TABLE 1
BENNETT'S CREEK FLOW CALCULATIONS
SABER HEALTHCARE GROUP
SUFFOLK, VA
6/23/2026

Property	# of beds	Flow	Average Flow		Peak Hour Flow		Design Flow
Type		gpd/unit*	gpd	gpm	gpd**	gpm	gpm
Nursing Home	100	200	20,000	13.9	80,000	56	56
Pump Design Capacity***							64

NOTES:

* SCAT regulation Table 3- Nursing Home, 200 gpd per bed =	200	gpd/bed
**SCAT - Peaking Factor for Pumping Unit and Submain Sewer (peak hourly flow)	4	
***Pump Design Flow is equal 1.15 times the peak hour flow =64 gpm	1.15	The velocity of pump capicity of 64 gpm for 4" dia. force main = 1.6 fps. Not Acceptable (Very low)

The minimum required pump capacity is 64 gpm, corresponding to a velocity of 1.6 fps, which is below the minimum recommended velocity of 2 fps.

At the selected design capacity of 110 gpm, (TDH = 61 ft at Dry Wether and TDH = 171 ft at Wet Weather) with Velocity = 2.8 fps

The proposed pump design capacity is based on the hydraulic conditions of the existing 30-inch force main under both dry weather and wet weather pressure scenarios (see attached Flygt Pump curves).

- Under wet weather conditions (30"FM Maximum HGL = 94 ft), the system would convey approximately 114.86 gpm total TDH = 126.37 at a velocity of 2.9 fps.

- Under dry weather conditions (30"FM Minimum HGL = 38 ft), the flow would increase to approximately 161.44 gpm, total TDH = 116.16 at a velocity of 4.1 fps.

APPENDIX "A"

BENNETT'S CREEK PUMP STATION - SUFFOLK,VA
FORCE MAIN HYDRAULIC CALCULATIONS - DRY WEATHER

Design Specifications

Description	Value	Units
Pump Design Rate (For Dry Weather) Q =	**110.00**	gpm
Peak Flow	55.56	gpm
Average Flow	13.89	gpm
C Factor	120.00	DI
Force Main Length	680.00	feet
Water level in the P.S. (Pump Off)	4.00	feet
*FM High Point Elev. = at Exist. 30" FM connection	13.50	feet
Force Main: Length within the P.S	10.00	feet
Force Main Length outside the P.S.:	680.00	feet
Static Head within PS (pump suction to FM out)	10.7	*feet*
Static Head outside P.S. (Existing 30" FM Elev. - Dry pit FM out)	2.5	*feet*
Static head from pump suction to Existing 30" FM	13.2	ft

Description	Value	Units
Wet Well RIM Elev.	16.5	*feet*
8" Gravity Sewer Inv. In Elev. at PS =	9	*feet*
Existing 30" FM Connection Elev.	13.5	*feet*
4" FM discharge Elev. =	11	*feet*

Mechanical Friction Head

Type of Fitting	Quantity	K Factor	Force Main # × (K ÷ 2g)	Wet Well # × (K ÷ 2g)
Entrance	1	0.50		0.0078
90 Degree Bend (Standard Radius)	3	0.90		0.0420
Reducer	2	0.25	0.0039	0.0039
45 Degree Bend (vrtical & Horz.)	4	0.42	0.0261	0.0261
11.5 Degree Bend	6	0.20	0.0186	
Standard Thru Tee/Wye	1	1.80		0.0140
Cross	0	0.30		
Branch	0	0.90		
Swing Check Valve	3	2.30	0.0715	0.0357
Gate Valve	6	0.19	0.0118	0.0059
Globe Valve	0	10.00		
Flowmeter	0	7.00		0.0000
Cleanout	2	1.80	0.0280	0.0280
Exit	1	1.00	0.0155	
Mechanical Friction Head = 0.1755 x (v^2)		**Subtotal**	**0.1755**	**0.1633**

Total Dynamic Head

Pipe Diameter	Flow	Velocity	Friction Head *(feet)*		Static Head	Min. HGL in Exist. 30" FM	Dynamic Head	
inches	*gpm*	*fps*	Pipe	Mechanical	*feet*	*feet*	*feet*	
4	**110.00**	2.8	7.3	1.38	2.5	**38.0**	49.2	**Outside P.S.**
4	**110.00**	2.8	0.1	1.29	10.7		12.1	**inside P.S.**
Total Dynamic Head Plus Static			7.4	2.7	13.2	38	**61**	

(Using Hazen-Williams Equation)

Ductile Iron Pipe: C factor = 120 per SCAT per SCAT checklist

Increased pump capacity to maintain at least 2.8 fps velocity.

Pressure Check - Net Positive Suction Head (NPSH) - Dry Weather

NPSHa = Ha + Hz + HV - Hf - Hvp		
Atmospheric Pressure (ft) = Ha	33.96	the weight of a column of fresh water = (14.7 psi x 2.31 = 33.96 feet)
Hz	2.50	
Hv	0.25	Velocity HL at suction
Hf	0.11	At suction
Vapor Pressure (ft) = Hvp	1.40	of water at 85 deg F
Available NPSH	**34.70**	

NPSHa = Hatm+Static Head on suction-Friction losses in suction - Vapor pressure (1.4' for water at 85 degree F)

Where:

Ha = Absolute pressure head on the liquid surface in the supply tank (e.g., atmospheric pressure).

Hz = Static head (vertical distance from the liquid level to the pump centerline). This is positive (+) if the liquid level is above the pump, and negative (-) if below (suction lift).

Hv = Velocity Head

Hf = Head loss due to friction in the suction pipe, valves, and fittings.

Hvp = Absolute vapor pressure head of the pumped fluid at its operating temperature.

BENNETT'S CREEK PUMP STATION - SUFFOLK,VA
WET WELL DESIGN - DRY WEATHER

Design Specifications

Description	Value	Units
Number of Pumps (N1)	2	*pumps*
Pumping Rate of One Pump (P)	**110**	*gallons/minute*
Peak Hour Flow Rate Entering Wet Well (F1)	56	*gallons/minute*
Average Daily Flow Rate Entering Wet Well (F2)	14	*gallons/minute*
Wet Well Type (Circular/Rectangular)	Circular	
Wet Well Diameter (D1)	8.0	*feet*
Wet Well Working Volume Draw Down Depth (H)	2	*feet*
Force Main Diameter (D2)	4.0	*inches*
Force Main Length (L)	680	*feet*

Calculations

Description	Flow Condition		Units
	Average Day	*Peak Hour*	
Wet Well Volume per Foot (V1 = π × (D1 ÷ 2)^2)	50.27		*cubic feet/foot*
Volume Between Pump On and Pump Off (Q = V1 × H × 7.48)	564		*gallons*
Force Main Volume (V2 = L × π ((D2 ÷ (12 × 2))^2) × 7.48)	444		*gallons*
Flow Rate (F = [F1 or F2])	14	56	*gallons/minute*
Net Flow Rate Out of Tank with Pump On (S = P - F)	96	54.4	*gallons/minute*
Time To Wet Well Draw Down (T1 = Q ÷ S)	5.9	10.4	*minutes*
Time Pump Off Between Cycles during Peak Flow (T2 = Q ÷ F)	40.6	10.2	*minutes*
Total Pump Cycle Time (T3 = T1 + T2)	46.5	20.5	*minutes*
Total Pump Starts Per Hour (N2 = 60 ÷ T3)	1.3	2.9	*cycles/hour*
Total Starts Per Pump Per Hour (N2 ÷ N1)	0.65	1.5	*cycles/hour/pump*
Pumping Volume per Cycle (P × T1)	646	1,140	*gallons*
Detention Time in Force Main (T4 = (T1 × (V2 ÷ Q)) + (T2 × RND_{Down}(V2 ÷ Q)))	4.6	8.15	*minutes*

Total Pump Cycle Time of less than 30 minutes and not more than 6 starts per pump per hour.

Storage capacity with a filling time of 30 minutes or less under design average daily flow rates (based on TR-16).

Maximum of 6 to 10 starts per hour. TR-16 recommends a maximum wet well fill time of 30 minutes during Average Daily Flows.

