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August 29, 2013

Mr. Tom Lubozynski, P.E.  
Section Supervisor  
Waste Management Program – Central District  
Florida Department of Environmental Protection  
Orlando, Florida 32803-3767

Re: Financial Assurance Responsibility Report (Fiscal Year 2013)  
Tomoka Farms Road Landfill ID# 27540 (North Cell Class I, South Cell,  
Class III Landfills) and Plymouth Avenue Landfill ID#27539  
Volusia County, Florida

On behalf of Volusia County, we are hereby submitting updated closure and long-term care cost estimates for the above-referenced landfills, fulfilling the requirements of 62-701.630(4) F.A.C.

If you have any questions or comments, please contact Lenny Marion at (386) 947-2952 or [lm Marion@co.volusia.fl.us](mailto:lm Marion@co.volusia.fl.us).

Sincerely,  
HDR Engineering, Inc.

Cliff Koenig, P.E.  
Project Manager

cc: Solid Waste Financial Coordinator, FDEP Tallahassee  
Lenny Marion, Volusia County Solid Waste Director

Enc.

**VOLUSIA COUNTY SOLID WASTE SYSTEM**  
**FINANCIAL RESPONSIBILITY**  
**CLOSURE & LONG-TERM CARE COST ESTIMATES**  
**FY 2013**

*Prepared for:*



**VOLUSIA COUNTY BOARD OF COUNTY COMMISSIONERS**  
**PUBLIC WORKS DEPARTMENT**  
**RECYCLING AND SOLID WASTE DIVISION**  
3151 East New York Avenue  
DeLand, FL 32724

*Prepared by:*



**HDR ENGINEERING, INC.**  
200 W Forsyth St, Suite 800  
Jacksonville, FL 32202  
Telephone: (904) 598-8900 Fax (904) 598-8988

August 2013

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## SECTION 1.0

### Executive Summary

The following report provides an estimate of closing and long-term costs for the various portions of the Volusia County (County) Solid Waste Management System for use by the County in providing assurance of Financial Responsibility as required by the Florida Administrative Code, (FAC) Section 62-701.630.

This report provides the County with an updated estimate of closing and long-term care costs for the North Cell Class I and Class III landfills at the Tomoka Farms Road Solid Waste Management Facility (TFR Facility), and the long-term care costs for the closed South Cell at the TFR Facility and the Plymouth Avenue Landfill. This report addresses costs associated with the currently permitted, constructed and operating landfills, but does not provide costs of current areas permitted for future landfilling. The financial assurance mechanism for expansion disposal areas will be fully funded according to Florida Department of Environmental Protection (FDEP) approved cost estimates and FDEP rules governing financial assurance responsibility at least sixty days prior to the acceptance of solid waste in these areas (FAC 62-701.630(1)(b)).

The following definitions for the words closing and closure as stated in FAC 62-701 are used in this report.

- "Closing": means the time at which a solid waste management facility ceases to accept wastes, and includes those actions taken by the owner or operator of the facility to prepare the facility for any necessary monitoring and maintenance after closing.
- "Closure": means the cessation of operation of a solid waste management facility and the act of securing such a facility so that it will pose no significant threat to human health or the environment. This includes closing, long term monitoring, maintenance, and financial responsibility.

This report was prepared assuming that financial responsibility for FY 2013 would be met by the Escrow Accounting Method, as defined in FAC 62-701.630(5). The 2012 closing and long-term care cost estimates, approved by FDEP, were adjusted assuming the Class I and Class III landfill areas will be closed in accordance with the requirements of the existing FDEP Operations Permits. In order to comply with the filing requirements of FAC 62-701.630, the FDEP Form 62-701.900(28) was completed for each facility and is included with this report. The estimated escrow funding obligations are presented for each disposal area individually. For this year's report, the closure and long-term care cost estimates for the TFR Facility's North Cell were recalculated using third-party quote estimates. The closure and long-term care cost estimates for the Plymouth Avenue Landfill and TFR Facility's Class III Landfill and South Cell Landfill were updated by adjusting the previously approved costs based on the current year annual inflation factor published by the U.S. Department of Commerce and provided by the FDEP. The current year inflation factor is 1.017 for estimates due September 1, 2013.

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Since last year's report:

- The County continued disposal operations in the North Cell Phase I Class I and Class III landfills at the TFR Facility.
- The County withdrew \$1,031,195 from the escrow account on September 27, 2012 for expansion of the landfill gas collection system for the North Cell Class I Landfill Closure – Sequence 1.
- The County submitted the Operations Permit Renewal application for North Cell Class I to the FDEP (dated December 12, 2012) that included re-calculated cost estimates for the North Cell Phase I Class I. The revised cost estimate excluded the gas collection system components installed in 2012. The revised cost estimate was approved by FDEP in a letter dated March 13, 2013.
- The County continued long-term care activities at Plymouth Avenue Landfill.

This report includes:

- Recalculated closing and long-term care cost estimates for the North Cell Class I including the Phase I expansion disposal area at the TFR Facility based on current permit requirements and remaining site life.
- Updated closing and long-term care cost estimates for the Class III solid waste disposal area at the TFR Facility based on current permit requirements and previously approved cost estimates adjusted for inflation.
- Updated long-term care cost estimates for the closed South Cell landfill based on current permit requirements and previously approved cost estimate adjusted for inflation.
- Updated long-term care cost estimates for the Plymouth Avenue Landfill based on current permit requirements and previously approved cost estimates adjusted for inflation.
- Closure cost estimate for the waste tire temporary storage area at the TFR Facility.

Based on the updated cost estimates for closure and long-term care for the noted facilities and detailed in this report, the County's escrow fund must provide for financial responsibility for FY 2013 in the amount of \$9,900,575. The FY 2012 Volusia County Landfill Escrow Fund consisting of account GMS 3064C00071 for TFR Facility and account GMS 3064C00070 for Plymouth Avenue Landfill showed a combined balance of \$9,445,699 as of September 30, 2012. The calculated increase to the Volusia County escrow fund for FY2012 financial responsibility equals \$454,876.

In accordance with FDEP requirements, the fund balances reported should indicate balance information for closing and long term care costs separately for each disposal facility. The updated closure cost for each facility and required escrow fund balance for FY 2013 is summarized as follows. The financial assurance forms must be submitted by September 1, 2013 to comply with the regulatory deadline specified in FAC 62-701.630(4)(a).



# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

DEP Form # 62-701.900(28), F.A.C.  
Form Title: Closure Cost Estimating Form  
For Solid Waste Facilities  
Effective Date: January 6, 2010  
Incorporated in Rule 62-701.630(3), F.A.C.

## CLOSURE COST ESTIMATING FORM FOR SOLID WASTE FACILITIES

Date of DEP Approval: \_\_\_\_\_

### I. GENERAL INFORMATION:

Facility Name: Plymouth Avenue Landfill WACS ID: 27539  
 Permit Application or Consent Order No.: SF64-0127461-002 Expiration Date: 11/29/2016  
 Facility Address: Northeast of the intersection of Plymouth Ave and Grand Ave, west of DeLand, Florida  
 Permittee or Owner/Operator: Volusia County Solid Waste Division  
 Mailing Address: 3151 East New York Avenue, DeLand, Florida 32724

Latitude: 29 ° 02 ' 35 " Longitude: 81 ° 20 ' 50 "  
 Coordinate Method: AutoCAD/GPS Datum: NAD 1983/90 (east)  
 Collected by: J.E. Zapert Company/Affiliation: Sliger & Associates, Inc.

Solid Waste Disposal Units Included in Estimate:

Phase / Cell	Acres	Date Unit Began Accepting Waste	Active Life of Unit From Date of Initial Receipt of Waste	If active: Remaining life of unit	If closed: Date last waste received	If closed: Official date of closing
Plymouth LF	79.6*	1940s	approx. 60 years	NA	1996	10/13/1999

Total disposal unit acreage included in this estimate: Closure: NA Long-Term Care: 39

Facility type: ☒ Class I ☒ Class III ☒ C&D Debris Disposal  
 (Check all that apply) ☐ Other: \_\_\_\_\_

\* of the 79.6 acres of waste disposal areas, 39 acres were closed after July 1, 1985

### II. TYPE OF FINANCIAL ASSURANCE DOCUMENT (Check type)

- ☐ Letter of Credit\*    ☐ Insurance Certificate    ☒ Escrow Account  
☐ Performance Bond\*    ☐ Financial Test    ☐ Form 29 (FA Deferral)  
☐ Guarantee Bond\*    ☐ Trust Fund Agreement

\* - Indicates mechanisms that require the use of a Standby Trust Fund Agreement

Northwest District  
160 Government Center  
Pensacola, FL 32502-5794  
850-595-8360

Northeast District  
7825 Baymeadows Way, Ste. B200  
Jacksonville, FL 32256-7590  
904-807-3300

Central District  
3319 Maguire Blvd., Ste. 232  
Orlando, FL 32803-3767  
407-894-7555

Southwest District  
13051 N. Telecom Pky.  
Temple Terrace, FL 33637  
813-632-7600

South District  
2295 Victoria Ave., Ste. 364  
Fort Myers, FL 33901-3881  
239-332-6975

Southeast District  
400 N. Congress Ave., Ste. 200  
West Palm Beach, FL 33401  
561-681-6600

### III. ESTIMATE ADJUSTMENT

40 CFR Part 264 Subpart H as adopted by reference in Rule 62-701.630, Florida Administrative Code, (F.A.C.) sets forth the method of annual cost estimate adjustment. Cost estimates may be adjusted by using an inflation factor or by recalculating the maximum costs of closure in current dollars. Select one of the methods of cost estimate adjustment below.

☒ (a) Inflation Factor Adjustment

☐ (b) Recalculated or New Cost Estimates

Inflation adjustment using an inflation factor may only be made when a Department approved closure cost estimate exists and no changes have occurred in the facility operation which would necessitate modification to the closure plan. The inflation factor is derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its survey of Current Business. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year. The inflation factor may also be obtained from the Solid Waste website [www.dep.state.fl.us/waste/categories/swfr](http://www.dep.state.fl.us/waste/categories/swfr) or call the Financial Coordinator at (850) 245-8706.

This adjustment is based on the Department approved closing cost estimate dated:

Latest Department Approved Closing Cost Estimate:	Current Year Inflation Factor, e.g. 1.02	Inflation Adjusted Closing Cost Estimate:
_____	× 1.017	= _____

This adjustment is based on the Department approved long-term care cost estimate dated:

September 6, 2012

Latest Department Approved Annual Long-Term Care Cost Estimate:	Current Year Inflation Factor, e.g. 1.02	Inflation Adjusted Annual Long-Term Care Cost Estimate:
\$92,271.05	× 1.017	= \$93,839.66
Number of Years of Long Term Care Remaining:	×	17
Inflation Adjusted Long-Term Care Cost Estimate:	=	\$1,595,274.18

Signature by: ☐ Owner/Operator

☒ Engineer

(check what applies)

  
Signature

200 W Forsyth St, Ste 800  
Address

Clifford G. Koenig, Project Manager  
Name & Title

Jacksonville, FL 32202  
City, State, Zip Code

8-29-2013  
Date

Cliff.Koenig@hdrinc.com  
E-Mail Address

(904) 598-8900  
Telephone Number



# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

DEP Form # 62-701.900(28), F.A.C.

Form Title: Closure Cost Estimating Form  
For Solid Waste Facilities

Effective Date: January 6, 2010

Incorporated in Rule 62-701.630(3), F.A.C.

## CLOSURE COST ESTIMATING FORM FOR SOLID WASTE FACILITIES

Date of DEP Approval: \_\_\_\_\_

### I. GENERAL INFORMATION:

Facility Name: Tomoka Farms Road Landfill- South Cell WACS ID: 27540  
 Permit Application or Consent Order No.: SF64-0078767-028 Expiration Date: 03/19/2017  
 Facility Address: 1990 Tomoka Farms Road, Daytona Beach, Florida  
 Permittee or Owner/Operator: Volusia County Solid Waste Division  
 Mailing Address: 3151 East New York Avenue, DeLand, Florida 32724

Latitude: 29 ° 07 ' 50 " Longitude: 81 ° 06 ' 02 "  
 Coordinate Method: AutoCAD/GPS Datum: NAD 1983/90 (east)  
 Collected by: J.E. Zapert Company/Affiliation Sliger & Associates, Inc.

Solid Waste Disposal Units Included in Estimate:

Phase / Cell	Acres	Date Unit Began Accepting Waste	Active Life of Unit From Date of Initial Receipt of Waste	If active: Remaining life of unit	If closed: Date last waste received	If closed: Official date of closing
South Cell	114	June 1978	Approx. 23 years	NA	2001	2001

Total disposal unit acreage included in this estimate: Closure: NA Long-Term Care: 114

Facility type: ☒ Class I ☒ Class III ☒ C&D Debris Disposal  
 (Check all that apply) ☐ Other: \_\_\_\_\_

### II. TYPE OF FINANCIAL ASSURANCE DOCUMENT (Check type)

- ☐ Letter of Credit\*    ☐ Insurance Certificate    ☒ Escrow Account  
☐ Performance Bond\*    ☐ Financial Test    ☐ Form 29 (FA Deferral)  
☐ Guarantee Bond\*    ☐ Trust Fund Agreement

\* - Indicates mechanisms that require the use of a Standby Trust Fund Agreement

Northwest District  
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Pensacola, FL 32502-5794  
850-595-8360

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813-632-7600

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239-332-6975

Southeast District  
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West Palm Beach, FL 33401  
561-681-6600

### III. ESTIMATE ADJUSTMENT

40 CFR Part 264 Subpart H as adopted by reference in Rule 62-701.630, Florida Administrative Code, (F.A.C.) sets forth the method of annual cost estimate adjustment. Cost estimates may be adjusted by using an inflation factor or by recalculating the maximum costs of closure in current dollars. Select one of the methods of cost estimate adjustment below.

☒ (a) Inflation Factor Adjustment

☐ (b) Recalculated or New Cost Estimates

Inflation adjustment using an inflation factor may only be made when a Department approved closure cost estimate exists and no changes have occurred in the facility operation which would necessitate modification to the closure plan. The inflation factor is derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its survey of Current Business. The inflation factor is the result of dividing the latest published annual Deflatory by the Deflator for the previous year. The inflation factor may also be obtained from the Solid Waste website [www.dep.state.fl.us/waste/categories/swfr](http://www.dep.state.fl.us/waste/categories/swfr) or call the Financial Coordinator at (850) 245-8706.

This adjustment is based on the Department approved closing cost estimate dated:

Latest Department Approved Closing Cost Estimate:	Current Year Inflation Factor, e.g. 1.02	Inflation Adjusted Closing Cost Estimate:
	x 1.017	=

This adjustment is based on the Department approved long-term care cost estimate dated:

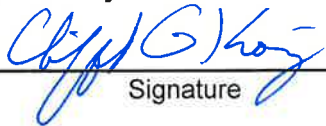
September 6, 2012

Latest Department Approved Annual Long-Term Care Cost Estimate:	Current Year Inflation Factor, e.g. 1.02	Inflation Adjusted Annual Long-Term Care Cost Estimate:
\$116,465.91	x 1.017	= \$118,445.83
Number of Years of Long Term Care Remaining:	x	= 30
Inflation Adjusted Long-Term Care Cost Estimate:		= \$3,553,374.91

Signature by: ☐ Owner/Operator

☒ Engineer

(check what applies)

  
Signature

Clifford G. Koenig, Project Manager  
Name & Title

8-29-2013  
Date

(904) 598-8900  
Telephone Number

200 W Forsyth St, Ste 800  
Address

Jacksonville, FL 32202  
City, State, Zip Code

Cliff.Koenig@hdrinc.com  
E-Mail Address





# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
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DEP Form # 62-701.900(28), F.A.C.

Form Title: Closure Cost Estimating Form  
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Effective Date: January 6, 2010

Incorporated in Rule 62-701.630(3), F.A.C.

## CLOSURE COST ESTIMATING FORM FOR SOLID WASTE FACILITIES

Date of DEP Approval: \_\_\_\_\_

### I. GENERAL INFORMATION:

Facility Name: Tomoka Farms Road Landfill- Class III Landfill WACS ID: 27540  
 Permit Application or Consent Order No.: SO64-0078767-019 Expiration Date: 10/9/2014  
 Facility Address: 1990 Tomoka Farms Road, Daytona Beach, Florida  
 Permittee or Owner/Operator: Volusia County Solid Waste Division  
 Mailing Address: 3151 East New York Avenue, DeLand, Florida 32724

Latitude: 29 ° 07 ' 53 " Longitude: 81 ° 05 ' 31 "  
 Coordinate Method: AutoCAD/GPS Datum: NAD 1983/90 (east)  
 Collected by: J.E. Zapert Company/Affiliation: Sliger & Associates, Inc.

Solid Waste Disposal Units Included in Estimate:

Phase / Cell	Acres	Date Unit Began Accepting Waste	Active Life of Unit From Date of Initial Receipt of Waste	If active: Remaining life of unit	If closed: Date last waste received	If closed: Official date of closing
Class III LF	88	June 1998	15.25 years	30.33 years	NA	NA

Total disposal unit acreage included in this estimate: Closure: 88 Long-Term Care: 88

Facility type: ☐ Class I ☒ Class III ☐ C&D Debris Disposal  
 (Check all that apply) ☐ Other: \_\_\_\_\_

### II. TYPE OF FINANCIAL ASSURANCE DOCUMENT (Check type)

- ☐ Letter of Credit\*      ☐ Insurance Certificate      ☒ Escrow Account  
☐ Performance Bond\*      ☐ Financial Test      ☐ Form 29 (FA Deferral)  
☐ Guarantee Bond\*      ☐ Trust Fund Agreement

\* - Indicates mechanisms that require the use of a Standby Trust Fund Agreement

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### III. ESTIMATE ADJUSTMENT

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☒ **(a) Inflation Factor Adjustment**

☐ **(b) Recalculated or New Cost Estimates**

Inflation adjustment using an inflation factor may only be made when a Department approved closure cost estimate exists and no changes have occurred in the facility operation which would necessitate modification to the closure plan. The inflation factor is derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its survey of Current Business. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year. The inflation factor may also be obtained from the Solid Waste website [www.dep.state.fl.us/waste/categories/swfr](http://www.dep.state.fl.us/waste/categories/swfr) or call the Financial Coordinator at (850) 245-8706.

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This adjustment is based on the Department approved closing cost estimate dated:		<u>September 6, 2012</u>	
Latest Department Approved Closing Cost Estimate:	Current Year Inflation Factor, e.g. 1.02		Inflation Adjusted Closing Cost Estimate:
<u>\$8,099,975.95</u>	<u>x</u> <u>1.017</u>	<u>=</u>	<u>\$8,237,675.54</u>

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This adjustment is based on the Department approved long-term care cost estimate dated:		<u>September 6, 2012</u>	
Latest Department Approved Annual Long-Term Care Cost Estimate:	Current Year Inflation Factor, e.g. 1.02		Inflation Adjusted Annual Long-Term Care Cost Estimate:
<u>\$94,663.76</u>	<u>x</u> <u>1.017</u>	<u>=</u>	<u>\$96,273.04</u>
Number of Years of Long Term Care Remaining:		<u>x</u>	<u>30</u>
Inflation Adjusted Long-Term Care Cost Estimate:		<u>=</u>	<u>\$2,888,191.32</u>

---

Signature by: ☐ Owner/Operator

☒ **Engineer**

(check what applies)

Cliff G Koenig  
Signature

Clifford G. Koenig, Project Manager  
Name & Title

8-29-2013  
Date

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Telephone Number

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## CLOSURE COST ESTIMATING FORM FOR SOLID WASTE FACILITIES

Date of DEP Approval: \_\_\_\_\_

### I. GENERAL INFORMATION:

Facility Name: Tomoka Farms Road Landfill-North Cell, Phase I, Class I WACS ID: 27540

Permit Application or Consent Order No.: SF64-0078767-028 Expiration Date: 03/19/2017

Facility Address: 1990 Tomoka Farms Road, Daytona Beach, Florida

Permittee or Owner/Operator: Volusia County Solid Waste Division

Mailing Address: 3151 East New York Avenue, DeLand, Florida 32724

Latitude: 29 ° 07 ' 50 " Longitude: 81 ° 06 ' 02 "

Coordinate Method: AutoCAD/GPS Datum: NAD 1983/90 (east)

Collected by: J.E. Zapert Company/Affiliation: Sliger & Associates, Inc.

Solid Waste Disposal Units Included in Estimate:

Phase / Cell	Acres	Date Unit Began Accepting Waste	Active Life of Unit From Date of Initial Receipt of Waste	If active: Remaining life of unit	If closed: Date last waste received	If closed: Official date of closing
North Cell	65.65	June 1999	13.5 years	5.0 years	NA	NA

Total disposal unit acreage included in this estimate: Closure: 65.65 Long-Term Care: 65.65

Facility type: ☒ Class I ☐ Class III ☐ C&D Debris Disposal  
(Check all that apply) ☐ Other: \_\_\_\_\_

### II. TYPE OF FINANCIAL ASSURANCE DOCUMENT (Check type)

- ☐ Letter of Credit\*      ☐ Insurance Certificate      ☒ Escrow Account  
☐ Performance Bond\*      ☐ Financial Test      ☐ Form 29 (FA Deferral)  
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This adjustment is based on the Department approved closing cost estimate dated: \_\_\_\_\_

Latest Department Approved  
Closing Cost Estimate:

Current Year Inflation  
Factor, **e.g. 1.02**

Inflation Adjusted Closing  
Cost Estimate:

\_\_\_\_\_ × \_\_\_\_\_ = \_\_\_\_\_

This adjustment is based on the Department approved long-term care cost estimate dated: \_\_\_\_\_

Latest Department Approved  
Annual Long-Term Care  
Cost Estimate:

Current Year Inflation  
Factor, **e.g. 1.02**

Inflation Adjusted Annual  
Long-Term Care Cost  
Estimate:

\_\_\_\_\_ × \_\_\_\_\_ = \_\_\_\_\_

Number of Years of Long Term Care Remaining:

\_\_\_\_\_ × \_\_\_\_\_

Inflation Adjusted Long-Term Care Cost Estimate:

\_\_\_\_\_ = \_\_\_\_\_

Signature by: ☐ Owner/Operator

☒ Engineer

(check what applies)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Name & Title

\_\_\_\_\_  
City, State, Zip Code

\_\_\_\_\_  
Date

\_\_\_\_\_  
E-Mail Address

\_\_\_\_\_  
Telephone Number

**IV. ESTIMATED CLOSING COST (check what applies)**☒ **Recalculated Cost Estimate**☐ **New Facility Cost Estimate**

Notes: 1. Cost estimates for the time period when the extent and manner of landfill operation makes closing most exp

2. Cost estimate must be certified by a professional engineer.

3. Cost estimates based on third party suppliers of material, equipment and labor at fair market value.

4. In some cases, a price quote in support of individual item estimates may be required.

Description	Unit	Number of Units	Cost / Unit	Total Cost
<b>1. Proposed Monitoring Wells (Do not include wells already in existence.)</b>				
	EA			
Subtotal Proposed Monitoring Wells:				
<b>2. Slope and Fill (bedding layer between waste and barrier layer):</b>				
Excavation	CY			
Placement and Spreading	CY			
Compaction	CY			
Off-Site Material	CY			
Delivery	CY			
Subtotal Slope and Fill:				
<b>3. Cover Material (Barrier Layer):</b>				
Off-Site <del>Clay</del> <b>Cover Soil</b>	CY	175,086	\$11.25	\$1,969,717.50
Synthetics - 40 mil	SY	346,837	\$4.30	\$1,491,399.10
Synthetics - GCL	SY			
Synthetics - Geonet	SY			
Synthetics - Other (explain)	SY	346,837	\$5.23	\$1,813,957.51
Double Sided Geocomposite				
Subtotal Cover Material:				\$5,275,074.11
<b>4. Top Soil Cover:</b>				
Off-Site Material	CY	58,362	\$12.50	\$729,525.00
Delivery	CY			
Spread	CY			
Subtotal Top Soil Cover:				\$729,525.00
<b>5. Vegetative Layer</b>				
Sodding	SY	307,333	\$2.25	\$691,499.25
Hydroseeding	AC	5.41	\$2,500.00	\$13,525.00
Fertilizer	AC			
Mulch	AC			
Other (explain)				
Subtotal Vegetative Layer:				\$705,024.25
<b>6. Stormwater Control System:</b>				
Earthwork	CY			
Grading	SY			
Piping	LF	6,778	\$21.09	\$142,948.02
Ditches	LF			
Berms	LF			
Control Structures	EA	12	\$1,919.23	\$23,030.76
Other (explain)	LS	1	\$360,772.04	\$360,772.04
See Attachment R-2				
Subtotal Stormwater Control System:				\$526,750.82

Description	Unit	Number of Units	Cost / Unit	Total Cost
<b>7. Passive Gas Control:</b>				
Wells	EA	_____	_____	_____
Pipe and Fittings	LF	_____	_____	_____
Monitoring Probes	EA	_____	_____	_____
NSPS/Title V requirements	LS	1	_____	_____
Subtotal Passive Gas Control:				_____
<b>8. Active Gas Extraction Control:</b>				
Traps	EA	_____	_____	_____
Sumps	EA	_____	_____	_____
Flare Assembly	EA	_____	_____	_____
Flame Arrestor	EA	_____	_____	_____
Mist Eliminator	EA	_____	_____	_____
Flow Meter	EA	_____	_____	_____
Blowers	EA	_____	_____	_____
Collection System	LF	_____	_____	_____
Other (explain) _____	LS	1	\$352,668.63	\$352,668.63
Subtotal Active Gas Extraction Control:				\$352,668.63
<b>9. Security System:</b>				
Fencing	LF	1	\$2,000.00	\$2,000.00
Gate(s)	EA	_____	_____	_____
Sign(s)	EA	_____	_____	_____
Subtotal Security System:				\$2,000.00
<b>10. Engineering:</b>				
Closure Plan Report	LS	1	\$50,000.00	\$50,000.00
Certified Engineering Drawings	LS	1	\$25,000.00	\$25,000.00
NSPS/Title V Air Permit	LS	1	\$20,000.00	\$20,000.00
Final Survey	LS	1	\$25,000.00	\$25,000.00
Certification of Closure	LS	1	\$50,000.00	\$50,000.00
Other (explain) _____	_____	_____	_____	_____
Subtotal Engineering:				\$170,000.00

Description	Hours	Cost / Hour	Hours	Cost / Hour	Total Cost
<b>11. Professional Services</b>					
	<u>Contract Management</u>		<u>Quality Assurance</u>		
P.E. Supervisor	160	\$130.00	80	\$130.00	\$31,200.00
On-Site Engineer	300	\$100.00	180	\$100.00	\$48,000.00
Office Engineer	200	\$100.00	144	\$100.00	\$34,400.00
On-Site Technician	_____	_____	2,992	\$65.00	\$194,480.00
Other (explain) _____	_____	_____	1	\$50,000.00	\$50,000.00
Lump Sum Amount					

Description	Unit	Number of Units	Cost / Unit	Total Cost
Quality Assurance Testing	LS	1	\$50,000.00	\$50,000.00
Subtotal Professional Services:				\$408,080.00

**Subtotal of 1-11 Above:** \$8,169,122.81

<b>12. Contingency</b>	<u>10</u>	% of Subtotal of 1-11 Above	<u>\$816,912.28</u>
		Subtotal Contingency:	<u>\$816,912.28</u>

**Estimated Closing Cost Subtotal:** \$8,986,035.09

Description	Total Cost
<b>13. Site Specific Costs</b>	
Mobilization	\$408,456.14
Waste Tire Facility	
Materials Recovery Facility	
Special Wastes	
Leachate Management System Modification	
Other (explain) _____	
Subtotal Site Specific Costs:	\$408,456.14

**TOTAL ESTIMATED CLOSING COSTS (\$):** \$9,394,491.23

## V. ANNUAL COST FOR LONG-TERM CARE

See 62-701.600(1)a.1., 62-701.620(1), 62-701.630(3)a. and 62-701.730(11)b. F.A.C. for required term length. For landfills certified closed and Department accepted, enter the remaining long-term care length as "Other" and provide years remaining.

