From: Barry Simescu [Barry@DuboisCooper.com]
Sent: Wednesday, October 14, 2009 1:46 PM
To: Benoit Dennis J.
Cc: Sales; JSchell@gormanrupp.com
Subject: RE: Howell WWTP Raw Sewage PS Gorman Rupp

Dennis
Based on my check of NPSH before we were short by about 7 feet so lowering 10 feet would work. A budget price for four T10 with 40 hp VFD and piping and valves would be about $210,000. This price includes the control panels also.
Barry

-----Original Message-----
From: Benoit Dennis J. [mailto:dbenoit@hrc-engr.com]
Sent: Saturday, October 10, 2009 5:41 PM
To: Barry Simescu
Subject: RE: Howell WWTP Raw Sewage PS Gorman Rupp

Could you do Option 1 if the suction lift were reduced by about 10 feet?
We could locate the pump skids in the basement of the filter building, which could be a good choice for either GR option,

Can you get a price for two of the New Baltimore sized skids?

Thanks

Have fun in Orlando!

Dennis J. Benoit, P.E.
Associate
Hubbell, Roth & Clark, Inc
801 Broadway NW, Suite 215
Grand Rapids, MI 49504
Phone: (616) 454-4286
Mobile: (616) 826-5400
Fax: (616) 454-4278
E-mail: dbenoit@hrc-engr.com

From: Barry Simescu [Barry@DuboisCooper.com]
Sent: Tuesday, October 06, 2009 9:42 AM
To: Benoit Dennis J.
Cc: Sales; JSchell@gormanrupp.com
Subject: Howell WWTP Raw Sewage PS Gorman Rupp

Dennis
It looks like we would not be able to do option #1 in your email because of NPSHr. For option #2 we would recommend a duplex T10 pump station with controls, piping and valves per the attached curve and typical drawing. The budget cost with VFD would be $105,000. We can also provide a modular enclosure (12'X16') similar to the one we recently furnished at Browning Dr for an additional $40,000. I will send the submersible options shortly.
Barry

Pump Data Sheet - Gorman-Rupp Eng. Sys. Catalog

Company: HRC
Name: Dennis Benoit
Date: 10/5/2009

Howell WWTP Raw Sewage Pumps Option 1 submersible

Pump:

Size: JS8AB-E94-2

Type: J-SERIES
Synch speed: 1800 rpm

Speed: 1750 rpm
Line: 11.02/12.64

Curve: JS8AB-E94-2

Impeller:

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: ---
Discharge: 8 in

Pump Limits:

Temperature: ---
Pressure: ---
Sphere size: 3.94 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 4200 US gpm

Head: 35 ft

Fluid:

Water
Density: 62.25 lb/ft³
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

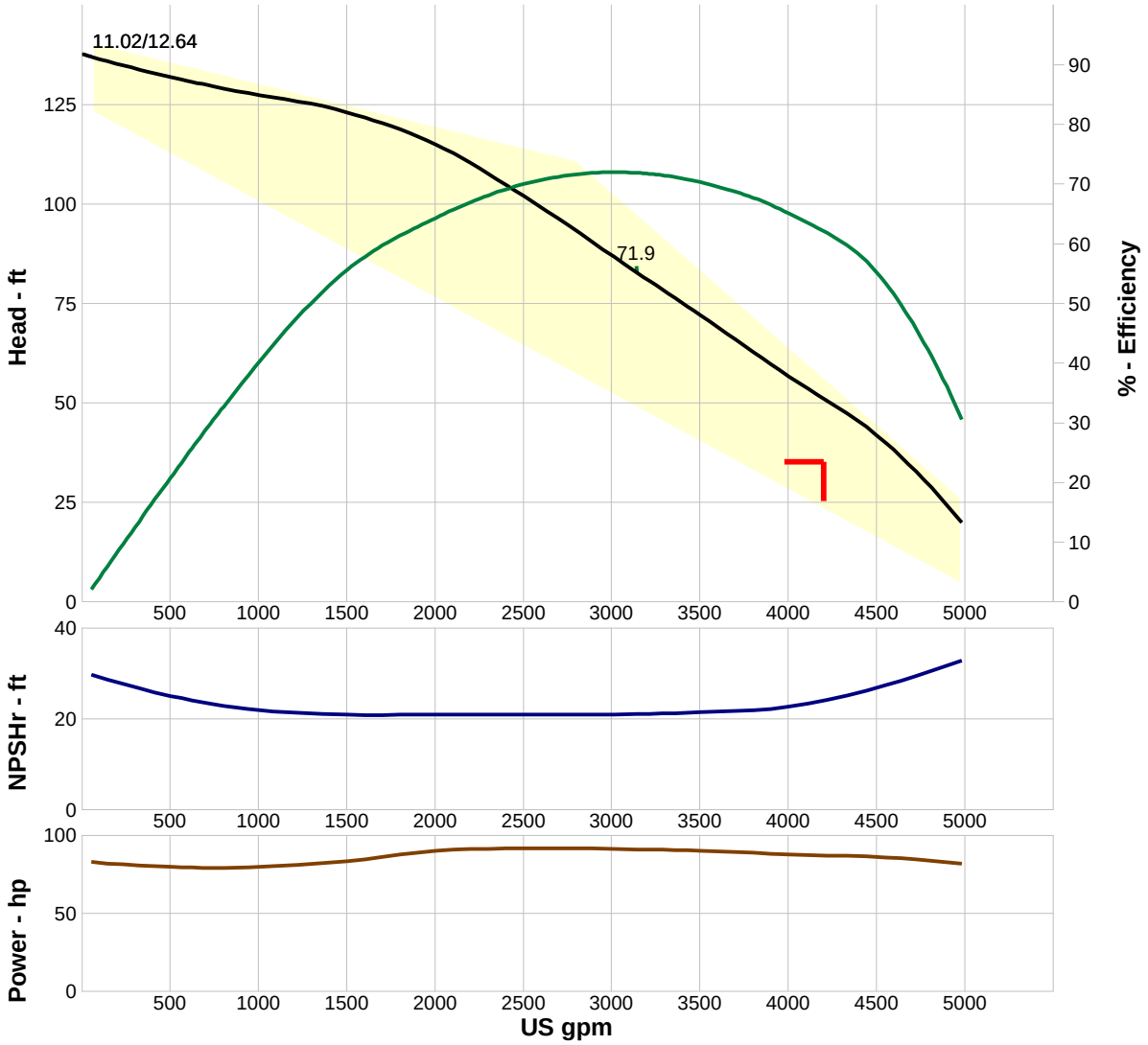
NPSHa: ---

Motor:

Size: 100 hp
Standard: NEMA
Speed: 1800
Enclosure: TEFC
Frame: 405T
Sizing criteria: Max Power on Design Curve

---- Data Point ----	
Flow:	4200 US gpm
Head:	50.6 ft
Eff:	61%
Power:	87.3 hp
NPSHr:	24.4 ft

---- Design Curve ----	
Shutoff head:	138 ft
Shutoff dP:	59.5 psi
Min flow:	---
BEP:	72% @ 3140 US gpm
NOL power:	92 hp @ 2500 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
5040	1750	---	---	---	---
4200	1750	50.6	61	87.3	24.4
3360	1750	76.2	71	90.8	21.3
2520	1750	101	70	92	21
1680	1750	120	59	86.1	21

Pump Data Sheet - Gorman-Rupp Eng. Sys. Catalog

Company: HRC
Name: Dennis Benoit
Date: 10/5/2009

Howell WWTP Raw Sewage Pumps Option 2 submersible

Pump:

Size: JS8D-E42-1

Type: J-SERIES
Synch speed: 1800 rpm

Speed: 1750 rpm
Line: 9.07/11.73

Curve: JS8D-E42-1

Impeller:

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: ---
Discharge: 8 in

Pump Limits:

Temperature: ---
Pressure: ---
Sphere size: 4.53 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 1750 US gpm

Head: 35 ft

Fluid:

Water
Density: 62.25 lb/ft³
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: ---

Motor:

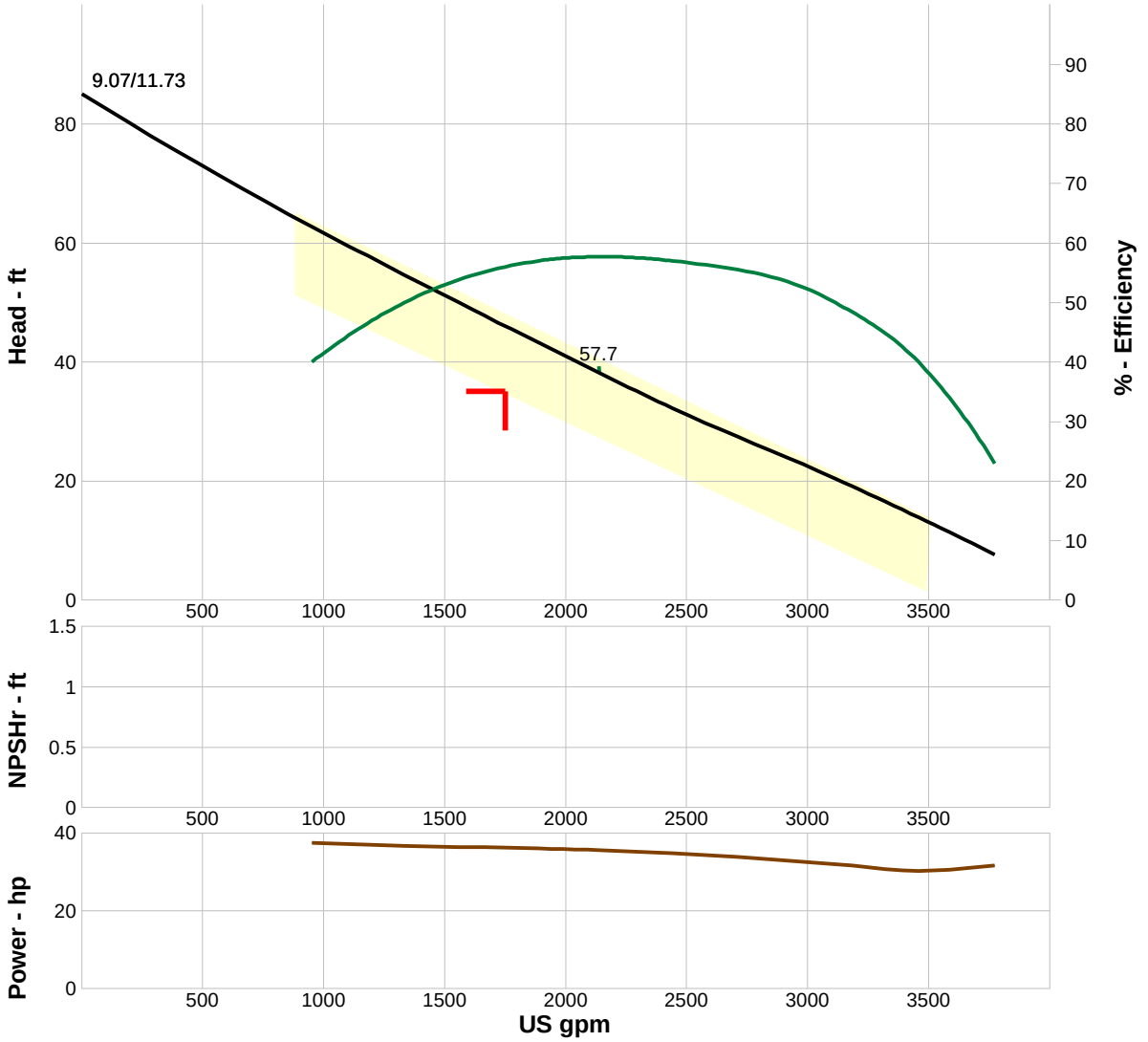
Size: 40 hp
Standard: NEMA
Speed: 1800
Enclosure: TEFC
Frame: 324T
Sizing criteria: Max Power on Design Curve

---- Data Point ----

Flow:	1750 US gpm
Head:	46 ft
Eff:	55%
Power:	36.3 hp
NPSHr:	---

---- Design Curve ----

Shutoff head:	85 ft
Shutoff dP:	36.7 psi
Min flow:	---
BEP:	58% @ 2139 US gpm
NOL power:	37.7 hp @ 879 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
2100	1750	38.9	58	35.8	---
1750	1750	46	55	36.3	---
1400	1750	53.3	51	36.7	---
1050	1750	60.6	43	37.4	---
700	1750	---	---	---	---

Pump Data Sheet - Gorman-Rupp Eng. Sys. Catalog

Company: HRC
Name: Dennis Benoit
Date: 10/5/2009

Howell WWTP Raw Sewage Pumps Option 1 (four pumps)

Pump:

Size: T10A-B-4

Type: T-SERIES
Synch speed: Adjustable

Speed: 1020 rpm
Dia: 14.764 in

Curve: T10A-B-4

Impeller:

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: 10 in
Discharge: 10 in

Pump Limits:

Temperature: ---
Pressure: ---
Sphere size: 3 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 2800 US gpm

Head: 35 ft

Fluid:

Water
Density: 62.25 lb/ft³
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: ---

Motor:

Standard: NEMA
Enclosure: TEFC
Sizing criteria: Max Power on Design Curve

Speed: ---
Frame: ---

---- Data Point ----

Flow:	2800 US gpm
Head:	35.7 ft
Eff:	73%
Power:	34.6 hp
NPSHr:	13.7 ft

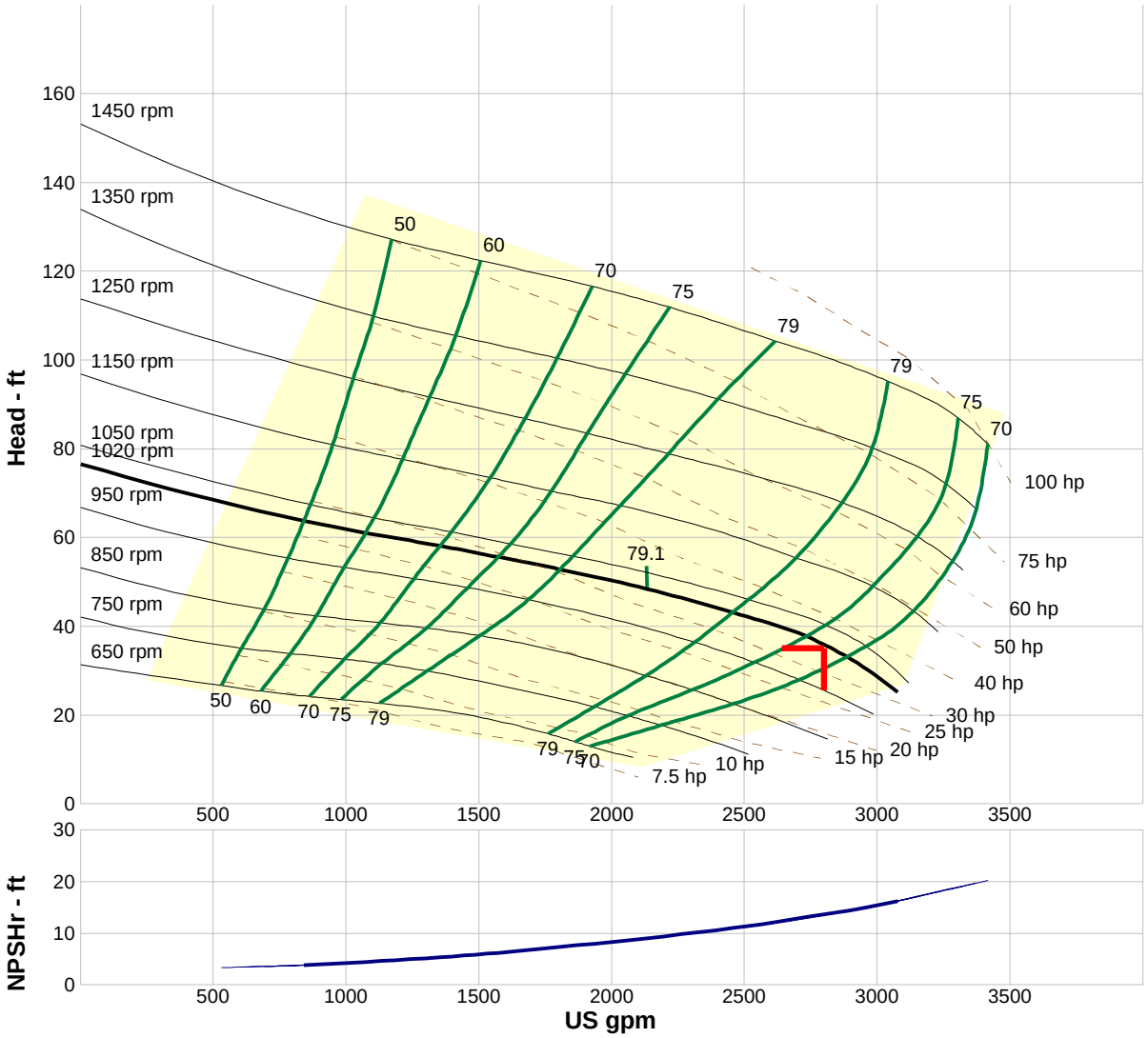
---- Design Curve ----

Shutoff head:	76.6 ft
Shutoff dP:	33.1 psi
Min flow:	---
BEP:	79% @ 2133 US gpm

NOL power:
34.7 hp @ 2731 US gpm

-- Max Curve --

Max power:
99.9 hp @ 3415 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
3360	1020	---	---	---	---
2800	1020	35.7	73	34.6	13.7
2240	1020	46.6	79	33.2	9.72
1680	1020	54.3	77	29.9	6.76
1120	1020	60.5	62	27.7	4.62

Pump Data Sheet - Gorman-Rupp Eng. Sys. Catalog

Company: HRC
Name: Dennis Benoit
Date: 10/5/2009

Howell WWTP Raw Sewage Pumps Option 2

Pump:

Size: T10A-B-4

Type: T-SERIES
Synch speed: Adjustable

Speed: 860 rpm
Dia: 14.764 in

Curve: T10A-B-4

Impeller:

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: 10 in
Discharge: 10 in

Pump Limits:

Temperature: ---
Pressure: ---
Sphere size: 3 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 1750 US gpm

Head: 35 ft

Fluid:

Water
Density: 62.25 lb/ft³
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: ---

Motor:

Standard: NEMA
Enclosure: TEFC

Speed: ---
Frame: ---

Sizing criteria: Max Power on Design Curve

---- Data Point ----

Flow:	1750 US gpm
Head:	35.9 ft
Eff:	79%
Power:	20 hp
NPSHr:	7.05 ft

---- Design Curve ----

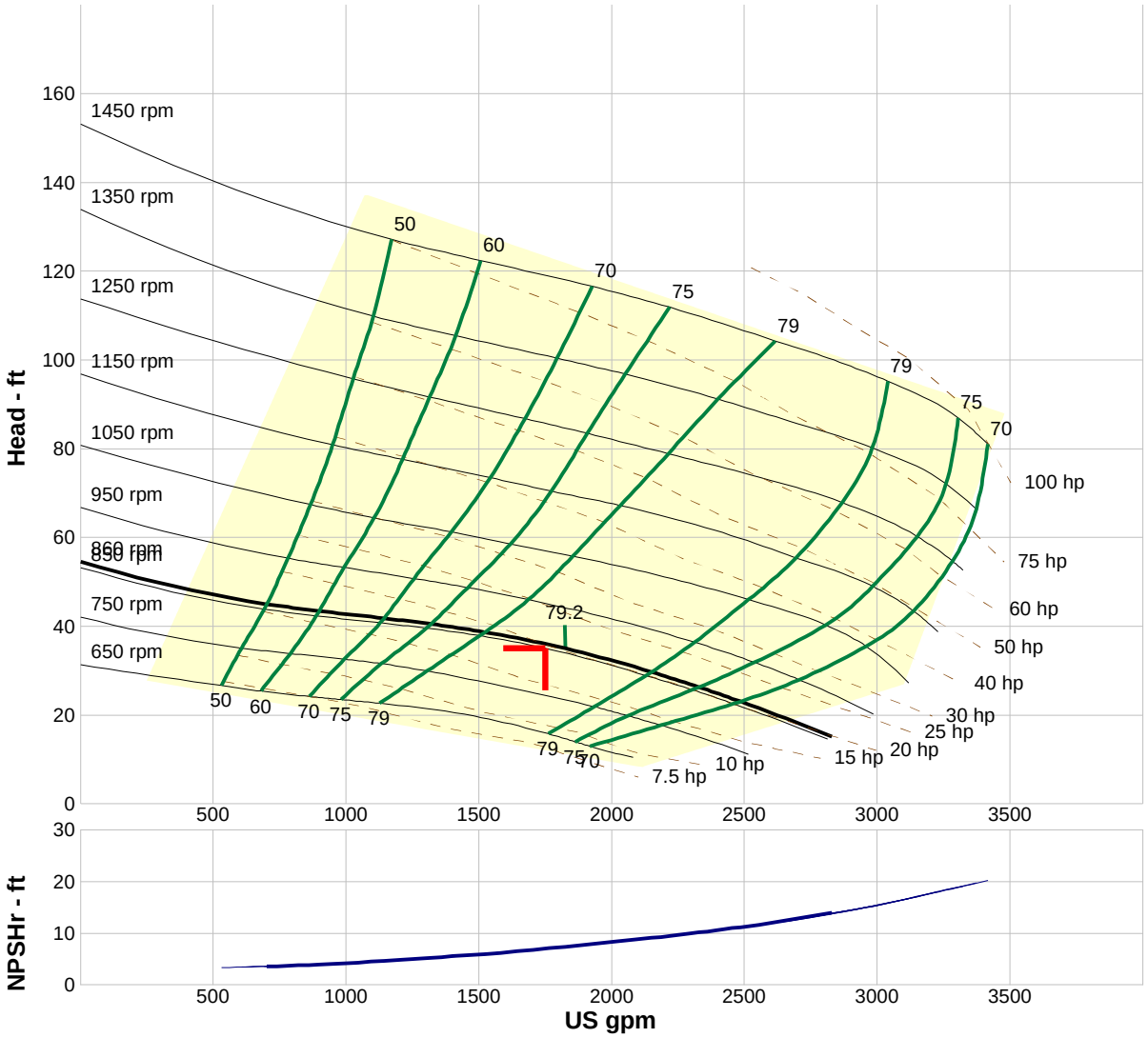
Shutoff head:	54.6 ft
Shutoff dP:	23.6 psi
Min flow:	---

BEP: 79% @ 1824 US gpm

NOL power:
20.7 hp @ 2483 US gpm

-- Max Curve --

Max power:
99.9 hp @ 3415 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
2100	860	30.5	79	20.4	8.86
1750	860	35.9	79	20	7.05
1400	860	39.8	77	18.3	5.57
1050	860	42.4	66	16.9	4.4
700	860	45	50	15.9	3.6

Project	**City of Howell master plan**
Customer pos.no	
Project ID	**S09**
Pos.no	
Created by	**Matt**

2009-10-07

Data sheet

Pump type KRT K 300-400/358XG-S

Operating data

Flow	4170	US g.p.m.	Fluid			
Head	35	ft	Density	62.3	lb/ft³	
Operating speed	875	rpm	Viscosity	1.08E-5	ft²/s	
Shaft power	44.8	hp	Temperature	68	°F	
Efficiency	82.4	%				
Required pump NPSH	10.8	ft				
Head H(Q=0)	60.1	ft				
Application range	Head		Flow			
From	47.4	ft	1950	US g.p.m.		
To	16.2	ft	6640	US g.p.m.		

