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Fluid Solutions

UnitedRentals

RDN

NBPCC Final Effluent Chamber No. 25-017
July 2025

Nanoose Bay, BC

Attn:
Ian Benoit, Capital Project Delivery

Written by:
Graham Robb, United Rentals Territory Manager



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Project Scope

- The effluent discharge piping in the final effluent chamber (and associated valving) is a critical piece of infrastructure which discharges effluent to the main effluent outfall. The piping is corroded and in 4 need of repair. During the work, the wet well will need to be bypassed. The work will require confined space entry. There is a mix of both Poly Ethelene and carbon steel pipe in the project. The existing pumps are generally in good condition and will not require replacement, although the pump bases may require replacement.
- ~~Flow Max =~~ Operating flow = 55 GPM. Max Flow = 135 GPM
- Bypass design from "SEDIMENTATION TANK NO.1 to OUTFALL

System Design

- Primary pump shall consist of (1) 4x4 PP44S10 Diesel Pump
    - Each pump will be running at 1500 engine RPM, @ 300 GPM through 1150' of 6" Lay Flat hose. Each pump will be connected to primary line through valving for throttling purposes due to the low flow. Pump is powered by a John Deere 4024TF281 engine or equivalent with a DBA of 68 at 23 feet.
- Redundant pumps shall consist of (1) 4x4 PP44S10 Diesel Pump
    - Same as the primary pump with independent discharge to primary line and isolated through a gate valve.

Design Notes

1. *Full engineering with a stamped plan to be provided post-award.*
2. *United Rentals to follow all safety policies of the Client.*
3. *Traffic Plan provided by Client.*
4. *Site safety precautions are to be discussed once the plan is approved.*
    a. *Field Level Hazard Assessment to be completed daily at the beginning and end of each shift.*

Work Flow Plan (Theoretical)

1- Unload trucks and place pumps & install suction setup
    a. Estimated duration 1 days
2- Install Discharge Hose
    a. Estimated duration 1 days
3- Hydrotest pump and pipe setup. (May include rework to ensure no leaks)
    a. Estimated duration 1 day
4- 24hr pumping and tech to supervise monitoring of system throughout entire duration.
    a. Estimated at 28-day cycle price.
5- Line decommissioning once the project is complete.
    a. Estimated 2 days.

Installation Procedure

Step	Description	Responsibility
1	Expose piping surrounding Final Effluent Chamber	Prime Contractor
1	Install the bypass pumps adjacent to Sed Tank 2 (Main and backup)	Prime Contractor / Bypass sub-contractor
2	Install float switches and cabling connections	Prime Contractor / Bypass sub-contractor
3	Lay out suction hose in a manner that does not interfere with mechanism rotation at specified elevations	Prime Contractor / Bypass sub-contractor
4	Lay out discharge hose near tie-in adjacent to final effluent chamber (after exposing via hydrovac)	Prime Contractor / Bypass sub-contractor
5	RDN operations to pump down sed tank 2 to approximately 36.3m in elevation via spare pump	RDN
6	Prime contractor to have septic truck on standbye	Prime Contractor
7	RDN operations to shut down existing 3x final effluent pumps	RDN
8	RDN operations to empty outfall discharge line	RDN
9	Prime contractor to install PVC tie-in for bypass pumping as per the Koers drawings	Prime Contractor
10	Hydrotest bypass pumping	Prime Contractor / Bypass sub-contractor
11	After succesfully tested, prime bypass pumps	Prime Contractor / Bypass sub-contractor
12	Begin bypass pumping	Prime Contractor / Bypass sub-contractor
13	Prime contractor to follow procedures and enter tanks to complete stainless piping installation, including isolation of final effluent chamber, install existing pumps	Prime Contractor
14	Pump down sed tank 2 to approximately 36.3m in elevation via bypass pumping	Prime Contractor / Bypass sub-contractor
15	septic truck on standbye	Prime Contractor
16	Shut down bypass pumping	Prime Contractor / Bypass sub-contractor
17	Complete final connection at discharge tie-in	Prime Contractor
18	Service test system	Prime Contractor / Bypass sub-contractor
19	Demob	Prime Contractor / Bypass sub-contractor

Equipment Information:

- Pumps
    - Model # = 4x4 PP44S10
    - Specs found in Equipment PDF after engineering in document.
- Hose
    - Suction & Manifold
        - 4” Suction Hose
        - 6” Discharge Hose and valving
- Floats and Pump Control Panel – Refer to pages 10-12for detailed specs.
- Callout system to be plugged into pump control panel. If not linked to RDN system, UR telemetry system can be used for callout. Starlink or other communication method may be required if cell service not available on site.

Redundancy Plan

- All pumping is designed with 100% redundancy on pumping capabilities.
- Site located within 2 hours of United Rentals Fluid Solution Branch.
- Professional Engineer did all hydraulic calculations.

Suction & Discharge Protection Measures

- Rubber suction hoses to be installed into chamber with matting over the edge to reduce impact on chamber and hose integrity.
- Discharge hose equipped with gate valves to allow for line isolation.
- Pumps and lines will be flagged for visibility.

Spill Response Plan

- Site C-Can has spill-clean kits and extra gear to mitigate the risk of spills throughout the out project.
- Stalker excavating or Groess Environmental partners with United Rentals on all bypass projects in the Nanaimo area. Not only do they do our hydro testing and bleach flushes but have a dedicated truck for us on an emergency basis 24hrs/day during live bypasses and diversions.
    - To be determined post award.

Risk Assessment & Mitigation

1. Predesign
    a. Site walk with RDN to review setup within chambers prior to pumping, but post award to URFS.
    b. Discharge tied into existing sanitary relief chamber to be confirmed post award.
    c. Lay flat hose to reduce installation time of piping.
    d. 100% redundancy provided in the pumping plan for pumps.
2. Setup
    a. Hydro test on pumping setup to be completed after setup.
        i. Any leak points will be identified and fixed prior to going live.
    b. All pumping equipment is set in spill guards. 12” walls surround pumps and capture everything from leaks on valves to fuel during filling. Spill guards will be cleaned out with hydro-vac once the project is complete or throughout depending on the duration.
3. Preconstruction
    a. Once the hydro test is complete URFS is ready to handle whatever test length deems necessary to approve work can commence.
4. Operation
    a. Due to the nature of bypass projects, spill kits, and redundant equipment (gaskets, plugs, bolt kits, compressors, etc.) can be found inside our onsite c-can/mobile office.
    b. Onsite monitoring sheets are provided on all bypasses. Sheets cover hourly checks of many facets of the project including but not limited to plug PSI, fuel levels, pump RPM, site-specific concerns…
5. Decommissioning
    a. Adequate crew to facilitate spotting equipment and heavy lifting.
6. Fuelling/Gasoline
    a. Fueling equipment to be provided by RDN/GC once awarded. Trans cube will be onsite and tied into pumps to reduce mitigate any fuel shortage.