Overflow Calculations		
Volume above FF to 8" gravity	**2,632**	Gallons
Volume above HHA to Hatch	**3,196**	Gallons

			Elevations
			16
	Wet Well Rim Elev. =		16.5
	4" force main discharge elev. =		11
	Sewer Inverts into P.S.	7	9
	dis above	**2**	
	High High alarm	5	7
	dis above	0.5	
	lag pump on	4.5	6.5
	dis above	0.5	
	High alarm	4	6
	dis above	0.5	
	Lead Pump on	3.5	5.5
	dis above	1.5	
	Pump off	2	4
	dis above	0.5	
OK	Low level alarm	1.5	**3.5**
	dis above	1.5	
			2
	Min water level ft varies per pump		2.875
OK	FLOOR ELEV		**2**

P.S Rim elev. =	16.5
P.S. Floor elev. =	2
P.S. Bottom of footing elev. =	1.33
P.S. inside from Rim H =	14.5
P.S. outside from Rim H =	15.17

APPENDIX "A"

BENNETT'S CREEK PUMP STATION - SUFFOLK,VA
FORCE MAIN HYDRAULIC CALCULATIONS - WET WEATHER

Design Specifications

Description	Value	Units
Pump Design Rate (For Dry Weather) Q =	**110.00**	gpm
Peak Flow	55.56	gpm
Average Flow	13.89	gpm
C Factor	120.00	DI
Force Main Length	680.00	feet
Water level in the P.S. (Pump Off)	4.00	feet
*FM High Point Elev. = at Exist. 30" FM connection	13.50	feet
Force Main: Length within the P.S	10.00	feet
Force Main Length outside the P.S.:	680.00	feet
Static Head within PS (pump suction to FM out)	10.7	*feet*
Static Head outside P.S. (Existing 30" FM Elev. - Dry pit FM out)	2.5	*feet*
Static head from pump suction to Existing 30" FM	13.2	ft

Description	Value	Units
Wet Well RIM Elev.	16.5	*feet*
8" Gravity Sewer Inv. In Elev. at PS =	9	*feet*
Existing 30" FM Connection Elev.	13.5	*feet*
4" FM discharge Elev. =	11	*feet*

Mechanical Friction Head

Type of Fitting	Quantity	K Factor	Force Main # × (K ÷ 2g)	Wet Well # × (K ÷ 2g)
Entrance	1	0.50		0.0078
90 Degree Bend (Standard Radius)	3	0.90		0.0420
Reducer	2	0.25	0.0039	0.0039
45 Degree Bend (vrtical & Horz.)	5	0.42	0.0326	0.0326
11.5 Degree Bend	3	0.20	0.0093	
Standard Thru Tee/Wye	1	1.80		0.0140
Cross	0	0.30		
Branch	0	0.90		
Swing Check Valve	3	2.30	0.0715	0.0357
Gate Valve	6	0.19	0.0118	0.0059
Globe Valve	0	10.00		
Flowmeter	0	7.00		0.0000
Cleanout	2	1.80	0.0280	0.0280
Exit	1	1.00	0.0155	
Mechanical Friction Head = 0.1727 x (v^2)		**Subtotal**	**0.1727**	**0.1699**

Total Dynamic Head

Pipe Diameter	Flow	Velocity	Friction Head *(feet)*		Static Head	Max. HGL in Exist. 30" FM	Dynamic Head	
inches	*gpm*	*fps*	Pipe	Mechanical	*feet*	*feet*	*feet*	
4	**110.00**	2.8	7.3	1.36	2.5	**94.0**	105.2	**Outside P.S.**
4	**110.00**	2.8	0.1	1.34	10.7		12.2	**inside P.S.**
Total Dynamic Head Plus Static			7.4	2.7	13.2	94	**117**	

(Using Hazen-Williams Equation)

Ductile Iron Pipe: C factor = 120 per SCAT per SCAT checklist

Increased pump capacity to maintain at least 2.8 fps velocity.

APPENDIX "A"

Pressure Check - Net Positive Suction Head (NPSH)- Wet Weather

NPSHa = Ha + Hz + HV - Hf - Hvp		
Atmospheric Pressure (ft) = Ha	33.96	the weight of a column of fresh water = (14.7 psi x 2.31 = 33.96 feet)
Hz	2.50	
Hv	0.25	Velocity HL at suction
Hf	0.11	At suction
Vapor Pressure (ft) = Hvp	1.40	of water at 85 deg F
Available NPSH	**34.70**	

NPSHa = Hatm+Static Head on suction-Friction losses in suction - Vapor pressure (1.4' for water at 85 degree F)

Where:

Ha = Absolute pressure head on the liquid surface in the supply tank (e.g., atmospheric pressure).

Hz = Static head (vertical distance from the liquid level to the pump centerline). This is positive (+) if the liquid level is above the pump, and negative (-) if below (suction lift).

Hv = Velocity Head

Hf = Head loss due to friction in the suction pipe, valves, and fittings.

Hvp = Absolute vapor pressure head of the pumped fluid at its operating temperature.

BENNETT'S CREEK PUMP STATION - SUFFOLK,VA
WET WELL DESIGN - WET WEATHER

Design Specifications

Description	Value	Units
Number of Pumps (N1)	2	*pumps*
Pumping Rate of One Pump (P)	**110.00**	*gallons/minute*
Peak Hour Flow Rate Entering Wet Well (F1)	56	*gallons/minute*
Average Daily Flow Rate Entering Wet Well (F2)	14	*gallons/minute*
Wet Well Type (Circular/Rectangular)	Circular	
Wet Well Diameter (D1)	8.0	*feet*
Wet Well Working Volume Draw Down Depth (H)	1.50	*feet*
Force Main Diameter (D2)	4.0	*inches*
Force Main Length (L)	680	*feet*

Calculations

Description	Flow Condition		Units
	Average Day	*Peak Hour*	
Wet Well Volume per Foot (V1 = π × (D1 ÷ 2)^2)	50.27		*cubic feet/foot*
Volume Between Pump On and Pump Off (Q = V1 × H × 7.48)	564		*gallons*
Force Main Volume (V2 = L × π ((D2 ÷ (12 × 2))^2) × 7.48)	444		*gallons*
Flow Rate (F = [F1 or F2])	14	56	*gallons/minute*
Net Flow Rate Out of Tank with Pump On (S = P - F)	96	54.4	*gallons/minute*
Time To Wet Well Draw Down (T1 = Q ÷ S)	5.9	10.4	*minutes*
Time Pump Off Between Cycles during Peak Flow (T2 = Q ÷ F)	40.6	10.2	*minutes*
Total Pump Cycle Time (T3 = T1 + T2)	46.5	20.5	*minutes*
Total Pump Starts Per Hour (N2 = 60 ÷ T3)	1.3	2.9	*cycles/hour*
Total Starts Per Pump Per Hour (N2 ÷ N1)	0.65	1.5	*cycles/hour/pump*
Pumping Volume per Cycle (P × T1)	646	1,140	*gallons*
Detention Time in Force Main (T4 = (T1 × (V2 ÷ Q)) + (T2 × RND_{Down}(V2 ÷ Q)))	4.6	8.15	*minutes*

Total Pump Cycle Time of less than 30 minutes and not more than 6 starts per pump per hour.

Storage capacity with a filling time of 30 minutes or less under design average daily flow rates (based on TR-16).

Maximum of 6 to 10 starts per hour. TR-16 recommends a maximum wet well fill time of 30 minutes during Average Daily Flows.

