered binding or controlling by either ODEQ or Valley Landfills, Inc. This is based on the best information available at time of approval by Oregon DEQ, which can change based upon service area impacts.

LSCL-F-5: Under the 2020 Franchise Agreement, the 1.1M tonnage cap is eliminated upon Benton County's approval of a CUP (expansion).

[3] 2013 Coffin Butte Landfill and Pacific Region Compost Annual Report

If intake volumes increase, an **expansion would not necessarily guarantee an increase in site life** or the extension of the Landfill's closure date. For example, if an expansion increases available airspace but intake volumes increase the fill rate even more, the overall life of the landfill could decrease. Republic Services said it was unlikely such a scenario would occur, due to operational limitations at the Landfill and in the Service Area [could not reach consensus].

Nonetheless, transitioning from the current lineal landfill economy to a circular economy landfill can potentially extend the life of a landfill. This is because a circular economy landfill is designed to minimize the amount of waste sent to the landfill and extract value from the materials that are discarded. By recovering valuable materials through recycling, composting, and other forms of recovery, a circular economy landfill reduces the volume of waste that needs to be disposed of in the landfill. This, in turn, reduces the rate at which the landfill is filled up, which can extend its lifespan with or without tonnage cap limitation.

Notwithstanding, a landfill tonnage cap is a regulatory limit on the amount of waste that can be disposed of in a landfill over a certain period of time. The tonnage cap is typically set by the local or state government and is intended to prevent the landfill from becoming overfilled and causing environmental or problems such as contamination of groundwater, soil, air, or demand and supply equilibrium problems, while transiting to a circular economy.

LSCL-F-6: For purposes of this discussion, the subcommittee agreed to rely on data from the annual reports and other landfill filings with the county. EPA also provides data in their [GHG reporting webpage] that uses different data from another source.

LSCL-F-7: Factors such as population growth and debris from disasters may drive up intake rates and thus shorten landfill life; factors such as recycling and waste diversion, plus emerging factors such as extended producer responsibility (EPR) incentives and climate crisis legislation, may drive down intake rates and thus lengthen landfill life.

LSC F TBD: Landfill Life (longevity) is the availability of the landfill reserve resources and landfill ancillary resources that currently operates the landfill's demand, supply and equilibrium of refuse disposal in a linear economy model.

LSCL-F-X: Business decisions and legal obligations, legislation, changing societal attitudes, technological advances, shifts in consumer habits and so on are all key components of a broad system that ultimately determines what is reused as part of a circular economy – and what is landfilled as waste. The subcommittee agrees that these human factors play a significant role in any Landfill's longevity, because they determine not only the flow of material that fills up the Landfill's permitted volume but what comprises that material.

LSCL-F-X: The subcommittee identified these factors that could impact usable landfill airspace: Landfill expansion(s) and associated removal of tonnage cap; the quarry excavation schedule; water table concerns; disasters that happen to the landfill itself.

LSCL-F-X: The subcommittee identified many factors that could impact the landfill's annual tonnage; i.e., the rate at which its usable volume fills up. These included: exceedance of the tonnage cap; recession(s); economic growth; structural and societal reductions in waste generation; disposal alternatives; transportation alternatives; global health issues such as pandemics; climate change and other environmental legislation concerning methane and other greenhouse gases; climate change and other environmental legislation concerning the reduction of waste and pollution in landfilled material; state and local legislation upgrading waste diversion efforts; environmental activism, especially about the climate crisis; wildfires and other disasters that generate debris for landfilling; service area changes; changes in population in the service area.

LSCL-F-X: Recognizing that the question "What factors could make the landfill close earlier than the Baseline Scenarios (by 2037–39)?" is of particular importance to this report's readers, the subcommittee explored those factors further, in a series of simple scenarios that each lay out their assumptions.

LSCL-F-X: In recent years society and its structures have begun to take action on the climate crisis, due to the threat that greenhouse gases pose to natural and social systems. Efforts to curtail the release of greenhouse gases pay special attention to methane, because this pollutant has fast-acting effects. The 2021 Methane Emissions Reduction Plan catalyzes and incentivizes ways to detect and cost-effectively reduce methane emissions from all major sources.

LSCL-F-X: Landfills such as Coffin Butte are known to be major emitters of methane; to date the methane emission level of Coffin Butte Landfill has not been well-characterized. This is likely to change, as new technologies that measure methane emissions directly (rather than estimate them using mathematical modeling) have been developed and are being deployed worldwide, and governmental initiatives have prioritized and emphasized detection and measurement of methane emissions. This would in turn reshape the landfill's operating environment and potentially its operating life, by changing competitive pressures, regulatory status, corporate strategy, public sentiment, etc.

LSCL-F-X: The 2023 Inflation Reduction Act focuses on incentives to prevent methane from being emitted, but included the rollout of penalties for methane pollution in the oil/gas industry, which could extend in time to the waste industry in some form.

LSCL-F-X: The most effective way to curtail a landfill's greenhouse gas emissions is to divert organic material from being landfilled. Landfill gas collection systems lessen the greenhouse gas impact but do not remediate it. In 2019 the EPA estimated that Coffin Butte Landfill's gas collection system operates at 57% efficiency.

LSCL-F-X: The impetus to curtail methane emissions is focusing attention on ways to divert organic waste from landfill wastestreams. The 2023 Food Donation Improvement Act, for example, enables existing food donation organizations to expand operations and incentivizes the creation of new methods and innovations in preventing food waste, both to stop wasting a valuable resource and to reduce methane emissions.

Landfill Size: Capacity

LSCL-F-8: A significant portion of the permitted capacity in the quarry area (Cell 6) is currently unavailable due to unexcavated rock. Permitted space is the physical volume available for the placement of solid waste. Benton County approves the land use for the landfill's footprint. However, DEQ and the franchisee (Valley Landfills Inc.), approve the cell design that determines the physical volume available. "Airspace" is the resulting volume left within the permitted space for the disposal of solid waste.

LSCL-F-9: Landfill total capacity increased by approximately 9,000,000 cubic yards in 2003 with the addition of the West and East triangle areas. The addition of Cell 6 (in TBD) added approximately 13,400,000 cubic yards, for a total of approximately 35,500,000 cubic yards. The formal County approval of Cell 6 as a disposal area has not been identified or confirmed. [REVIEW ACCURACY BASED ON BILL'S FEEDBACK] Since 2004, reported remaining airspace has decreased gradually, while total permitted airspace has remaining somewhat constant. As of end 2021 approximately 44% of permitted capacity remained unused.

Landfill Size: Intake Tonnage

LSCL-F-11: The amount of waste placed into the landfill has grown dramatically over the past 40 years. In 1983, 375 tons per day were placed into the landfill (117,000 tons per year). By 1993, the tonnage volume increased to 310,000 tons per year. In 2003 550,000 tons were placed into the landfill. By 2013, the waste tonnage was 479,000, and in 2021, 1,046,000 tons were emplaced.

LSCL-F-12: The official 2022 Coffin Butte annual intake tonnage is not available at the time of this report (February 2023). The size of the Host Fee payment to Benton County in January 2023 indicates a 2022 intake volume of 1,066,436 Tons. The actual tonnage figure should be updated after the receipt of the 2022 Coffin Butte Landfill Annual Report.

LSCL-F-13: The 2000 Landfill Franchise Agreement stipulated that the County was to perform a "Baseline" study as a reference for measuring potential future adverse effects (completed in 2001), and defined a ramping intake tonnage threshold to be applied during the term of the agreement (CY2001-2019). Intake volumes in excess of this threshold granted the County clear right to pursue specific remedies: a) the County, at its expense, could perform an updated Baseline assessment, and b) if the County determined that the new assessment indicated an adverse impact on "the Baseline," the agreement stipulated that "the parties shall immediately proceed in good faith to negotiate an increase in the Franchise Fee and/or Host Surcharge…".

LSCL-F-14: The 2000 intake tonnage threshold was exceeded in calendar years 2017, 2018 and 2019.

LSCL-F-15: Washington County waste tonnage accepted at the landfill increased by over 400% between 2016-2017, with the increased tonnage continuing through 2019. Riverbend Landfill was a regional landfill that accepted waste from many counties, including Washington County.

Tonnage from Riverbend was diverted to Coffin Butte in an effort to extend Riverbend's site life.

LSCL-F-16: Benton County did not utilize either of the contractual remedies available to it as a result of the intake tonnage exceeding the threshold in 2017-2019. No updated Baseline study was performed, and no renegotiation of the landfill fee structure was undertaken.

LSCL-F-17: Benton County received approximately $3.1M of incremental revenue from the increased intake volumes over the 2017-2019 period. Of this, approximately $1.08M was the result of intake volume in excess of the annual limits over the three-year period. This equates to roughly $11.50 total per Benton County resident for the three-year period.

LSCL-F-18: In an official 2018 presentation to Benton County Board of Commissioners, Benton County represented the 2000 Franchise Agreement intake threshold as "Annual Maximums Specified in Franchise Agreement." However, the 2000 Franchise Agreement does not describe the tonnage threshold as a "limit" or "maximum" and does not limit the number of tons that can be accepted.

LSCL-F-19: Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement include a section stating that "The parties acknowledge that there may be adverse effects to the County's infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill." In both agreements this section of the agreement then stipulates terms regarding intake volumes.

LSCL-F-20: The intake threshold defined in the 2000 Landfill Franchise Agreement and the Tonnage Cap defined in the 2020 Landfill Franchise Agreement were stipulated as contractual provisions, with consequences [reference other findings] explicitly defined in the 2000 agreement and implicit (violation of contract) consequences in the 2020 agreement.

LSCL-F-21: The 2020 Landfill Franchise Agreement defined a 2020 Tonnage Cap of 1.1 M Tons/year that the Landfill "shall not exceed." That includes 75,000 tons reserved annually for Benton County. The Tonnage Cap does not apply to fire, flood, natural disaster, or Force Majeure event materials.

LSCL-F-22: The 2020 Landfill Franchise Agreement also includes a provision that the tonnage cap would be eliminated upon a successful application to "expand the landfill onto the Expansion Parcel."

LSCL-F-23: Some residents near the landfill are concerned that the landfill will accept more waste than the allowed Tonnage Cap of 1.1M tons, and are unsure if the 2020 Franchise Agreement's enforcement mechanisms will do enough to prevent agreement violations.

LSCL-F-24: The landfill operator generally chooses how much tonnage to accept, based on demand and their contracts with various jurisdictions and haulers. Some of the increasing tonnage accepted at the landfill from 1993-2021 reflect the increase in business development.

LSCL-F-25: The slow downward trend in intake volume in the 2006-2010 period is explained by the franchisee as resulting from the economic downturn of 2008.

LSCL-F-26: Republic Services states that the drop in volumes to Coffin Butte in 2020 is due to the global COVID-19 pandemic, coupled with diversion of tonnage from Riverbend Landfill to other landfills besides Coffin Butte. However, tonnage volumes increased again in 2021 due in part to changes in lifestyle/development/at home shopping patterns as a result of the pandemic, as well as debris from the Oregon wildfires.

LSCL-F-27: A range of human factors have been seen to influence the landfill's intake rate and therefore its operating life in the past. These include business factors such as expansions or contractions of the Service Area, social factors such as recessions and population growth, and environmental factors such as recycling and other initiatives that divert materials out of the wastestream.

LSCL-F-28: More human factors are emerging that could influence the landfill's intake rate and therefore its operating life in the future. These include newly enacted state legislation assigning responsibility for disposal costs to the producers of waste material, newly enacted national legislation addressing food waste, and national legislation being rolled out that targets methane and other greenhouse gas pollution.

LSCL-F-29: A 2016 MOU between Benton County and Republic Services acknowledged "Coffin Butte Landfill will be accepting municipal solid waste currently being delivered to Waste Management's Riverbend Landfill for a term of 1-2 years, beginning in January of 2017."

LSCL-F-30: The 2016 MOU does not contain language preventing Benton County from exercising its rights under the 2000 Landfill Franchise Agreement (see Recommendations).

Specific Locations

LSCL-F-31 : Valley Landfills Inc. anticipates it will no longer be able to place waste in Cell 5 by mid-year 2025. When Cell 5 is full, Republic Services is working on a contingency plan to deposit waste in the permitted area of the landfill known as the quarry known as Cell 6. Excavation of the primary quarry footprint is scheduled to begin in Spring of 2023 with completion in Spring 2025.

LSCL-F-32: Approval of the 1983 rezoning was recommended by SWAC and CAC with on the condition that "No landfill be allowed on property south of Coffin Butte Road."

LSCL-F-33: The recommended condition prohibiting landfill south of Coffin Butte Road was not included in the 1983 rezoning ordinance through a change recommended by Benton County Staff, in which Staff noted that any new disposal area would require approval of the Planning Commission in a public vote. The process for approving landfill south of Coffin Butte Road was subsequently changed to "allowed by conditional use permit." This appears to be done via Ord.

90-0069 (BCC 77.305) This change was memorialized in the 2002 Memorandum of Understanding executed by Valley Landfills and Benton County.

Landfill Size: Footprint and Structure

LSCL-F-34: The 1983 rezoning action defined 194 acres as Landfill Size (LS) zone. An additional 56-acre parcel south of Coffin Butte Road, while zoned LS, would not be used for disposal of solid waste unless approved by a conditional use permit and Department of Environmental Quality permit for solid waste landfill use. The site map attached to the 2002 MOU restricted "fill" activity to the north side of Coffin Butte Road.

LSCL-F-35: Twenty-three tax lots are owned by landfill-affiliated entities. Six of these taxlots are zoned LS, and the 5 LS tax lots on the north side of Coffin Butte Road contain landfill cell disposal areas. The most recent tax lots associated with the landfill were purchased in 2001 (non-disposal areas).

LSCL-F-36: The landfill has changed visually over time. Coffin Butte Landfill has changed visually since it's designation as a regional landfill in 1974, growing in both height and size. However, the overall landfill acreage, most notably permitted airspace, hasn't changed significantly since 1983; it has filled in more of its footprint.

2 Table of Recommendations

Key Recommendations:

The A.1. Landfill Size, Capacity, and Longevity subcommittee proposes 8 recommendations as part of its overall charge. The committee is not in agreement on all findings, and the following findings have **NOT BEEN REVIEWED** by the full subcommittee. These recommendations do not represent consensuses of the subcommittee, and they may be revised by the subcommittee further.

LSCL-R-1: The Sustainable Materials Management Plan should further develop scenarios and factors that may impact the landfill lifespan, including detailed analyses of likely projections. The Commissioners and County staff should keep the questions about these factors and their effects in mind when making decisions affecting the landfill.

LSCL-R-2: Benton County should create and share a plan for the enforcement of all franchise agreements, including the 2020 Landfill Franchise Agreement Tonnage Cap.

LSCL-R-3: Benton County shall conduct an updated Baseline Study to evaluate the impact of the current intake level at Coffin Butte. As with the 2001 Baseline Study stipulated in the 2000 Landfill Franchise Agreement, this study should determine and measure adverse effects, including but not limited to: traffic, soil conditions and contamination levels, air quality, surface and ground water conditions and contamination levels, noise, odor, visual screenings, litter, hours of operation, solid waste control systems and compliance with all solid waste Permits. The county should then use this information to inform decision-making and financial choices regarding income from the landfill franchise.

LSCL-R-4: The County should, as soon as possible, consider the public record of the deliberations leading to the execution of the 2020 Landfill Franchise Agreement in order to assess a) which party requested that the 2020 Tonnage Cap be eliminated if expansion was approved, b) if Benton County proposed the elimination of the 2020 Tonnage Cap, determine why this was done, c) determine the County's expectation for the benefit(s) to the County of accepting up to 1.1M Tons of waste per year when the County's reserve portion is approximately 6.8% of that amount, d) interpretation of the "Tonnage Cap", specifically relative to the 2020 Tonnage Cap, and e) expectations of both parties for future landfill site expansion, including any plans for multiple (repeated) future expansions. The county should then use this information to inform landfill-related decision-making.

LSCL-R-5: Benton County should clarify and document the process for officially establishing Permitted Space, including any and all required Benton County actions and regulatory agency approvals (ODEQ, EPA, etc.).

LSCL-R-6: The County should clarify when formal approval of Cell 6 as a disposal area was granted.

LSCL-R-7: The Benton County Solid Waste Advisory Council (SWAC) should review all future Coffin Butte Annual Reports relative to past reports and official approvals, in particular with regard to intake volume, landfill traffic volume (both Municipal Solid Waste and leachate transport), expected Landfill Life and EOL, and total and remaining Permitted Space. SWAC should report these findings to the BOC for consideration.

LSCL-R-8: Benton County should secure information from Republic Services about the Annual Tonnage figures for presentation to SWAC/DSAC as soon as they are available, and not wait to include them for the first time in the Annual Report.

LSCL-R-X: The baseline scenarios laid out in this report assume that landfilling will continue as it is doing today for the next 16 years. That expectation should be tempered by signals of factors that can reshape Coffin Butte Landfill's social and regulatory landscape, especially environmental considerations related to the climate crisis. This reshaping is something that Benton County can participate in, on behalf of its citizens, as the landfill's permitted volume is filled.

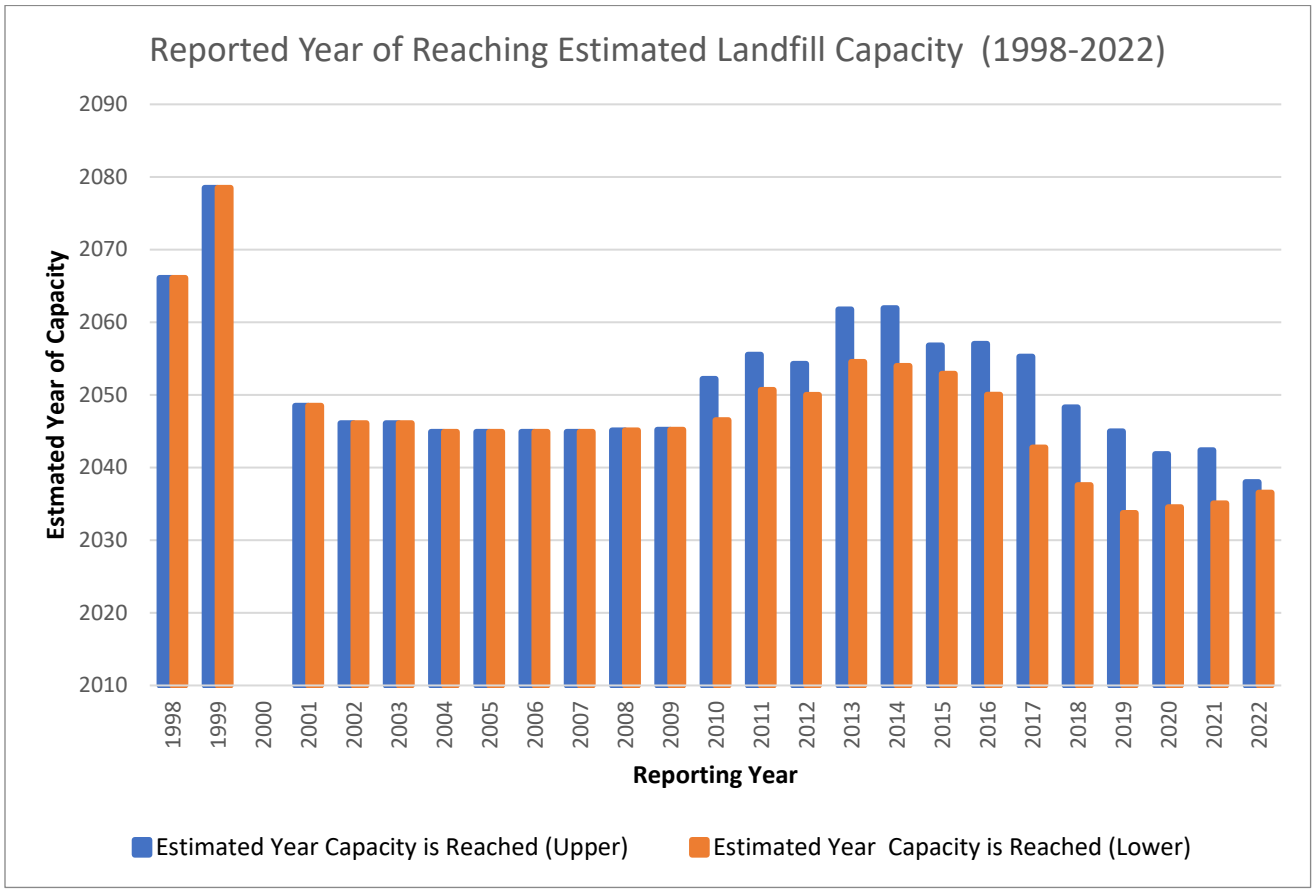
LSCL-R-X: Benton County should take steps to have the methane emissions of Coffin Butte Landfill measured, using new technologies that are coming or have become available. The landfill's emissions are currently not well-characterized, but the US Environmental Protection Agency estimates that Coffin Butte Landfill's methane collection system converts 57% of its methane to CO2, which is relatively inefficient as compared to other Oregon landfills.

