CITY OF
ST AUGUSTINE
EST. 1565

2015 BASELINE ASSESSMENT

A REPORT CARD FOR ROADS, WATER, SEWER, AND STORMWATER

APPENDIX

FEBRUARY, 2015

GRADING SCALE

Grade	Classification	Description	Value
A	Exceptional: Fit for the future	The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionnality and resilient to windstand most disasters and severe weather events	100-80
B	Good: Adequate for Now	The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe an reliable with minimal capacity issues and minimal risk	79-60
C	Mediocre: Requires Attention	The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk	59-40
D	Poor: At Risk	The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure	39-20
F	Failing/Critical: Unfit for Purpose	The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.	19-0

GRADING CRITERIA

CAPACITY	Evaluate the infrastructure's capacity to meet current and future demands
CONDITION	Evaluate the infrastructure's existing or near future physical condition
FUNDING	Evaluate the current level of funding (from all levels of government) for the infrastructure category and compare it to the estimated funding need
FUTURE NEED	Evaluate the cost to improve the infrastructure and determine if future funding prospects will be able to meet the need
OPERATION AND MAINTENANCE	Evaluate the owner's ability to operate and maintain the infrastructure properly and determine that the infrastructure is in compliance with government regulations.
PUBLIC SAFETY	Evaluate to what extent the public's safety is jeopardized by the condition of the infrastructure and what the consequences of failure may be.
RESILIENCE	Evaluate the infrastructure system's capability to prevent or protect against significant multihazard threats and incidents and the ability to expeditiously recover and reconstitute critical services with minimum damage to public safety and health, the economy, and national security.
INNOVATION	Evaluate the implementation and strategic use of innovative techniques and delivery methods.

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CITY OF
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INFRASTRUCTURE BASELINE ASSESSMENT

ROADS

SUPPORTING INFORMATION

FEBRUARY, 2015

ROADS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Weighted Value	Weighted Value
Arterial	60	65	50	50	50	50	40	40	50.6	5	253.1
Collector	15	60	50	50	50	50	40	40	44.4	5	221.9
Local	55	60	15	15	25	45	35	35	35.6	80	2850.0
Alley	50	15	15	15	20	40	25	20	25.0	10	250.0
						Weighted Average Grading			**35.8**	**100**	**3575.0**
								Overall Grade	**D+**		

The City maintains over 72 miles of local roadways. Roadways are classified as Arterial, Collector and Local. The Arterial and Collector roads within the City limits total 16.8 miles and are maintained by the State and County. The Public Works Department focuses on pavement management while the Engineering Division focuses on replacing streets that are beyond rehabilitation. The City tracks the condition of all its roads and alleys via a pavement maintenance management software known as MicroPAVER. A Pavement Condition Index (PCI) is utilitized to determine an appropriate maintenance budget and activities to prevent roads from falling into disrepair.

Road Asset Value & Replacement Cost

Pavement Grading System					COSA Roads			
Pavement Condition Index - PCI			Description	Grade	Road Miles	Grade as % of Roads	Rehabilitation Costs	Replacement Costs
PCI Range								
100	To	86	Good	A	18	58%	$4,463,900	$52,886,000
85	To	71	Satisfactory	B	24			
70	To	56	Fair	C	21	29%		
55	To	41	Poor	D	7	12%	$4,391,500	
40	To	26	Very Poor		1			
25	To	11	Serious	F	1			
10	To	0	Failed		0			

COSA Roads Surface Breakdown

Surface Material	Quantity (Miles)	% of Total	Average PCI
Asphalt	66.4	91%	69
Brick	1.9	3%	73
Concrete	0.4	1%	89
Unpaved	4.1	5%	97
Total	72.8		

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CITY OF
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INFRASTRUCTURE BASELINE ASSESSMENT

WATER DISTRIBUTION

SUPPORTING INFORMATION

FEBRUARY, 2015

WATER DISTRIBUTION SYSTEM

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Component Weighting	Weighted Value
Distribution	60.3	55.9	40.2	60.0	40.2	60.1	50.0	40.1	50.9	95%	48.56
Water Meters	66.5	40.7	35.0	40.0	35.0	65.0	50.0	35.0	45.9	5%	2.07
						Weighted Average Grading				**100%**	**50.6**

Overall Grade C

The City's water distribution system is comprised of over 200 miles of distribution mains ranging in size from 2 to 20-inches, 3,941 valves, 973 fire hydrants and over 13,000 service connections. The current efforts of the water main replacement program has resulted in over 30,000 linear feet of distribution mains replaced in the past 3-years. In-house crews conduct preventative maintenance measures on each fire hydrant annually to ensure fire protection for the citizens and business owners.

The City's water distribution system has over 13,000 potable water service connections ranging in size from 5/8" to 6". The meters are read by in house meter readers. Approximately 56% of the system meters are greater than 10 years old and approximately 23% are more than 20 years old. As meters age they tend to deteriorate due to sand and particulates in the water which results in inaccurate and typically low recordings of water consumption. This makes it difficult for a utility to understand water consumption behaviors, institute water conservation measures, detect water losses and leaks, and appropriately charge customers for water usage. Currently meters in areas of water main construction projects are being evaluated and replaced as necessary.

WATER DISTRIBUTION SYSTEM COMPONENTS

Distribution

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Component Weighting
Distribution System	60.0	55.8	40.0	60.0	40.0	60.0	50.0	40.0	50.7	98%
Hydrants	75.0	60.0	50.0	60.0	50.0	65.0	50.0	45.0	56.9	2%
Weighted Grade	60.3	55.9	40.2	60.0	40.2	60.1	50.0	40.1	50.9	100%
								Overall Grade	**C**	

Water Meters

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading
Water Meters	66.5	40.7	35.0	40.0	35.0	65.0	50.0	35.0	45.9
								Overall Grade	**C-**

Water Distribution System Asset Value & Replacement Cost

Approx Total Asset Value/Replacement Cost = $ 182,583,400

Distribution

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value ($)
1	2,734	$ 30.00	$ 82,020
2	205,887	$ 50.00	$ 10,294,350
3	1,003	$ 50.00	$ 50,150
4	23,187	$ 120.00	$ 2,782,440
6	363,560	$ 150.00	$ 54,534,000
8	167,855	$ 180.00	$ 30,213,900
10	141,401	$ 200.00	$ 28,280,200
12	99,724	$ 240.00	$ 23,933,760
16	73,301	$ 280.00	$ 20,524,280
20	163	$ 320.00	$ 52,160
		Total	**$ 170,747,260**

Hydrant		Unit Cost	Total
Location	No.	($/FH)	Value
City	569	$ 3,500	$ 1,991,500
County	404	$ 4,000	$ 1,616,000
		Total	**$ 3,607,500**

Estimated Construction Costs to Bring Deficient Water Distribution System Assets up to Acceptable Standard

Approx Cost to Rehabilitate = $ 59,855,410

Distribution

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value ($)
1	2,734	$ 150.00	$ 410,100
2	205,887	$ 150.00	$ 30,883,050
3	1,003	$ 150.00	$ 150,450
4	23,187	$ 150.00	$ 3,478,050
6	130,360	$ 150.00	$ 19,554,000
Approximate cost to eliminate all cast iron pipes equal to or less than 6-inches and upsize pipes less than 6-inches to a min. of 6-inches.			**$ 54,475,650**

Water Distribution System Asset Value & Replacement Cost

Water Meters

Meter Size (inches)	No. of Meters	Unit Cost ($/Ea)	Total Value ($)
5/8"	778	$ 575.00	$ 447,350
3/4"	11,121	$ 575.00	$ 6,394,575
1"	867	$ 750.00	$ 650,250
1.5"	33	$ 1,275.00	$ 42,075
2"	367	$ 1,570.00	$ 576,190
3"	39	$ 1,800.00	$ 70,200
6"	12	$ 4,000.00	$ 48,000
		Total	**$ 8,228,640**