Design

Make	KSB	Impeller type	Multi channel impeller		
Design	Submersible pump		Closed		
Series	KRT K	Impeller size	(392)	$15^{7}/_{16}$	inch
Frame size	300-400		Max. (408)	$16^{1}/_{16}$	inch
Stages	1		Min. (332)	$13^{1}/_{16}$	inch
Curve number	K41683/4	Free passage		$3^{15}/_{16}$	inch

Type of bearings	Antifriction	
Nos. of bearings	1 / 1	
Lubrication	Grease lubrication, lubricated for lifetime	
Suction port	Pressure rating	--
	Nominal pipe size	12"
	FlangeToSuit	--
Discharge port	Pressure rating	CLASS 125
	Nominal pipe size	12 inch
	FlangeToSuit	ASME/ANSI B16.1

Suction port: pump, discharge port: discharge elbow

Materials

Pump casing	Grey cast iron EN-JL1040 (A 48 Class 35)
Discharge cover	Grey cast iron EN-JL1040 (A 48 Class 35)
Impeller	Grey cast iron EN-JL1040 (A 48 Class 35)
Shaft	Stainless steel EN-1.4021+QT800 (A 276 Type 420)
Bearing bracket	Grey cast iron EN-JL1040 (A 48 Class 35)
Motor casing	Grey cast iron EN-JL1040 (A 48 Class 35)
Bolts, nuts	Stainless steel A4 (EN-1.4571) (A 276 Type 316)
Shaft protection sleeve	---
Casing wear ring	Grey cast iron EN-JL1030 (A 48 Class 30B)
Impeller wear ring	---
O-Rings	Nitrile rubber (NBR)

KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961

KSB Pumps Inc, 5885 Kennedy Road, Mississauga, Ontario L4Z 2G3 (Canada), Phone: (0905) 568-9200, Fax: (0905) 568-9120

KSB Aktiengesellschaft, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com

Data sheet

Pump type KRT K 300-400/358XG-S

Shaft seal

Type of seal	Double mechanical seal
Arrangement:	Tandem
Seal on medium side	with elastomer bellows
Mechanical seal, pump-side	Silicon carbide / Silicon carbide
Mechanical seal, bearing-side	Carbon / Silicon carbide

Monitoring

Thermal winding protection	By temperature sensitive switches
Explosion proof protection	---
Motor housing monitoring	By conductive moisture sensor electrode
Mechanical seal leakage detection	---
Bearing temperature monitoring	---

Coating

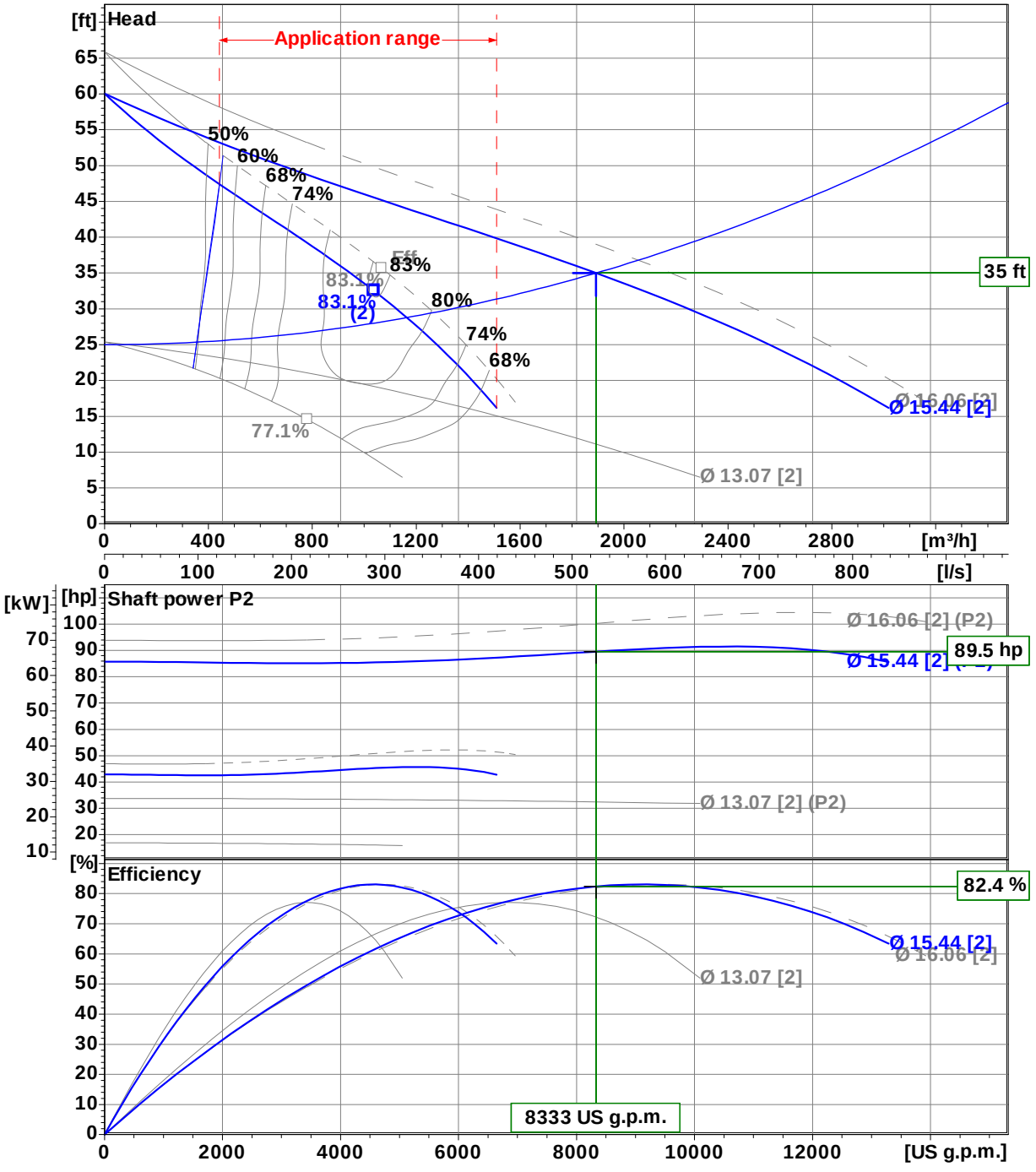
Preparatory treatment	Sa 2 1/2 to ISO 8501-1 / ISO 12 944-4 DIN 55928, Part 4
Blasting method	Steel grit blasting
Primer	Zinc phosphate or Zinc dust
Dry film thickness primer	> 35 microns
Top coat	2-component epoxy resin
Solids content	> 82 %
Dry film thickness top coat	> 150 microns
Colour	Ultramarine Blue (RAL 5002 to DIN 6174)

Installation

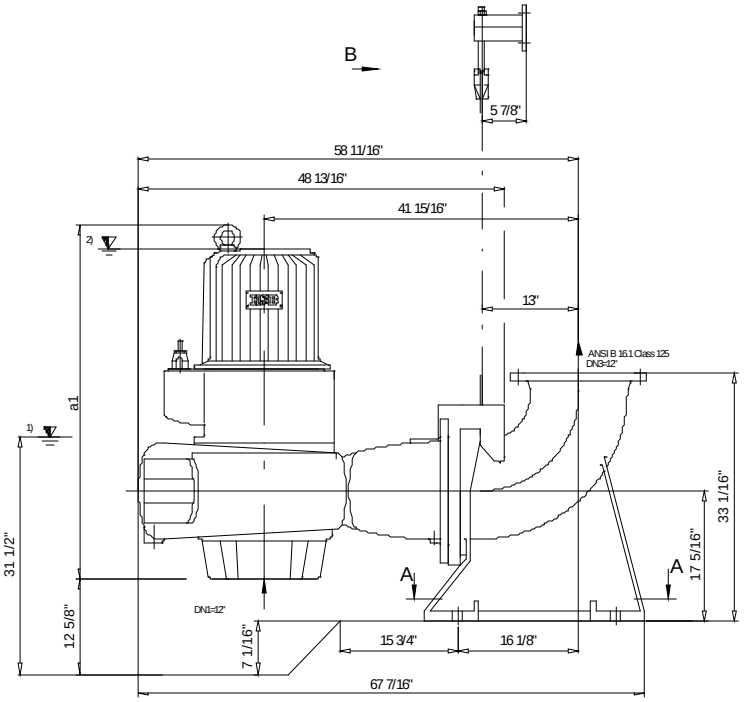
	INSTALLATION
Type of installation:	Wet well installation designed for automatic connection to a permanently installed discharge elbow
Discharge elbow size:	DN 12
Flange dimensions to:	ASME/ANSI B16.1, CLASS 125
Claw:	Bolted to the pump
Installation depth:	4,5 m (15 ft)
Guide system:	Double pre-stressed guides
Guide max. deviation:	+/- 5 degree from the vertical
Lifting device:	stainless steel lifting chain
Length of lifting device:	5 m (16 ft)
Lifting loops:	Every 2,5 m (8 ft)
Installation accessories:	Discharge elbow, fasteners, claw, bracket, lifting chain stainless steel guides
Materials:	
Discharge elbow:	Grey cast iron EN-JL1040 (A 48 Class 35)
Claw:	Grey cast iron EN-JL1040 (A 48 Class 35)
Bracket:	Galvanised steel EN-1.0038+Z (A 283 Grade B Galv.)
Guides:	Stainless steel EN-1.4401 (A276 Type 316)
Lifting device:	Stainless steel EN-1.4401 (A276 Type 316)

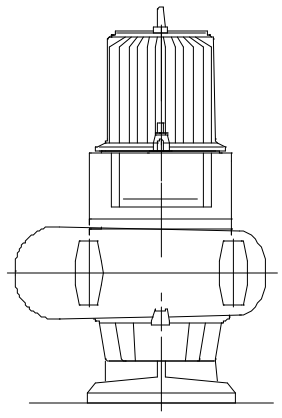
Performance curve

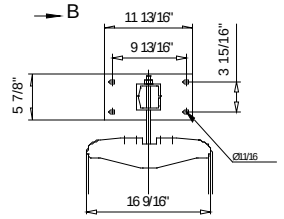
Pump type **KRT K 300-400/358XG-S**

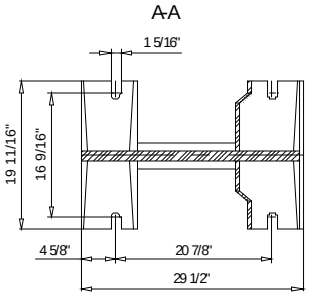


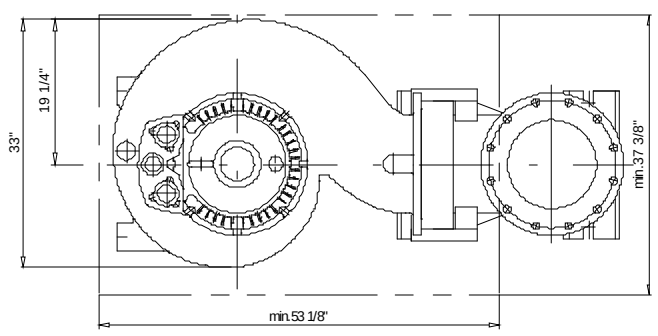
Impeller type	Multi channel impellers		Closed		Curve number	K41683/4
Free passage	$3^{15}/_{16}$"		Density	62.322 lb/ft³	Frequency	60 Hz
Impeller size	$15^{7}/_{16}$"	(392)	Viscosity	1.082E-5 ft²/s	Speed	875 1/min











Hydraulik Hydraulics Hydraulique	KSB-Motor KSB-Engine KSB-Moteur	a1 50 Hz mm	a1 60 Hz mm	a1 60 Hz inch	Gewicht/Weight/Poids G kg	G lbs	H kg	H lbs	C1, C2 kg	C1, C2 lbs
K	326	1200	1200	47 1/4	970	2140	1032	2277	1032	2277
	406	1200	1200	47 1/4	1000	2206	1058	2334	1058	2334
	506	1200	1200	47 1/4	1035	2284	1087	2398	1087	2398
	268	1200	1200	47 1/4	965	2129	1033	2279	1033	2279
	358	1200	1200	47 1/4	1035	2284	1068	2356	1068	2356

NUR FÜR ANFRAGE/ANGEBOT
technische Änderungen vorbehalten

FOR INQUIRY/OFFER ONLY
technical modifications reserved

SEULEMENT POUR LES DEMANDES/LES OFFRES
sous réserve de modifications technique

1)Tiefster Ausschaltpunkt bei Automatikbetrieb
1)Lowest shut-off point for automatic operation
1)Point d'arrêt le plus bas en service automatique

2)Mindestüberdeckung bei Dauerbetrieb
2)Minimums submergence for continuous operation
2)Recouvrement minimal pour service continu

Zeichnungs-Nr./Drawing No./N° Plan

Betreiber-Nr./Customer No./N° Client

Maßstab/Scale/Echelle 1:10 A2

2006-10-04 Datum/Date | H 331 Name/Nom | 0 Änderung/Revision Modification

KSB Auftrags-Nr./KSB Order No./N° commande KSB

Baureihe-Größe/Type-Size KRT 300-400/506

KSB Werk-Nr./KSB Work No./N° de fabrication KSB

stationäre Aufstellung
stationary installation
installation stationnaire

Bitte grundsätzlich bei Schriftverkehr angeben / Should always be stated in correspondence / A indiquer dans toute correspondance

Postfach 20 07 43
KSB Aktiengesellschaft D-06008 Halle (Saale)
Geschäftsbereich Pumpen Tunnicliffe 92-100
Wasserwirtschaftstechnik D-06110 Halle (Saale)
Tel.: (03 45) 48 26-0
Fax: (03 45) 48 26 46 99
Telex:0182284 ksbha.

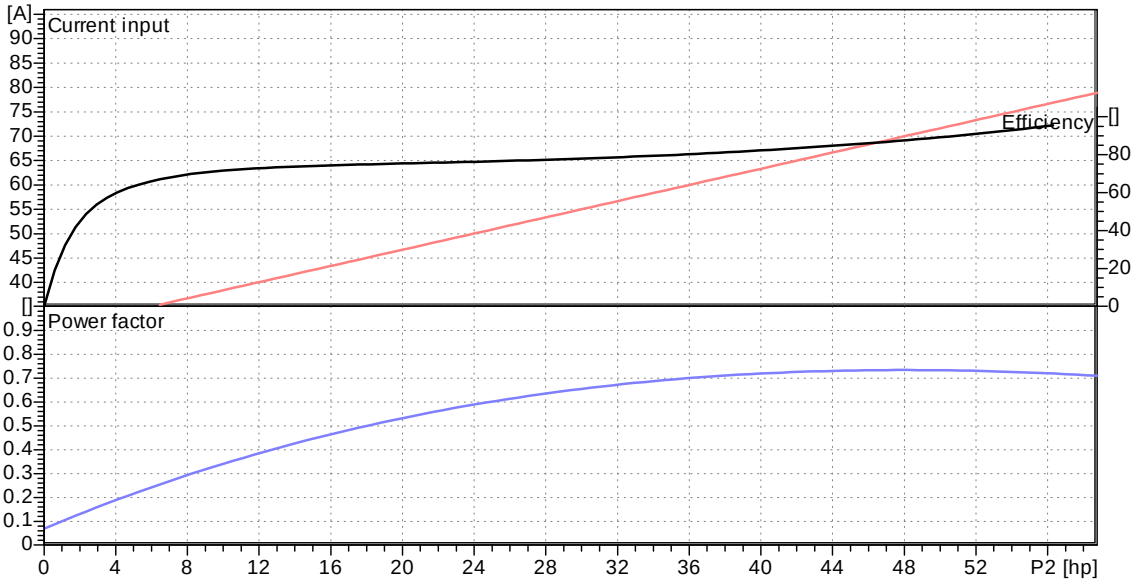
Data sheet: Motor data

Motor type 358XG

Motor manufacturer	KSB Aktiengesellschaft	Rated voltage	460	V
Design acc. standard	-	Rated frequency	60	Hz
Service factor	1.15	Rated power P2	47	hp
Degree of protection	IP68	Rated current	66.9	A
Insulation class	F	Nominal speed	875	rpm
Starting mode	Direct	NEMA code letter	D	
No. starts / h	20	Starting to rated current	3.6	
Coolant temperature	< / = 40 °C (104 °F)	Starting current	241	A
Motor casing	Grey cast iron EN-JL1040 (A 48 Class 35)			
Explosion protection	Class I, Div. 1, Groups C,D, T3			
Pump type	KRT K 300-400/358XG-S			

Load	P1 kW	P2 hp	eta %	cos phi	I A
4/4	40.39	47.0	86.8	0.73	69.1
3/4	32.88	35.3	79.9	0.7	59.4
2/4	23.01	23.5	76.1	0.58	49.6
1/4	12.05	11.8	72.7	0.38	39.9

Main cable	2 x AWG 7-4	Diameter	0.87..0.98 inch
Control cable	1 x AWG 13-12	Diameter	0.89..0.98 inch
Cable, outer sheath	Waterproof synthetic rubber compound		
Cable length	10 m		



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Project	**City of Howell master plan**
Customer pos.no	
Project ID	**S09**
Pos.no	
Created by	**Matt**

2009-10-07

Data sheet

Pump type KRT K 150-315/206XG-S

Operating data

Flow	1720	US g.p.m.	Fluid			
Head	34.8	ft	Density	62.3	lb/ft³	
Operating speed	1160	rpm	Viscosity	1.08E-5	ft²/s	
Shaft power	19.9	hp	Temperature	68	°F	
Efficiency	76.2	%				
Required pump NPSH	20.9	ft				
Head H(Q=0)	72.9	ft				

Application range	Head		Flow	
From	61.3	ft	396	US g.p.m.
To	24.4	ft	2010	US g.p.m.