LSCL-R-X: In its current actions and in concert with its Sustainable Materials Management Plan, the County should be aware of and prepare for changes in Coffin Butte Landfill's social and regulatory landscape, as the future could hold significant opportunities for the County and affiliated organizations to bring waste management closer to the County's goals and values.

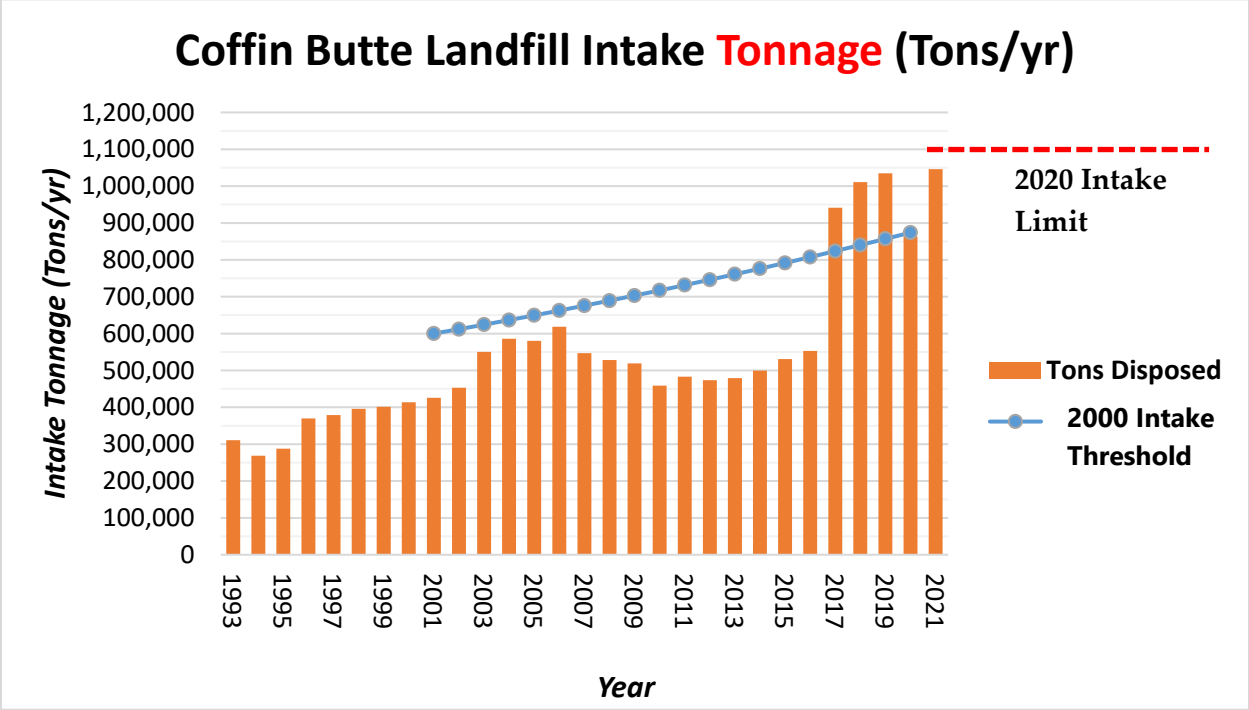
LSCL-R-X: Benton County should keep in mind that the most effective way to curtail a landfill's greenhouse gas emissions is to divert organic material from being landfilled. This can inform County and area-wide decisions regarding recycling, composting, food waste, and other initiatives affecting how the landfill's permitted volume is filled.

B. Historical Landfill Life Projections

Figure 1: Historical EOL Projections (source: Landfill Annual Reports)



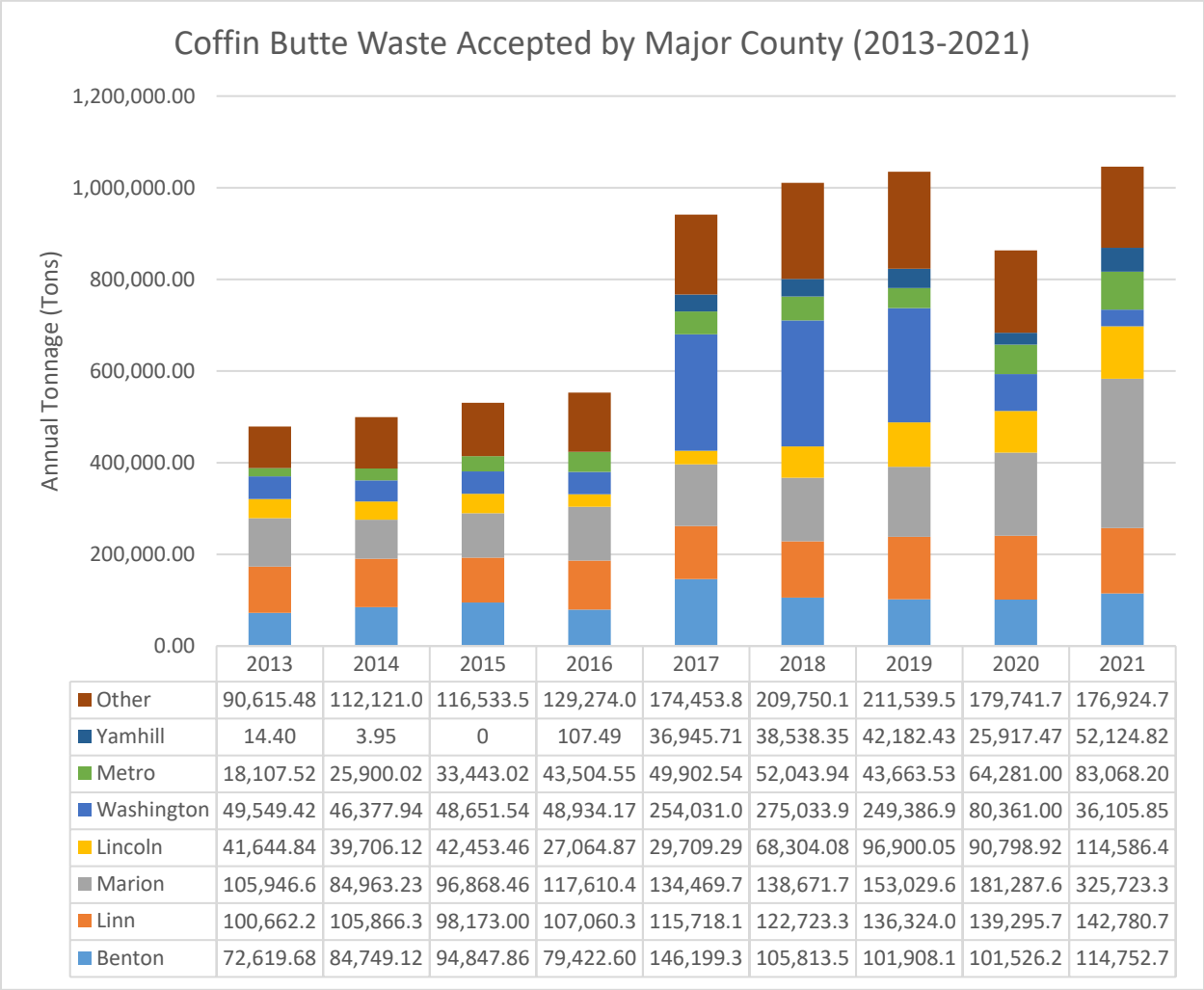
Recent intake volume: 1993 – 2021Chart 2: Coffin Butte Landfill Intake 1993 - 2021



i. Intake volume by source 2016 – 2021

See chart below for a breakdown of the Coffin Butte intake by source county for the period 2013-2021. This period includes the significant intake volume increase of 2016-2017. The intake shown for Benton County includes the volume of the landfill's daily cover, the soil used to overlay waste at the end of each day.

Figure 2: Intake by Source, 2013 - 2021



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other	90,615.48	112,121.0	116,533.5	129,274.0	174,453.8	209,750.1	211,539.5	179,741.7	176,924.7
Yamhill	14.40	3.95	0	107.49	36,945.71	38,538.35	42,182.43	25,917.47	52,124.82
Metro	18,107.52	25,900.02	33,443.02	43,504.55	49,902.54	52,043.94	43,663.53	64,281.00	83,068.20
Washington	49,549.42	46,377.94	48,651.54	48,934.17	254,031.0	275,033.9	249,386.9	80,361.00	36,105.85
Lincoln	41,644.84	39,706.12	42,453.46	27,064.87	29,709.29	68,304.08	96,900.05	90,798.92	114,586.4
Marion	105,946.6	84,963.23	96,868.46	117,610.4	134,469.7	138,671.7	153,029.6	181,287.6	325,723.3
Linn	100,662.2	105,866.3	98,173.00	107,060.3	115,718.1	122,723.3	136,324.0	139,295.7	142,780.7
Benton	72,619.68	84,749.12	94,847.86	79,422.60	146,199.3	105,813.5	101,908.1	101,526.2	114,752.7

Section 1: Landfill Size

A. Physical Real Estate Footprint

i. **History**

The Coffin Butte landfill was initiated in the early World War II era as a local burn dump for the Adair Air Force Base. The location was chosen because it was convenient to the Base, and was not necessarily the result of a careful selection and evaluation process.

Per the 2002 MOU Benton County & Valley Landfills MOU Relating to Land Use Issues (2002):

- History prior to 1974 in progress
- 1974 CUP approved landfill activities on 184 acres north of Coffin Butte Road.
- 1983 rezoning added 10 acres for landfill activities north of Coffin Butte Road, for a total of 194 acres.
- The site map included in the 1983 rezoning consideration restricted "fill" activity to the north side of Coffin Butte Road.
- Since 1983, the total acreage of the permitted landfill site has remained largely unchanged.
- Franchisee (VLI) agrees that the approximately 56-acre parcel south of Coffin Butte Road, while zoned Landfill Site (LS), would not be used for disposal of solid waste unless approved by a conditional use permit and Department of Environmental Quality permit for solid waste landfill use.
- Total acreage owned by landfill franchisee unstated.

See Section 2 of this document for additional detail on land use and zoning actions impacting the landfill.

Images

Figure 3: Reported circa 1941 aerial view of Coffin Butte area, before Camp Adair.

Figure 4: Wide aerial view dated 6-10-63 (1963). Pond on south side of Coffin Butte was a result of military quarry operation.

Figure 5: Reported 1978 image of vehicles in line at the landfill.

Figure 6: 2008 aerial view, from the 2008 Coffin Butte Landfill Annual Report, Republic Services, Inc.

Figure 7: Aerial image from Fall 2022

Figure 8: Additional Aerial Photography of Coffin Butte Landfill over Time (1954-2020)

[Temporarilly removed to reduce File Size]

ii. Current footprint

The real estate footprint of the landfill is shown in **Error! Reference source not found.**, and **Error! Reference source not found.**, below. See Appendix C for a detailed table of landfill property by taxlot.

Figure 9: Properties associated with the landfill, numbered in coordination with the table in Appendix C, and color-coded by zoning.

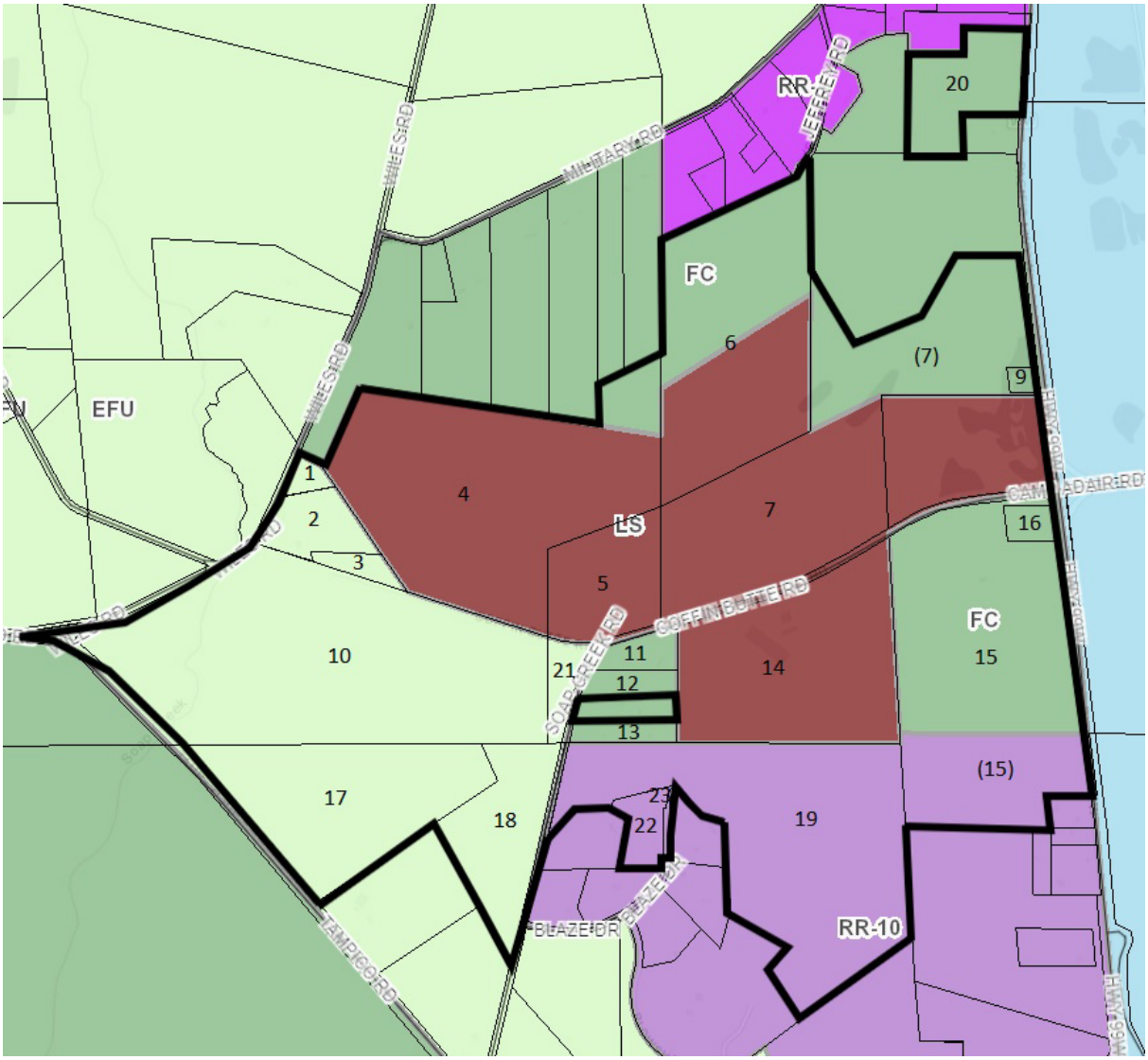
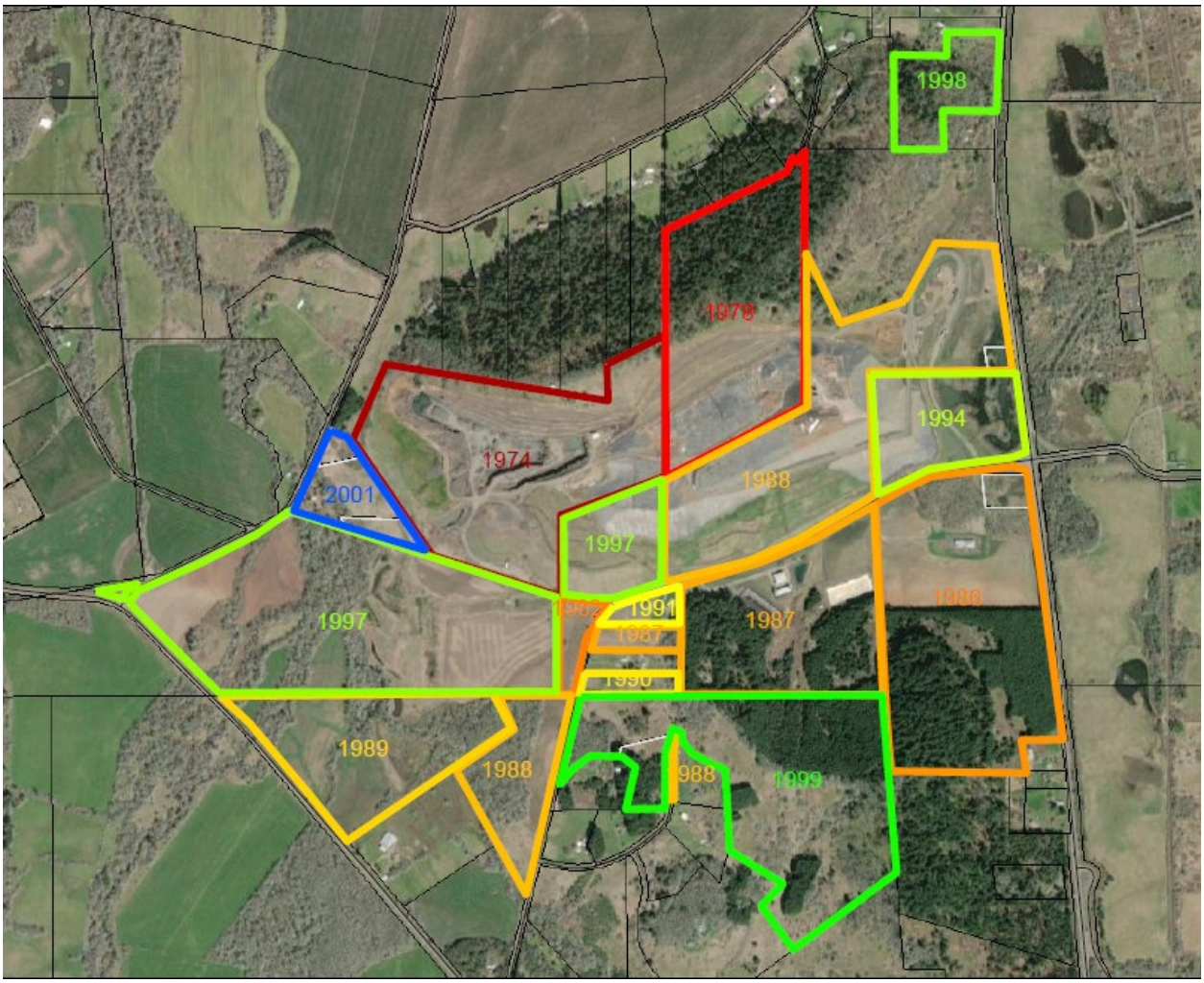


Figure 10: Property map, with years each property was purchased by a landfill-affiliated organization



Note: Properties zoned LS (specifically #5, 7, 8 and 14) were likely purchased by landfill owners prior to 1983, but at the time of this report that property ownership information was not available, and only the more recent property records shown above were available.

