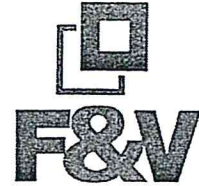


MEMO



To: James Green, Ken Baker, Blair Selover, Matt Hosier

From: David Harvey

CC: Bob Wilcox

Date: June 3, 2020

Re: Leoni Township Wastewater Treatment Plant
Influent Screen Repair / Replacement

F&V Operations (FVOP) experienced failure of one to the two influent screen late in April 2020. The failure was the result of a hole being worn through the perforated plate basket of Screen #2. On May 26, 2020, the Screen #1 also experienced a hole in the basket screen and a bent support.

Emergency repairs were made to Screen #1 to temporarily patch the screen, straightened the support and it was returned to service the following day. Screen #2 has traditionally been prone to failures and in October 2019 had the auger replaced.

Screening Equipment Rehabilitation is a line item cost identified on the WWTP Capital Improvement Plan for Fiscal Year 21/22; however, this work needs to be moved to this year due to the failures. F&V and FVOP staff have solicited pricing to the original manufacturer (Huber) to replace the baskets. Since these units are over ten years old, we felt it prudent to request pricing for full replacement of the units from Huber and another manufacturer. We also considered an alternate screening technology.

Our recommendations are as follows:

1. Replace the 3mm basket on Huber unit #2. Cost of the replacement basket installed is \$58,287.72. This work can be considered a maintenance budget item.
2. Replace unit #1 in its entirety with a 3mm screen of 316SS construction. Cost of the unit is estimated between \$137,000 and \$176,000. Installation will be an additional cost, yet to be determined. F&V can assist to solicit firm equipment quotes and pricing from mechanical and electrical contractors to perform the installation. Since this is critical component to the WWTP, we recommend the Board authorize the Executive Board Members to approve expenditure for purchase and installation of a replacement screen for the amount not-to-exceed \$200,000. The existing unit will be saved and used for spare parts.

Should the Board decide to replace both units, the equipment price would be estimated between \$274,000 and \$352,000. Installation cost would need to be determined.

Should the Board decide to replace both existing baskets, the price quoted by Huber is \$99,788.13 installed.

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
www.fveng.com

Maintenance
Fund
Capital Expense

Background:

The existing screens were manufactured by Huber, constructed of 304 stainless steel (SS) with 3mm perforated plate baskets, and each have a rated hydraulic capacity of 8.0 mgd. These type units have submerged end bearing and roller bearings that require annual inspection.

During the study phase for the MBR replacement project the various MBR manufacturers indicated the existing 3mm screens were acceptable; however, 2mm screens are preferred. We evaluated replacing the existing baskets with 2mm screens but significant modifications to the influent channel would be needed. As such we recommend continuing with the 3mm perforate plate design.

We also considered materials of construction. 316SS performs better than 304SS when exposed to hydrogen sulfide gas.

Also, FVOP is currently making upgrades to the controls system so that the units function reliably in automatic mode. Improvements include replacement of the power supply to the HMIs, rewiring upstream level devices and programming.

Pricing:

We received budgetary pricing from Huber and Enviro-Care, which make similar screening units. We also obtained pricing from HydroDyne which makes a band screen that has no submerged bearings.

1. **Huber:**

The quote to provide and install the 3mm replacement basket screen is \$58,287.72 for one unit, and \$99,788.13 for two units. We understand the replacement baskets take approximately 8 to 9 weeks for delivery.

Budgetary pricing for a new replacement screen constructed of 304SS would be \$150,400 per unit.

Budgetary pricing for a new replacement screen constructed of 316SS would be \$176,000 per unit.

Note: Pricing assumes the existing control panels will be reused. Firm pricing still needs to be negotiated for Huber to provide the equipment.

Advantages: Easiest installation. Operators familiar with equipment.

Disadvantages: 4 to 6 weeks for shop drawings. 20 to 24 weeks for fabrication and shipment from Germany. Still need to include cost to install unit(s).

2. Enviro-Care:

Enviro-Care is a direct competitor of Huber, offering a unit that is very similar in design and performance. They provide pricing options for 304SS and 316SS that includes an odor control housing, endless bagger and new control panels. We confirmed the pricing on the attached quote can be halved to purchase one unit.

Quoted pricing is as follows:

<u>Description</u>	<u>One Unit</u>	<u>Two Units</u>
304SS Rotating Drum Screen	\$124,800	\$249,600
316SS Rotating Drum Screen	\$136,650	\$273,300

Electrical and mechanical installation of the unit(s) would be an additional cost.

Advantages: Lower cost for new unit. Operators familiar with this type of equipment.

Disadvantages: 4 to 6 weeks for shop drawings. 18 to 20 weeks for fabrication and shipment from Italy. Still need to include cost to install unit.

3. HydroDyne:

HydroDyne offers band screen technology, having a separate washer / compactor for the screenings. The main parts requiring maintenance are located above the top of the channel and out of the wastewater.

Quoted pricing for a 3mm unit constructed of 316SS is \$425,000. This includes odor control covering, endless bagger, controls, startup and commissioning, and spare parts.

Electrical and mechanical installation of the unit would be an additional cost.

Advantages: Lower maintenance and operator friendly. Majority of maintenance is above the water surface. No submerged bearings.

Disadvantages: High capital cost. 4 to 6 weeks for shop drawings. 18 to 20 weeks for fabrication. Still need cost to install unit.

Attachments:

- Huber Quote for One Basket Screen Replacement
- Huber Quote for Two Basket Screen Replacements
- Huber Budgetary Pricing for New Unit
- Enviro-Care
- HydroDyne

Billing Address

Fleis and Vanderbrink
 2960 Lucerne Drive SE
 Suite 100
 Grand Rapids, MI 49546
 UNITED STATES

Delivery Address

Leoni Township
 8401 Page Avenue
 Jackson, MI 49201
 UNITED STATES

OFFER: 71007676 / V1
 Project: Leoni MI 288820

Your Letter/Your Reference:

Date printed: Jun 3, 2020
 Our Reference: Lindsay Barnes
 Phone: +1-704-990-2050
 Fax:
 Email: lindsay.barnes@hhusa.net

Customer No: 121487
 Phone: 616-977-1000
 Fax:

All parts in stock unless otherwise indicated below.
 Customer is responsible for the following prior to Huber's technician arrival:
 (1)Removal of Huber machine from channel,
 (2)Pressure washing of machine, and
 (3)Providing lifting equipment.
 Failure to do so will result in additional charges of \$1,000 per day Huber is onsite.

