

MARSHALL MUNICIPAL UTILITIES
ANNUAL REPORT
2016-2017

TO: Board of Public Works
City Council

January 12, 2018

This annual report summarizes some of the key issues and many of the accomplishments and improvements to Marshall's publicly owned utility systems during the fiscal year ending September 30, 2017.

The top story for fiscal year 2016/2017 was again the trihalomethane reduction project at MMU's Water Treatment Plant. Over a three year period this will be a \$5.8 million dollar project. Construction started in January of 2017. This project will continue until roughly the end of July 2018. The major components of the project include—

- Installation of mixing systems in the elevated and ground storage tanks in town,
- Construction of a 500,000 gallon ground storage clearwell at the water treatment plant,
- Installation of new high service pumps,
- Installation of an ammonia feed system to convert to chloramines as the residual disinfectant,
- Installation of baffles in the existing clearwells and conversion to contact basins,
- Upgrade of the SCADA system, and
- Construction of a new administration building to house the plant office, laboratory, a conference/training room, bathrooms, and SCADA control instrumentation.

In June of 2017, a major rain caused flooding at the site. The nearly completed 50,000 gallon ground storage clear-well floated off its base. It had to be demolished and rebuilt. Therefore completion of this project was changed from March to July 2018. Once completed the MMU Water Plant will convert to a chloramine disinfection process that will insure the THM and HAA levels will stay below the regulated limits of 80 ($\mu\text{g/l}$).

The second top story of 2016/2017 was for the first time in almost 20 years, we had an Electric System Study performed. Lutz, Daily and Brain consulting engineers were hired to complete the study. Some of the things they looked at were: system performance, age and condition of all equipment (including generators), and potential areas of load growth. One critical issue that was identified was MMU's loss of generation. In the past we were able to supply all power locally if there was a problem with our transmission line. With only one connection point at 161kV for our supply, the loss of local generation capacity made this issue a top priority. Work began to obtain a second 161kV emergency tie. Meetings were held with Central Electric, AECl, MMU and LD&B to discuss options. A plan was developed and LD&B was hired to design and oversee construction of a second 161kV tie. MMU, LD&B and MPUA are in the process of developing a contract with Central Electric and Associated Electric Cooperative for the connection and operation of this tie.

The third top story this year is that over the past year the materials being received in our Recycle Center has increased dramatically. This was largely due to Con-Agra Brands bringing their cardboard to us after the Cooperative Workshop discontinued taking it in December of 2016. In June of 2017, we also began taking Con-Agra Brands #4 HDPE (High Density Polyethylene) plastic. For several years the Recycling Operation had to be supplemented by our Electric Department. This year with the additional materials we have sold nearly 3,500 tons of recycling. At the beginning of the year we were running two shifts to keep up with the influx of materials using our hand-tie Excel Baler. At the end of April, we purchased an American 8043H auto-tie baler. The baler was delivered in May and by June we were able to return to one shift. The American baler is used for

baling cardboard and mix paper. We still use the Excel baler for metal cans, aluminum cans, and all the plastic baling.

It is our responsibility to provide for the current needs and to plan for the future needs of Marshall's citizens. We must never forget that Marshall's citizens are the owners of MMU. The citizens of Marshall can be assured that the employees of MMU are committed to continuing the efforts necessary to fulfill our mission, which is to:

Provide reliable utility service for our owners at the lowest reasonable cost; maintain and operate facilities that will assure safe, dependable electricity, potable water and wastewater treatment, giving due consideration to conservation and environmental impacts; plan for the future to assure adequate resources with progressive but sound economic reasoning.

The following bulleted points provide a glimpse of some of the accomplishments and operations during this past year.

Electric Distribution

The following is a summary of the accomplishments of the Electric Distribution department for the fiscal year 2016-2017.

- A project to replace our Automated Meter Reading system was started. Our old system is obsolete, meter displays and AMI modules are failing and parts are no longer available. A project to install a pilot system of 270 meters was started. The old system only included single phase meters; the pilot system will include both single and three phase meters.
- Crews completed overhead to underground projects in easements behind Mar, Yerby and Englewood. Primary and secondary lines serving 32 homes were relocated to underground.
- We continue the conversion of High Pressure Sodium Street and area lights to new LED fixtures. Approximately 1,470 new LED fixtures have been installed.