B. Permitted Disposal Capacity

iii. Historical permitted capacity benchmarks

The following table lists total expected/calculated permitted capacity for selected points in time. Note that before approximately CY 2000 the Coffin Butte annual reports are inconsistent in presenting an estimate of this capacity; thus historical figures (e.g. 1983) are typically derived from a combination of archival data. For all but the latest figure (CY 2021), the figures should be interpreted as rough estimates and not precise volume numbers. The intent of providing the historical numbers is to document the growth of the expected/planned landfill size over time.

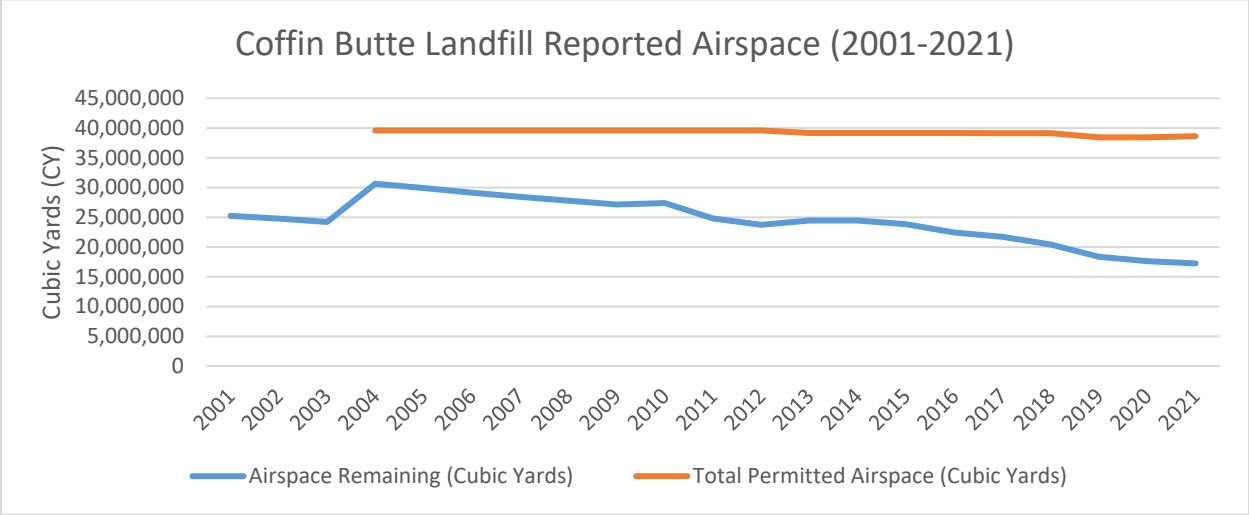
Table 1: Historical Capacity Values

Date	Total Capacity (yd^3)	Notes
1983	13,134,000	Capacities defined in the 2003 Site Development Plan for the cells ultimately located on the fill areas shown in ***Error! Reference source not found.*** areas (Cells 2-5)
2003	22,134,000	Addition of West and East triangles (3,400,000 yd^3 and 5,600,000 yd^3 respectively); calculated from 2003 Site Development plan 1999 cell volume figures
?	35,531,000	With Cell 6, estimated at 13,397,000 yd^3
1995	18,000,000	1995 Annual Report, estimated total capacity of Cells 1-5
2003	35,531,000	2003 Site Development Plan, based on October 1999 cell volumes and adding West and East triangles, with Cell 6 estimated at 13,397,000 yd^3
2004	39,594,002	2004 Coffin Butte Landfill Annual Report
2013	39,172,992	2013 Coffin Butte Landfill Annual Report
2021	38,997,848	2021 Coffin Butte Landfill Annual Report

iv. Capacity utilization 2001 – 2021

The plot below shows the total permitted airspace and the available (remaining) airspace over the period 2001 – 2021. Note that as of end 2021 approximately 44% of the total permitted capacity remained unused.

Chart 1: Coffin Butte Airspace Total/Remaining 2001 - 2021



Near-term (circa 2025) capacity adjustments for 5-year operating plan

Republic Services is currently in discussion with Knife River regarding necessary permitting/steps to begin excavation of the quarry (future cell 6).

Valley Landfills Inc. anticipates it will no longer be able to place waste in Cell 5 by mid-year 2025. When Cell 5 is full, Republic Services is working on a contingency plan to deposit waste in the permitted area of the landfill known as the quarry known as Cell 6. Excavation of the primary quarry footprint is scheduled to begin in Spring of 2023 with completion in Spring 2025.

Clarify language on quarry excavation. In progress.

C. Intake Volume

Coffin Butte intake volume is documented in the annual reports produced by the landfill franchisee. Benton County has annual reports on file for years 1993 – 2021 (inclusive) with the exception of year 2000; intake data for 2000 is available in the 2021 report. Note that with older (pre-2008) reports, the annual intake volume figure is sometimes difficult to determine precisely due to inconsistent values stated within a given annual report (e.g. narrative summary vs. intake volume table) and/or discrepancies in values referenced in subsequent annual reports (e.g. historical comparisons). Where discrepancies exist within a given annual report, the figure documented in the intake volume table is used. See Appendix A for a detailed listing of the annual intake volumes used in this document.

ii. 2000 and 2020 Landfill Franchise Agreement Intake Thresholds

Agreement Terms

Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement include a section with the stipulation "The parties acknowledge that there may be adverse effects to the County's infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill." In both agreements this section of the agreement then stipulates terms regarding intake volumes.

The 2000 Landfill Franchise Agreement mandated that the County was to perform a "Baseline" study as a reference for measuring potential future adverse effects (completed in 2001), and defined a ramping intake tonnage threshold to be applied during the term of the agreement (CY2001-2019). See Appendix A for a detailed calculation of the annual values of this threshold. In this document the threshold thus defined is termed the "2000 Intake Threshold." Intake volumes in excess of this threshold granted the County clear right to pursue specific remedies: a) the County, at its expense, could perform an updated Baseline assessment, and b) if the County determined that the new assessment indicated an adverse impact on "the Baseline," the "parties [Benton County and the franchisee] shall immediately proceed in good faith to negotiate an increase in the Franchise Fee and/or Host Surcharge…".

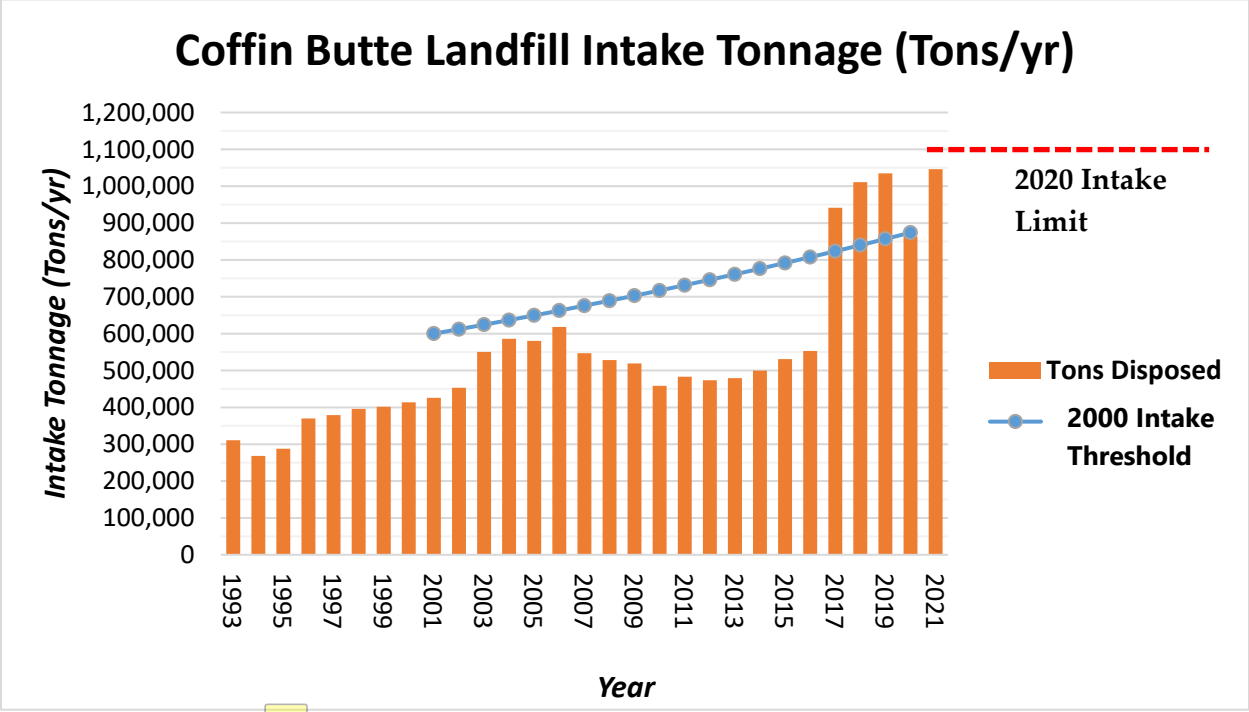
While the 2000 Landfill Franchisee Agreement did not refer to the intake threshold as a "limit," in a presentation compiled by the Benton County Health Department for consideration at the September 4, 2018 Benton County Board of Commissioners meeting the 2000 agreement intake threshold was described in a key chart as "Annual Maximums Specified in Franchise Agreement"; see Page 33 of the *BentonCountyBoardofCommissionersMeeting_4Sep20189_180904_tu_pkt.pdf* document.

The 2020 Landfill Franchise Agreement stipulates that the total tonnage deposited at the Landfill "shall not exceed" 1.1M Tons per calendar year (described as the "Limit on Solid Waste) until "applications to expand the Landfill onto the Expansion Parcel are granted (following any and all appeals to final judgement)." Of this 1.1 M Tons per year, 75,000 Tons per year were reserved for Solid Waste from the County exclusively, with the balance of 1.025 M Tons per year being termed the "Tonnage Cap." It was stipulated that "The County agrees that the Tonnage Cap shall not apply to any Solid Waste generated from fire, flood, other natural disaster or any Force Majeure event."

iii. Recent intake volume: 1993 – 2021

Annual intake volume for 1993 – 2021 is shown in Figure 2.

Chart 2: Coffin Butte Landfill Intake 1993 - 2021



iv. Comments/discussion:

1. The landfill operator generally chooses how much tonnage to accept, based on demand and their contracts with various jurisdictions and haulers. Some of the increasing tonnage accepted at the landfill from 1993-2021 reflect the increase in business development.
2. The annual Coffin Butte intake tonnage exceeded the 2000 Intake Threshold in calendar years 2017, 2018, and 2019 (see Appendix A for exact figures). The County did not perform an updated impact assessment as a result of the 2017-2019 tonnage threshold exceedances and no fee increase negation was undertaken.
3. Due to an expected additional influx of volume in 2017 resulting from the onset of the closure process for Riverbend landfill in Yamhill County, in December 2016 the franchisee and Benton County executed a MOU (Benton County & Republic Services MOU Relating to Additional Tonnage (2016)) acknowledging an expected increase in Coffin Butte intake volume "for a term of 1-2 years."

   In Progress – Need to determine accurate characterization of what happened with Riverbend Landfill
4. In documents provided to the A.1 Subcommittee, representatives of the franchisee have indicated that the approximately 70.25% year-over-year increase in CY2016-2017 was primarily due to redirected flow from Riverbend to Coffin Butte. According to the franchisee, 2017-2019 volume increases are primarily due to the diversion of waste from Riverbend Landfill, "in an effort to extend landfill life," and also rapid population growth in Willamette Valley and Western Oregon. Note that data from the Portland State University Population Center (referenced in the 2000

Landfill Franchise Agreement as the reference source for the population data to be used for calculating the 2000 Intake threshold) indicates the population of the 6-county service area defined in the 2000 Landfill Franchise Agreement grew 3.6% total in the period 2016-2019 (see Appendix A for population data).

5. The slow downward trend in intake volume in the 2006-2010 period is explained by the franchisee as resulting from the economic downturn of 2008.

   Work In Progress – Explaining 2008 recession related intake

6. The drop in volumes to Coffin Butte in 2020 is due to the global COVID-19 pandemic, coupled with diversion of tonnage from Riverbend Landfill to other landfills besides Coffin Butte. However, tonnage volumes increased again in 2021 due in part to changes in lifestyle/development/at home shopping patterns as a result of the pandemic, as well as debris from the Oregon wildfires.
7. The 2021 fire debris volume accepted at Coffin Butte is reported by the franchisee as **TBD** tons.
8. Benton County received approximately $3.1M of incremental revenue from the increased intake volumes over the 2017-2019 period (approximately 450,000 additional Tons/year @ $2.31/Ton x 3 years). Of this, approximately $1.08M was the result of volumes in excess of the intake threshold over the three-year period (see yearly overage figures in Appendix A; total = 466,479 Tons @2.31/Ton). This equates to roughly $11.50 total per Benton County resident for the three-year period.

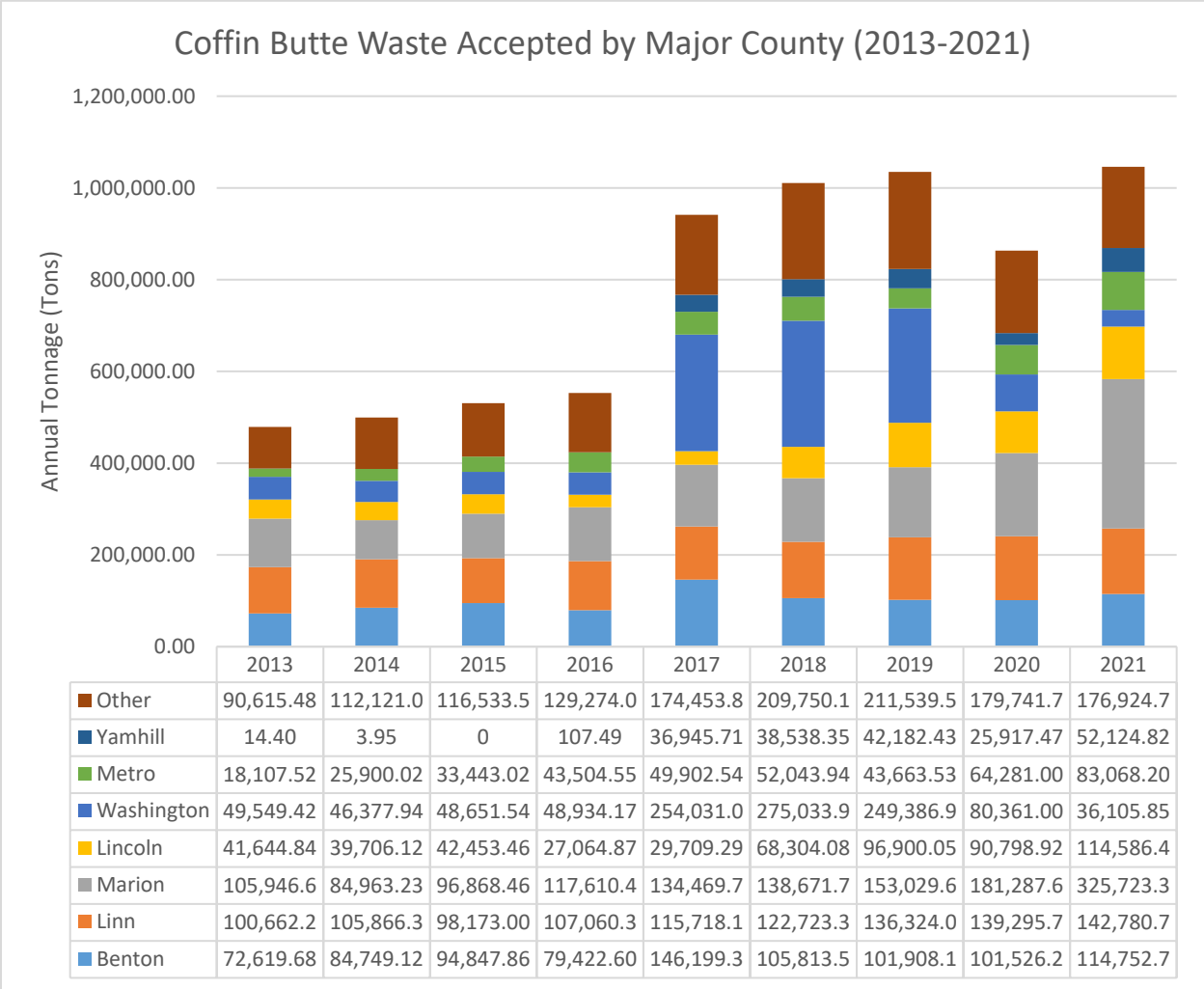
   In Progress – Add source/reference for data

9. A clear understanding of the intent of language in the 2020 Franchise Agreement is necessary for a thorough interpretation of this document regarding questions such as the setting of the 1.1 M Tons/yr. intake limit relative to the expected life of the landfill over the term of the agreement, the proper interpretation of the "Tonnage Cap" term, stipulations that bear on questions of allowed intake capacity relative to expected landfill life, and the parties' expectations of landfill expansion. To that end, release by Benton County of all available public records related to the negotiation of this agreement is necessary for proper consideration of these issues by this subcommittee and the larger workgroup.

v. Intake volume by source 2016 – 2021

See chart below for a breakdown of the Coffin Butte intake by source county for the period 2013-2021. This period includes the significant intake volume increase of 2016-2017.

Figure 11: Intake by Source, 2013 - 2021



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other	90,615.48	112,121.0	116,533.5	129,274.0	174,453.8	209,750.1	211,539.5	179,741.7	176,924.7
Yamhill	14.40	3.95	0	107.49	36,945.71	38,538.35	42,182.43	25,917.47	52,124.82
Metro	18,107.52	25,900.02	33,443.02	43,504.55	49,902.54	52,043.94	43,663.53	64,281.00	83,068.20
Washington	49,549.42	46,377.94	48,651.54	48,934.17	254,031.0	275,033.9	249,386.9	80,361.00	36,105.85
Lincoln	41,644.84	39,706.12	42,453.46	27,064.87	29,709.29	68,304.08	96,900.05	90,798.92	114,586.4
Marion	105,946.6	84,963.23	96,868.46	117,610.4	134,469.7	138,671.7	153,029.6	181,287.6	325,723.3
Linn	100,662.2	105,866.3	98,173.00	107,060.3	115,718.1	122,723.3	136,324.0	139,295.7	142,780.7
Benton	72,619.68	84,749.12	94,847.86	79,422.60	146,199.3	105,813.5	101,908.1	101,526.2	114,752.7

Long-term intake volume TBD – 2021

A long-term intake volume plot (from circa early 1980s to present) may be useful, in keeping with the "chronological history" aspect of the A.1 charge, and this could provide useful perspective for all concerned. For reference, in the approximately 80 years of landfill activity to date, 21,389,767 yd^3 have been consumed per the 2021 annual report, for an average volume of about 267,000 yd^3 per year.

This plot will require intake volume data and/or estimates that predate the available annual reports. Paul to investigate; any data input from others would be welcome.

D. Landfill Structure

v. Overview

The disposal area and surrounding lots are shown in **Error! Reference source not found.** below. This drawing is reproduced from the 2021 Site Development Plan, Appendix A, Drawing No. G03, and is reproduced here for convenience.

vi. Cell detail

Detail on individual disposal cells and the active dates for these cells is shown in **Error! Reference source not found.** below. Dates are summarized in the following table.

