

## MEMORANDUM

TO: Water Right File 63-34126

FROM: Daniel Nelson – Analyst 3

DATE: November 19, 2020

SUBJECT: Licensing Review of Water Right 63-34126

The field exam for this right was performed by Certified Water Right Examiner Jason Thompson of SPF Water Engineering. Mr. Thompson recommended 0.25 cfs and 56.25 af for the irrigation of 12.5 acres.

### **History and Overlap:**

This permit is overlapped by New York Irrigation District's water rights, so this is a supplemental water right. There will be no volume shown on the face of this water rights, but it will be recorded in the conditions.

Only the large park/field area on the west side of the place of use is actually owned by the City of Meridian. The remainder of the ground is actually owned by Young Men's Christian Association of Boise, Heathy Living Condo Association Inc., and Joint School District No 2. From the information in the file, the City of Meridian supplies water to these properties through this common system. The City of Meridian is a municipality that also supplies the potable municipal water to these same properties, so ownership shouldn't be an issue in this circumstance. This property is within the service area for the permits owned by the City of Meridian, but the existing water rights only show half of the property within the municipal service area. This should be fixed when the City of Meridian permits are licensed.

There was some concern in the application for permit stage that Permit 63-34135 owned by Brighton Development Inc. may overlap this permit, but those issues were resolved during permitting. Permit 63-34135 provides irrigation water to the subdivision to the south and west of the place of use for this permit.

**Point of Diversion: Place of Use:**

The point of diversion marked in the field exam maps does not match the well location in the Department's GIS mapping. I double checked the GPS coordinates on the well driller's report, and even though it doesn't match exactly, the point for the well shown in our GIS mapping and the GPS coordinates are reasonably close. The GPS Coordinates and the well location in our GIS mapping shows the well on property not owned by the permit holder. Therefore, I will use the point marked on the maps by the field examiner, since he has actually been to the property and knows where the well is located.

**Place of Use:**

The field examiner listed the place of use as 12.5 acres, and acres listed in each 40 acres tract down to the tenth of an acres. The Department's Beneficial Use Examination Rule 35.01.h (IDAPA 37.03.02.035.01.h) says:

Irrigated acreage shall be shown on the field report to the nearest whole acre in a legal subdivision except the acreage shall be shown to the nearest one-tenth (0.10) acre for permits covering land of less than ten (10) acres.

Using the IDAPA rule would change the acres to 9 acres in the NENW and 4 acres in the SENW for a total of 13 acres. This shouldn't be an issue, since it gives the permit holder additional acres, volume and diversion rate. However, I have been advised to maintain the recommended acres based on Administrative Processing Memorandum # 6. I will maintain the recommended diversion rates and volumes.

**Diversion Rate:**

The measurement done on this permit was a bit unconventional, but it did provide a measurement of the well production in a roundabout way. The water was pumped from the well into vault (referred to as the wet well in the field report). The water from the vault was then pumped by the re-lift pump into the sprinkler system. The measurement was made on the re-lift pump. Although unconventional, the field examiner states that no water was flowing into or out of the vault, so it should provide a reasonably could estimate of the well pumps production.

According to the well driller's report, the pumping water level (PWL) is approximately 68 feet (56 feet of static water level + 12 feet of drawdown @ 275 gpm = 68 feet). The field examiner stated that the well pump was 10 Hp pump. The well pump open discharges into the vault, so the pressure on the well pump is much harder to estimate. There a number of factors go into calculating the pressure on the pump. The field examiner stated that the Total Dynamic Head (TDH) was 130 feet. This would suggest a pressure against the pump of 92 feet or 39.8 psi. At 130 feet of TDH the theoretical formula suggests that the pump could divert approximately 173

gpm or 0.39 cfs. If work backwards to determine what pressure there would be at a diversion rate of 217 gpm to the vault, would require approximately 25.7 psi, which is reasonable for an open discharge system. Most open discharge systems generally range between 5 to 15 psi, so an estimated flow rate of 217 gpm from the well seems more than reasonable for this system.

The measurement is not that prevalent, since the diversion rate is limited to the 0.02 cfs per acre. As shown above, we must maintain the 12.5 acres recommended by the field examiner. Based on Administrative Processing Memorandum # 6, I agree with the 0.25 cfs recommended by the field examiner.

**Diversion Volume:**

The field examiner calculated the volume correctly for 12.5 acres. Based on Administrative Processing Administrative Memorandum #6, I agree with the field examiner's recommendation.

**Conditions:**

Conditions R61, 01M, and WB7 will be carried forward to licensing. Condition WB7 will be changed to reflect the actual volume being recommended for this permit. The remaining conditions will be removed or replaced. Conditions 065 and 105 will be replaced with condition 943 as is standard. Condition 121 will be replaced with condition 103 as is standard. Condition 004 will also be added, since the water system crosses various property lines. Condition X59 will be added showing that the point of diversion is located in Lot 1, Blk. 1 of Heathy Living Subdivision. There are not lots and block numbers for all of the parcels being served by this permit, so we can't use the X60 condition to describe the place of use.

THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)

Water Right No.: 63-34126  
 Reviewer: Dan Nelson  
 Date of Review: 11/19/2020

P/D No.:

PUMP HORSEPOWER  
 BOOSTER HORSEPOWER

PUMPING LEVEL

DISCHARGE PRESSURE

RATE OF FLOW (cfs)

Rate at 130 ft. of TDH	Pressure at 217 gpm
10	10
0	0
68	68
39.8	25.7
0.39	0.48
173	217

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.  
 No Friction

Examiners Notes:

The field examiner stated that the well pump operated at a TDH of 130 feet and 217 gpm. I used the theoretical calculation to determine what the diversion rate would be at 130 feet of TDH for a 10 Hp pump. I adjusted the pressures to determine what the pressure would be to get the 217 gpm the field examiner stated the pump operated at, and discovered that the pressure would need to be approximately 25.7 psi or 59.367 feet of pressure. This is an open discharge system, so either of these calculations supply the flow rate needed to provide 0.02 cfs for 13 acres of ground or 0.26 cfs.



November 10, 2020

RECEIVED

NOV 16 2020

DEPARTMENT OF  
WATER RESOURCES

Idaho Department of Water Resources  
PO Box 83720  
Boise, ID 83720-0098

Attn: Debbi Judd & Dan Nelson

*Subject: City of Meridian  
Permit No. 63-34126  
Proof of Beneficial Use & Beneficial Use Field Report*

Dear Debbi & Dan,

Enclosed on behalf of the City of Meridian is a completed Beneficial Use Field Report for the above-referenced permit and signed Statement of Completion. If you would like digital shapefiles of the point of diversion or place of use, please let Lori Graves or me know and we will forward them to you.

Please let me know if you have any questions regarding these documents.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jason Thompson", is written over a horizontal line.

Jason Thompson, P.E.  
Supervising Engineer  
CWRE No. 158

Enclosures

cc: Mike Barton, Superintendent

File: 790.0410

STATE OF IDAHO  
DEPARTMENT OF WATER RESOURCES  
**BENEFICIAL USE FIELD REPORT**

**RECEIVED**  
**NOV 16 2020**  
DEPARTMENT OF  
WATER RESOURCES

A Beneficial Use Field Report is prepared by a water right examiner as the result of an examination to clearly confirm and establish the extent of the beneficial use of water established in connection with a permit during the development period authorized by the permit and any extensions of time previously approved.

**A. GENERAL INFORMATION**Permit No. 63-34126

1. Owner City of Meridian Phone No. 208-898-5500  
Current address Parks & Rec. Dept., 33 E. Broadway, Ste 206, Meridian, ID 83642-2619
2. Examiner's name Jason Thompson, P.E. (CWRE No. 158)) EXAM DATE October 14, 2020
3. Accompanied by Roger Norberg Email rnorberg@meridiancity.org  
Address same as above
- Relationship to permit holder Parks Maintenance Foreman Phone No. 208-409-1839
4. Source Ground Water tributary to \_\_\_\_\_

**B. OVERLAP REVIEW**

1. Other water rights with the same place of use New York Irrigation District water rights
2. Other water rights with the same source and point of diversion None

