

# Phase 2 Southern Force Main Hester Dr. to Cardinal Dr. for the City of White House

White House, Robertson County, Tennessee

## SANITARY SEWER CALCULATIONS

March 22, 2022

Rev. Appendix 4/12/22

Rev. Add Appendix C 5/16/22

**WPN 22.0181**

Southern Forcemain Hester Drive to Sage Road

### APPROVED FOR CONSTRUCTION

THE DOCUMENT BEARING THIS STAMP HAS BEEN RECEIVED AND REVIEWED BY THE

TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION

DIVISION OF WATER RESOURCES

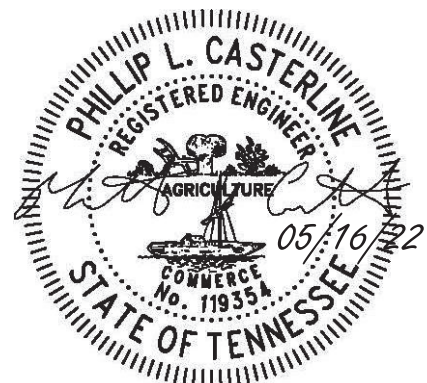
AND IS HEREBY APPROVED FOR CONSTRUCTION BY THE COMMISSIONER



May 24, 2022

THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A PRESUMPTION OF CORRECT OPERATION OR AS WARRANTING BY THE COMMISSIONER THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS.

APPROVAL EXPIRES ONE YEAR FROM ABOVE DATE



## Abstract

This report presents a detailed summary of phase two of the new southern force main for the City of White House. The existing collection system in this section of the city's system consists of a 12" PVC force main (shown in Figure 1) receiving flows from the south eastern portion of the city. The proposed 18" force main (shown in Figure 1) and in the constructions plans is proposed to facilitate continued growth and current increases in flows from active and future developments. The subsequent line flows, pressures and velocities are shown in both the existing and proposed conditions.



Figure 1 GIS Phase 2.

# **APPENDIX A**

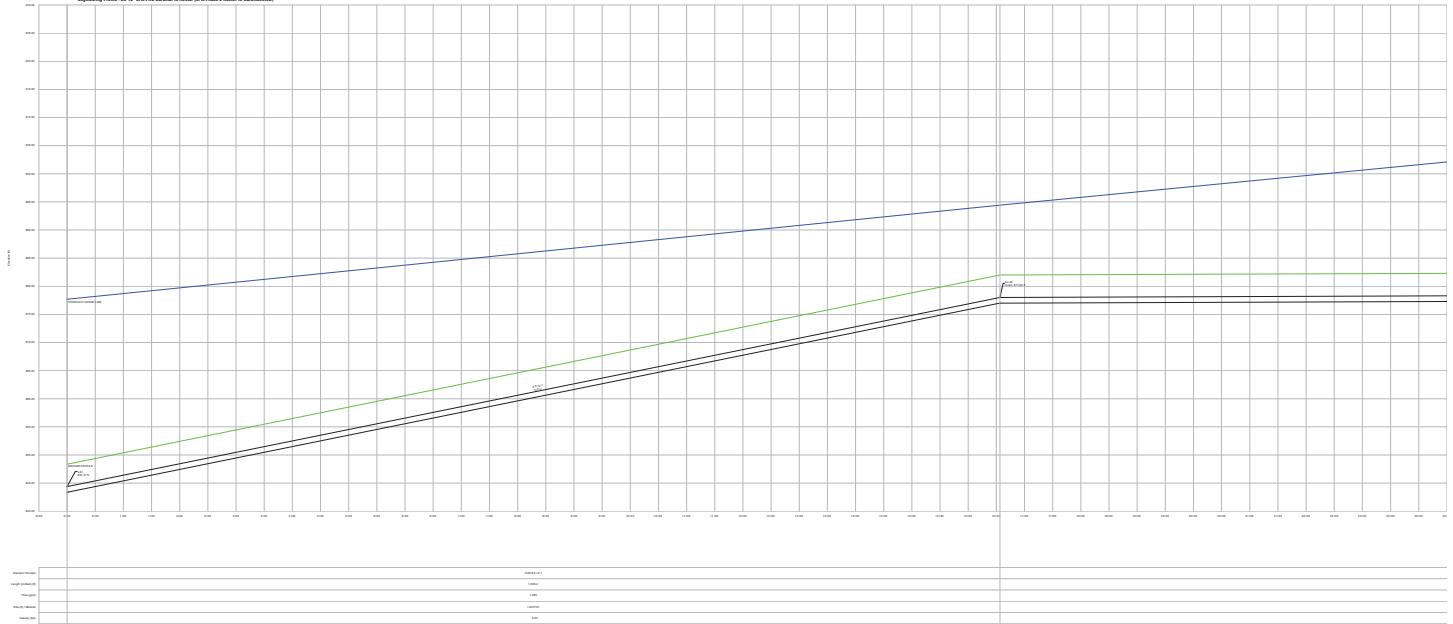
*Existing Force Main Sewer Calculations*

**FlexTable: Pressure Pipe Table**

ID	Label	Start Node	Stop Node	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Manning's n	Flow (gpm)	Velocity (ft/s)
1525	EX-12-1	AV-40	J-81	1,656.4	12.0	PVC	130.0	0.013	1,985	5.63
1524	EX-12-2	AV-34	AV-40	2,700.5	12.0	PVC	130.0	0.013	1,985	5.63
1508	EX-12-3	J-117	AV-34	617.6	12.0	PVC	130.0	0.013	1,985	5.63

Final Report

Representing Profile - 64.17 600 P&L Contract in Netter 2000-2005 3 Months in Contract/Line