Table 2: Cell Open/Closed Detail

Area	Date Opened	Date Capped/Closed
Closed Landfill (Burn Dump)	1940's	
Cell 1	Late 1970's	
Cell 1A	Late 1970's	
Cell 2A	1988	
Cell 2B	1994	
Cell 2C	1995	
Cell 2D	1998	
Cell 3A	2003	
Cell 3B	2004	
Cell 3C	2005	
Cell 3D Phase I	2007	
Cell 3D Phase 2	2009	
Cell 4	2012	
Cell 5A	2014	
Cell 5B	2018	
Cell 5C	2020	
Cell 5D	2022	
Cell 5E	Future	
Cell 6 (Quarry Area)	Future	

Figure 12: Landfill Zoning

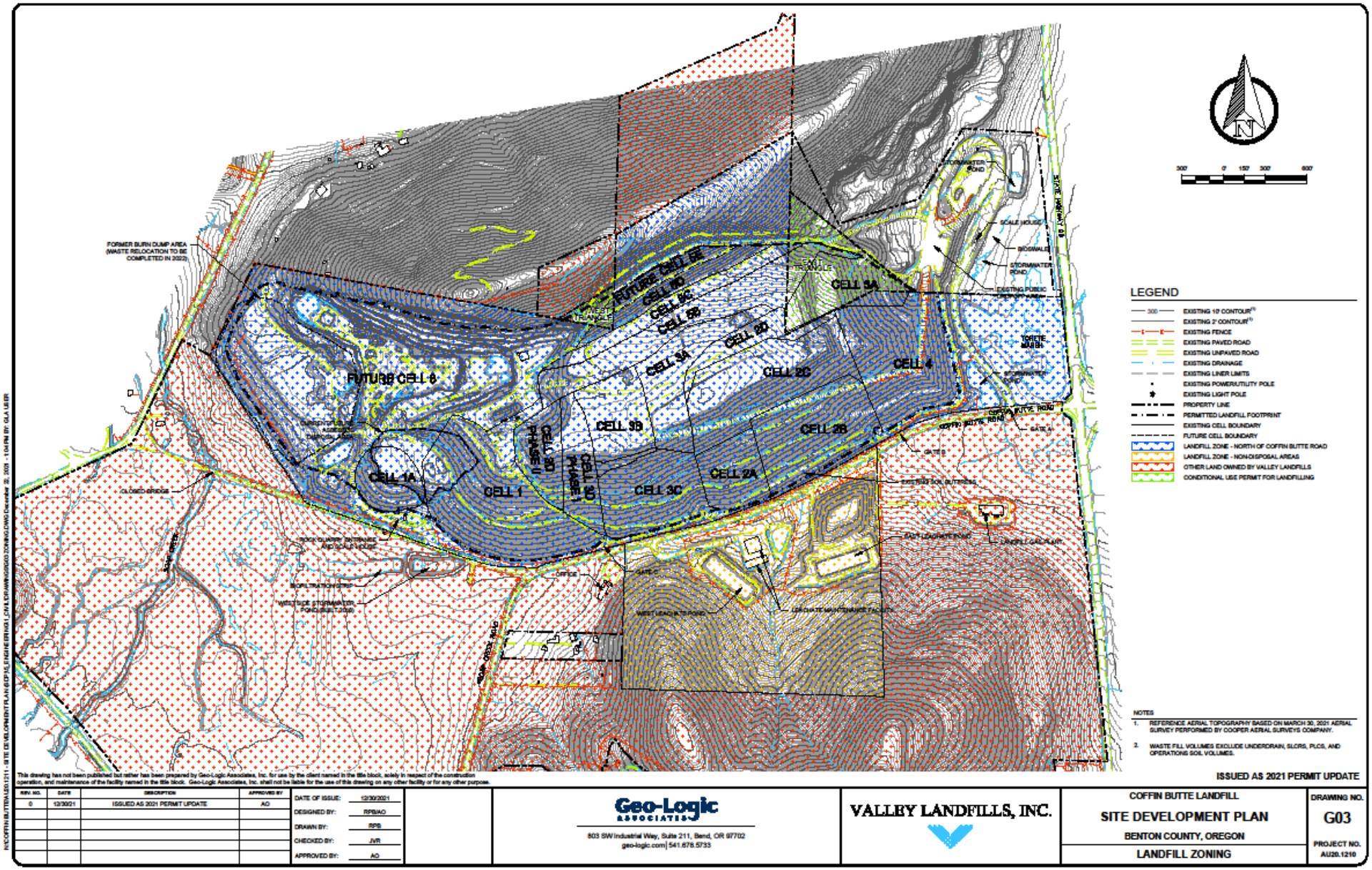
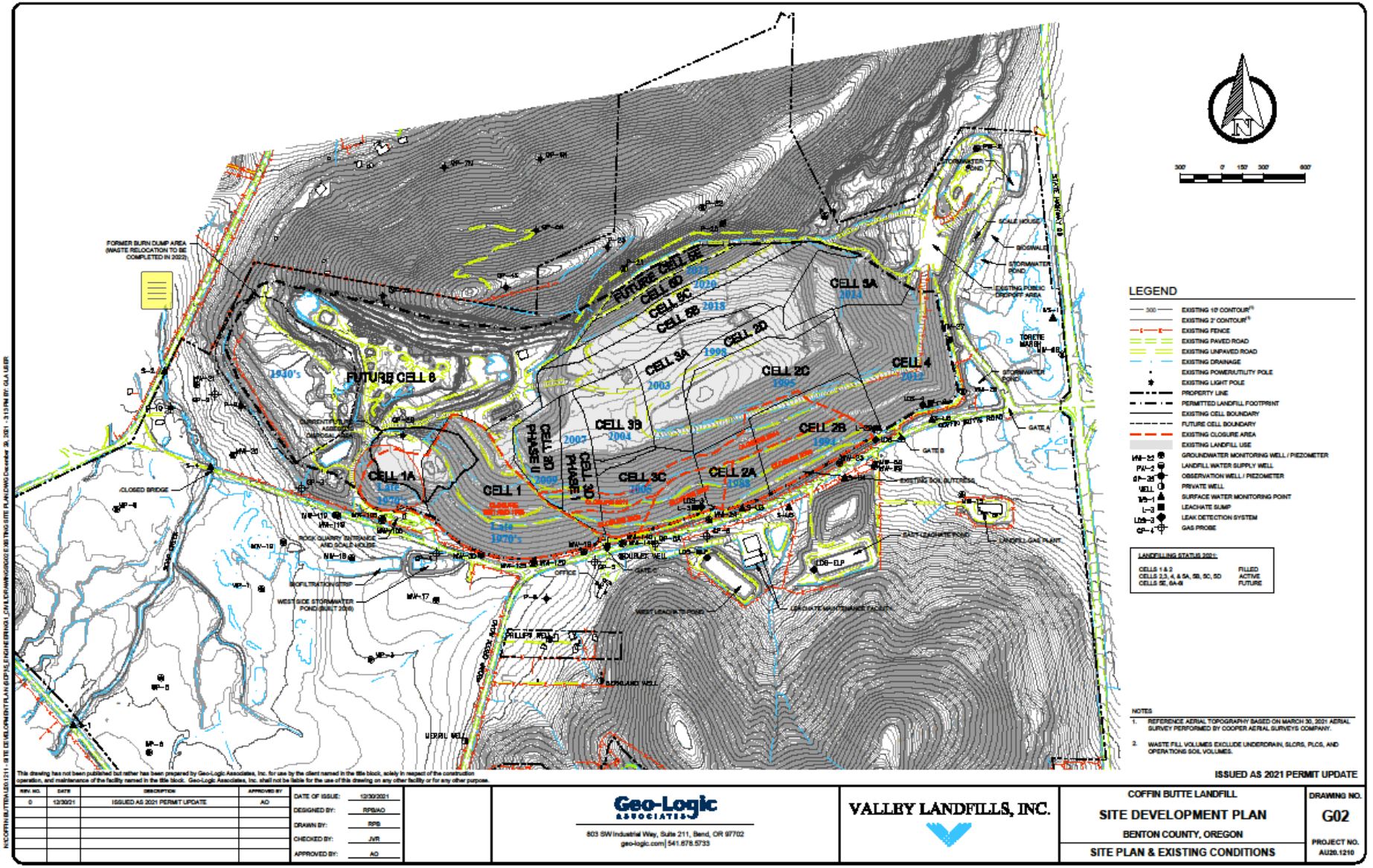


Figure 13: Landfill Cells



Section 2: Specific Locations

This section summarizes the primary actions and events that define the current Coffin Butte landfill footprint.

A. 1983 Rezoning Action

Per Benton County PC-83-07-C, in 1983 a new zoning category ("LANDFILL SITE") was created for Benton County. Approximately 266 acres of land owned by Valley Landfill, Inc. were rezoned with this classification. Of these 266 acres, 194 acres, all on the north side of Coffin Butte Road, were approved for waste disposal. The acreage on the south side of Coffin Butte Road can be permitted for waste disposal if a CUP is obtained from Benton County.

At the time the application for a zone change was filed in 1983, the landfill was receiving "approximately 375 tons of refuse per day" per PC-83-07 applicant filing.

Error! Reference source not found. denotes the originally proposed outline for land to be rezoned as Landfill Site (LS). Note that the northernmost section of the proposed area, extending north from the ridgeline of Coffin Butte, was ultimately not rezoned as LS due to concerns from neighbors. Also note that the expected areas of landfill are delineated in this drawing: Completed fill (west side), Present fill (southwest section), and Future fill (large area in center/east).

The overview map included in the Benton County & Valley Landfills MOU Relating to Land Use Issues (2002) document, included here as ***Error! Reference source not found.***, clarifies the zoning boundaries.

Figure 14: Proposed 1983 Rezoning Map

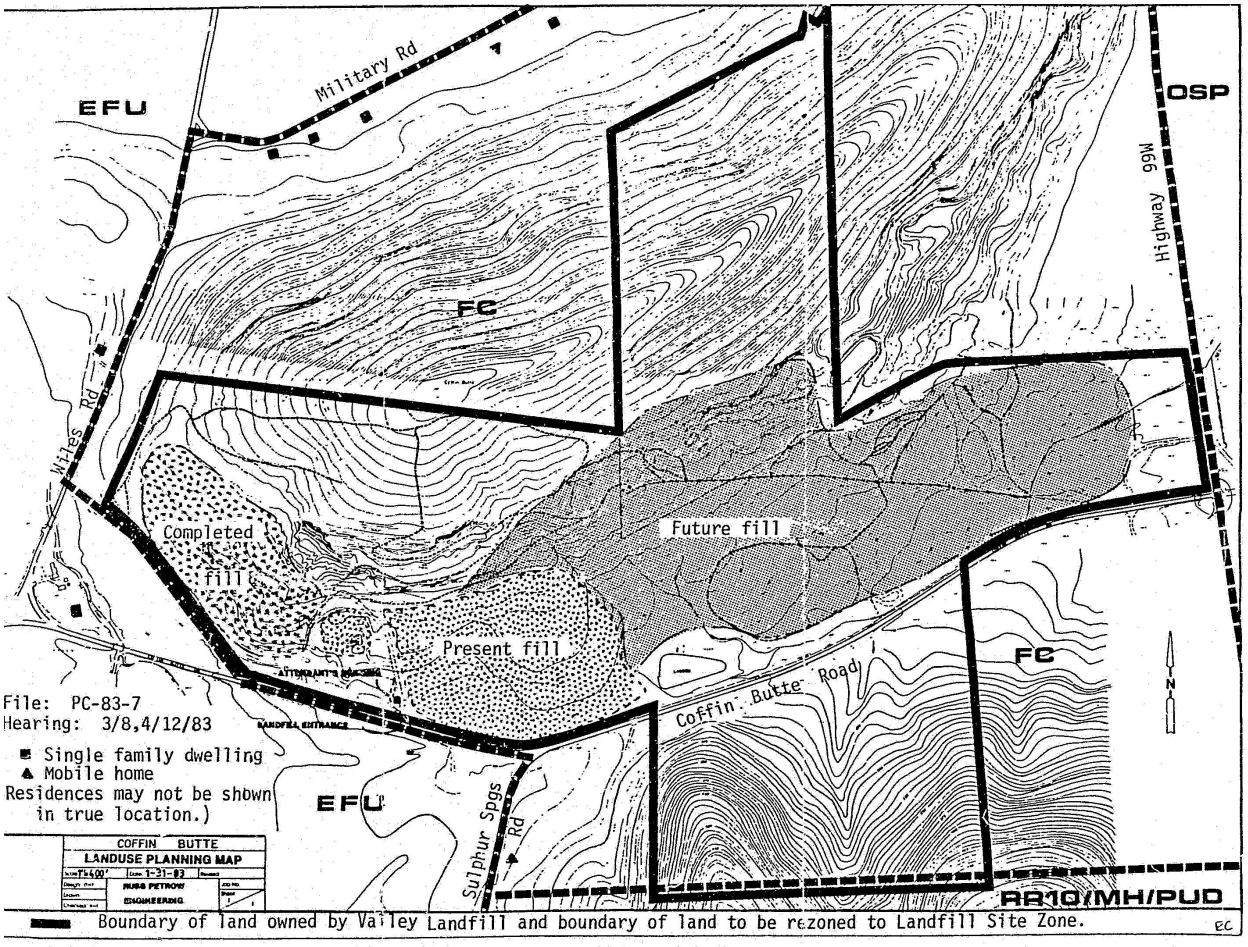
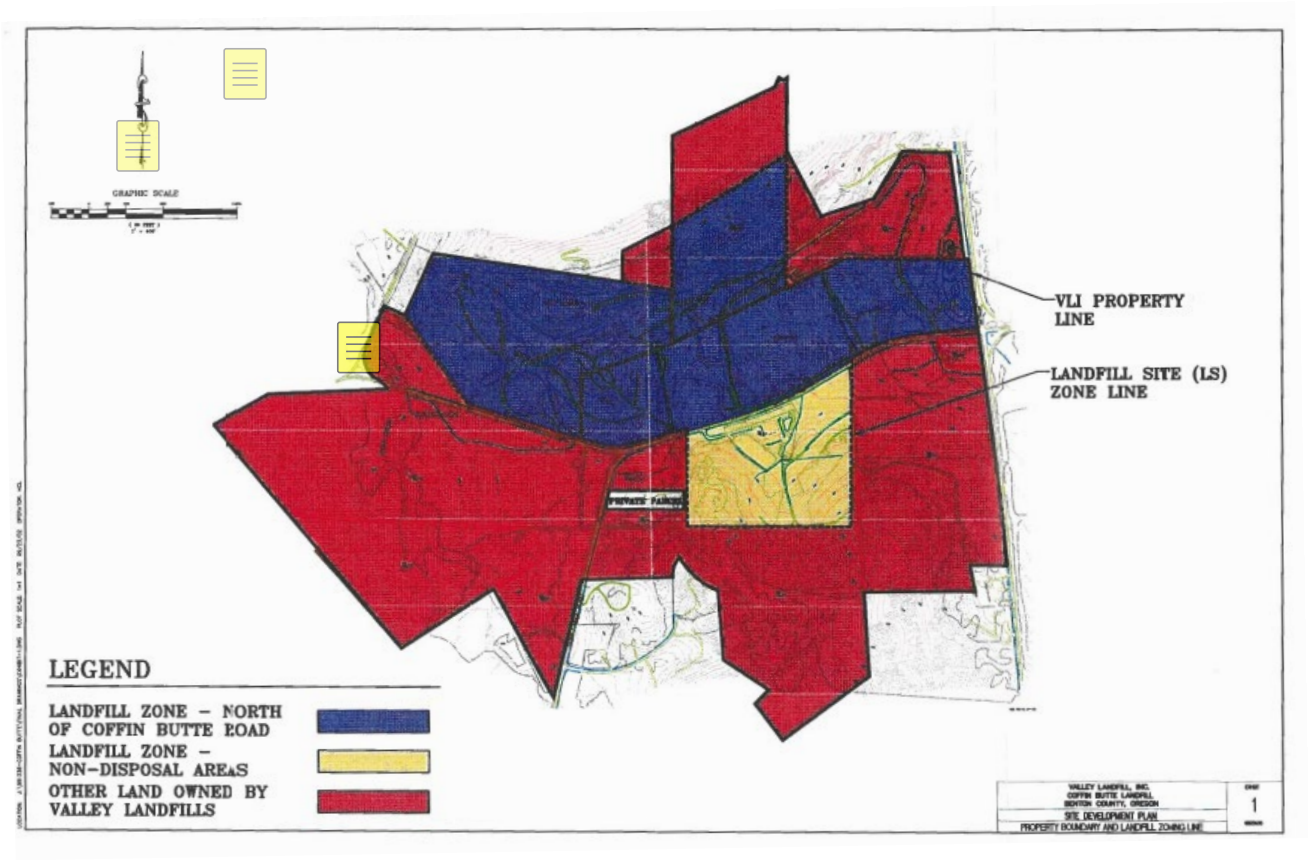


Figure 15: Zoning Map (2002 MOU)



B. West and East Triangle Additions

Two landfill areas were added in 2002 and 2003:

- The "West Triangle" was approved for landfill activities via Conditional Use Permit in 2002. This area is located on land zoned Forest Conservation (FC). Approximately 3,400,000 yd^3 of expected landfill capacity were added by the approval of the West Triangle.
- The "East Triangle" was approved for landfill activities via Conditional Use Permit in 2003. This area is located on land zoned Forest Conservation (FC). Approximately 5,600,000 yd^3 of expected landfill capacity were added by the approval of the East Triangle.

See Benton County document PC-03-11 for details.

Thus, a total of approximately 9,000,000 yd^3 of landfill capacity was added in the 2002 – 2003 period. This constituted an approximately 68.5% increase in total permitted capacity using the cell capacity figures shown in Table 3.1 of the Site Development Plan Amendment A2 in document PC-03-11.

C. Cell 6 (Quarry) Addition

Need information from Benton County regarding the instrument formally approving Cell 6.

D. LS Zone Parcel South of Coffin Butte Road

As part of the 1983 action considering the requests for rezoning of several parcels from Forest Conservation to Landfill Site, the Benton County Planning Department submitted a Staff Report. Within this report (Staff Report P2361/7 Page 3; Benton County document PC-83-07 Page 13) a Staff Comments section noted

"Benton County Solid Waste Advisory Council recommended approval of the requests [for rezoning] subject to two conditions:

1. No landfill be allowed on north face of Coffin Butte.
2. No landfill be allowed on property south of Coffin Butte Road [Taxlot 104180001107, Index 14 in Appendix C].

These two conditions were also requested by the North Benton Citizens Advisory Committee (CAC) and they recommended approval of the requests.

Staff concurs with these conditions. The property on the North face of Coffin Butte (approximately 30 acres) should remain under the Comprehensive Plan Designation of Forestry Conservation (FC), from the crest of the butte North."

However, the Benton County Planning Department Staff Report went on to state

"The other issue concerning the property south of Coffin Butte Road can be resolved through Conditions of Development placed on any approval of the site plan by the Planning Commission. The proposed zone allows no additional landfill activities unless approved by the Planning Commission at a public hearing. Therefore, the Commission may limit expansion into any area that is not appropriate for a landfill."

The staff recommendation was adopted as submitted by the Planning Commission in their April 26, 1983 meeting. The Staff Report was expressly adopted as Finding 4(a) by the Benton County Board of Commissioners and incorporated into the resulting Order on June 15, 1983.

The recommended approval of both SWAC and CAC for the 1983 rezoning action was conditioned on the agreement that no landfill would be allowed on the parcel south of Coffin Butte Road (Taxlot 104180001107, Index #14 in Appendix C).