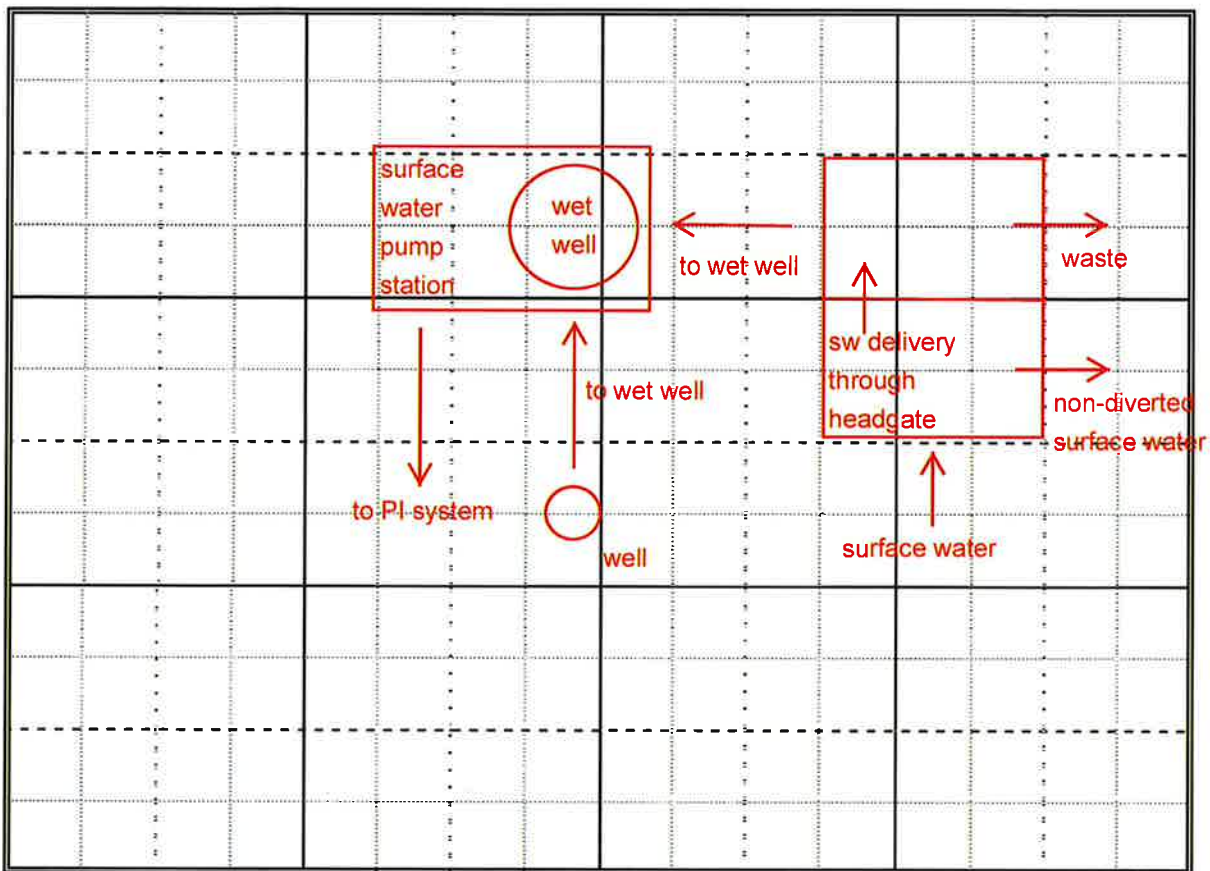
**C. DIVERSION AND DELIVERY SYSTEM****1. Point(s) of Diversion:**

Ident. No.	Gov't Lot	¼	¼	¼	Sec	Twp	Rge	County	Method of Determination/Remarks
			SE	NW	33	3N	1E	Ada	2019 GIS photo, exam

**2. Place(s) of Use:** Method of determination 2018 GIS photo, exam

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
3N	1E	33					8.9			3.6									12.5

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe diameter (inside), as applicable. Use the space provided or ☐ see attached.



Scale: 1" = \_\_\_\_\_

- ☒ Copy of USGS Quadrangle attached showing location(s) of point(s) of diversion and place(s) of use (**required**)  
☒ Aerial photo attached (required for irrigation of 10+ acres)  
☒ Photo of diversion and system attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Hillsdale Well	CentriPro	10	unknown	Goulds 250L10	3-inch

\*Code to correspond with no. on map and aerial photo

#### D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Permanent Flowmeter	Mag	Badger	M2000	1601-230/492	6-inch	2017
				81851		

2. **Measurements:** \_\_\_\_\_

14:13 218 gpm 43 Hz, 14:16 218 gpm 44 Hz, 14:17 217 gpm 44 Hz, 14:19 215 gpm 44 Hz, 14:24 218 gpm 44 Hz,  
 14:31 217 gpm 44 Hz, 14:40 216 gpm 44 Hz

### E. NARRATIVE/REMARKS/COMMENTS

An 8-inch well equipped with a variable-speed 10-hp submersible pump provides supplemental groundwater to a pressurized irrigation system for Hillsdale Park. Surface water from New York Irrigation District (NYID) is the Park's primary irrigation water source when available. The well delivers groundwater directly to a wet well. The wet well is also fed by surface water from a box equipped with a headgate. There is a pump station with submersible pumps installed over the wet well that delivers water to the pressurized irrigation system. The pump station is equipped with a mag meter. When surface water from NYID is available, it is delivered to the wet well via an irrigation box with a headgate. If water level in the wet well drops to a set level, then the well pump turns on and delivers water to the wet well. The system is set up to use surface water when available. During the beneficial use field exam, surface water was turned off for the season, so only groundwater was delivered to the wet well. The pump station pumps were then used to deliver water to the irrigation system, with pumping rate read from the flow meter. The well pump speed was adjusted so the water level in the wet well remained constant, so the pump station flow reading represented the flow from the groundwater well to the wet well. All flow readings were collected at a discharge pressure of 70 psi.

The irrigated area includes 8.6 acres owned by City of Meridian, 2.7 acres owned by YMCA, 1.2 acres owned by West Ada School District.

The well was completed with 8-inch diameter steel casing from +2 to 20 feet, 8-inch PVC casing to 220 feet, and 5-in stainless steel screen from 220 feet to 250 feet. The well is sealed with bentonite-cement grout to a depth of 200 ft.

The nominal capacity of the 10-hp well pump is 200 gpm at a TDH of 130 feet. The pumping water level in the well is about 56 feet based on testing. The pump is capable of delivering ~217 gpm to the wet well at that pumping water level while operating at 44 Hz. At 60 Hz the pump can produce 300 gpm. The design flow rate of the pump station is 325 gpm at 80 psi. The pump station includes (2) 15-hp and (1) 2-hp submersible pumps.

Attachment A: Permit and proof of beneficial use Attachment B: Topo, aerial photo map, property ownership map  
Attachment C: Well drillers report and well pump curve Attachment D: Photos Attachment E: Pump station submittal

Has the permit holder met all conditions of permit approval, including any mitigation requirements and/or measuring device installation requirements? ☒ Yes ☐ No If no, what must be done to meet the permit requirements?



**F. FLOW CALCULATIONS**☐ Additional computation sheets attached

Measured Method:

Pump station flow meter = 0.48 cfs

Theoretical based on pump curve, 56' pumping water level + 3' headloss = 59' TDH

At 44 Hz the pumping rate at 59' TDH is 200 gpm (0.45 cfs) from pump curve

The permit limits diversion to 0.02 cfs per acre. For 12.5 acres the allowable diversion is 0.25 cfs.

**G. VOLUME CALCULATIONS**

## 1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 12.5 \text{ acres} \times 4.5 \text{ afa/acre} = 56.25 \text{ afa}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 = 0.25 \text{ cfs} \times 260 \text{ days} \times 1.9835 = 129 \text{ afa}$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = 56.25 \text{ afa}$$

## 2. Volume Calculations for Other Uses:

**H. RECOMMENDATIONS**

## 1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion	Annual Volume
	From	To	Q (cfs)	V (afa)
Irrigation	3/1	11/15	0.25	56.25
Totals:			0.25	56.25

## 2. Recommended Amendments

☐ Change P.D. as reflected on page 1☐ Add P.D. as reflected on page 1☒ None☐ Change P.U. as reflected on page 1☐ Add P.U. as reflected on page 1☐ Other**I. AUTHENTICATION**

Field Examiner's Signature



Date 11-10-20

SEAL

Reviewer

Date

**ATTACHMENT A**  
**PERMIT RECORD, PROOF OF BENEFICIAL USE**



**State of Idaho**

**DEPARTMENT OF WATER RESOURCES**

Western Region, 2735 Airport Way • Boise, Idaho 83705-5082

Phone: (208) 334-2190 • Fax: (208) 334-2348 • Web Site: [www.idwr.idaho.gov](http://www.idwr.idaho.gov)

November 19, 2015

C. L. "BUTCH" OTTER  
Governor

GARY SPACKMAN  
Director

CITY OF MERIDIAN  
33 E BROADWAY AVE  
MERIDIAN ID 83642

RE: Permit No.63-34126

**Permit Approval Notice**

Dear Permit Holder:

The Department of Water Resources has issued the enclosed permit authorizing you to establish a new water right. Please be sure to thoroughly review the conditions of approval and remarks listed on your permit.

The permit is a PRELIMINARY ORDER issued by the Department pursuant to Section 67-5243, Idaho Code. It can and will become a final order without further action by the Department unless a party petitions for reconsideration or files an exception and/or brief within fourteen (14) days of the service date as described in the enclosed information sheet.

As a permit owner you must commence the excavation or construction of the diverting works within one year of the date the permit was issued, and you must proceed diligently until the project is completed. The date shown under condition no. 1 is the date when the project must be completed.

The Department will send you a 'Proof Due Notice' approximately 60 days prior to the above referenced date requesting you to file either a Proof of Beneficial Use form or a Request for Extension of Time form.

The right to drill a well is not a part of this permit to appropriate water. Beginning in July of 1987, a statute was enacted which requires a drilling permit for new well construction and deepening of existing wells. If the well(s) proposed for use under this water right permit were drilled or deepened after July 1, 1987, a separate drilling permit must be obtained from this Department. Please contact the Ground Water Protection Section located here at this office or our regional office nearest you.

Also, please note that water right owners are required to report any change of water right ownership and/or mailing address to the Department within 120 days of the change. Failure to report these changes could result in a \$100 late filing fee. Contact any office of the Department or visit the Department's homepage on the Internet to obtain the proper forms and instructions.

If you have any questions, please contact me at (208)334-2190.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rachel Neely', written over a horizontal line.

