


In the State of Texas

§
§
§

County of Cooke

I, Betsy Fleitman, City Secretary for the City of Lindsay, Texas, hereby certify that the attached document is a true and correct copy of a document taken from the official City files of the City of Lindsay, Texas, and is maintained in the regular course of business of the City of Lindsay, Texas. Given under my hand and the seal of office on June 3, 2008.



City Secretary
City of Lindsay, Texas

CITY OF LINDSAY
STATEMENT OF NET ASSETS
SEPTEMBER 30, 2006

	Primary Government		
	Governmental Activities	Business-type Activities	Total
ASSETS			
Current assets:			
Cash and cash equivalents	\$ 105,836	\$ 77,387	\$ 183,223
Certificates of deposit	619,000	414,496	1,033,496
Receivables			
Accounts		13,162	13,162
Property taxes (net)	91,748		91,748
Sales taxes	5,797		5,797
Liquor and motel taxes	5,552		5,552
Accrued interest	1,047		1,047
Total current assets	<u>828,980</u>	<u>505,045</u>	<u>1,334,025</u>
Restricted assets:			
Cash - meter deposits	-	4,285	4,285
Certificate of deposit - meter deposits		10,600	10,600
Cash - tourism	4,270		4,270
Lease reserve		39,955	39,955
Total restricted assets	<u>4,270</u>	<u>54,840</u>	<u>59,110</u>
Capital assets:			
Buildings and improvements (net)	391,684		391,684
Plant and equipment (net)	53,998	525,485	579,483
Streets (net)	130,074		130,074
Land	23,700	10,000	33,700
Total capital assets	<u>599,456</u>	<u>535,485</u>	<u>1,134,941</u>
Total assets	<u>1,432,706</u>	<u>1,095,370</u>	<u>2,528,076</u>
LIABILITIES			
Current liabilities:			
Accounts payable	51,222	6,031	57,253
Accrued payroll taxes	2,594		2,594
Customer deposits		14,885	14,885
Deferred revenue	900		900
Current lease payable		39,211	39,211
Less: discount on lease payable		(17,544)	(17,544)
Total current liabilities	<u>54,716</u>	<u>42,583</u>	<u>97,299</u>
Long term liabilities:			
Lease payable	-	317,553	317,553
Less: discount on lease payable		(75,379)	(75,379)
Total long term liabilities	<u>-</u>	<u>242,174</u>	<u>242,174</u>
Total liabilities	<u>54,716</u>	<u>284,757</u>	<u>339,473</u>
NET ASSETS			
Invested in capital assets, net of related debt	599,456	271,644	871,100
Restricted for tourism	7,830		7,830
Restricted for lease reserve		39,955	39,955
Unrestricted	770,704	499,014	1,269,718
Total net assets	<u>\$ 1,377,990</u>	<u>\$ 810,613</u>	<u>\$ 2,188,603</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF ACTIVITIES
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

Functions/Programs	Expenses	Program Revenues		Net (Expense) Revenue
		Charges for Services	Operating Grants and Contributions	
Governmental activities:				
General government	\$ 63,992	\$ 14,381		\$ (49,611)
Public safety:				
Court	7,414	10,421		3,007
Police	73,148		17,058	(56,090)
Fire	3,453			(3,453)
Disaster	221			(221)
Recreation	5,903	1,250		(4,653)
Streets and improvements	6,375			(6,375)
Total governmental activities	<u>160,506</u>	<u>26,052</u>	<u>17,058</u>	<u>(117,396)</u>
Business-type activities:				
Water and sewer utilities	146,689	191,512	-	44,823
Solid waste management	38,938	38,437		(501)
Total business-type activities	<u>185,627</u>	<u>229,949</u>	<u>-</u>	<u>44,322</u>
Total primary government	<u>\$ 346,133</u>	<u>\$ 256,001</u>	<u>\$ 17,058</u>	<u>\$ (73,074)</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF ACTIVITIES (continued)
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

	Primary Government		
	Governmental Activities	Business-type Activities	Total
Change in net assets:			
Net (expense) revenue	\$ (117,396)	\$ 44,322	\$ (73,074)
General revenues:			
Taxes:			
Property	100,357		100,357
Franchise (fees)	38,190	6,300	44,490
Liquor	7,030		7,030
Motel	7,830		7,830
Sales	78,125		78,125
Interest income	28,216	13,590	41,806
Transfers	(36,446)	36,446	-
Total general revenues and transfers	223,302	56,336	279,638
Change in net assets	105,906	100,658	206,564
Net assets - beginning	1,272,084	709,955	1,982,039
Net assets - ending	\$ 1,377,990	\$ 810,613	\$ 2,188,603

See accompanying notes to financial statements.

CITY OF LINDSAY
BALANCE SHEET - GOVERNMENTAL FUNDS
SEPTEMBER 30, 2006

	General Fund	Other Governmental Fund	Total Governmental Funds
ASSETS			
Cash and cash equivalents	\$ 109,206	\$ 900	\$ 110,106
Certificates of deposit	619,000		619,000
Property taxes receivable (net)	91,748		91,748
Liquor and motel taxes receivable	5,552		5,552
Sales taxes receivable	5,797		5,797
Accrued interest	1,047		1,047
Total assets	<u>\$ 832,350</u>	<u>\$ 900</u>	<u>\$ 833,250</u>
LIABILITIES			
Accounts payable	\$ 51,222	\$ -	\$ 51,222
Accrued payroll taxes	2,594		2,594
Deferred revenue	83,717	900	84,617
Total liabilities	<u>137,533</u>	<u>900</u>	<u>138,433</u>
FUND BALANCES			
Reserved for tourism	7,830		7,830
Unreserved	686,987		686,987
Total fund balances	<u>694,817</u>	<u>-</u>	<u>694,817</u>
Total liabilities and fund balances	<u>\$ 832,350</u>	<u>\$ 900</u>	<u>\$ 833,250</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
RECONCILIATION OF THE GOVERNMENTAL FUNDS BALANCE
SHEET TO THE STATEMENT OF NET ASSETS
SEPTEMBER 30, 2006

Total fund balances - governmental funds balance sheet	\$ 694,817
Amounts reported for governmental activities in the statement of net assets are difference because:	
Capital assets used in governmental activities are not reported in the funds.	599,456
Property taxes receivable unavailable to pay for current period expenditures are deferred in the funds.	<u>83,717</u>
Net assets of governmental activities - statement of net assets	<u>\$ 1,377,990</u>

See accompanying notes to financial statements.

CITY OF LINDSAY

**STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES
IN FUND BALANCES - GOVERNMENTAL FUNDS
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006**

	General Fund	Other Governmental Fund	Total Governmental Funds
REVENUES			
Property taxes	\$ 62,776	\$ -	\$ 62,776
Franchise taxes (fees)	38,190		38,190
Liquor taxes	7,030		7,030
Motel taxes	7,830		7,830
Sales taxes	78,125		78,125
Licenses and permits	9,114		9,114
Fees	16,938		16,938
Grants and donations		17,058	17,058
Interest	28,216		28,216
Total revenues	<u>248,219</u>	<u>17,058</u>	<u>265,277</u>
EXPENDITURES			
General government	56,053		56,053
Public safety			
Court	6,494		6,494
Police	85,276	17,058	102,334
Fire	3,025		3,025
Disaster	194		194
Recreation	5,171		5,171
Streets and improvements	64,012		64,012
Total expenditures	<u>220,225</u>	<u>17,058</u>	<u>237,283</u>
Excess (deficiency) of revenues over (under) expenditures	27,994	-	27,994
OTHER FINANCING SOURCES (USES)			
Transfers to other fund	(36,446)	-	(36,446)
Total other financing sources (uses)	<u>(36,446)</u>	<u>-</u>	<u>(36,446)</u>
Net change in fund balances	(8,452)	-	(8,452)
Fund balances - beginning	703,269	-	703,269
Fund balances - ending	<u>\$ 694,817</u>	<u>\$ -</u>	<u>\$ 694,817</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES
AND CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS
TO THE STATEMENT OF ACTIVITIES
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

Net change in fund balances - total governmental funds	\$ (8,452)
Amounts reported for governmental activities in the statement activities ("SOA") are different because:	
Capital outlays are not reported as expenses in the SOA	96,690
The depreciation of capital assets used in governmental activities is not reported in the funds	(19,913)
Certain property tax revenues are deferred in the funds. This is the change in these amounts for this year.	37,581
Change in net assets of governmental activities - statement of activities	<u>\$ 105,906</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF FUND NET ASSETS
PROPRIETARY FUND
SEPTEMBER 30, 2006

	<u>Water and Sewer Utilities</u>
ASSETS	
Current assets:	
Cash and cash equivalents	\$ 77,387
Certificates of deposit	414,496
Accounts receivable	13,162
Total current assets	<u>505,045</u>
Restricted assets:	
Cash - meter deposits	4,285
Certificate of deposit - meter deposits	10,600
Lease reserve	39,955
Total restricted assets	<u>54,840</u>
Capital assets:	
Plant and equipment (net)	525,485
Land	10,000
Total capital assets	<u>535,485</u>
Total assets	<u>1,095,370</u>
LIABILITIES	
Current liabilities:	
Accounts payable	6,031
Customer deposits	14,885
Current lease payable	39,211
Less: discount on lease payable	(17,544)
Total current liabilities	<u>42,583</u>
Long term liabilities:	
Lease payable	317,553
Less: discount on lease payable	(75,379)
Total long term liabilities	<u>242,174</u>
Total liabilities	<u>284,757</u>
NET ASSETS	
Invested in capital assets, net of related debt	271,644
Restricted for lease reserve	39,955
Unrestricted	499,014
Total net assets	<u>\$ 810,613</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF REVENUES, EXPENSES, AND
CHANGES IN FUND NET ASSETS
PROPRIETARY FUND
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

	<u>Water and Sewer Utilities</u>
OPERATING REVENUES	
Charges for services:	
Water and sewer charges	\$ 189,181
Water connection fees	2,330
Sanitation charges	38,438
Franchise fees	6,300
Total operating revenues	<u>236,249</u>
OPERATING EXPENSES	
Depreciation	23,329
General and administrative	17,986
Labor	9,067
Payroll expenses	9,375
Repairs and maintenance	20,400
Supplies	2,650
Testing and inspections	6,166
Utilities	79,456
Total operating expenses	<u>168,429</u>
Operating income	<u>67,820</u>
NONOPERATING REVENUES (EXPENSES)	
Interest income	13,591
Interest expense	(17,199)
Total nonoperating revenues (expenses)	<u>(3,608)</u>
Net income before contributions and transfers	64,212
Transfers from other funds	36,446
Change in net assets	<u>100,658</u>
Net assets - beginning	709,955
Net assets - ending	<u>\$ 810,613</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF CASH FLOWS
INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS
PROPRIETARY FUND
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

Cash flows from operating activities:	
Cash received from customers	\$ 236,911
Cash payments to suppliers for goods and services	(128,484)
Cash payments to employees and contractors for services	(18,442)
Net cash provided (used) by operating activities	<u>89,985</u>
Cash flows from capital and related financing activities:	
Principal payments on capital lease	(18,333)
Interest paid on capital lease	(17,190)
Operating transfers in from general fund	38,446
Net cash provided (used) capital and related financing activities	<u>914</u>
Cash flows from investing activities:	
Interest income	14,351
Net (purchases)/maturities of certificates of deposits	(57,496)
Net cash provided (used) by investing activities	<u>(43,145)</u>
Net increase (decrease) in cash and cash equivalents	47,754
Cash and equivalents, beginning	<u>33,918</u>
Cash and equivalents, ending	<u>\$ 81,672</u>
Reconciliation of operating income to net cash provided (used) by operating activities:	
Operating income	\$ 67,820
Adjustments to reconcile operating income (loss) to net cash provided (used) by operating activities:	
Depreciation	23,329
(Increase) Decrease in accounts receivable	(1,793)
Increase (Decrease) in accounts payable	(1,826)
Increase (Decrease) in customer deposits	2,455
Net cash provided (used) by operating activities	<u>\$ 89,985</u>
Noncash investing, capital, and financing activities:	
There were no significant noncash investing, capital, and financing activities during the reported period.	