(Check Term Length) ☐ 5 Years ☐ 20 Years ☒ 30 Years ☐ Other, \_\_\_\_ Years

Notes: 1. Cost estimates must be certified by a professional engineer.

2. Cost estimates based on third party suppliers of material, equipment and labor at fair market value.

3. In some cases, a price quote in support of individual item estimates may be required.

**All items must be addressed.** Attach a detailed explanation for all entries left blank.

Description	Sampling Frequency (Events / Year)	Number of Wells	(Cost / Well) / Event	Annual Cost
<b>1. Groundwater Monitoring [62-701.510(6), and (8)(a)]</b>				
Monthly	12	_____	_____	_____
Quarterly	4	_____	_____	_____
Semi-Annually	2	_____	_____	_____
Annually	1	_____	_____	_____
Subtotal Groundwater Monitoring:				_____
<b>2. Surface Water Monitoring [62-701.510(4), and (8)(b)]</b>				
Monthly	12	_____	_____	_____
Quarterly	4	_____	_____	_____
Semi-Annually	2	7	\$426.36	\$5,969.04
Annually	1	_____	_____	_____
Subtotal Surface Water Monitoring:				\$5,969.04
<b>3. Gas Monitoring [62-701.400(10)]</b>				
Monthly	12	_____	_____	_____
Quarterly	4	1	\$2,035.50	\$8,142.00
Semi-Annually	2	_____	_____	_____
Annually	1	_____	_____	_____
Subtotal Gas Monitoring:				\$8,142.00
<b>4. Leachate Monitoring [62-701.510(5), (6)(b) and 62-701.510(8)c]</b>				
Monthly	12	_____	_____	_____
Quarterly	4	_____	_____	_____
Semi-Annually	2	_____	_____	_____
Annually	1	_____	_____	_____
Other (explain) _____	_____	_____	_____	_____
Subtotal Leachate Monitoring:				_____

Description	Unit	Number of Units / Year	Cost / Unit	Annual Cost
<b>5. Leachate Collection/Treatment Systems Maintenance</b>				
<u>Maintenance</u>				
Collection Pipes	LF	_____	_____	_____
Sumps, Traps	EA	_____	_____	_____
Lift Stations	EA	_____	_____	_____
Cleaning	LS	1	\$2,000.00	\$2,000.00
Tanks	EA	_____	_____	_____



Description	Unit	Number of Units / Year	Cost / Unit	Annual Cost
<b>5. (continued)</b>				
<u>Impoundments</u>				
Liner Repair	SY	20	\$9.00	\$180.00
Sludge Removal	CY			
<u>Aeration Systems</u>				
Floating Aerators	EA			
Spray Aerators	EA			
<u>Disposal</u>				
Off-site (Includes transportation and disposal)	1000 gallon	1,000	\$30.00	\$30,000.00
Subtotal Leachate Collection / Treatment Systems Maintenance:				\$32,180.00
<b>6. Groundwater Monitoring Well Maintenance</b>				
Monitoring Wells	LF	1	\$500.00	\$500.00
Replacement	EA			
Abandonment	EA			
Subtotal Groundwater Monitoring Well Maintenance:				\$500.00
<b>7. Gas System Maintenance</b>				
Piping, Vents	LF	1	\$5,000.00	\$5,000.00
Blowers	EA	1	\$1,200.00	\$1,200.00
Flaring Units	EA	1	\$400.00	\$400.00
Meters, Valves	EA	1	\$500.00	\$500.00
Compressors	EA			
Flame Arrestors	EA	1	\$1,200.00	\$1,200.00
Operation	LS	1	\$24,840.00	\$24,840.00
Subtotal Gas System Maintenance:				\$33,140.00
<b>8. Landscape Maintenance</b>				
Mowing	AC	65.65	\$294.92	\$19,361.50
Fertilizer	AC			
Subtotal Landscape Maintenance:				\$19,361.50
<b>9. Erosion Control and Cover Maintenance</b>				
Sodding	SY	7,164	\$2.25	\$16,119.00
Regrading	AC			
Liner Repair	SY	1,194	\$8.57	\$10,232.58
Clay	CY	796	\$12.50	\$9,950.00
Subtotal Erosion Control and Cover Maintenance:				\$36,301.58
<b>10. Storm Water Management System Maintenance</b>				
Conveyance Maintenance	LS	1	\$5,000.00	\$5,000.00
Subtotal Storm Water Management System Maintenance:				\$5,000.00
<b>11. Security System Maintenance</b>				
Fences	LS	1	\$500.00	\$500.00
Gate(s)	EA			
Sign(s)	EA			
Subtotal Security System Maintenance:				\$500.00

Description	Unit	Number of Units / Year	Cost / Unit	Annual Cost
<b>12. Utilities</b>	LS	<u>1</u>	<u>\$1,800.00</u>	<u>\$1,800.00</u>
Subtotal Utilities:				<u>\$1,800.00</u>

**13. Leachate Collection/Treatment Systems Operation**

Operation

P.E. Supervisor	HR	<u>          </u>	<u>          </u>	<u>          </u>
On-Site Engineer	HR	<u>          </u>	<u>          </u>	<u>          </u>
Office Engineer	HR	<u>          </u>	<u>          </u>	<u>          </u>
OnSite Technician	HR	<u>104</u>	<u>\$65.00</u>	<u>\$6,760.00</u>
Materials	LS	<u>1</u>	<u>          </u>	<u>          </u>

Subtotal Leachate Collection/Treatment Systems Operation: \$6,760.00

**14. Administrative**

P.E. Supervisor	HR	<u>30</u>	<u>\$135.00</u>	<u>\$4,050.00</u>
On-Site Engineer	HR	<u>48</u>	<u>\$75.00</u>	<u>\$3,600.00</u>
Office Engineer	HR	<u>60</u>	<u>\$75.00</u>	<u>\$4,500.00</u>
OnSite Technician	HR	<u>          </u>	<u>          </u>	<u>          </u>
Other <u>                    </u>	HR	<u>30</u>	<u>\$35.00</u>	<u>\$1,050.00</u>

Administrative Assistant Subtotal Administrative: \$13,200.00

**Subtotal of 1-14 Above:** \$162,854.12

<b>15. Contingency</b>	<u>10</u>	% of Subtotal of 1-14 Above	<u>\$16,285.41</u>
Subtotal Contingency:			<u>\$16,285.41</u>

Description	Unit	Number of Units / Year	Cost / Unit	Annual Cost
<b>16. Site Specific Costs</b>				
<u>                                    </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>                                    </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>                                    </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
Subtotal Site Specific Costs:				<u>          </u>


**ANNUAL LONG-TERM CARE COST (\$ / YEAR):** \$179,139.53

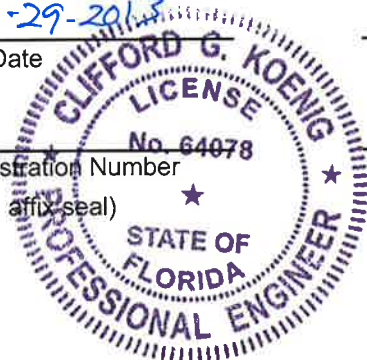
Number of Years of Long-Term Care: 30

**TOTAL LONG-TERM CARE COST (\$):** \$5,374,185.89


## VI. CERTIFICATION BY ENGINEER

This is to certify that the Cost Estimates pertaining to the engineering features of this solid waste management facility have been examined by me and found to conform to engineering principles applicable to such facilities. In my professional judgment, the Cost Estimates are a true, correct and complete representation of the financial liabilities for closing and/or long-term care of the facility and comply with the requirements of Rule 62-701.630 F.A.C. and all other Department of Environmental Protection rules, and statutes of the State of Florida. It is understood that the Cost Estimates shall be submitted to the Department annually, revised or adjusted as required by Rule 62-701.630(4), F.A.C.

 Signature	200 W. Forsyth St., Ste. 800 Mailing Address
Clifford G. Koenig, Project Manager Name and Title (please type)	Jacksonville, FL 32202-4321 City, State, Zip Code
8-29-2013 Date	CKoenig@hdrinc.com E-Mail address (if available)
64078 Florida Registration Number (please affix seal)	(904)-598-8900 Telephone Number



## VII. SIGNATURE BY OWNER/OPERATOR

 Signature of Applicant	3151 East New York Avenue Mailing Address
Leonard Marion, Director Name and Title (please type)	DeLand, FL 32724 City, State, Zip Code
lmarion@co.volusia.fl.us E-Mail address (if available)	(386)-943-7889 Telephone Number

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## SECTION 2.0

# Regulatory Requirements

FAC 62-701.630 addresses financial responsibility requirements for landfills and other solid waste management facilities. Government-owned landfills can demonstrate financial responsibility in several ways. Mechanisms available include establishment of an escrow account, use of the corporate guarantee (financial test), surety bonds, certificates of deposit, securities, letters of credit, trust fund agreements, and closure insurance.

Volusia County has used the escrow accounting mechanism to provide for financial responsibility. FAC 62-701.630 allows government-owned landfills to demonstrate financial responsibility for the annual cost of long-term care one-year prior to the actual final closure. The disposal areas at the TFR Facility and the Plymouth Avenue Landfill are required to have long-term care for 30 years after the landfill has been certified closed by the FDEP.

In March 1996, the U.S. Environmental Protection Agency (EPA) promulgated *Standards of Performance, Emission Guidelines and Compliance Times, and New Source Performance Standards* for municipal solid waste (MSW) landfills. These regulations brought MSW landfills under the direct control of the Clean Air Act (CAA) and require the installation of landfill gas (LFG) emissions controls for the Volusia County Tomoka Farms Road Landfill. Costs for implementation of the LFG control systems for the TFR Facility has been included in the closure cost estimates. The current FDEP closure permit for the Plymouth Avenue Landfill does not require a landfill gas collection system and costs for such system is not allocated in the updated long-term care cost estimates.

The FDEP establishes the method for estimating closing and long-term care costs for financial responsibility in FAC 62-701.630 and referencing and adopting 40 CFR, Part 264, Subpart H. These federal regulations specify that closing and long-term care cost estimates may be made by:

- Recalculating the maximum costs of closing and long-term care in current dollars; or,
- Using an inflation factor derived from the most recent Implicit Price Deflator for Gross Domestic Product published by the U.S. Department of Commerce in its *Economic Report of the President* to inflate cost estimates from the prior year.

The FDEP requirements for financial responsibility annual adjustments were met for the Class III landfill and South Cell Class I at the TFR Facility and the closed Plymouth Avenue Landfill by updating the 2012 FDEP-approved cost estimates with the annual inflation factor. An inflation rate of 1.7% was used for this year's financial responsibility report as provided by the FDEP. This value was obtained from the FDEP Solid Waste Financial Responsibility webpage. For North Cell Class I at the TFR Facility, the FDEP requirements were met by acquiring current third-party cost quotes.

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## SECTION 3.0

# Methodology

Closure and long-term care costs for the Class III landfill and South Cell at TFR Facility and the Plymouth Avenue Landfill were adjusted for inflation based on the FY2012 Financial Responsibility Closure and Long-Term Care Cost Estimates Report cost estimates approved by the FDEP. No modifications to the TFR Class III, South Cell or Plymouth landfills or their permits have occurred since the previous year's financial assurance submittal that would necessitate a recalculation of their financial assurance responsibility.

Closure and long-term care costs for the North Cell Class I landfill financial assurance were recalculated based on the most recently approved closure design. It is assumed that all work will be performed by an independent contractor as required by the Chapter 62-701 regulations. A detailed description of the North Cell's cost estimates and third-party cost quotes are provided in Attachment C to this report.

FDEP Form 62-701.900(28) was submitted for each facility individually with the updated estimated cost estimates for closure and long-term care. All additional data including population data, airspace depletion rate data, and life expectancy of the current permitted landfills are presented in Section 4.0.

Population projections and a six-year-averaged per capita landfill capacity utilization rate for Class I and Class III solid waste is used to project future landfill airspace utilization rates. The amount of permitted airspace utilized since the previous financial assurance report was determined by comparing new aerial topographic mapping flown in May 2013 with last year's aerial topographic survey flown in April 2012. This method takes into account the landfill volume used for the required daily and intermediate cover material and the landfill volume gained due to waste decomposition and compaction, as well as other factors which may impact permitted disposal capacity and the projection of remaining life.

Table 1 provides updated population projections for the Class I and Class III solid waste service areas. The contributing population for Class I solid waste is assumed to be the population of Volusia County only because according to the Volusia County, waste from Flagler County to the Volusia County TFR Facility will discontinue in the future. The contributing population for Class III solid waste was assumed to be Volusia County. The population projections are based on the data supplied by the Office of Economic and Demographic Research (EDR).

Table 2 presents the per capita permitted disposal capacity depletion rate. Tables 3 and 4 provide the permitted airspace depletion analysis for the North Cell Class I and Class III landfills. Table 5 provides a summary of the calculated closure dates and long-term care periods of the landfills. Tables 6 and 7 summarize the costs and required funding for closure and long-term care of each facility and provide an analysis of annual contributions to fund closure. Table 8 has been developed for the use of Volusia County and presents estimates on the accrued liability.

Although permitted for construction, the Phase II expansion has not yet been constructed and certified by the FDEP for waste disposal. Therefore, the Phase II expansion was not included in the 2012 FDEP inflationary adjustments for the North Cell Class I landfill's financial assurance responsibility and it was not factored into the site life calculations. Per FAC 62-701.630(1)(b), the financial assurance mechanism for the Phase II expansion area will be fully funded according to FDEP-approved cost estimates and FDEP rules governing financial assurance responsibility at least sixty days prior to the acceptance of solid waste in these areas. Based on volume calculation, the Phase II expansion will increase the total waste capacity by 3.8 million cubic yards which, based on future population projections and per capita utilizations, increases the site life by ten years.

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The TFR Facility waste tire storage area is a stand-alone waste tire drop-off facility where tires are loaded into containers for transportation to a permitted off-site processing facility. This operation is anticipated to remain as long as the other solid waste activities take place on the property. Since this length of time is not now defined, it is assumed that the closing date will be the same as the closing date for the TFR Solid Waste Management Facility. The cost estimate for closing the TFR Facility waste tire storage area was assumed to be the cost of disposing the quantity of tires stored at the facility. This cost was calculated by multiplying 77 tons of tires by the cost of hauling and disposal of tires by a third party contractor currently \$74.82/ton for rimmed tires, \$52.41/ton for de-rimmed tires and \$130.00/ton for oversized tires. The quantity of waste tires (60 tons, approx.) was calculated by averaging waste tire quantities reported in last four *Quarterly Waste Tire Report & Inventory Update* reports submitted to the department (from 2<sup>nd</sup> quarter 2012 to 1<sup>st</sup> quarter 2013).

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## SECTION 4.0

# Figures and Tables

The figures and tables are organized as follows:

<u>Figure Number</u>	<u>Title</u>
1	Existing Topographic Survey (May 2013) - Class I North Cell – Tomoka Farms Road Landfill
2	Final Grading Plan without Phase II Expansion – Class I North Cell– Tomoka Farms Road Landfill
3	Final Grading Plan with Phase II Expansion – Class I North Cell – Tomoka Farms Road Landfill
4	Existing Topographic Survey (May 2013) - Class III Landfill-Tomoka Farms Road Landfill
5	Final Grading Plan - Class III Landfill – Tomoka Farms Road Landfill
6	Aerial Site Plan (May 2013) – Tomoka Farms Road Landfill

<u>Table Number</u>	<u>Title</u>
1	Population Projections of Wasteshed Service Areas
2	Annual Rate of Landfill Capacity Utilization
3	North Cell Class I Landfill - Projected Capacity Utilization
4	Class III Landfill - Projected Capacity Utilization
5	Summary of Closing & Final Closure of Landfills
6	Summary of Estimated Cost
7	Summary of Escrow Analysis
8	Estimate of Accrued Liability (As of September 30, 2013)

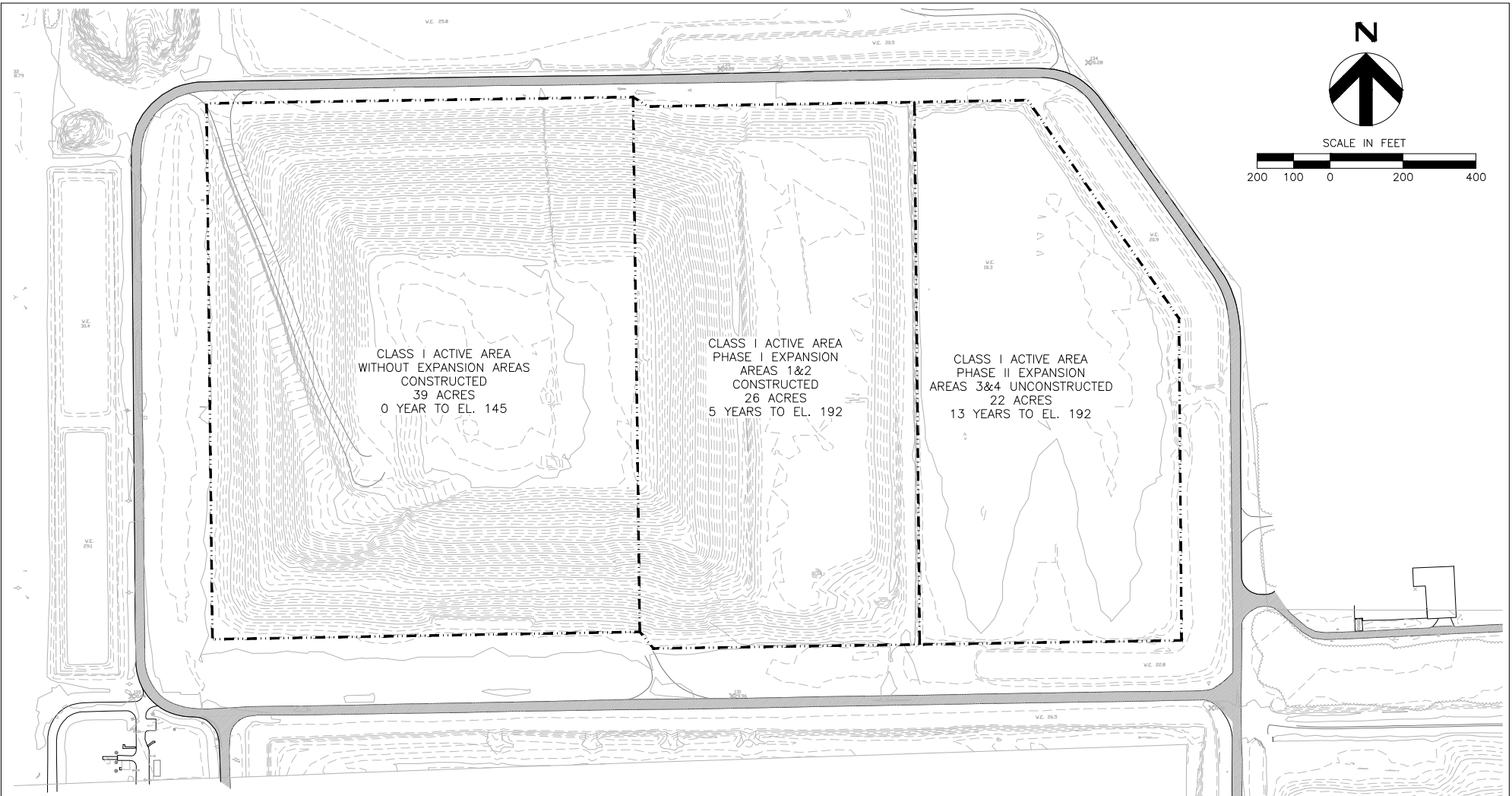
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## SECTION 5.0

### Sources

1. Volusia County Solid Waste System, Financial Responsibility Closure and Long Term Care Costs Report, FY 2012, August 2012, HDR Engineering, Inc.
2. Schedule of Activities, Landfill Management Escrow Accounts, September 30, 2012, James Moore & Co., P.L. dated March 5, 2013.
3. Waste Tire Processing Price Agreement between County of Volusia and MTR of Georgia, Inc. for the period 4/1/2008 to 4/12/2013.
4. Volusia County Public Works Department - Solid Waste Division, Quarterly Waste Tire Report & Inventory Update, 2<sup>nd</sup> Quarter 2012 dated July 9, 2012.
5. Volusia County Public Works Department - Solid Waste Division, Quarterly Waste Tire Report & Inventory Update, 3<sup>rd</sup> Quarter 2012 dated October 8, 2012.
6. Volusia County Public Works Department - Solid Waste Division, Quarterly Waste Tire Report & Inventory Update, 4<sup>th</sup> Quarter 2012 dated January 15, 2013.
7. Volusia County Public Works Department - Solid Waste Division, Quarterly Waste Tire Report, 1<sup>st</sup> Quarter 2013 dated April 10, 2013.
8. FDEP Operation Permit-North Cell Class I Landfill Tomoka Farms Road Solid Waste Management Facility.
9. FDEP Construction Permit-North Cell Class I Landfill Phase II Expansion Tomoka Farms Road Solid Waste Management Facility.
10. FDEP Closure Permit-North Cell Class I Landfill-Tomoka Farms Road Solid Waste Management Facility.
11. FDEP Operation Permit-Class III Landfill-Tomoka Farms Road Solid Waste Management Facility.
12. FDEP Closure Permit -South Cell Landfill -Tomoka Farms Road Solid Waste Management Facility.
13. FDEP Closure Permit -Plymouth Avenue Landfill.
14. Topography Survey and Mapping Report, Aerial Cartographics of America, April 2012.
15. Topography Survey and Mapping Report, Aerial Cartographics of America, May 2012.
16. Certified Topographic Survey Capacity Calculation Report, Aerial Cartographics of America, November 2008 (ACA Job Number 2008679).