# **APPENDIX B**

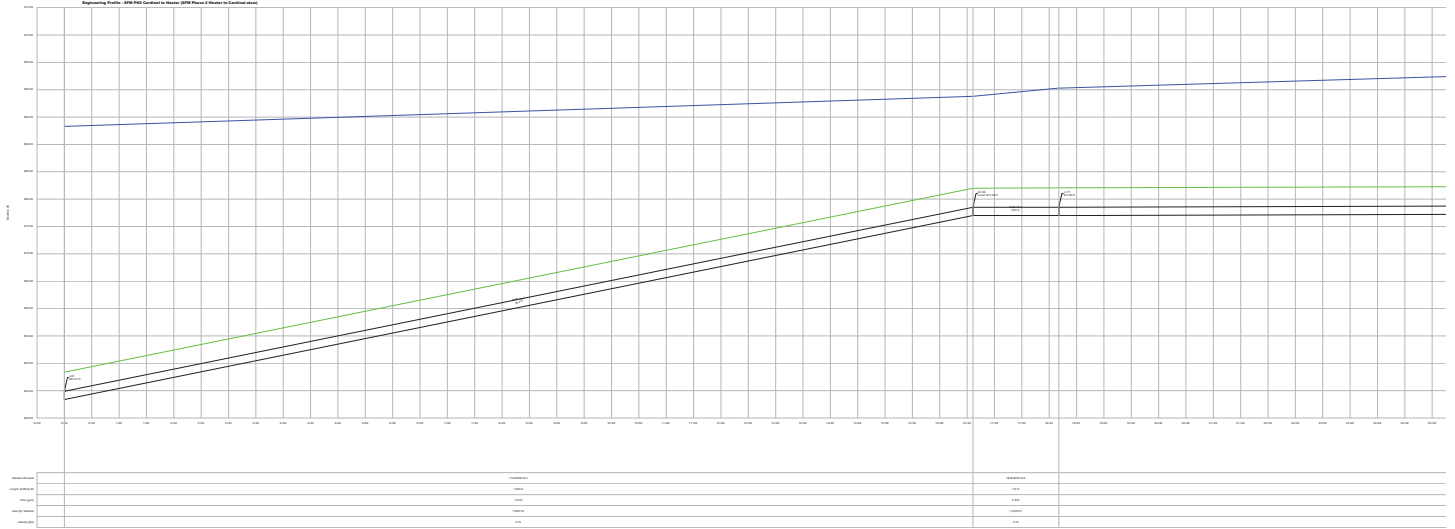
*Proposed Force Main Sewer Calculations*

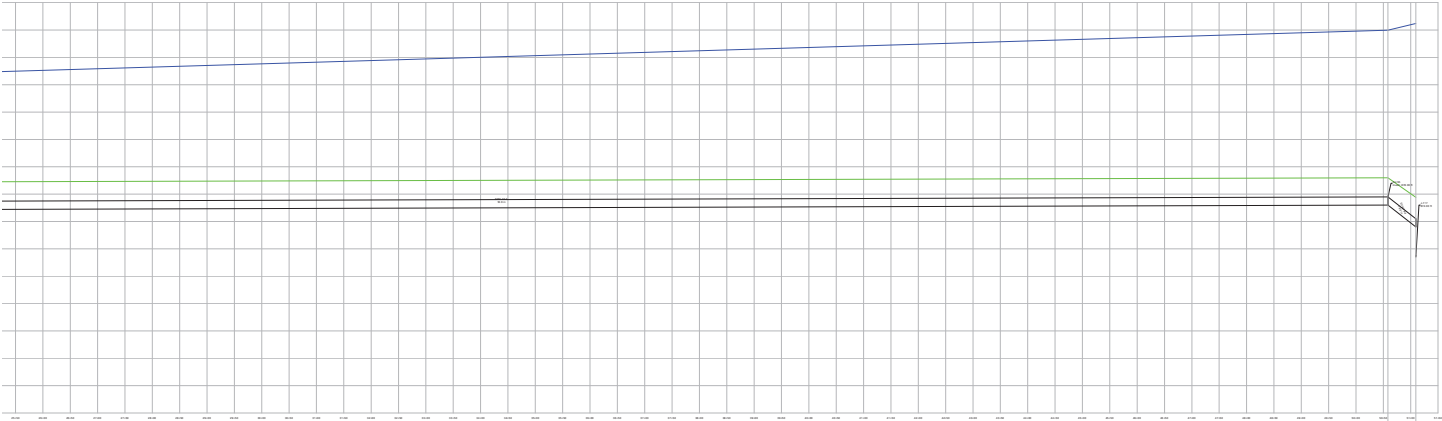
**FlexTable: Pressure Pipe Table**

ID	Label	Start Node	Stop Node	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Manning's n	Flow (gpm)	Velocity (ft/s)
1734	SFM-18-1	AV-56	J-81	1,660.6	18.0	PVC	130.0	0.010	2,975	3.75
1816	SFM-18-2	J-171	AV-56	157.0	18.0	PVC	130.0	0.010	2,975	3.75
1815	SFM-18-3	AV-55	J-171	3,240.8	18.0	PVC	130.0	0.010	2,975	3.75
1731	SFM-18-4	J-117	AV-55	51.1	18.0	PVC	130.0	0.010	2,975	3.75



Figure 10.10  
 Engineering Profile - 100% P&L Contract to Owner (100% Phase 2 Review to Control point)



