

Appendix C.1: Subcommittee Reports: Landfill Size/Capacity/Longevity



**Benton  
County**  
OREGON

**Landfill Size/Capacity/Longevity**

**A.1. Subcommittee**

DRAFT 1-25-23

## Table of Contents

0	Table of Findings.....	5
1	Table of Recommendations .....	9
2	Section 0: Background .....	10
	A. Charge.....	10
	i. <b>Workgroup charter and bylaws 8-23-2022</b> .....	10
	<b>Subcommittee A.1 charge</b> .....	10
	<b>Common Terms</b> .....	11
	B. Membership Composition.....	12
	C. Document Organization .....	12
3	Section 1: Landfill Size .....	14
	D. Physical Real Estate Footprint .....	14
	i. <b>History</b> .....	14
	<b>Images</b> .....	15
	ii. <b>Images</b> .....	15
	iii. <b>Current footprint</b> .....	21
	E. Permitted Disposal Capacity .....	24
	iv. <b>Historical permitted capacity benchmarks</b> .....	24
	v. <b>Capacity utilization 2001 – 2021</b> .....	25
	<b>Near-term (circa 2025) capacity adjustments for 5-year operating plan</b> .....	27
	F. Intake Volume.....	27
	i. <b>2000 and 2020 Landfill Franchise Agreement Intake Thresholds Limits</b> .....	27
	<b>Recent intake volume: 1993 – 2021</b> .....	30
	ii.....	30
	iii. <b>Comments/discussion:</b> .....	30
	iv. <b>Intake volume by source 2016 – 2021</b> .....	35
	<b>Long-term intake volume TBD – 2021</b> .....	38
	G. Landfill Structure.....	38
	vi. <b>Overview</b> .....	38
	vii. <b>Cell detail</b> .....	38
4	Section 2: Specific Locations .....	43

A.	1983 Rezoning Action .....	43
B.	West and East Triangle Additions .....	45
H.	Cell 6 (Quarry) Addition .....	46
I.	LS Zone Parcel South of Coffin Butte Road .....	46
5	Section 3: Landfill Life Projections .....	49
A.	Waste in Place: Projection to End 2022 .....	49
B.	Historical Landfill Life Projections .....	49
C.	Nominal Life Projection CY 2023 to End of Life .....	51
D.	Events and Factors with Potential Lifetime Impact.....	58
viii.	<b>Factors Impacting Amount of space available (airspace)</b> .....	61
ix.	<b>Factors Impacting Amount waste is accepted (tonnage)</b> .....	62
C.	Additional Events and Factors with Potential Lifetime Impact .....	69
<b>Landfill contracts and business choices</b> .....	70	
<b>Lifestyle changes</b> .....	70	
<b>Quarry excavation schedule</b> .....	70	
<b>Water table concerns and regulation</b> .....	71	
<b>Area wildfires, floods, earthquakes and other disasters</b> .....	71	
<b>Impacts to other disposal facilities</b> .....	71	
<b>Impacts to the waste recovery system</b> .....	72	
<b>Population growth/Change</b> .....	72	
<b>Localized fires, floods, spills and other disasters</b> .....	72	
<b>Landfill fire</b> .....	72	
<b>Landfill expansion – removal of tonnage cap</b> .....	73	
<b>Successful competition from other disposal facilities</b> .....	73	
<b>Improvements to the waste recovery system / alternatives to landfilling</b> .....	74	
<b>Reductions in waste generation</b> .....	74	
<b>Recessions</b> .....	75	
<b>Materials transportation</b> .....	75	
<b>The climate crisis</b> .....	75	
<b>Pandemics</b> .....	76	
<b>Selected scenario expanded views</b> .....	77	
<b>“What-If” Scenarios About Landfill Operating Life</b> .....	78	

6 Section 4: Human Factors Affecting Landfill Size/Capacity/ Longevity – Ken Eklund..... 96

7 Appendix A: Intake Volume and Capacity Data..... 106

8 Appendix B: Capacity Data and Site Life Projections..... 109

9 Appendix C: Landfill Properties..... 116



## 0 Table of Findings

[LSCL-F-1](#): 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 included in this action restricted “fill” activity to the north side of Coffin Butte Road.

[LSCL-F-2](#): The landfill has changed visually over time.

[LSCL-F-3](#): ~~23 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), 23 tax lots associated with the landfill. Five tax lots include landfill cell disposal area. The most recent tax lots associated with the landfill were purchased in 2001 (non-disposal areas).~~

[LSCL-F-4](#): Landfill total capacity increased by approximately 9,000,000 yd<sup>3</sup> (68.5%) in 2003 with the addition of the West and East triangle areas. The addition of Cell 6 (in TBD) added approximately 13,400,000 yd<sup>3</sup>, for a total of approximately 35,500,000 yd<sup>3</sup>.

[LSCL-F-5](#): Reported remaining airspace increased by over 6,000,000 Cubic Yards between 2003 and 2004. 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.

[LSCL-F-6](#): The 2000 Landfill Franchise Agreement allows for exceedances over the listed tonnage threshold.

[LSCL-F-7](#): The 2020 Landfill Franchise Agreement does not allow for exceedances over the listed tonnage threshold (described as a “Limit on Solid Waste”, which the landfill “shall not exceed”), not applying to fire, flood, natural disaster, or Force Majeure event materials.

[LSCL-F-8](#): Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement acknowledge the potential for “adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill.”

[LSCL-F-9](#): Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement define landfill solid waste intake limits thresholds immediately following and in the same document section as the acknowledgement of the potential for adverse effects.

[LSCL-F-10](#): In an official 2018 presentation to Benton County Board of Commissioners, Benton County represented the 2000 Franchise Agreement intake limits 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 allows for exceedances over the listed threshold.

[LSCL-F-11](#): The intake [limits](#) thresholds defined in both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement were instantiated as contractual provisions, with negative consequences explicitly defined in the 2000 agreement and implicit (violation of contract) consequences in the 2020 agreement.

[LSCL-F-12](#): 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-13](#): Representatives of the franchisee have indicated that the approximately 70% year-over-year increase in CY2016-2017 was primarily due to redirected flow from Riverbend to Coffin Butte. 2017-2019 volume increases are primarily due to the diversion of waste from Riverbend Landfill and rapid population growth in Willamette Valley and Western Oregon (the population of the 6-county area defined in the 2000 Landfill Franchise Agreement grew 3.6% total in the period 2016-2017).

[LSCL-F-14](#): The 2000 Landfill Franchise Agreement imposed a ramping intake [limits](#) threshold to be applied during the term of the agreement (CY2001-2019), giving the County the option to perform an updated impact assessment if the threshold was exceeded, denoted in the chart by the blue line ("Threshold to update Baseline Study"), which then could result in increases to the landfill fees paid to the county. The County did not perform an updated impact assessment as a result of the 2017-2019 tonnage threshold exceedances.

[LSCL-F-15](#): Due to an expected additional influx of volume in 2017 resulting from the disruption onset of the closure process for Riverbend landfill in Yamhill County, in December 2016 the franchisee and Benton County executed a MOU acknowledging an expected increase in Coffin Butte intake volume "for a term of 1-2 years."

[LSCL-F-16](#): The 2020 Landfill Franchise Agreement states that the total tonnage deposited at the Landfill shall not exceed 1.1M tons per calendar year until "application to expand the Landfill on to the Expansion Parcel are granted (following any and all appeals to final judgement)." The 2020 intake limit is denoted in the chart by the dashed red line ("2020 FA Limit.")

[LSCL-F-17](#): 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-18](#): 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-19](#): The 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-20](#): The 2016 MOU does not contain language preventing Benton County from exercising its rights under the 2000 Landfill Franchise Agreement in the event of violations of the intake limit.

[LSCL-F-21](#): The annual Coffin Butte intake tonnage exceeded the [limits](#) threshold defined in the 2000 Landfill Franchise Agreement as the tonnage [limits](#) threshold at which the County had the option to perform an updated baseline analysis of landfill impacts in calendar years 2017, 2018, and 2019.

[LSCL-F-22](#): Benton County did not perform an updated baseline analysis of landfill impacts as the result of the exceeded intake limit that occurred in 2017, 2018 and 2019. Specifically, the County was allowed to reassess infrastructure and environmental impacts relative to a baseline established in 2001, and, if adverse impact was found, to force a renegotiation of the Franchise Fee and/or Host Fee.

[LSCL-F-23](#): 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-24](#): 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-25](#): Due to an expected additional influx of tonnage in 2017 (approximately 70% year-over-year increase in CY2016-2017 was partially due to redirected flow from Riverbend to Coffin Butte (approximately 70% year-over-year increase in CY2016-2017 was due to redirected flow from Riverbend to Coffin Butte), in December 2016 the franchisee and Benton County executed a MOU agreeing to an expected increase in Coffin Butte intake volume “for a term of 1-2 years.” 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. The decreased intake volume in 2020 is attributed to the Covid-19 outbreak.

[LSCL-F-26](#): Washington County waste tonnage accepted at the landfill increased by over 400% between 2016-2017, with the increased tonnage continuing through 2019.

[LSCL-F-27](#): Map of the landfill shows current and planned cells (G-03)

[LSCL-F-28](#): 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. Of these 266 acres, 194 acres, all on the north side of Coffin Butte Road, were approved for waste disposal.

[LSCL-F-29](#): 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-30](#): 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.

The process for approving landfill south of Coffin Butte Road was subsequently changed to “allowed by conditional use permit” apparently via Ord. 90-0069 (BCC 77.305)

[LSCL-F-31](#): Current (1Q2023) estimate for landfill EOL = CY 2037 – 2039 based on an annual intake level of 1.0 – 1.1 MTons/year and a density of 0.999 Tons/yd<sup>3</sup>, assuming the quarry area will be fully excavated by the time the current disposal areas are full.

[LSCL-F-32](#): The quarry dynamics are construction of the needed cells for future disposal areas. The herculean construction task is to excavate basalt rock to form the excavated design dimensions for construction of future disposal cells. The assumption is that the excavated rock and the construction of future cells keep pace with the demands of increased volumes of refuse needed for disposal without interruption.

[LSCL-F-33](#): The complexities of demand and availability of refuse disposal is the crux of the puzzle to provide a viable sustainable material management process under consideration.

## 1 Table of Recommendations

[LSCL-R-1](#): Investigate the extent to which increased landfill revenue may have influenced Benton County's decision not to pursue contractual remedies for the 2017-2019 intake ~~limits~~ threshold exceedances ~~limit violations~~. See "Economics" charge of the Workgroup Charter and Bylaws.

[LSCL-R-2](#): The Sustainable Materials Management Plan should further develop scenarios and factors that may impact the landfill lifespan, including detailed analyses of likely projections.

## 2 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

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 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 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 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 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** is a regional disposal site and an **engineered sanitary landfill** in Benton County, north of Corvallis, located off ~~of~~ Coffin Butte Road. **In progress: Verify that this language applies to cells 1 and 1a.**

[Need definition of Airspace.](#)

[Need definition of Permitted Space](#)

[Limit<sup>1</sup>: "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<sup>2</sup>: "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"."](#)

**Commented [RD1]:** Does this qualify to cells 1 and 1a? Or cells that are unlined?

**Commented [PN2]:** I think both Republic and Benton Co. should provide their definitions here and we discuss/resolve.

**Commented [RD3]:** Definition of Limit and Threshold added by Daniel, using Oxford Languages definitions via Google.

<sup>1</sup> [Definition from Oxford Languages via Google](#)

<sup>2</sup> [Definition from Oxford Languages via Google](#)

## 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 ~~SWAC: 3-4~~ 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))
- ~~4. Private citizens: 1 member (Paul Nietfeld)~~

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.

**Commented [PN4]:** Remove this section

### 3 Section 1: Landfill Size

#### D. Physical Real Estate Footprint

~~i. Other topics required in addition to those noted below?~~

#### ii. 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.

~~necessarily~~ 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)~~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. (Language source? In progress).
- Total acreage owned by landfill franchisee unstated~~unstated~~.

~~Include: snapshots of footprint over time and a table of landfill property area over time.~~

~~DANIEL: Do you have any historical data on this?~~

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

#### Key Finding

**LSCL-F-1.** 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 included in this action restricted “fill” activity to the north side of Coffin Butte Road.

**A.1 Finding 1:** *The 1983 rezoning action defined 194 acres as Landfill Size (LS) zone, including a “56-acre” parcel south of Coffin Butte Road. The site map included in this action restricted “fill” activity to the north side of Coffin Butte Road.*

**Commented [PN5]:** Daniel: What is the source for this language? The 1983 rezoning Staff Report appears to state “...no additional landfill activities unless approved by the Planning Commission at a public hearing.”

**Commented [RD6R5]:** Chapter 77.305

**Commented [RG7]:** Since 1983, the total acreage of the permitted landfill site has remained largely unchanged.

**Commented [RD8R7]:** Added

**Commented [YM9]:** Any progress on this? Again, it is important to go back in time before 1974.

**Commented [RD10R9]:** I don't have any pre-1974 data on footprint/acreage.

Images

ii. Images

*Figure 1: Reported circa 1941 aerial view of Coffin Butte area, before Camp Adair.*

Figure 1: Reported circa 1941 aerial view of Coffin Butte area, before Camp Adair.



Commented [RD11]: Perhaps use google earth to compare similar perspectives in next draft.

Commented [RD12R11]: Done, added several aerial images provided by Paul.

Commented [13]: These images are good for historical context and should be retained.

Figure 2: Wide aerial view dated 6-10-63 (1963). Pond on south side of Coffin Butte was a result of military quarry operation.



Figure 3: Reported 1978 image of vehicles in line at the landfill.





Figure 4: 2008 aerial view, from the 2008 Coffin Butte Landfill Annual Report, Republic Services, Inc.

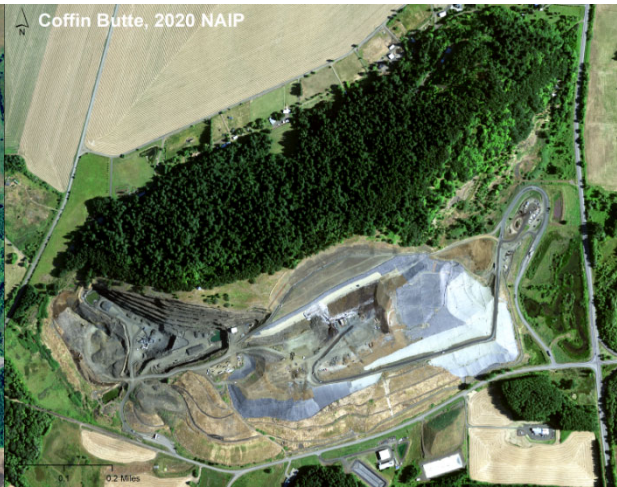
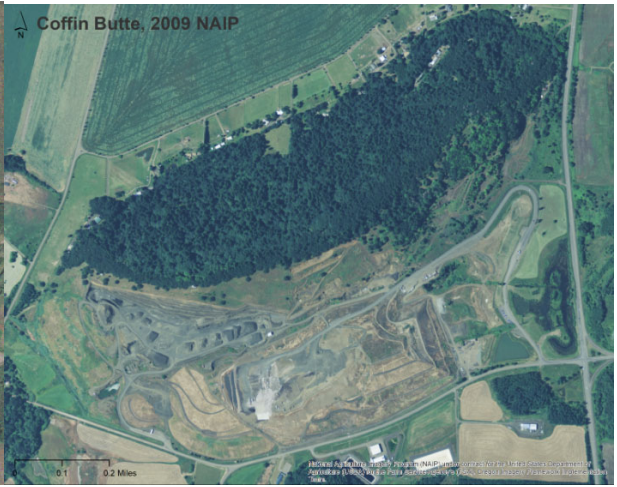


Aerial image from Fall 2022. Figure 5  
Aerial image from Fall 2022. Figure 5

**Commented [PN14]:** Daniel: please insert this image. I can resend if needed.









**Key Finding**

LSCL-F-2. The landfill has changed visually over time.

**iii. 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.

*Summary of current configuration (total footprint and breakdown by zoning type (acres), specific taxlots with zoning designations, working area of active landfill ("working face" area) to address historic limitations on this parameter (e.g. 1983 CUP: "not exceed 2 acres during the periods of October 15 to June 1 and to not exceed 3/4 of an acre during all other periods periods.").*

Figure 6: Properties associated with the landfill, numbered in coordination with the table in Appendix C, and color-coded by zoning.

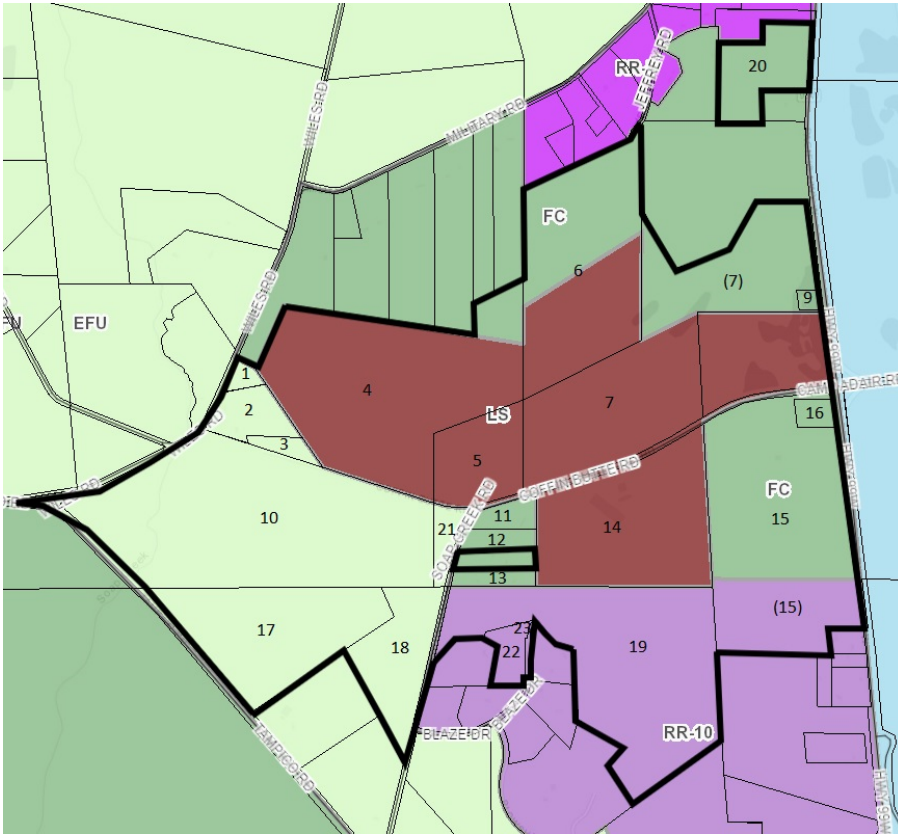
**Commented [RG15]:**  
I believe we had discussed removing this clause on a previous call. This was a DEQ permit requirement from 1983 that called out the maximum area that could be left uncovered each day. We use daily cover now and don't leave anything uncovered

**Commented [RD16R15]:** Added strikethrough, for group discussion.

**Commented [RD17R15]:** Can the group resolve this by adding the 1983 CUP details with context, and explaining how DEQ regulations have changed since, and how the operator currently uses daily cover now and don't leave anything uncovered? Perhaps referencing CUP subcommittee work on the topic.

**Commented [KE18]:**  
But that could change, right? I think the purpose for the text here is to characterize what is required, so the clause should stay

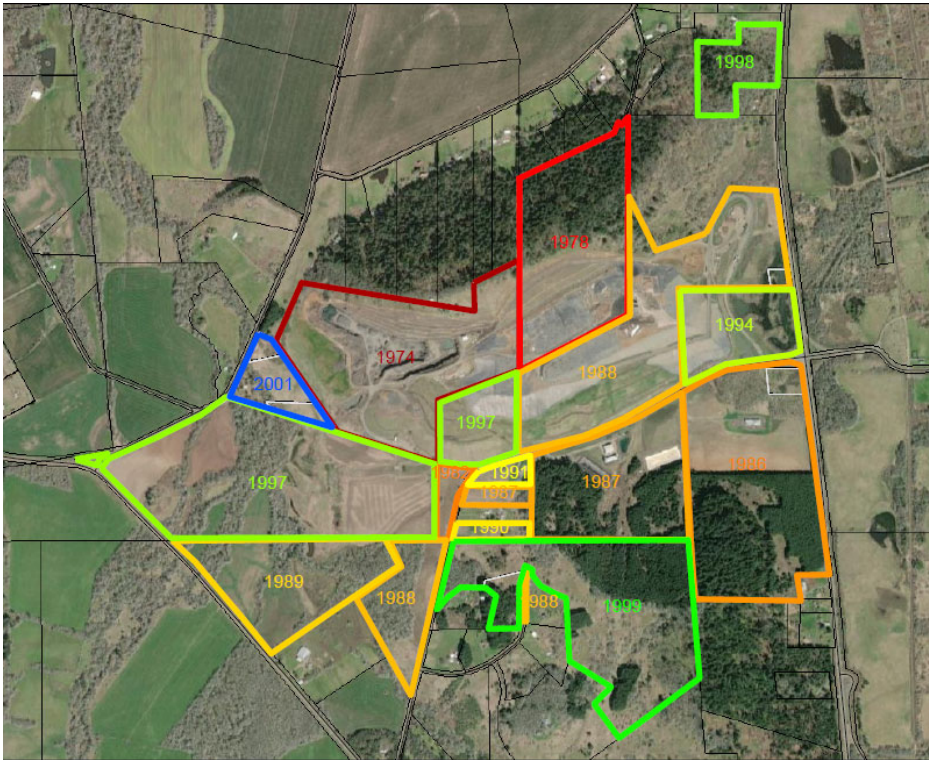
**Figure 2: Properties associated with the landfill, numbered in coordination with the table in Appendix C, and color-coded by zoning.**



**Figure 7: Property map, with years each property was purchased by a landfill-affiliated organization**

**Commented [RD19]:** Ian mentioned that these dates should be updated for properties zoned LS, which were likely purchased prior to 1983.

**Figure 3: Property map, with years each property was purchased by a landfill-affiliated organization**



Updating tax lot dates purchased on map. In progress. Dates should be updated for properties zoned LS, which were likely purchased prior to 1983.

**Key Finding**

LSCL-F-3. 23 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).

~~A.1 Finding 2: 23 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).~~

E. Permitted Disposal Capacity

iv. **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 demonstrate the growth of the expected/planned landfill size over time.

Table 1: Historical Capacity Values

Table 1: Historical Capacity Values

Date	Total Capacity (yd <sup>3</sup> )	Notes
1983	13,134,000	Capacities defined in the 2003 Site Development Plan for the cells ultimately located on the fill areas shown in <b>Error! Reference source not found.</b> areas (Cells 2-5)
2003	22,134,000	Addition of West and East triangles (3,400,000 yd <sup>3</sup> and 5,600,000 yd <sup>3</sup> respectively); calculated from 2003 Site Development plan 1999 cell volume figures
?	35,531,000	With Cell 6, estimated at 13,397,000 yd <sup>3</sup>
1995/1995	18,000,000/18,000,000	1995 Annual Report, estimated total capacity of Cells 1-5/5
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 <sup>3</sup>
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

Table 2: Historical Capacity Values

To include historical lifespan projections and anticipated closure dates, instead of permitted capacity. Consult DEQ permit documents. In progress.

**Commented [RD20]:** It is unclear what capacity information is included in these Site Development Plan (SDP) snapshots of data, and it might not be helpful to compare these as "benchmarks" from year-to-year. The annual reports probably have the most helpful total capacity data available, while the SDP capacity information seems to only relate to the volumes associated with planned development at that point in time.

**Commented [RD21R20]:** Suggestion from the group to use historical lifespan projections documented over time, instead of permitted capacity, due to lack of information/data available on permitted capacity prior to 2004.

**Commented [RD22]:** Consult DEQ permit documents.

**Commented [PN23]:** If Republic Services would like to include Cell 1 volume for completeness, please supply the volume figure for that cell.

**Commented [PN24]:** Still looking for date and instrument granting formal county approval of Cell 6 permitted space

**Commented [PN25]:** Daniel: when was the addition of Cell 6 formally approved by the county?

**Commented [RD26R25]:** Daniel will look in to this. Ian said it was approved via 1983 site zoning. 1994 expansion application can be confusing.

**Commented [RD27R25]:** Cell 6 development plans may still need to be approved by the Planning Official. Daniel is researching further.

**Commented [RG28]:** Per Ian Macnab: Need clarity on where this number came from? "I can't find anything regarding the 1995 number. I only can find annual reports going back to 2003 and the annual reports only started listing total capacity in 2004."

**Commented [RD29R28]:** This number came from a set SWAC minutes attached to the 1995 annual report (generated by Benton County Staff), where Valley Landfills included 18,000,000 tons as a line in a chart, referenced as total site capacity (not permitted/planned capacity).

