GREATER AUGUSTA UTILITY DISTRICT
WASTEWATER TREATMENT FACILITY

WHO WE ARE

WASTEWATER TREATMENT PLANT STAFF: OPERATIONS, SAFETY AND LABORATORY

- **OVER 100 COMBINED YEARS'** EXPERIENCE
- **DEDICATED** TO PROTECTING THE ENVIRONMENT
- **CONTINUING EDUCATION** VIA PROFESSIONAL ORGANIZATIONS AND IN-HOUSE TRAINING
- **3 MAINE DEP-CERTIFIED GRADE V-B** WASTEWATER OPERATORS

WHY WE ARE HERE

- TO **REMOVE POLLUTANTS** FROM INCOMING WASTEWATER, 4 – 44 MGD
  - COMMERCIAL, RESIDENTIAL AND INDUSTRIAL SOURCES
  - RAIN FLOWS
  - SNOW MELT

- TO DISCHARGE **TREATED, RECLAIMED WATER** TO THE KENNEBEC RIVER

MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMITTING (MEPDES) PROGRAM

- ADMINISTERED BY THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
- ALL DISCHARGES TO "WATERS OF THE STATE" MUST HAVE A PERMIT
- PERMIT LIMITS: BASED ON "CLASSIFICATION" OF RECEIVING WATER—

Classification of Kennebec River:

Class B

- **DISSOLVED OXYGEN CONTENT** NOT BE LESS THAN 7 PARTS PER MILLION
- SUITABLE AS A **HABITAT FOR FISH AND OTHER AQUATIC LIFE**. THE HABITAT MUST BE CHARACTERIZED AS UNIMPAIRED.
- **ESCHERICHIA COLI BACTERIA** MAY NOT EXCEED 236 PER 100 MILLILITERS.
- **DISCHARGES** TO CLASS B WATERS **MAY NOT CAUSE ADVERSE IMPACT** TO AQUATIC LIFE

GAUD MEPDES Permit – Effluent Limitations

SPECIAL CONDITIONS

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. The permittee is authorized to discharge **secondary treated sanitary wastewater** from **Outfall #001A** to the Kennebec River. Such discharges shall be limited and monitored by the permittee as specified below. The italicized numeric values bracketed in the tables below and in the text on subsequent pages are code numbers that Department personnel utilize to code the monthly Discharge Monitoring Reports (DMRs). Footnotes are found on Pages 9-14.

Effluent Characteristic	Discharge Limitations						Minimum Monitoring Requirements	
	Monthly Average as specified	Weekly Average as specified	Daily Maximum as specified	Monthly Average as specified	Weekly Average as specified	Daily Maximum as specified	Measurement Frequency as specified	Sample Type as specified
Flow [50050]	8.0 MGD [03]	---	Report MGD	---	---	---	Continuous [99/99]	Recorder [RC]
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) [80082]	1,668 lbs / Day [26]	2,668 lbs / Day [26]	Report lbs / Day [26]	25 mg/L [19]	40 mg/L [19]	45 mg/L [19]	5/Week [05/07]	Composite [24]
$CBOD_5$ % Removal (1) [81010]	---	---	---	85% [23]	---	---	1/Month [01/30]	Calculate [CA]
Total Suspended Solids (TSS) [00530]	2,002 lbs / Day [26]	3,002 lbs / Day [26]	Report lbs / Day [26]	30 mg/L [19]	45 mg/L [19]	50 mg/L [19]	5/Week [05/07]	Composite [24]
TSS % Removal (1) [81010]	---	---	---	85% [23]	---	---	1/Month [01/30]	Calculate [CA]
Settleable Solids [00545]	---	---	---	---	---	0.3 ml/L [25]	1/Day [01/01]	Grab [GR]
E. coli Bacteria (2) **From effective date until May 14, 2010** [31633]	---	---	---	142/100 ml (3) [13]	---	949/100 ml [13]	3/Week [03/07]	Grab [GR]
E. coli Bacteria (2) **Beginning May 15, 2010** [31633]	---	---	---	64/100 ml (3) [13]	---	427/100 ml [13]	3/Week [03/07]	Grab [GR]
Total Residual Chlorine (4) **From effective date until May 14, 2010** [50060]	---	---	---	---	---	1.0 mg/L [19]	2/Day [02/01]	Grab [GR]
Total Residual Chlorine (4) **Beginning May 15, 2010** [50060]	---	---	---	---	---	0.82 mg/L [19]	2/Day [02/01]	Grab [GR]
Total Phosphorus [00665] **From June 1 – September 30**	Report lbs / Day [26]	---	Report lbs / Day [26]	Report mg/L [19]	---	Report mg/L [19]	1/Month [01/30]	Composite [24]
pH (Std. Units) [00400]	---	---	---	---	---	6.0-9.0 [12]	1/Day [01/01]	Grab [GR]
Arsenic (total) (5) [01002] **(Upon permit issuance)**	report lb/day [26]	---	---	report ug/L [28]	---	---	1/Year [02/YR]	24-Hr. Composite [24]
Arsenic (Inorganic) (6) [01252] **(Upon EPA test method approval)**	0.27 lb / day [26]	---	---	4.1 ug/L [28]	---	---	1/Year [01/YR]	24-Hr. Composite [24]

