

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

City of Winfield
P.O. Box 59
Winfield, MO 63389

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo., and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources.

As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

September 13, 2023
Effective Date

September 12, 2025
Expiration Date



John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed wastewater collection system will consist of a lift station and force mains, which will carry raw wastewater produced by the Whispering Wind Mobile Home Park to the Winfield Wastewater Treatment Facility.

Construction and installation of approximately 3,100 linear feet of 4-inch diameter high density polyethylene (HDPE) force mains with cleanouts and air release valves, a 6 feet wide by 18.3 feet deep duplex lift station with each pump capable of operating at 85 gallons per minute (gpm) at 12.5 feet of total dynamic head (TDH), 12 volt battery backup, two sets of 30 linear feet of 60-inch diameter detention storage pipes, and all necessary appurtenances to make a complete and usable wastewater collection system to serve an estimated population equivalent of 114 and an estimated design average flow of 11,340 gallons per day. The project will also include general site work appropriate to the scope and purpose of the project.

These activities will be in the vicinity of MO-79 in Winfield, Lincoln County and discharge to an existing sewer system to be treated at the Winfield Wastewater Treatment Facility, Missouri State Operating Permit No. MO-0088676.

II. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct, subject to the following conditions:

1. This construction permit does not authorize discharge.
2. All construction shall be in accordance with the plans and specifications, Addenda No. 1, and Addenda No. 2 submitted by Horner & Shifrin, Inc. on July 13, 2023, August 16, 2023, and August 28, 2023, and signed and sealed July 11, 2023, August 15, 2023, and August 28, 2023, by the engineers listed below, and approved by the Department on September 13, 2023.

A. Gilbert E. Sewing, Jr., P.E.
B. Keith S. Smith, P.E.
3. Regulation 10 CSR 20-4.040(18)(B)1 requires that projects be publicly advertised, allowing sufficient time for bids to be prepared and submitted. Projects should be advertised at least 30 days prior to bid opening.
4. The Department must be contacted in writing prior to making any changes to the approved plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed project or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).
5. As per 10 CSR 20-4.040, all changes in contract price or time within the approved scope of work must be by change order in accordance with Section 19 of this rule.

6. Manholes shall be located with the top access at or above grade level.
7. State and federal law does not permit bypassing of raw wastewater; therefore, steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's electronic Sanitary Sewer Overflow/Bypass Reporting system at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem> or St. Louis Regional Office per 10 CSR 20-7.015(9)(G).
8. Protection of drinking water supplies shall be in accordance with 10 CSR 20-8.120(5), which includes by reference the provisions of 10 CSR 23-3.010. Separation distance requirements between water mains and sanitary sewers in 10 CSR 60-10.010 are also applicable.
9. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
10. A United States Army Corps of Engineers (USACE) Section 404 Department of Army permit (§404) along with the Department's Section 401 Water Quality Certification or waiver (§401) may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S., then a §404/§401 will likely be required. Since the USACE makes determinations on what is jurisdictional, you must contact the USACE to determine permitting requirements. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information or you may contact the Department's Water Protection Program at 573-522-4502 or wpsc401cert@dnr.mo.gov.
11. Upon completion of construction:
 - A. The City of Winfield will become the continuing authority for operation and maintenance of these facilities;
 - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications; and
 - C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N). When the receiving facility applies for their next operating permit renewal, they will be expected to include updated information about the sanitary sewer collection system on their application.

Angie Garcia, E.I.
Financial Assistance Center
angie.garcia@dnr.mo.gov

APPENDICES

- Summary of Design

APPENDIX—SUMMARY OF DESIGN

▪ MEMORANDUM ▪

TO: Joe Blume, P.E., Missouri Department of Natural Resources
FROM: Ed Sewing, P.E., Horner & Shifrin
SUBJECT: Winfield Whispering Wind RIG Project Summary of Design (C295856-2)
DATE: May 24, 2023
H&S JOB NO.: 2016910
CC:



Introduction

The Whispering Wind Mobile Home Park (MHP) is located approximately one-third of a mile north of the City of Winfield in Lincoln County, MO. The MHP is served by a single cell lagoon, which was constructed without permits from the Missouri Department of Natural Resources (MoDNR) and has been referred to enforcement as an unauthorized discharge. The construction and installation of a pump station and forcemain is proposed to regionalization the MHP via connection to the City of Winfield and eliminate the unpermitted lagoon.

Horner & Shifrin submitted a sewer extension construction permit application for the project to MoDNR on March 28, 2023. On April 13th, 2023 a request for the submittal of a Project Summary of Design was received from the Missouri Department of Natural Resources. This memorandum is intended to serve as the Project Summary of Design and provide supplementary information to the previously submitted construction permit application.

Hydraulic Capacity and Organic Waste Loads

Over the 20-year planning period, it is anticipated that the MHP will reach its full build-out of 50 trailer pad with the following anticipated loading:

Parameter	Units	
Average Daily Flow	gpd	11,340
Biochemical Oxygen Demand	mg/L	335.3
Total Suspended Solids	mg/L	403.7
Total Kjeldahl Nitrogen	mg/L	59.4

The connection of the nearby Christian Disposal waste transfer station, Victor Pipe & Steel, and J&J Boring were also considered for regionalization. It was anticipated that each industrial connection would contribute 1,000 gpd. An evaluation of actual industrial discharges would need to be performed to verify the forcemain has sufficient capacity for connection.

A new gravity system will be constructed by others within the MHP to collect and convey wastewater to the proposed pump station. Inflow and infiltration of the new gravity system was considered at a rate of 200 gallons per inch diameter per mile per day. This increases the anticipated average daily flow to 11,757 gpd. **See the attached Pump Station Design Basis for additional information on the pump station design flows.**



The City of Winfield is served by the City of Winfield's Municipal Lagoon WWTF, which is permitted under MSOP MO-0088676. Treatment at the facility consists of a three-cell facultative lagoon with a baffled second and third cell. The WWTF and influent pump station were recently upgraded under MoDNR Construction Permit No. CP0002002. Work under the construction permit included the installation of an influent pump station, new influent screening, conversion of one of the three lagoon cells to flow equalization, installation of a baffle and multiple static tube air diffusers in Cells #1 and 2 of the lagoon, installation of a moving bed biofilm reactor (MBBR) chamber, construction of an overflow cell of high flows, and installation of an ultraviolet (UV) disinfection system. The project increased the facility's average daily flow from 196,000 gpd to 300,000 gpd. Actual flow at the facility is reported to be 133,000 gpd. The facility has sufficient capacity to accept the additional flow from the MHP.