*Rachel Neely for:*

Nick Miller

Western Region Manager

Enclosure(s)

cc: SPF WATER ENGINEERING LLC

### **CERTIFICATE OF SERVICE**

I hereby certify that on November 19, 2015 I mailed a true and correct copy, postage prepaid, of the foregoing PRELIMINARY ORDER(Approved Permit) to the person(s) listed below:

**RE: WATER RIGHT NO.**

**63-34126**

**CITY OF MERIDIAN  
33 E BROADWAY AVE  
MERIDIAN ID 83642**

**SPF WATER ENGINEERING LLC  
C/O LORI GRAVES  
300 E MALLARD DR STE 350  
BOISE ID 83706**

A handwritten signature in black ink, appearing to read 'Rachel Neely', is written over a horizontal line.

**Rachel Neely  
Administrative Assistant**

State of Idaho  
Department of Water Resources  
**Permit to Appropriate Water**

NO. 63-34126

Priority: August 03, 2015

Maximum Diversion Rate: 0.44 CFS

This is to certify, that CITY OF MERIDIAN  
33 E BROADWAY AVE  
MERIDIAN ID 83642

has applied for a permit to appropriate water from:

**Source:** GROUND WATER

and a permit is APPROVED for development of water as follows:

**BENEFICIAL USE**

IRRIGATION

**PERIOD OF USE**

03/01 to 11/15

**RATE OF DIVERSION**

0.44 CFS

**LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER SE1/4 NW1/4 Sec. 33, Twp 03N, Rge 01E, B.M. ADA County

**PLACE OF USE:** IRRIGATION

Twp	Rge	Sec	NE	NW	SW	SE	Totals
03N	01E	33	16.0	8.0			24.0

Total Acres: 24

**CONDITIONS OF APPROVAL**

1. Proof of application of water to beneficial use shall be submitted on or before **December 01, 2020**.
2. Subject to all prior water rights.
3. This right when combined with all other rights shall provide no more than 4.5 afa per acre at the field headgate for irrigation of the place of use.
4. This right is limited to the irrigation of 22 acres within the authorized place of use in a single irrigation season.
5. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor exceed a combined annual maximum diversion volume of 99.0 af at the field headgate for the place of use.
6. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
7. The right holder shall make full beneficial use of all surface water available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right for land with an appurtenant surface water right(s) to those times when the surface water supply is not available or reasonably sufficient to irrigate the place of use authorized under this right.

State of Idaho  
Department of Water Resources  
**Permit to Appropriate Water**

NO. 63-34126

8. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.
9. Project construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which the permit holder had no control.
10. If the surface water right(s) appurtenant to the place of use for this right is unavailable for any reason other than drought or curtailment by priority (for example abandoned, forfeited, sold, transferred, leased, used on another place of use, or disallowed by court decree), the right holder shall not divert ground water for irrigation purposes on the land with appurtenant surface water rights without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
11. The Director retains jurisdiction to require the right holder to provide purchased or leased natural flow or stored water to offset depletion of Lower Snake River flows if needed for salmon migration purposes. The amount of water required to be released into the Snake River or a tributary, if needed for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this permit.

This permit is issued pursuant to the provisions of Section 42-204, Idaho Code. Witness the signature of the Director, affixed at Boise, this 19<sup>th</sup> day of November, 2015.

  
GARY SPACKMAN, Director

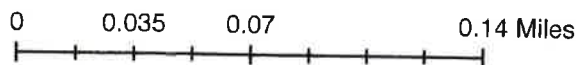
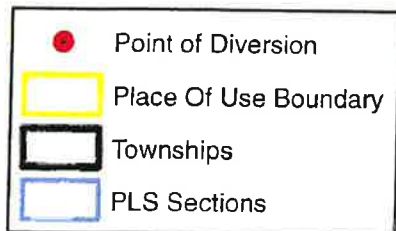
State of Idaho  
Department of Water Resources

# Attachment to Permit to Appropriate Water

63-34126

This map depicts the IRRIGATION place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.

01E

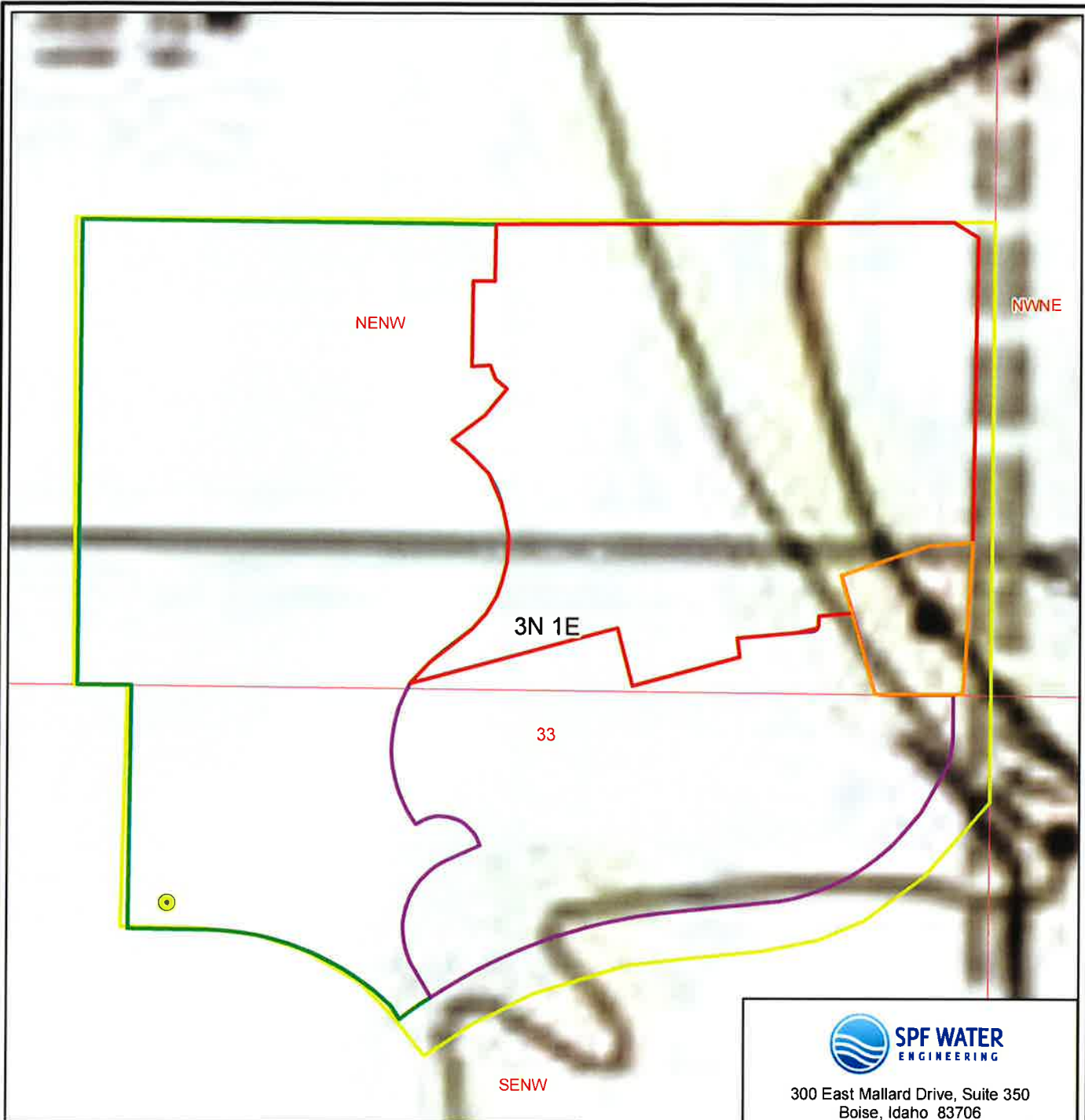










**ATTACHMENT B**

**TOPO MAP, 2018 AERIAL PHOTO,  
PROPERTY OWNERSHIP MAP**

Path: S:\PROJECTS\A thru D\Projects\City of Meridian\_7900410\_YMCA Property\PROJECTING\ArcMap\_Projects\BUFE Aerial Photo Map.mxd



## Legend

-  Well Site
-  Permit Place of Use - 24 ac
-  City Property - 9.54 ac
-  Healthy Living Condo Property - 7.35 ac
-  School Dist Property - 4.97 ac
-  Young Mens Christian Assoc Property - 0.6 ac