WHERE DOES FLOW COME FROM?

Residential

Rain Events/Snow Melt

Industrial

WEST/EAST SIDE INTERCEPTORS

TO HEADWORKS

EAST SIDE INTERCEPTOR

WEST SIDE INTERCEPTOR

WEST SIDE CONSOLIDATED CONDUIT

THE WASTEWATER TREATMENT PROCESS: PRELIMINARY TREATMENT

Incoming Wastewater ("Influent")

New Bar Screen: Optimizes removal of sticks, rags, plastics, etc. ("Screenings"). Flow goes through grit chamber to FDS #1.

Bar Screen

THE WASTEWATER TREATMENT PROCESS: PRIMARY TREATMENT

Primary Clarifier

Primary Treatment: Removal of floating ("scum") and heavy solids ("Primary Solids"). Liquid goes to Flow Distribution Structure #2.

THE WASTEWATER TREATMENT PROCESS: SECONDARY TREATMENT

Secondary Treatment: Removal of dissolved and suspended solids ("Secondary Solids") via bacterial activity ("Activated Sludge"). Requires Pure Oxygen.

Liquid from Aeration Tank goes to Secondary Clarifier.

Return Activated Sludge

Waste Activated Sludge

Sludge Holding Tank

Primary + Secondary Solids

PRIMARY + SECONDARY SOLIDS = BIOSOLIDS
COMPOSTING: BENEFICIAL REUSE

- DEWATERED BIOSOLIDS ARE HAULED TO A COMPOSTING FACILITY
- COMPOSTING: "PROCESS TO FURTHER REDUCE PATHOGENS"
- THE DRIER THE SOLIDS, THE LOWER THE HAULING FEES

- **2015 BUDGET: $347,200 (REVISED $295,850)**

- **PROJECTED 2015 SAVINGS $51,000**
- 2015 JAN – MAR = $73,741 ($81.98/TON)
- 2015 APRIL – DEC = $222,108 (74.11/TON)

- **PROJECTED BUDGET FOR 2016 - $288,000**

- **$72.00/TON 2016**

DEWATERING PROCESS

TO REDUCE COST:

- THICKEN WASTE ACTIVATED SLUDGE BEFORE IT GOES TO SLUDGE HOLDING TANK TO REDUCE WATER CONTENT
- OPTIMIZE POLYMER SYSTEM TO ACHIEVE BEST SLUDGE FLOC
- ASSIGN PERSONNEL TO RUN PROCESS EFFICIENTLY
  - THIS HAS HELPED REDUCE POLYMER USE BY 4000 LBS/YR SAVING $10,000
- INSTALLED CHOPPER PUMP FOR SLUDGE HOLDING TANK TO MIX AND BLEND PRIMARY AND THICKENED SLUDGE TO PRODUCE A BETTER BELT FILTER PRESS FEED SLUDGE.