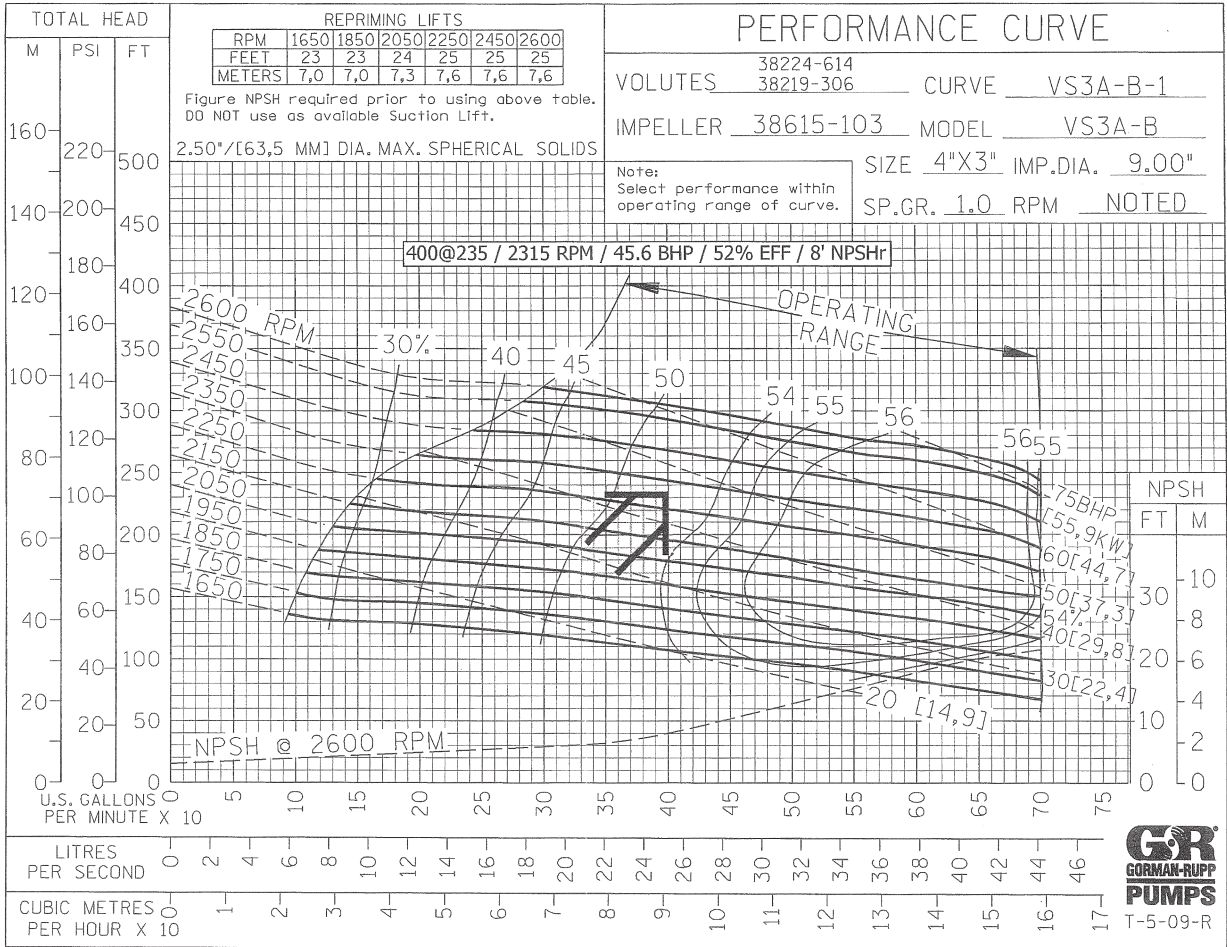


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# APPENDIX C

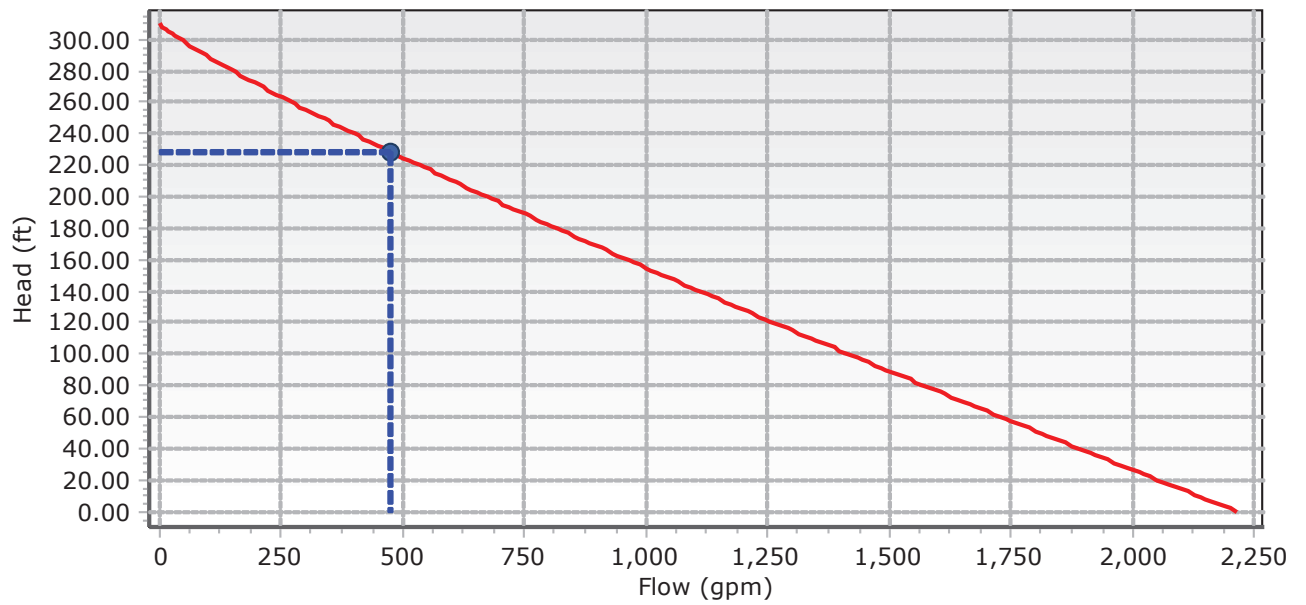
*Existing Vs. Proposed Pump Station Operating Point on System Curve*

Meadowdale P.S.



