

Johnson, Sabrina O

From: Carol G. Sawyer, PE <CSawyer@jonesedmunds.com>
Sent: Tuesday, December 21, 2021 2:17 PM
To: Morgan, Steve
Cc: Dan S. Sherlock; Joshua L. Younce; Kromhout, Elizabeth; Financial Assurance Working Group; Madden, Melissa; Chad J. Spreadbury, PhD, EI; Troy D. Hays, PG
Subject: Citrus Co. Central LF (WACS ID 39859)
Attachments: LTR-CitrusCo-2021CapacityAnalysis_2021.12.21.pdf

EXTERNAL MESSAGE

This email originated outside of DEP. Please use caution when opening attachments, clicking links, or responding to this email.

Dear Mr. Morgan,

On behalf of the Citrus County Solid Waste Department, Jones Edmunds has prepared the attached annual Capacity and Lifespan Analysis for the Citrus County Central Landfill, Class I Landfill in Lecanto, Florida. The landfill has capacity through December 2027. Please contact me with any questions or comments.

Best Regards,

Carol

Carol G. Sawyer, PE
Project Manager



p. 352.377.5821|x. 1356|c. 352-214-5849
JONESEDMUNDS.COM
730 NE Waldo Road, Gainesville, FL 32641



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December 21, 2021

Steve Morgan
Florida Department of Environmental Protection – Southwest District
13051 North Telecom Parkway, Suite 101
Temple Terrace, FL 33637-0926

RE: Citrus County Central Landfill
2021 Capacity and Lifespan Analysis
FDEP Permit No.: 21375-027-SO-MM
Facility WACS ID: 39859
Jones Edmunds Project No.: 03860-087-01

Dear Mr. Morgan:

On behalf of the Citrus County Solid Waste Department, Jones Edmunds has prepared the 2021 Capacity and Lifespan Analysis for the Citrus County Central Landfill (CCCL) Class I Landfill. The capacity and lifespan analysis is required in accordance with the above-referenced Solid Waste Operations Permit, Specific Condition C.14.b., and the recordkeeping requirements of Rule 62-701.500(13)(c), Florida Administrative Code (FAC).

This letter provides the methods, assumptions, and results of the annual capacity analysis and an estimate of the remaining life for the approximately 32-acre Class I Active Landfill (Phases 1, 1A, 2 and 3).

METHOD

We based the remaining life and capacity of the Class I Active Landfill estimate on the total remaining disposal volume, a site-specific calculated apparent density of the Class I waste, and projected waste acceptance rates. The annual topographic survey was completed by Dragonfly AeroSolutions on September 14, 2021. Attachment 1 includes a copy of Dragonfly's topographic survey and notes. Dragonfly submitted a signed and sealed, full-size copy of the survey to the County.

VOLUME ANALYSIS

Jones Edmunds determined the landfill disposal volumes to calculate the amount of airspace used since the 2020 annual survey and the total remaining disposal volume between the existing grade and the permitted conceptual final closure surface. We performed the volume calculations using AutoCAD® Civil 3D® and the following surfaces:

1. Topographic survey dated September 15, 2020, performed by Dragonfly AeroSolutions.

2. Topographic survey dated September 14, 2021, performed by Dragonfly AeroSolutions (Attachment 1 shows the survey map).
3. Permitted Class I Landfill (Phases 1-3) top of waste surface (final cover surface lowered 3 feet to account for final cover).

Attachment 2 presents the volume analysis calculations. The volume consumed between the 2020 and 2021 survey period and the remaining volume as of the 2021 survey are summarized below:

Class I Phases 1-3 Volume Analysis	Volume (cubic yards)
Volume Filled Between 9/15/2020 through 9/14/2021	155,150
Permitted Remaining Volume as of 9/14/2021 Survey	1,036,043

APPARENT DENSITY ANALYSIS

The in-place apparent density¹ of the solid waste filled since the 2020 survey is based on the tonnage accepted and the volume consumed at the landfill for the analysis period. There was 119,455 tons of waste landfilled between the September 15, 2020, and the September 14, 2021 surveys. The in-place apparent density of the solid waste disposed during this period is approximately 1,540 pounds per cubic yard (lb/CY).

HISTORICAL AND PROJECTED WASTE TONNAGE

The Class I Active Landfill has accepted waste since 1991 beginning in Phase 1. Currently, active landfilling occurs within Phases 2 and 3. Waste tonnage acceptance rates have been calculated for each year based on historical data. Future waste generation rates were conservatively projected based on current waste generation rates and future population projections. We obtained future population projections from the University of Florida Bureau of Economic and Business Research (BEER) report, *Projections of Florida Population by County, 2025-2045, with Estimates for 2020*, Volume 54, Bulletin 189, April 2021. We used a projected annual waste growth rate at the CCCL from 2021 to 2027 of 1.0 percent. This is a conservative estimate based on the projected population growth rates of Citrus County and representative of the average historical waste tonnage increase over the last decade (2010-2020).