Pos	Qty	Unit	Item Description	Country of origin HS-Code	Price USD Discount (%)	Total USD Tax (%)
10/1	1.00	pcs	10000001 Basket RPPS 1600/3		57,915.00 25%	43,436.25 0%
20/1	4.00	pcs	509818 bolt 30f7/40x 120 1xM10x1 Greasable Retrofit		406.00	1,624.00 0%
30/1	1.00	pcs	10000001 Lower Sealing Brush w/ Fasteners		1,018.81	1,018.81 0%
31/1	2.00	pcs	10065666 LOCTITE 648 Kit		102.48	204.96 0%
32/1	2.00	pcs	10109720 Kluber Paste 70g Tube		41.85	83.70 0%

Quotation No: 71007676
Date: Jun 3, 2020
Page: 2 (7)

Pos	Qty	Unit	Item Description	Country of origin HS-Code	Price USD Discount (%)	Total USD Tax (%)
40/1	32.00	HOUR	40001 Labor (2 technicians)		145.00	4,640.00 0%
50/1	20.00	HOUR	40003 Travel Time (2 technicians)		110.00	2,200.00 0%
60/1	2.00	pcs	10000002 Flight		800.00	1,600.00 0%
60/2	6.00	pcs	10000002 Hotel		150.00	900.00 0%
60/3	4.00	pcs	10000002 Car Rental		100.00	400.00 0%
60/4	8.00	pcs	10000002 Per Diem		60.00	480.00 0%
60/5	1.00	pcs	10000002 Misc Field Materials		200.00	200.00 0%
70/1	1.00	pcs	410500 Freight		1,500.00	1,500.00 0%
					Total net USD	58,287.72
					including Tax USD	0.00
					Total gross USD	58,287.72

Valid for: 90 days
 Delivery: prepaid and add
 Payment terms: Net 30 days

Best regards

Lindsay Barnes

Huber Technology, Inc.

Billing Address

Fleis and Vanderbrink
 2960 Lucerne Drive SE
 Suite 100
 Grand Rapids, MI 49546
 UNITED STATES

Delivery Address

Leoni Township
 8401 Page Avenue
 Jackson, MI 49201
 UNITED STATES

OFFER: 71007678 / V1
 Project: Leoni MI 288820

Your Letter/Your Reference:

Date printed: Jun 3, 2020
 Our Reference: Lindsay Barnes
 Phone: +1-704-990-2050
 Fax:
 Email: lindsay.barnes@hhusa.net

Customer No: 121487
 Phone: 616-977-1000
 Fax:

All parts in stock unless otherwise indicated below.
 Customer is responsible for the following prior to Huber's technician arrival:
 (1)Removal of Huber machine from channel,
 (2)Pressure washing of machine, and
 (3)Providing lifting equipment.
 Failure to do so will result in additional charges of \$1,000 per day Huber is onsite.

Pos	Qty	Unit	Item Description	Country of origin HS-Code	Price USD Discount (%)	Total USD Tax (%)
10/1	2.00	pcs	10000001 Basket RPPS 1600/3		57,915.00 35%	75,289.50 0%
20/1	4.00	pcs	509818 bolt 30f7/40x 120 1xM10x1		406.00	1,624.00 0%
30/1	2.00	pcs	10000001 Lower Sealing Brush w/ Fasteners		1,018.81	2,037.62 0%
31/1	2.00	pcs	10065666 LOCTITE 648 Kit		102.48	204.96 0%
32/1	2.00	pcs	10109720 Kluber Paste 70g Tube		41.85	83.70 0%
33/1	1.00	pcs	10117977		2,468.35	2,468.35

Quotation No: 71007678
Date: Jun 3, 2020
Page: 2 (8)

Pos	Qty	Unit	Item Description	Country of origin HS-Code	Price USD Discount (%)	Total USD Tax (%)
			RotoMat 1400-1800 Lower Bearing Assembly Kit			0%
40/1	64.00	HOUR	40001 Labor (2 technicians)		145.00	9,280.00 0%
50/1	20.00	HOUR	40003 Travel Time (2 technicians)		110.00	2,200.00 0%
60/1	2.00	pcs	10000002 Flight		800.00	1,600.00 0%
60/2	8.00	pcs	10000002 Hotel		150.00	1,200.00 0%
60/3	5.00	pcs	10000002 Car Rental		100.00	500.00 0%
60/4	10.00	pcs	10000002 Per Diem		60.00	600.00 0%
60/5	1.00	pcs	10000002 Misc Field Materials		200.00	200.00 0%
70/1	1.00	pcs	410500 Freight Lead Time: 8-9 weeks appx		2,500.00	2,500.00 0%
					Total net USD	99,788.13
					including Tax USD	0.00
					Total gross USD	99,788.13

Valid for: 90 days
Delivery: prepaid and add
Payment terms: Net 30 days

Best regards

David Harvey

Subject: FW: Leoni - Huber RPPS Screen Budget Prices

From: Glenn Hummel <glenn.hummel@hesco-mi.com>
Sent: Saturday, May 30, 2020 9:22 AM
To: David Harvey <dharvey@fveng.com>; Bob Wilcox <bwilcox@fveng.com>
Cc: Ken Baker <kbaker@fv-operations.com>
Subject: Re: Leoni - Huber RPPS Screen Budget Prices

The adder for 316 SS is 17% of the equipment cost

Meaning pull out the controls and bagger and give that a 1.17 multiplier
Then add back in those controls

(Leave the bagger out
It was bid w the enclosures this week on the Odor Control bid.)

