

SYSTEM CURVE DATA

Project No. 13870 - Cattail Creek SPS (off site)

Eq. 1 - Friction head in feet / 100 feet pipe '

(sheet 1 of 2)

$$f = 0.2083 (100/C)^{1.85} \times q^{1.85} / d^{4.8655}$$

where: C-Factor, C = as designated below

Flowrate, q = as designated below (GPM)

Pipe Dia., d = 5.993 in.

(6" SDR21)

Equivalent length of Pipe, L = 6,338 LF

Total Static Head = 66 LF

Eq. 2 - Total Dynamic Head

Total Dynamic Head = Dynamic Head + Static Head

C = 130					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	6,338	-	-	66.0	66.0
50	6,338	0.03	1.9	66.0	67.9
100	6,338	0.11	6.7	66.0	72.7
200	6,338	0.38	24.2	66.0	90.2
270	6,338	0.66	42.1	66.0	108.1
300	6,338	0.81	51.2	66.0	117.2
350	6,338	1.07	68.0	66.0	134.0
		-			

Q_d =

C = 140					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	6,338	-	-	66.0	66.0
50	6,338	0.03	1.6	66.0	67.6
100	6,338	0.09	5.8	66.0	71.8
200	6,338	0.33	21.1	66.0	87.1
270	6,338	0.58	36.7	66.0	102.7
300	6,338	0.70	44.6	66.0	110.6
350	6,338	0.94	59.3	66.0	125.3

Q_d =

SYSTEM CURVE DATA

Project No. 13870 - Cattail Creek SPS (off site)

Eq. 1 - Friction head in feet / 100 feet pipe '

(sheet 2 of 2)

$$f = 0.2083 (100/C)^{1.85} \times q^{1.85} / d^{4.8655}$$

where: C-Factor, C = as designated below

Flowrate, q = as designated below (GPM)

Pipe Dia., d = 5.993 in.

(6" SDR21)

Equivalent length of Pipe, L = 6,338 LF

Total Static Head = 81 LF

Eq. 2 - Total Dynamic Head

Total Dynamic Head = Dynamic Head + Static Head

C = 130					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	6,338	-	-	81.0	81.0
50	6,338	0.03	1.9	81.0	82.9
100	6,338	0.11	6.7	81.0	87.7
200	6,338	0.38	24.2	81.0	105.2
270	6,338	0.66	42.1	81.0	123.1
300	6,338	0.81	51.2	81.0	132.2
350	6,338	1.07	68.0	81.0	149.0
		-			

Q_d =

C = 140					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	6,338	-	-	81.0	81.0
50	6,338	0.03	1.6	81.0	82.6
100	6,338	0.09	5.8	81.0	86.8
200	6,338	0.33	21.1	81.0	102.1
270	6,338	0.58	36.7	81.0	117.7
300	6,338	0.70	44.6	81.0	125.6
350	6,338	0.94	59.3	81.0	140.3

Q_d =

SYSTEM CURVE DATA

Project No. 13870 - Cattail Creek SPS (on site)

Eq. 1 - Friction head in feet / 100 feet pipe '

(sheet 1 of 2)

$$f = 0.2083 (100/C)^{1.85} \times q^{1.85} / d^{4.8655}$$

where: C-Factor, C = as designated below

Flowrate, q = as designated below (GPM)

Pipe Dia., d = 6.27 in.

(6" DIP)

Equivalent length of Pipe, L = 187 LF

Total Static Head = 66 LF

Eq. 2 - Total Dynamic Head

Total Dynamic Head = Dynamic Head + Static Head

Q_d =

C = 120					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	187	-	-	66.0	66.0
50	187	0.03	0.1	66.0	66.1
100	187	0.10	0.2	66.0	66.2
200	187	0.35	0.7	66.0	66.7
270	187	0.62	1.2	66.0	67.2
300	187	0.75	1.4	66.0	67.4
350	187	1.00	1.9	66.0	67.9
		-			

Q_d =

C = 130					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	187	-	-	66.0	66.0
50	187	0.02	0.0	66.0	66.0
100	187	0.08	0.2	66.0	66.2
200	187	0.31	0.6	66.0	66.6
270	187	0.53	1.0	66.0	67.0
300	187	0.65	1.2	66.0	67.2
350	187	0.86	1.6	66.0	67.6

SYSTEM CURVE DATA

Project No. 13870 - Cattail Creek SPS (on site)

Eq. 1 - Friction head in feet / 100 feet pipe '

(sheet 2 of 2)

$$f = 0.2083 (100/C)^{1.85} \times q^{1.85} / d^{4.8655}$$

where: C-Factor, C = as designated below

Flowrate, q = as designated below (GPM)

Pipe Dia., d = 6.27 in.