CAPACITY AND REMAINING LIFE

The estimate of capacity and remaining life was based on the 2021 annual topographic survey, a calculated site-specific apparent waste density of 1,540 lb/CY, projected waste tonnage matching the population growth rate and previous decade of waste tonnage growth (2010-2020), and the current permitted airspace in Phases 1 through 3.

¹Apparent density is defined as the weight of the solid waste landfilled divided by the total volume of the landfill consumed. The apparent density is not the true bulk density of the landfill because the weight of cover soil is not included.

The lifespan of Phases 1 through 3, based on the existing incoming waste rates and remaining capacity, is approximately 6.3 years from September 2021 through December 2027. Attachment 2 provides the lifespan calculations.

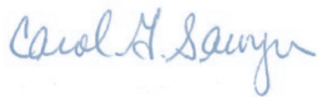
Capacity analysis calculations are performed with the best data available and are intended to be conservative. However, the capacity analysis does not account for unforeseen circumstances (e.g., hurricanes) that could cause a substantial increase in waste generation or operational issues associated with filling sequences.

Figures 1-4 in Attachment 3 illustrate historical topographical data from the September 15, 2020 and September 14, 2021 surveys as well as the projected final closure surface for comparison. These figures present the following:

- Figure 1: Site Plan of Phases 1-3
- Figure 2: Cross Section of Phase 1 (West/East)
- Figure 3: Cross Section of Phase 2 (West/East)
- Figure 4: Cross Section of Phases 1-3 (South/North)

If you have any questions concerning this analysis or would like to discuss the results, please contact me at (352) 377-5821.

Sincerely,



Carol G. Sawyer, PE

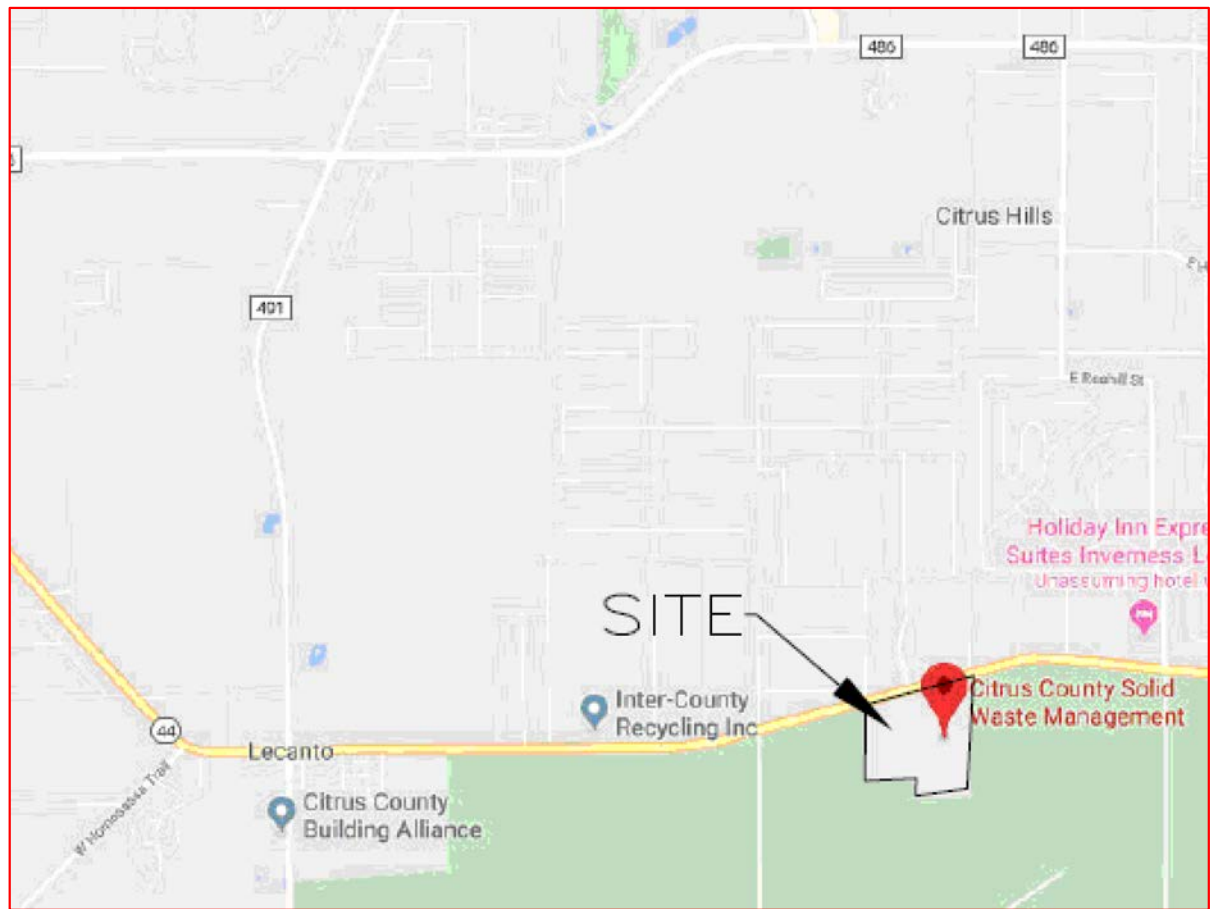
Project ManagerY:\03860-Citrus County\Projects\087-01 ClassIExpanAndCSAUpgrades\2021 Capacity Analysis\LTR-CitrusCo-2021CapacityAnalysis_2021.12.08.docx