300 East Mallard Drive, Suite 350  
Boise, Idaho 83706  
Tel (208) 383-4140 Fax (208) 383-4156

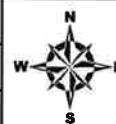
## Topo Map

### Permit 63-34126 BUFE

DATE: 10/2/2020

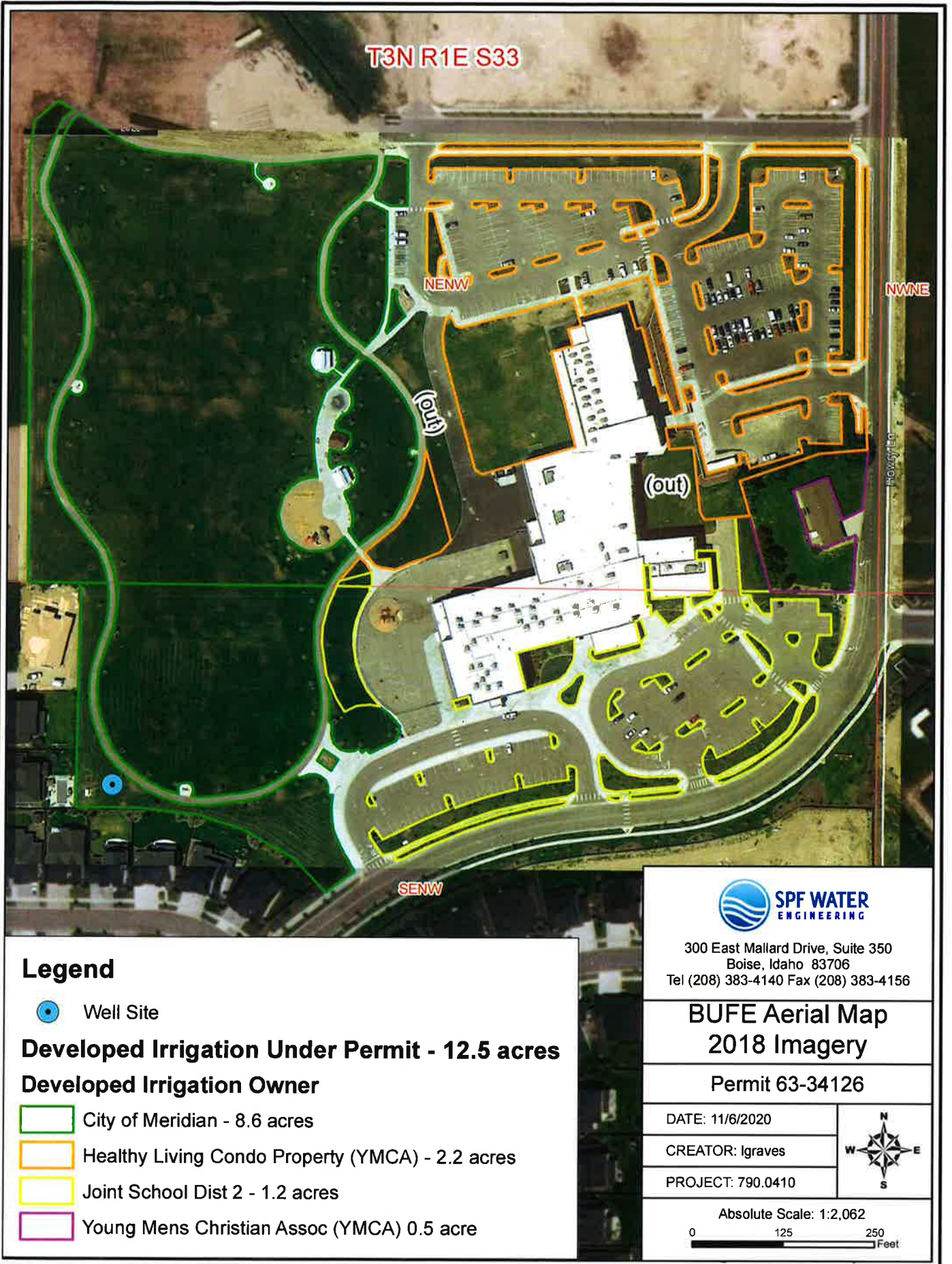
CREATOR: Igraves

PROJECT: 790.0410



Absolute Scale: 1:2,208

0 125 250  
Feet







## Legend

- Well Site
- Permit Place of Use - 24 ac
- City Property - 9.54 ac
- Healthy Living Condo Property - 7.35 ac
- School Dist Property - 4.97 ac
- Young Mens Christian Assoc Property - 0.6 ac



300 East Mallard Drive, Suite 350  
Boise, Idaho 83706  
Tel (208) 383-4140 Fax (208) 383-4156

## Current Property Ownership

Permit 63-34126 BUFE

DATE: 10/2/2020

CREATOR: Igraves

PROJECT: 790.0410



Absolute Scale: 1:2,208

0 125 250 Feet

**ATTACHMENT C**  
**WELL DRILLERS' REPORT**  
**WELL PUMP CURVE**



**ATTACHMENT D**

**PHOTOS**





Photo 1. Surface water diversion box, irrigated park in background





Photo 2. Well – water right point of diversion



Photo 3. Well, surface water diversion box, surface water pump station



Photo 4. Control panel display showing pumping rate and pressure



**ATTACHMENT E**  
**PUMP STATION SUBMITTAL**



## Hillsdale Park

### System Summary

Performance			
Design Flow Rate	325 GPM		
Pressure	80 PSI		
Electrical Input			
Input Voltage	480 V	Voltage and Phase Verified by:	
Input Phase	3 Phase	X	
Pump and Motor			
	HP	Type	QTY
Duty Pump	15 HP	Submersible Turbine	2
Jockey Pump	2 HP	Submersible Turbine	1
Piping			
	Mild Steel		
Powder Coating			
Non-Potable	TGIC Beige		

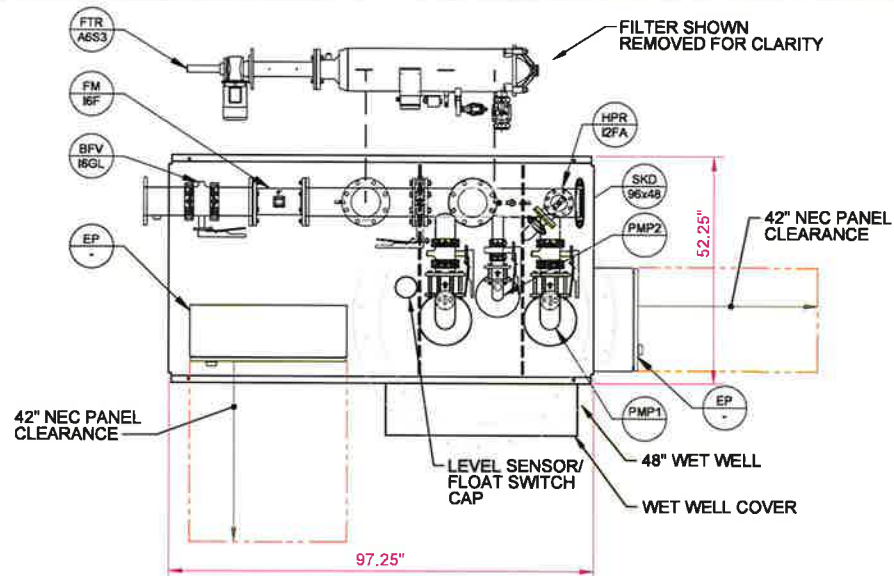
## Submittal Package

### 12220 - A

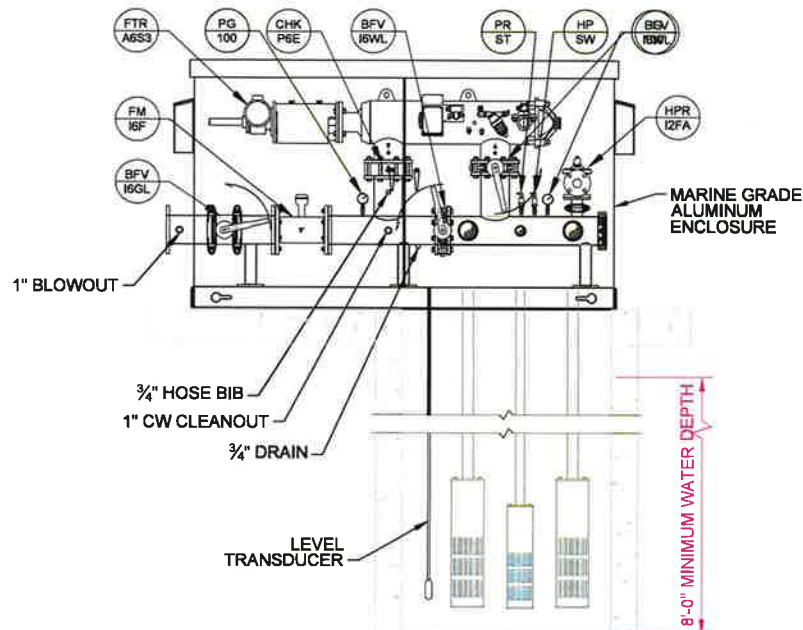
PPS  
6515 Business Way  
Boise, ID 83716  
[www.gopps.us](http://www.gopps.us)  
208-323-5300

Approved by: \_\_\_\_\_

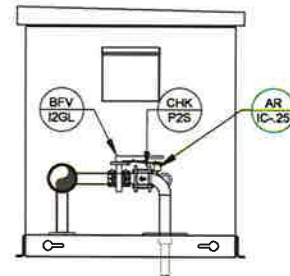
Date: \_\_\_\_\_



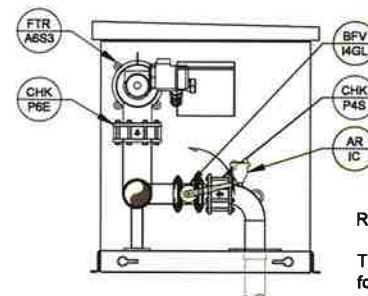
Plan View



Front View



Jockey Pump Assembly



Duty Pump Assembly

#### Remote Well Control

The packaged pump station shall include variable speed controls for remote groundwater well. The system shall include a level transducer, which will be placed in the wet well. The remote well pump will maintain wet well level when the pump station is in well fill mode.