Sent from my iPhone

From: Glenn Hummel <glenn.hummel@hesco-mi.com>
Sent: Friday, May 29, 2020 5:16:45 PM
To: David Harvey <dharvey@fveng.com>; Bob Wilcox <bwilcox@fveng.com>
Subject: Re: Leoni - Huber RPPS Screen Budget Prices

Sure!
I'll chase that down

Sent from my iPhone

From: David Harvey <dharvey@fveng.com>
Sent: Friday, May 29, 2020 5:11:29 PM
To: Glenn Hummel <glenn.hummel@hesco-mi.com>; Bob Wilcox <bwilcox@fveng.com>
Subject: Re: Leoni - Huber RPPS Screen Budget Prices

Glenn,
Thanks for the information. Very timely.
Is it possible to also receive pricing for a 316SS unit?
Thanks, DCH

From: Glenn Hummel
Sent: Friday, May 29, 2020 4:31 PM
To: Ken Baker <kbaker@fv-operations.com>
Cc: Steve Frank (steve.frank@hhusa.net) <steve.frank@hhusa.net>
Subject: Leoni - Huber RPPS Screen Budget Prices
Importance: High

Steve –

A direct replacement of Leoni's existing screen is HUBER's RPPS 1600 model with 3mm perforations.

Budget price for this RPPS 1600 (3mm) screen is \$170K and includes:

1. 304SST construction
2. Closed discharge Chute
3. Screenings bagger
4. level sensors
5. brass body SV's
6. Standard NEMA 4X 304 Control Panel
7. Standard Panel Consist of: NEMA 4X 304 stainless steel control panel with Allen Bradley Micrologix 1400 PLC and Allen Bradley 800 Panel View operator interface, including one NEMA 7 LCS per machine.
8. Freight, Start-up and standard 1 year warranty.
 1. *Deduct for controls is \$15K should they elect to reuse the existing controls.*
 2. *Deduct for bagger unit is \$2,300. Since those were quoted on the Odor Control Project*

Based on our conversation today, I'd say leave in Controls and take out the Bagger.

So that puts the **Budget at: \$167,700**

Standard delivery is 4-6 weeks for submittals and 20-24 weeks for equipment delivery. So use those for the "budgeting level" discussions and conceptual schedule.

I've asked them to look and see how much those can be shortened, so if this gets to that stage and the Twp is interested in a formal proposal or expediting an order, we can work the lead times down then. Would it make sense to try to line up the screen delivery with the odor control improvements project? In particular the screen enclosures? That might be able to be accommodated. Let me know if you want me to look into that.

Let me know your initial thoughts once you have had a chance to review.

Best regards-

Glenn

Glenn Hummel, PE

*** HESCO has implemented measures to continue to support our critical-infrastructure clients while maintaining our focus on safety and responsibility during the COVID-19 outbreak. LEARN MORE**

Cell: 586.214.9647 | Direct: 586.353.2242

23905 Freeway Park Dr. | Farmington Hills, MI 48335

Budget Proposal

Project:

Leoni Twp, MI

Equipment:

SAVI Flo-Drum In-Channel Rotating Drum Screens Model VSA 1600

Represented By:

Peterson and Matz, Inc.

Michael Wright

Cell: 616.350.1671

Email: Michael.Wright@petersonandmatz.com

Regional Sales Manager:

Enviro-Care

Gary Garzonetti

Phone: 847-502-5716

Email: ggarzonetti@enviro-care.com

Project No.: WEC220157

May 11, 2020



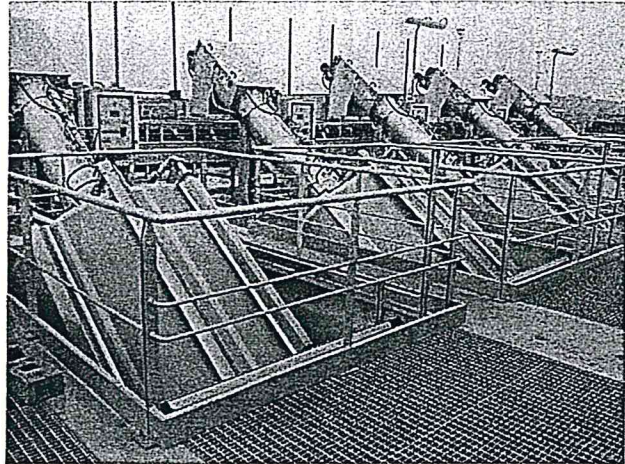
1570 St. Paul Avenue - Gurnee IL 60031

P: 815.636.8306

F: 847.672.7968

www.enviro-care.com

ITEM: "A" – Two (2) SAVI Flo-Drum In-Channel Rotating Drum Screens
Model VSA 1600



BASIS OF DESIGN (EACH)

2 mm Screening	
Max Design Flow	8 MGD
3 mm Screening	
Max Design Flow	10 MGD
Influent & Effluent Channel Width:	48 inches
Screen Channel Recess Width:	72 inches
Channel Depth:	4.75 feet
Angle of Inclination:	35 degrees
Discharge Height:	11.5 feet from channel bottom
Wash Water Requirement:	80 gpm at 72 psi

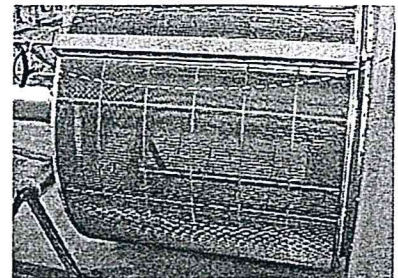
FINE SCREEN (EACH)

- Fully automatic, self-cleaning, perforated plate, rotating drum fine screen with integral screenings washing, conveying, and dewatering.
- Cylindrical drum screen basket constructed of perforated plate media from type 304 or 316 stainless steel with perforations around the entire basket.
- Proprietary triple face seal with polyurethane designed for maximum capture of fine solids including hair and to prevent material bypass.
- Cleaning brush and spray bar on the outside of the screen drum to thoroughly clean the drum and to prevent small solids from passing through the screen.
- Drum screen supported by reinforced type 304L or 316L stainless steel support arm on drive end and rollers on the opposite end. Rollers with stainless steel shafts mounted to upper support plate and shall require no lubrication. A brush is clamped to the upper support plate sealing the gap between the rotating screen basket and the fixed upper support plate.