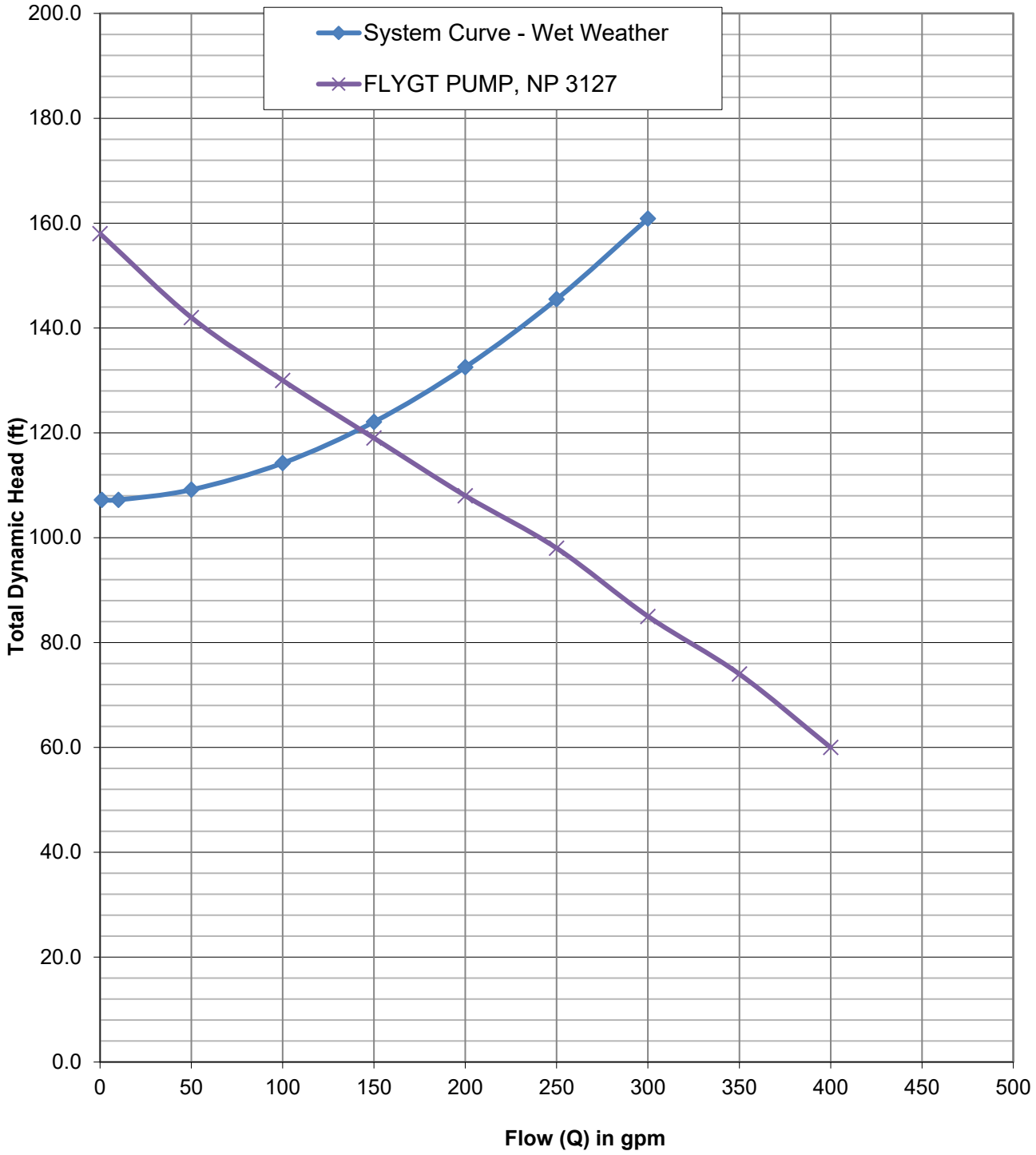
Overflow Calculations		
Volume above FF to 8" gravity	**2,632**	Gallons
Volume above HHA to Hatch	**3,196**	Gallons

			Elevations
			16
	Wet Well Rim Elev. =		16.5
	4" force main discharge elev. =		11
	Sewer Inverts into P.S	7	9
	dis above	**2**	
	High High alarm	5	7
	dis above	0.5	
	lag pump on	4.5	6.5
	dis above	0.5	
	High alarm	4	6
	dis above	0.5	
	Lead Pump on	3.5	5.5
	dis above	1.5	
	Pump off	2	4
	dis above	0.5	
OK	Low level alarm	1.5	**3.5**
	dis above	1.5	
			2
	Min water level ft varies per pump		
OK	FLOOR ELEV		**2**

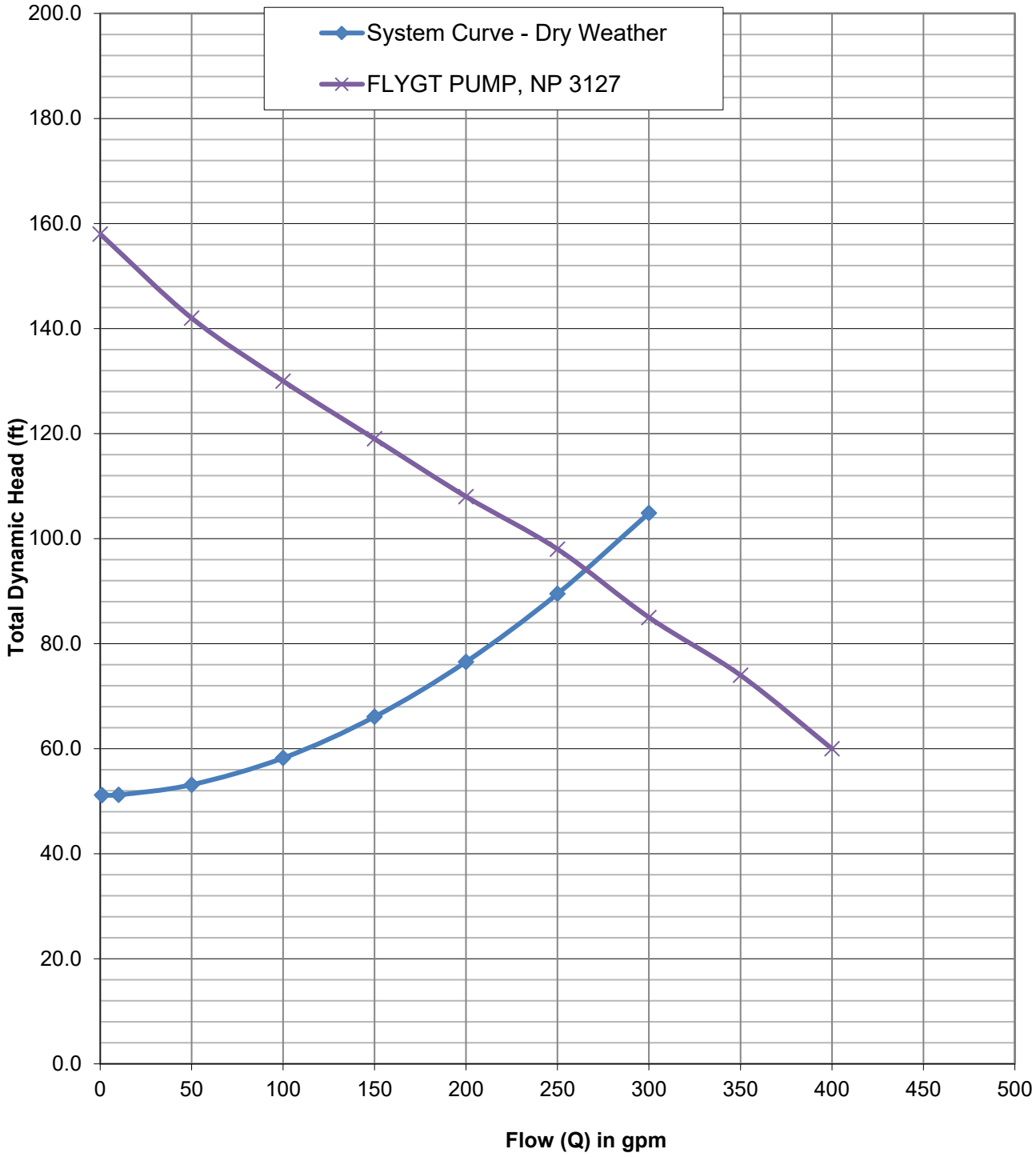
P.S Rim elev. =	16.5
P.S. Floor elev. =	2
P.S. Bottom of footing elev. =	1.33
P.S. inside from Rim H =	14.5
P.S. outside from Rim H =	15.17

APPENDIX "A"

APPENDIX "B"
System Head Curve - Wet Weather
Bennett's Creek Pump Station, Suffolks, VA



APPENDIX "B"
System Head Curve - Dry Weather
Bennett's Creek Pump Station, Suffolks, VA