#### DESIGN SPECIFICATIONS

Design Flow Rate:	325 GPM @ 80 PSI
Duty Pump Details:	15 HP/Pump 325 GPM @ 240 TDH
Jockey Pump Details:	2 HP/Pump 20 GPM @ 240 TDH
Incoming Power:	480 Volt / 3 Phase
Model #	#V2S015A00325-080S63S463ONS

#### BILL OF MATERIALS

ITEM	DESCRIPTION	SIZE	Count
AR 1C	AIR RELIEF VALVE	3/4"	2
AR 1C-25	AIR RELIEF VALVE	1/4"	1
BFV 12GL	BUTTERFLY VALVE, LO, GV	2"	1
BFV 14GL	BUTTERFLY VALVE, LO, GV	4"	2
BFV 16GL	BUTTERFLY VALVE, LO, GV	6"	1
BFV 16WL	BUTTERFLY VALVE, LO	6"	2
CHK P2S	CHECK VALVE, SILENT	2"	1
CHK P4S	CHECK VALVE, SILENT	4"	2
CHK P6E	CHECK VALVE, ENBEE	6"	1
EP	ELECTRICAL PANEL	(SIZE)	2
FM 16F	FLOW METER	6"	1
FTR A6S3	FILTER, SAF 3000	6"	1
HP SW	HIGH PRESSURE SWITCH	1/4"	1
HPR 12FA	HP RELIEF VALVE, ANGLED	2"	1
PG 100	PRESSURE GAUGE	100 PSI	2
PMP1	PUMP, SUBMERSIBLE	15 HP	2
PMP2	PUMP, SUBMERSIBLE	2 HP	1
PR ST	PRESSURE SENSOR	1/4"	1
SKD	SKID	96X48	1



**Badger Meter**

## M-Series® M2000

Electromagnetic Flow Meter Detector

## Section 3.4 Flow Meter

### DESCRIPTION

The Badger Meter M-Series® model M2000 detector is the result of years of research and field use of electromagnetic flow meter technology. Based on Faraday's law of induction, these meters can measure almost any liquid, slurry, or paste that has minimum electrical conductivity.

Designed, developed, and manufactured under strict quality standards, the M-Series meter features sophisticated, processor-based signal conversion with accuracies of  $\pm 0.25$  percent. The wide selection of liner and electrode materials helps ensure maximum compatibility and minimum maintenance over a long operating period.

### OPERATION

The flow meter is a stainless steel tube lined with a non-conductive material. Outside the tube, two DC powered electromagnetic coils are positioned opposing each other. Perpendicular to these coils, two electrodes are inserted into the flow tube. Energized coils create a magnetic field across the whole diameter of the pipe.

As a conductive fluid flows through the magnetic field, a voltage is induced across the electrodes. This voltage is proportional to the average flow velocity of the fluid and is measured by the two electrodes. This induced voltage is then amplified and processed digitally by the converter to produce an accurate analog or digital signal. The signal can then be used to indicate flow rate and totalization or to communicate to remote sensors and controllers.

With no moving parts in the flow stream, there is no pressure lost. Also, accuracy is not affected by temperature, pressure, viscosity, density or flow profile. There is practically no maintenance required.

### APPLICATION

The M2000 has many advantages over other conventional technologies. It can be used in a majority of industrial flow applications. The M2000 meter can accurately measure fluid flow—whether the fluid is water or a highly corrosive liquid, very viscous, contains a moderate amount of solids, or requires special handling. Today, magnetic meters are successfully used in industries including food and beverage, pharmaceutical, water and wastewater, and chemical.

### ELECTRODES

When looking from the end of the meter into the inside bore, the two measuring electrodes are positioned at three o'clock and nine o'clock. M2000 mag meters have an "empty pipe detection" feature. This is accomplished with a third electrode positioned in the meter between twelve o'clock and one o'clock.



If this electrode is not covered by fluid for a minimum five-second duration, the meter will display an "empty pipe detection" condition, send out an error message if desired, and stop measuring to maintain accuracy. When the electrode again becomes covered with fluid, the error message will disappear and the meter will continue measuring.

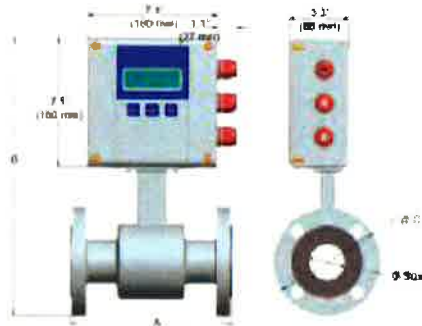
As an option to using grounding rings, a grounding electrode (fourth electrode) can be built into the meter during manufacturing to assure proper grounding. The position of this electrode is at five o'clock.

### FEATURES

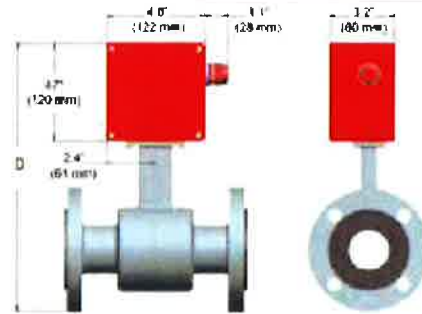
- Pulsed DC magnetic field for zero point stability
- Corrosion resistant liners for long life
- Calibrated in state-of-the art facilities
- Optional grounding rings or grounding electrode
- Measurement largely independent of flow profile
- NSF listed
- Integral and remote signal converter availability
- Available in sizes 0.25...54" (6...1400 mm)



## Section 3.5 Flow Meter



Meter with M2000 amplifier



Meter with junction box for remote M2000 amplifier

Size		A		B		C		D		Est. Weight with M-2000		Flow Range			
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg	LPM		GPM	
												min	max	min	max
1/4	6	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.063	20	0.02	5
5/16	8	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.114	34	0.03	9
3/8	10	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.177	53	0.05	14
1/2	15	6.7	170	14.0	356	3.5	89	11.4	288	10	4.5	0.416	125	0.11	33
3/4	20	6.7	170	14.2	361	3.9	99	11.5	293	13	5.5	0.75	225	0.2	59
1	25	8.9	225	14.4	366	4.3	108	11.7	298	18	8.0	1.20	350	0.3	93
1-1/4	32	8.9	225	15.2	386	4.6	117	12.5	318	20	9.0	2.00	575	0.5	152
1-1/2	40	8.9	225	15.4	390	5.0	127	12.7	322	21	9.5	3.00	900	0.8	239
2	50	8.9	225	15.9	403	6.0	152	13.2	335	26	11.5	4.70	1400	1	373
2-1/2	65	11.0	280	17.1	434	7.0	178	14.4	366	52	23.5	8	2400	2	631
3	80	11.0	280	17.3	440	7.5	191	14.7	372	54	24.5	12	3600	3	956
4	100	11.0	280	18.4	466	9.0	229	15.7	398	56	25.5	19	5600	5	1493
5	125	15.8	400	19.6	498	10.8	274	16.9	428	58	26.8	30	8800	9	2334
6	150	15.8	400	20.6	524	11.0	279	17.9	456	60	27.0	40	12700	11	3361
8	200	15.8	400	22.5	572	13.5	343	20.4	518	86	39.0	75	22600	20	5975
10	250	19.7	500	26.8	681	16.0	406	24.1	613	178	81.0	120	35300	30	9336
12	300	19.7	500	28.9	734	19.0	483	26.2	666	207	94.0	170	50800	45	13444
14	350	19.7	500	30.8	782	21.0	533	28.2	716	258	117	230	69200	60	18299
16	400	23.6	590	33.7	856	23.5	597	31.0	788	306	139	300	90400	80	23901
18	450	23.6	590	35.0	890	25.0	635	32.4	822	400	181	380	114000	100	30250
20	500	23.6	590	38.2	969	27.5	699	35.5	901	493	224	470	140000	125	37346
22	550	23.6	590	39.6	1005	29.5	749	36.9	937	523	237	570	170000	150	45188
24	600	23.6	590	42.2	1071	32.0	813	39.5	1003	552	251	680	200000	180	53778
28	700	23.6	590	46.2	1173	36.5	927	44.0	1118	648	294	920	275000	240	73100
30	750	31.5	800	48.3	1228	39.0	984	45.7	1161	702	319	1060	315000	280	84000
32	800	31.5	800	52.2	1325	41.4	1015	49.5	1257	768	349	1200	361000	320	95600
36	900	31.5	800	55.3	1405	46.0	1168	54.1	1374	848	385	1500	457000	400	121000
40	1000	31.5	800	60.0	1525	50.2	1230	57.4	1457	922	419	1900	565000	500	149300
42	1050	36.0	914	66.0	1675	53.0	1346	63.4	1610	1198	499	2100	620000	550	164600
48	1200	39.4	1000	69.9	1775	59.4	1455	67.2	1707	1208	549	2700	814000	720	215100
54	1400	39.4	1000	78.5	1995	68.4	1675	75.9	1927	1362	619	3700	1100000	980	292700