Bypass Lead:

- **Team Lead - Jason Shihinski – (SWAT) Operations Manager Pumping Solutions**
  - 2018 – Present (Current Role)
    - Manages and assists in the planning, mobilization, operations, and demobilization of sanitary sewer line bypasses, river diversions, and ground dewatering.
    - Projects to highlight:
      - North Vancouver Effluent bypass @ 2.2m3/s
      - Toronto Sanitary Trunk Line Rehab @ 1m3/s
      - Calgary Nose Creek Sanitary Trunk Line Rehab @ 3m3/s

  - 2004 – 2018 Operations Manager for NEP Operating Company & MEC Operating Company
    - Oversaw operations for all 6 branches / 14 oilfields across AB including all production, pipelines, facilities, environmental, regulatory, well servicing, and drilling operations.
    - 9 direct reports, 38 indirect reports, as well as all consultants and contractors.
    - Daily production reporting and held weekly project meetings/updates.
    - Managed water requirements for fracking operations.
      - Longest line moved water 35kms from the North Saskatchewan River past Leduc to 3 drilling pads for fracking (8) D2 horizontal wells.
    - Responsible for over 2000kms of pipeline.
    - Achieved certification in Pumps 201 Hydraulic efficiency classroom training.
      - Proficient in troubleshooting NPSH, Fluid Dynamics, Centrifugal Pump Construction & Repair.

- Day and Night leads will be picked prior to start-up based on availability.
    - All members of bypass SWAT team have full training from UR on pump operations, troubleshooting, fusion, and UR standard of safety.

Site Layout and Equipment Installation Locations

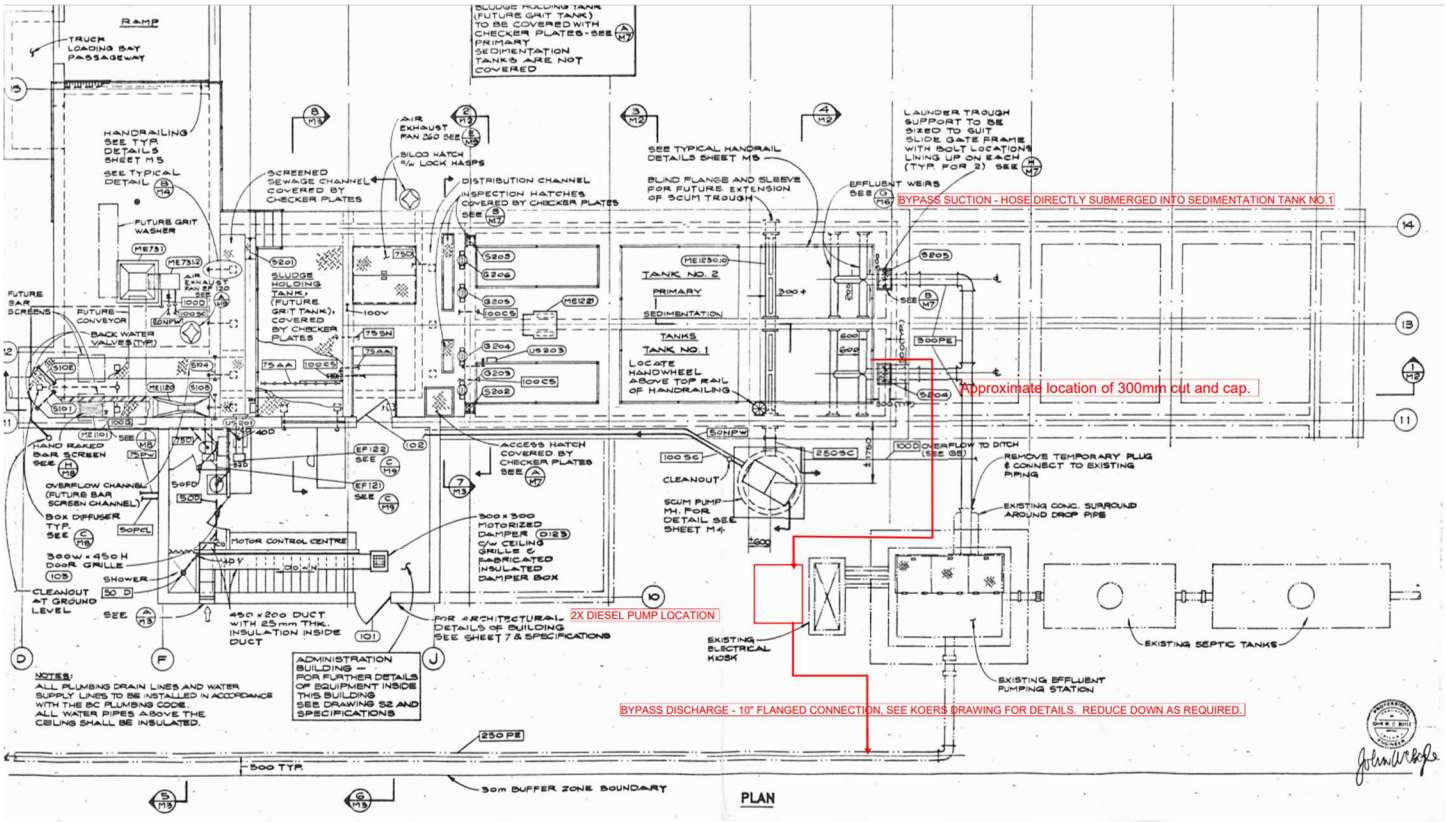


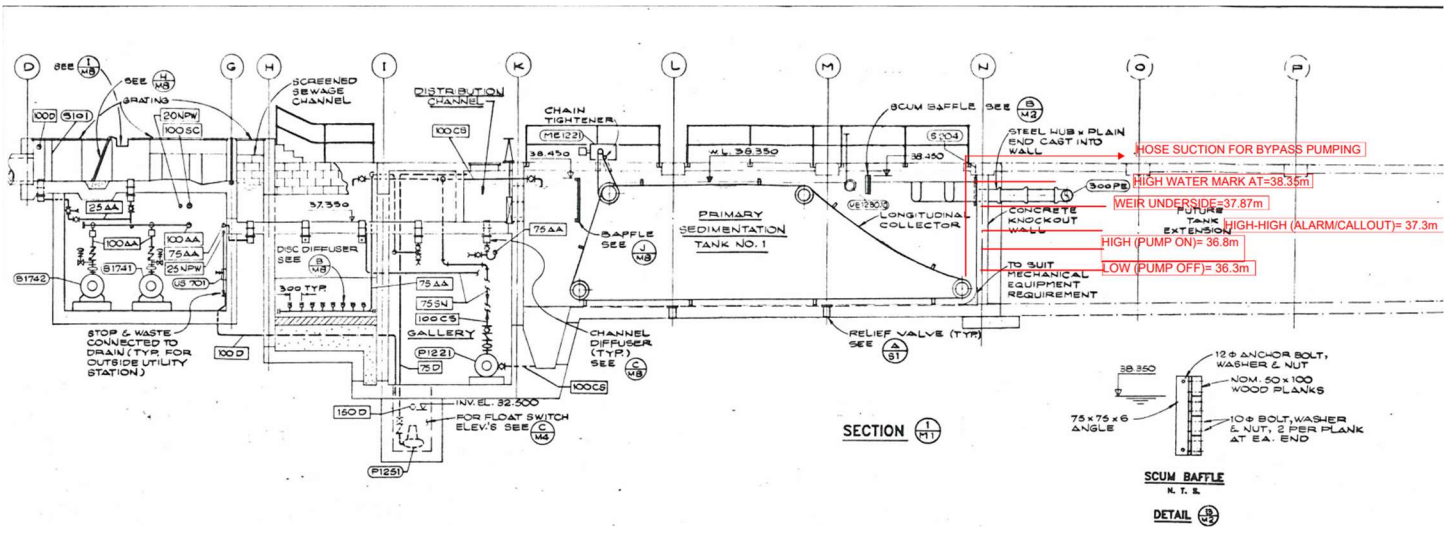
To Be Completed by Contractor

1. As per drawings below, contractor to spec fittings and isolate tank #2 to reroute to tank #1.
2. Expose pipe from final effluent chamber and hot tap a flanged end for bypass discharge hose to connect to.