Miscellaneous:

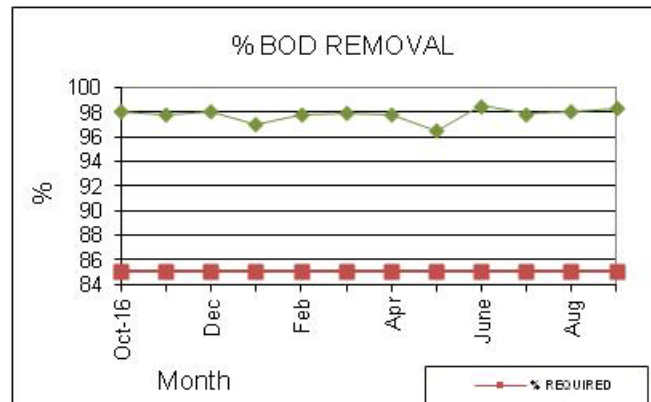
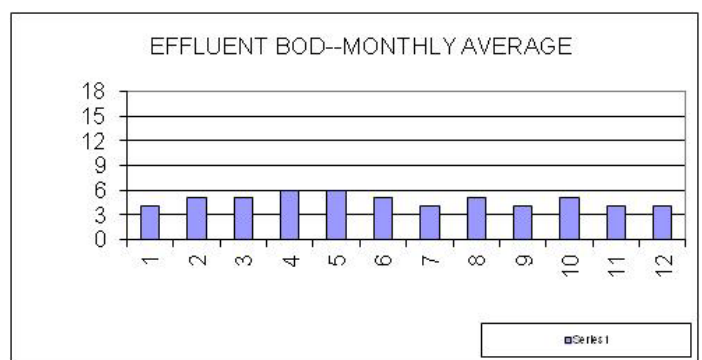
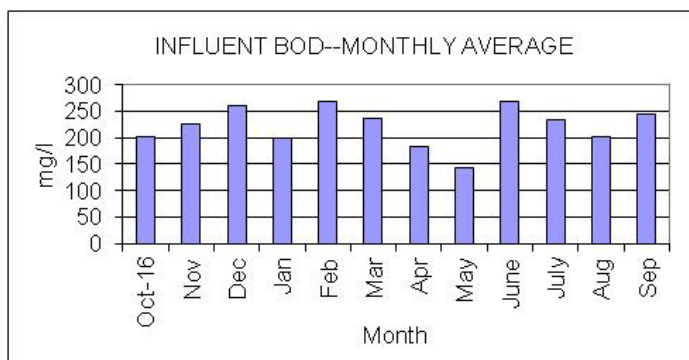
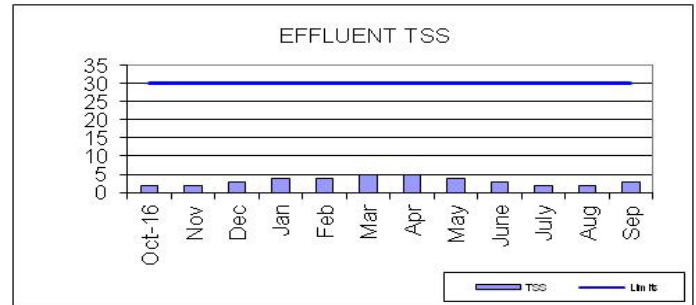
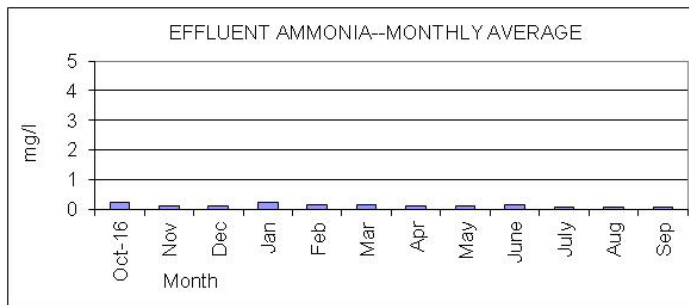
- Replaced/Installed 150 utility poles
- Installed services for new MMU Warehouse
- Modified Service to Water Treatment Plant to provide temporary supply to high service pumps during construction.
- Performed maintenance/upgraded services:
 - Orschlen Farm and Home
 - North English Lift Station
 - Prairie View State School

Water Treatment Plant

- The plant produced 868,128,353 gallons of water down approximate 2 % from 880,500,000 gallons produced in FY 16. The average day average was 2.37 million gallons
- We published, and mailed the annual consumer confidence report for 2016.