- One piece type 304 or 316 stainless steel seal plate on the influent end of the drum screen, directs flow into the screen basket and creates a seal with the channel preventing flow bypass.
- Drum screen and screw conveyor are driven by a common drive unit.
- The shafted screenings screw conveyor to be constructed of:
 - an epoxy coated high strength alloy steel for maximum torsion resistance, or
 - 304 stainless steel, or
 - 316 stainless steel
- Shafted screw supported by a lower sealed, self-lubricating bronze bushing.
- The screenings screw conveyor shall have a brush mounted on it for the length of the screenings inlet hopper.
- Screenings spray wash system with multiple injection points located in transport zone prior to dewatering zone with manual ball valves.
- Dual chambered dewatering and discharge zone from type 304 or 316 stainless steel with hinged access door.
- Dewatering zone drain flush spray system from type 304 or 316 stainless steel with manual ball valve.
- Plastic hose for drain connection to direct pressate back into the channel.
- Drive unit with 2.0 HP TEFC motor suitable for 460/3/60 electrical supply.
- Fasteners and anchors from type 304 stainless steel.

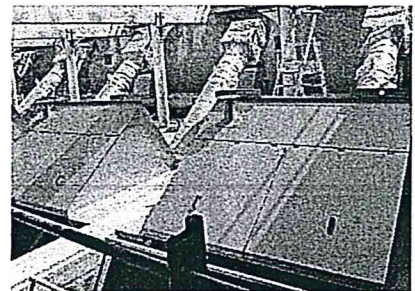
FINE SCREEN SPRAY HOUSING (EACH)

- Spray protection housing to cover the sides and top of the screen basket from type 304 or 316 stainless steel.



ODOR CONTROL SCREEN HOUSING (EACH SCREEN)

- Screen triangular housing to cover the sides and top of the screen basket from type 316 stainless steel. Cover includes 4-inch plain ended pipe for odor control connection.



FINE SCREEN SUPPORTS (EACH)

- A stand from type 304 or 316 stainless steel is supplied to support the fine screen unit. Support shall allow unit to be rotated.

VAVES

- One (1) NEMA 4X 120V 316 stainless steel solenoid valve to control compaction zone water spray functions.
- Two (2) NEMA 4X 120V electrically actuated 316 stainless steel body ball valves to control drum water spray functions.

SPARE PARTS (TOTAL)

- None.

FIELD SERVICE (TOTAL)

- Site service of one (1) trip for a total of two (2) days for installation inspection, startup and operator training.

CLARIFICATIONS/COMMENTS

- None.

NOTE: ANY ITEM NOT LISTED ABOVE TO BE FURNISHED BY OTHERS.

EXCLUSIONS

Taxes, electrical wiring, controls, conduit or electrical equipment, piping, valves, or fittings, shimming material, lubricating oil or grease, shop or field painting, field welding, erection, hoist or lifting apparatus, detail shop fabrication drawings, performance testing, unloading, storage, concrete work, civil design, grating, platforms, stairs, hand railing, dumpster (except as specifically noted).

This proposal section has been reviewed for accuracy and is approved for issue:

By: Gary Garzonetti Date: May 11, 2020



BUDGET

Item	Equipment	Budget Price
Option 1	Two (2) SAVI Flo-Drum In-Channel Rotating Drum Screen Model VSA 1600 – All 304 stainless steel construction except for Screening screw which is of an epoxy coated high strength alloy steel for maximum torsion resistance.	\$ 193,900
	OR	
Option 2	Two (2) SAVI Flo-Drum In-Channel Rotating Drum Screen Model VSA 1600 – All 304 stainless steel (including screw)	\$ 212,200
	OR	
Option 3	Two (2) SAVI Flo-Drum In-Channel Rotating Drum Screen Model VSA 1600 – All 316 stainless steel (including screw)	\$ 235,900

Validity:

Prices are valid for a period of 30 days from the date of this proposal.

Warranty Statement and Term:

Enviro-Care Company, Inc. warrants the supplied equipment to the original end user against defects in workmanship or material under normal use and service in compliance with the original design specifications and the maintenance requirements and instructions as found in the Operations & Maintenance Manual. All Enviro-Care supplied equipment is warranted for 12 months from date of start-up or 18 months from date of shipment, whichever occurs first.

Note: Lower Bearing includes a 5-year warranty.

Warranty Exclusions:

This warranty does not cover costs for standard and/or scheduled maintenance performed, nor does it cover consumables and Enviro-Care parts that, by virtue of their operation, require replacement through normal wear (aka: Wear Parts), unless a defect in material or workmanship can be determined by Enviro-Care. Wear parts are defined as brushes, rollers, spray nozzles, drum seals and other items specifically identified in the Operations & Maintenance Manual.

Warranty Coverage:

Enviro-Care's liability is limited to the supply or repair of defective parts returned, freight prepaid by buyer to a location specified by Enviro-Care. Repaired or replacement parts will be shipped to buyer prepaid via standard ground freight. Express or expedited shipments will be at the expense of the buyer.

Exclusions and Exceptions:

This Warranty excludes damage or wear to equipment caused by misapplication of product, improper maintenance, accident, abuse, unauthorized alteration or repair, Acts of God, or installation or operation that is non-compliant with Enviro-Care installation and operations instructions

Limited Liability:

Enviro-Care shall not under any circumstances be liable for any incidental or consequential damages arising from loss, damage to property, personal injury or other damage or losses owing to the failure of Enviro-Care's equipment. The liability of Enviro-Care Company, Inc. is limited as set forth above within the time period set forth above.

Term: 15% with Submittal Approval

80% Net 30 Days after Shipment

5% Net 30 days after Startup. Startup not to exceed 180 days from equipment delivery.