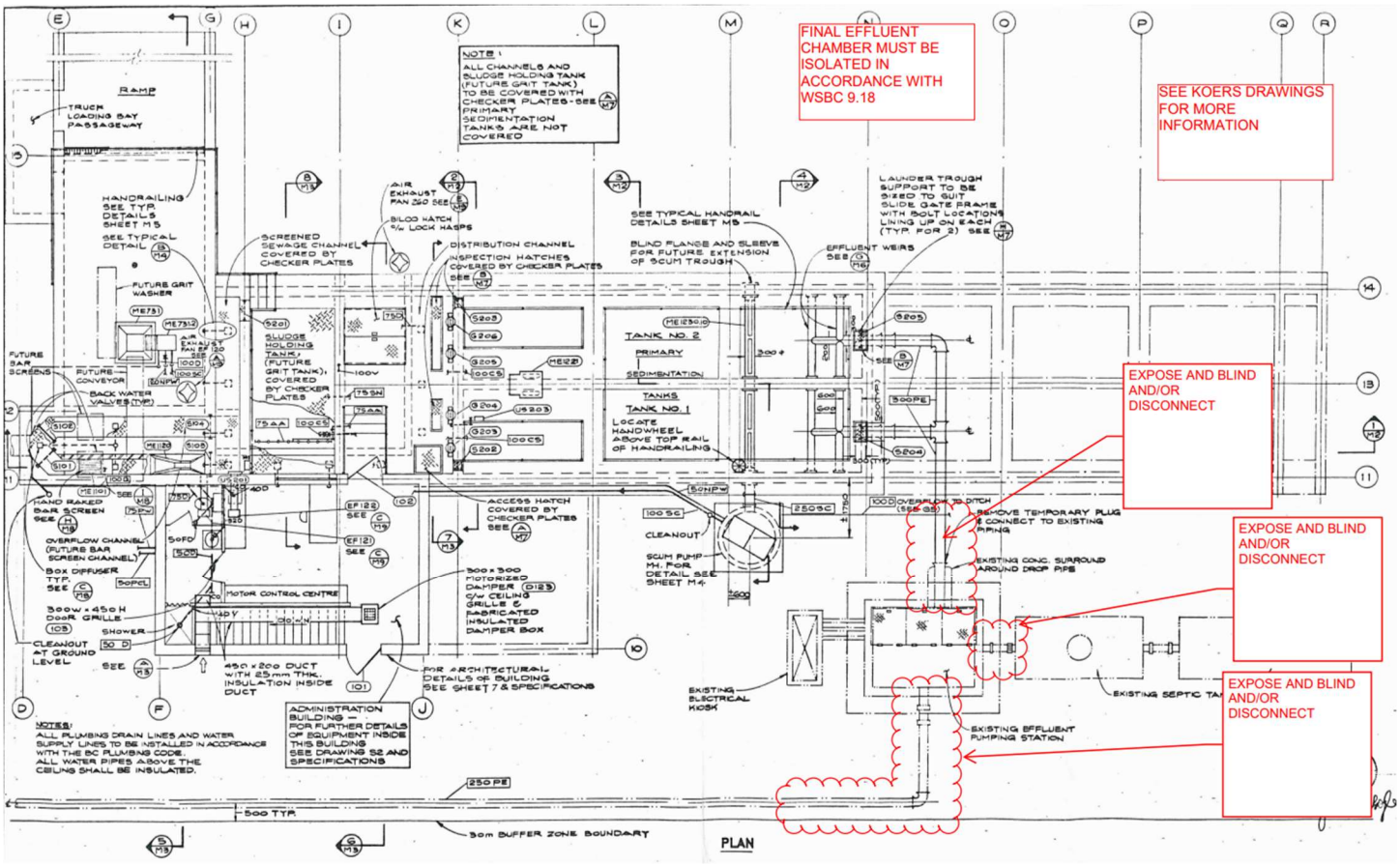
a. ANSI 150 10” flange

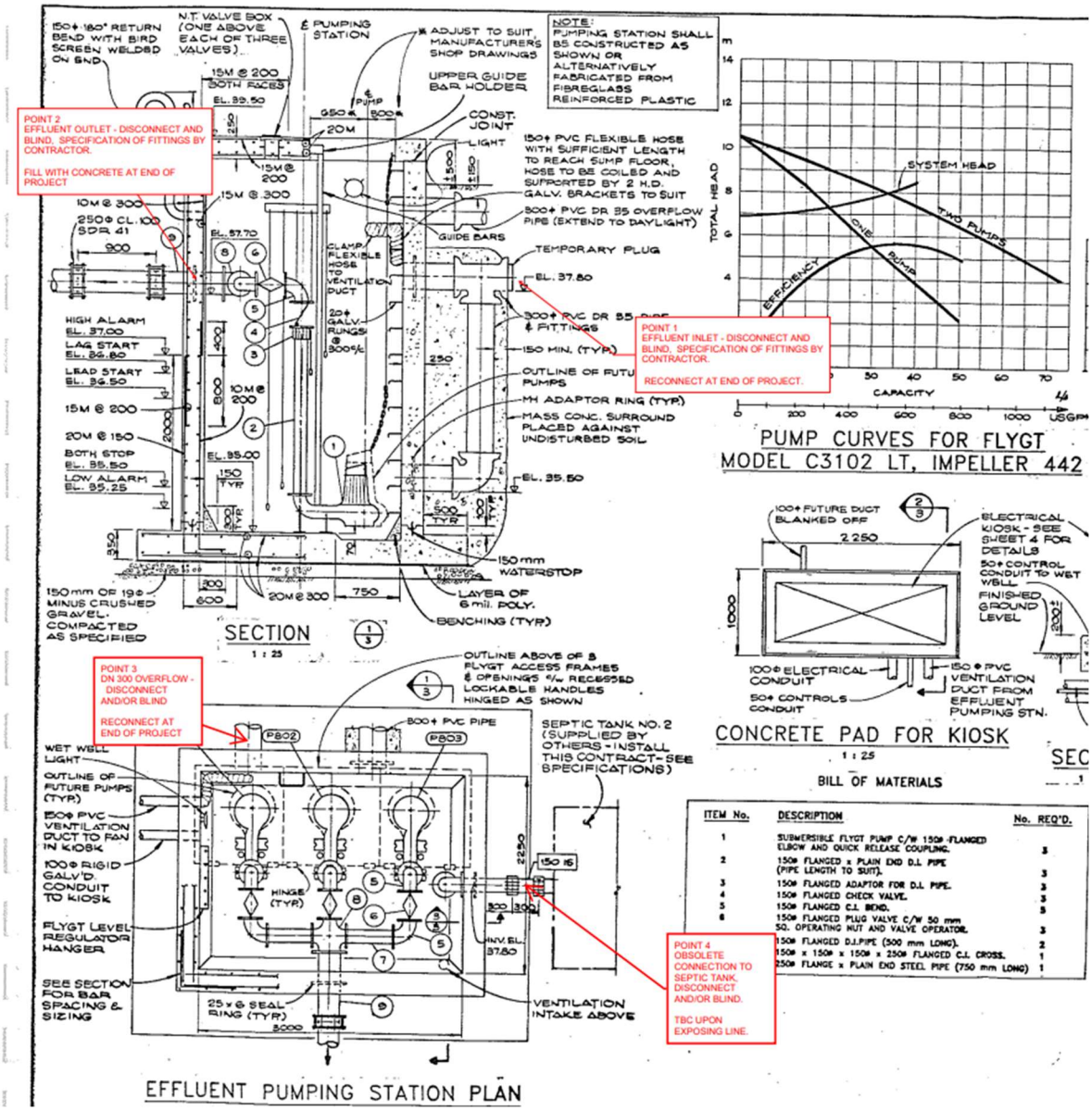
b. Disconnect exit pipe (blind flange?) from effluent chamber so bypass pumping can use existing forcemain pipe.