Cost includes meter assembly and box

Estimated Construction Costs to Bring Deficient Water Distribution System Assets up to Acceptable Standard

Water Meters

Type of Rehabilitation	Age (Yrs)	No. of Meters	Unit Cost ($/Ea)	Total Cost ($)
Convert Water Meters	Less 5 yrs	902	$ 230.00	$ 207,460
Replace Meters	More than 5 yrs	12,315	$ 420.00	$ 5,172,300
Assume contractor conducts replacement program			**Total**	**$ 5,379,760**

Water Distribution System:

Pipe Size (inches)	Material Length (feet)					Total Length (feet)	Grade Point	Weighted Grade Point
	CI	DI	GS	HDPE	PVC			
1	447	-	1,462	-	825	2,734	15	41010
2	40,178	-	37,872	-	127,837	205,887	35	7206045
3	1,003	-	-	-	-	1,003	15	15045
4	3,419	-	-	-	19,768	23,187	45	1043415
6	130,360	72	-	172	232,956	363,560	55	19995800
8	15,569	785	-	371	151,130	167,855	70	11749850
10	32,467	-	-	2,001	106,933	141,401	65	9191065
12	22,848	1,439	-	3,886	71,551	99,724	65	6482060
16	14,929	1,652	-	2,724	53,996	73,301	65	4764565
20	-	163	-	-	-	163	65	10595
Total	**261,220**	**4,111**	**39,334**	**9,154**	**764,996**	**1,078,815**	**495**	**60499450**
Grade	35	60	5	65	65	**230**		
Weighted	9142700	246660	196670	595010	49724740	**59905780**		
						761637		

Hydrant	
Location	**No.**
City	569
County	404
Total	**973**

Capacity			
Pipe Size (inches)	**Percent (%) of System**	**Grade Point**	**Weighted Grade Point**
Dia. < 6	21.6	20	432
6 ≤ Dia. < 10	62.4	70	4366
10 ≤ Dia. ≤ 20	16.1	75	1204
Total	**100**	**165**	**6001**

* Diameters less than 6-inches do not provide adequate capacity for fire flow protection.

Pipe Size Weighted Average =	**56.1**	**C**
Material Weighted Average =	**55.5**	**C**
Capacity Weighted Average =	**60.0**	**B**

Water Distribution System:

Size	Pipe by Material Percentage				
	CI	DI	GS	HDPE	PVC
1	16.3	0.0	53.5	0.0	30.2
2	19.5	0.0	18.4	0.0	62.1
3	100.0	0.0	0.0	0.0	0.0
4	14.7	0.0	0.0	0.0	85.3
6	35.9	0.0	0.0	0.0	64.1
8	9.3	0.5	0.0	0.2	90.0
10	23.0	0.0	0.0	1.4	75.6
12	22.9	1.4	0.0	3.9	71.7
16	20.4	2.3	0.0	3.7	73.7
20	0.0	100.0	0.0	0.0	0.0
Total	**24.2**	**0.4**	**3.6**	**0.8**	**70.9**

Valves	
Size	No.
1	2
2	134
4	13
6	322
8	61
10	28
12	39
Unknown	3342
Total	**3941**

Water Main Inventory & Replacement (Catch-Up) Analysis

Materials	2012 Inventory (miles)	2012 Material Breakdown of Inventory (%)	Inventory (miles) 12/16/2013	Material Breakdown of Inventory (%) 12/16/2013	Inventory (miles) 12/19/2014	Material Breakdown of Inventory (%) 12/19/2014
PVC	137.6	67%	139.8	69.0%	143.4	70.5%
Cast Iron (CI)	55	28%	53.26	26.3%	50.82	25.0%
CI < 6"	*10*	*18%*	*9.41*	*17.7%*	*9.41*	*18.5%*
CI = 6"	*28*	*51%*	*27.32*	*51.3%*	*27.54*	*54.2%*
Galvanized Steel (GS)	9	4%	8.55	4.2%	8.31	4.1%
Ductile Iron (DI)	1	1%	1	0.5%	1	0.5%
	202.6		**202.61**		**203.53**	

Water Meters

Size (inches)	Age (Years)						Total Meters by Size	Capacity Grade	Weighted Capacity
	5 yrs or less	6 to 10 yrs	11 to 15 yrs	16 to 20 yrs	21 to 25 yrs	More than 25 yrs			
5/8"	218	134	35	32	39	320	778	10	7,780
3/4"	2,184	2,816	2,558	1,343	1,492	728	11,121	70	778,470
1"	139	113	161	109	165	180	867	70	60,690
1.5"	3	2	16	5	2	5	33	70	2,310
2"	70	73	64	67	40	53	367	70	25,690
3"	11	5	7	8	3	5	39	70	2,730
6"	3	1	3	3	-	2	12	70	840
Total Meters by Age	2,628	3,144	2,844	1,567	1,741	1,293	13,217		878,510
Condition Grade	80	60	35	20	5	0			
Weighted Condition	210240	188640	99540	31340	8705	0	538,465		

Capacity Grade Overall = 66.5 B-

Condition Grade Overall = 40.7 C-

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INFRASTRUCTURE BASELINE ASSESSMENT

WATER TREATMENT

SUPPORTING INFORMATION

FEBRUARY, 2015

WATER TREATMENT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Component Weighting	Weighted Value
Wellfield	76.7	61.5	44.3	48.3	61.4	60.4	55.6	65.7	59.2	25%	14.81
Water Treatment Plant	45.9	54.6	51.3	44.8	61.0	58.7	49.2	68.5	54.2	75%	40.68
						Weighted Average Grading				**100%**	**55.5**

Overall Grade **C+**

WELLFIELD

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Replacement Cost	Weight
Deep Wells	90.0	76.7	50.0	75.0	60.0	75.0	65.0	75.0	70.8	$ 1,435,000	15.9%
Turbine Pumps and Motors	75.0	75.0	50.0	75.0	70.0	75.0	70.0	60.0	68.8	$ 612,500	6.8%
Pump Well Houses	80.0	75.0	65.0	59.0	70.0	70.0	60.0	70.0	68.6	$ 262,500	2.9%
Piping	72.5	52.5	40.0	37.5	62.5	52.5	52.5	65.0	54.4	$ 5,500,000	61.1%
Electrical and Controls	80.0	75.0	50.0	50.0	51.7	70.0	50.0	60.0	60.8	$ 1,190,000	13.2%
										$ 9,000,000	100.0%
Weighted Grade	76.7	61.5	44.3	48.3	61.4	60.4	55.6	65.7	59.2		
								Overall Grade	**C+**		

DEEP WELLS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Well	90.0	80.0	50.0	75.0	60.0	75.0	65.0	75.0	71.3	B
Casing	90.0	75.0	50.0	75.0	60.0	75.0	65.0	75.0	70.6	B
Screen	90.0	75.0	50.0	75.0	60.0	75.0	65.0	75.0	70.6	B
Average	90.0	76.7	50.0	75.0	60.0	75.0	65.0	75.0		
						Average Grading			**70.8**	**B**

TURBINE PUMPS AND MOTORS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Pumps	75.0	75.0	50.0	75.0	70.0	75.0	70.0	60.0	68.8	B
Motors	75.0	75.0	50.0	75.0	70.0	75.0	70.0	60.0	68.8	B
Average	75.0	75.0	50.0	75.0	70.0	75.0	70.0	60.0		
						Average Grading			**68.8**	**B**

PUMP WELL HOUSES

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	80.0	75.0	65.0	59.0	70.0	70.0	60.0	70.0	68.6	B
						Average Grading			**68.6**	**B**

