

**AGENDA**  
**LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION**  
**November 14, 2017**  
**6:30 p.m.**  
**LOUDON COUNTY COURTHOUSE ANNEX**  
**Loudon, Tennessee**

1. Opening of Meeting, Pledge of Allegiance, Invocation
2. Approval of Minutes – October 10, 2017
3. Items of Public Concern
4. Cash Activity Report
5. Operations Report
6. Auditor’s Contract RFP
7. Contract Modification Update
8. Poplar Springs Update
9. Attorney’s Report
10. Chairman’s Report
11. Other Items of Commission’s Consideration
12. Adjourn

**Loudon County Department of Accounts Budgets**  
**Solid Waste Disposal Fund 207**  
**Monthly Cash Report**  
**October 2017**

September 2017 Combined Ending Cash Balance per Monthly Report	3,453,200.64	
Adjustments:	0.00	
	0.00	
Total Adjustments		0.00
<b>Adjusted September 2017 Combined Ending Balance per Loudon Co Trustee</b>		<b>3,453,200.64</b>

**Solid Waste Disposal Commission Operating Fund**

<b>Operating Fund Ending Balance September 2017</b>		<b>3,254,477.55</b>
Cash Receipts:		
Trustee's Collections - Prior Year	0	
Surcharge - Host Fees ( <i>Sep 2017</i> )	13,796.55	
Surcharge - Security Fees ( <i>Sep 2017</i> )	17,245.68	
Investment Income	836.83	
Total Monthly Revenue		31,879.06
Cash Disbursements:		
Board & Committee Members Fees	(350.00)	
Social Security	(6.20)	
Medicare	(1.44)	
Audit Services (Mitchell Emert & Hill)	0.00	
Contracts with Private Agencies (Santek)	0.00	
Engineering Services (Santek)	0.00	
Contributions (Loudon Utilities - Quarterly)	0.00	
Legal Services	0.00	
Legal Notices	0.00	
Other Contracted Services	0.00	
Building & Content Insurance	0.00	
In-Service/Staff Development	0.00	
Trustee's Commission	(137.97)	
Total Cash Disbursements		(495.61)
Expenditure Credit:		
Trustee Commission Adjustment		0.00
<b><u>Operating Fund Ending Balance October 2017</u></b>		<b>3,285,861.00</b>

**Poplar Springs Subfund**

<b>Poplar Springs Subfund Balance September 2017</b>		<b>198,723.09</b>
Cash Receipts:		
Total Monthly Revenue	0.00	0.00
Cash Disbursements:		
Legal Services	0.00	
Total Cash Disbursements	0.00	0.00
<b><u>Poplar Springs Subfund Balance October 2017</u></b>		<b>198,723.09</b>

<b><u>TOTAL COMBINED OPERATING AND POPLAR SPRINGS OCTOBER 2016 BALANCE</u></b>		<b>3,484,584.09</b>
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**Combined Summary - October 2017**

Beginning Balance		3,453,200.64
Plus Operating Revenue		31,879.06
Less Operating and Poplar Springs Disbursements		(495.61)
<b>TOTAL COMBINED BALANCE - OCTOBER 2017</b>		<b>3,484,584.09</b>



# **LOUDON COUNTY SOLID WASTE DISPOSAL COMMISSION**



Loudon County Annex • 101 Mulberry Street, Suite 102  
Loudon, Tennessee 37774

The Loudon County Solid Waste Disposal Commission (“LCSWDC”), the owner of the Matlock Bend Landfill in Loudon Tennessee (the “Landfill”), is distributing a request for proposals to licensed and qualified accounting firms to perform LCSWDC’s annual audit and preparation of financial statements for submission to the Tennessee Comptroller. LCSWDC is an interlocal governmental entity comprised of Loudon County, the City of Loudon, and the City of Lenoir City that was created to manage solid waste disposal in Loudon County. LCSWDC retained Santek Environmental, Inc. to operate the Landfill pursuant to an Operating Agreement that expires in 2027.

The requested services include performing an audit of the statement of net position of LCSWDC as of June 30, 2018 and the related statement of revenue, expenses and changes in net position and statement of cash flows for the year then ended. LCSWDC anticipates that the selected accounting firm will generally perform the following scope of work:

- Meeting with LCSWDC representatives to obtain information regarding the operational and financial performance of LCSWDC;
- Expressing an opinion regarding whether LCSWDC’s financial statements are fairly presented in conformity with GAAP;
- Providing a report on LCSWDC’s internal controls related to the financial statements and compliance with applicable laws, regulations, and contractual obligations;
- Examining, on a test basis, evidence supporting the amounts and disclosures in LCSWDC’s financial statements; and
- Examining LCSWDC internal controls in order to assess the risk of material misstatements of its financial statements.

Respondents should provide the following information:

- A brief description of the proposed scope of work necessary to accomplish the stated objectives
- A fixed cost for performing the requested services
- CV information for selected personnel
- Identification of references (including governmental audit clients)

LCSWDC would request that respondents email their proposals to the following email address no later than \_\_\_\_\_, 2018 at 5pm: [lcswdc@loudoncounty-tn.gov](mailto:lcswdc@loudoncounty-tn.gov)



**LOUDON COUNTY SOLID WASTE  
DISPOSAL COMMISSION**



Loudon County Annex • 101 Mulberry Street, Suite 102  
Loudon, Tennessee 37774

November 14, 2017

County Mayor Rollen "Buddy" Bradshaw  
Loudon County  
100 River Road, Suite 106  
Loudon, TN 37774

Mayor Jim Greenway  
City of Loudon  
P.O. Box 189  
Loudon, TN 37774

Mayor Tony R. Aikens  
Lenoir City  
600 East Broadway  
Lenoir City, TN 37771

**Re: Loudon County Solid Waste Disposal Commission  
Poplar Springs Landfill**

Dear Mayors:

Loudon County Solid Waste Disposal Commission (LCSWDC) understands that the stakeholders have approved retaining a general contractor complete the proposed repairs to the Poplar Springs Landfill (the "Landfill"). As you are aware, LCSWDC is charged with administration of the portion of its funds that were previously deposited by the stakeholders following closure of the Landfill.

Given its responsibility to administer such funds, LCSWDC respectfully requests that it be kept fully apprised of all repair activities at the Landfill and the corresponding expenses. Specifically, LCSWDC would request a copy of the contract executed with the general contractor for the Landfill repairs along with updated records of all project estimates, invoices, and disbursements going forward. Further, LCSWDC would ask that it be kept generally apprised regarding the status of the repairs. Finally, LCSWDC would request information regarding the requested scope of work for monitoring the Landfill for the 10 year period after the repairs are completed and the corresponding expenses for the duration of this period.

Thank you for your assistance in this regard. Please let me know if you have any questions regarding this process.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Field". The signature is fluid and cursive, with the first letter being a large capital 'S'.

Steve Field, Chairman of Loudon County  
Solid Waste Disposal Commission

# LUNA LAW GROUP

ATTORNEYS AT LAW

333 UNION STREET  
SUITE 300  
NASHVILLE, TENNESSEE 37201

A PROFESSIONAL LIMITED LIABILITY COMPANY

TELEPHONE (615) 254-9146  
TELECOPIER (615) 254-7123  
WWW.LUNALAWNASHVILLE.COM

J.W. Luna  
jwluna@LunaLawNashville.com

July 24, 2017

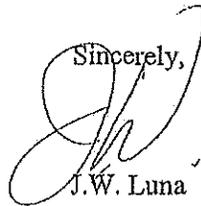
Robert Bowman, Esq.  
Kramer Rayson LLP  
P.O. Box 629  
Knoxville, TN 37901

Re: Loudon County – Poplar Springs Landfill

Dear Bob:

Enclosed please find an invoice for 3 months of services rendered from April 1, 2017 through June 30, 2017 in the above-referenced matter. This Invoice No. 5113-A represents 1/3 of the total of Invoice No. 5113.

If you have any questions, please do not hesitate to give me a call.

Sincerely,  
  
J.W. Luna

/cb  
Enclosure

**Luna Law Group, PLLC**  
333 Union Street  
Suite 300  
Nashville, TN 37201

Phone # 615-254-9146  
Fax # 615-254-7123  
Fed. ID # 26-0009703

Bill To:

Robert Bowman, Esq.  
Kramer Rayson LLP  
P.O. Box 629  
Knoxville, TN 37901

Date: 7/24/2017  
Invoice # 5113-A  
Account # 13-01921

Re: Loudon County – Poplar Springs Landfill

Legal Services Rendered April 1, 2017 – June 30, 2017 \$1,440.00

**TOTAL DUE: \$1,440.00**

SMB  
BB

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July 24, 2017

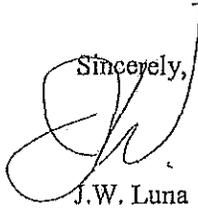
Robert Bowman, Esq.  
Kramer Rayson LLP  
P.O. Box 629  
Knoxville, TN 37901

Re: Loudon County – Poplar Springs Landfill Expert Fees

Dear Bob:

Enclosed please find an invoice for 3 months of expert fees incurred from April 1, 2017 through June 30, 2017 in the above-referenced matter. This Invoice No. 5114-A represents 1/3 of the total of Invoice No. 5114.

If you have any questions, please do not hesitate to give me a call.

Sincerely,  
  
J.W. Luna

/cb  
Enclosure

Luna Law Group, PLLC  
333 Union Street  
Suite 300  
Nashville, TN 37201

Phone # 615-254-9146  
Fax # 615-254-7123  
Fed. ID # 26-0009703

Bill To:

Robert Bowman, Esq.  
Kramer Rayson LLP  
P.O. Box 629  
Knoxville, TN 37901

Date: 7/24/2017  
Invoice # 5114-A  
Account # 15-01941

Re: Loudon County -- Poplar Springs Landfill

Expert Fees Incurred April 1, 2017 -- June 30, 2017

\$3,616.16

**TOTAL DUE:**

\$3,616.16

*BB*

*SM*

Luna Law Group, PLLC  
333 Union Street  
Suite 300  
Nashville, TN 37201

Phone # 615-254-9146  
Fax # 615-254-7123  
Fed. ID # 26-0009703

Bill To:

Joseph R. Ford, Esq.  
Ford & Nichols  
501 Mulberry Street  
P.O. Box 905  
Loudon, TN 37774

Date: 7/24/2017  
Invoice # 5114-B  
Account # 15-01941

Re: City of Loudon – Poplar Springs Landfill

Expert Fees Incurred April 1, 2017 – June 30, 2017

\$3,616.16

TOTAL DUE:

\$3,616.16



Luna Law Group, PLLC  
333 Union Street  
Suite 300  
Nashville, TN 37201

Phone # 615-254-9146  
Fax # 615-254-7123  
Fed. ID # 26-0009703

Bill To:

Joseph R. Ford, Esq.  
Ford & Nichols  
501 Mylberry Street  
P.O. Box 905  
Loudon, TN 37774

Date: 7/24/2017  
Invoice # 5113-B  
Account # 13-01921

Re: City of Loudon - Poplar Springs Landfill

Legal Services Rendered April 1, 2017 - June 30, 2017

\$1,440.00

TOTAL DUE:

\$1,440.00

A handwritten signature in black ink, appearing to be 'J.R. Ford', with a long horizontal stroke extending to the right.A handwritten signature in black ink, appearing to be 'A. Nichols', enclosed within a circular scribble.

# LUNA LAW GROUP

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July 24, 2017

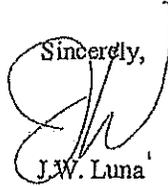
Gregory Harrison, Esq.  
Valliant & Harrison  
800 S. Gay Street, Suite 1650  
Knoxville, TN 37929

Re: Lenoir City -- Poplar Springs Landfill

Dear Mr. Harrison:

Enclosed please find an invoice for 3 months of services rendered from April 1, 2017 through June 30, 2017 in the above-referenced matter. This Invoice No. 5113-C represents 1/3 of the total of Invoice No. 5113.

If you have any questions, please do not hesitate to give me a call.

Sincerely,  
  
J.W. Luna

/cb  
Enclosure

Luna Law Group, PLLC  
333 Union Street  
Suite 300  
Nashville, TN 37201

Phone # 615-254-9146  
Fax # 615-254-7123  
Fed. ID # 26-0009703

Bill To:

Gregory Harrison, Esq.  
Valliant & Harrison  
800 S. Gay Street, Suite 1650  
Knoxville, TN 37929

Date: 7/24/2017  
Invoice # 5113-C  
Account # 13-01921

Re: Lenoir City - Poplar Springs Landfill

Legal Services Rendered April 1, 2017 - June 30, 2017 \$1,440.00

TOTAL DUE: \$1,440.00

*OK!*  
*[Signature]*  
*[Signature]*

LUNA LAW GROUP

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WWW.LUNALAWNASHVILLE.COM

J.W. Luna  
jwluna@LunaLawNashville.com

July 24, 2017

Gregory Harrison, Esq.  
Valliant & Harrison  
800 S. Gay Street, Suite 1650  
Knoxville, TN 37929

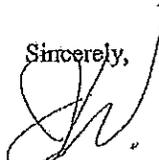
Re: Lenoir City – Poplar Springs Landfill Expert Fees

Dear Mr. Harrison:

Enclosed please find an invoice for 3 months of expert fees incurred from April 1, 2017 through June 30, 2017 in the above-referenced matter. This Invoice No. 5114-C represents 1/3 of the total of Invoice No. 5114.