SCREENED SEWAGE CHANNEL
GRATING
DISTRIBUTION CHANNEL
CHAIN TIGHTENER
SCUM BAFFLE
STEEL HUB x PLAIN END CAST INTO WALL
HOSE SUCTION FOR BYPASS PUMPING
HIGH WATER MARK AT=38.35m
WEIR UNDERSIDE=37.87m
CONCRETE KNOCKOUT WALL
FUTURE TANK EXTENSION
HIGH-HIGH (ALARM/CALLOUT)= 37.3m
HIGH (PUMP ON)= 36.8m
LOW (PUMP OFF)= 36.3m
TO SUIT MECHANICAL EQUIPMENT REQUIREMENT
PRIMARY SEDIMENTATION TANK NO. 1
LONGITUDINAL COLLECTOR
BAFFLE
DISC DIFFUSER
GALLERY
CHANNEL DIFFUSER (TYP.)
RELIEF VALVE (TYP.)
STOP & WASTE CONNECTED TO DRAIN (TYP. FOR OUTSIDE UTILITY STATION)
INV. EL. 32.500
FOR FLOAT SWITCH ELEV.'S
SECTION
12Φ ANCHOR BOLT, WASHER & NUT
NOM. 50 x 100 WOOD PLANKS
75 x 75 x 6 ANGLE
10Φ BOLT, WASHER & NUT, 2 PER PLANK AT EA. END
SCUM BAFFLE
DETAIL

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To Be Completed by URFS

1. Install pumps next to sediment tank 2 and insert suction hose into the chamber as per separate engineered plan.
    a. Install float controls on panel and set level for continuous and or variable pumping at desired rate. Pumping plan is designed based off of existing pumps in the wet well with a higher achievable PSI. This will enable us to overcome the friction losses in the existing forcemain pipe as found in segment 4 and 5 of the pumping plan.
    b. High/High float to be set at elevation of 36 meters in sed tank #1. Pump on float to be set at elevation of 35.5 meters in sed tank #1. Pump off float to be set at elevation of 34 meters in sed

tank #1.

2. Run discharge line to exposed effluent pipe and attach to flanged hot tap as seen in respective koers drawings.
    a. Based on the information given including layout and profiles of pipe this pumping plan will overcome the existing PSI requirements to use the existing underground forcemain through the 10" line and into the 12" line with approximately 1100' total length and over 24' of static head.
    b. URFS to provide 10" flange by cam adaptor to tie into 250mm line.
    c. URFS to provide air relief valve to be installed at tie-in.
    d. Contractor or RDN to supply 10" flange tie in port.

URFS plans to work closely with the chosen Mechanical Contractor to execute these needs so we can keep the area free and clear of fluid for all permanent repairs to be made to the existing pump station

Exclusions

- Light towers if working at night.
- Pump staging area grading and prep to be done by contractor.
- Equipment protection (jersey barriers, barricades, etc.)
- Traffic control measures incl. flagging for deliveries or installation
- Permits of any type
- Site office & Restrooms

Conclusion

Based on the information given and working with the client to provide best practices for the care of water; we believe this bypass plan will keep the area free and clear for the client to complete their work and provide sufficient capacity for the flows projected.

If there are any questions or concerns about the outline or proposed solutions don't hesitate to get in touch with me. We look forward to providing you with the equipment and expertise to complete this job.

Sincerely,

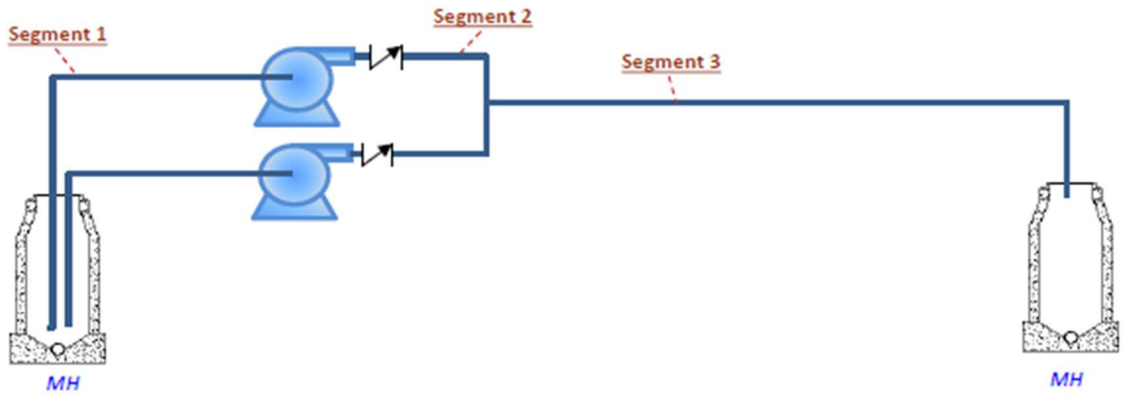
Graham Robb – Outside Sales Rep Vancouver Island, BC

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TOTAL DYNAMIC HEAD (TDH) CALCULATION
INPUTS

Branch:		Date:	3/26/2025
Customer:		Project:	