PIPING

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Pump Discharge	75.0	70.0	50.0	45.0	70.0	65.0	65.0	65.0	63.1	B
Main Pipe	70.0	35.0	30.0	30.0	55.0	40.0	40.0	65.0	45.6	C
Average	72.5	52.5	40.0	37.5	62.5	52.5	52.5	65.0		
						Average Grading			**54.4**	**C+**

ELECTRICAL AND CONTROLS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Underground Elec	80.0	75.0	50.0	50.0	35.0	80.0	50.0	60.0	60.0	B
Electrical Panels	80.0	75.0	50.0	50.0	60.0	65.0	50.0	60.0	61.3	B
Control Panels	80.0	75.0	50.0	50.0	60.0	65.0	50.0	60.0	61.3	B
Average	80.0	75.0	50.0	50.0	51.7	70.0	50.0	60.0		
						Average Grading			**60.8**	**B-**

WATER TREATMENT PLANT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Replacement Cost	Weight
Lime Softening Plant	40.0	27.5	35.0	38.0	40.0	40.0	35.0	55.0	38.8	$ 11,750,000	43.5%
Low Pressure Reverse Osmosis Plant (2.0 MGD)	46.3	80.0	65.0	50.0	80.0	75.0	60.0	80.0	67.0	$ 11,750,000	43.5%
North Tank	81.3	81.3	60.0	50.0	80.0	75.0	70.0	80.0	72.2	$ 1,750,000	6.5%
South Tank	47.5	40.0	60.0	50.0	55.0	58.0	51.3	70.0	54.0	$ 1,750,000	6.5%
										$ 27,000,000	100.0%
Weighted Grade	45.9	54.6	51.3	44.8	61.0	58.7	49.2	68.5	54.2		
								Overall Grade	**C+**		

LIME SOFTENING PLANT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	40.0	15.0	35.0	38.0	40.0	40.0	35.0	55.0	37.3	D
Equipment	35.0	25.0	35.0	38.0	40.0	40.0	35.0	55.0	37.9	D
Piping	45.0	30.0	35.0	38.0	40.0	40.0	35.0	55.0	39.8	D
Elec and Controls	40.0	40.0	35.0	38.0	40.0	40.0	35.0	55.0	40.4	C
Average	40.0	27.5	35.0	38.0	40.0	40.0	35.0	55.0		
						Average Grading			**38.8**	**D+**

LOW PRESSURE REVERSE OSMOSIS (LPRO) PLANT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	50.0	80.0	65.0	50.0	80.0	75.0	60.0	80.0	67.5	B
Equipment	50.0	80.0	65.0	50.0	80.0	75.0	60.0	80.0	67.5	B
Piping	45.0	80.0	65.0	50.0	80.0	75.0	60.0	80.0	66.9	B
Elec and Controls	40.0	80.0	65.0	50.0	80.0	75.0	60.0	80.0	66.3	B
Average	46.3	80.0	65.0	50.0	80.0	75.0	60.0	80.0		
						Average Grading			**67.0**	**B**

NORTH TANK

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65.0	55.0	60.0	50.0	80.0	75.0	70.0	80.0	66.9	B
Equipment	90.0	90.0	60.0	50.0	80.0	75.0	70.0	80.0	74.4	B
Piping	90.0	90.0	60.0	50.0	80.0	75.0	70.0	80.0	74.4	B
Elec and Controls	80.0	90.0	60.0	50.0	80.0	75.0	70.0	80.0	73.1	B
Average	81.3	81.3	60.0	50.0	80.0	75.0	70.0	80.0		
						Average Grading			**72.2**	**B**

SOUTH TANK

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65.0	60.0	60.0	50.0	55.0	58.0	50.0	70.0	58.5	C
Equipment	40.0	35.0	60.0	50.0	55.0	58.0	50.0	70.0	52.3	C
Piping	45.0	35.0	60.0	50.0	55.0	58.0	60.0	70.0	54.1	C
Elec and Controls	40.0	30.0	60.0	50.0	55.0	58.0	45.0	70.0	51.0	C
Average	47.5	40.0	60.0	50.0	55.0	58.0	51.3	70.0		
						Average Grading			**54.0**	**C+**

Water Treatment Systems Asset Value & Replacement Cost:

Approx Total Asset Value/Replacement Cost = $ 36,000,000

Wellfield

Component	Total Cost
Deep Wells (4 - 1500 gpm) Upper Florida Wells	$ 3,500,000
Transmission Pipe Line (12" and 20")	$ 5,500,000
Total	**$ 9,000,000**

Water Treatment Plant

Component	Total Cost
Raw Water Blend (2.5 MGD)	
Low Pressure Reverse Osmosis Plant (4.0 MGD)	
North Tank and South Tank	
Total	**$ 27,000,000**

Estimated Construction Costs to Bring Deficient Water Treatment System Assets up to Acceptable Standard

Approx Cost to Rehabilitate = $ 15,350,000

Wellfield

Component	Total Cost
Deep Wells	$ 200,000
Turbine Pumps and Motors	$ -
Pump Well Houses	$ 200,000
Piping	$ -
Electrical and Controls	$ 150,000
Total	**$ 550,000**

Water Treatment Plant

Component	Total Cost
Lime Softening Plant	$ 400,000
Low Pressure Reverse Osmosis Plant (2.0 MGD)	$ 13,000,000
North Tank	$ 200,000
South Tank	$ 1,200,000
Total	**$ 14,800,000**

WELLFIELD

BASELINE EVALUATION

SUMMARY

Component	Avg Grading	Grade	Cost
Deep Wells	70.8	B	$ 200,000
Turbine Pumps and Motors	68.8	B	$ -
Pump Well Houses	68.6	B	$ 200,000
Piping	54.4	C+	$ -
Electrical and Controls	60.8	B-	$ 150,000
Overall Grading	64.7	B-	
Total Cost			$ 550,000

DEEP WELLS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Well	90	80	50	75	60	75	65	75	71.3	B
Casing	90	75	50	75	60	75	65	75	70.6	B
Screen	90	75	50	75	60	75	65	75	70.6	B
						Average Grading			**70.8**	**B**

The City phased out nine (9) surficial wells as required by SJRWMD in 2008 when the new CUP Permit was issued. Installation of four (4) new Upper Floridan Aquifer with each well having a 1500 gpm capacity were installed between 2009 and 2010. These new wells in combinationwith three (3)) existing deep wells and one (1) surficial well form the wellfield system for the City. Also, as required by SJRWMD five (5) monitoring wells were installed in order to monitor the water quality of the groundwater. So, the wells are new and they are in good condition. A budgetary amount of $200,000 is established in this Report Card in order to provide acidification to each well within the next five (5) years.

TURBINE PUMPS AND MOTORS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Pumps	75	75	50	75	70	75	70	60	68.8	B
Motors	75	75	50	75	70	75	70	60	68.8	B
						Average Grading			**68.8**	**B**

New pumps and motors were installed when the new wells were drilled in 2009. These pumps and motor are presently in good condition and they will provide the projected flow to the WTP for treatment within the next twenty (20) years.

PUMP WELL HOUSES

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	80	75	65	59	70	70	60	70	68.6	B
						Average Grading			**68.6**	**B**

Pump Motor, Electrical and Control Panels for each new well are housed in a new Pump House made of concrete block and concrete roof. Each Pump Hose was designed and constructed to withstand winds of 150 mph. The pump houses are in good condition. The old pump houses that served to house the old motors and electrical equipment, must be demolished and all the debrie from the demolition must be disposed of in accordance with present regulations. An amount of $200,000 is assigned for demolition and material disposal of the old well houses.

PIPING

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Pump Discharge	75	70	50	45	70	65	65	65	63.1	B
Main Pipe	70	35	30	30	55	40	40	65	45.6	C
						Average Grading			**54.4**	**C+**

The discharge piping, fittings and valves from each well pump are in good condition. The transmission main that transports the raw water from the well field to the WTP is composed of 9,200 LF of 12-inch Ductile Iron pipe and approximately 39,300 LF of 20-inch Ductile Iron pipe. This transmission line was installed in 1981 and its in fair condition.