If you have any questions, please do not hesitate to give me a call.

Sincerely,



J.W. Luna

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Vallian & Harrison  
800 S. Gay Street, Suite 1650  
Knoxville, TN 37929

Date: 7/24/2017  
Invoice # 5114-C  
Account # 15-01941

Re: Lenoir City-- Poplar Springs Landfill

Expert Fees Incurred April 1, 2017 - June 30, 2017

\$3,616.17

**TOTAL DUE:**

**\$3,616.17**

OK  
grupp  
ame

**MEH** MITCHELL EMERT & HILL, P.C.  
CERTIFIED PUBLIC ACCOUNTANTS

October 4, 2017

Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
100 River Road, Suite 106  
Loudon, TN 37774



We are pleased to confirm our understanding of the services we are to provide Loudon County Solid Waste Disposal Commission for the year ended June 30, 2017.

We will audit the statement of net position of Loudon County Solid Waste Disposal Commissions as of June 30, 2017 and the related statement of revenue, expenses and changes in net position and statement of cash flows for the year then ended, including the related notes to the financial statements. Accounting standards generally accepted in the United States of America provide for certain required supplementary information (RSI), such as management's discussion and analysis (MD&A), to supplement Loudon County Solid Waste Disposal Commission's basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic and historical context. As part of our engagement, we will apply certain limited procedures to Loudon County Solid Waste Disposal Commission's RSI in accordance with auditing standards generally accepted in the United States of America. These limited procedures will consist of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we will obtain during our audit of the basic financial statements. We will not express an opinion or provide any assurance on the information because the limited procedures will not provide us with sufficient evidence to express an opinion or provide any assurance. The following RSI is required by generally accepted accounting principles and will be subjected to certain limited procedures but will not be audited:

1. Management's discussion and analysis.

Any additional supplementary information accompanying the financial statements will not be subjected to the auditing procedures applied in our audit of the basic financial statements. Our auditors' report will not provide and opinion or any assurance on this additional supplementary information.

## **Audit Objectives**

The objective of our audit is the expression of an opinion as to whether the basic financial statements are fairly presented, in all material respects, in conformity with U.S. generally accepted accounting principles and to report on the fairness of the supplementary information referred to in the second paragraph when considered in relation to the financial statements taken as a whole. Our audit will be conducted in accordance with auditing standards generally accepted in the United States of America and the standards for financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States of America, and will include tests of the accounting records and other procedures we consider necessary to enable us to express such opinions. We cannot provide assurance that unmodified opinions will be expressed. Circumstances may arise in which it is necessary for us to modify our opinions or add emphasis-of-matter or other-matter paragraphs. If our opinions on the financial statements are other than unmodified, we will discuss the reasons with you in advance. If, for any reason, we are unable to complete the audit or are unable to form or have not formed opinions, we may decline to express opinions or to issue reports, or may withdraw from this engagement.

We will also provide a report (that does not include an opinion) on internal control related to the financial statements and compliance with provisions with laws, regulations, contracts, and grant agreements, noncompliance with which could have a material effect on the financial statements as required by *Government Auditing Standards*. The report on internal control and compliance and other matters will include a paragraph that states that the purpose of the report is solely to describe the scope of testing of internal control over financial reporting and compliance, and the result of that testing, and not to provide an opinion on the effectiveness of internal control over financial reporting or on compliance and that the report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering internal control over financial reporting and compliance. The paragraph will also state that the report is not suitable for any other purpose. If during our audit we become aware that Loudon County Solid Waste Disposal Commission is subject to an audit requirement not encompassed in the terms of this engagement, we will communicate to management and those charged with governance that an audit in accordance with generally accepted auditing standards established by the Auditing Standards Board (United States) and the standards for financial audits contained in *Government Auditing Standards* may not satisfy the relevant legal, regulatory, or contractual requirements.

### **Audit Procedures – General**

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve judgment about the number of transactions to be examined and the areas to be tested. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We will plan and perform the audit to obtain reasonable rather than absolute assurance about whether the financial statements are free of material misstatement, whether from (1) errors, (2) fraudulent financial reporting, (3) misappropriation of assets, or (4) violations of laws or governmental regulations that are attributable to Loudon County Solid Waste Disposal Commission or to acts by management or employees acting on behalf of Loudon County Solid Waste Disposal Commission. Because the determination of abuse is subjective, *Government Auditing Standards* does not expect auditors to provide reasonable assurance of detecting abuse.

Because of the inherent limitations of an audit, combined with the inherent limitations of internal control, and because we will not perform a detailed examination of all transactions, there is a risk that material misstatements may exist and not be detected by us, even though the audit is properly planned and performed in accordance with U.S. generally accepted auditing standards and *Government Auditing Standards*. In addition, an audit is not designed to detect immaterial misstatements or violations of laws or governmental regulations that do not have a direct and material effect on the financial statements. However, we will inform the appropriate level of management of any material errors and any fraudulent financial reporting or misappropriation of assets that come to our attention. We will also inform the appropriate level of management of any violations of laws or governmental regulations that come to our attention, unless clearly inconsequential. Our responsibility as auditors is limited to the period covered by our audit and does not extend to later periods for which we are not engaged as auditors.

Our procedures will include tests of documentary evidence supporting the transactions recorded in the accounts and may include tests of the physical existence of inventories, if applicable, and direct confirmation of receivables and certain other assets and liabilities by correspondence with selected individuals, funding sources, creditors, and financial institutions. We will request written representations from your attorneys as part of the engagement, and they may bill you for responding to this inquiry. At the conclusion of our audit, we will also require certain written representations from you about your responsibilities for the financial statements; compliance with laws, regulations, contracts, and grant agreements; and other responsibilities required by generally accepted auditing standards.

Page 4  
Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
October 4, 2017

### **Audit Procedures – Internal Controls**

Our audit will include obtaining an understanding of Loudon County Solid Waste Disposal Commission and its environment, including internal control, sufficient to assess the risk of material misstatements of the financial statements and to design the nature, timing and extent of further audit procedures. Tests of controls may be performed to test the effectiveness of certain controls that we consider relevant to preventing and detecting misstatements resulting from illegal acts and other noncompliance matters that have a direct and material effect on the financial statements. Our tests, if performed, will be less in scope than would be necessary to render an opinion on internal control and, accordingly, no opinion will be expressed in our report on internal control issued pursuant to *Government Auditing Standards*.

An audit is not designed to provide assurance on internal control or to identify deficiencies in internal control. However, during the audit, we will communicate to management and those charged with governance internal control related matters that are required to be communicated under professional standards and *Government Auditing Standards*.

### **Audit Procedures – Compliance**

As part of obtaining reasonable assurance about whether the financial statements are free of material misstatement, we will perform tests of Loudon County Solid Waste Disposal Commission's compliance with the provisions of applicable laws, regulations, contracts, and agreements. However, the objective of our audit will not be to provide an opinion on overall compliance and we will not express such an opinion in our report on compliance issued pursuant to *Government Auditing Standards*.

### **Management Responsibilities**

Management is responsible for the basic financial statements and all accompanying information as well as all representations contained therein. As part of the audit, we will assist with preparation of your financial statements and related notes. You will be required to acknowledge in the management representation letter our assistance with preparation of the financial statements and that you have reviewed and approved the financial statements and related notes prior to their issuance and have accepted responsibility for them.

Page 5  
Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
October 4, 2017

Management is responsible for establishing and maintaining effective internal controls, including evaluating and monitoring ongoing activities, to help ensure that appropriate goals are met; following laws and regulations; and ensuring that management and financial information is reliable and properly reported. Management is also responsible for implementing systems designed to achieve compliance with applicable laws, regulations, contracts, and grant agreements. You are also responsible for the selection and application of accounting principles, for the preparation and fair presentation of the financial statements and all accompanying information in conformity with U.S. generally accepted accounting principles, and for compliance with applicable laws and regulations and the provisions of contracts and grant agreements.

Management is also responsible for making all financial records and related information available to us and for the accuracy and completeness of that information. You are also responsible for providing us with access to all information of which you are aware that is relevant to the preparation and fair presentation of the financial statements; additional information that we may request for the purpose of the audit; and unrestricted access to persons with the government from whom we determine it necessary to obtain audit evidence.

Your responsibilities include adjusting the financial statements to correct material misstatements and for confirming to us in the written representation letter that the effects of any uncorrected misstatements aggregated by us during the current engagement and pertaining to the latest period presented are immaterial, both individually and in the aggregate, to the financial statements taken as a whole.

You are responsible for the design and implementation of programs and controls to prevent and detect fraud, and for informing us about all known or suspected fraud affecting the government involving: (1) management, (2) employees who have significant roles in internal control, and (3) others where the fraud could have a material effect on the financial statements. Your responsibilities include informing us of your knowledge of any allegations of fraud or suspected fraud affecting the government received in communications from employees, former employees, grantors, regulators, or others. In addition, you are responsible for identifying and ensuring that Loudon County Solid Waste Disposal Commission complies with applicable laws, regulations, contracts, agreements, and grants for taking timely and appropriate steps to remedy any fraud, violations of contracts or grant agreements, or abuse that we may report.

Page 6  
Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
October 4, 2017

You are responsible for the preparation of the supplementary information. You agree to include our report on the supplementary information in any document that contains and indicates that we have reported on the supplementary information. You also agree to include the audited financial statements with any presentation of the supplementary information that includes our report thereon. Your responsibilities include acknowledging to us in the written representation letter that (1) you are responsible for presentation of the supplementary information; (2) that you believe the supplementary information, including its form and content, is fairly presented; (3) that the methods of measurement or presentation have not changed from those used in the prior period (or, if they have changed, the reasons for such changes); and (4) you have disclosed to us any significant assumptions or interpretations underlying the measurement or presentation of the supplementary information.

Management is responsible for establishing and maintaining a process to track the status of audit findings and recommendations. Management is also responsible for identifying for us previous financial audits, attestation engagements, performance audits, or other studies related to the objectives discussed in the Audit Objectives section of this letter. This responsibility includes relaying to us corrective actions taken to address significant findings and recommendations resulting from those audits, attestation engagements, performance audits, or other engagements or studies. You are also responsible for providing management's views on our current findings, conclusions, and recommendations, as well as your planned corrective actions, for the report, and the timing and format for providing that information.

You agree to assume all management responsibilities relating to the financial statements and related notes and any other nonaudit services we provide. You will be required to acknowledge in the management representation letter our assistance with preparation of the financial statements and related notes and that you have reviewed and approved the financial statements and related notes prior to their issuance and have accepted responsibility for them. Further, you agree to oversee the nonaudit services by designating an individual, preferably from senior management, with suitable skill, knowledge, or experience; evaluate the adequacy and results of those services; and accept responsibility for them.

### **Engagement Administration, Fees, and Other**

We will provide copies of our reports to Loudon County Solid Waste Disposal Commission and the Tennessee Comptroller of the Treasury; however, management is responsible for distribution of the reports and the financial statements. Unless restricted by law or regulation, or containing privileged and confidential information, copies of our reports are to be made available for public inspection.

We understand that you intend to distribute copies of the financial statements, with our audit report attached, to the Board of Commissioners of Loudon County Solid Waste Disposal Commission. If you intend to publish or otherwise reproduce the financial statements and make reference to our firm, you agree to provide us with printers' proofs or masters for our review and approval before printing.

Page 7  
Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
October 4, 2017

The audit documentation for this engagement is the property of Mitchell Emert & Hill, P.C., and constitutes confidential information. However, pursuant to authority given by law or regulation, we may be requested to make certain audit documentation available to the Comptroller of the Treasury or his representatives, agents and legal counsel, a federal agency providing direct or indirect funding, or the U.S. Government Accountability Office for purposes of a quality review of the audit, to resolve audit findings, or to carry out oversight responsibilities. We will notify you of any such request. If requested, access to such audit documentation will be provided under the supervision of Mitchell Emert & Hill, P.C. personnel. Furthermore, upon request, we may provide copies of selected audit documentation to the aforementioned parties. These parties may intend, or decide, to distribute the copies or information contained therein to others, including other governmental agencies.

Parties to this engagement agree that any dispute that may arise regarding the meaning, performance, or enforcement of this engagement will, prior to resorting to litigation, be submitted to mediation upon the written request of any party to the engagement. All mediation initiated as a result of this engagement shall be administered by the American Arbitration Association (AAA) and in accordance with the "Mediation Rules for Professional Accounting and Related Disputes" as then adopted by the AAA. The results of this mediation shall be binding only upon agreement of each party to be bound. Costs of any mediation proceedings shall be shared equally by both parties.

As a result of our services to you, we may be required or requested to provide information or documents to you or a third-party in connection with a legal or administrative proceeding (including a grand jury investigation) in which we are not a party. If this occurs, our efforts in complying with such requests or demands will be deemed a part of this engagement and we shall be entitled to compensation for our time and reimbursement for our reasonable out-of-pocket expenditures (including legal fees) in complying with such requests or demands, and will render additional invoices for the time and expenses incurred. This is not intended, however, to relieve us of our duty to observe the confidentiality requirements of our profession.