Taxes: No sales or use taxes have been included in our pricing.

Freight: Prices quoted are F.O. B. shipping point with freight allowed to a readily accessible location nearest jobsite. Any claims for damage or loss in shipment to be initiated by purchaser.

Submittals: Full submittals will be supplied approximately 4 to 6 weeks after receipt and acceptance of purchase order at the Enviro-Care offices.

Shipment: Shipment time is approximately 18 to 20 weeks after receipt of approved submittal is received at the Enviro-Care offices. Under no circumstances will verbal approval be accepted.

Additional Field Service: This service may be scheduled at \$1,250.00 per day plus expenses or is available through a yearly service contract.

Material of Construction: Enviro-Care is providing the equipment from the type of material specified for this project. If from 304L stainless steel the concentration of chloride and hydrogen sulfide (H₂S) in the equipment operating environment shall be kept below the following values:

- Chloride <200 mg/L
- Hydrogen Sulfide (H₂S) <6ppm

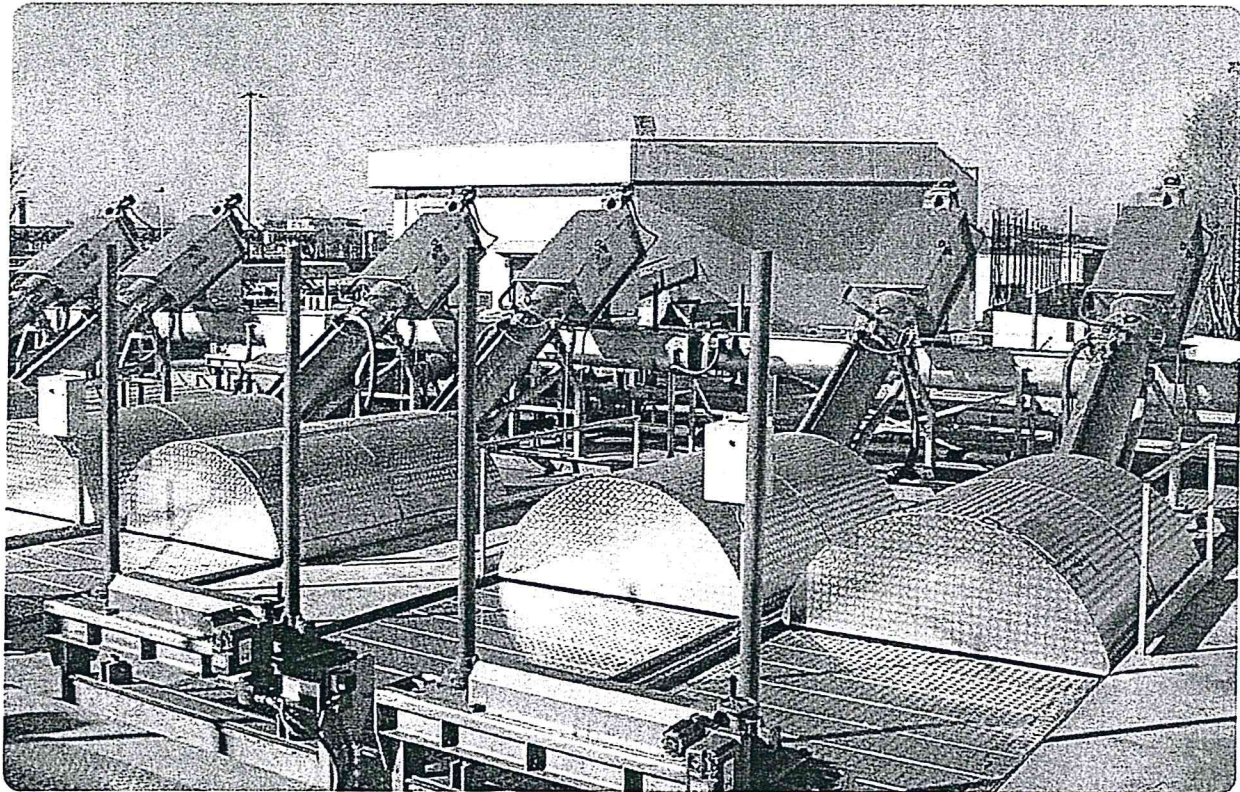
If not already done so, Enviro-Care can provide the equipment from 316L stainless steel for a price adder for environments that exceed the values noted above.

Flo-Drum MBR

Pre-Treatment Screen

VSA-M

SAVI



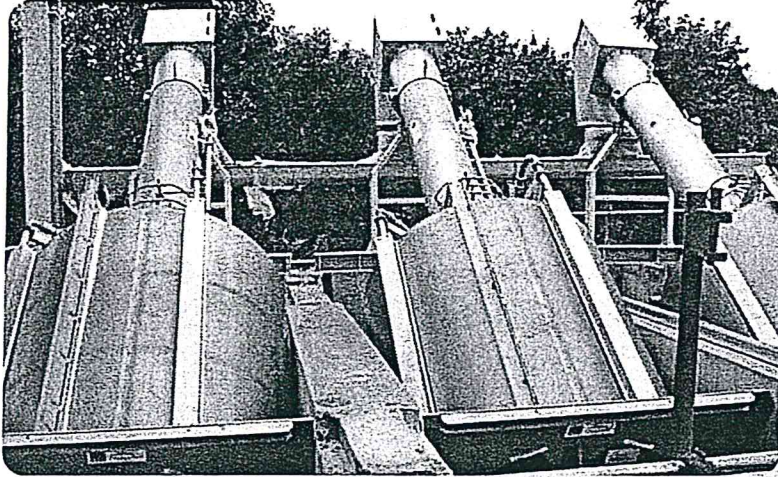
Six FD-MBR2000 10 MGD Per Screen - Brescia Italy