Stantec Consulting Services Inc.
45 Blue Sky Drive, 3rd Floor
Burlington MA, 01803

Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	1 of 2
Calculated by	F.M.D.	Date	6/5/2026
Checked by	K.P.K.	Revised	

Buoyancy Calculations - Pump Station - Wet Well

Objective:

Methodology:

Design Criteria:

Pump Options:

Tank Elevations

Conditions	*Unit*	Value	Remarks
Soil Unit Wt =	*lbs/cf*	120.00	
Concrete Unit Wt =	*lbs/cf*	150.00	
Bottom of structure elevation	*Elev.*	**1.00**	
Invert In	*Elev.*	**9.00**	
Invert Out	*Elev.*	**11.00**	
Rim elevation	*Elev.*	**16.50**	
Top of structure elevation	*Elev.*	16.50	
Height of structure	*Feet*	**15.50**	
Groundwater elevation	*Elev.*	**16.00**	**Assume at GND = 16 ft**
Submerged depth	*Elev.*	15.00	

Tank Dimensions

Conditions	*Unit*	Value	Remarks
Outside Diameter of structure	*Feet*	9.67	
Outside Height of structure	*Feet*	15.50	
Inside Diameter of structure	*Feet*	8.00	
Inside Height of structure	*Feet*	14.17	
Concrete Floor slab thickness	*inches*	8.00	
Concrete Top Slab thickness	*inches*	8.00	
Concrete Wall slab thickness	*inches*	10.00	
Footing Width	*Feet*	1.00	
Footing Depth	*Feet*	0.67	

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Buoyancy Calculations - Pump Station - Wet Well

Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	1 of 2
Calculated by	F.M.D.	Date	6/15/2026
Checked by	K.P.K.	Revised	

Weight of Empty Tank and Soil

Conditions	*Unit*	Value	Remarks
Outer volume of structure	*cf*	1,138	
Inner volume of structure	*cf*	712	
Surface Area	*sf*	73	
Manhole/Hatch Surface Area	*sf*	8	
Net surface area	*sf*	65	
Volume of Footing	*cf*	22	
Weight of Soil above structure	*lbs*	0	
Weight of Soil above footing (extended base)	*lbs*	44,714	
Weight of Concrete Structure	*lbs*	63,820	
Weight of Concrete Footing	*lbs*	3,351	
Total Weight of Anti-Flotation	*lbs*	**111,885**	

Weight of Displaced Groundwater

Conditions	*Unit*	Value	Remarks
Submerged depth	*ft*	15.00	
Height of water displaced	*ft*	15.00	
Surface Area	*sf*	73	
Volume of water displaced	*cf*	1,101	
Density of water	*lbs/cf*	62.40	
Weight of Water Displaced	*lbs*	**68,694**	
Factor of Safety	*1.5*	**103,041**	

Excess Weights

Conditions	*Unit*	Value	Remarks
Excess weight of Structure	*lbs*	**8,844**	**OK**
Excess weight of Displaces Groundwater	*lbs*	-8,844	
Factor of Safety		**1.63**	

FS = 1.6 without soil above footing
FS = 2.5 with soil above footing

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Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	2 of 2
Calculated by	F.M.D.	Date	6/8/2026
Checked by	K.P.K.	Revised	

Buoyancy Calculations - Pump Station Valve Chamber

Objective:

Methodology:

Design Criteria:

Pump Options:

Tank Elevations

Conditions	*Unit*	Value	Remarks
Soil Unit Wt =	*lbs/cf*	120.00	
Concrete Unit Wt =	*lbs/cf*	150.00	
Bottom of structure elevation	*Elev.*	10.00	
Invert In	*Elev.*	11.00	
Invert Out	*Elev.*	11.00	
Rim elevation	*Elev.*	16.50	
Top of structure elevation	*Elev.*	16.50	
Height of structure	*Feet*	7.33	
Groundwater elevation	*Elev.*	16.00	Assume at GND = 16 ft
Sumerged depth	*Elev.*	6.00	

Tank Dimensions

Conditions	*Unit*	Value	Remarks
Outside Length of structure	*Feet*	8.33	
Outside Width of structure	*Feet*	7.33	
Outside Height of structure	*Feet*	7.33	
Inside Length of structure	*Feet*	7.00	
Inside Width of structure	*Feet*	6.00	
Inside Height of structure	*Feet*	6.00	
Concrete Floor slab thickness	*inches*	8.00	
Concrete Top Slab thickness	*inches*	8.00	
Concrete Wall slab thickness	*inches*	8.00	
6" Concrete extended base	*inches*	6.00	

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street, 6th Floor
Boston Massachusetts 02114

Buoyancy Calculations - Pump Station Valve Chamber

Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	2 of 2
Calculated by	F.M.D.	Date	6/8/2026
Checked by	K.P.K.	Revised	

Weight of Empty Tank and Soil

Conditions	Unit	Value		Remarks
Outer volume of structure	*cf*	448	11.78	6" extended base volume
Inner volume of structure	*cf*	252		
Surface Area	*sf*	61		
Manhole/Hatch Surface Area	*sf*	7.50		30" x 36" access hatch
Net surface area	*sf*	53.61	17.67	6" extended base surface area
Weight of Soil above manhole	*lbs*	0		
Weight of Soil above footing (extended base)	*lbs*	14,133		
Weight of Concrete	*lbs*	31,189		includes 6" extended base
Total Weight of Anti-Flotation	*lbs*	**45,322**		

Collar(cf) *11.78*

Weight of Displaced Groundwater

Conditions	Unit	Value	Remarks
Submerged depth	*ft*	6.00	
Height of water displaced	*ft*	6.00	
Surface Area	*sf*	61.11	
Volume of water displaced	*cf*	366.67	
Density of water	*lbs/cf*	62.40	
Weight of Water Displaced	*lbs*	22,880	
Factor of Safety	*1.5*	**34,320**	

Excess Weights

Conditions	Unit	Value	Remarks
Excess weight of Structure	*lbs*	**11,002**	**OK**
Excess weight of Displaces Groundwater	*lbs*	-11,002	
Factor of Safety		**1.98**	

Stantec Consulting Services Inc.
45 Blue Sky Drive, 3rd Floor
Burlington MA, 01803

Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	2 of 2
Calculated by	F.M.D.	Date	6/12/2026
Checked by	K.P.K.	Revised	

Buoyancy Calculations - Clean Out Valve Vault

Objective:

Methodology:

Design Criteria:

Pump Options:

Tank Elevations

Conditions	*Unit*	Value	Remarks
Soil Unit Wt =	*lbs/cf*	120.00	
Concrete Unit Wt =	*lbs/cf*	150.00	
Bottom of structure elevation	*Elev.*	5.66	
Invert In	*Elev.*	7.50	
Invert Out	*Elev.*	7.50	
Rim elevation	*Elev.*	17.00	
Top of structure elevation	*Elev.*	17.00	
Height of structure	*Feet*	11.34	
Groundwater elevation	*Elev.*	**17.00**	Assume at GND = 17 ft
Sumerged depth	*Elev.*	11.34	

Tank Dimensions

Conditions	*Unit*	Value	Remarks
Outside Length of structure	*Feet*	8.33	
Outside Width of structure	*Feet*	7.33	
Outside Height of structure	*Feet*	11.34	
Inside Length of structure	*Feet*	7.00	
Inside Width of structure	*Feet*	6.00	
Inside Height of structure	*Feet*	10.0	
Concrete Floor slab thickness	*inches*	8.00	
Concrete Top Slab thickness	*inches*	8.00	
Concrete Wall slab thickness	*inches*	8.00	
6" Concrete extended base	*inches*	6.00	

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street, 6th Floor
Boston Massachusetts 02114

Buoyancy Calculations - Clean Out Valve Vault

Project	Bennett's Creek PS	Project #	195151140
Location	Suffolk, VA	Sheet	2 of 2
Calculated by	F.M.D.	Date	6/12/2026
Checked by	K.P.K.	Revised	

