The BWSD has established a formal cross connection control program. The water system must ensure that cross connections do not exist or are isolated from the potable water system by an approved backflow prevention assembly. Backflow prevention assemblies shall be inspected and tested annually for functionality by an Idaho licensed tester, as specified in Subsection 552.06.c. Annual backflow testing of all backflow assemblies installed on underground sprinkler systems within distribution is required.

Administration

The BWSD is governed by the Water District Board. The financial contact is currently Linda Williams. The operator and administrative contact is Neil Peck. He is currently licensed as DWD1, WWC1, WWT1 and WWTLA and is certified through April 10, 2015 per the Idaho Bureau of Occupational Licensing.

Monitoring

Please refer to the Public Water System Switchboard for current monitoring schedules and other important information located at:
http://www.deq.idaho.gov/water-quality/drinking-water/pws-switchboard.aspx

Well 7 & 8 (manifold):

Alpha/ R226/R228/R6&8 – 1 routine per 9 years
Uranium – 1 routine per 9 years
Fluoride – 1 routine per 9 years
IOCs – 1 routine per 9 years
Sodium – 1 routine per 3 years
VOCs – 1 routine per 6 years
Arsenic – 1 routine per 9 years
Nitrate – 1 per year
Nitrite – 1 per 9 years

Distribution:

Coliform – 2 routine per month
Disinfection By Products (DBP) – 2 routine per year
Lead Copper – 10 routine per 3 years

> *Please remember to select an additional sample location so you have 10 total sample locations according to the sample site selection criteria. Please have these sites selected prior to the next scheduled round of Lead Copper monitoring. If you do not have enough sites that fit the Lead/Copper sampling site selection criteria, then please select sites throughout distribution to equal the total number of sample sites needed. You can also contact the Idaho Department of Environmental Quality (DEQ) for additional guidance.*

Conclusion

At the time of the survey it was evident that Mr. Neil Peck takes his responsibility of providing safe and reliable water to the users of BWSD seriously; his efforts are appreciated by DEQ. The BWSD was found to be in compliance with the Idaho Rules for Public Drinking Water Systems. No significant deficiencies were noted during this sanitary survey.

The deficiencies and recommendations listed below need to be addressed in a written Plan of Correction (POC) and submitted to DEQ within 30 days of the receipt of this letter. The POC is a simple narrative document that lists the deficiencies and additional requirements, how they will be corrected, and the date by which correction will be completed.

Deficiencies and Requirements:

1. It is required that any dead end distribution mains must be flushed every six months.

Follow up Items:

1. If at any time there is a depressurization event, where distribution pressure is known to have fallen below 20 psi, the BWSD must provide public notification and also notify the DEQ.

Recommendations:

1. It is recommended that all sample taps be smooth nosed.
2. DEQ recommends the reservoir be inspected and cleaned every five years.
3. DEQ recommends the valves in distribution be exercised annually.
4. DEQ recommends an operation and maintenance manual be provided for the drinking water system. Operation and maintenance manuals should include daily operating instructions, trouble shooting, operator safety procedures, location of valves and other key system features, parts lists and parts order forms and information for contacting the water system operator.

Photographic Documentation

Name of Facility: BAYVIEW WATER & SEWER DISTRICT

Inspector: J. FELKER

Inspection Date: Tuesday, April 01, 2014

Purpose of Inspection: SANITARY SURVEY

Publish Date: Tuesday 29 April 2014

Table of Photographs:

Photograph 1: Dromore Booster Station 3
Photograph 2: Dromore Booster Vault 3
Photograph 3: Dromore Reservoir 3
Photograph 4: Farragut Reservoir 3
Photograph 5: Pumphouse for Well 8 4
Photograph 6: Well 8 4
Photograph 7: Cape Horn Booster Station 4
Photograph 8: Cape Horn Emergency Power Generator 4
Photograph 9: Cape Horn Power Controls 5
Photograph 10: Cape Horn Booster Pumps 5
Photograph 11: Sodium Hypochlorite solution tank and LMI meter 5
Photograph 12: Injection site for Cape Horn distribution 5
Photograph 13: Pend Orielle Pines Booster Station 6
Photograph 14: Pend Orielle Pines booster pumps 6
Photograph 15: Pend Orielle Pines Reservoir 6
Photograph 16: Cape Horn Estates Booster station 6
Photograph 17: Cape Horn Estates Booster vault 6
Photograph 18: Cape Horn Estates Reservoir 6
Photograph 19: Cape Horn Estates Reservoir valves 7
Photograph 20: Pump house for Well 7 7
Photograph 21: Well 7 - primary well 7

Idaho Department of Environmental Quality
Photographic Documentation For BAYVIEW WATER & SEWER DISTRICT

Photograph 1: Dromore Booster Station

Photograph 2: Dromore Booster Vault

Photograph 3: Dromore Reservoir

Photograph 4: Farragut Reservoir

Photograph 5: Pump house for Well 8

Photograph 6: Well 8

Photograph 7: Cape Horn Booster Station

Photograph 8: Cape Horn Emergency Power Generator

Photograph 9: Cape Horn Power Controls

Photograph 10: Cape Horn Booster Pumps

Photograph 11: Sodium Hypochlorite solution tank and LMI meter

Photograph 12: Injection site for Cape Horn distribution

Photograph 13: Pend Orielle Pines Booster Station

Photograph 14: Pend Orielle Pines booster pumps

Photograph 15: Pend Orielle Pines Reservoir

Photograph 16: Cape Horn Estates Booster station

Photograph 17: Cape Horn Estates Booster vault

Photograph 18: Cape Horn Estates Reservoir

Photograph 19: Cape Horn Estates Reservoir valves

Photograph 20: Pump house for Well 7

Photograph 21: Well 7 - primary well

Enhanced Sanitary Survey
Instructions for Selection of Correction Time Frame

☐ **24 hours**

This time frame should be selected for those items that pose an Imminent Threat to Public Health and must be remedied as soon as possible to decrease exposure to dangerous or potentially dangerous contamination or circumstances.

These items would be considered to be Health Hazards that would create or may create a danger to the consumer's health. These hazards may consist of but are not limited to, design, construction, operational, structural, collection, storage, distribution, monitoring, treatment, or water quality elements of a public water system.