The City's collection system is comprised of approximately 16,000 linear feet of 8-inch diameter clay tile collection mains, brick and concrete manholes, forcemain, and pump stations. The construction and installation of approximately 3,000 linear feet of forcemain is proposed to deliver wastewater to an existing manhole located at the norther terminus of Pine Street in the City of Winfield. The immediately downstream manhole is located approximately 225.5-linear feet downstream, at the intersection of Pine Street and 2nd Street.

	Top	Invert In	Invert Out
U/S Manhole	447.31	443.91	443.86
D/S Manhole	448.88	443.18	440.78

The pipe is 8-inch diameter vitrified clay pipe (VCP). The full pipe capacity of the pipe is estimated to be 464,595 gpd. The full pipe flow exceeds the average daily design flow of the City's WWTF. The only pump station located downstream of the proposed connection is the influent pump station at the WWTF. Therefore, it is assumed that sufficient capacity exists within the collection system to accept the proposed connection.

Pump Station Design

The Whispering Wind MHP pump station would be a pre-cast concrete structure that includes a wet well, dry well, and storage. Storage is made up of 30-linear feet of 60-inch diameter polypropylene pipe with a storage volume of 3,920-gallons to provide 2-hour storage of the MHP peak hourly flow. Based upon discussion with the City, the utilization of submersible pumps is preferred to standardize pumps throughout the City's collection system. Flygt NP 3085 pumps were selected to provide a flow of approximately 96.5 gpm at a TDH of 12.5 feet. Two pumps would operate off of floats with an audiovisual alarm at the station and phone dialer for alarm communication. A forcemain diameter of 4-inches was selected to provide sufficient capacity to deliver the MHP build-out design flow and allow for the necessary cleansing velocities of at least 2 feet per second in accordance with 10 CSR 20-8.130(8)(A). The forcemain is to be constructed of IPS HDPE (DR 11, PE 470, ASTM D3350). **See the attached Pump Station Design Basis for additional information on the pump station.**

Attachments

City of Winfield Collection System Map Pump Station
Hydraulics
Pump Station Design Basis Pump
Selection Information



Design Flow Calculations

1. Total Average Flow From Population (F)

Type of Establishment Existing
Mobile Homes New Mobile
Homes Equipment Shop
Office

Number of Units	# People per Establishment	Number of People	GPD per Person	Avg GPD
25	3	75	75	5,625
25	3	75	75	5,625
1	3	3	15	45
1	3	3	15	45

11,340

Waste Transfer Station J&J Boring
Victor Pipe & Steel

1				1,000
1				1,000
1				1,000

are included to allow for potential future connection of
tries between MHP and City

Total Average Flow From Population (F)

11,340 3,000
GPD Excluding Infiltration

2. Infiltration - Existing Sewer System

a. Gravity System: I = Pipe Dia (in) * pipe length (miles)*200(gal/in dia/mi/day)
per MSD Guidelines (See Attachment 1 for sewer layout)

Pipe Location Description	Length (ft)	Length (mi)	Size (in)	Infiltration (GPD)
New 8-inch dia Gravity Main	1375	0.260	8	416.7
		0.000		0.0
		0.000		0.0
Sum				416.7

b. Storage: N/A for this system

3. Average Daily Flow @ MHP Build-Out (Population plus Infiltration) ADF = F+I

ADF = 11,340 + 416.7 = 11,757 PD
= 8.16 PM - 24 hr day <<<< mobile home park build-out

4. Peak Daily Flow (PDF)

MHP Build-Out
Design Peak Factor: 4.0
Peak Flow: 32.66 PM
47,026.7 PD

5. Constant speed pump rated to accommodate

96.50 GPM

6. Forcemain Downstream Manhole (check velocity for ADF and PDF)

V = Q/A

Pipe Material	IPS HDPE DR 11
Pipe Size (inches)	4
Outside Dia (in)	4.451
Wall Thickness (in)	0.409
Inside Dia (in)	3.633

Size	Outside Dia	Thickness
3	3.466	0.318
4	4.451	0.409
5	5.502	0.506
6	6.554	0.602

Mobile Home Park Design Flow						
	Q (GPM)	Q (ft³/s)	Dia (in)	Dia (ft)	Area (ft²)	V (fps)
ADF	8.16	0.018	3.633	0.303	0.072	0.253
PDF	32.66	0.073	3.633	0.303	0.072	1.011
Const. Speed Pump	96.50	0.215	3.633	0.303	0.072	2.987
Calculate v=2 fps	64.62	0.144	3.633	0.303	0.072	2
Calculate v=3 fps	96.93	0.216	3.633	0.303	0.072	3

7. Forcemain Design
--> Total Dynamic Head

a. Static Head (H_s)

E _n = Max Forcemain Elev=	503.58	(forcemain peak)
E ₁ = wet well low water elev= H _s	492.25	(Pump off elevation) ft
= E _n -E ₁ =	11.33	

Length Fittings
3" X 4" Expansion
11.25
45 Elbows
60 Elbows
90 Elbows
Total Equivalent Length

10 ft length point in line to allow for full pipe flow through valve vault			
Dia (in)	Quantity	Friction Loss	L _s
4	1	2.60	2.6
4	0	1.68	0
4	2	5.37	10.74
4	0	6.22	0
4	0	10.1	0
			20.74

(Sum of FM Length and Fittings)

b. Forcemain Equivalent Lengths (Ref pg 3-120 Camaron Hydraulic Data Ingersoll-Dresser Pumps)

Pipe/Fitting	Dia (in)	Quantity	Friction Loss/ea	L _s
PVC	3			35
90° Elbows	3	2	7.67	15.34
Tees	3	1	15.3	15.3
Check Valve	3	1	25.5	25.5
Shut-Off Valve	3	1	2.04	2.04
Sum				93.18