Thus, Benton County Planning staff modified the clear recommendation from the Solid Waste Advisory Council (SWAC) and the recommendation of the North Benton Citizens Advisory Committee by weakening the terms governing the property south of Coffin Butte Road from "No landfill be allowed" to "...no additional landfill activities unless approved by the Planning Commission at a public hearing."

The 1983 rezoning ordinance (Ord. 26I) stated that “Any proposal to expand the area approved for landfill must be reviewed and approved by the Planning Commission at a Public Hearing.” No mention of a Conditional Use Permit process was stated in this ordinance as part of the process for expanding landfill area.

Per the Benton County Code Chapter 77 (77.305), “Any proposal to expand the area approved for landfill within the Landfill Size Zone is allowed by conditional use permit approved by the Planning Commission.” This change is apparently a result of Ord. 90-0069. The introduction of the conditional use permit process allows review and/or de novo judgement by the Board of Commissioners, as opposed to a final decision by the Planning Commission.

Section 3: Landfill Life Projections

A. Waste in Place: Projection to End 2022

Coffin Butte Landfill's 2022 intake volume has not yet been finalized, so we are using the projected figure of 1 million tons. As such, we are projecting the Landfill's remaining permitted airspace to be 16,008,557 cubic yards. As noted in the subcommittee's findings, remaining permitted airspace is not available airspace. A significant portion of what's permitted is not currently useable to unexcavated rock.

This section of the report will first look at historical end of life projections and then try to address future scenarios.

B. Historical Landfill Life Projections

Figure 16: Historical EOL Projections (source: Landfill Annual Reports)

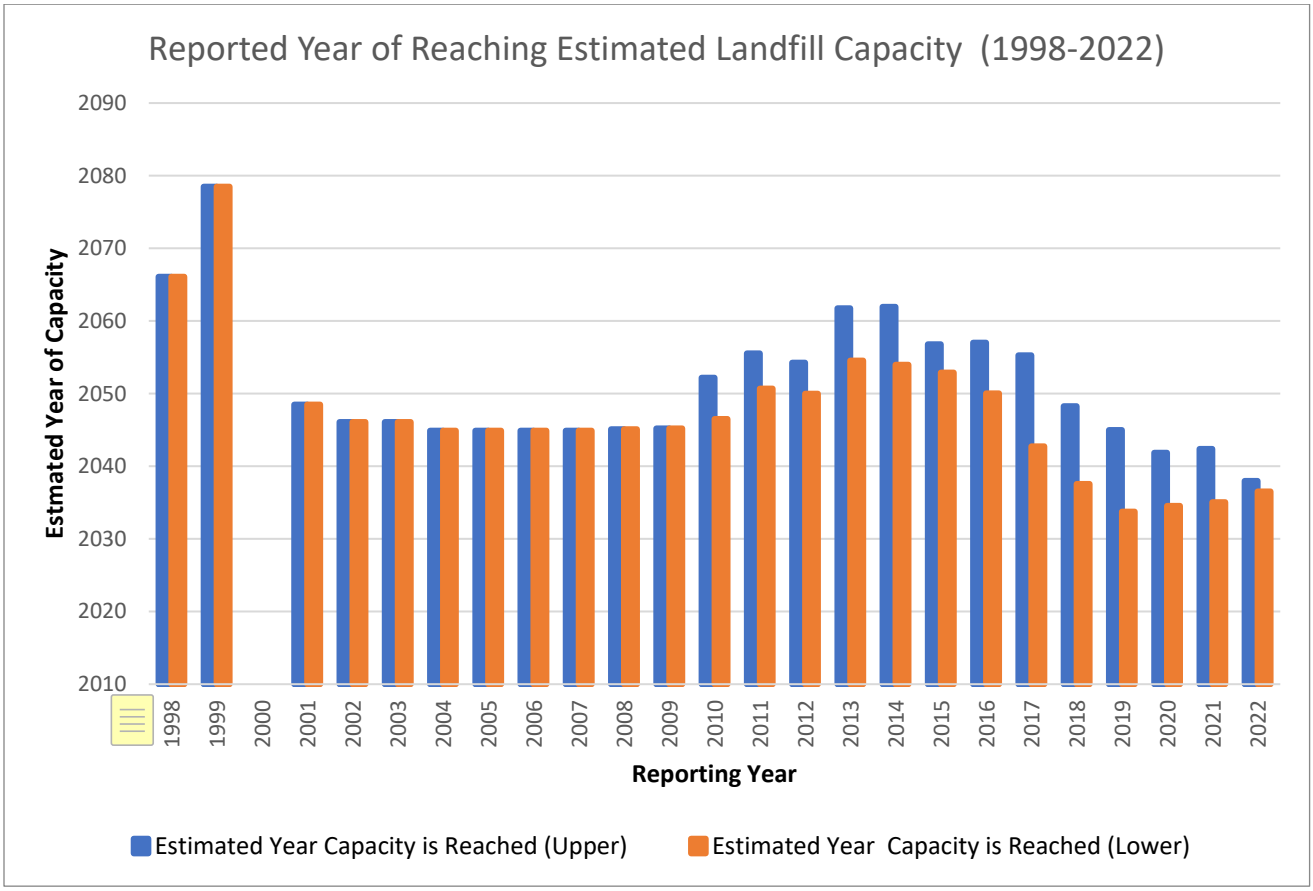


Table 3: Historical EOL Projections

Date of Projection	Projected EOL (CY)	Reference/Comment

1974	1989-2004+	February 19, 1974 Planning Commission Public Hearing Minutes (CP-74-01) 15-30 or more years estimated from 1974.
1974	1994	March 1, 1974 Letter from Chemeketa Region Solid Waste Management Program Director (CP-74-01) Based on 1,759,831 total tons received, at 32-40 feet, with Sweet Home and Lebanon area wastes directed towards "Lebanon Landfill"
1977	2000	WCSI Solid Waste Management Plan (1977)
1983	2033	March 7, 1983 Memo from Benton County Development Director to BOC (L-83-07) 50 years from 1983 estimated with approval of zoning change (estimate may include property South or Coffin Butte Road, the information was unclear).
1994	2024-2034	"Summary of Written Comments Receipted from Citizens Regarding Coffin Butte Zone Change Request" Prepared by Benton County Environmental Health Division for a 11/29/10994 community meeting (PC-94-10) 30-40 years from 1994. Estimate using only property North of coffin Butte Road, assuming material from current counties at the time.
1999	Late 2070	2003 Site Development Plan, Page 57, Table 3.1 71.1 Years from Oct 1999 Includes Cells 1-6 and East and West Triangles Based on 400,000 Tons/year and 0.8 Tons/yd^3
2001	2049	2001 Annual Report, prior to addition of East and West Triangles and Cell 6 47.5 years from Beginning 2002 Based on 425,000 Tons/year and 0.8 Tons/yd^3
~~2003~~	~~Late 2070~~	~~2003 Site Development Plan, Page 57, Table 3.1~~ ~~71.1 Years from Oct 1999~~ ~~Includes Cells 1-6 and East and West Triangles~~ ~~Based on 400,000 Tons/year and 0.8 Tons/yd^3~~
2003	2046	2003 Annual Report (Referenced in the chart above)

2010	2053	United States Environmental Protection Agency*
2013	2064	United States Environmental Protection Agency*
2014	2065	United States Environmental Protection Agency*
2015	2061	United States Environmental Protection Agency*
2016	2058	United States Environmental Protection Agency*
2018	2048	United States Environmental Protection Agency*
2019	2044	United States Environmental Protection Agency*
2021	2039	2021 Site Development Plan, Appendix B With detailed breakdown of planned Cell 6 structure and corresponding subcell life expectancy Based on 846,274 Tons/year and 0.8 Tons/yd^3
* EPA Greenhouse Gas (GHG) Emissions Data from Large Facilities, 2010-2021		

C. Coffin Butte Site Life Projection: 2023 to closure

The landfill life projections shown below are provided Republic Services. They are designed to establish a baseline – a simple operational project that more sophisticated scenarios can be built upon.

It presumes:

d) A steady annual tonnage intake of between 1 million and 1.1 million tons for the duration of the landfill's projected remaining site life.
e) Site life is currently projected by Republic Services to be between 14.5 and 16 years, with a closure date between 2037-2039.
Note: This also presumes that the landfill area known as "the quarry" can be fully excavated. A significant portion of permitted airspace at Coffin Butte is currently unusable due to unexcavated rock.
f) As indicated in the assumptions, this baseline is not a "default future," in that it does not incorporate outside factors.

Scenario 1

Tons per Year	1,000,000	Tons
Projected Remaining Airspace 12/31/22	16,008,557	CY
2022 3-year Density Avg	0.999	Tons/CY
Site Life	15.99	Years

Scenario 2

Tons per Year	1,100,000	Tons
Projected Remaining Airspace 12/31/22	16,008,557	CY
2022 3-year Density Avg	0.999	Tons/CY
Site Life	14.54	Years

Definitions:
Tons per Year: Projected tonnage based off recent history*
Projected Remaining Airspace: Airspace remaining at the end of 2022 based off projected 2022 tons and 2022 3-year density average
2022 3-year Density Avg: Average density measured during 2020, 2021 and 2022 measurements
Site Life: Total site life including the fully excavated quarry area

*Variables can and do impact tonnage and available airspace, and can include changes in disposal and diversion rates, natural disasters and other unforeseen market changes, etc.

The table shown above represents industry-accepted modeling for estimating a Landfill's remaining life. Modeling is based on three factors: remaining permitted airspace, volume, and density. As noted in the text below the graphic, Republic Services acknowledges that a wide variety of variables, independently or in concert with each other, can impact the baseline(s) enumerated above.

Committee members also want to make clear that the two baseline scenarios shown in the graphic are built on certain assumptions. They are as follows:

a) **Tons per year** – Projected tonnage based on recent history (2019-2021) and 2020 Franchise Agreement tonnage cap (1.1M tons/year). *Does not reflect variables such as changes in disposal and diversion rates, natural disasters, market, and regulatory changes, etc.*

b) **Projected remaining airspace** – Airspace consumed in 2022 based on projected 2022 tonnage and the three-year density average. *"Remaining airspace" includes approximately 2.7M cubic yards of quarry rock; how much of and by when this rock can be converted to airspace is currently unknown.* Quarry extraction in 2022 freed up approximately 140,000 cubic yards.

c) **2022, three-year-density average** – Derived from 2020-22 measurements. 2022 density based on 2021 measurements.

d) **Site Life** – Time to fill the projected remaining airspace, *including the permitted airspace that is currently unexcavated.*

e) Landfill Life is the availability of landfill reserves and landfill alternatives that sustains the landfill's demand, supply and equilibrium of refuse disposal.

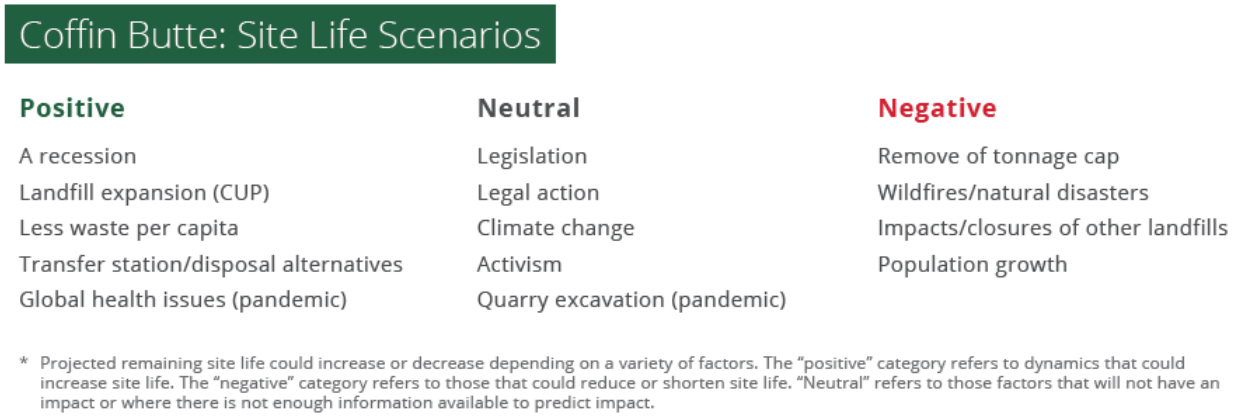
D. Events and Factors that could impact life

As noted, Republic Services and other landfill owners/operators generally estimate a facility's lifespan by calculating three variables on an annual basis, using data from previous years as a roadmap:

- Amount of space available (airspace)
- Amount of waste accepted (tonnage)
- Density of the waste (tons per cubic yard)

The main discussion in this section is around the various factors that impact the first and second variables: i.e. the amount of space available (airspace) and the amount of waste accepted (tonnage.)

Almost none of the factors relate to density of solid waste, so this discussion excludes that variable. The following graphic summarizes possible impacts of various factors on site life, meaning those that could impact the amount of space available and the amount of waste accepted:



The chart above, submitted by Republic Services, lists factors and elements that could impact Coffin Butte's site life in ways not foreseen in the baseline (Scenario 1 and 2) approach outlined above. The subcommittee believes that it's likely that one or more of these factors could occur in concert with each other.

For example, an expansion through approval of a CUP is listed as a “positive” factor – meaning one that could increase the Landfill’s site life and longevity. However, it is possible that any positive gain from such a factor would be neutralized or lessened by a “negative” element listed above (such as another wildfire or continued population growth in the region.)

Items listed in the neutral category are defined as such because they serve as “swing” factors – climate change legislation, for example, could yield either a positive or negative impact on site life depending on political influences and authors that shape it.

In addition, the future construction of a transfer station, alternate disposal options and other such factors as contemplated in a wide-ranging Solid Materials Management Plan could likely produce new options for refuse disposal for Benton County and neighboring municipalities and counties.

Therefore, the intent of the above graphic is not to provide an either/or solution, but to convey that an evolving array of factors, including future legislative and economic influences, could produce a matrix of outcomes that not only impact Landfill life but foster new waste management solutions as contemplated by the sustainable management sub-committee.

Assumptions and scenarios

While the subcommittee has generated a list of potential factors that could impact site life, these are by no means exhaustive. Our goal was to begin to describe the “terrain” that the Landfill’s future could traverse.

The subcommittee also agrees that so-called “human factors” play a significant role in any Landfill’s longevity, because they determine not only the flow of material that fills up the Landfill’s permitted volume but what comprises that material.

Unlike the layout of the Landfill or its permitted airspace (factors which are either pre-determined or yield a planned impact) these so-called human variables have the power to shift a Landfill’s operating life unexpectedly and very quickly.

Business decisions and legal obligations, legislation, changing societal attitudes, technological advances global shifts in consumer habits are all key components of a broad system that ultimately determines what is reused as part of a circular economy -- and what is landfilled as waste.

While the A.1 Subcommittee agrees that these factors are real and present, we struggled with how best to present them in terms of predictive scenarios from which the reader could potentially draw conclusions. **we could not reach consensus on the merits of presenting them in terms of predictive scenarios from which the reader could potentially draw conclusions.** The subcommittee members who represent Republic Services and its interests support using the existing modeling data to shape its projections, while acknowledging the “caveats” presented in the graphic above. But they offer no speculative analysis.

The subcommittee members who represent community and neighborhood interests, meanwhile, supported a broader exploration of factors and impacts using predictive processes known as "futurecasting," and "imagination training."

Ultimately, we decided as a subcommittee that these human-caused factors and scenarios need further review and detailed analysis, a careful examination that we were neither qualified nor had time to pursue given time constraints and the limited scope of this bridge process.

Therefore, we have posed a multitude of questions that we would like the SMMP subcommittee and its hired experts to delve into, in hopes of providing a more detailed picture of solid waste disposal options and Landfill longevity.

Those questions are enumerated in the table below.

Coffin Butte Landfill: How could site life change from the Baseline Scenario(s)?

Factors that could impact airspace	**Background**	**Questions**
Landfill expansion (and removal of tonnage cap)	Republic Services is likely to apply to expand the landfill's permitted airspace. Republic Services currently operates under a 1.1 million annual tonnage cap. Under the terms of the 2020 Franchise Agreement, this cap would be eliminated if the Landfill is expanded. **MORE: see "4. Landfill expansion and intake limit removal" section below.**	If the tonnage cap were removed, by how many years could the Landfill's life be shortened, given the region's capacity for generating landfill material?
Quarry excavation schedule	Our baseline scenario assumes 100 percent of the Landfill's permitted airspace is made usable by excavating rock from the quarry. **MORE: see "2. Quarry excavation" section below.**	What is the likelihood that the quarry is not fully excavated by the time landfilling operations need to begin in that area? Or that it cannot ever be fully excavated? How would that impact the Landfill's lifespan?

Water table concerns	A portion of the Landfill's permitted airspace seems to lie below the groundwater level, and it is unclear whether DEQ regulations allow this airspace to be used, or if it would be cost effective for the Landfill owner to excavate the area.	To what extent do DEQ regulations address the water table issue and what steps would the Landfill operator need to take to turn this into "useable airspace?" How could overall site life be reduced by the water table issue? What role if any does Benton County have in protecting its groundwater?
Disaster concerns (Landfill fire, earthquake)	Although it rarely happens, landfills can catch fire, either on their surface or as exothermic reactions deep under their surface. The ubiquitous presence of methane, a flammable gas, is a risk factor. A landfill fire ignited by an area wildfire is a troubling possibility. Exothermic reactions are deep in the landfill itself and can take years to extinguish. The Landfill is in an earthquake zone and that could also cause loss of access to permitted airspace. (Note: there are regulations and plans in place at the landfill regarding disasters)	How can Benton County better assess the risks of losing access to permitted airspace due to damage from disasters that directly or indirectly impact landfill infrastructure such as a landfill fire?
Factors related to annual tonnage (demand)	**Background**	**Questions**

Exceedance beyond tonnage cap	Benton County previously did not exercise its threshold options under the 2000 Franchise Agreement, when Republic Services took in excess tonnages in 2017-2019. **MORE: see "5. Intake Limit Exceeded" section below.**	How often does Benton County review its Franchise Agreements for contract compliance? Does the county have enforcement plans? Are the contracts written in such a way that Benton County is incentivized to ignore exceedances of the tonnage cap or other aspects of the contract that would shorten landfill life?
Recession	A slowing or contracting economy, such as the Crash of 2008, generally reduces the volume of waste produced throughout the service area. We saw a decline in tonnage at Coffin Butte Landfill during 2006-2010.	Are current inflationary pressures likely to have any reduction in waste generation at Coffin Butte Landfill? Using history as a guide, how many recessions are we likely to experience between now and the Landfill's baseline closure dates? How could recessions/inflation alter the Landfill's projected site life?
Economic growth	If a slowing economy generally reduces waste production, a robust growth economy could increase it. EPA data from 2018 states that 4.9 pounds of municipal solid waste was generated per person per day.	How have waste generation rates changed over time, and specifically during periods of economic growth? Can we project any changes to a Landfill's site life using the data available and forecasting that against the likelihood of economic expansion?