Our fee for these services will be \$7,975. Our invoices will be rendered as work progresses and are payable upon presentation. Should Loudon County Solid Waste Disposal Commission expend more than \$750,000 of federal funds during the year, the fee will increase by \$1,500 for the additional work required to have the audit comply with the requirements of Title 2 U.S. Code of Federal Regulations Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance). This fee is based on anticipated cooperation from your personnel and the assumption that unexpected circumstances will not be encountered during the audit. If significant additional time is necessary, we will discuss it with you and arrive at a new fee estimate before we incur the additional costs. Amounts not paid within 30 days from the invoice date will be subject to a late payment charge of 1.5% per month (18% per year). If for any reason the account is turned over to an attorney for collection, an additional charge of 33.33% will be added to cover collection costs.

Page 8  
Steve Field, Chairman  
Board of Commissioners  
Loudon County Solid Waste Disposal Commission  
October 4, 2017

We appreciate the opportunity to be of service to Loudon County Solid Waste Disposal Commission and believe this letter accurately summarizes the significant terms of our engagement. If you have any questions, please let us know. If you agree with the terms of our engagement as described in this letter, please sign below.

Best regards,

MITCHELL EMERT & HILL, P.C.



Richard W. Hill, CPA  
Director

RESPONSE:

This letter correctly sets forth the understanding of Loudon County Solid Waste Disposal Commission.

Signature: Stephen M. Field

Title: Chairman, Loudon County Solid Waste Disposal Commission

Loudon County Solid Waste Commission  
Fiscal Year 2017

Budget or Estimated

**Revenue:** \$ \_\_\_\_\_

**Total Operating Expenses:**

Salaries and wages:

Board of Commissioners compensation \$ \_\_\_\_\_

**Contracted Services:**

Legal Services \$ \_\_\_\_\_

Trustee Commission \$ \_\_\_\_\_

Investment Expenditures \$ \_\_\_\_\_

Accounting and Auditing \$ \_\_\_\_\_

City of Loudon Debt \$ \_\_\_\_\_

Conferences \$ \_\_\_\_\_

Travel \$ \_\_\_\_\_

Insurance \$ \_\_\_\_\_

Newspaper Advertising \$ \_\_\_\_\_

Miscellaneous \$ \_\_\_\_\_

## Editor's Comments: Ripple Effect

Posted By *Arturo Santiago* On October 19, 2017 @ 6:00 am In Editorial | [No Comments](#)

A ripple effect has already begun since waste officials in China announced to the World Trade Organization (WTO) in July that they would no longer be accepting various solid waste and recycling materials at the end of the year. Those ripples can be seen from Hong Kong to mainland China and to the Pacific Northwest.

According to Reuters, massive amounts of paper waste are piling up on Hong Kong's docks, and a small fleet of cargo ships filled with paper meant for recycling has been waiting in limbo in local waters. China's system for dealing with the paper began stumbling almost immediately after filing with the WTO that it would no longer be importing 24 types of solid waste.

The news report says, "Each day in Hong Kong, 2,500 tons of fresh paper waste is piling up with no place to go, according to Jacky Lau, director of Hong Kong's main recycling business association.

"We started our business 50 years ago and we have never experienced such a crisis," Lau said, saying the industry was losing HK\$2.7 million (\$346,000) daily."

FREE Infographic on Landfill Management: 6 Tips for Excellence in Landfill Operations. [Covering publicity, education, engineering, long-term planning, and landfill gas waste-to-energy](#) [1]. Download it now!

Prices for finished paper out of China have doubled. Have you ordered something from Amazon lately? Guess where most of its cardboard boxes come from? China.

The world's largest shipper of containers, Maersk, says there's been a marked decline in waste cargo into China.

Oregon Public Broadcasting (OPB) says the ripples are being felt in the Northwest.

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"By the end of the year, much of the mixed plastic and paper in our recycling bins will be banned from China. That leaves companies in the Northwest without buyers for much of the material they collect from curbside bins, which could mean our recyclables will end up in a landfill. Peter Spendelow, a natural resource specialist with the Oregon Department of Environmental Quality, said the loss of Chinese buyers is a major disruption in the recycling market. It's unclear where all the paper and plastic will go instead. 'We've seen markets go up and down before, but this is big,' he said. 'When the major buyer cuts out with almost no notice—it's going to be a struggle for a while. There's just no way around it.'" – OPB

While I was at WasteCon/ISWA World Congress in September, I had a long conversation with John Bradburn, the global manager of waste reduction at General Motors. Bradburn leads more than 150 GM groups around the world to recycle, reuse, and convert waste to energy from daily operations. He's also one of the founders of Reuse Opportunity Collaboratory Detroit ([rocdetroit.org](#) [3]), a nonprofit organization that brings together companies and programs so they can reuse each others' waste materials.

His presentation to the conference emphasized the need for new, creative, domestic solutions to reprogram what we traditionally view as waste management and recycling.

We're running out of time to do just that, as we could very soon be facing a tsunami of China-rejected waste. Right now, more than ever, we need a few game-changing ideas that can be the "stone tossed into a pond" that creates our own ripple effect across the global waste and recycling industry. **MSW**

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[2] *MSW Management Weekly*: <https://foresternetwork.com/account/>

[3] [rocdetroit.org](http://rocdetroit.org): <http://rocdetroit.org>

# The Selection Process

Posted By *Barbara Hesselgrave* On October 19, 2017 @ 6:26 am In Waste Collection | [No Comments](#)

When municipalities face the demands of projects that are typically out of their scope of work, they turn to outside consultants to help them reach their objectives. These goals can span the range from enormously challenging, such as coping with natural disasters, to assistance in day-to-day administration, writing new ordinances, analyzing trash routes, and everything in between.

Long gone are the days when organizations selected outside business partners on the whim of management, or to fulfill the insistent wish of relatives to find a family ne'er do well gainful occupation. For decades, both vendors (the consultants) and their clients (the municipalities) typically enter the waters of their relationship through formal protocols of Request For Information (RFI) and Request for Proposals (RFP) that are essentially the roadmap "to explore how they can work together to create something that doesn't yet exist."

FREE Infographic on Landfill Management: 6 Tips for Excellence in Landfill Operations. [Covering publicity, education, engineering, long-term planning, and landfill gas waste-to-energy](#) <sup>[1]</sup>. Download it now!

In the era of increasing transparency, relationships between municipalities and outside partners have been streamlined toward fairness, ability, capacity, and, of course, budget. But while electronic communications and online documents are designed to foster these benefits and improve processes, the common denominators of a good client-consultant relationship repeatedly echoed by all still emphasize the personal touch: good communication, willingness to dialogue and be flexible, and listening, listening, listening—on both sides of the table.

## Getting What You Want And Didn't Know You Needed

"We are very transparent," says Tony Miano, deputy Public Works director of Field Operations for the City of Tempe, AZ.

"We go out and do an RFP Master Plan Process and follow the rules through purchasing, and we make sure we follow our guidelines so we're not hiring our relations or a company that can't meet the scoping guidelines.

"Plus, we ensure we are consistent with all the competitors and once we go through the interview process and we select the candidates, our committee chairperson who is the contact liaison makes sure that literally what we want is what they are going to provide for us."

Miano says that prior to hiring a consultant, there is a process of first preparing the case of need, budgeting for the consultant, and then taking that to City Council for adoption.

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"We look at what our revenue requirements are, we have different customers with recycling, waste diversion, organics, and different functions with the solid waste team. We develop a pricing matrix and then the Council approves the dollars for what we want and need to do. Our diversion goal is to be at 40% by 2020, so we have a lot of programs to strive toward getting us there.

He adds that they go put out an RFP that describes the scope of work. "And we describe what we are trying to achieve and then when responses come in, our team of all our different disciplines reviews these and each one grades it with a score. Then, based on the score, we work together and negotiate a contract."

The role of consultants, Miano says, is to supply the staff time and expertise "that you may not have internally." And it lends objectivity and a set of skills "to help you get ordinances passed, for example, and to comply with the legal requirements of grants when we receive project funding."

In one example, Miano cites how they used consultants "to help me redistrict the garbage collection. We found we were overloaded with work and vehicles in one area, and we had to streamline this by spreading out the operation and looking at improving efficiencies at the transfer stations and throughput in our fleet shops."

Consultants also helped with the master planning of asset maintenance program to replace sewers.

"Tempe is a suburb of Phoenix but we are much older than most suburbs in the surrounding valley; we have some infrastructure from the 60s and 70s still out there. So, being landlocked, it's a problem to have streets torn up during an extensive sewer/water replacement project. We had a consultant work with us to look at all our treatment plants, all of our schedules, and how many miles of sewers/water lines that need replacing, and the service to create a master plan.

"We do the same thing with rate increases by having consultants help us analyze our billing process, our costs over a ten-year period to plan for increases so that customers aren't suddenly surprised by a new, huge utility bill. They can dig into your numbers and help provide that mastery to help you talk about your systems, your efficiencies, and how to best plan for the future."

He adds it is also nice "to see how you compare to other cities that the consultant works with, just to see if you meet or exceed industry standards."

The best consultants, he says, are the ones who have the capacity to get the job done and who bring information to the table that you may not have considered, and who have the patience to work with a diverse group with many expectations and views.

"If you are running your business correctly, you are asking them to find the little holes, not the big gaping ones. I use them to fine-tune my operation and provide skill sets and expertise to do what we aren't able to do here. If they are finding big holes in your business model, you have other issues."

But the success of the partnership isn't the sole onus of the consultant. "You only get out of it as much as you put into it," explains Miano.

"You need a good administrator on the client side who will hold them accountable for deliverables, and it is essential you write a good scope of information so that everyone knows what the objectives are. And you need to spend time with the applicant during the interview process to see if it's going to be a good working relationship. In that personal encounter, you can learn if they supply the expertise, whether you feel they have the capacity to do what you need or to hire subcontractors with specific skills, and also to keep within the timeframe to meet milestone dates. Listening, on both sides, is essential."

And Brett Wolfe, the waste sector director of HDR Inc., echoes the collaboration in vision as essential for the consultant/client partnership.

### **Bridging Vision to Action**

"HDR is a full-service firm providing engineering, architecture, environmental, and construction services for the built environment and we have a broad range of public and private clients we work with.

"I think that what works from a consultant perspective like ours is that we have a trusted advisor relationship. They know we are looking out for their interests and we sit at the same table to discuss challenges to their waste systems."

Wolfe describes their role as one of serving as a partner "to get from point A to point B. And, if they view us as more than an engineer providing those design services, we are well poised to do much more."

"For example, we can help them manage risk as they are working with subcontractors who are building landfills for solid waste, and make sure they meet regulatory compliance issues."

He says it's not unusual for clients to feel like they are on shaky ground. "They don't often know exactly what they want which is part of our responsibility—to communicate the vision, and then, get them to partner with us to explore how to move forward to where they want to be."

"We encourage cross communications to explore the possibilities. These can be brainstorming workshops, or a design charrette to see what ideas emerge. Of course, this isn't always applicable as some clients do know exactly what they want, but it is our job to maximize the potential of opportunities and help them realize the full benefit of the projects."

The company also does remediation for hazardous waste, and it has the expertise for Superfund cleanup sites and also in developing sustainability for environmental protection.

"We look at our client fees as not just our payment for service, but their investment in the work that ultimately compares very favorably with what we will be saving them. And this is a factor many clients don't often consider, 'if we do A project now, we will be saving B dollars later as a result.'"

He adds that they assist with engineering permitting and help clients in costing out the job, plus they have a large effort towards supporting greenhouse gas reduction, performing carbon footprint studies so that projects will have a lower carbon footprint, and "are very engaged in maximizing the use and repurposing of waste streams."

"Taking the waste and showing clients how to use advances in traditional recycling for biogas, or electricity, or some other use, helps them create a revenue stream they may not have considered."

The company has more Envision-certified staff than any other consulting firm doing this type of work. Wolfe explains this certification is the "equivalent to a LEED certification for the non-vertical environment work on sustainability."

Envision was developed by the not-for-profit Institute for Sustainable Infrastructure, who says it is their "mission is to help communities build more sustainable infrastructure projects. Our nonprofit organization was created for a single purpose: to develop and maintain a sustainability rating system for all civil infrastructure."

"Provided at no cost to practitioners, Envision is a plain-language guide that combines a best practices library, field-proven checklists for infrastructure projects of every size and type, and a comprehensive sustainability rating system that helps infrastructure owners gain recognition for their well-planned and executed projects."

The organization says there is no cost to help people plan their projects, but there are costs involved if you pursue third-party verification.

Wolfe adds that everyone today is "looking at their waste composition; there is a lot of planning toward some form of energy conversion. We've invested in the expertise to provide planning activity toward that end for our clients, and we can offer capabilities to help them look at how to divert waste, and still keep revenues. We're looking at pricing structures that are basically reinventing the waste programs, and also asking clients the question, 'Where do you want to be 20 years from now?' This is crucial to defining strategies for environmental policy planning, and finding sustainable means to ensure municipalities have a consistent and favorable

revenue stream.”

With HDR services in several countries, Wolfe sees the changes in waste management with a global perspective. “The future of waste today is very different than that of the past and we’re here to help achieve those goals.”

### **A Six-Story Football Field**

Hurricane Katrina of 2005 is forever in the minds of everyone who lived through it. For the rest of us, it was a catastrophe of epic proportions that unfolded across every media channel in an hour-by-hour drama. While New Orleans was often the focal point of headlines and images, it was in fact, nearby Biloxi, MS, that incurred unprecedented levels of structural damage.

