



## MEMORANDUM

**DATE:** August 31, 2012  
**TO:** Dan Quick, Growth Management Director  
**THROUGH:** Robert Halfhill, Public Works Director  
**FROM:** Roger Lescrynski, Solid Waste Project Manager  
**SUBJECT:** Calusa Green, LLC – Needs Analysis for Landfill

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The County's comprehensive plan, Smart Charlotte 2050, requires the County to provide for a specific level of disposal capacity in the Zemel Road Landfill for each permanent resident of the County.

*MSW Policy 1.1.2 Residential Solid Waste Disposal: The County shall provide for the disposal of no less than 5.0 pounds per permanent resident per day within the County's landfill.*

The need for a new landfill would be based on whether the Zemel Road Landfill could not supply the projected permanent population of the County at the required disposal capacity. Based on population projections, and providing 5.0 pounds per permanent resident per day, the existing permitted disposal cells in the Zemel Road Landfill would not run out of capacity until 2030. Only 128,527 cubic yards (CY) additional capacity would be needed in the year 2030. This information can be found in *Attachment 1*, which is the report from the County's consultant Atkins North America, Inc.

Zemel Road Landfill has in total, 298 acres for landfilling operations. The present permitted landfilling operations is on 108 acres and the area set aside for future expansion is 190 acres. The existing landfill disposal cells are permitted up to 130 feet. The operational permit for this site expires February 15, 2015, and until this year, operational permits were only issued in 5 year increments. This year, the rules were amended to allow FDEP to issue 20 year permits. The County intends to request a 20 year permit and, within that permit application, include the future 190 acres in the permit as construction/operation status and may also request expansion of the height of the existing disposal cells up to 180 feet. Also, the County has proactively sized the

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stormwater facilities and the leachate treatment facility at the Zemel Road Landfill to accommodate the run-off and leachate from the entire 298 acres.

In 2007, Charlotte County contracted with CDM, an engineering firm, to analyze the remaining capacity of the existing Zemel Road Landfill and possible expansion options. The report, *Attachment 2*, estimated possible disposal capacity based on a few parameters, an increase in height and area. The report concluded that the existing disposal capacity, in 2007, was 7,820,000 CY. Opening new cells at an increased height of 310 feet would give an additional 33,942,500 CY disposal capacity. This report is being used by staff to evaluate possible expansion options. The Atkins report uses the 33,942,500 CY to project out the life of the landfill. In the projection, in the year 2050, the landfill could still have 28+ million CY disposal capacity available.

A more recent report, which is done yearly, of just the remaining capacity of the existing disposal cells was completed by SCS Engineers on February 16, 2012. It evaluated the remaining disposal capacity as of 2011. It indicates that the remaining capacity of the existing disposal cells is 4,113,375 CY. The SCS Engineers report is included as *Attachment 3* of this report. Please note that landfill capacity reports examine actual landfill airspace consumption and project the additional available capacity of the permitted cells based on those parameters. The reports are a valuable tool in guiding the operations and capital improvement needs of the Zemel Road Landfill. The reports do not use the 5 pound capacity requirement of the County's comprehensive plan but utilize the 4.2 pound average of actual disposal per person usage of the landfill. Based on the latest Landfill Life report of February 2012, the Zemel Road Landfill under present conditions using the 4.2 pound average has capacity until 2031.

Also, a very important point to note is that none of these reports include an analysis of the amount of space that could be realized through increased efforts in recycling, which would increase the disposal capacity of Zemel Road Landfill.

Zemel Road Landfill Permit Status:

(1) Operational Permit:

The operational permit issued by the Florida Department of Environmental Protection authorizing the operation of a Class I landfill. This permit expires February 15, 2015.

(2) Title V:

Title V is issued by the Florida Department of Environmental Protection, this permit is called the Air Permit which is for emissions. This permit expires July 15, 2015.

(3) Deep Injection Well Permit.

Issued by the Florida Department of Environmental Protection for operation of the deep injection well. This permit expires July 13, 2013.

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7000 Florida Street | Punta Gorda, FL 33950-5714  
Phone: 941.575.3600 | Fax: 941.637.9265

(4) Stormwater Permit:

Issued by the Southwest Florida Water Management District (SWFWMD) for the stormwater system within the boundary of the Zemel Road Landfill for the present and future. This permit went Operational status in 1991.

(5) NPDES Permit

Issued by Florida Department of Environmental Protection for Stormwater discharge associated with industrial activity. This permit expires August 19, 2014.

County staff anticipates submitting for a 20 year Operational Permit for the extension of the landfill operations approximately 6 months prior to the expiration of the permit. This is a typical timeframe for application submittals for extension of a permit.

In summary, the Zemel Road Landfill has present and future capacity to meet the needs of Charlotte County residents.