BYPASS PUMPING



Service:	Input	System Design Flow	300	Site Elevation: (Ft)	130	
Total Number of Pumps	2	System Peak Flow	101	Liquid Temperature (Deg. F)	70	
Working Pumps	1	System Minimum Flow		Liquid Being Pumped	Sewage	
Backup Pumps	1			Friction loss methodology	Hazen-Williams	

		Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6
Number of parallel pipes in segment		2	2	1			
Pipe (Select from drop down list)		Hose - 6" Rigid	Hose - 6" Rigid	HDPE 6" DR26	N/A	N/A	N/A
Flow Rate	GPM	300	300	300			
Lift	ft.	9					
Flooded Suction	ft.	0					
Suction Pressure	psi	0					
Suction Vacuum	inHg	0					
Length	ft.	20	20	1095			
Elevation Change	ft.		-3	-5			
Pressure @ line	psi		0	25			
Fittings							
>45º ell	# Qty.	0	0	0			
>90º std. ell	# Qty.	1	1	1			
>90º LR ell	# Qty.	0	0	0			
>Butterfly valve	# Qty.	0	0	0			
>Gate valve	# Qty.	0	0	0			
>Check Valve	# Qty.	0	1	1			
>Knife Gate Valve	# Qty.	0	1	0			
>Globe Valve	# Qty.	0	0	0			
>Wye	# Qty.	0	1	0			
>Tee - Branch	# Qty.	0	0	0			
>Tee - Thru	# Qty.	0	0	0			
>Return Bend	# Qty.	0	0	0			
>Reducer/Increaser	# Qty.	0	0	3			
>Suction Strainer	ft (head loss)	1.0					
> Road Crossing - 8"	Qty	0.0	0.0	1.0			
> Element 2	psi (head loss)	0.0	0.0	0.0			
> Element 3	ft (head loss)	0.0	0.0	0.0			
>Element 4	psi (head loss)	0.0	0.0	0.0			
>Throttled Gate valve 1	Closure (%)	-	-	-			
>Throttled Gate valve 2	Closure (%)	-	-	-			

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TOTAL DYNAMIC HEAD (TDH) CALCULATION
DETAILED CALCULATIONS

Branch:	-			Date:			3/26/2025
Customer:	-			Project:			-
Service:		Input	Design Flow	300	Site Elevation: (Ft)		130
Total Number of Pumps		2	Peak Flow	101	Liquid Temperature (Deg. F)		70
Number of Backup Pumps		1	Minimum Flow	-	Liquid Being Pumped		Sewage
			Specific Gravity	1.00	Kinematic Viscosity (cSt)		1.02
					Vapor Pressure (psi)		0.36

		SUCTION			DISCHARGE		
		Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6
Pipe Material/Size:		Hose - 6" Rigid	Hose - 6" Rigid	HDPE 6" DR26	N/A	N/A	N/A
Pipe I.D.:	In.	6	6	6.085			
C Factor Pipe smoothness		140	140	150			
Flow Rate	MGD	0.4	0.4	0.4			
	GPM	300	300	300			
Velocity	ft./sec	3.4	3.4	3.3			
Reynolds Number		155299	155299	153130			
STATIC HEAD							
Lift Elevation	ft.	9					
Flooded Suction Elevation	ft.	N/A					
Suction Pressure	psi / ft.	N/A					
Suction Vacuum	in. hg / ft.	N/A					
Elevation Change	ft.		-3	-5			
Pressure @ line	psi / ft.		0 / 0	25 / 57.8			
STATIC HEAD	ft.	9.0	-3.0	52.8			
FRICTION LOSS							
Actual pipe length:	ft.	20	20	1095			
Equivalent Length (Fittings)							
>45º ell	#Qty. / Total ft.	-	-	-			
>90º std. ell	#Qty. / Total ft.	# 1 / 15	# 1 / 15	# 1 / 16			
>90º LR ell	#Qty. / Total ft.	-	-	-			
>Butterfly valve	#Qty. / Total ft.	-	-	-			
>Gate valve	#Qty. / Total ft.	-	-	-			
>Check Valve	#Qty. / Total ft.	-	# 1 / 50	# 1 / 51			
>Knife Gate Valve	#Qty. / Total ft.	-	# 1 / 5	-			
>Globe Valve	#Qty. / Total ft.	-	-	-			
>Wye	#Qty. / Total ft.	-	# 1 / 30	-			
>Tee - Branch	#Qty. / Total ft.	-	-	-			
>Tee - Thru	#Qty. / Total ft.	-	-	-			
>Return Bend	#Qty. / Total ft.	-	-	-			
>Reducer/Increaser	#Qty. / Total ft.	-	-	# 3 / 8			
Pipe length : Actual + Equivalent	ft.	35	120	1169			
>Suction Strainer	ft. (head loss)	1					
> Road Crossing - 8"	ft. (head loss)	-	-	0.1			
> Element 2	ft. (head loss)	-	-	-			
> Element 3	ft. (head loss)	-	-	-			
>Element 4	ft. (head loss)	-	-	-			
>Throttled Gate valve 1	ft. (head loss)	-	-	-			
>Throttled Gate valve 2	ft. (head loss)	-	-	-			
TOTAL FRICTION LOSS	ft.	1.2	0.8	6.8			
DYNAMIC HEAD IN SEGMENT	**ft.**	**10.2**	**-2.2**	**59.6**			

TDH	**ft.**	**67.6**	**psi**	**29.2**

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TOTAL DYNAMIC HEAD (TDH) CALCULATION SUMMARY

Branch:	-			Date:		3/26/2025	
Customer:	-			Project:		-	
Service:	Input				System Design Flow	GPM	300
Total Number of Pumps	2				System Peak Flow	GPM	101
Number of Backup Pumps	1				System Minimum Flow	GPM	-

SUCTION HEAD CALCULATION		Segment 1
Pipe Material / Size:		Hose - 6" Rigid
Pipe I.D.:	In.	6
C Factor Pipe smoothness		140
Flow Rate	MGD	0.4
	GPM	300
Velocity	ft./sec	3.4
Reynolds Number		155299
STATIC HEAD	ft.	9.0
Actual pipe length:	ft.	20
Pipe length : Actual + Equivalent	ft.	35
TOTAL FRICTION LOSS	ft.	1.2
SUCTION TDH	ft.	10.2

Site Elevation: (Ft)	130
Atmospheric Pressure (psi)	14.65
Liquid Temperature (Deg. F)	70
Liquid Being Pumped	Sewage
Kinematic Viscosity (cSt)	1.02
Vapor Pressure (psi)	0.36
Specific Gravity	1.00
Is Pump Centerline Distance Included in Suction Lift?	Yes
Net Positive Suction Head - Available	
NPSHa	*22.8* ft.
Effective Suction Lift	*11.1* ft.

