

Appendix 4-3

**Inventory of Existing Process Facilities and
Equipment at Hyannis WPCF**

INVENTORY OF TREATMENT FACILITIES AND PROCESS EQUIPMENT
 Hyannis WPCF
 Town of Barnstable, Massachusetts

Manual Bar Screens

Location	Pretreatment Building
Type	Hand cleaned
Number of coarse bar screens	2
Number of fine bar screens	1
Coarse bar separation, inches	2
Fine bar separation, inches	1
Year placed in service	1975

Mechanical Bar Screen

Location	Pretreatment Building
Type	Reciprocating raked
Number of mechanical bar screen	1
Manufacturer and model	Fairfield Services Company, Type "RPF"
Bar separation, inches	1/2
Motor horsepower	1-1/2
Year placed in service	2009

Type of level element	Ultrasonic level differential controller
Location	Pretreatment Building
Number of units	1
Manufacturer and model	Siemens, Hydromanager Model 200
Year placed in service	2009

Screenings Conveyor

Location	Pretreatment Building
Type	Shaftless screw, washer and compactor
Number of mechanical bar screen	1
Manufacturer and model	JDV Equipment Corporation, U-trough Model U-260
Motor horsepower	3
Year placed in service	2009

Grit Removal

Type	Aerated chamber
Location	Pretreatment Building
Tank volume, gallons	45,500
Blower type	Positive displacement, on VFDs
Number of blowers	2
Blower manufacturer and model	Gardner Denver; Sutorbuilt; Tuthill Corp.

Grit Removal continued

Blower horsepower	3
Year placed in service (blowers)	1980
Year placed in service (blower motors)	2009
Type of diffusers	Coarse bubble
Location	Pretreatment Building
Manufacturer	ITT Sanitaire
Year placed in service	2009
Type of grit conveyor	Shaftless screw, with hydraulic drive
Location	Pretreatment Building
Manufacturer and model	JDV Equipment Corporation, U-trough Model U-355
Number of grit conveyor	1
Motor horsepower	5
Year placed in service	2009
Type of grit pump	Recessed impeller
Location	Pretreatment Building
Number of grit pump	1
Manufacturer and model	Wemco Pump, 3" Model C
Capacity, gpm	200
Motor horsepower	10
Year placed in service	2009

Grit Handling Unit

Hydrocyclone manufacturer	Krebs Engineers
Location of hydrocyclone	Pretreatment Building
Number of hydrocyclone units	1
Size of vortex finder, inches	3
Year placed in service	2009
Grit washer manufacturer and model	WesTech Engineering, Inc., CleanGrit™ Model SW400C
Grit washer location	Pretreatment Building
Number of grit washer units	1
Grit washer agitator motor horsepower	$\frac{3}{4}$
Grit washer spiral motor horsepower	$\frac{1}{2}$
Year placed in service	2009

Flow Measuring

Location	Pretreatment Building
Flow element	Parshall flume
Number of units	2 (1 presently in service)
Throat width, inches	18

Flow Measuring continued

Flow meter type	Ultrasonic
Flow range, mgd	0.6 – 15.6
Flow meter manufacturer	Pulsar
Year ultrasonic sensor placed in service	2008

Building Sump Pump

Location	Pretreatment Building
Number of Units	1
Type	Submersible, explosion proof
Manufacturer and Model	Zoeller, Model NX163
Motor Horsepower	½
Year Placed in Service	2009

Pretreatment Odor Control

Scrubber	
Location	Pretreatment Building
Number of scrubber unit	1
Manufacturer	Celicote
Chemical No. 1	Sodium hypochlorite
Chemical No. 2	Sodium hydroxide
Scrubber chemical pump type	Electronic metering pump
Number of scrubber chemical pump units	2 (1 for each chemical)
Scrubber chemical pump manufacturer	LMI
Scrubber chemical pump models	E731-410SI (sodium hydroxide), E731-410HI (sodium hypochlorite)
Number of scrubber fan	1
Scrubber fan motor horsepower	5
Scrubber fan mfg, model	Celicote, CLMR 14
Number of scrubber pump	1
Scrubber pump motor horsepower	3
Year placed in service	1991 (scrubber pump motor and chemical pumps replaced in 2009)