Design

Make	KSB	Impeller type	Multi channel impeller		
Design	Submersible pump		Closed		
Series	KRT K	Impeller size	(310)	$12^{3}/_{16}$	inch
Frame size	150-315		Max. (310)	$12^{3}/_{16}$	inch
Stages	1		Min. (235)	$9^{1}/_{4}$	inch
Curve number	K42579/1	Free passage		3	inch

Type of bearings	Antifriction	
Nos. of bearings	1 / 1	
Lubrication	Grease lubrication, lubricated for lifetime	
Suction port	Pressure rating	--
	Nominal pipe size	6"
	FlangeToSuit	--
Discharge port	Pressure rating	CLASS 125
	Nominal pipe size	6 inch RF
	FlangeToSuit	ASME/ANSI B16.1

Suction port: pump, discharge port: discharge elbow

Materials

Pump casing	Grey cast iron EN-JL1040 (A 48 Class 35)
Discharge cover	Grey cast iron EN-JL1040 (A 48 Class 35)
Impeller	Grey cast iron EN-JL1040 (A 48 Class 35)
Shaft	Stainless steel EN-1.4021+QT800 (A 276 Type 420)
Bearing bracket	Grey cast iron EN-JL1040 (A 48 Class 35)
Motor casing	Grey cast iron EN-JL1040 (A 48 Class 35)
Bolts, nuts	Stainless steel A4 (EN-1.4571) (A 276 Type 316)
Shaft protection sleeve	---
Casing wear ring	Grey cast iron EN-JL1030 (A 48 Class 30B)
Impeller wear ring	---
O-Rings	Nitrile rubber (NBR)

KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961

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Data sheet

Pump type KRT K 150-315/206XG-S

Shaft seal

Type of seal	Double mechanical seal
Arrangement:	Tandem
Seal on medium side	with elastomer bellows
Mechanical seal, pump-side	Silicon carbide / Silicon carbide
Mechanical seal, bearing-side	Carbon / Silicon carbide

Monitoring

Thermal winding protection	By temperature sensitive switches
Explosion proof protection	---
Motor housing monitoring	By conductive moisture sensor electrode
Mechanical seal leakage detection	---
Bearing temperature monitoring	---

Coating

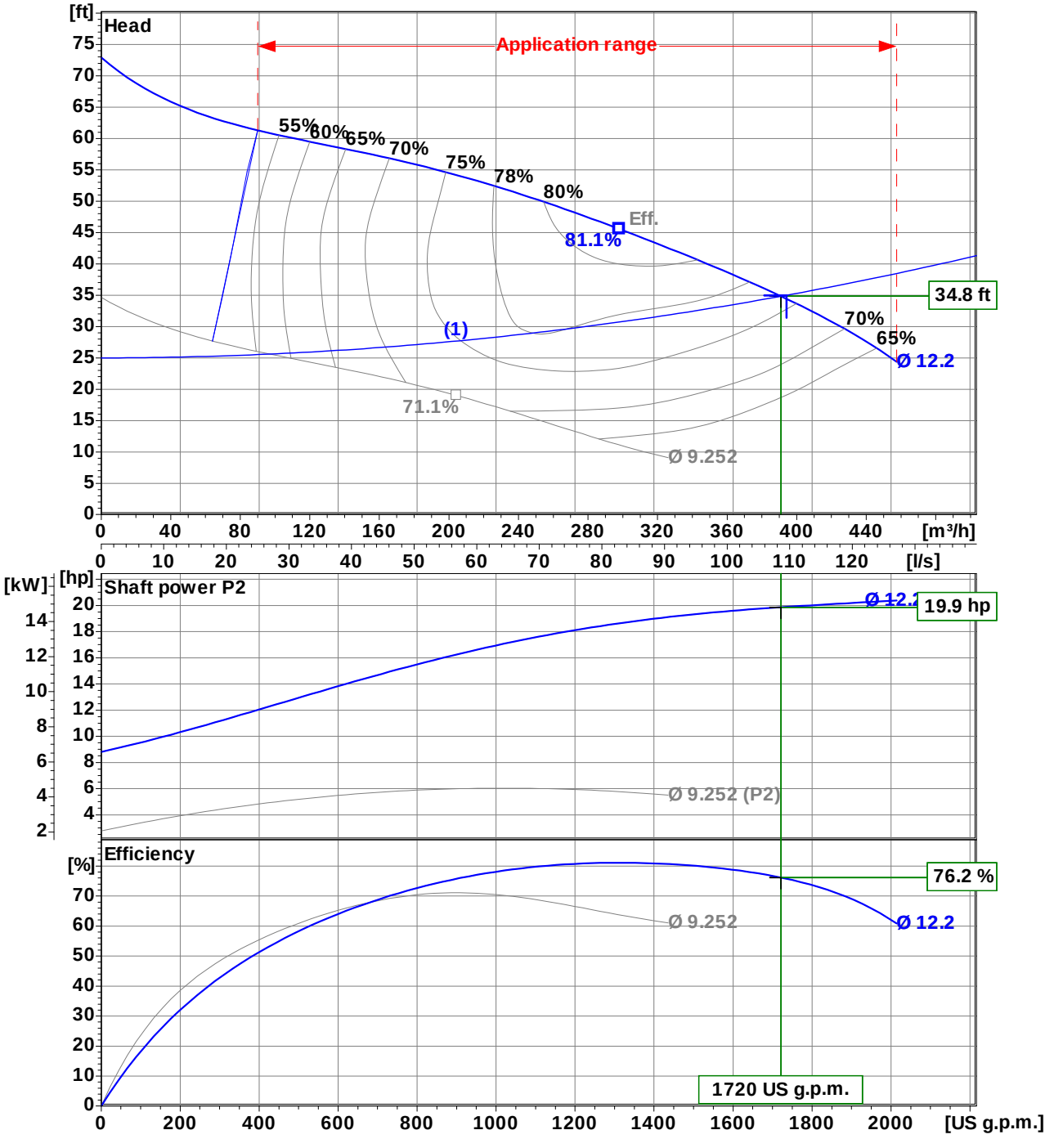
Preparatory treatment	Sa 2 1/2 to ISO 8501-1 / ISO 12 944-4 DIN 55928, Part 4
Blasting method	Steel grit blasting
Primer	Zinc phosphate or Zinc dust
Dry film thickness primer	> 35 microns
Top coat	2-component epoxy resin
Solids content	> 82 %
Dry film thickness top coat	> 150 microns
Colour	Ultramarine Blue (RAL 5002 to DIN 6174)

Installation

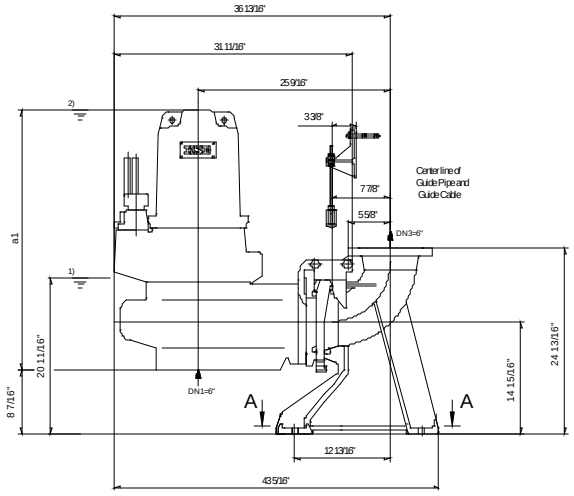
	INSTALLATION
Type of installation:	Wet well installation designed for automatic connection to a permanently installed discharge elbow
Discharge elbow size:	DN 6 RF
Flange dimensions to:	ASME/ANSI B16.1, CLASS 125
Claw:	Bolted to the pump
Installation depth:	4,5 m (15 ft)
Guide system:	Double pre-stressed guides
Guide max. deviation:	+/- 5 degree from the vertical
Lifting device:	galvanised lifting chain
Length of lifting device:	5 m (16 ft)
Installation accessories:	Discharge elbow, fasteners, claw, bracket, lifting chain stainless steel guides
Materials:	
Discharge elbow:	Grey cast iron EN-JL1040 (A 48 Class 35)
Claw:	Grey cast iron EN-JL1040 (A 48 Class 35)
Bracket:	Stainless steel EN-1.4571 (A 276 Type 316)
Guides:	Stainless steel EN-1.4401 (A276 Type 316)
Lifting device:	Galvanised steel EN-1.0038+Z (A 283 Grade B Galv.)

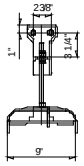
Performance curve

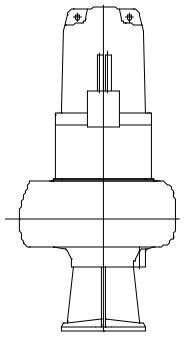
Pump type **KRT K 150-315/206XG-S**



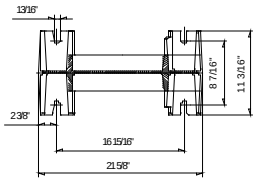
Impeller type	Multi channel impeller		Density	62.322 lb/ft³	Curve number	K42579/1
Free passage	3"		Viscosity	1.082E-5 ft²/s	Frequency	60 Hz
Impeller size	12 3/16"	(310)			Speed	1160 1/min



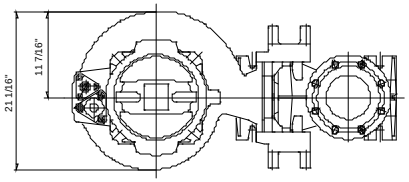




A- A



Hydraulik Hydraulics Hydraulique	KSB-Motor KSB-Engine KSB-Moteur	a1		Gewicht / Weight / Poids Material version/variant G	
		mm	inch	kg	lbs
F,K	206	878,5	34 10/16	317	699



NUR FÜR ANFRAGE/ANGEBOT
technische Änderungen vorbehalten

FOR INQUIRY/OFFER ONLY
technical modifications reserved

SEULEMENT POUR LES DEMANDES/LES OFFRES
sous réserve de modifications technique

1)Tiefster Ausschaltpunkt bei Automatikbetrieb
1)Lowest shut-off point for automatic operation
1)Point d'arrêt le plus bas en service automatique

2)Mindestüberdeckung bei Dauerbetrieb
2)Minimum submergence for continuous operation
2)Recouvrement minimal pour service continu

Zeichnungs-Nr./Drawing No./N° Plan				Betreiber-Nr./Customer No./N° Client
	2005-08-04	Paula	1	
Maßstab/Scale/Echelle 1:10 A2	2005-06-06	Paula	0	KSB Auftrags-Nr./KSB Order No./N° commande KSB
	Datum/Date	Name/Nom	Änderung/Revision Modification	
	Baureihe-Größe/Type-Size KRTFK 150-315			KSB Werk-Nr./KSB Work No./N° de fabrication KSB
	stationäre Aufstellung stationary installation installation stationnaire			

Bitte grundsätzlich bei Schriftverkehr angeben / Should always be stated in comespondence / A indiquer dans toute comespondance

KSB Aktiengesellschaft
Geschäftsbereich Pumpen Turmstraße 92-100
Wasserwirtschaftstechnik D-06110 Halle (Saale)

Postfach 20 07 43
D-06008 Halle (Saale)

Tel.: (03 45) 48 26-0
Fax: (03 45) 48 26 46 99
Telex 0181284 ksbha.

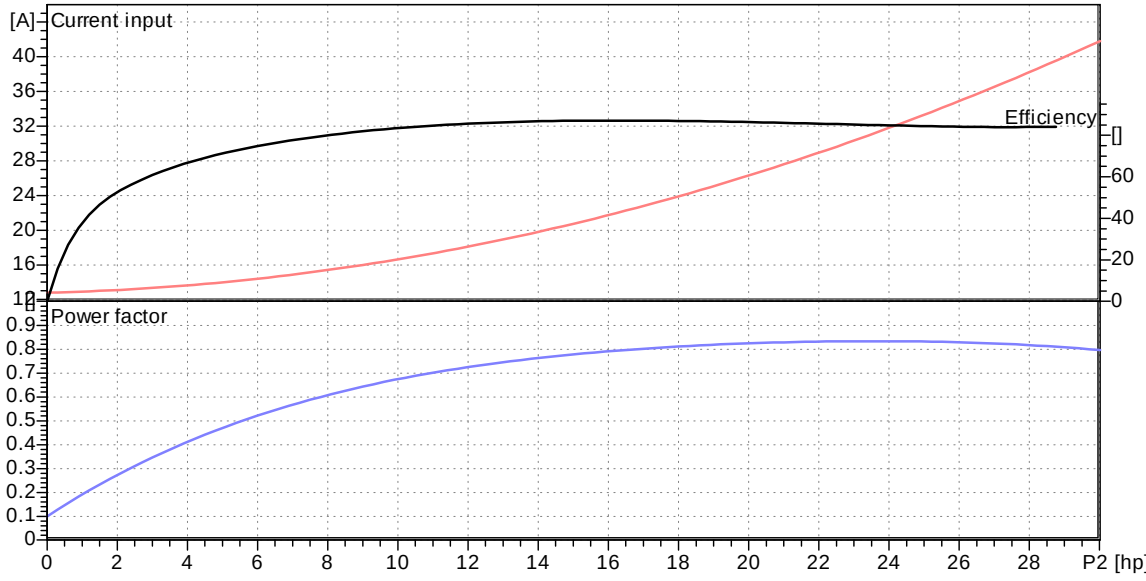
Data sheet: Motor data

Motor type **206XG**

Motor manufacturer	KSB Aktiengesellschaft	Rated voltage	460	V
Design acc. standard	-	Rated frequency	60	Hz
Service factor	1.15	Rated power P2	24	hp
Degree of protection	IP68	Rated current	31.5	A
Insulation class	F	Nominal speed	1160	rpm
Starting mode	Direct	NEMA code letter	F	
No. starts / h	20	Starting to rated current	5.3	
Coolant temperature	< / = 40 °C (104 °F)	Starting current	167	A
Motor casing	Grey cast iron EN-JL1040 (A 48 Class 35)			
Explosion protection	Class I, Div. 1, Groups C,D, T3			
Pump type	KRT K 150-315/206XG-S			

Load	P1 kW	P2 hp	eta %	cos phi	I A
4/4	21.11	24.0	84.8	0.83	31.8
3/4	15.45	18.0	86.9	0.81	23.9
2/4	10.46	12.0	85.6	0.72	18.1
1/4	5.98	6.0	74.8	0.52	14.4

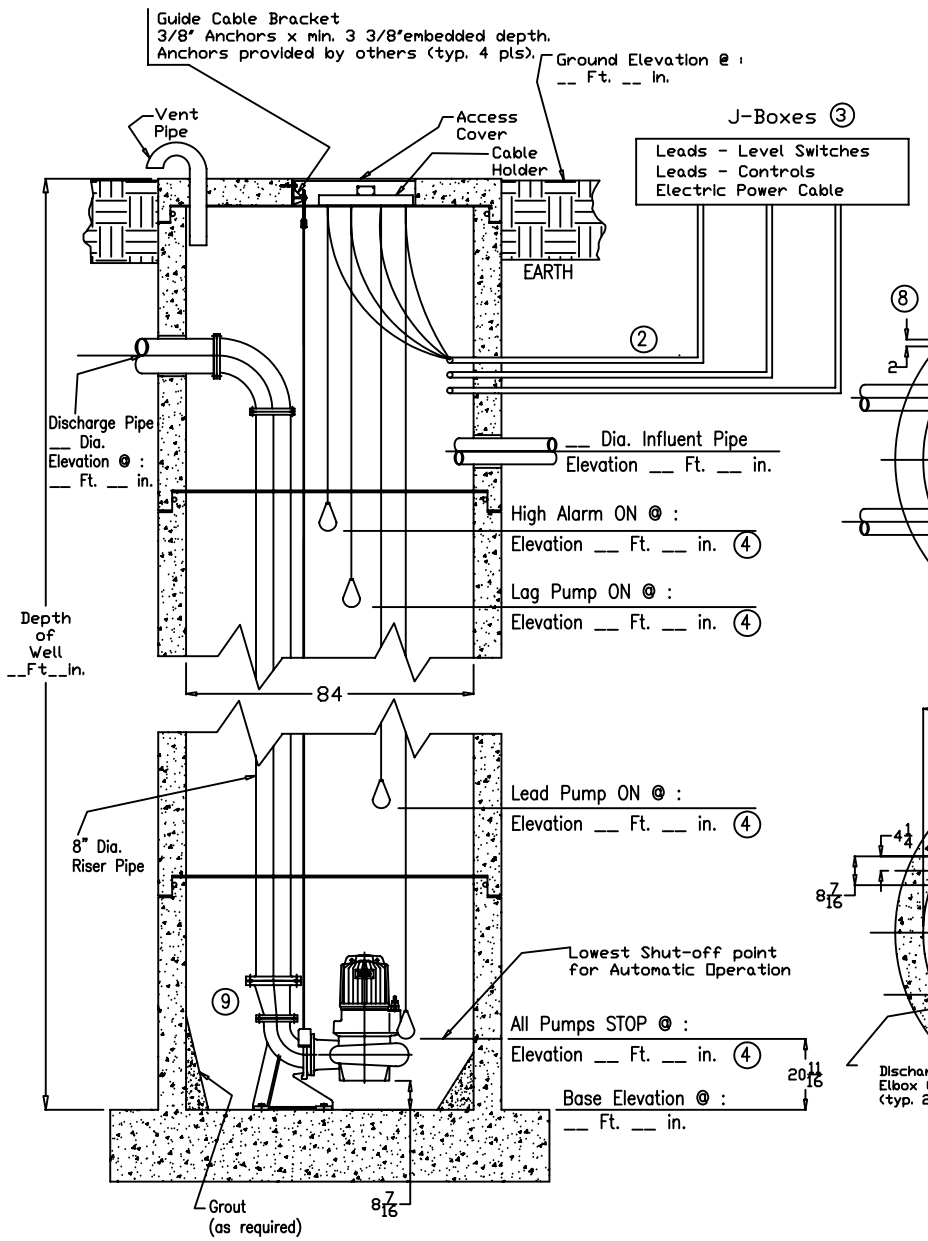
Main cable	1 x AWG 11-7+15-5	Diameter	0.97..1.09 inch
Control cable	---	Diameter	
Cable, outer sheath	Waterproof synthetic rubber compound		
Cable length	10 m		

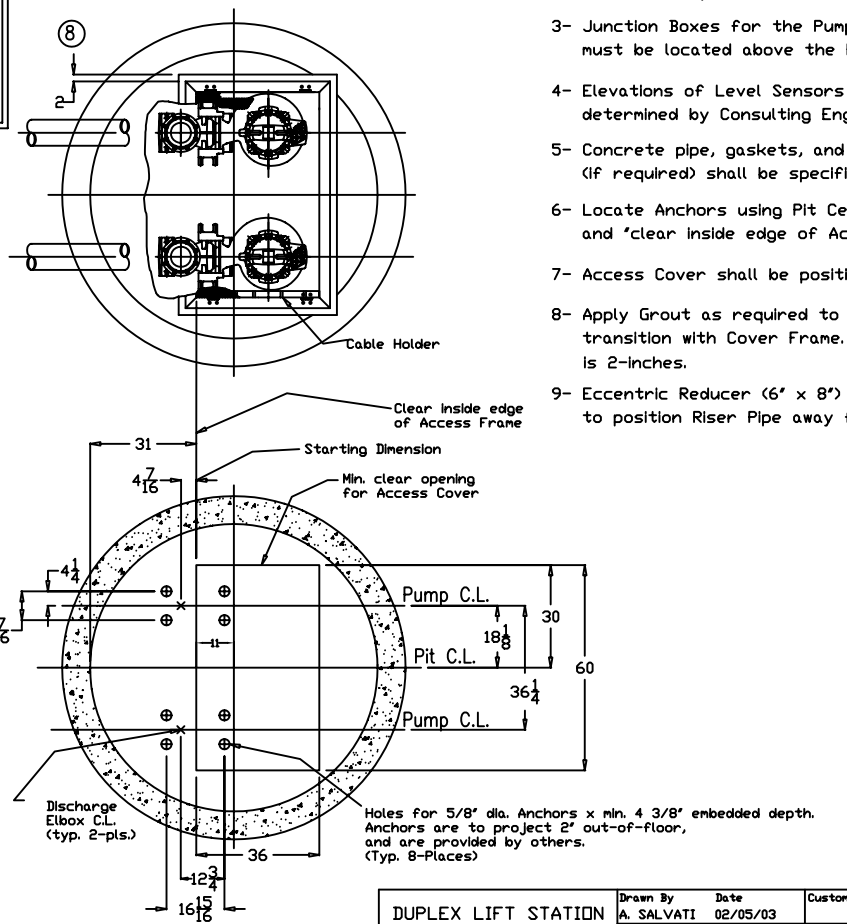


KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961

KSB Pumps Inc, 5885 Kennedy Road, Mississauga, Ontario L4Z 2G3 (Canada), Phone: (0905) 568-9200, Fax: (0905) 568-9120

KSB Aktiengesellschaft, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com





NOTES:

1- Configuration and dims. shown are suggested requirements only. All details, including sizing of pit, type, location, and arrangement of valves and piping etc. are to be specified by the Consulting Engineer.

2- Conduit size and quantity, for Power Cable leads, Controls, adn Float Level Sensors thru Pit wall, shall be determined by Others.

3- Junction Boxes for the Pumps' Power Cables must be located above the Flood Elevation.

4- Elevations of Level Sensors shall be determined by Consulting Engineer.

5- Concrete pipe, gaskets, and manhole steps (if required) shall be specified by Others.

6- Locate Anchors using Pit Centerline, and and "clear inside edge of Access Frame".

7- Access Cover shall be positioned as shown.

8- Apply Grout as required to achieve smooth transition with Cover Frame. Typical width is is 2-inches.

9- Eccentric Reducer (6" x 8") shall be installed to position Riser Pipe away from Guide Cable.