Wastewater Treatment Plant

- The plant treated 860,974,000 gallons of wastewater, an approximate 23.4% decrease from the 124,000,000 gallons for FY16/17. We applied roughly 284 tons of sludge to local farmland.
- Following are charts showing the wastewater treatment plant's effluent sampling results for FY16/17 compared against the effluent limits set by DNR.



BOD – biochemical oxygen demand

TSS – total suspended solids

mg/l – milligrams per liter or parts per million

There currently is no discharge limit, only a monitoring requirement, for ammonia.

Electric Production

- One improvement that started in 2016, and was finished at the beginning of 2017, was the controls upgrade for Unit 6, the Westinghouse 191 gas turbine generator. The old Bailey Infi-90 controls which were installed in 1998 were replaced with new Allen-Bradley PLC based controls. The programming and installation for these controls was performed in house. Lutz, Daily & Brain (LD&B) were hired to help with replacing the generator protective relays which were 1972 vintage. The controls and equipment have been in service for the past year and are working well.
- After the completion of the controls upgrade on Unit #6 we were able to continue the replacement of the expansion joints at Units #10 & #11. These expansion joints were original equipment from 1989 and 1993 and in bad condition. All rubber expansion joints on the oil and water sides of both units have been replaced. The cooling tower fill was also original and was deteriorated from UV rays and age. In October, we replaced this fill in both Marley Quadraflow cooling towers. On November 7th, we tested both units for compliance of the NESHAP Rice rules. This emissions test is required every three years and must have a 70% reduction of CO (carbon dioxide). Both units passed with Unit #10 being 81.1 and Unit #11 at 78.5 percent reduction.
- During the summer on July 12th, we ran our summer capacity test. This test is required by MOPep every three years. It consists of running all generation, Units #6, #7, #8, #9, #10, and #11 at full capacity simultaneously for two consecutive hours. Our capacity credits are based on this generation. All units ran well and we generated 29,008 KW on all units combined. We did have an issue on Unit #6 with the fogger and were not able to run it during the test. Running the fogger would have increased our generation on that unit by approximately 1000 KW. This issue has been resolved.
- Since the decommissioning of Unit #4 in October of 2016, we have recently started a demolition project of removing equipment pertaining to the steam units within the Power Plant. Unit #4 cooling tower has been taken down and some work started on it's baghouse. With the colder weather coming we have moved inside the Plant and started work dismantling the condensers on Units #1 and #2. In February of 2017, the Board approved to alert MoPEP to remove Unit #5 from our capacity with the Southwest Power Pool.

Underground Facilities

- Approximately 10,000 feet of sewer main was reconditioned with cured-in-place pipe (CIPP) method. This type of trenchless main replacement consists of a flexible, resin saturated fabric liner that is installed inside the old main. The liner takes the shape of the old pipe and is cured with hot water or steam. There were different sections throughout the collection system. In some of the areas the mains were located in backyards in an easement. To replace the mains in these areas by the traditional open excavation method would take many months to complete. The main liner should last for 50 years and possibly up to 100 years. This was the tenth year that repairs were made to the collection system using the CIPP method.
- The four inch main on Eastwood St from Odell Ave to Brunswick Ave was in poor condition and had failed many times in the years past. The second phase of this project included installation of a new six inch ductile iron pipe (DIP) from Allen Ave to Brunswick Ave and included approximately 900 feet of main, four new control valves and nine services and one new fire hydrant.
- Installed mixing systems in the water tower and #1 and #3 reservoirs.
- A lot of focus was on residential house services. This past year over twenty-five shut-offs and thirty meter boxes have been repaired.
- Inspection and cleaning of the sewer mains continue throughout the collection system. Water from a high pressure sewer cleaner was used to clean over twenty miles of sewer main. The sewer camera was used to videotape over twenty-four miles of sewer mains. These video inspections reveal areas that need to be

repaired, totally replaced or reconditioned, as well as identifying other potential problems in the collection system.

- MMU personnel have also made eleven sewer main repairs this last year. There were seventeen new water services installed, twenty-six main breaks in the distribution system, and three main breaks on the transmission line between the Water Treatment Plant near Malta Bend and the reservoirs at the Power Plant.
- Improvements and maintenance in the wastewater collection system are an ongoing process. The six inch main on Ted, Bond, Wall and Grant Streets were replaced with approximately 1,100 feet of new eight inch PVC pipe and five new pre-cast manholes to replace the old brick manholes.
- Installed a 6” main extension at the MMU Warehouse for fire protection and two new fire hydrants.