### SPECIFICATIONS

<b>Flow Range</b>	0.1...39.4 fps (0.03...12 m/s)	<b>Pipe Spool Material</b>	316 stainless steel
<b>Min. Conductivity</b>	≥ 5 micromhos/cm	<b>Meter Housing Material</b>	Carbon steel welded
<b>Accuracy</b>	± 0.25 percent of rate for velocities greater than 1.64 ft/s (0.50 m/s), ± 0.004 ft/s (± 0.001 m/s) for velocities less than 1.64 ft/s (0.50 m/s)	<b>Flanges</b>	Standard (ANSI B16.5 Class 150 RF): Carbon steel Optional: 316 stainless steel
<b>Electrode Materials</b>	Standard: Alloy C Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium	<b>Meter Enclosure Classification</b>	NEMA 4X (IP66) Optional: Submersible NEMA 6P (remote amplifier required)
<b>Liner Material</b>	PFA up to 3/8", PTFE 1/2"...24", soft and hard rubber from 1...54" Halar* from 14...40"	<b>Junction Box Enclosure Protection</b>	For remote amplifier option: Powder coated die-cast aluminum, NEMA 4 (IP65)
<b>NSF Listed</b>	Models with hard rubber liner 4" size and up; PTFE liner, all sizes.	<b>Cable Entries</b>	1/2" NPT Cord Grip
<b>Fluid Temperature</b>	With Remote Amplifier: PFA, PTFE & Halar 311° F (155° C) With Meter Mounted Amplifier: Rubber 178° F (80° C), PFA, PTFE & Halar 212° F (100° C), Rubber 178° F (80° C)	<b>Optional Stainless Steel Grounding Rings</b>	<b>Meter Size</b> Up through 10 inches 12...2" <b>Thickness (of one ring)</b> 0.135" 0.187"

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# Section 4.1 Duty Pump and Motor Data

## HYDRAULIC ANALYSIS

Quote Number: 9001-161007-014:1  
Model: VIS-WF  
Size: 6CLC 4 Stage(s)

### OVERALL PUMP PARAMETERS

**Capacity:** 165.00 USGPM  
Total Pump Length: 0.00 ft  
Pump Type: VIS -Submersible Vertical Turbine (Borehole) Pumps  
Pump K-Factor: 2.10 lbs/ft  
Additional Pump K-Factor: 2.10 lbs/ft  
Pump Operating Speed [RPM]: 3450

**Total Dynamic Head:** 232.00 ft  
Impeller Trim: 4.220 inch  
Number of Stages: 4  
Pumping Level: 0.00 ft

### BOWL DATA

Total Bowl Length: 26.100 inch  
Bowl Shaft Diameter: 1.000 inch  
Bowl Diameter: 5.500 inch

Bowl Shaft Limit : 138 Hp  
Bowl Shaft Material: 416SS

### COLUMN DATA

**Column Diameter :** 4 inch  
Column Wall Thickness: 0.230 inch  
Column Load: 273.80 lb

Column Elongation: 0.00001 inch  
Shut Off Column Elongation: 0.00002 inch

### HORSEPOWER DATA

Bowl Hp at Design: 13 Hp  
Thrust Load Loss: 0.000000 Hp

**Rating:** 15 Hp [11.2 kW]

### OTHER DATA

Hydraulic Thrust: 487.20 lb  
Thrust at Shut Off: 700.03 lb  
Column Loss: 0.01 ft  
Head Loss: 0.20 ft  
Total Loss: 0.21 ft  
Thrust at Design: 496.40 lb

Actual Head Above Grade: 231.79 ft  
Shut Off Discharge Pressure: 142.41 psi  
NPSHa: 34.00 ft  
NPSHr: 11.90 ft @design  
NPSH Margin: 2.00 ft

### EFFICIENCY DATA

Bowl Efficiency: 78.00 %  
Motor Efficiency: 0.00 %  
Pump Efficiency: 77.80 %

Overall Efficiency: 0.00 %  
KWH per 1000 gallons: 0.00

### FLUID DATA

Fluid Type: Water  
Temperature: 70.00°F

Specific Gravity: 0.9999  
Viscosity: 0.9695 cP

### COMPONENT WEIGHTS

Bowl Weight: 115 lbs  
Head Weight: 0 lbs  
Driver Weight: 161 lbs

Column Weight: 0 lbs  
Can Weight:  
Total Pump Weight: 276 lbs

### DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified by

Date of certification

Pump serial number

Project Name

Tag

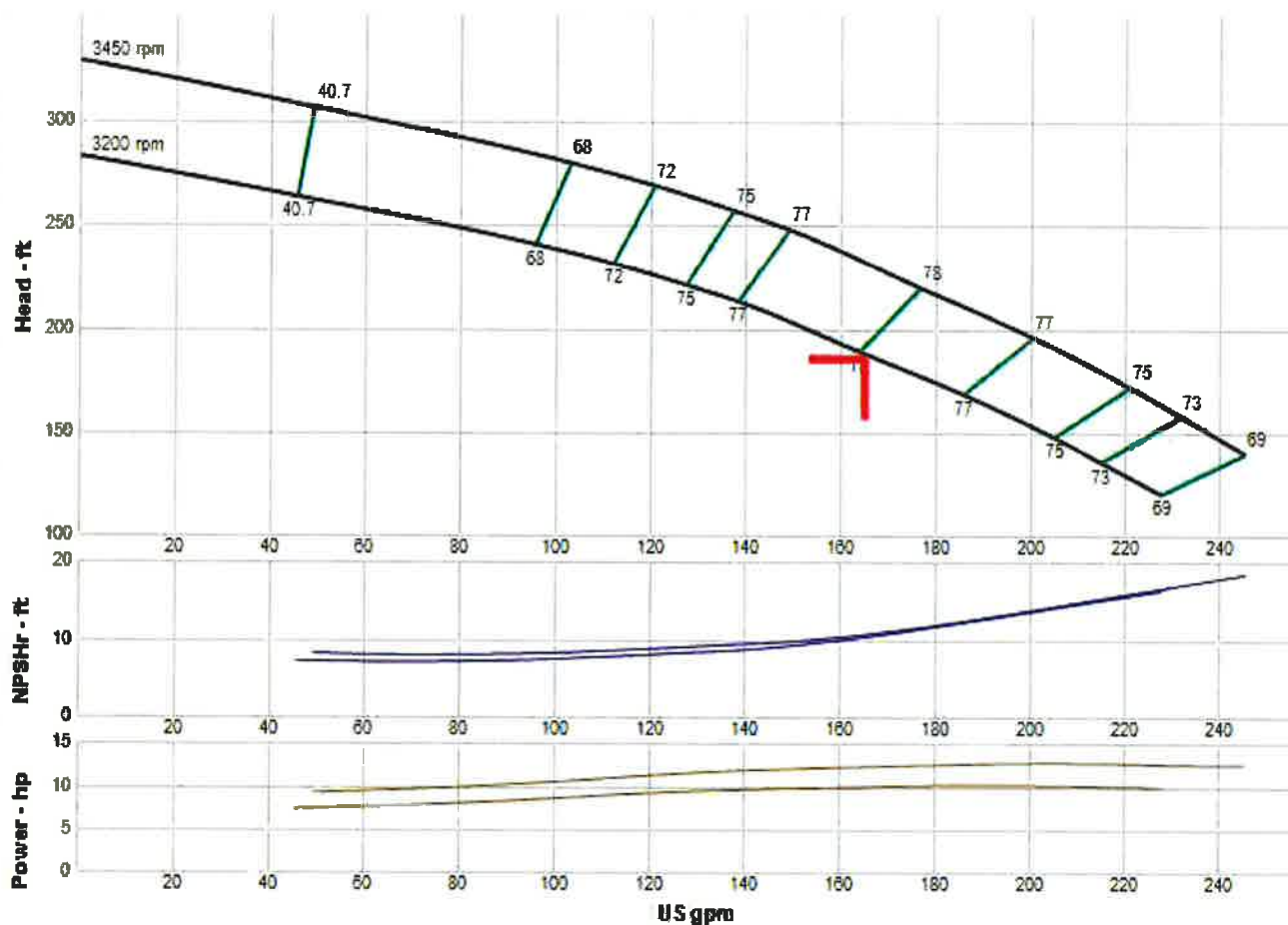
Hillsdale Park 15hp Subm

## PERFORMANCE CURVE

Quote Number: 9001-161007-014:1

Model: VIS-WF

Size: 6CLC 4 Stage(s)



Driver Size Criteria:

Speed: 3450 RPM

Impeller Trim: 4.220 inch

Additional Impeller Trim: 4.2200 inch

Frequency: 60 Hz

Impeller Maximum Trim: 4.220 inch

Specified Flow: 165.00 USGPM

Specified Head: 185.000 ft

Head at Design: 232.00 ft

Efficiency at Design: 77.90 %

Power at Design: 13 Hp

Flow on Design Trim @ Max Pwr: 200.00 USGPM

Max Power on Design Curve: 12.80 Hp

Max power on design curve (NOL)

Best Efficiency: 78.00 %

Flow at BEP: 176.00 USGPM

Min Flow: 44.10 USGPM

Derate Factor: 1.0000

Specified NPSH Avail: 34.00 ft

NPSH Required: 11.90 ft

Shut-Off Head: 329.00 ft

Fluid Type: Water

Temperature / Specific Gravity: 70.00°F / 0.9999

Viscosity: 0.0695 cP

Allowable Sphere Size: 0.47 inch

Certified by Thrust K Factor: 2.10 lbs/ft

Additional Thrust K Factor: 2.10 lbs/ft

Pump serial number

Project Name Hillsdale Park 15hp Subm

Tag



## Section 4.2 Jockey Pump and Motor Data

### TECHNICAL BROCHURE

B35-85GS

#### FEATURES

**Powered for Continuous Operation:** All ratings are within the working limits of the motor as recommended by the motor manufacturer. Pump can be operated continuously without damage to the motor.

**Field Serviceable:** Units have left hand threads and are field serviceable with common tools and readily available repair parts.

**Sand Handling Design:** Our face clearance, floating impeller stack has proven itself for over 50 years as a superior sand handling, durable pump design.

**FDA Compliant Non-Metallic Parts:** Impellers, diffusers and bearing spiders are constructed of glass filled engineered composites. They are corrosion resistant and non-toxic.