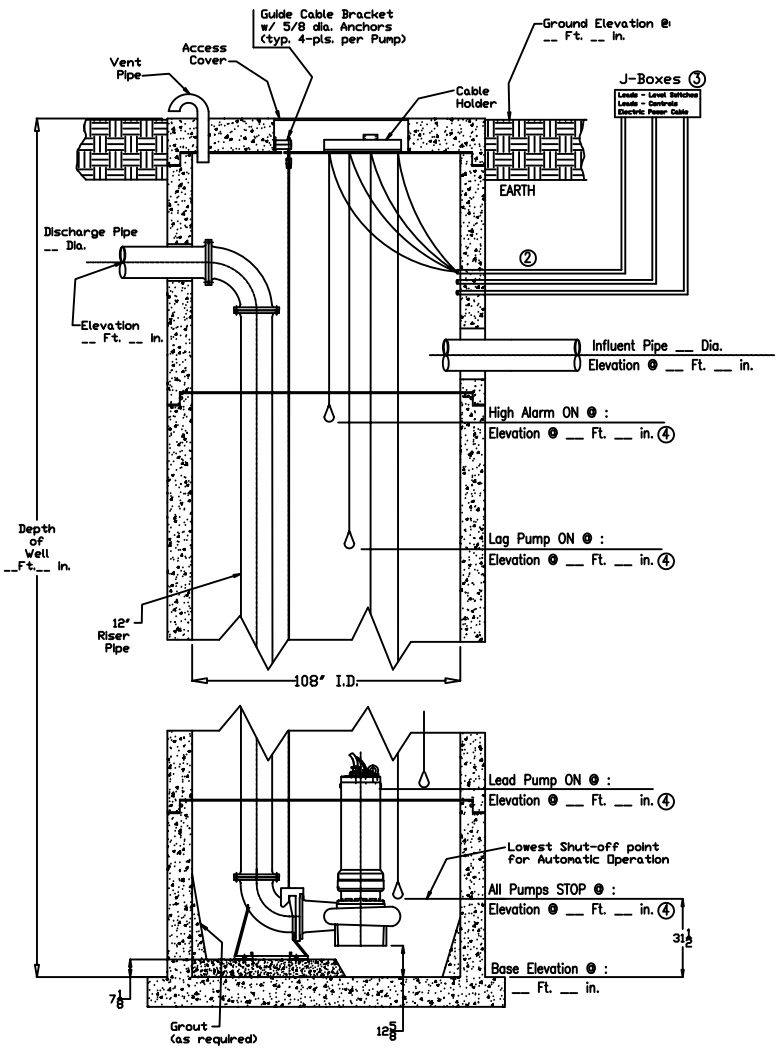
NOTE: All dimensions are in inches.
Pump Ref. Dwg.: KRT 150-315/266

DUPLEX LIFT STATION
84" I.D. PIT with KRT 150-315 PUMPS and Guide Cables

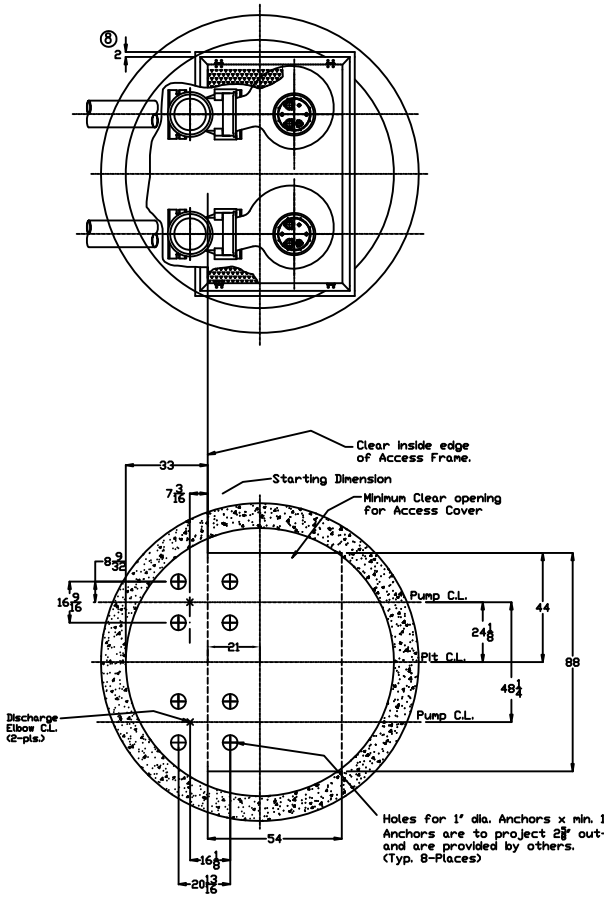
Drawn By: A. SALVATI	Date: 02/05/03	Customer PO No.
Approved By: M.S.S.	Date: 07/9/06	Project
SERIAL NO.		KSB Order NO.
Equipment Type: Submersible Pumps		KSB Drawing No.: 2023
Drawing Title: Duplex Lift Station (Cables), KRT 150-315, 84" Pit		REV. NO.: 1

KSB, Inc. 4415 Sarellen Road Richmond, Va. 23231 Tel: 804-222-1818 Fax: 804-226-6961

ELEVATION



TOP VIEW



BASE SECTION

NOTES:

1- Configuration and dims. shown are suggested requirements only. All details, including sizing of pit, type, location, and arrangement of valves and piping etc. are to be specified by the Consulting Engineer.

2- Conduit size and quantity, for Power Cable leads, Controls, adn Float Level Sensors thru Pit wall, shall be determined by Others.

3- Junction Boxes for the Pumps' Power Cables must be located above the Flood Elevation.

4- Elevations of Level Sensors shall be determined by Consulting Engineer.

5- Concrete pipe, gaskets, and manhole steps (if required) shall be specified by Others.

6- Locate Anchors using Pit Centerline, and and "clear inside edge of Access Frame".

7- Access Cover shall be positioned as shown.

8- Apply Grout as required to achieve smooth transition with Cover Frame. Typical width is is 2-inches.

NOTE: All dimensions are in inches.
Pump Ref. Dwg.: KRT 300-400/1006 (old 300-380)
Pump Ref. Dwg.: KRT 300-401/1006 (old 300-381)

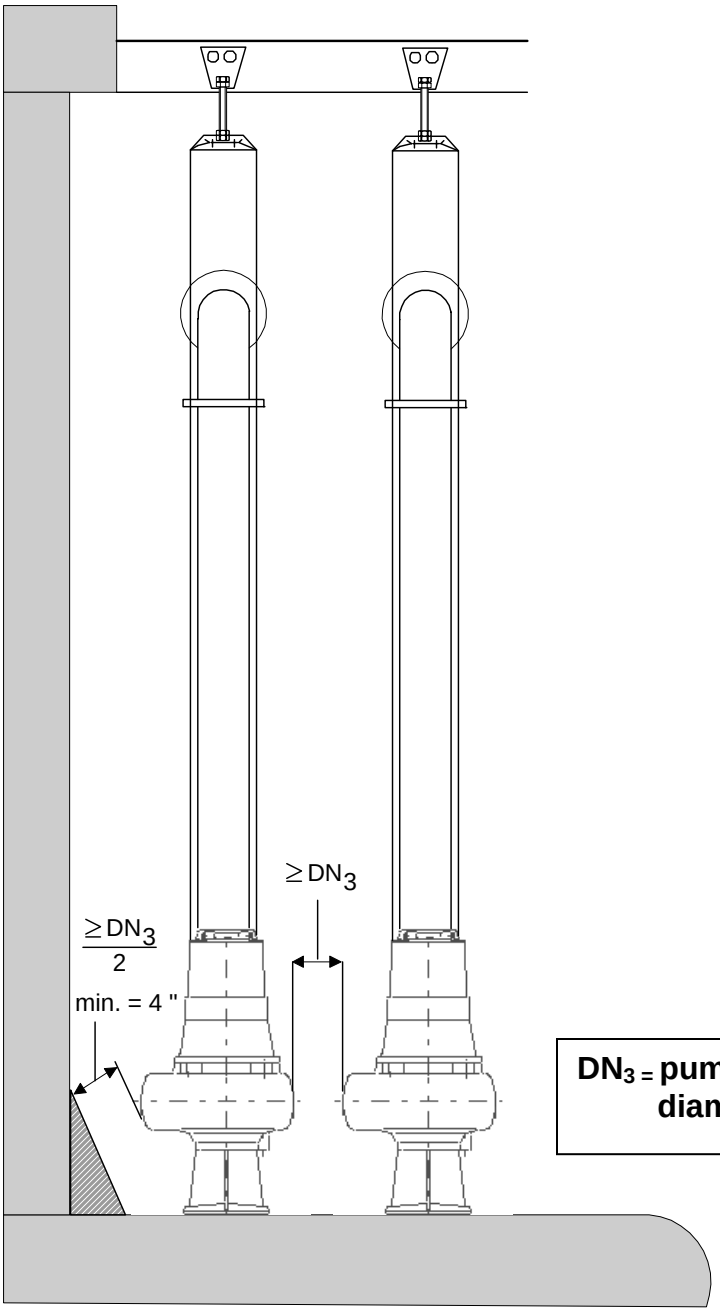
DUPLEX LIFT STATION
108" I.D. PIT with KRT 300-380/381 PUMPS and Guide Cables

KSB

Drawn By: A. SALVATI	Date: 02/18/03	Customer PO No.
Approved By: M.S.S.	Date: 08/03/06	Project
SERIAL NO.		KSB Order NO.
Equipment Type: Submersible Pumps		KSB Drawing No.: 2042
Drawing Title: Duplex Lift Station (Cables), KRT 300-380/381, 108" Pit		REV. NO.: 1

KSB, Inc.
4415 Sarellen Road
Richmond, Va. 23231
Fax: 804-222-1818
Fax: 804-226-6961

Lift Station Design

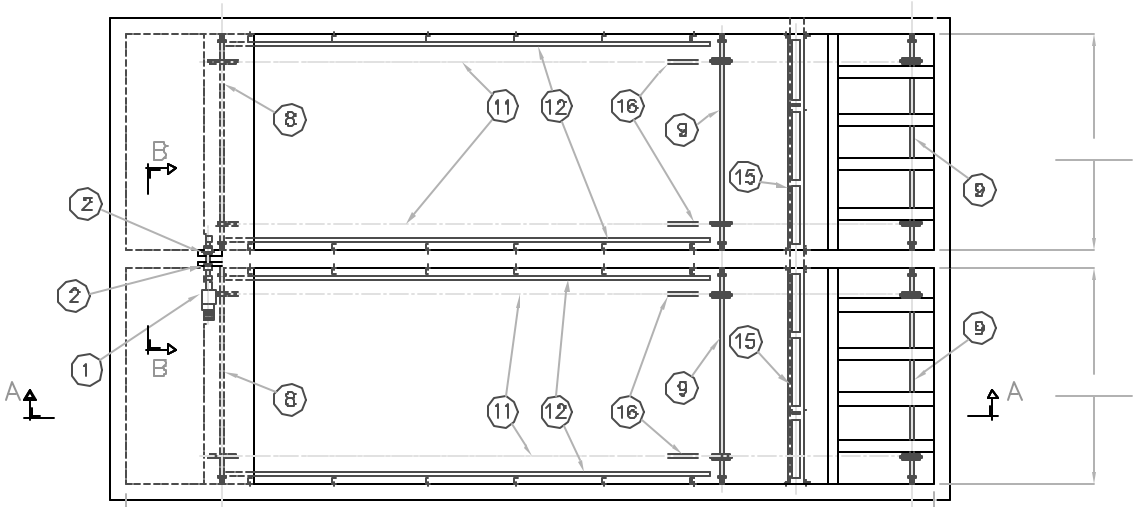


DN_3 = pump discharge diameter in inches.

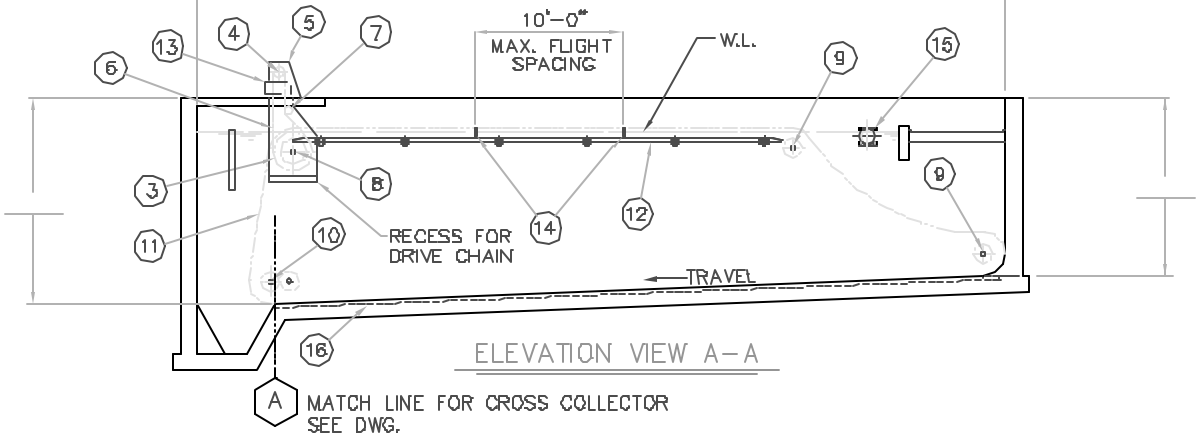
Minimum distances for duplex or multiple pump installations

NOMENCLATURE

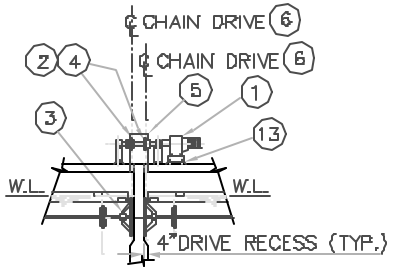
1. DRIVE UNIT
2. DRIVE SPROCKET
3. DRIVEN SPROCKET
4. OVERLOAD DEVICE
5. GUARD
6. DRIVE CHAIN
7. DRIVE CHAIN TIGHTENER
8. HEAD SHAFT
9. IDLER SHAFT
10. TAKEUP SHAFT
11. COLLECTOR CHAIN
12. RETURN RAIL w/BRACKETS
13. DRIVE BASE
14. FLIGHTS w/WEAR SHOES
15. SCUM SKIMMER PIPE
16. FLOOR RAIL



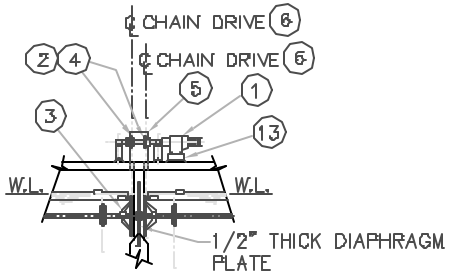
PLAN VIEW



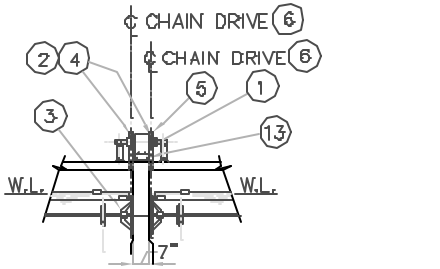
ELEVATION VIEW A-A



SECTION B-B



SECTION B-B (ALTERNATE NO. 1)
12" OR LESS CENTER WALL



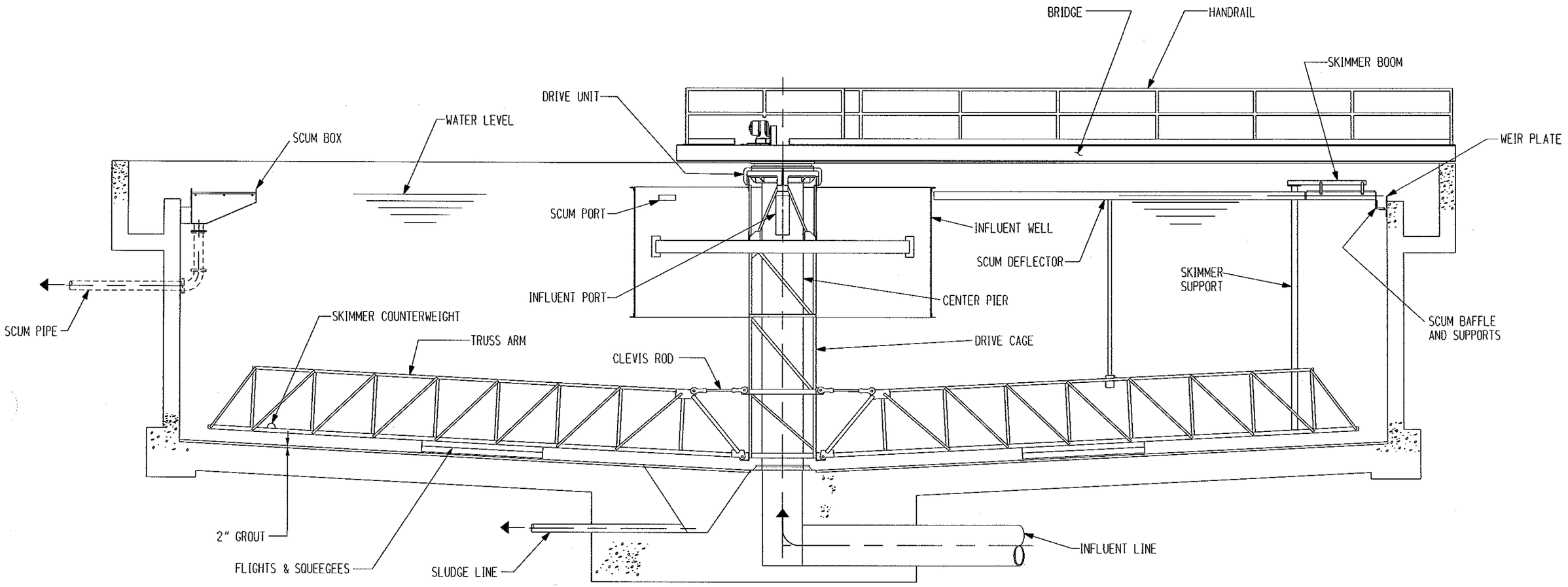
SECTION B-B (ALTERNATE NO. 2)
16" MIN. CENTER WALL

Walker Process Equipment
Division of McNish Corporation

Dedicated to the Water and Wastewater Industry

RECTANGULAR COLLECTOR
TYPE CRF
(WITH SKIMMING)
(DOUBLE TANK)

Cad File: 6081-200	Drg. No. 6081-200
Rev. 11/99	Side



SECTIONAL ELEVATION

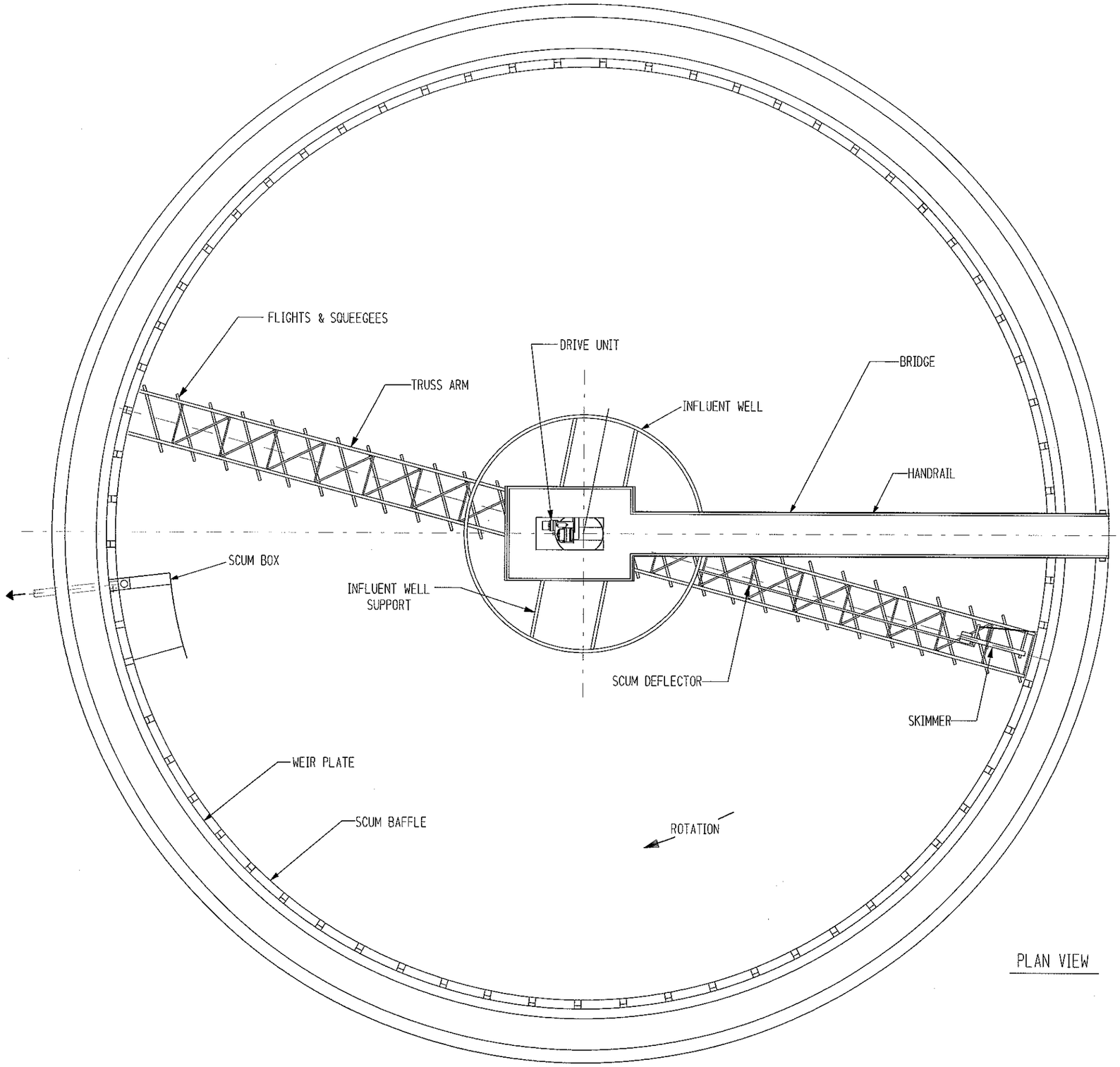
WALKER PROCESS EQUIPMENT

RSP

CIRCULAR COLLECTOR

Division of McNish Corporation
Dedicated to the
Water and Wastewater
Industry

Class 6093	
CAD DRG P1166	



PLAN VIEW

WALKER PROCESS EQUIPMENT

RSP

CIRCULAR COLLECTOR

Division of McNish Corporation
Dedicated to the
Water and Wastewater
Industry

Class 6093	
CAD DRG P1167	

From: Barry Simescu [Barry@DuboisCooper.com]
Sent: Monday, August 10, 2009 8:46 AM
To: Benoit Dennis J.
Cc: Sales; Dan Harker
Subject: FW: Howell
Attachments: image001.gif; image002.gif; Rectangular Chain_Flight Collectors.pdf; 2-60' Primary Collectors.pdf; 4-55' Final Collectors.pdf

Dennis
Here are the budget numbers you requested from Walker Process. Let me know if you need anything else.
Barry

From: Dan Harker [mailto:dharker@walker-process.com]
Sent: Friday, August 07, 2009 12:24 PM
To: Barry Simescu
Cc: Sales
Subject: RE: Howell

Barry,
Budget prices for the following equipment are below and I have attached some general assembly drawings that illustrate what each looks like.
Two (2) 60’ primary collector mechanisms type RSP ~ $200,000 - $215,000
Four (4) 55’ secondary collector mechanisms type RSMTP ~ $375,000 - $390,000
Four (4) 20’ x 88.5’ Rectangular Collector mechanisms ~ 160,000 - $180,000.

