



**DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING**

3600 W. Sovereign Path, Suite 241  
Lecanto, Florida 34461

Telephone: (352) 527-5446 Fax: (352) 527-5476  
Citrus Springs/Dunnellon/Inglis/Yankeetown area - Toll Free (352) 489-2120  
TTY Telephone: (352) 527-0825 or (352) 527-5312

Dept. of Environmental Protection  
DEC 21 2015  
Southwest District

**CITRUS COUNTY CENTRAL LANDFILL  
OCTOBER 2015 SITE LIFE CALCULATION ANNUAL REPORT**

**FDEP PERMIT NO. 21375-008-S0/01**

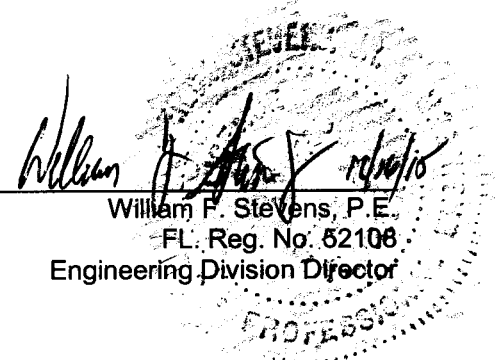
**PHASES 1/1A, 2 and 3**

**Located in S1/T19S/R18E, Citrus County, Florida**

**Prepared for:**

**Citrus County Department of Public Works  
Solid Waste Management Division  
Attn: Henry Norris, Director  
230 W. Gulf-to-Lake Highway  
Lecanto, FL 34461  
(352) 527-7670**

**Prepared on December 15, 2015**

  
William F. Stevens, P.E.  
FL Reg. No. 52108  
Engineering Division Director

Citrus County's Department of Public Works - Division of Engineering has calculated the remaining site life for Phases 1/1A, 2 and 3 of the Citrus County Central Landfill based on the past twelve months of data. The remaining airspace was estimated using population projections, projections of future waste receipts and topographic survey efforts performed by the Citrus County Survey Section in October 2015. The topographic survey information was compiled using real time kinematic satellite navigation (GPS) and is based on NAVD88 datum.

Phases 1/1A, 2, and 3:

The airspace consumed from October 4, 2014 (the date of the previous topographic survey as prepared by Pickett and Associates, Inc. and as referenced in the November 2014 Site Life Calculation Report) to October 1, 2015 (the date of the current survey) was calculated by comparing the surface contours from the two surveys. The airspace consumed during this time period was 116,121CY, as shown on sheet 1 of 3 in attachment A. The effective density of the waste deposited in the landfill was estimated by comparing the waste tonnage records supplied by Citrus County Solid Waste Management Division for the same period (82,992 tons) to the airspace consumed. The estimated effective density was determined to be 1,429.41 pounds per cubic yard. This translates to an effective airspace consumption rate of 1.40 CY/ton of waste disposed. The volume of the Cap was entered on the calculation as zero. For the calculations, the final closure surface has been lowered by two feet and the final 4' cap will be installed after 2' of settlement. Therefore the volume of the cap was entered into the calculations as 0CY assuming that the airspace will be available before placement.

The remaining life through build out of Phases 1/1A, 2 and 3 was estimated by multiplying the future projected quantities of waste by the current effective airspace consumption rate. Waste tonnage was assumed to increase each year at the same rate as the population and is estimated by using the "Low" projections in the University of Florida Bureau of Economic Research (BEER) population projections for Citrus County. The projected waste tonnage for each year was multiplied by the effective airspace consumption rate to obtain the airspace volume consumed each year. This is then subtracted from the remaining airspace for each year until the available airspace is depleted. The calculations indicate that Phases 1/1A, 2, and 3 have approximately 1,916,483CY of available airspace as of the October 4, 2015 survey (Attachment #1, Sheet 2) and that this airspace could be completely utilized by September 2030. This assumes that waste will continue to be added to the landfill at the current generation rates and effective density. As Statutory Recycling is implemented waste generation rates will decrease thereby adding a factor of safety to the calculations. For quick reference, the previous Site Life Calculation Report prepared in December 15, 2014 estimated this date to be October 2027 Using High projection.