This time frame should be selected for those items identified that are Significant Deficiencies and that we determine to cause or have potential to cause, risk to health or safety or that could affect the reliable delivery of safe drinking water.

(It is anticipated that relatively few items, and only those of the highest priority, will be identified that will require remedy within this Correction Time Frame.)

☐ **7 Days**

These items would be considered to be Health Hazards that would create or may create a danger to the consumer's health. These hazards may consist of but are not limited to, design, construction, operational, structural, collection, storage, distribution, monitoring, treatment, or water quality elements of a public water system.

This time frame should be selected for those items identified that are Significant Deficiencies and that we determine to cause or have potential to cause, risk to health or safety or that could affect the reliable delivery of safe drinking water.

☐ **Complete Report of Survey Results Within Thirty Days**

A report describing the complete results of this survey will be provided within thirty days. After receipt of this report, you have 30 days to consult with the regulatory agency regarding a schedule for completing any corrective actions required in response to the survey.

(It is anticipated that the majority of the items identified during the inspection will require corrective action within 120 days following consultation with the regulatory agency. Factors that could be considered when selecting this time frame would be overall risk or potential risk to public health, expertise necessary to effectively make the modification (plumbing, electrician, engineering) and expense of the modification (large capital improvement vs. replacement of item from operating budget.)

DISCLAIMER: This document is a Preliminary Inspection Findings Form. It does not constitute a final determination of compliance status with any of the laws administered by the Idaho Department of Environmental Quality, including, but not limited to, the Idaho Environmental Protection and Health Act, Idaho Code § 39-101, et seq., the Idaho Rules for Public Drinking Water Systems, IDAPA 58.01.08, and adoptions of Federal Regulations thereunder, Idaho Code § 50-1326 et seq., Idaho Code § 54-2401 et seq., or any rules promulgated, permits issued, or consent or judicial orders entered into under authority of these acts. The Idaho Department of Environmental Quality reserves the right to supplement this document with additional compliance determinations, and amend, change, or otherwise modify any determination stated in this document. This document in does not restrict or preclude the State of Idaho or the Department of Environmental Quality from taking action available under law to address past, present, or future violations of the laws administered by the agency.

Enhanced Sanitary Survey
Preliminary Inspection Findings Form

Facility Name: Bayview Wts District PWS #: 1280014

Inspection Date: 4-1-2014 Time Closing Conference Begins: _____ Time Closing Conference Ends: _____

Inspector: Jean Felker Phone #: _____
(Print Name)

Inspector: Jeanfelker
(Signature)

Facility Representative: Neil Peck E-mail: _____
(Print Name)

Title: _____ Facility Representative: Neil Peck
(Signature)

Note: *Your signature indicates you have received this document and does not imply agreement with the violations noted.*

Significant Deficiencies Noted at the Time of the Inspection:
In accordance with IDAPA 58.01.08.008.02., the health hazards identified below must be mitigated as required by the Department and terminated within a time schedule established by the Department.

Correction Time Frame

1. _____ ☐ **24 hours** ☐ **7 days** ☐ **Corrective action plan within 30 days**
2. none noted ☐ **24 hours** ☐ **7 days** ☐ **Corrective action plan within 30 days**
3. _____ ☐ **24 hours** ☐ **7 days** ☐ **Corrective action plan within 30 days**
4. _____ ☐ **24 hours** ☐ **7days** ☐ **Corrective action plan within 30 days**
5. _____ ☐ **24 hours** ☐ **7 days** ☐ **Corrective action plan within 30 days**
6. _____ ☐ **24 hours** ☐ **7 days** ☐ **Corrective action plan within 30 days**

Potential Violations Pending Further Review:

1. _____
2. none
3. _____
4. _____
5. _____
6. _____

Free Technical Assistance: Yes ☐ No ☐

- ☐ Financial: a) rate reviews b) budgeting c) finding loans and grants d) capital improvement planning
- ☐ Training: a) operator b) board/council c) asset management d) developing policies and procedures
- ☐ Technical Assistance: a) leak detection b) line location c) distribution d) treatment e) other
- ☐ System Operation: a) best practices guidance b) emergency response c) vulnerability assessment
- ☐ Source Water Protection: a) planning b) implementation

Contact Name: _____ phone #: _____

Original stays with inspector for scanning and registration into TRIM. Copy stays with Public Water System Owner/Operator.

Appendix 2-C

Hydraulic Calculations

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

BWSD Water System Facility Plan

Hydraulic Analysis

System Calibration Using Hydrant Testing Data

Location No.	Location	Elevation (ft)
1	Farragut Tank - Ground	2,330
2	Farragut Tank - Overflow	2,430
3	FH 708 - 17974 E Hwy 54	2,180
4	FH 703 - 1st St and Fir	2,252
5	Main PRV (2190 + 40 psi downstream)	2,282
6	FH 720 - Limekiln and Pier	2,075

This sheet uses system elevations and headloss to calculate a static pressure at various points in the system. This is then compared against static pressures measured during fire hydrant flow testing conducted by Timberlake Fire District.

Hydrant static checks are within 4% of calculated values.

Therefore, system assumptions/information (e.g., tank overflow, friction factor, etc.) seem reasonable.

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	839	12	113.1	0.785	2.38	1,900	1.41E-05	1.69E+05	0.005	0.0188	3.14
	2	839	8	50.3	0.349	5.36	1,100	1.41E-05	2.53E+05	0.005	0.0192	14.12
	3	839	6	28.3	0.196	9.52	1,300	1.41E-05	3.38E+05	0.005	0.0199	72.85
2	1	839	12	113.1	0.785	2.38	1,900	1.41E-05	1.69E+05	0.005	0.0188	3.14
	2	839	8	50.3	0.349	5.36	1,100	1.41E-05	2.53E+05	0.005	0.0192	14.12
	3	839	6	28.3	0.196	9.52	1,750	1.41E-05	3.38E+05	0.005	0.0199	98.06
Below PRV	1	993	8	50.3	0.349	6.34	3,500	1.41E-05	3.00E+05	0.005	0.0190	62.26

1 - Storage Tank to Hydrant 708 at 17974 Hwy 54		
Route		
Flow (gpm)	839	
Delta z (ft)	250	
Delta z (psi)	108.2	<-- Static Pressure, Calculated
Fire Flow Static P (psi)	110.0	<-- 2014 hydrant testing
Difference (psi)	-1.8	
Difference (%)	-1.6%	