NOTES:

1. AERIAL IMAGERY WAS TAKEN FROM AERIAL SURVEY PERFORMED BY AERIAL CARTOGRAPHICS OF AMERICA ON MAY 05, 2013.
2. BOUNDARIES ARE APPROXIMATE.

**HDR**

**EXISTING TOPOGRAPHIC SURVEY  
(MAY 2013)  
CLASS I NORTH CELL**

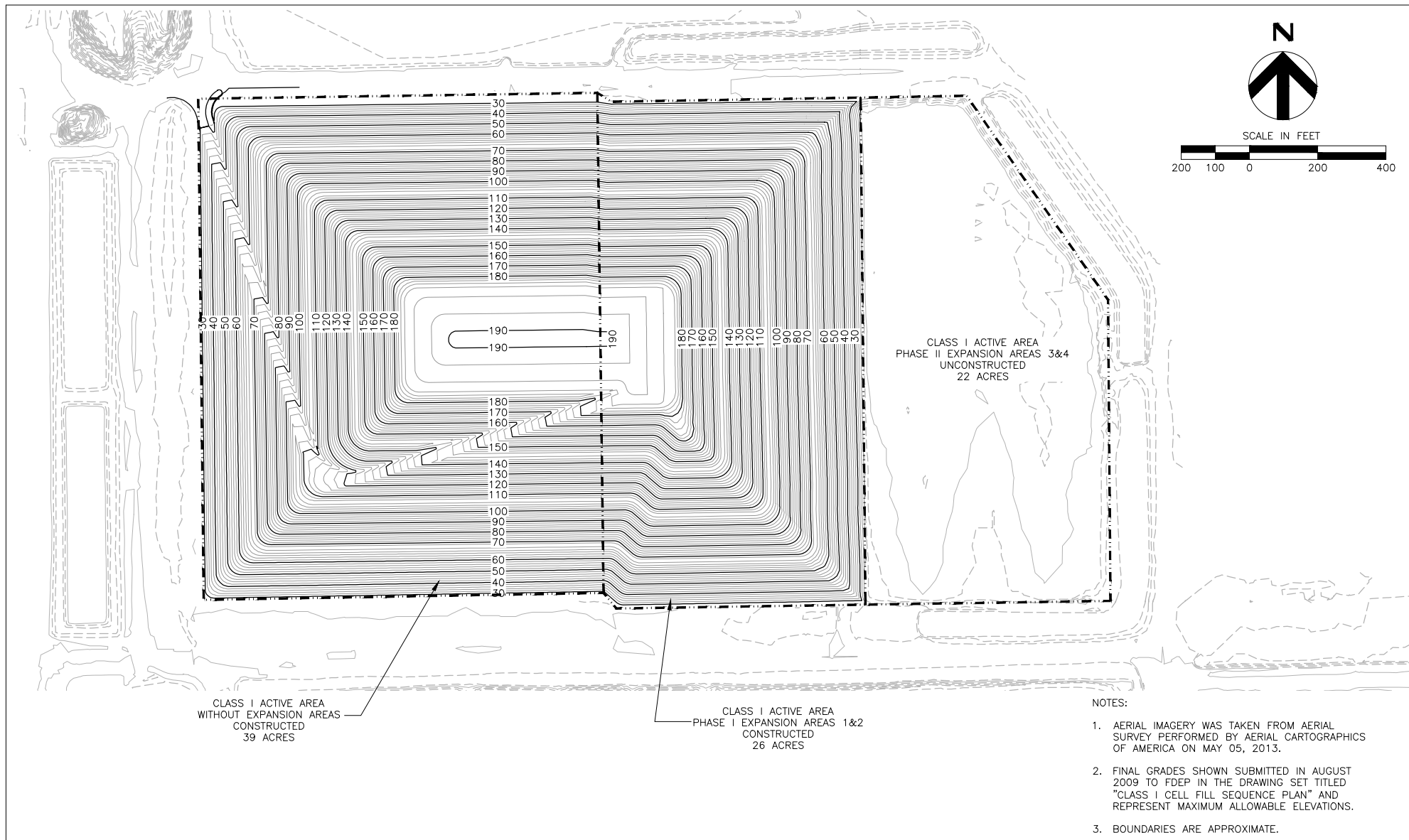
VOLUSIA COUNTY, FL

DATE

06/13

FIGURE

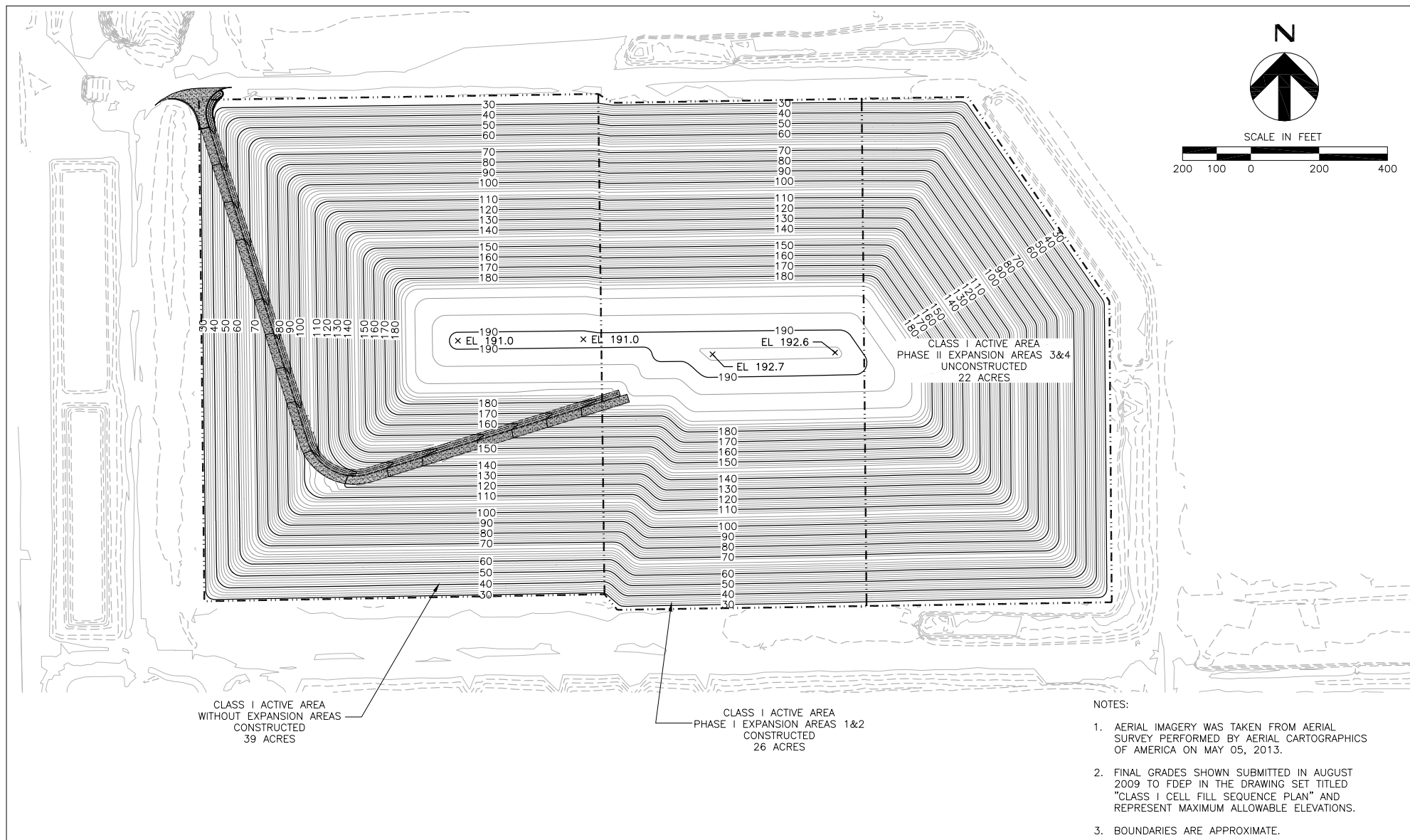
FIGURE 1



# FINAL GRADING PLAN WITHOUT PHASE II EXPANSION CLASS I NORTH CELL

VOLUSIA COUNTY, FL

DATE
06/13
FIGURE
FIGURE 2



**HDR**

# FINAL GRADING PLAN WITH PHASE II EXPANSION CLASS I NORTH CELL

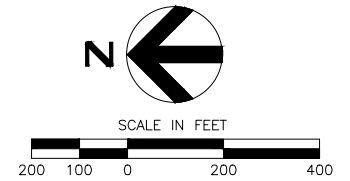
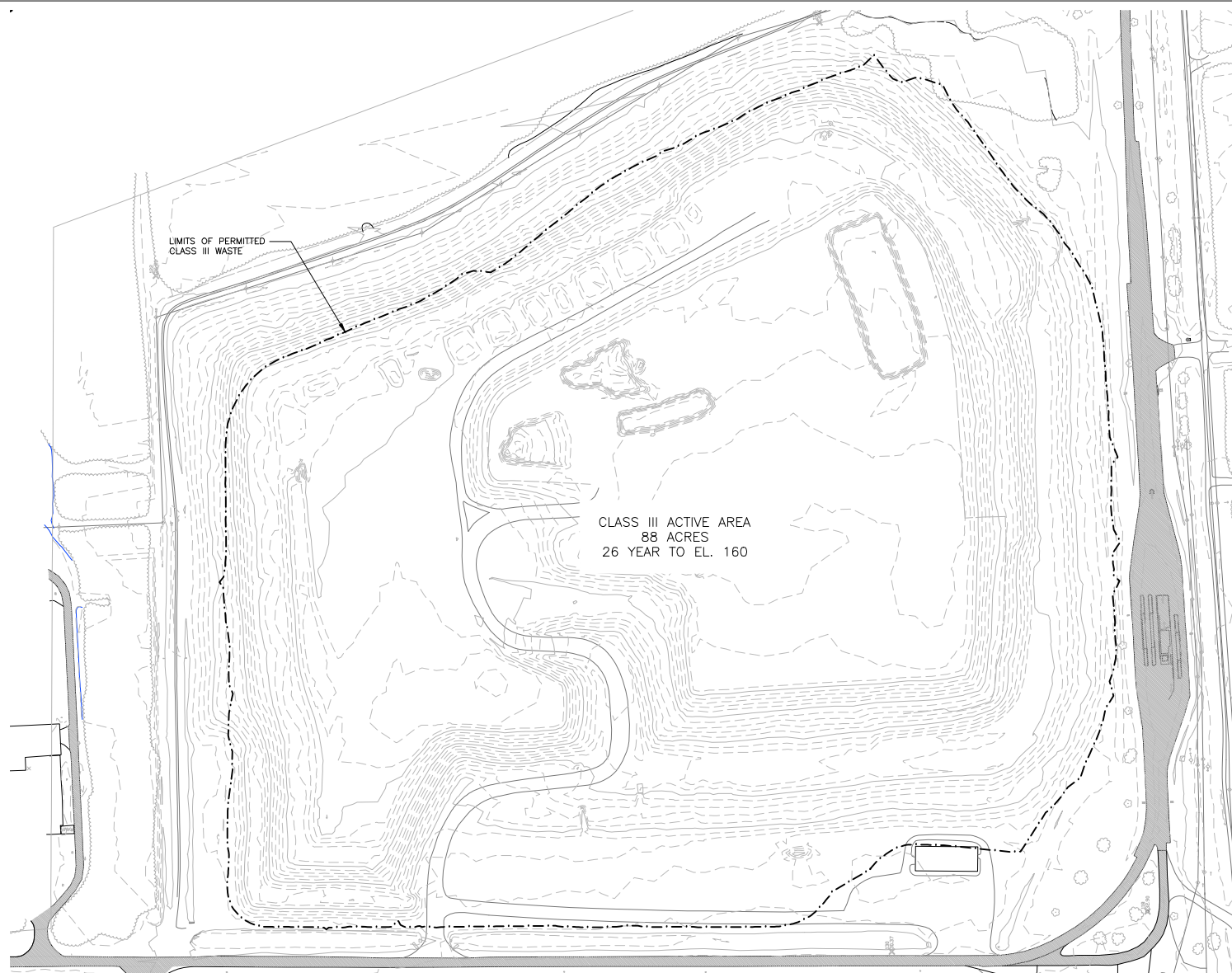
VOLUSIA COUNTY, FL

DATE

06/13

FIGURE

FIGURE 3



NOTES:

1. AERIAL IMAGERY WAS TAKEN FROM AERIAL SURVEY PERFORMED BY AERIAL CARTOGRAPHICS OF AMERICA ON MAY 05, 2013.
2. BOUNDARIES ARE APPROXIMATE.

**HDR**

**EXISTING TOPOGRAPHIC SURVEY  
(MAY 2013)  
CLASS III LANDFILL**

VOLUSIA COUNTY, FL

DATE

06/13

FIGURE

FIGURE 4



**HDR**

## FINAL GRADING PLAN CLASS III LANDFILL

VOLUSIA COUNTY, FL

DATE

06/13

FIGURE

FIGURE 5





**HDR**

**AERIAL SITE PLAN  
(MAY 2013)**

VOLUSIA COUNTY, FL

DATE

06/13

FIGURE

FIGURE 6

**Table 1: Population Projections of Wasteshed Service Areas  
2013 Financial Assurance Report  
Volusia County, Florida**

Year	Service Area Populations <sup>1</sup>			Class I Wasteshed (Volusia and Flagler Counties)	Class III Wasteshed (Volusia County)
	Volusia County	Flagler County <sup>3</sup>	City of Deltona <sup>2</sup>		
2007	508,014	93,568	---	601,582	508,014
2008 <sup>2</sup>	510,109	96,172	28,719	577,562	481,390
2009	507,105	94,901	84,264	517,742	422,841
2010	506,528	95,671	84,749	517,451	421,780
2011	495,400	96,241	85,233	506,408	410,167
2012	497,145	97,160	---	594,305	497,145
2013	499,562	---	---	499,562	499,562
2014	503,155	---	---	503,155	503,155
2015	507,749	---	---	507,749	507,749
2016	512,596	---	---	512,596	512,596
2017	517,337	---	---	517,337	517,337
2018	521,873	---	---	521,873	521,873
2019	526,237	---	---	526,237	526,237
2020	530,492	---	---	530,492	530,492
2021	534,681	---	---	534,681	534,681
2022	538,796	---	---	538,796	538,796
2023	542,819	---	---	542,819	542,819
2024	546,730	---	---	546,730	546,730
2025	550,509	---	---	550,509	550,509
2026	554,143	---	---	554,143	554,143
2027	557,630	---	---	557,630	557,630
2028	560,975	---	---	560,975	560,975
2029	564,179	---	---	564,179	564,179
2030	567,245	---	---	567,245	567,245
2031	570,179	---	---	570,179	570,179
2032	572,998	---	---	572,998	572,998
2033	575,720	---	---	575,720	575,720
2034	578,363	---	---	578,363	578,363
2035	580,946	---	---	580,946	580,946
2036	583,480	---	---	583,480	583,480
2037	585,946	---	---	585,946	585,946
2038	588,322	---	---	588,322	588,322
2039	590,586	---	---	590,586	590,586
2040	592,716	---	---	592,716	592,716
2041	596,451	---	---	596,451	596,451
2042	600,209	---	---	600,209	600,209
2043	603,991	---	---	603,991	603,991

**Notes:**

1. Population estimates for the years 2007 through 2011 were derived from Table 1 of HDR Engineering's FY2012 Financial Responsibility Closure & Long-term Care Cost Estimates, dated August 2012. The Office of Economic and Demographic Research (EDR) is the source for Volusia County and Flagler County population estimates for 2012 through 2040. Population estimates for 2041 through 2043 are based upon the average annual population growth rate from 2013 through 2040.

2. From June 2009 to September 2011 waste generated by City of Deltona was diverted from disposal in the Class I & III landfills. The City of Deltona's 2008 population has been adjusted proportionally based on the time duration for which waste was diverted from the Class I & III landfills.

3. Per Volusia County Flagler County's Class I waste will not be disposed at the Class I landfill 2013 onwards.

**Table 2: Annual Rate of Landfill Capacity Utilization  
2013 Financial Assurance Report  
Volusia County, Florida**

A. Class I Landfill-North Cell

Year <sup>(1)</sup>	Annual Utilization <sup>(2)</sup> (CY)	Population of Wasteshed	Rate of Class I Landfill Space Utilization Per Capita (CY/Yr)
2007	568,418	601,582	0.945
2008	393,429	577,562	0.681
2009	321,980	517,742	0.622
2010	266,219	517,451	0.514
2011	335,394	506,408	0.662
2012	399,352	594,305	0.672
Projected Rate of Class I Landfill Space Utilization Per Capita (CY/Yr) <sup>(5)</sup>			<b>0.683</b>

B. Class III Landfill

Year <sup>(1)</sup>	Annual Utilization <sup>(2)</sup> (CY)	Population of Wasteshed	Rate of Class III Landfill Space Utilization Per Capita (CY/Yr)
2007	212,703	508,014	0.419
2008	84,739	481,390	0.176
2009	51,831	422,841	0.123
2010	145,471	421,780	0.345
2011	122,020	410,167	0.297
2012	78,803	497,145	0.159
Projected Rate of Class III Landfill Space Utilization Per Capita (CY/Yr) <sup>(5)</sup>			<b>0.253</b>

Notes:

1) The year shown refers to the period in between the annual aerial topographic surveys (i.e. year 2012 refers to April 27, 2012 to May 5, 2013). For the year 2012, the annual utilized airspace, 408,105 cubic yards for the Class I North Cell and 80,530 cubic yards for the Class III Landfill, was divided by 1.02192 to normalize for the 373 days in between aerial photograph dates (April 27, 2012 to May 5, 2013).

2) Annual utilization for the years 2007 through 2012 is provided by HDR Engineering's 2012 Financial Assurance Report dated August 2012. The Class I 2012 annual utilization was calculated by Autodesk AutoCAD Civil 3D using the April 27, 2012 and May 5, 2013 aerial topographic surveys by Aerial Cartographic of America, Inc. The extent of the area used in the volume calculation was the "Existing Edge of Liner" Final Cover/Closure Site Plan SCS Engineers, 7/24/2009. The boundary was truncated at the 29' contour on the northern boundary of the original North Cell. The boundary used for the Class III landfill volume calculation was "the limits of permitted Class III" line shown on the SCS Engineers permit renewal drawing dated June 2009. The western margin of the permitted Class III boundary was truncated (approximately 10 acres) since activities unrelated to waste disposal, compaction or decomposition (i.e. removal of yard trash stockpiles) occurred in this area.

3) The higher solid waste landfill space utilization for Class I and Class III Landfills in 2007 may be attributed to impacts of beachside resort construction.

4) The decrease in Class III landfill per capita space utilization for 2008 and 2009 tonnages may be attributed to a downturn in construction.

5) The projected rate of landfill space utilization is assumed to be the average rate of per capita utilization for the past six years.

6) The estimated annual landfill space utilization includes landfill space lost due to the use of intermediate/daily cover material and the space gained due to compaction and decomposition of waste.



**Table 3: North Cell Class I Landfill - Projected Capacity Utilization**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

Year <sup>(1)</sup>	Time Period	Estimated Volume Utilized (CY)	Estimated Cumulative Volume Utilized (CY)	Permitted Disposal Capacity Remaining without Phase II Expansion (CY)	Percent of Permitted Disposal Capacity Used <sup>(2)</sup>
2011 <sup>(3)</sup>	5/8/11 to 4/27/12	---	---	2,300,390	73%
2012 <sup>(4)</sup>	4/28/12 to 5/5/13	408,105	6,601,041	1,893,046	78%
2012	5/6/13 to 9/30/13	163,476	6,764,517	1,729,570	80%
2013	10/1/13 to 9/30/14	341,201	7,105,718	1,388,369	84%
2014	10/1/14 to 9/30/15	343,655	7,449,373	1,044,714	88%
2015	10/1/15 to 9/30/16	346,793	7,796,165	697,922	92%
2016	10/1/16 to 9/30/17	350,103	8,146,269	347,818	96%
2017	10/1/17 to 9/25/18	347,818	8,494,087	0	100%
				Calculated Closure Date	September 2018

Notes:

1) Year generally represents October 1 to September 30 (i.e. year 2012 is from October 1, 2012 to September 30, 2013).

2) The total disposal capacity, including daily/intermediate cover, was calculated to be 8,494,087 cubic yards (assuming 211,722 cubic yards of final cover). The Phase 1 expansion basegrades utilized in this calculation were from an as-built drawing by Map-Tech dated October 4, 2005. The basegrades in the original North Cell were modeled from design basegrades from SCS Engineers. The final grade contours shown on Figure 2 were generated based on the July 24, 2009 Final Cover/Closure Site Plan drawing by SCS Engineers. The drawing was modified to exclude Phase II Expansion airspace.

3) Source is 2012 Financial Responsibility Report, HDR Engineering dated August 2012.

4) The volume capacity remaining as of the May 5, 2013 topo survey was calculated to be approximately 2,104,768 cubic yards. This volume was calculated using the final cap grade contours (see Note #2) and the May 5, 2013 aerial topographic survey. The final cover volume was estimated to be 211,722 cubic yards which assumes a permitted 2-foot thick soil cover for the entire closure area. The remaining capacity, 1,893,046 cubic yards, was assumed to be utilized for waste disposal and daily/intermediate cover.

**Table 4: Class III Landfill - Projected Capacity Utilization**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

Year <sup>(1)</sup>	Time Period	Estimated Volume Utilized (CY)	Estimated Cumulative Volume Utilized (CY)	Permitted Disposal Capacity Remaining (CY)	Percent of Permitted Disposal Capacity Used <sup>(4)</sup>
2011 <sup>(2)</sup>	5/8/11 to 4/27/12	--	--	4,394,689	37%
2012	4/28/12 to 5/5/13	80,530	2,698,458	4,310,804	38%
2012	5/6/13 to 9/30/13	50,656	2,749,114	4,260,148	39%
2013	10/1/13 to 9/30/14	126,389	2,875,503	4,133,759	41%
2014	10/1/14 to 9/30/15	127,298	3,002,801	4,006,461	43%
2015	10/1/15 to 9/30/16	128,460	3,131,262	3,878,000	45%
2016	10/1/16 to 9/30/17	129,687	3,260,948	3,748,314	47%
2017	10/1/17 to 9/30/18	130,886	3,391,835	3,617,427	48%
2018	10/1/18 to 9/30/19	132,034	3,523,868	3,485,394	50%
2019	10/1/19 to 9/30/20	133,138	3,657,006	3,352,256	52%
2020	10/1/20 to 9/30/21	134,214	3,791,221	3,218,041	54%
2021	10/1/21 to 9/30/22	135,274	3,926,495	3,082,767	56%
2022	10/1/22 to 9/30/23	136,315	4,062,811	2,946,451	58%
2023	10/1/23 to 9/30/24	137,333	4,200,144	2,809,118	60%
2024	10/1/24 to 9/30/25	138,323	4,338,467	2,670,795	62%
2025	10/1/25 to 9/30/26	139,279	4,477,745	2,531,517	64%
2026	10/1/26 to 9/30/27	140,198	4,617,943	2,391,319	66%
2027	10/1/27 to 9/30/28	141,080	4,759,024	2,250,238	68%
2028	10/1/28 to 9/30/29	141,927	4,900,951	2,108,311	70%
2029	10/1/29 to 9/30/30	142,737	5,043,688	1,965,574	72%
2030	10/1/30 to 9/30/31	143,513	5,187,201	1,822,061	74%
2031	10/1/31 to 9/30/32	144,255	5,331,456	1,677,806	76%
2032	10/1/32 to 9/30/33	144,968	5,476,425	1,532,837	78%
2033	10/1/33 to 9/30/34	145,657	5,622,082	1,387,180	80%
2034	10/1/34 to 9/30/35	146,326	5,768,408	1,240,854	82%
2035	10/1/35 to 9/30/36	146,979	5,915,387	1,093,875	84%
2036	10/1/36 to 9/30/37	147,620	6,063,007	946,255	86%
2037	10/1/37 to 9/30/38	148,244	6,211,252	798,010	89%
2038	10/1/38 to 9/30/39	148,845	6,360,097	649,165	91%
2039	10/1/39 to 9/30/40	149,418	6,509,515	499,747	93%
2040	10/1/40 to 9/30/41	149,957	6,659,473	349,789	95%
2041	10/1/41 to 9/30/42	150,902	6,810,375	198,887	97%
2042	10/1/42 to 9/30/43	151,853	6,962,228	47,034	99%
2043	10/1/43 to 1/21/44	47,034	7,009,262	0	100%
				Calculated Closure Date	January 2044

**Notes:**

1) Year generally represents October 1 to September 30 (i.e. year 2012 is from October 1, 2012 to September 31, 2013).