Reductions in waste generation (structural and societal)	Oregon environmental policy emphasizes recovery and reuse of solid waste, to insure highest practicable protection of the public health and welfare and air, water and land resources. Desire to decrease the size of wastestreams and increased awareness of the importance of a "circular economy" are prompting structural and societal changes to divert material from landfilling. Example: SB 582, an extended producer responsibility (EPR) law for packaging, became law in 2021, giving producer responsibility organizations (PROs) mandates to improve recycling and other waste diversion plans beginning in 2025.	What is the likelihood that counties in the service area will decrease the size of their wastestreams over the next 20 years? What proportion of the tonnage that currently goes into the Landfill is divertible material? What role can Benton County play in reducing waste generation and landfilling in county and in the Landfill service area?  
Disposal alternatives	Outside of maximized recovery (recycling and composting), alternatives to landfilling exist in various forms, primarily in new disposal technology. An incinerator in Marion County burns waste and generates energy for example.	What other disposal alternatives exist in the U.S. and elsewhere in the world? Which ones are showing the greatest promise for success and replication (taking in factors like cost, longevity, political will, etc)? How readily could these be incorporated into the solid waste management plans for cities and counties in the service area? Will Benton County consider these alternatives in its own Sustainable Materials Management Plan?
Transportation alternatives	Solid waste is currently trucked to Coffin Butte Landfill. Alternative modes of transportation (barge, rail, etc.) are being used to haul trash from intermodal transfer stations to landfills in more remote, less-densely populated areas.	What are the options for transporting waste using via rail or boat? How could Western Oregon's current network of transfer stations play a role in diverting waste from Coffin Butte? What is the feasibility of using existing railroad networks to haul waste (consider costs, safety, reliability, etc.)?

Global health issues (pandemics)	The COVID-19 pandemic had a significant impact on Landfill tonnage, decreasing it dramatically in 2020, but waste generation surged back in 2021.	e COVID-19 pandemic still impacting waste generation? If so, how? What is the likelihood that we will experience other global health crises in the next two decades? How would that potentially extend or reduce the life of Coffin Butte Landfill?
Climate change and other environmental legislation (A)	People worldwide are increasingly concerned about the threat of uncontrolled releases of greenhouse gases to their quality of life. Methane releases are a focus, because methane is a potent and quick-acting greenhouse gas. Landfills are major sources of greenhouse gas emissions, especially methane, in the United States. (A) Concern by the public, science and industry, and financial entities about the climate crisis is manifesting in legislation. President Biden rolled out the U.S. Methane Emissions Reduction Action Plan in November 2021, followed by the Inflation Reduction Act of 2022, which provided for more than $300 billion in strategic investments to address the climate crisis. This includes incentives to detect, monitor and reduce methane emissions. **MORE: see Appendix D below.**	Are there plans to expand the requirements of the methane legislation to include landfills? If so, what is the likelihood of that passing and how could that impact Landfill operations? What other major pieces of legislation are circulating and gaining support? Do the climate pollution reduction incentives authorized in the Act present opportunities to fund waste-reduction projects in Benton County and throughout the Landfill service area? Are there opportunities for Benton County to begin the monitoring of methane emissions at Coffin Butte Landfill?

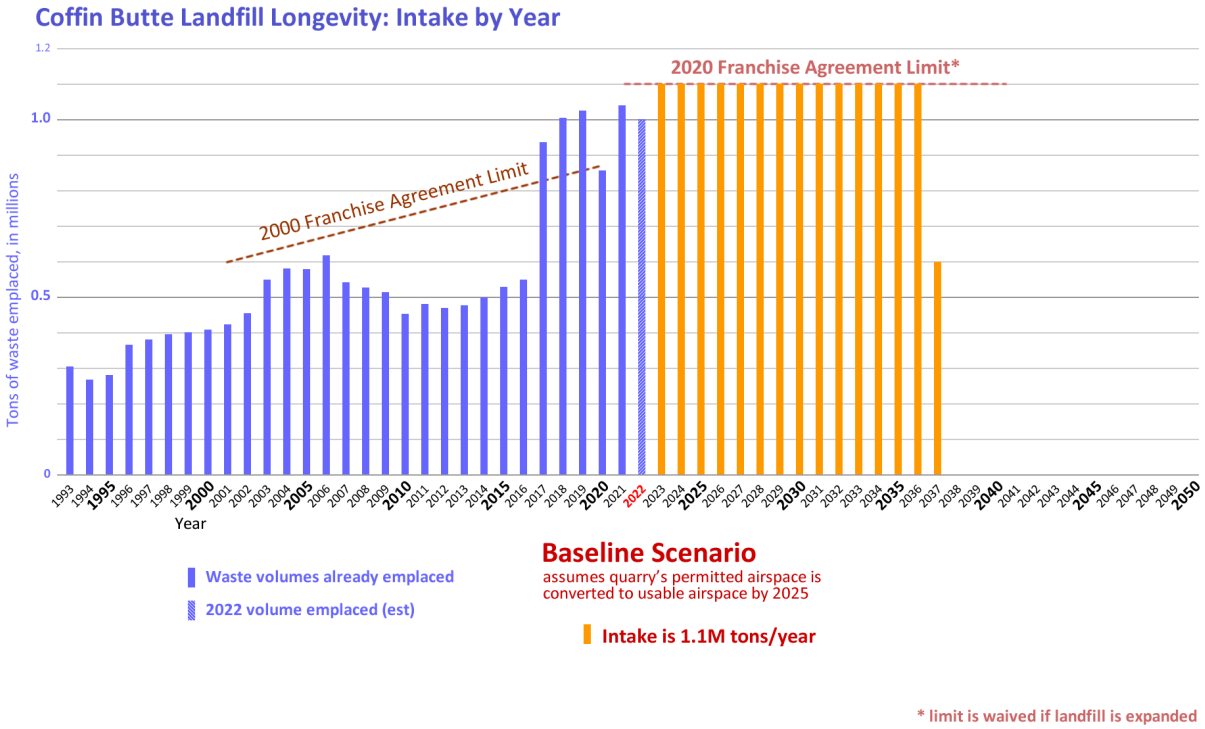
Climate change and other environmental legislation (B)	(B) Regarding landfilling, the first effect of the EPA's focus on methane reduction is the Food Donation Improvement Act, signed into law in January 2023. America wastes about 30-40% of its food, and food waste is the most common material found in landfills, estimated at roughly a quarter of material. When landfilled, food waste converts readily to methane. **MORE: see Appendix D below.**	How much food waste will the new legislation divert from landfills? How prohibitive is the "commerce clause" in diverting tonnage away from the Landfill? Is environmental legislation creating incentives and opportunities for Benton County and other counties in the service area to transition to cleaner, less wasteful trash management systems?
Wildfires/natural disasters (local and regional)	Fires, floods, spills, and other disasters can suddenly generate large amounts of landfill material. Disaster debris is not limited by the Landfill's 1.1 million annual tonnage cap. Example: devastating wildfires in the mid-Willamette Valley in 2020 generated hundreds of thousands of tons of disaster debris, and Coffin Butte Landfill accepted roughly 300,000 tons of debris for landfilling in late 2020–early 2021. **MORE: see "6. Disaster Debris" section below.**	What is the forecast for wildfires and other disasters in the region? What options are there for disaster debris other than disposal at Coffin Butte Landfill?

Service area changes (closures and creation of other landfills/facilities)	In recent years Coffin Butte Landfill has taken in 25% to 30% of the total trash generated and disposed of in Oregon, according to DEQ reports. Closure of other regional landfills could create a opportunity for Coffin Butte Landfill to grow its service area if an expansion is granted and the tonnage cap removed.	What is the current disposal picture for Western Oregon? How many landfills are operating and how much capacity is remaining in each? Are there landfills nearing capacity? How could these dynamics impact tonnage and airspace at Coffin Butte-Landfill? Does Benton County have options for influencing or preparing for these outcomes? 
Industry competition/business choices	Republic Services competes with other trash haulers and Landfill owners and operators. Industry competition can yield either an increase or decrease in the Coffin Butte waste shed, depending on Republic Services ability to successfully gain or maintain existing contracts.	What market factors could impact Republic Services (and Coffin Butte's) customer base? Who are the other competitors in the market? Which municipalities and counties are nearing the end of their franchise or hauling agreements? Where are the new business opportunities? How could these increase or decrease tonnage coming to the Landfill? 
Population growth/change	The service area's population is forecast to grow modestly over the next 20 years, with annual growth rates of less than one percent. Under the 2020 Franchise Agreement, any additional waste tonnage generated would be subject to the Landfill's intake cap unless an expansion is granted.	Can Benton County make educated guesses about actual population trends in the Landfill's service area? Can Benton County make more detailed estimates about future waste generation in the service area? What options does Benton County have to influence a likely increase in waste generation, both in county and regionally?

A. Coffin Butte Landfill: What factors could make the landfill close earlier than the Baseline Scenario(s)?

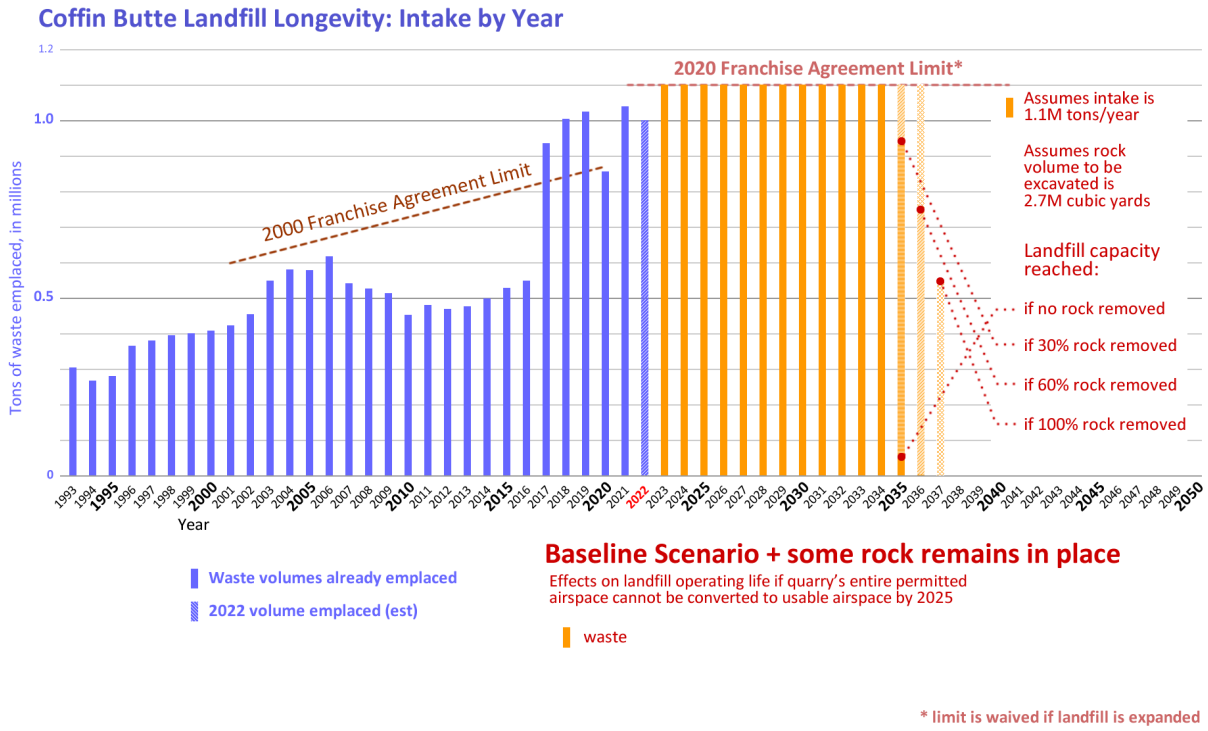
The subcommittee paid particular attention to factors that could lead to a landfill closure date earlier than 2037, because such an development could have serious repercussions for Benton County and for everyone else in the landfill's service area. These factors are discussed in more detail in this section, and graphs with representative assumptions are included to make these prospective outcomes easier to visualize.

1. The baseline scenario



The graph above visualizes Scenario 2 of the formal baseline projection ("baseline") provided by the franchisee, from Section 3.C Table 1 above. This projection is derived from an upward limit of waste intake of 1.1 million tons a year, which is in turn derived from the limit specified in the 2020 Franchise Agreement, as shown on this graph. We will use this projection in the expanded scenarios that follow.

2. Quarry excavation: “What if the franchisee cannot excavate all of the quarry?”



Roughly 2.7 million cubic yards of the landfill's permitted airspace is currently unavailable because it is unexcavated rock.[4] The landfill's owner holds a surface mining permit for this rock, and franchises it to Knife River as a quarry. For the past few years Knife River has currently quarried the rock at a rate of roughly 150,000 cubic yards a year,[5] so at a normal pace the airspace will not be fully available until the year 2040.

This poses a dilemma for the landfill's owners, because the landfill is on track to fill its current cell in 3 years, when it will look to move operations into the quarry area. The landfill and the quarry cannot safely overlap their operations in the airspace. Ideally, the quarry would pre-excavate all the rock by year-end 2024, and the landfill would then prepare the quarry site for landfilling. Alternatively, the landfill could use a new permitted area (a landfill expansion) as a “bridge” to give the quarry more time to pre-excavate, but it seems unlikely that a landfill expansion could be (a) successful and (b) legally resolved in time to be useful.

[4] Derived from Knife River testimony before the Benton County Planning Commission, November 2021.

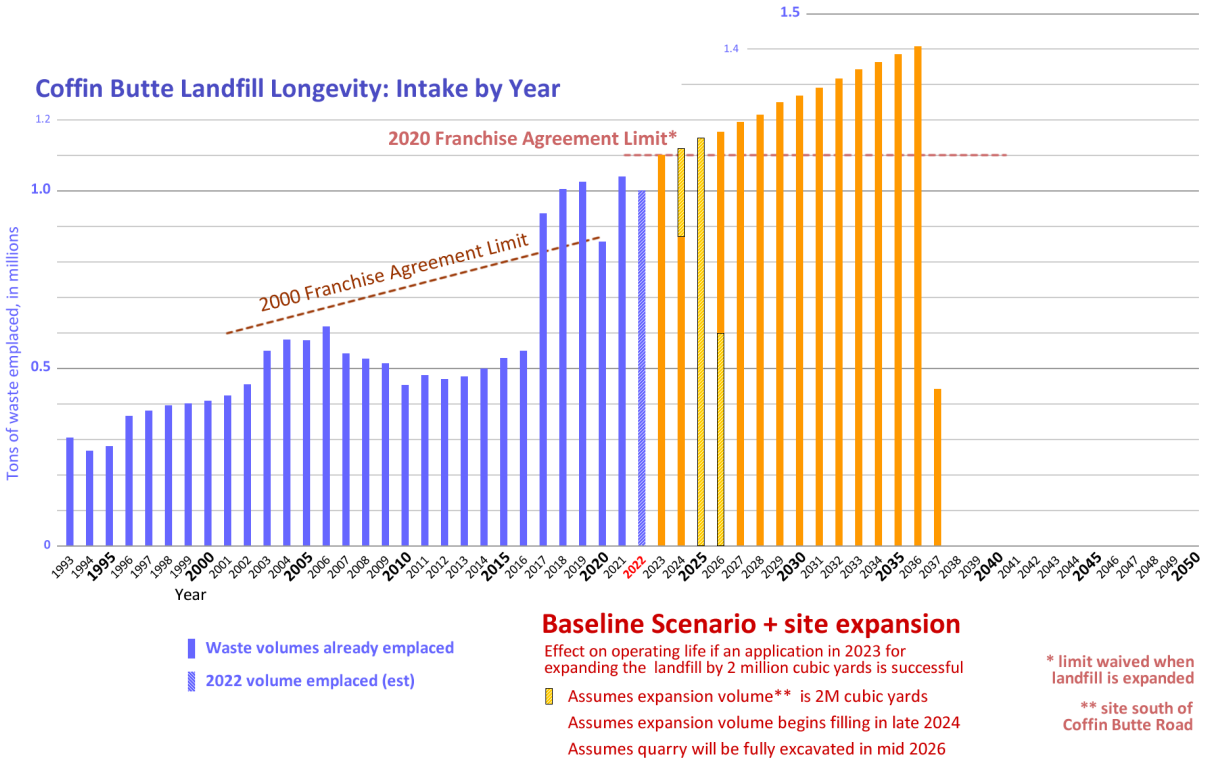
[5] Derived from Knife River testimony before the Benton County Planning Commission, November 2021.

We do not currently know how much rock can be pre-excavated before landfilling operations move into the quarry airspace. We can display the possibility range graphically, assuming the unexcavated volume is 2.7 million cubic yards.

3. Water table restriction: “What if the franchisee cannot or chooses not to excavate below the water table line?”

A (currently unquantified) portion of the landfill’s permitted airspace seems to lie below the groundwater level, and it is unclear at this time whether or not Oregon DEQ regulations will allow this theoretical airspace to be used. if not permitted, actual permitted airspace would decrease and the lifespan of the landfill would shorten, in proportion to the volume affected.

4. Landfill expansion and intake limit removal: "What if the franchisee obtains a permit to expand the landfill, which will remove the intake cap?"

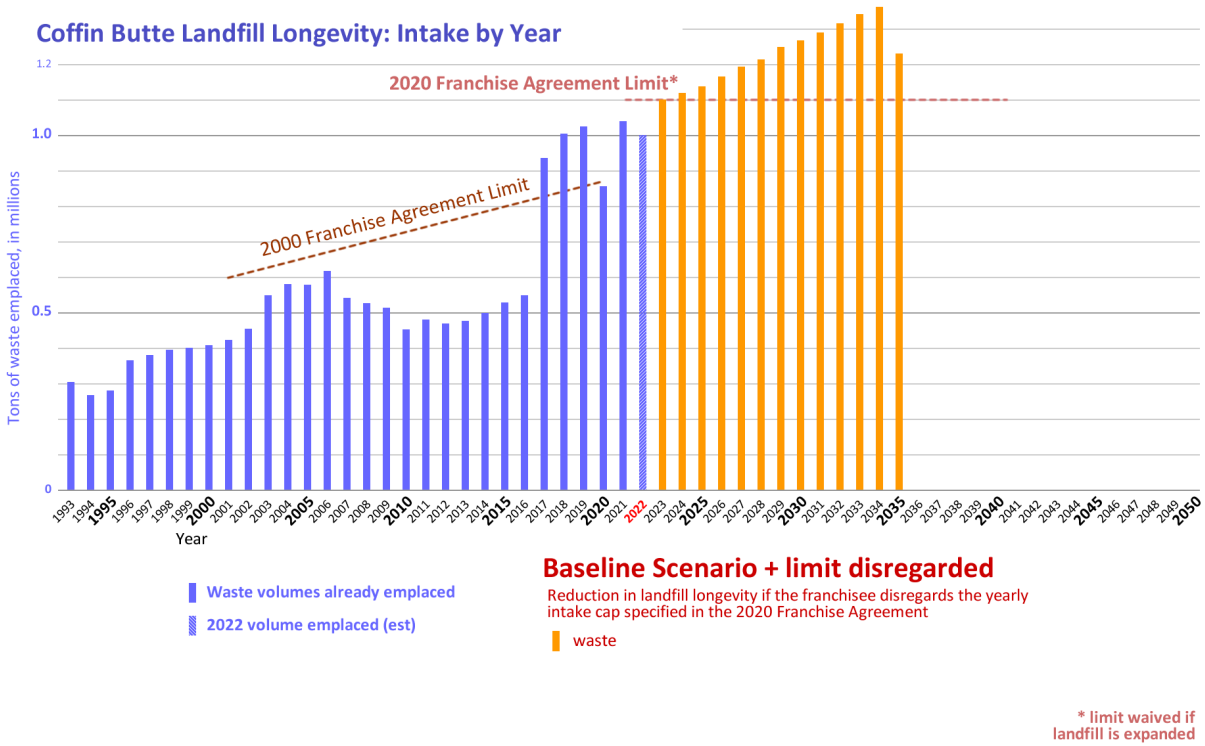


The baseline scenario may only be fully realized in combination with a landfill expansion – to serve as a bridge landfilling site that allows time for the quarry airspace to be pre-excavated. The landfill owner has indicated that it will apply for such an expansion, likely in the first half of 2023. Almost certainly this expansion site would be the area south of Coffin Butte Road that is already zoned as Landfill Site. The maximal size of this airspace is estimated to be roughly 10M cubic yards (the estimated volume of the withdrawn 2021 expansion application). It's possible however that the next expansion will follow a different strategy, and be smaller, perhaps even much smaller, than the previous; this would bring about a situation where an increased intake rate could more than offset the volume gain, leading to an overall shorter landfill life.