Weight of Empty Tank and Soil

Conditions	Unit	Value		Remarks
Outer volume of structure	*cf*	693	11.78	6" extended base volume
Inner volume of structure	*cf*	420		
Surface Area	*sf*	61		
Manhole/Hatch Surface Area	*sf*	7.50		30" x 36" access hatch
Net surface area	*sf*	53.61	17.67	6" extended base surface area
Weight of Soil above manhole	*lbs*	0		
Weight of Soil above footing (extended base)	*lbs*	22,627		
Weight of Concrete	*lbs*	42,675		includes 6" extended base
Total Weight of Anti-Flotation	*lbs*	**65,302**		

Weight of Displaced Groundwater

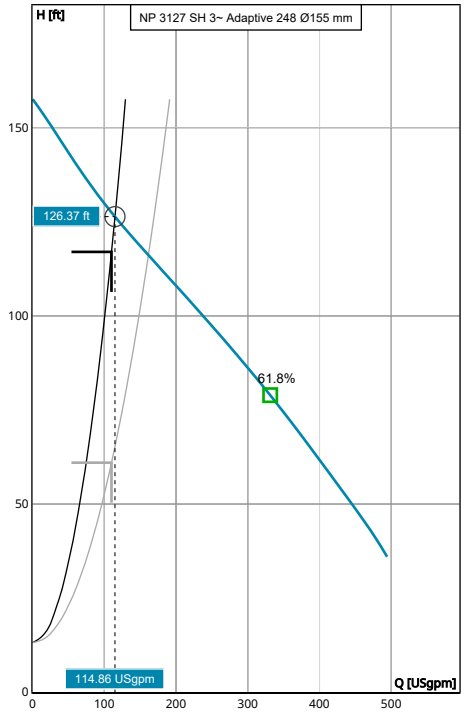
Conditions	Unit	Value	Remarks
Submerged depth	*ft*	11.34	
Height of water displaced	*ft*	11.34	
Surface Area	*sf*	61.11	
Volume of water displaced	*cf*	693.00	
Density of water	*lbs/cf*	62.40	
Weight of Water Displaced	*lbs*	43,243	
Factor of Safety	*1.5*	**64,865**	

Excess Weights

Conditions	Unit	Value	Remarks
Excess weight of Structure	*lbs*	**437**	**OK**
Excess weight of Displaces Groundwater	*lbs*	-437	
Factor of Safety		**1.51**	

APPENDIX "D"

NP 3127 SH 3~ Adaptive 248 | Configuration Summary



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

GENERAL

Explosion Proof	Max. Pumped Media Temp.
Yes	104 °F
Approval	Impeller Diameter
FM	155 mm

MATERIAL AND COATING

Impeller Material	Stator Cover Material
Hard-Iron	Grey Cast Iron
Volute Material	
Grey Cast Iron	

MOTOR

Rated Voltage	Motor Efficiency Class
208 V	Standard
Coupling	Rated Power
D	11 Hp

INSTALLATION

Installation Type

P - Semi-Permanent, Wet

Project:	Created By:	Created On:	Last Update:
NP 3127 SH 248 - Bennett's Creek - 208V	Ian Belczyk	6/9/26	-

NP 3127 SH 3~ Adaptive 248 | Product Details

Description

N 3127

Wastewater N-Technology Pump With Adaptive N® Impeller

Flygt N-pumps take on the toughest applications and get the job done. Every component is designed and manufactured to deliver sustained high efficiency. Thanks to patented N-technology with its innovative self-cleaning impeller, Flygt N-pumps deliver the highest total efficiency. They lower your energy bill and reduce unplanned maintenance costs. That adds up to total peace of mind – and big savings over the long term. Most solid objects entering the pump will pass through the impeller between the impeller vanes. If an object gets caught on the leading edge of one of the vanes, it will slide along the backswept shape towards the perimeter of the inlet. Due to the mechanical self-cleaning design, a sludge concentration up to 8% can easily be pumped.

Flexible and Modular Design

- This self-cleaning pump features innovative functions that make it the best choice for a broad range of applications. The modular hydraulic design enables you to tailor the hydraulics to meet the requirements of virtually any application.
- Replaceable wear ring in two materials, gray iron or Hard-Iron, for different operation conditions
- Hardened gray iron impeller for typical wastewater applications
- Hard-Iron impeller for abrasive and corrosive applications
- Stainless steel impeller for special applications that require duplex stainless steel
- Short shaft overhang reduces shaft deflection and increases seal and bearing life
- Motor designed for submersible use. Heat is concentrated to the stator core for improved cooling properties
- The double mechanical seal system consists of two sets of mechanical shaft seals that work independently to provide double security. Available in Tungsten carbide (WCCR) or Silicone carbide (SiC) depending on pumped media.
- Griploc mechanical face seal system secures locking to the shaft, no rubber friction, no grub screws and no shaft damage
- Motor cable SUBCAB ® specially developed for submersible use.

Product Features

- Sustained high efficiency
- Hardened cast iron, optional Duplex stainless steel and Hard-Iron impellers
- State-of-the-art wastewater pump with enhanced Adaptive N® hydraulic
- Sustained high efficiency with energy savings up to 25%
- Flexible and modular design
- Robust and reliable

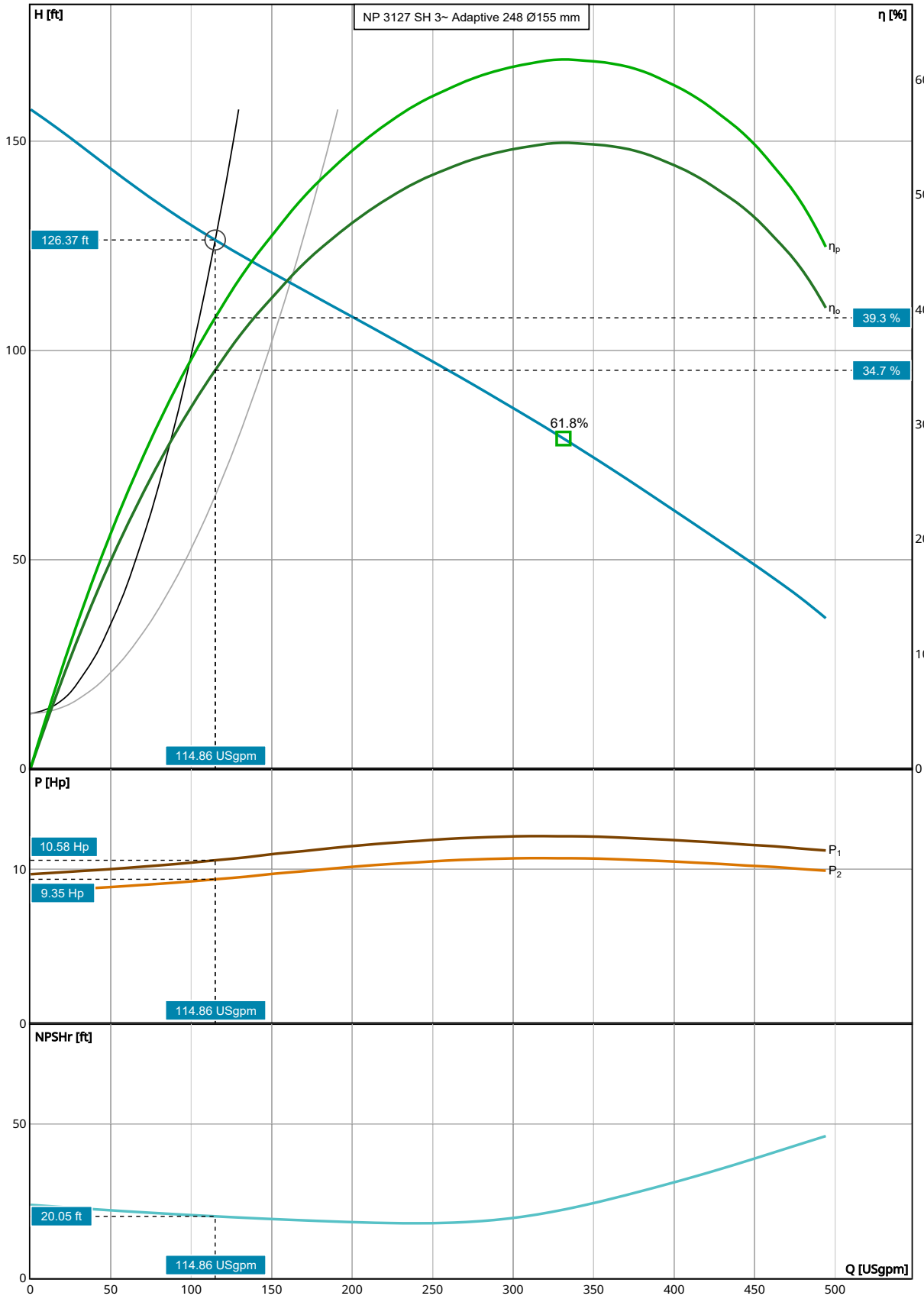
Construction Materials

Impeller Material	Volute Material	Stator Cover Material
Hard-Iron	Grey Cast Iron	Grey Cast Iron