Dan Harker
Walker Process Equipment
Division of McNish Corporation
File No. 06-S-008

-----Original Message-----
From: Barry Simescu [mailto:Barry@DuboisCooper.com]
Sent: Monday, August 03, 2009 1:58 PM
To: Dan Harker
Cc: Sales
Subject: FW: Howell

Dan
Can you work up sizing and estimates for the primaries and finals per the attached request from Dennis?
Thanks
Barry

From: Benoit Dennis J. [mailto:dbenoit@hrc-engr.com]
Sent: Monday, August 03, 2009 2:51 PM
To: Barry Simescu
Subject: Howell

Barry

Howell WWTP
Howell, MI
HRC

Objective: Recommend mixers for mixing of 8 separate and equally sized anoxic zones.

Design Data:

TSS	=	0.5 %
Quantity	=	8
Length	=	24.33 ft
Width	=	22 ft
Water Depth	=	15.33 ft
Volume	=	0.0614 MG
Material	=	concrete

Scope:

Recommend mixers for mixing of 8 separate and equally sized anoxic zones.

Calculations:

Power Requirement

A mixing level of 30 HP/MG is recommended to provide complete mix conditions.

Power	=	30 HP/MG x 0.0614 MG
	=	2 HP

Recommendation:

Recommend total of eight (8) - 3 HP FSS AquaDDM mixers with 3 point cable mooring on each to mix the anoxic zones.

DRH

From: Randy Hamlett [randyh@hamlettenvironmental.com]
Sent: Friday, August 07, 2009 8:40 AM
To: Benoit Dennis J.
Subject: FW: Howell WWTP, MI - 105687B/25300
Attachments: HowellWWTPMIMixing.pdf

Hi Dennis,

Hope your week has gone well. Please see the attached Mixer information from Aqua-Aerobic and let me know if you have any questions. As indicated below, the budget price is $ 82,000. Have a great weekend.

Randy Hamlett

From: Dennis Holder [mailto:DHolder@aqua-aerobic.com]
Sent: Wednesday, August 05, 2009 12:57 PM
To: Randy Hamlett (Randy Hamlett)
Cc: Cynthia Borcherts; Steve Schupbach
Subject: Howell WWTP, MI - 105687B/25300

Randy,

I have attached the design recommendation for using 8-3hp FSS AquaDDM mixers for anoxic mixing. For estimating purposes use total of $82K for the mixers including mooring cables, clips, thimbles, power cables w/ ties, estimated freight and startup. Not included are any controls, wall anchors/eyes or taxes.

Denny

From: Marsha Elliott
Sent: Tuesday, August 04, 2009 12:04 PM
To: Dennis Holder; Cynthia Borcherts
Subject: FW: Howell, MI

Denny/Cynthia,

FYI, Mixer request. MO# 105687

Marsha

From: Randy Hamlett [mailto:randyh@hamlettenvironmental.com]
Sent: Monday, August 03, 2009 3:26 PM
To: Marsha Elliott
Cc: Bernie Eiswert
Subject: FW: Howell

Hi Marsha,

Please see the below request and provide budgetary recommendations for Mixers, AquaDisk and ABF package and concrete filtering units. Please note the requested response time of 2-weeks and

Mixer design INVENT HYPERCLASSIC® *evolution 6*

18.06.2009

Offer Number:	**AN0906057-HCM-rev00**
Project:	**Howell, MI**

Medium		
Type	activated sludge	
Sludge Volume Index	80	ml/g
Dried Solids Content	5,000	ppm

Basin		
Type	rectangular	
Length	24.0	ft
Width	22.0	ft
Water Depth	17.0	ft
Freeboard	3.0	ft
Basin Area	528	ft^2
Basin Volume	0.067	Mgal
Number of Basins	16	-
Number of Mixer Rows	1	-
Number of Mixers per Row	1	-
Total Number of Mixers	16	-

Mixer		
Type	HCM/2000-24-2.0hp	
Rib type	*evolution 6*	
Diameter	78.7	in
Rotational Speed	24	rpm
Rated Motor Power	2.0	hp
Shaft Power	1.3	hp
Power Consumption	1.7	hp
Power Density	0.14	hp/1000 ft^3
Mixing Intensity	59	s^{-1}
Bottom Velocity	1.0	ft/s
Average Bottom Velocity	2.0	ft/s
Mixer Flow Rate	6,440	ft^3/min
Service Factor	3.6	-
Bottom Distance	15.7	in
Mixer Weight	690	lb
Shaft Diameter 304	4.5	in
Shaft Length	200.0	in
Flange Diameter Gearbox	11.8	in
Hollow Shaft Diameter	2.0	in
Rated Torque	5,400	lb-in
Start-up Torque	17,620	lb-in
Static Axial Force	690	lb
Dynamic Axial Force	410	lb
Rated Current	3.1	A
Start-up Current	21.5	A
Power Reserve	35	%

From: Mike Furst [mfurst@invent-et.com]
Sent: Friday, June 19, 2009 11:34 AM
To: Benoit Dennis J.
Subject: Howell, MI - INVENT Mixers
Attachments: AU0906057-HCM-rev00.pdf; HCM-withDiffusers-Austria.jpg; Upper Blackstone 10282008 4E.jpg; Merrimack,NH.jpg

Dennis,

We are pleased to offer the INVENT HyperClassic Tm Mixing System for the Howell, MI WWTP. The equipment will include a total of either eight (8) or sixteen (16) HyperClassic mixers.

General
The INVENT HyperClassic mixing system is the most efficient and effective method to mix water and wastewater. With well over twenty years of experience, INVENT is the mixing solution for Howell. We highlight some of the features and benefits of the HyperClassic mixing system below:

* The hyperboloid shape of the HyperClassic mixer body results in an energy efficient and effective mixing system.
* All INVENT mixer bodies are supplied with a special gel coat finish to resist fouling.
* The mixers will operate at a slow speed which minimizes the potential of ragging.
* Each mixer will have the time proven INVENT supplied dry mounted motor / gear box assembly.
* Routine maintenance includes an oil change every year or two (depending on the lubricant).

We attach the design summary and specific details for the mixers at the Howell plant as well as some supporting pictures from other projects.

Equipment Supply

Option 1
INVENT will supply eight (8) 2.0 meter diameter mixers. Each mixer will be located in the center of a 22 ft. by 24 ft cell. Each mixer will include a 2 HP motor and will rotate at a speed of 24 RPM.

The eight (8) mixers will be supplied complete with balanced and trued 304 stainless steel shaft, motor / gear box assembly, mounting plate and required fastening hardware.

The price for the equipment in this option is $190,000.

The prices includes freight to the job site and an allowance for field service (maximum of one trip of not more than 2 days on site) for inspection, start up and operator training. Electrical controls, bridges and equipment installation are not included in the price.

Option 2
INVENT will supply sixteen (16) 2.0 meter diameter mixers. Each mixer will be located in the center of the 22 ft. by 24 ft cell. Each mixer will include a 2 HP motor and will

rotate at a speed of 24 RPM.

The sixteen (16) mixers will be supplied complete with balanced and trued 304 stainless steel shaft, motor / gear box assembly, mounting plate and required fastening hardware.

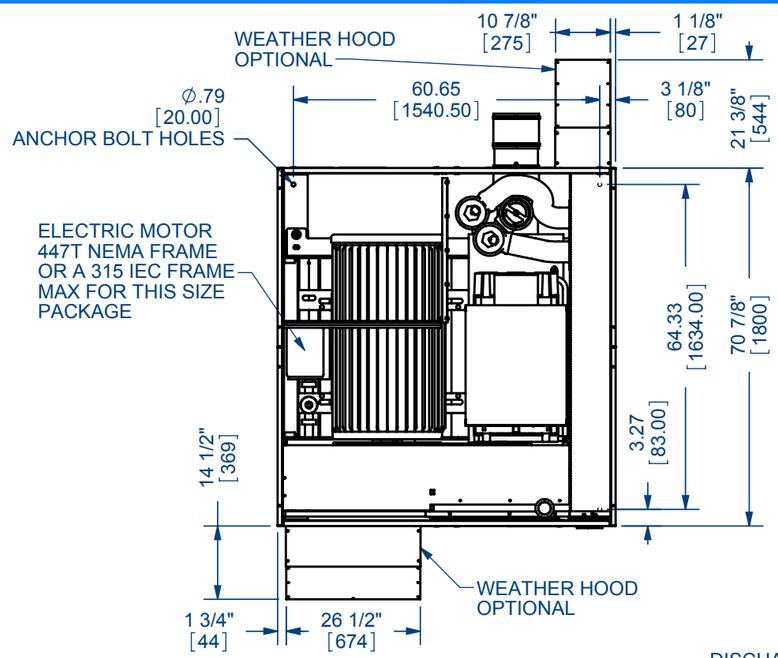
The price for the equipment in this option is $375,000.

The price includes freight to the job site and an allowance for field service (maximum of two trips of not more than 2 days each on site) for inspection, start up and operator training. Electrical controls, bridges and equipment installation are not included.

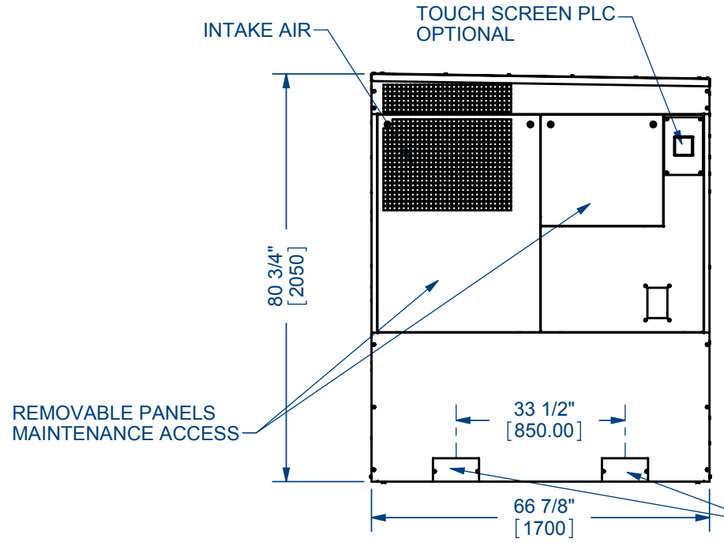
Comment
Note that the diffusers under the mixer will need to be removed and the orifice plugged. The diffuser free zone should extend at least one foot from the outer diameter of the mixer body. For your information, we designed the system using the 2 meter diameter mixer rather than the 2.3 meter diameter mixer to reduce the number of diffusers that will need to taken out of service.

We appreciate your interest in INVENT mixing systems. If you have any questions or would like a formal proposal for this equipment, please let us know.

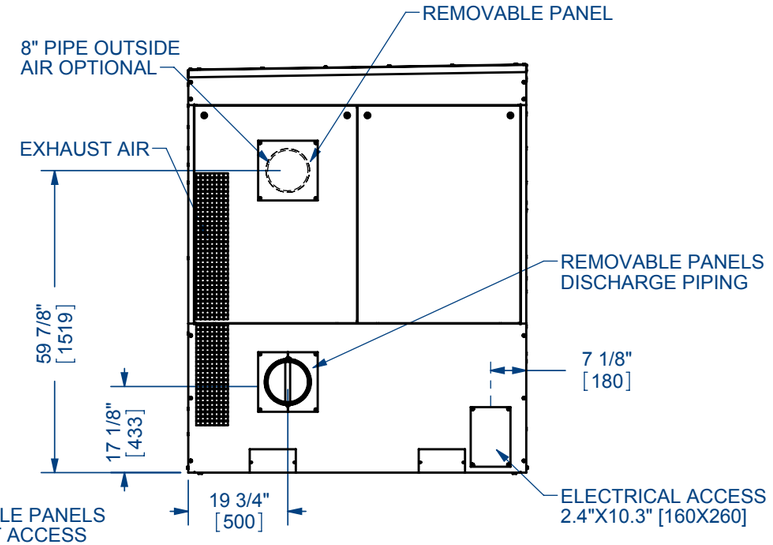
Best regards,
Mike Furst P.E.
Regional Manager
262.798.6898



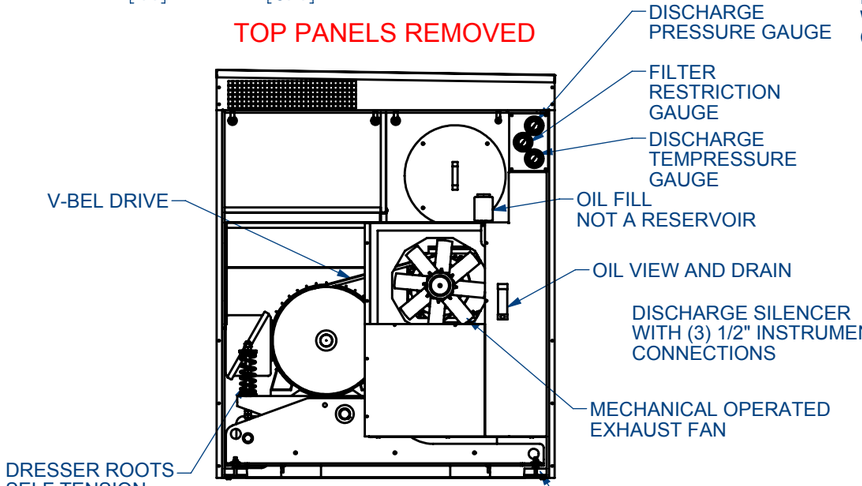
TOP PANELS REMOVED



FRONT VIEW OF ENCLOSURE



BACK VIEW OF ENCLOSURE



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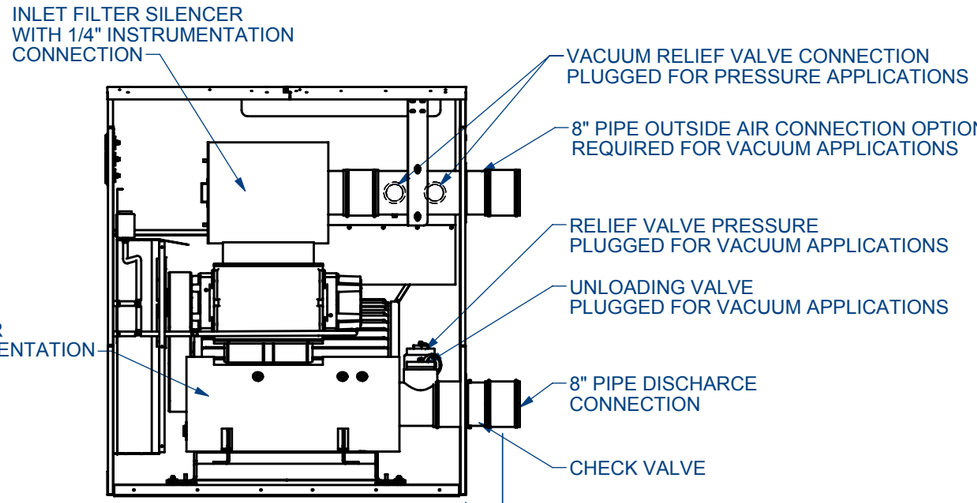

SIDE PANELS REMOVED

REV					
B	REV DISCHARGE PIPE EXTENSION				
	RDR	9/1/09	10495V		
	BY	DATE	CHANGE NOTICE	CHKD.	APP
A	RELEASED				
REV					
	BY	DATE	CHANGE NOTICE	CHKD.	APP

CONFIDENTIAL

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DIMENSIONS AND DATA
CERTIFIED

PURCHASE ORDER _____
PROJECT _____
LOCATION _____
EQUIPMENT No. _____
ROOTS ORDER No. _____
CERTIFIED BY _____
DATE _____

		DATE
DR.	RDR	5/5/09
CHKD.		
APP.		
DBV	RDR	5/5/09
SCALE	13/32"=1'-0"	
CAD FILE / DIRECTORY		
93965A21		
MISC		

DO NOT SCALE FOR DIMENSIONS
ALL DIMENSIONS SHOWN IN BRACKETS [] ARE MILLIMETERS

ORDER No.