Attachments: Atkins – 2012 Report  
CDM – 2007 Report  
SCS – 2012 Report

Copy: Richard Allen, Solid Waste Operations Manager  
Inga Williams, AICP, Principal Planner

**PUBLIC WORKS**

7000 Florida Street | Punta Gorda, FL 33950-5714  
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ATTACHMENT 1

Atkins Report - 2012



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August 31, 2012

Mr. Roger Lescrynski, CPPB, CPPO  
Project Manager  
Charlotte County  
25550 Harbor View Road, Suite 2  
Port Charlotte, Florida 33980

**Re: Analysis Review – Private Class I Landfill**

Dear Mr. Lescrynski:

Charlotte County has received an application for planned development rezoning for a private Class 1 Landfill in Charlotte County. The applicant is required to include a needs analysis in accordance with Charlotte County's comprehensive plan – Smart Charlotte 2050 – the Solid Waste section of the Infrastructure element, MSW Policy 2.3.1 Needs Analysis. Atkins has been requested by the County to review the County compliance with the Comprehensive Plan requirements and determine if the applicant's Needs Analysis is accurate.

In accordance with our Scope of Work dated June 29, 2012, the following is our findings on this matter.

**Requirements of the Comprehensive Plan**

The Solid Waste Section of the Infrastructure Element establishes, among others, the following goals, objectives and policies relating to Municipal Solid Waste over the life of the Comprehensive Plan.

MSW Goal 1 sets an acceptable level of service (LOS) for the County's Integrated Municipal Solid Waste Management System. Under this goal is the following relevant policy:

MSW Policy 1.1.2 Residential Solid Waste Disposal stating:

"The County shall provide for the disposal of no less than 5.0 pounds per permanent resident per day within the County's landfill."

MSW Goal 2 sets provisions for safe, effective, and efficient services and facilities for solid waste collection and disposal. Under this goal are the following relevant policies:

MSW Policy 2.1.1 Landfill Maintenance and Operations stating:

"The County shall continue to maintain, expand and operate ZRL to provide for the proper management and disposal of MSW generated with the County, and shall do so in accordance with all applicable Federal and State requirements."

MSW Policy 2.1.3 Landfill Life Report stating:

"The County shall conduct an annual assessment of the volume consumption and develop a projection of useful remaining life at ZRL, and this assessment shall be presented in an annual Landfill Life report."

and, MSW Policy 2.3.1 Needs Analysis stating:

"The County shall require any proposed solid waste disposal facility to prepare a Needs Analysis that supports the added disposal capacity proposed is required in order to service County Residents."

### **Calusa Green, LLC Application for Planned Development Rezoning**

**Project Overview:** The development project proposed is a Class I Landfill and a C&D Solid Waste Management Facility with a capacity for approximately 30 years. In the project overview the Applicant states:

- "Calusa Green will not accept any Class I solid waste generated in Charlotte County unless Charlotte County specifically requests to do so."
- "Like the County Class I landfill at Zemel Road, Calusa Green will receive trash and garbage generated on residential and commercial properties, but will not accept hazardous waste, biomedical waste, or other types of prohibited materials."

**Needs Analysis:** In accordance with MSW Policy 2.3.1 of the Comprehensive Plan, the Applicant has prepared and submitted a Needs Analysis. In reviewing this Needs Analysis we found the following:

- The proper permanent population was used. (Table 8- Population Projections by Age Cohort (2005-2050) by Renaissance Planning Group, 2008.
- The correct waste generation rate was used – 5 pounds per permanent resident per day (MSW Policy 2.1.1)
- The most recent landfill capacity report was not used for their Needs Analysis. Based on the "Remaining Site Life Calculation, 2011, Zemel Road Landfill, Charlotte County Florida", February 16, 2012 prepared by SCS Engineers the remaining capacity of ZRL as of 2011 is 4,113,375 CY, not 4,674,295 CY that was used by the applicant in their needs analysis.
- The most recent data on in-place waste density was not used. The SCS report cited above finds that in place densities are increasing to as much as 2,000 pounds per cubic yard, but recommended using 1,446 pounds per CY, not the 1,263 #/CY used by the applicant in their needs analysis.

### **Zemel Road Landfill Analysis**

**MSW Policy 1.1.2:** The County shall provide for the disposal of no less than 5.0 pounds per permanent resident per day within the County's landfill." Atkins re-calculated the landfill capacity requirements for the 2030 planning horizon and 2050 vision horizon using the latest available data available to the County (See Table 1).

Table 1: Zemel Road Landfill Capacity Projections was developed in the following manner:

The Permanent Population data was taken from "Charlotte County Population Projections 2010 – 2050" from the Comprehensive Plan Update, October 2011.

The Growth Rate (next 5 years) is simply an annual average growth rate calculated between the two reported population 5-year increments.

Annual Waste Disposed (Tons) is based on MSW Policy 1.1.2 that states the County shall provide for the disposal of no less than 5 pounds per permanent resident per day. Therefore, in 2015, you calculate Annual Waste disposed as follows:

$173,594 \text{ permanent population} \times 5 \text{ \#/day} \times 365 \text{ days/year} \times 1 \text{ ton}/2000 \text{ \#} = 158,404.5 \text{ tons/year}$

Annual Air Space Consumed (CY) was calculated using the 11-year average density reported by SCS Engineers in their letter to you dated February 16, 2012 "Subject: Remaining airspace and Site Life Calculation, 2011, Zemel Road Landfill, Charlotte County, Florida". They reported an average density of 1,446 pounds per cubic yard, or  $1,446 \text{ \#/}2000 \text{ \#/ton} = 0.723 \text{ tons per cubic yard}$ .