ELECTRICAL AND CONTROLS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Underground Electric	80	75	50	50	35	80	50	60	60.0	B
Electrical Panels	80	75	50	50	60	65	50	60	61.3	B
Control Panels	80	75	50	50	60	65	50	60	61.3	B
						Average Grading			**60.8**	**B-**

New electrical and control systems were installed for each new well in 2009. The electrical and control systems are generally in good condition.. It is advisable that a new emergency generator be installed in one of the well sites in orderr to improve realibily service in case of power failure caused during major weather storms. A budgetary amount of $150,000 is estimated for for the purchasing and installation of the new emergency generator and transfer switch.

WATER TREATMENT PLANT

BASELINE EVALUATION

SUMMARY

Component	Avg Grading	Grade	Cost
Lime Softening Plant	38.8	D+	$ 400,000
Low Pressure Reverse Osmosis Plant	67.3	B	$ 13,000,000
North Tank	71.9	B	$ 200,000
South Tank	55.0	C+	$ 1,200,000
Overall Grading	58.2	C+	
Total Cost			$ 14,800,000

LIME SOFTENING PLANT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	40	15	35	38	40	40	35	55	37.3	D
Equipment	35	25	35	38	40	40	35	55	37.9	D
Piping	45	30	35	38	40	40	35	55	39.8	D
Electrical and Controls	40	40	35	38	40	40	35	55	40.4	C
						Average Grading			**38.8**	**D+**

The Lime Softening Water Treatment Plant was originally placed in service in the 1920s. Modifications to the original plant were constructed in 1987. Studies conducted in 2006 and 2007 determined that the City must build a new plant to replace the original plant. The Lime Softening Plant is scheduled for demolition when the new Low Pressure Reverse Osmosis (LPRO) is expanded to meet future demands. A budgetary amount of $400,000 is made for the demolition and disposal of the plant structures and piping

LOW PRESSURE REVERSE OSMOSIS (LPRO) PLANT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	50	80	65	50	80	75	60	80	67.5	B
Equipment	50	80	65	50	80	75	60	80	67.5	B
Piping	45	80	65	50	80	75	60	80	66.9	B
Electrical and Control	40	80	65	50	80	75	60	80	66.3	B
						Average Grading			**67.3**	**B**

The existing 2.0 MGD Low Pressure Reverse Osmosis WTP was built in 2008. This plant is scheduled to be expanded to 4.0 MGD within the next three or four years. The permeate from the expanded LPRO plant will be blended with pretreated raw water from the wellfield. The ultimate treatment capacity will be 6.5 MGD. The estimated cost for the treatment plant expansion has been estimated at $ 13 million dollars.

NORTH TANK

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	55	60	50	80	75	70	80	66.9	B
Equipment	90	90	60	50	80	75	70	80	74.4	B
Piping	90	90	60	50	80	75	70	80	74.4	B
Electrical and Controls	80	90	60	50	80	75	70	80	73.1	B
						Average Grading			**71.9**	**B**

The existing facilities of the North Tank are presently being rehabilitated. New pumps, piping, valves, metering, chemical feed systems and electrical controls are being replaced. Therefore, the mechanical, piping and electrical systems will be in good conditions. However, the 1.0 prestressed concrete tank needs to be cleaned , recoated and disinfected. A budget of $200,000 is estimated to perform the required work for the tank.

SOUTH TANK

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	60	60	50	55	58	50	70	58.5	C
Equipment	40	35	60	50	55	58	50	70	52.3	C
Piping	45	35	60	50	55	58	60	70	54.1	C
Electrical and Controls	40	30	60	50	55	58	45	70	51.0	C
						Average Grading			**55.0**	**C+**

The South Tank facilities are in mediocre conditions and therefore a replacement of mechanical, piping and electrical systems are recommended to bring this facility to a good conditions and to provide a reliable service to the customers. Also the prestressed concrete tank must be cleaned, recoated and disinfected. A total budgetary amount of $1.2 million dollars is allocated for the complete rehabilitation of this facility.

CITY OF
ST AUGUSTINE
EST. 1565

INFRASTRUCTURE BASELINE ASSESSMENT

SEWER COLLECTION

SUPPORTING INFORMATION

FEBRUARY, 2015

SEWER COLLECTION SYSTEM

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Component Weighting	Weighted Value
Gravity Conveyance System	77.6	61.1	40.0	30.0	65.0	55.0	30.0	60.0	52.3	56%	29.4
Forcemains	42.7	73.0	40.0	35.0	60.0	55.0	45.0	50.0	50.1	35%	17.3
Pump Stations	66.5	51.1	40.0	30.0	60.0	50.0	40.0	50.0	48.5	9%	4.5
						Weighted Average Grading					**51.2**

Overall Grade **C**

The City's sewer system is composed of the gravity conveyance system, lift stations, and forcemains. The gravity conveyance system incorporates 79.5 miles of gravity sewer piping ranging in size from 6-inch to 24-inch and approximately 1,950 manholes. There are 75 lift stations and approximatley 61 miles of associated forcemain rangining in size from 2-inch to 36-inch.

Sewer Collection System Asset Value & Replacement Cost

Approx Total Asset Value/Replacement Cost = $ 176,902,912

Gravity Sewer

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value
6	13,634	$ 170.00	$ 2,317,698
8	192,239	$ 200.00	$ 38,447,746
10	166,576	$ 220.00	$ 36,646,754
12	37,510	$ 260.00	$ 9,752,504
15	7,999	$ 295.00	$ 2,359,839
16	230	$ 300.00	$ 68,968
18	768	$ 320.00	$ 245,831
24	101	$ 380.00	$ 38,283
		Total	**$ 89,877,622**

Manholes		Unit Cost	Total
Material	No.	($/MH)	Value
Brick	1145	$ 4,500	$ 5,152,500
Precast	793	$ 4,500	$ 3,568,500
Unknown	161	$ 4,500	$ 724,500
		Total	**$ 9,445,500**

Estimated Construction Costs to Bring Deficient Sewer Collection System Assets up to Acceptable Standard

Approx Cost to Rehabilitate = $ 32,354,347

Gravity Sewer

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)*	Total Cost
6	13,634	$ 150.00	$ 2,045,028
8	152,822	$ 35.36	$ 5,403,948
10	9,552	$ 39.87	$ 380,839
12	17,141	$ 44.38	$ 760,753
15	1,321	$ 57.58	$ 76,074
18	677	$ 65.28	$ 44,200
24	101	$ 121.05	$ 12,195
Approximate Cost to Upgrade to 6" diameter pipe to 8" and slip line non-plastic materials =			**$ 8,723,036**

Manholes		Unit Cost	Total
Material	No.		
Brick Rehab	573	$ 3,000	$ 1,719,000
Brick Replace	572	$ 4,500	$ 2,574,000
Precast Rehab	199	$ 3,000	$ 597,000
Unknown Rehab	161	$ 3,000	$ 483,000
Cost to replace or rehabilitate		**Total**	**$ 5,373,000**

Sewer Collection System Asset Value & Replacement Cost

Forcemains

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value
Unknown	3,134	$ 125.00	$ 391,700
2	25,920	$ 100.00	$ 2,592,009
3	1,416	$ 105.00	$ 148,723
4	46,159	$ 125.00	$ 5,769,820
6	67,536	$ 150.00	$ 10,130,339
8	35,548	$ 180.00	$ 6,398,680
10	27,937	$ 200.00	$ 5,587,367
12	71,439	$ 240.00	$ 17,145,262
16	27,955	$ 280.00	$ 7,827,322
18	683	$ 300.00	$ 204,932
24	8,400	$ 360.00	$ 3,023,840
36	4,564	$ 425.00	$ 1,939,795
		Total	**$ 61,159,790**