EASYAIR EAX2 PACKAGE OUTLINE

FOR EAX2 200 RAMX 400,500

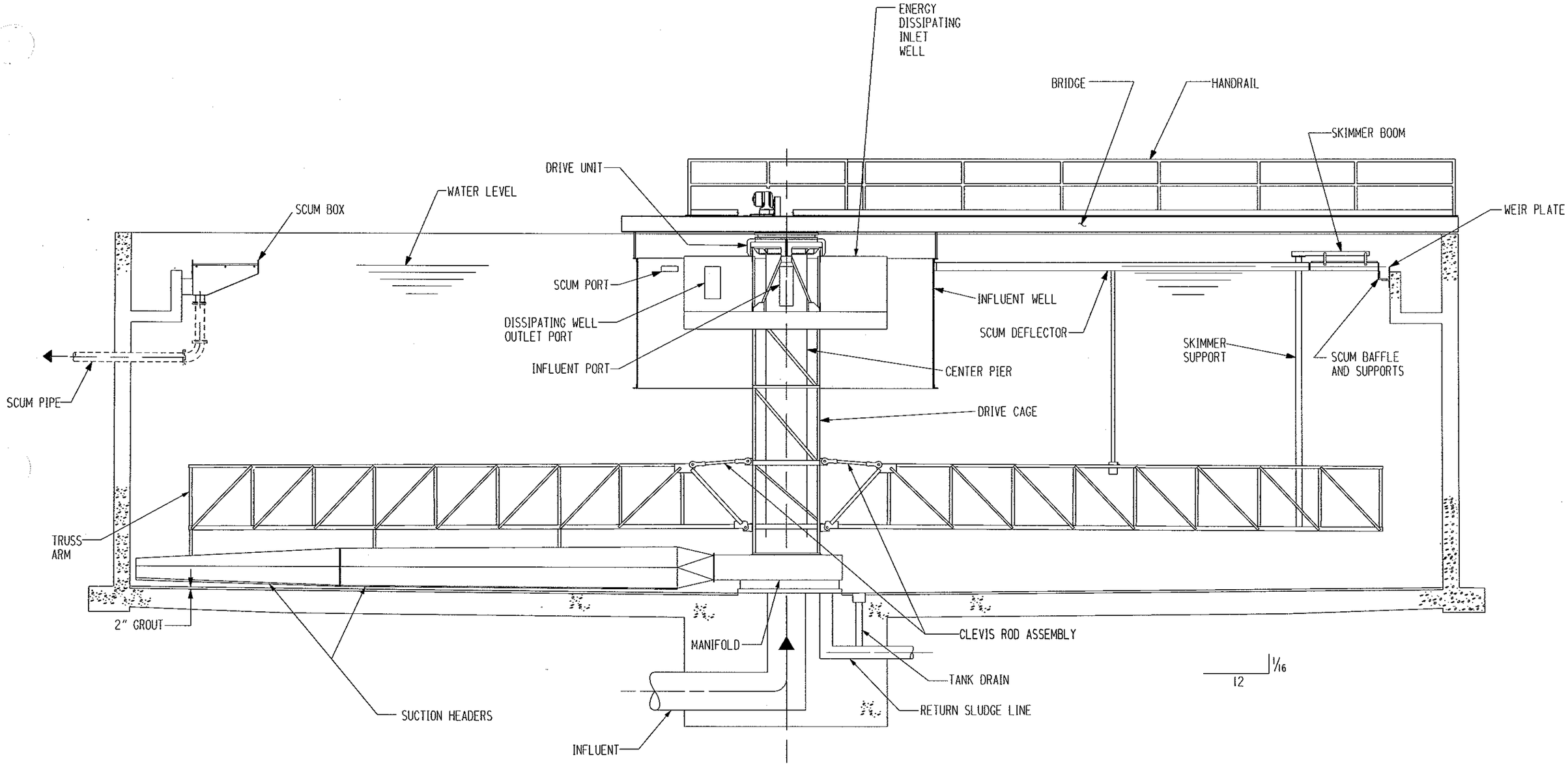
DRESSER Roots
Dresser Roots, Dresser, Inc.
Connersville, IN USA

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANCHOR BOLT LOCATIONS ±.13 [3.30]
BLOWER INLET & DISCHARGE LOCATIONS ±.25 [6.35]
ALL OTHER DIMENSIONS REFERENCE

93965021
SHEET 1 OF 1

REV B

GBSIZE



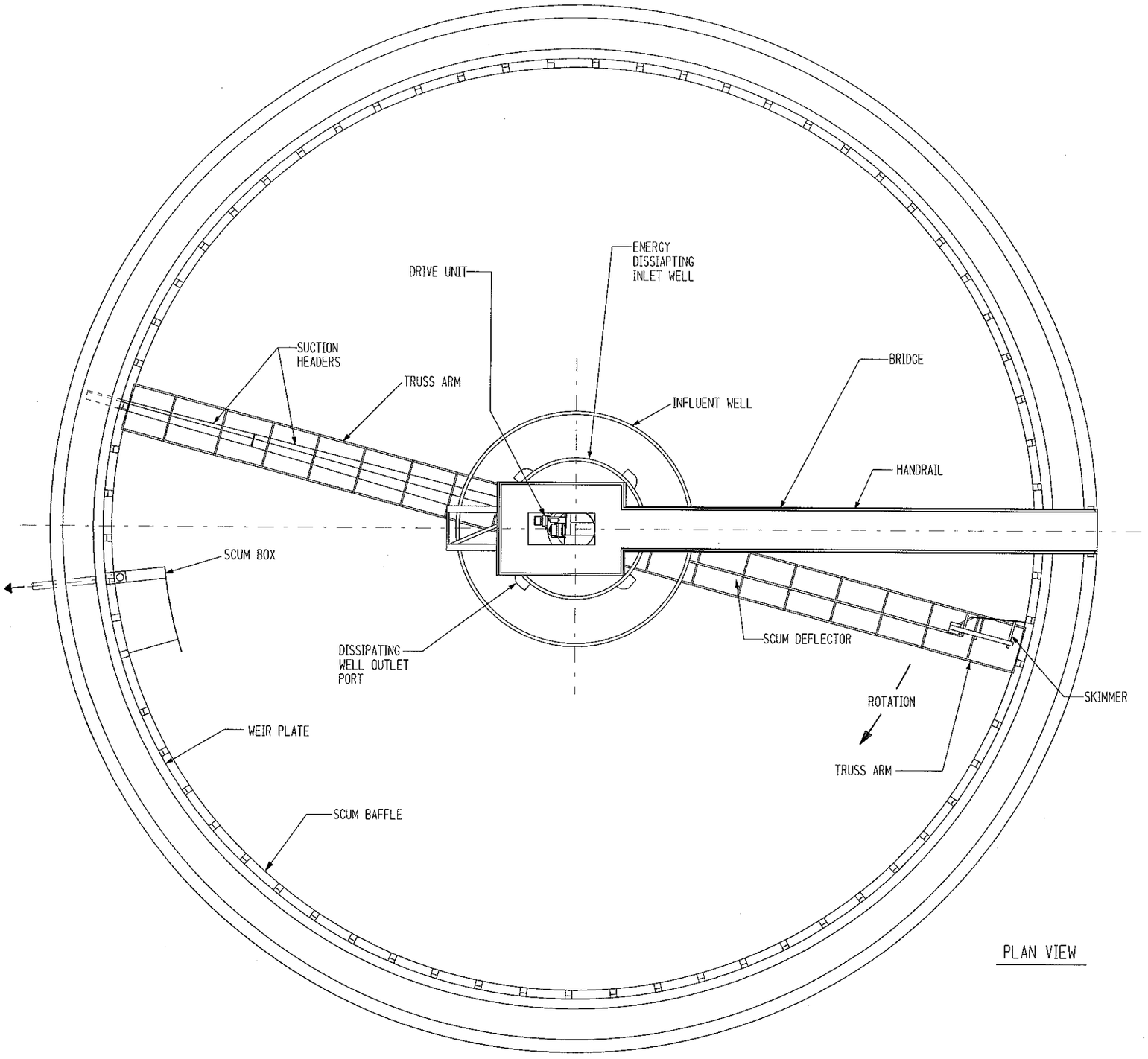
SECTIONAL ELEVATION

WALKER PROCESS EQUIPMENT

RSMTP
CIRCULAR COLLECTOR

Division of McNish Corporation
Dedicated to the
Water and Wastewater
Industry

Class 6096	
CAD DRG P1062	



PLAN VIEW

WALKER PROCESS EQUIPMENT

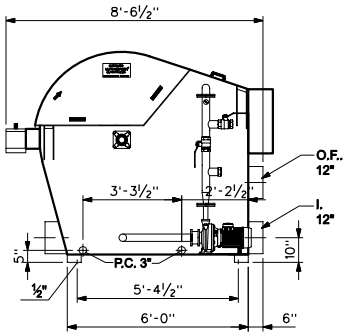
RSMTP

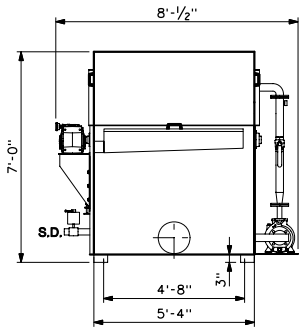
CIRCULAR COLLECTOR

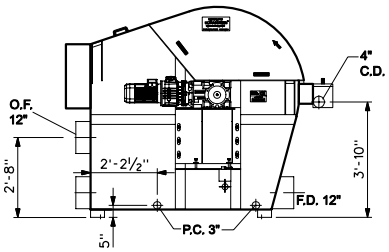
Division of McNish Corporation
Dedicated to the
Water and Wastewater
Industry

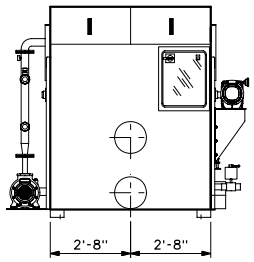
Class 6096	
CAD DRG P1063	

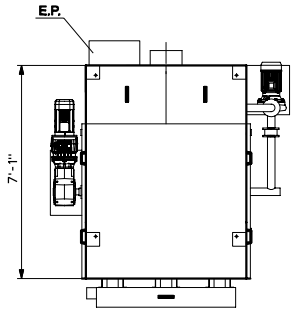
ULTRASCREEN® MICROFILTER
mod. UL 1603
OVERALL SIZES











IDLING WEIGHT: 4960 lbs
WORKING WEIGHT: 13889 lbs
MINIMUM HYDRAULIC HEAD: 3.6 ft

I.	INLET
O.F.	OVER FLOW
F.D.	FILTERED DISCHARGED
C.D.	CONCENTRATED DISCHARGE
E.P.	ELECTRICAL PANEL
S.D.	MOTORIZED-VALVE SLUDGE DISCHARGE
P.C.	PIPE FOR BOTTOM CLEANNING

nova water technologies llc.
7310 Annapolis Lane
Parkland FL 33067
P.954.753.4786
C.954.798.0254
F.954.753.9498
Pure Innovation.

U.S. PATENT No. 6,500,331

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Water Treatment Machinery and Technology

DIS. N.
UL_1603_001-06_EC

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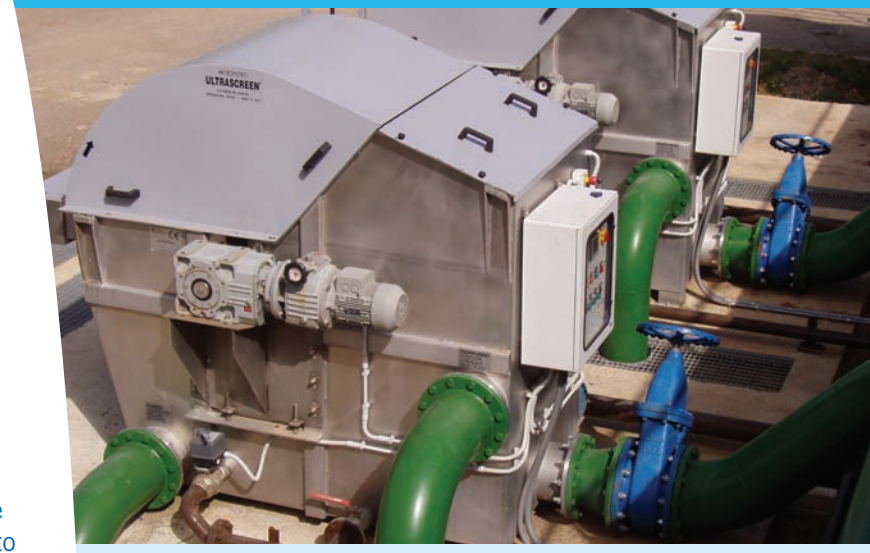
The Ultrascreen® Microfilter



The Ultrascreen® Microfilter (U.S. Patent No. 6,500,331) uses the patented concept of "dynamic-tangential filtration," an innovative approach to applying disk filters for tertiary treatment. This concept easily integrates into existing wastewater treatment plants without requiring changes to your current process or any special civil work. The Ultrascreen® Microfilter comes standard with all wetted parts in AISI 304 stainless steel construction. The covers are made of durable and lightweight polyethylene to facilitate operation and maintenance.

"Dynamic-tangential filtration" is made possible by disks that continuously rotate, presenting a fresh filtration surface to the incoming flow at all times. The flow through the openings in the media occurs at angles less than 90 degrees, which when combined with the rotational speed of the disks, makes the openings in the mesh functionally smaller than when they are standing still. This is analogous to trying to throw a snow ball through an open window of a moving car. The faster the car moves, the harder it is for the smaller solid, the snowball, to pass through the larger opening.

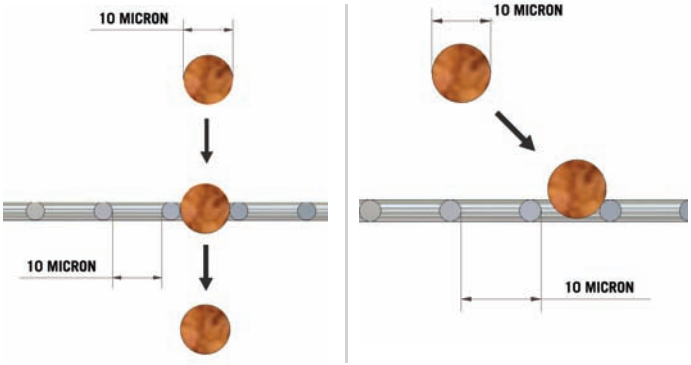
As the disks rotate, a layer of biomass accumulates on the surface of the AISI 304 stainless steel mesh and strains out increasingly finer solids. When the influent level in the feed box rises to a preset limit, a sensor actuates operation of the backwash pump. Each disk has a dedicated spray header for efficient washing. The wash water from each set of disks is collected in a common 304 stainless steel trough and exits the filter through a stainless steel drain, for return to the head of the plant or to the biological process.

The Ultrascreen® uses woven stainless steel as a filtration medium thus eliminating the need to change filter cloths. The stainless steel weave also allows the Ultrascreen® to handle higher hydrostatic heads (see Figure No. 2), which translates to more efficient use of the total available filtering surface lowering your overall footprint.

As shown in Figure No. 3, the feed to the filter is introduced into the middle of each "disk." As each disk is split in two halves, the internals of the filter are easily accessible if service is required. The flow passes through the disks from the inside-out and the filtered water free-falls into the collection well and exits the outlet pipe. The periphery of each disk is sealed with flexible seals, which form a positive mechanical barrier and prevents the filtered effluent from mixing with the dirty influent. Effluent integrity is assured!

Another benefit of the Ultrascreen® is performance optimization. Speed, wash cycle timing, and the level of fluid in the feed zone are all variable. The Ultrascreen® is therefore the right choice for all types of treatment plants and operating conditions. Performance optimization like this is not possible with static disk filters.

Figure No. 1



Figures No. 2 & 3

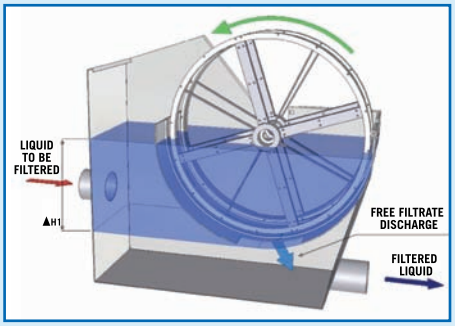


Figure No. 2

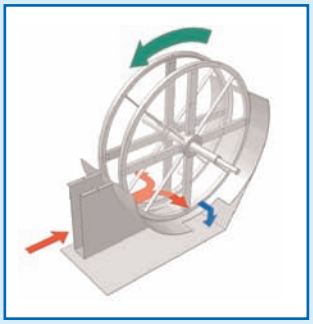
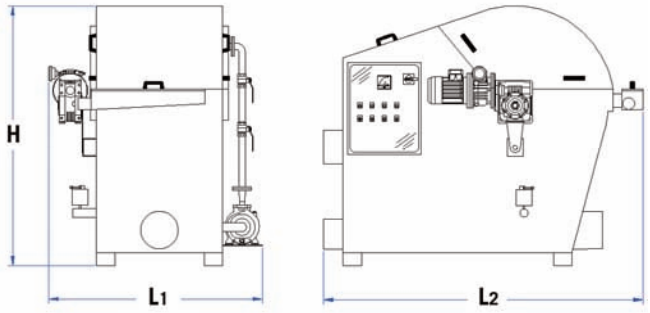


Figure No. 3

The Ultrascreen® Microfilter

Figure No. 4 - Refer to chart below



Unique Features

- Dynamic-tangential filtration
- Stainless steel filter media
- Continuously rotating disks
- All stainless steel construction
- Variable speed

Benefits

- Finer filtration with larger openings
- No cloths to replace
- Higher capacity with smaller footprint
- Longer life with low maintenance
- Flexible operation

MODEL	H	L1	L2	INSTALLED HORSEPOWER		WEIGHT		CAPACITY GPM	
	Ft.	Ft.	Ft.	Filter	Wash Pump	Empty Lbs.	Operating Lbs.	Min.	Max.
UL 1001	4'11"	3'5"	6'1"	1	2	900	2000	75	150
UL 1351	6'6"	4'2"	7'8"	2	2	1540	3685	140	300
UL 1601	7'8"	6'2"	8'6"	3	5	2090	6160	200	430
UL 1352	6'6"	6'3"	7'8"	3	2	2080	4970	280	600
UL 1602	7'8"	6'4"	8'6"	5	5	3300	9020	400	860
UL 1603	7'8"	7'10"	8'6"	5	7.5	4950	13860	600	1290
UL 1604	7'8"	10'4"	8'6"	7.5	7.5	5500	15400	800	1725
UL 1605	7'8"	12'1"	8'6"	7.5	7.5	6050	16500	990	2160
UL 1606	7'8"	13'1"	8'6"	10	7.5	6600	17600	1190	2590

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Pure Innovation.™

The Ultrascreen® Microfilter

The Ultrascreen® Microfilter (U.S. Patent No. 6,500,331) uses the patented concept of "dynamic-tangential filtration," an innovative approach to applying disk filters for tertiary treatment. This concept easily integrates into existing wastewater treatment plants without requiring changes to your current process or any special civil work. The Ultrascreen® Microfilter comes standard with all wetted parts in AISI 304 or 316 stainless steel construction. The covers are made of durable and lightweight polyethylene to facilitate operation and maintenance.

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As shown in Figure No. 3, the feed to the filter is introduced into the middle of each "disk." As each disk is split in two halves, the internals of the filter are easily accessible if service is required. The flow passes through the disks from the inside-out and the filtered water free-falls into the collection well and exits the outlet pipe. The periphery of each disk is sealed with flexible seals, which form a positive mechanical barrier and prevents the filtered effluent from mixing with the dirty influent. Effluent integrity is assured!

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Figure No. 1

Typical Influent Particle

Media Type

Static Disk Filtration

Dynamic Tangential Filtration

Figures No. 2 & 3

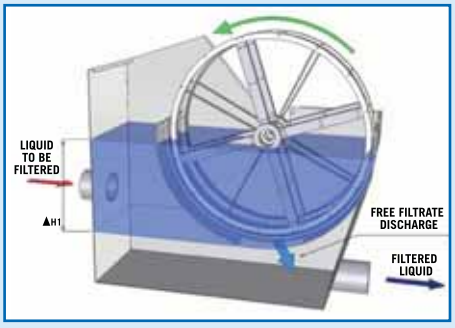


Figure No. 2

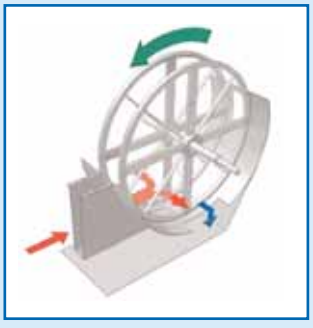


Figure No. 3

The Ultrascreen® Microfilter

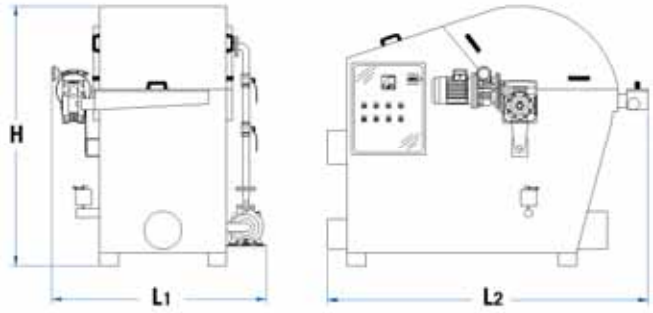
Unique Features

- Dynamic-tangential filtration
- Stainless steel filter media
- Continuously rotating disks
- All stainless steel construction
- Variable speed

Benefits

- Finer filtration with larger openings
- No cloths to replace
- Loading Rates as high as 12-15 gpm/sq.ft.
- Longer life with low maintenance
- Flexible operation
- Reject rates as low as 0.1-0.5% of the feed

Figure No. 4 - Refer to chart below



MODEL	H	L1	L2	INSTALLED HORSEPOWER		WEIGHT		TYPICAL FLOWRATES, gpm	
	Ft.	Ft.	Ft.	Filter	Wash Pump	Empty Lbs.	Operating Lbs.	Avg.	Peak
UL 1001	4'11"	3'5"	6'1"	1	2	900	2000	102	204
UL 1351	6'2"	4'0"	7'9"	2	2	1540	3685	186	372
UL 1601	7'0"	4'7"	8'7"	3	5	2090	6160	264	528
UL 1352	6'2"	6'0"	7'9"	3	2	2080	4970	377	744
UL 1602	7'0"	6'4"	8'7"	5	5	3300	9020	528	1056
UL 1603	7'0"	8'1"	8'7"	5	7.5	4950	13860	792	1584
UL 1604	7'0"	10'1"	8'7"	7.5	7.5	5500	15400	1050	2100
UL 1605	7'0"	12'1"	8'7"	7.5	7.5	6050	16500	1320	2640
UL 1606	7'0"	13'0"	8'7"	10	7.5	6600	17600	1578	3156

Note: All dimensions are approximate. Flowrates are based on a typical activated sludge process.