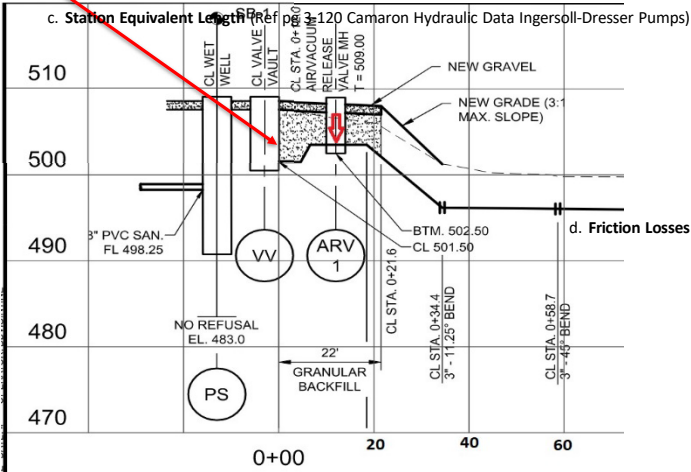
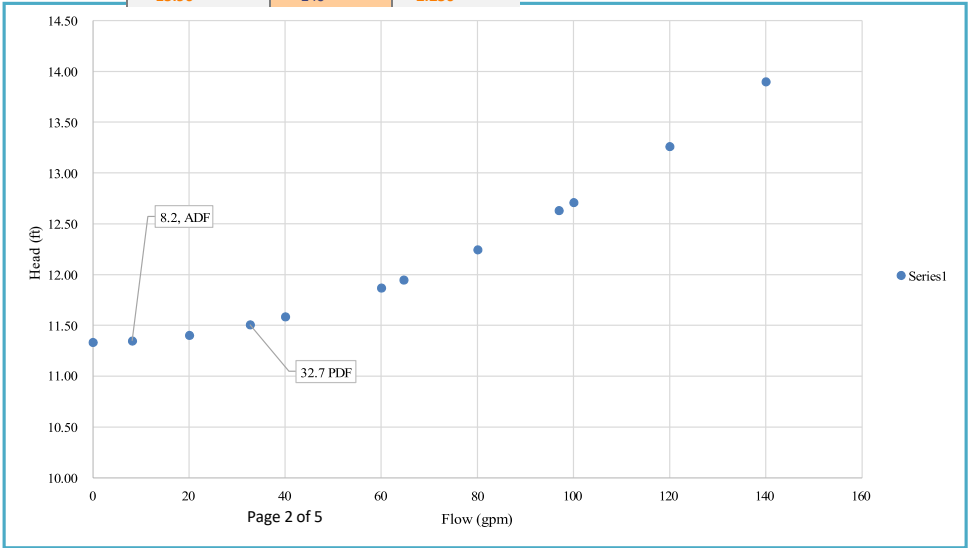
Use Hazen Williams: $f = 0.2083 (100/C)^{1.85} q^{1.85} / d^{4.8655}$ $f =$
loss/100 ft of pipe length
C = 130 for PVC
q = flow = ADF = 8.16
d = Inside Dia = 3.633 IPS HDPE DR 11
L_f = 0.0117 (average Daily Flow)

TDH = friction loss (L_f) + Station Loss (L_s) + Static Head (H_s)

8. System Curve for Force Main

MHP Build-Out

Condition	Head (ft)	Q (GPM)	Loss/100 ft pipe
0 flow	11.33	0	0
ADF PDF	11.35	8.2	0.012
v=2 fps v=3 fps	11.51	32.7	0.152
	11.95	64.6	0.538
	12.63	96.9	1.140
	11.40	20	0.061
	11.59	40	0.222
	11.87	60	0.469
	12.24	80	0.799
	12.71	100	1.208
	13.26	120	1.692
	13.90	140	2.250



9. Pump Selection

For a minimum of 2 ft/s velocity, Q = V*A

V =

Dia =

Area = πr^2 Q = V*A

Q = V*A

Q = V*A

Minimum Flow Rate for Selected Pump

a. Pump Info

Type:

Make:

Model:

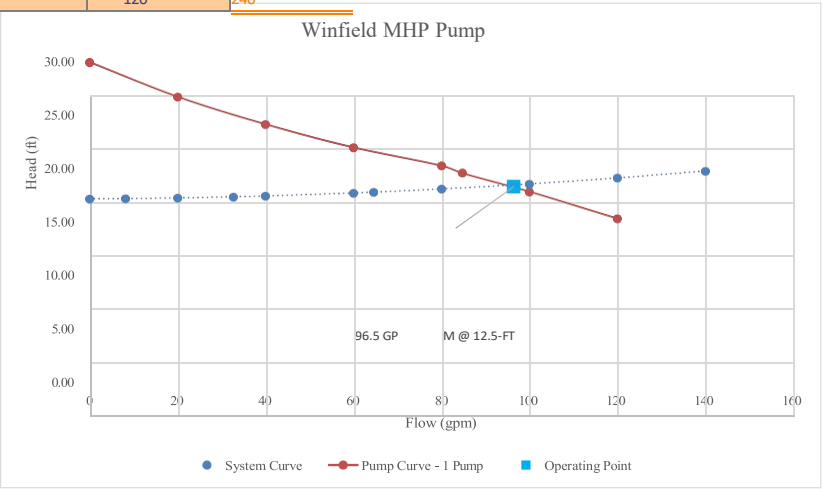
b. Operating Point on Pump

Flow Rate: gpm TDH:

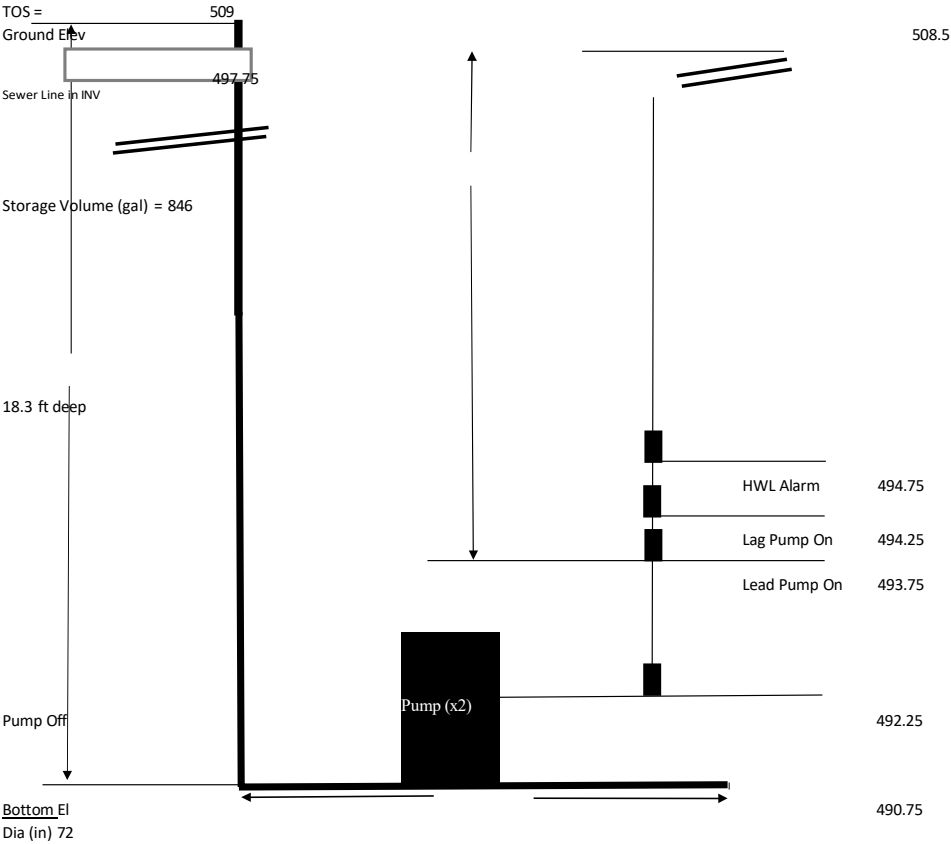
c. Pump Curve

Head
1 Pump Flow (gpm) 2 Pumps Flow (gpm)