Remaining Air Space (CY) Existing has a starting point of 4,113,375 CY as reported in the letter referenced above. The new remaining airspace is the difference of the previous year's remaining air space minus the current year's annual air space consumed. There is a positive available airspace through 2028 and a deficit building up year over year after that.

Based on our calculations the ZRL runs out of capacity in 2030, not 2027 as indicated in the Applicant's needs analysis, and is short 128,527 CY in 2030, not 1,148,299 CY as indicated in the Applicant's needs analysis. For the 2050 Planning Horizon, the County is currently short 5,317,168 CY rather than the 7,125,297 CY as indicated in the Applicant's needs analysis.

MSW Policy 2.1.1: The County shall continue to maintain, expand and operate ZRL to provide for the proper management and disposal of MSW generated with the County, and shall do so in accordance with all applicable Federal and State requirements.

The County investigated the opportunities to expand the ZRL to provide additional disposal capacity. The report "Zemel road Landfill Capacity Evaluation, Charlotte County, Florida" prepared by CDM, August 12, 2007 investigates vertical and horizontal expansion of the landfill and found that using the available land and air space 41.2 million cubic yards of additional capacity can be obtained through expansion of the landfill.

MSW Policy 2.1.3: "The County shall conduct an annual assessment of the volume consumption and develop a projection of useful remaining life at ZRL, and this assessment shall be presented in an annual Landfill Life report."

The landfill capacity reports prepared by various County consultants over the years look at actual landfill airspace consumption and project the additional available capacity based on those parameters. Therefore they are a valuable tool in guiding the operations and capital

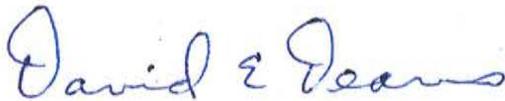
improvement needs of the ZRL and meet the spirit of compliance with the Comprehensive Plan, though not necessarily demonstrating compliance with the planning parameters.

Attachments:

removed  
as  
unnecessary  
information  
JD

1. Calusa Green, LLC Project overview and Needs Analysis
2. Infrastructure – Municipal Solid Waste (MSW) – Goals, Objectives and Policies
3. Smart Charlotte – 2050 Infrastructure Data and Analysis: Solid Waste
4. Charlotte County Population Projections 2010- 2050 prepared for use in the Smart Charlotte 2050 comprehensive Plan Update, October, 2011.

Very truly yours,



David E. Deans, PE, BCEE  
Vice President

Table 1  
Zemel Road Landfill Capacity Projections

<u>Year</u>	<u>Permanent Population</u>	<u>Growth Rate (Next 5 Years)</u>	<u>Annual Waste disposed (Tons)</u>	<u>Annual Air Space Consumed (CY)</u>	<u>Remaining Air Space (CY) Existing</u>	<u>Remaining Air Space (CY) Lateral Expansion*</u>
2010	159,978.00	1,604.0	145,979.9			
2011	161,582.40		147,443.9		4,113,375	
2012	163,186.80		148,908.0	205,958	3,907,417	
2013	164,791.20		150,372.0	207,983	3,699,433	
2014	166,395.60		151,836.0	210,008	3,489,425	
2015	168,000.00	1,700.0	153,300.0	212,033	3,277,392	
2016	169,700.00		154,851.3	214,179	3,063,213	
2017	171,400.00		156,402.5	216,324	2,846,889	
2018	173,100.00		156,402.5	216,324	2,630,564	
2019	174,800.00		157,953.8	218,470	2,412,094	
2020	176,500.00	1,640.2	159,505.0	220,615	2,191,479	
2021	178,140.20		161,056.3	222,761	1,968,718	
2022	179,780.40		162,552.9	224,831	1,743,887	
2023	181,420.60		164,049.6	226,901	1,516,985	
2024	183,060.80		165,546.3	228,971	1,288,014	
2025	184,701.00	1,580.0	167,043.0	231,041	1,056,973	
2026	186,281.00		168,539.7	233,112	823,861	
2027	187,861.00		169,981.4	235,106	588,755	
2028	189,441.00		171,423.2	237,100	351,655	
2029	191,021.00		172,864.9	239,094	112,562	33,942,500
2030	192,601.00	1,479.8	174,306.7	241,088	(128,527)	33,813,973
2031	194,080.80		175,748.4	243,082	(371,609)	33,570,891
2032	195,560.60		177,098.7	244,950	(616,559)	33,325,941
2033	197,040.40		178,449.0	246,817	(863,376)	33,079,123
2034	198,520.20		179,799.4	248,685	(1,112,061)	32,830,438
2035	200,000.00	1,340.2	181,149.7	250,553	(1,362,614)	32,579,886
2036	201,340.20		182,500.0	252,420	(1,615,034)	32,327,465
2037	202,680.40		183,722.9	254,112	(1,869,146)	32,073,353
2038	204,020.60		184,945.9	255,803	(2,124,950)	31,817,550
2039	205,360.80		186,168.8	257,495	(2,382,445)	31,560,055
2040	206,701.00	1,219.8	187,391.7	259,186	(2,641,631)	31,300,868
2041	207,920.80		188,614.7	260,878	(2,902,509)	31,039,991
2042	209,140.60		189,727.7	262,417	(3,164,926)	30,777,573
2043	210,360.40		190,840.8	263,957	(3,428,883)	30,513,616
2044	211,580.20		191,953.9	265,496	(3,694,379)	30,248,120
2045	212,800.00	1,020.2	193,066.9	267,036	(3,961,415)	29,981,084
2046	213,820.20		194,180.0	268,575	(4,229,991)	29,712,509
2047	214,840.40		195,110.9	269,863	(4,499,854)	29,442,646
2048	215,860.60		196,041.9	271,151	(4,771,004)	29,171,495
2049	216,880.80		196,972.8	272,438	(5,043,442)	28,899,057
2050	217,901.00		197,903.7	273,726	(5,317,168)	28,625,331