Public relations specialist Cecilia Dobbs Walton from the City of Biloxi recalls today, 11 years later, how the “flood waters came in and then drained out of New Orleans, and of course, it was terrible in human tragedy, but here it was a somewhat different story.

“We had an ongoing high tide at landfall, and the storm surge that developed from the wind driving the water inland took out entire streets. It picked up buildings that then floated downstream acting as huge missiles that took out other buildings. What we lost in structure—those historic buildings can never be replaced. The roads, beaches, and other buildings can and are being rebuilt, but the others are just lost to history,” affirms Walton.

Few municipalities will ever face a crisis of this magnitude, which only underscores the valuable role consultants made in helping Biloxi with its massive cleanup that has been quantified as a “football field six stories high of collected storm debris.”

As the weather experts mounted increasingly severe warnings of the impending storm severity, employees with the City of Biloxi Engineering were working with administrators throughout the city and state to line up assistance to help them when it was over. Contracts and funds had been arranged and consultants were in place, ready to perform the cleanup of what proved to be an unimaginable amount of debris.

Tonya Hebert, the FEMA Coordinator in the City of Biloxi Mayor’s office, says, “The City of Biloxi puts out an RFP [Request for Proposal] for emergency debris pickup, which also includes services for debris monitoring; the main debris efforts were completed by August 2006.”

Hebert explains that monitoring means keeping track of what you are picking up, where it came from, how much of it there is, and then where is it going for disposal.

“You need to have these statistics and information in order to be reimbursed by FEMA for these services,” explains Hebert. The total cost, which covered activity over nine separate categories, was just shy of \$62 million to move out and dispose of the six-story football field of post-storm debris.

This figure did not include two projects that Hebert says “were initially Category A Debris Removal FEMA Projects, but were then re-allocated as a general project because of the time frame, and done later.”

Also, Hebert says the two cement piers that had been destroyed had to be demolished by the City, who then took the cement debris and sent it out to a “Katrina Reef.”

Biloxi City engineer Christy LeBatard says that the waste management is handled by a county-wide government agency called the Harrison County Utility Authority (HCUA) and not by the municipalities.

“So it is this group that is responsible for collecting and disposing of solid waste in the county, which includes the City of Biloxi.”

LeBatard describes how the HCUA guides the plans for using consultants to help tackle issues such as ongoing infrastructure needs, as well as future concerns like climate change and sea level rise.

“The City has a master plan currently being designed by a consultant in order to help prioritize future public works projects in areas currently without sewer and drainage. In other areas, the City sees a need with a water/sewer/drainage issue and then brings a consultant on board to design a project to fill that need.”

She says that through the RFP/RFQ process, consultants are contracted using either a lump sum contract or an hourly not-to-exceed contract, “but there are times when consultants are contracted with directly, instead of going through those formal processes. But this is usually based on our experience with them with a specific project, such as designing phase II.”

LeBatard adds that state law does not allow engineer selection to be based on costs and that they must be retained based on qualifications, with costs negotiated after selections.

“The City doesn’t consult with any solid waste type consultants or contractors as that is handled by HCUA, but we do hire engineers and architects.”

Nonetheless, sometimes the best-laid plans have to be modified. Hebert says that one of their pre-event contractors they had on hold for Katrina cleanup was unable to handle the enormity of the subsequent hurricane debris, and while they did help out in the initial 72-hour push, “such as clearing roads for emergency vehicles, we then got submittals from various engineering firms for the



Credit: Cornerstone  
Optimizing airspace with mechanically stabilized earth berms

debris monitoring and to help us put together the information we would need in order to obtain contractors to clear the debris.

"In the end, we used five or six different contractors for the job. In the case of doing work for FEMA reimbursement, we have to go with the lowest cost in order to comply with their regulations and get paid."

But the FEMA reimbursements were a bit of a snarl of red tape when it came to historic properties, recalls Biloxi's director of community development, Jerry Creel.

"We got the City Council to vote to declare a state of emergency that allowed us to put our measures in place before the storm, as we knew there was going to be a lot of debris needing to be removed and properly disposed of."

When you have a declaration of emergency, the City "can execute contracts with engineering firms that will assist us," says Creel, but "One of the things that surprised me—and keep in mind there are several branches of this agency—FEMA first told us if you want to get reimbursed, you have to hurry up and get this debris out of there so you can be eligible for the funds.

"But then, the historic branch of FEMA stepped in and said, hold on, before you move anything, you have to submit a form for anything 50 years or older. Any demolition or removal or alternations need to be approved by the historic branch of the agency.

"We were trying to get the streets opened and this was a snag in the process as Katrina took out the whole lower end of the city, the section that is on the peninsula on the east end of Biloxi."

It all worked out, Creel says, but it was something of a nail-biter as they were told to hurry up, but then to stop and do more forms, and then wait for those approvals.

"We had to make sure we didn't do anything that would upset the process with FEMA, but this is bit of red tape that they could probably modify, given the circumstances and crucial timing to restore some level of public safety for police, fire, and other first responders in this type of disaster."

When the City puts out an engineering RFP, Creel says the engineering staff at the City then decides who most closely meets the specification, citing several criteria. "For one thing, we look at the number of years the staff who is actually going to be doing the work has been with the company. Then we look at their capacity. In the case of Katrina, we had to make sure they had the capacity and resources to cover a project this large.

"But I'll tell you, it's a close call on several occasions; sometimes, it just comes down to the judgment of the City engineer, who ultimately knows who is going to do the best job for us."

#### **A Primer of Client Guidelines**

At Cornerstone Environmental Group, LLC, a Tetra Tech Company, business development director Mark Swyka says that "Roughly half of our work is in support of projects for municipal agencies."

He adds that within the arena of environmental services that the company offers, "a large percentage of our professionals specialize in the area of solid waste, recyclable materials, and organics management."

Swyka offers a range of important criteria that clients should consider when looking for partners to fulfill their municipal project needs.

"First, are you comfortable with the consultant's representative? Does that individual or project team have a proven track record for addressing projects that are similar to yours?"

"Then, does the consultant clearly demonstrate that they have your best interests at heart? Do they look you in the eye? Take time to evaluate your needs? Will they tell you the truth even if they know you probably won't like it?"

Finally, Swyka says that when consultants are upfront, they admit that the work is outside of their scope of expertise, and offer to recommend someone better suited to the job, it is a good hallmark of credibility.

Another suggestion he advances is to ask the consultant to cite other projects similar to the one under consideration and describe how administrative, technical, and regulatory hurdles were managed.

Choosing the right engineering partner for your project "should never be based upon an estimated fee," Swyka cautions, adding that "All too often, the pressures to reduce the amount of a fee estimate results in the avoidance or elimination of the time necessary to fully consider each of the important aspects of a project.

The possibility that "too many good consultants can be compromised in this way" results in the project reducing the scope of service or eliminating time that otherwise would be a crucial factor to the best outcomes.

"I learned very early in my career that the short way is the long way—essentially meaning that when shortcuts are taken that are not fully thought-out, they can easily compound into problems that result in project delay and additional cost," says Swyka.

On the municipal agency side, he emphasizes the responsibility on their end to communicate and to hold regular dialogue as essential.

"As a consultant, we need to know what the agency is thinking so we can provide the best guidance. At the same time, we can bring in fresh ideas from outside the agency to solve current problems, as well as help them avoid future problems in their operations."

Swyka cites the current push in the industry that encourages an increase of waste segments toward recycling or conversion pathways, with organics as a primary focus of that path. He says Cornerstone's expertise in this area is well poised to offer clients the approaches best suited to their needs to initiate or modify their organics programs.

And as technologies continue to develop, "There is a need for expanded landfill disposal capacity and optimization of the airspace volume of existing landfills. This is where our expertise in MSE's [mechanically stabilized earth] berms have proven to be an excellent solution over the existing footprint."

While there may be a tendency to view municipalities as less forward-thinking than private clients, Swyka counters the notion.

"I am not sure that municipal agencies differ from any one of us when it comes to making the decision to enter into a new venture or stay the course with existing programs and systems. After all, these agencies are made up of people just like you and me. My sense is that this comes back to the dialogue element mentioned earlier.

"When we are talking, sharing ideas, and legitimately looking for the best long-term solution, the course of action usually becomes pretty obvious for all concerned."

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According to reputable historical sources, the first recorded use of "red tape"—the term familiar to all bureaucracies—may first have appeared in the late 1600s. In the 1696-1717 *Maryland Laws*, a description states, "*The Map upon the Backside thereof sealed with his Excellency's Seal at Arms on a Red Cross with Red Tape.*" Indeed, the rolled-up map was sealed with a red tape. However, centuries ago, tape was synonymous with ribbon or binder, not the sticky sealant we know it as today.

But the penchant to "tie up any and all documents" quickly led to spoofing of unnecessary bureaucracy, and it wasn't long before the noun "red tape" took on a satirical meaning as an action adverb. Despite the fact that the tape is long gone, and electronic transactions are ostensibly simpler and easier, the moniker persists today and reflects the same sentiment of frustration and obstruction to fulfilling a task. Which, 300 years later, is probably an interesting insight on "progress" in handling documents.

## **MSW**

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# Project Profile: The Conversion Process

Posted By *Jim McMahon* On October 19, 2017 @ 7:10 am In Project Profile | [No Comments](#)

The production of biomethane as a fuel, and digestate as an organic fertilizer, through the process of anaerobic digestion, plays a critical role in the efforts to realize both environmental and economic benefits. Conversion of biowaste to energy and usable digestate is a movement away from wasted resources and towards the utilization of waste as a usable resource. The process not only decreases the volume of waste; it also saves natural resources such as land and water.

It makes a contribution to long-term environmental and climate protection efforts by reducing carbon dioxide (CO<sub>2</sub>) emissions, and by reducing the need for natural gas through drilling, thereby offsetting fossil carbon emissions. It also protects the air and climate because it reduces the greenhouse gases coming from the landfill. Such a process effectively delivers a closed and environmentally friendly carbon cycle.

Anaerobic digestion is a multi-step biological process with four fundamental steps that include hydrolysis, acidogenesis, acetogenesis, and methanogenesis. Throughout this entire process, large organic polymers that make up biomass are broken down into smaller molecules by microorganisms. Upon completion of the anaerobic digestion process, the biomass is converted into biogas, namely methane (CH<sub>4</sub>) and carbon dioxide, as well as into digestate—liquid and solid.

To feed the anaerobic digestion process, organic waste in the form of lawn and tree cuttings, and food waste, such as fruit and vegetable waste, is recovered as source segregated organic (SSO) waste. When households or restaurants produce organic waste, it is collected separately from residual waste.

This ensures that the SSO does not come into contact with any contaminants that might be in the residual waste. In addition to the production and collection of biomethane, the anaerobic digestion process recovers and recycles the nutrients contained in this organic material. From the produced digestate, top-grade solid compost is produced, which is made available to nurseries, farmers, and market gardens. The process also produces liquid digestate, which is distributed for agricultural use as a certified organic liquid soil conditioner.

## Continuous Dry Anaerobic Digestion

Although a number of processes can be employed to produce biogas, as well as solid and liquid digestate within an anaerobic environment, one approach in particular provides the most efficient method for the production of biomethane. That process is continuous dry anaerobic digestion, which is capable of producing the highest biogas yield from organic input material. One of the most efficient of these processes is Kompogas continuous dry anaerobic digestion, developed by Hitachi Zosen Inova, a global Engineering, Procurement, and Construction (EPC) contractor for thermal and biological energy-from-waste (EFW) plants. Understanding how Kompogas functions gives critical insight into the unique advantages of continuous dry anaerobic digestion for the production of biomethane, and solid and liquid digestate for nutrient-rich fertilizers.

Uniquely different from other anaerobic digestion processes, due to the plug flow, the Kompogas digester creates an extremely efficient microorganism environment. This separates and optimizes the different steps of biomass degradation throughout the process much more effectively than conventional anaerobic digestion, making for very stable microbiology inside the reactor. The process recirculates approximately one-third of the digestate, rich in thermophilic microorganisms, from the output and back up front into the digester to activate and accelerate the anaerobic digestion process of the fresh material fed into the digester. This allows a perfect adjustment of the hydrolysis and acidogenesis rate in the digester feeding section and facilitates high bioprocessing efficiency within the system. Conversely, with conventional anaerobic digestion, the key steps of hydrolysis, acidogenesis, acetogenesis, and methanogenesis are completely mixed. Each step takes place at the same time and at the same place in the digester. This does not permit optimum conditions for the microorganisms to digest the organic material.

If required, additional process water creates the optimal consistency for decomposition, with humidity residing around 70%. A specially developed heating system regulates the temperature during processing at 131°F (55°C). The thermophilic microorganisms decompose the organic matter and produce carbon-neutral biogas.

An anaerobic digestion retention period of 14 days at 131°F (55°C) and the plug flow ensure that spores and bacteria are eliminated. The digestate is completely sanitized during processing, and the biogas potential is fully exploited by the time the substrate comes out of the digester; hence, the system does not require any upstream pasteurization, compared to other solutions.

After receiving biomass into a Kompogas plant, the organic waste undergoes a pre-treatment process before entering the digester. To prepare for anaerobic digestion, a shredder chops the organic matter into small pieces which then are sieved to a maximum particle size of about 2 inches to remove impurities such as stones, plastics, and metal. The prepared biomass is then automatically conveyed to the digester feed-in point.