Phases 1/1A, 2, and 3

Landfill Side Slopes

Specific Condition C.13.f of the site's FDEP Permit (Permit No. 21375-008-S0/01) requires that the disposal capacity and site life calculations submitted each year be accompanied by a survey indicating that the actual above grade side slopes are no greater than the design slopes and that the top elevation does not exceed the design elevation. As shown in the cross-sections provided on Sheet 3 of Attachment #1, the side slopes appear to be less than or equal to the design slopes, and the design top elevation of the landfill has not been attained.

# **ATTACHMENT 1**

## **VOLUME CALCULATION DRAWINGS**

(Refer to 24"x36" Drawings)



# **ATTACHMENT 2**

## **SITE LIFE CALCULATIONS**

**CITRUS COUNTY SOLID WASTE MANAGEMENT DIVISION  
CENTRAL LANDFILL SITE LIFE CALCULATION  
NOVEMBER 2015 REPORT**

**Objective:** Calculate the October 2015 remaining site life for Phases 1 thru 3 using waste tonnage records from Citrus County and calculated waste generation projections.

**Approach:**

1. Calculate the available airspace as of the most recent survey.
2. Calculate the "Effective Density" using volume consumed between October 2014 through September 2015.
3. Use the effective density to calculate the remaining life of the available airspace.

Available Airspace Calculation:

Airspace available from Oct 2015 to Final Grade = 1,916,483 CY (From Survey)

Air volume consumed Oct 2014 through September 2015 = 116,121 CY (From Survey)

Effective Density Calculation:

Waste Disposed of between 10/2014 through 09/2015 = 82,992 tons (From Landfill Records)

Effective Density=  $\frac{82,992 \text{ ton}}{116,121 \text{ CY}} \times \frac{2,000 \text{ lbs}}{\text{ton}} = \frac{1,429.41 \text{ lbs}}{\text{CY}}$

Effective Airspace Consumption Rate=  $\frac{116,121 \text{ CY}}{82,992 \text{ ton}} \times \frac{1.40 \text{ CY}}{\text{ton}} = 1.40 \text{ CY/ton}$

Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil.

Cap Volume = 0 CY

Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation.

Remaining Volume= 1,916,483 CY - 0 CY = 1,916,483 CY

Site Life Calculation

The site life calculation is based on Citrus County waste tonnage records and population projections from the University of Florida Bureau of Business and Economic Research (BEBR). The historic population growth trends have been lower than the BEBR Low estimates therefore, the Low population projection was used.

FISCAL YEAR	TONNAGE	VOLUME CONSUMED (CY)	NET REMAINING AIRSPACE (CY)
2013-2014	79,908	113,295	
2014-2015	82,992	116,121	1,916,483
2015-2016	83,387	116,673	1,799,810
2016-2017	83,782	117,226	1,682,584
2017-2018	84,177	117,778	1,564,806
2018-2019	84,571	118,330	1,446,476
2019-2020	84,966	118,883	1,327,593
2020-2021	85,265	119,301	1,208,292
2021-2022	85,565	119,720	1,088,571
2022-2023	85,864	120,139	968,432
2023-2024	86,164	120,558	847,874
2024-2025	86,463	120,977	726,897
2025-2026	86,679	121,279	605,618
2026-2027	86,895	121,581	484,037
2027-2028	87,110	121,883	362,154
2028-2029	87,326	122,185	239,970
2029-2030	87,542	122,487	117,483
2030-2031	87,626	122,604	-5,121
2031-2032	87,710	122,722	-127,843
2032-2033	87,794	122,839	-250,682
2033-2034	87,878	122,957	-373,639
2034-2035	87,962	123,074	-496,714