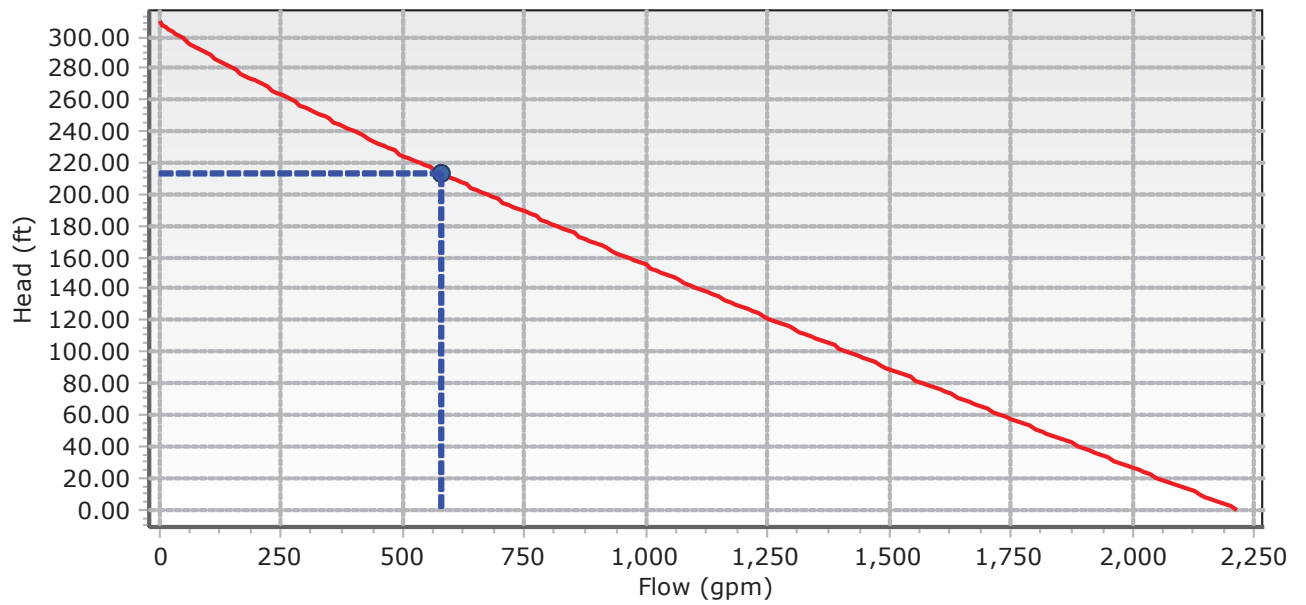
FILE NO. vs3ab.s01

Pump: Meadowlark at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Existing SFM



— Head      ● Head operating point

Pump: Meadowlark at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Proposed SFM



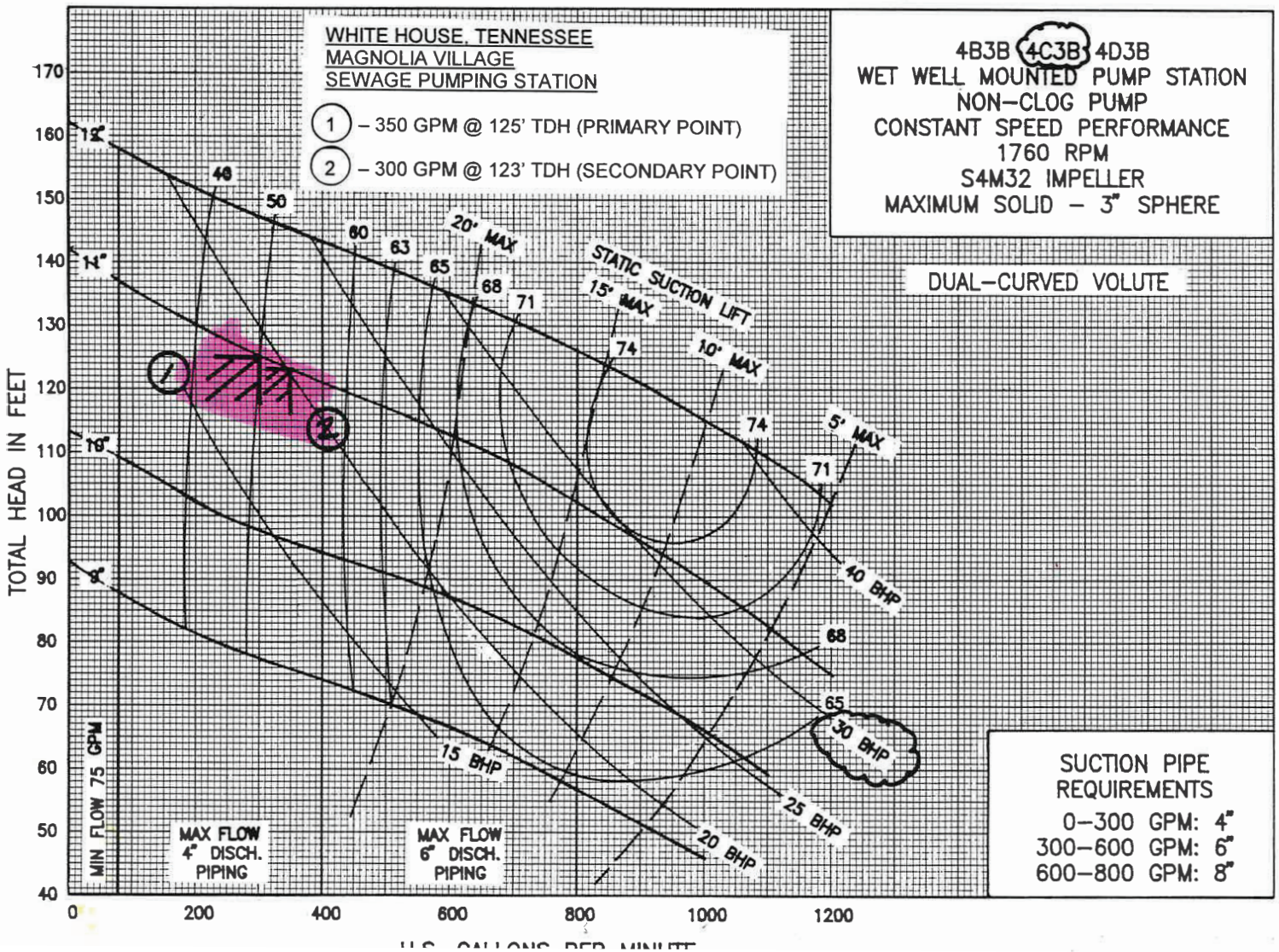
— Head      ● Head operating point

WHITE HOUSE, TENNESSEE  
 MAGNOLIA VILLAGE  
 SEWAGE PUMPING STATION

- ① - 350 GPM @ 125' TDH (PRIMARY POINT)
- ② - 300 GPM @ 123' TDH (SECONDARY POINT)

4B3B **4C3B** 4D3B  
 WET WELL MOUNTED PUMP STATION  
 NON-CLOG PUMP  
 CONSTANT SPEED PERFORMANCE  
 1760 RPM  
 S4M32 IMPELLER  
 MAXIMUM SOLID - 3" SPHERE