2 - Storage Tank to Hydrant 703 at 1st and Fir		
Route		
Flow (gpm)	839	
Delta z (ft)	178	
Delta z (psi)	77.1	<-- Static Pressure, Calculated
Fire Flow Static P (psi)	80.0	<-- 2012 hydrant testing
Difference (psi)	-2.9	
Difference (%)	-3.8%	

3 - Main PRV to Hydrant 720 at Limekiln and Pier		
Route		
Flow (gpm)	993	
Delta z (ft)	207	
Delta z (psi)	89.8	<-- Static Pressure, Calculated
Fire Flow Static P (psi)	92.0	<-- 2012 hydrant testing
Difference (psi)	-2.2	
Difference (%)	-2.5%	

BWSD Water System Facility Plan

Hydraulic Analysis

Existing Average Day Flow

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	1,500

This sheet uses system elevations and headloss to calcualte a static pressure and dynamic pressure at various points in the system under **existing average day flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 40 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained: 40 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	162	12	113.1	0.785	0.46	1,900	1.41E-05	3.26E+04	0.005	0.0242	0.15
	2	162	8	50.3	0.349	1.03	1,100	1.41E-05	4.89E+04	0.005	0.0231	0.63
	3	162	6	28.3	0.196	1.84	1,300	1.41E-05	6.52E+04	0.005	0.0228	3.12
2	1	162	12	113.1	0.785	0.46	1,900	1.41E-05	3.26E+04	0.005	0.0242	0.15
	2	162	8	50.3	0.349	1.03	1,100	1.41E-05	4.89E+04	0.005	0.0231	0.63
	3	162	6	28.3	0.196	1.84	1,750	1.41E-05	6.52E+04	0.005	0.0228	4.20
3	1	162	12	113.1	0.785	0.46	1,900	1.41E-05	3.26E+04	0.005	0.0242	0.15
	2	162	8	50.3	0.349	1.03	1,100	1.41E-05	4.89E+04	0.005	0.0231	0.63
4	1	162	8	50.3	0.349	1.03	3,500	1.41E-05	4.89E+04	0.005	0.0231	2.02
5	1	162	8	50.3	0.349	1.03	200	1.41E-05	4.89E+04	0.005	0.0231	0.12
	2	162	6	28.3	0.196	1.84	4,200	1.41E-05	6.52E+04	0.005	0.0228	10.09
6	1	162	8	50.3	0.349	1.03	3,500	1.41E-05	4.89E+04	0.005	0.0231	2.02
	2	162	8	50.3	0.349	1.03	900	1.41E-05	4.89E+04	0.005	0.0231	0.52
	3	162	6	28.3	0.196	1.84	1,650	1.41E-05	6.52E+04	0.005	0.0228	3.96

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	162		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	3.91	<-- Friction headloss	
Allowable h_L (ft)	157.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	106.5	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	162		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	4.99	<-- Friction headloss	
Allowable h_L (ft)	262.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	151.5	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	162		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	0.79	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	89.4	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	162		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	2.02	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	88.9	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	162		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	10.20	<-- Friction headloss	
Allowable h_L (ft)	20.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	44.2	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	162		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	6.50	<-- Friction headloss	
Allowable h_L (ft)	10.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	41.5	<-- Pressure at Given Flow	

BWSD Water System Facility Plan

Hydraulic Analysis

Existing Maximum Day Flow

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	1,500

This sheet uses system elevations and headloss to calculate a static pressure and dynamic pressure at various points in the system under **existing maximum day flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 40 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained: 40 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	331	12	113.1	0.785	0.94	1,900	1.41E-05	6.65E+04	0.005	0.0213	0.55
	2	331	8	50.3	0.349	2.11	1,100	1.41E-05	9.98E+04	0.005	0.0209	2.39
	3	331	6	28.3	0.196	3.75	1,300	1.41E-05	1.33E+05	0.005	0.0212	12.04
2	1	331	12	113.1	0.785	0.94	1,900	1.41E-05	6.65E+04	0.005	0.0213	0.55
	2	331	8	50.3	0.349	2.11	1,100	1.41E-05	9.98E+04	0.005	0.0209	2.39
	3	331	6	28.3	0.196	3.75	1,750	1.41E-05	1.33E+05	0.005	0.0212	16.20
3	1	331	12	113.1	0.785	0.94	1,900	1.41E-05	6.65E+04	0.005	0.0213	0.55
	2	331	8	50.3	0.349	2.11	1,100	1.41E-05	9.98E+04	0.005	0.0209	2.39
4	1	331	8	50.3	0.349	2.11	3,500	1.41E-05	9.98E+04	0.005	0.0209	7.61
5	1	331	8	50.3	0.349	2.11	200	1.41E-05	9.98E+04	0.005	0.0209	0.43
	2	331	6	28.3	0.196	3.75	4,200	1.41E-05	1.33E+05	0.005	0.0212	38.88
6	1	331	8	50.3	0.349	2.11	3,500	1.41E-05	9.98E+04	0.005	0.0209	7.61
	2	331	8	50.3	0.349	2.11	900	1.41E-05	9.98E+04	0.005	0.0209	1.96
	3	331	6	28.3	0.196	3.75	1,650	1.41E-05	1.33E+05	0.005	0.0212	15.28

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	331		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	14.98	<-- Friction headloss	
Allowable h_L (ft)	157.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	101.7	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	331		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	19.15	<-- Friction headloss	
Allowable h_L (ft)	262.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	145.4	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	331		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	2.94	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	88.5	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	331		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	7.61	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	86.5	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	331		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	39.32	<-- Friction headloss	
Allowable h_L (ft)	20.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	31.6	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	331		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	24.84	<-- Friction headloss	
Allowable h_L (ft)	10.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	33.6	<-- Pressure at Given Flow	