**Commented [RD30]:** This 18,000,000 referenced is reported as tons in the graph in SWAC Minutes attached (A-3) to the 1995 report, not cubic yards. That graph is also not fully detailed in the annual report, and the 18,000,000 is referred to as "capacity of total landfill area" as a disti... [2]

**Commented [RD31R30]:** From Mark Yeager: We need to get more info here regarding the history of the permitted capacity - this makes it look like the permitted space h... [1]

**Commented [RD32]:** Perhaps use anticipated closure dates over time

**Commented [RG33]:** We need to reconcile the numbers in this chart. The annual report in 2004 lists total capacity as 39,594,002.

**Commented [PN34]:** See table in Section 3.B. Is this table adequate to address this concern?

*Discuss at this point theoretical Cell 6 volume vs. currently available vs. likely scenario? Ian provided guidance recently; is this still valid?*

**DANIEL:** *Do you have other datapoints that should be included in the table above?*

**Key Finding**

**LSCL-F-4.** Landfill total capacity increased by approximately 9,000,000 yd<sup>3</sup> (68.5%) in 2003 with the addition of the West and East triangle areas. The addition of Cell 6 (in TBD) added approximately 13,400,000 yd<sup>3</sup>, for a total of approximately 35,500,000 yd<sup>3</sup>.

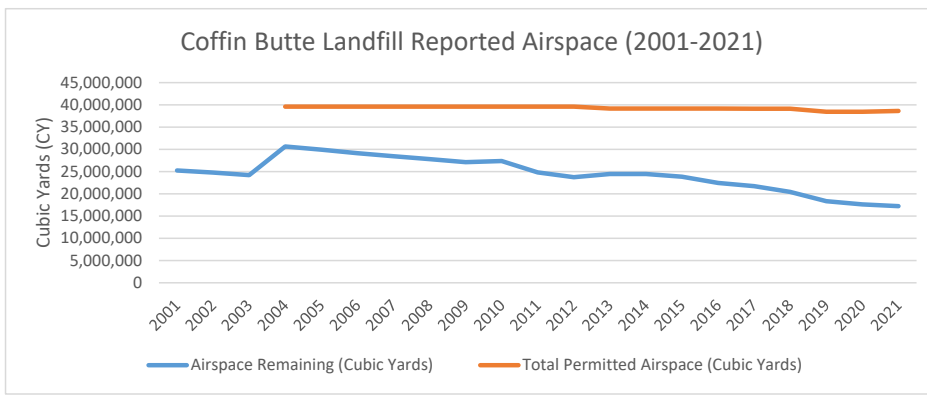
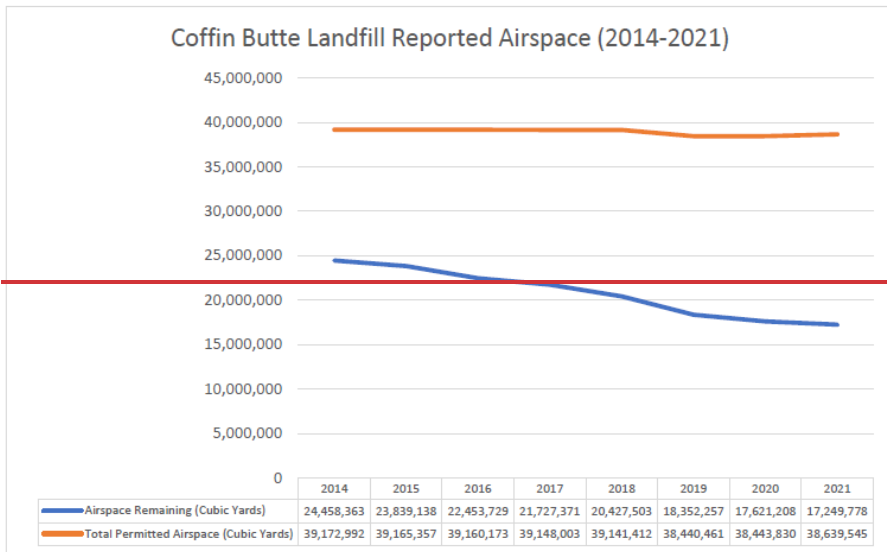
**v. Capacity utilization ~~TBD~~ 2001 – 2021**

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

**Commented [YM35]:** I agree that more data points are needed here to put the landfill history and growth in perspective.

A plot of available/used capacity over time may be a useful reference. See Daniel's Reported Airspace (2014-2021) plot as an example:



**Key Finding**

LSCL-F-5. Reported remaining airspace increased by over 6,000,000 Cubic Yards between 2003 and 2004. 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.

Figure 1

Note that as of end 2021 approximately 44% of permitted capacity remained unused.

Near-term (circa 2025) capacity adjustments for 5-year operating plan issue: the "Quarry Problem"

Provide simple overview of Cell 5 -> Cell 6 transition issue in terms that can be understood by the general public. State that as of the time of this report (Q4 2022) potential solutions are being explored? Note this as the driving factor in landfill's prior conditional use permit application to expand, LU21-1047, which the Planning Commission denied, and the applicant's appeal was withdrawn in March 2022?

REPUBLIC SERVICES: guidance/input on phrasing and/or extent to which this should be flagged as an issue.

Republic Services is currently in discussion with both Knife River and Benton County regarding necessary permitting/steps to begin excavation of the quarry (future cell 6). Clarify language on quarry excavation. In progress.

F. 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.

i. 2000 and 2020 Landfill Franchise Agreement Intake Thresholds/Limits

Work in Progress: Explaining 2000 and 2020 Franchise agreement tonnage limits

The 2000 Landfill Franchise Agreement between Benton County and Valley Landfills (Coffin Butte Landfill) includes a section regarding the impacts of waste volume, which states:

"If during the term of this Agreement the volume of solid waste accepted at the landfill in any calendar year exceeds 600,000 tons or 1,200,000 cumulative tons over any period of two consecutive calendar years, the County may perform a new assessment."

The original assessment is known as "the Baseline", and was a study that assessed 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

Commented [RG36]: Perhaps note, for clarity, that this document is our prior CUP application, which was withdrawn in March 2022. NOTE: I NEED TO STILL WRITE/WORK ON BROADER OVERVIEW LANGUAGE

Commented [RD37R36]: Added temporary clarifying details

Commented [RG38]: I think this will be updated in the coming weeks. Perhaps we should say for now that "Republic Services is currently in discussion with both Knife River and Benton County regarding necessary permitting/steps to begin excavation of the quarry (future cell 6).

Commented [KE40]: In a recent report to the BoC, Darren Nichols heard this characterization and responded that the County has not been engaged in any discussion. So maybe delete the mention of Benton County for now.

I agree that we do have to come up with interim language to summarize the negotiations-in-process, as it seems unlikely to be resolved before our document is due

Commented [YM42]: Not sure what this is intended to mean - they are and have been excavating the quarry for many years. What is different now?

Commented [RD43]: Scale weight, tonnage may be better

Commented [44]: I think the text in this subsection lays out the similarities and differences between the two FA limits very well.

Commented [RD45]: From Paul: I now agree the 2000 boundary was not stated as a limit per se, but it was clearly identified as a threshold, that, if exceeded, granted the county clear right to pursue specific remedies (launching a new Baseline assessment, reopening negotiations on the Franchise and/or Host fees if the County determined that the updated Baseline study indicated "adverse impact").

Commented [RD46R45]: From Paul: I believe the 2000 "threshold" was clearly exceeded in 2017-2019. I believe Benton County utilized none of the contractual remedies available to it as a result of these "exceedances." We agreed it is fair to note these concerns in Findings and Recommendations.

Commented [RD47]: This section should be re-titled as to not mislead readers into thinking that the "limits" in the 2000 and 2020 Franchise agreement are similar, because they are completely different and unique concepts.

Commented [RD48]: The following four paragraphs (including quotes) added by Daniel, along with additional sentences added to subsequent paragraphs (which were added by Paul). Daniel also changed the word "limit" to "threshold" when referencing 2000 FA for accuracy.



systems, and compliance with all solid waste Permits. The franchise agreement then describes the consequences of a new assessment showing adverse impacts on “the Baseline”:

“If the County determines that information in the Baseline Updated indicates an adverse impact on “the Baseline,” the parties shall immediately proceed in good faith to negotiate an increase in the Franchise Fee and/or Host Surcharge...”

Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement preface the definition of their respective solid waste intake limits with an acknowledgement of potential “adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill.”

Each of these agreements then defined an intake threshold ~~limit~~ (in Tons/yr.). In the 2000 agreement, intake levels in excess of the threshold allowed the County to reassess infrastructure and environmental impacts relative to a baseline established in 2001, and, if adverse impact was found, to force a renegotiation of the Franchise Fee and/or Host Fee. The 2020 agreement noted that the total tonnage deposited into the landfill in any calendar year “shall not exceed” the limit level.

In both agreements the intake thresholds ~~limits~~ were defined immediately following the acknowledgement of potential adverse impact from increased annual volumes. In both agreements the intake thresholds ~~limits~~ were defined in the same section of the agreement as the adverse impact clause (Section 8 of the 2000 agreement, Section 5 of the 2020 agreement).

The calculation of the intake threshold ~~limit~~ defined in the 2000 agreement is somewhat complex; see Appendix A for details of this calculation. The result of this calculation is that the intake threshold ~~limit~~ defined in the 2000 agreement is set at 600,000 Tons in any calendar year or 1,200,000 Tons in any period of two consecutive calendar years, with both figures increasing by 2% per year. The intake limit defined in the 2020 agreement was stated as a flat 1,100,000 Tons per calendar year. ~~Both of these thresholds ~~limits~~ are included in~~ **Error! Reference source not found.** below.

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 ~~limit~~ was described in an intake volume chart as “Annual Maximums Specified in Franchise Agreement”; see Page 33 of the BentonCountyBoardofCommissionersMeeting\_4Sep2018\_180904\_tu\_pkt.pdf document. However, the 2000 Franchise agreement does not describe the tonnage threshold as a “limit” or “maximum”, and allows for exceedances over the listed threshold.

### **Key Findings**

**LSCL-F-6. The 2000 Landfill Franchise Agreement allows for exceedances over the listed tonnage threshold.**

**Commented [RD49]:** From Paul: The 2020 agreement is legally much clearer in defining a limit, using the phrases "Limit on Solid Waste" and the legal phrase "shall not exceed."  
We have agreed to call the 2020 value the "2020 Limit on Solid Waste" in our report.

**Commented [RD50]:** Again, these "limits" should be described very clearly as to not mislead the reader. This description seems to imply that the two concepts are similar, without pointing out any of the very important differences.



LSCL-F-7. The 2020 Landfill Franchise Agreement does not allow for exceedances over the listed tonnage threshold (described as a “Limit on Solid Waste”, which the landfill “shall not exceed”), not applying to fire, flood, natural disaster, or Force Majeure event materials.

LSCL-F-8. Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement acknowledge the potential for “adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill.”

LSCL-F-9. Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement define landfill solid waste intake ~~limits~~ thresholds immediately following and in the same document section as the acknowledgement of the potential for adverse effects.

LSCL-F-10. In an official 2018 presentation to Benton County Board of Commissioners, Benton County represented the 2000 Franchise Agreement intake ~~limits~~ 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 allows for exceedances over the listed threshold.

LSCL-F-11. The intake ~~limits~~ thresholds defined in both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement were instantiated as contractual provisions, with negative consequences explicitly defined in the 2000 agreement and implicit (violation of contract) consequences in the 2020 agreement.

A.1 Finding x: The 2000 Landfill Franchise Agreement allows for exceedances over the listed tonnage threshold.

A.1 Finding x: The 2020 Landfill Franchise Agreement does not allow for exceedances over the listed tonnage threshold (described as a “Limit on Solid Waste”, which the landfill “shall not exceed”), not applying to fire, flood, natural disaster, or Force Majeure event materials.

A.1 Finding 3: Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement acknowledge the potential for “adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill.”

A.1 Finding 4: Both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement define landfill solid waste intake ~~limits~~ thresholds ~~limits~~ immediately following and in the same document section as the acknowledgement of the potential for adverse effects.

A.1 Finding 5: In an official 2018 presentation to Benton County Board of Commissioners, Benton County represented the 2000 Franchise Agreement intake ~~limits~~ threshold ~~limit~~ as “Annual Maximums Specified in Franchise Agreement.” However, the 2000 Franchise agreement does not describe the tonnage threshold as a “limit” or “maximum”, and allows for exceedances over the listed threshold.

A.1 Finding 6: The intake thresholds limits defined in both the 2000 Landfill Franchise Agreement and the 2020 Landfill Franchise Agreement were instantiated as contractual provisions, with negative consequences explicitly defined in the 2000 agreement and implicit (violation of contract) consequences in the 2020 agreement.

vi. Recent intake volume: 1993 – 2021

ii.

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

Chart 2: Coffin Butte Landfill Intake 1993 - 2021

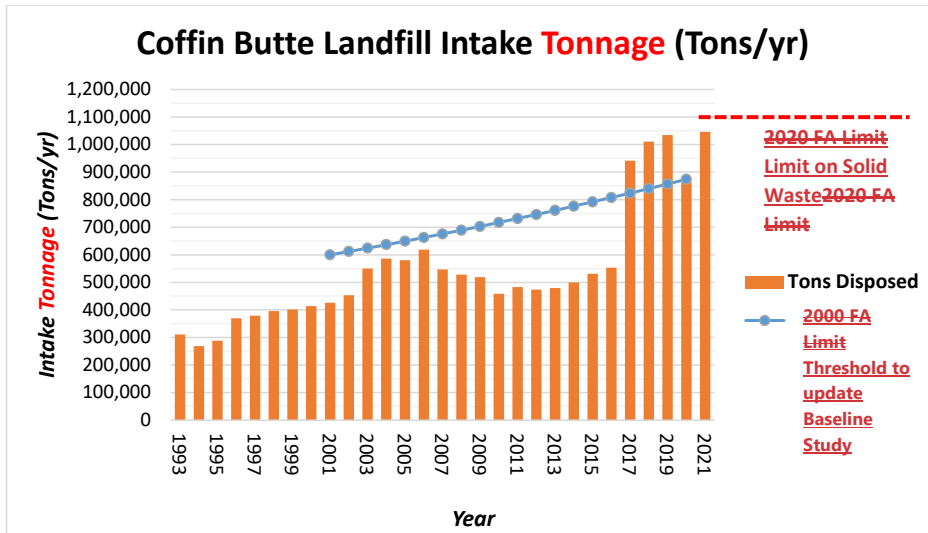


Figure 2

iii. 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 2000 Landfill Franchise Agreement imposed a ramping intake limits threshold to be applied during the term of the agreement (CY2001-2019), giving the County the option to perform an updated impact assessment if the limits threshold was exceeded, denoted in the chart by the blue line ("Threshold to update Baseline Study"). The County did not

**Commented [RD51]:**  
The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I recommend using the landfill annual report data for consistency (as shown in the suggested chart below). ... [3]

**Commented [KE52]:**  
From our conversations, the issue with the 2000 FA line and the 2020 FA line is that they both are characterized by the word "limit," but what they limit are each different. Perhaps the best resolution for this is to use the word "cap" instead of limit for the label on the 2020 FA line, since that is the word actually used in that Agreement.

**Commented [RD53R52]:** I understand the issue to be the confusion caused by word choice, which is not clarified through replacing "limit" with "cap", which will generally mean the same thing to most readers. Providing more detail in these titles will help provide clarification, perhaps using titles like "Threshold to update Baseline Study" to replace "2000 FA limit".

**Commented [RD54]:** The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I recommend using the landfill annual report data for consistency (as shown in the suggested chart below). ... [4]

**Commented [RD55R54]:** Daniel, Paul, and Mark are working on options for rewording the legend. Paul and Daniel verified annual tonnage data, based on data in the tonnage charts of landfill annual reports (instead of the narrative). Paul used 2% annual increases in the 2000 FA reference line, as that was larger than population growth.

**Commented [56]:**  
The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I ... [5]

**Commented [57R56]:**  
Daniel, Paul, and Mark are working on options for rewording the legend. Paul and Daniel verified annual tonnage data, based on data in the tonnage charts of landfill annual reports (instead of the narrative). Paul used 2% annual increases in the 2000 FA reference line, as that was larger than population growth.

**Commented [58]:**  
The 2000 FA did not have a "threshold" as that word is most commonly understood. A threshold is literally a doorway, so in this context it most commonly refers to a point in which an obvious transition happens, akin to passing from one room to another, entirely different room. The word thus has a transformative context, and also a context of 'you ca ... [6]

perform an updated impact assessment as a result of the 2017-2019 tonnage limits threshold exceedances. The 2000 Landfill Franchise Agreement imposed a ramping intake limit (cap) intake limit (cap) intake limit (cap) to be applied during the term of the agreement (CY2001-2019), denoted in the chart by the blue line ("2000 FA Limit"). The 2000 Landfill Franchise Agreement imposed a ramping intake limit (cap) to be applied during the term of the agreement (CY2001-2019), denoted in the chart by the blue line ("2000 FA Limit").

1-

3. Due to an expected additional influx of volume in 2017 resulting from the waste flow disruption into onset of the closure process for waste flow disruption into 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 agreeing to 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

2-

3.4. In documents provided to the A.1 Subcommittee, representatives of the franchisee have indicated that the approximately 70% year-over-year increase in CY2016-2017 was primarily was due to redirected flow from Riverbend due to redirected flow from Riverbend to Coffin Butte. 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. The population of the 6-county service area washed-area defined in the 2000 Landfill Franchise Agreement grew 3.6% total in the period 2016-2017 (see Appendix A for population data).

4.5. The 2020 Landfill Franchise Agreement defined a flat intake limit (cap) of 1.1M Tons/yr. unless expansion was fully permitted onto the "expansion parcel" (i.e. the lot south of Coffin Butte Road zoned LS in 1983 but at that time restricted to non disposal activities); upon this expansion approval the intake limit would be eliminated. The 2020 intake limit is denoted in the chart by the dashed red line ("2020 FA Limit"). The 2020 Landfill Franchise Agreement states that the total tonnage deposited at the Landfill shall not exceed 1.1M tons per calendar year until "application to expand the Landfill on to the Expansion Parcel are granted (following any and all appeals to final judgement)." The 2020 intake limit is denoted in the chart by the dashed red line ("2020 FA Limit.")

6. The slow downward trend in intake volume in the 2017-2012 2006-2010 period is explained by the franchisee as resulting from the economic downturn of from the economic downturn of 2008 2008.

5- Work In Progress - Explaining 2008 recession related intake

Commented [RD59]: There was not an intake limit or cap in the 2000 franchise agreement. There was a tonnage threshold discussed at which an updated baseline study can be done.

Commented [YM60R59]: The language in the 2000 FA related to this also included reference to the "adverse impacts to the County's infrastructure and environmental conditions" of increased annual volumes of solid waste. Once a certain volume was exceeded, a new assessment of impacts was to be conducted and potentially triggering negotiation of increased franchise fee and/or host surcharge. The County never chose to complete a new assessment even though referenced volumes were exceeded.

Commented [RD61]: There was not an intake limit or cap in the 2000 franchise agreement. There was a tonnage threshold discussed at which an updated baseline study can be done.

Commented [KE62]: ... [7]

Commented [63]: ... [8]

Commented [RD64]: There was not an intake limit or cap in the 2000 franchise agreement. There was a tonnage ... [9]

Commented [PN65]: Ongoing dialog on this. Both the 2000 and the 2020 Landfill Franchise Agreements ref ... [10]

Commented [KE66]: ... [11]

Commented [PN67]: As Ed Pitera pointed out in the 15Dec2022 Workgroup meeting, this MOU was an ... [12]

Commented [YM68]: Has anyone looked closely at the numbers to actually determine how much of the incr ... [13]

Commented [RG69]: 2017-2019 volume increases are primarily due to the diversion of waste from Riverbe ... [14]

Commented [RD70R69]: Added

Commented [YM71]: This phrase does not make any sense in this sentence. What is the intention of this ... [15]

Commented [YM72]: Some reference to additional Republic's efforts to broaden their landfill customer t ... [16]

Commented [PN73]: Added detail on actual population increase.

Commented [RG74]: Republic Services requests that item #4 be re-worded as follows, per legal interpretation f ... [17]

Commented [RD75R74]: Added, with a strikethrough on previous text to be discussed.

Commented [KE76]: ... [18]

Commented [RG77]: There's a typo here (should the first part of this sentence be 2007-2012, or should the se ... [19]

Commented [RD78R77]: Updated to 2006-2010.

Commented [RD79R77]: Added detail to #7, with a strikethrough on previous text.

7. The decreased intake volume in 2020 is attributed to the Covid-19 outbreak. 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.

8. The annual Coffin Butte intake tonnage exceeded threshold limit defined in the 2000 Landfill Franchise Agreement as the tonnage-limits threshold at which the County had the option to perform an updated baseline analysis of landfill impacts, in calendar years 2017, 2018, and 2019 (see Appendix A for exact figures).

9. 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 limit over the three-year period (see yearly average 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

### Key Findings

LSCL-F-12. 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-13. Representatives of the franchisee have indicated that the approximately 70% year-over-year increase in CY2016-2017 was primarily due to redirected flow from Riverbend to Coffin Butte. 2017-2019 volume increases are primarily due to the diversion of waste from Riverbend Landfill and rapid population growth in Willamette Valley and Western Oregon (the population of the 6-county area defined in the 2000 Landfill Franchise Agreement grew 3.6% total in the period 2016-2017).

LSCL-F-14. The 2000 Landfill Franchise Agreement imposed a ramping intake-limit threshold to be applied during the term of the agreement (CY2001-2019), giving the County the option to perform an updated impact assessment if the-limits threshold was exceeded, denoted in the chart by the blue line (“Threshold to update Baseline Study”), which then could result in increases to the landfill fees paid to the county. The County did not perform an updated impact assessment as a result of the 2017-2019 tonnage-limits threshold exceedances.

LSCL-F-15. Due to an expected additional influx of volume in 2017 resulting from the disruption onset of the closure process for Riverbend landfill in Yamhill County, in December 2016 the franchisee and Benton County executed a MOU acknowledging an expected increase in Coffin Butte intake volume “for a term of 1-2 years.”

**Commented [YM80]:** In addition, Republic Services has been expanding their landfill customer base and, as a result, more waste is being transported to Coffin Butte.

**Commented [RD81]:** This calculation, and source material should be referenced in its own appendix. Paul, can you please put that together?

**Commented [YM82]:** Has anyone looked closely at the numbers to actually determine how much of the increased volume was due to redirected waste flow from Riverbend closure and how much was due to Republic's efforts to develop new customers and contracts to haul waste to Coffin Butte? I am not sure that it is accurate to assign all the increased tonnage to Riverbend closure.

**Commented [RG83]:** 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.

**Commented [RD84R83]:** Added

- LSCL-F-16. The 2020 Landfill Franchise Agreement states that the total tonnage deposited at the Landfill shall not exceed 1.1M tons per calendar year until “application to expand the Landfill on to the Expansion Parcel are granted (following any and all appeals to final judgement).” The 2020 intake limit is denoted in the chart by the dashed red line (“2020 FA Limit.”)
- LSCL-F-17. 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-18. 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-19. The 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-20. The 2016 MOU does not contain language preventing Benton County from exercising its rights under the 2000 Landfill Franchise Agreement in the event of violations of the intake limit.
- LSCL-F-21. The annual Coffin Butte intake tonnage exceeded the ~~limits~~ threshold defined in the 2000 Landfill Franchise Agreement as the ~~limit~~ tonnage threshold at which the County had the option to perform an updated baseline analysis of landfill impacts in calendar years 2017, 2018, and 2019.
- LSCL-F-22. Benton County did not perform an updated baseline analysis of landfill impacts as the result of the exceeded intake limit that occurred in 2017, 2018 and 2019. Specifically, the County was allowed to reassess infrastructure and environmental impacts relative to a baseline established in 2001, and, if adverse impact was found, to force a renegotiation of the Franchise Fee and/or Host Fee.
- LSCL-F-23. 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-24. 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-25. Due to an expected additional influx of tonnage in 2017 (approximately 70% year-over-year increase in CY2016-2017 was partially due to redirected flow from Riverbend to Coffin Butte (approximately 70% year-over-year increase in CY2016-

2017 was due to redirected flow from Riverbend to Coffin Butte), in December 2016 the franchisee and Benton County executed a MOU agreeing to an expected increase in Coffin Butte intake volume “for a term of 1-2 years.” 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. The decreased intake volume in 2020 is attributed to the Covid-19 outbreak.

### **Key Recommendations**

**LSCL-R-1.** Investigate the extent to which increased landfill revenue may have influenced Benton County’s decision not to pursue contractual remedies for the 2017-2019 intake threshold exceedances ~~limit violations~~. See “Economics” charge of the Workgroup Charter and Bylaws.

**A.1 Finding 6:** 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.

**A.1 Finding 7:** Representatives of the franchisee have indicated that the approximately 70% year-over-year increase in CY2016-2017 was primarily due to redirected flow from Riverbend to Coffin Butte. 2017-2019 volume increases are primarily due to the diversion of waste from Riverbend Landfill and rapid population growth in Willamette Valley and Western Oregon (the population of the 6-county ~~wasteshed~~ area defined in the 2000 Landfill Franchise Agreement grew 3.6% total in the period 2016-2017).