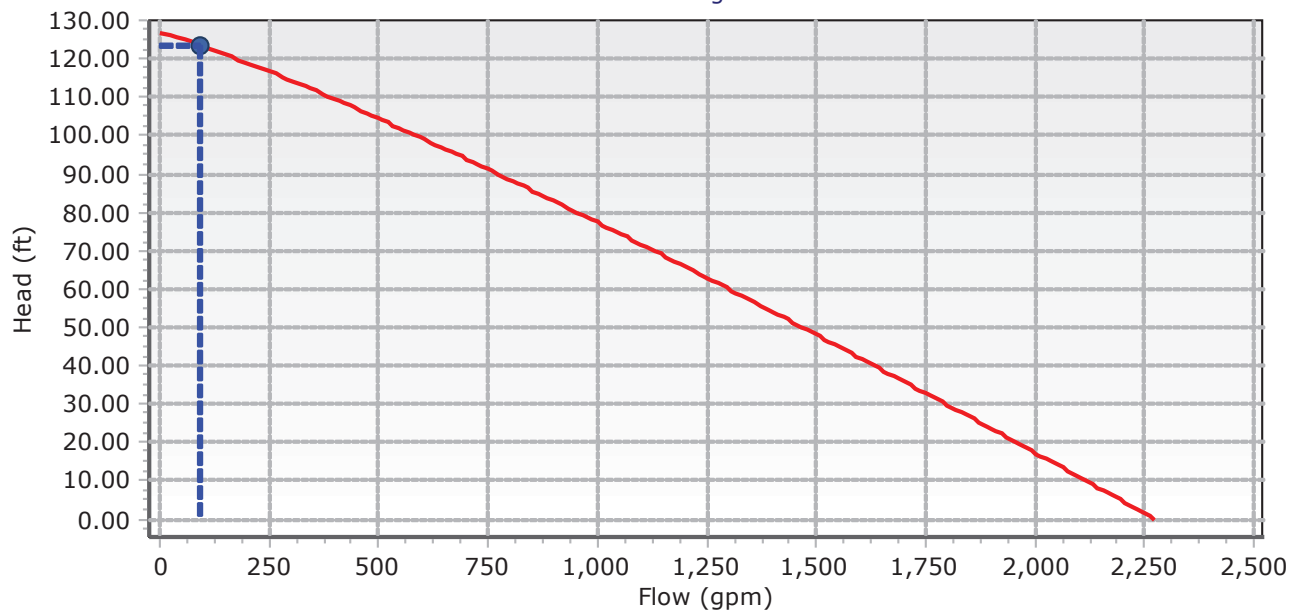
DUAL-CURVED VOLUTE



SUCTION PIPE REQUIREMENTS

- 0-300 GPM: 4"
- 300-600 GPM: 6"
- 600-800 GPM: 8"

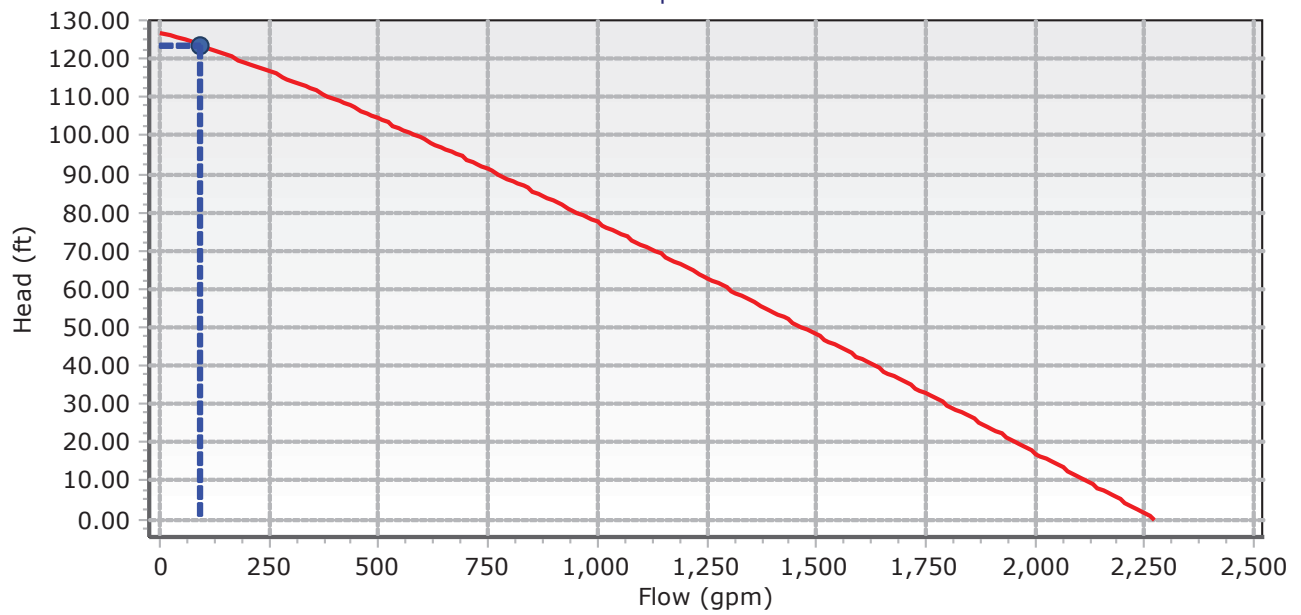
Pump: Union Road at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Existing SFM



— Head      ● Head operating point



Pump: Union Road at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Proposed SFM