24	0	0
20.8	20	40
18.25	40	80
16.1	60	120
14.4	80	160
13.7	84.8	169.6
12	100	200
9.5	120	240



10. Pump Station Layout



Storage					
Dia (in)	Dia (ft)	Area (ft ²)	Depth (ft)	Vol (ft ³)	Vol (gal)
144	12	113.1	4	452	3,384
120	10	78.5	4	314	2,350
96	8	50.3	4	201	1,504
84	7	38.5	4	154	1,152
72	6	28.3	4	113	846

Description	Flow (GPD)	24-hr V (gal)	12-hr V (gal)	6-hr V (gal)	4-hr V (gal)	3-hr V (gal)	2-hr V (gal)
ADF	11,757	11,757	5,878	2,939	1,959	1,470	980
PDF	47,027	47,027	23,513	11,757	7,838	5,878	3,919

Storage Time at Average Daily Flow

1.7 hours

Storage Time at Peak Flow

0.4 hours

Winfield Municipal Lagoon
[0088676.pdf \(mo.gov\)](#)

Design Q: 300,000 gpd
Actual Q: 133,000 gpd

10 CSR 20-8.130(7)(A):
In addition to the required emergency means of operation and a storage/detention basin or tank, the following minimum retention time shall be provided:

1. For facilities with a design average flow of 100,000 gpd or greater, a storage capacity for 2-hour retention of the peak hourly flow; or
2. For facilities with a design average flow of less than 100,000 gpd, a storage capacity for 4-hour retention of the peak hourly flow.

2-hr V (gal)

3,919 gal

523.9 ft³

26.7 ft

EX. ASPHALT PAVEMENT (TBR&R)

EX. SAN. MANHOLE
T = 447.31

444.00

444.11

EX. 8" VCP
443.86

EX. 4" VCP
443.91

ft ³	72 in
gal	6 ft
Mi	.27 ft ²
	317
	97
	3.3

10 starts per hour for grinder

Actual Flow:		
No. of MHP Conn:	9	
Avg Flow: Time to Fill	2025 GPD	
	1.4 GPM	
to Pump On:	225.6 min	
	3.8 hours	
Starts Per Day:	6.4	

Horner & Shifrin, Inc. 401 S. 18th ST., STE. 400 ST. LOUIS, MO (314) 531- 4321		CITY OF WINFIELD, MISSOURI LINCOLN COUNTY, MISSOURI REGIONALIZATION CONNECTION TO WHISPERING WIND MHP Whispering Wind MHP Pump Station Pump Station Design Basis	
H&S Proj. No.: 2016910			
REVISION NO	BY	DATE	Date Prepared: 24-May-23
Design Basis Memorandum	RED	5/24/23	By: R. Dixon
			Checked: E. Sewing
			SHEET: See Footer

1.) GENERAL

LIFT STATION NAME Whispering Wind MHP Pump Station

ADDRESS Whispering Wind Drive, Winfield, MO 63389

STATION TYPE ☒ Submersible

Concrete Wet Well/Dry Well ☒

Steel Dry Well / Concrete Wet Well ☐

Self-Priming Pumps above Concrete Wet Well ☐

Other: ☐

Condition	Population Equivalent	Average Daily Flow (ADF)	Peak Daily Flow (PDF)	P.S. Firm Capacity
Existing <i>(9 of 25 trailer pads occupied)</i>	33 Persons	5,715 gpd	N/A	N/A
Pump Station Design <i>(Full build-out of MHP)</i>	114 Persons	11,757 GPD (8.16 GPM)	47,030 GPD (32.67 GPM) <i>(P.F. = 4.00)</i>	102± GPM
Forcemain Design <i>(Full build-out of Forcemain)</i>		14,760 GPD (10.25 GPM)	59,025 GPD (40.99 GPM) <i>(P.F. = 4.00)</i>	N/A

NOTES:

Forcemain design considers the connection of Christian Disposal waste transfer station, Victor Pipe & Steel, and J&J Boring. These are industrial customers located along the proposed forcemain. It was assumed that each connection would contribute 1,000 gpd. An evaluation of actual industrial discharges would need to be performed to verify sufficient capacity prior to connection.

2.) PUMP EQUIPMENT

Eqpt. I.D.	P-01	P-02	P-03	P-04
Pump Type	Vertical Dry Centrifugal Self-Priming Submersible Non-Clog Grinder <input type="checkbox"/> Vortex Other <input type="checkbox"/>	Vertical Dry Centrifugal Self-Priming Submersible Non-Clog Grinder <input type="checkbox"/> Vortex Other <input type="checkbox"/>	Vertical Dry Centrifugal Self-Priming Submersible Non-Clog Grinder <input type="checkbox"/> Vortex Other <input type="checkbox"/>	Vertical Dry Centrifugal Self-Priming Submersible Non-Clog Grinder <input type="checkbox"/> Vortex Other <input type="checkbox"/>
Pump Manufacturer	FLYGT	FLYGT	--	--
Pump Model ^[1]	NP 3085 SH 3~455	NP 3085 SH 3~455	--	--
Design Flow (nameplate)	96± U.S. gpm	96± U.S. gpm	--	--
Design TDH (nameplate)	12.5± ft. W.C. TDH	12.5± ft. W.C. TDH	--	--
Motor HP	3 HP	3 HP	--	--
Electrical Criteria	230VAC/3Ø/60Hz	230VAC/3Ø/60Hz	--	--
Notes:				

^[1] See attached data sheet.