The Kompogas process is based on using a horizontal plug-flow digester. The

organic material is transported inside the digester, with the material moving horizontally through the system by feeding on the inlet side and discharging on the outlet side. A slowly-turning agitator ensures that the substrate is optimally mixed within the digester, and the biogas bubbles are permitted to vent for a high-yield formation of methane. This facilitates the biological strength of the Kompogas anaerobic environment, enabling it to make maximum use of the organic waste's energy potential.

BioMethan separates the CO<sub>2</sub> and upgrades the CH<sub>4</sub> to natural gas quality.

Once through the Kompogas dry anaerobic digestion processes, digestate is separated into a solid and a liquid phase. The solid digest can be treated further to produce high-quality compost that is utilized as organic fertilizer. Similarly, the liquid digestate is collected for use within the digester and as organic fertilizer. Liquid digestate-free organic waste treatment technology can also be implemented. Here, the digestate is mixed with shredded green waste and coarsely structured sieved fraction from the composting process. The mixture then undergoes an intense two-week closed-tunnel composting process. This aerobic treatment substantially increases the dry material content by evaporating water due to self-heating of the biological activity.

### **Biomethane Upgrade**

The raw biogas produced in the anaerobic digester, which is approximately 56% methane, is collected and can be used directly for power and heat generation in combined heat and power cogeneration units. It can also be used for heat generation in highly efficient gas-fired condensing heating systems.

But before distribution into the natural gas grid, the biogas must be upgraded, undergoing either physical (membrane) or chemical (amine scrubbing) processing. One of the leading systems utilizing these technologies is BioMethan upgrade, developed by HZI, which is profiled here for example.

By means of membrane-based gas permeation, the raw biogas is dried, then desulphurized, and the low-calorific carbon dioxide is subsequently separated using membrane modules. These consist of several thousand extremely fine hollow fibers—the ends are embedded in resin and bundled in stainless steel pipes. The membranes are characterized by high pressure and temperature resistance, pressure stability, and different gas permeability.

The above-average carbon dioxide and methane selectivity allow for methane purity of 97% and methane slip of below 0.5%.

Then there is the heat-driven amine scrubbing process. The raw biogas is dried and desulphurized, and the low-calorific carbon dioxide is separated, with the CH<sub>4</sub> upgraded to natural gas quality—so-called biomethane. Amine scrubbing is a highly efficient and economical process technology, with methane purity of up to 99% and methane slip of below 0.1%.

The membrane process has an electricity demand of 0.24 kWh/m<sup>3</sup> biogas. The amine scrubbing process has an electricity demand of 0.24 kWh/m<sup>3</sup> biogas and a heat demand of 0.6 kWh/m<sup>3</sup> biogas.

Determination of which gas upgrade process would be more applicable for a given situation would depend on several factors, including a) the quality of biomethane required; b) availability of heat; c) cost of electricity; and d) the biomethane slip.

The upgrading of biogas to biomethane offers particular potential, with a wide range of possible applications. Injected into the natural gas grid, biomethane is efficiently stored and transported to the nearest, most suitable location. This flexibility is beneficial for both municipalities and large industries in generating energy, providing an economical heat supply, and improving their carbon footprint. Due to its high quality, biomethane is perfectly compatible with existing technical facilities. It is comparable to conventional natural gas and is used as a renewable fuel in natural gas vehicles. Comparatively, for the same amount of heat or electricity generated, the biomethane produced from upgrade processes produces 80% less greenhouse gas emissions compared to burning natural gas as a fossil fuel. For many municipalities and their residents who are largely environmentally conscious, biomethane is the energy preferred over natural gas.

### **Integration of Continuous Dry Anaerobic Digestion with Biomethane Upgrade**

Conventional plants providing anaerobic digestion with subsequent biomethane upgrade are typically constructed using process systems from different suppliers. This presents limitations in system continuity and design flexibility, which can inhibit overall plant performance.

With the integration of Kompogas continuous dry anaerobic digestion and BioMethan upgrade processes—both systems provided by Hitachi Zosen Inova as a singular fully-integrated and completely automated system—plant design flexibility and operational efficiency can now be optimized for maximum production. This allows plant operators to more efficiently design for both small-batch or large-scale production operations.

Continuous dry anaerobic digestion, coupled with biomethane upgrade, contributes to a versatile energy mix, along with reducing dependency on natural gas imports, ultimately contributing to the reduction of climate change due to reduced carbon dioxide emissions. Recent improvements in these systems' technology, design flexibility, and operational performance have made major strides toward supporting these initiatives. **MSW**

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# Planning Ahead for the Bottom Liners

Posted By *Daniel Cooper* On October 19, 2017 @ 6:32 am In Waste Collection | [No Comments](#)

Most landfill gas design engineers are accustomed to preparing design drawings to incorporate the installation of a gas system into an existing landfill that has been accepting waste for many years. The landfill may require a gas system per the New Source Performance Standard (NSPS) regulations or may be adding gas collection for odor control or as a beneficial use project. Either way, the landfill gas system design is going to come as a secondary feature to the already existing landfill or landfill cell. In this article, we will look at including considerations for the landfill gas system during the landfill bottom liner design process. By considering the landfill gas system during the early stages of the landfill's life, it is possible to improve collection efficiencies, lower operating costs, and save time in the future.

Every landfill gas collection and control system (GCCS), whether regulated or not, has various engineered features such as vacuum source, gas collection piping, gas extraction points, and liquids management features that must be designed and constructed for proper operations. Although there may be many areas where early design considerations would be beneficial, we will focus on the blower/flare station, leachate cleanout tie-ins, extraction well targets, and use of perimeter off waste header lines.

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## Blower/Flare Station

The blower/flare station should be located during the overall landfill layout planning in an area that will be sheltered from surrounding neighbors to avoid the public perception of odors, have a safe perimeter from other above-grade objects, and will never receive waste. If the location is in an area that will receive waste in the future, then it will have to be moved at a later date, which will increase the overall system cost. The location should be away from landfill traffic and surrounding neighbors for safety and public perception of odors from gas combustion. A location where high voltage electrical and possibly leachate disposal infrastructure are available works best. The location must also be designed for vehicle access by a lull or truck with a hoist so that maintenance can be performed on the blowers, motors, and flare stack. There must be a perimeter area with a radius of 75 to 100 feet with no above-grade infrastructure such as utility poles or trees, which could be impacted by heat radiating from the flare's flame.

## Leachate Risers

Leachate risers for cleanouts and pumps are typically located on the landfill's perimeter, mostly at the toe of the slope, along the liner's edge near the anchor trench. Since the leachate collection system is installed prior to waste being placed, these pipes are the first to see landfill gas as the cell is filled. The gas that is generated as waste is placed and encapsulated will quickly migrate into the leachate riser and cleanout pipes, causing odors and possibly an explosive environment. Since these pipes terminate at the landfill perimeter, they can be cause for odor concerns. The normal methodology for gas collection from a leachate cleanout or riser during installation of the GCCS is to tie into the riser upslope of the toe of the landfill after it is buried in waste (Figure 1).

Instead of waiting to tie into the leachate pipe after waste is placed, which involves excavation in waste and saddling into an existing pipe, a better method would be to install the tie-in point with the original liner and leachate riser construction well before the gas system construction. A valve can be added to the tie-in to seal off the pipe until gas system construction. The valve may not be used for several years, but once the GCCS is installed and can access the riser, there is already an above-grade tie-in to connect to the GCCS. This minimizes excavation and eliminates using a branch saddle, which can be a potential point of leakage. The pre-installed tie-in can also be used for connection to a passive flare should the riser contain significant gas that needs to be mitigated prior to the GCCS installation.

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## Extraction Well Targets

Vertical extraction wells are an integral part of the GCCS at any landfill, but they are typically not installed until there are over 50 feet of waste in place, and they are normally offset from the bottom liner system at least 15 feet. Vertical wells provide for efficient gas collection deep within the waste mass, yet when liquid accumulates inside the well casing, this can make them ineffective and potential points of non-compliance in a regulated system. In wetter regions like the southeast United States, and at landfills where they have accepted liquids or recirculate leachate, water in the wells is a significant issue. These trapped liquids are typically removed from the well casing by pneumatic pumps and then pumped to the leachate collection system via a common or dedicated force main. There can be considerable cost associated with the purchase, operation, and continued maintenance of these pumps. The cost for pumps and routine maintenance can be thousands of dollars per gas extraction well. What if there was a way to limit or even eliminate these costs?

Extraction well targets are a possible solution to minimize the pumping of liquids from vertical gas extraction wells. The idea is that a well target is placed above the protective cover of the bottom liner system or even in the first lift of waste. The location of the target is chosen based on a gas system design performed before waste has been placed in the cell, during the design of the landfill bottom liner system. The landfill will have a fill sequencing plan for waste placement over time, and the gas system can be

integrated into the sequence plan; thus, future vertical extraction well locations are known and designed before any waste is placed. The targets are then constructed in these locations from a material such as granite or other inert non-calcareous aggregates that are readily available at or near the landfill. The targets are sized to be roughly 10 feet by 10 feet and between 8–15 feet deep. Figure 2 shows the placement of these targets in early lift. The target should be surveyed in place and include, at minimum, measurements at all four corners and the center.

A vertical gas extraction well is installed directly over the target once the lifts of waste are of sufficient depth to warrant it. The bottom of the well is terminated when the target is reached and the known material is brought to the surface in the drilling spoils. The well casing is placed on top of the target at the bottom of the borehole and normal well construction continues, including aggregate material placed in the annular space to a specified depth below grade, sealed with a bentonite or other impermeable material, and then backfilled to the surface. This well casing can now drain directly to the leachate drainage layer at the bottom of the landfill and may not need to have a pump installed to remove liquids. This is a low-cost, easy to construct feature that potentially reduces the need for costly well pumps, while still maintaining a well with reduced liquid accumulation and efficient gas collection.

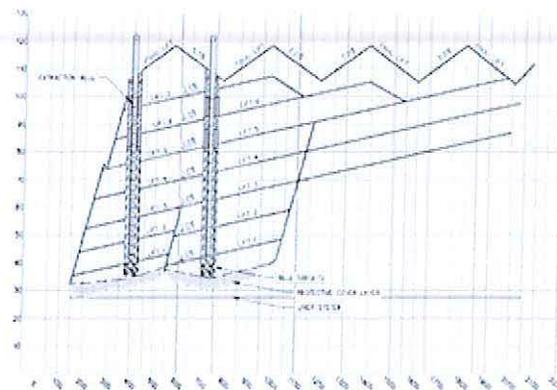


Figure 2. Tie-in to leachate system riser installed prior to waste placement

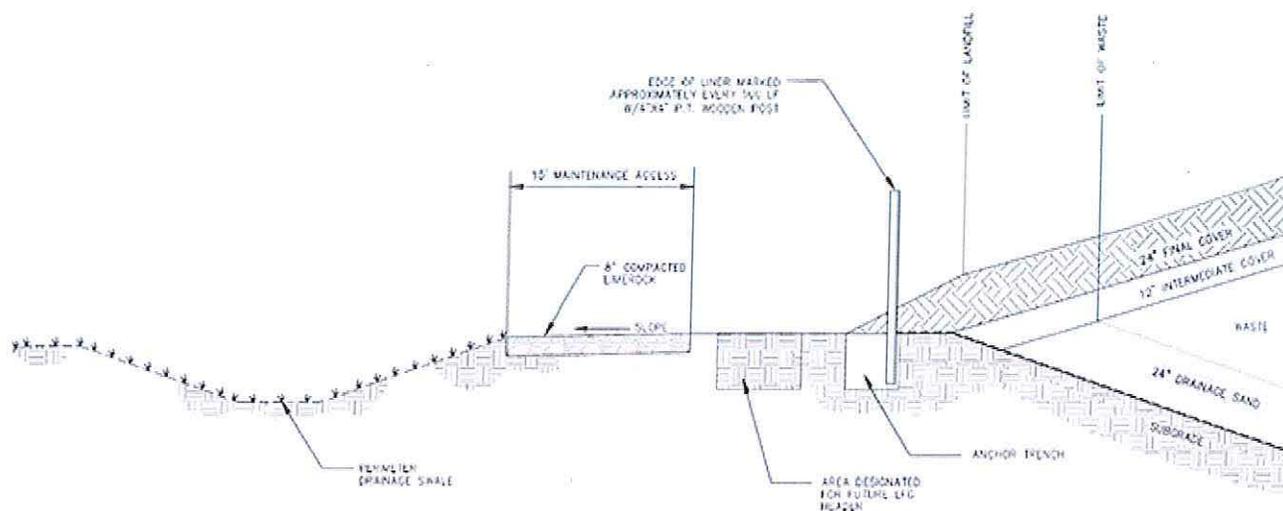


Figure 3. Landfill perimeter cross-section with area allocated for LFG header

### External Header Piping

During development of new landfill cells and overall site plans, the location of current and future infrastructure such as roads, stormwater swales, leachate force mains, and electrical lines are reviewed and considered before any construction occurs. What is usually not considered is where the landfill gas lines will be located and how they will interact with the other infrastructure onsite. Normally, all the other elements are in place and the landfill gas piping is placed in the waste along the perimeter slopes and very seldom exits the waste footprint.