*Assume Unknown is 4" piping

Estimated Construction Costs to Bring Deficient Sewer Collection System Assets up to Acceptable Standard

Forcemains

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Cost
Uknown	3,134	$ 125.00	$ 391,700
2	62	$ 100.00	$ 6,183
4	3,137	$ 125.00	$ 392,100
6	3,829	$ 150.00	$ 574,417
8	7,957	$ 180.00	$ 1,432,238
10	32,301	$ 200.00	$ 6,460,218
12	17,412	$ 240.00	$ 4,178,958
16	32	$ 280.00	$ 9,025
18	646	$ 300.00	$ 193,708
24	4,662	$ 360.00	$ 1,678,422
36	3,700	$ 425.00	$ 1,572,500
		Total	**$ 16,889,469**

Approximate cost to replace unsuitable forcemain materials and add or increase size of existing forcemains for capacity

Sewer Collection System Asset Value & Replacement Cost

Pump Stations

Wet Well Depth (feet)	Discharge FM Size (inches)						Total Value
	2	4	6	8	10	12	
D ≤ 10	2	8	5	0	0	1	
$/Pump Station	$ 60,000	$ 145,000	$ 160,000	$ 225,000	$320,000	$ 375,000	$ 2,455,000
>10 D ≤ 15	2	8	9	2	1	1	
$/Pump Station	$ 75,000	$ 160,000	$ 180,000	$ 250,000	$350,000	$ 400,000	$ 4,300,000
>15 D ≤ 20	1	9	10	2	3	5	
$/Pump Station	$ 90,000	$ 180,000	$ 200,000	$ 275,000	$380,000	$ 460,000	$ 7,700,000
>20 D ≤ 25	0	1	1	2	2	0	
$/Pump Station	$ 115,000	$ 205,000	$ 250,000	$ 325,000	$430,000	$ 515,000	$ 1,965,000
Total	**5**	**26**	**25**	**6**	**6**	**7**	**$ 16,420,000**

Costs to Bring Deficient Sewer Collection System Assets up to Acceptable Standard

Pump Stations

Discharge FM Size (inches)	No. of Pump Stations Need Rehabilitation	Total Cost
2	4	$ 108,456
4	18	$ 516,765
6	16	$ 275,871
8	4	$ 119,602
10	3	$ 86,332
12	4	$ 261,817
	Total	**$ 1,368,842**

Sewer Conveyance System:

Pipe Size (inches)	Material Length (feet)								Total Length (feet)	Grade Point	Weighted Grade Point
	Slip Lined Cast Iron	Cast Iron	Slip Lined Clay	Clay	Slip Lined Ductile Iron	Ductile Iron	Concrete/RCP	PVC			
6	0	446	0	12,970				218	13,634	5	68168
8	994	332	35,212	151,371	166	0	1,119	3,045	192,239	80	15379098
10	55	35	2,731	8,979	146	538	0	154,092	166,576	80	13326092
12	238	342	3,681	16,355		176	269	16,449	37,510	80	3000770
15				1,302		19		6,678	7,999	80	639956
16								230	230	80	18391
18				677				91	768	80	61458
24							101		101	80	8060
Total	**1,288**	**1,155**	**41,625**	**191,653**	**312**	**733**	**1,488**	**180,803**	**419,056**	**565**	**32501994**
Grade	70	5	75	5	70	5	5	80	**315**		
Weighted	90,129	5,774	3,121,842	958,267	21,838	3,666	7,440	14,464,236	**18673192**		

Manhole	
Material	**No.**
Brick	1145
Precast	793
Unknown	161
Total	2099

Capacity			
Pipe Size (inches)	**Percent (%) of System**	**Grade Point**	**Weighted Grade Point**
Dia. < 8	3.3	5	16
8 ≤ Dia. < 24	96.7	80	7740
Total	**100**	**85**	**7756**

* Diameters less than 8-inches do not meet minimum engineering standards and are assumed unfit for purpose resulting in a failing grade.

Pipe Size Weighted Average =	**77.6**	**B+**
Material Weighted Average =	**44.6**	**C-**
Capacity Weighted Average =	**77.6**	**B+**
Condition (Pipe and Mtl Avg) =	**61.1**	**B-**

Forcemain System

Pipe Size (inches)	Material Length (feet)					Total Length (feet)	Grade Point	Weighted Grade Point
	Uknown	Cast Iron	Ductile Iron	HDPE	PVC			
Uknown	3,134					3,134	5	15668
2	62			1,699	24,160	25,920	80	2073607
3					1,416	1,416	80	113313
4		1,869	1,268		43,022	46,159	80	3692685
6		3,097	733	263	63,443	67,536	80	5402848
8	632	1,675	3,650	5,267	24,324	35,548	80	2843858
10		17,565	6,036		4,336	27,937	80	2234947
12	5,867	3,550	95	1,395	60,531	71,439	80	5715087
16		32		3,521	24,401	27,955	80	2236378
18		646			37	683	80	54649
24		8,362			37	8,400	80	671964
36					4,564	4,564	80	365138
Total	**9,695**	**36,796**	**11,781**	**12,145**	**250,272**	**320,690**	**885**	**25420141**
Grade	5	5	5	90	80	**185**		
Weighted	48475	183981	58904	1093075	20021766	**21406201**		

Capacity			
Needed Pipe Size (inches)	Length (feet)	Importance to Entire System (Grade)	Weighted Grade Point
6	1,900	80	152000
8	3,800	60	228000
10	8,700	50	435000
12	7,900	35	276500
36	3,700	5	18500
Total	**26,000**		**1110000**

Pipe Size Weighted Average =	**79.3**	**B+**
Material Weighted Average =	**66.8**	**B**
Capacity Weighted Average =	**42.7**	**C-**
Condition (Pipe and Mtl Avg)	**73.0**	**B**

*Based on an evaluation of forcemains needing an increase in size and the importance of that forcemain to the functionality and capacity of the entire sewer collection system.

Pump Stations

Pump Station ID	Discharge FM (inches)	Upstream FM (inches)	PS Type	Wet Well Size (ft)	HP	Wet Well Depth (ft)	Total Estimated Rehabilitation Cost	Condition Grade	Weighted Condition Grade	Capacity Grade	Weighted Capacity Grade
PS-1	4		dry	5'	3	12	**$30,703**	30	120	70	280
PS-2	8		Sub	8'	20	18	**$34,043**	35	280	70	560
PS-3	6		dry	5'	7.5	13	**$38,566**	30	180	70	420
PS-4	4		dry	4'	7.5	10	**$37,143**	30	120	70	280
PS-5	4		dry	4'	5	11	**$35,259**	30	120	70	280
PS-6	12		Sub Triplex	10'	47	19	**$121,763**	20	240	40	480
PS-7	10		Sub Triplex	12'	20	17	**$47,547**	35	350	40	400
PS-8	6		dry	6'	5	13	**$32,380**	30	180	70	420
PS-9	8		Sub	8'	5			75	600	40	320
PS-10	12		Sub Triplex	11.5'	20	18	**$47,359**	35	420	40	480
PS-11	6		Sub	8'	5			75	450	70	420
PS-12	6		Sub	8'	10	14	**$22,048**	35	210	70	420
PS-14	6		Dry	5'	10	15	**$36,623**	20	120	70	420
PS-15	4		Dry	6'	5	15	**$30,077**	20	80	70	280
PS-16	4		Sub	5'	1	7	**$49,348**	20	80	70	280
PS-17	6		Sub	4' .2''	3	9	**$4,266**	45	270	70	420
PS-18	4		dry	5'	2	10	**$30,050**	30	120	70	280
PS-20	10		Dry	8'	20		**$25,000**	45	450	70	700
PS-21	-	10	Sub	6'	10			75	750	70	700
PS-22	4		Sub	6'	5			75	300	70	280
PS-23	6		Sub	8'	10	16	**$9,900**	45	270	70	420
PS-24	10		Sub	8'	20	16	**$13,784**	45	450	70	700
PS-25	6		Dry	4'	3	9	**$4,207**	45	270	70	420
PS-26	6		Sub	4'		7	**$21,743**	20	120	70	420
PS-28	-	6	Sub	6'	3	12	**$12,560**	45	270	70	420
PS-29	6		Sub	6'	3	14	**$7,141**	45	270	70	420
PS-30	4		Sub	6'	15	10	**$4,834**	45	180	70	280