In fiscal year 2017, a total of 3 people were hired. All people were hired to fill vacancies created by departing personnel. During the year, one person was hired for Underground Facilities (Fleet Mechanic), one for Water Treatment (Operator) and one for Administrative Services (Meter Reader). At year’s end, we have 18 vacancies created by personnel who have departed or retired. Sixteen of these vacancies will remain unfilled indefinitely. December 1, 2017, started year three of the HSA-qualified high deductible health plan (HDHP) the number of employees using this plan has grown to 81%, in lieu of the traditional PPO option.

The information and statistics above are intended to give you a feel for what was accomplished this last year, but these statistics do not begin to convey the importance of the utility services provided to the citizens of Marshall by the citizens of Marshall. This local ownership yields many hometown advantages, not the least of which is having the Business Office right here in town and having decisions made by citizen owners.

Kyle D. Gibbs
General Manager

KDG/jm

TABLE A

Free Services
Fiscal Year 2016-2017

WATER:

Fire Hydrant Maintenance	\$	12,421
Depreciation of Fire Hydrants	\$	6,606
Labor and Material Donated	\$	3,873
Utilities Donated to City	\$	8,761
	\$	31,661

ELECTRIC:

Street Lighting Energy	\$	126,319
Street Lighting Maintenance	\$	6,623
Depreciation of Street Lighting	\$	56,387
Labor and Material Donated	\$	25,429
Marshall-Saline Development Corp.	\$	30,000
Utilities Donated to City	\$	10,500
	\$	255,258

WASTEWATER:

Utilities Donated to City	\$	13,558
	\$	13,558

INTERNET:

Utilities Donated to City	\$	30
	\$	30

TOTAL	\$	300,507
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Payments in Lieu of Taxes

Water Transfers to City General Fund	\$	186,800
Electric Transfers to City General Fund	\$	1,787,808
	\$	1,974,608

TABLE B

Operating Statistics

	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Average # Elec. Customers	5,913	5,920	5,933	5,949	5,957
Average # Water Customers	4,940	4,947	4,933	4,957	4,974
Average # Internet Customers	743	1,075	1,456	1,821	2,131
Average Residential Bill (monthly)					
Water	\$25.31	\$26.82	\$27.48	\$29.92	\$30.45
Electric	\$86.42	\$93.04	\$92.91	\$98.93	\$95.72
Wastewater	\$36.15	\$37.99	\$37.84	\$37.60	\$37.31
Uncollectables (Bad Debts)	\$56,452	\$67,187	\$60,930	\$77,665	\$69,528
Customers Assisted	394	420	456	474	500
MVCAA	\$39,947	\$59,924	\$49,956	\$68,433	\$59,634
Other*	\$11,608	\$17,868	\$15,430		
Peak Day Water (on production) (1,000,000 gal.)	8/8 5.07	4/8 6.66	8/13 5.37	8/20 4.75	6/13 4.65
Water Sold (1,000,000 gal.)					
Residential	231	229	209	216	211
Commercial	65	70	68	59	64
Small General	44	42	44	42	42
Large General	73	55	48	54	58
Industrial	243	247	234	212	201
Wholesale	262	243	239	243	231
TOTAL	918	886	842	830	807
Total Annual Water from Wells (1,000,000 gal.)	1,019	970	927	913	886
Water % Losses	9.91	8.66	9.17	9.10	8.92
Tons Waste Lime (land applied)	5,500	486	2,300	0	7,693
# Acres	1,300	180	1,040	0	3,847

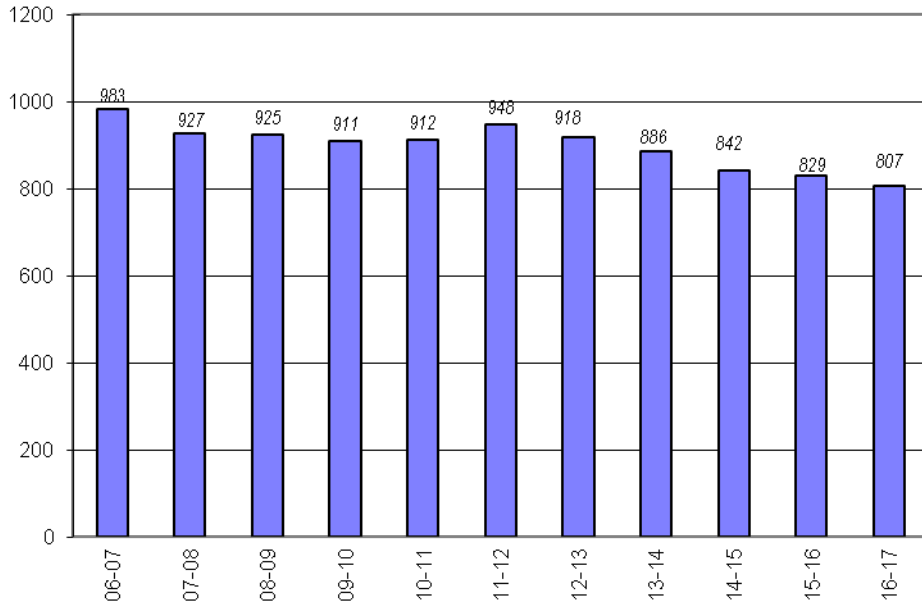
* Includes churches and Salvation Army.