2) Source is 2012 Financial Responsibility Report, HDR Engineering dated August 2012.

3) The total air space remaining as of the May 5, 2013 aerial survey was calculated to be 4,745,920 (final cap to 133 feet). The required volume for final cover is 435,116 cubic yards of final cover, per Renewal Application for Operating Permit, SCS, 2009. A remaining capacity of 4,310,804 cubic yards was assumed to be utilized for waste disposal and intermediate cover.

4) The total design capacity is assumed same as the total capacity used in 2012 Financial Responsibility Report prepared by HDR Engineering and dated August 2012.

**Table 5: Summary of Closing & Final Closure of Landfills**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

	Calculated Time of Closure <sup>(1)</sup>	Acreage Remaining to be Closed <sup>(4)</sup>	Acreage Closed	Approximate Time of Post-closure LTC <sup>(1,4)</sup>	Remaining Years of Operations under Current Footprint <sup>(1)</sup>	Remaining Years of LTC under Current Status
<b>1. Tomoka Farms Road Landfill</b>						
South Cell <sup>(2)</sup>	---	0	114	---	0	30
North Cell Class I	September 2018	67	0	2018-2048	5	30
Class III Landfill	January 2044	88	0	2044-2074	30	30
<b>2. Plymouth Ave. Landfill</b>						
Final Closure (LTC Period)	---	0	39	---	0	17

Notes:

- 1) As calculated in Tables 3 and 4 of this report. Reference date is 9/1/2013.
- 2) Under the current FDEP permit, the thirty-year long term care period for the South Cell landfill will begin once the North Cell Class I Landfill is certified closed by the FDEP.
- 3) Plymouth Avenue Landfill's Remaining Years of LTC was acquired from the Financial Assurance spreadsheet from Volusia County Solid Waste Accounting and subtracting one year.
- 4) Class III acreage and approximate time of closure increased in 2008 to reflect lateral and vertical expansion approved by FDEP.

**TABLE 6: Summary of Estimated Costs**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

Facility	Updated Closing Cost Estimate	Updated Annual LTC Cost Estimate	Total Updated LTC Cost Estimate	Total Updated Cost Estimate
1. Tomoka Farms Road Landfill				
South Cell-Previously Closed (LTC Period)	----	\$ 118,446	\$ 3,553,375	\$ 3,553,375
North Cell (in Operation)	\$ 9,394,491	\$ 179,140	\$ 5,374,186	\$ 14,768,677
Class III Landfill (In Operation)	\$ 8,237,676	\$ 96,273	\$ 2,888,191	\$ 11,125,867
2. Plymouth Ave. Landfill				
Previously Closed (LTC Period)	----	\$ 93,840	\$ 1,595,274	\$ 1,595,274
3. Used Tire Area (in Operation)	\$ 5,926	---	----	\$ 5,926
Total Estimated Cost	\$ 17,638,093	\$ 487,698	\$ 13,411,026	\$ 31,049,119

Notes:

1) Refer to the FDEP Forms 62-701.900(28), F.A.C. provided in this Report.

2) The cost for closing the waste tire area was calculated by multiplying 77 tons of tires at average expense of disposing rimmed tires (\$74.82/ton), de-rimmed tires (\$52.41/ton) and over-sized tires (\$130/ton). Quantity of waste tires (77 tons, approx.) is calculated by averaging waste tire quantities reported in last four "Quarterly Waste Tire Report & Inventory Update" reports submitted to the FDEP (from 2nd quarter 2012 to 1st quarter 2013).

**TABLE 7: Summary of Escrow Analysis**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

Facility	South Cell Landfill	North Cell Class I Landfill	Class III Landfill	Plymouth Ave. Landfill	Used Tire Area	Total Cost
Estimated Updated Closing Cost (CE)	\$ -	\$ 9,394,491	\$ 8,237,676	\$ -	\$ 5,926	\$ 17,638,093
Months of Exhausted Design Life (DE) <sup>(1)</sup>	---	171	183	---	---	---
Months of Total Design Life (DL) <sup>(2)</sup>	---	232	547	---	---	---
Documented Closure Expenses (E)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remaining Years of Long-term Care	30	30	30	17	0	---
Estimated Updated Post-Closure LTC Cost	\$ 3,553,375	\$ -	\$ -	\$ 1,595,274	\$ -	\$ 5,148,649
Escrow Account Balance (period ending September 30, 2012) <sup>(3)</sup>	\$ 171,555	\$ 6,254,476	\$ 2,916,657	\$ 92,271	\$ 10,740	\$ 9,445,699
Total Escrow Funding Required <sup>(4)</sup>	\$ 118,446	\$ 6,925,968	\$ 2,756,396	\$ 93,840	\$ 5,926	\$ 9,900,575
Total Estimated Increase/(Decrease) for FY-13 Requirement	\$ (53,109)	\$ 671,492	\$ (160,261)	\$ 1,569	\$ (4,814)	\$ <b>454,876</b>
Financial Responsibility Escrow Account Balance for 2013 FDEP Requirement						\$ <b>9,900,575</b>

**Notes:**

1) Exhausted design life as of September 1, 2013.

2) North/Phase I Landfill: opening date is June 1999 and closure date of September 2018 as calculated in Table 3 (171 months of exhausted life, 232 months of design life). Class III landfill - opening date is June 1998 and closure date of Jan 2044 as calculated in Table 4 (183 months of exhausted life, 547 months of design life).

3) See attached documentation from James & Moore (Attachment B).

4) With the exception of the used tire facility, the escrow account funding required for closure of active sites was calculated using the formula  $[CE \times DE/DL] - E$ . Funding requirements for sites in post-closure care are required to provide funding for one year. Keeping with last year's report methodology, it was assumed that the escrow funding required for closing the waste tire facility is equal to the calculated cost of disposing the waste tires.

**TABLE 8: Estimate of Accrued Liability (As of September 30, 2013)**  
**2013 Financial Assurance Report**  
**Volusia County, Florida**

Item <sup>1</sup>	Tomoka Farms (South Cell)	Tomoka Farms (North Class I)	Tomoka Farms (Class III)	Plymouth Avenue	Waste Tire	Total
<b>CLOSURE AND POST-CLOSURE COST ESTIMATES</b>						
Closure Cost (Non-Completed) (Note 3)	\$ -	\$ 9,394,491	\$ 8,237,676	\$ -	\$ 5,926	\$ 17,638,093
Post Closure Care (30 Years) (Note 2)	\$ 3,553,375	\$ 5,374,186	\$ 2,888,191	\$ 1,595,274	\$ -	\$ 13,411,026
<b>Total FY 2013 Estimates</b>	<b>\$ 3,553,375</b>	<b>\$ 14,768,677</b>	<b>\$ 11,125,867</b>	<b>\$ 1,595,274</b>	<b>\$ 5,926</b>	<b>\$ 31,049,119</b>
% of Capacity Used	100.00%	79.64%	39.22%	100.00%	N/A	-
<b>FY2013 LF Closure &amp; LTC Cost Estimate (Current FY2013 Estimate x % of Capacity Used)</b>	<b>\$ 3,553,375</b>	<b>\$ 11,761,472</b>	<b>\$ 4,363,694</b>	<b>\$ 1,595,274</b>	<b>\$ 5,926</b>	<b>\$ 21,279,741</b>
<b>TRIAL BALANCE ADJUSTMENT</b>						
FY2012 LF Closure & LTC Liability per GL @ 9/30/2012	\$ 3,493,977	\$ 10,090,911	\$ 4,163,114	\$ 1,660,879	\$ 5,145	\$ 19,414,026
Less Amount Paid for Closure in 2013 included in Closure Cost Re-calculation (Note 3)	\$ -	\$ (138,018)	\$ -	\$ -	\$ -	\$ (138,018)
<b>FY2013 LF Closure &amp; LTC Liability Pre-Adjusted Balance (8/30/2013)</b>	<b>\$ 3,493,977</b>	<b>\$ 9,952,893</b>	<b>\$ 4,163,114</b>	<b>\$ 1,660,879</b>	<b>\$ 5,145</b>	<b>\$ 19,276,008</b>
<b>Adjustment for FY2013 Fiscal Year-End Change in LF Closure and LTC Estimate</b>	<b>\$ 59,398</b>	<b>\$ 1,808,579</b>	<b>\$ 200,580</b>	<b>\$ (65,605)</b>	<b>\$ 781</b>	<b>\$ 2,003,733</b>

Notes:

1. Closure costs, Long-Term Care Costs and Percent Used Capacity are based on this report.
2. Post-Closure Care Costs are all based on 30 years except for Plymouth Avenue which is under long-term care period with 17 years of remaining long-term care.
3. Due to landfill closure re-calculation of the Tomoka Farms North Cell, the closure cost (non-completed) is calculated net of all closure expenses as of 8/30/2013.

Attachment A

Mapping Report

Tomoka Farms Road Solid Waste Disposal Facility



## Photogrammetric Survey and Map Report

Provided by **AERIAL CARTOGRAPHICS OF AMERICA, INC.**  
**LB # 0006748**

U.S. MAIL  
P.O. Box 593846  
Orlando, FL. 32859-3846

Phone (407) 851-7880 Fax (407) 855-8250

DELIVERIES  
1722 W. Oak Ridge Rd.  
Orlando, FL. 32809

P.S.M. in responsible charge: Mark Detrick PSM # 5433

Title: Topographic Survey

Date of Survey: (photography) 05/05/2013 Date of Field Edit: N/A

Subject Name: Volusia County Landfill

Ref. No.: 201348 County: Volusia

File Name: 13048.dwg

Aerial Target Survey Provided by: Sliger & Associates

Datum:

Horizontal NAD 83/90 Florida State Plane East Zone, U.S. Survey Feet

Vertical NGVD 29 U.S. Survey Feet

### Notes

- a.) Accuracies: The following stated accuracies are plus or minus tolerances that pertain to 90% of the information when compared to actual field measured position. These accuracies can be based on the results of the aerial triangulation.

(Horizontal:) Features shown are intended to be accurate to 1'.

(Vertical:) The 2' contours shown are accurate to 0.5' excluding those in dense vegetation that have no stated accuracy. These contours will be shown as dashed lines.  
Spot elevations are accurate to 0.5'.

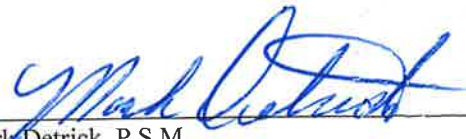
- b.) This map is intended to be displayed at 1"= 100' or smaller.
- c.) Analytical aerial triangulation was performed on the survey control and was determined to be acceptable.
- d.) The attached survey map has not been field verified therefore it is recommended that a field verification be performed to determine actual accuracies and map content.
- e.) This survey map is neither full nor complete without the attached survey map referencing this report and is not valid without the signature and original raised seal of a Florida Licensed Surveyor and Mapper.



Certification: I hereby certify to the best of my knowledge, the above information is correct and that the work performed by Aerial Cartographics of America was under my supervision. The photogrammetric survey meets the Minimum Technical Standards of the Department of Agriculture and Consumer Services, Chapter 5j-17-050 thru .052, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

I Mark Detrick certify that the Quality Control (QC) was conducted on this project and found to meet required specifications.

Signed: \_\_\_\_\_

  
Mark Detrick, P.S.M.

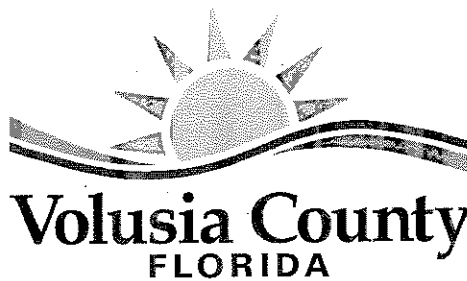
Florida Surveyor & Mapper #LS0005433

Date of Report: \_\_\_\_\_ 07/18/2013

Page 2 of 2

## Attachment B

### FY – 2013 Escrow Account Balance



**Financial and Administrative Services**

March 26, 2013

Florida Department of Environmental Protection  
Solid Waste Financial Coordinator  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Subject: Volusia County Financial Responsibility

Dear Ladies and Gentlemen:

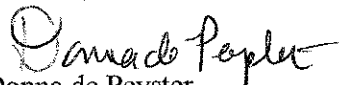
As per Rule 62-701.630(5) Florida Administrative Code, the County of Volusia has established an interest bearing account with the Florida State Board of Administration, Agency No. 301052 in January 1991. As of November 2007, this account has been transferred to a Morgan Stanley Liquidity Fund.

The updated Cost Estimates (submitted to your office by HDR Engineering, Inc.) indicated the Financial Responsibility Escrow Account Balance for FY12 required a balance of \$8,980,667. Accordingly, enclosed is the following documentation providing proof of our compliance of the current established financial responsibility requirements:

1. The audited "Schedule of Activity" for the County of Volusia Landfill Management Escrow Accounts for the fiscal year ending September 30, 2012.
2. The "Summary Estimated Cost and Escrow Analysis FY 2012 Financial Assurance Report Volusia County, Florida"
3. The September 2012 Morgan Stanley Liquidity Fund: Account Detail showing the Fiscal Year end balance of funds set aside for the Landfill Liability.

If you have any questions or require any additional information, please let me know.

Sincerely,

  
Donna de Peyster  
Accounting Director

Cc: Frank Hornbrook, Environmental Specialist  
Leonard Marion, Solid Waste Director

**COUNTY OF VOLUSIA, FLORIDA**  
**SCHEDULE OF ACTIVITY**  
**LANDFILL MANAGEMENT ESCROW ACCOUNTS**  
**SEPTEMBER 30, 2012**

## INDEPENDENT AUDITORS' REPORT

To the Honorable County Council Members  
of the County of Volusia, Florida:

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the County of Volusia, Florida for the year ended September 30, 2012, and have issued our report thereon dated March 5, 2013. We have also audited the accompanying Schedule of Activity for the County of Volusia, Florida Landfill Management Escrow Accounts, for the year ended September 30, 2012. This schedule is the responsibility of the County of Volusia, Florida's management. Our responsibility is to express an opinion on this schedule based on our audit.

We conducted our audit of the schedule in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule is free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the schedule. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall schedule presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the Schedule of Activity for the County of Volusia, Florida Landfill Management Escrow Accounts, for the year ended September 30, 2012, presents fairly, in all material respects the cash balances of the escrow accounts as of September 30, 2012, and the activity in the escrow accounts for the year then ended, in conformity with the requirements of Rule 62-701.630, Florida Administrative Code.

Pursuant to Chapter 119, Florida Statutes, this report is a public record and its distribution is not limited. Auditing standards general accepted in the United States of America require us to indicate that this report is intended solely for the information and use of the County of Volusia, Florida and the State of Florida Department of Environmental Protection and is not intended to be and should not be used by anyone other than these specified parties.

Daytona Beach, Florida  
March 5, 2013

121 Executive Circle  
Daytona Beach, FL 32114-1180  
Telephone: 386/257-4100  
Fax: 386/255-3261  
dab@jmco.com

5931 NW 1st Place  
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Tallahassee, FL 32308-4386  
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tlh@jmco.com

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**COUNTY OF VOUSIA, FLORIDA  
LANDFILL MANAGEMENT ESCROW ACCOUNTS  
SCHEDULE OF ACTIVITY  
FOR THE YEAR ENDED SEPTEMBER 30, 2012**

	<b>Tomoka Class III</b>	<b>Tomoka Class I</b>	<b>Tomoka South</b>	<b>Plymouth</b>	<b>Waste Tire</b>	<b>Total</b>
Escrow Account Balances, October 1, 2011	\$ 2,763,229	\$ 7,436,816	\$ 171,473	\$ 90,462	\$ 10,718	\$ 10,472,698
<b>Withdrawal</b>						
September 27, 2012	-	(1,031,195)	-	-	-	(1,031,195)
<b>Interest Income</b>						
October 31, 2011	41	89	3	1	1	135
November 30, 2011	78	171	5	3	1	258
December 31, 2011	81	177	5	3	1	267
January 31, 2012	83	179	5	3	1	271
February 29, 2012	76	164	5	3	2	250
March 31, 2012	112	241	7	4	3	367
April 30, 2012	131	284	8	4	2	429
May 31, 2012	136	295	9	5	2	447
June 30, 2012	140	303	9	5	2	459
July 31, 2012	136	294	9	5	2	446
August 31, 2012	135	293	9	5	3	445
September 30, 2012	129	279	8	4	2	422
Total interest income	1,278	2,769	82	45	22	4,196
Escrow Account Balances, September 30, 2012 before transfers due to changes in required escrows	2,764,507	6,408,390	171,555	90,507	10,740	9,445,699
<b>Transfers due to changes in escrow required</b>	152,150	(153,914)	-	1,764	-	-
Escrow Account Balances, September 30, 2012	<u>\$ 2,916,657</u>	<u>\$ 6,254,476</u>	<u>\$ 171,555</u>	<u>\$ 92,271</u>	<u>\$ 10,740</u>	<u>\$ 9,445,699</u>
Cash and Cash Equivalents	<u>\$ 2,916,657</u>	<u>\$ 6,254,476</u>	<u>\$ 171,555</u>	<u>\$ 92,271</u>	<u>\$ 10,740</u>	<u>\$ 9,445,699</u>

The accompanying notes to the schedule of activity  
are an integral part of this schedule.

**COUNTY OF VOLUSIA, FLORIDA  
LANDFILL MANAGEMENT ESCROW ACCOUNTS  
NOTES TO SCHEDULE OF ACTIVITY  
SEPTEMBER 30, 2012**

**(1) Reporting Entity:**

The County of Volusia, Florida (the County) is a political subdivision of the State of Florida, which is responsible for legislative and fiscal administration of the County.

The Schedule of Activity for the County Landfill Management Escrow Accounts (the Schedule) is prepared and submitted to the State of Florida Department of Environmental Protection pursuant to Section 62-701.630 of the Florida Administrative Code (the Code). The Schedule contains only the escrow balances required by the Code and is not intended to present the financial position of the County of Volusia, Florida's Refuse Disposal Fund, or any fund in the County's financial statements.

**(2) Landfill Management Escrow:**

The County records the landfill management escrows as restricted cash to fund postclosure care costs of the Plymouth Landfill and closure costs and postclosure care costs of the Tomoka Landfill. The escrow, which is part of the County's cash and cash equivalents, is calculated annually based on the "balance" method, which uses months of exhausted design life as a percentage of total design life times the estimated costs calculated by inflationary indexes or, if changes to the facility are made, by a study performed by a Registered Professional Engineer.

**TABLE 6: Summary of Estimated Cost & Escrow Analysis**  
**FY 2012 Financial Assurance Report**  
**Volusia County, Florida**

Facility	Updated Closing Cost Estimate	Updated Annual LTC Cost Estimate	Total Updated LTC Cost Estimate	Total Updated Cost Estimate
1. Tomoka Farms Road Landfill				
South Cell-Previously Closed (LTC Period)	---	\$ 116,466	\$ 3,493,977	\$ 3,493,977
North Cell (in Operation)	\$ 9,552,240	\$ 178,832	\$ 5,364,970	\$ 14,917,210
Class III Landfill (in Operation)	\$ 8,099,976	\$ 94,664	\$ 2,839,913	\$ 10,939,889
2. Plymouth Ave. Landfill				
Previously Closed (LTC Period)	---	\$ 92,271	\$ 1,660,879	\$ 1,660,879
3. Used Tire Area (in Operation)	\$ 5,145	---	---	\$ 5,145
Total Estimated Cost	\$ 17,657,361	\$ 482,233	\$ 13,359,739	\$ 31,017,100

Facility	South Cell Landfill	North Cell Class I Landfill	Class III Landfill	Plymouth Ave. Landfill	Used Tire Area <sup>(b)</sup>	Total Cost
Estimated Updated Closing Cost (CE)	\$ -	\$ 9,552,240	\$ 8,099,976	\$ -	\$ 5,145	\$ 17,657,361
Months of Exhausted Design Life (DE) <sup>(1)</sup>	---	159	171	---	---	---
Months of Total Design Life (DL) <sup>(2)</sup>	---	221	475	---	---	---
Documented Closure Expenses (E)	0	\$ 1,024,339	0	0	0	---
Remaining Years of Long-term Care	30	30	30	18	0	---
Estimated Updated Post-Closure LTC Cost	\$ 3,493,977	\$ -	\$ -	\$ 1,660,879	\$ -	\$ 5,154,856
Escrow Account Balance (period ending September 30, 2011) <sup>(3)</sup>	\$ 171,473	\$ 7,436,816	\$ 2,763,229	\$ 90,462	\$ 10,718	\$ 10,472,698
Total Escrow Funding Required <sup>(4)</sup>	\$ 116,466	\$ 5,850,128	\$ 2,916,657	\$ 92,271	\$ 5,145	\$ 8,980,667
Total Estimated Increase/(Decrease) for FY-12 Requirement	\$ (55,007)	\$ (1,586,688)	\$ 153,428	\$ 1,809	\$ (5,573)	\$ (1,492,031)
Financial Responsibility Escrow Account Balance for FY-12 FDEP Requirement						\$ 8,980,667

**Notes:**

- 1) Exhausted design life as of September 1, 2012.
- 2) North/Phase I Landfill: opening date is June 1999 and closure date of October 2017 as calculated in Table 3 (159 months of exhausted life, 221 months of design life). Class III landfill - opening date is June 1998 and closure date of January 2038 as calculated in Table 4 (171 months of exhausted life, 475 months of design life).
- 3) See attached documentation from James & Moore (Attachment B).
- 4) With the exception of the used tire facility, the escrow account funding required for closure of active sites was calculated using the formula  $[CE \times DE/DL] - E$ . Funding requirements for sites in post-closure care are required to provide funding for one year. Keeping with last year's report methodology, it was assumed that the escrow funding required for closing the waste tire facility is equal to the calculated cost of disposing the waste tires.
- 5) The cost for closing the waste tire area was calculated by multiplying 60 tons of tires at average expense of disposing rimmed tires (\$74.82/ton), de-rimmed tires (\$52.41/ton) and over-sized tires (\$130/ton). Quantity of waste tires (60 tons, approx.) is calculated by averaging waste tire quantities reported in last four "Quarterly Waste Tire Report & Inventory Update" reports submitted to the department (from 2nd quarter 2011 to 1st quarter 2012).



# Morgan Stanley

Morgan Stanley Institutional Liquidity Funds  
PO BOX 219804  
Kansas City MO 64121-9804

# Investment Report

September 1, 2012 - September 30, 2012

Page 1 of 2

COUNTY OF VOLUSIA FL SOLID WASTE RE  
FINANCIAL AND ADMINISTRATIVE SERVICE  
ATTN MYRIAM LEMAY  
123 W INDIANA AVENUE ROOM 300  
DELAND FL 32720-4615

000366



888-378-1630



www.morganstanley.com/im

For account number(s), refer to page 2 "Account Summary."

## Total Portfolio Value as of September 30, 2012

**\$9,445,698.36**

## Portfolio Value Summary

	Monthly Activity	Year-to-Date Activity
<b>Beginning Value</b>	\$10,476,471.28	\$10,473,357.18
Investments/Contributions	\$0.00	\$0.00
Withdrawals/Redemptions	(\$1,031,195.00)	(\$1,031,195.00)
Dividends/Cap Gains	\$422.08	\$3,536.18
Change in Portfolio Value	(\$1,030,772.92)	(\$1,027,658.82)
<b>Total Portfolio Value</b>	<b>\$9,445,698.36</b>	<b>\$9,445,698.36</b>

Change in Portfolio Value is the difference between the Total Portfolio Value (closing value) and the Beginning Value.

## News

Liquidity Link offers a convenient and secure way of investing with the Morgan Stanley Institutional Liquidity Funds. Access to Liquidity Link includes trading rights, principal and accrual balances, as well as access to a wide range of MSILF reports including monthly statements, holdings reports, daily rates, fund commentary, and fact sheets.

For more information, please call Client Services at the number listed above.

We are pleased to announce the ability to suppress daily confirms. Please contact us at 1-888-378-1630 for more details.