The graph is a simple projection of this scenario and its effect on baseline longevity, assuming a successful expansion application adding 2M cubic yards.

Note: At the time of this writing, the franchisee represents that they are willing to make the 1.1M intake limit permanent and uphold that limit. This scenario assumes current conditions (the limit is waived if the landfill is successfully expanded).

5. Intake Limit Exceeded: "What if the franchisee exceeds the 2020 Franchise Agreement limit?"

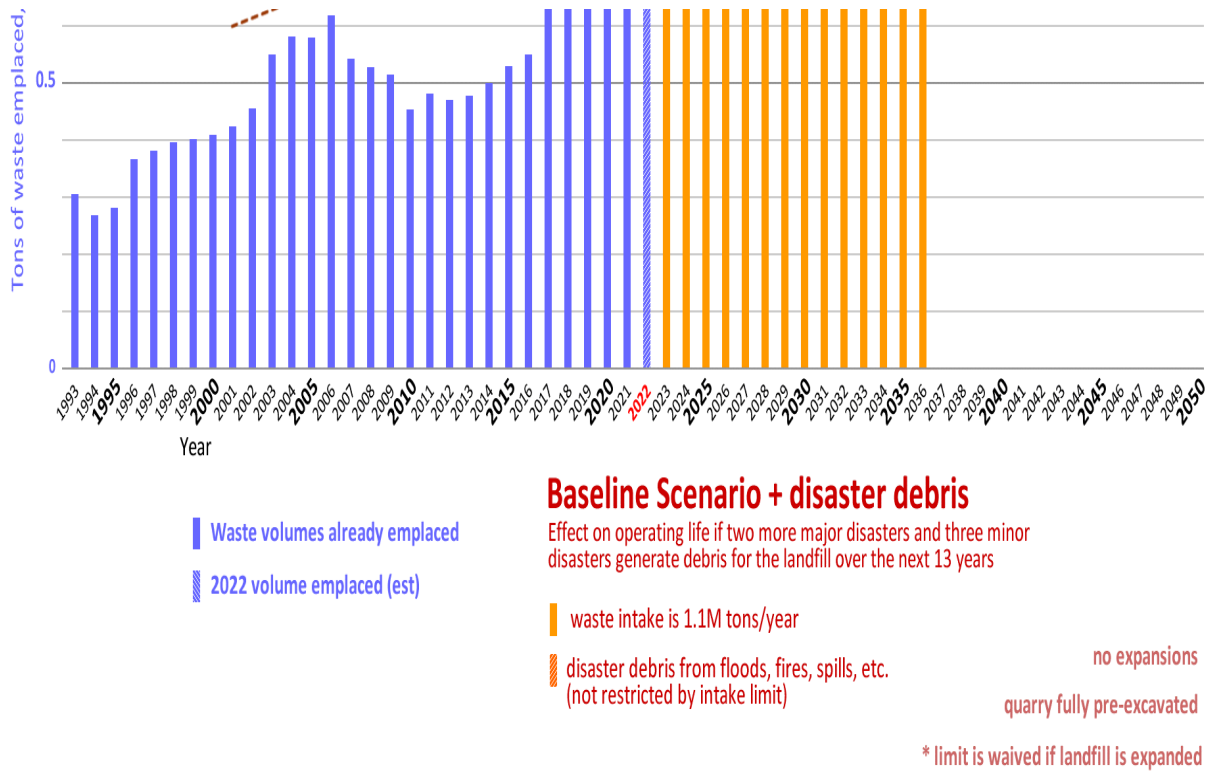


The 2020 Franchise Agreement limits the franchisee to a cap of 1.1M tons per year, but does not include any provisions for enforcement of that cap. There is historical precedent; as described earlier in Section 1.C, when the 2000 Franchise Agreement limit was exceeded, Benton County signed a Memorandum of Understanding that allowed the exceedance with no extra fees per ton. There is contemporary precedent also, as the 2020 Franchise Agreement also specifies a fee-per-ton that would apply if the cap were contractually lifted when an expansion was approved. The scenario assumes there are business opportunities that enable the franchisee to grow the yearly intake, because those are what would motivate the exceedance in the first place.

This scenario represents the effect on landfill longevity if the franchisee disregards the intake limit specified in the 2020 Franchise Agreement and the County responds either with no action or with an accommodation agreement such as a per-ton surcharge. It assumes a modest growth rate to intake (less than 2% per year).

Note: At the time of this writing, the franchisee represents that they are willing to make the 1.1M intake limit permanent and uphold that limit. If they do so, this scenario no longer applies.

6. Disaster debris: "What if there are more disasters like the 2020 **wildfires,** that generate debris for the landfill?"



Fires, floods, earthquakes, spills, and other major disasters can suddenly generate large amounts of debris to be landfilled. These events also occur more frequently at minor levels. These inflows can reduce the landfill's life, as disaster debris takes up airspace in the Landfill and is not limited by the Landfill's 1.1 million annual tonnage cap.

The visualization above assumes that two more major disasters occur in the region before close of Landfill, or roughly once every seven years; plus three minor disasters occur in the same time period, roughly every four years. The two major events each generate about 300,000 tons of debris (roughly the amount of material generated by the area wildfires of 2020) and the three smaller disasters generate 75,000 tons each. These inflows happen in addition to the normal wastestream, which as per the baseline is assumed to be 1.1 million tons per year.

Conclusion: A Confluence of Factors – Findings and Recommendations

The subcommittee has generated a Table calling attention to, and posing questions about, potential factors impacting site life; this list is not exhaustive and its characterizations are limited. We hope a more complete list and more detailed characterizations will come as Benton County prepares a Sustainable Materials Management Plan.

These factors are all relevant to understanding the possible longevity of Coffin Butte Landfill. Each factor has its own likelihood of being significant to landfill longevity and its own effect over time, and each joins with other factors to determine the actual longevity. These factors have been included to enable the reader to form a conception of the likely "possibility space" for the landfill's operation from current day to its End Of Life.

The possibility space shows landfill closure as early as 2034 and as late as 2045.[6] Within that range, the landfill's 2021 Site Development Plan estimates the closure year to be 2039 and the EPA shows a closure year of 2044. The franchisee's baseline projects a closure range of 2037-2039. The franchisee intends to keep intake rates as high as possible, as shown in their baseline projection. Intake-increasing factors such as population growth and debris from disasters may drive up intake rates and thus shorten landfill life within the range; intake reduction factors such as recycling and waste diversion, plus emerging factors such as extended producer responsibility (EPR) incentives and climate crisis legislation, may drive down intake rates and thus lengthen landfill life in the range and beyond.

[6] Closure outside of this date range is possible, but seen as less likely

Appendix A: Intake Tonnage and Capacity Data

Coffin Butte annual intake volume, derived from 1993-2021 Coffin Butte Annual Report (CBAR) documents. CY 2000 is highlighted to indicate this value was derived from the 2001 report because the 2000 report document is unavailable. Blue highlights below are assumptions and estimates, not actually recorded data.

Year	CBAR Volume (Tons)	2000 FA Threshold	Intake Exceeding 2000 FA Threshold (Tons)	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
1993	310,648	#N/A				
1994	268,472	#N/A				
1995	287,932	#N/A				
1996	369,835	#N/A				
1997	378,919	#N/A				
1998	395,751	#N/A				
1999	401,408	#N/A				
2000	413,493	#N/A				
2001	425,723	600,000		0.9	473000	25,238,000
2002	453,261	612,000		0.98	561,592	24,776,627
2003	550,506	624,240		0.98	561,592	24,209,320
2004	586,076	636,725		0.80	736,434	24,513,192
2005	580,275	649,459		0.80	725,344	29,916,144
2006	618,340	662,448		0.8	781,094	29,135,051
2007	546,996	675,697		0.8	683,746	28,451,306
2008	528,396	689,211		0.8	660,494	27,785,082
2009	519,058	702,996		0.8	648,823	27,136,259
2010	458,590	717,056		0.892	514,111	27,382,241
2011	482,951	731,397		1.0375	465,495	24,807,718
2012	473,550	746,025		0.83	572,825	23,741,843

Year	CBAR Volume (Tons)	2000 FA Threshold	Intake Exceeding 2000 FA Threshold (Tons)	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
2013	479,160	760,945		0.92	523,100	24,458,567
2014	499,687	776,164		0.92	545,510	23,839,138
2015	530,971	791,687		0.89	595,593	23,839,138
2016	552,979	807,521		0.93	592,689	22453729
2017	941,430	823,671	117,759	0.97	969,048	21,727,371
2018	1,010,879	840,145	170,734	0.99	1,021,090	18,015,098
2019	1,034,934	856,948	177,986	0.8	1,293,668	18,352,257
2020	863,210	874,087		1	863,210	17,621,208
2021	1,046,067	#N/A		0.98	1,067,415	17,249,778
2022	1,100,000			0.999	1,089,900	16,008,557
2023	1,100,000			0.999	1,089,900	14,918,657
2024	1,100,000			0.999	1,089,900	13,828,757
2025	1,100,000			0.999	1,089,900	12,738,857
2026	1,100,000			0.999	1,089,900	11,648,957
2027	1,100,000			0.999	1,089,900	10,559,057
2028	1,100,000			0.999	1,089,900	9,469,157
2029	1,100,000			0.999	1,089,900	8,379,257
2030	1,100,000			0.999	1,089,900	7,289,357
2031	1,100,000			0.999	1,089,900	6,199,457
2031	1,100,000			0.999	1,089,900	5,109,557
2033	1,100,000			0.999	1,089,900	4,019,657
2034	1,100,000			0.999	1,089,900	2,929,757
2034	1,100,000			0.999	1,089,900	1,839,857
2035	1,100,000			0.999	1,089,900	749,957
2036	750,708			0.999	749,957	0

Year	CBAR Volume (Tons)	2000 FA Threshold	Intake Exceeding 2000 FA Threshold (Tons)	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)

Appendix B: Calculation of 2000 Intake Threshold

From the 2000 Landfill Franchise Agreement Section 8 (b):

"One year after the Effective Date of this Agreement, the tonnage volumes identified in Section 8 (a) above (600,000 tons for one calendar year and 1,200,000 tons for two consecutive calendar years) shall each be increased at an annual rate of the greater of the following two percentages: (i) two percent (2%); or (ii) the increase in total population of Benton, Linn, Polk, Lincoln, Tillamook and Marion Counties as reported by Portland State University, based upon the preceding calendar year."

Population data from Portland State University for the 2000-2019 period, with calculated Y/Y percentage increase:

Data from Portland State University Population Research Center 1/4/2023

https://drive.google.com/file/d/1g1ckFE8eSrLAkztbeqcA9GlEadKsY043/view?usp=sharing

https://www.pdx.edu/population-research/population-estimate-reports

For 2010 - 2019 data, figures from individual "Certified Population Estimates" tables are used

	April 1, 2000 Census	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BENTON	78,153	78,334	78,777	79,542	80,006	81,121	82,071	83,226	84,266	84,950	85,420	85,735	85,995	86,785	87,725	88,740	90,005	91,320	92,575	93,590	94,360
LINCOLN	44,479	44,519	44,880	45,069	45,509	45,048	45,193	45,447	45,697	45,921	46,045	46,135	46,155	46,295	46,560	46,890	47,225	47,735	47,960	48,210	48,260
LINN	103,069	103,393	104,397	105,441	106,885	108,879	110,223	111,867	113,481	114,890	116,114	116,840	117,340	118,035	118,665	119,705	120,860	122,315	124,010	125,575	126,550
MARION	284,834	285,571	287,676	289,757	294,188	296,268	299,484	303,545	307,481	310,807	313,643	315,900	318,150	320,495	322,880	326,150	329,770	333,950	339,200	344,035	347,760
POLK	62,380	62,679	64,647	65,132	66,317	67,902	69,256	70,891	72,361	73,726	74,911	75,495	75,965	76,625	77,065	77,735	78,570	79,730	81,000	82,100	82,940
TILLAMOOK	24,262	24,287	24,450	24,359	24,568	24,527	24,691	24,925	25,149	25,273	25,252	25,260	25,255	25,305	25,375	25,480	25,690	25,920	26,175	26,935	26,500
Total		598,783	604,828	609,300	617,473	623,746	630,919	639,901	648,434	655,567	661,385	665,365	668,860	673,540	678,270	684,700	692,120	700,970	710,920	720,445	726,370
Y/Y Incr. (%)			1.010	0.740	1.341	1.016	1.150	1.424	1.333	1.100	0.887	0.602	0.525	0.700	0.702	0.948	1.084	1.279	1.419	1.340	0.822

From the table above, the population of the specified area did not increase more than 2% Year over Year in any consecutive two-year interval in the CY2000-2019 period.

Therefore the mathematical value of the 2000 Intake Threshold defined in Section 8 of the 2000 Landfill Franchise Agreement is equal to the initial (CY2000) values of 600,000 tons per calendar year or 1,200,000 cumulative tons over any period of two consecutive calendar years, with each figure increased at a rate of 2% per calendar year. The calculated yearly values of the 2000 Intake Threshold are detailed in the table above.

Appendix C: Landfill Properties

Coffin Butte Landfill Properties					
	Tax Lot #	**Current Zone**	**Previous Zone (Change Date)**	**Property Use**	**Date Acquired and Ownership**
1	105130000901	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Agriculture	March 2001, Valley Landfills, Inc. Deed 295810-01
2	105130000900	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Agriculture, barn	March 2001, Valley Landfills, Inc. Deed 295810-01
3	105130000902	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Agriculture	March 2001, Valley Landfills, Inc. Deed 295810-01
4	105130001000	Landfill Site/ Forest Conservation (Northeast Corner)	Forest Conservation Forty Acre Minimum (FC-40) (1983)	Disposal Cell 1A, Cell 1, Cell 5, Future Cell 6, Current/Future Asbestos Disposal area, Rock quarry entrance and scale house (2021 SDP); Quarry excavation and landfilling in FC zone (2002)	October 1974, Valley Landfills, Inc. Deed M-50855 Consolidated with Tax Lot 105130000205 (4.69 ACRE) and Tax Lot 105130000204 (1.74 ACRE) in 1992
5	104180001106	Landfill Site	Forest Conservation Forty Acre Minimum (FC-40) (1983)	Disposal Cell 1, Cell 3	November 1994, Valley Landfill, Inc. Deed M-192291-94 Segregated Parcels 104180001108 (29.22 AC) & 104180001109 (51.39 AC) in 2011. Went from 100 acres to 20.15
6	104180000301	Landfill Site (South)/ Forest Conservation (North)	Forest Conservation Forty Acre Minimum	Disposal Cell 5 and forested hillside	March 1978, Valley Landfills, Inc. Deed M-91774 Segregated from 104180000300 in 1972

Coffin Butte Landfill Properties					
	Tax Lot #	**Current Zone**	**Previous Zone (Change Date)**	**Property Use**	**Date Acquired and Ownership**
			(FC-40) (1983)		
7	104180000801	Landfill Site/ Forest Conservation	Forest Conservation Forty Acre Minimum (FC-40) (1983)	Disposal Cell 2, Cell 3, Cell 4, Cell 5, Scale house, public disposal area, stormwater ponds, bioswale, Toretie Marsh (2021 SDP); landfilling in FC zone (2003); transfer facility, stormwater conveyance/detention, container/drop box storage area, landfill construction staging/storage area (2011)	July 1988, Valley Landfills, Inc Deed M-102558-88 Segregated from 104180000800 in 1988
8	104180001108	Landfill Site	Forest Conservation Forty Acre Minimum (FC-40) (1983)	Disposal Cell 4, Entrance, stormwater pond, Toretie Marsh (2021 SDP)	November 1994, Valley Landfill, Inc. Deed M-192291-94 Segregated from 104180001106 in 2011
9	104180000900	Forest Conservation	Agricultural and Forestry (AF) (1982)	Wetland, pond	July 1988, Valley Landfills, Inc. Deed 1988-101891 Segregated from 104180000800 in 1968
10	105130000800	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Stormwater treatment facility (pond and biofiltration strip) (2015), Soap Creek, Agriculture	February 1997, Valley Landfills, Inc Deed 1997-224922
11	104180001101	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	Construction staging/storage area, office (2013)	December 1991, Valley Landfills, Inc Deed 142396-91

Coffin Butte Landfill Properties					
	Tax Lot #	**Current Zone**	**Previous Zone (Change Date)**	**Property Use**	**Date Acquired and Ownership**
12	104180001104	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	Construction staging/storage area (2013)	January 1987, Valley Landfills Inc. Deed 1987-086356 Segregated from 104180001101 in 1969
13	104180001102	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	Vacant, non-forested land	March 1990, Valley Landfills, Inc Deed 123022-90
14	104180001107	Landfill Site	Forest Conservation Forty Acre Minimum (FC-40) (1983)	Leachate Maintenance facility/leachate ponds (2021 SDP)	August 1987, Valley Landfills, Inc. Deed 1987-092809 Segregated from 104180001100 in 1977
15	104180001200	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	2.2 Megawatt power generation facility (originally on lot 1100) (1994)	September 1986, Valley Landfills, Inc. Deed 1986-081011
16	104180001000	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	forest	March 1986, Valley Landfills, Inc. Deed 1986-077318 Segregated from 104180001100 in 1968
17	105240000200	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Agriculture, forest, creeks	December 1989, Valley Landfills, Inc Deed M-118414-89

Coffin Butte Landfill Properties					
	Tax Lot #	**Current Zone**	**Previous Zone (Change Date)**	**Property Use**	**Date Acquired and Ownership**
18	105240000103	Exclusive Farm Use	Agricultural and Forestry (AF) (1982)	Minor Land Partition 1980-017312; Formerly part of 105240000100	April 1988, Valley Landfill Inc. Deed 1988-099247 Segregated from 105240000100 in 1980
19	10419B001600	Rural Residential - 10	RR-10 Planned Unit Development (PUD)	Vacant residential Former subdivision/Planned Development BCS-78-5, LD-82-11, Tampico Ridge Subdivision vacated in 1988	December 1999, Valley Landfills, Inc. Deed 1999-276868 Segregated from 10419B000100/00200/01400 in 1988, Segregated from 10419B001601 in 1999
20*	104180000200	Forest Conservation		Forested land	01/07/1998, purchased by Peltier Real Estate Co Deed 239947-98 Taxes paid by Republic Services
21*	104180001105	Exclusive Farm Use		Agriculture	October 1982, purchased by Peltier Real Estate Co Deed 1982-041706 Taxes paid by Republic Services Property Tax
22*	10419B000300	Rural Residential - 10	RR-10	Vacant residential	09/07/1999, purchased by Peltier Real Estate Co Deed 277841-99 Taxes paid by Republic Services
23	10419B001301	Rural Residential - 10	RR-10	Vacated right-of-way Former subdivision/Planned Development BCS-78-5, LD-82-11, part of Tampico Ridge Subdivision vacated in 1988	September 1988, Valley Landfills Inc. Deed M-106768-88 Formerly part of 10419B000300

Appendix D: Climate change and other environmental activism/legislation

The potential of environmental activism, litigation, and legislation, especially as related to the climate crisis, is both significant and complex. This Appendix expands on the ideas presented in brief in Table X above.