Motor

Rated Power	Number Of Phases	Start Current Ratio	Motor Issue
11 Hp	3	9.22	12
Motor Denomination	**Rated Motor Speed**	**Insulation Class**	**Locked Rotor Code**
21-11-2AL	3,505 RPM	H	K
Motor Efficiency Class	**Rated Voltage**	**Approval**	**Max starts per hour**
Standard	208 V	FM	30
Version Code	**Rated Current**	**Total Moment Of Inertia**	**Power Factor 100%**
070	29 A	0.49 ft²lbf	0.92
Frequency	**Start Current**	**Type of duty**	**Power Factor 75%**
60 Hz	270 A	S1	0.9
Max P2 (1x)	**Starting Current, Direct Starting**	**Stator Variant**	**Power Factor 50%**
10.72 Hp	270 A	28	0.85
Number Of Poles	**Starting Current, Star Delta**	**Motor Module**	**Efficiency 100%**
2	90 A	146	84.7 %
			Efficiency 75%
			84.6 %
			Efficiency 50%
			82.4 %

NP 3127 SH 3~ Adaptive 248 | Hydraulic Data & Performance Curve



Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Project:	Created By:	Created On:	Last Update:
NP 3127 SH 248 - Bennett's Creek - 208V	Ian Belczyk	6/9/26	-

Selection

Series N 3000	Curve Code 248
Name NP 3127 SH 3~ Adaptive 248	Impeller Diameter 155 mm
Frequency 60 Hz	Inlet Diameter 80 mm
Total Flow 110 USgpm	Outlet Diameter 3 in
Total Head 117 ft	Number Of Vanes 2
Pump Flow 110 USgpm	
Pump Head 117 ft	
System Type Single Pump	
Operating Pumps 1	
Standby Pumps No Standby Pump	

Fluid and Operating Conditions

Fluid Type Water	Density 62.43 lb/ft³
Fluid Temperature 39.2 °F	Dynamic Viscosity 1.57 cP
Specific Gravity 1	Fluid Vapor Pressure 0.12 psi
	Atmospheric Pressure 14.7 psi
	Elevation 0 ft
	Ambient Temperature 68 °F
	NPSH Available 33.68 ft
	Submergence 0 ft

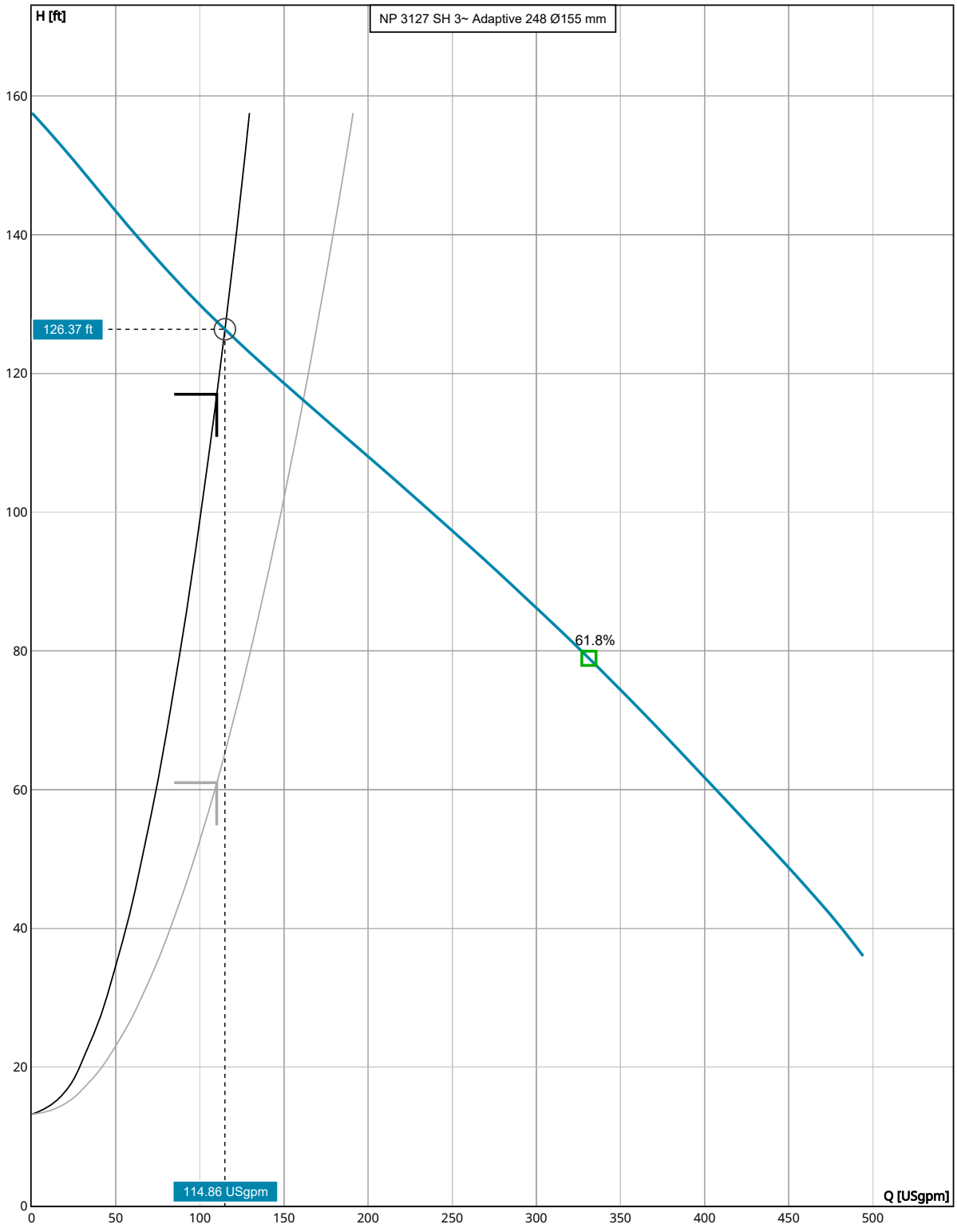
Design Point

Flow 114.86 USgpm	Shaft Power (P2) 9.35 Hp
Head 126.37 ft	NPSHR 20.05 ft
Overall Efficiency (ηo) 34.7 %	Static Head 13.2 ft
Pump Efficiency (ηp) 39.27 %	Flow To BEP Ratio 34.68 %
Input Power (P1) 10.58 Hp	

Design Curve

Rated Speed 60 Hz	BEP Flow 331.24 USgpm
Max Flow 494.23 USgpm	BEP Head 78.93 ft
H@QMin 157.55 ft	Max P2 10.72 Hp
H@QMax 36.01 ft	Specific Energy 1,144.99 kWh/mGal
BEP 61.75 %	