Floc with Polymer

Chopper Pump

Sludge Holding Tank #1

CHEMICAL USE AND COSTS

Sodium Hydroxide	3411 gallons/yr	$8,000
Sodium Hypochlorite	27,052 gallons/yr	$27,000 (dependent on flow)
Sodium Bisulfite	5993 gallons/yr	$19,000 (dependent on flow)
Liquid Oxygen	8400 gallons/yr	$11,000
Defoamer	24 drums	$8,000
Polymer	11,700 pounds	$21,000

Total Chemical Budget 2015 - $106,000

THE WASTEWATER TREATMENT PROCESS: EFFLUENT DISINFECTION – CHLORINATION AND DECHLORINATION

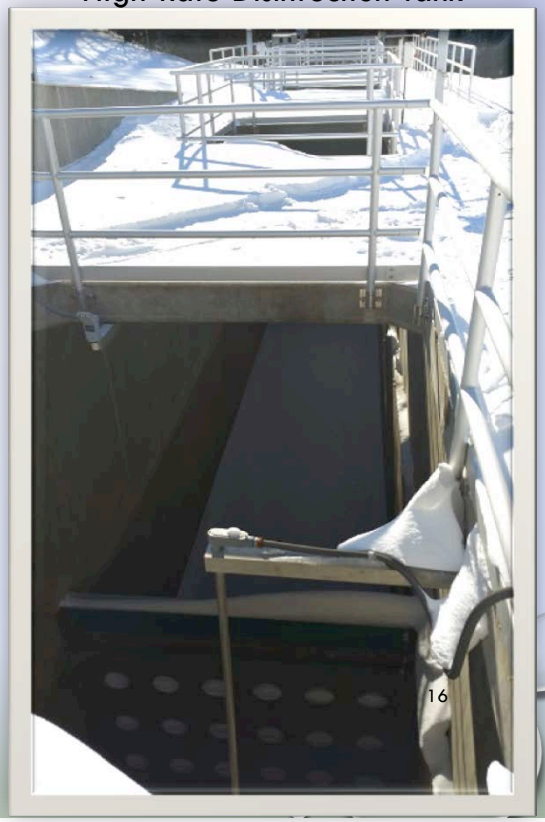
Disinfection: Reduction of disease-causing bacteria ("pathogens")

Chlorine Contact Chamber

SECONDARY BYPASS
(BYPASS OF THE SECONDARY WASTEWATER TREATMENT PROCESS)

- TRIGGER:
  - INSTANTANEOUS FLOWS > 12 MILLION GALLONS PER DAY
- GOES THROUGH PRIMARY TREATMENT
- BYPASSES SECONDARY TREATMENT PROCESS
- DISINFECTION IN HIGH-RATE DISINFECTION TANK
- DECHLORINATION IN HIGH-RATE DISINFECTION TANK

High-Rate Disinfection Tank



GAUD MEPDES Permit – Secondary Bypass Effluent Limitations

SPECIAL CONDITIONS

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (cont'd)

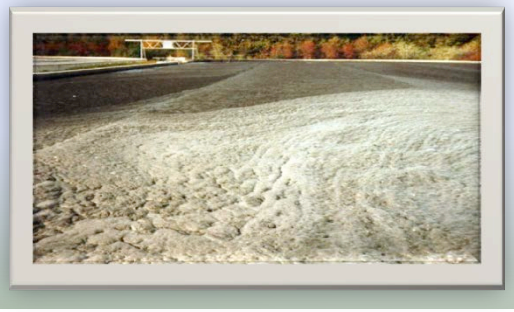
3. The permittee is authorized to **bypass secondary treatment**, identified herein **as Outfall #001B** (internal waste-stream). Such CSO related discharges may only occur in response to wet weather events when the influent to the wastewater treatment facility exceeds an instantaneous flow rate of 8,333 gallons per minute (12.0 MGD) or in accordance with the most current approved Wet Weather Flow Management Plan. Discharges shall be monitored and reported as specified below. Approval of said bypass will be reviewed and may be modified or terminated pursuant to Special Condition Q, *Reopening of Permit for Modification,* if there is substantial change in the volume or character of pollutants in the collection/treatment system.