Horner & Shifrin, Inc. 401 S. 18th ST., STE. 400 ST. LOUIS, MO (314) 531- 4321 H&S Proj. No.: 2016910	CITY OF WINFIELD, MISSOURI LINCOLN COUNTY, MISSOURI REGIONALIZATION CONNECTION TO WHISPERING WIND MHP Whispering Wind MHP Pump Station Pump Station Design Basis		
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			SHEET: See Footer

3.) SITE BUILDING

Criteria:	Y:	N:	Remarks:
<input checked="" type="checkbox"/> Station accesible by boom truck	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Security (fences & gates)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6'-0" chain link security fence w/ 3 strand barbed wire & 12'-0" gate.
<input type="checkbox"/> Turnaround provided	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Use agg. drive as turnaround.
<input checked="" type="checkbox"/> Bollards at critical structures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Drainage sufficient	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Snow removal provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Space available for future expansion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Landscaping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Structures above 100-yr Flood?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Site Lighting Provided	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LED Light Fixture on 16' Square Steel Pole
<input type="checkbox"/> Other:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Site Surfacing: ☐ Earth (none) ☒ Aggregate ☐ Asphalt ☐ Concrete

4.) FLOW BYPASS

Gravity Bypass Capability Y: ☐ N: ☒

Description: _____

Portable Pump Bypass Capability Y: ☒ N: ☐

Description: By-pass pumping portal connection provided for connection of City provided portable pump.

5.) BACKUP POWER

Back-up Power: ☐ None ☐ Redundant Srvc. ☒ Generator

Generator Location: ☐ On-Site ☒ Portable

Generator Transfer Switch: ☒ Manual ☐ Automatic

6.) PUMP CONTROLS & INSTRUMENTATION

Level Sensor: ☐ Transducer ☒ Floats ☐ Float Rod ☐ Ultrasonic

☐ Other: _____

Level Sensor Redundancy: Y: ☐ N: ☒

Pump Start: ☐ Constant Speed ☒ Variable Speed

Operation: ☒ Lead / Lag ☐ Duty / Standby ☒ Pump Down ☐ PID Cntrl.

☐ Other: _____

Control: ☒ Relay ☐ PLC ☐ Microprocessor ☐ RTU

Instrumentation: ☐ Pressure Transducer (per pump) ☐ Pressure Transducer (common)

Motor Thermal Sensor (per pump) ☒

Wet Well Gas Detector ☐

Check Valve Limit Switch(es) ☐

☐ Intrusion Alarms ☐ Other: _____

Flow Meter: ☒ None ☐ Ultrasonic ☐ Mag Meter ☐ Propeller

☐ Parshall ☐ Other: _____

Horner & Shifrin, Inc. 401 S. 18th ST., STE. 400 ST. LOUIS, MO (314) 531- 4321 H&S Proj. No.: 2016910		CITY OF WINFIELD, MISSOURI LINCOLN COUNTY, MISSOURI REGIONALIZATION CONNECTION TO WHISPERING WIND MHP Whispering Wind MHP Pump Station Pump Station Design Basis	
REVISION NO	BY	DATE	Date Prepared: 24-May-23
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			Checked: E. Sewing
			SHEET: See Footer

7.) SCADA

Criteria: _____ Remarks: _____

<input checked="" type="checkbox"/> Local Control Panel	Y: <input type="checkbox"/> N: <input type="checkbox"/>	
<input type="checkbox"/> Remote Send Capable	Y: <input type="checkbox"/> N: <input checked="" type="checkbox"/>	
<input type="checkbox"/> Remote Receive Capable	Y: <input type="checkbox"/> N: <input checked="" type="checkbox"/>	

Communication Type: ☐ None ☐ Cellular Dialer ☒ Telephone Dialer
☐ Fiber RTU ☐ Radio Telemetry ☐ Other _____

Alarms: _____ Remarks: _____

Criteria: _____

<input checked="" type="checkbox"/> Remote transmissions of alarms	Y: <input type="checkbox"/> N: <input type="checkbox"/>	Automatic phone dialer
<input checked="" type="checkbox"/> Alarm signals on building exterior	Y: <input type="checkbox"/> N: <input type="checkbox"/>	+120VDC horn & strobe.
<input type="checkbox"/> Fire alarm	Y: <input type="checkbox"/> N: <input checked="" type="checkbox"/>	
<input type="checkbox"/> Intruder alarm	Y: <input type="checkbox"/> N: <input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Power Failure alarm	Y: <input type="checkbox"/> N: <input type="checkbox"/>	
<input checked="" type="checkbox"/> Pump Failure alarm	Y: <input type="checkbox"/> N: <input type="checkbox"/>	
<input checked="" type="checkbox"/> High Water alarm	Y: <input type="checkbox"/> N: <input type="checkbox"/>	
<input type="checkbox"/> Gas Detection alarm	Y: <input type="checkbox"/> N: <input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Other Alarm:	Y: <input type="checkbox"/> N: <input type="checkbox"/>	75% of Detention Pipe Alarm

8.) OTHER

Odor Control Facilities ☒ None ☐ Activated Carbon ☐ Chem. Add't'n. : _____

Other: ☐

Hoists ☐ None ☐ Monorail ☒ Hoist

Bar Screen ☒ None ☐ Trash Rack (manual) ☐ Mechanical Bar Screen ☐ Muffin Monster

Wet Well Mixer ☒ None ☐ Qty. / HP

Service Water ☒ None ☐ Potable ☐ Non-Potable

Wet Well Isolation ☒ None ☐ Sluice Gate ☐ Slide Gate ☐ Stop Logs

Dry Well Drainage ☐ None ☐ Simplex Sump Pump ☐ Duplex Sump Pump ☒ Drain to WW

Wet Well Protection ☐ None ☒ Anti-Microbial Conc. ☐ Lining ☒ Coating

Wet Well Ladder ☒ None ☐ Poly MH Steps ☐ Aluminum ☐ 304/316 S.S.

Aluminum Ladder Extension Post ☐ 304/316 S.S. Ladder Extension Post

Valve Vault Ladder ☐ None ☐ Poly MH Steps ☐ Aluminum ☐ 304/316 S.S.