Hydrogen Peroxide (50%) Addition

Storage Location	Adjacent to Pretreatment Bldg Exterior
Type of hydrogen peroxide storage tank	Crosslinked HDPE, vertical cylindrical
Number of hydrogen peroxide storage tanks	1
Working capacity of storage tank, gallons	3,000
Manufacturer	Poly Processing Company
Hydrogen peroxide storage tank dimensions	
Outer diameter	10’-2”
Overall height	7’-9-1/2”
Type of hydrogen peroxide feed pumps	Peristaltic
Number of hydrogen peroxide feed pumps	3
Hydrogen peroxide pump mfg and model	Watson Marlow/Bredel Pumps, Model 520DuS/R2

Pretreatment Odor Control (continued)

Pump Enclosure mfg, material Enpac, polypropylene
Year placed in service 2009

Primary Clarification

Number of tanks 2
Type Circular, center feed, pier supported
Tank dimensions
 Diameter, feet 60
 Sidewater depth, feet 10
Total surface area (both tanks), SF 5,655
Total weir length (both tanks), feet 377
Influent well
 Diameter, feet 10
 Depth, feet 4
Equipment manufacturer Smith & Loveless
Drive horsepower, each unit 1
Year placed in service 1980

Primary Sludge Pumping

Sludge pump
 Location Primary Pump Building
 Number of units 2
 Type Progressive cavity, on VFDs
 Capacity, gpm 50-150
 Manufacturer and model Netzsch Incorporated,
 Model NM063SY01L07K

 Motor horsepower 7-1/2
 Year placed in service 2009

Primary sludge grinders

 Location Primary Pump Building
 Number of units 2
 Grinder No. 1
 Manufacturer and model JWC Environmental, Muffin Monster,
 Model 30001-12-6

 Motor horsepower 3
 Year placed in service 1993
 Grinder No. 2
 Manufacturer and model JWC Environmental, Muffin Monster,
 Model 30004T-1206-DI

 Motor horsepower 3
 Year placed in service 2009

Primary Sludge Pumping (continued)

Building sump pump	
Location	Primary Pump Building
Number of units	1
Type	Vertical centrifugal
Manufacturer	Myers

Biological Reactors

Process	Activated sludge, MLE process
Number of treatment trains	3
Total tank volume, cubic feet	170,000
Treatment tank dimensions	
Length	120
Width	40
Sidewater depth	12

Aeration tank distribution box sump pumps

Number	2
Location	Compartment for biofilter drain
Type	Submersible effluent pump
Manufacturer and model	ITT Goulds, WE Series Model 3885
Capacity gpm	45 (minimum)
Sump pump motor horsepower	1/3
Year placed in service	2009

Aeration equipment

Type	Diffused aeration, forced air
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Blowers

Location	Aeration blower building
Type	Multi stage centrifugal
Number of units	5
Manufacturer (Blower Nos. 1-4)	Hoffman
Manufacturer (Blower No. 5)	Houston Service Industries, Inc. (HSI), Model 8606
Capacity, scfm	1,800
Discharge pressure, psig	7.0
Motor horsepower	100
Year placed in service (Blower Nos. 1-4)	1998
Year placed in service (Blower No. 5)	2009

Diffusers

Type	Fine bubble, membrane
Size	9-inch
Number of grids per tank	5
Manufacturer	ITT Sanitaire

Submersible mixers

Location	Aeration tank anoxic zone and anoxic/aerobic switchzone
Number of mixers per tank	2
Manufacturer (Mixer Nos. 1-4)	US Filter
Manufacturer (Mixer Nos. 5 and 6)	WILO-EMU USA LLC, Model TR60-2.18-6/16REx
Motor horsepower	6
Year placed in service (Mixer Nos. 1-4)	1998
Year placed in service (Mixer Nos. 5 and 6)	2009

Nitrate recycle pumps

Location	Aeration tank
Type	Submersible, on VFDs
Number per tank	1
Manufacturer (Mixer Nos. 1 and 2)	US Filter
Manufacturer (Mixer Nos. 3)	WILO-EMU USA LLC, Model RZP50-3.58-4/16REx
Motor horsepower	10
Year placed in service (Mixer Nos. 1 and 2)	1998
Year placed in service (Mixer No. 3)	2009

Aeration controls

Controls	DO probes
Location	Aeration tanks
Number of units per tank	1
Manufacturer (Nos. 1 and 2)	Hach
Manufacturer and model (No. 3)	Hach, Model LDO-57900-00 (sensor), Model SC100-LXV401.52.0002 (transmitter)
Year placed in service (Nos. 1 and 2)	1998
Year placed in service (No. 3)	2009