	Current Assets	Restricted Assets	Statement of Cash Flows Total
Cash and cash equivalents - beginning	\$ 32,088	\$ 1,830	\$ 33,918
Net increase (decrease)	45,299	2,455	47,754
Cash and cash equivalents - ending	<u>\$ 77,387</u>	<u>\$ 4,285</u>	<u>\$ 81,672</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
NOTES TO THE FINANCIAL STATEMENTS
FOR THE ELEVEN MONTHS ENDED SEPTEMBER 30, 2006

	<u>Beginning Balances</u>	<u>Increases</u>	<u>Decreases</u>	<u>Ending Balances</u>
<u>Business-type activities:</u>				
<u>Capital assets not being depreciated</u>				
Land	\$ 10,000	--	--	\$ 10,000
Total capital assets not being depreciated	<u>10,000</u>	<u>--</u>	<u>--</u>	<u>10,000</u>
<u>Capital assets being depreciated:</u>				
Plant and equipment	1,017,149	--	--	1,017,149
Total capital assets being depreciated	<u>1,017,149</u>	<u>--</u>	<u>--</u>	<u>1,017,149</u>
Less accumulated depreciation for:				
Plant and equipment	(468,335)	(23,329)	--	(491,664)
Total accumulated depreciation	<u>(468,335)</u>	<u>(23,329)</u>	<u>--</u>	<u>(491,664)</u>
Total capital assets being depreciated, net	<u>548,814</u>	<u>(23,329)</u>	<u>--</u>	<u>525,485</u>
Business-type activities capital assets, net	\$558,814	\$(23,329)	\$ --	\$535,485

Depreciation was charged to functions as follows:

Water and sewer utilities \$ 23,329

D. Transfers To and From Other Funds

Transfers to and from other funds at September 30, 2006, consisted of the following:

<u>Transfers From</u>	<u>Transfers To</u>	<u>Amount</u>	<u>Reason</u>
General fund	Water and sewer fund	\$ 36,446	Supplement other fund sources

E. Commitments under Capitalized Leases

During the fiscal year 1995, the City entered into a contract to construct and acquire a new water well under the provisions of a long-term capital lease agreement. Upon final payment (fiscal year 2015) the title of the water well will pass to the City.

Future obligations over the primary terms of the City's capital lease as of September 30, 2006 are as follows:

<u>Year Ending September 30.</u>	<u>Amount</u>
2007	39,211
2008	41,160
2009	41,206
2010	42,788
2011-2015	<u>192,399</u>
Total	\$356,764


The effective interest rate on the capital lease is 6.55%.

In the State of Texas

§
§
§

County of Cooke

I, Betsy Fleitman, City Secretary for the City of Lindsay, Texas, hereby certify that the attached document is a true and correct copy of a document taken from the official City files of the City of Lindsay, Texas, and is maintained in the regular course of business of the City of Lindsay, Texas. Given under my hand and the seal of office on June 3, 2008.



City Secretary
City of Lindsay, Texas

CITY OF LINDSAY
STATEMENT OF NET ASSETS
SEPTEMBER 30, 2007

	Primary Government		
	Governmental Activities	Business-type Activities	Total
ASSETS			
Current assets:			
Cash and cash equivalents	\$ 86,839	\$ 123,756	\$ 210,595
Certificates of deposit	666,754	487,286	1,154,040
Receivables			
Accounts	-	12,657	12,657
Property taxes (net)	102,460	-	102,460
Sales taxes	8,174	-	8,174
Liquor and motel taxes	2,827	-	2,827
Accrued interest	1,047	-	1,047
Total current assets	868,101	623,699	1,491,800
Restricted assets:			
Cash - meter deposits	-	5,605	5,605
Certificate of deposit -meter deposits	-	10,600	10,600
Lease reserve	-	39,955	39,955
Total restricted assets	-	56,160	56,160
Capital assets:			
Buildings and improvements (net)	393,293	-	393,293
Plant and equipment (net)	53,611	503,905	557,516
Streets (net)	136,072	-	136,072
Land	23,700	10,000	33,700
Total capital assets	606,676	513,905	1,120,581
Total assets	1,474,777	1,193,764	2,668,541
LIABILITIES			
Current liabilities:			
Accounts payable	2,971	14,296	17,267
Accrued payroll liabilities	1,440	-	1,440
Customer deposits	-	16,280	16,280
Deferred revenue	542	-	542
Current lease payable	-	41,160	41,160
Less: discount on lease payable	-	(16,160)	(16,160)
Total current liabilities	4,953	55,576	60,529
Long term liabilities:			
Lease payable	-	276,394	276,394
Less: discount on lease payable	-	(57,553)	(57,553)
Total long term liabilities	-	218,841	218,841
Total liabilities	4,953	274,417	279,370
NET ASSETS			
Invested in capital assets, net of related debt	606,676	270,064	876,740
Restricted for lease reserve	-	39,955	39,955
Reserved for street improvement project	225,000	-	225,000
Unrestricted	638,148	609,328	1,247,476
Total net assets	\$ 1,469,824	\$ 919,347	\$ 2,389,171

CITY OF LINDSAY
STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED SEPTEMBER 30, 2007

Functions/Programs	Expenses	Program Revenues		Net (Expense) Revenue
		Charges for Services	Operating Grants and Contributions	
Governmental activities:				
General government	\$ 86,280	\$ 14,515	\$ -	\$ (71,765)
Public safety:				
Court	10,802	20,248	-	9,446
Police	63,752	-	1,021	(62,731)
Fire	5,895	-	-	(5,895)
Disaster	7,165	-	-	(7,165)
Recreation	7,059	2,025	-	(5,034)
Streets and improvements	17,134	-	-	(17,134)
Total governmental activities	198,087	36,788	1,021	(160,278)
Business-type activities:				
Water and sewer utilities	159,584	189,927	-	30,343
Solid waste management	45,397	44,830	-	(567)
Total business-type activities	204,981	234,757	-	29,776
Total primary government	\$ 403,068	\$ 271,545	\$ 1,021	\$ (130,502)

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF ACTIVITIES (continued)
FOR THE YEAR ENDED SEPTEMBER 30, 2007

	Primary Government		
	Governmental Activities	Business-type Activities	Total
Change in net assets:			
Net (expense) revenue	\$ (160,278)	\$ 29,776	\$ (130,502)
General revenues:			
Taxes:			
Property	107,117	-	107,117
Franchise (fees)	40,440	7,843	48,283
Liquor	7,498	-	7,498
Motel	7,158	-	7,158
Sales	97,222	-	97,222
Interest income	36,088	27,704	63,792
Transfers	(43,411)	43,411	-
Total general revenues and transfers	252,112	78,958	331,070
Change in net assets	91,834	108,734	200,568
Net assets - beginning	1,377,990	810,613	2,188,603
Net assets - ending	\$ 1,469,824	\$ 919,347	\$ 2,389,171

See accompanying notes to financial statements.

CITY OF LINDSAY
BALANCE SHEET - GOVERNMENTAL FUNDS
SEPTEMBER 30, 2007

	General Fund	Other Governmental Fund	Total Governmental Funds
ASSETS			
Cash and cash equivalents	\$ 86,297	\$ 542	\$ 86,839
Certificates of deposit	666,754	-	666,754
Property taxes receivable (net)	102,460	-	102,460
Liquor and motel taxes receivable	2,827	-	2,827
Sales taxes receivable	8,174	-	8,174
Accrued interest	1,047	-	1,047
Total assets	<u>\$ 867,559</u>	<u>\$ 542</u>	<u>\$ 868,101</u>
LIABILITIES			
Accounts payable	\$ 2,971	\$ -	\$ 2,971
Accrued payroll liabilities	1,440	-	1,440
Deferred revenue	92,098	542	92,640
Total liabilities	<u>96,509</u>	<u>542</u>	<u>97,051</u>
FUND BALANCES			
Designated for improvements related to grant	225,000	-	225,000
Unreserved	546,050	-	546,050
Total fund balances	<u>771,050</u>	<u>-</u>	<u>771,050</u>
Total liabilities and fund balances	<u>\$ 867,559</u>	<u>\$ 542</u>	<u>\$ 868,101</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
RECONCILIATION OF THE GOVERNMENTAL FUNDS BALANCE
SHEET TO THE STATEMENT OF NET ASSETS
SEPTEMBER 30, 2007

Total fund balances - governmental funds balance sheet	\$ 771,050
Amounts reported for governmental activities in the statement of net assets are difference because:	
Capital assets used in governmental activities are not reported in the funds.	606,676
Property taxes receivable unavailable to pay for current period expenditures are deferred in the funds.	92,098
Net assets of governmental activities - statement of net assets	<u>\$ 1,469,824</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES
IN FUND BALANCES - GOVERNMENTAL FUNDS
FOR THE YEAR ENDED SEPTEMBER 30, 2007

	General Fund	Other Governmental Fund	Total Governmental Funds
REVENUES			
Property taxes	\$ 98,736	\$ -	\$ 98,736
Franchise taxes (fees)	40,440	-	40,440
Liquor taxes	7,498	-	7,498
Motel taxes	7,158	-	7,158
Sales taxes	97,222	-	97,222
Licenses and permits	11,202	-	11,202
Fees	25,586	-	25,586
Grants and donations	-	1,021	1,021
Interest	36,088	-	36,088
Total revenues	<u>323,930</u>	<u>1,021</u>	<u>324,951</u>
EXPENDITURES			
General government	84,339		84,339
Public safety			
Court	9,277		9,277
Police	53,733	1,021	54,754
Fire	5,063		5,063
Disaster	6,154		6,154
Recreation	17,042		17,042
Streets and improvements	28,678		28,678
Total expenditures	<u>204,286</u>	<u>1,021</u>	<u>205,307</u>
Excess (deficiency) of revenues over (under) expenditures	119,644	-	119,644
OTHER FINANCING SOURCES (USES)			
Transfers to other fund	(43,411)	-	(43,411)
Total other financing sources (uses)	<u>(43,411)</u>	<u>-</u>	<u>(43,411)</u>
Net change in fund balances	76,233	-	76,233
Fund balances - beginning	694,817	-	694,817
Fund balances - ending	<u>\$ 771,050</u>	<u>\$ -</u>	<u>\$ 771,050</u>

See accompanying notes to financial statements.