**A.1 Finding 8:** 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~~.

**A.1 Finding 9:** 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.

**A.1 Finding 10:** The 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.”

**Commented [RD85]:** These exceedances were not "violations" of the agreement, just a trigger for the option to do a baseline study.

**Commented [YM86]:** Has anyone looked closely at the numbers to actually determine how much of the increased volume was due to redirected waste flow from Riverbend closure and how much was due to Republic's efforts to develop new customers and contracts to haul waste to Coffin Butte? I am not sure that it is accurate to assign all the increased tonnage to Riverbend closure.

**Commented [RG87]:** 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.

**Commented [RD88R87]:** Added

**Commented [RD89]:** A "wasteshed" has a specific definition. Benton County is considered its own "wasteshed".

**Commented [KE90]:** It is unclear to me how the crash of 2008 can be responsible for a downturn that began in 2006. Let's look at other explanations, such as the rise of environmental awareness that played a key role in the 2008 election.

**Commented [RG91]:** There's a typo here (should the first part of this sentence be 2007-2012, or should the second part of the sentence be 2018?)

We CAN say 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.

**Commented [RD92R91]:** Updated to 2006-2010.

**Commented [RD93R91]:** Added detail to #7, with a strikethrough on previous text.

**Commented [YM94]:** In addition, Republic Services has been expanding their landfill customer base and, as a result, more waste is being transported to Coffin Butte.



*A.1 Finding 11: The 2016 MOU does not contain language preventing Benton County from exercising its rights under the 2000 Landfill Franchise Agreement in the event of violations of the intake limit.*

*A.1 Finding 12: The annual Coffin Butte intake tonnage exceeded the threshold limit defined in the 2000 Landfill Franchise Agreement as the tonnage threshold at which the County had the option to perform an updated baseline analysis of landfill impacts in calendar years 2017, 2018, and 2019.*

*A.1 Finding 13: Benton County did not perform an updated baseline analysis of landfill impacts as the result took no action in to address the violations of the exceeded intake limit that occurred in 2017, 2018 and 2019. Specifically, the County was allowed to reassess infrastructure and environmental impacts relative to a baseline established in 2001, and, if adverse impact was found, to force a renegotiation of the Franchise Fee and/or Host Fee.*

*A.1 Finding 14: 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.*

*A.1 KR-1: Investigate the extent to which increased landfill revenue may have influenced Benton County's decision not to pursue contractual remedies for the 2017-2019 intake threshold exceedances limit violations. See "Economics" charge of the Workgroup Charter and Bylaws.*

#### ii.iv. 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.

*DANIEL or REPUBLIC SERVICES: can you supply this chart? Alternatively, data could be extracted from the annual reports.*

Chart 3: Intake by Source, 2013 - 2021

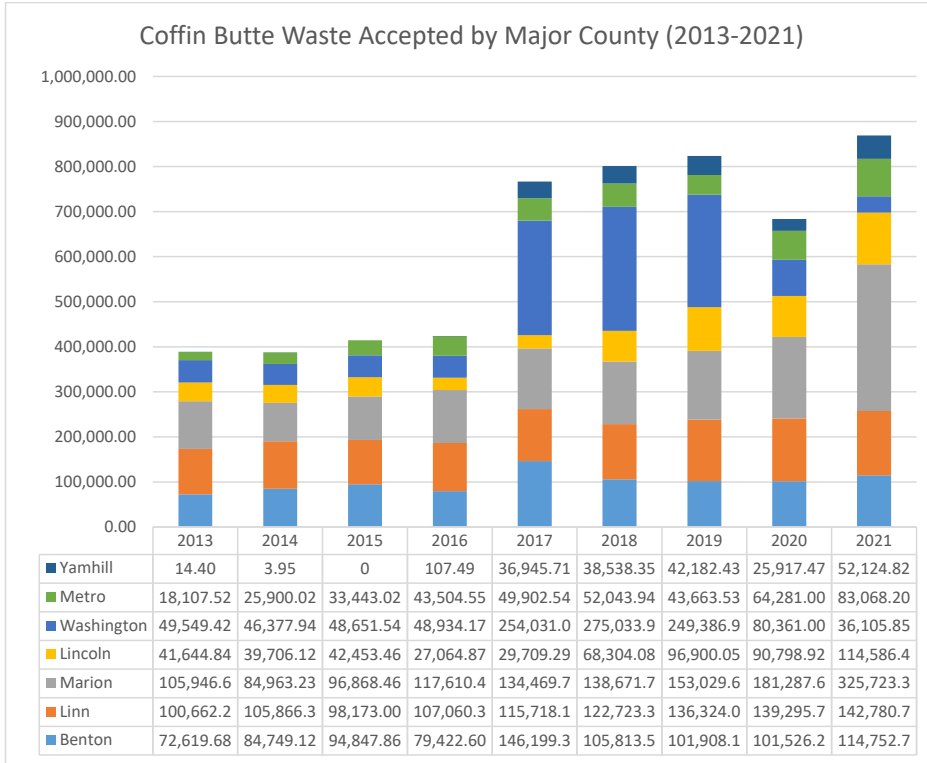
*A stacked bar chart may be helpful for a) analyzing the source flow changes that occurred in 2016-2017, and b) addressing questions regarding the extent to which the disruption of inflow to Riverbend accounts for the 2016-2017 increase.*

*DANIEL or REPUBLIC SERVICES: can you supply ? Alternatively, data could be extracted from the annual reports.*

**Commented [YM95]:** This chart raises many questions - what caused the huge jump in Benton County waste from 2016 to 2017? Also, why is Marion County bringing nearly twice as much waste to Coffin Butte 2020 to 2021? Also, the waste volume from Other dramatically increased in 2017 and has stayed high for the past 5 years. There is more to this story that should be told here in a narrative to support the chart.

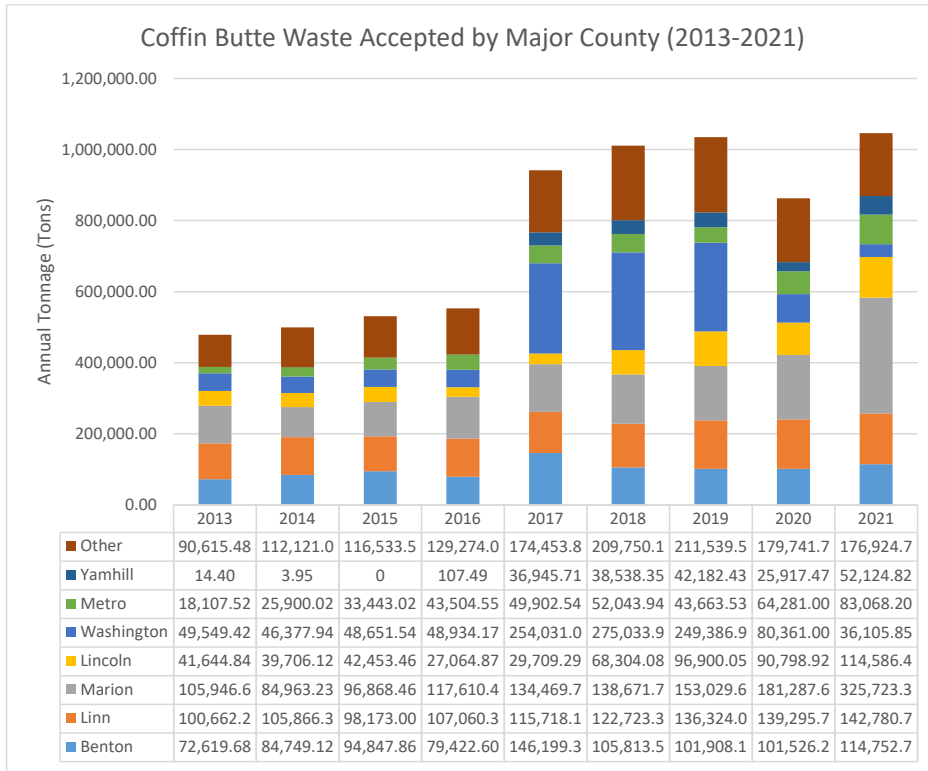
**Commented [RD96R95]:** 2017 tanker cleanup - 50,000 tons

**Figure 4: Intake by Source, 2013 - 2021**





**Figure 5: Intake by Source, 2013 - 2021**



**Figure 6: Intake by Source, 2013 - 2021**

Table

Table

**Problem** The Benton County waste contributions shown here are **disputed**, because they are in sharp variance with DEQ estimates for the wasteshed (Oregon DEQ puts county waste at about two-thirds of what is shown here). The discrepancy is significant and readily explained. Because Republic gives a preferential rate to private haulers if they self-identify their loads come from Benton County, they incentivize over-representation. **Call out Yamhill County (Ken Eklund)**

**Key Finding**

**Commented [RD97]:** Add Tonnage to title

**Commented [RD98]:** Discuss "other" section. Explain growth, and possible cause if available.

**Commented [RD99]:** Discuss "other" section. Explain growth, and possible cause if available.

**Commented [KE100]:** I think we should characterize both the contributing entities and their contribution amounts for this section, so that readers can get an idea as to the geographical extent of the wasteshed.

**Commented [KE101]:** This may be a versioning problem that only I have, but I cannot see the legend for this graph explaining what each color represents.

**Commented [RD102R101]:** The legend is included. I recommend using the PDF version on the webpage to view the figures in the document.

**Commented [RD103]:** DEQ provided a helpful explanation for the differences (see below). Essentially, Coffin Butte Landfill's reported waste (in the chart) is higher than DEQ's (not in the chart), because it provides a more complete report of the types of waste included (industrial or agricultural wastes, sewage sludge, asbestos, rubble, rock, and asphalt or other inert wastes, or petroleum-contaminated soil), where DEQ's report does not include some waste types (industrial or agricultural wastes, sewage sludge, asbestos, rubble, rock, and asphalt or other inert wastes, or petroleum-contaminated soil)

"tons we report in the material recovery survey is just the "counting waste" – basically municipal solid waste plus tires and construction and demolition waste, excluding dirt, rubble, rock and asphalt. It does not include industrial or agricultural wastes, sewage sludge, asbestos, rubble, rock, and asphalt or other inert wastes, or petroleum-contaminated soil. We do not ask landfills to report the county of origin for these other wastes – only report if they are from Oregon or from out-of-state. The difference between the Benton County numbers in the Coffin Butte 2020 report (table on page 7) and our Material Recovery Survey report is due to all the industrial waste, sewage sludge, and alternative daily cover disposed at Coffin Butte, that is coming from Benton County but only reported to DEQ as coming from somewhere in Oregon."

**Commented [KE104]:** I'd like for Yamhill County itself to be broken out in this chart (I think it is one of the sources lumped in with 'other.' Showing it gives context to Riverbend Landfill, which like Coffin Butte got most of its volume from outside its host county.

**Commented [RD105R104]:** Done, as seen in the second chart added. For group discussion.

LSCL-F-26. Washington County waste tonnage accepted at the landfill increased by over 400% between 2016-2017, with the increased tonnage continuing through 2019.

A.1 Finding 15: Washington County waste tonnage accepted at the landfill increased by over 400% between 2016-2017, with the increased tonnage continuing through 2019.

### 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<sup>3</sup> have been consumed per the 2021 annual report, for an average volume of about 267,000 yd<sup>3</sup> 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.*

**Commented [RG106]:** Republic Services certainly understands the intent of this intake volume plot, but warns that historical records are both limited and potentially inaccurate.

## G. Landfill Structure

### vii.vi. Overview

The disposal area and surrounding lots are shown in **Error! Reference source not found.** Figure 3 below. This drawing is reproduced from the 2021 Site Development Plan, Appendix A, Drawing No. G03, and is reproduced here for convenience.

*Drawing below imported from pdf; quality degraded. Better means of importing into Word?*

**Commented [RD107]:** I suggest adding the high quality PDFs for each image in the final draft PDF version of this report.

### viii.vii. 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

Table 3: Cell Open/Closed Detail

<u>Area</u>	<u>Date Opened</u>	<u>Date Capped/Closed</u>
<u>Closed Landfill (Burn Dump)</u>	<u>1940's</u>	
<u>Cell 1</u>	<u>Late 1970's</u>	
<u>Cell 1A</u>	<u>Late 1970's</u>	
<u>Cell 2A</u>	<u>1988</u>	
<u>Cell 2B</u>	<u>1994</u>	
<u>Cell 2C</u>	<u>1995</u>	
<u>Cell 2D</u>	<u>1998</u>	

**Commented [PN108]:** This is the chart supplied by Ian M. on 11Nov2022. I have requested cell closure dates (Nietfeld email of 7Jan2023 to Ian M., Ginger R., Bill B.)

**Commented [RD109R108]:** Closure dates can be complicated. Burn dump no longer has closure date due to move to Cell 6. Final Cap might be better terminology. Only Cell 1 and 1A has been fully closed (in the 1990s). Final cap areas that exist might only be for part of the cell, because they are tied to other cells (2, 2b, cell areas along Coffin Butte Road). Request for Ian/Ginger to add verbiage.

<u>Cell 3A</u>	<u>2003</u>	
<u>Cell 3B</u>	<u>2004</u>	
<u>Cell 3C</u>	<u>2005</u>	
<u>Cell 3D Phase 1</u>	<u>2007</u>	
<u>Cell 3D Phase 2</u>	<u>2009</u>	
<u>Cell 4</u>	<u>2012</u>	
<u>Cell 5A</u>	<u>2014</u>	
<u>Cell 5B</u>	<u>2018</u>	
<u>Cell 5C</u>	<u>2020</u>	
<u>Cell 5D</u>	<u>2022</u>	
<u>Cell 5E</u>	<u>Future</u>	
<u>Cell 6 (Quarry Area)</u>	<u>Future</u>	

*Table 4: Cell Open/Closed Detail*

Figure 4 below.

Figure 4: Landfill Zoning

DRAFT





## 54 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 ~~1938~~ 1983 a new zoning category (“LANDFILL SITE”) was created for Benton County. ~~A~~ and 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~~ 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 Figure 5 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.* ~~Figure 6~~, clarifies the zoning boundaries.

**Commented [RG110]:** The acreage on the south side of Coffin Butte Road can be permitted for waste disposal if a CUP is obtained from Benton County.

**Commented [RD111]:** Comment from Chuck in response to Paul's comments: it would be good to have the legal sub-committee weigh in, since the 1983 rezoning appears to imply that a conditional land use action was made, but it also appears no landfill permit was granted by DEQ.

Therefore if true, would the land action default the land then to the Coffin Butte Disposal Site instead?

**Commented [RG112]:** The acreage on the south side of Coffin Butte Road can be permitted for waste disposal if a CUP is obtained from Benton County.

**Commented [RD113R112]:** Added



Figure 9: Proposed 1983 Rezoning Map

Figure 1: Proposed 1983 Rezoning Map

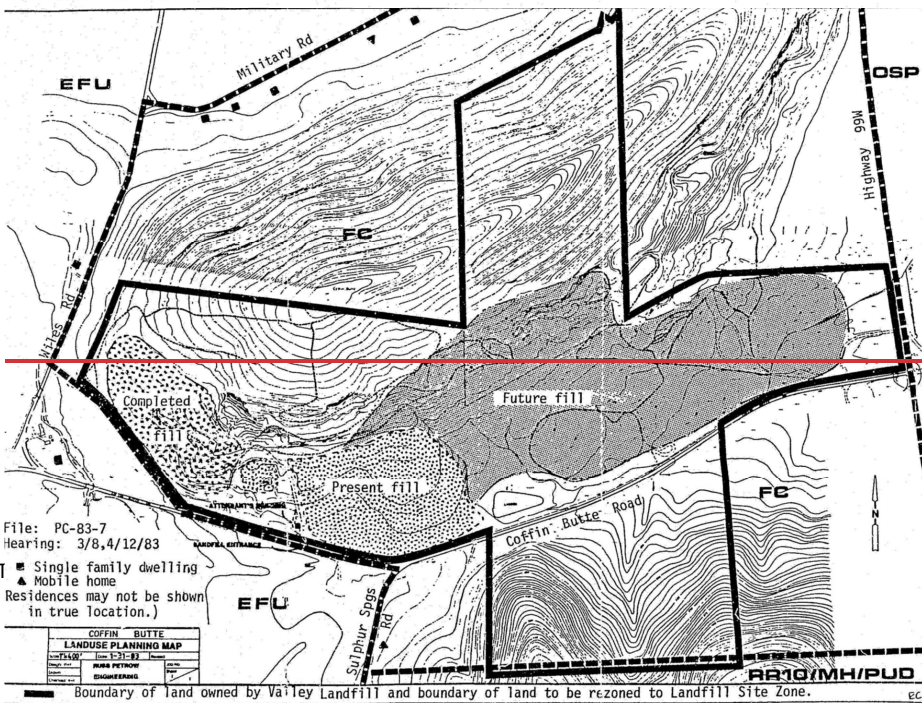
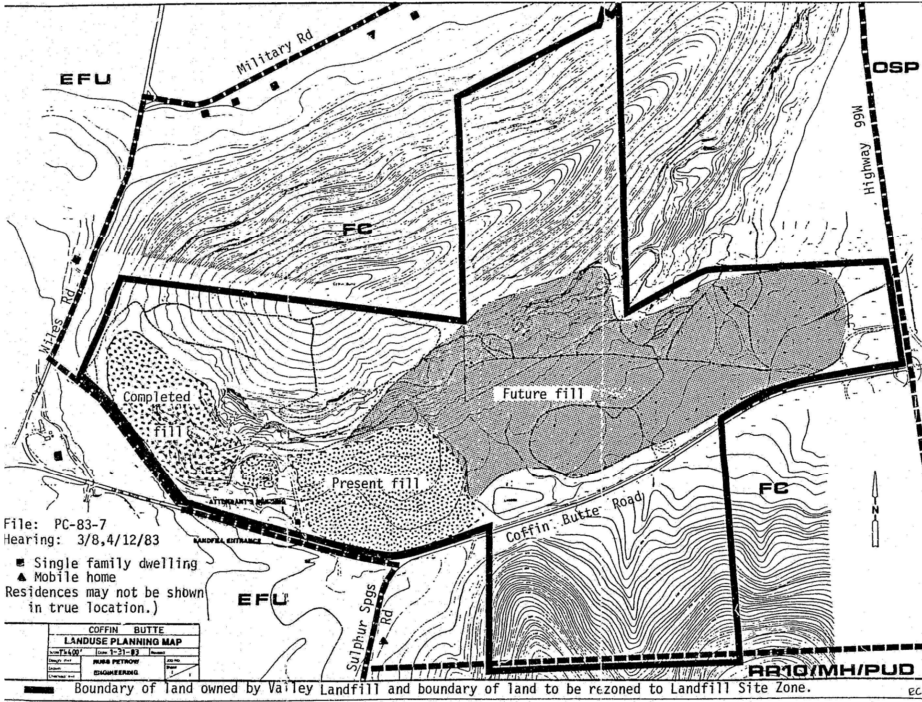
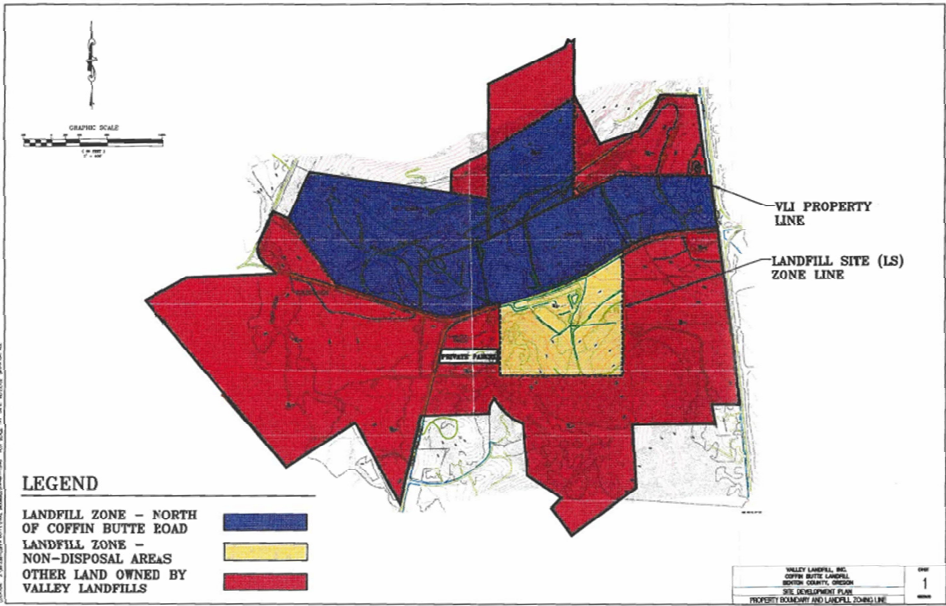


Figure 7: Zoning Map (2002 MOU)

Figure 5

Figure 10: Zoning Map (2002 MOU)



**Key Finding**

**LSCL-F-4, LSCL-F-28.** 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. Of these 266 acres, 194 acres, all on the north side of Coffin Butte Road, were approved for waste disposal.

Figure 6

**A.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<sup>3</sup> 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<sup>3</sup> 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<sup>3</sup> 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.

#### H. Cell 6 (Quarry) Addition

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

#### I. 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.

**Commented [PN114]:** Daniel: Is the Staff Report that is included in PC-83-07 (pages 11-30) the official, final released version?

**Commented [RD115R114]:** I believe so.

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).

**Commented [RD116]:** These are recommendations only, those bodies do not provide "approvals"

Thus, Benton County Planning staff modified the clear recommendation ~~directive~~ 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."

**Commented [RD117]:** These are recommendations only, those bodies do not provide "directives" to any other bodies or staff.

**Commented [RD118]:** These are recommendations only, those bodies do not provide "directives" to any other bodies or staff.

~~The 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.~~

~~Additionally, per the Board of Commissioners Order of June 15, 1983, approval of additional landfill activities on the LS zoned parcel south of Coffin Butte Road (Taxlot 104180001107, Index #14 in Appendix C) requires only 1) approval of the site plan by the Planning Commission and 2) approval by the Planning Commission at a public hearing.~~

- The 1983 rezoning ordinance (Ord. 261) 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.

**Commented [RD119]:** Added at request of Paul to replace the deleted section above: The 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. Additionally, per the Board of Commissioners Order of June 15, 1983, approval of additional landfill activities on the LS-zoned parcel south of Coffin Butte Road (Taxlot 104180001107, Index #14 in Appendix C) requires only 1) approval of the site plan by the Planning Commission and 2) approval by the Planning Commission at a public hearing.

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.

### Key Findings

~~LSCL-F-1, LSCL-F-29.~~ 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-2, LSCL-F-30.~~ The recommended condition prohibiting landfill south of Coffin Butte Road was ~~eliminated from~~ not included in the 1983 rezoning ordinance ~~by~~ through a change recommended by Benton County Staff. The process for approving landfill south of Coffin Butte Road was subsequently changed to "allowed by conditional use permit" apparently via Ord. 90-0069 (BCC 77.305)



~~A.1 Finding 19: 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.”~~

~~A.1 Finding 20: The recommended condition prohibiting landfill south of Coffin Butte Road was *eliminated from* not included in the 1983 rezoning ordinance *by* through a change recommended by Benton County Staff. The process for approving landfill south of Coffin Butte Road was subsequently changed to “allowed by conditional use permit” apparently via Ord. 90-0069 (BCC 77.305)~~

~~Other information required/useful in this section?~~

DRAFT

## 65 Section 3: Landfill Life Projections

### A. Waste in Place Baseline: Projection to End 2022

#### Definitions:

Landfill Life = Expected time remaining in which the landfill will continue to accept waste, typically in Years.

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

Franchisee, landfill owner = Republic Services

Intake at Coffin Butte Landfill in 2022 have not been finalized at the time of this writing, so we are using the projected figure of 1M tons. This gives us a projected volume of 16,008,557 cubic yards as of end-of-year 2022. This projected volume is Remaining Permitted Airspace, not available airspace; it includes a significant volume of unexcavated rock.

### B. Historical Landfill Life Projections

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

Figure 11: Historical EOL Projections (source: Landfill Annual Reports)

**Commented [RD120]:** Addition from Ken Eklund

**Commented [RD121]:** Can we add these to the "common terms" section at the top of the document?

**Commented [RD122]:** Addition from Ken Eklund

**Commented [123]:**  
I think this was the figure we were using, but I can't find it in my notes.

**Commented [124]:**  
Is this true? I can't find the number in my notes.

**Commented [RD125]:** We already have modern data for reported site life from Landfill annual reports, which I recommend using instead of EPA data for consistency with the rest of the document. This table should probably focus on adding historical data points prior to that available in the landfill annual reports.