NP 3127 SH 3~ Adaptive 248 | Duty Analysis



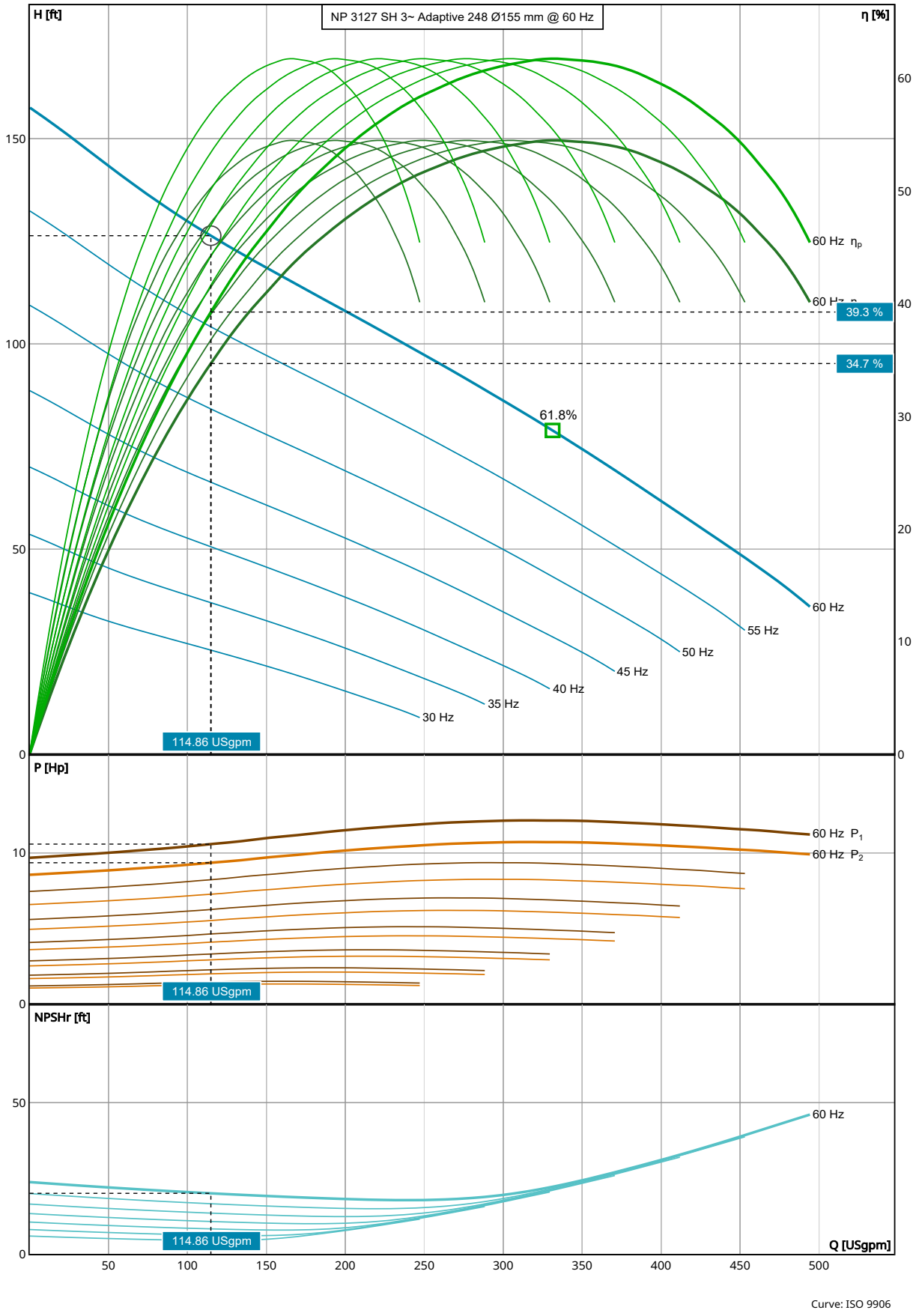
Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Name	Q (1x) [USgpm]	H (1x) [ft]	P2 (1x) [Hp]	Q [USgpm]	H [ft]	P2 [Hp]	ηp [%]	SE [kWh/mGal]	NPSHr [ft]
High Head @ 1x	114.86	126.37	9.35	114.86	126.37	9.35	39.27	1,144.99	20.05
Low Head @ 1x	161.44	116.16	9.8	161.44	116.16	9.8	48.4	854.19	18.92

Project:	Created By:	Created On:	Last Update:
NP 3127 SH 248 - Bennett's Creek - 208V	Ian Belczyk	6/9/26	-

NP 3127 SH 3~ Adaptive 248 | Variable Speed Curve

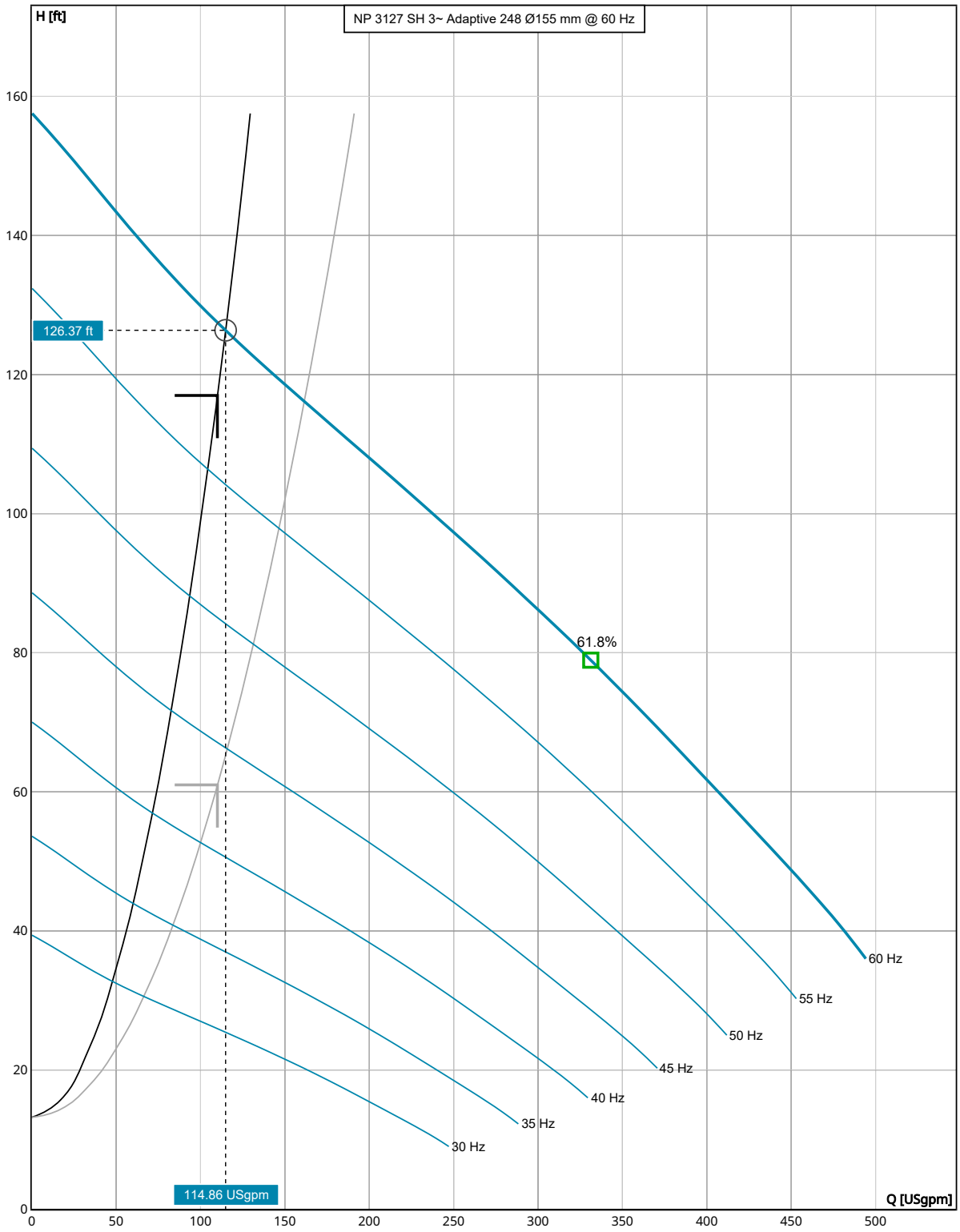


Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Project:	Created By:	Created On:	Last Update:
NP 3127 SH 248 - Bennett's Creek - 208V	Ian Belczyk	6/9/26	-