TABLE B - Operating Statistics (cont.)

	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Peak Day Wastewater (1,000,000 gal.)	4/18 14.01	4/4 6.41	7/9 12.03	8/1 18.31	4/30 18.88
Total Annual Wastewater (1,000,000 gal.)	1,213	779	1,057	1,124	861
Tons Wastewater Sludge (land applied)	414	806	384	378	284
# Acres	614	1,303	643	673	277
Golf Course Irrigation Water (1,000,000 gal.)					
Effluent	0	17,421	0	0	0
Potable	16,870	0	10,643	11,452	12,939
Peak Load KW	38,600	37,800	38,351	38,600	37,200
Date	7/18	8/25	7/28	7/20	7/20
MWH sold					
General Lighting	158	154	138	122	100
Residential	48,528	50,117	48,121	48,439	46,684
Commercial	12,406	15,127	14,497	13,140	13,068
Small General	17,942	18,808	17,376	18,601	17,911
Large General	25,879	22,383	22,283	22,032	24,880
Industrial	71,225	68,872	70,222	67,898	65,443
Interruptible	42	39	37	38	57
Area / Street Light	0	0	632	693	525
TOTAL	176,180	178,459	173,316	170,963	168,668
Total MWH Purchased	185,925	188,373	185,042	179,472	176,710
Total MWH Generated *	6,261	166	4,527	249	121
% Losses	5.24	4.92	6.34	4.74	4.55
Natural Gas Burned (MCF)	9,678	1,944	4,368	3,260	2,715
#2 Fuel Oil Burned (gal)	3,200	4,470	1,680	2,272	2,040
Coal Burned (tons)	3,488	0	2,896	0	0
Paper Sold (tons)	875	1,051	879	893	659
Cardboard Sold (tons)	427	531	534	544	2,324

* Beginning in June 2006, all energy generated is sold to MoPEP.

WATER SALES (MIL GAL)



ELECTRIC SALES (MWH)