**Commented [RD126]:** Proposed figure from Daniel

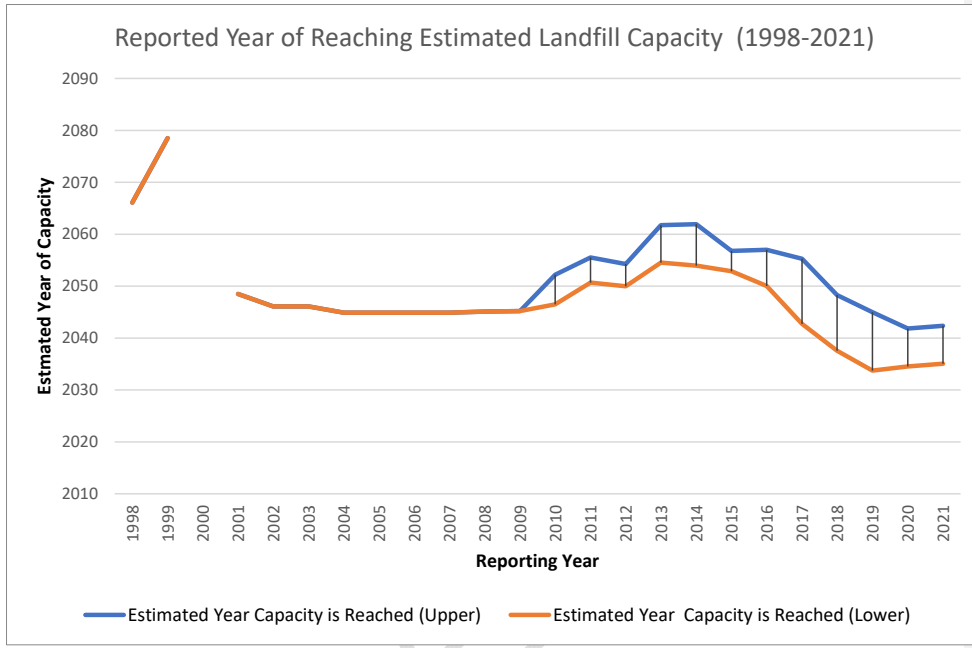


Table 5: Historical EOL Projections

**Table 5: Historical EOL Projections**

Date of Projection	Projected EOL (CY)	Reference/Comment
1974?	2000	TBD
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 <sup>3</sup>
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 <sup>3</sup>

**Commented [127]:**  
I remember seeing reference to an earlier report which gave the landfill EOL as the year 2000.



<u>2010</u>	<u>2053</u>	<u>United States Environmental Protection Agency*</u>
<u>2013</u>	<u>2064</u>	<u>United States Environmental Protection Agency*</u>
<u>2014</u>	<u>2065</u>	<u>United States Environmental Protection Agency*</u>
<u>2015</u>	<u>2061</u>	<u>United States Environmental Protection Agency*</u>
<u>2016</u>	<u>2058</u>	<u>United States Environmental Protection Agency*</u>
<u>2018</u>	<u>2048</u>	<u>United States Environmental Protection Agency*</u>
<u>2019</u>	<u>2044</u>	<u>United States Environmental Protection Agency*</u>
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 <sup>3</sup>
* EPA Greenhouse Gas (GHG) Emissions Data from Large Facilities, 2010-2021		

**Commented [RD128]:** Addition from Ken Eklund

Table

(a note on table above) (another note on table above)

LSCL-F-31. The U.S. Environmental Protection Agency projects the landfill EOL to be CY 2044. The assumptions behind this projection are not available to be examined.

LSCL-F-32. The 2021 Site Development Plan filed by the landfill owner with the Oregon Department of Environmental Quality projects the landfill EOL to be CY 2039, based on an annual intake of 846,274 Tons/year and a density of 0.8 Tons/yd<sup>3</sup>. Other assumptions behind this projection are not available to be examined.

**Commented [129]:**  
Note that I have added more entries to this table.

**Commented [130]:**  
I remember seeing this historical projection (that in the '70s and '80s the landfill was projected to close in 2000) but cannot put my hands on it now. Daniel, can you and staff help?

**Commented [131]:**  
Note that Rows 4 through 10 have been added to this table

**Commented [RD132]:** Addition from Ken Eklund

**Commented [RD133]:** Addition from Ken Eklund

C. Nominal Life Projection CY 2023 to End of Life

The landfill life projections shown below are provided by the franchisee.

**Work in-progress, and items to address in this section:**

The figure below (Figure 3B-1) establishes a baseline, a simple operational projection that more sophisticated scenarios can be built upon. It is our baseline because it models the idealized parameters and longevity intended for the landfill by the landfill's owner, which is: a steady

annual intake of between 1M and 1.1M tons for the duration of the landfill's 14.5-16 year site life (to 2037-2039). As indicated in its Assumptions, this baseline scenario is not a "default future"; it is not realistic, in that it references itself only and does not incorporate outside factors.

**Scenario 1**

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

**Scenario 2**

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

#### 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

#### Assumptions:

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

**Projected Remaining Airspace** – Airspace consumed in 2022 based on projected 2022 tonnage and 3-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. 2022 quarry extraction freed up approximately 140,000 cubic yards.

**2022 3-year Density Average** – derived from 2020-22 measurements. 2022 density based on 2021 measurements.

**Site Life** – Time to fill the projected remaining airspace, including the airspace currently unexcavated.

Commented [134]:  
This is Figure 3B-1

Density based off measurement from prior year.

< GRAPHIC EDIT: I updated the explanatory text to better communicate what we discussed about this baseline > Ken Eklund

Graphic edit: the “Site Life” assumption is a bit unclear; how about “Site Life—Time to fill the projected remaining airspace, including the airspace currently unexcavated, given the projected Tons per Year intake rate.” Ken Eklund

#### Key Findings

**LSCL-F-33.** Current (1Q2023) estimate for landfill EOL = CY 2037 – 2039 based on an annual intake level of 1.0 – 1.1 MTons/year and a density of 0.999 Tons/yd<sup>3</sup>, assuming the quarry area will be fully excavated by the time the current disposal areas are full. The franchisee 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. The franchisee acknowledges that a variety of factors, including human factors, can impact landfill site life, but it is unknown which of these factors if any have been part of this baseline calculation. As of this writing, the franchisee represents that there will be no more information provided about how the baseline was derived, as their model and modeling process are proprietary.

**Commented [RD135]:** Addition from Ken Eklund

**LSCL-F-5.LSCL-F-34.** The landfill owner projects the landfill EOL to be CY 2037 – 2039 based on an annual intake of 1.0 – 1.1 MTons/year and a density of 0.999 Tons/yd<sup>3</sup>. The other assumptions behind this projection are not available to be examined.

**Commented [RD136]:** Addition from Ken Eklund

**LSCL-F-6.LSCL-F-35.** The quarry dynamics are construction of the needed cells for future disposal areas. The herculean construction task is to excavate basalt rock to form the excavated design dimensions for construction of future disposal cells. The assumption is that the excavated rock and the construction of future cells keep pace with the demands of increased volumes of refuse needed for disposal without interruption.

**LSCL-F-36.** The complexities of demand and availability of refuse disposal is the crux of the puzzle to provide a viable sustainable material management process under consideration.

**LSCL-F-37.** The below referenced Coffin Butte: Site Life Scenarios submitted by Republic Services is also a subject of the full Subcommittees Report that represents an array of elements for assumptions that can provide a correlation of topics in order to better analyze the capacity, size and longevity of Coffin Butte Landfill projections, especially within the short-term analysis of needing additional landfill disposal capacity during the current transitional bridge period with the BCTT Committee.

**Commented [RD137]:** From Chuck

For example, the assumption that the “positive” element of Landfill expansion (CUP) alone against the net effects of the “negative” elements of “population growth and wildfires/natural disasters” will within the economies of scope and economies of scale will likely exceed tonnage cap disposal limitation that are reflected in the current landfill franchise agreement.

Likewise, the assumption of “positive” elements of “Landfill expansion (CUP)” and “Transfer Station/Disposal alternatives” against the net effects of all of the “negative” elements of the array will in all likelihood within the economies of scope and the economies of scale produce a better-balanced cost effective and economical result of refuse disposal for Benton County and neighboring municipalities and counties.

**Commented [RD138]:** From Paul regarding "tonnage cap" generally, not this section specifically: Daniel also advised caution in the use of the term "Tonnage Cap" in the context of the 2020 agreement. We now agree this refers not to the top-line 1.1M T/yr. value, but to the remainder of that value once Benton County's reserve tonnage is subtracted (i.e. 1.1M - 75k = 1.025M Tons/yr.) For this reason we will attempt to work wherever possible with the "2020 Limit on Solid Waste" referenced above, which is the normally-understood 1.1M Ton/yr. limit and avoid use of the "Tonnage Cap" term.

The intent above is not to imply an either/or solution, but assure that an evolving array of elements examined with sound economic principles along with savvy layman thought and professional understanding can produce a matrix that best support a circular economy that is still heavily reliant on a sanitary engineered landfill refuse disposal site during the embryonic stages of the circular economy development being considered by BCTT's sustainable material management sub-committee.

**Key Recommendation**

~~LSCL-R-1~~**LSCL-R-2.** The Sustainable Materials Management Plan should further develop scenarios and factors that may impact the landfill lifespan, including detailed analyses of likely projections.

~~A.1 Finding 21:~~ Current (1Q2023) estimate for landfill EOL = CY 2037 – 2039 based on an annual intake level of 1.0 – 1.1 MTons/year and a density of 0.999 Tons/yd<sup>3</sup>, assuming the quarry area will be fully excavated by the time the current disposal areas are full.

~~A.1 KR-2:~~ The Sustainable Materials Management Plan should further develop scenarios and factors that may impact the landfill lifespan, including detailed analyses of likely projections.

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: Time to fill the projected remaining airspace, including the airspace currently unexcavated in the quarry area, given the projected Tons per Year intake rate

~~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

Comment

The baseline stands in contrast to what the U.S. Environmental Protection Agency currently lists as the projected end-of-life year for Coffin Butte Landfill: 2044, as displayed in Section B. Historical Landfill Life Projections, above. This estimate also relies on data from the franchisee, but is calculated using a different model.

We include an important note here: the A.1 Subcommittee members are not in agreement about the suitability of the baseline to characterize the longevity of the landfill. In general, the franchisee subcommittee members feel the baseline is an adequate characterization and other community subcommittee members feel it is not; the franchisee members feel that other characterizations are too speculative to be included and community members feel they are vital to

**Commented [RD139]:** From Ken Eklund: the "Site Life" assumption is a bit unclear; how about "Site Life – Time to fill the projected remaining airspace, including the airspace currently unexcavated, given the projected Tons per Year intake rate."

**Commented [RD140]:** The following four paragraphs added by Ken Eklund

understand the landfill's true situation regarding its longevity. These disagreements can be considered to generally apply in the material that follows.

The A.1 subcommittee is charged to research and document the assumptions behind the operating life of Coffin Butte Landfill. It has also been charged by the Workgroup to develop not a singular projection, but scenarios to lay out possible and likely influences upon the landfill's longevity. The goal of our end product is to create value for the Board of Commissioners, the government, and the people of Benton County, whose questions and concerns are not addressed by the franchisee's model, which seems to optimize for the intake rate and longevity intended for the landfill by the franchisee and discounts or ignores counterfactors. It's also common sense not to rely on a single, proprietary model to characterize something as complex as the operating life of Coffin Butte Landfill.

Presenting a single answer to the question "What is the longevity of the Coffin Butte Landfill?" implies that all known major factors influencing that answer have been accounted for. It generates questions such as "What does this number assume happens to recycling rates?" and "Has this number factored in Oregon's extended producer responsibility (EPR) initiative?" and so on. The baseline has been acknowledged not take major factors into account and itself is unavailable for querying. The subcommittee has undertaken a listing of major factors and a querying of several "what if" questions; this exploration of this operating future is summarized in the next Subsection.  
**D. Events and Factors with Potential Lifetime Impact.**

J. — Nominal Life Projection CY 2023 to End of Life  
Incorporate Ian's life projection from macnab\_112222\_coffin\_butte\_capacity.pdf.

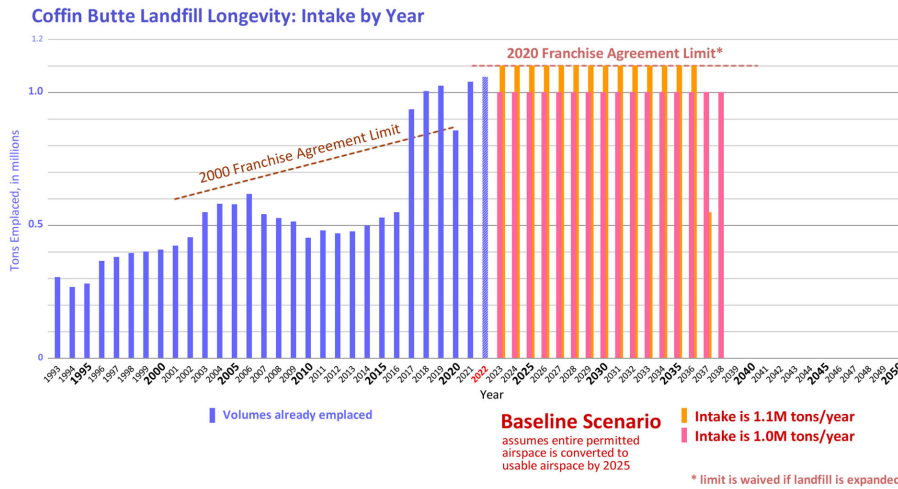
(These I believe are qualifiers to the numbers in Figure 3B-1. Someone should write them out for real but I don't feel qualified to do that)

Comments re: Scenario 1 vs. Scenario 2? Likely somewhere between the two scenarios – 14.54-15.99 year site life\*.

- Derived from Republic Services annual measurements
- Describe the underlying method for calculating these numbers
- List assumptions
- \*Includes quarry, which currently has unexcavated rock
- Quarry sequencing/staging – timeline and description. May be combination of options.
- Where the landfill is currently receiving waste stands over a number of previous cells. At the time of transition to place liner in the quarry, they will be starting a new footprint, without a lot of area to fill on top of or against. Considering efficiencies of fill and stability of hill.
- Larger footprint needed when starting fill that is not leaning against existing fill/cell.
- Add potential factors that could change the site development plan expectations

-





The longevity timeline in the baseline is shown in Figure 3B-2; this figure includes historic data for context.

The baseline is a simple longevity projection prepared by the landfill owner for operational purposes, and by design does not reflect the influence of real-world variables. To estimate the landfill's real-world operational lifetime, these influences must be considered. We have identified some of these influences and outline their possible effects in Section 3C. For simplicity's sake, we will use the 1.1M tons/year assumption ("Scenario 2") and also assume full conversion of rock space in the quarry area into usable airspace as the baseline in Section 3C.

#### D. Events and Factors with Potential Lifetime Impact<sup>3</sup>

##### K. D. Events and Factors with Potential Lifetime Impact

**Work In-Progress: Working on coming to consensus on how much detail to include in this section and the scenario sections that follow.**

Consider possible disruptions impacting life (e.g. recession, wildfire, other landfill closure, regulatory (e.g. methane)).<sup>2</sup> As seen in the two baseline scenarios above, the landfill's lifespan is generally determined by a calculation of three variables:

1. Amount of space available (airspace)
2. Amount waste is accepted (tonnage)
3. Density of the waste (tons per cubic yard)

<sup>3</sup> We cannot predict the outcome or impact of every scenario

**Commented [141]:**  
This is now Figure 3B-2.

I will be updating all of these graphics, as some figs and texts need updating

**Commented [RD142]:** Has this happened in the past?

**Commented [RD143R142]:** Many of the topics are discussed above, reduce redundancies.

**Commented [RD144R142]:** Various probabilities and ranges of impact for each of these factors. Likely going to be combinations of several factors playing out.

**Commented [RD145]:** Has this happened in the past?

**Commented [RD146R145]:** Many of the topics are discussed above, reduce redundancies.

**Commented [RD147R145]:** Various probabilities and ranges of impact for each of these factors. Likely going to be combinations of several factors playing out.

**Commented [RD148]:** The following three paragraphs added by Daniel

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

Figure x

### Coffin Butte: Site Life Scenarios

#### Positive

- A recession
- Landfill expansion (CUP)
- Less waste per capita
- Transfer station/disposal alternatives
- Global health issues (pandemic)

#### Neutral

- Legislation
- Legal action
- Climate change
- Activism
- Quarry excavation (pandemic)

#### Negative

- Remove of tonnage cap
- Wildfires/natural disasters
- Impacts/closures of other landfills
- Population growth

\* Projected remaining site life could increase or decrease depending on a variety of factors. The "positive" category refers to dynamics that could increase site life. The "negative" category refers to those that could reduce or shorten site life. "Neutral" refers to those factors that will not have an impact or where there is not enough information available to predict impact.

**Commented [RD149]:** Addition from Ginger, with support from Chuck.

**Commented [RD150R149]:** From Chuck: After further review, can the attached array be considered for additional information for key recommendations page 56 in the Subcommittee Report to Workgroup – BCTT Subcommittee A.1 for further vetting?

The below referenced Coffin Butte: Site Life Scenarios submitted by Republic Services is also a subject of the full Subcommittee's Report that represents an array of elements for assumptions that can provide a correlation of topics in order to better analyze the capacity, size and longevity of Coffin Butte Landfill projections, especially within the short-term analysis of needing additional landfill disposal capacity during the current transitional bridge period with the BCTT Committee.

**Commented [RD151]:** The following four paragraphs are from Chuck

For example, the assumption that the "positive" element of Landfill expansion (CUP) alone against the net effects of the "negative" elements of "population growth and wildfires/natural disasters" will within the economies of scope and economies of scale will likely exceed tonnage cap disposal limitation that are reflected in the current landfill franchise agreement.

Likewise, the assumption of "positive" elements of "Landfill expansion (CUP)" and "Transfer Station/Disposal alternatives" against the net effects of all of the "negative" elements of the array will in all likelihood within the economies of scope and the economies of scale produce a better-balanced cost effective and economical result of refuse disposal for Benton County and neighboring municipalities and counties.

The intent above is not to imply an either/or solution, but assure that an evolving array of elements examined with sound economic principles along with savvy layman thought and professional understanding can produce a matrix that best support a circular economy that is still heavily reliant on a sanitary engineered landfill refuse disposal site during the embryonic stages of the circular economy development being considered by BCTT's sustainable material management sub-committee.

These factors generally impact one another in complex ways. The direction of impact (increasing or decreasing lifespan), magnitude of impacts, and the dynamics between each factor is largely



- For simplicity's sake only, we will assume full conversion of rock space in the quarry area into usable airspace for the baseline.
- Factors that shorten landfill life but are subject to the intake cap will effectively help the franchisee keep intake at baseline levels. They will not shorten landfill life beyond that.
- Factors that shorten landfill life and are not subject to the intake cap will shorten landfill life to be less than the baseline.

#### viii. Factors Impacting Amount of space available (airspace)

- Quarry excavation schedule  
  - Our baseline assumes that 100% of the landfill's permitted airspace be converted into actual usable airspace before it is required for landfilling, but it is unclear at the time of this writing how much of the rock currently occupying the airspace is going to be successfully excavated. The timeline may require that some or all of the rock is left in place.
  - If the quarry is fully excavated by the time the current cell is filled, the landfill's airspace is expected to remain at the estimated 16,008,557 CY, with no changes to the calculated lifespan.
  - If the quarry is not fully excavated by the time the current cell is filled, the landfill's airspace is expected to decrease below 16,008,557 CY, with a reduction in lifespan.
- DEQ regulations regarding cell development below the water table    
  - 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, or if permitted, will be cost-effective for the landfill owner to undertake. If the portion below the groundwater line is not usable / used, airspace would decrease and the lifespan of the landfill would shorten, in proportion to the volume affected.
  - If the quarry is allowed to be fully excavated by the time the current cell is filled, the landfill's airspace is expected to remain at the estimated 16,008,557 CY, with no changes to the calculated lifespan.
  - If the quarry is not allowed to be fully excavated by the time the current cell is filled, the landfill's airspace is expected to decrease below 16,008,557 CY, with a reduction in lifespan.
- Landfill Expansion  
  - The baseline assumes that no expansion occurs, and that the current available airspace is used. A landfill expansion would create an alternate additional landfilling

space in addition to what is currently listed as available airspace (16,008,557 CY). The landfill owner has indicated that it will apply for such an expansion, likely in the first half of 2023. The new site would likely be the same as the 2021 application site, in the Landfill Site (LS) zone currently used for landfill operations south of Coffin Butte Road.

- Extends landfill life by increasing permitted volume
- A combination of an expansion and removal of tonnage cap (detailed below), which would occur simultaneously, would yield unknown results, because the magnitude of each are unknown.

#### **ix. Factors Impacting Amount waste is accepted (tonnage)**

Most of the factors discussed relate more specifically to the amount of waste accepted. Coffin Butte Landfill's operator generally chooses how much tonnage to accept, based on demand and their agreements with various jurisdictions and haulers. The following factors are related to those that impact tonnage accepted at the landfill by impacting the landfill's demand, and the subcommittee have taken an initial guess at how these factors may impact demand:

- Landfill Demand (contracts and business choices)   
  - Decreases lifespan if landfill increases business and agrees to accept more waste per year, increasing demand.
  - No change to lifespan if the landfill business stays the same, accepting the same amount of waste, and maintaining constant demand.
  - Increases lifespan if landfill decreases business and accepts less waste per year, decreasing demand.
- Recession  
  - Recessions reduce economic activity, which generally reduces the amount of waste produced per-capita.
  - Increases lifespan if per-capita waste for landfill's service area decreases, decreasing demand.
  - Example: 2008 Recession  No change to lifespan if per-capita waste for landfill's service area does not change, maintaining demand.
  - Example: 2008 Recession was attributed in part to decreases in waste accepted from 2006-2010.
- Economic Growth  
  - Increased economic activity from economic growth generally increases the amount of waste produced per-capita.
  - Decreases lifespan if per-capita waste for landfill's service area increases, decreasing demand.

No change to lifespan if per-capita waste for landfill's service area does not change, maintaining demand.

• ~~Wildfire~~-Natural Disasters

- Disasters can produce large amounts of debris. Natural disasters like wildfires and flooding are generally expected to increase due to climate change, along with their debris. Disaster debris does not apply toward the landfill's intake cap.
- Decreases lifespan if natural disasters increase demand, and the landfill agrees to accept more natural disaster debris per year.
- No change to lifespan if natural disasters do not change demand, and the landfill's intake tonnage remains constant.
- Increases lifespan if natural disasters decrease demand by impacting the landfill's ability to accept waste (via reduced landfill access, for example).
- Example: 2020 wildfire debris contributed to tonnage accepted by the landfill in 2020 and 2021.

• Impacts to other disposal facilities     ?

- Coffin Butte Landfill currently takes in about 1/4 of the trash generated and disposed in Oregon. If a provider of the other 3/4 can no longer service its service area, it creates a business opportunity for the landfill owner to expand the Coffin Butte service area. Similarly, if another facility can capture business from an area or customer base currently served by Coffin Butte Landfill, then Coffin Butte Landfill's service area would decrease.
- Decreases lifespan if there is an increase in demand through impacts to other facilities, and the landfill agrees to accept more materials per year.
- No change to lifespan if there is no change in demand, and the landfill's intake tonnage remains constant.
- Increases lifespan if there is a decrease in demand through growth of other facility's businesses, and the landfill accepts less material per year.
- ? It is unclear how impacts of simultaneously expanding and contracting customer bases (shifts in customer base) would impact lifespan.
- Example: in 2016 the Riverbend Landfill in Yamhill County lost its bid to expand, and because it was nearly full, this enabled the landfill owner to capture its flows of approximately 500,000 tons of waste yearly for Coffin Butte Landfill.
- Example: although Washington County sent over 275,000 tons of waste to Coffin Butte Landfill in 2018, that amount decreased precipitously and was down to 36,000 tons in 2021, due presumably to successful competition by another disposal facility.
- Example: Riverbend Landfill

• Localized fires, floods, spills and other disasters. Contaminated soils—spills

- Localized disasters can produce landfill material.

- Decreases lifespan if disasters increase demand, and the landfill agrees to accept more disaster debris per year.
- No change to lifespan if natural disasters do not change demand, and the landfill's intake tonnage remains constant.
- Increases lifespan if disasters decrease demand by impacting the landfill's ability to accept waste (via reduced landfill access, for example).
- Example: a fuel tanker that spilled on Highway 99 generated many tons of contaminated dirt, which the landfill accepted. ~~Example: fuel tanker that spilled on highway 99~~

- Changes Impacts to waste recovery system     ?

- The waste recovery system, composed of service providers, materials collectors, material recovery facilities, material processors, recycled material markets, and more, can impact the demand on the landfill. We say the material headed for the landfill is "waste," but the majority of that material has productive utility. This profit incentive often is buttressed by cultural imperatives not to waste resources. The result is a wide array of initiatives at work ranging from system-wide resource recycling programs down to grassroots freesharing collaboratives.
- Decreases lifespan if there is an increase in landfill demand through negative impacts to the material recovery system, and the landfill agrees to accept more materials per year.
- No change to lifespan if there is no change in demand, and the landfill's intake tonnage remains constant.
- Increases lifespan if there is a decrease in demand through positive impacts to the material recovery system, like new recovery facilities or growth in market for recovered materials, and the landfill accepts less material per year.
- ? It is unclear how impacts of simultaneously expanding and contracting customer bases (shifts in customer base) would impact lifespan.
- Example: China's 2017-2018 policies on importing waste materials reduced the ability for Oregon recyclers to export materials, changing the standards for recycling in Oregon, decreasing recycled materials, and increasing disposal.
- Examples: Too many to list, but the Food Donation Improvement Act, passed in 2022 with bipartisan support and signed into law in Jan 2023, aims to catalyze a major effort to address both hunger and the climate crisis by reducing food waste in America.<sup>4</sup>

- Population growth Change     ?