Attachments: 1. Dragonfly Survey
2. Calculations
3. Figures

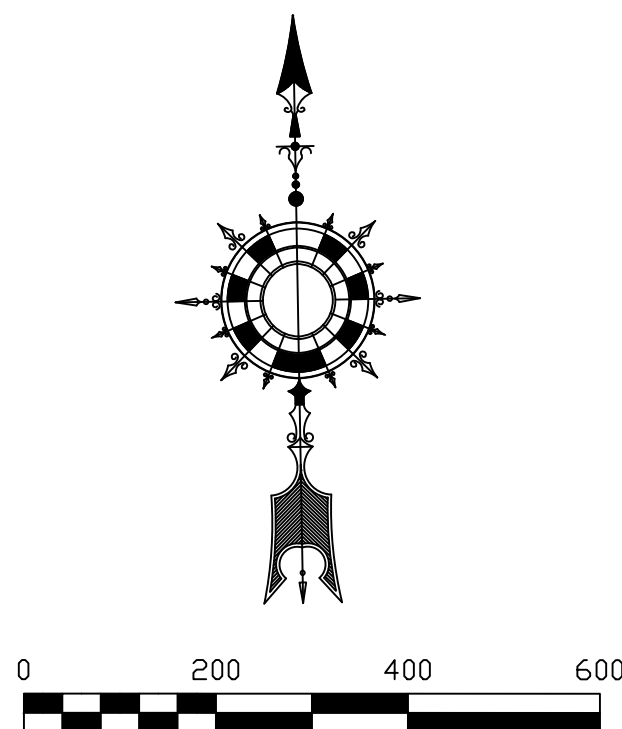
XC: Dan Sherlock, Citrus County, Interim Solid Waste Director (Dan.Sherlock@citrusbocc.com)
Joshua Younce, Citrus County, Compliance Manager (Joshua.Younce@citrusbocc.com)
Solid Waste Financial Coordinator (Financial.Assurance.Working.Group@FloridaDEP.gov)
El Kromhout, PG, Environmental Administrator FDEP (Elizabeth.Kromhout@FloridaDEP.gov)
Melissa Madden, Environmental Consultant FDEP (Melissa.Madden@FloridaDEP.gov)

Attachment 1
Dragonfly Survey

CITRUS COUNTY LANDFILL: 2021 AERIAL SURVEY AND MAPPING
LOCATED IN SECTION 1,
TOWNSHIP 19 SOUTH, RANGE 18 EAST
CITRUS COUNTY, FLORIDA



VICINITY MAP



KEY
xxx – ELEVATION (FT)

TOPOGRAPHIC SURVEY NOTES:

1. THIS SURVEY WAS COMPLETED ON SEPTEMBER 14, 2021.
2. THIS IS NOT A BOUNDARY SURVEY.
2. THIS TOPOGRAPHIC SURVEY WAS PREPARED FOR DRAGONFLY AEROSOLUTIONS. ADDITIONS OR DELETIONS BY ANYONE OTHER THAN THE SIGNING PARTY ARE PROHIBITED WITHOUT THE WRITTEN CONSENT OF COASTAL LAND SURVEYORS AND MAPPERS , INC.
3. THIS TOPOGRAPHIC SURVEY IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD. NO TITLE INFORMATION WAS PROVIDED TO THE SURVEYOR.
4. COORDINATES SHOWN HEREON ARE RELATIVE TO GRID NORTH, STATE PLANE COORDINATE SYSTEM, FLORIDA WEST, NAD 83, NGS ADJUSTMENT OF 2011, GEOID 12B.
5. UNLESS OTHERWISE NOTED, SURVEY MEASUREMENTS AND PLOTTED FEATURES SHOWN ON THIS SURVEY ARE BASED ON ACTUAL FIELD MEASUREMENTS.
6. THE ACCURACY OF THIS SURVEY MEETS OR EXCEEDS STANDARDS SET FORTH IN ADMINISTRATIVE RULE 5J-17 "STANDARDS OF PRACTICE FOR SURVEYORS AND MAPPERS."
7. THE VERTICAL DATUM FOR THIS SURVEY IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
8. ONLY VISIBLE IMPROVEMENTS WERE LOCATED AND ARE SHOWN AS PART OF THIS SURVEY. NO ATTEMPT WAS MADE TO LOCATE OR VERIFY SUBSURFACE IMPROVEMENTS OR ENCROACHMENTS.
9. ELEVATIONS AND CONTOURS DEPICTED WITHIN VEGETATED AREAS ARE APPROXIMATIONS OF THE TOP OF THE VEGETATION.
10. THIS TOPOGRAPHIC SURVEY WAS PREPARED BY PHOTOGRAMMETRIC METHODS. THIS MAP SHOULD BE USED FOR PRELIMINARY DESIGN WORK AND DOES NOT REPLACE AN ACTUAL FIELD SURVEY. ACCURACY WAS VERIFIED WITH GROUND TRUTHING METHODS WITH REAL TIME KINEMATIC GLOBAL POSITION SYSTEM ON THE FLORIDA PERMANENT REFERENCE NETWORK (FPRN). CONTOUR VERTICAL ACCURACY LIMITS IS +/- 2'.