Pump Station ID	Discharge FM (inches)	Upstream FM (inches)	PS Type	Wet Well Size (ft)	HP	Wet Well Depth (ft)	Total Estimated Rehabilitation Cost	Condition Grade	Weighted Condition Grade	Capacity Grade	Weighted Capacity Grade
PS-34	6		Sub	8'	30	17	**$10,171**	45	270	70	420
PS-35	6		Sub	6'		13	**$6,996**	45	270	70	420
PS-36	-		Dry Single	4'	1	7	**$41,946**	20	40	19	38
PS-38	-	6	Dry	5' 10"				75	450	70	420
PS-39	6		Dry	5'				75	450	70	420
PS-40	4		Dry	5'	7.5	14	**$6,429**	45	180	70	280
PS-41	4		Dry	4'	15	14	**$50,869**	20	80	70	280
PS-42	4		Sub	4'	3	9	**$59,843**	20	80	70	280
PS-43	2		Sub	4'	3	10	**$3,556**	45	90	70	140
PS-44	-	8	Sub	6'	10	13	**$20,000**	45	360	70	560
PS-45	8		Sub	8'	20	22	**$10,456**	45	360	70	560
PS-46	4		Sub	6'	2	11	**$4,153**	45	180	70	280
PS-47	4		Sub	4'	3	10	**$4,556**	45	180	70	280
PS-49	6		Sub	8'	10	20	**$11,953**	45	270	70	420
PS-50	6		Dry	6'	5		**$17,000**	45	270	70	420
PS-51	-	8	dry	6'	5			75	600	70	560
PS-52	12		dry	8'	40			75	900	70	840
PS-53	2		Sub	6.5"	2	12	**$49,852**	30	60	70	140
PS-54	6		Sub	6'	5	20	**$36,761**	20	120	70	420
PS-55	4		Sub	6'	20	9	**$68,485**	20	80	70	280
PS-56	4		Sub	6'	15	15	**$7,693**	45	180	70	280
PS-57	4		Sub	6'	3	18	**$6,593**	45	180	70	280
PS-58	4		Sub	6'	10	17	**$39,745**	20	80	70	280
PS-59	4		Sub	3'		5	**$15,546**	30	120	70	280
PS-60	12		Sub	6'	10	11	**$36,595**	20	240	70	840
PS-61	2		Sub	10'	3	20	**$13,102**	45	90	70	140
PS-62	6			4'		10	**$3,556**	45	270	70	420
PS-63	4		Sub	8'	2	16	**$35,439**	20	80	70	280
PS-64	12		Sub Triplex	127''x88''	47	8	**$56,099**	40	480	50	600
PS-65	8		Sub	12'	10	21	**$55,103**	20	160	70	560

Pump Station ID	Discharge FM (inches)	Upstream FM (inches)	PS Type	Wet Well Size (ft)	HP	Wet Well Depth (ft)	Total Estimated Rehabilitation Cost	Condition Grade	Weighted Condition Grade	Capacity Grade	Weighted Capacity Grade
PS-66	6		Sub	8'	3			75	450	70	420
PS-67	4		Sub	8'	10			75	300	70	280
PS-68	6		sub	6'	15			75	450	70	420
PS-69	4		Sub	8'	15			75	300	70	280
PS-70	4		Sub	8'	15			75	300	70	280
PS-71	-	6	Sub	6'				75	450	70	420
PS-72	4		Sub	8'	7.5			75	300	70	280
PS-73	4		Sub	8'				75	300	70	280
PS-74	10		Sub	6'	15			80	800	70	700
PS-75	6		Sub	8'	20			80	480	70	420
PS-76	12		Sub	8'	47			80	960	70	840
PS-77	12		Sub	11.5'	105			85	1020	70	840
PS-78	10		Sub	11.5'	5			85	850	70	700
PS-80	4		Sub	11.5'	5			85	340	70	280
PS-81	4		Sub	5.5'	3			85	340	70	280
PS-82	6		Sub	7.5'	10			85	510	70	420
PS-83	2							90	180	70	140
PS-84	6							90	540	70	420
	410	**44**							**23310**		**30318**
Total	**456**										

Condition Grade Overall **51.1** **C**
Capacity Grade Overall **66.5** **B-**

Capacity grade based on overall assessment that the master (triplex) pump stations are approximately a "C" grade and the others are "B" grade. A pump station with a single

Condition grade based on noted recommended upgrades, size of wet well (too small or non standard) and need for wet well liner; pump stations with no info or

Resilience grade based on overall condition of pump stations and the fact that 28 of the 75 pump stations don't have pump outs

CITY OF
ST AUGUSTINE
EST. 1565

INFRASTRUCTURE BASELINE ASSESSMENT

WASTEWATER TREATMENT

SUPPORTING INFORMATION

FEBRUARY, 2015

WASTEWATER TREATMENT

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Component Weighting	Weighted Value
WWTP	51.1	53.2	37.8	42.3	59.8	48.5	43.6	59.6	49.5	100%	49.5
						Weighted Average Grading					**49.5**

Overall Grade **C**

The WWTP has a permitted capacity of 4.95 MGD and utilizes a complete mix activated sludge treatment process which utilizes a headworks system for removal of grit and debris, aeration basins, clarifiers, disinfection chambers and post aeration. Effluent is disinfected utilizing paracetic acid, an innovative process which eliminates the creation of environmentally damaging chlorinated disinfection byproducts and reduced chemical costs. Effluent from the WWTP is discharged to the Matanzas River. Residuals are aerobically digested and dewatered and land applied.

WWTP Compilation of Weighted Grade Using Cost Data

HEADWORKS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	15	35	45	50	40	40	30	60	39.4	D+
Equipment	60	55	45	50	70	40	40	60	52.5	C
Piping	75	75	45	50	70	65	60	60	62.5	B-
Average	50	55	45	50	60	48	43	60		
						Average Grading			**51.5**	**C**

BIOLOGICAL TREATMENT UNITS (BTUs)

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	30	50	20	30	40	40	30	60	37.5	D+
Equipment	75	79	20	30	70	40	40	60	51.8	C
Piping	55	55	20	30	70	65	60	60	51.9	C
Average	53	61	20	30	60	48	43	60		
						Average Grading			**47.0**	**C**

CLARIFIERS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	39	65	59	40	40	40	60	51.0	C
Equipment	15	15	65	59	70	40	40	60	45.5	C-
Piping	59	59	65	59	70	65	40	60	59.6	C+
Average	46	38	65	59	60	48	40	60		
						Average Grading			**52.0**	**C**

Disinfection and Post Aeration

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	79	80	65	59	40	75	50	60	63.5	B-
Equipment	55	55	65	59	70	75	50	60	61.1	B-
Piping	60	75	65	59	70	65	50	60	63.0	B-
Average	65	70	65	59	60	72	50	60		
						Average Grading			**62.5**	**B-**

Return and Waste Sludge Pumping

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	40	40	65	59	40	50	50	60	50.5	C
Equipment	35	20	65	59	70	50	50	60	51.1	C
Piping	19	19	65	59	70	50	50	60	49.0	C
Average	31	26	65	59	60	50	50	60		
						Average Grading			**50.2**	**C**