Aluminum Ladder Extension Post ☒ 304/316 S.S. Ladder Extension Post

Wet Well Access ☐ MH Frame & Cover ☒ Aluminum Hatch ☐ 304/316 S.S. Hatch ☒ Safety Grating

Valve Vault Access ☐ MH Frame & Cover ☒ Aluminum Hatch ☐ 304/316 S.S. Hatch ☒ Safety Grating

9.) VENTILATION

Ventilation - Valve Vault: ☒ None ☐ Vent Pipe ☒ 6 ACM ☐ 12 ACM

Electrical Classification (VV) ☐ Unclassified ☐ Class 1 Div. 1 ☐ Class 1 Div. 2

Gas Detection Provided Y: ☐ N: ☒

Ventilation - Wet Well: ☐ None ☒ Vent Pipe ☐ 6 ACM ☐ 12 ACM

Electrical Classification (WW) ☐ Unclassified ☒ Class 1 Div. 1 ☐ Class 1 Div. 2

Gas Detection Provided Y: ☐ N: ☒

Heating Provided ☒ None ☐ Wet Well ☐ Valve Vault

10.) STORAGE

On-Line Storage ☒ 2-hour PDF ☐ 4-hr. PDF ☒ Volume 3,920 gal. (30' of 60" Ø Storage Pipe)

Trunk Storage Y: ☐ N: ☒ Volume: _____

NP 3085 SH 3~ Adaptive 455

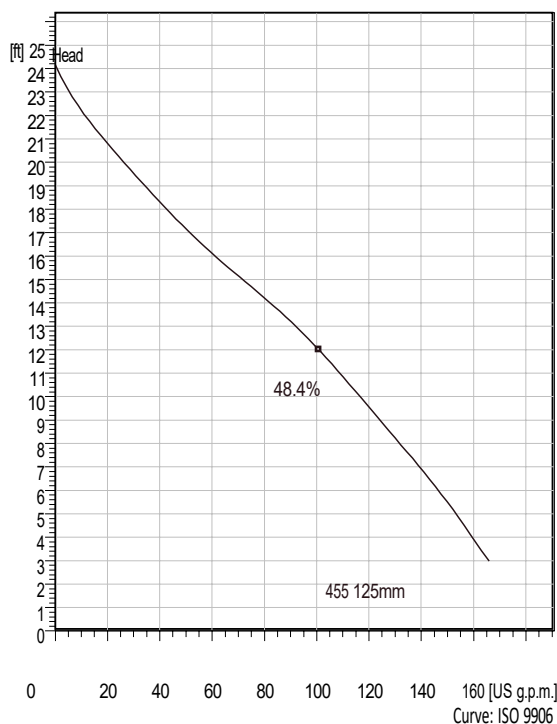
Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.



Technical specification



Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Configuration

Motor number	Installation type
N3085.060 15-10-4AL-W	P - Semi permanent, Wet
3hp	
Impeller diameter	Discharge diameter
125 mm	3 1/8 inch

Pump information

Impeller diameter
125 mm
Discharge diameter
3 1/8 inch
Inlet diameter
80 mm
Maximum operating speed
1700 rpm
Number of blades
2

Materials

Impeller
Hard-Iron™
Stator housing material
Grey cast iron

Max. fluid temperature 40 °C
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Technical specification



Motor - General

Motor number N3085.060 15-10-4AL-W 3hp ATEX approved No	Phases 3~ Number of poles 4	Rated speed 1700 rpm Rated current 4.3 A	Rated power 3 hp Stator variant 12
Frequency 60 Hz Version code 060	Rated voltage 460 V	Insulation class H	Type of Duty S1

Motor - Technical

Power factor - 1/1 Load 0.83	Motor efficiency - 1/1 Load 78.1 %	Total moment of inertia 0.204 lb ft ²	Starts per hour max. 30
Power factor - 3/4 Load 0.77	Motor efficiency - 3/4 Load 79.1 %	Starting current, direct starting 22 A	
Power factor - 1/2 Load 0.66	Motor efficiency - 1/2 Load 77.4 %	Starting current, star-delta 7.34 A	

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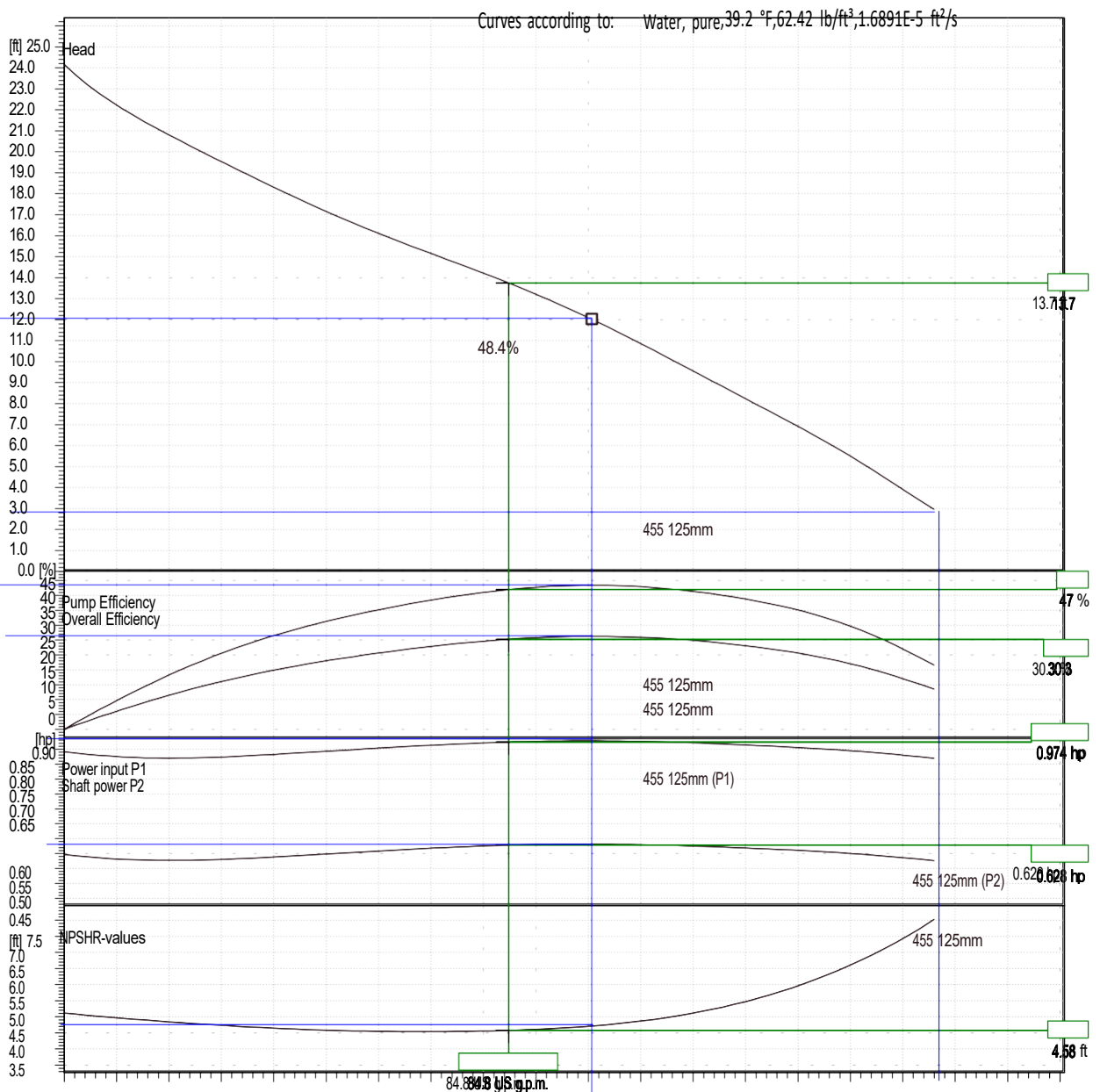
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Performance curve

Duty point

Flow
84.8 US g.p.m.