## Asset Allocation as of September 30, 2012

Percent	Asset Category	Total Value
0.00%	Money Market	\$0.00
0.00%	Prime	\$0.00
100.00%	Government	\$9,445,698.36
0.00%	Treasury	\$0.00
0.00%	Government Securities	\$0.00
0.00%	Tax Exempt	\$0.00
0.00%	Treasury Securities	\$0.00
<b>100.00%</b>	<b>Total</b>	<b>\$9,445,698.36</b>

# Morgan Stanley

Morgan Stanley Institutional Liquidity Funds  
PO BOX 219804  
Kansas City MO 64121-9804

## Investment Report

September 1, 2012 - September 30, 2012

Page 2 of 2

### Account Summary

Fund Name Fund/Account Number	Beginning Value as of 9/01/2012	Investments/ Contributions	Withdrawals/ Redemptions	Dividends/ Cap Gains	Change in Value	Closing Value as of 9/30/2012
<b>Investment Accounts</b>						
Government Portfolio Institutional Class 8302/756014866	\$10,476,471.28	\$0.00	(\$1,031,195.00)	\$422.08	(\$1,030,772.92)	\$9,445,698.36
<b>Total All Accounts</b>	<b>\$10,476,471.28</b>	<b>\$0.00</b>	<b>(\$1,031,195.00)</b>	<b>\$422.08</b>	<b>(\$1,030,772.92)</b>	<b>\$9,445,698.36</b>

Change in Portfolio Value is the difference between the Total Portfolio Value (closing value) and the Beginning Value.

### Account Transactions

#### Government Portfolio Institutional Class

Fund/Account Number	8302/756014866	Year-to-Date Dividends	\$3,536.18
Tax ID Number	Certified	Year-to-Date Capital Gains	\$0.00
Account Owner	County Of Volusia FL Solid Waste Re Financial and Administrative Servic Attn Myriam Lemay	Dividends are	Reinvested
		Capital Gains are	Reinvested

Trade Date	Transaction Description	Dollar Amount	Share Price	Shares This Transaction	Total Shares
	<b>Beginning Value as of 9/01/2012</b>	\$10,476,471.28	\$1.00		10,476,471.280
09/25/2012	Same Day Wire Redemption	(\$1,031,195.00)	\$1.00	(1,031,195.000)	9,445,276.280
09/28/2012	Income Reinvest	\$422.08	\$1.00	422.080	9,445,698.360
	<b>Ending Value as of 9/30/2012</b>	<b>\$9,445,698.36</b>	<b>\$1.00</b>		<b>9,445,698.360</b>

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## Attachment C

### Supporting Information for the North Cell's Closure and Long-term Care Cost Estimates

**Financial Assurance Responsibility  
Closure and Long-term Care Cost Estimates  
Tomoka Farms Road Landfill North Cell, Phase I  
Volusia County, Florida  
August 2013**

Closure and long-term care cost estimates for the Tomoka Farms Road Landfill North Cell, excluding Phase II, are being re-calculated according to 62-701.630(3)(a), FAC. The basis for cost estimates include current pricing, closure design and regulations contained in Chapter 62-701 of the Florida Administrative Code (FAC).

The updated FDEP Form 62-701.900(28) is provided in this report. Quotes from third-party sources are provided in Attachment 1. The 2012 RSMeans Heavy Construction Cost Data 26<sup>th</sup> Annual Edition was used to estimate some unit costs. In order to correct the costs to region specific, a city factor provided by RSMeans in the manual is used. The Daytona city factor of 0.979 was applied to all unit costs from RSMeans. The page has been provided in Attachment 1.

## **CLOSURE COSTS**

### **Monitoring Wells (Item 1)**

Monitoring wells were installed during the construction of Phase I of the North Cell and therefore and not included as part of the closure construction estimate.

### **Slope and Fill (Item 2)**

As a part of on-going landfill operations a 12-inch bedding layer will be installed over compacted waste once the intermediate cover grades are achieved. The associated cost of placing this layer is not included in this cost estimate.

### **Cover Material (Item 3)**

The proposed final cover consists of a 40-mil textured LLDPE, double sided geocomposite, and 18" layer of cover soil. The geosynthetic quantities have been adjusted by 4% to account for seams, destructive testing, wastage, anchoring, toe of slope run-out, and booting. The cover soil has been increased by 5% to account for soil bulking and other losses. A slope factor of 1.054 has been accounted in the side slope area for 3:1 side-slope.

Waste Footprint = 65.65 AC

Total Surface Area = Side Slope Area + Top Flat Area

Side Slope Area = 2,766,001 ft<sup>2</sup> (obtained from AutoCAD Civil 3D)

Top Area = 235,476 ft<sup>2</sup> (obtained from AutoCAD Civil 3D)

Total Surface Area = 3,001,477 ft<sup>2</sup>

#### **(a) Cover Soil:**

Volume of Cover Soil in 18" layer=  $(3,001,477 \text{ ft}^2 \times 1.5 \text{ ft} \times 1.05 / 27) = 175,086 \text{ CY}$

Please note that the unit price of installed cover soil is based on an average of two quotes from third-party installers. Quotations are provided in Attachment 1.

#### **(b) Synthetics:**

$$\text{Area of Geosynthetics} = (3,001,477 \text{ ft}^2 \times 1.04 / 9) = 346,837 \text{ yd}^2$$

Please note that the unit prices of installed geomembrane and geocomposite are based on an average of three quotes from third-party installers. Quotations are provided in Attachment 1.

#### **Top Soil Cover (Item 4)**

The top soil cover consists of 6" layer over the entire closure area. Top soil has been increased by 5% to account for soil bulking and other losses.

$$\text{Volume of Cover Soil in 6" layer} = (3,001,477 \text{ ft}^2 \times 0.5 \text{ ft} \times 1.05 / 27) = 58,362 \text{ CY}$$

Please note that the unit price of installed top soil is based on an average of two quotes from third-party installers. Quotations are provided in Attachment 1.

#### **Vegetation (Item 5)**

Sod will be installed on a side slopes for the entire closure area. The top surface closure area will be vegetated by Hydroseeding.

$$\text{Quantity of sod required} = 2,766,001 \text{ ft}^2 = 307,333 \text{ SY}$$

$$\text{Area of Hydroseeding required} = 235,476 \text{ ft}^2 = 5.41 \text{ AC}$$

Please note that the unit prices for installed sod and Hydroseeding are based on an average of two quotes from third-party installers. Quotations are provided in Attachment 1.

#### **Stormwater Control System (Item 6)**

No separate earthwork, grading and ditches are considered as part of North Cell closure as it will be covered in items 2 through 4. Also, the installation of the perimeter ditch and berm installation are part of the landfill's on-going operations and therefore, not included in this updated cost estimate.

- Piping\*:

Total length of 18" downdrain piping required for drainage = 5,222 LF

Unit Cost of 18" downdrain pipe = \$20.41 (RSMeans)

Total length of 24" downdrain piping required for drainage = 1,556 LF

Unit Cost of 24" downdrain pipe = \$23.39 (RSMeans)

Total length of downdrain pipe = 6,778 LF

Weighted Average Unit cost of downdrain pipe = \$21.09 per LF

- Control Structures\*:

Number of control structures, i.e., Baffled Endwall FDOT No. 261= 12

Please refer to Attachment 1 for unit price of control structures.

- Others\*:

Number of inlets = 42

Cost per Inlet = \$5,463.62  
Total cost of Inlets = \$229,472.04

Assume \$2,000 per AC for Sedimentation and Erosion Control.  
Total for Sedimentation and Erosion Control = \$2,000 x 65.65 AC = \$131,300.00

Total "Others" Cost = \$360,772.04

\*Note that quantities are based on FDEP approved cost estimates included as part of the North Cell Closure Permit Renewal Application dated December 6, 2011.

#### **Passive Gas Control (Item 7)**

No passive gas control system is proposed as a part of the North Cell closure.

#### **Active Gas Extraction Control (Item 8)**

Active gas extraction control will be part of the North Cell closure. The quantities associated with the active gas extraction system required for the North Cell closure were identified in the FDEP approved cost estimates included as part of the North Cell Closure Permit Renewal Application dated December 6, 2011. It should be noted that existing gas extraction system was expanded from December 2011 through April 2012 by installing several vertical wells, associated piping, condensate sumps etc. Out of the installed items, the following items can be considered as part of the active gas extraction system required for North Cell closure.

- 3 vertical wells (275 ft total depth)
- 3 vertical wells required benching
- 3 well heads
- 3 pipe boots
- 1,611 ft of 18-inch header pipe
- 596 ft of 16-inch header pipe
- 399 ft of 4-inch lateral pipe
- 5 condensate sumps
- 7 access points
- One 18-inch and one 16-inch header isolation valve

The active gas extraction system quantities have been updated by taking into account the above listed quantities of the items recently installed. A detailed breakdown of the costs associated with the gas extraction system installation at closure is included in Appendix R-2.

#### **Security System (Item 9)**

Perimeter fencing, gates and signs already exists at the facility. A \$2,000 lump sum is allocated for additional signs as part of the closure costs.

#### **Closure Permit, Contracts, CQA and Certification (Items 10 & 11)**

Professional engineering services will be needed during three phases of the closure process: permitting, construction and certification. The fee for certification of closure includes a professional engineer's time spent at the landfill reviewing test data and submitting the certification report to the FDEP.

#### **Contingency (Item 12)**

A 10% of total closure cost will be allocated as a contingency.

**Site Specific Costs (Item 13)**

The mobilization fee has been estimated to be 5% of Items 1 through 11.

**LONG-TERM CARE COSTS**

Total long-term care area = 65.65 AC

**Ground Water Monitoring (Item 1)**

Per previous correspondence with FDEP, the long-term care costs for groundwater monitoring at the facility are included wholly in the long-term care financial assurance for the South Cell.

**Surface Water Monitoring (Item 2)**

There are seven surface water monitoring locations associated with the North Cell, and all the locations are monitored on a semi-annual basis.

It is estimated that it takes four hours to sample, travel to the site and submit results to FDEP. Lab analysis costs are based upon the facility's master agreement with the lab. Applicable pages from the master agreement are included in Appendix R-2. A detailed cost breakup is provided below:

- Cost Associated with Ammonia as N, Hardness as CaCO<sub>3</sub>, Organic Carbon, TDS, TSS, BOD, COD, Nitrogen as N, Nitrate as N, Phosphates, Chlorophyll A, and Fecal Coliform = \$182.00
- Cost Associated with Iron, Mercury, and Sodium = \$31.50
- Cost Associated with 40 CFR Part 258 Appendix I Parameters = \$190.00
- Assuming 4 hours of sampling @ \$40 per hour
- Total Cost per semi-annual monitoring event =  $7 (\$182.00 + \$31.50 + \$190.00) + 40 \times 4 = \$2,984.50$

**Gas Monitoring (Item 3)**

There are 8 gas monitoring probes as well as surface monitoring for the North Cell long-term care and all the locations are monitored on a quarterly basis.

It is estimated that it takes approximately 2 days (10 hours per day) to perform monitoring, travel to the site and submit results to the FDEP for both probe monitoring and surface monitoring. The field technician charge is estimated to be \$65/hour. Equipment rental for a GEM2000 monitor is \$100/day and \$60/day for a RKI Eagle Multi Gas Detector (see quotes from AJAX Environmental and Safety Supply in Attachment 1) and miscellaneous expenses are estimated to be \$250. A 15% profit and contingency fee was added to the sum. Assuming monitoring will be performed in 2 days (10 hours per day), the cost estimate per quarterly monitoring event is  $\$2035.50 = 115\% * (\$60 \times 20 + \$100 \times 2 + \$60 \times 2 + \$250)$ .

**Leachate Monitoring (Item 4)**

Per Chapter 62-701 of the Florida Administrative Code (FAC), annual leachate monitoring is no longer required and therefore, no included as part of this long-term care cost estimates.

**Leachate Collection & Treatment System (Item 5)****Maintenance:**

- Assume lump sum allocation of \$500/year for repairs to piping, valves, etc.
- Jet cleaning of leachate collection system is performed every 5 years for the North Cell @ \$7,500 (refer to Attachment 1).
- Therefore, annual maintenance cost = \$2,000.

Impoundments and Aeration Systems: It is assumed that 20 SY of liner repairs will be required every year @ \$9 per SY.

Offsite Disposal: The cost is based on average annual generation of 1,000,000 gallons of leachate and \$30 per 1,000 gallons of total disposal cost for leachate (disposal cost per Volusia County).

#### **Groundwater Monitoring Well Maintenance (Item 6)**

Assume a lump sum amount of \$500 per year for well maintenance and replacement.

#### **Gas System Maintenance (Item 7)**

To estimate the cost of maintaining the active gas collection system, maintenance of the well field and flare station were taken into consideration. Routine maintenance includes replacing the thermocouples in the flare stack every few months, inspecting and cleaning of the flare arrestor and replacing the bearings on the blower. Installation of replacement collection wells, especially in the years immediately after closure, was budgeted in addition to replacement of the blower every fifteen years. It was assumed a field technician would be needed for two days per month (20 hours @ \$65 per hour, \$500 misc expenses, and 15% profit and contingency fee) to monitor the collection wells, perform well field adjustments and document readings.

#### **Landscaping (Item 8)**

It is anticipated the landfill cap will need landscaping/mowing four times a year.

Cost of mowing from 2012 RS Means= \$1.70 per 1000 SF × 0.979 × 1.017 = \$1.69 per 1000 SF  
= \$73.73 per AC (refer to Attachment 1)

Total annual mowing cost = \$73.73 per AC \* 4 = \$294.92 per AC

#### **Erosion Control and Cover Maintenance (Item 9)**

To account for erosion control and cover maintenance in the post closure care period, reconstruction of the final cover (including sod, liner and soil fill material) and re-grading were considered. An annual average soil loss of 796 CY was calculated using the United Soil Loss Equation (USLE). This is a conservative assumption since it is assumed that 60% of the ground is covered by vegetation. Please refer to Attachment 2 for further explanation of the USLE equation.

For financial assurance estimation, it is assumed that soil will erode in channels that will cut an average of six inches deep into the final cover.

- Sodding:  $7,164 \text{ SY} = 796 \text{ CY} * 27 \text{ CF/CY} * 150\% \text{ machinery disturbance} / (0.5 \text{ FT average depth})$
- Liner Repair:  $1,194 \text{ SY} = 796 \text{ CY} * 27 \text{ CF/CY} * 25\% / 0.5 \text{ FT}$
- Soil: 796 CY

Please refer to Attachment 1 for unit price of sodding.



It was assumed that 25% of the disturbed area will require liner repairs. Replacement soil will include cover soil and top soil. As the unit price of installed top soil is higher, the unit cost of replacement soil was assumed similar to that of top soil. See Item 4 of the closure cost for installed replacement soil.

**Stormwater Maintenance (Item 10)**

A lump sum amount of \$5,000 has been allocated for annual storm water management system maintenance.

**Security System Maintenance (Item 11)**

A lump sum amount of \$500 is assumed as cost associated with fence repairs and other security management.

**Utilities (Item 12)**

Estimated power requirement for site equipment = \$150/month = \$1,800/year

**Leachate Collection/Treatment Systems Operation (Item 13)**

It is assumed that a technician will be needed for an average of eight hours every four weeks to monitor, inspect, and maintain the system.

**Administrative Costs (Item 14)**

Professional engineering services expected during the long-term care period include semiannual water quality monitoring, water quality technical reports, ten-year long-term care permit renewal applications, stabilization reports and other miscellaneous reporting requirements. Time was added for inspections of the stormwater and landfill cap systems.

**Attachment 1**  
**Third Party Quotes**

Tomoka Farms Road Landfill - North Cell  
Class I Financial Assurance Closure Cost  
Average of Quotations

Item NO.	Description	Unit	Unit Cost		
			ERC	Southeast Environmental	Average
1	18" Cover Soil Layer (See Note 1)	CY	\$9.00	\$13.50	\$11.25
2	6" Top Vegetative Soil Layer (See Note 1)	CY	\$10.00	\$15.00	\$12.50
3	Textured 40-mil LLDPE*	SY	\$2.70	\$4.90	\$4.30
4	Double Sided Geo-Composite*	SY	\$3.69	\$5.85	\$5.23
5	Sodding	SY	\$2.10	\$2.40	\$2.25
6	Hydroseeding	AC	\$2,500.00	\$2,500.00	\$2,500.00
*SEC and ERC's quotes for LLDPE and geocomposite were weighted based on HDR's experience.					

## Beben, David

---

**From:** Jerry L. Pinder <jerry.pinder@ercflorida.com>  
**Sent:** Tuesday, August 13, 2013 11:11 AM  
**To:** Beben, David  
**Cc:** Nestor Reyes  
**Subject:** RE: Volusia Cost Estimates

---

**From:** Beben, David [<mailto:David.Beben@hdrinc.com>]  
**Sent:** Monday, August 12, 2013 1:33 PM  
**To:** Jerry Pinder ([jerry.pinder@ercflorida.com](mailto:jerry.pinder@ercflorida.com))  
**Subject:** RE: Volusia Cost Estimates

Hi Jerry – any updates?

---

**From:** Beben, David  
**Sent:** Thursday, August 08, 2013 4:40 PM  
**To:** Jerry Pinder ([jerry.pinder@ercflorida.com](mailto:jerry.pinder@ercflorida.com))  
**Subject:** Volusia Cost Estimates

Hi Jerry, we are collecting cost quotes for the Tomoka Farms landfill in Daytona. It will be for the regulatory submittal for closure of the North Cell. Please complete the unit cost for the six items to the best of your knowledge.

Item	Quantity	Unit	Unit Cost	Comments
18" Cover soil Layer (off-site material)	221,281	CY	9.00	Installed unit cost including materials, hauling and installation costs.
6" Top vegetative soil (off-site materials)	73,760	CY	10.00	Installed unit cost including materials, hauling and installation costs.
Textured 40-mil LLDPE	460,264	SY	.30	Installed unit cost including materials and installation costs.
Double sided geocomposite	460,264	SY	.41	Installed unit cost including materials and installation costs.
Sodding	387,175	SY	2.10	Installed unit cost including materials and installation costs.
Hydroseeding	11.44	AC	2,500	

Thanks,

DAVID BEBEN  
PE

HDR Engineering, Inc.  
Project Engineer

200 West Forsyth St. Suite 800 | Jacksonville, FL 32202

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## Beben, David

**From:** Earl Holmes <secontracting@windstream.net>  
**Sent:** Thursday, August 08, 2013 5:00 PM  
**To:** Beben, David  
**Subject:** Fw: Volusia Cost Estimates

**From:** [Beben, David](#)  
**Sent:** Thursday, August 08, 2013 4:41 PM  
**To:** <mailto:earl@southeastenvironmental.com>  
**Subject:** Volusia Cost Estimates

Hi Earl, we are collecting cost quotes for the Tomoka Farms landfill in Daytona. It will be for the regulatory submittal for closure of the North Cell. Please complete the unit cost for the six items to the best of your knowledge.

<u>Item</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Comments</u>
18" Cover soil Layer (off-site material)	221,281	CY	13.50	Installed unit cost including materials, hauling and installation costs.
6" Top vegetative soil (off-site materials)	73,760	CY	15.00	Installed unit cost including materials, hauling and installation costs.
Textured 40-mil LLDPE	460,264	SY	4.90	Installed unit cost including materials and installation costs.
Double sided geocomposite	460,264	SY	5.85	Installed unit cost including materials and installation costs.
Sodding	387,175	SY	2.40	Installed unit cost including materials and installation costs.
Hydroseeding	11.44	AC	2500.00	

Thanks,

DAVID BEBEN  
PE

HDR Engineering, Inc.  
Project Engineer

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The 2012 Heavy Construction Cost Data, 26th Annual Edition, and all of the RSMeans annual cost data books are dedicated to the memory of our respected friend and colleague, Hsiao-Cheng (John) Chiang, PE.

# RSMeans Heavy Construction Cost Data

## 26TH ANNUAL EDITION

# 2012

### RSMeans

A division of Reed Construction Data  
Construction Publishers & Consultants  
700 Longwater Drive  
Norwell, MA 02061  
USA

**1-800-334-3509**  
**www.rsmeans.com**

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Printed in the United States of America  
ISSN 0893-5602  
ISBN 978-1-936335-37-4

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# City Cost Indexes

DIVISION		COLORADO						CONNECTICUT																	
		SALIDA			BRIDGEPORT			BRISTOL			HARTFORD			MERIDEN			NEW BRITAIN								
		812			066			060			061			064			060								
MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL					
015433	CONTRACTOR EQUIPMENT		96.5	96.5		100.4	100.4		100.4	100.4		100.4	100.4		100.9	100.9		100.4	100.4						
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	123.6	95.0	103.9	111.8	103.3	105.9	111.0	103.3	105.7	103.6	103.3	103.4	109.2	104.0	105.6	111.2	103.3	105.7						
0310	Concrete Forming & Accessories	110.1	79.2	83.3	99.3	121.7	118.8	99.3	121.6	118.7	97.3	121.6	118.4	99.0	121.6	118.6	99.6	121.6	118.7						
0320	Concrete Reinforcing	104.3	80.7	92.4	103.6	128.8	116.3	103.6	128.8	116.3	103.6	128.8	116.3	103.6	128.8	116.3	103.6	128.8	116.3						
0330	Cast-in-Place Concrete	114.1	81.4	101.2	107.8	125.0	114.6	101.0	125.0	110.4	107.0	125.0	114.1	97.1	125.0	108.1	102.6	125.0	111.4						
03	CONCRETE	111.5	80.4	96.3	110.6	124.0	117.1	107.1	123.9	115.3	110.0	123.9	116.8	105.2	123.9	114.3	108.0	123.9	115.7						
04	MASONRY	134.8	75.6	98.7	104.1	129.8	119.8	96.7	129.8	116.9	97.2	129.8	117.1	96.3	129.8	116.7	98.0	129.8	117.4						
05	METALS	94.6	82.4	90.6	99.1	125.2	107.7	99.1	125.0	107.7	103.9	125.0	110.9	96.5	125.0	105.9	95.7	125.0	105.4						
06	WOOD, PLASTICS & COMPOSITES	96.5	82.4	88.3	98.6	120.3	111.1	98.6	120.3	111.1	97.1	120.3	110.5	98.6	120.3	111.1	98.6	120.3	111.1						
07	THERMAL & MOISTURE PROTECTION	105.0	81.9	95.6	101.2	126.6	111.6	101.3	123.7	110.4	102.6	123.7	111.2	101.3	123.7	110.4	101.3	123.7	110.4						
08	OPENINGS	95.7	83.7	92.7	102.4	130.1	109.4	102.4	130.1	109.4	103.1	130.1	109.9	105.1	130.1	111.4	102.4	130.1	109.4						
0920	Plaster & Gypsum Board	81.2	81.8	81.6	97.8	120.3	113.8	97.8	120.3	113.8	95.9	120.3	113.3	99.6	120.3	114.4	97.8	120.3	113.8						
0950, 0980	Ceilings & Acoustic Treatment	108.8	81.8	90.9	102.0	120.3	114.1	102.0	120.3	114.1	100.2	120.3	113.5	106.3	120.3	115.5	102.0	120.3	114.1						
0960	Flooring	119.1	47.5	98.1	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2						
0970, 0990	Wall Finishes & Painting/Coating	107.9	24.9	56.7	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0						
09	FINISHES	107.9	67.7	85.5	101.7	123.2	113.7	101.8	123.2	113.7	99.9	123.2	112.9	102.9	123.2	114.2	101.8	123.2	113.7						
COVERS	DIVS. 10 - 14, 25, 28, 41, 43, 44, 46	100.0	91.0	98.2	100.0	108.6	101.7	100.0	108.6	101.7	100.0	108.6	101.7	100.0	108.6	101.7	100.0	108.6	101.7						
21, 22, 23	FIRE SUPPRESSION, PLUMBING & HVAC	94.1	74.6	86.2	100.0	114.7	106.0	100.0	114.7	106.0	100.1	114.7	106.0	94.1	114.7	102.4	100.0	114.7	106.0						
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	95.1	75.1	84.8	102.2	109.9	106.2	102.2	109.6	106.0	99.2	110.5	105.1	102.1	109.6	106.0	102.3	109.6	106.1						
MF2010	WEIGHTED AVERAGE	101.3	78.3	91.2	102.2	118.7	109.5	101.5	118.6	109.0	102.0	118.7	109.4	99.7	118.6	108.0	101.1	118.6	108.8						