**Discharge Head/Check Valve:** Cast 303 stainless steel for strength and durability. Two cast-in safety line loops for installer convenience. The built-in check valve is constructed of stainless steel and FDA compliant BUNA rubber for abrasion resistance and quiet operation.

**Motor Adapter:** Cast 303 stainless steel for rigid, accurate alignment of pump and motor. Easy access to motor mounting nuts using standard open end wrench.

**Stainless Steel Casing:** Polished stainless steel is strong and corrosion resistant.

**Hex Shaft Design:** Six sided shafts for positive impeller drive.

**Engineered Polymer Bearings:** The proprietary, engineered polymer bearing material is strong and resistant to abrasion and wear. The enclosed upper bearing is mounted in a durable Noryl® bearing spider for excellent abrasion resistance.

# e-GS

## 35GS, 45GS, 65GS & 85GS

35-85 GPM 1-10HP, 60 HZ, SUBMERSIBLE PUMPS



**GOULDS**  
WATER TECHNOLOGY

a xylem brand

# Goulds Water Technology

## Residential Water Systems

### WATER END DATA

Series	Model	Required HP	Stages	Water End	
				Length (in)	Weight (lbs)
35GS	35GS10	1	6	14.2	8
	35GS15	1.5	8	16.6	9
	35GS20	2	10	19.1	10
	35GS30	3	14	24.0	13
	35GS50	5	23	36.4	20
	35GS75	7.5	36	53.0	28
	35GS100	10	46	65.2	34
45GS	45GS15	1.5	5	12.9	8
	45GS20	2	7	15.4	9
	45GS30	3	10	19.0	10
	45GS50	5	17	27.7	15
	45GS75	7.5	25	38.9	21
	45GS100	10	34	50.6	27
65GS	65GS15	1.5	6	19.1	10
	65GS20	2	7	21.2	11
	65GS30	3	10	27.4	12
	65GS50	5	16	41.2	18
	65GS75	7.5	26	62.3	35
	65GS100	10	33	76.8	42
85GS	85GS30	3	8	29.4	13
	85GS50	5	14	42.8	18
	85GS75	7.5	21	63.8	35
	85GS100	10	27	79.9	41

### SPECIFICATIONS

Model	Flow Range GPM	Horse-Power Range	Best Efficiency GPM	Discharge Connection	Minimum Well Size	Rotation
35GS	10-50	1.0 - 10	35	2"	4"	CCW
45GS	20 - 65	1.5 - 10	45	2"	4"	CCW
65GS	30 - 80	1.5 - 10	65	2"	4"	CCW
85GS	40 - 120	3.0 - 10	85	2"	4"	CCW

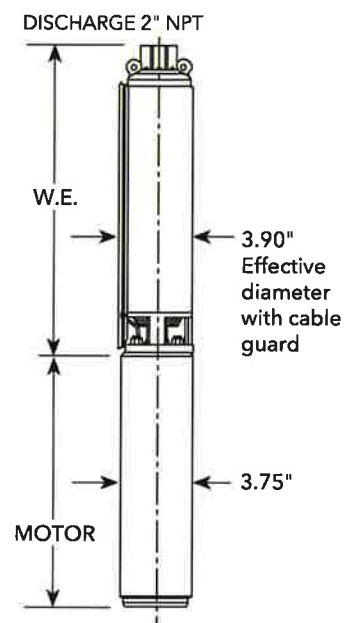
### "GS" SERIES MATERIALS OF CONSTRUCTION

Part Name	Material
Discharge Head	AISI 303 SS
Check Valve Poppet	AISI 303 SS
Check Valve Seal	BUNA, FDA Compliant
Check Valve Seat	AISI 304 SS
Check Valve Retaining Ring	AISI 302 SS
Bearing Spider - Upper	Noryl
Bearing	Proprietary Engineered Polymer
Klipring	AISI 301 SS
Diffuser	Noryl
Impeller	Noryl
Bowl	AISI 304 SS
Intermediate Sleeve*	AISI 304 SS, Powder Metal
Intermediate Shaft Coupling*	AISI 304 SS, Powder Metal
Intermediate Bearing Spider*	Noryl
Intermediate Bearing Spider*	AISI 303 SS
Shim	AISI 304 SS
Screws - Cable Guard	AISI 304 SS
Motor Adapter	AISI 303 SS
Casing	AISI 304 SS
Shaft	17-4 PH Stainless Steel
Coupling	AISI 304 SS, Powder Metal
Cable Guard	AISI 304 SS
Suction Screen	AISI 304 SS

### NOMENCLATURE - SOLD AS WATER ENDS ONLY

35 GS 20  
 GPM at — 35, 45, 65, 85 —  
 Best Efficiency  
 GS Pump Series  
 Horsepower Code

10 = 1      50 = 5  
 15 = 1½      75 = 7½  
 20 = 2      100 = 10  
 30 = 3



## Residential Water Systems

### CENTRIPRO 4" SINGLE-PHASE MOTORS

Order No.	Type	HP	Volts	Length in. (mm)	Weight lb. (kg.)
M10422	2-wire PSC	1	230	13.3 (337)	24.5 (11.1)
M15422		1.5		14.9 (378)	28.9 (13.1)
M10412	3-wire	1	230	11.7 (297)	23.1 (10.5)
M15412		1.5		13.6 (345)	27.4 (12.4)
M20412		2		15.1 (383)	31.0 (14.1)
M30412		3		18.3 (466)	40.0 (18.1)
M50412		5		27.7 (703)	70.0 (31.8)

### CENTRIPRO 4" THREE-PHASE MOTORS

Order No.	HP	Volts	Length in. (mm)	Weight lb. (kg.)
M10430	1	200	11.7 (297)	22 (10.4)
M15430	1.5		11.7 (297)	22 (10.4)
M20430	2		13.8 (351)	28 (12.7)
M30430	3		15.3 (389)	32 (14.5)
M50430	5		21.7 (550)	55 (24.9)
M75430	7.5		27.7 (703)	70 (31.8)
M10432	1	230	11.7 (297)	23 (10.4)
M15432	1.5		11.7 (297)	23 (10.4)
M20432	2		13.8 (351)	28 (12.7)
M30432	3		15.3 (389)	32 (14.5)
M50432	5		21.7 (550)	55 (24.9)
M75432	7.5		27.7 (703)	70 (31.8)
M10434	1	460	11.7 (297)	23 (10.4)
M15434	1.5		11.7 (297)	23 (10.4)
M20434	2		13.8 (351)	28 (12.7)
M30434	3		15.3 (389)	32 (14.5)
M50434	5		21.7 (550)	55 (24.9)
M75434	7.5		27.7 (703)	70 (31.8)
M100434	10		—	—
M15437	1.5	575	11.7 (297)	23 (10.4)
M20437	2		15.3 (389)	32 (14.5)
M30437	3		15.3 (389)	32 (14.5)
M50437	5		27.7 (703)	70 (31.8)
M75437	7.5		27.7 (703)	70 (31.8)

### NEMA MOTOR

- Corrosion resistant stainless steel construction.
- Built-in surge arrestor is provided on single phase motors through 5 HP.
- Stainless steel splined shaft.
- Hermetically sealed windings.
- Replaceable motor lead assembly.
- NEMA mounting dimensions.
- Control box is required with 3 wire single phase units.
- Three phase units require a magnetic starter with three leg Class 10 overload protection.

### AGENCY LISTINGS



CentriPro Motor - tested to UL778 and CAN 22.2 by CSA International (Canadian Standards Association)



CentriPro Motor - Certified to NSF/ANSI 61, Annex G, Drinking Water System Components 4P49



NSF/ANSI 372 - Drinking Water System Components - Lead Content

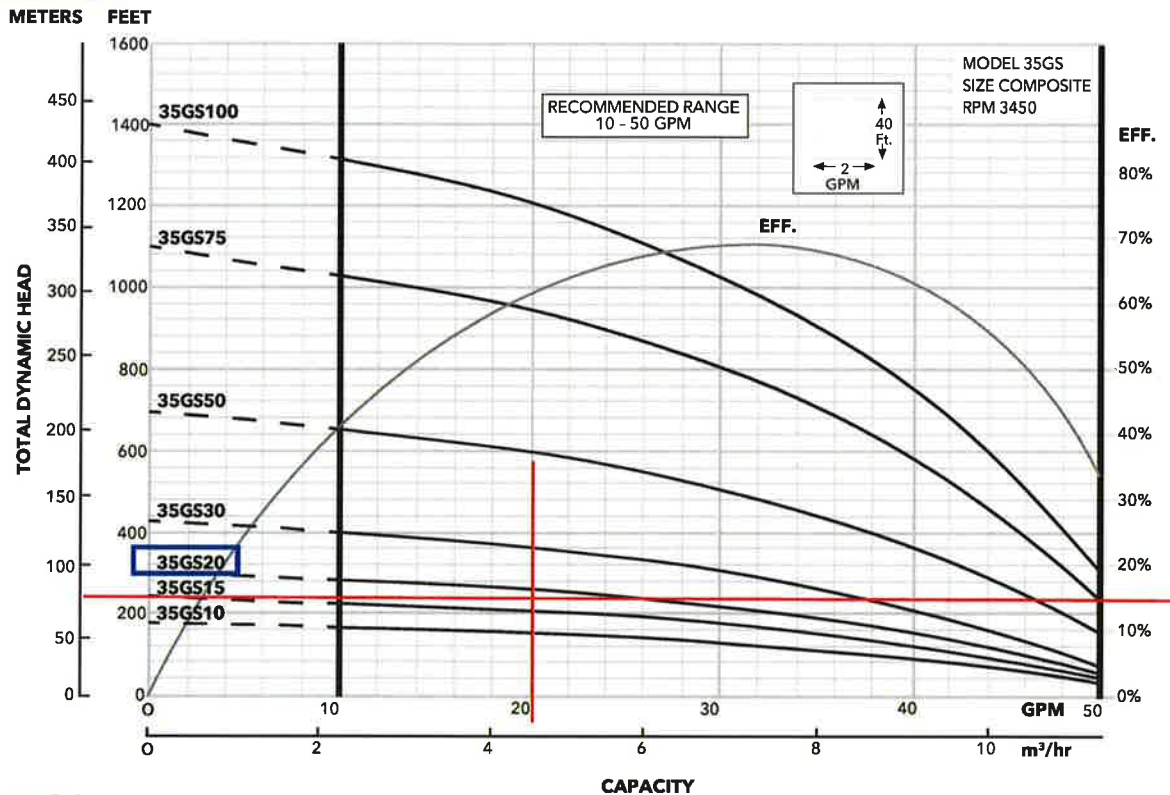
**CLASS 6853 01** - Low Lead Content Certification Program -- Plumbing Products