DISCHARGE HEAD CALCULATION		Segment 2	Segment 3
Pipe Material / Size:		Hose - 6" Rigid	HDPE 6" DR26
Pipe I.D.:	In.	6	6.085
C Factor Pipe smoothness		140	150
Flow Rate	MGD	0.4	0.4
	GPM	300	300
Velocity	ft./sec	3.4	3.3
Reynolds Number		155299	153130
STATIC HEAD	ft.	-3.0	52.8
Actual pipe length:	ft.	20	1095
Pipe length : Actual + Equivalent	ft.	120	1169
TOTAL FRICTION LOSS	ft.	0.8	6.8
DISCHARGE TDH	ft.	-2.2	59.6

SYSTEM TDH	ft.	67.6	psi	29.2

	Flow per Pump	System Flow	SYSTEM TDH	
	MGD / GPM	MGD / GPM	ft.	psi.
Design/Peak Flow	0.43 / 300	0.43 / 300	67.6	29.2
Average Flow	0.15 / 101	0.15 / 101	60.8	26.3

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TOTAL DYNAMIC HEAD (TDH) CALCULATION

PUMP CURVE

Branch:	-	Date:	3/26/2025
Customer:	-	Project:	-
Service:	Input		

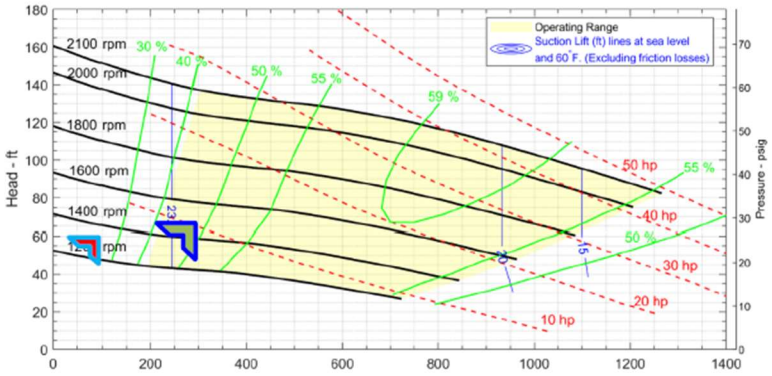
Design Flow
300 gpm @ 67.6ft

NPSHa	22.8	ft.
NPSHr	8.0	ft.

Peak Flow
101 gpm @ 60.8ft

NPSHa	22.6	ft.
NPSHr	8.0	ft.

Performance Curve



Pump Make	Pioneer Pump
Pump Model	PP44S10
Operating Speed	Variable
Min. Speed	1200 rpm
Max. Speed	2100 rpm
Impeller Rated Dia.	10 inch
Impeller Type	Enclosed
No. of Impeller Vanes	2
Solid Dia.	3 inch
Specific Speed	2165 US Units
Suction Size	4 inch
Discharge Size	4 inch

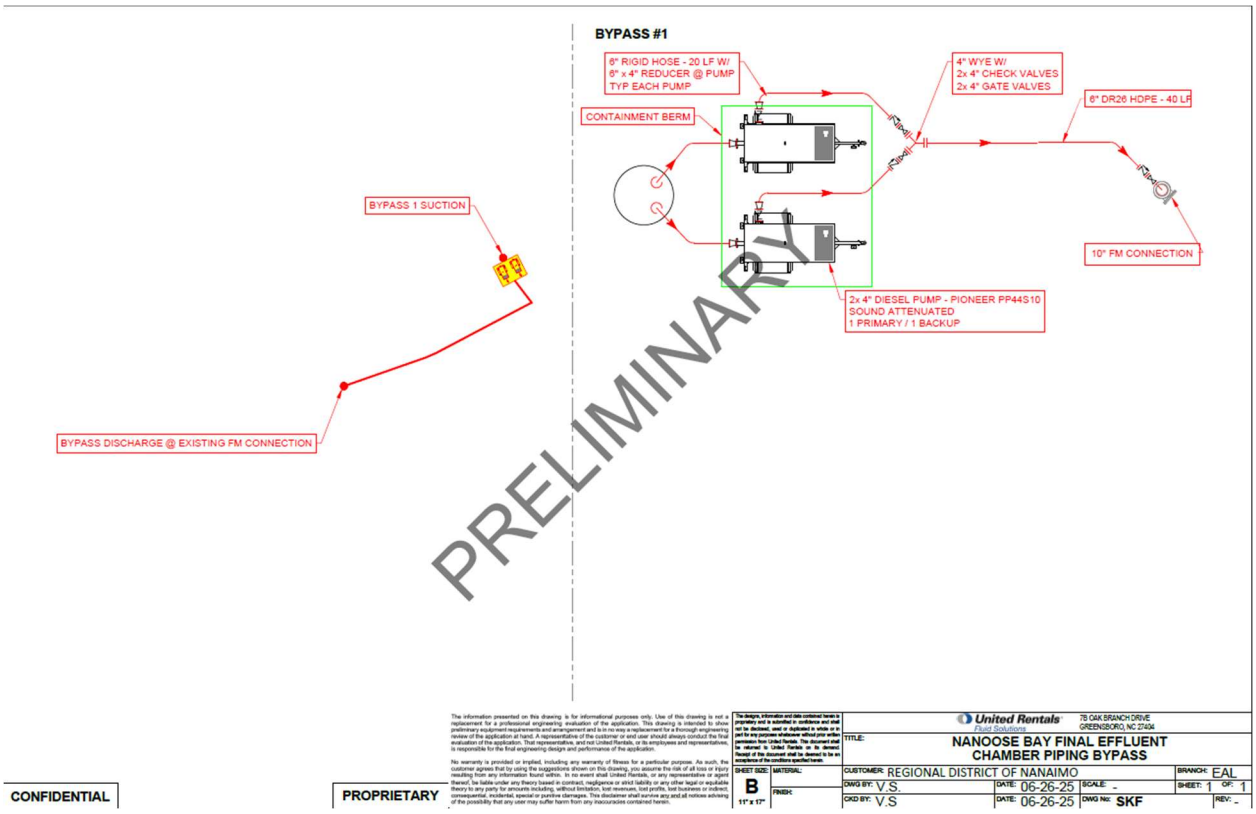
Suction Lift lines shown on the curve are for Sea Level Elevations

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Duty point within operating range

Duty point outside operating range. System modification such as surcharging, throttling etc. required or warnings

Duty point outside operating range


BYPASS #1
6" RIGID HOSE - 20 LF W/
6" x 4" REDUCER @ PUMP
TYP EACH PUMP
CONTAINMENT BERM
4" WYE W/
2x 4" CHECK VALVES
2x 4" GATE VALVES
6" DR26 HDPE - 40 LF
BYPASS 1 SUCTION
10" FM CONNECTION
2x 4" DIESEL PUMP - PIONEER PP44S10
SOUND ATTENUATED
1 PRIMARY / 1 BACKUP
BYPASS DISCHARGE @ EXISTING FM CONNECTION
PRELIMINARY
CONFIDENTIAL
PROPRIETARY
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78 OAK BRANCH DRIVE
GREENSBORO, NC 27406
TITLE:
NANOOSE BAY FINAL EFFLUENT
CHAMBER PIPING BYPASS
CUSTOMER: REGIONAL DISTRICT OF NANAIMO
BRANCH: EAL
DWG BY: V.S.
DATE: 06-26-25
SCALE: -
SHEET: 1 OF: 1
CKD BY: V.S
DATE: 06-26-25
DWG No: SKF
REV: -
SHEET SIZE: B
11" x 17"
MATERIAL:
FINISH:

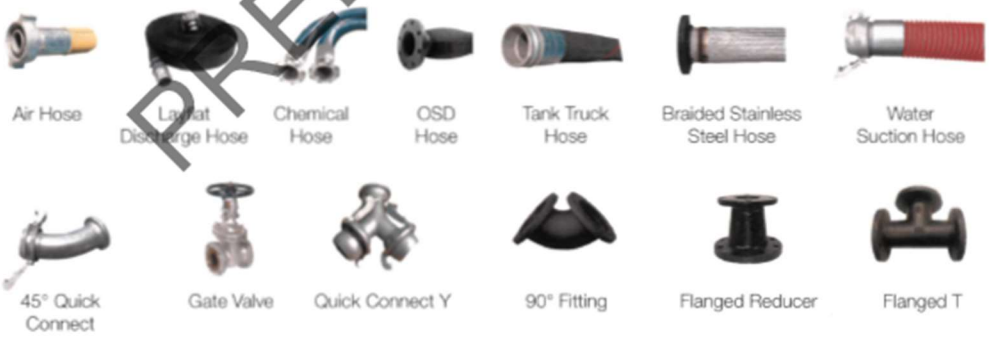
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Hose Data

Hose	Material Construction	Max psi (bar)	Size in (cm)	Fittings
Water Suction	PVC Kanaflex Rubber	50 (3.4) 70 (4.8) 150 (10.3)	2-12 (6-31)	Camlock Quick-Connect
Layflat Discharge	Rubber (Oil Resistant Cover)	150 (10.3)	2-12 (6-31)	Camlock Quick-Connect
Tank Truck	Nitrile	150 (10.3)	2-8 (5-21)	Camlock 150# Flanged Hammer Union
Oil Suction & Discharge (OSD)	Nitrile	250 (17.2)	3-14 (8-36)	150# Flanged 300# Flanged
All Chemical	UHMW Polyethylene	200 (13.8)	2-8 (5-21)	SST 150# Flanged SST Camlock
Stainless Steel Braided	316 Stainless Steel Double Braided	200-400 (13.8-27.6)	2-8 (5-21)	150# Flanged 300# Flanged
Air	Rubber Textile Braided	200 (13.8) 500 (34.5)	¾-3 (2-8)	Crow's Foot Bull/Boss

Pipe Data

Pipe	Material Construction	Max psi (bar)	Size in (cm)
HDPE	HDPE DR17 HDPE DR26 HDPE DR32.5	130 (9.0) 80 (5.5) 65 (4.5)	4-36 (10.2-91.4)
Quick Connect	Laminated Steel	175 (12.1)	4-12 (10.2-30.5)



Air Hose | Layflat Discharge Hose | Chemical Hose | OSD Hose | Tank Truck Hose | Braided Stainless Steel Hose | Water Suction Hose

45° Quick Connect | Gate Valve | Quick Connect Y | 90° Fitting | Flanged Reducer | Flanged T

PRELIMINARY

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Sensors

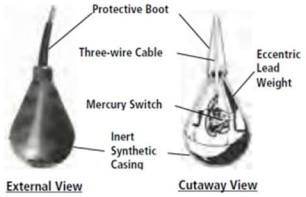
Level Floats

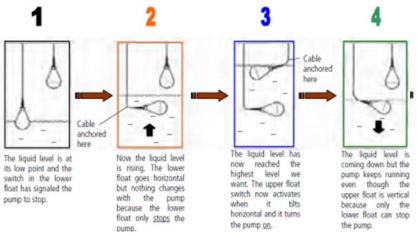
FEATURES :

Monitoring system parameter (Low and high level set points in suction pit)

Control pump on/off through control panel (Switch Input)

Remote Alarm through auto-dialers or remote monitoring





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Standard
Control Panel

Direct Replacement to LOFA CP750 Panel

Auto & Manual Operation

Tier 4 Electronic Engine Support

On/Off Key Switch with Safety Lockout Bracket

Easy Setup for Quick Installations



STANDARD ELECTRONIC PANEL FOR ENGINE DRIVEN PUMPS

This powder coated steel panel is designed to be a direct replacement to the CP750 panel for all electronically governed engines. Allowing for manual and auto control at the press of a button enables superior operator control from manual mode to auto mode without shutting down the pump.

The control panel supports J1939 CAN protocols for electronically governed engines as well as messaging and Icons for Tier 4 engines.

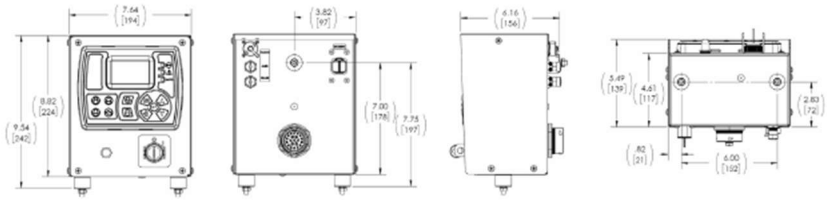
The design allows for easy serviceability through the lifetime of the system. The easy to use menu allows for quick setup without the need of a PC.

Available Auto Start Functions Single Float • Dual Float • Level Pressure • Flow • Temperature

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Standard Control Panel

DIMENSIONS



SPECIFICATIONS

HARDWARE	
SCREEN SIZE	2.7 inches, WQVGA Monochrome HR-TFT
RESOLUTION	400 x 240
LEDs	(1) Red, Shutdown (1) Amber, Warning (1) Green, Auto mode
CIRCUIT BREAKER	20A (TE W58-XB1A4-20)
CONNECTORS	(1) 21 Pin Engine Connector (Deutsch HDP26-24 series) (1) 4 Pin Float Connector (TE/AMP 206061-1) (1) 5 Pin RS485 Connector (M12, Code A) (1) 5 Pin Analog Input Connector (M12, Code A) (1) 6 Pin Gateway Connector (TE/Amp AT04-6-CL06)
ENCLOSURE	Controller: Polycarbonate/ABS Panel: Powder-coated cold rolled steel
ISOLATION MOUNTS	(3) 1.00" x 0.75" Natural Rubber with 1/4-20 UNC x 0.50" Zinc Plated Steel Studs

ELECTRICAL	
OPERATING VOLTAGE	8-32 VDC, reverse battery polarity and load dump protected
TOTAL CURRENT CONSUMPTION	Power on in Ready to Start state: 117 mA at 12 VDC Power on in Standby mode: 52 mA at 12 VDC
INPUTS	(2) Digital, Dedicated for Floats (3) Analog (AI1) Dedicated for Fuel Level (AI2) Parameter Selectable for 4-20mA or Resistive Sensors (AI3) Parameter Selectable for 4-20mA or Resistive Sensors
OUTPUTS	(2) Relays: 10A (RLY1) Dedicated for Starter Cranking (RLY2) Dedicated for ECU Enable (1) Dedicated Alternator Excite (provides Charge Fail Fault if unable to excite alternator when the warning is enabled

ENVIRONMENTAL	
OPERATING TEMPERATURE	-40°C to +85°C (-40°F to 185°F)
STORAGE TEMPERATURE	-40°C to +85°C (-40°F to 185°F)
INGRESS PROTECTION	Controller: IP67 and IP69K front and back Panel: IP44 from all sides

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PP44S10 - Data Sheet

4" Diesel Pump

Vacuum Assisted – dBa Silencer

Product Description

Diesel engine driven centrifugal pump equipped with vacuum-assisted priming system.
Trailer mounted for easy transportation and enclosure for sound attenuation, having the following additional features: Run dry mechanical seal, Auto-start control, monitoring of fuel level, engine load, run time, oil and coolant temperature, and telemetry system.