Head
13.7 ft



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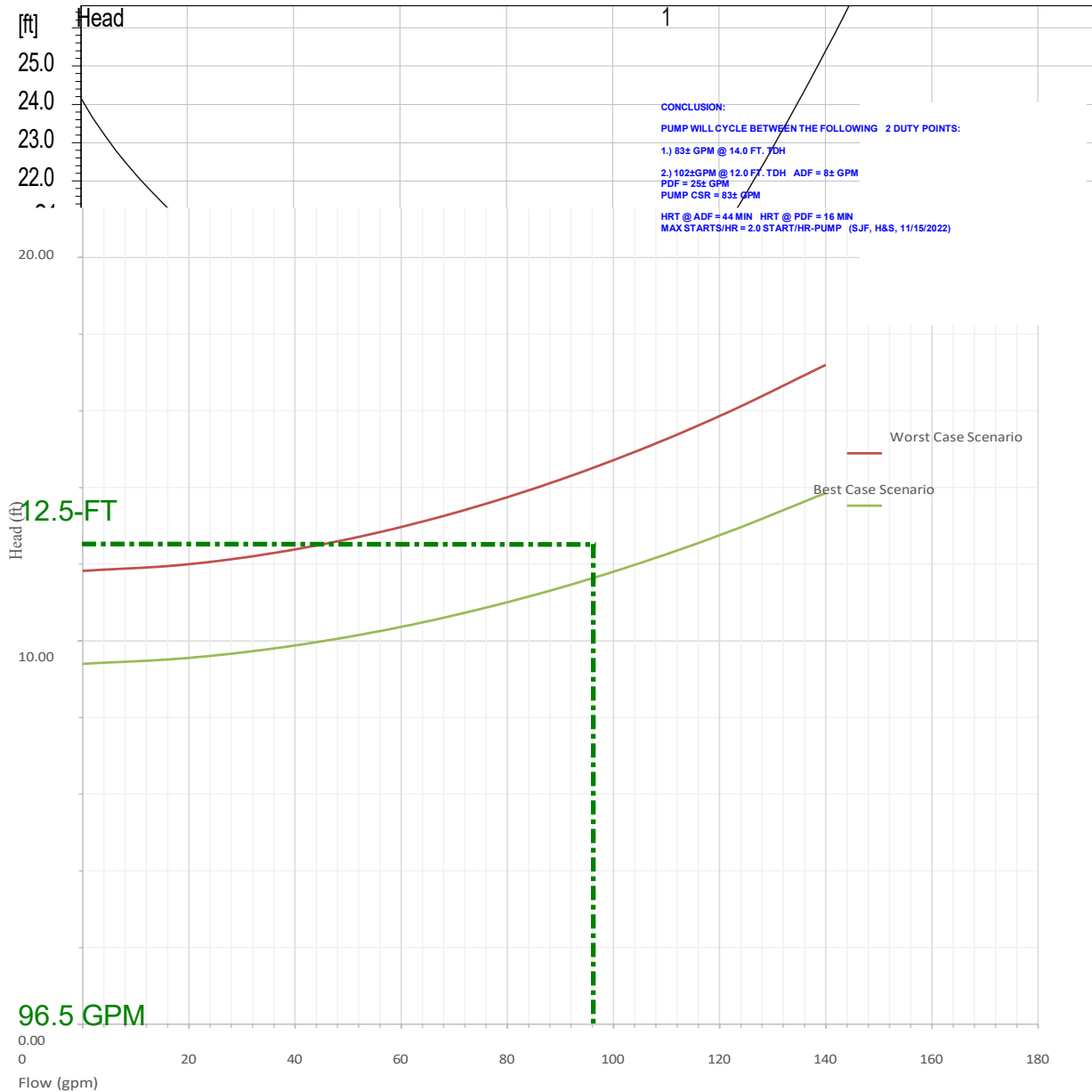
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Duty Analysis



Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific Energy	NPSHre
1	84.8 US g.p.m.	13.7 ft	0.628 hp	84.8 US g.p.m.	13.7 ft	0.628 hp	47 %	143 kWh/US MG	4.58 ft

Project
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Created by
Created on