DIVISION		CONNECTICUT																		
		NEW HAVEN			NEW LONDON			NORWALK			STAMFORD			WATERBURY			WILLIMANTIC			
		065			063			068			069			067			062			
MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL
015433	CONTRACTOR EQUIPMENT		100.9	100.9		100.9	100.9		100.4	100.4		100.4	100.4		100.4	100.4		100.4	100.4	
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	111.1	104.0	106.2	102.8	104.0	103.6	111.6	103.3	105.9	112.3	103.3	106.1	111.4	103.3	105.8	111.9	103.3	105.9	
0310	Concrete Forming & Accessories	99.0	121.6	118.6	99.0	121.6	118.6	99.3	122.1	119.1	99.3	122.1	119.1	99.3	121.6	118.7	99.3	121.6	118.6	
0320	Concrete Reinforcing	103.6	128.8	116.3	81.2	128.8	105.2	103.6	129.0	116.4	103.6	129.0	116.4	103.6	128.8	116.3	103.6	128.8	116.3	
0330	Cast-in-Place Concrete	104.4	125.0	112.5	88.9	125.0	103.1	106.0	126.5	114.1	107.8	126.5	115.2	107.8	125.0	114.6	100.7	124.9	110.2	
03	CONCRETE	123.2	123.9	123.5	94.7	123.9	108.9	109.7	124.7	117.0	110.6	124.7	117.4	110.6	123.9	117.0	107.0	123.8	115.2	
04	MASONRY	96.9	129.8	117.0	95.3	129.8	116.3	96.4	131.3	117.7	97.2	131.3	118.0	97.2	129.8	117.1	96.5	129.8	116.8	
05	METALS	95.9	125.0	105.5	95.6	125.0	105.3	99.1	125.7	107.9	99.1	125.7	107.9	99.1	125.0	107.7	98.9	124.9	107.5	
06	WOOD, PLASTICS & COMPOSITES	98.6	120.3	111.1	98.6	120.3	111.1	98.6	120.3	111.1	98.6	120.3	111.1	98.6	120.3	111.1	98.6	120.3	111.1	
07	THERMAL & MOISTURE PROTECTION	101.4	123.6	110.4	101.3	123.7	110.4	101.4	127.3	111.9	101.3	127.3	111.9	101.3	123.6	110.4	101.5	123.3	110.4	
08	OPENINGS	102.4	130.1	109.4	105.6	130.1	111.8	102.4	130.1	109.4	102.4	130.1	109.4	102.4	130.1	109.4	105.6	130.1	111.8	
0920	Plaster & Gypsum Board	97.8	120.3	113.8	97.8	120.3	113.8	97.8	120.3	113.8	97.8	120.3	113.8	97.8	120.3	113.8	97.8	120.3	113.8	
0950, 0980	Ceilings & Acoustic Treatment	102.0	120.3	114.1	100.0	120.3	113.4	102.0	120.3	114.1	102.0	120.3	114.1	102.0	120.3	114.1	100.0	120.3	113.4	
0960	Flooring	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2	94.5	134.4	106.2	94.5	119.7	101.9	
0970, 0990	Wall Finishes & Painting/Coating	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	90.1	117.5	107.0	
09	FINISHES	101.8	123.2	113.7	100.6	123.2	113.2	101.8	123.2	113.7	101.9	123.2	113.7	101.6	123.2	113.6	101.5	120.7	112.2	
COVERS	DIVS. 10 - 14, 25, 28, 41, 43, 44, 46	100.0	108.6	101.7	100.0	108.6	101.7	100.0	108.8	101.7	100.0	108.8	101.7	100.0	108.6	101.7	100.0	108.6	101.7	
21, 22, 23	FIRE SUPPRESSION, PLUMBING & HVAC	100.0	114.7	106.0	94.1	114.7	102.4	100.0	114.8	106.0	100.0	114.8	106.0	100.0	114.7	106.0	100.0	114.7	106.0	
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	102.1	109.6	106.0	98.7	109.6	104.3	102.2	162.3	133.2	102.2	162.3	133.2	101.6	109.9	105.9	102.2	110.5	106.5	
MF2010	WEIGHTED AVERAGE	102.8	118.6	109.8	97.6	118.6	106.9	101.8	126.3	112.6	101.9	126.3	112.7	101.8	118.6	109.2	101.7	118.4	109.1	

DIVISION		D.C.						DELAWARE						FLORIDA						
		WASHINGTON			DOVER			NEWARK			WILMINGTON			DAYTONA BEACH			FORT LAUDERDALE			
		200 - 205			199			197			198			321			333			
MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL
015433	CONTRACTOR EQUIPMENT		103.2	103.2		116.9	116.9		116.9	116.9		117.0	117.0		98.0	98.0		90.9	90.9	
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	109.6	92.6	97.9	98.2	111.9	107.6	98.6	111.9	107.8	88.8	112.2	104.9	116.5	89.6	97.9	99.7	77.9	84.6	
0310	Concrete Forming & Accessories	97.4	81.1	83.2	98.3	102.7	102.1	100.4	102.7	102.4	101.4	102.7	102.5	96.7	72.1	75.3	95.3	72.8	75.7	
0320	Concrete Reinforcing	98.5	89.7	94.1	96.0	102.1	99.1	96.8	102.1	99.5	96.8	102.1	99.5	96.3	77.0	86.6	96.3	76.7	86.4	
0330	Cast-in-Place Concrete	129.8	90.0	114.1	95.5	101.9	98.0	85.8	101.9	92.2	92.6	101.9	96.3	91.8	73.9	84.7	96.2	81.0	90.2	
03	CONCRETE	115.7	87.0	101.7	97.3	103.2	100.2	92.7	103.2	97.8	96.2	103.2	99.6	91.6	74.8	83.4	93.8	77.5	85.8	
04	MASONRY	101.4	81.4	89.2	103.8	96.0	99.5	99.5	103.1	95.6	103.1	95.6	103.1	93.6	69.4	78.8	93.9	72.2	80.6	
05	METALS	96.5	106.6	99.8	103.9	116.0	105.2	97.2	102.0	100.0	95.1	102.0	100.0	96.1	92.2	94.8	96.0	93.1	95.1	
06	WOOD, PLASTICS & COMPOSITES	101.9	79.9	89.2	97.2	102.0	100.0	97.2	102.0	100.0	97.2	102.0	100.0	100.0	73.6	84.7	95.9	71.4	81.8	
07	THERMAL & MOISTURE PROTECTION	100.2	84.9	94.0	97.9	112.0	100.0	97.9	112.0	100.0	95.1	112.0	100.0	95.1	77.8	88.1	95.1	85.4	91.2	
08	OPENINGS	103.0	88.8	99.4	95.6	110.4	99.3	95.6	110.4	99.3	95.3	110.4	99.1	100.2	70.5	92.7	97.9	69.5	90.7	
0920	Plaster & Gypsum Board	108.6	79.3	87.7	105.9	102.5	103.5	107.3	102.5	103.9	107.8	102.5	104.0	93.2	73.2	78.9	92.3	71.0	79.4	
0950, 0980	Ceilings & Acoustic Treatment	105.8	79.3	88.3	104.2	102.5	103.1	104.2	102.5	103.1	99.5	102.5	101.5	95.8	73.2	80.9	95.8	71.0	104.5	
0960	Flooring	115.0	97.2	109.8	97.1	107.6	100.1	97.3	107.6	100.3	96.9	107.6	100.0	117.7	7					



# 33 41 Storm Utility Drainage Piping

## 33 41 13 – Public Storm Utility Drainage Piping

33 41 13.40 Piping, Storm Drainage, Corrugated Metal		Daily Crew	Labor- Output	Hours	Unit	Material	2012 Bare Costs		Total	Total Incl O&P
							Labor	Equipment		
2860	24" diameter				Eq.	21			21	23.50
2865	30" diameter					24			24	26.50
2870	36" diameter					26.50			26.50	29
2875	48" diameter					35			35	38.50
2880	60" diameter					53			53	58.50
2885	72" diameter					70			70	77

## 33 41 13.50 Piping, Drainage & Sewage, Corrug. HDPE Type S

PIPING, DRAINAGE & SEWAGE, CORRUGATED HDPE TYPE S										
0010	Not including excavation & backfill, bell & spigot									
1000	With gaskets, 4" diameter	B-20	425	.056	L.F.	.85	2.21		3.06	4.35
1010	6" diameter		400	.060		2	2.35		4.35	5.85
1020	8" diameter		380	.063		4.15	2.48		6.63	8.40
1030	10" diameter		370	.065		6	2.54		8.54	10.50
1040	12" diameter		340	.071		6.70	2.77		9.47	11.60
1050	15" diameter		300	.080		7.95	3.14		11.09	13.40
1060	18" diameter	B-21	275	.102		12.65	4.12	.48	17.25	20.50
1070	24" diameter		250	.112		15.55	4.53	.53	20.61	24.50
1080	30" diameter		200	.140		22	5.65	.66	28.31	33.50
1090	36" diameter		180	.156		29.50	6.30	.74	36.54	43
1100	42" diameter		175	.160		39.50	6.45	.76	46.71	54.50
1110	48" diameter							8	54.43	62.50
1120	54" diameter							3	95.93	109
1130	60" diameter							8	123.43	140
1135	Add 15% to material pipe cost for								146.50	199
1140	HDPE type S, elbows 12" dia								198	263
1150	15" diameter							0	293.70	375
1160	18" diameter							0	465.70	565
1170	24" diameter							5	673.55	800
1180	30" diameter							5	818.55	960
1190	36" diameter								238	320
1240	HDPE type S, Tee 12" diameter								312	415
1260	15" diameter		6	4		155	157		429	555
1280	18" diameter	B-21	6	4.667		218	189	22	550.50	710
1300	24" diameter		5	5.600		298	226	26.50	847.50	1,025
1320	30" diameter		5	5.600		595	226	26.50	986	1,200
1340	36" diameter		4	7		670	283	33	1,051	1,275
1360	42" diameter		4	7		735	283	33	1,566	1,850
1380	48" diameter		4	7		1,250	283	33		
1400	Add to basic installation cost for each split coupling joint									93.50
1402	HDPE type S, split coupling, 12" diameter	B-20	17	1.412	Eq.	7.35	55.50		62.85	110
1420	15" diameter		15	1.600		12.25	62.50		74.75	135
1440	18" diameter		13	1.846		21	72.50		93.50	155
1460	24" diameter		12	2		31	78.50		109.50	221
1480	30" diameter		10	2.400		68.50	94		162.50	266
1500	36" diameter		9	2.667		95.50	105		200.50	298
1520	42" diameter		8	3		107	118		256	335
1540	48" diameter		8	3		138	118			

RS Means 2012, adjusted for inflation - Piping Cost

18" Pipe = \$20.50 per LF

24" Pipe = \$24.50 per LF

City Factor = 0.979

Inflation factor = 1.017

Total 18" Pipe = \$20.50 \* 0.979 \* 1.017 = \$20.41

Total 24" Pipe = \$24.50 \* 0.979 \* 1.017 = \$23.39

## 33 41 13.60 Sewage/Drainage Collection, Concrete Pipe

SEWAGE/DRAINAGE COLLECTION, CONCRETE PIPE										
0010	Not including excavation or backfill									
0050	Box culvert, cast in place, 6' x 6'	C-15	16	4.500	L.F.	206	187		393	510
0060	8' x 8'		14	5.143		300	213		513	655

**Florida Department of Transportation**  
**Item Average Unit Cost**  
**From 2012/07/01 to 2013/06/30**

**Contract Type: CC STATEWIDE**  
**Displaying: VALID ITEMS WITH HITS**  
**From: 0102 1 To: 9999999**

Item	No. of Conts	Weighted Average	Total Amount	Total Quantity	Unit Meas	Obs?	Description
0430200 25	1	\$1,553.83	\$3,107.66	2.000	EA	N	FLARED END SECTION, CONCRETE, 18"
0430602125	1	\$1,428.90	\$1,428.90	1.000	EA	N	U-ENDWALL,W \GRATE,STD 260,1:4 SLP,18"
0430602129	1	\$2,180.00	\$4,360.00	2.000	EA	N	U-ENDWALL,W \GRATE,STD 260,1:4 SLP,24"
0430610025	2	\$2,621.43	\$18,350.00	7.000	EA	N	U-ENDWALL,STD 261,1:6 SLP, 18"
0430610029	1	\$2,800.00	\$2,800.00	1.000	EA	N	U-ENDWALL,STD 261,1:6 SLP, 24"
0430610123	1	\$1,516.49	\$3,032.98	2.000	EA	N	U-ENDWALL,STD 261,1:4 SLP, 15"
0430610125	1	\$2,000.00	\$6,000.00	3.000	EA	N	U-ENDWALL,STD 261,1:4 SLP, 18"
0430610323	1	\$1,516.50	\$1,516.50	1.000	EA	N	U-ENDWALL,STD 261,1:2 SLP, 15"
0430610325	1	\$1,551.23	\$3,102.46	2.000	EA	N	U-ENDWALL,STD 261,1:2 SLP, 18"
0430610329	2	\$1,445.00	\$2,890.00	2.000	EA	N	U-ENDWALL,STD 261,1:2 SLP, 24"
0430611025	1	\$1,800.00	\$1,800.00	1.000	EA	N	U-ENDWALL,STD 261,BAFFLES,1:6 SLP, 18"
0430611029	1	\$2,100.00	\$2,100.00	1.000	EA	N	U-ENDWALL,STD 261,BAFFLES,1:6 SLP, 24"
0430611123	1	\$1,400.00	\$5,600.00	4.000	EA	N	U-ENDWALL, BAFFLES,STD 261,1:4 SLP, 15"
0430611125	10	\$1,656.39	\$120,916.37	73.000	EA	N	U-ENDWALL, BAFFLES,STD 261,1:4 SLP, 18"
0430611129	4	\$2,383.47	\$47,669.30	20.000	EA	N	U-ENDWALL, BAFFLES,STD 261,1:4 SLP, 24"
0430611225	4	\$2,056.60	\$8,226.40	4.000	EA	N	U-ENDWALL, BAFFLES, STD 261,1:3 SLP,18"
0430611325	2	\$1,919.23	\$24,950.00	13.000	EA	N	U-ENDWALL, BAFFLES, STD 261,1:2 SLP,18"
0430611329	1	\$2,200.00	\$2,200.00	1.000	EA	N	U-ENDWALL, BAFFLES,STD 261,1:2 SLP,24"
0430612029	1	\$1,999.62	\$3,999.24	2.000	EA	N	U-ENDWALL, GRATE, STD 261,1:6 SLP,24"
0430830	10	\$237.95	\$91,095.56	382.840	CY	N	PIPE FILLING AND PLUGGING
0430950	7	\$65.56	\$64,770.92	988.000	CY	N	DESILTING CONCRETE BOX CULVERT,
0430963 1	4	\$33.63	\$11,029.86	328.000	LF	N	PVC PIPE FOR BACK OF SIDEWALK, 4"
0430963 2	5	\$30.08	\$5,866.38	195.000	LF	N	PVC PIPE FOR BACK OF SIDEWALK, NON STAND
0430982123	5	\$1,031.10	\$10,311.03	10.000	EA	N	MITERED END SECT, OPTIONAL RD, 15" CD
0430982125	24	\$1,082.49	\$151,548.48	140.000	EA	N	MITERED END SECT, OPTIONAL RD, 18" CD
0430982129	15	\$1,032.66	\$69,188.03	67.000	EA	N	MITERED END SECT, OPTIONAL RD, 24" CD
0430982133	13	\$1,420.33	\$39,769.20	28.000	EA	N	MITERED END SECT, OPTIONAL RD, 30" CD
0430982138	11	\$1,747.13	\$33,195.38	19.000	EA	N	MITERED END SECT, OPTIONAL RD, 36" CD
0430982140	2	\$2,879.45	\$14,397.24	5.000	EA	N	MITERED END SECT, OPTIONAL RD, 42" CD
0430982141	4	\$2,225.68	\$22,256.83	10.000	EA	N	MITERED END SECT, OPTIONAL RD, 48" CD
0430982142	1	\$4,300.00	\$4,300.00	1.000	EA	N	MITERED END SECT, OPTIONAL RD, 54" CD
0430982625	4	\$826.09	\$9,086.95	11.000	EA	N	MITERED END SECT, OPT - OTHER, 18" CD
0430982629	4	\$1,491.09	\$17,893.08	12.000	EA	N	MITERED END SECT, OPT - OTHER, 24" CD
0430982633	2	\$2,000.00	\$6,000.00	3.000	EA	N	MITERED END SECT, OPT - OTHER, 30" CD
0430982638	1	\$3,289.56	\$6,579.12	2.000	EA	N	MITERED END SECT, OPT - OTHER, 36" CD
0430982640	2	\$1,724.47	\$3,448.94	2.000	EA	N	MITERED END SECT, OPT - OTHER, 42" CD
0430984123	8	\$764.97	\$16,829.36	22.000	EA	N	MITERED END SECT, OPTIONAL RD, 15" SD
0430984125	39	\$793.71	\$687,348.57	866.000	EA	N	MITERED END SECT, OPTIONAL RD, 18" SD
0430984129	27	\$928.36	\$259,941.24	280.000	EA	N	MITERED END SECT, OPTIONAL RD, 24" SD
0430984133	12	\$2,135.35	\$111,038.00	52.000	EA	N	MITERED END SECT, OPTIONAL RD, 30" SD

# 33 41 Storm Utility Drainage Piping

## 33 41 13 – Public Storm Utility Drainage Piping

33 41 13.40 Piping, Storm Drainage, Corrugated Metal		Daily Crew	Output	Labor-Hours	Unit	Material	2012 Bare Costs		Total	Total Incl O&P
							Labor	Equipment		
2860	24" diameter				Ea.	21			21	23.50
2865	30" diameter					24			24	26.50
2870	36" diameter					26.50			26.50	29
2875	48" diameter					35			35	38.50
2880	60" diameter					53			53	58.50
2885	72" diameter					70			70	77

## 33 41 13.50 Piping, Drainage & Sewage, Corrug. HDPE Type S

0010 PIPING, DRAINAGE & SEWAGE, CORRUGATED HDPE TYPE S										
0020	Not including excavation & backfill, bell & spigot									
1000	With gaskets, 4" diameter	B-20	425	.056	L.F.	.85	2.21		3.06	4.35
1010	6" diameter		400	.060		2	2.35		4.35	5.85
1020	8" diameter		380	.063		4.15	2.48		6.63	8.40
1030	10" diameter		370	.065		6	2.54		8.54	10.50
1040	12" diameter		340	.071		6.70	2.77		9.47	11.60
1050	15" diameter		300	.080		7.95	3.14		11.09	13.60
1060	18" diameter	B-21	275	.102		12.65	4.12	.48	17.25	20.50
1070	24" diameter		250	.112		15.55	4.53	.53	20.61	24.50
1080	30" diameter		200	.140		22	5.65	.66	28.31	33.50
1090	36" diameter		180	.156		29.50	6.30	.74	36.54	43
1100	42" diameter		175	.160		39.50	6.45	.76	46.71	54.50
1110	48" diameter		170	.165		47	6.65	.78	54.43	62.50
1120	54" diameter		160	.175		88	7.10	.83	95.93	109
1130	60" diameter		150	.187		115	7.55	.88	123.43	140
1135	Add 15% to material pipe cost for water tight connection bell & spigot									
1140	HDPE type S, elbows 12" diameter	B-20	11	2.182	Ea.	61	85.50		146.50	199
1150	15" diameter	"	9	2.667		93	105		198	263
1160	18" diameter	B-21	9	3.111		153	126	14.70	293.70	375
1170	24" diameter		9	3.111		325	126	14.70	465.70	565
1180	30" diameter		8	3.500		515	142	16.55	673.55	800
1190	36" diameter		8	3.500		660	142	16.55	818.55	960
1240	HDPE type S, Tee 12" diameter	B-20	7	3.429		104	134		238	320
1260	15" diameter	"	6	4		155	157		312	415
1280	18" diameter	B-21	6	4.667		218	189	22	429	555
1300	24" diameter		5	5.600		298	226	26.50	550.50	710
1320	30" diameter		5	5.600		595	226	26.50	847.50	1,025
1340	36" diameter		4	7		670	283	33	986	1,200
1360	42" diameter									1,275
1380	48" diameter									
1400	Add to basic installation									
1402	HDPE type S, split									
1420	15" diam									
1440	18" diam									
1460	24" diam									
1480	30" diam									
1500	36" diam									
1520	42" diam									
1540	48" diam									

RS Means 2012 Inlet Cost:

A single inlet includes a tee and 45 degree elbow along with an approximately 50 SY concrete pad.

City Factor = 0.979

Inflation Factor = 1.017

Total Cost for Two Inlets = 2 \* 0.979 \* (\$375+\$555)\*1.017\*1.15 = \$2,130.62

Total Cost of Concrete (from FDOT) = 50 \* \$66.66 = \$3,333.00

Total Cost of Double Inlet = \$5,463.62

## 33 41 13.60 Sewage/D

0010	SEWAGE/DRAINAGE
0020	Not including excavation
0050	Box culvert, cast in plac
0060	8' x 8'

**Florida Department of Transportation**  
**Item Average Unit Cost**  
**From 2012/07/01 to 2013/06/30**

**Contract Type: CC STATEWIDE**  
**Displaying: VALID ITEMS WITH HITS**  
**From: 0102 1 To: 9999999**

Item	No. of Conts	Weighted Average	Total Amount	Total Quantity	Unit Meas	Obs?	Description
0327 70 15	18	\$1.47	\$1,920,210.38	1,303,239.500	SY	N	MILLING EXIST ASPH PAVT, 2 3/4" AVG DEPTH
0327 70 16	8	\$1.36	\$326,840.73	239,477.000	SY	N	MILLING EXIST ASPH PAVT, 1/2" AVG DEPTH
0327 70 17	6	\$1.84	\$157,679.84	85,731.000	SY	N	MILLING EXIST ASPH PAVT, 3 1/4" AVG DEPTH
0327 70 19	30	\$1.58	\$1,211,337.14	766,487.000	SY	N	MILLING EXIST ASPH PAVT, 3/4" AVG DEPTH
0327 70 20	2	\$2.55	\$46,586.28	18,242.000	SY	N	MILLING EXIST ASPH PAVT, 3 3/4" AVG DEPTH
0327 70 21	1	\$8.00	\$8,632.00	1,079.000	SY	N	MILLING EXIST ASPH PAVT, 7" AVG DEPTH
0327 70 22	3	\$2.80	\$10,646.95	3,802.000	SY	N	MILLING EXIST ASPH PAVT, 4 1/4" AVG DEPT
0327 70 23	1	\$7.45	\$72,607.70	9,746.000	SY	N	MILLING EXIST ASPH PAVT, 6" AVG DEPTH
0327 70 26	3	\$1.38	\$80,737.51	58,372.000	SY	N	MILLING EXIST ASPH PAVT, 4 3/4" AVG DEPTH
0327 70 30	1	\$4.28	\$64,957.56	15,177.000	SY	N	MILLING EXIST ASPH PAVT, 11.5" AVG DEPTH
0334 1 11	13	\$92.47	\$1,666,441.85	18,021.710	TN	N	SUPERPAVE ASPHALTIC CONC, TRAFFIC A
0334 1 12	23	\$81.68	\$6,285,590.38	76,950.120	TN	N	SUPERPAVE ASPHALTIC CONC, TRAFFIC B
0334 1 13	67	\$85.66	\$50,871,631.94	593,895.740	TN	N	SUPERPAVE ASPHALTIC CONC, TRAFFIC C
0334 1 14	12	\$87.74	\$5,626,521.79	64,129.800	TN	N	SUPERPAVE ASPHALTIC CONC, TRAFFIC D
0334 1 22	16	\$90.06	\$11,554,707.56	128,300.700	TN	N	SUPERPAVE ASPH CONC, TRAF B, PG76-22,PMA
0334 1 23	24	\$92.31	\$28,147,557.76	304,931.500	TN	N	SUPERPAVE ASPH CONC, TRAF C, PG76-22,PMA
0334 1 24	19	\$91.58	\$16,906,110.82	184,612.260	TN	N	SUPERPAVE ASPH CONC, TRAF D, PG76-22,PMA
0334 1 25	3	\$82.11	\$7,417,658.18	90,340.500	TN	N	SUPERPAVE ASPH CONC, TRAF E, PG76-22,PMA
0337 7 22	33	\$117.99	\$27,742,656.64	235,125.700	TN	N	ASPH CONC FC, INC BIT, FC-5, PG76-22, PMA
0337 7 40	15	\$99.56	\$6,104,161.23	61,313.300	TN	N	ASPH CONC FC, TRAFFIC B, FC-9.5, PG 76-22
0337 7 42	7	\$109.90	\$3,675,415.78	33,442.100	TN	N	ASPH CONC FC, TRAFFIC C, FC-9.5, PG 76-22
0337 7 43	18	\$92.39	\$10,289,110.86	111,364.600	TN	N	ASPH CONC FC, TRAFFIC C, FC-12.5, PG 76-22
0337 7 45	7	\$105.11	\$2,406,958.15	22,899.100	TN	N	ASPH CONC FC, TRAFFIC D, FC-12.5, PG 76-22
0339 1	80	\$146.48	\$2,184,870.47	14,915.846	TN	N	MISCELLANEOUS ASPHALT PAVEMENT
0341 70	4	\$6.01	\$445,994.48	74,192.000	SY	N	ASPHALT RUBBER MEMBRANE INTERLAYER
0350 1 4	2	\$66.66	\$45,349.60	680.300	SY	N	PLAIN CEMENT CONC PAVT, 9"
0350 1 20	1	\$62.23	\$2,052,220.94	32,978.000	SY	N	PLAIN CEMENT CONC PAVT, 9 1/2"
0350 2 10	1	\$86.00	\$25,800.00	300.000	SY	N	CEMENT CONC PAVT REINFORCED, 12"
0350 72	7	\$2.02	\$674,608.24	333,887.000	LF	N	CLEANING & RESEALING JOINTS - CONC PVMT
0350 78	4	\$3.44	\$68,300.40	19,866.000	LF	N	CLEANING & SEALING RAN CRACKS CONC PVMT
0352 70	7	\$4.07	\$1,100,639.74	270,236.000	SY	N	GRINDING CONCRETE PAVT
0353 70	3	\$469.87	\$4,364,490.00	9,288.700	CY	N	CONC PAVT SLAB REPLACEMENT
0400 0 11	35	\$436.84	\$2,947,857.29	6,748.100	CY	N	CONC CLASS NS, GRAVITY WALL
0400 1 2	35	\$789.99	\$634,906.59	803.690	CY	N	CONC CLASS I, ENDWALLS
0400 1 11	1	\$100.00	\$3,120.00	31.200	CY	N	CONC CLASS I, RETAINING WALLS
0400 2 1	2	\$594.17	\$34,461.58	58.000	CY	N	CONC CLASS II, CULVERTS
0400 2 4	18	\$587.29	\$9,251,197.34	15,752.370	CY	N	CONC CLASS II, SUPERSTRUCTURE
0400 2 5	7	\$717.24	\$1,333,357.26	1,859.000	CY	N	CONC CLASS II, SUBSTRUCTURE
0400 2 10	21	\$372.62	\$1,674,421.12	4,493.600	CY	N	CONC CLASS II, APPROACH SLABS
0400 2 11	8	\$577.99	\$751,446.69	1,300.100	CY	N	CONC CLASS II, RETAINING WALLS