\* Additional landfill capacity added in accordance with CDM Master Plan letter of August 6, 2007

## CHARLOTTE COUNTY POPULATION PROJECTIONS 2010-2050

This worksheet presents population projections prepared for Charlotte County for use in the Smart Charlotte 2050 comprehensive plan update. These projections are intended to be used as population projections for all Charlotte County uses by all County departments.

*October, 2011*

<b>YEAR</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Permanent Population</b>	159,978	168,000	176,500	184,701	192,601
<b>Seasonal Population</b>	15,615	16,081	16,538	16,943	17,292
<b>Hotel/Motel Population</b>	3,224	3,338	3,444	3,558	3,665
<b>Total Seasonal</b>	18,839	19,419	19,982	20,501	20,957
<b><i>Total Population</i></b>	178,817	187,419	196,482	205,202	213,558
<b>YEAR</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	
<b>Permanent Population</b>	200,000	206,701	212,800	217,901	
<b>Seasonal Population</b>	17,574	17,776	17,909	17,944	
<b>Hotel/Motel Population</b>	3,779	3,885	3,999	4,106	
<b>Total Seasonal</b>	21,353	21,661	21,908	22,050	
<b><i>Total Population</i></b>	221,353	228,362	234,708	239,951	

ATTACHMENT 2

CDM Report - 2007



1601 Belvedere Road, Suite 211 South  
West Palm Beach, Florida 33406  
tel: 561 689-3336  
fax: 561 689-9713

August 6, 2007

Mr. Roger Lescrynski, CPPB, CPPO  
Project Manager  
25550 Harbor View Road, Suite 2  
Port Charlotte, Florida 33980

Subject: Zemel Road Landfill Capacity Evaluation  
Charlotte County

Dear Mr. Lescrynski:

Camp Dresser & McKee Inc. (CDM) is pleased to submit this letter report setting forth our analysis of the Zemel Road Landfill's projected capacity. Provided in this letter report is an analysis of the remaining capacity of the current landfill footprint, the proposed lateral expansion, and a potential vertical expansion of the existing landfill.

### **Background**

The Charlotte County Department of Environmental and Extension Services (County) would like to estimate the remaining capacity of the existing Zemel Road Landfill (Landfill) and the approximate 130-acre adjacent site. The County will use the information in this report for planning purposes.

### **Data Gathering and Evaluation**

The County provided CDM the most recent topographic survey and aerial photograph of the Landfill, along with the proposed limits of the future lateral expansion. CDM used this information to develop a base AutoCAD file and develop a model of the final grades at closure.

### **Volume Calculation**

To determine the capacity, CDM created a computer model using AutoCAD Civil 3D to calculate the volume between the build-out surface and the surface shown on the annual topographic survey provided by the County. Following is a list of assumptions used for the model:

- The slopes were set at a 3H:1V angle;
- Base grade elevation for the model was set at 25' NGVD;
- Fifteen-foot wide bench terraces were set at elevations 80', 130', and 170' NGVD; and
- Final build-out elevation is 310'.

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Mr. Roger Lescrynski, CPPB, CPPO  
August 6, 2007  
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Sheet C-1 shows the current landfill contours (as of the date of the November 24, 2006, survey). Sheet C-2 shows the final contours of the existing landfill's current permitted conditions. Sheet C-3 shows the proposed final grading plan for the future lateral expansion. Sheet C-4 shows the future grading plan for a vertical expansion of the existing landfill. Sheet C-5 shows a cross-section across the landfill and the available volume between the current elevation and the future elevations. Computer software was used to calculate the volume between the existing and proposed surfaces, and the results are shown in Table 1.

**Table 1 Volume Calculation**

Landfill Area	Estimated Capacity (cubic yards)
Current Permit Conditions (Sheet C-2)	7,820,000
Future Landfill Expansion (Sheet C-3)	33,942,500
Future Vertical Expansion (Sheet C-4)	7,251,000

We appreciate the opportunity to provide this letter report to you. If you have any questions or if we can be of further assistance, please contact me at (561) 689-3336.