Effluent Characteristic	Discharge Limitations				Minimum Monitoring Requirements	
	Monthly Average as specified	Daily Maximum as specified	Monthly Average as specified	Daily Maximum as specified	Measurement Frequency as specified	Sample Type as specified
Flow, MGD [50050]	Report Total MGD [03]	Report MGD [03]	---	---	Continuous [99 99]	Recorder [RC]
Surface Loading Rate(10) [50050]	---	Report gpd/sf [07]	---	---	1/Discharge Day(11) [01 DS]	Calculate [CA]
Overflow Use, Occurrences(12) [74062]	---	---	Report # of days [93]	---	1/Discharge Day(11) [01 DS]	Record Total [RC]
$CBOD_5$ From effective date until March 31, 2009 [80082]	---	---	---	Report mg/L [19]	1/Discharge Day(11) [01 DS]	Composite [24]
$CBOD_5$ % Removal(13) From effective date until Mar. 31, 2009 [81010]	---	---	Report (%) [23]	---	1/Discharge Day(11) [01 DS]	Calculate [24]
BOD_5 Beginning April 1, 2009 [00310]	---	---	---	Report mg/L [19]	1/Discharge Day(11) [01 DS]	Composite [24]
BOD_5 % Removal(13) Beginning April 1, 2009 [81010]	---	---	Report (%) [23]	---	1/Discharge Day(11) [01 DS]	Calculate [24]
TSS [00530]	---	---	---	Report mg/L [19]	1/Discharge Day(11) [01 DS]	Composite [24]
TSS % Removal(13) [81011]	---	---	Report (%) [23]	---	1/Discharge Day(11) [01 DS]	Calculate [24]
E. coli Bacteria (2) From effective date until May 14, 2011 [31633]	---	---	---	949/100 ml [13]	1/Discharge Day(11) [01 DS]	Grab [GR]
E. coli Bacteria (2) Beginning May 15, 2011 [31633]	---	---	---	427/100 ml [13]	1/Discharge Day(11) [01 DS]	Grab [GR]
Total Residual Chlorine(4) From effective date until May 14, 2011 [50060]	---	---	--	1.0 mg/L [19]	1/Discharge Day(11)	Grab

WE CAN'T "SET IT AND FORGET IT"

PROCESS CONTROL IS ESSENTIAL

- INFLUENT FLOW CHARACTERISTICS CHANGE CONSTANTLY DEPENDING ON MANY FACTORS SUCH AS RAIN, SPILLS, INDUSTRIAL AND DOMESTIC DISCHARGES. THROUGH PROCESS CONTROL PERSONNEL TRACK THESE TRENDS AND ADJUST PROCESS CONTROL PARAMETERS.
- SAMPLING/TESTING THROUGHOUT WASTEWATER TREATMENT TRAIN
- MICROSCOPIC EXAMINATIONS
- VISUAL OBSERVATIONS (COLORS, ODORS, FOAM)
- **OPERATOR EXPERIENCE**



CSO ABATEMENT

PROJECTS

- PHASE I –1996 - CSO ABATEMENT AND DEWATERING IMPROVEMENTS - $ 9,200,000
- PHASE II – 2001 – WEST SIDE CONSOLIDATED CONDUIT - $10,750,000
- PHASE III – 2011 – BOND BROOK COLLECTION SYSTEM - $18,130,000
  - BOND BROOK INTERCEPTOR - $14,520,000
  - CSO A1 AND A2 - $1,610,000
  - CSO III ENGINEERING $2,000,000

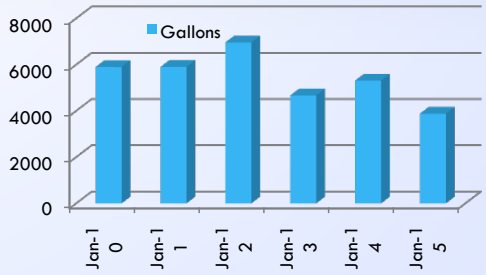
Box Conduit

- TOTAL COST OF CSO ABATEMENT TO DATE: $44,046,539

Storage Conduit – Mill Park

$ WWTP COST-SAVING INITIATIVES $

ITEM	INITIATIVE	SAVINGS
MOD RATE	REDUCTION FROM 1.24 → 1.03	$15,000
LEADER PROGRAM SCORE	EXCELLENT	$6,000
SCHEDULE CHANGE	REDUCED OVERTIME	$19,000
HEATING FUEL	REDUCED USE	
BIOSOLIDS	REDUCED COST/TON	$40,000