(6" DIP)

Equivalent length of Pipe, L = 187 LF

Total Static Head = 81 LF

Eq. 2 - Total Dynamic Head

Total Dynamic Head = Dynamic Head + Static Head

Q_d =

C = 120					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	187	-	-	81.0	81.0
50	187	0.03	0.1	81.0	81.1
100	187	0.10	0.2	81.0	81.2
200	187	0.35	0.7	81.0	81.7
270	187	0.62	1.2	81.0	82.2
300	187	0.75	1.4	81.0	82.4
350	187	1.00	1.9	81.0	82.9
		-			

Q_d =

C = 130					
Flowrate	Eq. Length of Pipe	Friction Head	Dynamic Head	Static Head	Total Dynamic Head
q (GPM)	L (LF)	f (FT/100 LF)	(FT)	(FT)	(FT)
0	187	-	-	81.0	81.0
50	187	0.02	0.0	81.0	81.0
100	187	0.08	0.2	81.0	81.2
200	187	0.31	0.6	81.0	81.6
270	187	0.53	1.0	81.0	82.0
300	187	0.65	1.2	81.0	82.2
350	187	0.86	1.6	81.0	82.6



MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS
AND LANDSCAPE ARCHITECTS

- ☐ 3445-A BOX HILL CORPORATE CENTER DRIVE, ABINGDON, MD 21009
- ☐ 1220-C EAST JOPPA RD., SUITE 505, TOWSON, MD 21286
- ☐ 14280 PARK CENTER DRIVE, LAUREL, MD 20707
- ☐ 18 BOULDON CIRCLE, SUITE 34, WILMINGTON, DE 19720
- ☐ 2113 STERLING AVENUE, SUITE 7, GEORGETOWN, DE 19947
- ☐ 43760 TRADE CENTER PLACE, SUITE 110, STERLING, VA 20166

- 410-515-9000 FAX: 410-515-9002
- 410-821-1690 FAX: 410-821-1748
- 410-792-9792 FAX: 410-792-7395
- 302-326-2200 FAX: 302-326-2399
- 302-855-5734 FAX: 302-855-0157
- 703-674-0161 FAX: 703-478-0137

JOB CATTAIL CREEK
SHEET NO. _____ OF _____
CALCULATED BY KH DATE 7/31/18
CHECKED BY _____ DATE _____
SCALE _____

• SYSTEM CURVE

BASED ON: 187 LF 6" D.I.P. (on-site) * 6,338 ~~6,254~~ 6" SDR21 PVC (off-site)

* DESIGN POINT

STATIC HEAD = 36 ft ✓
Common FM HEAD = 30 ft. MIN. / 45 ft. MAX

C = 120/130 (ON-SITE/OFF-SITE)

FLOW	<u>H_L (ft)</u>	<u>H_L (ft)</u>	<u>STATIC (= STATIC + Common) (ft)</u>		<u>T.D.H. (ft)</u>	
	(ON-SITE)	(OFF-SITE)	MIN	MAX	MIN	MAX
50	0.1	1.8	66	81	67.9	82.9
100	0.2	6.6	66	81	72.8	87.8
200	0.7	23.8	66	81	90.5	105.5
* 262 <u>270</u>	1.1 <u>1.2</u>	39.3 <u>41.5</u> <u>42.1</u>	66	81	106.4 <u>108.7</u>	121.4 <u>123.7</u> <u>124.2</u>
300	1.4	50.5	66	81	117.9	132.9
350	1.9	67.1	66	81	135.0	150.0

C = 130/140 (ON-SITE/OFF-SITE)

FLOW	<u>H_L (ft)</u>	<u>H_L (ft)</u>	<u>STATIC (= STATIC + Common) (ft)</u>		<u>T.D.H. (ft)</u>	
	(ON-SITE)	(OFF-SITE)	MIN	MAX	MIN	MAX
50	0	1.6	66	81	67.6	82.6
100	0.2	5.8	66	81	72.0	87.0
200	0.6	20.8	66	81	87.4	102.4
* 262 <u>270</u>	0.9 <u>1.0</u>	34.3 <u>36.2</u> <u>36.7</u>	66	81	101.2 <u>103.2</u>	116.2 <u>118.2</u> <u>118.7</u>
300	1.2	44.0	66	81	111.2	126.2
350	1.6	58.5	66	81	126.1	141.1