Flo-Drum MBR

Pre-Treatment Screen

Protecting Membrane Bioreactors Worldwide

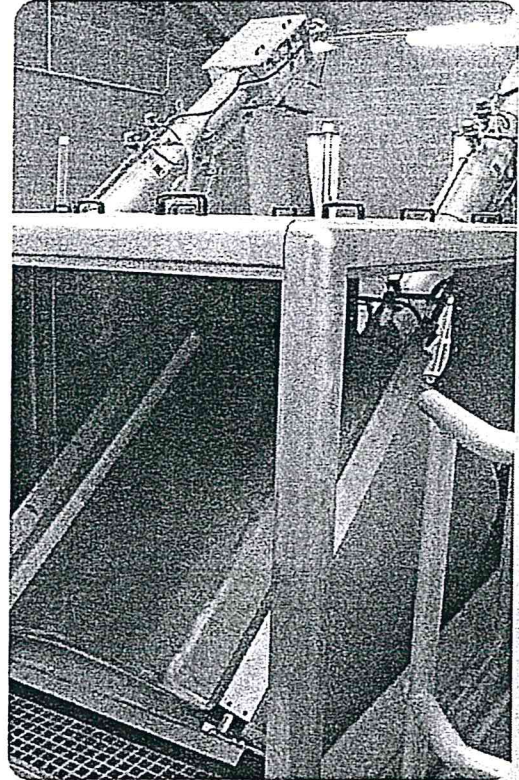


Three - FD-MBR2000 5 MGD Per Screen - Orleans, France

The Enviro-Care Flo-Drum MBR Pre-treatment Screen is a fine screen with the high capture efficiency and minimal by-pass features that the sensitive MBR process requires.

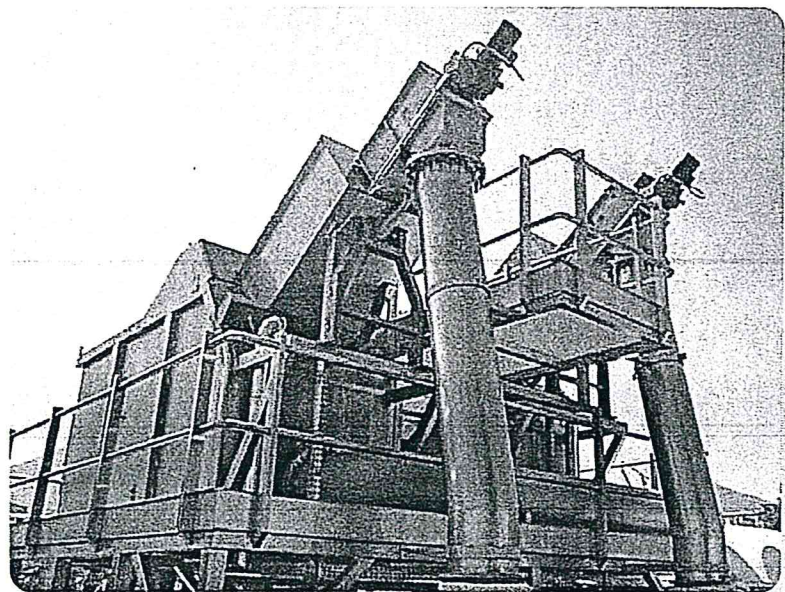
The rotating drum, cleaning brush and water spray ensure that a clean screen surface is always available to meet the incoming wastewater flow. Screenings captured on the drum surface are immediately swept into the auger trough and moved out of the screening zone.

This MBR pre-treatment screen is an excellent retrofit option. Below, two Flo-Drum MBR in tank screens are pre-treating flow from a primary clarifier prior to a membrane bioreactor process.

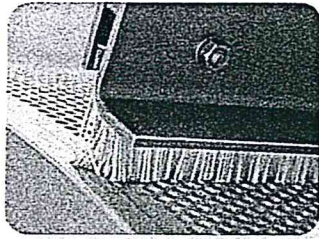


Two FD-MBR1600 6 MGD Per Screen - La Center WA U.S.A.

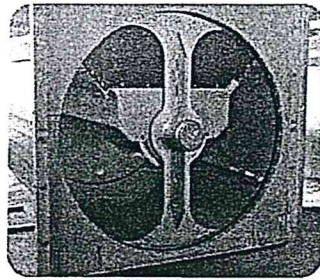
**Over 200
Drum Screen
Installations
Worldwide**



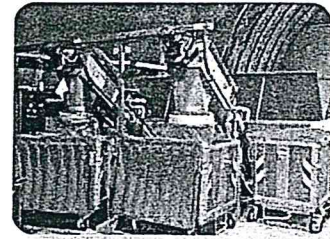
Three FD-MBR1400 3 MGD Per Screen - Trento Italy



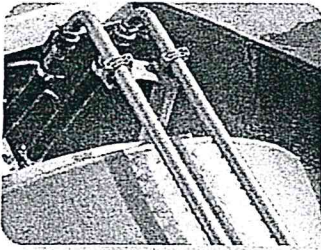
6 - Exterior Brush



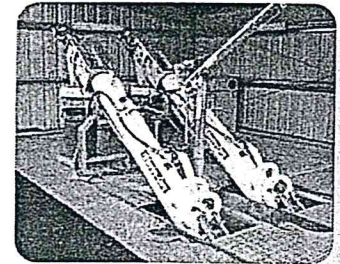
8 - Bottom Bronze Bushing



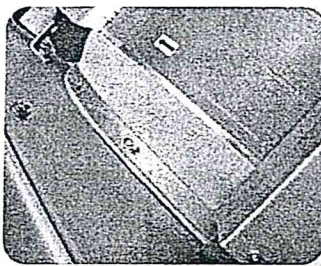
11 - Clean, Dry Screening Area



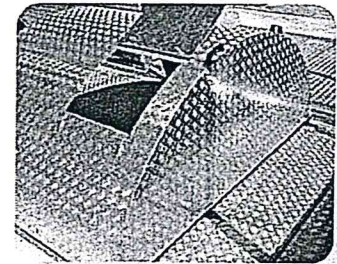
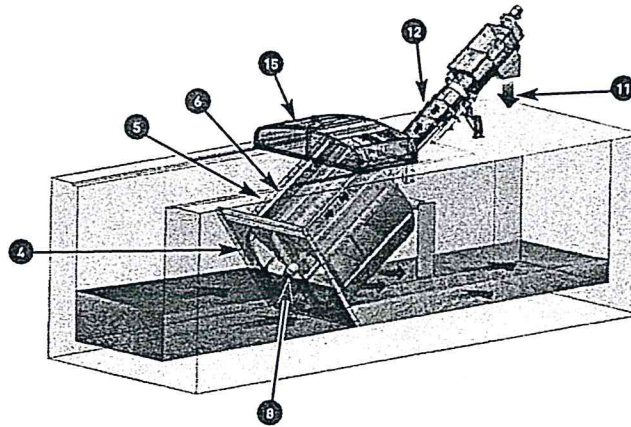
5 - Overlapping Spray Pattern