**CONCLUSION:** Estimated Phases 1/1A, 2 & 3 Fill Completion Date = September 2030

**CITRUS COUNTY CENTRAL LANDFILL  
WASTE TONNAGE PROJECTION**

Year	*Population (BEER Low Estimate)	% Change in Population	Tons/Year
2010 <sup>(1)</sup>	141,236		
2011 <sup>(1)</sup>	140,956	-0.20%	<b>81,477</b>
2012 <sup>(1)</sup>	140,761	-0.14%	81,326
2013 <sup>(1)</sup>	140,519	-0.17%	81,326
2014 <sup>(1)</sup>	140,796	0.20%	79,908
<b>2015</b>	<b>138,100</b>	<b>-1.95%</b>	<b>82,992</b>
2016	138,760	0.48%	83,387
2017	139,420	0.47%	83,782
2018	140,080	0.47%	84,177
2019	140,740	0.47%	84,571
<b>2020</b>	<b>141,400</b>	<b>0.47%</b>	<b>84,966</b>
2021	141,900	0.35%	85,265
2022	142,400	0.35%	85,565
2023	142,900	0.35%	85,864
2024	143,400	0.35%	86,164
<b>2025</b>	<b>143,900</b>	<b>0.35%</b>	<b>86,463</b>
2026	144,260	0.25%	86,679
2027	144,620	0.25%	86,895
2028	144,980	0.25%	87,110
2029	145,340	0.25%	87,326
<b>2030</b>	<b>145,700</b>	<b>0.25%</b>	<b>87,542</b>
2031	145,840	0.10%	87,626
2032	145,980	0.10%	87,710
2033	146,120	0.10%	87,794
2034	146,260	0.10%	87,878
<b>2035</b>	<b>146,400</b>	<b>0.10%</b>	<b>87,962</b>
2036	146,380	-0.01%	87,950
2037	146,360	-0.01%	87,938
2038	146,340	-0.01%	87,926
2039	146,320	-0.01%	87,914
<b>2040</b>	<b>146,300</b>	<b>-0.01%</b>	<b>87,902</b>

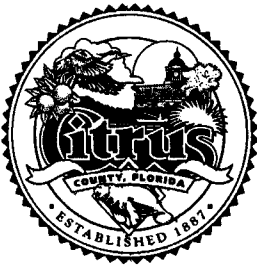
\*Population projection data for Citrus County originated from the University of Florida Bureau of Economic and Business Research (BEER) Florida Population Studies, Bulletin 168. A linear interpolation for yearly population increase was performed between the years in bold.

<sup>(1)</sup> Previously reported value: 2014 Site Life Calculation Annual report.

The 2015 "Tons/Year" amount is based on scale house data supplied by the Waste Management Department and is based upon the monthly collection reports from 10/01/2014 - 09/30/2015.