CITY OF LINDSAY

**RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES
AND CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS
TO THE STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED SEPTEMBER 30, 2007**

Net change in fund balances - total governmental funds	\$ 76,233
Amounts reported for governmental activities in the statement activities ("SOA") are different because:	
Capital outlays are not reported as expenses in the SOA	35,178
The depreciation of capital assets used in governmental activities is not reported in the funds	(27,958)
Certain property tax revenues are deferred in the funds. This is the change in these amounts for this year.	8,381
Change in net assets of governmental activities - statement of activities	<u>\$ 91,834</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF FUND NET ASSETS
PROPRIETARY FUND
SEPTEMBER 30, 2007

	<u>Water and Sewer Utilities</u>
ASSETS	
Current assets:	
Cash and cash equivalents	\$ 123,756
Certificates of deposit	487,286
Accounts receivable	12,657
Total current assets	<u>623,699</u>
Restricted assets:	
Cash - meter deposits	5,605
Certificate of deposit - meter deposits	10,600
Lease reserve	39,955
Total restricted assets	<u>56,160</u>
Capital assets:	
Plant and equipment (net)	503,905
Land	10,000
Total capital assets	<u>513,905</u>
Total assets	<u>1,193,764</u>
LIABILITIES	
Current liabilities:	
Accounts payable	14,296
Customer deposits	16,280
Current lease payable	41,160
Less: discount on lease payable	(16,160)
Total current liabilities	<u>55,576</u>
Long term liabilities:	
Lease payable	276,394
Less: discount on lease payable	(57,553)
Total long term liabilities	<u>218,841</u>
Total liabilities	<u>274,417</u>
NET ASSETS	
Invested in capital assets, net of related debt	270,064
Restricted for lease reserve	39,955
Unrestricted	609,328
Total net assets	<u>\$ 919,347</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF REVENUES, EXPENSES, AND
CHANGES IN FUND NET ASSETS
PROPRIETARY FUND
FOR THE YEAR ENDED SEPTEMBER 30, 2007

	<u>Water and Sewer Utilities</u>
OPERATING REVENUES	
Charges for services:	
Water and sewer charges	\$ 189,927
Water connection fees	
Sanitation charges	44,830
Franchise fees	7,843
Total operating revenues	<u>242,600</u>
OPERATING EXPENSES	
Depreciation	29,795
General and administrative	17,090
Labor	14,693
Payroll expenses	11,796
Repairs and maintenance	26,793
Supplies	3,994
Testing and inspections	1,295
Utilities	80,314
Total operating expenses	<u>185,770</u>
Operating income	<u>56,830</u>
NONOPERATING REVENUES (EXPENSES)	
Interest income	27,704
Interest expense	<u>(19,211)</u>
Total nonoperating revenues (expenses)	<u>8,493</u>
Net income before contributions and transfers	65,323
Transfers from other funds	43,411
Change in net assets	<u>108,734</u>
Net assets - beginning	810,613
Net assets - ending	<u>\$ 919,347</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
STATEMENT OF CASH FLOWS
INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS
PROPRIETARY FUND
FOR THE YEAR ENDED SEPTEMBER 30, 2007

Cash flows from operating activities:	
Cash received from customers	\$ 244,499
Cash payments to suppliers for goods and services	(121,220)
Cash payments to employees and contractors for services	(26,489)
Net cash provided (used) by operating activities	<u>96,790</u>
Cash flows from capital and related financing activities:	
Principal payments on capital lease	(20,000)
Interest paid on capital lease	(19,211)
Purchases of fixed assets	(8,216)
Operating transfers in from general fund	43,411
Net cash provided (used) capital and related financing activities	<u>(4,016)</u>
Cash flows from investing activities:	
Interest income	27,704
Net (purchases)/maturities of certificates of deposits	(72,789)
Net cash provided (used) by investing activities	<u>(45,085)</u>
Net increase (decrease) in cash and cash equivalents	47,689
Cash and equivalents, beginning	<u>81,672</u>
Cash and equivalents, ending	<u>\$ 129,361</u>
Reconciliation of operating income to net cash provided (used) by operating activities:	
Operating income	\$ 56,830
Adjustments to reconcile operating income (loss) to net cash provided (used) by operating activities:	
Depreciation	29,795
(Increase) Decrease in accounts receivable	505
Increase (Decrease) in accounts payable	8,265
Increase (Decrease) in customer deposits	1,395
Net cash provided (used) by operating activities	<u>\$ 96,790</u>
Noncash investing, capital, and financing activities:	
There were no significant noncash investing, capital, and financing activities during the reported period.	

	Current Assets	Restricted Assets	Statement of Cash Flows Total
Cash and cash equivalents - beginning	\$ 77,387	\$ 4,285	\$ 81,672
Net increase (decrease)	46,369	1,320	47,689
Cash and cash equivalents - ending	<u>\$ 123,756</u>	<u>\$ 5,605</u>	<u>\$ 129,361</u>

See accompanying notes to financial statements.

CITY OF LINDSAY
NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED SEPTEMBER 30, 2007

	Beginning		Ending	
	<u>Balances</u>	<u>Increases</u>	<u>Decreases</u>	<u>Balances</u>
<u>Business-type activities:</u>				
<i>Capital assets not being depreciated</i>				
Land	\$ 10,000	--	--	\$ 10,000
Total capital assets not being depreciated	<u>10,000</u>	<u>--</u>	<u>--</u>	<u>10,000</u>
<i>Capital assets being depreciated:</i>				
Plant and equipment	1,017,149	8,215	--	1,025,364
Total capital assets being depreciated	<u>1,017,149</u>	<u>8,215</u>	<u>--</u>	<u>1,025,364</u>
Less accumulated depreciation for:				
Plant and equipment	(491,664)	(29,795)	--	(521,459)
Total accumulated depreciation	<u>(491,664)</u>	<u>(29,795)</u>	<u>--</u>	<u>(521,459)</u>
Total capital assets being depreciated, net	525,485	(21,580)	--	503,905
Business-type activities capital assets, net	\$535,485	\$(21,580)	\$ --	\$513,905

Depreciation was charged to functions as follows:

Water and sewer utilities \$ 29,795

D. Transfers To and From Other Funds

Transfers to and from other funds at September 30, 2007, consisted of the following:

<u>Transfers From</u>	<u>Transfers To</u>	<u>Amount</u>	<u>Reason</u>
General fund	Water and sewer fund	\$ 43,411	Supplement other fund sources

E. Commitments under Capitalized Leases

During the fiscal year 1995, the City entered into a contract to construct and acquire a new water well under the provisions of a long-term capital lease agreement. Upon final payment (fiscal year 2015) the title of the water well will pass to the City.

Future obligations over the primary terms of the City's capital lease as of September 30, 2007 are as follows:

<u>Year Ending</u>	<u>Amount</u>
<u>September 30,</u>	
2008	41,160
2009	41,206
2010	42,788
2011	40,802
2012	40,469
2013-2015	111,129
Total	\$317,554

The effective interest rate on the capital lease is 6.55%.

FEDERAL RESERVE statistical release



H.15 (519) SELECTED INTEREST RATES

Yields in percent per annum

For use at 2:30 p.m. Eastern Time
May 12, 2008

Instruments	2008 May 5	2008 May 6	2008 May 7	2008 May 8	2008 May 9	Week Ending		2008
						May 9	May 2	Apr
Federal funds (effective) ^{1 2 3}	1.85	1.91	2.01	1.99	1.97	1.94	2.28	2.28
Commercial Paper ^{3 4 5}								
Nonfinancial								
1-month	1.98	1.96	1.98	1.96	1.94	1.96	2.05	2.10
2-month	1.99	1.99	1.98	2.00	1.96	1.98	2.02	2.05
3-month	n.a.	n.a.	n.a.	n.a.	1.96	1.96	1.87	1.99
Financial								
1-month	2.45	2.30	2.17	2.37	2.44	2.35	2.55	2.56
2-month	2.51	2.49	2.44	2.50	2.52	2.49	2.60	2.61
3-month	2.59	2.55	2.70	2.58	2.68	2.62	2.72	2.72
CDs (secondary market) ^{3 6}								
1-month	2.68	2.65	2.60	2.62	2.54	2.62	2.75	2.82
3-month	2.73	2.72	2.71	2.70	2.63	2.70	2.82	2.85
6-month	2.84	2.84	2.82	2.80	2.72	2.80	2.94	2.86
Eurodollar deposits (London) ^{3 7}								
1-month	2.85	2.85	2.75	2.75	2.65	2.77	2.91	2.97
3-month	2.90	2.90	2.85	2.85	2.75	2.85	3.07	3.03
6-month	3.05	3.00	3.00	2.95	2.90	2.98	3.19	3.04
Bank prime loan ^{2 3 8}	5.00	5.00	5.00	5.00	5.00	5.00	5.21	5.24
Discount window primary credit ^{2 9}	2.25	2.25	2.25	2.25	2.25	2.25	2.46	2.49
U.S. government securities								
Treasury bills (secondary market) ^{3 4}								
4-week	1.30	1.51	1.54	1.52	1.57	1.49	1.14	1.04
3-month	1.51	1.60	1.64	1.63	1.66	1.61	1.43	1.29
6-month	1.72	1.72	1.71	1.70	1.70	1.71	1.67	1.55
Treasury constant maturities								
Nominal ¹⁰								
1-month	1.34	1.53	1.57	1.55	1.60	1.52	1.17	1.07
3-month	1.53	1.63	1.67	1.66	1.69	1.64	1.45	1.31
6-month	1.76	1.76	1.75	1.74	1.74	1.75	1.71	1.58
1-year	1.98	1.96	1.94	1.91	1.91	1.94	1.93	1.74
2-year	2.42	2.38	2.31	2.25	2.25	2.32	2.37	2.05
3-year	2.62	2.62	2.56	2.47	2.50	2.55	2.56	2.23
5-year	3.14	3.15	3.09	2.99	2.98	3.07	3.10	2.84
7-year	3.45	3.51	3.45	3.34	3.33	3.42	3.41	3.19
10-year	3.88	3.93	3.87	3.79	3.77	3.85	3.83	3.68
20-year	4.58	4.64	4.61	4.55	4.52	4.58	4.54	4.44
30-year	4.58	4.64	4.61	4.50	4.53	4.57	4.53	4.44
Inflation indexed ¹¹								
5-year	0.85	0.84	0.80	0.69	0.66	0.77	0.82	0.62
7-year	1.19	1.23	1.20	1.12	1.09	1.17	1.18	1.00
10-year	1.53	1.55	1.51	1.43	1.39	1.48	1.53	1.36
20-year	2.04	2.07	2.05	1.98	1.95	2.02	2.03	1.91
Inflation-indexed long-term average ¹²	2.03	2.07	2.05	1.98	1.95	2.02	2.02	1.90
Interest rate swaps ¹³								
1-year	2.87	2.84	2.86	2.75	2.75	2.81	2.91	2.71
2-year	3.21	3.16	3.19	3.02	3.01	3.12	3.18	2.89
3-year	3.51	3.46	3.51	3.32	3.31	3.42	3.46	3.18
4-year	3.73	3.70	3.76	3.59	3.56	3.67	3.68	3.45
5-year	3.91	3.88	3.95	3.78	3.76	3.85	3.86	3.66
7-year	4.19	4.17	4.25	4.10	4.07	4.16	4.14	3.99
10-year	4.47	4.45	4.54	4.40	4.37	4.44	4.42	4.30
30-year	4.92	4.91	4.99	4.87	4.84	4.91	4.87	4.80
Corporate bonds								
Moody's seasoned								
Aaa ¹⁴	5.57	5.63	5.61	5.53	5.49	5.57	5.56	5.55
Baa	6.89	6.94	6.92	6.87	6.84	6.89	6.90	6.97
State & local bonds ¹⁵				4.62		4.62	4.63	4.70
Conventional mortgages ¹⁶				6.05		6.05	6.06	5.92