Controls	Pressure indicating transmitter
Location	Aeration blower building
Number of units	1
Year placed in service	2009

Aeration odor control

Odor control covers	
Type	Flat, aluminum, with hinged hatches
Location	Aeration tank distribution box and Aeration tank anoxic zone and anoxic/aerobic switchzone
Manufacturer	Hallsten Corporation
Year placed in service	2009

Biofilter

Number of biofilter unit	1
Biofilter vessel material	FRP
Biofilter manufacturer and model	Biorem, Model BASYS™
Number of biofilter fan	1
Biofilter fan type	Centrifugal, with enclosure
Biofilter fan capacity, scfm	4,200 – 5,500
Biofilter fan motor horsepower	20
Number of recirculation pump	1
Recirculation pump capacity, gpm	30
Recirculation pump motor horsepower	1-1/2
Year placed in service	2009

Secondary Clarification

Number of tanks	3
Units 1 & 2	
Type	Circular, center feed, pier supported
Tank dimensions	
Diameter, feet	70
Sidewater depth, feet	10
Total surface area (both tanks), SF	7,690
Total weir length (both tanks), feet	440
Influent well	
Diameter, feet	10
Depth, feet	4
Equipment manufacturer	Smith & Loveless
Drive horsepower, each unit	1
Year placed in service	1980

Unit 3

Type	Circular, center feed, pier supported, spiral scraper
Tank dimensions	
Diameter, feet	85
Sidewater depth, feet	13
Total surface area, SF	5,670
Total weir length, feet	267
Equipment manufacturer	Westech
Year placed in service	1997

Secondary Sludge Pumping

RAS pumps	
Location	Secondary Pump Building
Number of units	3
Type	Horizontal, end suction
Speed control	variable frequency drive (VFD)

Capacity	925 gpm @ 24.5' TDH
Manufacturer	PACO
Impeller size, inch	11.93"
Motor horsepower	10
Year placed in service	
WAS pumps	
Location	Secondary Pump Building
Number of units	2
Type	Progressive cavity
Speed control	Adj. belt drive
Manufacturer	Dresser Monoflo
Motor horsepower	15
Year placed in service	1997
Plant Water pumps	
Location	Secondary Pump Building
Number of units	3
Type	Horizontal centrifugal
Speed control	variable frequency drive (VFD)
Capacity, gpm	275
Manufacturer	Peerless – C820A
Motor horsepower	15
RAS flowmeter	
Location	Secondary Pump Building
Number of units	1
Type	Magmeter
Size, inch	12
Manufacturer	Fischer-Porter
Model	MAGX 10D1435U
<u>Disinfection</u>	
Type	Chemical
Chemical	Liquid 50% sodium hypochlorite
Storage, gallons	8,000
Feed pumps	
Location	Outside control building
Type	electronic diaphragm
Number of Units	2
Manufacturer	LMI
Capacity, gph	9
Year placed in service	1991
Contact Tank	
Number of units	2
Volume of each tank, gallons	73,300
Contact time at 3.8 mgd, min	27.8 per tank

Treated Water Pumping

Location	Control building basement
Number of units	4
Type	Vertical centrifugal, close coupled
Speed control	Constant speed
Level control	Bubbler system
Capacity of each, gpm	2,300 gpm @ 50' TDH
Manufacturer	Allis-Chalmers
Model	No. 300 NSWV 8x8x14
Motor horsepower	50
Year placed in service	1980

Treated Water Recharge

Type	Sand Infiltration Beds
Surface Area, SF	
System 1 (Beds 1-2)	50,000
System 2 (Beds 12-22)	267,000
System 3 (Beds 23-33)	270,000
System 4 (Beds 34-49)	<u>264,000</u>
	851,000

Grease Concentrator

Number of units	1
Location	Septage processing building
Capacity, gpm	40, dilute grease
Skimmer drive, HP	1/2
Grinder, HP	7.5
Manufacturer and model	Saracco Model No. 40-500
Year placed in service	1991
Current use	Currently unused

Concentrated grease pump

Type	Two-stage progressive cavity
Location	Septage processing building
Capacity, gpm	15
TDH, feet	138
Speed, rpm	150
Drive, HP	5
Manufacturer and model	Robbins & Meyers Model No. 2J6CDQAAA
Year placed in service	1991