## Projections of Florida Population by County, 2015–2040, with Estimates for 2014

County and State	Estimates April 1, 2014	Projections, April 1					
		2015	2020	2025	2030	2035	2040
ALACHUA	250,730						
Low		245,500	248,900	251,400	252,900	253,700	253,500
Medium		253,200	265,600	277,300	288,300	299,100	309,100
High		263,200	283,400	303,900	324,700	346,200	367,900
BAKER	26,991						
Low		26,500	27,500	28,200	28,900	29,400	29,700
Medium		27,400	29,300	31,200	33,000	34,700	36,200
High		28,500	31,200	34,100	37,100	40,100	43,000
BAY	170,781						
Low		167,200	169,900	171,600	173,000	173,800	173,700
Medium		172,500	181,200	189,300	197,300	205,000	211,800
High		179,300	193,300	207,500	222,100	237,200	252,000
BRADFORD	27,323						
Low		26,800	26,700	26,500	26,200	25,900	25,400
Medium		27,600	28,400	29,200	29,900	30,500	31,000
High		28,700	30,400	32,000	33,700	35,300	36,900
BREVARD	552,427						
Low		540,700	547,900	552,200	553,700	552,000	547,700
Medium		557,700	584,500	609,000	631,100	650,700	668,000
High		579,700	623,600	667,500	710,900	753,400	794,900
BROWARD	1,803,903						
Low		1,763,300	1,773,600	1,772,200	1,763,500	1,747,600	1,726,500
Medium		1,818,700	1,891,300	1,953,100	2,009,000	2,059,300	2,105,600
High		1,890,600	2,018,800	2,142,200	2,264,500	2,385,000	2,505,500
CALHOUN	14,592						
Low		14,000	13,800	13,600	13,300	13,000	12,600
Medium		14,600	15,100	15,500	15,900	16,300	16,600
High		15,300	16,400	17,500	18,600	19,700	20,800
CHARLOTTE	164,467						
Low		161,000	163,300	164,600	164,500	163,400	162,000
Medium		166,100	174,200	181,500	187,500	192,600	197,600
High		172,600	185,900	198,900	211,300	223,000	235,100
CITRUS	140,798						
Low		138,100	141,400	143,900	145,700	146,400	146,300
Medium		142,500	150,900	158,900	166,300	172,700	178,500
High		148,100	160,900	174,000	187,100	199,800	212,300
CLAY	197,403						
Low		195,500	209,800	220,500	229,200	235,300	238,800
Medium		201,800	224,600	247,000	268,400	288,300	306,100
High		209,600	238,800	271,900	306,500	341,500	376,500
COLLIER	336,783						
Low		332,600	351,600	367,700	380,900	391,000	399,500
Medium		343,200	376,100	406,900	435,400	461,700	487,300
High		356,600	400,300	444,500	489,200	533,600	579,800
COLUMBIA	67,826						
Low		66,300	67,500	68,400	68,900	68,900	68,600
Medium		68,400	72,000	75,500	78,600	81,200	83,600
High		71,100	76,800	82,700	88,500	94,000	99,500
DESOTO	34,426						
Low		33,400	32,600	31,500	30,500	29,300	28,100
Medium		34,400	34,700	34,700	34,600	34,500	34,300
High		35,800	37,100	38,100	39,100	40,000	40,800
DIXIE	16,356						
Low		16,000	16,100	16,100	16,000	15,900	15,600
Medium		16,600	17,500	18,400	19,200	19,900	20,500
High		17,400	19,000	20,700	22,300	24,000	25,600



# Board of County Commissioners

## DEPARTMENT OF PUBLIC WORKS SOLID WASTE MANAGEMENT DIVISION

P.O. Box 340, Lecanto, Florida 34460

Telephone: (352) 527-7670 FAX: (352) 527-7672

TDD Telephone 527-5303

email: [landfillinfo@bocc.citrus.fl.us](mailto:landfillinfo@bocc.citrus.fl.us)

Citrus Springs/Dunnellon/Inglis/Yankeetown area Toll Free (352) 489-2120

Dept. of Environmental Protection  
DEC 21 2015  
Southeast District

December 17, 2015

Mr. Steve Morgan  
Dept of Environmental Protection  
13051 N Telecom Parkway  
Temple Terrace, FL 33637-0926

**Re: Citrus County Central Class I Landfill (FDEP Permit No. 21375-018-S0/01)  
Annual Site Life Calculation Transmittal for Phases 1/1A, 2 and 3**

Dear Mr. Morgan:

Pursuant to Specific Condition # C.13.e. of the subject operation permit (which requires landfill site life calculations to be submitted annually no later than January 15<sup>th</sup> of each year), please find enclosed 2015 Site Life Calculations reports and supporting documentation prepared by Citrus County Division of Engineering.

If you should need additional information, please let me know.

Sincerely,

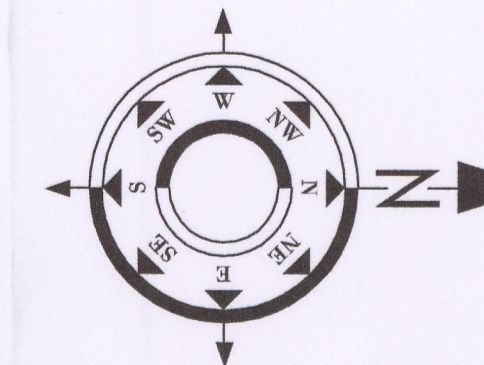
A handwritten signature in black ink, appearing to read "H. C. Norris, Jr.", is written over a horizontal line.