BWSD Water System Facility Plan

Hydraulic Analysis

Future - Maximum Day Flow

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	1,500

This sheet uses system elevations and headloss to calculate a static pressure and dynamic pressure at various points in the system under **future maximum day flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 40 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained: 40 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	473	12	113.1	0.785	1.34	1,900	1.41E-05	9.52E+04	0.005	0.0202	1.07
	2	473	8	50.3	0.349	3.02	1,100	1.41E-05	1.43E+05	0.005	0.0202	4.71
	3	473	6	28.3	0.196	5.37	1,300	1.41E-05	1.90E+05	0.005	0.0206	23.96
2	1	473	12	113.1	0.785	1.34	1,900	1.41E-05	9.52E+04	0.005	0.0202	1.07
	2	473	8	50.3	0.349	3.02	1,100	1.41E-05	1.43E+05	0.005	0.0202	4.71
	3	473	6	28.3	0.196	5.37	1,750	1.41E-05	1.90E+05	0.005	0.0206	32.26
3	1	473	12	113.1	0.785	1.34	1,900	1.41E-05	9.52E+04	0.005	0.0202	1.07
	2	473	8	50.3	0.349	3.02	1,100	1.41E-05	1.43E+05	0.005	0.0202	4.71
4	1	473	8	50.3	0.349	3.02	3,500	1.41E-05	1.43E+05	0.005	0.0202	15.00
5	1	473	8	50.3	0.349	3.02	200	1.41E-05	1.43E+05	0.005	0.0202	0.86
	2	473	6	28.3	0.196	5.37	4,200	1.41E-05	1.90E+05	0.005	0.0206	77.42
6	1	473	8	50.3	0.349	3.02	3,500	1.41E-05	1.43E+05	0.005	0.0202	15.00
	2	473	8	50.3	0.349	3.02	900	1.41E-05	1.43E+05	0.005	0.0202	3.86
	3	473	6	28.3	0.196	5.37	1,650	1.41E-05	1.90E+05	0.005	0.0206	30.42

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	473		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	29.75	<-- Friction headloss	
Allowable h_L (ft)	157.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	95.3	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	473		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	38.05	<-- Friction headloss	
Allowable h_L (ft)	262.6	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	137.2	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	473		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	5.79	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	87.3	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	473		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	15.00	<-- Friction headloss	
Allowable h_L (ft)	115.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	83.3	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	473		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	78.28	<-- Friction headloss	
Allowable h_L (ft)	20.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	14.8	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	473		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	49.27	<-- Friction headloss	
Allowable h_L (ft)	10.0	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	23.0	<-- Pressure at Given Flow	

BWSD Water System Facility Plan

Hydraulic Analysis

Fire Flow - 500 gpm

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	500

This sheet uses system elevations and headloss to calculate a static pressure and dynamic pressure at various points in the system under **the specified fire flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 20 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained 20 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	500	12	113.1	0.785	1.42	1,900	1.41E-05	1.01E+05	0.005	0.0200	1.19
	2	500	8	50.3	0.349	3.19	1,100	1.41E-05	1.51E+05	0.005	0.0200	5.23
	3	500	6	28.3	0.196	5.67	1,300	1.41E-05	2.01E+05	0.005	0.0205	26.64
2	1	500	12	113.1	0.785	1.42	1,900	1.41E-05	1.01E+05	0.005	0.0200	1.19
	2	500	8	50.3	0.349	3.19	1,100	1.41E-05	1.51E+05	0.005	0.0200	5.23
	3	500	6	28.3	0.196	5.67	1,750	1.41E-05	2.01E+05	0.005	0.0205	35.86
3	1	500	12	113.1	0.785	1.42	1,900	1.41E-05	1.01E+05	0.005	0.0200	1.19
	2	500	8	50.3	0.349	3.19	1,100	1.41E-05	1.51E+05	0.005	0.0200	5.23
4	1	500	8	50.3	0.349	3.19	3,500	1.41E-05	1.51E+05	0.005	0.0200	16.65
5	1	500	8	50.3	0.349	3.19	200	1.41E-05	1.51E+05	0.005	0.0200	0.95
	2	500	6	28.3	0.196	5.67	4,200	1.41E-05	2.01E+05	0.005	0.0205	86.07
6	1	500	8	50.3	0.349	3.19	3,500	1.41E-05	1.51E+05	0.005	0.0200	16.65
	2	500	8	50.3	0.349	3.19	900	1.41E-05	1.51E+05	0.005	0.0200	4.28
	3	500	6	28.3	0.196	5.67	1,650	1.41E-05	2.01E+05	0.005	0.0205	33.81

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	500		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	33.06	<-- Friction headloss	
Allowable h_L (ft)	203.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	93.9	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	500		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	42.28	<-- Friction headloss	
Allowable h_L (ft)	308.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	135.4	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	500		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	6.42	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	87.0	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	500		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	16.65	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	82.6	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	500		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	87.02	<-- Friction headloss	
Allowable h_L (ft)	66.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	11.0	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	500		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	54.74	<-- Friction headloss	
Allowable h_L (ft)	56.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	20.6	<-- Pressure at Given Flow	

BWSD Water System Facility Plan

Hydraulic Analysis

Fire Flow - 1000 gpm

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	1,000

This sheet uses system elevations and headloss to calculate a static pressure and dynamic pressure at various points in the system under **the specified fire flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 20 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained: 20 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	1000	12	113.1	0.785	2.84	1,900	1.41E-05	2.01E+05	0.005	0.0185	4.39
	2	1000	8	50.3	0.349	6.38	1,100	1.41E-05	3.02E+05	0.005	0.0190	19.84
	3	1000	6	28.3	0.196	11.35	1,300	1.41E-05	4.02E+05	0.005	0.0198	102.69
2	1	1000	12	113.1	0.785	2.84	1,900	1.41E-05	2.01E+05	0.005	0.0185	4.39
	2	1000	8	50.3	0.349	6.38	1,100	1.41E-05	3.02E+05	0.005	0.0190	19.84
	3	1000	6	28.3	0.196	11.35	1,750	1.41E-05	4.02E+05	0.005	0.0198	138.24
3	1	1000	12	113.1	0.785	2.84	1,900	1.41E-05	2.01E+05	0.005	0.0185	4.39
	2	1000	8	50.3	0.349	6.38	1,100	1.41E-05	3.02E+05	0.005	0.0190	19.84
4	1	1000	8	50.3	0.349	6.38	3,500	1.41E-05	3.02E+05	0.005	0.0190	63.12
5	1	1000	8	50.3	0.349	6.38	200	1.41E-05	3.02E+05	0.005	0.0190	3.61
	2	1000	6	28.3	0.196	11.35	4,200	1.41E-05	4.02E+05	0.005	0.0198	331.77
6	1	1000	8	50.3	0.349	6.38	3,500	1.41E-05	3.02E+05	0.005	0.0190	63.12
	2	1000	8	50.3	0.349	6.38	900	1.41E-05	3.02E+05	0.005	0.0190	16.23
	3	1000	6	28.3	0.196	11.35	1,650	1.41E-05	4.02E+05	0.005	0.0198	130.34