12 - Flo-Drum Units with freeze protection in Washington State



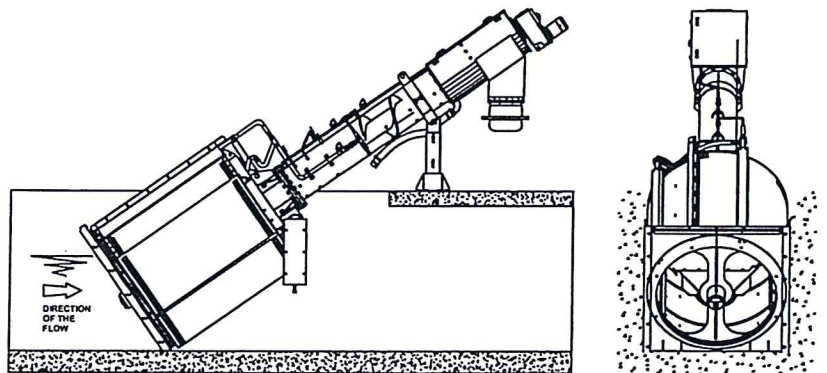
4 - Triple Face Seal



15 - Removable, Sliding Aluminum Covers

Features & Benefits

- 1 The Flo-Drum screens, conveys, washes and dewateres screenings all in one unit - Eliminates the need for multiple pieces of equipment.
- 2 Flo-Drum units are available for in-channel or in-tank applications - Same efficient operation for either gravity or pumped flows.
- 3 Flo-Drum screening systems have three separate washing functions - The unit is designed to wash organics from the screenings and be self-cleaning at the screen basket and in the dewatering zone.
- 4 Proprietary triple face seal - Designed in conjunction with a major MBR manufacturer for maximum capture efficiency of fine solids including hair and to prevent bypass.
- 5 Spray nozzles on the outside of the screen basket produce an overlapping spray pattern - More efficient cleaning of screen basket and better capture of small solids.
- 6 A cleaning brush on the exterior of the screen keeps solids contained within the screening basket - Prevents small solids from passing through the screen and maintains a clean screen surface for the incoming flow.
- 7 Durable brush is attached to the spiral at the auger trough - Even the smallest solids are swept into the auger trough for removal.
- 8 Large, robust, self-lubricating bronze bushing - No lubrication pumps or maintenance required.
- 9 Common drive operates the rotating screen basket and screw conveyor - Synchronized operation for lower energy consumption and less maintenance.
- 10 Hinged and latched compaction zone access with safety interlock switch - Provides ease of access with no tools required and prevents opening during operation.
- 11 Screenings are completely enclosed within the transport tube and dewatering zone - Creates a cleaner, drier screenings area with reduced odor. Optional bagger is available.
- 12 Optional freeze protection is available - Screens are easily adaptable for outdoor installations in colder climates.
- 13 Screening drum is available in perforated plate or mesh screen media - Custom engineered to meet specific application requirements.
- 14 Exceptional design, durable construction - Designed for high capture efficiency and years of reliable operation.
- 15 Removable, sliding Aluminum covers - Covers slide open and out of the way to perform routine maintenance or to pivot the unit out of the channel.
- 16 Optional Stainless steel cover design available - A cover alternative based on customer preference.



Specifications

Flow rate	mgd	1 - 30
Channel widths	inches	26 - 118
Opening for MBR applications	mm perforated media	1 - 2 - 3
Angle of inclination		35°
Drum screen OD	mm	600 - 800 - 1000 - 1200 - 1400 - 1600 - 1800 - 2000 - 2200 - 2400 - 2600 - 3000
Drive motor	Hp	1 - 1.5 - 2 - 3 - 5
Controls		NEMA 4X/7
Voltage	V-Hz	240/480 V - 60 Hz

Materials of Construction

Shafted screw	ST52-3 Alloy Steel [304/316 SST Optional]
Supports, End Plates, Anti-rotation bars	AISI 304 SST [316 Optional]
Tubes and Discharge Chutes	AISI 304 SST [316 Optional]

David Harvey

Subject: FW: Leoni Twp WWTP- Headworks Screen Replacement

From: Dave Connors <dconnors@waterworkssystem.com>
Sent: Monday, June 1, 2020 3:06 PM
To: David Harvey <dharvey@fveng.com>
Subject: Re: Leoni Twp WWTP- Headworks Screen Replacement

Hi David,

The 3mm perf plate Great White Center Flow screen would now budget for \$425,000.00 delivered to Michigan. As this is a budget price, I think there is a 5-8% savings to be had, once we firm this budget number up. Scott Griffith of Hydro Dyne has put together a full proposal, which you will find attached. I think, at this point, we have provided answers to all of the questions from your initial email.

If allowed, I would be happy to set up a presentation with the rest of your group or your client to discuss this further, as you see fit.

Let me know what else you would need to recommend this screen for this application.

Dave Connors
Waterworks Systems & Equipment
dconnors@waterworkssystem.com
989-860-9816

On Fri, May 29, 2020 at 2:23 PM David Harvey <dharvey@fveng.com> wrote:

Dave,

Thanks for the quick response. Looking forward to the pricing information.