NP 3127 SH 3~ Adaptive 248 | Variable Speed Analysis



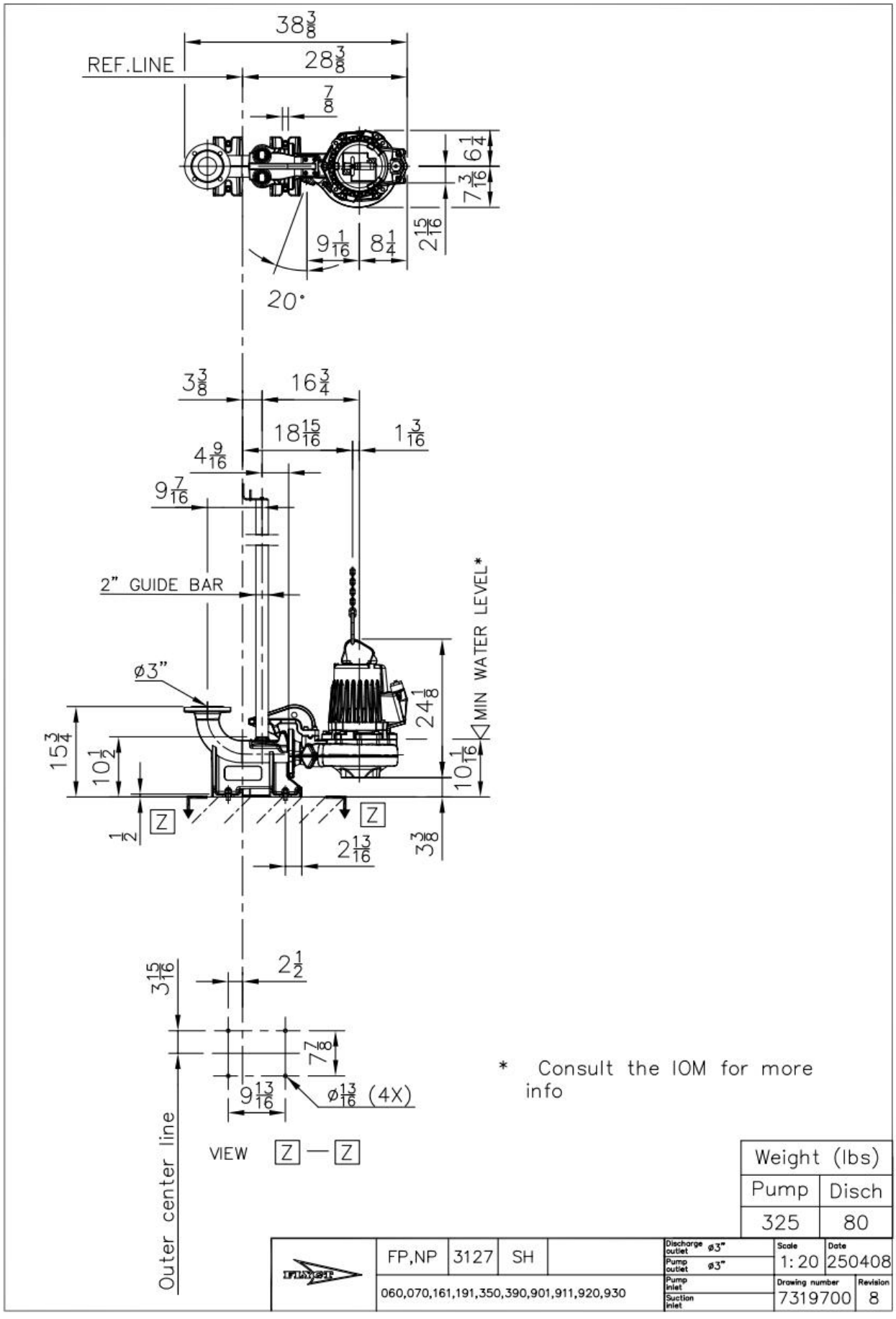
Curve: ISO 9906

Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Name	Speed	Q (1x) [USgpm]	H (1x) [ft]	P2 (1x) [Hp]	Q [USgpm]	H [ft]	P2 [Hp]	ηp [%]	SE [kWh/mGal]	NPSHr [ft]
High Head @ 1x	30 Hz	47.74	32.75	1.15	47.74	32.75	1.15	34.49	337.92	5.15
High Head @ 1x	35 Hz	59.9	43.98	1.83	59.9	43.98	1.83	36.34	430.65	6.94
High Head @ 1x	40 Hz	71.43	56.97	2.75	71.43	56.97	2.75	37.44	541.46	9

Project:	Created By:	Created On:	Last Update:
NP 3127 SH 248 - Bennett's Creek - 208V	Ian Belczyk	6/9/26	-

NP 3127 SH 3~ Adaptive 248 | Dimensional Data & Drawing



Pump Station Information Form

Note: Please complete this form as much as possible and submit to HRSD, if your project calls for:

1. a new pump station facility,
2. upgrades and/or modifications to an existing pump station facility, or
3. a replacement of an existing pump station facility.

Project Name: Bennett's Creek Health and Rehabilitation Center

Jurisdiction: Suffolk, VA

Pump Station Facility Information

Pump station number:	N/A	As provided by locality
Name:	Bennett's Creek PS	Pump station name
Ownership:	Private	Is this a "Private" or "Public" pump station facility?
Number of pumps:	2	Number of pumps in the pump station
Design TDH:	126 -116	Total Dynamic Head for the pumps (ft)
Firm capacity:	115 -162	Design capacity with largest capacity pump out of service (gpm)
Total capacity:	115 -162	Pump station design capacity with all pumps operating (gpm)
Configuration type:	Submersible	WW/DW, Submersible, Vacuum, Suction lift, Dry pit
Force main outfall type:	Pressure	Select force main outfall type (gravity, pressure)
Drive type:	Constant	Motor drive (Constant, VFD)
Vertical datum :		Vertical Datum - Year of Adjustment
Construction year:	202	Year the pump station was built

Wet Well Information

Ground elev:	16	Existing or new ground elevation (ft)
Top slab elev:	16.5	Wet well top elevation (ft)
Bottom slab elev:	1	Wet well bottom slab elevation (ft)
Influent invert elev:	9	Invert elevation of influent pipe into the pump station wet well (ft)
Lead pump ON elev:	5.5	Pump control setting elevation (ft)
Lag pump ON elev:	6.5	Pump control setting elevation (ft)
Lead pump OFF elev:	4	Pump control setting elevation (ft)
Lag pump OFF elev:	4	Pump control setting elevation (ft)
VFD Set Point elev:	N/A	Set point for VFD pumps (ft)
CL of pump volute elev:	2.88	Center line of pump volute elevation (ft)
High water alarm elev:	7	Alarm setting elevation (ft)
Cross-sectional area:	50.27	Cross-sectional area based on operational storage volume (ft^2)
Overflow elev:	9	Elevation at which SSO will first occur at PS or upstream SMH (ft)
Overflow point location:		

Note: *Provide location of known lowest manhole rim upstream of the pump station where an overflow would first occur. Please Include a map to indicate this location.*

Pump Information

Pumps	Pump Manufacturer	Model	Min. impeller di. (in)	Max. impeller di. (in)	Installed impeller di. (in)
1	Flygt Pump by Xylem Inc.	NP 3127 SH 3	6.102		
2	Flygt Pump by Xylem Inc.	NP 3127 SH 3	6.102		
3					
4					

Motor Information *(For constant speed pumps, use the "Max Speed" column to report motor speed)*

Motors	Motor Manufacturer	HP	Min. Speed	Max. Speed
1	**Xylem Inc.**	**11**		**3,505 rpm (60 Hz)**
2	**Xylem Inc.**	**11**		**3,505 rpm (60 Hz)**
3				
4				

Note: *For constant speed pumps fill out the "Maximum Pump Curves" table ONLY.*

Maximum Pump Curves *(Units should be in **feet** for H and **gpm** for Q)*

Pump Curve		1	2	3	4	5	6	7	8	9
Pump 1	H	116.16								
	Q	161.44								
Pump 2	H	116.16								
	Q	161.44								
Pump 3	H									
	Q									
Pump 4	H									
	Q									

Minimum Pump Curves *(Units should be in **feet** for H and **gpm** for Q)*

Pump Curve		1	2	3	4	5	6	7	8	9
Pump 1	H	126.37								
	Q	114.86								
Pump 2	H	126.37								
	Q	114.86								
Pump 3	H									
	Q									
Pump 4	H									
	Q									

Applicant's Name: **Saber Healthcare Group** Date: **6/12/2026**