Very truly yours,

Manuel J. Hernandez, P.E.  
P.E. No. 59796  
Project Manager  
Camp Dresser & McKee Inc.

Kevin C. Leo, P.E., BCCE  
P.E. No. 57520  
Principal Engineer  
Camp Dresser & McKee Inc.

Enclosures

c: Kirk Martin, P.G.

File: 6073-60555-001[1]

Attached drawings were removed *KL*

ATTACHMENT 3

SCS Report - 2012

Environmental Consultants  
and Contractors

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813 621-0080  
FAX 813 623-6757  
www.scsengineers.com

## SCS ENGINEERS

February 16, 2012  
File No. 09211002.05

Mr. Roger Lescrynski, CPPB, CPPO  
Charlotte County Department of Environmental Services  
25550 Harbor View Road, Unit 2  
Port Charlotte, FL 33980

Subject: Remaining Airspace and Site Life Calculation, 2011  
Zemel Road Landfill, Charlotte County, Florida

Dear Roger:

SCS Engineers (SCS) is pleased to submit the attached annual topographic survey of the Zemel Road Landfill (Landfill) and estimates of remaining capacity and life of site, as more fully described below.

The estimated net remaining airspace at this landfill was calculated based on the proposed final contours that were generated by HDR Engineering, Inc. (HDR), dated December 2001, and a 2011 aerial topographic survey performed by Pickett & Associates, Inc., (Pickett). Waste disposal quantities provided by Charlotte County for the period between two surveys (December 2, 2010 and December 5, 2011) were used to estimate the average in-place density of the waste and volume of cover materials for closure.

SCS compared the ground elevations provided in the aerial topographic survey flown by Pickett on December 5, 2011 and the proposed final contours generated by HDR to estimate the gross remaining airspace available for placement of waste material, cover soils, and the closure cap. Please refer to Attachment 1 for the following drawings:

- Aerial photograph of the facility (Sheet 1)
- Existing facility topographic map dated 12/5/11 (Sheet 2)
- Proposed closure contours (Sheet 3)
- Elevation differences between last two topographic surveys (Sheet 4)
- Related cross sections referenced (Sheet 5)
- Yard waste piles and white goods volume calculation drawing (Sheet 6)

## GROSS AVAILABLE AIR SPACE

Comparing the existing topographic survey to the final buildout contours, the gross available air space was estimated to be approximately **4,510,449 cubic yards (CY)**. From the gross available airspace volume, SCS subtracted the approximate airspace consumed by a three-foot final closure cap. A three-foot cap is a conservative closure cap thickness and additional airspace may be available depending upon final closure design (i.e., use of geotextile fabric in lieu of soil for protective layer over waste and under liner). The airspace volume of the closure cap was estimated to be **482,140 CY**.

In addition to the deduction of the closure cap, SCS added in the volume of the numerous piles of temporarily stored materials located on the landfill as they are currently taking up space that in the future will be occupied by solid waste. SCS estimated that approximately **85,066 CY** of yard waste and other items were located on site at the time the aerial was flown. Drawing Sheet 6 shows the temporary pile locations and volumes (net).

Accounting for the three-foot closure cap and temporary waste pile volumes, the net airspace volume available for disposal of waste materials and daily cover soils was estimated to be approximately **4,113,375 CY** as of December 5, 2011.

## POPULATION PROJECTIONS

To estimate the remaining life of the landfill, SCS obtained population projections from the County to project the future waste quantities to be disposed of at the landfill. As shown in Table 1, population projections have been prepared by Charlotte County for use in the Smart Charlotte 2050 Comprehensive Plan Update. These projections are intended to be used as population projections for all County used by all County Departments.

**Table 1. Charlotte County Population Projections, 2010-2050**

Population	YEAR								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
Permanent	159,978	168,000	176,500	184,701	192,601	200,000	206,701	212,800	217,901
Seasonal	15,615	16,081	16,538	16,943	17,292	17,574	17,776	17,909	17,944
Hotel/Motel	3,224	3,338	3,444	3,558	3,665	3,779	3,885	3,999	4,105
Total Seasonal	18,839	19,419	19,982	20,501	20,957	21,353	21,661	21,908	22,050
Total Population	178,817	187,419	196,482	205,202	213,558	221,353	228,362	234,708	239,951

Source: Charlotte County, 2011.

Historically, it is assumed that under normal conditions the quantity of waste disposed of varies directly with the rate of population increase. Due to the hurricane activity that affected

Mr. Roger Lescrynski  
February 16, 2011  
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Charlotte County, the per capita waste disposal rates for 2004, 2005, and 2006 were significantly higher than past years and it can be seen that in 2008-2011 those numbers have subsided and return to previous levels which is expected in the next year (assuming a normal hurricane season).