Sludge Treatment and Handling

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	55	40	40	35	40	50	50	60	46.3	C-
Equipment	35	35	40	35	70	50	50	60	46.9	C
Piping	45	55	40	35	70	50	50	60	50.6	C
Average	45	43	40	35	60	50	50	60		
						Average Grading			**47.9**	**C**

Plant Pumping Station

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	25	30	35	40	50	50	60	44.4	C-
Equipment	60	35	30	35	70	50	50	60	48.8	C
Piping	60	55	30	35	70	50	50	60	51.3	C
Average	62	38	30	35	60	50	50	60		
						Average Grading			**48.1**	**C**

Yard Piping

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Piping	75	55	30	35	50	35	40	50	46.3	C-
						Average Grading			**46.3**	**C-**

Electrical

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Overall Electrical	80	59	50	60	75	60	40	60	60.5	B-
						Average Grading			**60.5**	**B-**

WWTP Compilation of Weighted Grade Using Cost Data

Overall WWTP Assessment

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade	Weight
Headworks	50.0	55.0	45.0	50.0	60.0	48.3	43.3	60.0			25.9%
BTUs	53.3	61.3	20.0	30.0	60.0	48.3	43.3	60.0			43.1%
Clarifiers	46.3	37.7	65.0	59.0	60.0	48.3	40.0	60.0			12.1%
Dis & Post Aer	64.7	70.0	65.0	59.0	60.0	71.7	50.0	60.0			1.7%
RAS/WAS Pump	31.3	26.3	65.0	59.0	60.0	50.0	50.0	60.0			8.2%
Sludge	45.0	43.3	40.0	35.0	60.0	50.0	50.0	60.0			2.8%
Plant Pump	61.7	38.3	30.0	35.0	60.0	50.0	50.0	60.0			0.7%
Piping	75.0	55.0	30.0	35.0	50.0	35.0	40.0	50.0			4.3%
Overall Electrical	80.0	59.0	50.0	60.0	75.0	60.0	40.0	60.0			1.3%
											100.0%
Overall WWTP	**51.1**	**53.2**	**37.8**	**42.3**	**59.8**	**48.5**	**43.6**	**59.6**	**49.5**	**C**	

Wastewater Treatment System Asset Value & Replacement Cost

Approx Total Asset Value/Replacement Cost = $ 26,500,000

Wastewater Treatment Plant

WWTP Capacity (MGD)	Unit Cost ($/WWTP)	Total Value
5	$ 26,500,000	**$ 26,500,000**

Estimated Construction Costs to Bring Deficient Wastewater Treatment System Assets up to Acceptable Standard

Approx Cost to Rehabilitate = $ 11,600,000

Wastewater Treatment Plant

Component	Total Cost
Headworks	$ 3,000,000
Biological Treatment Units	$ 5,000,000
Clarifiers	$ 1,400,000
Disinfection and Post Aeration	$ 200,000
Return and Waste Sludge Pumping	$ 950,000
Sludge Treatment and Handling	$ 320,000
Plant Pumping Station	$ 80,000
Piping	$ 500,000
Electrical	$ 150,000
Total	**$ 11,600,000**

WASTEWATER TREATMENT PLANT

BASELINE EVALUATION

SUMMARY

Component	Avg Grading	Grade	Cost
Headworks	51.5	C	$ 3,000,000
Biological Treatment Units (BTUs)	47.0	C	$ 5,000,000
Clarifiers	52.0	C	$ 1,400,000
Disinfection and Post Aeration	62.5	B-	$ 200,000
Return and Waste Sludge Pumping	50.2	C	$ 950,000
Sludge Treatment and Handling	47.9	C	$ 320,000
Plant Pumping Station	48.1	C	$ 80,000
Piping	46.3	C-	$ 500,000
Electrical	60.5	B-	$ 150,000
Overall Grading	51.8	C	
Total Cost			$ 11,600,000

HEADWORKS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	15	35	45	50	40	40	30	60	39.4	D
Equipment	60	55	45	50	70	40	40	60	52.5	C
Piping	75	75	45	50	70	65	60	60	62.5	B
						Average Grading			**51.5**	**C**

The headworks structurally is adequate for current conditions but does not have reserve strength for modifications to provide additional hydraulic capacity. The structure does not have the hydraulic capacity to handle Maximum Daily Flows. The equipment needs to be replaced to improve the removal of grit and rags that are present in the incoming flow. The construction of a new Headworks structure with a more efficient equipment is estimated at $3,000,000

BIOLOGICAL TREATMENT UNITS (BTUs)

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	30	50	20	30	40	40	30	60	37.5	D
Equipment	75	79	20	30	70	40	40	60	51.8	C
Piping	55	55	20	30	70	65	60	60	51.9	C
						Average Grading			**47.0**	**C**

The biological treatment units presently meet treatment requirements, although the concrete structures are in a need of repair due to vertical cracking in the structure walls. A new aeration system was installed in 2010 which provides the required air for treatment and mixing. It is estimated that EPA and FDEP will require Advance Wastewater Treatment to this facility in the next permit period (2019). Furthermore, it is also estimated the WWTP needs to be expanded to accommodate additional flow. Therefore these structures need to be modified to accommodate more flow and removal of nitrogen and phosphorous. The estimated cost for the BTUs modifications and structural repairs is approximately $5,000,000 for both structures

CLARIFIERS

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	39	65	59	40	40	40	60	51.0	C
Equipment	15	15	65	59	70	40	40	60	45.5	C
Piping	59	59	65	59	70	65	40	60	59.6	C
						Average Grading			**52.0**	**C**

The clarifier structures need to be repair to bring them to a good condition. The equipment has reached the life expectancy and need to be replaced in their totallity. The estimated cost to make the structural repairs and replace the equipment on both clarifiers is approximately $1,400,000

Disinfection and Post Aeration

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	79	80	65	59	40	75	50	60	63.5	B
Equipment	55	55	65	59	70	75	50	60	61.1	B
Piping	60	75	65	59	70	65	50	60	63.0	B
						Average Grading			**62.5**	**B-**

The disinfection and post aeration structure is in a good condition. Presently, no modifications or additions to this structure are contemplated. It appears that this structure has enough capacity to meet the required detention time for the expansion of the WWTP in the future. A budget figure of $200,000 is included in this evaluation to recoat the inside walls of the structure in the future.

Return and Waste Sludge Pumping

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	40	40	65	59	40	50	50	60	50.5	C
Equipment	35	20	65	59	70	50	50	60	51.1	C
Piping	19	19	65	59	70	50	50	60	49.0	C
						Average Grading			**50.2**	**C**

The pumping equipment and piping of the return sludge and waste sludge systems are in mediocre condition and need to be replaced, The primary issue with these systems is that the pumps, piping and valves are near the end of their service life and therefore need replacement. The key engineering goal for this task will be equipment selection to meet hydraulic and functional requirements within the constrains of the existing infrastructure. The estimated cost to replace the return sludge and waste sludge pumping and piping systems is approximately $950,000.