PROJECT

CITRUS COUNTY LANDFILL
AERIAL SURVEY & MAPPING

230 W GULF TO LAKE HWY
LECANTO, FLORIDA 34461

COASTAL LAND SURVEYORS
AND MAPPERS, INCORPORATED

34 NORTH 14TH STREET
FERNANDINA BEACH, FL 32034

FLORIDA LICENSED BUSINESS
NUMBER LB6412

REVISION/ISSUE HISTORY

No.	Revision/Issue	Date

SURVEYOR'S CERTIFICATION

I, THE UNDERSIGNED FLORIDA
LICENSED SURVEYOR AND
MAPPER, DO HEREBY CERTIFY
THAT I HAVE COMPLETED THIS
SURVEY IN ACCORDANCE WITH
THE FLORIDA ADMINISTRATIVE
RULE 5J-17 STANDARDS OF
PRACTICE FOR PROFESSIONAL
SURVEYORS AND MAPPERS.

SIGN/SEAL/DATE

JAMES CHARLES PEACOCK JR.
LS3718
PROFESSIONAL SURVEYOR AND
MAPPER

NOT VALID WITHOUT THE
SIGNATURE AND THE ORIGINAL
RAISED SEAL OF A FLORIDA
LICENSED SURVEYOR AND
MAPPER

Attachment 2

Calculations



PROJECT NUMBER: 03860-087-01
PROJECT NAME: Citrus County Central Landfill
SUBJECT: Capacity Analysis 2021
BY: CSPREADBURY
CHECKED BY: MMORSE

SHEET: 1 of 3
Date: 12/10/2021
Date: 12/10/2021

Objective:

- 1) To determine the remaining capacity of the existing Phases 1-3 at the Citrus County Central Landfill (CCCL).

Assumptions:

- 1) Waste generation growth rates are directly proportional to population growth rates.
2) Waste apparent density is 1540 lb/CY, based on 2020-2021 tonnage data from County and annual surveys. (Refs. 1, 2, 3, 6)

Waste Density:

$$\rho_1 = \frac{\text{Class I Materials Received (tons)}}{\text{Volume Consumed (CY)}} * \left(2000 \frac{\text{lbs}}{\text{ton}}\right) \quad \frac{1,540 \text{ lbs/CY}}{0.77 \text{ tons/CY}}$$

Population Projections for Citrus County

Data:

Population Projections for Citrus County					
Year	Population ¹	Annual Rate of Change	Year	Population	Annual Rate of Change
(yr)		(%/yr)	(yr)		(%/yr)
2020	149,383	-	2036	167,673	0.46%
2021	150,799	0.95%	2037	168,449	0.46%
2022	152,229	0.95%	2038	169,229	0.46%
2023	153,672	0.95%	2039	170,013	0.46%
2024	155,129	0.95%	2040	170,800	0.46%
2025	156,600	0.95%	2041	171,494	0.41%
2026	157,743	0.73%	2042	172,191	0.41%
2027	158,895	0.73%	2043	172,891	0.41%
2028	160,055	0.73%	2044	173,594	0.41%
2029	161,223	0.73%	2045	174,300	0.41%
2030	162,400	0.73%			
2031	163,290	0.55%			
2032	164,185	0.55%			
2033	165,085	0.55%			
2034	165,990	0.55%			
2035	166,900	0.55%			
Average Growth Rate ²			1.0%		

¹ Population projection data retrieved from Florida Estimates of Population by the University of Florida's Bureau of Economic and Business Research (BEER) and is based on "Medium" projections of population.

(Reference 4)

² The Average Growth Rate was rounded up to conservatively estimate remaining lifespan.