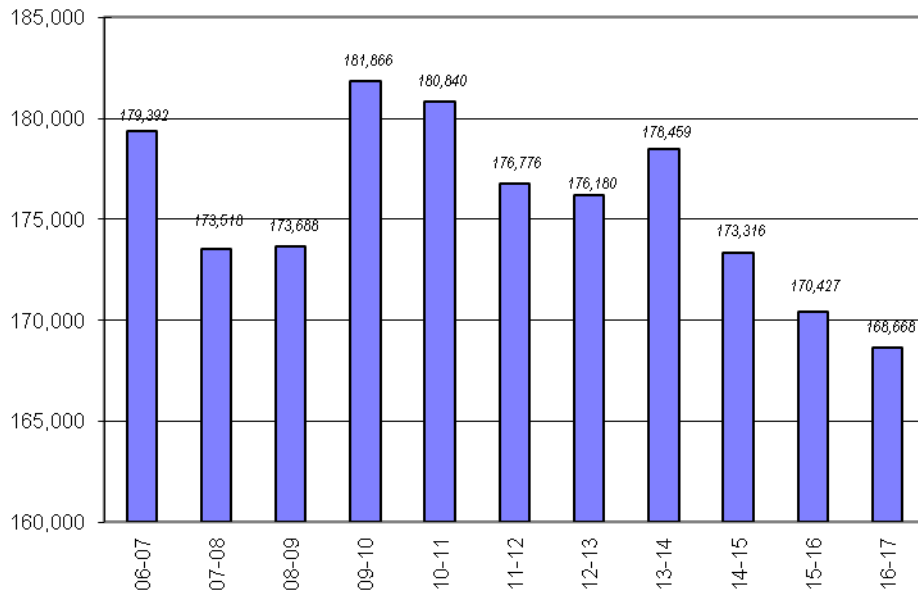


TABLE C

Cash Transaction Report

Fiscal Year 2016/17

	<u>WATER</u>	<u>ELECTRIC</u>	<u>SEWER</u>	<u>INTERNET</u>	<u>GAS</u>	<u>TOTAL</u>
Fund Balance (10/1/17)*	\$2,521,505	\$20,194,446	\$2,906,249	\$139,311	\$2,546,006	\$28,307,517
Revenues	\$4,030,040	\$21,009,634	\$2,846,343	\$977,845	\$207,205	\$29,071,067
Disbursements	\$4,645,047	\$20,538,427	\$2,992,710	\$775,348	\$79,001	\$29,030,533
Net Transfers		\$480,000	\$ (480,000)			-
Fund Balance (9/30/17)*	\$1,906,498	\$21,145,653	\$2,279,882	\$341,808	\$2,674,210	\$28,348,051
Investments (9/30/17)	-	\$14,919,364	\$1,239,944	-	\$1,988,726	\$18,148,034

* Includes Investments

TABLE D

Wastewater Debt

(Subject to interest rate change semi-annually)

Estimated payments due for year ending:

	Principal & Interest
9/30/18	\$513,356
9/30/19	\$507,922

TABLE E-1

	<u>Cash and Investments</u>		
	9/30/17		
	<u>Total</u>	<u>Cash</u>	<u>Investments</u> <u>(at cost)</u>
WATER:			
Operating	\$1,270,524	\$1,270,524	\$0
Water Plant	\$135,974	\$135,974	\$0
Insurance	\$500,000	\$500,000	\$0
Reserve			
Equipment	\$0	\$0	\$0
Reserve			
	<u>\$1,906,498</u>	<u>\$1,906,498</u>	<u>\$0</u>
ELECTRIC:			
Operating	\$5,312,578	\$5,312,578	\$0
Consumer			
Deposits	\$595,233	\$595,233	\$0
Insurance			
Reserve	\$5,001,566	\$29,371	\$4,972,195
Equipment		\$289,107	
Reserve	<u>\$10,236,276</u>		<u>\$9,947,169</u>
	\$21,145,653	<u>\$6,226,289</u>	<u>\$14,919,364</u>
WASTEWATER:			
Operating	\$162,123	\$162,123	\$0
Inflow &			
Infiltration	\$1,140,566	\$398,094	\$742,472
Insurance			
Reserve	\$500,000	\$2,528	\$497,472
Main			
Replacement	\$477,193	\$477,193	\$0
Equipment			
Reserve	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
	\$2,279,882	<u>\$1,039,938</u>	<u>\$1,239,944</u>
INTERNET:			
Operating	\$341,808	\$341,808	\$0
NATURAL GAS			
Operating	\$670,830	\$670,830	\$0
Equipment	<u>\$2,003,380</u>	<u>\$14,654</u>	<u>\$1,988,726</u>
	\$2,674,210	<u>\$685,484</u>	<u>\$1,988,726</u>

TABLE E-2(Detail of Table E-1)
Investments 9/30/17

	<u>Cost</u>	<u>Face Value</u>	<u>% Yield</u>
ELECTRIC (Wood & Huston)			
Treasury Bill Maturing 11/2/17	<u>\$4,975,354</u>	\$5,000,000	0.993%
Treasury Bill Maturing 12/14/17	<u>\$4,972,194</u>	\$5,000,000	1.122%
Treasury Bill Maturing 1/18/19	<u>\$2,983,241</u>	\$3,000,000	1.127%
Treasury Bill Maturing 2/1/18	<u>\$1,988,574</u>	\$2,000,000	1.152%
	<u>\$14,919,363</u>	<u>\$15,000,000</u>	
WASTEWATER (Community Bank):			
CD - Community Bank 12/17/17	\$245,000	\$245,000	0.30%
Treasury Bill Maturing 1/18/18	\$994,944	\$1,000,000	0.60%
	<u>\$1,239,944</u>	<u>\$1,245,000</u>	
NATURAL GAS (Wood & Huston)			
Treasury Bill Maturing 02/22/18	\$1,988,726	\$2,000,000	1.14%
	<u>\$18,148,033</u>	<u>\$18,245,000</u>	

(Organization Chart)