The calculated 2010 per capita disposal rate of 0.71 tons disposed per capita appears to be in line with what could have been expected if not for the large increases in previous years due to the 2004 hurricanes and subsequent rebuilding. Therefore, we used a nine-year average (2000-2003, and 2007-2011) of 0.75 tons disposed per capita to project waste disposal rates from 2012 until anticipated final closure to calculate the remaining site life.

#### **IN-PLACE WASTE DENSITY**

The in-place density of the waste material and cover soil was estimated by comparing the December 2, 2010 aerial survey flown by Pickett to the most recent survey flown by Pickett (December 5, 2011). Sheet No. 4 of Attachment 1 includes cross sections for a comparison of the two topographic surveys. During the period from December 2, 2010 to December 5, 2011, approximately **155,915 CY** of airspace was consumed by landfilling (fill) activities. This volume difference did not account for non-solid waste piles that were present during the December 5, 2011 survey (**85,066 CY**).

During the same period, County records show that approximately **111,942 tons** of waste was disposed in the landfill. This tonnage and volume consumption yield an approximate in-place density of the waste placed and cover soils deposited into the landfill in 2011 of approximately 2,000 pounds per cubic yard (lbs/CY). Similar to CDM's 2009 and 2010 findings, a comparison of previous surveys revealed a consolidation across the entire landfill, which results in a high net density for the solid waste placed in the landfill last year. Consequently, for the purposes of developing conservative projections of landfill life, an 11-year average (2000-2009 and 2011) density of 1,446 pounds per /CY was used by SCS to calculate the projected volumes that will be landfilled. SCS recommends that trends in population and waste disposal continue to be observed to further refine the landfill life estimate in the future.

#### **ESTIMATED REMAINING DISPOSAL CAPACITY AND SITE LIFE**

The net total available airspace at the end of 2011 was estimated to be approximately **4,113,375 CY**. Based on the projected population of the County, waste disposal rates, and the estimated in-place waste density, the landfill capacity is estimated to provide a site life until around 2031; roughly 20 years of landfill life. Attachment 2 includes the following tables:

- Table 1 – County scale records, 2011;
- Table 2 - Waste disposal projections; and
- Table 3 - Landfill life estimate summary.

Mr. Roger Lescrynski  
February 16, 2011  
Page 4

The estimated life of the landfill will vary depending on factors such as population growth, actual disposal rates, types of material disposed, amount of daily and intermediate cover materials used, the settlement and decomposition of in place wastes, and the in-place density achieved over the operational life of the facility.

We look forward to working with the County on future projects.

Please call us if you have any questions or need additional information.

Sincerely,



Marc J. Rogoff, Ph.D.  
Project Director  
SCS ENGINEERS



Daniel R. Cooper, P.E.  
Project Manager  
SCS ENGINEERS

MJR/DRC

Attachments

**ATTACHMENT 1**

**DRAWINGS**

**ATTACHMENT 2**

**REMAINING CAPACITY VOLUME AND SITE LIFE TABLES**

Table 1 County Scale Records, 2011

SCS ENGINEERS

Client: Charlotte County	Project: Site Life Calculations Zemel Road Landfill	Job No.: 09211002.05
Subject: Scale Records	By: MJR	Date: 2/10/2012
	Checked: DRC	Date: 2/13/2012

Tonnage report 12-02-10 thru 12-05-11

MATERIAL	NUMTICKETS	TOTCOUNT	TOTESTVOL	TOTACTVOL	TOTESTWT	TOTACTWT	TOTAMOUNT
1000	877	0	11901600	0	5980.80	5980.80	101285.60
1005	80	0	0	0	1248.50	1248.50	22879.50
1009	6566	0	112860340	0	56180.17	56180.17	20229.62
1109	60	0	319140	0	159.57	159.57	0.00
1209	3	0	127300	0	63.65	63.65	0.00
2000	10190	1	8630000	0	43400.04	43400.04	166600.54
2001	310	0	1217150	0	308.50	308.50	0.00
2003	45	0	0	0	68.64	68.64	4949.44
2009	25	0	96460	0	48.23	48.23	0.00
2500	24	106	0	0	0.00	0.00	3300.00
2800	186	185	453360	0	226.68	226.68	8165.08
2805	12	12	29640	0	14.92	14.92	1074.24
2809	22	3	0	0	32.79	32.79	0.00
3000	610	0	1270000	0	635.04	635.04	22941.56
3005	14	0	61560	0	39.73	39.73	2218.16
3009	4	0	19820	0	9.91	9.91	0.00
4009	1279	3	10197200	0	5066.64	5066.64	0.00
4119	956	0	34900040	0	17450.02	17450.02	52380.05
4150	392	0	0	0	19225.29	19225.29	127703.48
4209	5	0	163300	0	81.65	81.65	0.00
4300	60	0	50840	0	25.42	25.42	919.24
4305	38	0	35840	0	42.97	42.97	3104.26
4500	7	0	122800	0	111.44	111.44	4021.84
4700	7	0	23220	0	11.61	11.61	1161.00
4809	2022	0	96239120	0	48319.59	48319.59	0.00
5009	505	0	992000	0	491.00	491.00	26466.00
5005	3	0	7920	0	3.71	3.71	432.30
5009	46	0	126780	0	63.59	63.59	0.00
5100	120	432	109600	0	10.10	3.37	864.00
5101	25	117	5850	0	2.98	0.00	585.00
5105	1	5	0	0	0.00	0.00	10.00
5169	3	12	0	0	0.00	0.00	0.00
5509	38	1	147660	0	73.23	73.23	0.00
6000	33	33	62	62	0.11	0.11	168.00
6100	2977	0	7202840	0	3601.42	3601.42	129791.22
6105	21	0	70200	0	35.14	35.14	2530.00
7000	3060	0	6080540	0	3040.27	3040.27	110182.36
7005	5	0	5050	0	4.03	4.03	290.16
7009	170	0	2062340	0	1031.12	1031.12	0.00
7701	367	0	1733720	0	831.85	831.86	0.00
7709	2420	0	38595220	0	19297.61	19297.61	0.00
8009	46	0	23380	0	11.19	11.19	465.56
8009	1	0	850	0	0.43	0.43	0.00
8809	19	0	44720	0	22.36	22.36	0.00
9803	87	0	2545060	0	1272.98	1272.98	0.00
9802	8	0	181120	0	90.58	90.58	0.00