Henry C. Norris, Jr.  
Director, Division of  
Solid Waste Management

HCN:CW

CC: Jeff Rogers, P.E. Director, Dept. Of Public Works (w/o map attachments)





PROFILE VIEWS ARE ON SHEET 3

### LEGEND AND ABBREVIATIONS

- EXISTING ELEVATION CONTOUR (25' INTERVAL) 10/01/2015 SURVEY
- EXISTING ELEVATION CONTOUR (5' INTERVAL) 10/01/2015 SURVEY
- PREVIOUS ELEVATION CONTOUR (25' INTERVAL) 10/04/2014 SURVEY
- PREVIOUS ELEVATION CONTOUR (5' INTERVAL) 10/04/2014 SURVEY

### SITE VOLUME TABLE

SITE	CITRUS COUNTY CENTRAL LANDFILL
SURFACE 1	OCTOBER 2014 (PHOTOGRAMMETRY DATA COMBINED WITH FIELD SURVEY)
SURFACE 2	OCTOBER 2015 (FIELD SURVEY OF 2015)
CUT UNADJUSTED	45.86 CU. YD.
FILL UNADJUSTED	116,167 CU. YD.
NET UNADJUSTED	116,121 CU. YD.
METHOD	COMPOSITE

### SURVEY SOURCE NOTE

This Comparable Volume report for the period stated was calculated based on a Citrus County Surface compilation of Real Time Kinematic (RTK) Global Positioning data collected by Citrus County Survey Section personnel on or around October 1, 2015 for the 2014-2015 Volume Calculation Report. This data was compared to a Base Surface created from Aerial Photogrammetry data provided by Pickett Surveying and Photogrammetry, Bartow, FL Office, for the 2013 - 2014 Base Surface Comparable Report.

The Pickett Base Surface and the Citrus County Surface were created using NAVD 88 elevations (Pickett & Associates Project #17446 dated 10/04/2014). The Control panels noted in said report (AT-1, AT-2, and AT-4) were established using said RTK GPS redundant observations on said Control Points, cross referenced to Published National Geodetic Survey Control Stations Citrus 13 and Citrus 14.

As the original designed Landfill closure surface was calculated and published utilizing NGVD of 29, the original 2013 & 2014 and 2014 & 2015 NAVD 88 surfaces were adjusted +0.85', per NGS Vertcon, converting the NAVD 88 elevations to NGVD 29 elevations for relative volume calculations.

The above stated data was collected via GPS RTK under my direction utilizing acceptable Survey Standards.

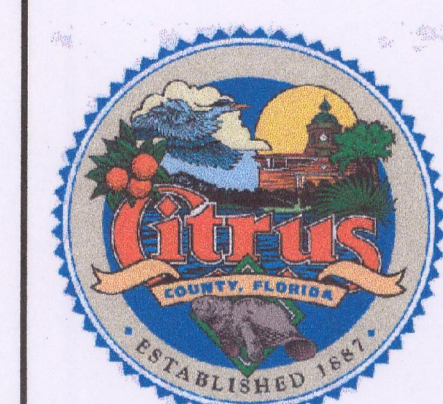
Mark T. Thomas

Florida Registered Surveyor no. 5151

9600 SOUTHERN PATH  
SUITE 240  
LELAND, FLORIDA 34461  
(882) 827-5446

## CITRUS COUNTY DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING

## CITRUS COUNTY CENTRAL LANDFILL OCTOBER 2015 SITE LIFE CALCULATION REPORT



CITRUS COUNTY  
CENTRAL LANDFILL  
10/01/2014 SURVEY

vs.

10/01/2015 SURVEY  
VOLUME ESTIMATE  
PLAN

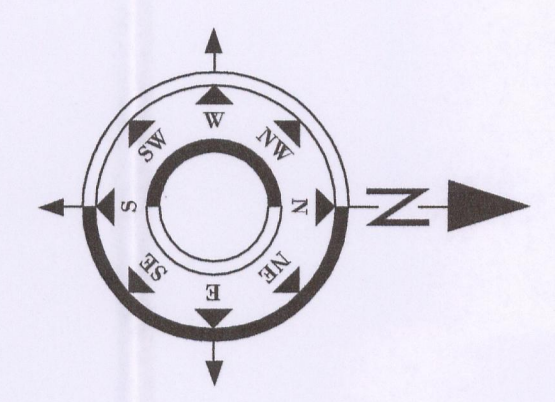
10/1/15  
William F. Stevens, Jr., P.E.  
Engineering Director  
FL LICENSE NO. 52108

SURVEY PROJECT NO.	15-117	SHEET NO.	1
DATE	10/12/15	OF	3
SCALE	1" = 60'		

CONTOUR LABELS WITH ROUNDED  
RECTANGULAR SYMBOL ARE FINAL  
SURFACE LABELS. ALL OTHER  
CONTOUR LABELS ARE 2015 SURFACE.