See overleaf for footnotes.
n.a. Not available.

Footnotes

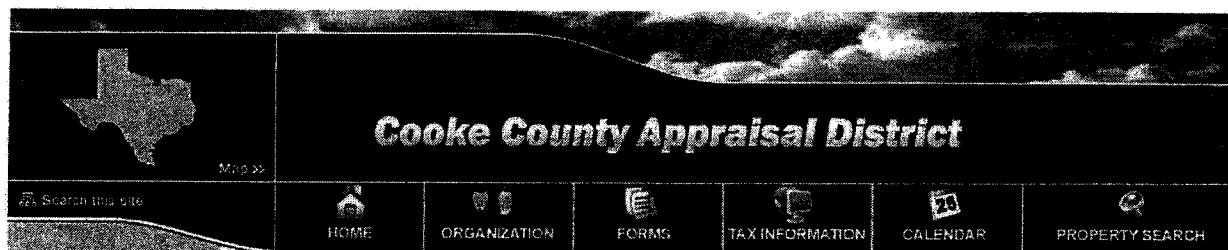
1. The daily effective federal funds rate is a weighted average of rates on brokered trades.
2. Weekly figures are averages of 7 calendar days ending on Wednesday of the current week; monthly figures include each calendar day in the month.
3. Annualized using a 360-day year or bank interest.
4. On a discount basis.
5. Interest rates interpolated from data on certain commercial paper trades settled by The Depository Trust Company. The trades represent sales of commercial paper by dealers or direct issuers to investors (that is, the offer side). The 1-, 2-, and 3-month rates are equivalent to the 30-, 60-, and 90-day dates reported on the Board's Commercial Paper Web page (www.federalreserve.gov/releases/cp/).
6. An average of dealer bid rates on nationally traded certificates of deposit.
7. Bid rates for Eurodollar deposits collected around 9:30 a.m. Eastern time.
8. Rate posted by a majority of top 25 (by assets in domestic offices) insured U.S.-chartered commercial banks. Prime is one of several base rates used by banks to price short-term business loans.
9. The rate charged for discounts made and advances extended under the Federal Reserve's primary credit discount window program, which became effective January 9, 2003. This rate replaces that for adjustment credit, which was discontinued after January 8, 2003. For further information, see www.federalreserve.gov/boarddocs/press/bcreg/2002/200210312/default.htm. The rate reported is that for the Federal Reserve Bank of New York. Historical series for the rate on adjustment credit as well as the rate on primary credit are available at www.federalreserve.gov/releases/h15/data.htm.
10. Yields on actively traded non-inflation-indexed issues adjusted to constant maturities. The 30-year Treasury constant maturity series was discontinued on February 18, 2002, and reintroduced on February 9, 2006. From February 18, 2002, to February 9, 2006, the U.S. Treasury published a factor for adjusting the daily nominal 20-year constant maturity in order to estimate a 30-year nominal rate. The historical adjustment factor can be found at www.treas.gov/offices/domestic-finance/debt-management/interest-rate/ltcompositeindex_historical.shtml. Source: U.S. Treasury.
11. Yields on Treasury inflation protected securities (TIPS) adjusted to constant maturities. Source: U.S. Treasury. Additional information on both nominal and inflation-indexed yields may be found at www.treas.gov/offices/domestic-finance/debt-management/interest-rate/index.html.
12. Based on the unweighted average bid yields for all TIPS with remaining terms to maturity of more than 10 years.
13. International Swaps and Derivatives Association (ISDA®) mid-market par swap rates. Rates are for a Fixed Rate Payer in return for receiving three month LIBOR, and are based on rates collected at 11:00 a.m. Eastern time by Garban InterCapital plc and published on Reuters Page ISDAFIX®1. ISDAFIX is a registered service mark of ISDA. Source: Reuters Limited.
14. Moody's Aaa rates through December 6, 2001, are averages of Aaa utility and Aaa industrial bond rates. As of December 7, 2001, these rates are averages of Aaa industrial bonds only.
15. Bond Buyer Index, general obligation, 20 years to maturity, mixed quality; Thursday quotations.
16. Contract interest rates on commitments for fixed-rate first mortgages. Source: FHLMC.

Note: Weekly and monthly figures on this release, as well as annual figures available on the Board's historical H.15 web site (see below), are averages of business days unless otherwise noted.

Current and historical H.15 data are available on the Federal Reserve Board's web site (www.federalreserve.gov/). For information about individual copies or subscriptions, contact Publications Services at the Federal Reserve Board (phone 202-452-3244, fax 202-728-5886). For paid electronic access to current and historical data, call STAT-USA at 1-800-782-8872 or 202-482-1986.

Description of the Treasury Nominal and Inflation-Indexed Constant Maturity Series

Yields on Treasury nominal securities at "constant maturity" are interpolated by the U.S. Treasury from the daily yield curve for non-inflation-indexed Treasury securities. This curve, which relates the yield on a security to its time to maturity, is based on the closing market bid yields on actively traded Treasury securities in the over-the-counter market. These market yields are calculated from composites of quotations obtained by the Federal Reserve Bank of New York. The constant maturity yield values are read from the yield curve at fixed maturities, currently 1, 3, and 6 months and 1, 2, 3, 5, 7, 10, 20, and 30 years. This method provides a yield for a 10-year maturity, for example, even if no outstanding security has exactly 10 years remaining to maturity. Similarly, yields on inflation-indexed securities at "constant maturity" are interpolated from the daily yield curve for Treasury inflation protected securities in the over-the-counter market. The inflation-indexed constant maturity yields are read from this yield curve at fixed maturities, currently 5, 7, 10, and 20 years.



Links

[City of Gainesville](#)
[Gainesville Chamber of Commerce](#)
[How to Get More Information](#)
[Pay Online with a Credit Card](#)
 Phone: (940) 665-7651
 Fax: (940) 668-2587
 Address: 201 N. Dixon
 Gainesville, TX 76240
[Email](#)

Current Tax Rates

TAXING JURISDICTIONS	2007
Cooke County	.476700
Lateral Road	.000100
Callisburg ISD	1.215029
Era ISD	1.184000
Gainesville ISD	1.285419
Lindsay ISD	1.019193
Muenster ISD	1.196000
Sivells Bend ISD	0.886709
Valley View ISD	1.124700
Walnut Bend ISD	1.040000
Callisburg City	0.164100
Gainesville City	0.647000
* Muenster City	0.340000
Oakridge City	0.163300
Valley View City	0.210000
Lindsay City	0.221600
North Central Texas College	0.077200
Gainesville Hospital	0.114100
Muenster Hospital	0.188900
* Muenster Water	0.337030
Clear Creek Water	0.065200
CCAD collects for all entities. EXCEPT	
*Muenster City & *Muenster Water. Muenster City Collects for these Entities.	

[HOME](#) :: [ORGANIZATION](#) :: [FORMS](#) :: [TAX INFORMATION](#) :: [CALENDAR](#) :: [PROPERTY SEARCH](#)
 Copyright © True Automation, Inc. All Rights Reserved.

**Study to Determine the
Magnitude of, and Reasons for,
Chronically Malfunctioning On-Site
Sewage Facility Systems in Texas**

Funded by:

**Texas On-Site Wastewater
Treatment Research Council**

September 2001

Prepared by:

**Reed, Stowe & Yanke, LLC
5806 Mesa Drive, Suite 310
Austin, Texas 78731
(512) 450-0991**



REED, STOWE & YANKE
A Limited Liability Company

September 12, 2001

Mr. Warren Samuelson, Executive Secretary
Texas On-Site Wastewater Treatment Research Council
C/O Installer Certification Section, MC-178
P.O. Box 13087
Austin, Texas 78711-3087

RE: Study to Determine the Magnitude of, and Reasons for, Chronically Malfunctioning On-Site Sewage Facility (OSSF) Systems in Texas

Dear Mr. Samuelson:

Reed, Stowe and Yanke, LLC (RS&Y) is pleased to provide the results of the "Study to Determine the Magnitude, and Reasons for, Chronically Malfunctioning On-Site Sewage Facility (OSSF) Systems in Texas" to the Texas On-Site Wastewater Treatment Research Council (Council).

Based on the results of the statewide survey administered for this project, the number of reported chronically malfunctioning OSSFs in the State is approximately 148,573, which represents approximately 13% of the OSSF systems represented by the survey results. These results indicate that there is a potentially serious threat to human health and the environment due to the large number of chronically malfunctioning OSSFs in Texas. As a part of this study, RS&Y evaluated reasons for chronically malfunctioning OSSFs in Texas. Several of the key reasons for malfunction include the following:

- OSSF systems that are older and/or pre-regulatory tend to be problematic and have a higher malfunction rate than newer OSSF systems. The reasons for this high rate of malfunction include, but are not limited to; installation in improper soil types, installation in an undersized lot, system is undersized for current uses, and improper operation and maintenance.
- Since the development of regulations, other types of problems related to OSSFs have emerged. These problems are typically related to the need for on-going maintenance, which is a requirement of many of the newer systems.
- Factors that contribute to malfunctions frequently include a lack of (1) public education programs for OSSF owners, (2) effective enforcement programs, and (3) records about existing OSSF systems.