PROJECT NUMBER: 03860-087-01
 PROJECT NAME: Citrus County Central Landfill
 SUBJECT: Capacity Analysis 2021
 BY: CSPREADBURY
 CHECKED BY: MMORSE

SHEET: 2 of 3
 Date: 12/10/2021
 Date: 12/10/2021

Waste Acceptance Projections for the Citrus County Central Landfill

Data:

Waste Acceptance Projections for the Citrus County Central Landfill			
Year	Waste Acceptance ¹	Tons per Day ²	Annual Rate of Waste Acceptance Change
(yr)	(tons)	(tpd)	(%)
1991	43,411	141	-
1992	60,820	198	40.1%
1993	64,228	209	5.6%
1994	58,463	190	-9.0%
1995	60,075	196	2.8%
1996	54,526	178	-9.2%
1997	37,088	121	-32.0%
1998	58,577	191	57.9%
1999	73,527	240	25.5%
2000	80,912	264	10.0%
2001	83,398	272	3.1%
2002	91,481	298	9.7%
2003	93,569	305	2.3%
2004	97,710	318	4.4%
2005	105,517	344	8.0%
2006	124,571	406	18.1%
2007	121,582	396	-2.4%
2008	113,212	369	-6.9%
2009	108,157	352	-4.5%
2010	102,248	333	-5.5%
2011	95,799	312	-6.3%
2012	96,875	316	1.1%
2013	79,908	260	-17.5%
2014	81,326	265	1.8%
2015	82,992	270	2.0%
2016	88,186	287	6.3%
2017	107,769	351	22.2%
2018	97,064	316	-9.9%
2019	99,475	324	2.5%
2020	112,432	366	13.0%
2021	123,138	401	9.5%
2022	124,369	405	1.0%
2023	125,613	409	1.0%
2024	126,869	413	1.0%
2025	128,138	417	1.0%
2026	129,419	422	1.0%
2027	130,713	426	1.0%
Average Historical Waste Acceptance Rate (Between 2010-2020)			1.0%

- 1) Historical waste acceptance data for 1991 - 2020. Average historical waste acceptance rate is calculated based on annual rate changes calculated from 2010-2020.
 2) Hours of operation for the CCCL is Monday through Saturday with six holidays off; therefore, the number of working days in a year is 307 days. (Reference 5)



PROJECT NUMBER: 03860-087-01
PROJECT NAME: Citrus County Central Landfill
SUBJECT: Capacity Analysis 2021
BY: CSPREADBURY
CHECKED BY: MMORSE

SHEET: 3 of 3
Date: 12/10/2021
Date: 12/10/2021

Projected Lifespan of Active Site

Data:

Apparent Density (Calculated)	0.77 tons/CY	(Refs. 1, 2, 3, 6)
Remaining Capacity of Existing Site (Phases 1-3)	1,036,043 CY	(Reference 6)
Current Annual Waste Acceptance Rate	119,455 (tons/yr)	(Reference 3)
Lifespan Projection Start Date	9/14/2021	(Reference 2)

Calculations:

Projected Lifespan of Active Site ¹			
Year	Waste Acceptance Rate ²		Remaining Volume Existing Site (CY)
	(tons/yr)	(CY/yr)	
Sept 14, 2021 - Dec 31, 2021	36,901	47,928	988,115
2022	124,369	161,533	826,582
2023	125,613	163,148	663,433
2024	126,869	164,780	498,654
2025	128,138	166,428	332,226
2026	129,419	168,092	164,134
2027	130,713	169,773	-5,638
Existing Site (Ph.1-3) Projected Lifespan:			6.3 years
Anticipated Closure Date:			Dec-2027

- 1) Lifespan calculated using site-specific apparent capacity (1,540 lb/CY or 0.77 tons/CY).
2) Waste Acceptance Rate in (tons/yr) based on a 1% growth from the previous year.

Conclusion:

The expected closure date of Phases 1, 1A, 2 and 3 is approximately 6.3 years from September 14, 2021, in December 2027.

References:

- 2020 Capacity Analysis and Survey, Citrus County Central Landfill, 12/16/2020.
- 2021 Capacity Survey, Citrus County Central Landfill, 9/14/2021.
- Citrus County Solid Waste Management Department - Recent Waste Tonnage Email (10/19/2021).
- University of Florida - Bureau of Economic and Business Research, Projections of Florida Population by County, 2025-2045, with Estimates for 2020. Vol. 54, Bulletin 189, Apr. 2021.
- Holiday Operation Schedule for the CCCL.
- Volume Report performed by Jones Edmunds in Auto CAD Civil 3D.