CONTOUR LABELS WITH ROUNDED  
RECTANGULAR SYMBOL ARE FINAL  
SURFACE LABELS. ALL OTHER  
CONTOUR LABELS ARE 2015 SURFACE.



PROFILE VIEWS ARE ON SHEET 3

LEGEND AND ABBREVIATIONS

- EXISTING ELEVATION CONTOUR (5' INTERVAL) 10/01/2015 SURVEY
- EXISTING ELEVATION CONTOUR (1' INTERVAL) 10/01/2015 SURVEY
- DESIGN ELEVATION CONTOUR (5' INTERVAL) FINAL CLOSURE
- DESIGN ELEVATION CONTOUR (1' INTERVAL) FINAL CLOSURE

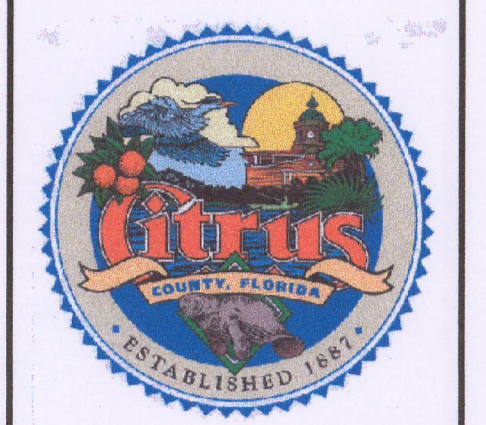
SITE VOLUME TABLE

SITE	CITRUS COUNTY CENTRAL LANDFILL
SURFACE 1	FINAL CLOSURE (DESIGN)
SURFACE 2	OCTOBER 2015 (Field Survey of 2015 waste area combined with 2014 base surface)
CUT UNADJUSTED	1236 CU. YD.
FILL UNADJUSTED	1,917,719 CU. YD.
NET UNADJUSTED	1,916,483 CU. YD.
METHOD	COMPOSITE

3800 SOVEREIGN PATH  
LELAND, FL 34461  
(352) 327-5446

CITRUS COUNTY  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING

CITRUS COUNTY  
CENTRAL LANDFILL  
OCTOBER 2015 SITE  
LIFE CALCULATION  
REPORT



CITRUS COUNTY  
CENTRAL LANDFILL  
FINAL CLOSURE  
DESIGN  
vs.  
10/01/2015 SURVEY  
VOLUME ESTIMATE  
PLAN

12/16/15  
William F. Stevens, Jr., P.E.  
Engineering Director  
FL LICENSE NO. 52108

SURVEY PROJECT NO.	15-117	SHEET NO.	2
DATE	10/12/15	OF	3
SCALE	1" = 60'		