Developing solutions to the problems presented by malfunctioning OSSFs is a significant challenge facing the State of Texas. Meeting this challenge will require the replacement of many OSSFs in the State and the development and implementation of more effective education, management and enforcement programs by local authorized agents and the TNRCC. Should you have any questions regarding the content of this study, please contact Mr. Scott Pasternak at (512) 450-0991.

Sincerely,

Reed, Stowe & Yanke, LLC
Reed, Stowe and Yanke, LLC

TABLE OF CONTENTS

List of Figures, Tables and Charts	iii
Executive Summary	v
Introduction.....	1
Project Background.....	1
Texas On-Site Wastewater Treatment Research Council.....	2
Project Purpose	2
Document Format	2
Acknowledgements.....	3
Section 1: Methodology.....	4
Existing Data.....	4
Survey Instrument.....	6
Dividing the State into Regions	9
Section 2: Regional Analysis.....	12
Region I.....	12
Region II	21
Region III.....	30
Region IV.....	38
Region V	47
Section 3: Regional Comparison	56
Description of Survey Results	56
Designated Representative Background Information	56
Malfunctioning OSSF Systems	57
OSSF Systems by Soil Classification	58
Ranking of Factors in Malfunctioning OSSF Systems	59
Contributing Factors to the Malfunction of OSSF Systems	59
Effects of Soil, Design, Climate, and Operation/Maintenance	60
Functionality of Different Types of OSSF Systems	60
1997 Rule Changes	61
Owner Education and Designated Representative Training	61
Section 4: Policy Issues and Key Findings.....	62
Issue 1: Malfunctioning OSSFs are a Significant Problem.....	63
Issue 2: OSSF Systems Installed in Improper Soil Classes.....	63
Issue 3: Malfunctions Related to System Age and "Grandfathered" Systems	63
Issue 4: System Operation and Maintenance.....	65
Issue 5: Need for Public Education of OSSF Owners	67

Issue 6: Lack of Enforcement	68
Issue 7: Need for Records Regarding Existing OSSF Systems	71
Issue 8: Need for Further Regional Research	72
Section 5: Recommendations for Future Council Research Projects	73
Recommendation 1: Inform State and Local Officials about OSSF Problems.....	73
Recommendation 2: Use this Study to Prioritize Future Council Projects.....	73
Recommendation 3: Develop a Comprehensive Resource.....	74
Recommendation 4: Conduct Further Regional Research.....	75

Appendices

Appendix A: Survey Instrument

Appendix B: Literature Review

LIST OF TABLES, FIGURES AND CHARTS

Figure 1: On-Site Wastewater Regions of Texas.....	12
Region I:	
Table I.A: Survey Response Profile.....	12
Table I.B: Designated Representative Background Information.....	13
Table I.C: Malfunctioning OSSF Systems	13
Table I.D: OSSF Systems by Soil Classification.....	14
Table I.E: Ranking of Factors in Malfunctioning OSSF Systems.....	14
Table I.F: Contributing Factors to the Malfunctioning OSSF Systems.....	15
Table I.G: Effects of Soil, Design, Climate and O&M on OSSF Systems.....	16
Table I.H: Functionality of Different Types of OSSF Systems.....	17
Table I.I: Functionality of Different Treatment Technologies	17
Table I.J: 1997 Rule Changes	18
Table I.K: Owner Education and Designated Representative Training.....	18
Region II:	
Table II.A: Survey Response Profile	21
Table II.B: Designated Representative Background Information.....	21
Table II.C: Malfunctioning OSSF Systems	22
Table II.D: OSSF Systems by Soil Classification	22
Table II.E: Ranking of Factors in Malfunctioning OSSF Systems.....	23
Table II.F: Contributing Factors to the Malfunctioning OSSF Systems	24
Table II.G: Effects of Soil, Design, Climate and O&M on OSSF Systems	25
Table II.H: Functionality of Different Types of OSSF Systems	26
Table II.I: Functionality of Different Treatment Technologies	26
Table II.J: 1997 Rule Changes	27
Table II.K: Owner Education and Designated Representative Training	27
Region III:	
Table III.A: Survey Response Profile.....	30
Table III.B: Designated Representative Background Information	31
Table III.C: Malfunctioning OSSF Systems.....	31
Table III.D: OSSF Systems by Soil Classification.....	32
Table III.E: Ranking of Factors in Malfunctioning OSSF Systems	32

Table III.F: Contributing Factors to the Malfunctioning OSSF Systems	33
Table III.G: Effects of Soil, Design, Climate and O&M on OSSF Systems	34
Table III.H: Functionality of Different Types of OSSF Systems	35
Table III.I: Functionality of Different Treatment Technologies	35
Table III.J: 1997 Rule Changes	35
Table III.K: Owner Education and Designated Representative Training	36
Region IV:	
Table IV.A: Survey Response Profile	38
Table IV.B: Designated Representative Background Information	38
Table IV.C: Malfunctioning OSSF Systems	39
Table IV.D: OSSF Systems by Soil Classification	39
Table IV.E: Ranking of Factors in Malfunctioning OSSF Systems	40
Table IV.F: Contributing Factors to the Malfunctioning OSSF Systems	41
Table IV.G: Effects of Soil, Design, Climate and O&M on OSSF Systems	42
Table IV.H: Functionality of Different Types of OSSF Systems	43
Table IV.I: Functionality of Different Treatment Technologies	43
Table IV.J: 1997 Rule Changes	44
Table IV.K: Owner Education and Designated Representative Training	44
Region V:	
Table V.A: Survey Response Profile	47
Table V.B: Designated Representative Background Information	47
Table V.C: Malfunctioning OSSF Systems	48
Table V.D: OSSF Systems by Soil Classification	48
Table V.E: Ranking of Factors in Malfunctioning OSSF Systems	49
Table V.F: Contributing Factors to the Malfunctioning OSSF Systems	50
Table V.G: Effects of Soil, Design, Climate and O&M on OSSF Systems	51
Table V.H: Functionality of Different Types of OSSF Systems	52
Table V.I: Functionality of Different Treatment Technologies	52
Table V.J: 1997 Rule Changes	53
Table V.K: Owner Education and Designated Representative Training	53
Table A.1: Regional Response Rates	56
Chart A.1: Percentage of Chronically Malfunctioning OSSF Systems by Region and Statewide	57
Chart A.2: Total Number of Chronically Malfunctioning Systems per Region	58

EXECUTIVE SUMMARY

The State of Texas contains approximately 1.5 million households that rely upon on-site sewage facility (OSSF) systems for wastewater disposal and the numbers are increasing each year. Approximately 55,052 OSSF systems were installed in Texas in 1999, and approximately 49,616 systems were installed in 2000. Unlike households connected to centralized systems, households with OSSF systems are required to have a general understanding of the operation and maintenance needs of the system in order to ensure that it functions properly.

When an OSSF system is not functioning properly, it cannot only become an inconvenience for the homeowner, but it can create threats to public health and the environment. This threat to public health can reach beyond the individual household and extend to the community at large. Recent research completed by the United States Environmental Protection Agency (U.S. EPA) identified a number of public health and environmental problems related to the malfunction of OSSFs.¹ Effluent from malfunctioning OSSF systems can provide a medium for the transmission of disease. For example, the U.S. EPA has estimated that approximately 169,000 viral and 34,000 bacterial illnesses occur each year as the result of drinking contaminated groundwater. Malfunctioning OSSFs have been identified as a potential source of this contamination. Within the context of the natural environment, malfunctioning OSSFs have also been considered a primary reason for reduced harvests in many shellfish growing areas.

Project Overview

In 2000, the Texas On-Site Wastewater Treatment Research Council (Council) determined that there was a need to study the magnitude of, and reasons for, chronically malfunctioning OSSFs in the State of Texas. Given the large size of Texas and the various soil types and climate conditions within the state, the Council decided to approach the research from a regional perspective. Reed, Stowe & Yanke, LLC (RS&Y) was retained by the Council in October of 2000 to research the issues and factors that contribute to OSSF malfunction, as well as determine the extent of the problem in the various regions of Texas.

After reviewing the existing literature and the available data on OSSF systems, RS&Y determined that the Council's project goals would best be attained through the administration of a survey to the Designated Representatives across Texas. It was decided that Designated Representatives were the appropriate survey population due to their comprehensive knowledge of issues related to OSSF malfunctions within their respective jurisdictions. The survey contained questions that were designed to ascertain the reasons for chronically malfunctioning OSSF systems and covered topics such as

¹ EPA Guidelines for Management of Onsite/Decentralized Wastewater Systems (Draft). United States Environmental Protection Agency, September 26, 2000. Pages 1-2.

system design, operation and maintenance, OSSF owner education, effective treatment technologies, soil type, and climate conditions. The survey was mailed to 278 Designated Representatives in January of 2001.