(BUDGET REDUCTION)

PROJECTS COMPLETED IN 2014

- **TWO NEW ACRISON 515 POLYMER SYSTEMS –**

  COST $96,506 ($24,016 FOR LABOR AND $72,490 FOR EQUIPMENT)

  - NEW SYSTEMS REDUCED POLYMER USE BY 1.6 LBS / BATCH SAVING $8,000/YR

Old Acrison 500 Polymer Systems

New Acrison 515 Polymer Systems

PROJECTS COMPLETED IN 2014

TWO NEW 150 HP ATLAS COPCO COMPRESSORS FOR THE PRESSURE SWING ABSORBTION (PSA) SYSTEM

COST $256,500 ($221,084 FOR EQUIPMENT AND $ 35,416 FOR LABOR)

- REDUCED HP FROM 250 TO 150

Original 250 HP Compressor

150 HP Atlas Copco Compressors

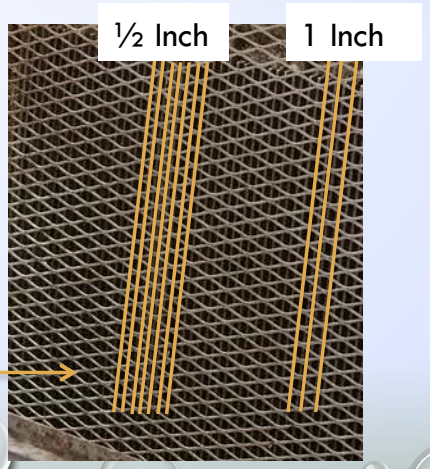
PROJECTS COMPLETED IN 2014

REDUCED BAR RACK BAR WIDTH FROM 1 INCH TO ½ INCH –

COST $72,162

- THIS WILL REDUCE THE AMOUNT OF DEBRIS ALLOWED TO PASS THROUGH
  - REDUCES DAMAGE TO EQUIPMENT DOWN STREAM
  - REDUCES MAINTENANCE COST

Bars



PROJECTS COMPLETED IN 2014

INSTALLED 6 NEW BULK STORAGE CHEMICAL TANKS

COST $126,636 ($50,165 FOR EQUIPMENT, $ 37,616 FOR LABOR AND $38,855 FOR THE PIPING CHANGE ORDER)