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	1000		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	126.91	<-- Friction headloss	
Allowable h_L (ft)	203.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	53.3	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	1000		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	162.46	<-- Friction headloss	
Allowable h_L (ft)	308.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	83.4	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	1000		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	24.22	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	79.3	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	1000		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	63.12	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	62.5	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	1000		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	335.38	<-- Friction headloss	
Allowable h_L (ft)	66.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-96.5	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	1000		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	209.69	<-- Friction headloss	
Allowable h_L (ft)	56.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-46.4	<-- Pressure at Given Flow	

BWSD Water System Facility Plan

Hydraulic Analysis

Fire Flow - 1500 gpm

Location No.	Location	Elevation (ft)	Flow Scenario	Flow (gpd)	Flow (gpm)
1	Farragut Tank - Ground	2,330	Existing (2017)		
2	Farragut Tank - Overflow	**2,430**	Avg. Day	233,500	162
3	FH 708 - 17974 E Hwy 54	2,180	Max. Day	476,300	331
4	FH 703 - 1st St and Fir	2,252	Future (2037)		
5	Main PRV (2190 + 40 psi downstream)	**2,282**	Avg. Day	334,100	232
6	FH 720 - Limekiln and Pier	2,075	Max. Day	681,600	473
7	Hudson Bay Road at Vista Bay	2,170			
8	FH 713 - N Shore and Arapaho	2,180	Fire Flow	N/A	1,500

This sheet uses system elevations and headloss to calculate a static pressure and dynamic pressure at various points in the system under **the specified fire flow conditions**. The Swamee & Jane explicit approximation of the Colebrook-White equation is used to determine the friction factor .

The calculated dynamic pressure is then compared against the IDEQ-required minimum operating pressure of 20 psi to detemine if system pressures are adequate at the given flow rate.

The storage tank overflow elevation is the basis for the static pressures in the

Minimum Pressure to Be Maintained: 20 psi

Darcy-Weisbach Pipe Headloss

Scenario	Pipeline Segment	Q (gpm)	D (in)	A (in^2)	A (ft^2)	V (fps)	L (ft)	Kinematic Viscosity (ft^2/sec)	Reynolds No.	k_s (in)	f	h_L (ft)
1	1	1500	12	113.1	0.785	4.26	1,900	1.41E-05	3.02E+05	0.005	0.0178	9.52
	2	1500	8	50.3	0.349	9.57	1,100	1.41E-05	4.53E+05	0.005	0.0186	43.68
	3	1500	6	28.3	0.196	17.02	1,300	1.41E-05	6.04E+05	0.005	0.0195	227.77
2	1	1500	12	113.1	0.785	4.26	1,900	1.41E-05	3.02E+05	0.005	0.0178	9.52
	2	1500	8	50.3	0.349	9.57	1,100	1.41E-05	4.53E+05	0.005	0.0186	43.68
	3	1500	6	28.3	0.196	17.02	1,750	1.41E-05	6.04E+05	0.005	0.0195	306.61
3	1	1500	12	113.1	0.785	4.26	1,900	1.41E-05	3.02E+05	0.005	0.0178	9.52
	2	1500	8	50.3	0.349	9.57	1,100	1.41E-05	4.53E+05	0.005	0.0186	43.68
4	1	1500	8	50.3	0.349	9.57	3,500	1.41E-05	4.53E+05	0.005	0.0186	138.97
5	1	1500	8	50.3	0.349	9.57	200	1.41E-05	4.53E+05	0.005	0.0186	7.94
	2	1500	6	28.3	0.196	17.02	4,200	1.41E-05	6.04E+05	0.005	0.0195	735.87
6	1	1500	8	50.3	0.349	9.57	3,500	1.41E-05	4.53E+05	0.005	0.0186	138.97
	2	1500	8	50.3	0.349	9.57	900	1.41E-05	4.53E+05	0.005	0.0186	35.74
	3	1500	6	28.3	0.196	17.02	1,650	1.41E-05	6.04E+05	0.005	0.0195	289.09

Scenario 1 - Storage Tank to Hydrant 708 at 17974 Hwy 54			
Route			
Flow (gpm)	1500		
Delta z (ft)	250		
Delta z (psi)	108.2	<-- Static Pressure	
Actual h_L (ft)	280.97	<-- Friction headloss	
Allowable h_L (ft)	203.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-13.4	<-- Pressure at Given Flow	
Scenario 2 - Storage Tank to Hydrant 703 at 1st and Fir			
Route			
Flow (gpm)	1500		
Delta z (ft)	355		
Delta z (psi)	153.7	<-- Static Pressure	
Actual h_L (ft)	359.81	<-- Friction headloss	
Allowable h_L (ft)	308.8	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-2.1	<-- Pressure at Given Flow	
Scenario 3 - Storage Tank to main PRV			
Route			
Flow (gpm)	1500		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	53.20	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	66.8	<-- Pressure at Given Flow	
Scenario 4 - Main PRV to FH 720 - Limekiln and Pier			
Route			
Flow (gpm)	1500		
Delta z (ft)	207		
Delta z (psi)	89.8	<-- Static Pressure	
Actual h_L (ft)	138.97	<-- Friction headloss	
Allowable h_L (ft)	161.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	YES		
Dynamic P (psi)	29.6	<-- Pressure at Given Flow	
Scenario 5 - Main PRV to east end of Hudson Bay Road at Vista Bay			
Route			
Flow (gpm)	1500		
Delta z (ft)	112		
Delta z (psi)	48.7	<-- Static Pressure	
Actual h_L (ft)	743.81	<-- Friction headloss	
Allowable h_L (ft)	66.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-273.3	<-- Pressure at Given Flow	
Scenario 6 - Main PRV to FH 713 at N Shore and Arapaho			
Route			
Flow (gpm)	1500		
Delta z (ft)	102		
Delta z (psi)	44.3	<-- Static Pressure	
Actual h_L (ft)	463.80	<-- Friction headloss	
Allowable h_L (ft)	56.2	<-- Allowable hL to Maintain Min. Req. P	
Adequate h_L?	NO		
Dynamic P (psi)	-156.4	<-- Pressure at Given Flow	