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nova water technologies

FLOW MGD	INF GPM	TOTAL FILTER SQ FT BASED ON 1.9 GPM PER SQ FT	NO. OF BACKWASH LATERALS	ACTUAL FILTER SQ FT	BACKWASH RATE @ 25 GPM PER SQ FT	BW PUMP HP	WW PUMP HP	NUMBER INFLUENT PORTS	WIDTH "A"	FILTER BED LENGTH "B"	O A LENGTH "C"
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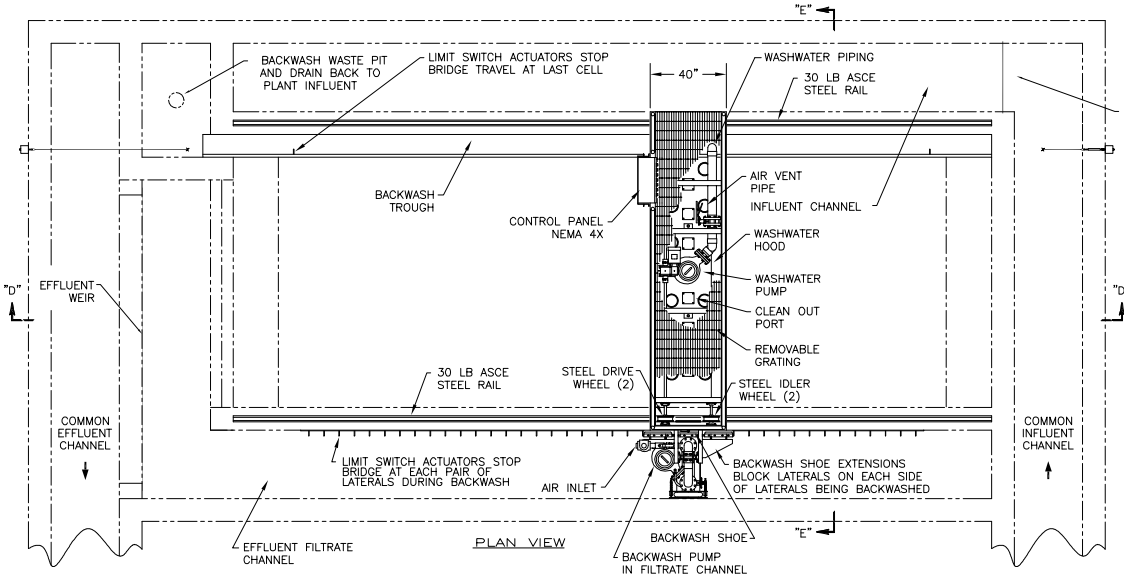
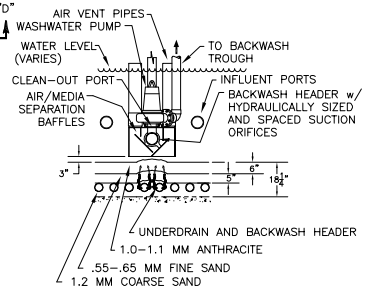
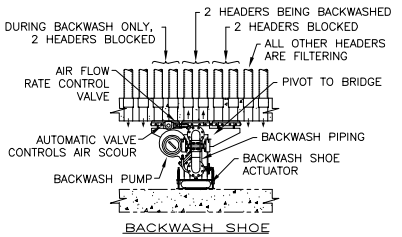
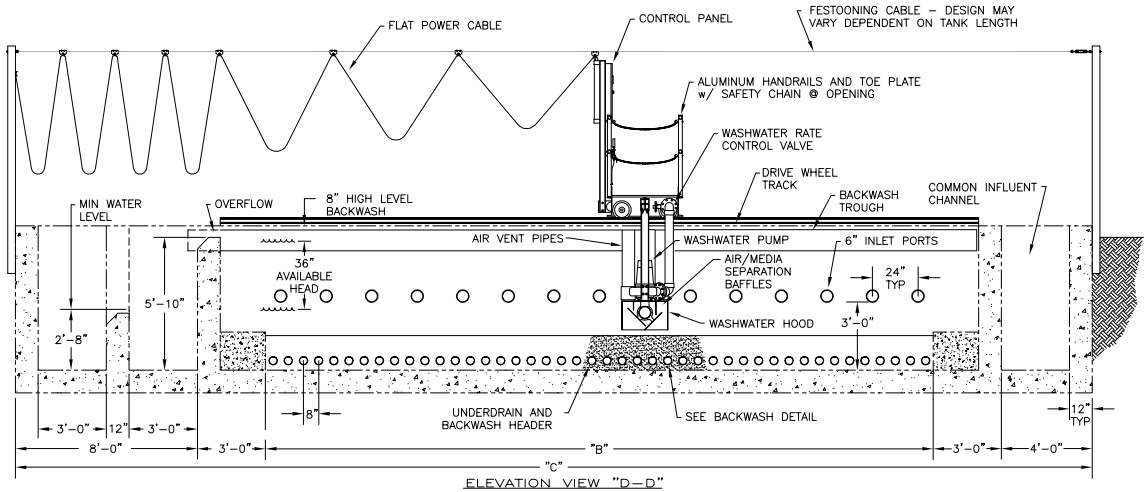
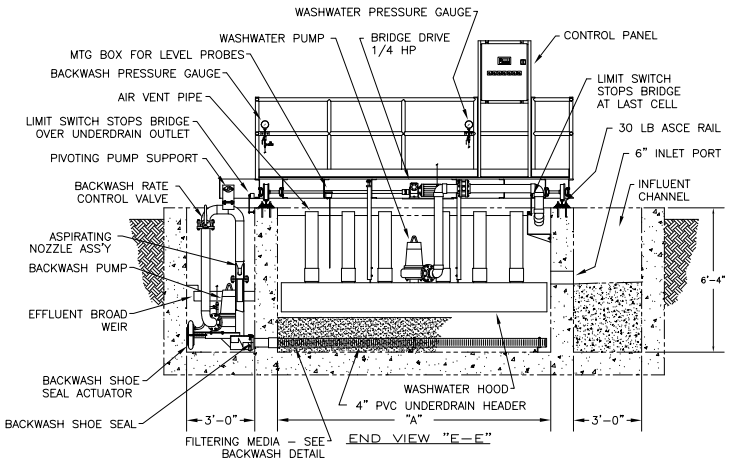










DESIGNER	DATE
JWK	08/13/09
CHECKER	DATE
BSP	08/13/09
ENGINEER	DATE
MANAGER	DATE
FILE:	UPDATE:
SCALE: 32	SIZE: D

TITLE: 2.4MGD GRAVISAND® MX IAS TRAVELING BRIDGE FILTER w/ STEEL RAIL TRACK

CLIENT

SIEMENS WATER TECHNOLOGIES THOMASVILLE, GA 1-800-841-1550

PROJECT	CODE	DRAWING	SHEET	REV
		Howell, Mich	OF	000

BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	BY	DATE

ABF Filter /Design Calculations

HOWELL WWTP, MI AQUAABF FILTER

11-Aug-09 **Based on: Avg. Daily Flow**

Concrete Filter

Project #: 2021
Design #: 1
Project State: MI

ENGINEERING CONSIDERATIONS

Automatic Backwash Filter Media

DESIGN CRITERIA

Wastewater Type: Domestic
Treatment Preceding Filter: Secondary
Average Daily Flow (gpd): 3,700,000.0
Max. Daily Flow (gpd): 8,500,000.0

FILTER INFLUENT QUALITY

Influent Average BOD5 (mg/l):
Influent Average TSS (mg/l): 10
Influent Maximum TSS (mg/l): 15
Influent Avg. Temperature (C): 20
Influent Turbidity (N.T.U.):
Influent Phosphorus (mg/l): 0.8

FILTER EFFLUENT QUALITY DESIRED

Effluent Average BOD5 (mg/l):
Effluent Average TSS (mg/l): 5
Effluent Turbidity (N.T.U.):
Effluent Phosphorus (mg/l): 0.3

FILTER LOADING RATES

Design Hydraulic Loading @ Avg. Daily Flow (gpm/sq.ft) = 2
Max. Hydraulic Loading @ Max. Daily Flow (gpm/sq.ft) = 5
Max. Solids Loading (lbs/sq.ft/day) = 1.2

DESIGN CALCULATIONS

$$\text{Filter Area} = \frac{2{,}569.4 \text{ gpm @ Avg. Daily Flow}}{2 \text{ gpm/sq.ft}} = 1284.7 \text{ sq. ft required}$$

$$\text{Filter Area} = \frac{5{,}902.8 \text{ gpm @ Max. Daily Flow}}{5 \text{ gpm/sq.ft}} = 1180.6 \text{ sq. ft required}$$

$$\text{Filter Area} = \frac{308.6 \text{ lbs. of TSS/day @ Avg. Daily Flow}}{1.2 \text{ lbs/sq.ft/day}} = 257.1 \text{ sq. ft required}$$

MEDIA REQUIREMENTS: Sand

2 16 x 82 ABF Filter(s) will require:

112.0 tons of: Sand

Therefore, a minimum filter area o **1284.7** sq.ft. is required based only on the Avg. Daily Flow and the following equipment is recommended:

2 ABF Concrete Filter(s)16x82 w/1 Unit Out-Of-Service (Single Media)

Filtration

1. The filter recommendation is based upon the following assumptions (as shown on the design sheet): 10 mg/l average daily Influent TSS, 15 mg/l peak Influent TSS, 5 mg/l daily (monthly) effluent TSS and an acceptable upstream process such as an activated sludge plant with a minimum of SRT of 5 days.

2. The anticipated filtered effluent quality is based on the specified filter influent conditions as shown under "Design Parameters" of this Process Design Report. In addition to the specified design parameters, the filter influent should be free of algae and other small, colloidal solids that cannot be readily removed via filtration media. Provisions shall be made, by others, to treat algae and condition the solids to be filterable, if necessary.

3. The anticipated effluent quality is based upon filterable influent solids.

4. The filter recommendation is based on providing redundancy such that the remaining unit(s) is capable of handling 100% of the peak design flow.

Phosphorous

5. The filter will only remove TP that is associated with the TSS removed by the filter. Solids include both biological and chemical solids. Since only insoluble, particle-associated phosphorous is capable of being removed by filtration, phosphorous speciation shall be provided by the Owner to substantiate the concentrations of soluble and insoluble phosphorous in the filter influent. If the proportions of soluble (unfilterable) and insoluble phosphorous are such that removal to achieve the desired effluent limit is not practical, the Owner will provide for proper conditioning of the wastewater, upstream of the filter system, to allow for the required removal.

6. To achieve an effluent monthly average total phosphorus limit of 0.3 mg/L, the biological process, chemical feed systems, and AquaABF Filter need to be designed to facilitate optimum performance.

7. A minimum of twelve (12) 24 hour daily composite samples per month (both influent and effluent) shall be

obtained for total phosphorus analysis.

8. Meeting the required phosphorus final effluent limit is contingent on a secondary effluent total phosphorus concentration of equal or less than 0.8 mg/L on a daily average basis and a daily average TSS of 10 mg/L and a maximum TSS concentration of 15 mg/L.

9. Secondary effluent phosphorus shall be either in a reactive phosphate form or a filterable particulate form or both. It is assumed that soluble non-reactive phosphorous is not present in the waste stream.

10. Chemical feed lines (i.e. metal salts) shall be furnished to each reactor, aerobic digester and recycle stream as necessary.

11. Chemical addition (i.e. metal salts and polymer) shall be furnished prior to the filter. Adequate rapid mixing must be provided as part of the chemical feed system. The chemical dosage should be flow-paced and controlled to avoid overdosing. Jar testing with various metal salts and polymers is recommended to determine the most effective metal salt and polymer as well as the optimum dosages of each, and to estimate the degree of phosphorus removal that can be achieved. In addition, a pilot study may be required to verify the actual performance capability.

12. A flocculation tank with a minimum of 5-minute HRT at the maximum daily flow shall be furnished after chemical addition and prior to the filter.

13. pH monitoring and control in a range of 6.8-7.2 of the upstream biological reactor is required when adding metal salts.

Equipment

14. Equipment selection is based upon Aqua Aerobic Systems standard materials of construction and electrical components.

15. AAS is familiar with the requirements of the American Recovery and Reinvestment Act of 2009 and the Buy American provision included. AAS can provide a system that is in full compliance with the Buy American provision. As the project develops AAS can work with you to ensure full compliance with the Act should it be required. Please contact the factory should compliance be required.

ABF Filter /Construction Costs

HOWELL WWTP, MI AQUAABF FILTER

11-Aug-09 **Based on: Avg. Daily Flow**

Concrete Filter

Project #: 2021
Design #: 1
Project State: MI

Note: The following calculations are approximate values as concrete, labor & building costs vary widely and are dependent on project location. Aqua-Aerobic Systems provides these estimates for cursory project cost analyses.

Concrete

	***Est. Cubic Yards Required:**	450
X	**Est. Concrete$ / Cubic Yard:**	$350
	Estimated Concrete Costs:	$157,500

*Est. Cubic Yards Required includes concrete required for the construction of the Automatic Backwash Filter. Cost is estimated on an installed basis and work is to be performed by others.

*Est. Cubic Yards Required does not include concrete required for a building. (A minimum clearance of 5 ft. is recommended on all sides of the filter within a building.)

PROCESS DESIGN REPORT

HOWELL WWTP, MI

Design#: 38720

Option: AquaDisk Cloth Media Filters

Designed by Brandon Thomas on Tuesday, August 11, 2009

Design Notes

Filtration

1. The cloth media filter recommendation is based upon the following assumptions (as shown on the design sheet): 10 mg/l average daily Influent TSS, 15 mg/l peak Influent TSS, 5 mg/l daily (monthly) effluent TSS and an acceptable upstream process such as an activated sludge plant with a minimum of SRT of 5 days

2. The anticipated filtered effluent quality is based on the specified filter influent conditions as shown under “Design Parameters” of this Process Design Report. In addition to the specified design parameters, the filter influent should be free of algae and other small, colloidal solids that cannot be readily removed via filtration through nominal 10 micron pore size media. Provisions shall be made, by others, to treat algae and condition the solids to be filterable, if necessary.

3. The anticipated effluent quality is based upon filterable influent solids.

4. For this application, pile filter cloth is recommended, which has a nominal pore size of 10 microns.

5. The cloth media filter recommendation is based on providing redundancy such that the remaining unit(s) is capable of handling 100% of the peak design flow.

Membrane

6. The cloth media filter will only remove TP that is associated with the TSS removed by the filter. Solids include both biological and chemical solids. Since only insoluble, particle-associated phosphorous is capable of being removed by filtration with 10 micron nominal pore size cloth media, phosphorous speciation shall be provided by the Owner to substantiate the concentrations of soluble and insoluble phosphorous in the filter influent. If the proportions of soluble (unfilterable) and insoluble phosphorous are such that removal to achieve the desired effluent limit is not practical, the Owner will provide for proper conditioning of the wastewater, upstream of the filter system, to allow for the required removal.

7. To achieve an effluent monthly average total phosphorus limit of 0.3 mg/L, the biological process, chemical feed systems, and Aqua Cloth media Filter need to be designed to facilitate optimum performance.

8. A minimum of twelve (12) 24 hour daily composite samples per month (both influent and effluent) shall be obtained for total phosphorus analysis.

9. Meeting the required phosphorus final effluent limit is contingent on a secondary effluent total phosphorus concentration of equal or less than 0.8 mg/L on a daily average basis and a daily average TSS of 10 mg/L and a maximum TSS concentration of 15 mg/L.

10. Secondary effluent phosphorus shall be either in a reactive phosphate form or a filterable particulate form or both. It is assumed that soluble non-reactive phosphorous is not present in the waste stream.

11. Chemical feed lines (i.e. metal salts) shall be furnished to each reactor, aerobic digester and recycle stream as necessary.

12. Chemical addition (i.e. metal salts and polymer) shall be furnished prior to the filter. Adequate rapid mixing must be provided as part of the chemical feed system. The chemical dosage should be flow-paced and controlled to avoid overdosing. Jar testing with various metal salts and polymers is recommended to determine the most effective metal salt and polymer as well as the optimum dosages of each, and to estimate the degree of phosphorus removal that can be achieved. In addition, a pilot study may be required to verify the actual performance capability.

13. A flocculation tank with a minimum of 5-minute HRT at the maximum daily flow shall be furnished after chemical addition and prior to the filter.

14. pH monitoring and control in a range of 6.8-7.2 of the upstream biological reactor is required when adding metal salts.

Equipment

15. Equipment selection is based upon Aqua Aerobic Systems standard materials of construction and electrical components.

16. AAS is familiar with the requirements of the American Recovery and Reinvestment Act of 2009 and the Buy American provision included. AAS can provide a system that is in full compliance with the Buy American provision. As the project develops AAS can work with you to ensure full compliance with the Act should it be required. Please contact the factory should compliance be required.

AquaDISK Tertiary Filtration - Design Summary

DESIGN INFLUENT CONDITIONS

Pre-Filter Treatment: Secondary

Avg. Design Flow = 3.7 MG/day = 2569.4 gpm = (13986 m^3/day)

Max. Design Flow = 8.5 MG/day = 5902.8 gpm = (32130 m^3/day)

DESIGN PARAMETERS	Influent	mg/l	Effluent Required	<= mg/l	Effluent Anticipated	<= mg/l
Avg. Total Suspended Solids:	TSSa	10	TSSa	5	TSSa	5
Max. Total Suspended Solids:	TSSm	15	--	--	--	--
Phosphorus:	Total P	0.8	Total P	0.3	Total P	0.3

AquaDISK FILTER RECOMMENDATION

Qty Of Filter Units Recommended = 3

Number Of Disks Per Unit = 10

Total Number Of Disks Recommended = 30

Total Filter Area Provided = 1614 ft^2 = (149.95 m^2)

Filter Model Recommended = AquaDisk Concrete Model 54E: 10 Disk Unit

AquaDISK FILTER CALCULATIONS

Filter Type:

Vertically Mounted Cloth Media Disks featuring automatically operated vacuum backwash.

Average Flow Conditions:

Average Hydraulic Loading = Avg. Design Flow (gpm) / Recommended Filter Area (ft^2)
= 2569.44 / 1614 ft^2
= 1.59 gpm/ft^2 (1.08 l/s/m^2) at Avg. Flow

Maximum Flow Conditions:

Maximum Hydraulic Loading = Max. Design Flow (gpm) / Recommended Filter Area (ft^2)
= 5902.78 / 1614 ft^2
= 3.66 gpm/ft^2 (2.49 l/s/m^2) at Max. Flow

Solids Loading:

Solids Loading Rate = (lbs TSS/day at max flow and max TSS loading) / Recommended Filter Area (ft^2)
= 1063.4 lbs/day / 1614 ft^2
= 0.66 lbs. TSS /day/ft^2 (3.21 kg. TSS/day/m^2)

The above recommendation is based upon the provision to maintain a satisfactory hydraulic surface loading with (1) unit out of service. The resultant hydraulic loading rate at the Maximum Flow is: 5.5 gpm / ft^2 = (3.7 L/s / m^2)

Estimated total concrete requirement: = 219.2 yd^3 = (186.1 m^3)

Equipment Summary

Cloth Media Filters

AquaDisk Tanks/Basins

3 Aquadisk model # ADFC-54x10E-PC concrete filter basin accessories consisting of:

- Concrete basin(s) (by others).
- Centertube support beam wall brackets.
- 304SS anchors.
- 6" manual butterfly valve(s).
- Painted steel backwash pump stand.
- Effluent seal plate weldment.

3 Influent Flow Assembly(ies) consisting of:

- Level weir / flow separation baffle(s).
- Stiffening angle(s).
- 304SS anchors.

AquaDisk Centertube Assemblies

3 Centertube Assembly(ies) consisting of:

- Centertube.
- Lower quad wheel carrier assembly(ies).
- Centertube position maintainer.
- Centertube end support bearing kit(s).
- Effluent centertube lip seal.
- Centertube drive sprocket(s).
- Disk segment stainless steel support rod(s).
- Neoprene media sealing gaskets.
- Pile cloth media and non-corrosive support frame assemblies.

AquaDisk Drive Assemblies

3 Drive System Assembly(ies) consisting of:

- Gearbox with motor.
- Stationary drive bracket weldment.
- Drive chain(s) with pins.
- Warning label(s).
- Chain guard weldment(s).
- Drive spocket(s).

AquaDisk Backwash/Sludge Assemblies

3 Backwash Pump installation(s) consisting of:

- Backwash and sludge pump(s).
- Backwash pump throttling gate valve(s).
- 3" ball valve(s).

3 Backwash Support Assembly(ies) consisting of:

- Backwash support weldment(s).

3 External Piping Accessory kit(s) consisting of:

- 0 to 30 inches mercury vacuum gauge(s).
- 0 to 15 psi pressure gauge(s).
- Vacuum transducer(s).

3 Backwash System Assembly(ies) consisting of:

- Backwash collection nozzle.

- PVC sludge collection manifold(s).
- Combination nipple(s) for hose to pipe connection(s).
- Stainless steel backwash nozzle springs.
- 1 1/2" Flexible hose.
- 2" Flexible hose.
- Stainless steel hose clamps.
- 304 stainless steel backwash collection manifold(s).

AquaDisk Instrumentation

3 Pressure Transducer Assembly(ies) consisting of:

- Level sensing pressure transducer(s).
- 304 Stainless steel probe mounting bracket(s).
- Float switch(es).

AquaDisk Valves

3 Influent Valve(s) consisting of:

- 18" manual butterfly valve(s).
- Valve extension(s) painted steel.
- Valve extension support bracket (by others).