- PROVIDES MORE STORAGE FOR CHEMICALS NEEDED FOR HIGH FLOW EVENTS AND REPLACE 34 OLD TANKS AND PIPING

PROJECTS COMPLETED IN 2014

INSTALLED ROTARY LOBE WASTE ACTIVATED SLUDGE PUMPS AND REMOVE 2 PENN VALLEY GRAVITY BELT THICKENER (GBT) PUMPS

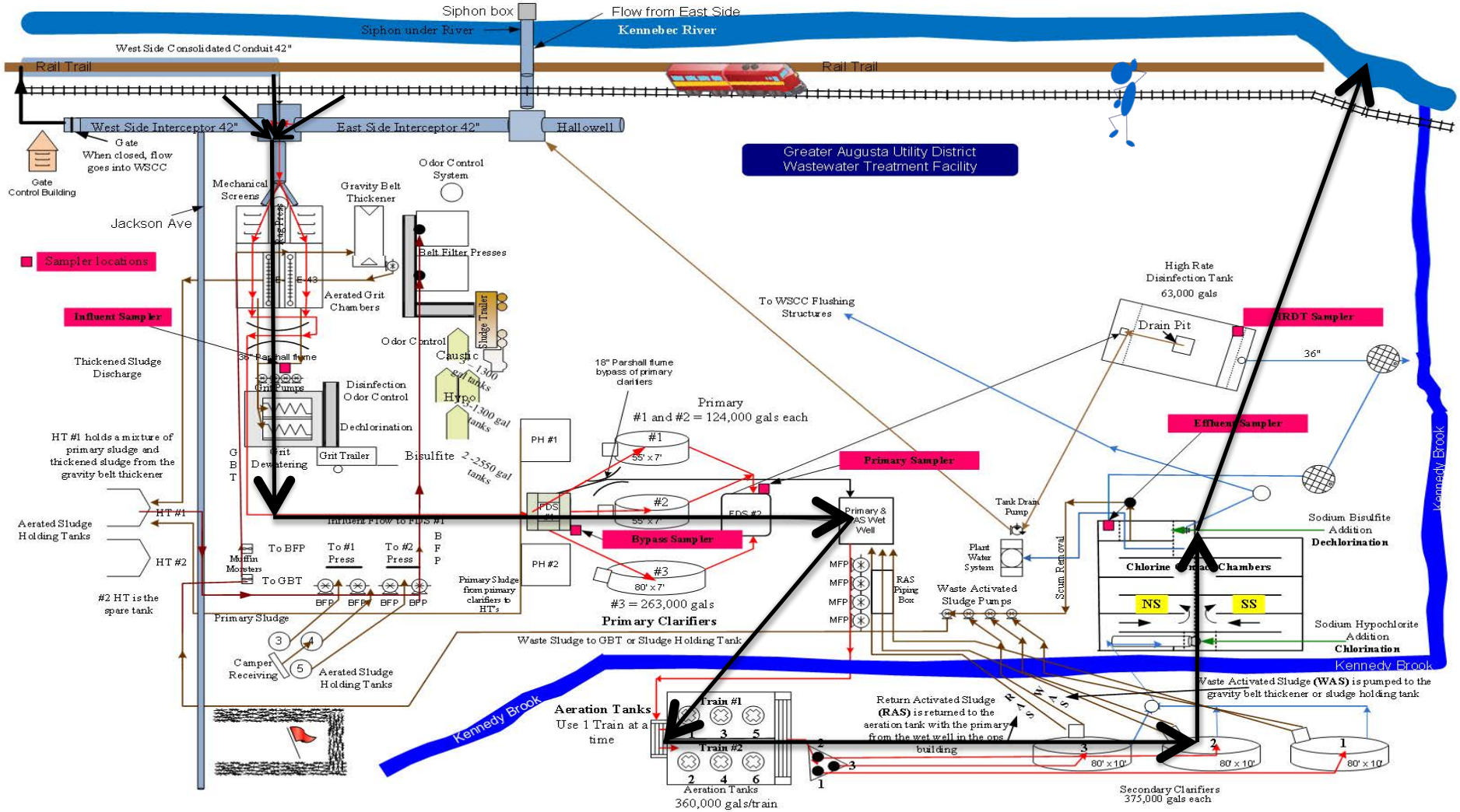
COST $27,658

- INSTALLED LARGER WASTE ACTIVATED SLUDGE PUMPS WITH THE CAPACITY TO PUMP TO THE GRAVITY BELT THICKENER SO 4 – 34 YR OLD PUMPS COULD BE REMOVED
- REDUCES COST BY SAVING ON MAINTENANCE, POWER AND EVENTUAL REPLACEMENT