Attachment 3

Figures

12/6/2021 7:51 AM BY: PUPSTILL PATH= Y:\03860-CITRUS COUNTY PROJECTS\087-01 CLASSIEXPMANDCSAUPGRADES\CAD\FIGURES CAPACITY\03860087-FG-1-PLAN.DWG 12/6/2021 07:57 AM BY: PAUL E. UPSTILL

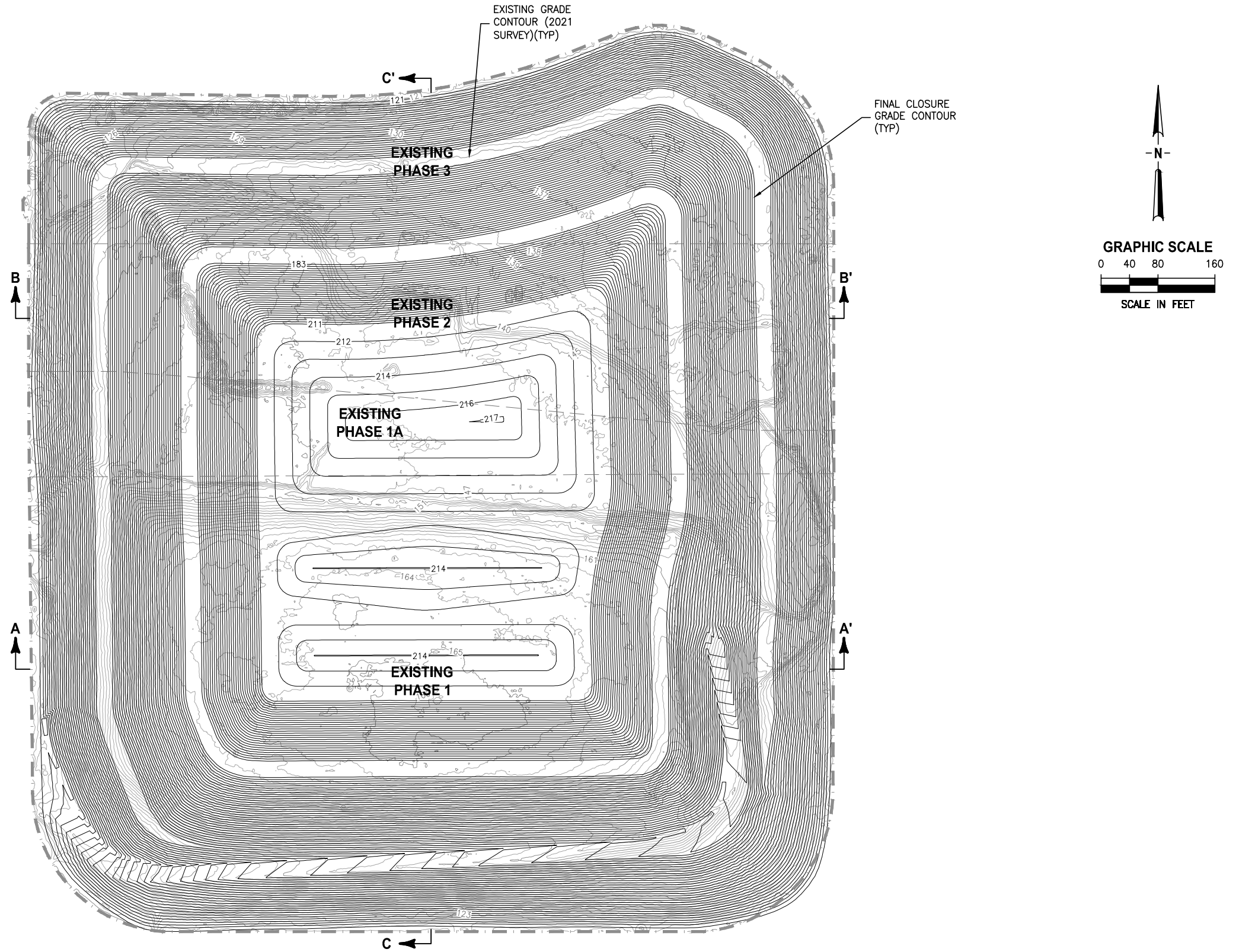


FIGURE 1 - SITE PLAN
CLASS I PHASE 1-3 CAPACITY
CITRUS COUNTY CENTRAL LANDFILL
CITRUS COUNTY, FLORIDA

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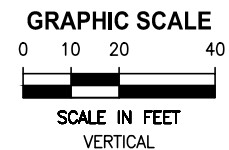