Design Pt. 270 gpm @ 124 ft

* 8/16/18
* 11/29/18

Project: PS 38 - Cattail Creek
Project number: Kent County, DE

Created on: 2018-09-10
Created by: Carl Mitchell

wilo

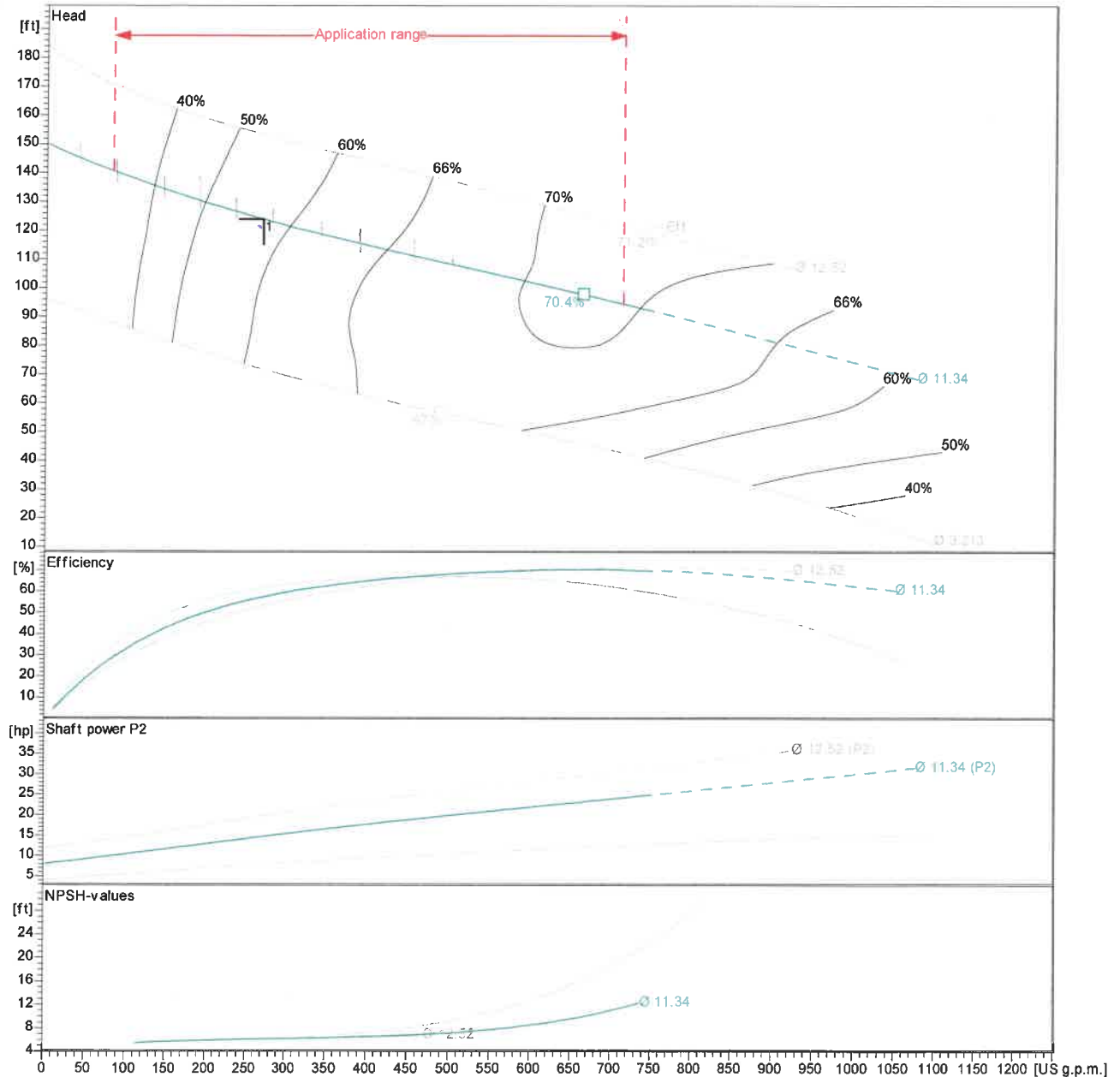
Performance curves

Submersible sewage pump

FA 10.65E

with motor
FK 202-4/27

Power data referred to: Water, pure [100%]; 68°F; 62.315lb/ft³; 1.0768E-5ft²/s
Tolerance as per ISO 9906 / Annex A.2



Pump			Duty point data		
Impeller Ø	designed	11 ⁵ / ₁₆	inch	Volume flow	270 US g.p.m.
Nominal speed		1740	rpm	Head	124 ft
Frequency		60	Hz	Shaft power P ₂	14.8 hp
Impeller type		Single-channel		Pump efficiency	57.4 %
Motor			Power input P ₁		hp
Rated power		25	hp	Required pump NPSH	6.2 ft
Sel. explosion protection		--		Speed	1725 rpm