<sup>4</sup> [https://www.washingtonpost.com/business/americas-food-waste-problem-is-a-hunger-solution-in-disguise/2023/01/06/a6f5ba22-8dbe-11ed-b86a-2e3a77336b8e\\_story.html](https://www.washingtonpost.com/business/americas-food-waste-problem-is-a-hunger-solution-in-disguise/2023/01/06/a6f5ba22-8dbe-11ed-b86a-2e3a77336b8e_story.html)



- As the landfill's service area adds more people, it also adds the waste they generate. Similarly, as the population decreases in the landfill's service area, the per-capita waste can decrease.
- Decreases lifespan if there is an increase in demand through population growth and per-capita disposal either grows or stays constant, and the landfill agrees to accept more materials per year.
- No change to lifespan if there is no change in demand, and the landfill's intake tonnage remains constant.
- Increases lifespan if there is a decrease in demand through population decline and per-capita disposal either declines or stays constant, and the landfill accepts less material per year.
- Example: Benton County's population is forecasted to grow steadily through 2071, with a population of over 120,000 in 2040<sup>5</sup>

DEQ regulations regarding cell development below the water table

- Removal of tonnage cap   
  - If an expansion is approved, by terms of the 2020 Franchise Agreement, the tonnage cap of 1.1M tons/year is removed, enabling the landfill owner to increase the Coffin Butte watershed without limit.
  - Shortens landfill life by enabling increased fill rates, if the landfill demand also increases and the landfill accepts more waste material.
  - No change to lifespan if removal of tonnage cap does not change demand, and the landfill tonnage intake remains constant.
  - Increases landfill life if the landfill demand decreases and the landfill accepts less waste material.

- Availability of landfill alternatives   
  - Outside of maximized recovery (recycling and composting) and waste prevention, alternatives to landfilling exist in various forms, primarily in different disposal technology. An incinerator in Marion County burns waste and generates energy, for example.
  - Decreases lifespan if there is an increase in landfill demand through impacts to other disposal facilities (like the closure or temporary closure of an alternative disposal facility), and the landfill agrees to accept more materials per year.
  - No change to lifespan if there is no change in demand, and the landfill's intake tonnage remains constant.
  - Increases lifespan if there is a decrease in demand through growth of other facility's businesses, and the landfill accepts less material per year.

**Commented [RD153]:** Provide a list of possible alternatives - feed into SMMP work

<sup>5</sup> [https://www.pdx.edu/population-research/sites/g/files/znlchr3261/files/2021-06/Final\\_Report\\_Benton.pdf](https://www.pdx.edu/population-research/sites/g/files/znlchr3261/files/2021-06/Final_Report_Benton.pdf)



- Environmentally engaged citizens are suing governmental agencies, and investors are suing corporations, for failing to act responsibly on the climate crisis, and to force action to address the crisis. Legal action can also increase landfill demand.
- Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.
- No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.
- Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.
- Example: the worldwide campaign of atmospheric trust litigation organized by Our Children's Trust, a public interest nonprofit law firm headquartered in Eugene.
- Example: Legal action regarding the commerce clause prevent Benton County from limiting the source of waste materials into the landfill.

**Commented [RD154]:** How does this example impact the landfill? Please provide more detail here, and maybe a link.

• Activism

- 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. A major focus of activism worldwide is the release of methane, because methane is a potent and quick-acting greenhouse gas. While only 1.4% of emissions associated with the life cycle of materials in Oregon occur in the post-consumer disposal life-cycle stage (including landfilling and transportation to landfills), landfills are major sources of greenhouse gas emissions, especially methane, in the United States. Activism thus constitutes a powerful and growing force that is highly motivated to push forward actions that move beyond landfilling. Similarly, a variety of activist efforts can drive demand to the landfill.
- Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.
- No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.
- Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.
- Example: grassroots environmental activists successfully prevented landfill owners from expanding their landfills in both Yamhill and Benton counties in the last ten years.

• Climate change impacts to landfill operations

- Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.
- No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.

○  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

• Landfill facility and technical challenges/successes

○  Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.

○  No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.

○  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

• Staffing in the local and regional solid waste industry

○  Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.

○  No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.

○  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

• Changes to Solid Waste transportation options

○  Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.

○  No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.

○  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

*lifestyle changes (i.e., increased at home shopping as we saw during the pandemic),*

• *acts of Mother Nature (such as wildfires)*

• adjustments in diversion/recycling rates, and

○  Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.

○  No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.

○  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

• tonnage volume in the broader market.

○  Decreases lifespan if it increases demand through increased disposal, and the landfill agrees to accept more waste material per year.

- o  No change to lifespan if there is no change in demand, and the landfill does not change material intake per year.
- o  Increases lifespan if it decreases demand through decreased disposal, and the landfill does not accept more waste material per year.

List various known factors impacting longevity

Include footnotes that show we cannot predict every scenario

List examples using known information, not projections, but historic data for context

Not just Coffin Butte Landfill impacts, but generally all landfills

Impacts may not be immediate, but experienced over the course of years.

LSCL-F-38. Human factors – decisions and agreements such as business and legal obligations, legislation, enforcement, civic action and attitudes, technological advances, risk assessments and risk taking, individual and collective values and choices, and so on –drive the landfill’s actual longevity, because they determine the inflow of material that fills up the landfill’s actual volume.

LSCL-F-39. 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 watershed, 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-40. More human factors are emerging that will 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.

### C. Additional Events and Factors with Potential Lifetime Impact

Although the physical parameters of Coffin Butte Landfill play a role in its longevity, human factors drive the actual outcome, because they determine the inflow of material that fills up the landfill’s permitted volume (and shape that volume itself). Unlike the physical factors, human factors – by which we mean decisions and agreements such as business and legal obligations, legislation, enforcement, civic action and attitudes, technological advances, risk assessments and risk taking, individual and collective values and choices, and so on – have the power to shift the landfill’s

operating life very quickly. Estimations of the operating life of the Coffin Butte Landfill necessarily rely on assessments of and assumptions about the entire system that feeds waste to the landfill, and this wider system is created by, motivated by, operated by, and continuously being changed by human factors and the events they bring about.

The subcommittee has generated a Table of potential factors impacting site life, and characterized some of them briefly and others in more detail. Our goal was to begin to describe the “terrain” that the landfill’s future will traverse. This list is not exhaustive and our characterizations limited; we hope a more complete list and more detailed characterizations will come as Benton County prepares a Sustainable Materials Management Plan.

### **[-] Factors that shorten landfill life (trend the fill rate to baseline or beyond)**

#### **Landfill contracts and business choices**

Landfilling at Coffin Butte is a business, subject to the standard pressures of customer loyalty, competitive pressure, price resistance, etc. This factor will tend to keep the landfill life at baseline, as the landfill owner strives to counteract any decline in intake by growing the wasteshed / by lowering prices, etc.

[-] [-] Shortens landfill life (only as far as the baseline)

This factor can also extend landfill life – loss of business, decrease in demand, operator’s choice to extend business longevity, etc.

#### **Lifestyle changes**

Our society is constantly affording new opportunities for consumers to participate in, and this increased economic activity tends to generate more waste.

[-] [-] Shortens landfill life (only as far as the baseline)

This factor can also extend landfill life – more consumer resistance to single-use items, causing a decrease in landfill demand

#### **Quarry excavation schedule**

Our baseline assumes that 100% of the landfill’s permitted airspace be converted into actual usable airspace before it is required for landfilling, but it is unclear at the time of this writing how much of the rock currently occupying the airspace is going to be successfully excavated. The timeline may require that some or all of the rock is left in place. Example: a similar situation occurred earlier in the landfill’s history, and quarryable rock was covered over with landfill.

An expanded discussion and visualization of this factor is included below.

[-] Shortens landfill life by not liberating landfill airspace

### Water table concerns and regulation

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, or if permitted, will be cost-effective for the landfill owner to undertake. If the portion below the groundwater line is not usable / used, airspace would decrease and the lifespan of the landfill would shorten, in proportion to the volume affected.

Shortens landfill life by not liberating landfill airspace

### Area wildfires, floods, earthquakes and other disasters

Disasters can produce large amounts of debris. Example: Coffin Butte Landfill took in approximately 350,000 tons of debris in late 2020-early 2021 from the multiple area wildfires in 2020. The incidence of wildfire and flooding are generally expected to increase due to climate change. Disaster debris does not count toward the landfill's intake cap.

Shortens landfill life by consuming landfill airspace

The landfill can also choose not to accept as much disaster debris, where haulers would bring disaster debris further away, extending the landfill life

**Commented [RD155]:** Source for this data?

### Impacts to other disposal facilities

Coffin Butte Landfill currently takes in about 1/4 ~~1/3~~ of the trash generated and disposed in Oregon. If a provider of the other 3/4 ~~2/3~~ can no longer service its service area ~~washed~~, it creates a business opportunity for the landfill owner to expand the Coffin Butte service area ~~washed~~. Example: in 2016 the Riverbend Landfill in Yamhill County lost its bid to expand, and because it was nearly full, this enabled the landfill owner to capture its flows of approximately 500,000 tons of waste yearly for Coffin Butte Landfill.

Shortens landfill life only as far as the baseline, if intake cap is maintained

Shortens landfill life if intake cap is set aside

This factor can also extend landfill life – new or expanded disposal facilities elsewhere may decrease demand at Coffin Butte Landfill. Similarly, and change that makes other disposal facilities more favorable (cost for haulers, etc) would decrease demand at Coffin Butte Landfill, extending the landfill life.

**Commented [RD156]:** Worth adding the source here - The latest [DEQ report](#) says 3,452,854 tons disposed generated in Oregon in 2020. [Coffin butte report](#) from same year says it accepted 863,209.73 in 2020. 1/4 of waste instead of 1/3.



### Impacts to the waste recovery system

The landfill owner depends on outside suppliers for many services outside of landfilling, and if these relationships break down, then material that was formerly diverted ends up in the landfill.

Example: Chinese recycling companies imposed new quality standards on imported recycled plastic in 2017-2018, and local recycling efforts could not meet those standards.

Shortens landfill life by consuming landfill airspace

This factor can also extend landfill life – if waste recovery becomes more accessible (new MRFs, new processors, stronger markets for material, etc) the demand on the landfill would decrease.

### Population growth/Change

As the watershed adds more people, it also adds the waste they generate. Example: Benton County's population is forecasted to grow steadily through 2071, with a population of over 120,000 in 2040.<sup>6</sup>

Shortens landfill life (only as far as the baseline)

This factor can also extend landfill life – if population moves out of the typical waste generation source counties, demand on the landfill could decrease.

This factor can also not impact landfill life – if population stays constant in the typical waste generation source counties, demand on the landfill could potentially not change.

### Localized fires, floods, spills and other disasters

Localized disasters can produce landfill material. Example: a fuel tanker that spilled on highway 9 generated many tons of contaminated dirt.

Shortens landfill life by consuming landfill airspace

This factor can also either not impact or extend landfill life (depending on how much of this type of material is expected in the baseline scenarios – if the landfill either chooses not to accept this material, or the hauler chooses a different facility).

### Factors that shorten landfill life (threaten landfill operations)

#### Landfill fire

Although it is very rare, 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 take years to extinguish.

Shortens or ends landfill life by ending operations

<sup>6</sup> [https://www.pdx.edu/population-research/sites/g/files/znidhr3261/files/2021-06/Final\\_Report\\_Benton.pdf](https://www.pdx.edu/population-research/sites/g/files/znidhr3261/files/2021-06/Final_Report_Benton.pdf)

This factor can also not impact landfill life, if the fire does not effect landfill operations and the ability to accept waste.

This factor can also extend landfill life, by reducing the amount of waste accepted temporarily while the operations are impacted, and then continuing operations with the full airspace available.

#### [-] Factors that lengthen landfill life (diminish the fill rate)

##### Landfill expansion – removal of tonnage cap

Expansion. The baseline assumes that no expansion occurs, and that the current available airspace is used. ~~may only be fully realized in combination with Aa~~ landfill expansion, ~~which would create an alternate~~ additional landfiling space 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. The new site would likely be the same as the 2021 application site, in the Landfill Site (LS) zone currently used for landfill operations south of Coffin Butte Road.

An expanded discussion and visualization of this factor is included below.

[-] Extends landfill life by increasing permitted volume

Removal of tonnage cap. If an expansion is approved, by terms of the 2020 Franchise Agreement, the tonnage cap of 1.1M tons/year is removed, enabling the landfill owner to increase the Coffin Butte wasteshed without limit.

[-] Shortens landfill life by enabling increased fill rates

This factor can also either not impact or extend landfill life if the landfill's demand does not change with the removal of the tonnage cap.

The two of these factors together would yield unknown results, because the magnitude of each are unknown.

##### Successful competition from other disposal facilities

The landfill owner competes in the marketplace to establish and maintain the Coffin Butte wasteshed, and other facilities can and do successfully prevail. Example: although Washington County sent over 275,000 tons of waste to Coffin Butte Landfill in 2018, that amount decreased precipitously and was down to 36,000 tons in 2021, due presumably to successful competition by another disposal facility.

[-] Extends landfill life by reducing source waste and therefore fill rate

### Improvements to the waste recovery system / alternatives to landfilling

Waste recovery. We say the material headed for the landfill is “waste,” but the truth is, the majority of that material has productive utility. This profit incentive often is buttressed by cultural imperatives not to waste resources. The result is a wide array of initiatives at work ranging from system-wide resource recycling programs down to grassroots freesharing collaboratives. Examples: Too many to list, but the Food Donation Improvement Act, passed in 2022 with bipartisan support and signed into law in Jan 2023, aims to catalyze a major effort to address both hunger and the climate crisis by reducing food waste in America.<sup>7</sup>

→ Extends landfill life by reducing source waste and therefore fill rate

Landfill alternatives. Waste recovery is often augmented with measures that seek to prevent the harmful effects of landfilling, to get “beyond landfilling” by diverting materials to dedicated processing facilities or alternative disposal sites.

→ Extends landfill life by reducing source waste and therefore fill rate

Obsolescence. Landfilling is an old technology, and alternative processes already exist. Examples of this abound in Europe, where EU member nations are working together to move beyond landfilling.

[-] Extends landfill life by reducing source waste and therefore fill rate

### Reductions in waste generation

Systemic. No one enjoys throwing things away, but the systems by which we acquire and use material goods are often designed to generate trash. These systems are being redesigned to either recycle materials or to eliminate their trash components. Examples: there are many to choose from, but a focus right now is extended producer responsibility (EPR) initiatives such as Oregon SB 582, the Plastic Pollution and Recycling Modernization Act passed in 2021, which provides “a much more accessible, responsible and stable recycling system.”<sup>8</sup>

[-] Extends landfill life by reducing source waste and therefore fill rate

Cultural. People individually can prioritize reducing waste, often in response to cultural or systemic cues. Example: the current recycling system relies on social engagement with issues of environmental awareness and action to inspire its volunteer actions to reuse, recycle, compost, etc. Historically, as shown in the historical data, this engagement goes up (and per-capita trash generation goes down) during Democratic administrations, when environmental issues are emphasized; the reverse is generally true during Republican administrations, when they are not.

→ Extends landfill life by reducing source waste and therefore fill rate

<sup>7</sup> [https://www.washingtonpost.com/business/americas-food-waste-problem-is-a-hunger-solution-in-disguise/2023/01/06/a6f5ba22-8dbe-11ed-b86a-2e3a77336b8e\\_story.html](https://www.washingtonpost.com/business/americas-food-waste-problem-is-a-hunger-solution-in-disguise/2023/01/06/a6f5ba22-8dbe-11ed-b86a-2e3a77336b8e_story.html)

<sup>8</sup> <https://www.wastetodaymagazine.com/news/oregon-signs-extended-producer-responsibility-law-packaging/>

Equity. Groups of people in the Coffin Butte watershed do not have equal access to recycling or other elements of waste reduction; measures are being designed to correct this. Example: Oregon SB 582, the Plastic Pollution and Recycling Modernization Act, contains provisions to fund reuse and waste prevention programs in these communities.<sup>9</sup>

Extends landfill life by reducing source waste and therefore fill rate

### Recessions

Recessions reduce economic activity, which generally reduces the amount of waste produced throughout the watershed. Example: the Crash of 2008 can explain in part the historical intake decline beginning in late 2008 and continuing through 2012.

Extends landfill life by reducing source waste and therefore fill rate

### Materials transportation

Materials with inherent value currently go into landfills just because where they are is not where they need to be for that value to be extracted. Investments and improvements into relevant transportation systems (such as intermodal transfer stations, which enable materials to be shipped more economically by rail) can enable materials to become less wasteful and less environmentally harmful and participate more fully in circular economies.

Extends landfill life by reducing source waste and therefore fill rate

### The climate crisis

Activism. 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. A major focus of activism worldwide is the release of methane, because methane is a potent and quick-acting greenhouse gas. While only 1.4% of emissions associated with the life cycle of materials in Oregon occur in the post-consumer disposal life-cycle stage (including landfilling and transportation to landfills)<sup>10</sup>, landfills are major sources of greenhouse gas emissions, especially methane, in the United States. Activism thus constitutes a powerful and growing force that is highly motivated to push forward actions that move beyond landfilling. Example: grassroots environmental activists successfully prevented landfill owners from expanding their landfills in both Yamhill and Benton counties in the last ten years.

Extends landfill life by reducing methane-generating waste going into the landfill

Litigation and Shareholder Action. Environmentally engaged citizens are suing governmental agencies, and investors are suing corporations, for failing to act responsibly on the climate crisis.

<sup>9</sup> <https://www.wastetodaymagazine.com/news/oregon-signs-extended-producer-responsibility-law-packaging/>

<sup>10</sup> [Oregon's consumption-based greenhouse gas emissions in 2015](#)

Commented [RD157]: Source for this data?

and to force action to address the crisis. Example: the worldwide campaign of atmospheric trust litigation organized by Our Children’s Trust, a public interest nonprofit law firm headquartered in Eugene.

[-] Extends landfill life by reducing methane-generating waste going into the landfill

**Legislation.** The pressure generated by the public, science, financial, and industry communities concerned about the climate crisis is manifesting in legislation. Examples: in its 2021 Methane Emissions Reduction Plan, the US government is mobilizing “all available tools to identify and reduce methane emissions from all major sources,” and in its 2023 Food Donation Improvement Act, it targets food waste, “the most common material found in landfills, constituting an estimated 24% of material” which generates large quantities of methane emissions.<sup>11</sup>

[-] Extends landfill life by reducing methane-generating waste going into the landfill

#### [-] [-] Novel factors on landfill life

##### **Pandemics**

The COVID pandemic has had a significant but mixed impact on landfill life, which can be characterized as a profound reduction in waste generation in 2020 and a resurgence of waste generation in 2021, likely due to lifestyle adaptations such as increased at-home shopping. The pandemic will continue to have an effect as long as it is endemic.

[-] Extends landfill life by reducing economic activity and therefore fill rate

[-] [-] Trends toward baseline by incentivizing activities that generate more waste

(These bullet points not yet addressed in the text above)

• Climate change impacts to landfill operations

• Landfill facility and technical challenges

• Staffing in the local and regional solid waste industry | |

• adjustments in diversion/recycling rates, and

tonnage volume in the broader market.

**Commented [158]:**  
Not sure what this means

**Commented [159]:**  
Not sure what this means

**Commented [160]:**  
Deleted because I have expanded these bullet points into the more explanatory texts that come right below.

**Commented [161]:**  
This and “tonnage” below is taken from a comment by Ginger re: factors, but I’m not sure what they mean exactly?

<sup>11</sup> <https://www.whitehouse.gov/wp-content/uploads/2021/11/US-Methane-Emissions-Reduction-Action-Plan-1.pdf>

List various known factors impacting longevity

Include footnotes that show we cannot predict every scenario

List examples using known information, not projections, but historic data for context

Not just Coffin Butte Landfill impacts, but generally all landfills

Impacts may not be immediate, but experienced over the course of years.

• \_\_\_\_\_

**Selected scenario expanded views**

To help with visualizing the factors, a few of them are discussed in greater detail below.

**Commented [162]:**  
This is done in second para above

DRAFT

---

“What-If” Scenarios About Landfill Operating Life

**Commented [RD163]:** Addition from Ken Eklund, suggested to replace Ken's previous "scenarios built upon the baseline" sections below.

“What would it take for the baseline to come about in real life?”

The Baseline as a Scenario

The graph below visualizes the Nominal Life Projection (“baseline”) from Section 3.C and puts it in historical context.

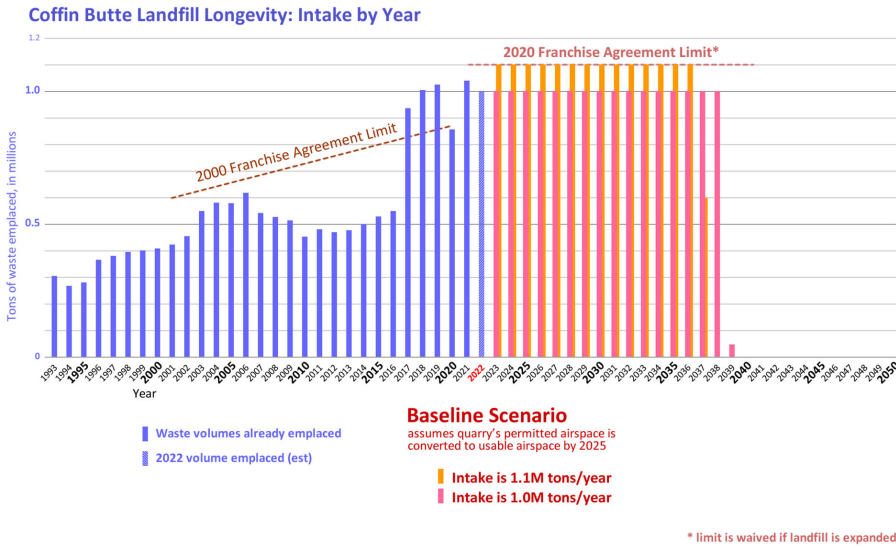
As noted in Section 3.C, the baseline is a projection prepared by the landfill owner for operational purposes using a proprietary model, and the assumptions underlying this projection have not been revealed.

For the baseline to come about in real life, it seems that the factors that have historically caused intake to vary will no longer apply from 2023 on, i.e., the landfill owner will be able to counteract any efforts such as increased waste prevention, diversion or recycling by growing the watershed or lowering prices to undercut those efforts. To maintain the baseline, the landfill owner may also counteract efforts by legal means, i.e., by contractually establishing or maintaining control over such efforts.

DRAFT



The subcommittee did not receive evidence regarding the landfill owner's intent in this regard, or its



ability.

Figure 3.C.2

“What if the franchisee cannot excavate all of the quarry?”

Scenarios built upon the Baseline: Quarry Levels

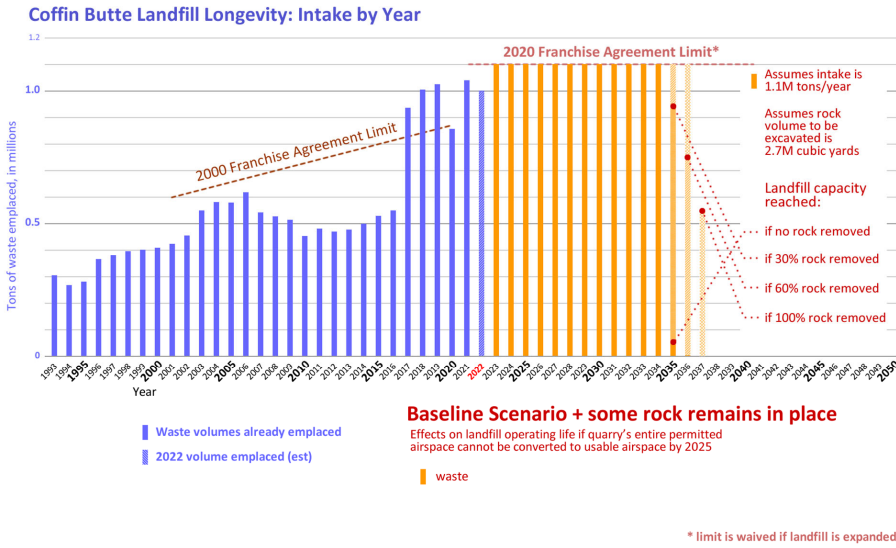
Roughly 2.7 million cubic yards of the landfill’s permitted airspace is currently unavailable because it is unexcavated rock.<sup>12</sup> The landfill’s owner holds a surface mining permit for this rock, and franchises it to Knife River as a quarry. For the past few years Knife River has currently quarried the rock at a rate of roughly 150,000 cubic yards a year,<sup>13</sup> 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.