Background: The Climate Crisis Imperative, and Methane

People all over the world are growing increasingly concerned about the threat the uncontrolled release of greenhouse gases poses to the ecosystems that human societies depend upon. Worldwide, militaries, businesses, governments at all levels, other organizations and the public at large have incorporated or are incorporating responses to this threat into their planning, a response that collectively comprises the "climate crisis."[7][8][9][10][11][12][13] Internationally, the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) took place from 6 to 20 November in 2022, and hosted more than 100 Heads of State and Governments and over 35,000 participants who engaged in high-level meetings and key negotiations regarding climate action. UN Secretary-General Antonio Guterres said that more needs to be done to drastically reduce emissions now. "The world still needs a giant leap on

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[7] Global Risks: The heat is on businesses to respond to climate change," World Economic Forum, January 2020. link

[8] "Climate change poses a range of financial and economic risks to households, communities and market across the United States… Climate change impacts threaten the stability of the US housing market." Nature Climate Change, "Unpriced climate risk and the potential consequences of overvaluation in US housing markets," Feb 2023. link

[9] "Tackling the Climate Crisis - The planet's changing climate has a significant effect on Defense Department missions, plans and installations. DOD is elevating climate change as a national security priority, integrating climate considerations into policies, strategies and partner engagements." US Department of Defense, Spotlight, January 26, 2023. link

[10] "President Biden's Executive Order 14057, collectively referred to as 'The Federal Sustainability Plan', outlines an ambitious path to prepare Federal agency policy, programs, operations, and infrastructure to adopt adaptive and resilient strategies for future climate impacts." Office of the Federal Chief Sustainability Officer, 2023. link

[11] "Oregon is already experiencing the effects of the changing climate and ocean… State government has a duty to our communities, businesses, and future generations not only to reduce emission of Green House Gases (GHGs), the primary cause of climate and ocean change, but to take action to address the impacts of change across all sectors… to take advantage of emerging opportunities and harness existing state resources to protect people and the environment." The 2021 Oregon Climate Adaption Framework. link

[12] "This page provides resources for climate change materials and information. It includes links to documents, reports, web sites, and resources from local, state, federal, academic, and non-profit organizations." Climate Change Resources, Oregon Department of Land Conservation and Development. link

[13] "Americans who think global warming is happening outnumber those who think it is not happening by a ratio of more than 4 to 1 (70% versus 16%)… One in ten Americans (10%) have considered moving to avoid the impacts of global warming." Yale Program on Climate Change Communication, "Change in the American Mind: Beliefs & APitudes, December 2022." link

climate ambition… we can and must win this battle for our lives." He urged the world not to relent "in the fight for climate justice and climate ambition."[14]

In the United States, this fight is focused on the release of methane, a potent greenhouse gas.[15]15 The US is one of the world's top 10 methane emitters, and methane emissions are a major contributor to climate change, "which is why President Biden is taking critical, commonsense steps at home to reduce methane across the economy." Last year the US announced that it was joining with more than 100 world governments to meet a Global Methane Pledge and reduce the world's methane emissions 30% from 2020 levels by 2030.[16] Humans produce the bulk of methane pollution, and atmospheric concentrations of methane have been trending upward for more than a decade,[17] with landfills contributing 17% of US pollution,[18] a figure which many experts say significantly underestimates landfill methane.[19] [20]

Through the 2021 Methane Emissions Reduction Plan, the US government is using all available tools – "commonsense regulations, catalytic financial incentives, transparency and disclosure of actionable data, and public and private partnerships – to identify and cost-effectively reduce methane emissions from all major sources." As part of this Plan, in a carrot-and-stick manner, the EPA has begun to both catalyze multi-pronged action against, and assess penalties for, the release of methane into the atmosphere. [21] The global monetized benefits for all market and nonmarket impacts are approximately $4300 per ton of methane reduced.[22]

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[14] United Nations: Climate Action. link

[15] "CO2 … has a Global Warming Potential (GWP) of one. Methane has a GWP of between 28 and 36 over 100 years, according to the EPA, meaning it is significantly more potent as a greenhouse gas than CO2. It gets worse. The GWP of methane gets even higher over shorter periods of time due to the gas' shorter life span. Over a period of 20 years, methane has a GWP of between 84 and 87. According to the Environmental Defense Fund, while CO2 lasts for longer than methane, methane 'sets the pace for warming' in the short term." "Methane Vs CO2: Which Is the Most Potent Greenhouse Gas As White House Unveils New Pledge," Newsweek, November 2021. link

[16] The White House, "Fact Sheet: President Biden Tackles Methane Emissions, Spurs Innovations, and Supports Sustainable Agriculture to Build a Clean Energy Economy and Create Jobs," November 2021. link

[17] "Methane Levels Hit New High, While the Cause of Rising Emissions Remains a Mystery," Yahoo News, February 2021. link

[18] Environmental Protection Agency, "Overview of Greenhouse Gases: Methane." link

[19] National Public Radio, "Your Trash Is EmiPing Methane In The Landfill. Here's Why It MaPers For The Climate," July 13, 2021 link

[20] "Existing measures to burn off the powerful greenhouse gas allow far more to slip by than had been believed, according to the paper published on Thursday in Science." "Study: Methane emissions may be five times higher than previously thought," The Hill, September 2022. link

[21] "Methane Emissions Reduction Program: The Next Step in the United States' Efforts to Tackle a Potent Greenhouse Gas," Covington, July 2022. link

[22] "Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions," United Nations Environment Programme and Climate and Clean Air Coalition, 2021. link

Relevance to Coffin Butte Landfill and its longevity

Landfills are major sources of methane, according to the EPA. Landfilling inherently creates methane as a natural byproduct of the decomposition of organic material in landfills. Landfill gas is composed of roughly 50 percent methane (the primary component of natural gas), 50 percent carbon dioxide (CO_2) and a small amount of non-methane organic compounds. Methane and carbon dioxide are odorless; "landfill smell" is from the trace non-methane organic compounds. [23]

For a more complete context of landfill emissions and their relative greenhouse gas impacts, Oregon's consumption-based greenhouse gas emissions in 2015 show that approximately "one percent of emissions stem from post-consumer disposal of wastes", leaving about 99% of the consumption-based greenhouse gas emissions resulting from "upstream" consumption of materials in Oregon, including production and supply chain, transportation, wholesale and retail, and use life-cycle phases.[24]

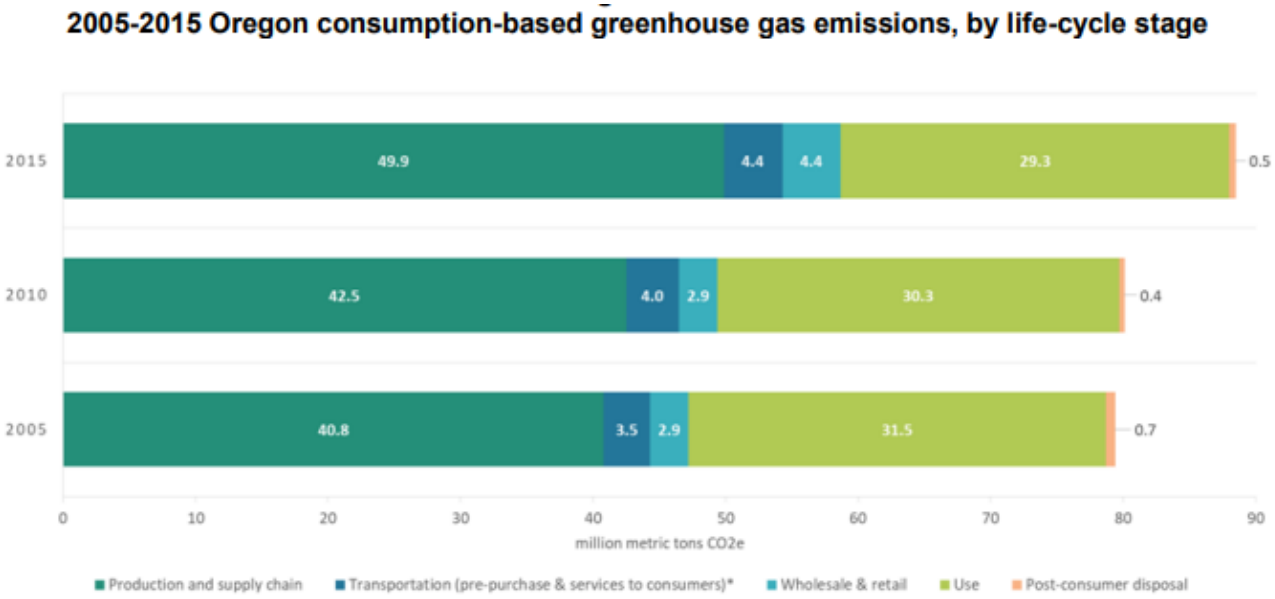
For a more complete context of Oregon landfill emissions, "Since 1990, [sector-based] statewide emissions from waste have increased from 1.7 million MTCO2e to 2.3 million MTCO2e. Additionally, while statewide emissions decreased from 2005 through 2011, emissions from waste increased during the same time period. The majority of emissions from waste are fugitive methane emissions from municipal solid waste landfills in Oregon." Oregon's consumption based greenhouse gas emissions for waste (post-consumer disposal) in 2015 are estimated at 500,000 MTCO2e. Sector-based emissions are those produced in Oregon; consumption-based emissions are those produced around the world due to Oregon's consumption of energy, goods and services.[25]

[23] Environmental Protection Agency, "Basic Information about Landfill Gas." link

[24] Oregon's consumption-based greenhouse gas emissions in 2015. Post-consumer disposal = 0.5 million MTCO2e. Total Oregon consumption-based GHG emissions = 88.7 million MTCO2e.

[25] "Oregon's Greenhouse Gas Emissions through 2015: An assessment of Oregon's sector-based and consumption-based greenhouse gas emissions," May 2018. link

Figure 17



It's known that Coffin Butte Landfill has greenhouse gas emissions, but to date they have not been well-characterized by Republic Services or by Benton County. The US Environmental Protection Agency estimates that Coffin Butte Landfill's methane collection system converts 57% of its methane to CO2, which is relatively inefficient as compared to other Oregon landfills such as Columbia Ridge (85%) and Dry Creek (80%).[26]

Changes to the Landfill's emissions status in the near future

In the past methane pollution has been difficult to quantify. For landfills, historically the EPA has relied on theoretical calculations to estimate pollution, but these mathematical models by definition produce estimates, not exact data - useful at a national level but less so at a per landfill level. In response, other organizations have engineered their own models that are more useful for assessing emissions at a particular landfill. In recent years, focus has shifted to better direct measurement technologies for more accurate and transparent emissions reporting.[27]26

Using area measurement tools deployed on satellites, aircraft, and towers, the Environmental Defense Fund has shown that landfill outputs are generally higher than EPA calculations indicate. Carbon-Mapper, a joint public-private enterprise, focuses on identifying superemi tters, because a previous flyover project across California discovered that only 1% of sites

[26] "Emission Data for the Designated Pollutants," Oregon Amended State Plan to Implement Emissions Guidelines for Municipal Solid Waste Landfills, Oregon Department of Environmental Quality, August 1, 2019.

[27] "Methane menace: Aerial survey spots 'super-emiPer' landfills," Reuters, June 2021 link

produced 50% of methane emissions, and the largest emissions were from landfills.[28] Carbon-Mapper plans to launch two satellites in 2023, building to a suite of 20 satellites eventually; these will join other systems such as Kayrros, a French company, GHGSat, a Canadian company, and MethaneSAT, a subsidiary of the EDF.[29]

These developments all signal a changed operating environment for Coffin Butte Landfill, one in which its greenhouse gas emissions move from being unknown and unexamined to being an open number impacting business competitiveness, waste flows, operating costs, regulatory fines, corporate investment levels, public action, and more.[30] Coffin Butte Landfill may be a particular target, because its wet environment converts waste to methane quickly.

It's important to note that landfill methane poses a lesser-of-evils situation. The best-case environmental outcome for methane, once it is generated from municipal solid waste, is for it to oxidize into carbon dioxide, i.e., for it to transition from a quick-acting high-impact greenhouse gas into a slower-acting, durable greenhouse gas. Methane is not "destroyed" nor does it become carbon neutral. Therefore, the best way to mitigate landfill methane is never to create it in the first place, i.e., to divert waste, especially organic waste, from ever entering a landfill. This is a fundamental logic at work with landfill methane now and into the future.[31]

Climate Crisis Legislation

The US focus on methane reduction for landfilling began manifesting in January 2023, with the signing of the Food Donation Improvement Act. America wastes about 30-40% of its food, and food waste is the most common material found in landfills, estimated at roughly a quarter of material. When landfilled, food waste converts readily to methane. The bipartisan Act offers benefits beyond methane reduction, which is typical when initiatives target waste. [32] [33]

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[28] "Fugitive Methane Worsens Warming: New Assessments Point To Urgent Oil And Gas Fix," Forbes, August 2021. link

[29] "With landfill methane in the climate spotlight, satellite and flyover measurements aPract a following," Waste Dive, November 2021 link

[30] "US waste and recycling sector faces mounting risks and opportunities from climate change," Waste Dive, November 2020. link

[31] "The first priority for landfills continues to be avoiding landfilling materials altogether," the CARB spokesperson said, "which provides the most direct path for reducing landfill methane emissions." "With landfill methane in the climate spotlight, satellite and flyover measurements aPract a following," Waste Dive, November 2021. link

[32] "Here's Why Congress Should Pass The Food Donation Improvement Act," Forbes, March 2022. link

[33] "Reducing food waste seems to be one of those areas that is a win-win situation. No one is benefiting when we throw food away. The production of food itself causes emissions, and when the food goes to the

The Inflation Reduction Act of 2023 imposed methane-corrective measures on the oil/gas industry. These measures are focusing on incentives to prevent methane from being emitted but include penalties for methane pollution. These penalties are being eased in over a four-year period, and establish a rate for methane pollution: $1550 per metric ton in 2022 dollars.[34]

It's possible that similar methane-corrective measures will be imposed upon the landfill industry, as a next development in the US 2021 Methane Emissions Reduction Plan. Such a development would be in accord with the stated goals of the US government, its commitments to climate action to the world, and goals and provisions already in place with the US 2021 Methane Emissions Reduction Plan.

In general, the effect of this carrot + stick scenario on Coffin Butte Landfill's operating life may be to lengthen it. The incentives may attract recyclers and other entities to target the high organic sector of the landfill's intake (about a quarter of total intake mass) for diversion away from the landfill, and the penalties may bring the landfill operator into alignment with this diversion (despite the concurrent reduction of profit). This change in wasteflow may create knock-on opportunities to create circular economies for other types of waste, motivated by environmental concerns, economic efficiencies, and other reasons. The likelihood of these eventualities depend upon the actual methane output of the landfill, which is currently undocumented.

Climate Crisis Legal and Shareholder Action

As part of the climate crisis, environmentally engaged citizens and environmental organizations are suing governmental agencies (and investors are suing corporations) for failing to act on the climate crisis[35]. As with climate crisis legislation, these lawsuits may compel action to reduce emissions of greenhouse gases, which in turn may boost efforts to divert material, especially food and other high organic waste, from being landfilled at Coffin Butte Landfill. These lawsuits have the potential to occur across the landfill's service area. As with climate crisis legislation, the effect would be to reduce waste inflow into the landfill and thus lengthen its operating life.

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landfill, it's a huge emiPer of methane. So that's not good on either end of it." The Harvard GazePe, "How food donations can help fight hunger and climate change," August 2021. link

[34] "Inflation Reduction Act Adds First-time Charge for Methane Emissions for the Oil and Gas Sector," O'Melveny, August 2022. link

[35] "Growing numbers of customers and investors are insisting that all industries − waste included − record greenhouse gas emissions and shrink their carbon footprints. In a relatively short period, considering how a company may be exacerbating the effects of climate change morphed from a peripheral concern for investors to a mainstream inquiry." "Renewed focus on landfill calculations as waste industry faces pressure to reduce emissions," Waste Dive, March 2021. link

A. Climate Crisis Environmental Activism

As part of the climate crisis, environmental activists accelerate their efforts, and act as an across-the- board accelerant and forcer for all the environmentally motivated changes being discussed in this Appendix.

The effects of environmental activism on the operating life of Coffin Butte Landfill have been mixed. Environmental activism has already caused the single most impactful event on the operating life of Coffin Butte Landfill in its recent history: as described elsewhere in this report, activists were instrumental in stopping the expansion of the Riverbend Landfill in Yamhill County, which enabled Republic Services to increase trash intake at Coffin Butte Landfill by over 50% beginning in 2017. Other activism focused on pollution other than that at Coffin Butte Landfill may have similar effects that shorten the landfill's operating life. Activism focused on trash reduction or on the landfill itself may extend the landfill's life, if they act to reduce waste flows into the landfill.

No Counterreasoning or Counterevidence Presented

No lines of reasoning or evidence were presented in subcommittee in answer to the lines of reasoning and evidence outlined in this Appendix. No arguments or evidence were brought forward to establish that Coffin Butte Landfill would not be subject to climate crisis-related advances in measuring technology, waste diversion technologies and policies, and legislation, legal and shareholder action, and activism, and that these developments would not have effects on the operating life of the Landfill.

Conclusion

In recent years society and its structures have begun to take action on the climate crisis, due to the threat that greenhouse gases pose to natural and social systems. Responses to the climate crisis focus mainly on curtailing the release of greenhouse gases, but also include mitigating or adapting to the emerging effects of climate change. Efforts to curtail the release of greenhouse gases pay special attention to methane, because this pollutant has fast-acting effects. Landfills such as Coffin Butte are known to be major emitters of methane, and some recent studies indicate that US landfills release significantly more methane than had been previously characterized by EPA estimates. The methane emission level of Coffin Butte Landfill has not been well-characterized. DEQ estimates emissions from disposal of waste to be <1%-2.6% of total emissions.

New technologies that measure methane emissions directly (rather than estimate them using mathematical modeling) have been developed and are being deployed worldwide, on satellites, aircraft, and overlook towers. The operating environment of Coffin Butte Landfill is likely to change as its greenhouse gas emissions become well-characterized, subjecting the landfill to

competitive pressure, regulatory fines, shifts in corporate strategy, public action, and other effects. Coffin Butte Landfill's wet environment is known to convert waste to methane quickly, so these changes may decrease waste inflows and thus lengthen the operating life of the landfill.

The most effective way to curtail a landfill's greenhouse gas emissions is to divert organic material from being landfilled. Landfill gas collection systems lessen the greenhouse gas impact but do not remediate it, because they do not collect all of the methane generated by a landfill; they do not completely combust the methane that is collected; they generate carbon dioxide, a greenhouse gas, when they combust methane; and half of landfill gas is carbon dioxide, which gas collection systems release into the atmosphere. In 2019 the EPA estimated that Coffin Butte Landfill's gas collection system operates at 57% efficiency.

The impetus to curtail methane emissions is focusing attention on ways to divert organic waste from landfill wastestreams. In the US, the Food Donation Improvement Act enables existing food donation organizations to expand operations dramatically, and incentivizes the creation of new methods and innovations in preventing food waste. The 2021 Methane Emissions Reduction Plan catalyzes and incentivizes ways to identify and cost-effectively reduce methane emissions from all major sources. The 2023 Inflation Reduction Act of 2023 focuses on incentives to prevent methane from being emitted, but included the rollout of penalties for methane pollution in the oil/gas industry, which could extend in time to the waste industry in some form. These emerging legislative drivers go hand in hand with emerging litigation, shareholder action, and activism over environmental protection, all of which have the potential to affect significantly how landfilling will be done in the future.

The baseline scenarios laid out elsewhere in this report assume that landfilling will continue as normal for the next 16 years. That expectation should be tempered by the signals that environmental considerations, especially those related to the climate crisis, are emerging as a major factor that will reshape the social and legal landscape that Coffin Butte Landfill is in. This reshaping is something that Benton County can participate in, on behalf of its citizens. This is something the County should be aware of and prepare for, in current actions and in concert with its Sustainable Materials Management Plan, as the reshaping includes significant opportunities for the County and affiliated organizations to bring their waste management more in line with the County's stated goals and values.