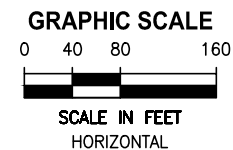
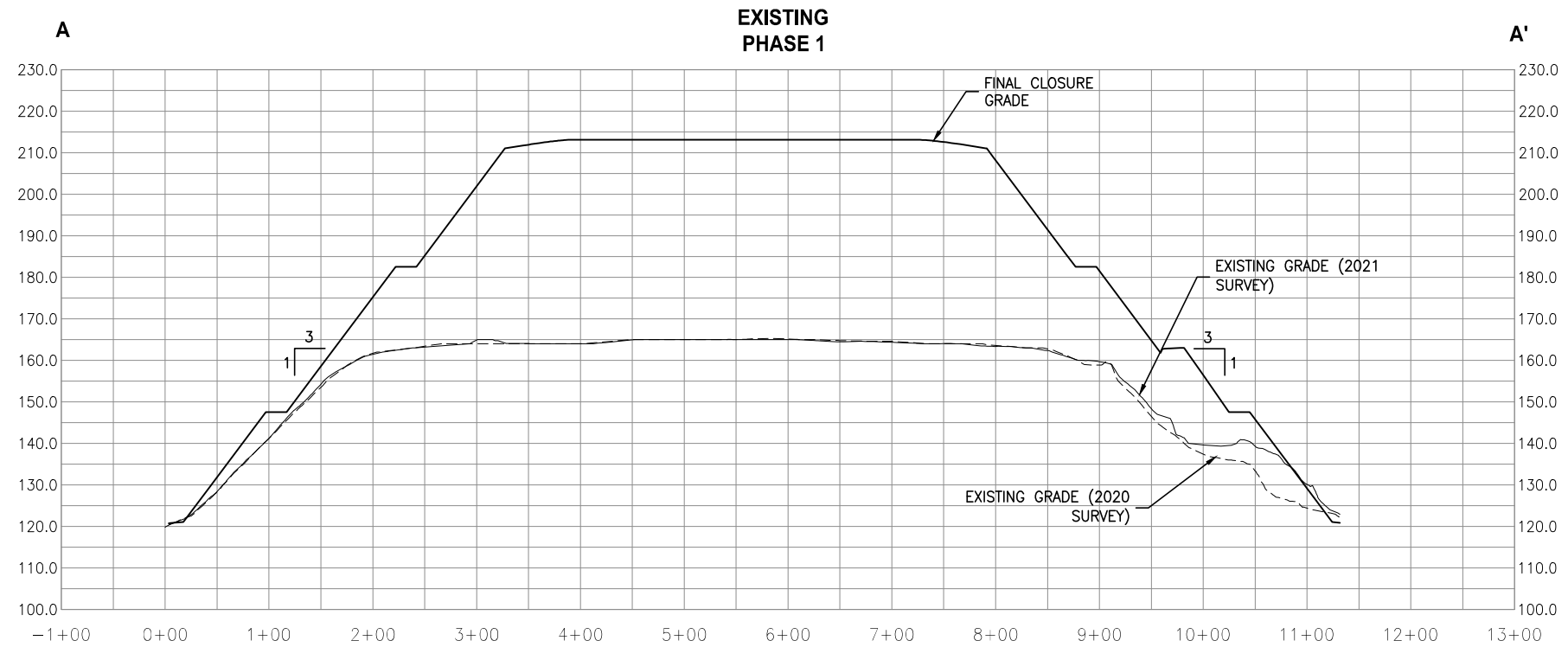


FIGURE 2 - SECTION A-A'
CLASS I PHASE 1-3 CAPACITY
CITRUS COUNTY CENTRAL LANDFILL
CITRUS COUNTY, FLORIDA

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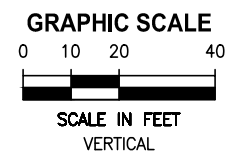
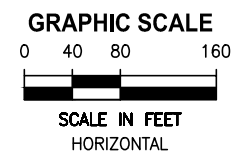
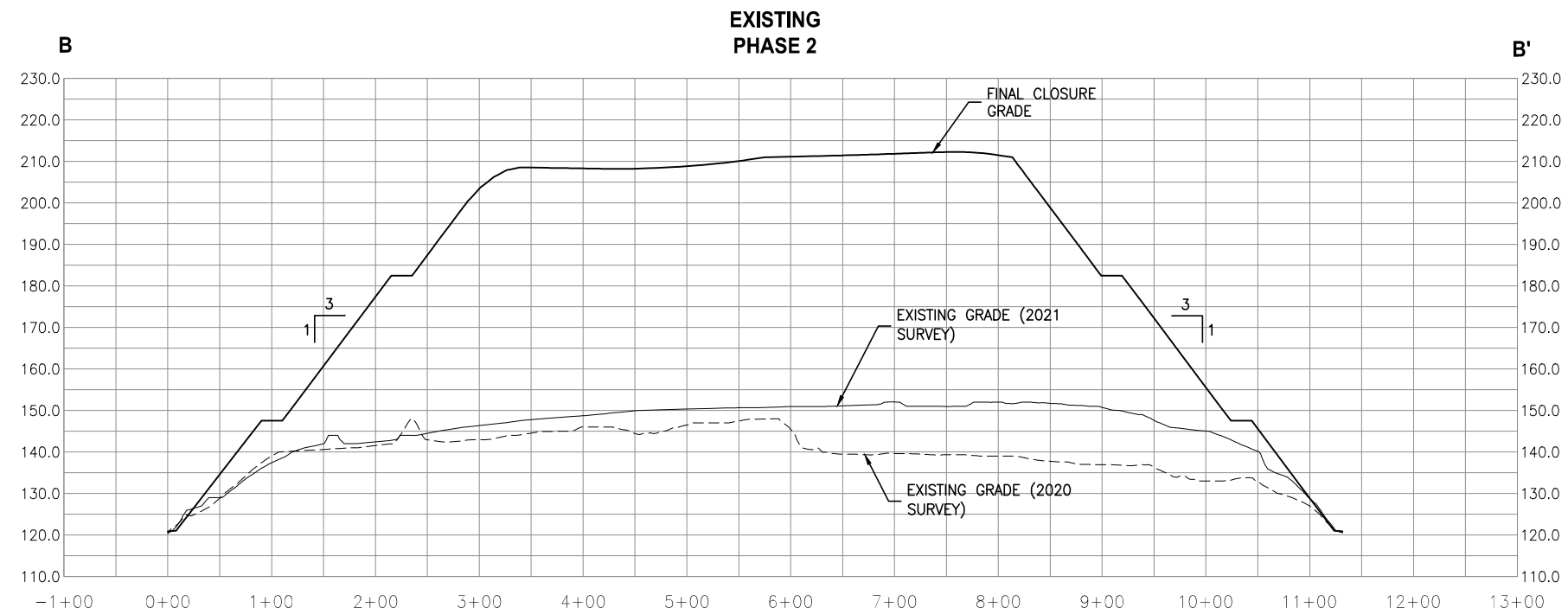