3800 SOVEREIGN PATH  
LELAND, FLORIDA 34461  
(352) 827-5446

**CITRUS COUNTY**  
**DEPARTMENT OF PUBLIC WORKS**  
**DIVISION OF ENGINEERING**

**CITRUS COUNTY**  
**CENTRAL LANDFILL**  
**OCTOBER 2015 SITE**  
**LIFE CALCULATION**  
**REPORT**

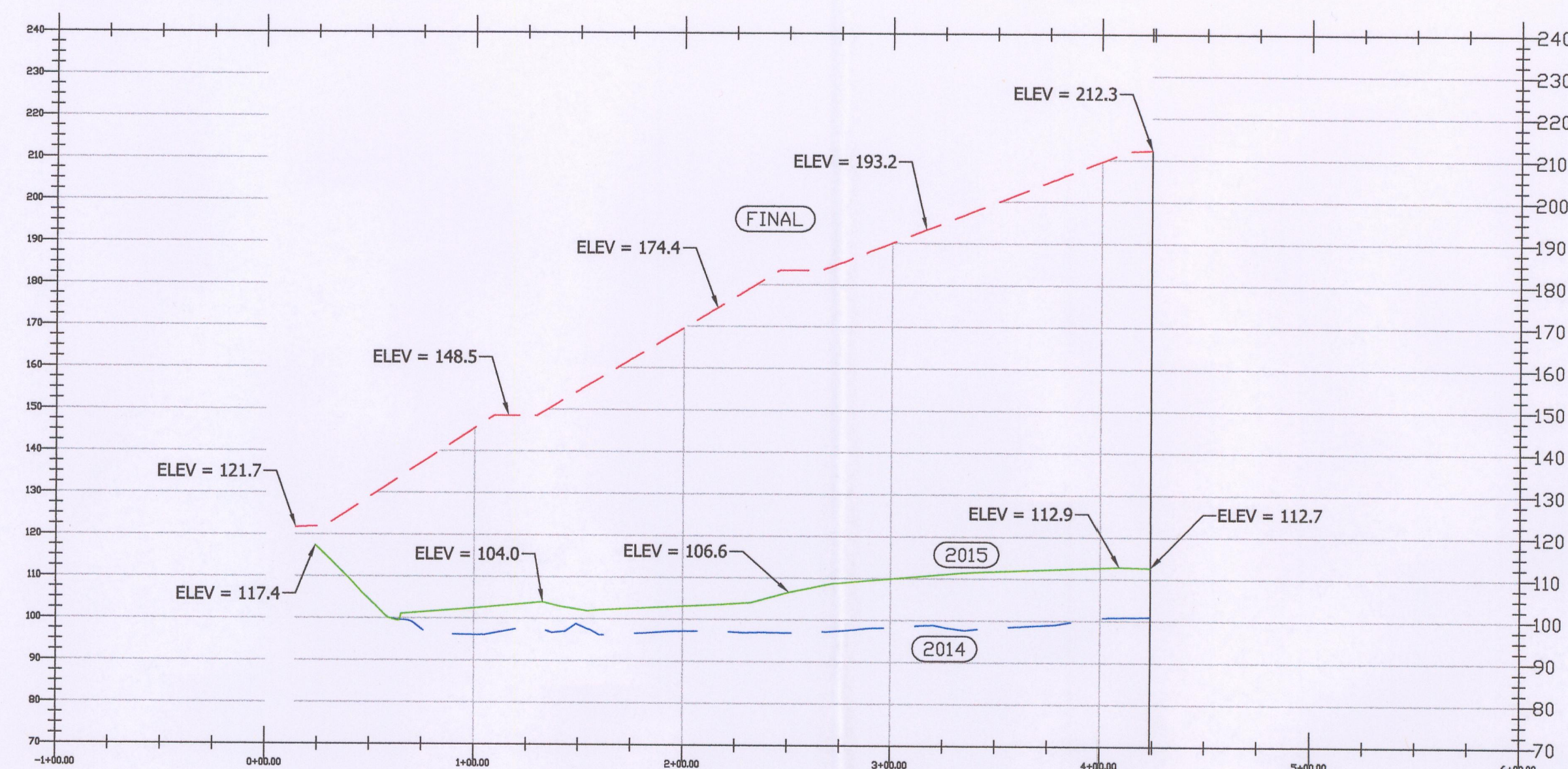


**CITRUS COUNTY**  
**CENTRAL LANDFILL**  
**FINAL CLOSURE**  
**10/01/2015 SURVEY**  
**10/04/2014 SURVEY**  
**PROFILES**

12/10/15  
*William F. Stevens, Jr.*  
WILLIAM F. "BILL" STEVENS, JR., P.E.  
Engineering Director  
FL LICENSE NO. 82108