Much like the blower/flare station location discussed earlier, a new methodology is to include the location of the final gas design piping or at least allot the real estate outside the waste perimeter for landfill gas header piping during the initial planning of a landfill cell. There are several advantages in the long run if this consideration is taken. The pipes are not buried very deep, which is often the case when headers have to be placed on internal slopes. Instead, the slope of the pipe outside of waste can be minimal because the pipes will not settle and water in as they do in waste, which will lower the number of sumps required over the same distance. Although it is sometimes necessary to place the header in waste, considering the ultimate location before designing the landfill cells can lead to fewer headaches and greater cost savings.

### Conclusion

What we hope to have presented here are some engineering ideas that allow landfill gas design engineers to get involved in the landfill design process early. When considerations are made for landfill gas extraction elements before landfill gas collection is required, and in some cases, before waste is placed, there can be significant benefits, not the least of which is more efficient construction of gas collection elements such as leachate riser tie-ins and exterior header piping. The gas system operator will benefit by having fewer pumps to operate and maintain and shallower headers that are more easily accessible. Like many engineering concepts, the idea of planning ahead can lead to long-term benefits for all the stakeholders at the landfill. **MSW**

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# Landfill Managers Notebook: Vegetation Control—Naturally

Posted By *Neal Bolton* On October 19, 2017 @ 7:00 am In Landfill Manager's Notebook | [No Comments](#)

If you are in the landfill business, you probably spend a lot of your time trying to make your landfill look natural, organic, and environmentally sustainable. Sounds like some kind of health food supplement, doesn't it? The fact is, our image of a well-run landfill is one that is well vegetated and appears to be environmentally friendly. And we put a lot of time, money, and resources into achieving that.

So we prepare the soil, carefully select a native seed mix, add fertilizer and mulch, and try to time it all so the seasonal rain will help those seeds germinate and grow. Yes, a well-vegetated landfill is a happy landfill. And then the dry season comes, and all that lush, green vegetation dries up and becomes a very serious fuel source for wildfires.

Think about it—a wildfire at your landfill can do significant damage to your infrastructure. Your fences, monitoring wells, and heavy equipment can be at risk. Your organics processing operations can represent hundreds of tons of flammable material, but for many landfills, the greatest risk is associated with your landfill gas collection system—those wells, laterals, and headers filled with flammable, explosive gas. The thought of a wildfire raging across your landfills, methane wells, laterals, and headers is not something that gives landfill managers restful sleep.

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The flames of a grass fire can reach 1,800°F, and though a grass fire moves quickly, it may have enough time to impact your landfill gas system. HDPE pipe melts at approximately 350°F. The auto ignition temperature—the point where methane will burst into flame without an ignition source—for methane is around 1,000°F, but that's really irrelevant because at 350°, the pipe melts and methane is ignited by the wildfire.

Any way you look at it, those numbers don't work. So, to avoid the potential devastating impact of a wildfire, you should have an effective vegetation management plan.

Several options come to mind; the first is herbicides. The correct herbicide applied at the right time will stop that vegetation from growing in the first place. But that's really a bit counterproductive considering the effort you went through to try to get it to grow. Plus, you want that vegetation to establish a good root structure in order to minimize soil erosion.

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Herbicides applied too late may still kill the weeds and grass, but can actually increase the risk by creating a swath of dead vegetation along the pipelines.

So, removing the above-ground portion of that vegetation, through mowing or weed whacking, is perhaps a better and more common option. But that can be labor intensive and costly. It can be difficult to get that equipment in and around your methane well's piping and other infrastructures without causing damage.

But here's the real kicker: surveys indicate that nine out of 10 wildfires are caused by humans, and a high percentage of those are caused by people using machines to perform vegetation management.

Is there any good solution out there? In fact there is, and coincidentally, it falls under the category of natural, healthy, and environmentally sustainable.

An increasing number of landfills are using sheep and/or goats to control vegetation, whether it's a herd of a goats, a flock of sheep, or what our Australian neighbors might call a mob. The bottom line is that when you put a bunch of grass-eating critters on your landfill, they can remove that vegetation quickly, effectively, and safely. And because landfills are, among other things, in the business of public perception, a flock of sheep can munch that grass and provide you with some very cool PR. So how does this process work?

Well, it's really quite simple. Somewhere between a few dozen and a few hundred sheep or goats are released at your landfill and are constrained by a simple, portable, electric fence. They are rotated section by section across your landfill, and left in place for whatever duration is required to eat down the grass before being moved to the next section.

The contractor who provides the sheep or goats also provides the electric fencing, water, and management for the entire process. In some cases where there are no local predators, a single electric wire is sufficient to keep them in a specific section. In areas where there are predators, a more substantial electric fence is required, not just to contain the sheep, but to keep predators out. In either case, the system is quite simple.

Temporary fence posts are installed around the perimeter of the area, wire is stretched across the posts, and the fence is connected and energized by a small control box. The electricity is most often provided by a battery that may or may not be

connected to a small solar panel to help maintain an adequate charge.

Depending on the size of the flock and how long they're left in a specific area, they can thin the vegetation or eat it right down to soil. It's really up to you. The cost is really quite reasonable, especially considering that sheep and goats can remove vegetation from the nooks and crannies around your monitoring and gas collection wells with very little risk of damage.

According to landfills that are using this type of vegetation management, the cost compares favorably with laborers armed with weed-wackers. It's kind of funny when you think about it: while sheep herders have been grazing their flocks for thousands of years, for us in the landfill business this newly discovered natural approach to vegetation management is state-of-the-art.

**MSW**

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[1] Covering publicity, education, engineering, long-term planning, and landfill gas waste-to-energy:

<https://foresternetwork.com/free-reports/landfill-management-6-tips-for-excellence-in-landfill-operations/>

[2] *MSW Management Weekly*: <https://foresternetwork.com/account/>

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# A Finger on the Pulse of Collection Operations

Posted By *Daniel P. Duffy* On February 15, 2017 @ 3:12 pm In Waste Collection | [No Comments](#)

There's an old saying in the solid waste industry that a waste management company does not make money by picking waste up, so much as it does by putting it back down again. That is to say, the labor-intensive act of collecting waste is not as profitable as capital-intensive disposal operations. This, of course, is an over simplification, and no solid waste operation can make any profit at all at a landfill until the waste is delivered in the first place. But a waste hauler needs to take advantage of any productivity tool that is available, because only through improved efficiency and production can this part of the operation stay profitable and competitive.

And the one tool that maximizes its own return on investment—providing the biggest productivity bang of the investment buck—is collection software that helps manage vehicle tracking, maintenance, and management. But before committing to a particular suite of software tools, waste haulers have to ask themselves: What should organizations be considering when putting together a package of collection software for vehicle tracking, maintenance, and management?

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They then need to discuss the priorities that go into the decision-making process: What is the balance between safety and efficiency, and how will the software work to satisfy those needs? Finally, how effective is the technology when it comes to cost savings and safety?

## Factors Affecting Waste Hauling Costs Productivity, and Efficiency

A typical waste collection truck racks up 20,000–30,000 miles annually at a fuel consumption rate of less than 3 miles per gallon of diesel, consuming up to 10,000 gallons each year. For 2016, the price of diesel fuel varied (depending on location) from \$1.861, to \$2.828 a gallon, with \$2.34 as a planning average (*Source: On-Highway Diesel Fuel Prices, Energy Information Administration*).

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Using average costs and mileage, the annual fuel costs alone of a single waste hauling truck would be approximately \$19,500 (25,000 miles ÷ 3 miles per gallon = 8,333 gallons x \$2.34 per gallon).

Total operating costs of a waste collection truck fleet can be staggering. A study performed for the City of Pittsburgh summarizes these costs as follows:

*For fuel expense, we use a nationwide estimate of annual fuel use for garbage trucks that places consumption at 8,600 gallons per vehicle. Thus, with 50 trucks and \$4 a gallon for fuel, garbage collection would require \$1.7 million for fuel. Vehicle capital cost is somewhat more difficult to derive. Garbage trucks suffer a lot of wear and tear, creating the need for relatively frequent replacement. Assuming an average useful life of eight years and a cost of \$170,000 per new truck, we put the capital costs of garbage trucks at around \$1.6 million, very close to the estimate contained in the Mayor's 2004 forecast. This estimate does not include maintenance expenses, which are estimated at \$1.5 million per year using a budget note reference that maintenance will average about \$30,000 per vehicle.... However, even without an assignment of these overhead costs to garbage collection, the total cost of collecting residential garbage in the City is placed at \$23,257,000 for 2008. That amounts to \$202 per household for the estimated 115,000 households being served ("The True Cost of Garbage Collection in Pittsburgh: Can the City Compete with Private Contractors?", Allegheny Institute Report #08-02, July 2008).*

The above total includes labor costs such as \$2 million for workers fringe, and \$7 million for workers compensation. These three costs (labor, fuel, and maintenance) determine the overall costs of collecting waste. The average annual waste collection cost per truck works out to approximately \$465,000, with each of the 50 trucks in the fleet servicing an average of 2,300 households.

So, anything that can be done to minimize overall costs by minimizing the number of trucks and crews needed to perform the same amount of work will positively affect the operational bottom line. There are several factors that can affect this overall cost rate, but the key to achieving this is maximizing the operational efficiency of each truck. This, in turn, is achieved by eliminating—as much as possible—the movements made, distances travelled, and time spent on the collection routes. This allows more waste to be picked up per hour and more households serviced per shift, all the while using less fuel by travelling fewer miles. These savings lead to further savings in minimizing the need for maintenance and reducing the number of crews. (The size of individual crews is more a function of how automated the actual curbside



[3]

Vehicle equipped with a GPS Insight tracking solution

waste pickup operation is.)

These estimates remain averages only. Actual operational parameters and costs can vary widely with: population density, road net availability, use of transfer stations and material recovery facilities, location of landfills, weather and seasons, the efficiency of landfill disposal operations and resultant truck queuing at the landfill entrance gate, waste compaction densities achieved by the collection trucks internal hydraulic compaction system, type of pickup (residential, commercial, or rolloff), etc. There is no such thing as a perfectly efficient hauling route, and some time and effort will always be wasted out on the road. What vehicle management and tracking software can do—when employed correctly—is minimize any inefficiency in waste collection and hauling operations as much as possible. The first step is knowing where the trucks are at any given moment.

### **GPS Positioning and Navigation: How Does it Work?**

A GPS is part of a larger system, the Global Navigation Satellite System, developed during the Cold War by the Pentagon for military applications that pinpoint the location of ships, tanks, and aircraft equipped with a dedicated GPS receiver antennae. With this technology, locations of vehicles and equipment can be determined with an accuracy of less than 30 centimeters (1 ft.). The heart of the system is a series of 24 satellites in geosynchronous orbit (one each for every 1-hour time zone, or 15 degrees of longitude) that cover their individual band of the Earth's surface from pole to pole while orbiting twice daily, making one orbit every 12 hours. As they orbit, they continuously emit a unique time signal to the ground surface.

A geosynchronous orbit is defined as: "A geostationary equatorial orbit [GEO] is a circular geosynchronous orbit in the plane of the Earth's equator with a radius of approximately 42,164 kilometers [26,199 mi., measured from the center of the Earth]. A satellite in such an orbit is at an altitude of approximately 35,786 kilometers [22,236 mi.] above mean sea level."

At the speed of light (299,792 km/sec.) the signals reach the Earth's surface, straight down along the shortest path in approximately 0.12 seconds. Signals from adjacent satellites take slightly longer to reach the same point on the Earth's surface. This time lag allows for a precise measurement of the distance between the emitting satellites and the ground-receiving antennae. Triangulation between the ground receiver and signals from four or more satellites gives the precise location (northing, easting, and elevation above sea level) of the vehicle or equipment being located.

### **Picking the Right System**

What should organizations be considering when putting together a package of collection software for vehicle tracking, maintenance, and management? This would seem to be a no-brainer, since nearly every public works process can be enhanced by using geographic information. These obvious advantages explain why more and more municipalities are looking to route optimization to visualize their data to improve the effectiveness of field operations.

The real question isn't whether or not to use GPS tracking, but which system is the best for the operation. So, when issuing a request for proposal (RFP) for procurement of a GPS routing and tracking system, the buyer needs to know what to look for. This requires the buyer to do a little research and compare the available option prior to final selection. The more advanced fleets have moved beyond simply connecting their vehicles, to focusing on camera/vision technologies integrated with telematics, as well as optimizing routes and schedules and mobile worker enablement. They have moved beyond basic telematics, to integrated routing, navigation, and mobile workforce management solutions on one Mobile Resource Management platform. The benefit of an integrated single-cloud software solution to run the mobile business is more important than ever.

The ability to interact with back office and front office software solutions with an open telematics API platform is critical as well. Connecting telematics data with applications such as order/dispatch systems, HR systems, CRM systems, and ERP systems allow for the optimization and automation of key business processes that drive efficiency, utilization, and profitability. Advanced fleets are also embracing open mobile devices, such as Apple and Android, versus closed proprietary telematics appliances that do not provide for the flexibility and innovation demanded by today's rapidly changing competitive environment.