<sup>12</sup> Derived from Knife River testimony before the Benton County Planning Commission, November 2021.

<sup>13</sup> 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, in Figure 3.C.3.

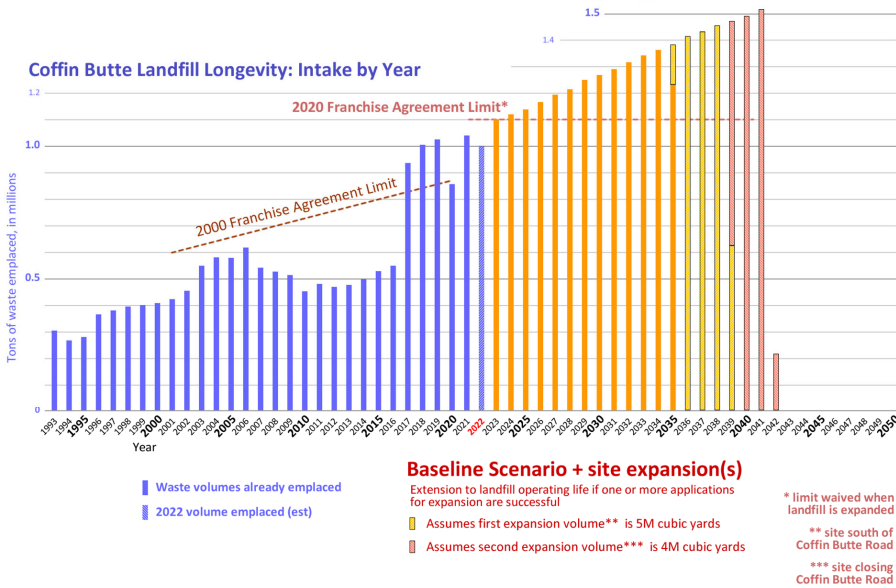
Figure 3.C.3

**“What if the franchisee obtains a permit to expand the landfill?”**

**Scenarios built upon the Baseline: Expansion(s)**

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; we can roughly estimate the size of this expansion airspace as 6M cubic yards.

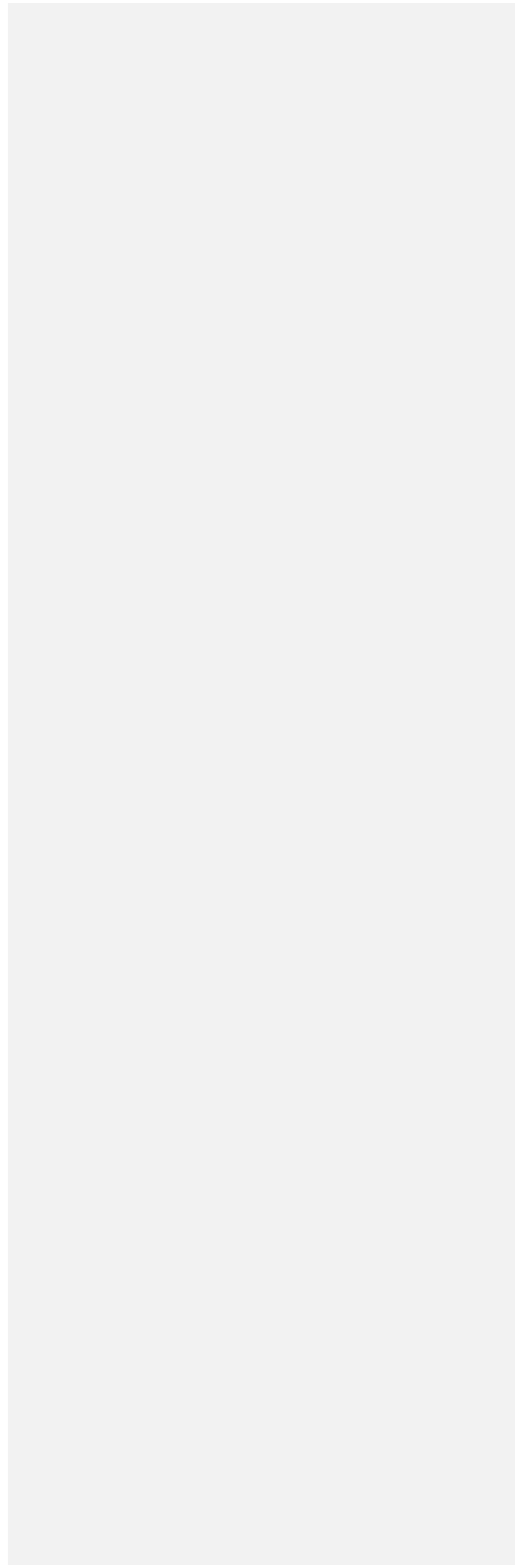
This application may be followed by others, either to continue to act as bridges for quarry excavation or to take advantage of the removal of the intake cap, which happens once the first expansion is approved, according to the 2020 Franchise Agreement. Any expansion may close Coffin Butte Road or seek to rezone other areas around the landfill as Landfill Sites.



We can represent the effect this set of scenarios would have on baseline longevity, as Figure 3.C.4.

Figure 3.C.4

DRAFT

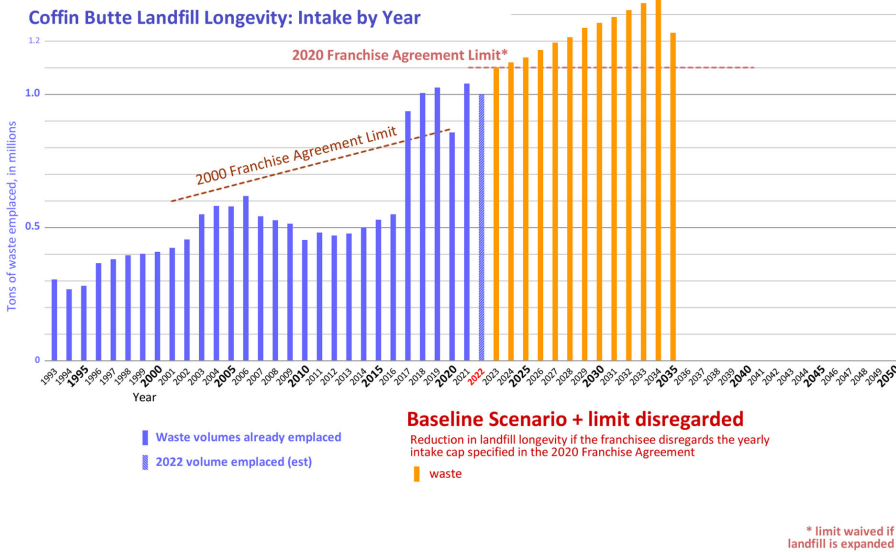


**“What if the franchisee exceeds the 2020 Franchise Agreement limit?”**

**Scenarios built upon the Baseline: Intake Cap Disregarded**

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, however; 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 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.

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.



We can represent the effect this scenario would have on baseline longevity, as Figure 3.C.5.

Figure 3.C.5

Note: this scenario, coupled with possible excavation shortfalls in the quarry scenario or with debris flows from wildfires or other disasters, represents the shortest longevity of the landfill in our scenarios: landfill life of less than a dozen years.

DRAFT

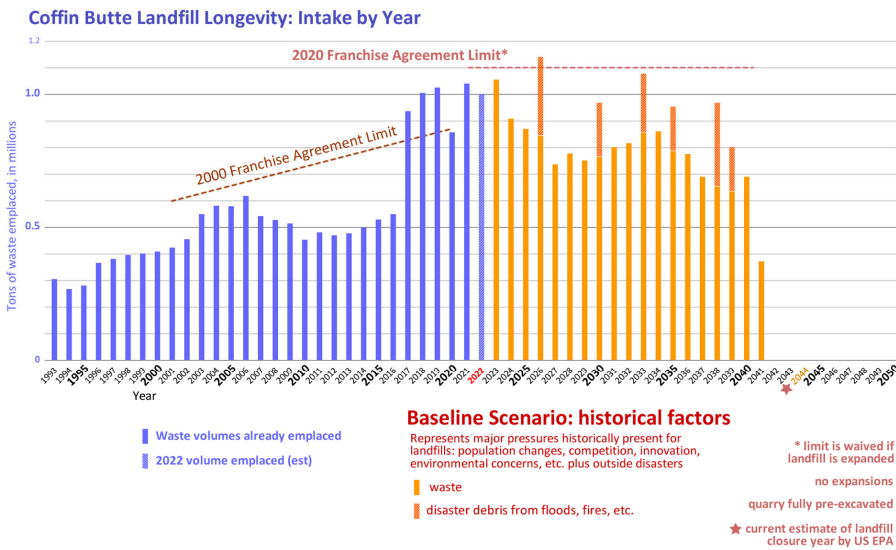


**“What if the factors which historically have acted on landfill intake are taken into account?”**

**Scenarios built upon the Baseline: Historical Variance**

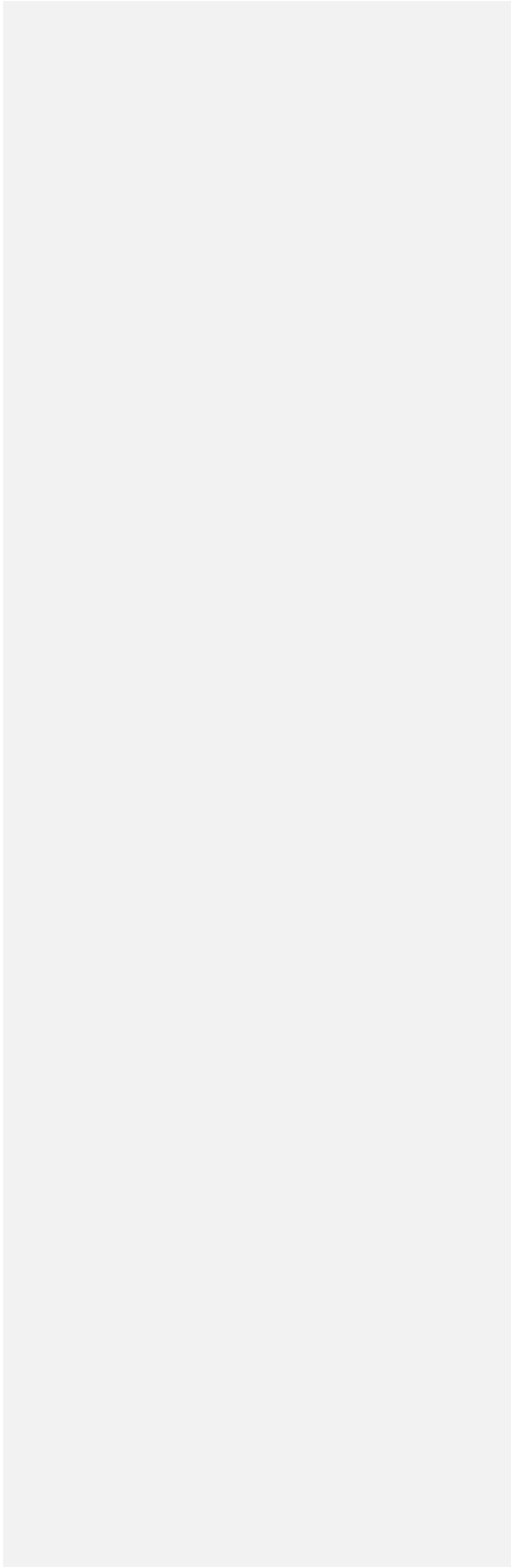
The baseline scenario is derived primarily from the annual intake the landfill owner and would like to achieve and maintain. In reality such stability occurs rarely if ever. Historically, the annual intake of a landfill is determined by many factors, many beyond the owner’s ability to control or to counteract.

The following graphic (Figure 3.5) shows variance due to (a) slow but steady demand by people to reduce their garbage disposal costs, (b) growing demand by people for less polluting alternatives to waste disposal, (c) growing population in the wasteshed, (d) competitive pressure from innovative alternatives to landfilling, (e) sudden spikes in intake due to wildfires, floods, and other climate-related disasters, and (f) pressure by the landfill owner to maintain intake via downward pricing and cost-cutting. These are all factors that have caused the intake rate to fluctuate in the past. These “human factors” are discussed more fully in Section 4.



**Figure 3.C.6**

DRAFT



“What if landfill intake is affected by growing concerns about the climate crisis?”

Scenario built upon the Baseline: Climate Crisis Legislation

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. In the United States, this fight is focused on the release of methane, a potent greenhouse gas. Landfills are major sources of greenhouse gas emissions, especially methane. In its Methane Emissions Reduction Plan, the US government is using all available tools to identify and reduce methane emissions from all major sources. The Inflation Reduction Act of 2022 prioritized curtailing methane pollution in the oil and gas industry sector, initiating a program that catalyzes pollution detection and offers incentives for reduction and imposes penalties for continued releases of methane into the atmosphere.

Since methane is not “destroyed” nor does it become carbon neutral, 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 when curtailing landfill methane.

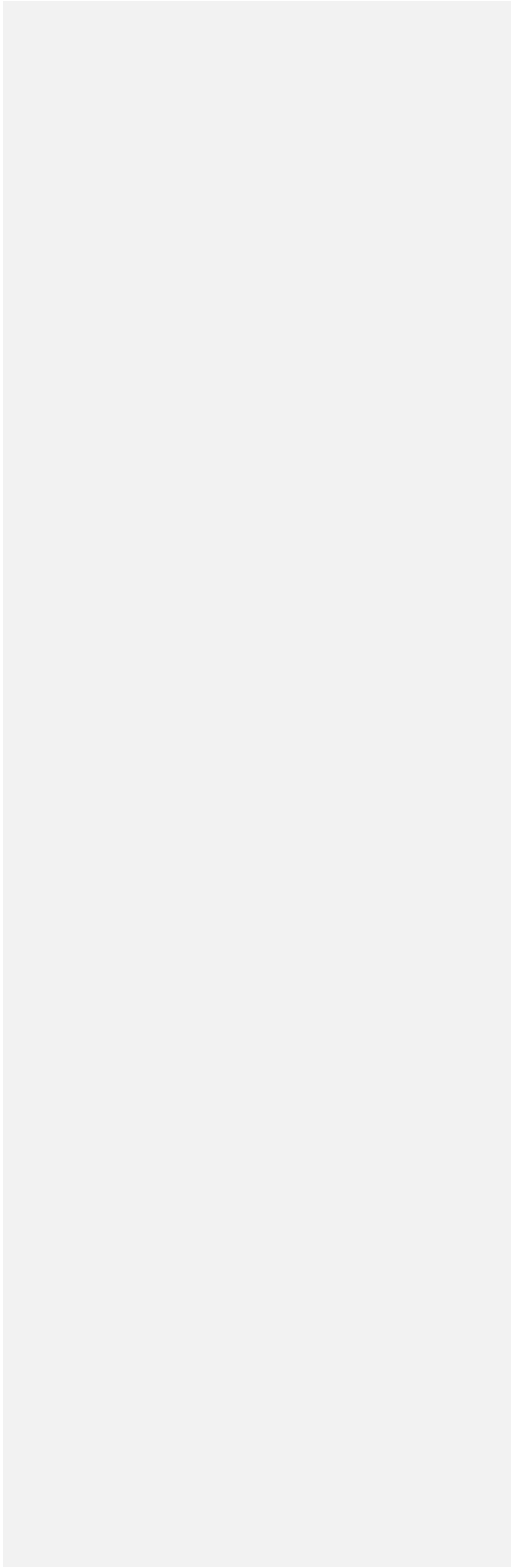
Legislation.

In this scenario, methane-corrective measures similar to the ones currently imposed on the oil/gas industry are extended into the landfill industry. As is happening in the oil/gas industry, the measures focus on incentives to prevent methane from being emitted, but include penalties for methane pollution. This extension happens in the year 2024. As they are doing in the oil/gas industry, federal and state environmental agencies offer billions of dollars in incentives tailored to catalyze efforts that can curtail landfill methane. These incentives would attract companies and organizations with waste-reduction ideas 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 motivate the landfill operator to align with this diversion.

This scenario also encompasses “crossover” legislation that reduces methane-generating waste from entering the landfill, although that is not the primary aim of the legislation. This process has already begun: the 2023 Food Donation Improvement Act aims to prevent food from being wasted but also diverts food from the wastestream as a greenhouse gas reduction measure.

This scenario presents a national initiative designed to impact the landfill’s entire wasteshed. A representation of its effect is shown in Figure 3.C.7.

DRAFT



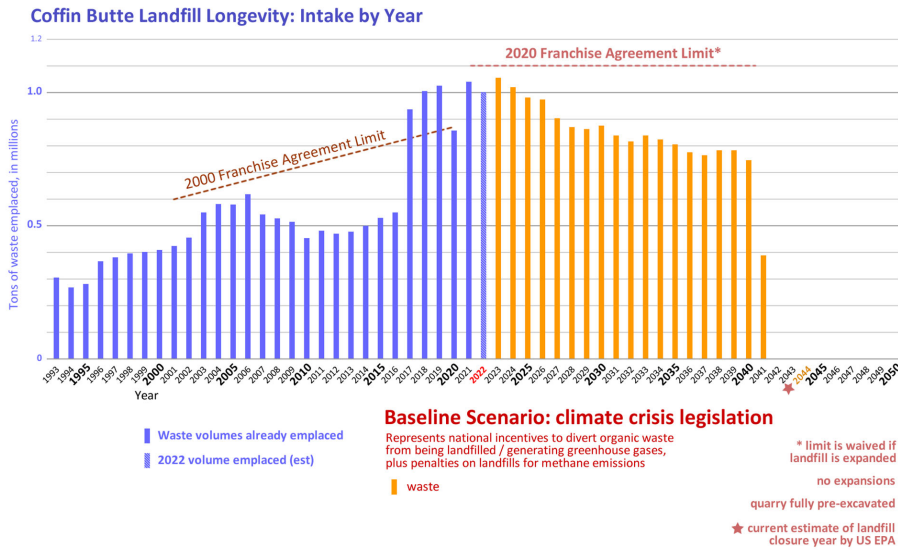


Figure 3.C.7

**Conclusion: A Confluence of Factors – Findings and Recommendations**

The subcommittee has generated a List of 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.<sup>14</sup> 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

<sup>14</sup> Closure outside of this date range is possible, but seen as less likely

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.

LSCL-F-41. The subcommittee has generated a List of potential factors impacting site life; this list is not exhaustive and its characterizations are limited.

LSCL-F-42. Human 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.

LSCL-F-43. The possibility space shows landfill closure as early as 2034 and as late as 2045. Closure outside of this date range is possible, but seen as less likely.

LSCL-F-44. Within the 2034-2045 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.

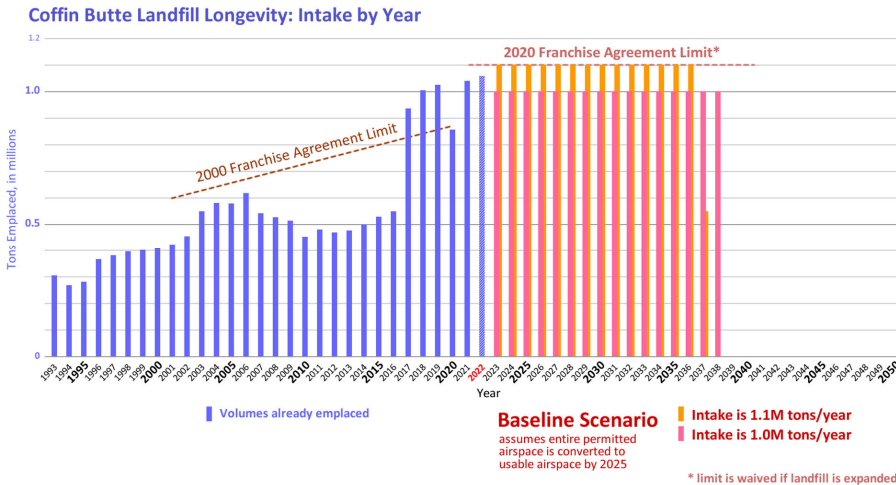
LSCL-F-45. The franchisee's baseline projection of 2037-2039 is based upon an intention to keep intake rates as high as possible.

LSCL-F-46. Intake-increasing factors such as population growth and debris from disasters may drive up intake rates and thus shorten landfill life within the 2034-2045 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 within the 2034-2045 range and beyond.

The above section requested by Ken Eklund to replace the below section

The baseline scenario described in Part A, above, graphically displays the landfill's longevity as shown in Figure 3.2, below:

Figure 3.2



**Commented [RD164]:** This figure should be updated with a new title for "2000 Franchise Agreement Limit" to match the final title chosen above in figure 2.

This scenario is termed a baseline because it is a simple projection that more sophisticated scenarios can be built upon. As indicated in its Assumptions, this baseline scenario is not a "default future"; it is not realistic, in that it references itself only, has no supporting data, is aspirational, and does not incorporate outside factors. It is our baseline because it models the idealized parameters (and longevity) intended for the landfill by the landfill's owner, which is: a steady annual intake of between 1M and 1.1M tons for the duration of the landfill's 14.5-16 year site life (to 2037-2039).

**Commented [RD165]:** I recommend using this as the introduction to section 3A

**Scenarios built upon the Baseline: Quarry Levels**

Roughly 2.7 million cubic yards of the landfill's permitted airspace is currently unavailable because it is unexcavated rock. 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, so at a normal pace the airspace will not be fully available until the year 2040.

**Commented [RD166]:** I recommend using some of this description as an introduction to section 1.B.iii. Republic Services staff should weigh in on the numbers.

**Commented [RD167]:** Where does this number come from? Please include a reference link.

**Commented [RD168]:** Reference?

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.



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, in Figure 3.3.

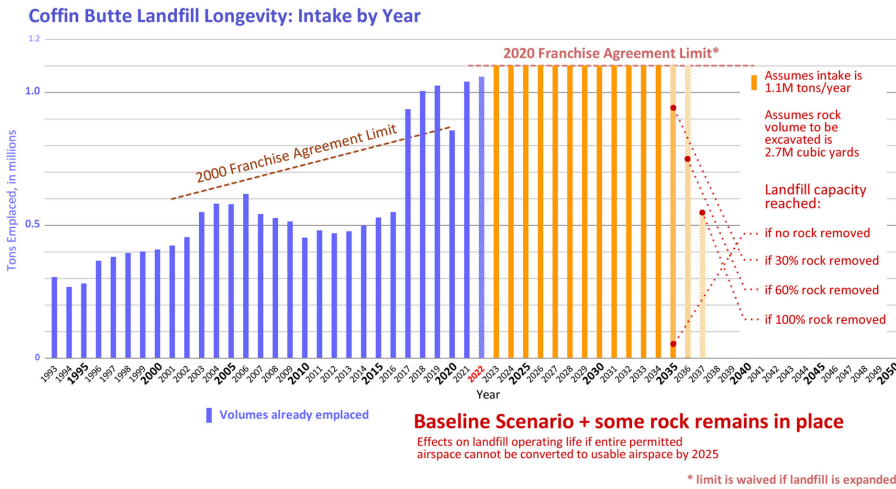


Figure 3.3

**Scenarios built upon the Baseline: Water Table**  
**Scenarios built upon the Baseline: Water Table**

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.

**Scenarios built upon the Baseline: Expansion(s)**  
**Scenarios built upon the Baseline: Expansion(s)**

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; it’s **unlikely** that the expansion would involve the airspace over the road itself, as

**Commented [RD169]:** I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

**Commented [YM170R169]:** Reducing this text to a bullet point does not allow for the explanation of what is meant by the title. As presented, the paragraph only describes the general aspects of the scenario and does not make a definitive prediction. I think it is important to keep these paragraphs, in general.

**Commented [RD171]:** I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

**Commented [RD172]:**  
 I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

**Commented [KE173]:**  
 What are the reasons for your recommendation?

**Commented [RD174]:** I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

closing the road proved problematic in the 2021 expansion attempt. We can roughly estimate the size of this expansion airspace as 6M cubic yards, M cubic yards.

This application **may** be followed by others, either to continue to act as bridges for quarry excavation or to take advantage of the removal of the intake cap, which happens once the first expansion is approved, according to the 2020 Franchise Agreement. These further expansions may close Coffin Butte Road or seek to rezone other areas around the landfill as Landfill Sites.

We can represent the effect this set of scenarios would have on baseline longevity, as Figure 3.4.