Grease feed pumps

Number	2
Location	Pretreatment building
Type	Plunger
Manufacturer	ITT-Marlow

Septage Processing

Storage Tanks

Number of units	4
Volume, gallons (each)	50,000

Blowers (mixing and aeration)

Location	Septage building basement
Number of units	5
Type	Positive displacement
Capacity, cfm (each)	75-210
Manufacturer	Roots
Model	53U-RAI
Year placed in service	1991

Cyclone feed pumps

Location	Septage building sub-basement
Number of units	2
Type	Recessed impeller
Capacity, gpm (each)	350
Manufacturer	WEMCO
Model	Model 'C'
Motor horsepower	50
Year placed in service	1991

Raw septage grinders

Location	Septage building sub-basement
Number of units	2
Manufacturer	JWC Environmental
Model	Muffin Monster 30001-12-6
Motor horsepower	3
Year placed in service	1991

Grit cyclone

Location	Septage building second floor
Number of units	2
Manufacturer	WEMCO
Year placed in service	1991

Grit classifier

Location	Septage building second floor
Number of units	2
Type	Screw
Manufacturer	WEMCO
Year placed in service	1991

De-gritted septage pumps

Location	Septage building sub-basement
Number of units	2
Type	Progressive cavity
Manufacturer	Moyno
Year placed in service	1991
De-gritted septage grinders	
Location	Septage building sub-basement
Number of units	2
Manufacturer	JWC Environmental
Model	Muffin Monster
Motor horsepower	3
Year placed in service	1991
Thickened septage/Sludge transfer pumps	
Location	Septage building second floor
Type	9-inch Duplex Plunger
Number of units	2
Manufacturer	Watson-Marlow
Motor Horsepower	5
Year placed in service	1991
Sludge/Septage Thickeners	
Location	Septage building second floor
Type	Gravity belt (GBT)
Number of units	2
Manufacturer	Ashbrook
Feed rate, gpm	170
Belt width, m	2
Year placed in service	1991
Polymer Feed System	
Location	Septage building second floor
Number of units	1
Manufacturer	Acrison
Year placed in service	1991
Capacity	
Dry polymer, lb/hr	8
Liquid polymer, gpm	1
Metering pumps	
Capacity, gph	30
Drive, HP	1
Type	Diaphragm
Transfer pump	
Type	Progressive cavity
Capacity, gph	7

Booster pumps	
Location	Septage building second floor
Type	horizontal centrifugal
Number of units	2
Manufacturer	Peerless

Odor control system	
Capacity, cfm (at 8-inch water column and 100 ppm H ₂ S influent)	14,000
Fan, HP	25
Recirculation pump	
Capacity, gpm	216
TDH, feet	70
Motor horsepower	15
pH control pump	
Capacity, gph	4
Motor horsepower	1/2
ORP control pump	
Capacity, gph	85
Motor horsepower	1/2

Additional Sludge Facilities (currently not used)

Sludge holding tanks	
Number of tanks	2
Volume, both tanks, cubic feet	20,700
Current use	(Currently unused)
Sludge aeration	
Type	Coarse bubble
Blowers	
Type	Positive displacement
Location	Sludge process blower building
Number of units	3
Capacity, cfm	90-250
Motor horsepower, each blower	25
Year placed in service	1991

Sludge Mixing	
Unit 1	
Manufacturer	Philadelphia
Model	PSA-8QB
HP	15
Output speed, rpm	30

Unit 2	
Manufacturer	Flygt
Model	4660, 410A #9480011
Installed	1995
Sludge thickener	
Diameter, feet	45
Surface area, SF	1,590
Sidewater depth, feet	10
Volume, gallons	135,000
Odor control system	
Location	Sludge Process Blower Building
Capacity, cfm (at 8-inch water column and 100 ppm H ₂ S influent)	4,000
Fan, HP	7.5
Recirculation pump	
Capacity, gpm	144
TDH, feet	70
Motor horsepower	5
pH control pump	
Capacity, gph	2
Motor horsepower	1/4
ORP control pump	
Capacity, gph	42
Motor horsepower	1/2
Sludge transfer pumps in Sludge Dewatering Building	
Unit 1	
Manufacturer	Voglesang
Model	V136-70
Installed	2000
Type	Rotary Lobe
Capacity	
hp	1.7
gpm	130
head, psi	60
Unit 2	
Type	Plunger
Drive, HP	50 gpm
Manufacturer and Model	Dorr-Oliver
Year laced in service	1968