Appendix 2-D

Fire Hydrant Testing Reports

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

Ellery Howard

From: Ellery Howard
Sent: Friday, September 14, 2018 12:22 PM
To: Bill Steele
Subject: Bayview Area - target fire flows for water system planning

Chief Steele,

I am following up with you on our discussions from today and earlier this year related to the target fire flows in the Bayview area. In our discussions related to the Bayview Water & Sewer District's (BWSD) water system planning efforts, you indicated that Timberlake FPD had flow tested the hydrants on the existing water system several times over the years. Based on the fire flow data that you compiled and previous Fire District policies, you indicated that there is always room for improvement but that there were generally no glaring inadequacies based on existing conditions for residential areas, with the exception of the inadequate and very small tank (11,000 gallons) in the Dromore area. With that said, it is my understanding that you would prefer to see the following target fire flows and duration be addressed in future water system improvements:

- Residential Areas (single family homes up to 3,600 SF): 1,000 gpm for 1 hour
- Larger Residential/Commercial Areas: 1,500 gpm for 2 hours

Obviously these are just targets and any future commercial construction would need to be evaluated by Timberlake FPD based on building construction materials, building area, location, and available fire flow, etc. As we wrap up the planning efforts for the BWSD water system, I just wanted to confirm these fire flow targets/goals with you.

It should be noted that during the construction project that extended water service out to the Cape Horn Area in 2002, the Fire District indicated that a flow of 500 gpm for 2 hours (60,000 gallons) was the requested goal since it was considered a rural area with inadequate water supply. One of the areas that was deemed acceptable at that time was the far end of the Cape Horn that has a total of 60,000 gallons of storage serving approximately 10-15 households.

Thanks again for all of your assistance in this planning effort. Let me know if you have any questions or clarifications.

ELLERY HOWARD, P.E.
Project Manager

J-U-B ENGINEERS, Inc.
7825 Meadowlark Way, Coeur d'Alene, Idaho 83815
e ehoward@jub.com *w* www.jub.com
p 208 762 8787 *f* 208 762 9797

TLFD

Hydrant Flow Test By Hydrant

District = "01 "

702 **16010 E 5TH ST & N SPRUCE AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	85	30	30.00	0.00	919	1006	1087	1163
	<No Staff Member Listed>							
09/25/2012	85	41	31.00	0.00	934	1153	1246	1333
JGERNNS	Gernns, Joshua							
10/14/2013	90	50	40.00	0.00	1061	1435	1543	1644
BHERMENET	Hermenet, Brandon							
05/31/2014	95	50	40.00	0.00	1061	1398	1496	1588
	<No Staff Member Listed>							
Subtotal Flow Tests:		**4**		**Min:**	**919**	**1006**	**1087**	**1163**
				Max:	**1061**	**1435**	**1543**	**1644**
				Avg:	**993**	**1248**	**1343**	**1432**

703 **16262 E 1ST ST & N FIR AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	28	24.00	0.00	822	888	965	1037
	<No Staff Member Listed>							
09/25/2012	80	30	25.00	0.00	839	926	1006	1081
JGERNNS	Gernns, Joshua							
05/31/2014	90	20	15.00	0.00	650	650	699	744
	<No Staff Member Listed>							
Subtotal Flow Tests:		**3**		**Min:**	**650**	**650**	**699**	**744**
				Max:	**839**	**926**	**1006**	**1081**
				Avg:	**770**	**821**	**890**	**954**

705 **34082 E 4TH ST & N FIR AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	52	18	25.00	0.00	839	812	940	1055
	<No Staff Member Listed>							
09/20/2012	50	18	15.00	0.00	650	628	733	827
JGERNNS	Gernns, Joshua							
10/14/2013	50	15	10.00	0.00	531	489	571	644
BHERMENET	Hermenet, Brandon							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

705 **34082 E 4TH ST & N FIR AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
05/31/2014	60	20	10.00	0.00	531	531	599	661
	<No Staff Member Listed>							
Subtotal Flow Tests:		**4**		**Min:**	**531**	**489**	**571**	**644**
				Max:	**839**	**812**	**940**	**1055**
				Avg:	**637**	**615**	**710**	**796**

706 **16025 E 5TH ST & N PINE AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	50	20	27.00	0.00	872	872	1019	1149
	<No Staff Member Listed>							
09/20/2012	55	17	15.00	0.00	650	622	712	794
JGERNNS	Gernns, Joshua							
10/14/2013	55	17	15.00	0.00	650	622	712	794
BHERMENET	Hermenet, Brandon							
05/31/2014	60	20	10.00	0.00	531	531	599	661
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**531**	**531**	**599**	**661**
				Max:	**872**	**872**	**1019**	**1149**
				Avg:	**675**	**661**	**760**	**849**

707 **E 5TH ST & N SPRUCE AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	22	28.00	0.00	888	913	1030	1136
	<No Staff Member Listed>							
09/20/2012	60	20	18.00	0.00	712	712	803	886
JGERNNS	Gernns, Joshua							
10/14/2013	62	20	5.00	0.00	375	375	421	463
BHERMENET	Hermenet, Brandon							
05/31/2014	70	22	15.00	0.00	650	664	733	797
CTYLER	Tyler, Caleb N							

*** Scheduled Flow Test**

TLFD

Hydrant Flow Test By Hydrant

District = "01 "

707 **E 5TH ST & N SPRUCE AVE** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		**4**		**Min:**	**375**	**375**	**421**	**463**
				Max:	**888**	**913**	**1030**	**1136**
				Avg:	**656**	**666**	**746**	**820**

708 **17974 E HIGHWAY 54** **WATEROUS** **150**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	100	58	25.00	0.00	839	1188	1266	1340
	<No Staff Member Listed>							
09/25/2012	104	48	30.00	0.00	919	1144	1216	1284
JGERNNS	Gernns, Joshua							
10/14/2013	110	55	40.00	0.00	1061	1384	1465	1543
BHERMENET	Hermenet, Brandon							
05/31/2014	110	45	25.00	0.00	839	1000	1059	1115
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**839**	**1000**	**1059**	**1115**
				Max:	**1061**	**1384**	**1465**	**1543**
				Avg:	**914**	**1179**	**1251**	**1320**