— Head      ● Head operating point



**Fairbanks Morse**  
Pentair Water

**Certified Pump Performance Curve**

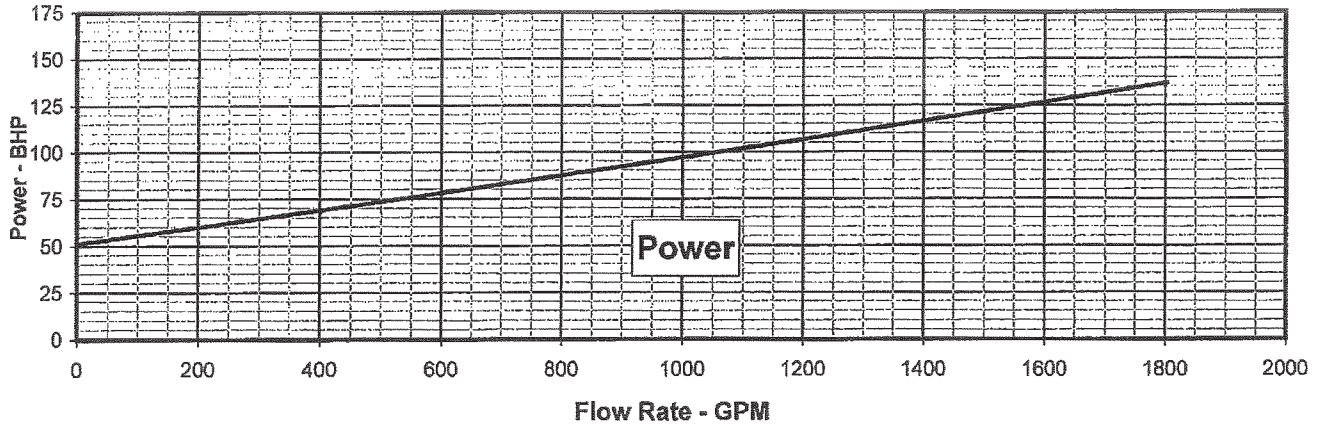
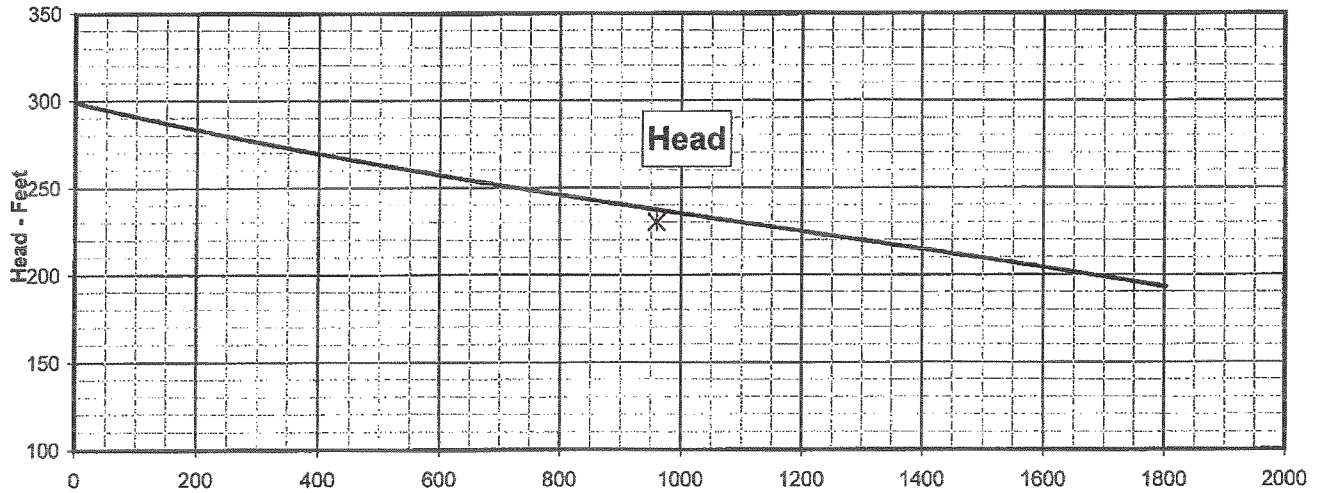
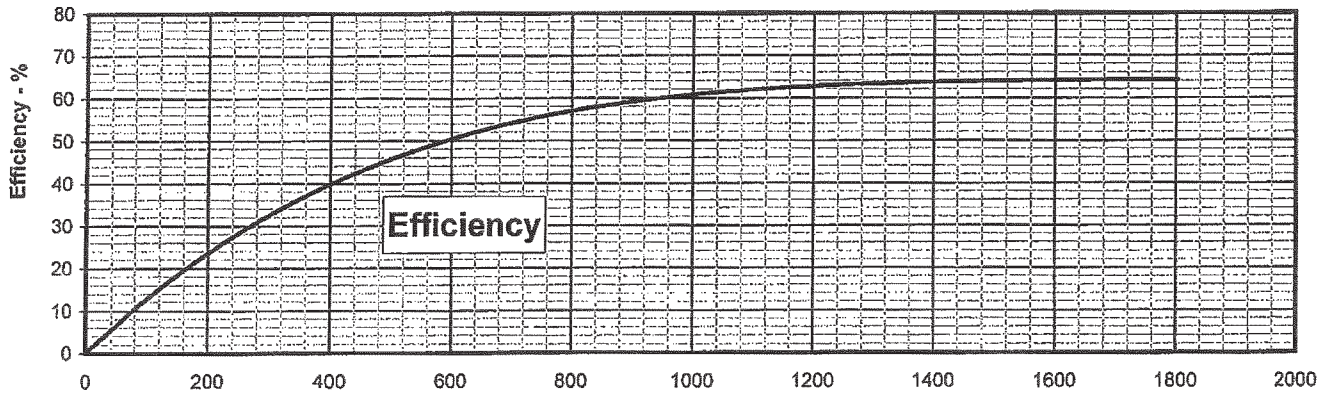
Guaranteed Values			
GPM	960		
HEAD	230		
Eff			
RPM	1780		

Size-Model	4" D5434MV	CCW
Impeller:	T4D1AT 0220 F	
Impeller Dia:	15.6"	
Driver:	Job Driver	HP: 135
RPM:	1780	Stages: ONE