3 Set(s) of Backwash Valve(s) consisting of:

- 2" full port, two piece, stainless steel body ball valve(s), flanged end connections with single phase electric actuator(s). Valve / actuator combination shall be manufactured by TCI / Nibco or equal.

3 Sludge Valve(s) consisting of:

- 2" full port, two piece, stainless steel body ball valve(s), flanged end connections with single phase electric actuator(s). Valve / actuator combination shall be manufactured by TCI / Nibco or equal.

AquaDisk Controls w/Starters

3 Controls Package(s) will be provided as follows:

- NEMA 4X fiberglass enclosure(s).
- Starter 18 AMP 3-Pole.
- Allen Bradley SLC 5/04 programmable controller.
- Analog input card(s).
- Allen Bradley Panelview 600 touch screen display(s).

From: Randy Hamlett [randyh@hamlettenvironmental.com]
Sent: Tuesday, August 11, 2009 7:38 PM
To: Benoit Dennis J.
Subject: FW: Howell WWTP, MI
Attachments: 2009-08-11 38721 AquaDisk Filter Design - Painted Steel Tanks.pdf; 2009-08-11 2021 ABF Filter Design.pdf; 2009-08-11 38720 AquaDisk Filter Design - Concrete Tanks.pdf; Project E-Mail....pdf; Fw: Howell, MI

Hi Dennis,

Please see the attachments from Aqua-Aerobic. We are providing information for our standard Cloth Media Disk Filter in both steel tank, pre-packaged arrangement and also in cast-in-place concrete arrangement. We are also offering our standard ABF (automatic backwash filter) traveling bridge sand filter for your consideration. The ABF is only available in cast-in-place concrete for the size required for this project.

The primary difference between the package unit and cast-in-place is the package unit comes fully assembled and ready to set on a pad, connect the inlet and outlet piping and electrical service and its ready to go. The concrete version requires full field assembly and wiring. Generally the concrete version has a higher installed price but may suit a given building layout better. Previous preliminary designs for Howell were based on using three 8-Disk package style, cloth media Disk filters. However, this was done in 2005 and was based on less flow and also trying to squeeze the filters into the existing filter building.

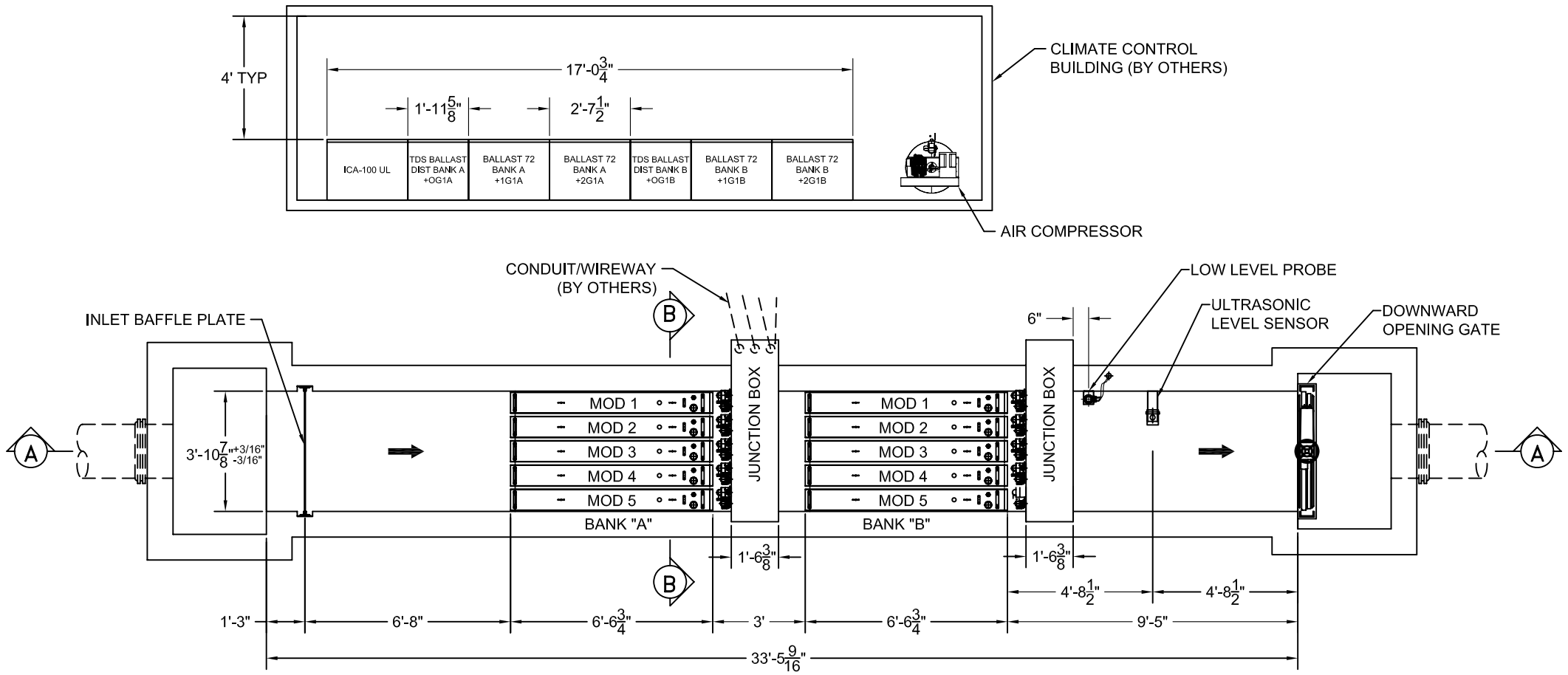
Let me know if you have any questions or need additional information.

Regards,

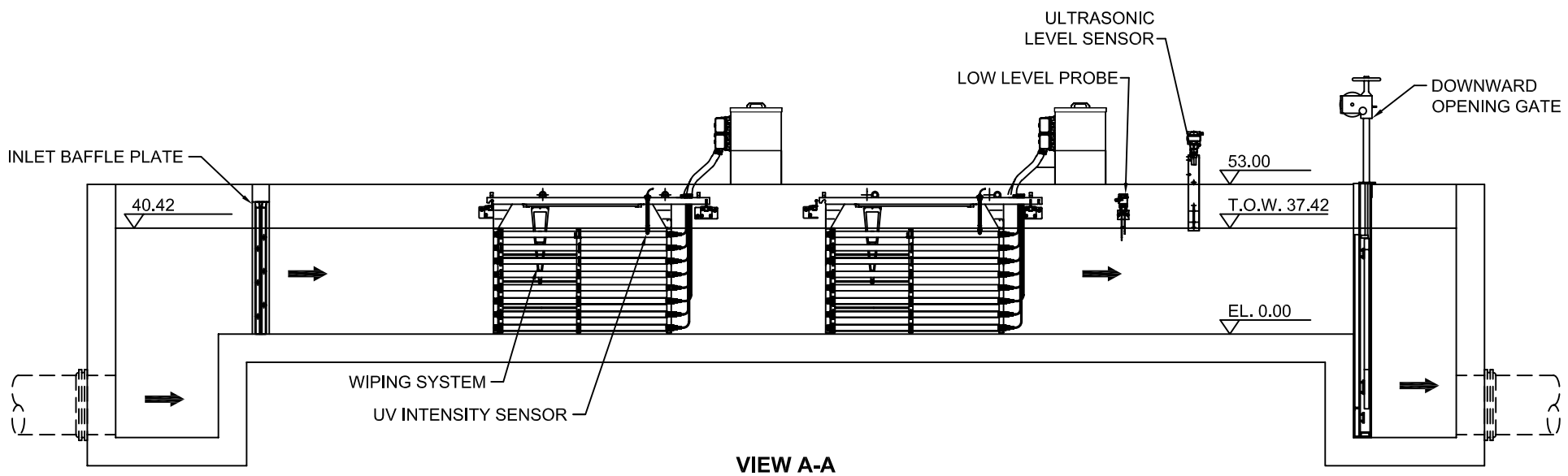
Randy Hamlett

-----Original Message-----
From: Marsha Elliott [mailto:MElliott@aqua-aerobic.com]
Sent: Tuesday, August 11, 2009 5:23 PM
To: 'Randy Hamlett'
Cc: Brandon Thomas; Bernie Eiswert
Subject: Howell WWTP, MI

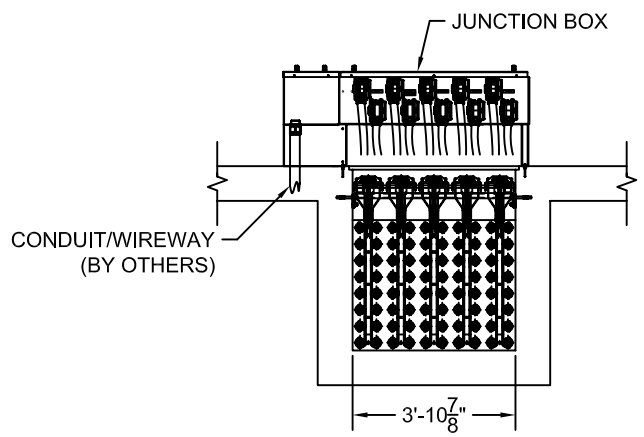
http://www.aqua-aerobic.com/
http://www.ourgreenisblue.com/



PLAN VIEW



VIEW A-A



VIEW B-B

NOTES:

1. TOTAL CONDUIT LENGTH SHALL NOT EXCEED 50 FEET. LAMP CABLES FROM JUNCTION BOX TERMINATION TO CONTROL ENCLOSURE TERMINATION NOT TO EXCEED 82 FT (26 FT MIN.). ALL CONDUITS AND CABLING SHALL BE IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES. MAXIMUM # OF LAMP CABLE PER CONDUIT NOT TO EXCEED 48.
2. ALL WIREWAY/CONDUIT & AIR CONDUITS TO HAVE LONG RADIUS BENDS. (CONTRACTOR TO SIZE AND SUPPLY).
3. SYSTEM ENCLOSURES AND AIR COMPRESSOR TO BE LOCATED IN A CLIMATE CONTROLLED BUILDING (BY OTHERS).
4. ALL CIVIL DIMENSION TOLERANCES TO BE $\pm\frac{1}{4}$ UNLESS OTHERWISE STATED.
5. COVERING OF CHANNEL BY OTHERS.
6. ISOLATION GATE e.g. INLET GATE VALVE (SUPPLIED BY OTHERS) IF REQUIRED.
7. CONTRACTOR TO SUPPLY CONDUIT AND $\frac{3}{8}$" AIR LINE, OR RUN ABOVE GROUND IF SITE LAYOUT DICTATES.
8. DISINFECTION CANNOT BE GUARANTEED IF MAXIMUM WATER LEVELS ARE EXCEEDED.
9. ANCHOR BOLTS ARE NOT SUPPLIED BY WEDECO.
10. LIFTING DEVICE (BY OTHERS) FOR INDIVIDUAL MODULES NOT SHOWN.
11. ELECTRICAL EQUIPMENT TO BE LOCATED IN ACCORDANCE WITH LOCAL/NATIONAL ELECTRICAL CODES.
12. BOTTOM OF UV CHANNEL MUST BE FLAT WITHIN $\pm\frac{1}{8}$". CHANNEL WALLS TO BE PERPENDICULAR TO BOTTOM OF CHANNEL WITHIN $\pm\frac{1}{8}$".
13. GIVEN DIMENSIONS RELATE TO THE CORRECT INSTALLATION AND OPERATION OF WEDECO EQUIPMENT AND SHOULD BE ADHERED TO.
14. **DRAWING IS FOR DISCUSSION PURPOSES ONLY.**

REV	REV # ECN #	SHEET (ZONE)	DESCRIPTION	DATE	APPROVAL

REVISIONS

FOR DISCUSSION ONLY

PROJECT: HOWELL, MI

LOCATION:

CUSTOMER:

CONSULTING ENGINEER: HUBBELL, ROTH & CLARK

NAVISION NUMBER: | JOB NUMBER:

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE
X/X = $\pm\frac{1}{16}$ .X = ±.05 .XX = ± .02 .XXX = ± .005 ANG = ± 1°

THIRD ANGLE PROJECTION

DESIGNER	DATE
GV	8/11/09
APPROVED BY	DATE

ITT WEDECO
14125 South Bridge Circle
Charlotte, NC 28273 USA
TEL: (704) 716-7600
FAX: (704) 716-9080
www.itt.com

ITT
Engineered for life

TITLE: UV DISINFECTION SYSTEM GENERAL ARRANGEMENT

MODEL NO.: TAK 55 ID M-HP 8-5x2i1W

SIZE	DRAWING NO.	REV
B	P-09JSC0807-GA-1001	-

SCALE	WEIGHT	MATERIAL	FINISH	SHEET
NTS				OF 1 OF 1

From: BOBPOG2@aol.com
Sent: Friday, August 14, 2009 9:03 AM
To: Benoit Dennis J.
Subject: Fwd: Howell Michigan Traveling Bridge Filters
Attachments: HowellMich.DWG; HowellMich.pdf; MX.DOC

Dennis, the following e-mail and attachment pertains to Howell.

Robert L. Poglits
Peterson and Matz, Inc.
30701 W. 10 Mile Road, Suite 100
Farmington Hills, MI 48336
Phone: 248-476-3204
Fax: 248-476-3445
Cell: 248-318-8728
E-mail: bobpog2@aol.com

From: James.Knisely@siemens.com
To: bobpog2@aol.com
CC: Jimmy.Speigner@siemens.com
Sent: 8/13/2009 6:47:21 P.M. Eastern Daylight Time
Subj: Howell Michigan Traveling Bridge Filters

<<Howell Mich.DWG>> <<Howell Mich.pdf>> <<MX.DOC>>
Bob,
Attached are dwgs & specs pertaining to the Howell, Michigan TBF's. I have attached the dwg as an auto cad and pdf file for your convenience.
Budget price for the two Gravisand TBF's (freight included) is $286,000. Taxes not included
Budget pricing is for TBF components in concrete basins as listed in the attached spec (MX.DOC).
Each filter is sized for a 2.4 mgd average flow with a peak of 5.0 mgd. TSS effluent will be less than 10mg/l with a 20-30 mg/l TSS influent at average flow.
Bill Knisely
Sales Support Engineer
Siemens Water Technologies Corp.
1828 Metcalf Ave.
Thomasville, GA 31792
E-mail: James.Knisely@siemens.com
Tel 229-227-8736
Fax 229-228-0312

ITT Water & Wastewater · 14125 South Bridge Circle · Charlotte, NC 28273 · tel 1.704.409.9700 · www.us.ittwww.com

Budget Proposal for Wastewater UV Disinfection Equipment

Project name:	**Howell, MI**
Proposal no.	**09JSC0807**
Date:	August 11, 2009

Prepared for

Representative sales associate:	Barry Simescu
Representative company:	Dubois Cooper

UV System Design Criteria

Peak design flow:	11.3	MGD		
UV transmittance (1 cm), min:	65	%		
Suspended solids, max:	30	mg/l		
Design approach:	Low and Medium Dose Bioassay			
Effluent Fecal Coliforms Max:	200	/100 ml	@ 30	days geometric mean
Effluent Fecal Coliforms Max:	400	/100 ml	@ 7	days geometric mean
UV dose min:	20.0	mJ/cm²	@	end of lamp lifetime

UV Equipment Standard Details

TAK 55 Model	TAK 55 M - HP 8 - 5 ( ) x 2 ( ) i 1 ( ) W
Number of channels	1
Number of banks per channel	2
UV lamps per bank	80
Total number of UV lamps	160
Maximum head loss, including 4 inch freefall	21.98 inches
Maximum power consumption	57.6 kW (lamps and ballasts only)

- All required UV modules incl. lamps and support framework for installation of the UV modules in the channel(s)
- One (1) single module A-frame lifting bracket
- All power cabling from lamps to ballast cabinet(s)
- Painted steel electrical enclosure(s) Type 12 housing the electrical equipment for indoor installation
- Transformer to convert the incoming electrical supply to the required voltage needed
- Power supply electrical enclosures and PD/PLC control enclosures with a PLC and HMI
  - PLC make & model: Allen Bradley Compact Logix
  - HMI make & model: Allen Bradley Panelview plus 700
- Labeling of components
- Automatic wiping system including compressed air supply (one compressor and one air receiver)
- UV-intensity monitoring and control system [one per bank]
- Inlet baffle plate(s) [one per channel]
- Low level probe(s) [one per channel]
- Downward opening gate [one per channel]
- All required stainless steel junction box(es)
- Dose Pacing and Variable Power
- Remote Service Support (including modem and software)
- Three (3) operating and maintenance manuals in English language
- Factory testing of all parts and equipment prior to shipment
- Packaging of UV equipment
- Manufacturer's field services on site [1 trip(s) / 11 days]

ITT Water & Wastewater · 14125 South Bridge Circle · Charlotte, NC 28273 · tel 1.704.409.9700 · www.us.ittwww.com

UV Equipment Options

- Spare parts: 10% Lamps, ballasts, quartz sleeves

Commercial Details

Delivery time:	Submittals: 8 – 10 weeks after approved purchase order UV Equipment: 14 – 18 weeks after approved submittals
Terms of Delivery:	FOB Factory / Ex-works
Terms of Payment:	Net 30 days Payment Plan. Price(s) valid for thirty (30) days. Price(s) do not include local taxes.
Warranties:	Lamp Warranty: Guaranteed 12,000 hours of operation, prorated after 9,000 hours. System Warranty: 18 months from date of delivery and 12 months from date of Substantial Completion of UV Equipment whichever comes first.

Sale Price(s)

TAK 55 standard equipment sale price:	$352,000
Total Sales Price	***$352,000***

Please contact us if you have any questions or comments.

District Sales Manager:	Rick Calmes
Phone:	716-537-3596
Email:	richard.calmes@itt.com
Applications Engineer (if applicable):	Josey Chan

SIEMENS

Formerly SUNLIGHTSYSTEMS

UV DISINFECTION WASTEWATER PROJECT SIZING FORM

Date:_____ Siemens contact: _____

Project name:_____ Project location: _____

Project engineer: _____ Sales representative: _____

Flow rates

Peak instant: _____ Average: _____ Minimum: _____

Disinfection period: Full year ☐ Seasonal ☐ Flow meter available: Yes ☐ No ☐

Design parameters

UVT%: _____ TSS: _____mg/l BOD: _____ mg/l

Effluent temp.: _____ Air temp.: _____ Discharge permit: _____mpn/100 ml

Desired dosage: _____(if available) Location of UV system: Indoor ☐ Outdoor ☐

Orientation and Technology

System type: Chambered ☐ Vertical open channel ☐ Horizontal open channel ☐ Inline vessel ☐

Channel type: Stainless steel ☐ Pre-poured concrete ☐ Existing concrete ☐

Channel level control: Finger weir ☐ Flap gate ☐ Downward gate ☐

Vessel: Inlet type and size:_____

UV lamp type: standard ☐ high output ☐ high intensity aka amalgam ☐ medium pressure ☐

Options and Controls

UV Monitoring: Yes ☐ No ☐ PLC: Yes ☐ No ☐ Redundancy: Yes No_____

UV transmission monitoring: Yes ☐ No ☐ Online UVT ☐ Lab Photometer ☐

Automatic cleaning: Yes ☐ No ☐ Cleaning tank: Yes ☐ No ☐ Hoist: Yes ☐ No ☐

80 Commerce Drive
Allendale, NJ 07401
(201) 760-0364 Fax (201) 760-0586

From: eschiebold@aol.com
Sent: Tuesday, August 04, 2009 9:15 AM
To: Benoit Dennis J.
Subject: Fwd: Howell, MI
Attachments: WASTEWATER_DATA_SHEET.pdf

Dear Dennis:
Any information you can provide will be helpful. See below.

Sincerely,
Eric Schiebold
Environmental Sales, Inc.
17348 W 12 Mile Road
Suite 103
Southfield, MI 48076-6325
vox 248-569-9393
fax 248-569-9388
cell 248-761-7195

-----Original Message-----
From: Kim, Steve (WT) <Steve.Kim@siemens.com>
To: eschiebold@aol.com
Cc: Bermudez, Arthur L (WT) <Arthur.Bermudez@siemens.com>; Bourne, Derek (WT) <Derek.Bourne@siemens.com>; Graff, Larry E (WT) <larry.graff@siemens.com>; Yelpo, Joseph (WT) <Joseph.Yelpo@siemens.com>
Sent: Tue, Aug 4, 2009 8:51 am
Subject: RE: Howell, MI
Eric,

Can we get drawings of the existing channel if available?
Also I need some design information to be able to size the system. Attached is a design form.
Please see if you can find out the target dosage and/or permit. Also the minimum UVT if known.
Thank you,
Steve Kim
UV Applications Engineer
Siemens Water Technologies
ph: 856.507.4057/ 201.760.0364 | fax: 856.507.4079 | 1901 West Garden Road | Vineland, New Jersey 08360 | Siemens Water/UV

From: Graff, Larry E (WT)
Sent: Monday, August 03, 2009 4:59 PM
To: Kim, Steve (WT); Yelpo, Joseph (WT)
Cc: Bermudez, Arthur L (WT); eschiebold@aol.com; Bourne, Derek (WT)
Subject: FW: Howell, MI