Gravity Belt Thickener (GBT) Pumps

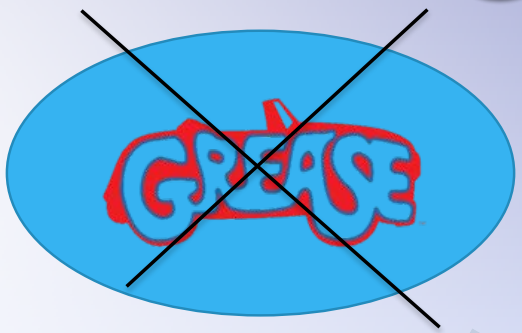
SUMMARY OF 2014 PROJECTS

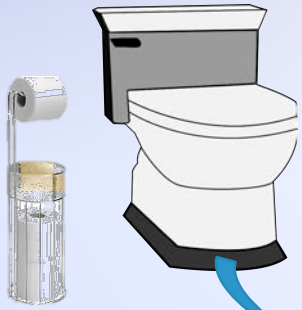
- **TOTAL COST OF 2014 WWTF PROJECTS: $563,310**
- STAFF ORDERED ALL EQUIPMENT TO SAVE ON CONTRACTOR MARK-UP
- ALL METAL FROM THE CONSTRUCTION WAS RECYCLED
- SUPPLIER SUBMITTED AN APPLICATION FOR AN EFFICIENCY MAINE GRANT FOR COMPRESSORS
- REPLACED 34-YEAR-OLD EQUIPMENT
- NEW EQUIPMENT SHOULD HAVE A 20-YEAR SERVICE LIFE

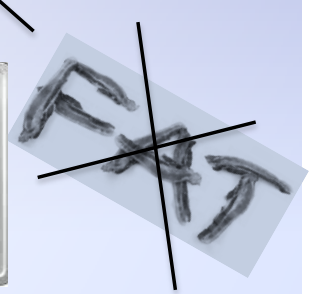

Siphon box
Flow from East Side
Siphon under River
Kennebec River
West Side Consolidated Conduit 42"
Rail Trail
Rail Trail
West Side Interceptor 42"
East Side Interceptor 42"
Hallowell
Gate
When closed, flow goes into WSCC
Gate Control Building
Jackson Ave
Greater Augusta Utility District
Wastewater Treatment Facility
Sampler locations
Influent Sampler
Thickened Sludge Discharge
Mechanical Screens
Rag Press
Gravity Belt Thickener
Odor Control System
Belt Filter Presses
Sludge Trailer
E-43
Aerated Grit Chambers
36" Parshall flume
Grit Pumps
Odor Control
Caustic
2 - 1300 gal tanks
Hypo
2 -1300 gal tanks
Disinfection Odor Control
Dechlorination
Grit Dewatering
Grit Trailer
Bisulfite
2 -2550 gal tanks
GBT
HT #1 holds a mixture of primary sludge and thickened sludge from the gravity belt thickener
Aerated Sludge Holding Tanks
HT #1
HT #2
#2 HT is the spare tank
Influent Flow to PDS #1
To BFP
To #1 Press
To #2 Press
BFP
Muffin Monsters
To GBT
Primary Sludge
Camper Receiving
Aerated Sludge Holding Tanks
Primary Sludge from primary clarifiers to HT's
PH #1
PH #2
18" Parshall flume bypass of primary clarifiers
Primary
#1 and #2 = 124,000 gals each
#1
55' x 7'
#2
55' x 7'
#3
80' x 7'
#3 = 263,000 gals
Primary Clarifiers
PDS #1
PDS #2
Primary Sampler
Bypass Sampler
Primary & RAS Wet Well
MFP
RAS Piping Box
Waste Activated Sludge Pumps
Scum Removal
Waste Sludge to GBT or Sludge Holding Tank
Aeration Tanks
Use 1 Train at a time
Train #1
Train #2
Aeration Tanks
360,000 gals/train
Return Activated Sludge (RAS) is returned to the aeration tank with the primary from the wet well in the ops building
RAS
WAS
Secondary Clarifiers
375,000 gals each
80' x 10'
High Rate Disinfection Tank
63,000 gals
To WSCC Flushing Structures
Drain Pit
HRDT Sampler
36"
Effluent Sampler
Tank Drain Pump
Plant Water System
Chlorine Contact Chambers
NS
SS
Sodium Bisulfite Addition
Dechlorination
Sodium Hypochlorite Addition
Chlorination
Kennedy Brook
Kennedy Brook
Waste Activated Sludge (WAS) is pumped to the gravity belt thickener or sludge holding tank

SUMMARY

Residential







NO FATS, OIL OR GREASE

NO WIPES

WWTF

DISCHARGE OF TREATED WATER TO THE KENNEBEC RIVER