Items highlighted in yellow are materials that at Zemel Road Landfill

Material Cat	Tons
1000	5,980.80
1005	1,248.50
1009	56,180.17
1109	159.57
1209	63.00
2000	43,400.04
2001	608.59
2005	68.64
2009	48.23
2500	0.00
2800	226.68
2805	14.92
2809	32.79
4209	81.65
4300	25.42
4305	42.97
4500	111.44
4700	11.61
6100	3,601.42
6105	35.14
Total	111,941.58

Notes: Categories marked in yellow delivered to Zemel Road Landfill.

Table 2 Population and Waste Disposed Projections

SCS ENGINEERS

Client: Charlotte County	Project: Site Life Calculations Zemel Road Landfill	Job No.: 09211002.05
Subject:  Population and Waste Disposal Rates	By: MRC	Date: 2/10/2012
	Checked: DRC	Date: 2/13/2012

Year	Population Projection <sup>1</sup>	Percent Inc. in Pop. 5-year	Est. Population	Waste Disposed <sup>2</sup> (tons)	Disposal per Capita <sup>2</sup> (tons/person)	Comment
2000	141,627		141,627	110,141	0.78	
2001			144,189	112,832	0.78	
2002			146,751	117,210	0.80	
2003			149,314	130,331	0.87	
2004			151,876	349,563	2.30	See Note 3
2005	154,438	0.09	154,438	196,115	1.27	See Note 3
2006			159,314	188,501	1.18	See Note 3
2007			164,190	161,248	0.98	
2008			169,065	126,452	0.75	
2009			173,941	125,794	0.72	
2010	178,817	0.16	178,817	121,500	0.68	
2011			180,537	111,942	0.62	
2012			182,258	136,749	0.75	See Note 4
2013			183,978	138,040	0.75	
2014			185,699	139,330	0.75	
2015	187,419	0.05	187,419	140,621	0.75	
2016			189,232	141,981	0.75	
2017			191,044	143,341	0.75	
2018			192,857	144,701	0.75	
2019			194,669	146,061	0.75	
2020	196,482	0.05	196,482	147,421	0.75	
2021			198,226	148,730	0.75	
2022			199,970	150,038	0.75	
2023			201,714	151,347	0.75	
2024			203,458	152,655	0.75	
2025	205,202	0.04	205,202	153,964	0.75	
2026			206,946	155,272	0.75	
2027			208,690	156,581	0.75	
2028			210,434	157,890	0.75	
2029			212,178	159,198	0.75	
2030	213,558	0.04	213,558	160,233	0.75	
2031			215,302	161,542	0.75	
2032			217,046	162,851	0.75	
2033			218,790	164,159	0.75	
2034			220,534	165,468	0.75	
2035	221,353	0.04	221,353	166,082	0.75	
2036			223,097	167,391	0.75	
2037			224,841	168,699	0.75	
2038			226,585	170,008	0.75	
2039			228,329	171,316	0.75	
2040	228,362	0.03	228,362	171,341	0.75	

**Notes:**

- 1 Population projections from Charlotte County Smart Charlotte 2050 Comprehensive Plan Update.
- 2 Projected waste disposal quantities and projected per capita rate are shown in italics.
- 3 Consider 2004 through 2006 above average due to hurricane debris disposal and rebuilding materials disposal. The current solid waste disposal per capita figure is 0.62 tons per person. We have taken an average of the per capita rates for 2000-2003 and 2007-2010 to approximate a nine -year per capita rate without Hurricane effects (debris and re-building).
- 4 Nine-year average of per capita rates .