709 **33955 N MOONBEAM CT & E HIGHWAY 54** **WATEROUS** **150**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	120	25	20.00	0.00	750	771	812	851
	<No Staff Member Listed>							
09/25/2012	125	28	20.00	0.00	750	783	822	860
JGERNNS	Gernns, Joshua							
10/14/2013	95	30	20.00	0.00	750	810	867	921
BHERMENET	Hermenet, Brandon							
05/31/2014	85	30	10.00	0.00	531	581	628	672
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**531**	**581**	**628**	**672**
				Max:	**750**	**810**	**867**	**921**
				Avg:	**695**	**736**	**782**	**826**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

712 **E BANNOCK DR & CAPE HORN DR** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	50	24.00	0.00	822	1195	1299	1396
	<No Staff Member Listed>							
09/20/2012	78	55	45.00	0.00	1126	1855	2022	2177
JGERNNS	Gernns, Joshua							
10/14/2013	75	56	45.00	0.00	1126	1999	2188	2363
107	Kaplan, Andrew							
07/30/2015	75	48	40.00	0.00	1061	1558	1705	1842
KWRIGHT	Wright, Kody							
Subtotal Flow Tests:		**4**		**Min:**	**822**	**1195**	**1299**	**1396**
				Max:	**1126**	**1999**	**2188**	**2363**
				Avg:	**1033**	**1651**	**1803**	**1944**

713 **17375 E NORTH SHORE LN & E ARAPAHO RD** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	50	10	5.00	0.00	375	321	375	423
	<No Staff Member Listed>							
09/20/2012	55	12	9.00	0.00	503	450	516	575
JGERNNS	Gernns, Joshua							
10/14/2013	50	10	10.00	0.00	531	455	531	599
JBRODIN	Brodin, Justin							
06/07/2014	58	15	10.00	0.00	531	497	563	624
SMICHAEL	Michael, Seth							
09/03/2015	54	18	10.00	0.00	531	515	592	661
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**375**	**321**	**375**	**423**
				Max:	**531**	**515**	**592**	**661**
				Avg:	**494**	**447**	**515**	**576**

*** Scheduled Flow Test**

TLFD

Hydrant Flow Test By Hydrant

District = "01 "

714 **17724 E NORTH SHORE LN** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	20	11.00	0.00	557	557	605	651
	<No Staff Member Listed>							
09/20/2012	78	21	14.00	0.00	628	634	691	744
JGERNNS	Gernns, Joshua							
10/14/2013	70	20	15.00	0.00	650	650	717	780
BHERMENET	Hermenet, Brandon							
06/07/2014	80	25	15.00	0.00	650	681	740	796
SMICHAEL	Michael, Seth							
09/03/2015	80	22	10.00	0.00	531	541	588	632
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**531**	**541**	**588**	**632**
				Max:	**650**	**681**	**740**	**796**
				Avg:	**603**	**612**	**668**	**720**

715 **E NORTH SHORE LN** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	70	28	16.00	0.00	671	737	814	884
	<No Staff Member Listed>							
09/20/2012	78	25	22.00	0.00	787	826	900	970
JGERNNS	Gernns, Joshua							
~~10/14/2013~~	~~75~~	~~25~~	~~22.00~~	~~0.00~~	~~0~~	~~0~~	~~0~~	~~0~~
BHERMENET	Hermenet, Brandon							
~~06/06/2014~~	~~75~~	~~30~~	~~20.00~~	~~0.00~~	~~0~~	~~0~~	~~0~~	~~0~~
CTYLER	Tyler, Caleb N							
09/03/2015	79	30	20.00	0.00	750	829	902	971
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**0**	**0**	**0**	**0**
				Max:	**787**	**829**	**902**	**971**
				Avg:	**441**	**478**	797 **523**	**565**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

716 **34325 N LIMEKILN RD** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	65	30	30.00	0.00	919	1053	1173	1284
	<No Staff Member Listed>							
09/20/2012	64	25	22.00	0.00	787	840	938	1028
JGERNNS	Gernns, Joshua							
10/14/2013	65	25	20.00	0.00	750	799	891	975
BHERMENET	Hermenet, Brandon							
06/06/2014	60	30	26.00	0.00	856	1000	1128	1245
CTYLER	Tyler, Caleb N							
06/06/2014	80	40	36.00	0.00	1007	1253	1362	1464
CTYLER	Tyler, Caleb N							
06/11/2015	70	40	18.00	0.00	712	938	1035	1125
MCONNER	Conner, Matthew							
Subtotal Flow Tests:		**6**		**Min:**	**712**	**799**	**891**	**975**
				Max:	**1007**	**1253**	**1362**	**1464**
				Avg:	**838**	**980**	**1087**	**1186**

717 **17105 CAPE HORN DR** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	38	10	8.00	0.00	475	374	475	560
	<No Staff Member Listed>							
09/20/2012	41	11	11.00	0.00	557	459	567	659
JGERNNS	Gernns, Joshua							
10/08/2013	30	0	8.00	0.00	475	262	382	475
BHATHAWAY	Hathaway, Brad							
06/06/2014	46	12	8.00	0.00	475	411	490	559
CTYLER	Tyler, Caleb N							
06/11/2015	50	20	15.00	0.00	650	650	759	856
MCONNER	Conner, Matthew							
Subtotal Flow Tests:		**5**		**Min:**	**475**	**262**	**382**	**475**
				Max:	**650**	**650**	**759**	**856**
				Avg:	**526**	**431**	**534**	**621**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

718 **N LIMEKILN RD /BITTEREND MARINA** **AMERICAN** **B62BQ**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	48	45.00	0.00	1126	1581	1718	1847
	<No Staff Member Listed>							
09/20/2012	80	38	30.00	0.00	919	1114	1211	1301
JGERNNS	Gernns, Joshua							
10/14/2013	83	35	32.00	0.00	949	1099	1190	1276
JBRODIN	Brodin, Justin							
09/03/2015	70	28	15.00	0.00	650	714	788	856
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**4**		**Min:**	**650**	**714**	**788**	**856**
				Max:	**1126**	**1581**	**1718**	**1847**
				Avg:	**911**	**1127**	**1226**	**1320**