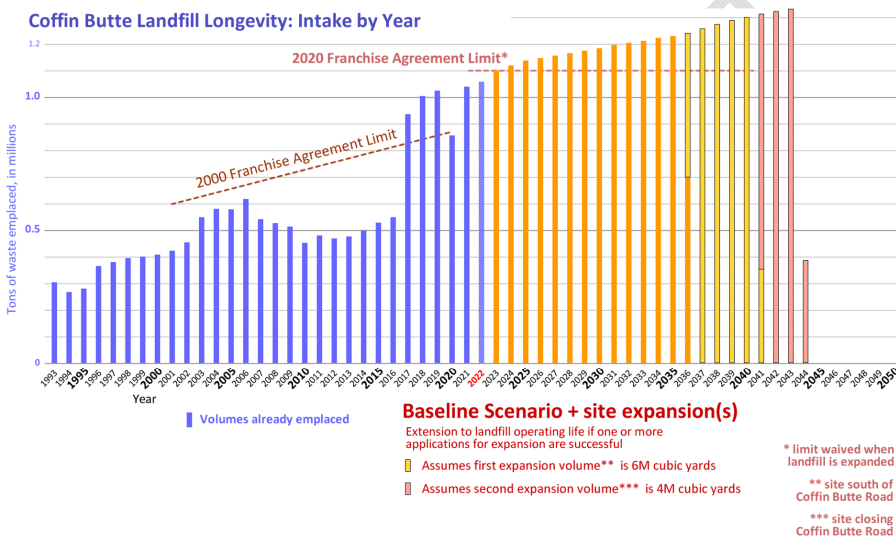


Figure 3.4

Scenarios built upon the Baseline: Historical Variance  
 Scenarios built upon the Baseline: Historical Variance

**Commented [RD175]:** We don't know how to base these assumptions in fact/sourcing/ground-truthing these numbers.

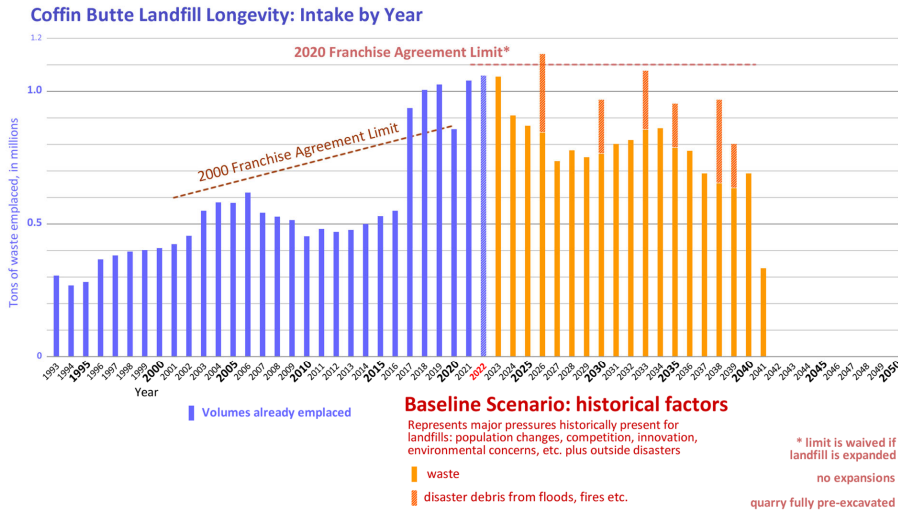
**Commented [RD176]:** We don't know how to base these assumptions in fact/sourcing/ground-truthing these numbers.

**Commented [YM177R176]:** Republic is free to opine on whether their future expansion request will involve vacation of coffin butte road and the estimated expansion airspace.

**Commented [RD178]:** I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

**Commented [KE179]:** What are the reasons for your recommendation?

**Commented [RD180]:** I recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.



The baseline scenario is derived primarily from the annual intake the landfill owner has achieved and would like to maintain. In reality such stability occurs rarely if ever. Historically, the annual intake of a landfill is determined by many factors, many beyond the owner’s ability to control or to counteract by expanding the wasteshed.

The following graphic (Figure 3.5) shows variance due to (a) slow but steady demand by people to reduce their “tax” of garbage disposal costs, (b) growing demand by people for less polluting alternatives to waste disposal, (c) growing population in the wasteshed, (d) competitive pressure from innovative alternatives to landfiling, (e) sudden spikes in intake due to wildfires, floods, and other climate-related disasters, and (f) pressure by the landfill owner to maintain intake via downward pricing and cost-cutting. These “human factors” are discussed more fully in Section 4.

Figure 3.5

**Scenarios built upon the Baseline: Climate Crisis Legislation/Legal Action/Activism**

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. In the United States, this fight is focused on the release of methane, a potent greenhouse gas. Landfills are major sources of greenhouse gas emissions, especially methane. In its Methane Emissions Reduction Plan, the US government is using all available tools to identify and reduce methane emissions from all major sources. The Inflation Reduction Act of 2022 prioritized curtailing methane pollution in the oil and gas industry sector, initiating a program that catalyzes pollution detection and offers incentives for reduction and imposes penalties for continued releases of methane into the

**Commented [RD181]:**  
TI recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

**Commented [KE182]:**  
What are the reasons for your recommendation?

**Commented [RD183]:** TI recommend that these scenarios be removed and simplified as bullet points in the "Events and Factors with Potential Lifetime Impact" section.

atmosphere. At the same time, environmentally engaged citizens are suing governmental agencies, and investors are suing corporations, for failing to act responsibly on the climate crisis. These signals of change are discussed in Section 4.

Since methane is not “destroyed” nor does it become carbon neutral, 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 when curtailing landfill methane.

The preceding graphic (Figure 3.5) does not take into account these increasing pressures for action. The following graphic (Figure 3.6) shows one range of possible effects of these regulatory, legal, political and competitive pressures.

<graphic to come>

Figure 3.6

## 76 Section 4: Human Factors Affecting Landfill Size/Capacity/Longevity – Ken Eklund

### Assessing Human Factors

Although the physical parameters of Coffin Butte Landfill play a role in its longevity (“operating life”), human factors drive the actual outcome, because they determine the inflow of material that fills up the landfill’s permitted volume (and shape that volume itself). Unlike the physical factors, human factors – by which we mean decisions and agreements such as business and legal obligations, legislation, enforcement, civic action and attitudes, technological advances, risk assessments and risk taking, individual and collective values and choices, and so on – have the power to shift the landfill’s operating life very quickly. Estimations of the operating life of the Coffin Butte Landfill necessarily rely on assessments and assumptions about the entire system that feeds waste to the landfill, and this wider system is created by, motivated by, operated by, and continuously being changed by human factors.

**Commented [RD184]:** I recommend that these scenarios be removed and simplified as bullet points in the “Events and Factors with Potential Lifetime Impact” section.

**Commented [RG185]:** Republic Services acknowledges that a variety of factors, including human, can have an impact on landfill site life. These include, but are not limited to, population growth, lifestyle changes (i.e., increased at home shopping as we saw during the pandemic), acts of Mother Nature (such as wildfires) adjustments in diversion/recycling rates, and tonnage volume in the broader market.

**Commented [RD186R185]:** Added to list above

When mapping possible futures, experts use different methods to assess human factors than they do for physical factors. “Scenario planning” poses *what if* questions to anticipate future possibilities. “Futures signaling” looks for events that indicate coming trends or movements. Using these futurecasting methods is important because for many people, cognitive biases limit their view of the future to be a mere extension of the present, with only incremental changes, even though their actual experience is of a world in which radical and disruptive changes are occurring at an ever-faster rate. “Imagination training” can be a useful tool to be more successful at discerning these patterns of ~~change~~ ~~change~~ ~~change~~.

### The Climate Change Imperative, and ~~Methane~~ ~~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. The 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) took place from 6 to 20 November this year, 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.<sup>i</sup> UN Secretary-General António Guterres said that more needs to be done to drastically reduce emissions now. “The world still needs a giant leap on 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.”<sup>ii</sup>

In the United States, this fight is focused on the release of methane, a potent greenhouse gas. 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. Humans produce the bulk of methane pollution, and atmospheric concentrations of methane have been trending upward for more than a decade, with 2020 seeing the biggest one-year jump on record.

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.

**Commented [RG187]:** Republic Services has proposed a couple of viable “scenarios” based on accepted practices of landfill site life modeling, and past data points. However, we are opposed to any “imagination training” or modeling that is speculative in nature.

**Commented [KE188]:** We can make it clear in the document which scenarios are yours and which are not.

**Commented [KE189]:** What are the “data points” that you are referencing here?

**Commented [RG190]:** Republic Services has proposed a couple of viable “scenarios” based on accepted practices of landfill site life modeling, and past data points. However, we are opposed to any “imagination training” or modeling that is speculative in nature.

**Commented [RG191]:** Republic Services has proposed a couple of viable “scenarios” based on accepted practices of landfill site life modeling, and past data points. However, we are opposed to any “imagination training” or modeling that is speculative in nature.

**Commented [YM192R191]:** The Human Factors discussion proposed to be included here provide a valuable perspective and highlight the fact that all modeling efforts require a broad range of assumptions (a.k.a. speculation) as to the likely inputs going forward. The descriptions included here do not attempt to identify a specific result, but, in fact, highlight the many complex variables that influence our future.

**Commented [RG193]:** Republic Services believes that this entire section and the scenarios that follow should be stricken from the record, as these issues are not within the scope or charge of the site life subcommittee. Further, the scenarios outlined below are based on speculative presumptions that have not yet occurred.

**Commented [RG194]:** Republic Services believes that this entire section and the scenarios that follow should be stricken from the record, as these issues are not within the scope or charge of the site life subcommittee. Further, the scenarios outlined below are based on speculative presumptions that have not yet occurred.

**Commented [YM195R194]:** I disagree and oppose the effort to strike this discussion from the record as proposed by Republic Services.

Landfills are major sources of greenhouse gas emissions. 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<sub>2</sub>) 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.

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.

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 super-emitters, because a previous flyover project across California discovered that only 1% of sites produced 50% of methane emissions, and the largest emissions were from landfills. 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, and MethaneSAT, a subsidiary of the EDF.

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 waste flows, operating costs, regulatory fines, corporate investment levels, public action, and more. Coffin Butte Landfill may be a particular target for negative effects, because its wet environment converts waste to methane quickly. This section details several Scenarios which explore these impacts upon the landfill’s anticipated operating life.

It’s important to note here 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.

## Scenarios

### A. Climate Crisis Legislation

Scenario: the methane-corrective measures imposed on the oil/gas industry are extended into the landfill industry, focusing on incentives to prevent methane from being emitted but including penalties for methane pollution. This extension happens in the year 2024.

In this scenario, as they are doing in the oil/gas industry, federal and state environmental agencies offer billions of dollars in incentives tailored to catalyze efforts that can curtail landfill methane.

In this scenario, federal and state environmental agencies announce and implement financial penalties (fines) for methane release to the atmosphere. As is currently happening in the oil/gas industry, these penalties are eased in over a four-year period, and cap at a rate around \$1550 per metric ton in 2022 dollars.

In general, the effect of this carrot + stick scenario on Coffin Butte Landfill's operating life would be to lengthen it. The incentives would 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 would bring the landfill operator into alignment with this diversion (and reduction of profit). This would be a sea change in the wasteflow, creating knock-on opportunities to create circular economies for other types of waste, motivated by environmental concerns, economic efficiencies, and other reasons.

It's also possible that this scenario would shorten the operating life of Coffin Butte Landfill, even precipitously, if the prospective penalties for incoming waste (plus the penalties for methane emissions from waste already emplaced) cut unacceptably into the profit schema of the landfill owner. The likelihood of this eventuality depends upon the actual methane output of the landfill, which is currently undocumented.

The signal for this scenario is strong, because it is based upon 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.



Another legislative scenario to mention briefly, related to the climate crisis: efforts to limit atmospheric carbon widen to non-methane sources in the US, in the form of a carbon tax and/or subsidies for rail electrification. This scenario would disrupt the current operations in the Coffin Butte watershed, by establishing new incentives to transport waste by rail rather than truck. This scenario is likely to extend the operating life of Coffin Butte Landfill, which has no rail connection and depends on trucking for its inflow. If entities can transport waste more economically by rail to cleaner landfills or to regional waste reclamation centers, that would cut inflow to Coffin Butte Landfill.

## **B. Climate Crisis Legal and Shareholder Action**

Scenario: Environmentally engaged citizens sue governmental agencies (and investors sue corporations) for failing to act on the climate crisis. These lawsuits compel action to reduce emissions of greenhouse gases, which in turn boost efforts to divert material, especially food and other high organic waste, from being landfilled at Coffin Butte Landfill. In this scenario, these lawsuits have the potential to occur across the watershed.

Signals for this scenario set exist in plenty. Groups of environmentally engaged citizens are already pursuing lawsuits against states and nations; such cases appear regularly in the news as current ones wind their way through the courts and new ones are filed. Climate activism is already widespread in Oregon and the landfill's watershed includes areas disposed politically toward this kind of legal action. Benton County is more likely than most to be targeted for this kind of lawsuit, as its population generally prioritizes environmental concerns and the County has not shown concern over greenhouse gas emissions in its administration of Coffin Butte Landfill.

"I started looking at the world through a new lens recently — when my older daughter gave me the incredible news that I'll become a grandfather next year... I can sum up the solution to climate change: We need to eliminate global emissions of greenhouse gases by 2050... We need to revolutionize the entire physical economy... If we don't get to net-zero emissions, our grandchildren will grow up in a world that is dramatically worse off." The grandfather-to-be is Bill Gates, a major shareholder in Republic Services' stock.

This scenario would further extend the operating life of the landfill if methane studies show that Coffin Butte Landfill is a worse polluter than alternative landfills in drier climates (if Coffin Butte Landfill converts waste to methane more quickly, for example). The legal action would then not only divert high-organic material out of the wastestream, but divert unsorted waste away from Coffin Butte Landfill to less-polluting alternatives.



### **C. Climate Crisis Environmental Activism**

Scenario: Environmental activists accelerate their efforts to increase accountability for, and limit waste intake at, Coffin Butte Landfill. These efforts consist mostly of expansion to the current level of civic engagement but also branch out as protests and other direct action when civic engagement cannot produce the depth and velocity of change required for environmental protection.

This scenario is similar to, and operates in tandem with, the “legal action” scenario, and has a similar effect of reducing intake at the landfill. Activism happens more quickly however, so the primary impact of this scenario is as an across-the-board accelerant and forcer for all the environmentally motivated changes being discussed in this section.

Signals for environmental activism’s impact on the operating life of Coffin Butte Landfill are very strong. Environmental activism has already caused the single most impactful event on the operating life of Coffin Butte Landfill in its history: activists stopped the expansion of the Riverbend Landfill in Yamhill County, which effectively doubled trash intake at Coffin Butte Landfill to its current high level. Local activism is why the County has assembled its Workgroup studying the future of solid waste management in Benton County, and local activists feature prominently in the work done by the Workgroup so far.

### **D. Climate Crisis Effects Upon Landfill Operating Life**

Scenarios: effects of the climate crisis itself circle back to affect the operating life of Coffin Butte Landfill, by increasing the incidence of wildfires, floods, droughts, and other disruptions to the landfill’s extensive infrastructure; by causing rapid and novel shifts in population migrations and attitudes; by posing threats to the landfill’s operational status itself.

Signals for this set of scenarios are strong. Worldwide, the number and severity of climate events and disasters is growing, made more extreme by climate-crisis effects. Locally, in 2020 the Beachie Creek–Lionshead wildfire generated about a third of a million tons of debris for Coffin Butte Landfill. The region continues to slide into multi-year drought, which extends the fire season in an area already at risk with high forest fuel loads. The Willamette Valley now has a regular “smoke season.” Rain events are growing in severity, increasing chances for flood events in the landfill’s watershed and on the landfill itself. As a creator of flammable methane, the landfill has clear

potential for a major fire event; it has caught fire in the past, which on one occasion called for a large fire response and took over 24 hours to bring under control.

Despite these trends, the Pacific Northwest is seen as a haven for those elsewhere who have been even more severely impacted by heat, fire, flood and other disasters.

~~In the main, climate crisis events are likely to shorten the landfill's operating life. Fires and flooding have the potential to generate debris flows that will consume capacity.~~ ~~In the main, climate crisis events are likely to shorten the landfill's operating life. Fires and flooding have the potential to generate debris flows that will consume capacity,~~ as would a population boost from climate refugees relocating into the wasteland.

**Commented [YM196]:** None of these waste streams are counted in the "tonnage cap" included in the 2020 franchise agreement

**Commented [197]:** The debris isn't affected by the cap, but it still shortens landfill life by occupying volume in the landfill

The most extreme scenarios shorten the landfill's operating life precipitously. The landfill itself could have a flooding event, where leachate cannot be pumped out fast enough or overflows its collection ponds for example, with effects unknown upon the landfill's ability to continue operations. Wildfire is a clear existential threat, as landfills are full of both incendiary methane and flammable material; landfill fires can burn deep, are difficult to fight and have been known to burn for years and take over a hundred million dollars to extinguish.

These events concatenate: a storm event, for example, might knock out power to the landfill for an extended period, which then leads to a flood event as pumps cannot operate. An earthquake could cause both a power outage, which collapses the landfill's ability to operate its methane extraction system, and multiple wildfires, which threaten to ignite the uncontrolled methane. In such scenarios, the landfill is not a direct threat to human life and thus not a priority for firefighters or other emergency action, so any incident can snowball.

#### E. Longevity: Post-Operational Costs

Climate legislation, activism, crisis events, and so on are all increasing the burden of monitoring and maintaining public safety for the decades required after the landfill ceases operations. It's estimated that the landfill will continue to produce significant amounts of methane for 20 years after it closes, for example. If that methane is incurring penalties, who will be paying them? If trees need to be prevented from growing on the landfill cover, who will be performing that maintenance? And so on, through a growing list of like questions.

Scenario: As a clearer picture of the landfill's post-operational burden emerges, it sparks action to cut the landfill's waste intake. This effort may be initiated by the County, in an effort to both reduce the landfill's pollution impacts and to put off the day when responsibility for the landfill is transferred to the County; it may be initiated by citizens, in an effort to both reduce the pollution impacts and to delay transition to another waste management scheme; it may be initiated by the landfill owner, in an effort to delay incurring expensive post-operation environmental mitigations, and/or to keep alive the legal option to file for expansion.

Signals for this scenario include the current litigation at Riverbend Landfill in Yamhill County, where the landfill owner is trying to avoid closing the landfill by taking in a minimal amount of trash per year, and county citizens are suing to force the landfill to close.

#### **F. Unforeseen Novel Effects**

The scenarios listed above have signals that are easy to discern, and they manifest in more or less familiar ways. The level of change at work here, however, signals the strong possibility for novel and unforeseen effects, especially concatenating ones. In the same way that COVID manifested itself in a myriad of ways that were difficult to anticipate, the climate crisis is causing changes with ripple effects that have yet to become apparent.

These effects inject (more) uncertainty into the agreements and infrastructure of the landfill's watershed, which in turn steers the entities in the watershed toward reducing their waste flows and increasing the resilience of their waste management by seeking other options. The unforeseen effects of climate change are likely to increase the landfill's operating life.

#### **G. Contractual Obligations**

From day to day the wasteflow to Coffin Butte Landfill is governed by business contracts that Republic Services holds with various entities; the landfill's watershed is defined and redefined by these contracts. Republic Services will not provide detail about these contracts, citing their proprietary nature, so the wasteflow's net effect upon the operating life of the landfill is undocumented.

### **Imagination Training**

When thinking about the future, it's common for people to manifest a cognitive bias toward the status quo, to think the future is settled as an extension of the present. This bias can manifest itself even when change is clearly underway. To counteract this bias, it's useful to require the arguments FOR the continuation of the status quo (rather than just accepting it as being unquestioningly able to continue).

To refute the idea that measures to prevent methane leaks will be extended from the oil/gas industry to the landfill industry, for example, would require a line of reasoning as to why those measures wouldn't be extended into the landfill industry (which is known to leak methane).

Another example: minimizing the role of environmental activism (as a human factor in the landfill's operating life) would require a line of reasoning as to why such activism will cease impacting the state's landfilling ecosystem or will not continue to grow at its current pace.

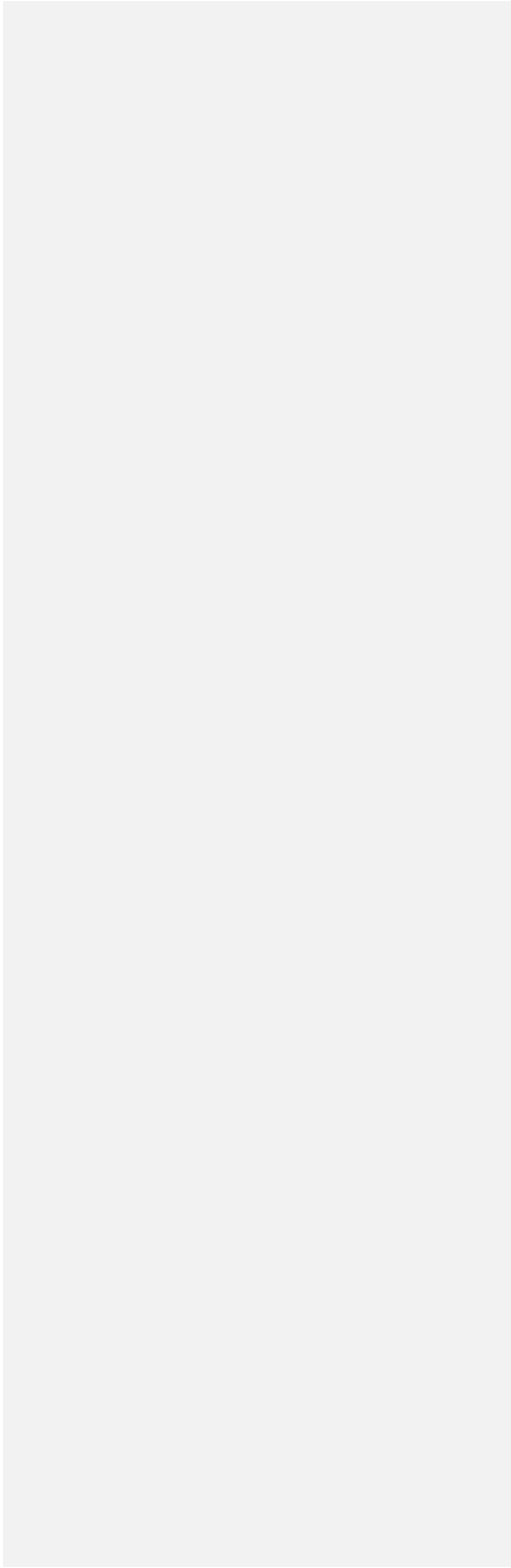
Imagination training is also useful in exposing areas where data still holds sway, even though it is now known to be limited or obsolete, i.e., where an old idea perseveres purely through momentum or inertia. An example would be the methane emissions level at Coffin Butte Landfill: to persist in relying on an obsolete EPA estimate would require a line of reasoning as to why that estimate should hold sway over modern direct measurements.

#### **Determining Landfill Longevity - Ken Eklund**

< summary of human factors to come >

< graphic to come >

DRAFT



87 **Appendix A: Intake Volume 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.

**Commented [PN198]:** I will work with Chuck to consolidate the data from his Appendix B table, and to add backup information for the "2000 FA Limit" item.

**Commented [RD199]:** I recommend using the combined table below, which includes reported airspace.

Year	CBAR Volume (Tons)
1993	310,648
1994	268,472
1995	287,932
1996	369,835
1997	378,919
1998	395,751
1999	401,408
2000	413,493
2001	425,723
2002	453,261
2003	550,506
2004	586,076
2005	580,275
2006	618,340
2007	546,996
2008	528,396
2009	519,058
2010	458,590
2011	482,951
2012	473,550
2013	479,160
2014	499,687
2015	530,971
2016	552,979
2017	941,430
2018	1,010,879
2019	1,034,934
2020	863,210
2021	1,046,067

Table x:

**Commented [RD200]:** Daniel's addition, combining Paul and Chuck's submitted tables into one. Can this replace Paul's table above, and the three tables from chuck below?