Jason Schneider
10/16/2020

Last update

10/16/2020

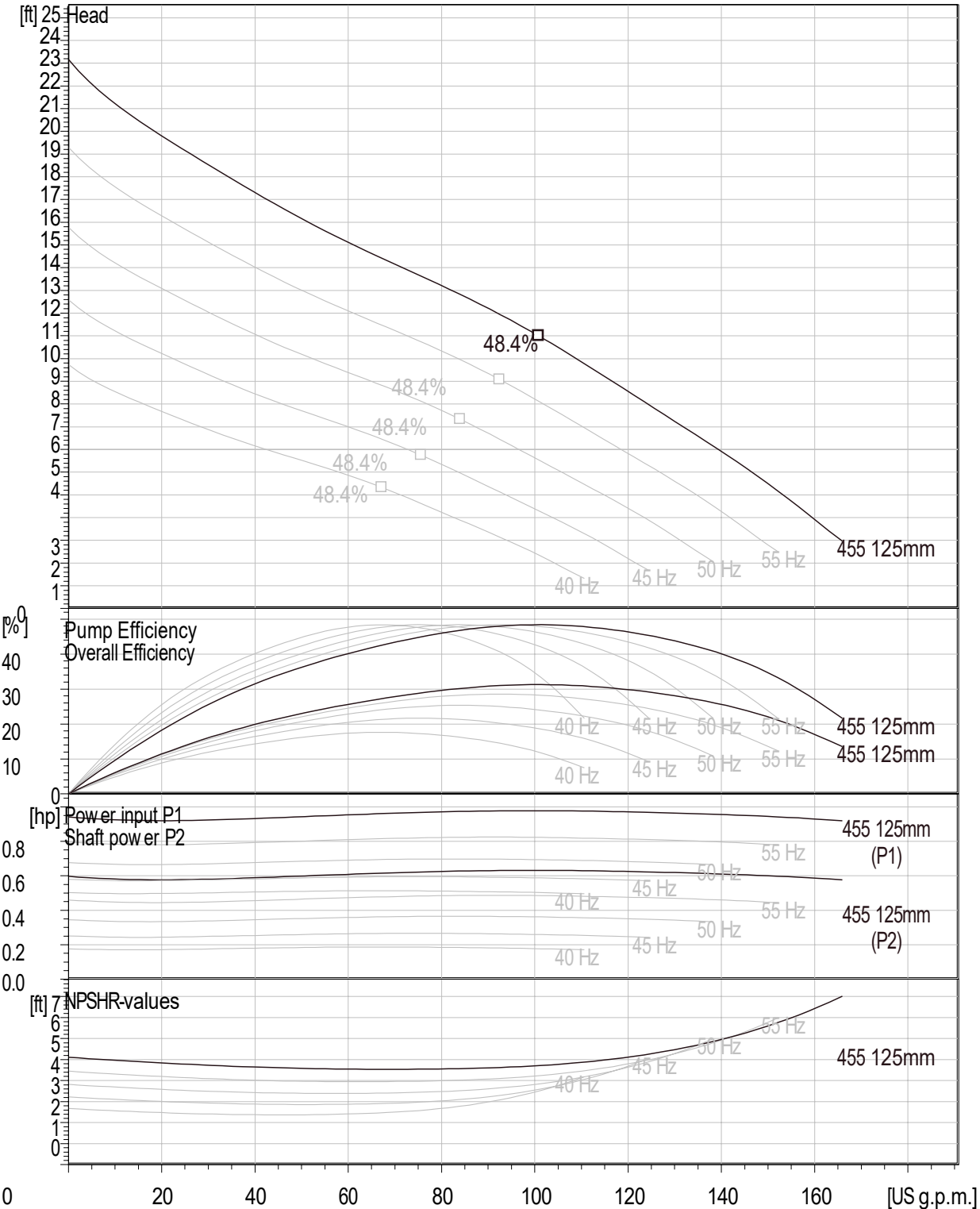
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VFD Curve



Curves according to:

Water, pure, 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



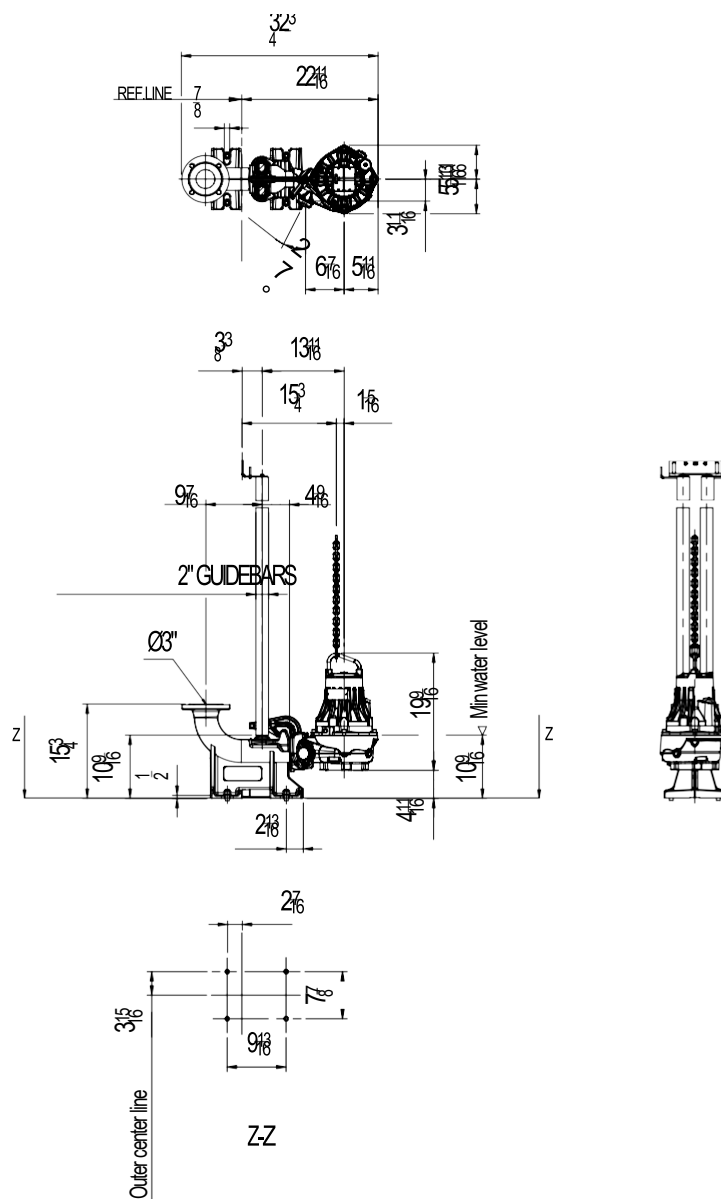
VFD Analysis



Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific Energy	NPSHr
1	60 Hz	84.8 US g.p.m.	13.7 ft	0.628 hp	84.8 US g.p.m.	13.7 ft	0.628 hp	47 %	143 kWh/US M	4.58 ft
	55 Hz	72.9 US g.p.m.	12 ft	0.481 hp	72.9 US g.p.m.	12 ft	0.481 hp	45.9 %	140 kWh/US M	3.96 ft
	50 Hz	60.1 US g.p.m.	10.4 ft	0.359 hp	60.1 US g.p.m.	10.4 ft	0.359 hp	44 %	143 kWh/US M	3.39 ft
1	45 Hz	46 US g.p.m.	8.99 ft	0.257 hp	46 US g.p.m.	8.99 ft	0.257 hp	40.7 %	158 kWh/US M	2.87 ft
1	40 Hz	30.3 US g.p.m.	7.86 ft	0.176 hp	30.3 US g.p.m.	7.86 ft	0.176 hp	34.2 %	206 kWh/US M	2.41 ft
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Dimensional drawing



Weight	Pump	Stand
lbs	150	80
Discharge outlet	Ø8"	Scale
Pump outlet	Ø3"	Date
Pump inlet		1:20 200728
Suction inlet		Drawing number
		7332300
		Revision
		4



NP 3085 SH

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