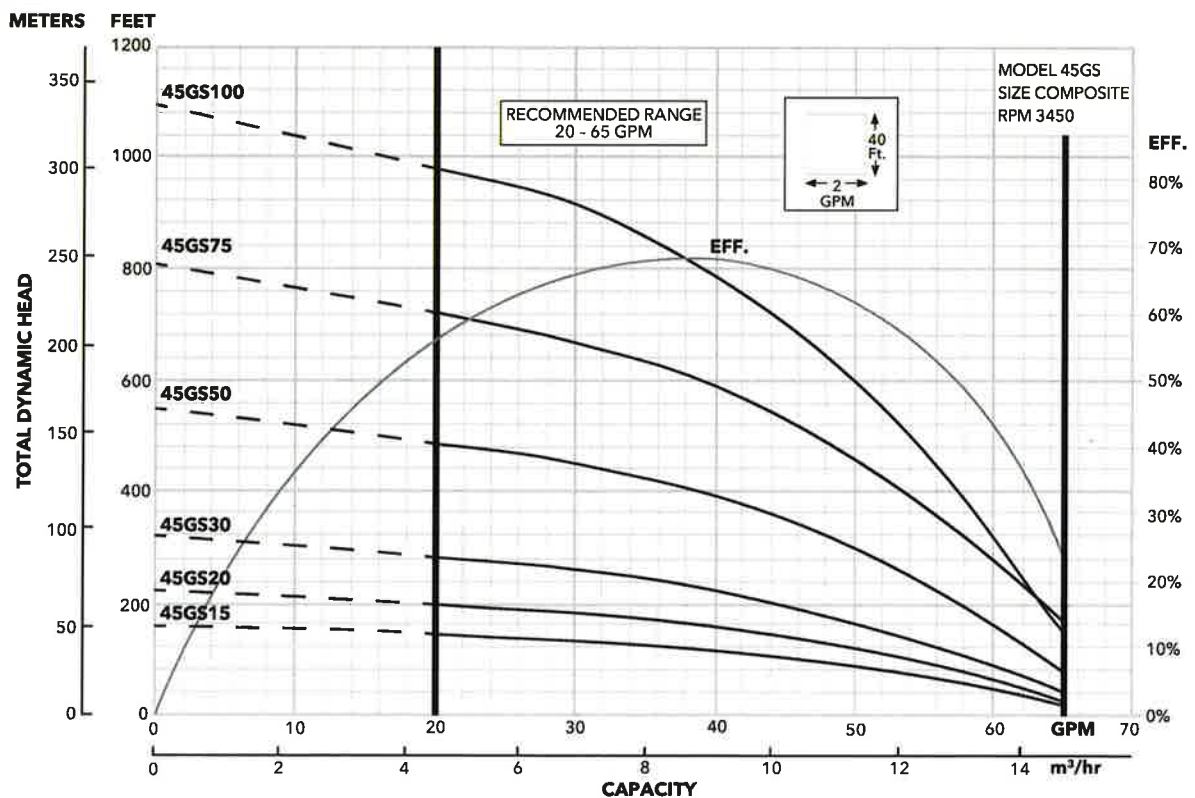
# Goulds Water Technology

## Residential Water Systems

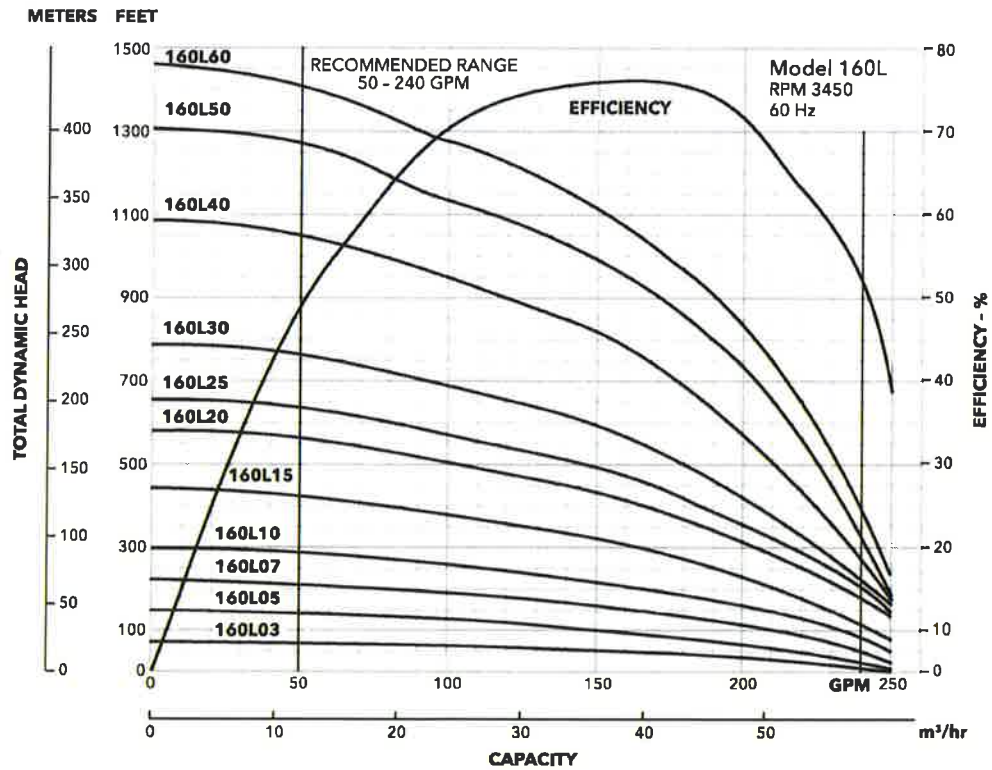
### Model 35GS



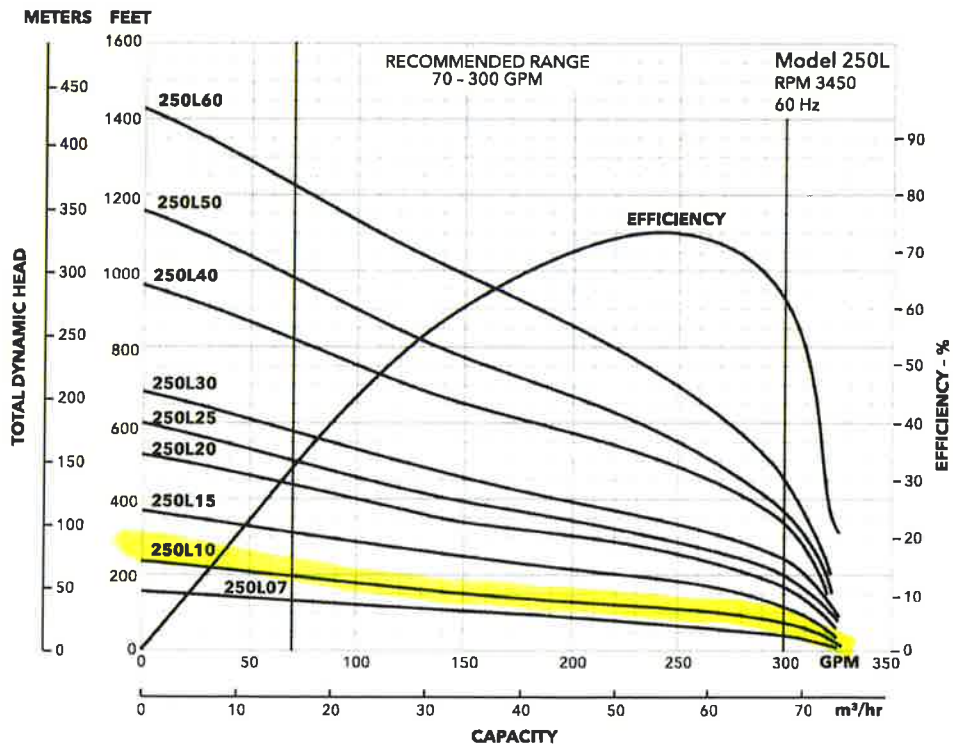
### Model 45GS



### MODEL 160L



### MODEL 250L



**NOTE:** On 250L, operation below minimum recommended flow will increase motor amp. draw and trip overloads.