Sludge Treatment and Handling

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	55	40	40	35	40	50	50	60	46.3	C
Equipment	35	35	40	35	70	50	50	60	46.9	C
Piping	45	55	40	35	70	50	50	60	50.6	C
						Average Grading			**47.9**	**C**

The aerobic Digesters are near the end of their life expectancy. However these structures can be rehabilitated to bring them to a good condition. As mentioned before the present regulations can change, so at this time is very difficult to predict any upgrades that need to be implemented to the entire sludge treatment and handling facilities. The supernatant lift station for the digesters needs to be rehabilitated in its entirely There are some booster pumps within the system that need to be replaced. Also, it is advisable to improve the inside conditions of the aerobic digesters by blasting and lining the interior walls. A cost estimate for the improvements of this WWTP component is as follows: Replace Booster pumps $70,000. Supernatant Pumping Station $100,000 and Rehab the digesters by blasting and lining the interior walls $ 150,000. Therefore the total cost is approximately, $320,000

Plant Pumping Station

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Structure	65	25	30	35	40	50	50	60	44.4	C
Equipment	60	35	30	35	70	50	50	60	48.8	C
Piping	60	55	30	35	70	50	50	60	51.3	C
						Average Grading			**48.1**	**C**

The Plant Pumping Station needs to be refurbished to bring it to a good and operable condition. It is required that the wetwell be lined to discontinue the deterioration of the concrete walls. Piping must be replaced and the electrical cabinet and pump controls must be replaced. The estimate cost to bring the Plant Pumping Station to a good condition is approximately $80,000

Yard Piping

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Piping	75	55	30	35	50	35	40	50	46.3	C
						Average Grading			**46.3**	**C-**

The existing piping that transport the wastewater troughout the entire plant lacks of valves which makes the system difficult to operate and control the flows between different WWTP tanks. Also the existing structures lack of drain pipes and valves. Therefore, pumps must be utilized to empty tanks for maintenance or repairs. An estimated budget of $500,0000 is assigned for the installation of the valves. Not budget is assigned to retrofit the existing structures with drain pipes. This retrit is costly and the City can continue utilizing pumps to drain the tanks.

Electrical

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Grade
Overall Electrical	80	59	50	60	75	60	40	60	60.5	B
						Average Grading			**60.5**	**B-**

The electrical system at the WWTP was refurbished in 2008. The electrical system was brought to meet the Electrical Code Standards. New conduits, wire and new electrical contol panels were installed to replace the old electrical system. There is an existing Motor Control Center (MCC) that need to be replaced. The cost of the replacement of this MCC is estimated at $150,000

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CITY OF
ST AUGUSTINE
EST. 1565

INFRASTRUCTURE BASELINE ASSESSMENT

STORMWATER SYSTEM

SUPPORTING INFORMATION

FEBRUARY, 2015

STORMWATER

Component	Capacity	Condition	Funding	Future Need	O&M	Public Safety	Resilience	Innovation	Average Grading	Weighted Value	Weighted Value
Conveyance System	35	29	40	30	45	50	30	30	36.1	80	2890
Channels	50	50	50	50	45	50	45	30	46.3	10	462.5
Treatment Structures	85	90	30	30	25	90	50	50	56.3	10	562.5
						Weighted Average Grading			**39.2**	**100**	**3915**

Overall Grade **D+**

The City's stormwater conveyance system spans 13 watersheds consisting of pipes, inlets, manholes, water quality treatment structures and swales within the road system and drainage channels. St. Augustine has approximately 3 miles of channels, 20 miles of storm sewer pipes and culverts including 103 outfalls to surrounding waterbodies, 949 inlets, 298 manholes and 14 treatment structures. Since 1995, extensive improvements have been made in areas that suffered from frequent flooding while new stormwater conveyance systems are constructed with road projects. Maintenance is performed on a routine basis and repairs are made on an as-needed.

Stormwater System Asset Value & Replacement Cost

Approx Total Asset Value/Replacement Cost = $ 29,966,430

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value
4	130	$ 150.00	$ 19,500
6	1457	$ 150.00	$ 218,550
8	13532	$ 150.00	$ 2,029,800
10	11850	$ 150.00	$ 1,777,500
12	20199	$ 150.00	$ 3,029,850
15	12292	$ 250.00	$ 3,073,000
16	629	$ 250.00	$ 157,250
18	11623	$ 260.00	$ 3,021,980
21	1624	$ 265.00	$ 430,360
23	157	$ 275.00	$ 43,175
24	10314	$ 275.00	$ 2,836,350
27	1568	$ 280.00	$ 439,040
30	6099	$ 285.00	$ 1,738,215
36	2939	$ 290.00	$ 852,310
42	2583	$ 300.00	$ 774,900
48	1311	$ 350.00	$ 458,850
60	839	$ 400.00	$ 335,600
66	476	$ 450.00	$ 214,200
		Total	**$ 21,450,430**

Estimated Construction Costs to Bring Deficient Stormwater System Assets up to Acceptable Standard

Approx Cost to Rehabilitate = $ 11,792,000

Pipe Size (inches)	Total Length (feet)	Unit Cost ($/ft)	Total Value
4	130	$ 250.00	$ 32,500
6	1457	$ 250.00	$ 364,250
8	13532	$ 250.00	$ 3,383,000
10	11850	$ 250.00	$ 2,962,500
12	20199	$ 250.00	$ 5,049,750
Approximate Cost to Upgrade to 15" diameter pipe =			**$ 11,792,000**

Stormwater System Asset Value & Replacement Cost

Manhole Material	Manhole No.	Unit Cost ($/MH)	Total Value
Brick	211	$ 4,500	$ 949,500
Precast	87	$ 4,500	$ 391,500
		Total	**$ 1,341,000**

Inlets No.	Unit Cost ($/Inlet)	Total Value
949	$ 5,000	**$ 4,745,000**

Outfall No.	Unit Cost ($/OF)	Total Value
103	$ 10,000	**$ 1,030,000**

Treatment Str. No.	Unit Cost ($/TS)	Total Value
14	$ 100,000	**$ 1,400,000**

Conveyance System:

Pipe Size (inches)	Material Length (feet)								Total Length (feet)	Grade Point	Weighted Grade Point
	ADS	Cast Iron	Clay	CMP	Concrete	HDPE	PVC	RCP			
4	0	71	43	0	0	0	16	0	130	5	650
6	0	282	994	0	70	0	111	0	1457	5	7285
8	637	319	10815	0	1024	0	737	0	13532	5	67660
10	304	88	9256	0	1449	0	753	0	11850	5	59250
12	0	52	8345	0	9848	170	1407	377	20199	10	201990
15	23	32	1022	0	8806	163	1373	873	12292	20	245840
16	0	0	0	0	0	0	629	0	629	20	12580
18	619	0	387	0	6022	659	2013	1923	11623	60	697380
21	0	0	521	0	513	0	590	0	1624	20	32480
23	0	0	0	0	157	0	0	0	157	20	3140
24	241	0	0	0	6193	142	1268	2470	10314	60	618840
27	0	0	0	0	0	0	1513	55	1568	20	31360
30	772	0	0	80	3485	0	757	1005	6099	20	121980
36	507	0	0	0	1961	0	144	327	2939	60	176340
42	377	0	0	0	1670	0	0	536	2583	60	154980
48	0	0	0	0	471	0	0	840	1311	60	78660
60	0	0	0	0	0	0	0	839	839	80	67120
66	0	0	0	0	476	0	0	0	476	80	38080
Total	**3480**	**844**	**31383**	**80**	**42145**	**1134**	**11311**	**9245**	**99622**	**610**	**2615615**
Grade	50	5	5	60	50	50	5	60	**285**		
Weighted	174000	4220	156915	4800	2107250	56700	56555	554700	**3115140**		

Conveyance System:

Manhole	
Material	No.
Brick	211
Precast	87
Total	298

Inlets	949

Capacity			
Pipe Size (inches)	Percent (%) of System	Grade Point	Weighted Grade Point
Dia. < 15	47.3	5	237
15 ≤ Dia. < 36	44.5	60	2668
36 ≤ Dia. ≤ 66	8.2	75	613
Total	**100**	**140**	**3519**

* Diameters less than 15-inches do not meet minimum engineering standards and are assumed unfit for purpose resulting in a failing grade.

Pipe Size Weighted Average =	**26.3**	**D**
Material Weighted Average =	**31.3**	**D**
Capacity Weighted Average =	**35**	**D**