Figure ES.1 On-Site Wastewater Regions of Texas

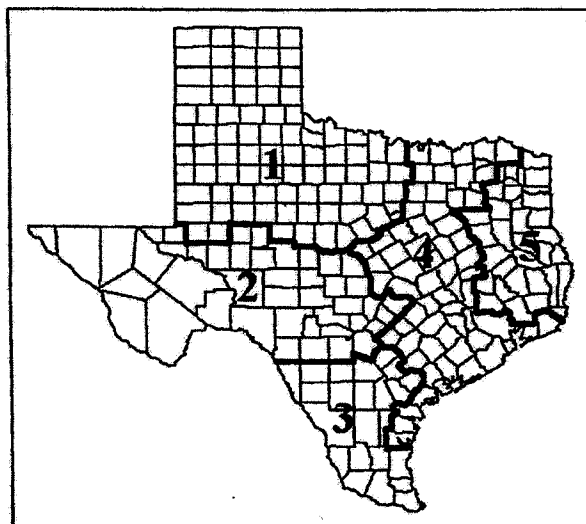
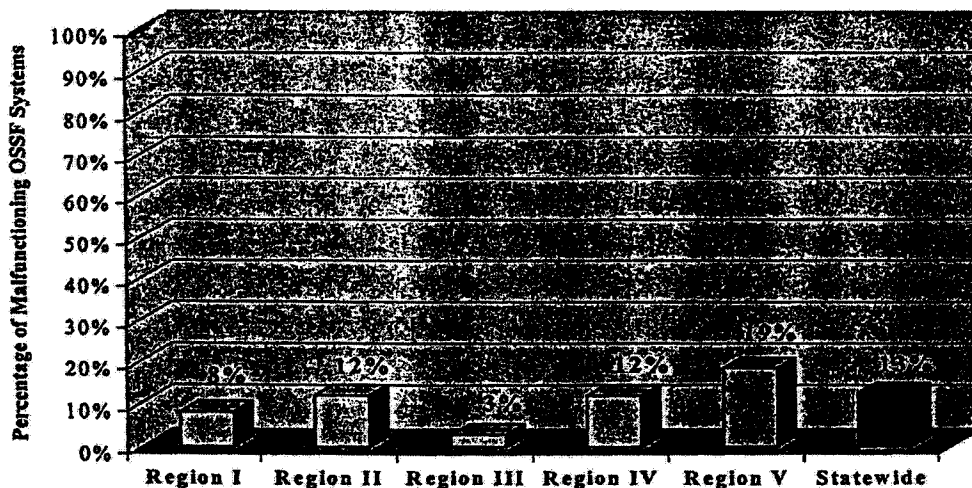


Chart ES.1 Percentage of Chronically Malfunctioning OSSF Systems

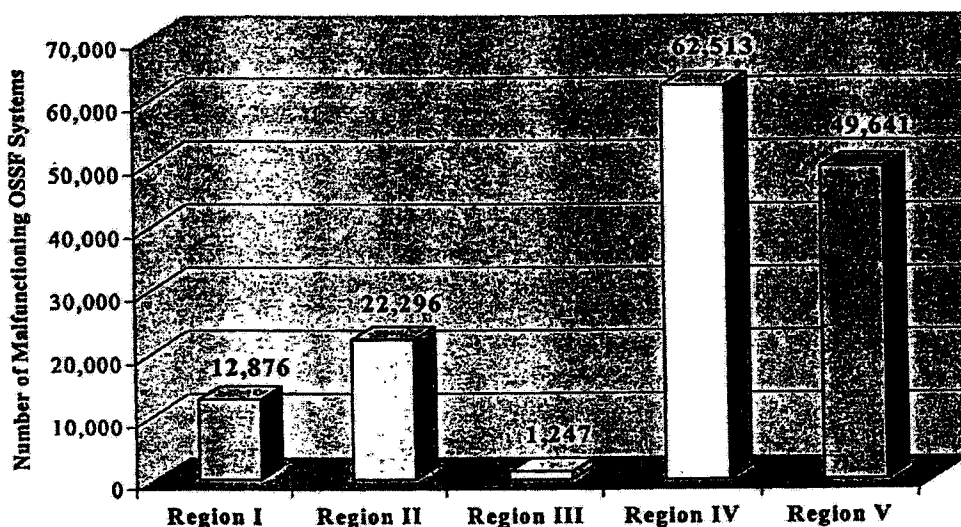


The statewide survey response rate, based on the number of completed surveys returned, was 64%. The survey results were compiled and analyzed on a regional basis and these

regions are presented in Figure ES.1. The analyzed survey results were successful in fulfilling the project goals, and will be an important resource for OSSF professionals and policymakers alike. Important trends in the factors that contribute to OSSF malfunction were revealed through the survey results, as well as data that offers insight into the number of chronically malfunctioning OSSF systems in the State of Texas.

Chart ES.1 shows the percentage of OSSF systems that were reported to malfunction chronically in each region of the State. Statewide, approximately 13% of the OSSF systems were reported to be chronically malfunctioning. Chart ES.2 shows the approximate number of chronically malfunctioning OSSF systems by region. The total number of chronically malfunctioning systems reported through the survey results in the State was approximately 148,573.

Chart ES.2 Total Number of Chronically Malfunctioning Systems per Region



The actual total number of malfunctioning OSSF systems in Texas is certain to be higher, as the survey's response rate was less than 100%. However, the rate of OSSF malfunction for the entire State is still unknown and cannot be projected based on survey responses. The project team determined that it would not be statistically valid to use the regional rates of chronic OSSF malfunction for the jurisdictions that responded to the survey, and extrapolate those figures to determine the rate of malfunction for all OSSF systems across the State. Although it might be a useful exercise for the purposes of antidotal discussion, it would not necessarily be representative of the opinions and situations in the remaining jurisdictions.

Document Format

This document is divided into five sections. Section 1 describes the methodology used to determine the type of research instrument used in the project, the process of creating the survey instrument, the survey distribution process, and the limitations of the survey. This section also illustrates the regional approach used to analyze the survey results, including a map that depicts the State of Texas divided into the five regions. A copy of the survey questionnaire is located in Appendix A.

Section 2 presents the regional analyses of the survey results. The survey results are presented from Region I through Region V, with the analyzed data discussed in the order in which it was listed on the actual survey questionnaire. The survey results are described in a text format as well as in various tables that illustrate the raw data results and percentage ratios. Key findings from each region are summarized in the next section, "Key Findings Summary" of the Executive Summary.

Section 3 of this report presents a regional comparison of the survey results from the five regions of the State. This section compares and contrasts the significant factors in OSSF malfunction reported in the survey results from each region. Section 4 discusses in detail the major policy issues and key findings that resulted from the survey analysis presented in Section 2. These policy issues are summarized on page xi of the Executive Summary.

The recommendations of the report are presented in Section 5. In this section, the project team has developed a set of recommendations based on the policy issues discussed in Section 4. The project team would like to emphasize that the recommendations presented in this discussion are not intended to provide a comprehensive resolution to all problems effecting OSSF systems. The purpose of these recommendations is to highlight actions that the Council could take based on the findings of this study. These recommendations have also been developed to help identify and prioritize future Council research projects based on the major reasons for malfunctioning OSSFs.

Key Findings Summary

Region I: Key Findings Summary

- Region I reported that approximately 8% of the OSSF systems in the reporting jurisdictions were chronically malfunctioning.
- The age of the OSSF system was ranked as the highest contributor to malfunction. Pre-regulatory "grandfathered" systems were found to be a severe contributor to malfunction by 51% of survey respondents and a moderate contributor by 29%.
- Operation and maintenance issues were ranked as the second highest contributor to malfunction. Problems with operation and maintenance practices were reported to

severely contribute to OSSF malfunction by 34% of the respondents and to moderately contribute by 34%.

- The lack of education for OSSF owners was reported to contribute severely to OSSF malfunction by 34% of the respondents and moderately contribute by 31%. Additionally, 60% of the respondents in Region I reported that OSSF owners do not receive sufficient information about how to properly operate their system.
- Region I did not report significant OSSF problems due to climate or a high water tables and septic tanks/leaching chambers were reported to function well in the region.

Region II: Key Findings Summary

- Region II reported that approximately 12% of the OSSF systems in the reporting jurisdictions were chronically malfunctioning.
- The age of the OSSF system was ranked as the highest contributor to malfunction. Pre-regulatory "grandfathered" systems were found to be a severe contributor to malfunction by 22% of the survey respondents and a moderate contributor by 37%.
- The factors that contribute to OSSF malfunction in Region II were varied and were generally reported as being less severe than in other regions of the State. Areas of concern for many respondents included: a lack of education for OSSF owners, improper operation and maintenance, and problems with soils, such as tightly-packed clay soils that do not allow for proper leaching and fractured limestone soils that allow sewage to flow directly into the ground.

Region III: Key Findings Summary

- Region III reported that approximately 3% of the OSSF systems in the reporting jurisdictions tend to chronically malfunction. This is the lowest reported rate of OSSF malfunction for any region in the State.
- Region III had an unusually low response rate of 44% and the returned surveys only represent approximately 32% of the total number of OSSF systems in the region. Due to this low regional response rate and the lower OSSF representation, the results from this regional analysis may not be representative of the OSSF issues in the entire region, nor can they be assumed to represent the opinions of the majority of Designated Representatives in the region.
- According to the Designated Representatives that responded to the survey, the age of the OSSF system was ranked as the highest contributor to malfunction. Pre-regulatory "grandfathered" systems were found to be a severe contributor to malfunction by 50% of the survey respondents and a moderate contributor by 25%.
- Improper system design ranked as the second highest contributor to malfunction and 38% of the respondents reported that it severely contributes to malfunction, while

19% stated it was a moderate contributor. Examples of system design issues reported in the region include OSSF systems that are too small for the sewage load from the facility and lot sizes and/or drainfields that are too small.

Region IV: Key Findings Summary

- Region IV reported that approximately 12% of the OSSF systems in the reporting jurisdictions were chronically malfunctioning.
- Soils were ranked as the highest contributor to OSSF malfunction in Region IV. Soils were found to severely contribute to malfunction by 42% of the respondents and to moderately contribute by 36%. Specifically, tightly-packed clay soils that do not allow for proper leaching were reported to be severe contributors to malfunction by 51% of the respondents and a moderate contributor by 22%.
- The age of the OSSF system was ranked as the second highest contributor to malfunction. Pre-regulatory "grandfathered" systems were found to be a severe contributor to malfunction by 46% of the survey respondents and a moderate contributor by 32%.
- Lack of education for OSSF owners was reported to contribute severely to malfunction by 28% of the respondents and moderately contribute by 46%. Additionally, 85% of the respondents in Region IV stated that OSSF owners do not receive sufficient information about how to properly operate their system.
- Operation and maintenance was generally reported to be a moderate contributor to malfunction in Region IV. A total of 15% of the respondents reported that operation and maintenance was a severe contributor to malfunction while 51% reported it was a moderate contributor. Specifically, failure to renew maintenance contracts and failure to add the proper disinfectant to the system were identified as the two main contributors to malfunction under the operation and maintenance category.

Region V: Key Findings Summary

- Region V reported that approximately 19% of the OSSF systems in the reporting jurisdictions were chronically malfunctioning. This is the highest reported rate of malfunction for any region.
- Soil was ranked as the highest contributor to malfunction, with 66% of the respondents reporting severe contribution to malfunction, and 14% reporting moderate contribution. Tightly-packed clay soils were reported to contribute severely to malfunction by 69% of the respondents and moderately by 24%.
- High water tables were ranked as the second highest contributor to malfunction and were reported to severely contribute to malfunction by 34% of the respondents and moderately contribute to malfunction by 31%.

- The age of the OSSF system was ranked as the third highest contributor to malfunction. Pre-regulatory "grandfathered" systems were found to be a severe contributor to malfunction by 55% of the survey respondents and a moderate contributor by 31%.
- Lack of education for OSSF owners was found to severely contribute to malfunction by 34% of the respondents and moderately contribute to malfunction by 45%. Additionally, 79% of respondents in Region V stated that OSSF owners do not receive sufficient information about how to properly operate their system.
- Failure to renew maintenance contracts was reported to be a severe contributor to malfunction by 48% of the respondents and a moderate contributor by 45%. A failure to add the proper disinfectant to the system was reported to be a severe contributor by 38% of the respondents and a moderate contributor by 45%. These factors were the two main contributors to malfunction under the operation and maintenance category.
- One hundred percent of the respondents reported that aerobic system treatment technologies function well and 93% reported that surface irrigation systems function well.