Tomoka Farms Road Landfill - North Cell Class I Financial Assurance Closure Cost Estimates Landfill Gas Collection System

Item No.	Description	Quantity	Unit	Shaw Environmental	2011 Total Cost	2012 Total Cost <sup>2</sup>	2013 Total Cost <sup>2</sup>
1	Mobilization/Demobilization	1	LS	\$12,400.00	\$12,400.00	\$12,648.00	\$12,863.02
2	Wellhead Assembly	17	EA	\$500.00	\$8,500.00	\$8,670.00	\$8,817.39
3	Drilling of 36" borehole and completion of Vertical Well (0'-274')	274	LF	\$131.00	\$35,894.00	\$36,611.88	\$37,234.28
4	Drilling of 36" borehole and completion of Vertical Well (275'-549')	275	LF	\$93.00	\$25,575.00	\$26,086.50	\$26,529.97
5	Drilling of 36" Borehole and Completion of Vertical Well (550' - 999')	450	LF	\$78.50	\$35,325.00	\$36,031.50	\$36,644.04
6	Drilling of 36" Borehole and Completion of Vertical Well (1,000'+)	878	LF	\$76.00	\$66,728.00	\$68,062.56	\$69,219.62
7	Benching	14	EA	\$400.00	\$5,600.00	\$5,712.00	\$5,809.10
8	18" HDPE SDR 17 Header Pipe (0'-499')	318	LF	\$52.00	\$16,536.00	\$16,866.72	\$17,153.45
9	16" HDPE SDR 17 Header Pipe (0'-499')	349	LF	\$50.00	\$17,450.00	\$17,799.00	\$18,101.58
10	6" HDPE SDR 11 Lateral Pipe (0'-499')	499	LF	\$20.00	\$9,980.00	\$10,179.60	\$10,352.65
11	6" HDPE SDR 11 Lateral Pipe (500'-1,499')	1000	LF	\$18.00	\$18,000.00	\$18,360.00	\$18,672.12
12	6" HDPE SDR 11 Lateral Pipe (1,500'+)	1177	LF	\$17.00	\$20,009.00	\$20,409.18	\$20,756.14
13	4" HDPE SDR 11 Lateral Pipe (0'-499')	499	LF	\$15.00	\$7,485.00	\$7,634.70	\$7,764.49
14	4" HDPE SDR 11 Lateral Pipe (500'-1,499')	1000	LF	\$14.00	\$14,000.00	\$14,280.00	\$14,522.76
15	4" HDPE SDR 11 Lateral Pipe (1,500'+)	584	LF	\$13.00	\$7,592.00	\$7,743.84	\$7,875.49
16	Header/Condensate Access Point	3	EA	\$2,300.00	\$6,900.00	\$7,038.00	\$7,157.65
17	Condensate Sump	2	EA	\$16,000.00	\$32,000.00	\$32,640.00	\$33,194.88
18	Pipe Boot	17	EA	-	\$0.00	\$0.00	\$0.00

TOTAL = \$352,668.63

Notes:

1. Unit Prices are based on the bid received from Shawn Environmental for "Landfill Gas Collection System Installation" Project at Tomoka Farms Road Landfill (June 2011)

2. Inflation Factors of 1.020 and 1.017 are from the FDEP.

<http://www.dep.state.fl.us/waste/categories/swfr/pages/CostEstimates.htm>



SOLID WASTE DIVISION			
Organics	Price Per Test	Metals	Price Per Test
Lindane	\$25.00	Aluminum	\$7.00
Endrin	\$25.00	Antimony	\$7.00
Methoxychlor	\$25.00	Arsenic	\$7.00
Toxaphene	\$25.00	Barium	\$7.00
2, 4-D	\$25.00	Beryllium	\$7.00
2, 4, 5-TP (silvex)	\$25.00	Cadmium	\$7.00
Ethylene Dibromide	\$25.00	Calcium	\$7.00
Vinyl Chloride	\$5.00	Chromium	\$7.00
1, 2-Dichloroethane	\$5.00	Copper	\$7.00
1, 1, 1-Trichloroethane	\$5.00	Cobalt	\$7.00
Trichloroethene	\$5.00	Iron	\$7.00
Tetrachloroethene	\$5.00	Lead	\$7.00
Benzene	\$5.00	Magnesium	\$7.00
Carbon Tetrachloride	\$5.00	Manganese	\$7.00
1,3-Dichlorobenzene	\$5.00	Mercury	\$17.50
Toluene	\$5.00	Nickel	\$7.00
Xylenes (total)	\$5.00	Potassium	\$7.00
1,2,4-Trichlorobenzene	\$5.00	Selenium	\$7.00
1,4-Dichlorobenzene	\$5.00	Silver	\$7.00
1,2-Dichlorobenzene	\$5.00	Sodium	\$7.00
Chlorobenzene	\$5.00	Thallium	\$7.00
1,1-Dichloroethylene	\$5.00	Tin	\$7.00
cis-1,2-Dichloroethylene	\$5.00	Vanadium	\$7.00
1,2-Dichloropropane	\$5.00	Zinc	\$7.00
Ethylbenzene	\$5.00	Toxicity Characteristic Leaching Procedure (TCLP)	\$75.00
Styrene	\$5.00	Arsenic	\$7.00
Trans-1,2-Dichloroethylene	\$5.00	Barium	\$7.00
Dichloromethane	\$5.00	Cadmium	\$7.00
1,1,2-Trichloroethane	\$5.00	Chromium	\$7.00
Trihalomethane	\$35.00	Lead	\$7.00
Chlorinated Phenols	\$150.00	Mercury	\$17.50
Purgable Halocarbons 601/8260	\$75.00	Selenium	\$7.00
Purgable Volatiles	\$75.00	Silver	\$7.00
Purgable Aromatics 602/8260	\$40.00	TCPL Organics -- Price includes extraction plus methods 8260,8270,8151,8081	\$625.00
Total Organic Halogens	\$120.00	Organic & Demands	Price Per Test
Total Recovery Hydrocarbon/FLPRO	\$65.00	Biochemical Oxygen Demand	\$20.00
Polynuclear Aromatic Hydrocarbs	\$90.00	Chemical Oxygen Demand	\$15.00
Organic Toxic Pollutants -- VOC	\$75.00	Oil & Grease	\$45.00
Organic Toxic Pollutants -- BNA	\$150.00	Phenols, Total	\$20.00
Organic Toxic Pollutants -- Pesticides	\$125.00	Total Organic Carbon	\$15.00
Organic Toxic Pollutants -- VOC	\$75.00	Total Inorganic Carbon	\$15.00

<i>Nutrients</i>	<i>Price Per Test</i>	<i>Groups</i>	<i>Price Per Test</i>
Ammonia Nitrogen	\$15.00	<b>Hazardous Waste Characterization</b>	
Ammonium	\$15.00	Reactive Cyanide	\$50.00
Kjeldahl Nitrogen, Total	\$17.00	Reactive Sulfide	\$50.00
Nitrate Nitrogen	\$8.00	<b>Metals</b>	<b>Price Per Test</b>
Nitrite Nitrogen	\$8.00	RCRA Metals (8)	\$56.00
Nitrogen, Total	\$30.00	Prioritiy Pollutant Metals (13)	\$85.00
Organic Nitrogen	\$32.00	TAL Metals	\$125.00
<b>Mircobiological</b>	<b>Price Per Test</b>	<b>Semi-Volatile Organics</b>	<b>Price Per Test</b>
Fecal Coliform	15	PAH's by EPA 625 or 8270C	90
Total Coliform	15	Base/Neutrals by EPA 625 or 8270C, PP or TCL list	\$125.00
		Base/Neutrals and Acid Extractables by EPA 625 or 8270C, PP or TCL List	\$150.00
<b>Residue/Solids</b>	<b>Price Per Test</b>	BNA RCRA List with TCLP extraction (EPA 1311 & 8270C)	\$200.00
Total Dissolved Solids	\$10.00	STARS PAH's by EPA 8270C	\$90.00
Total Suspended Solids	\$10.00	PCB's by EPA 8082	\$70.00
Percent Solids	\$5.00	Pesticides by EPA 8081	\$100.00
<b>Field Test</b>	<b>Price Per Test</b>	Pesticides & PCB's by EPA 8081/8082	\$150.00
Total Well Depth	\$0.00	Herbicides-WATER by EPA 8151 or 515.1	\$135.00
Water Elevation	\$0.00	Herbicides-SOIL by EPA 8151	\$175.00
Temperature	\$0.00	<b>Toxicity Characteristic Leaching Procedure (TCLP)</b>	<b>Price Per Test</b>
Specific Conductance	\$0.00	TCLP Metals	\$66.50
Dissolved Oxygen	\$0.00	TCLP Volatile Organics	\$75.00
pH	\$0.00	TCLP Pesticides	\$100.00
Turbidity	\$0.00	TCLP Herbicides	135
<b>Miscellaneous</b>	<b>Price Per Test</b>	Full TCLP	675
Bicarbonates as HCO <sub>3</sub>	\$10.00	AHE Extraction	75
Calcium Hardness as CaCO <sub>3</sub>	\$7.00	SPLP Extraction	50
Chloride	\$8.00	<b>Volatile Organics</b>	<b>Price Per Test</b>
Color	\$5.00	BTEX + MTBE by EPA 624 or 8260B	40
Cyanide	\$20.00	VOHs by EPA 624 or 8260B	75
Corrosivity	\$20.00	VOC's by EPA 624 or 8260B (chlorinated and aromatic compounds)	75
Flouride	\$8.00	VOC's by EPA 8021 (chlorinated and aromatic compounds)	90
Hydrogen Sulfide	\$20.00	VOC's by GC/MS EPA 624 or 8260B	75
Odor	\$5.00	NYSDEC STARS List VOC's by EPA 8260B	75
pH	\$5.00	<b>Miscellaneous</b>	<b>Price Per Test</b>
Sulfate	\$8.00	40 CFR Part 258 Appendix I	\$190.00
Total Alkalinity	\$10.00	40 CFR Part 258 Appendix II	\$750.00
Total Hardness as CaCO <sub>3</sub>	\$7.00	Primary Metals 62-550.310(1)(a)	\$94.50
Total Phosphorus	\$15.00	Primary VOC 62-550.310(2)(C)	\$75.00
Total Phosphate	\$15.00	Full Primary Drinking Water Scan 62-550.310	\$1,000.00
Chlorophyll A	\$35.00	Secondary Drinking Water Scan 62-550.320(1)	\$135.00
		Field Parameters	0
Hourly Rate for time in field during regular working hours (8:00 a.m. to 5:00 p.m. Monday through Friday)			40
Hourly Rate for time in field after regular working hours (nights, weekends and county recognized holidays)			75
<b>GRAND TOTAL</b>			<b>\$17,475.80</b>

<b>Definitions</b>			
BNA = Base, Neutral, Acid extractable organics			
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes			
CFR = Code of Federal Regulations			
MTBE = Methyl Tert-Butyl Ether			
PAHs = Polynuclear Aromatic Hydrocarbons			
PCBs = Polychlorinated Biphenyls			
RCRA = Resource Conservation and Recovery Act			
SPLP = Synthetic Precipitation Leaching Procedure			
TAL = Target Analyte List			
TCLP = Toxicity Characteristic Leaching Procedure			
TRPH = Total Recoverable Petroleum Hydrocarbons			
VOAs = Volatile Organic Aromatics			
VOCs = Volatile Organic Compunds			
VOHs - Volatile Organic Halogens			



# 32 01 Operation and Maintenance of Exterior Improvements

## 32 01 30 - Operation and Maintenance of Site Improvements

### 32 01 30.10 Site Maintenance

	Crew	Daily Output	Labor-Hours	Unit	Material	2012 Bare Costs Labor	Equipment	Total	Total Incl O&P
Spray after mulch	1 Clab	48	.167	M.S.F.		5.85		5.85	9
Tree maintenance									
Clear and grub trees, see Section 31 11 10.10									
Cutting and piling trees, see Section 31 13 13.20									
Fertilize, tablets, slow release, 30 gram/tree	1 Clab	100	.080	Ea.	.52	2.81		3.33	4.89
Guying, including stakes, guy wire & wrap, see Section 32 94 50.10									
Planting, trees, Deciduous, in prep. beds, see Section 32 93 43.20									
Removal, trees see Section 32 96 43.20									
Pest control, spray	1 Clab	24	.333	Ea.	23.50	11.70		35.20	44
Systemic	"	48	.167	"	24	5.85		29.85	35.50

## 32 01 90 - Operation and Maintenance of Planting

### 32 01 90.13 Fertilizing

	Crew	Daily Output	Labor-Hours	Unit	Material	2012 Bare Costs Labor	Equipment	Total	Total Incl O&P
<b>FERTILIZING</b>									
Dry granular, 4#/M.S.F., hand spread	1 Clab	24	.333	M.S.F.	2.59	11.70		14.29	21
Push rotary		140	.057	"	2.59	2.01		4.60	5.95
Push rotary, per 1076 feet squared		130	.062	Ea.	2.59	2.16		4.75	6.15
Tractor towed spreader, 8'	B-66	500	.016	M.S.F.	2.59	.72	.49	3.80	4.47
12' spread		800	.010		2.59	.45	.31	3.35	3.87
Truck whirlwind spreader		1200	.007		2.59	.30	.21	3.10	3.53
Water soluble, hydro spread, 1.5#/M.S.F.	B-64	600	.027		2.66	.93	.59	4.18	4.99
Add for weed control					.45			.45	.50

### 32 01 90.19 Mowing

	Crew	Daily Output	Labor-Hours	Unit	Material	2012 Bare Costs Labor	Equipment	Total	Total Incl O&P
<b>MOWING</b>									
Mowing brush, tractor with rotary mower	B-84	22	.364	M.S.F.		16.95	15.60	32.55	42.50
Light density		13	.615			28.50	26.50	55	72
Medium density		9	.889			41.50	38	79.50	105
Heavy density		13	.615			28.50	26.50	55	72
Mowing, brush/grass, tractor, rotary mower, highway/airport median	A-2B	1	8	Day		275	211	486	645
Traffic safety flashing truck for highway/airport median mowing	1 Clab	65	.123	M.S.F.		4.32		4.32	6.65
Lawn mowing, power mower, 18" - 22"		110	.073			2.55		2.55	3.93
22" - 30"		140	.057			2.01		2.01	3.09
30" - 32"	B-66	300	.027			1.19	.82	2.01	2.71
Riding mower, 36" - 44"	"	480	.017			.75	.52	1.27	1.70
48" - 58"									
Mowing with tractor & attachments	B-66	930	.009	M.S.F.		.38	.27	.65	.87
3 gang reel, 7'		1200	.007			.30	.21	.51	.68
5 gang reel, 12'		210	.038			1.71	1.18	2.89	3.87
Cutter or sickle-bar, 5', rough terrain		340	.024			1.05	.73	1.78	2.39
Cutter or sickle-bar, 5', smooth terrain		5	1.600	Mile		71.50	49.50	121	163
Drainage channel, 5' sickle bar	1 Clab	10	.800	Ea.		28		28	43
Lawnmower, rotary type, sharpen (all sizes)		7	1.143	"		40		40	61.50
Repair or replace part		5760	.001	L.F.		.05		.05	.08
Edge trimming with weed whacker									

### 32 01 90.23 Pruning

	Crew	Daily Output	Labor-Hours	Unit	Material	2012 Bare Costs Labor	Equipment	Total	Total Incl O&P
<b>PRUNING</b>									
1-1/2" caliper	1 Clab	84	.095	Ea.		3.34		3.34	5.15
2" caliper		70	.114			4.01		4.01	6.15
2-1/2" caliper		50	.160			5.60		5.60	8.65
3" caliper		30	.267			9.35		9.35	14.40
4" caliper, by hand	2 Clab	21	.762			26.50		26.50	41
Aerial lift equipment	B-85	38	1.053			39.50	24.50	64	87
6" caliper, by hand	2 Clab	12	1.333			47		47	72

**Pace Analytical Services, Inc.**

8 East Tower Circle  
Ormond Beach, FL 32174  
386.672.5668  
fax 386.673.4001



**Pace Quote No.:** 10-0241

**Date:** 7/14/10

**To:** Volusia County Solid Waste  
1990 Tomoka Farms Rd.  
Port Orange, FL 32128

**Attn:** Jennifer Stirk

**Email:** [jstirk@co.volusia.fl.us](mailto:jstirk@co.volusia.fl.us)

**Project Name:** Additional Parameters

**Start Date:** as required

**Duration:** as required

**Samples Per Day:** NA

**Report Results:** NA

**Deliverable:** Florida

**Surcharge:** NA

**Turnaround:** 10 business days

**TAT Surcharge:** NA

**Phone:** 386-947-2952

**Fax:**

**P.O. Number:**

**Qualifiers:** NA

**Special Analytes:** NA

**Shipping:** NA

**Shipping Charges:** NA

Client generated from

**EDD:** PacePort

**Primary Lab:** Ormond Beach

**Sampling Org.:** Pace/client

**Hourly Rate:** NA

**Pace Contact:**

Paul Jackson

813.731.1595

[Paul.Jackson@pacelabs.com](mailto:Paul.Jackson@pacelabs.com)

Qty	Matrix	Test Description	Method	Unit Price	Total
NA	water	Ethane/Ethene	Microseeps SOP-AM20GAx	\$96.00	NA
NA	water	2-Butanone	8260	\$75.00	NA
NA	water	Mercury, Low-level (field QC samples are invoiced at the same unit price)	1631E	\$85.00	NA
NA	water	Solids, Total Volatile	160.4	\$20.00	NA
NA	water	Molybdenum (when run with >3 other 200.7/6010 analytes)	200.7/6010	\$7.00	NA
NA	water	Organophosphorus Pesticides	8141	\$145.00	NA
Estimated Project Total					NA

To: Volusia County Solid Waste  
Attn: Jennifer Stirk

Pace Quote No.: 10-0241  
Pace Contact: Paul R. Jackson

***Notes:***

***Please write Pace quotation number on chain of custody.***

**Terms and conditions as follows unless superceded by existing MSA or contract.**

***We appreciate the opportunity to be of service to you.***

***Please call Paul Jackson at 813.731.1595 for questions concerning this quotation.***

# FLORIDA JETCLEAN

---

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---

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www.floridajetclean.com

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800-226-8013  
FAX : 813-926-4616

### PROPOSAL

DATE : 12/4/12  
TO : Jonathan Albers – HDR  
FROM : Ralph Calistri (floridajetclean@yahoo.com)  
SUBJECT : 2012 Volusia County Landfill LCS Maintenance Proposal

Thank you for your inquiry. We confirm our capability and interest in providing the required leachate collection system services for HDR at the Volusia County landfill.

Based on prior work at the project location we quote as follows:

High-pressure water-jetting of roughly 10,000' of existing landfill HDPE leachate collection piping at the above location \$ 7,500.00

Subject to:

- An adequate no charge on site water for jetcleaning.
- Exposed and opened cleanouts/manholes at ground level.
- Continuity of access allowing work to be carried out on a single mobilization
- Standby time chargeable at \$200.00 per hour should delays not of our making delay progress e.g. bad weather, access problems, high leachate flow levels etc.
- Payment : net 30 days

Please call with questions or to schedule service.

Thank you.

Ralph Calistri - Florida Jetclean - 800-226-8013



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- In-Situ Level Troll 700
- In-Situ Rugged Reader
  - INW PS-9800
- LaMotte 2020 Turbidity Meter
- Landtec GEM 2000 Landfill Gas Monitor
  - Ludlum NORM Meter
  - Magellan Handheld GPS
  - Masterflex Peristaltic Pump
  - Myron Ultrameter II 6P
  - Pipehorn Magnetic Pipe Locator
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    - Quest Noise Dosimeter
    - RAE MiniRAE 2000
    - RAE MultiRAE Plus PID
    - RAE PGM-7200
  - RKI Eagle 4 Gas Monitor
  - RKI Single Gas Monitor
  - SKC Air Sampling Pump
    - Soil Sampling Kit
  - Thermo 580B 10.6 Lamp
  - Thermo 580B 11.8 Lamp
  - Thermo DataRam PDR Series
  - Thermo Foxboro TVA 1000
  - Thermo Foxboro TVA 1000 PID/FID
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The EAGLE's ergonomic design offers easy access to controls such as autocalibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has 2 alarm levels plus TWA and STEL alarms for toxic channels. Alarm levels are adjustable and can be latching or self resetting.



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Standard features on the EAGLE are not available on most other competitive units such as ppm/LEL hydrocarbon detection (5 ppm resolution) and a methane elimination switch for environmental applications. For quick response and recovery, the EAGLE has a strong internal pump which can draw samples from over 125 feet. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on Ni-Cads. Many accessories such as long hoses, special probes, datalogging, continuous operation adapters, remote alarms and strobes, dilution fittings, inter-nal hydrophobic filter, etc, are available to help satisfy almost any application. Rugged, weather resistant, easy to operate and maintain, the EAGLE is the industry's answer to portable gas detection in many applications, including land survey.

**Features**

- Simultaneous detection of up to 6 different gases
- Wide variety of field proven gas sensors available
- IR Sensors available for CO2, %LEL CH4, and 0-100% volume CH4
- Transformer testing version available

## **Attachment 2**

### **USLE Calculation**

**Volusia County- Tomoka Farms Road Landfill**  
**December 2012**

**Soil Erosion using the Universal Soil Loss Equation (USLE)**

**The Universal Soil Loss Equation**       $A \text{ (tons/AC/year)} = R * K * LS * C * P$

**Name    Value    Reference\***

**Rainfall Factor**

**R =**    400      Figure 1 of USDA "Predicting Rainfall Loss Handbook"

**Soil Erodibility Factor**

**K =**    0.08      Figure 3 of USDA "Predicting Rainfall Loss Handbook"; assuming 10% silt and very fine sand (.15 to .075 mm), 90% sand (0.1 to 2 mm), 2% organic matter, fine granular structure, and moderate permeability

**Topographic Factor (North Cell)**

**LS =**    11.57      Table 3 USDA "Predicting Rainfall Loss Handbook"; 150 ft slope, 33% slope

**Topographic Factor (South Cell)**

**LS =**    5.77      Table 3 USDA "Predicting Rainfall Loss Handbook"; 200 ft slope, 20% slope

**Cover and Management Factor**

**C =**    0.042      Assuming 60% of the ground is covered by vegetation.

**Support Practice Factor**

**P =**    1      support practice factor (ranges 0 to 1), assumed for slope with no farming

**Assumptions:**

density      95 lb/ft<sup>3</sup>      dry density for silty sand  
acreage      65.65 acres      North Cell Landfill area

**Table of Soil Loss**

	<b>C</b>	<b>A (tons/AC/year)</b>	<b>tons/ year</b>	<b>CF/ year</b>	<b>CY/ year</b>
<b>North Cell</b>	0.042	15.55	1,021	21,492	796

*\*reference*    United States Department of Agriculture. "Predicting Rainfall Erosion Losses."  
Agriculture Handbook No. 537, December 1978.