But, before the buyer examines the potential system offerings, the operator needs to examine their own operation. What types of routing tasks does the fleet need to manage? Does the operator need residential and commercial waste collection? Does the operator plan to optimize bulky waste collection or other work orders? What are the most pressing issues (creating better balanced routes in large residential areas, balancing commercial service of varying frequencies and patterns, cost reduction factors such as minimizing travel distance and keeping on top of vehicle maintenance needs, reducing over time and other labor costs, or improving safety, etc.)?

Once the desired capabilities are known, they can be prioritized and weighted in an evaluation matrix to optimize the purchasing decision. Armed with this self-knowledge, the operator can then examine the status of current commercially available technology. Lastly, the operator should examine the general repudiations and capabilities of potential suppliers. This last bit of research requires some legwork since everyone looks good on the paper. The operator should speak to references if any are available, find out how long they have been in business, and determine if the supplier is the creator of the software or a partner/reseller.

These steps will allow the buyer to frame a set of possible solutions. Now the operator is prepared to write a tightly focused RFP that will meet specific needs. It can take six months to a year for a response to be received and properly evaluated. After proposals are received from potential suppliers, the operator has to rate how well the proposals match the requirements. Concerning the purchase itself, will the software acquisition be sole source (choosing a software package from only one vendor), or involve piggy-backing (riding on another agency's contract—assuming all deliverables are equal and compatible)?

Of even greater concern than cost considerations is safety. Nothing should be done to compromise safety. Like avoiding maintenance, maximizing efficiency at the expense of safety is a false economy, especially since human injury—even human lives—may be put at risk. Keys to maximizing safety involve minimizing the need for U-turns, driving in reverse, keeping collection on the safe side of the truck, and reducing the manually hauling distance of waste cans to the collection truck. Most accidents take place

when employees are walking in the path of the truck or crossing traffic. Sometimes these cannot be avoided, but every effort must be made—even at the expense of immediate efficiency.

So, an operator must strike a proper balance between safety and efficiency. Though safety remains paramount, both aspects are critical to successfully running a truck fleet. As Ryan Driscoll, marketing director of GPS Insight, explains:

*As for safety, one of the most dangerous maneuvers a driver can make in a big waste truck is to go in reverse. Many fleets have no reversing policies with almost no way to enforce them. Vehicle tracking software can actually detect when a vehicle is in reverse and alert the driver that he is in violation, and also alert management which driver is in violation, when, and where. This way, drivers can be held accountable for dangerous driving behaviors such as reversing. GPS tracking data also monitors driver behaviors like speeding, hard braking, and rapid acceleration to determine who the most at-risk drivers are.*

*As for efficiency, the lowest-hanging fruit is to improve routing efficiency. Many waste management fleets have drivers that overlap routes regularly, which is putting unnecessary mileage on the trucks, wasting time, and wasting fuel as well. Management can use vehicle-tracking software to examine routes and determine where improvements can be made. Another way vehicle tracking improves efficiency is that dispatch no longer has to guess where a truck is located and doesn't need to call drivers for status updates, route changes, or one-off pickups. Dispatchers can dispatch and communicate all from within the software. Waste management fleets can also share their routes with the public/customers if they wish. This will reduce the number of phone calls, making the office team much more efficient. Integration with fuel cards, maintenance software, accounting software, and many others improves efficiency as well. Sharing data between platforms makes managing a fleet much more efficient.*

Operationally, matching the right system to the needs of the hauling company requires answering five key questions:

1. Does the software system actually do its job? Does it meet the business needs of its user, in that it provides a fleet manager with the information and data he needs to effectively manage truck maintenance and repair, improve route efficiency by reducing overall travel times, while improving safety and reducing accidents?
2. Is the software system user friendly? Can it be learned quickly? Is it easy to use?
3. Does it utilize a fine-tuned GPS installation that allows for superior accuracy?
4. Is customer service provided, and is it of superior quality that it actually provides help with problem solving? Is it readily available at all times, and is there a dedicated US-based account manager, specifically for addressing problems and needs?
5. Does the software come with a pilot program where the owner can do a dry run (a 30-day trial is typical) and test the capabilities of the software prior to purchasing it?

In other words, the main priority in making a GPS software purchase decision is what the anticipated customer experience will be using the software once it is installed. In short, is the GPS tracking software worth it, and how effective is it? The cost of a GPS tracking system pays for itself usually in less than a year. Its data allow individual drivers and fleet managers to minimize fleet operating costs for fuel, labor, maintenance, insurance, etc.. Indirectly, the system protects both the driver and manager from customer complaints by providing hard data concerning the vehicles movements and whereabouts in real time. For example, GPS data can exonerate a truck when a customer complains that his vehicle ran over a mailbox or missed his appointed waste pickup. This ensures superior customer service while minimizing the occurrences of complaints and the amount of time needed to deal with upset customers when they occur.

### **Major Suppliers**

Cro Software provides asset management system software specialized for the waste, recycling, logistics, and service-based industries. This Cloud-based interactive system links customers, drivers, dispatchers, and management via a simple user interface designed according to research performed on user/software interactions. Administrators and fleet management are provided live overviews of vehicle locations in real time, as well as historical data (truck data, driver data, interactive graphs, etc.), that allow them to effectively manage locations and mobile assets. Dispatches are given a tool that provides route building, as well as route optimization functions. Real-time GPS tracking allows for efficient dispatching, yard management, mapping, and scheduling.

Out on the road, drivers can access this system easily on a smartphone via an app that provides destination planning, images, directions, and live data updates. The drivers perhaps benefit the most from the flexible planning capabilities of this app. The easy-to-understand format provides straightforward data displays with up-to-the-minute communications, instructions, and data. Included is a list of all the trucks currently assigned to the fleet, with each driver seeing a list of their pickup requests, including relevant information (addresses, images, notes, material types, calculated weight loads, etc.). Destinations are shown via route maps that visualize location and most efficient travel directions.

GPS Insight provides flexible vehicle and asset tracking solutions for commercial and government fleets. The company helps waste collection fleets reduce costs and risk, and increase revenue. These solutions are tailored based on fleet sizes, depending on the number of trucks being operated.

For fleets of 1 to 25 trucks, there's the Standard system. This system is designed for small businesses looking for a simple, yet cost-effective GPS tracking solution. The Pro system—designed for moderately large fleets of 25 to 500 trucks—is intended for businesses that need a more sophisticated GPS tracking software personalized for each user with more at-a-glance metrics. For large fleets of more than 500 trucks, the Enterprise system is for fleets with a complex business structure requiring highly customized data to efficiently manage. The hardware used to run this system includes vehicle tracking devices and asset tracking devices. Alerts and reports are provided on flexible dashboard displays.

Another company, RouteSmart Technologies Inc., provides route planning and optimization solutions for high-density residential workload balancing, commercial service routing, and rolloff pickup for the waste and recycling industry. Used by more than 200



[4]

Fleet vehicles with GPS Insight tracking software

need to guess which street they need to hit, or where they need to go. And, it increases their efficiency—it saves them a lot of time—so they really like the routes.”

John Sowl, of Western Disposal, also states, “By using the tool to organize ourselves and our data, it trickles down to a more consistent, reliable service for the customer.”

In addition to time savings, money is also saved, according to Bill Schroeder, Woodbridge, NJ, who used the tool to reduce his daily routes from 20 to 14. “We are doing more with less,” he says. “Our savings in sanitation is approximately \$4 million a year, which is astronomical.”

Clients effectively implementing RouteSmart have seen an average of 8–10% cost savings. Cost savings is realized through a reduction in travel distance (mileage), total work time, and overtime. A number of vehicles can be reduced, and the vehicles and personnel become more productive by improving average service per hour.

The Telogis Route Planning Suite is a planning tool for effective route planning. This suite includes Telogis Territory, Telogis Schedule, Telogis Appointment, and Telogis Plan. Together, they provide a range of planning tools that not only allow an operator to build smarter routes, but also show the operator the impact of each route option and modification in real dollars. In other words, it allows the operator to visualize the cost of proposed changes before they are implemented. Current plans and operations can be continually optimized with information provided by tight feedback loops from drivers mobile operations. Telogis Route is a Web-based and scalable to meet the needs of truck fleets of varying sizes. Being Web-based, it is easy to deploy, which saves time, reduces hardware needs, and minimizing startup costs. It can be used to create new routes while analyzing, modifying, and optimizing existing routes. Groups of routes can be organized temporally by pickup schedules, or spatially within predetermined geographic boundaries. Together, these capabilities allow for efficient workload leveling.

More vehicle manufacturers, such as Mack (Telogis is the built-in telematics partner), are choosing to build telematics into the dash as a standard feature protected by the vehicle warranty and typically provide advanced diagnostic capabilities not provided by aftermarket telematics solutions. Manufacturers, such as Hino Motors, already provide built-in telematics (called Hino Insight) that provides advanced engine diagnostics and maintenance alerts, along with a fleet management portal and mobile app. Several other manufacturers—such as Ford (Ford Telematics, powered by Telogis), GM, Volvo, Mack, and Isuzu—offer built-in telematics, and there will be more in the very near future. Telematics providers, such as Telogis, will continue to invest heavily in broader platform capabilities, such as route and schedule optimization, commercial navigation, and mobile applications that are tightly integrated with back office capabilities, workflow optimization, and automation.

Over the next five years, we will start to see more developments around IoT connections leveraging in-vehicle Wi-Fi hotspot capabilities. We will see a lot of advancements with ADAS systems to assist the driver with safety and performance related to efficiency and fuel economy. There will be significant movement towards Vehicle to Vehicle and Vehicle to Infrastructure communication. Ultimately, autonomous vehicles capabilities built into vehicles that telematics providers will leverage to continue to improve efficiency, safety, and productivity. **MSW**

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major municipal and private waste haulers worldwide, the RouteSmart for ArcGIS routing software meets truck management goals by decreasing miles, maximizing stops and lifts per hour, balancing workloads across the week, reducing overtime, improving safety, speeding route planning time, and modeling new service areas.

RouteSmart software solutions provide controls for balancing residential waste and recycling collection days for a fleet of rear- and side-loaders. The software efficiently performs the time-consuming process of residential routing, allowing the user to balance weekly workloads and optimize hauling routes.

RouteSmart Multi-Day routing tools manage commercial routing operations by optimizing varying frequencies of service, while rolloff route optimization manages everchanging rolloff pickup routes. By providing same side service routing, U-turn minimization, and street barrier/construction information, RouteSmart improves safety performance.

These abilities have been confirmed by customers of RouteSmart. “By following the routes, the drivers know exactly where they need to pick up,” says Gaye Belles, GIS specialist for the City of Richardson, TX. “They don’t

need to guess which street they need to hit, or where they need to go. And, it increases their efficiency—it saves them a lot of time—so they really like the routes.”

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**Monthly Operations Report  
Matlock Bend Landfill  
November 14, 2017**

**Presented by:  
Santek Environmental, Inc.**



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- I. OPERATIONS**
  - A. Tonnage Report
  - B. Customer Report
  - C. Materials Classification Report
  - D. Waste Characterization Report
  - E. Tire Report
  - F. Quarterly Waste Origin Report
  - G. Quarterly State Surcharge and Inspection Fee Report
  
- II. AIRSPACE UTILIZATION SCHEDULE**
  
- III. HOST & SECURITY FEES**

**LANDFILL TONNAGE VOLUME  
MONTH ENDING -  
October 2017**

**MATLOCK BEND LANDFILL**

MONTH	2016	2017	2016 TO 2016
JANUARY	13,035.08	15,336.42	2,301.34
FEBRUARY	13,619.92	14,991.58	1,371.66
MARCH	15,803.85	16,055.37	251.52
APRIL	14,569.65	14,472.05	(97.60)
MAY	14,994.10	16,123.28	1,129.18
JUNE	14,159.65	15,653.83	1,494.18
JULY	14,517.67	14,583.45	65.78
AUGUST	16,139.18	15,865.64	(273.54)
SEPTEMBER	15,761.01	16,560.64	799.63
OCTOBER	16,145.67	17,666.70	1,521.03
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	148,745.78	157,308.96	8,563.18

**DAILY AVG FOR ANY  
RUNNING 30 DAY  
PERIOD                    588.89**

**LOUDON COUNTY**

MONTH	2016	2017	2016 TO 2016
JANUARY	412.09	477.16	65.07
FEBRUARY	444.62	424.98	(19.64)
MARCH	513.60	498.94	(14.66)
APRIL	465.42	507.83	42.41
MAY	466.86	549.58	82.72
JUNE	493.13	519.50	26.37
JULY	501.33	542.63	41.30
AUGUST	495.64	512.30	16.66
SEPTEMBER	440.52	482.19	41.67
OCTOBER	468.33	459.47	(8.86)
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	4,701.54	4,974.58	273.04

**DAILY AVG FOR 22.5  
DAY PERIOD                    785.19**

**LENOIR CITY**

MONTH	2016	2017	2016 TO 2016
JANUARY	260.26	320.21	59.95
FEBRUARY	296.65	280.52	(16.13)
MARCH	385.43	375.49	(9.94)
APRIL	342.75	345.90	3.15
MAY	343.73	385.74	42.01
JUNE	353.55	361.60	8.05
JULY	355.51	368.18	12.67
AUGUST	374.84	405.09	30.25
SEPTEMBER	315.59	351.66	36.07
OCTOBER	285.54	349.35	63.81
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	3,313.85	3,543.74	229.89