FIGURE 3 - SECTION B-B'
CLASS I PHASE 1-3 CAPACITY
CITRUS COUNTY CENTRAL LANDFILL
CITRUS COUNTY, FLORIDA

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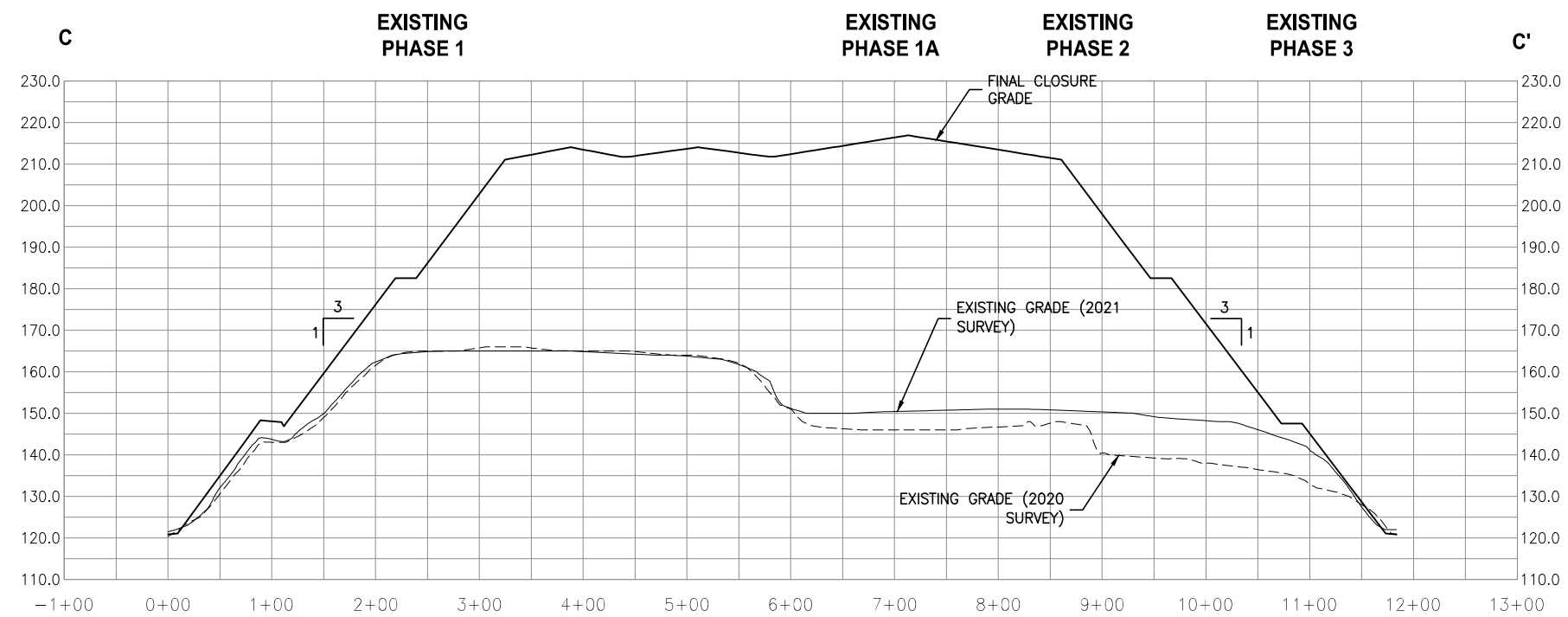


FIGURE 4 - SECTION C-C'
CLASS I PHASE 1-3 CAPACITY
CITRUS COUNTY CENTRAL LANDFILL
CITRUS COUNTY, FLORIDA