# PREDICTING RAINFALL EROSION LOSSES

A GUIDE TO CONSERVATION PLANNING



UNITED STATES  
DEPARTMENT OF  
AGRICULTURE

AGRICULTURE  
HANDBOOK  
NUMBER 537

*PREPARED BY*  
SCIENCE AND  
EDUCATION  
ADMINISTRATION

site as the product of six major factors whose most likely values at a particular location can be expressed numerically. Erosion variables reflected by these factors vary considerably about their means from storm to storm, but effects of the random fluctuations tend to average out over extended periods. Because of the unpredictable short-time fluctuations in the levels of influential variables, however, present soil loss equations are substantially less accurate for prediction of specific events than for prediction of longtime averages.

The soil loss equation is

$$A = R K L S C P \quad (1)$$

where

- A** is the computed soil loss per unit area, expressed in the units selected for **K** and for the period selected for **R**. In practice, these are usually so selected that they compute **A** in tons per acre per year, but other units can be selected.
- R**, the rainfall and runoff factor, is the number of rainfall erosion index units, plus a factor for runoff from snowmelt or applied water where such runoff is significant.
- K**, the soil erodibility factor, is the soil loss rate per erosion index unit for a specified soil as measured on a unit plot, which is defined as a 72.6-ft length of uniform 9-percent slope continuously in clean-tilled fallow.
- L**, the slope-length factor, is the ratio of soil loss from the field slope length to that from a 72.6-ft length under identical conditions.
- S**, the slope-steepness factor, is the ratio of soil loss from the field slope gradient to that from a 9-percent slope under otherwise identical conditions.
- C**, the cover and management factor, is the ratio of soil loss from an area with specified cover and management to that from an identical area in tilled continuous fallow.
- P**, the support practice factor, is the ratio of soil loss with a support practice like contouring, stripcropping, or terracing to that with straight-row farming up and down the slope.

---

The soil loss equation and factor evaluation charts were initially developed in terms of the English units commonly used in the United States. The factor definitions are interdependent, and direct conversion of acres, tons, inches, and feet to metric units would not produce the kind of integers that would be desirable for an expression of the equation in that system. Therefore, only the English units are used in the initial presentation of the equation and factor evaluation materials, and their counterparts in metric units are given in the Appendix under **Conversion to Metric System**.

---

Numerical values for each of the six factors were derived from analyses of the assembled research data and from National Weather Service precipitation records. For most conditions in the United States, the approximate values of the factors for any particular site may be obtained from charts and tables in this handbook. Localities or countries where the rainfall characteristics, soil types, topographic features, or farm practices are substantially beyond the range of present U.S. data will find these charts and tables incomplete and perhaps inaccurate for their conditions. However, they will provide guidelines that can reduce the amount of local research needed to develop comparable charts and tables for their conditions.

The subsection on **Predicting Cropland Soil Losses**, page 40 illustrates how to select factor values from the tables and charts. Readers who have had no experience with the soil loss equation may wish to read that section first. After they have referred to the tables and figures and located the values used in the sample, they may move readily to the intervening detailed discussions of the equation's factors.

The soil loss prediction procedure is more valuable as a guide for selection of practices if the user has a general knowledge of the principles and factor interrelations on which the equation is based. Therefore, the significance of each factor is discussed before presenting the reference table or chart from which local values may be obtained. Limitations of the data available for evaluation of some of the factors are also pointed out.



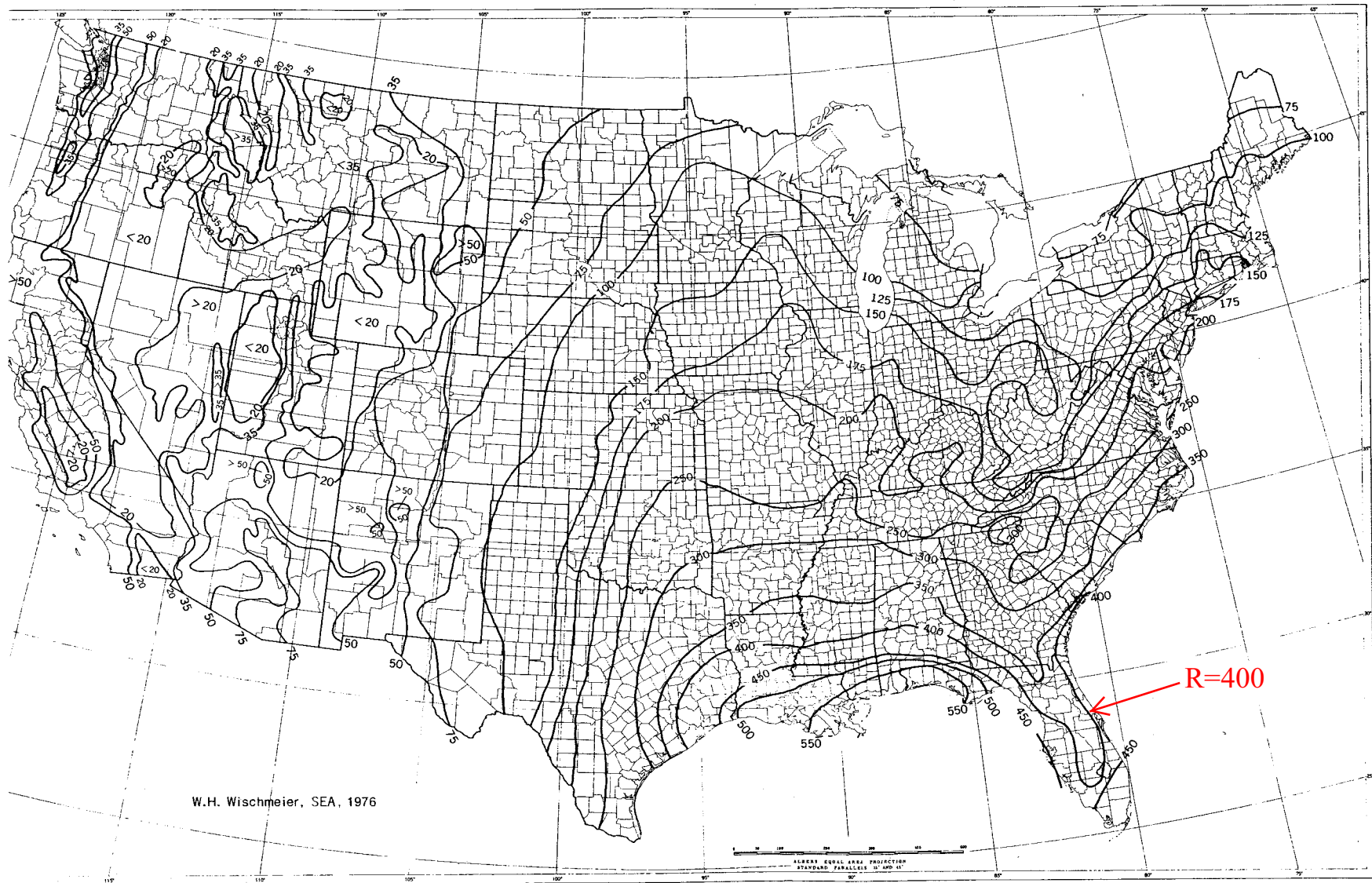


FIGURE 1.—Average annual values of the rainfall erosion index.

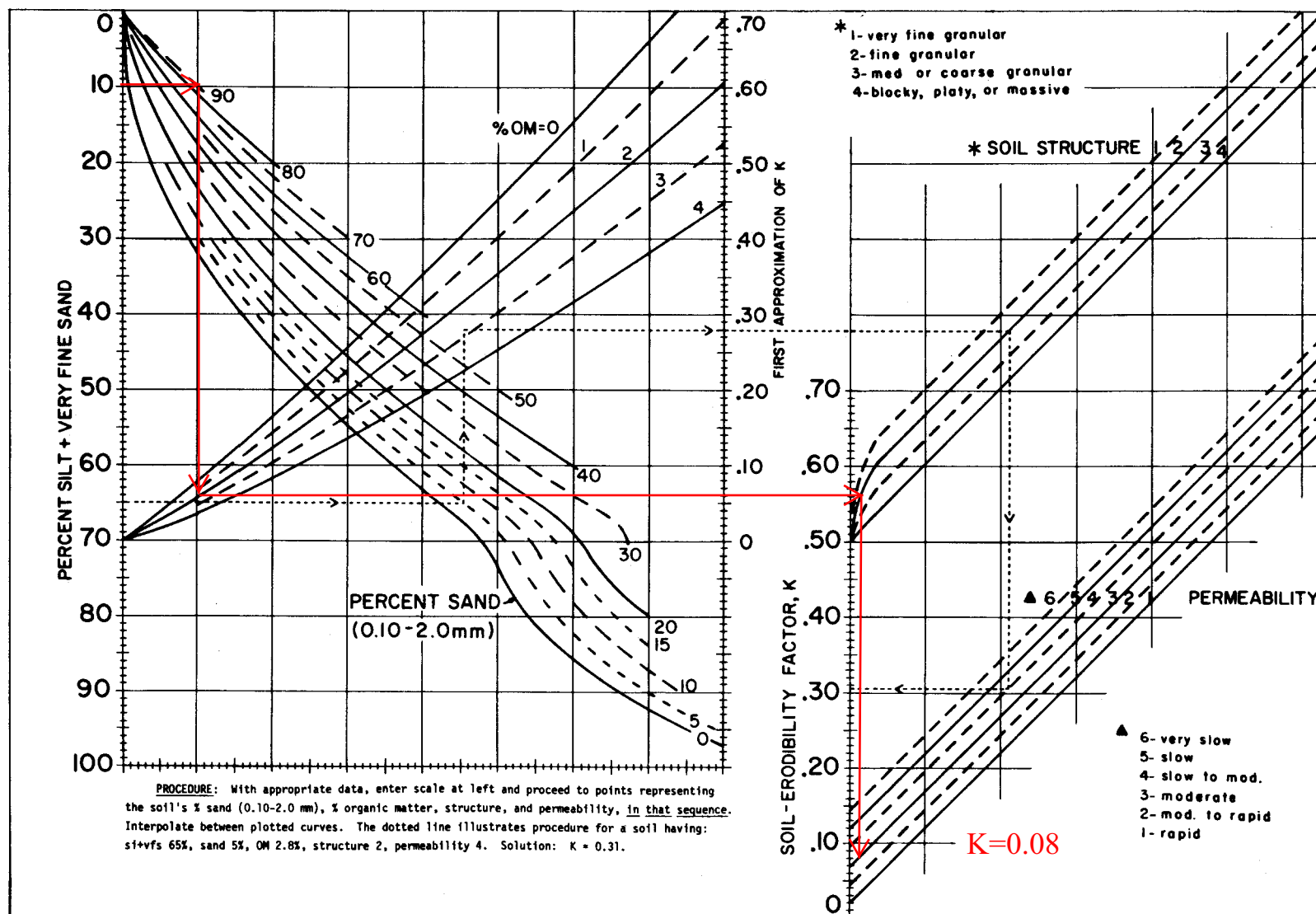


FIGURE 3.—The soil-erodibility nomograph. Where the silt fraction does not exceed 70 percent, the equation is  $100 K = 2.1 M^{1.14} (10^{-5}) (12 - a) + 3.25 (b - 2) + 2.5 (c - 3)$  where  $M = (\text{percent si} + \text{vfs}) (100 - \text{percent c})$ ,  $a = \text{percent organic matter}$ ,  $b = \text{structure code}$ , and  $c = \text{profile permeability class}$ .

## TOPOGRAPHIC FACTOR (LS)

Both the length and the steepness of the land slope substantially affect the rate of soil erosion by water. The two effects have been evaluated separately in research and are represented in the soil

loss equation by **L** and **S**, respectively. In field applications, however, considering the two as a single topographic factor, **LS**, is more convenient.

### Slope-Effect Chart

**LS** is the expected ratio of soil loss per unit area from a field slope to that from a 72.6-ft length of uniform 9-percent slope under otherwise identical conditions. This ratio for specified combinations of field slope length and uniform gradient may be obtained directly from the slope-effect chart (fig. 4). Enter on the horizontal axis with the field slope length, move vertically to the appropriate percent-slope curve, and read **LS** on the scale at the left. For example, the **LS** factor for a 300-ft length of 10-percent slope is 2.4. Those who prefer a table may use table 3 and interpolate between listed values.

To compute soil loss from slopes that are appreciably convex, concave, or complex, the chart **LS** values need to be adjusted as indicated in the section **LS Values for Irregular Slopes**. Figure 4 and table 3 assume slopes that have essentially uniform gradient. The chart and table were derived by the equation

$$LS = (\lambda/72.6)^m (65.41 \sin^2 \theta + 4.56 \sin \theta + 0.065) \quad (4)$$

where  $\lambda$  = slope length in feet;

$\theta$  = angle of slope; and

$m = 0.5$  if the percent slope is 5 or more, 0.4 on slopes of 3.5 to 4.5 percent, 0.3 on slopes of 1 to 3 percent, and 0.2 on uniform gradients of less than 1 percent.

The basis for this equation is given in the subsection discussing the individual effects of slope length and steepness. However, the relationships expressed by the equation were derived from data obtained on cropland, under natural rainfall, on slopes ranging from 3 to 18 percent in steepness and about 30 to 300 ft in length. How far beyond these ranges in slope characteristics the relationships derived from the data continue to be accurate has not been determined by direct soil loss measurements.

The Palouse Region of the Northwest represents

TABLE 3.—Values of the topographic factor, **LS**, for specific combinations of slope length and steepness<sup>1</sup>

Percent slope	Slope length (feet)											
	25	50	75	100	150	200	300	400	500	600	800	1,000
0.2	0.060	0.069	0.075	0.080	0.086	0.092	0.099	0.105	0.110	0.114	0.121	0.126
0.5	.073	.083	.090	.096	.104	.110	.119	.126	.132	.137	.145	.152
0.8	.086	.098	.107	.113	.123	.130	.141	.149	.156	.162	.171	.179
2	.133	.163	.185	.201	.227	.248	.280	.305	.326	.344	.376	.402
3	.190	.233	.264	.287	.325	.354	.400	.437	.466	.492	.536	.573
4	.230	.303	.357	.400	.471	.528	.621	.697	.762	.820	.920	1.01
5	.268	.379	.464	.536	.656	.758	.928	1.07	1.20	1.31	1.52	1.69
6	.336	.476	.583	.673	.824	.952	1.17	1.35	1.50	1.65	1.90	2.13
8	.496	.701	.859	.992	1.21	1.41	1.72	1.98	2.22	2.43	2.81	3.14
10	.685	.968	1.19	1.37	1.68	1.94	2.37	2.74	3.06	3.36	3.87	4.33
12	.903	1.28	1.56	1.80	2.21	2.55	3.13	3.61	4.04	4.42	5.11	5.71
14	1.15	1.62	1.99	2.30	2.81	3.25	3.98	4.59	5.13	5.62	6.49	7.26
16	1.42	2.01	2.46	2.84	3.48	4.01	4.92	5.68	6.35	6.95	8.03	8.98
18	1.72	2.43	2.97	3.43	4.21	4.86	5.95	6.87	7.68	8.41	9.71	10.9
20	2.04	2.88	3.52	4.08	5.00	5.77	7.07	8.16	9.12	10.0	11.5	12.9

<sup>1</sup>  $LS = (\lambda/72.6)^m (65.41 \sin^2 \theta + 4.56 \sin \theta + 0.065)$  where  $\lambda$  = slope length in feet;  $m = 0.2$  for gradients < 1 percent, 0.3 for 1 to 3 percent slopes, 0.4 for 3.5 to 4.5 percent slopes, 0.5 for 5 percent slopes and steeper; and  $\theta$  = angle of slope. (For other combinations of length and gradient, interpolate between adjacent values or see fig. 4.)

tion and developmental areas can be obtained from table 5 if good judgment is exercised in comparing the surface conditions with those of agricultural conditions specified in lines of the table. Time intervals analogous to cropstage periods will be defined to begin and end with successive construction or management activities that appreciably change the surface conditions. The procedure is then similar to that described for cropland.

Establishing vegetation on the denuded areas as quickly as possible is highly important. A good sod has a *C* value of 0.01 or less (table 5-B), but such a low *C* value can be obtained quickly only by laying sod on the area, at a substantial cost. When grass or small grain is started from seed, the probable soil loss for the period while cover is developing can be computed by the procedure outlined for estimating cropstage-period soil losses. If the seeding is on topsoil, without a mulch, the soil loss ratios given in line 141 of table 5 are appropriate for cropstage *C* values. If the seeding is on a desurfaced area, where residual effects of prior vegetation are no longer significant, the ratios for periods SB, 1 and 2 are 1.0, 0.75 and 0.50, respectively, and line 141 applies for cropstage 3. When the seedbed is protected by a mulch, the pertinent mulch factor from the upper curve of figure 6 or table 9 is applicable until good canopy cover is attained. The combined effects of vegetative mulch and low-growing canopy are given in figure 7. When grass is established in small grain, it can usually be evaluated as established meadow about 2 mo after the grain is cut.

### *C* Values for Pasture, Range, and Idle Land

Factor *C* for a specific combination of cover conditions on these types of land may be obtained from table 10 (57). The cover characteristics that must be appraised before consulting this table are defined in the table and its footnotes. Cropstage periods and *EI* monthly distribution data are generally not necessary where perennial vegetation has become established and there is no mechanical disturbance of the soil.

Available soil loss data from undisturbed land were not sufficient to derive table 10 by direct comparison of measured soil loss rates, as was done for development of table 5. However, analyses of the assembled erosion data showed that the research information on values of *C* can be ex-

tended to completely different situations by combining subfactors that evaluate three separate and distinct, but interrelated, zones of influence: (a) vegetative cover in direct contact with the soil surface, (b) canopy cover, and (c) residual and tillage effects.

Subfactors for various percentages of surface cover by mulch are given by the upper curve of

TABLE 10.—Factor *C* for permanent pasture, range, and idle land<sup>1</sup>

Vegetative canopy		Cover that contacts the soil surface						
Type and height <sup>2</sup>	Percent cover <sup>3</sup>	Type <sup>4</sup>	Percent ground cover					
			0	20	40	60	80	95+
No appreciable canopy		G	0.45	0.20	0.10	0.042	0.013	0.003
		W	.45	.24	.15	.091	.043	.011
Tall weeds or short brush with average drop fall height of 20 in	25	G	.36	.17	.09	.038	.013	.003
		W	.36	.20	.13	.083	.041	.011
	50	G	.26	.13	.07	.035	.012	.003
		W	.26	.16	.11	.076	.039	.011
	75	G	.17	.10	.06	.032	.011	.003
		W	.17	.12	.09	.068	.038	.011
Appreciable brush or bushes, with average drop fall height of 6½ ft	25	G	.40	.18	.09	.040	.013	.003
		W	.40	.22	.14	.087	.042	.011
	50	G	.34	.16	.08	.038	.012	.003
		W	.34	.19	.13	.082	.041	.011
	75	G	.28	.14	.08	.036	.012	.003
		W	.28	.17	.12	.078	.040	.011
Trees, but no appreciable low brush. Average drop fall height of 13 ft	25	G	.42	.19	.10	.041	.013	.003
		W	.42	.23	.14	.089	.042	.011
	50	G	.39	.18	.09	.040	.013	.003
		W	.39	.21	.14	.087	.042	.011
	75	G	.36	.17	.09	.039	.012	.003
		W	.36	.20	.13	.084	.041	.011

<sup>1</sup> The listed *C* values assume that the vegetation and mulch are randomly distributed over the entire area.

<sup>2</sup> Canopy height is measured as the average fall height of water drops falling from the canopy to the ground. Canopy effect is inversely proportional to drop fall height and is negligible if fall height exceeds 33 ft.

<sup>3</sup> Portion of total-area surface that would be hidden from view by canopy in a vertical projection (a bird's-eye view).

<sup>4</sup> G: cover at surface is grass, grasslike plants, decaying compacted duff, or litter at least 2 in deep.

W: cover at surface is mostly broadleaf herbaceous plants (as weeds with little lateral-root network near the surface) or undecayed residues or both.

TABLE 12.—Factor C for mechanically prepared woodland sites

Site preparation	Mulch cover <sup>1</sup>	Soil condition <sup>2</sup> and weed cover <sup>3</sup>							
		Excellent		Good		Fair		Poor	
		NC	WC	NC	WC	NC	WC	NC	WC
Percent									
Disked, raked, or bedded <sup>4</sup>	None	0.52	0.20	0.72	0.27	0.85	0.32	0.94	0.36
	10	.33	.15	.46	.20	.54	.24	.60	.26
	20	.24	.12	.34	.17	.40	.20	.44	.22
	40	.17	.11	.23	.14	.27	.17	.30	.19
	60	.11	.08	.15	.11	.18	.14	.20	.15
	80	.05	.04	.07	.06	.09	.08	.10	.09
Burned <sup>5</sup> . . . .	None	.25	.10	.26	.10	.31	.12	.45	.17
	10	.23	.10	.24	.10	.26	.11	.36	.16
	20	.19	.10	.19	.10	.21	.11	.27	.14
	40	.14	.09	.14	.09	.15	.09	.17	.11
	60	.08	.06	.09	.07	.10	.08	.11	.08
	80	.04	.04	.05	.04	.05	.04	.06	.05
Drum chopped <sup>5</sup>	None	.16	.07	.17	.07	.20	.08	.29	.11
	10	.15	.07	.16	.07	.17	.08	.23	.10
	20	.12	.06	.12	.06	.14	.07	.18	.09
	40	.09	.06	.09	.06	.10	.06	.11	.07
	60	.06	.05	.06	.05	.07	.05	.07	.05
	80	.03	.03	.03	.03	.03	.03	.04	.04

meadow, the selected seedbed soil loss ratio is multiplied by a factor from table 5-D. If mulch is applied, a subfactor read from the upper curve

<sup>1</sup> Percentage of surface covered by residue in contact with the soil.

<sup>2</sup> Excellent soil condition—Highly stable soil aggregates in topsoil with fine tree roots and litter mixed in.

Good—Moderately stable soil aggregates in topsoil or highly stable aggregates in subsoil (topsoil removed during raking), only traces of litter mixed in.

Fair—Highly unstable soil aggregates in topsoil or moderately stable aggregates in subsoil, no litter mixed in.

Poor—No topsoil, highly erodible soil aggregates in subsoil, no litter mixed in.

<sup>3</sup> NC—No live vegetation.

WC—75 percent cover of grass and weeds having an average drop fall height of 20 in. For intermediate percentages of cover, interpolate between columns.

<sup>4</sup> Modify the listed C values as follows to account for effects of surface roughness and aging:

First year after treatment: multiply listed C values by 0.40 for rough surface (depressions >6 in); by 0.65 for moderately rough; and by 0.90 for smooth (depressions <2 in).

For 1 to 4 years after treatment: multiply listed factors by 0.7. For 4+ to 8 years: use table 6.

More than 8 years: use table 7.

<sup>5</sup> For first 3 years: use C values as listed.

For 3+ to 8 years after treatment: use table 6.

More than 8 years after treatment: use table 7.

of figure 6 is multiplied by the residual subfactor to obtain C. When canopy develops, a canopy subfactor from figure 5 is also included.

## SUPPORT PRACTICE FACTOR (P)

In general, whenever sloping soil is to be cultivated and exposed to erosive rains, the protection offered by sod or close-growing crops in the system needs to be supported by practices that will slow the runoff water and thus reduce the amount of soil it can carry. The most important of these supporting cropland practices are contour tillage, stripcropping on the contour, and terrace systems. Stabilized waterways for the disposal of excess rainfall are a necessary part of each of these practices.

The practice of tillage and planting on the contour, in general, has been effective in reducing erosion. In limited field studies, the practice provided almost complete protection against erosion from storms of moderate to low intensity, but it provided little or no protection against the occasional severe storms that caused extensive break-

By definition, factor P in the USLE is the ratio of soil loss with a specific support practice to the corresponding loss with up-and-down-slope culture. Improved tillage practices, sod-based rotations, fertility treatments, and greater quantities of crop residues left on the field contribute materially to erosion control and frequently provide the major control in a farmer's field. However, these are considered conservation cropping and management practices, and the benefits derived from them are included in C.

### Contouring

overs of the contoured rows. Contouring appears to be the most effective on slopes in the 3- to 8-percent range. As land slope decreases, it approaches equality with contour row slope, and the soil loss ratio approaches 1.0. As slope increases, contour row capacity decreases and the soil loss ratio again approaches 1.0.