David C. Harvey, PE

Sr. Engineer Manager, Associate

From: Dave Connors <dconnors@waterworkssystem.com>
Sent: Friday, May 29, 2020 9:42 AM
To: David Harvey <dharvey@fveng.com>
Subject: Re: Leoni Twp WWTP- Headworks Screen Replacement

Hi David,

Thanks for your time on the phone yesterday. Regarding the 2 mm mesh screen we discussed yesterday, Hydro Dyne is a little leary of making the depth of the unit (the length it runs down the channel, essentially) and longer than 67.47 inches listed in the flow calcs.

We ran the calcs again using a 3 mm perf plate. With the perf plate, since we cut all of our own holes, we are able to hold the tolerances better of the holes and the areas between the holes. This allows us to reduce the percentage of screen obstructed, reduce the size of the machine which will therefore reduce the price of the screen. Even at 3 mm, we expect to achieve a capture rate of 90%. While I understand you have asked for a 2mm screen, there are some hydraulic limitations that we see, plus our 3 mm meets the screenings capture rate of other screen models with that size aperture.

Please review the attached Equipment Sizing chart and let me know your thoughts. I should have pricing by end of day but I do expect that number to decrease some.

Best Regards,

Dave Connors

Waterworks Systems & Equipment

dconnors@waterworkssystem.com

989-860-9816

On Wed, May 27, 2020 at 9:54 AM Dave Connors <dconnors@waterworkssystem.com> wrote:

David,

Before we put together a full proposal, we wanted to discuss the hydraulic flow through this unit in this application with you. After much deliberation at Hydro Dyne, they have decided to show the profile with a peak flow of 6 MGD. This is not to say that the screen will not work with flows over 6 MGD (up to 8.5 MGD), but with zero coarse screening we have to be cautious on the blinding of the screen. The screen, per the hydraulic profile attached, has been sized with 75% blinding, however 85% blinding was looked at when developing the screen size and water levels.

It is also important to note that the screen technology will also play an important role in the performance of the MBR. Per UKWIR (only independent study of screen capture ever conducted), the way a screen operates is just as important as the grid opening. The Huber Rotamat was tested at UKWIR and had an average screening capture rate of 73% (3mm perforated plate). Hydro-Dyne's Great White Center Flow Screen was also tested and achieved 93% SCR (2mm perforated plate). Per MOP8, on average a wastewater treatment plant can receive approximately 204 cy-yd of screenings per year per MGD. When comparing the inclined drum screen to the center flow screen that's roughly 41 cy-yds of screening per year per MGD that is getting to the downstream process affecting the performance of the MBR. Hydro Dyne has been approved by Suez as a screening supplier ahead of their membranes and they have always required 2 mm or finer screening.

I have attached two pictures that I have taken of the links that are part of my demo kit. The first shows the 0.5 mm clearance between the link itself and the frame of the unit. This prevents any material from being able to bypass the screen grid system, which can cause fouling downstream. The second shows the UHMW link itself and how beefy it is. The general rule for the MBR process is, "NO BYPASS ALLOWED".

See budget price below which includes the following:

- 1 EA, Great White Center Flow Screen with 2mm Stainless Steel Perforated Plates
- 1 EA, Integral Whitetip Shark Washing Compactor with additional washing
- All 316 SS Construction
- Endless Bagger System
- Motors for C1D1 Location

- Odor control flange at head section of screen
- Standard Spare Parts Kit (10) hook links and spacers, (2) grid axles, (2) guide links, (2) screen panels, (1) center support link and (1) brush for the compactor screw
- Controls
 - 1 NEMA 4x Main Control Panel
 - 1 NEMA 7 Local Control Panel
 - VFD for screen
 - MS for washing compactor
 - Differential Level Control System
- One trip/one day for start up and commissioning
- One year warranty

Budget Price - \$525K

Based on the drawings provided, no modifications need to be done to the existing channel.

The last attachment is the maintenance pages typically included in a full proposal. This will give you an idea of what to expect maintenance-wise.

I would be glad to set up a conference call/webinar with Hydro Dyne to discuss this further, at your convenience,

We are also ready to provide a full proposal for your review, if you see that this fits your needs.

Best Regards,

Dave Connors

Waterworks Systems & Equipment

dconnors@waterworkssystem.com

989-860-9816

On Tue, May 19, 2020 at 4:31 PM David Harvey <dharvey@fveng.com> wrote:

Hi David,

F&V Operations runs the Leoni Township WWTP, which process municipal sanitary waste. The plant has two Huber 1/8" (3 mm) perforated plate microscreens that have required significant maintenance since they were installed in 2010. One of the screens has worn through and the Township is evaluating the cost of replacing the screening basket versus installing a new unit. As such, we feel it's prudent to consider alternate screening units and would like to know if the Hydro-Dyne Great White Shark would be a cost competitive option. Attached are original headworks drawings, fine screens specification and several photos of the installation.

Background:

- The Headworks Building Screening Room is a high hydrogen sulfide gas area nominal levels between 10 to 40 ppm. This has been particularly hard on the equipment. We feel utilizing 316 SS construction is warranted.

- We have been authorized to design the MBR replacement project and understand 2mm perforated plate screening is preferred by the manufacturer. We are interested if the screen unit can fit in the existing channel and satisfy the flow conditions listed in the specification.
- What is the headloss through the unit for the specified flow conditions? A headloss curve would be helpful in our evaluation.
- An odor control system is about to start construction to capture and treat odors from the Screening Room. The portion of the screen should be enclosed above the top of channel height. Also, can a vent pipe be attached to the enclosure?
- There is final effluent water at about 85 psi at the building.

Pricing options should include:

- The 2mm screen, 316SS construction, integrated screenings handling equipment. Unit is located in a Class 1, Division 1, Group D area.
- Control panel. Located in unclassified area.
- Endless bagger system.

Since the facility is running on only one screen, we request your immediate attention to providing pricing for the unit. A purchasing decision should be made in a matter of a few weeks.

As part of the evaluation, the operations staff would like to know the recommended maintenance and parts replacement schedule.

Please let me know if any questions.

Thanks and stay safe!

David C. Harvey, PE

Sr. Engineer Manager, Associate

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