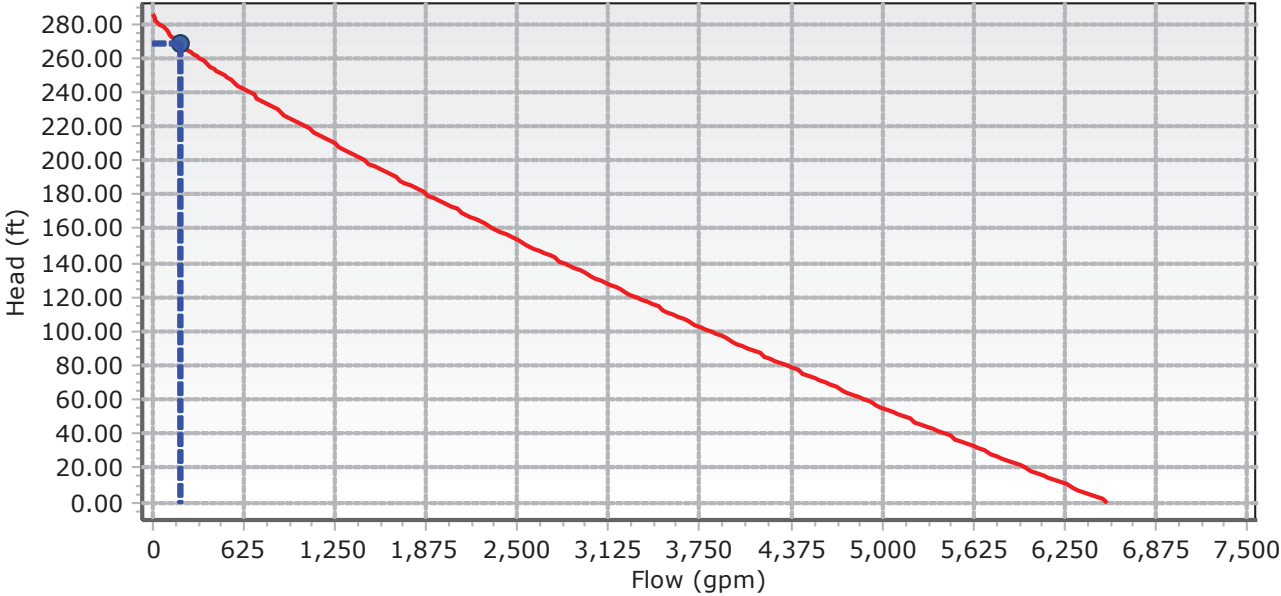
Serial Number: 1948264-0  
Project Number: 093640  
Test Date: 10/26/2010