SURVEY PROJECT NO.	15-117	SHEET NO.	3
DATE	10/12/15	OF	3
SCALE	1" = 60' H 1" = 30' V		

PROFILE NORTHEAST



LEGEND AND ABBREVIATIONS

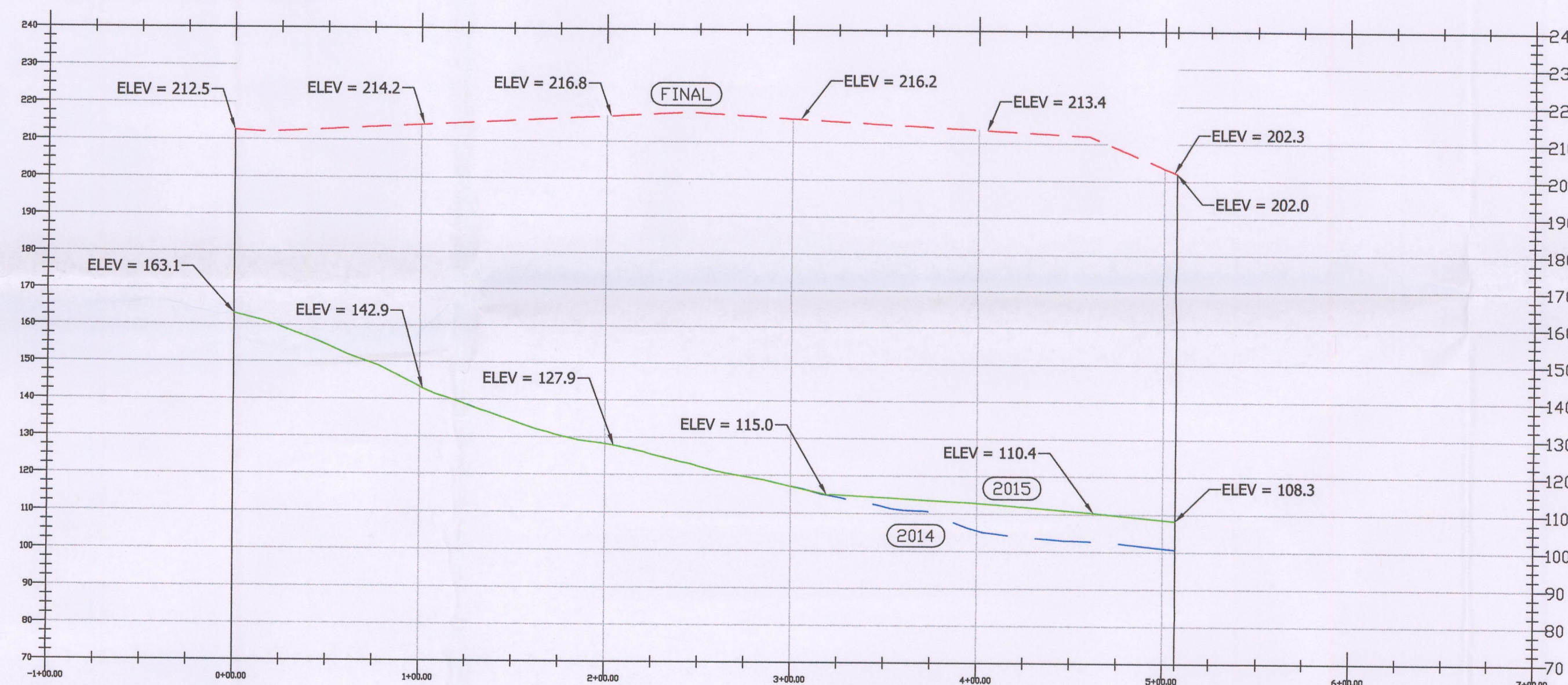
--- SURFACE 1 FINAL CLOSURE (DESIGN)  
--- SURFACE 2 OCTOBER 2014 (PHOTOGRAMMETRY DATA BY PICKETT & ASSOCIATES, INC. & CITRUS COUNTY FIELD SURVEY)  
--- SURFACE 3 OCTOBER 2015 (FIELD SURVEY BY CITRUS COUNTY)

PLAN VIEWS ARE ON SHEETS 1 AND 2

PROFILE NORTHWEST



PROFILE NORTH SLOPE



PROFILE SOUTHWEST