**CITY OF LOUDON**

MONTH	2016	2017	2016 TO 2016
JANUARY	312.87	374.21	61.34
FEBRUARY	346.21	316.79	(29.42)
MARCH	416.82	407.26	(9.56)
APRIL	366.91	368.89	1.98
MAY	383.35	446.12	62.77
JUNE	427.97	404.84	(23.13)
JULY	403.03	399.49	(3.54)
AUGUST	432.17	398.67	(33.50)
SEPTEMBER	373.37	378.74	5.37
OCTOBER	351.68	384.36	32.68
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	3,814.38	3,879.37	64.99

**WASTE SERVICES OF TN**

MONTH	2016	2017	2016 TO 2016
JANUARY	1,835.75	2,573.63	737.88
FEBRUARY	2,031.60	2,358.39	326.79
MARCH	2,387.63	2,521.29	133.66
APRIL	2,329.74	2,350.38	20.64
MAY	2,347.21	2,737.26	390.05
JUNE	2,406.60	2,769.33	362.73
JULY	2,438.41	2,558.48	120.07
AUGUST	2,673.71	2,759.94	86.23
SEPTEMBER	2,410.12	2,617.34	207.22
OCTOBER	2,502.28	2,681.16	178.88
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	23,363.05	25,927.20	2,564.15

**TENNESSEE TRASH**

MONTH	2016	2017	2016 TO 2016
JANUARY	2,152.03	3,735.96	1,583.93
FEBRUARY	2,264.75	3,572.92	1,308.17
MARCH	2,824.58	3,906.62	1,082.04
APRIL	2,841.02	3,800.78	959.76
MAY	2,927.00	4,370.78	1,443.78
JUNE	2,955.40	4,485.85	1,530.45
JULY	3,286.37	3,911.99	625.62
AUGUST	4,086.78	4,476.93	390.15
SEPTEMBER	4,104.61	4,048.58	(56.03)
OCTOBER	4,421.76	4,606.41	184.65
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	31,864.30	40,916.82	9,052.52

LANDFILL TONNAGE VOLUME  
MONTH ENDING -  
October 2017

**KIMBERLY CLARK - PAPER WASTE**

MONTH	2016	2017	2016 TO 2016
JANUARY	4,649.89	4,389.45	(260.44)
FEBRUARY	4,671.47	4,197.85	(473.62)
MARCH	5,141.91	3,834.53	(1,307.38)
APRIL	4,797.68	3,145.34	(1,652.34)
MAY	4,941.64	3,846.17	(1,095.47)
JUNE	4,254.76	3,682.06	(572.70)
JULY	4,137.17	3,592.35	(544.82)
AUGUST	4,418.74	3,422.54	(996.20)
SEPTEMBER	5,124.10	4,366.81	(757.29)
OCTOBER	4,866.65	4,461.57	(405.08)
NOVEMBER			0.00
DECEMBER			0.00
TOTAL	47,004.01	38,938.67	(8,065.34)

**Materials Classification Report**  
**Matlock Bend Landfill**  
**Monthly Tonnage Summary October 2017**

Material	Tonnage	2015 Sludge %		2016 Sludge %	
<b>MSW</b>		January	2%	January	4%
		February	3%	February	3%
MSW	<u>11,498</u>	March	3%	March	4%
		April	1%	April	3%
<b>Special Waste</b>		May	2%	May	4%
		June	1%	June	2%
Other	4,673	July	5%	July	2%
		August	2%	August	3%
Ash	0	September	2%	September	2%
		October	2%	October	3%
Sludge	<u>1,496</u>	November	3%	November	3%
		December	5%	December	3%
<b>Total Special Waste</b>	<u><u>6,169</u></u>				
<b>Total MSW &amp; SW</b>	<b>17,667</b>				
Tires	50				
<b>Total Material</b>	<u><u>17,717</u></u>				
<b>% MSW</b>	<u>65%</u>				
<b>% Special Waste</b>	<u>35%</u>				
<b>% Sludge</b>	<u>8%</u>				

2017 Sludge %	
January	5%
February	8%
March	8%
April	7%
May	4%
June	2%
July	3%
August	4%
September	7%
October	8%
November	0%
December	0%

### 2017 Loudon MSW and Special Waste Analysis

Material	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MSW	9,960	9,455	10,622	10,093	11,432	11,165	10,369	11,487	10,753	11,498			106,834
Special Waste	5,376	5,537	5,433	4,379	4,692	4,488	4,214	4,378	5,808	6,169			50,475
Tires	28	25	33	33	24	45	38	59	31	50			366
<b>Total</b>	<b>15,365</b>	<b>15,017</b>	<b>16,088</b>	<b>14,505</b>	<b>16,148</b>	<b>15,699</b>	<b>14,621</b>	<b>15,925</b>	<b>16,592</b>	<b>17,717</b>	<b>0</b>	<b>0</b>	<b>157,676</b>
%													
MSW	65%	63%	66%	70%	71%	71%	71%	72%	65%	65%	0%	0%	68%
Special Waste	35%	37%	34%	30%	29%	29%	29%	27%	35%	35%	0%	0%	32%
<b>Total</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>									

**2017-2018 Matlock Bend  
Landfill Tire Report**

<b>Month</b>	<b>Tonnage</b>
Jul-17	47.28
Aug-17	54.96
Sep-17	39.52
Oct-17	33.36
Nov-17	
Dec-17	
Jan-18	
Feb-18	
Mar-18	
Apr-18	
May-18	
Jun-18	
<b>Total (tons)</b>	<b>175.12</b>

**Landfill Origin Report for Loudon County, Tennessee**

Advertised Tipping Fee Per ton \$28.45

Origin of Waste (Name of County)	Waste Received From County, Transfer Station or Other	Q1 2017	Q2 2017	Q3 2017	Q4 2017	YTD Total
Anderson	County	151.08	72.55	715.46		939.09
Knox	County	345.00	352.46	372.90		1,070.36
Loudon	County	42,330.42	41,596.57	41,732.31		125,659.30
McMinn	County	167.26	205.76	247.70		620.72
Monroe	County	1,020.44	1,231.08	1,186.23		3,437.75
Roane	County	2,241.00	2,614.93	2,575.40		7,431.33
Blount	County	112.01	157.88	176.63		446.52
Meigs	County	7.22	14.20	2.22		23.64
Rhea	County	8.64	0.00	0.88		9.52
Bradley	County	0.00	3.76	0.00		3.76
		46,383.07	46,249.16	47,009.73		139,641.96



STATE OF TENNESSEE  
 DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
 DIVISION OF SOLID WASTE MANAGEMENT  
 WILLIAM R. SNODGRASS TENNESSEE TOWER  
 312 ROSA L. PARKS AVENUE, 14TH FLOOR  
 NASHVILLE, TN 37243

**PRINT FORM**

**RESET FORM**

YEAR 2017

QUARTER

Q1 JAN - MAR

Q2 APR - JUN

Q3 JUL - SEP

Q4 OCT - DEC

**QUARTERLY SOLID WASTE SURCHARGE AND FACILITY INSPECTION FEE REPORT**

**1. FACILITY INFORMATION**

FACILITY ID: SNL 53-103-0203 FACILITY NAME: Matlode Bend Landfill

PHYSICAL LOCATION ADDRESS: 21712 Hwy 72 North CITY: Loudon STATE: TN ZIP: 37774

FACILITY MANAGER OR SITE OPERATOR: Loudon County / Sante Environmental Inc (AREA CODE) + PHONE: 423-303-7101 EMAIL: jmillier@santekenviro.com

**2. FEE CALCULATION**

LINE	DESCRIPTION	CALCULATION	AMOUNT	UNIT	LINE
LINE 1	AMOUNT OF WASTE RECEIVED	FIRST MONTH OF REPORTING QUARTER	<u>14,583.45</u>	TONS	1
LINE 2	AMOUNT OF WASTE RECEIVED	SECOND MONTH OF REPORTING QUARTER	<u>15,865.64</u>	TONS	2
LINE 3	AMOUNT OF WASTE RECEIVED	THIRD MONTH OF REPORTING QUARTER	<u>16,360.64</u>	TONS	3
LINE 4	TOTAL AMOUNT OF WASTE RECEIVED	ADD LINE1 + LINE2 + LINE3	<u>47,009.73</u>	TONS	4
LINE 5	SURCHARGE	MULTIPLY LINE 4 X <u>.90</u>	<u>42,308.76</u>		5
<input checked="" type="checkbox"/> CHECK IF YOU ARE CLAIMING THE 1% "ON-TIME PAYMENT DEDUCTION"; IF NOT, ENTER \$0.00 ON LINE 6					
LINE 6	1% DEDUCTION IF PAYMENT MADE ON-TIME	MULTIPLY LINE 5 X <u>.01</u>	<u>423.09</u>		6
LINE 7	SUBTOTAL	SUBTRACT LINE 5 - LINE 6	<u>41,885.67</u>		7
LINE 8	FACILITY INSPECTION FEE	MULTIPLY LINE 4 X <u>.35</u>	<u>16,453.41</u>		8
LINE 9	SUBTOTAL	ADD LINE 7 + LINE 8	<u>58,339.08</u>		9
LINE 10	OUTSTANDING DEBIT	ENTER DEBIT AMOUNT HERE, ADD TO LINE 9 AND ENTER TOTAL ON LINE 12	<u>0</u>		10
LINE 11	OUTSTANDING CREDIT	ENTER CREDIT AMOUNT HERE, SUBTRACT FROM LINE 9 AND ENTER TOTAL ON LINE 12	<u>0</u>		11
LINE 12	TOTAL DUE	PAY THIS AMOUNT =>	<u>\$ 58,339.08</u>		12

Q1 FEES DUE APRIL 30    Q2 FEES DUE JULY 31    Q3 FEES DUE OCTOBER 31    Q4 FEES DUE JANUARY 31    MAKE REMITTANCE PAYABLE TO: TREASURER, STATE OF TENNESSEE.

**3. CERTIFICATION REQUIRED**

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Jamie Miller  
SIGNATURE OF OWNER / OPERATOR

Jamie Miller  
PRINTED NAME

Staff Accountant  
TITLE

10/18/17  
DATE SIGNED

## Matlock Bend Landfill - Module I-A 2018 Airspace Projection / Construction Schedule

DATE	REMAINING AIRSPACE <sup>1</sup> (CY)	MONTHLY TONNAGE	ACTUAL / PROJECTED <sup>2</sup>	UTILIZATION FACTOR	MONTHLY VOLUME CONSUMED (CY)	ENDING MONTHLY REMAINING AIRSPACE (CY)
		16,699		1.44		
Sept. 7, 2017	260,032	-	-	-	-	-
Sept. 8 - 30, 2017	-	13,104	A	1.44	18,870	241,162
October	-	17,669	A	1.44	25,443	215,719
November	-	16,699	P	1.44	24,046	191,673
December	-	16,699	P	1.44	24,046	167,627
January '18	-	16,699	P	1.44	24,046	143,581
February	-	16,699	P	1.44	24,046	119,535
March	-	16,699	P	1.44	24,046	95,489
April	-	16,699	P	1.44	24,046	71,443
May	-	16,699	P	1.44	24,046	47,397
June	-	16,699	P	1.44	24,046	23,351
July	-	16,699	P	1.44	24,046	0
August	-	16,699	P	1.44	24,046	0
September	-	16,699	P	1.44	24,046	0
October	-	16,699	P	1.44	24,046	0
November	-	16,699	P	1.44	24,046	0
December	-	16,699	P	1.44	24,046	0

<sup>1</sup> = Remaining airspace based on September 7, 2017 aerial survey.

Full Date

July-2018

<sup>2</sup> = Projected tonnages are based on a 3 month average per Matt Dillard on 6-2-09.

<sup>3</sup> = Utilization rate based on the annual utilization rate per October 27, 2008 construction meeting (Avg. Utilization = 1.24 cy/ton)

### Tonnage for Past 3 Months

August	15,865
September	16,562
October	17,669
<b>Average</b>	<b>16,699</b>

cc: Tim  
Matt  
Cheryl  
Ron  
Chris  
Raymond  
Jason  
Mark



650 25<sup>th</sup> Street NW, Ste 100  
Cleveland, TN 37311

Phone: (423) 303-7101  
Toll Free: (800) 467-9160  
www.santekenviro.com

November 13, 2017

Loudon County Solid Waste Disposal Commission  
100 River Road  
P.O. Box 351  
Loudon, TN 37774

Dear Steve:

Pursuant to Section 10.6 and 10.7 of the Sanitary Landfill Operation Agreement between Loudon and Santek as of July 1, 2007, Santek agreed to pay the Commission a host fee and security fee as defined in the Agreement. The following recap reflects the calculation for the period October 1, 2017 to October 31, 2017:

Host Fees (Greater of below) –	
Total Tip Fees Billed	\$369,055.27
Host Fee Percentage	4.00%
	<u>\$ 14,762.21</u>
Minimum Fee	<u>\$ 10,652.00</u>
Security Fees (Greater of below) –	
Total Tonnage Received	17,666.70
Rate per ton	<u>\$ 1.00</u>
Total	<u>\$ 17,666.70</u>
Total Tip Fees Billed	\$369,055.27
Security Fee Percentage	5.00%
	<u>\$ 18,452.77</u>

Our checks in payment of the above fees have been remitted to the above address for the Commission. Should you have any questions or need additional information, please let me know.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Mathys", written over a horizontal line.

Mark Mathys  
Corporate Controller