Certified By: John C. Mamie 10/10  
Test Department Date

**Copes Pump Station**

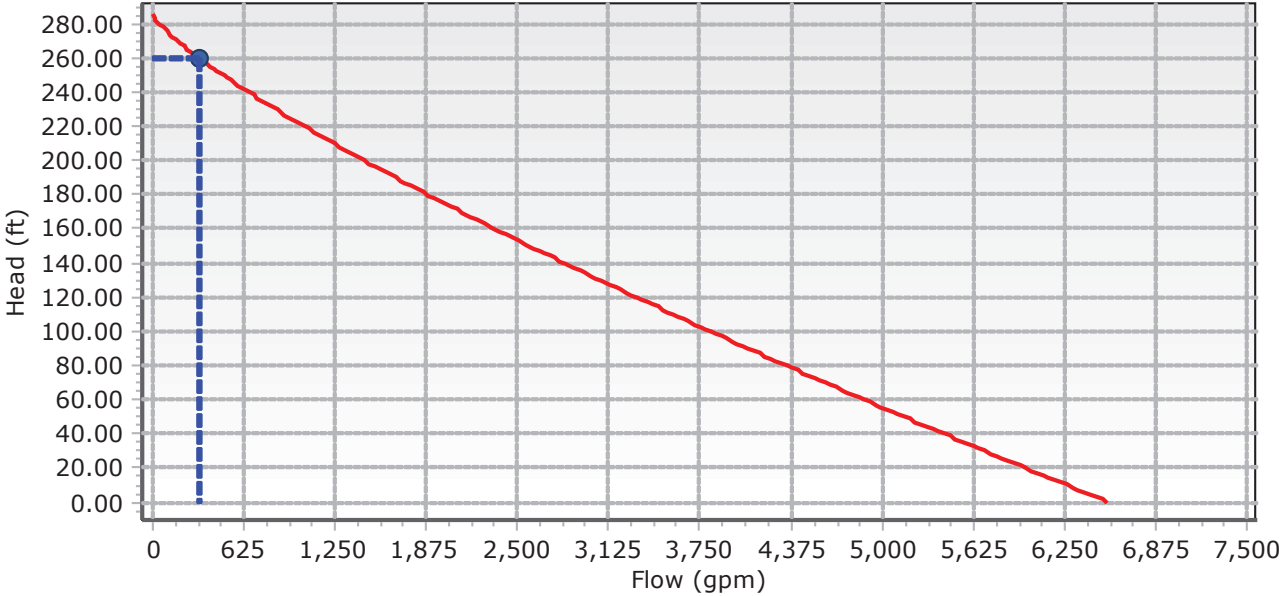


Pump: Copes at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Existing SFM

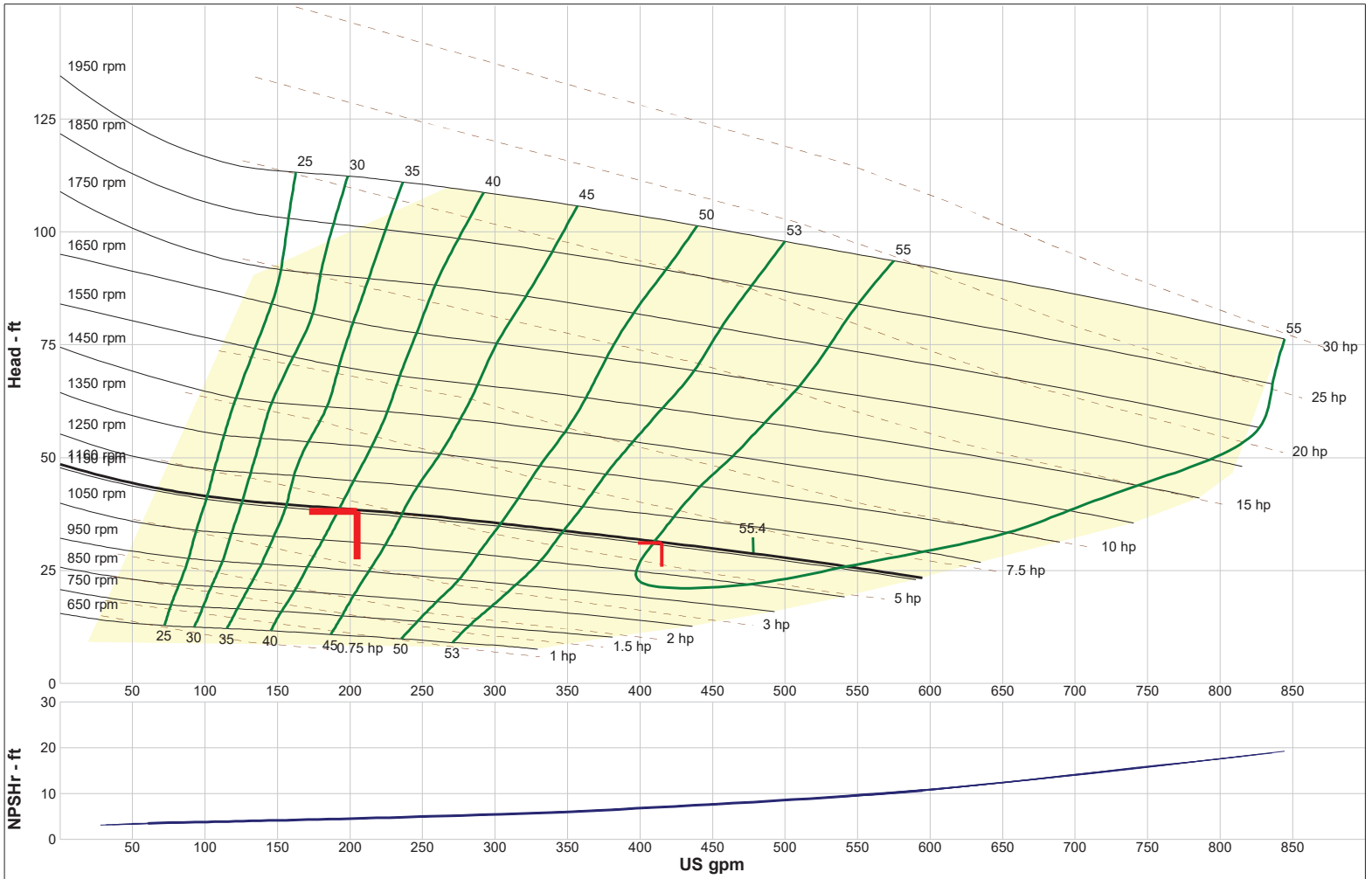


— Head      ● Head operating point

Pump: Copes at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Proposed SFM



— Head ● Head operating point



This curve is provided for preliminary selection only. Please consult factory before making final pump or motor selections.

Company: Southern Sales  
 Name:  
 12/14/2015

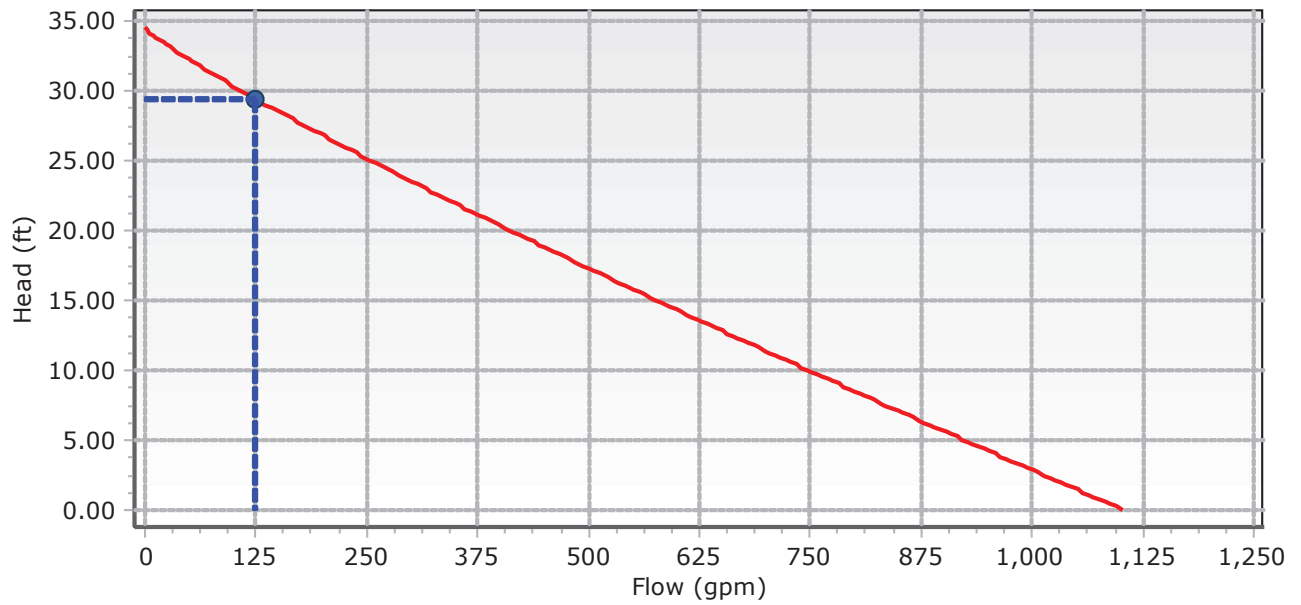
Summerlin Pump Station

Gorman-Rupp SEW 60Hz  
 Catalog: Gorman-Rupp Engineered Systems Pumps.60, Vers 4.75  
 V&VS-SERIES - Adjustable  
 Design Point: 205 US gpm, 38 ft

Size: V3B-B-1  
 Speed: 1160 rpm  
 Dia: 9.75 in  
 Curve: V3B-B-1  
 Impeller: 38615-107



Pump: Summerlin at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Existing SFM



— Head      ● Head operating point

Pump: Summerlin at time 00:00:00.00  
Relative Speed Factor: 1.000  
Pump Status: On  
Scenario: Proposed SFM