Technical Data

Operating Parameters

Min. / Max. Flow	210 gpm / 1266 gpm
Min. / Max. Shutoff Head	53 ft (23psi) / 161 ft (70psi)
Maximum Casing Pressure	260 psi
Maximum Temperature	200°F
Maximum Solid Size	3 inch
Min. / Max. Pump Speed	1200 rpm / 2100 rpm

Pump & Accessory Specifications

Suction / Discharge Size	4 inch / 4 inch
Impeller Diameter	10 inch
Vacuum System - Type / Capacity	Diaphragm / 50 CFM
Casing	Ductile Iron
Impeller	CA6NM Stainless Steel
Wear Ring	Gray Iron 40
Shaft	17-4PH Stainless Steel
Mechanical Seal Faces	Tungsten/Silicon-Carbide
Mechanical Seal Lubrication	ISO Viscosity Grade 32 or Lower *(synthetic recommended)*
O-rings & Gaskets	Buna-N & Viton
Check Valve Body	Ductile Iron
Check Valve Flapper	Buna-N
Check Valve Type	Swing type



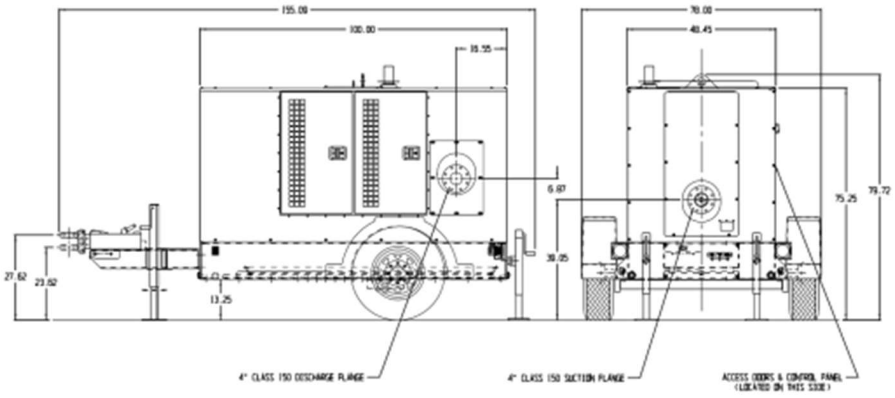
Notes

- Performance data based on water at 60°F
- Run time indicated is for reference and could vary based on speed and engine loads
- Maximum temperature is the equipment material limitation. Based on the application, process, product and NPSH requirements, the maximum allowable temperature could be lower
- This pump is also available with a 20 CFM venturi-compressor priming system

Driver Properties	Type A	Type B
Driver Type	Diesel Engine	Diesel Engine
Driver Make	John Deere	Duetz
Model	4024TF281	D2.9L4
Max. Continuous Rating	49 hp	49 hp
Total Displacement	2.44 liters	2.92 liters
Aspiration	Naturally aspirated	Turbocharged
Number of Cylinders	4	4
Safety Shutdowns	Low Oil Pressure, High Temp.	Low Oil Pressure, High Temp.
Fuel Consumption	2.4 gal/hr @ 1800 rpm	2.6 gal/hr @ 1800 rpm
Run Time	35.4 hours @ 1800 rpm	32.7 hours @ 1800 rpm
Fuel Type	No. 2 Diesel: **NO BIODIESEL**	No. 2 Diesel: **NO BIODIESEL**
Fuel Capacity	110 U.S. gallons	110 U.S. gallons
Noise Rating	68 dBa @ 23 feet	68 dBa @ 23 feet

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Dimensional Drawing

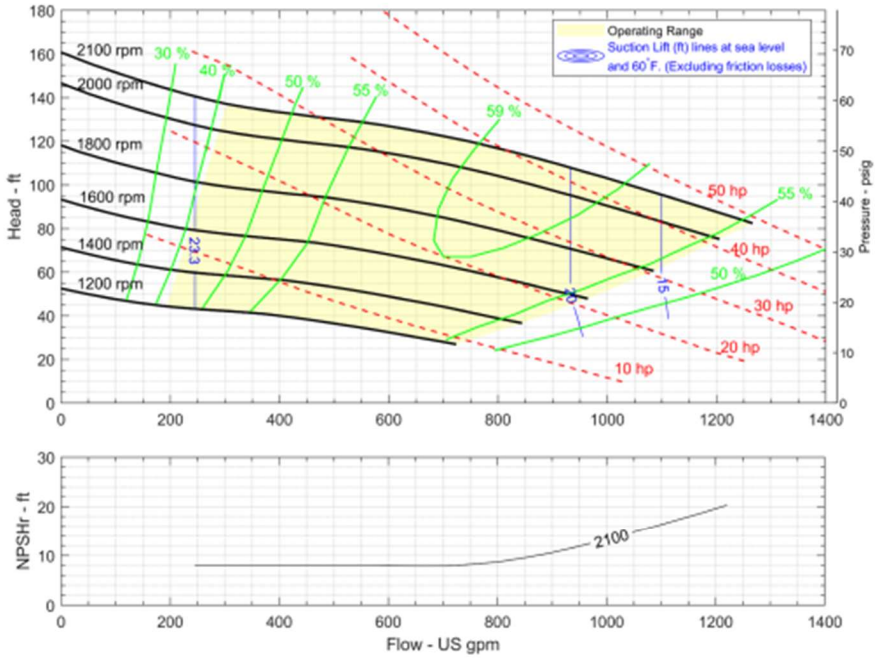


Dimensional Details

Type A	
Total Weight wo/Fuel	2822 lbs
Total Weight w/Fuel	3603 lbs
Overall Height	78 inch
Overall Width	67 inch
Overall Length	135 inch

Type B	
Total Weight wo/Fuel	3202 lbs
Total Weight w/Fuel	3983 lbs
Overall Height	80 inch
Overall Width	78 inch
Overall Length	155 inch

Performance Curve



Pump Make	Pioneer Pump
Pump Model	PP44S10
Operating Speed	Variable
Min. Speed	1200 rpm
Max. Speed	2100 rpm
Impeller Rated Dia.	10 inch
Impeller Type	Enclosed
No. of Impeller Vanes	2
Solid Dia.	3 inch
Specific Speed	2165 US Units
Suction Size	4 inch
Discharge Size	4 inch

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