Synopsis of Policy Issues

Issue 1: Malfunctioning OSSFs are a significant problem in Texas based on the results of the survey. In the State of Texas, there are approximately 148,573 chronically malfunctioning systems, which represents about 13% of all OSSFs.

Issue 2: OSSF systems installed in improper soil classes was the factor that had the highest impact on OSSF system malfunction in Region IV and Region V.

Issue 3: Malfunctions related to system age and "grandfathered" systems was the category that consistently ranked as having the highest impact on the malfunction of OSSF systems in Region I, Region II, and Region III. The age of the OSSF systems was ranked as the second highest factor in Region IV and the third highest factor in Region V. The age of OSSF systems is also affected by several other factors, as many older systems were installed prior to the development of regulations.

Issue 4: System operation and maintenance issues related to surface irrigation/aerobic systems, such as a lack of maintenance contracts and improper addition of disinfectant to the OSSF system, were the key reasons for malfunction in Region IV and Region V.

Issue 5: A need for more education for OSSF system owners is a key issue. Approximately 73% of responding Designated Representatives believe that OSSF owners are not receiving adequate education regarding their systems.

The resource guide should be developed in such a manner that the Designated Representatives can use individual sections independent of information from other sections. The resource guide should also include specific recommendations on steps that could be taken to implement each topic. Additionally, the recommendations should be based upon case studies of other Texas communities that have effectively developed and implemented programs to address various OSSF problems.

Recommendation 4: Conduct Further Regional Research

In order obtain an understanding of the magnitude of, and reasons for, malfunctioning OSSF systems in Region III, which includes the area of South Texas know as the Lower Rio Grande Valley, the project team recommends that the Council fund additional research in this area of the State. This research is needed because the survey response rate for this region was significantly lower than the response rates for the other four regions of the State. This research would ideally build from the research completed through this study.

This future research could be conducted through a combination of case studies, interviews and/or surveys. This additional research could be especially helpful in determining potential infrastructure or other resource needs in this area of the State. Information gathered through the additional research would be valuable and useful for Region III since there are several state and federal programs that can provide financial assistance for water and wastewater infrastructure problems in the border region.

COMPARATIVE STUDY
of Costs of OSSF Systems
Old Rules versus New Rules

Prepared for the
Texas On-Site Wastewater Treatment Research Council

Prepared by
Guadalupe Wastewater Company
217A West Water Street
Kerrville, Texas 78028

Contract No. 9870098900

	Region 1 Panhandle	Region 2 N.E. Texas	Region 3 East Texas	Region 4 So. Texas	Region 5 Central TX	Region 6 West TX	Change in Cost for All Regions per System Type
Conventional System							
Old Rules	4,298.86	4,713.74	4,059.26	4,267.54	4,329.42	4,189.78	
New Rules	3,191.22	3,576.78	3,141.22	3,490.70	3,169.36	3,124.92	
Change in Cost per System	(\$1,107.64)	(\$1,136.96)	(\$918.04)	(\$776.84)	(\$1,160.06)	(\$1,064.86)	
No. Installed in 1995	x 302	x 5,128	x 2,863	x 6,003	x 5,453	x 898	
Total Change in Region	(\$334,807)	(\$5,830,331)	(\$2,628,349)	(\$4,663,371)	(\$6,325,807)	(\$956,244)	(\$20,738,609)
Low Pressure Dosing							
Old Rules	3,473.10	3,522.62	3,473.10	3,578.18	3,579.96	3,485.52	
New Rules	3,805.04	3,790.68	3,730.04	3,947.16	3,747.70	3,652.34	
Change in Cost per System	\$331.94	\$268.06	\$256.94	\$369.98	\$167.74	\$166.82	
No. Installed in 1995	x 0	x 45	x 485	x 745	x 1,170	x 5	
Total Change in Region	\$0	\$12,063	\$124,616	\$274,890	\$196,256	\$634	\$608,659
Aerobic with Spray							
Old Rules	4,923.71	4,367.23	4,395.05	5,004.69	6,373.37	5,682.07	
New Rules	5,016.09	4,381.49	4,419.29	5,197.69	6,311.37	5,559.45	
Change in Cost per System	\$82.38	\$14.26	\$24.24	\$193.00	(\$62.00)	(\$122.62)	
No. Installed in 1995	x 0	x 2,709	x 2,053	x 131	x 425	x 5	
Total Change in Region	\$0	\$38,630	\$49,765	\$25,283	(\$26,350)	(\$613)	\$86,715
E.T. Dots							
Old Rules	5,796.35	6,901.89	14,060.77	8,336.58	7,671.50	4,381.51	
New Rules	6,391.42	9,303.66	22,137.83	7,864.44	8,562.41	5,304.70	
Change in Cost per System	\$595.07	\$2,401.77	\$8,077.06	(\$472.14)	\$890.91	\$923.19	
No. Installed in 1995	x 1	x 295	x 2	x 13	x 597	x 45	
Total Change in Region	\$595	\$708,622	\$16,154	(\$6,138)	\$531,873	\$41,544	\$1,292,550
Total Change in Region All Systems in 1995							

NOTE: Numbers in (\$) indicate a reduction in cost due to new rules.

COMPARATIVE COST STUDY - OLD RULES (1994 RULES) vs. NEW RULES (PER 1997 RULES)

Comparative Conventional, Low Pressure Dosing, Aerobic and Oxygen Dependent Cell Systems
for a New 2 Bedroom Home containing 1,000 square feet.

file:compstud\comptable2

office.) The evaluation must be signed and sealed by either a registered professional engineer or a registered professional sanitarian.

[] 4. An affidavit signed by the property owner and notarized indicating the permittee is aware of his responsibility for proper maintenance and operation of the on-site sewage facility. (Affidavit forms are available from this office and may be notarized here.)

[] 5. If the designed OSSF requires maintenance reports you must also submit a signed "Acknowledgment of Testing Results" form (Forms are available from this office.)

[] 6. The fees for the permit, two inspections and the State of Texas Research Fee total \$260.00 for a residential structure, \$410.00 for a commercial structure, and a minimum of \$210.00 for a holding tank and/or port-a-can. If more inspections are required, an additional \$50.00 for each trip to the job site is charged. Payment can be made by personal check, cashier's check, money order or cash, and made payable to the Harris County Treasurer.

[] 7. A separate additional filing fee of \$16.00 required for the affidavit must also be submitted and made

p:\forms\wastewater section\ossf info guide_may 2006.doc

payable to the Harris County Clerk. The County Permit Office collects the fee and files the affidavit for you.

Once you have obtained your permit you must decide whether you intend to install the system or have a registered installer do the work. All installers doing work in Harris County must be registered by the TCEQ. To insure an installer is registered call (713) 956-3000 or ask to see their current registration card or check online at www.tceq.state.tx.us.

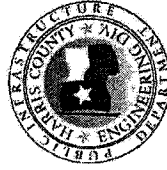
As the property owner, you must insure that your on-site sewage facility is inspected by the County Permit Office and passes all inspections prior to placing it into use. The inspector will issue an Authorization to Operate when the system passes the required inspections. You should keep this Authorization to Operate with your property records, at all times.

WHEN CAN I GET ELECTRICITY (PERMANENT POWER)?

Review your permits to see what inspections are required. Once you have passed ALL inspections for your project, including development and on-site sewerage facility, you may call (713) 956-3000 to request release for permanent power.

ON-SITE SEWERAGE FACILITIES RULES OF HARRIS COUNTY, TEXAS FOR ON-SITE SEWERAGE FACILITIES

INFORMATION GUIDE



HARRIS COUNTY
PERMIT OFFICE
(713) 956-3000
www.eng.hctx.net/permits

HARRIS COUNTY
PUBLIC INFRASTRUCTURE DEPT.
10000 NORTHWEST FRWY. STE. 102
HOUSTON, TX 77092-8620

Harris County
Public Infrastructure
Department
Engineering Division
10000 Northwest Fwy. Ste. 102
Houston, TX 77092-8620



On-site wastewater treatment systems

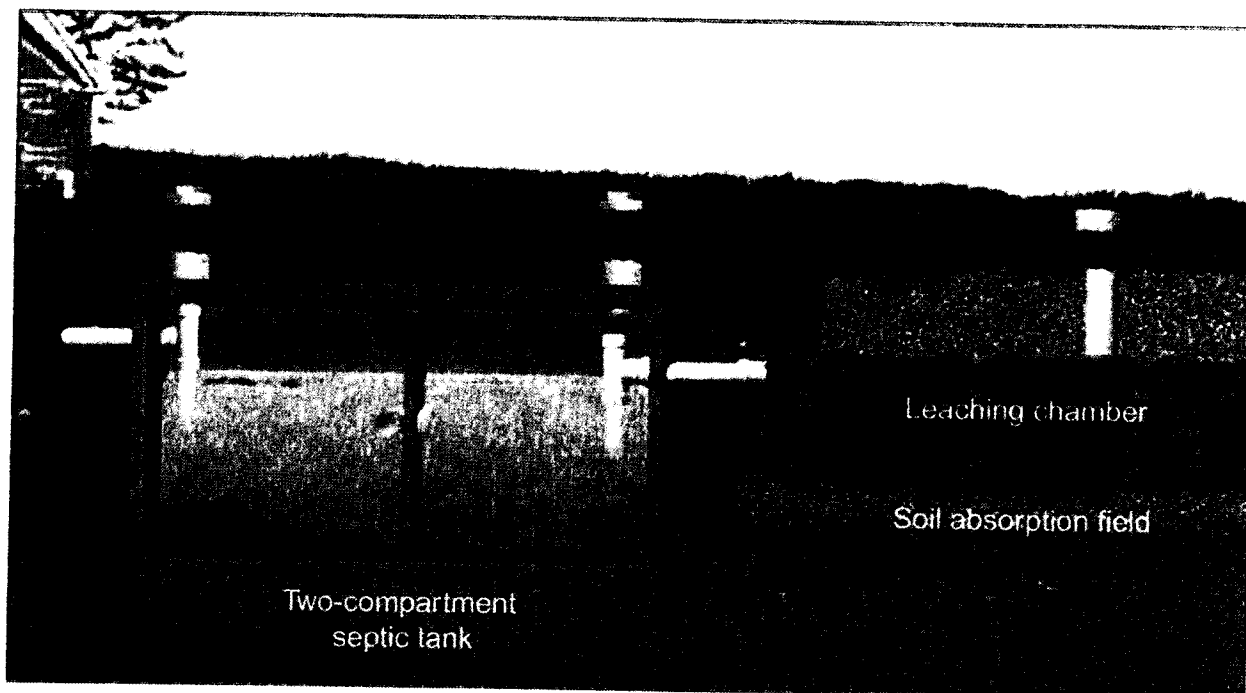


Figure 1: Leaching chamber systems can have smaller drain fields than those for conventional systems.