**Table 3 Remaining Landfill Life Calculations**

**SCS ENGINEERS**

Client:	Charlotte County	Project:	Site Life Calculations Zemel Road Landfill	Job No.:	09211002.05	
Subject:	Cumulative Volume/ Remaining Site Life		By:	MJR	Date:	2/9/2012
			Checked:	DRC	Date:	2/13/2012

Year	Projected Population <sup>1</sup>	Waste Landfilled <sup>2</sup> Tons	Waste Volume (CY)	Waste Density <sup>b</sup> (lbs/CY)	Cumulative Total Volume (CY)	Remaining Capacity End of Year (CY)	Note
2000	141,627	110,141	129,449	1,702	129,449	6,431,584	3
2001	144,189	112,832	156,711	1,440	286,160	6,288,875	4
2002	146,751	117,210	158,392	1,480	444,552	5,878,500	5
2003	149,314	115,080	147,257	1,563	591,809	5,702,133	6
2004	151,876	349,563	482,796	1,448	1,074,605	5,112,800	7
2005	154,438	196,115	270,846	1,448	1,345,451	4,878,762	8
2006	159,314	188,501	251,980	1,496	1,597,431	4,759,705	9
2007	161,524	161,248	257,192	1,272	1,854,623	4,674,295	10
2008	163,245	126,452	235,493	1,263	2,090,116	4,438,802	11
2009	162,567	125,794	222,559	1,413	2,312,675	4,216,243	11
2010	178,817	121,500	223,167	2,430	2,535,842	4,371,685	11
2011	180,537	111,942	155,915	1,436	2,691,757	4,113,375	12 and c, d
2012	182,258	136,749	189,131	1,446	2,880,888	3,924,244	
2013	183,978	138,040	190,916	1,446	3,071,804	3,733,328	
2014	185,699	139,330	192,701	1,446	3,264,506	3,540,626	
2015	187,419	140,621	194,487	1,446	3,458,992	3,346,140	
2016	189,232	141,981	196,368	1,446	3,655,360	3,149,772	
2017	191,044	143,341	198,249	1,446	3,853,609	2,951,523	
2018	192,857	144,701	200,130	1,446	4,053,739	2,751,393	
2019	194,669	146,061	202,011	1,446	4,255,749	2,549,383	
2020	196,482	147,421	203,892	1,446	4,459,641	2,345,491	
2021	198,226	148,730	205,701	1,446	4,665,342	2,139,790	
2022	199,970	150,038	207,511	1,446	4,872,853	1,932,279	
2023	201,714	151,347	209,321	1,446	5,082,174	1,722,958	
2024	203,458	152,655	211,131	1,446	5,293,305	1,511,827	
2025	205,202	153,964	212,940	1,446	5,506,245	1,298,887	
2026	206,946	155,272	214,750	1,446	5,720,995	1,084,137	
2027	208,690	156,581	216,560	1,446	5,937,555	867,577	
2028	210,434	157,890	218,370	1,446	6,155,925	649,207	
2029	212,178	159,198	220,179	1,446	6,376,104	429,028	
2030	213,558	160,233	221,612	1,446	6,597,716	207,416	

c. The 2011 filled in waste volume includes the numerous yard waste piles located on the landfill footprint. These piles are not permanent. Deducting the difference in the waste piles volume from December 2, 2010 to December 5, 2010, the gross fill volume in 2010 was:

155,915 CY

d. The volume remaining at the end of 2010, calculated in AutoCADD, was found to be 3,943,243 CY. Adjusting for miscellaneous piles on the site and final cover.

4,510,449 CY - 482,140 CY + 85,066 CY = 4,113,375 CY

**Table 3 Remaining Landfill Life Calculations**

SCS ENGINEERS			Sheet 2 of 2
Client: Charlotte County	Project: Site Life Calculations Zemel Road Landfill	Job No.: 0921T002.05	
Subject:  Cumulative Volume/ Remaining Site Life	By: MJR	Date: 2/10/2012	
	Checked: DRC	Date: 2/13/2012	
<p>Notes</p> <ol style="list-style-type: none"> <li>1. See Table 2.</li> <li>2. Projected waste volumes for year 2007 and beyond are calculated using a five year running average for waste density. <i>Projected quantities shown in italics.</i></li> <li>3. December 31, 2000 remaining landfill capacity estimated by HDR based on the modified closure drawings and February 6, 2001 aerial survey.</li> <li>4. December 31, 2001 remaining landfill capacity (waste and cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on August 6, 2002.</li> <li>5. December 31, 2002 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on February 12, 2003.</li> <li>6. December 31, 2003 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on January 12, 2004.</li> <li>7. December 31, 2004 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on January 31, 2004.</li> <li>8. November 23, 2005 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on November 23, 2005.</li> <li>9. November 24, 2006 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on November 24, 2006.</li> <li>10. November 24, 2007 remaining landfill capacity (waste plus cover soil) was estimated by SCS Engineers based on closure drawings by HDR and aerial survey performed on November 24, 2007.</li> <li>11. Data from CDM landfill capacity reports, February 2008, 2009, and 2010</li> <li>12. The landfill is estimated to reach capacity in late 2030. The increase in life over last year can be accounted for due to increased settlement and the more accurate population projections used for this report. The settlement is evident in the year over year drawings that are part of this report.</li> </ol>			