Year	CBAR Volume (Tons)	2000 FA Threshold	<u>CBR Density Ratio</u>	<u>CBR Annual Airspace Used (CY)</u>	<u>CBR Remaining Airspace (cy)</u>
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	<u>0.9</u>	<u>473000</u>	<u>25,238,000</u>
2002	453,261	612,000	<u>0.98</u>	<u>561,592</u>	<u>24,776,627</u>
2003	550,506	624,240	<u>0.98</u>	<u>561,592</u>	<u>24,209,320</u>
2004	586,076	636,725	<u>0.80</u>	<u>736,434</u>	<u>24,513,192</u>
2005	580,275	649,459	<u>0.80</u>	<u>725,344</u>	<u>29,916,144</u>
2006	618,340	662,448	<u>0.8</u>	<u>781,094</u>	<u>29,135,051</u>
2007	546,996	675,697	<u>0.8</u>	<u>683,746</u>	<u>28,451,306</u>
2008	528,396	689,211	<u>0.8</u>	<u>660,494</u>	<u>27,785,082</u>
2009	519,058	702,996	<u>0.8</u>	<u>648,823</u>	<u>27,136,259</u>
2010	458,590	717,056	<u>0.892</u>	<u>514,111</u>	<u>27,382,241</u>
2011	482,951	731,397	<u>1.0375</u>	<u>465,495</u>	<u>24,807,718</u>
2012	473,550	746,025	<u>0.83</u>	<u>572,825</u>	<u>23,741,843</u>
2013	479,160	760,945	<u>0.92</u>	<u>523,100</u>	<u>24,458,567</u>
2014	499,687	776,164	<u>0.92</u>	<u>545,510</u>	<u>23,839,138</u>
2015	530,971	791,687	<u>0.89</u>	<u>595,593</u>	<u>23,839,138</u>
2016	552,979	807,521	<u>0.93</u>	<u>592,689</u>	<u>22453729</u>

Year	CBAR Volume (Tons)	2000 FA Threshold	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
2017	941,430	823,671	<u>0.97</u>	<u>969,048</u>	<u>21,727,371</u>
2018	1,010,879	840,145	<u>0.99</u>	<u>1,021,090</u>	<u>18,015,098</u>
2019	1,034,934	856,948	<u>0.8</u>	<u>1,293,668</u>	<u>18,352,257</u>
2020	863,210	874,087	<u>1</u>	<u>863,210</u>	<u>17,621,208</u>
2021	1,046,067	#N/A	<u>0.98</u>	<u>1,067,415</u>	<u>17,249,778</u>
2022	<u>1,100,000-</u>		<u>0.999</u>	<u>1,089,900</u>	<u>16,008,557</u>
2023	<u>1,100,000-</u>		<u>0.999</u>	<u>1,089,900</u>	<u>14,918,657</u>
2024	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>13,828,757</u>
2025	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>12,738,857</u>
2026	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>11,648,957</u>
2027	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>10,559,057</u>
2028	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>9,469,157</u>
2029	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>8,379,257</u>
2030	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>7,289,357</u>
2031	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>6,199,457</u>
2031	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>5,109,557</u>
2033	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>4,019,657</u>
2034	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>2,929,757</u>
2034	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>1,839,857</u>
2035	<u>1,100,000</u>		<u>0.999</u>	<u>1,089,900</u>	<u>749,957</u>
2036	<u>750,708</u>		<u>0.999</u>	<u>749,957</u>	<u>0</u>



98 Appendix B: Capacity Data and Site Life Projections

Year	Annual CBR Tons Scaled Intake	CBR Density Aerials	CBR Annual Airspace Used (CY) Landfilled	CBR Remaining Airspace (CY)	Geo Logic 2021 Plan Consumed Airspace (YD)	Geo Logic 2021 Plan Remaining Airspace (YD)
1993	310,648					
1994	268,472					
1995	287,932					
1996	369,835					
1997	378,919 Averaged					
1998	395,751					
1999	403,697					
2000	413,493					
2001	426,000	0.9 tons/cy	473,000			
2002	457,000	0.98 tons/cy	461,000			
2003	550,360	0.98 tons/cy	561,592			
2004	589,147	0.80 tons/cy	736,434			
2005	580,275	0.80 tons/cy	725,334			
2006	624,875	0.80 tons/cy	781,094			
2007	546,996	0.80 tons/cy	683,746			
2008	528,395	0.80 tons/cy	660,494			
2009	519,058	0.80 tons/cy	648,823			
2010	458,590	0.892 tons/cy	514,111	39,594,002		
2011	482,951	0.1.0375 tons/cy	465,495	24,807,718		

**Commented [YM201]:** The 1983 zone change application contains a data point (375 tons per day) that should be added to this table. Assuming 312 operating days, that equals 117,000 tons per year.

**Commented [RD202]:** I recommend removing these columns

2012	473,440	0.83 tons/cy	572,825	23,741,813		
2013	479,160	0.92 tons/cy	523,100	24,458,567		
2014	499,687	0.92 tons/cy	545,510	24,458,363		
2015	530,971	0.89 tons/cy	595,593	23,839,138		
2016	552,979	0.93 tons/cy	592,689	22,453,729		
2017	941,430	0.97 tons/cy	969,048	21,727,371		
2018	1,010,879	0.99 tons/cy	1,021,090	20,427,503		
2019	1,034,934	0.80 tons/cy	1,293,668	18,352,257		
2020	863,210	1.0 tons/cy	863,210	17,621,208		
2021	1,046,067	0.98 tons/cy	1,046,415	17,249,778	1,072,037	4,834,330
2022					1,057,700	3,776,631
2023					1,057,700	2,718,931
2024					1,057,700	1,661,232
2025					1,057,700	603,532
2026					1,057,700	1,028,093
2027					1,057,700	999,823
2028					1,057,700	1,685,254
2029					1,057,700	626,554
2030					1,057,700	1,428,675
2031					1,057,700	370,975
2032					1,057,700	391,696
2032					1,057,700	1,020,066
2034					1,057,700	1,977,627
2035					1,057,700	919,927
2036					1,057,700	1,157,678
2037					1,057,700	99,978
2038					664,409	664,409

Commented [RD203]: I recommend deleting these rows

The data table to the left references the year, intake tons, density, annual airspace used and remaining airspace for Coffin Butte landfill.

The following Year 2021 is a summary of information used for the annual reports for Coffin Butte landfill.

Each year Republic Services produces an annual report for Coffin Butte Landfill & Pacific Region Compost (CBR).

In particular, during year of 2021 the landfill accepted 1,046,067 tons of solid waste. Based on historical aerial fly-over data, the average effective density of the in-place waste at the Coffin Butte Landfill is 0.98 tons/cy (1,961 lbs. /cy – 2021 Operational Density). Therefore, an estimated 1,067,415 cubic yards of airspace was used for the year. A total of 21,389,767 cubic yards has been consumed as of December 31, 2021. The remaining capacity for the entire permitted landfill footprint as of the end of 2021 was approximately 17,249,778 cubic yards. This information is updated annually with aerial flyovers. Using 0.80 tons/cy, the remaining available landfill space expressed in tons is about 13,799,822 tons. Using an average disposal rate of approximately 750,000 tons per year, there are about 18.40 years of landfill space available. If we use our 3-year density average of 0.93 tons/cy, the site life extends to 21.38 years.

This illustrates the importance of density on landfill site life.

As the density (compaction) is lowered per ton of solid waste due to the varying waste composition, then more headspace is consumed in the landfill thereby lowering landfill space available.

The remaining Airspace (CY) in the table to the left for Year2022 is adjusted for Scenario 2 data provided by Ian MacNab member of Subcommittee A1 – Republic Services.

*Reference MacNab's e-mail of 11/22/22 – Coffin Butte Landfill Capacity, which outlines the following scenarios for for site life of the landfill.*

Site life scenarios are based on the capping of the cells when reaching the final design elevation of the landfill, but does not include the decomposition cycle of the solid waste when the cell is capped.

Site:	Coffin Butte Landfill
Project Name:	2021 Site Development Plan Update
Date:	12/23/2021
Calc By:	ASO
Reviewed By:	RB

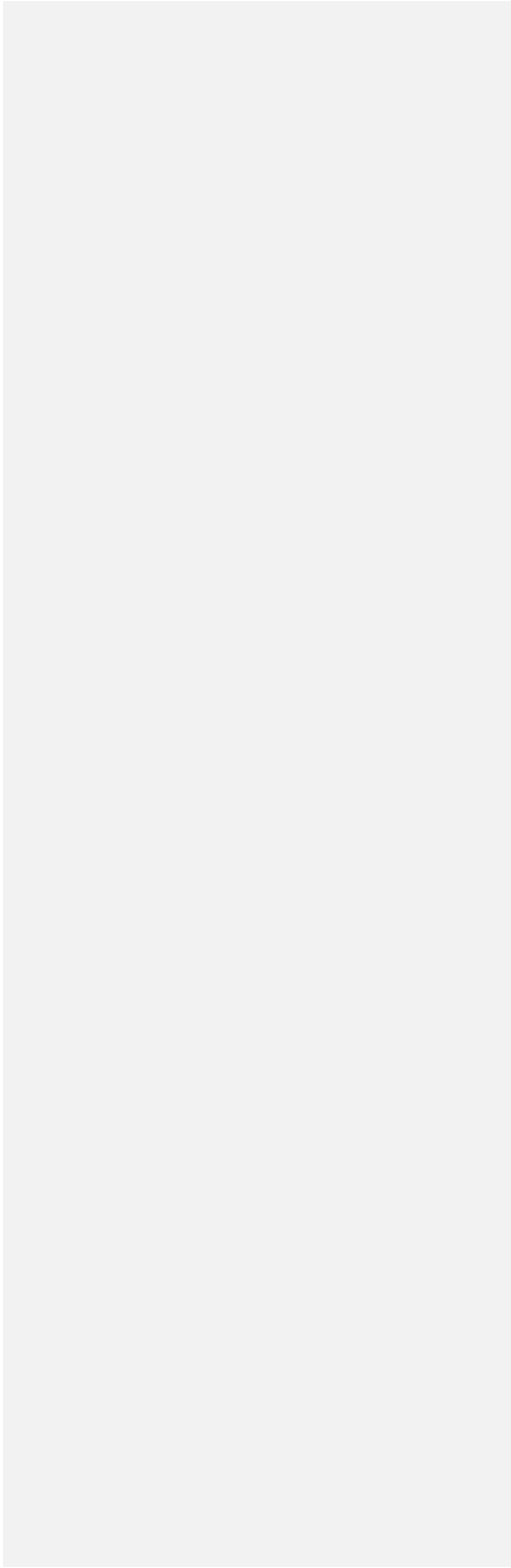
Projected Daily Waste Receipt            2,959 tons/day    (from 2021 5 Yr Fill Plans)

Assume <sup>1</sup>    0.0 % growth rate  
Operational Density                            0.8 ton/cy    (from 2021 5 Yr Fill Plans)  
Operational Days                                286 days/year  
  
Remaining Site Life                            18 Years

Note <sup>1</sup>: Growth Rate Based On Site Aerial Budget Model

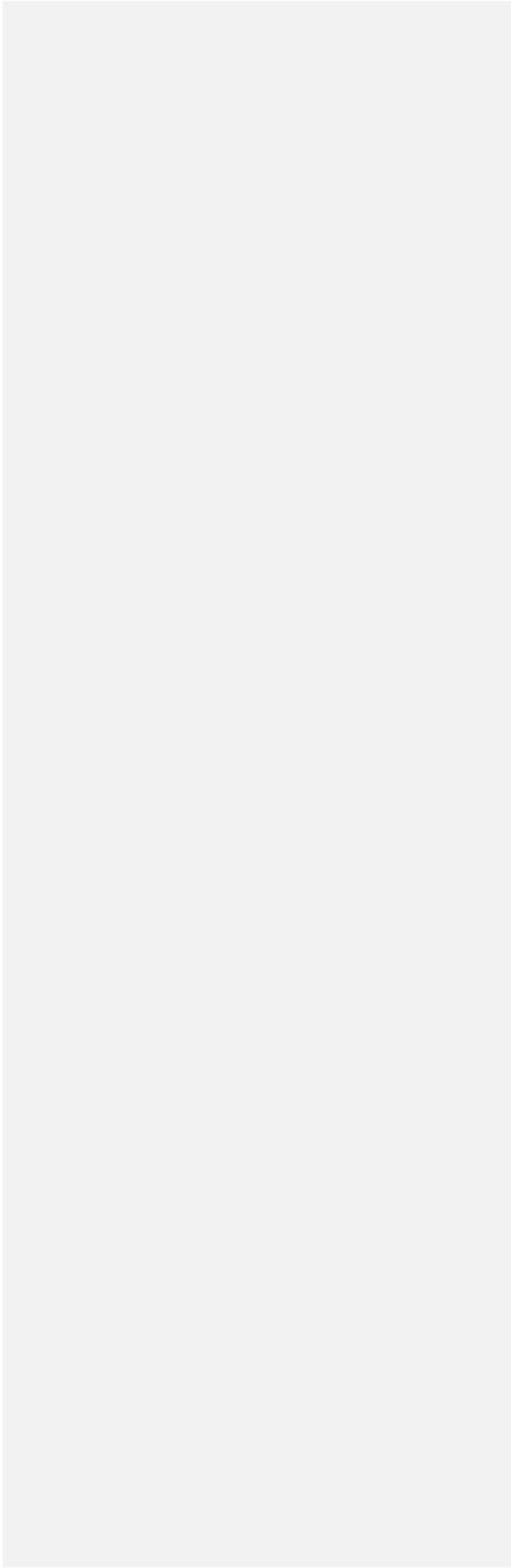
Year	Consumed    Remaining	
	Airspace (cy)	Airspace (cy)
2021	1,072,037	4,834,330 *Cell 5D/5E Constructed Remaining from 3/30/21 survey date
2022	1,057,700	3,776,631
2023	1,057,700	2,718,931
2024	1,057,700	1,661,232
2025	1,057,700	603,532
2026	1,057,700	1,028,093 Construct Phase 6A (Add 1,482,260 cy)
2027	1,057,700	999,823 Construct Phase 6B (Add 1,029,430 cy)
2028	1,057,700	1,684,254 Construct Phase 6C (Add 1,742,130 cy)
2029	1,057,700	626,554
2030	1,057,700	1,428,675 Construct Phase 6D (Add 1,859,820 cy)
2031	1,057,700	370,975
2032	1,057,700	391,696 Construct Phase 6E (Add 1,078,420 cy)
2033	1,057,700	1,020,066 Construct Phase 6F (Add 1,686,070 cy)
2034	1,057,700	1,977,627 Construct Phase 6G (Add 2,015,260 cy)
2035	1,057,700	919,927
2036	1,057,700	1,157,678 Construct Phase 6H (Add 1,295,450 cy)
2037	1,057,700	99,978
2038	1,057,700	664,409 Construct Phase 6I (Add 1,622,130 cy)
2039	664,409	0

DRAFT



Year	Annual CBR Intake Tons	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
1993	310,648			
1994	268,472			
1995	287,932			
1996	369,835			
1997	378,919			
1998	395,751			
1999	403,697			
2000	413,493			
2001	426,000	0.9	473000	25,238,000
2002	457,000	0.98	561,592	24,776,627
2003	550,360	0.98	561,592	24,209,320
2004	589,147	0.80	736,434	24,513,192
2005	580,275	0.80	725,344	29,916,144
2006	624,875	0.8	781,094	29,135,051
2007	546,996	0.8	683,746	28,451,306
2008	528,395	0.8	660,494	27,785,082
2009	519,058	0.8	648,823	27,136,259
2010	458,590	0.892	514,111	27,382,241
2011	482,951	1.0375	465,495	24,807,718
2012	473,440	0.83	572,825	23,741,843
2013	479,160	0.92	523,100	24,458,567
2014	499,687	0.92	545,510	23,839,138
2015	530,971	0.89	595,593	23,839,138
2016	552,979	0.93	592,689	22453729
2017	941,430	0.97	969,048	21,727,371
2018	1,010,879	0.99	1,021,090	18,015,098
2019	1,034,934	0.8	1,293,668	18,352,257
2020	863,210	1	863,210	17,621,208
2021	1,046,067	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

DRAFT



9 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

**Commented [YM204]:** This Table really could benefit from a parcel map or maps to orient the reader.

**Commented [YM205]:** Is Property Use the same as the parcel zoning?

**Commented [RD206R205]:** No

**Commented [RD207]:** Highlighted cells show the properties which Republic Services said were likely purchased prior to the 1983 zoning changes.



Coffin Butte Landfill Properties					
	Tax Lot #	Current Zone	Previous Zone (Change Date)	Property Use	Date Acquired and Ownership
		Forest Conservation (North)	Forty Acre Minimum (FC-40) (1983)		Segregated from 104180000300 in 1972
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

**Commented [YM205]:** Is Property Use the same as the parcel zoning?

**Commented [RD206R205]:** No

**Commented [PN208]:** Daniel: I believe this lot was owned by the landfill at the time of the 1983 rezoning; what is the transfer prior to 1983?

Coffin Butte Landfill Properties					
	Tax Lot #	Current Zone	Previous Zone (Change Date)	<del>Property Use</del> Property Use	Date Acquired and Ownership
11	104180001101	Forest Conservation	Rural Residential, 5 Acre Minimum (1982)	Construction staging/storage area, office (2013)	December 1991, Valley Landfills, Inc Deed 142396-91
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, 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

**Commented [YM205]:** Is Property Use the same as the parcel zoning?

**Commented [RD206R205]:** No

**Commented [PN209]:** Daniel: I believe this lot was owned by the landfill at the time of the 1983 rezoning. Is the 1977 "segregation" transfer when it became part of the landfill? History of this parcel is particularly important to document as it would be the target for any expansion similar to LU21-047.

Coffin Butte Landfill Properties					
	Tax Lot #	Current Zone	Previous Zone (Change Date)	<del>Property Use</del> Property Use	Date Acquired and Ownership
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
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

Commented [YM205]: Is Property Use the same as the parcel zoning?

Commented [RD206R205]: No

Coffin Butte Landfill Properties					
	Tax Lot #	Current Zone	Previous Zone (Change Date)	<del>Property Use</del> Property Use	Date Acquired and Ownership
					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

**Commented [YM205]:** Is Property Use the same as the parcel zoning?

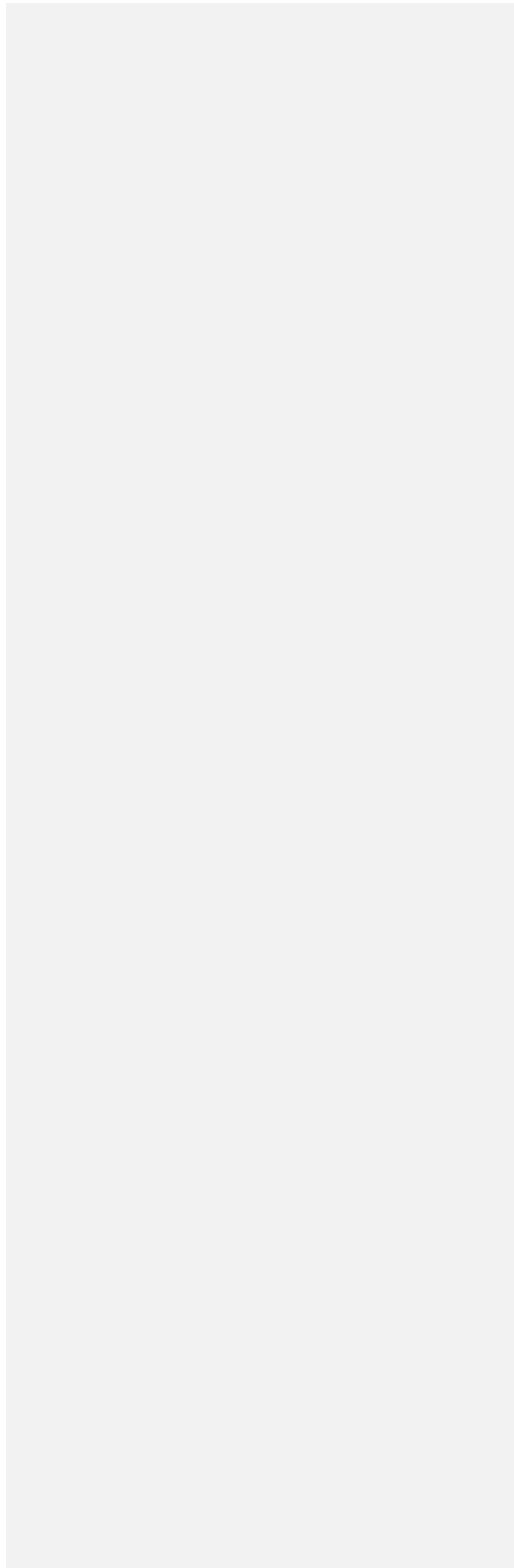
**Commented [RD206R205]:** No

DRAFT

<sup>i</sup> Endnotes to come.

<sup>ii</sup> Endnotes to come...

DRAFT



**Page 24: [1] Commented [RD31R30] REDICK Daniel 1/17/2023 7:50:00 AM**

From Mark Yeager: We need to get more info here regarding the history of the permitted capacity - this makes it look like the permitted space has always been the same from inception to now, and that is not true. Does DEQ have information here? Prior permits?

**Page 24: [2] Commented [RD30] REDICK Daniel 12/30/2022 4:28:00 PM**

This 18,000,000 referenced is reported as tons in the graph in SWAC Minutes attached (A-3) to the 1995 report, not cubic yards. That graph is also not fully detailed in the annual report, and the 18,000,000 is referred to as "capacity of total landfill area" as a distinction from "capacity of planned development area" (cells 1-5 at the time). I recommend removing this line.

**Page 30: [3] Commented [RD51] REDICK Daniel 12/27/2022 1:52:00 PM**

The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I recommend using the landfill annual report data for consistency (as shown in the suggested chart below).

"Intake Volume" may be misleading for this chart, as tonnage and volume are distinct concepts with landfill operations. I recommend a label like "Annual Tons Accepted" for clarity.

**Page 30: [4] Commented [RD54] REDICK Daniel 12/27/2022 1:52:00 PM**

The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I recommend using the landfill annual report data for consistency (as shown in the suggested chart below).

"Intake Volume" may be misleading for this chart, as tonnage and volume are distinct concepts with landfill operations. I recommend a label like "Annual Tons Accepted" for clarity.

**Page 30: [5] Commented [56] REDICK Daniel 12/27/2022 1:52:00 PM**

The 2000 Franchise Agreement did not have a "limit", so the blue line is not accurate.

This annual tonnage does not match the data from the landfill annual reports for many of the years, so I recommend using the landfill annual report data for consistency (as shown in the suggested chart below).

"Intake Volume" may be misleading for this chart, as tonnage and volume are distinct concepts with landfill operations. I recommend a label like "Annual Tons Accepted" for clarity.

**Page 30: [6] Commented [58] Ken Eklund 1/30/2023 12:34:00 PM**

The 2000 FA did not have a “threshold” as that word is most commonly understood. A threshold is literally a doorway, so in this context it most commonly refers to a point in which an obvious transition happens, akin to passing from one room to another, entirely different room. The word thus has a transformative context, and also a context of ‘you can’t go back,’ i.e., like when you cross the pain threshold. None of that is true here; the franchisee did not cross a threshold, more like they stepped over a line.

**Page 31: [7] Commented [KE62] Ken Eklund 1/9/2023 9:05:00 PM**

See above, regarding this limit shown on the graph. It seems like this language can be made more accurate rather than deleting it entirely.

**Page 31: [8] Commented [63] Ken Eklund 1/25/2023 10:50:00 AM**

The term “limit” seems appropriate here, as the common understanding of “limit” (as in speed limit, weight limit, etc.) applies here. The subcommittee desires clarity, so someone would have to put forth an argument as to why “limit” can’t be used, which I don’t believe has been done yet.

**Page 31: [9] Commented [RD64] REDICK Daniel 12/30/2022 5:17:00 PM**

There was not an intake limit or cap in the 2000 franchise agreement. There was a tonnage threshold discussed at which an updated baseline study can be done.

**Page 31: [10] Commented [PN65] Paul Nietfeld 1/11/2023 10:36:00 AM**

Ongoing dialog on this. Both the 2000 and the 2020 Landfill Franchise Agreements refer to their respective limits in the context of potential “adverse effects to the County’s infrastructure and environmental conditions due to increased annual volumes of Solid Waste accepted at the Landfill.”

**Page 31: [11] Commented [KE66] Ken Eklund 1/9/2023 9:07:00 PM**

This is not an accurate characterization of what happened. Riverbend Landfill attempted to expand but could not, so it closed as scheduled.

**Page 31: [12] Commented [PN67] Paul Nietfeld 1/11/2023 10:37:00 AM**

As Ed Pitera pointed out in the 15Dec2022 Workgroup meeting, this MOU was an “acknowledgement” of expected 1-2 year intake increase, rather than an “agreement.”

**Page 31: [13] Commented [YM68] Yeager, Mark 1/12/2023 5:03:00 PM**

Has anyone looked closely at the numbers to actually determine how much of the increased volume was due to redirected waste flow from Riverbend closure and how much was due to Republic's efforts to develop new customers and contracts to haul waste to Coffin Butte? I am not sure that it is accurate to assign all the increased tonnage to Riverbend closure.

**Page 31: [14] Commented [RG69] Rough, Ginger 12/14/2022 11:02:00 AM**

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.

**Page 31: [15] Commented [YM71] Yeager, Mark 1/12/2023 5:04:00 PM**

This phrase does not make any sense in this sentence. What is the intention of this statement?

**Page 31: [16] Commented [YM72] Yeager, Mark 1/12/2023 5:05:00 PM**

Some reference to additional Republic's efforts to broaden their landfill customer base needs to be included here.

**Page 31: [17] Commented [RG74] Rough, Ginger 12/14/2022 11:09:00 AM**

Republic Services requests that item #4 be re-worded as follows, per legal interpretation from our attorneys: "The 2020 Landfill Franchise Agreement states that the total tonnage deposited at the Landfill shall not exceed 1.1M tons per calendar year until expansion was fully permitted onto the "expansion parcel." The 2020 intake limit is denoted in the chart by the dashed red line ("2020 FA Limit.")

**Page 31: [18] Commented [KE76] Ken Eklund 1/9/2023 9:23:00 PM**

It is unclear to me how the crash of 2008 can be responsible for a downturn that began in 2006. Let's look at other explanations, such as the rise of environmental awareness that played a key role in the 2008 election.

**Page 31: [19] Commented [RG77] Rough, Ginger 12/14/2022 11:03:00 AM**

There's a typo here (should the first part of this sentence be 2007-2012, or should the second part of the sentence be 2018?)

We CAN say 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.