Leaching chambers

Bruce Lesikar and Russell Persyn

Extension Agricultural Engineering Specialist, Extension Assistant-Water Conservation
The Texas A&M University System

Leaching chamber systems handle wastewater in a similar manner as conventional gravel-filled trench systems. The main difference is in how the trench is constructed.

A leaching chamber system includes:

- ✓ A treatment device, generally a septic tank, but it can be an advanced treatment system.
- ✓ A leaching chamber, which is a commercially available plastic chamber molded into a dome shape. The chamber top is solid so that it can support the soil above it; the sides are louvered; and the

bottom is open to allow the water to exit. Chamber widths vary from 15 to 36 inches.

- ✓ Leaching chamber trenches, which can be no longer than 150 feet.

In a leaching chamber system, a solid 4-inch-diameter pipe carries wastewater from the septic tank to the leaching chamber trenches. The leaching chambers store the wastewater until it enters the soil. Each leaching

chamber system should have at least one observation port to allow water levels in the trench to be inspected.

Advantages

A leaching chamber is made of lightweight material that can easily be carried to the excavated trench. There is no need for additional perforated pipe or geotextile fabric as used in conventional trench systems.

The drain fields for chamber systems are permitted to be smaller than those for conventional systems. For a house without water-saving

devices, the drain field absorptive area can be 40 percent smaller than in conventional systems; for houses with water-saving devices, it can be 20 percent smaller. (The reason that houses with water-saving devices can have only a 20-percent smaller drain field is that such systems are already designed to be 20 percent smaller than houses without water-saving devices. The reduction in drain field size cannot be compounded.)

Disadvantages

The drain field size can be reduced only in class Ib, II and III soils. The drain field size may not be reduced for low-pressure dosing systems using leaching chambers in class IV soils.

The bottom of the chamber must be separated from a restrictive horizon or groundwater by at least 2 feet.

How to keep it working

Leaching chambers are a proprietary product, so please follow the manufacturer's recommendations for maintaining the system. Other guidelines include:

- ✓ Pump out the treatment tanks every 2 to 3 years to keep solids out of the drain field.

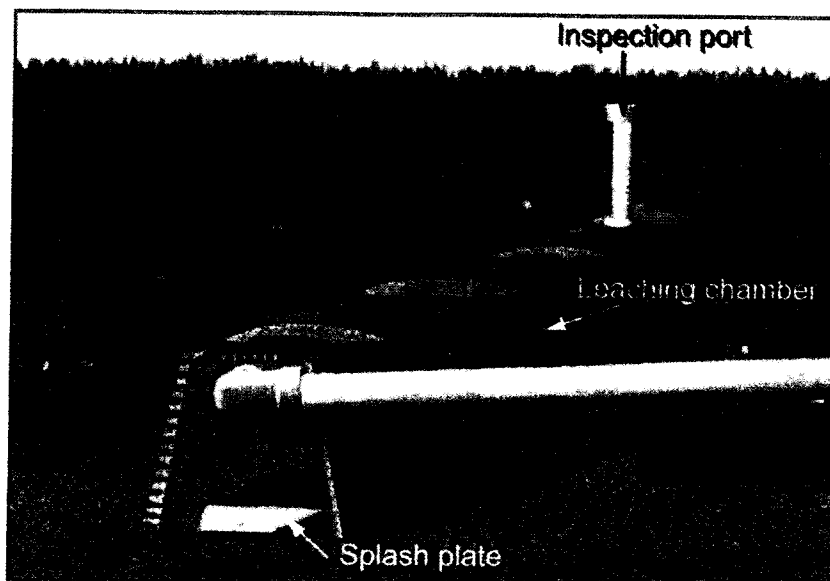


Figure 2: Leaching chamber trenches can be no longer than 150 feet.

- ✓ Maintain a grass cover over the trenches to help remove water from the soil.
- ✓ Do not place any solid materials over the ground surface that could prevent air from moving into the soil in the drain field.
- ✓ Conserve water to prevent the drain field from flooding.
- ✓ Do not drive heavy equipment across the drain field. The

equipment can damage the drain field.

Estimated costs

The installation cost ranges from \$3,000 to \$6,000 depending on the soil type, house size and other factors.

Septic tank maintenance costs are about \$75 per year, if you have it pumped out every 3 years. More frequent maintenance increases cost.

The On-Site Wastewater Treatment Systems series of publications is a result of collaborative efforts of various agencies, organizations and funding sources. We would like to acknowledge the following collaborators:

Texas State Soil and Water Conservation Board
Texas On-Site Wastewater Treatment Research Council
Texas Natural Resource Conservation Commission
USDA Water Quality Demonstration Projects
Consortium of Institutes for Decentralized Wastewater Treatment

USEPA 319(h) Program
Texas Agricultural Extension Service
Texas Agricultural Experiment Station
Texas On-Site Wastewater Association
USDA Natural Resources Conservation Service

Produced by Agricultural Communications, The Texas A&M University System

All publications in the On-site Wastewater Treatment Systems series can be downloaded free from the World Wide Web at
<http://agpublications.tamu.edu/pubs/ewaste>

Educational programs of the Texas Agricultural Extension Service are open to all people without regard to race, color, sex, disability, religion, age or national origin.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Farris, Deputy Director, The Texas Agricultural Extension Service, The Texas A&M University System.
30,000 copies. New

ENG
For Sale Only \$1



Search

Find

Options Select a service

Select a map

[Directory](#) | [Departments](#) | [FAQ](#) | [Links](#) | [Site Map](#) | [Help](#) | [Contact Us](#)

Aerated Tanks (Aerobic Units)



I. Description

Aerobic units, or small extended aeration package plants, utilize a suspended growth wastewater treatment process, and may be used to remove substantial amounts of BOD and suspended solids which are not removed by simple sedimentation (as occurs in septic tanks). Under appropriate conditions, aerobic units may also provide for nitrification of ammonia, as well as significant pathogen reduction.

Some type of primary treatment usually precedes the aerated tank. The aerated tanks contain an aeration chamber, with either mechanical aerators or blowers, or air diffusers, and an area for final clarification (settling). Aerobic units may be designed as either continuous flow or batch flow systems, with most commercially available units being the continuous flow type. Effluent from the aerated tank is conveyed either by gravity flow or pumping to either further treatment/pretreatment processes, or final treatment and disposal in a subsurface soil disposal system.

II. Common Modifications

Various types of pretreatment may be employed ahead of the aerobic units, including septic tanks, trash traps, and comminutors. Septic tanks or trash traps are most commonly used for pretreatment for smaller onsite systems.

Aerobic units may be of either the continuous flow, or batch type. The batch (fill and draw) flow system collects and treats wastewater over a period of time (usually one day), then discharges the settled effluent at the end of the cycle.

Some proprietary package treatment units are equipped with filters for providing further treatment following the extended aeration activated sludge process. This system modification may provide for additional TSS and BOD.

A modified type of proprietary aerobic treatment unit has been undergoing research and demonstration during the past few years. The "biofilter" unit consists of a covered tank (usually concrete) containing foamed plastic media packing. The foamed plastic is very porous, so flow paths through and around the

media is possible. Septic tank, or "trash trap", effluent uniformly distributed over the surface of the media. A fan (or blower) is used to simultaneously circulate air through the media via vent pipes in the tank. The system appears to provide very effective removal of BOD, TSS, as well as nitrification.

III. Technology Status

Aerobic units have been commercially available for approximately 25 years.

IV. Applications

Aerobic units may be used by individual or clustered residences and establishments for treating wastewater prior to (1) further treatment/pretreatment, or (2) final onsite subsurface treatment and disposal. They are particularly applicable where enhanced pretreatment is important, and where there is limited availability of land which is suitable for final onsite disposal of wastewater effluent.

Due to the need for routine maintenance of these systems in order to ensure proper operation and performance, aerobic units may be well-suited for multiple-home or commercial applications, where economies of scale tend to reduce maintenance and/or repair costs per user. The lower organic and suspended solids content of the effluent may allow a reduction of land area requirements for subsurface disposal systems.

V. Limitations

The rate of sludge production for aerobic units is much greater than for septic tanks, necessitating more frequent sludge removal by a licensed transporter. To ensure proper performance of the units, it may be necessary in at least some cases to require a maintenance contract. Electrical power is required for aerobic units. Current Austin-Travis County Health and Human Services rules require that this type of system be designed by a licensed professional engineer.

VI. Typical Equipment/Number of Manufacturers

Aerated tank units are commercially available from several suppliers in Texas. The TNRCC provides a list of State-approved units.

VII. Performance

Numerous studies have been conducted during the past 20 to 25 years to evaluate the performance of aerobic treatment units. The results of a 4-year study conducted in Wisconsin appear to be representative of, and consistent with other studies conducted during that same general time period (late 1970's and early 1980's). Mean effluent values for various wastewater parameters measured

during that study are presented in a table included as the last page of this fact sheet. Although the nitrification (ammonia removal) reported in the table is very high, levels of nitrification in aerobic units will be very dependent on a variety of factors including loading rates for key wastewater constituents, detention times, oxygen transfer, and temperature. More recent testing of certain aerobic unit models has been performed by NSF International. Those results indicate that there may have been some design and performance improvements for those models as compared with the systems tested in the earlier studies. Operation and maintenance practices could however be responsible for the different performance reported from those studies. NSF studies on several units showed the following effluent quality for TSS and BOD:

Parameter	Average Concentration (mg/L)
BOD ₅	5-20
TSS	7-22

VIII. Residuals Generation

U.S. EPA literature generally recommends that aerobic units are pumped out at least about once every year.

IX. Overall Reliability

Several studies conducted to evaluate the performance of aerobic units have shown that, if properly designed, installed, and maintained for a particular site's application, these units can perform reliably. Those same studies have also found that home owner neglect, or in general, failures to maintain or replace system components as needed can result in the failure of systems using these units. The acceptable operation of aerobic units has been found to be a function of (1) home owners' understanding of the limitations of the unit, (2) a dependable power supply, and (3) sufficient maintenance.

X. Operation and Maintenance Requirements

Pretreatment Units: If septic tanks or "trash traps" are used as a pretreatment unit prior to an aerobic unit, as discussed under "Residuals Generation" in the Septic Tanks fact sheet, septic tanks should be pumped at an average frequency of 2 to 5 years, depending on their size relative to the system's capacity and use. Communitors or other pretreatment units with mechanical or electrical components must occasionally be serviced or replaced.

Aerobic Units: Sludge must be removed from these units, on the average, about once every eight to