719 **N LIMEKILN RD /SCENIC BAY MARINA** **AMERICAN** **B62B**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	98	70	60.00	0.00	1300	2261	2413	2557
	<No Staff Member Listed>							
09/20/2012	95	55	45.00	0.00	1126	1581	1692	1796
JGERNNS	Gernns, Joshua							
10/14/2013	95	55	50.00	0.00	1186	1665	1782	1892
JBRODIN	Brodin, Justin							
06/06/2014	92	54	40.00	0.00	1061	1498	1607	1710
CTYLER	Tyler, Caleb N							
09/03/2015	100	62	35.00	0.00	993	1484	1582	1674
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**993**	**1484**	**1582**	**1674**
				Max:	**1300**	**2261**	**2413**	**2557**
				Avg:	**1133**	**1697**	**1815**	**1925**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

720 **N LIMEKILN RD & E PIER RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	85	52	45.00	0.00	1126	1624	1754	1877
	<No Staff Member Listed>							
09/20/2012	78	40	35.00	0.00	993	1248	1360	1464
JGERNNS	Gernns, Joshua							
10/14/2013	85	45	42.00	0.00	1087	1413	1526	1633
107	Kaplan, Andrew							
06/06/2014	92	50	35.00	0.00	993	1328	1425	1516
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**993**	**1248**	**1360**	**1464**
				Max:	**1126**	**1624**	**1754**	**1877**
				Avg:	**1049**	**1403**	**1516**	**1622**

721 **N COTTONWOOD CT & CAPE HORN DR** **WATEROUS 250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	20	12.00	0.00	581	581	655	723
	<No Staff Member Listed>							
09/20/2012	58	22	16.00	0.00	671	691	784	868
JGERNNS	Gernns, Joshua							
10/14/2013	55	20	12.00	0.00	581	581	665	742
JBRODIN	Brodin, Justin							
06/11/2015	60	25	20.00	0.00	750	806	909	1003
MCONNER	Conner, Matthew							
Subtotal Flow Tests:		**4**		**Min:**	**581**	**581**	**655**	**723**
				Max:	**750**	**806**	**909**	**1003**
				Avg:	**645**	**664**	**753**	**834**

722 **34317 W MAIN AVE & N BARDILL ST** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	28	15.00	0.00	650	733	827	913
	<No Staff Member Listed>							
09/20/2012	58	22	22.00	0.00	787	810	919	1018
JGERNNS	Gernns, Joshua							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

722 **34317 W MAIN AVE & N BARDILL ST** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/14/2013	70	28	25.00	0.00	839	922	1017	1106
JBRODIN	Brodin, Justin							
05/31/2014	70	28	20.00	0.00	750	824	909	988
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**650**	**733**	**827**	**913**
				Max:	**839**	**922**	**1017**	**1106**
				Avg:	**756**	**822**	**918**	**1006**

723 **16205 N CHEROKEE RD & E PERIMETER RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	55	15	15.00	0.00	650	605	693	772
	<No Staff Member Listed>							
09/20/2012	54	14	14.00	0.00	628	575	661	738
JGERNNS	Gernns, Joshua							
10/14/2013	50	15	12.00	0.00	581	535	624	704
JBRODIN	Brodin, Justin							
05/31/2014	50	18	25.00	0.00	839	810	946	1068
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**4**		**Min:**	**581**	**535**	**624**	**704**
				Max:	**839**	**810**	**946**	**1068**
				Avg:	**674**	**631**	**731**	**820**

724 **W MAIN AVE & E 5TH ST** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	90	60	52.00	0.00	1210	1912	2055	2190
	<No Staff Member Listed>							
09/20/2012	90	52	45.00	0.00	1126	1566	1683	1794
JGERNNS	Gernns, Joshua							
10/14/2013	92	55	50.00	0.00	1186	1699	1823	1940
JBRODIN	Brodin, Justin							
05/31/2014	98	80	40.00	0.00	1061	2342	2500	2649
CTYLER	Tyler, Caleb N							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

724 W MAIN AVE & E 5TH ST AMERICAN

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		**4**		**Min:**	**1061**	**1566**	**1683**	**1794**
				Max:	**1210**	**2342**	**2500**	**2649**
				Avg:	**1145**	**1879**	**2015**	**2143**

726 16415 E 4TH ST & N PEND OREILLE DR AMERICAN 1978

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	65	20	20.00	0.00	750	750	836	915
	<No Staff Member Listed>							
09/25/2012	65	25	20.00	0.00	750	799	891	975
JGERNNS	Gernns, Joshua							
10/14/2013	65	35	20.00	0.00	750	934	1040	1139
BHERMENET	Hermenet, Brandon							
05/31/2014	75	50	20.00	0.00	750	1148	1256	1357
SMICHAEL	Michael, Seth							
Subtotal Flow Tests:		**4**		**Min:**	**750**	**750**	**836**	**915**
				Max:	**750**	**1148**	**1256**	**1357**
				Avg:	**750**	**907**	**1005**	**1096**

727 E HUDSON BAY RD & N STUBS ST WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	82	58	45.00	0.00	1126	1880	2038	2186
	<No Staff Member Listed>							
09/25/2012	82	55	25.00	0.00	839	1314	1425	1529
JGERNNS	Gernns, Joshua							
10/08/2013	80	50	40.00	0.00	1061	1543	1677	1802
107	Kaplan, Andrew							
06/01/2014	88	60	45.00	0.00	1126	1818	1958	2090
SMICHAEL	Michael, Seth							
Subtotal Flow Tests:		**4**		**Min:**	**839**	**1314**	**1425**	**1529**
				Max:	**1126**	**1880**	**2038**	**2186**
				Avg:	**1038**	**1638**	**1774**	**1901**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

728 **E HUDSON BAY RD & N STUBS ST** **WATEROUS**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	82	60	50.00	0.00	1186	2075	2250	2413
	<No Staff Member Listed>							
09/25/2012	86	60	40.00	0.00	1061	1755	1894	2024
JGERNNS	Gernns, Joshua							
10/08/2013	80	60	42.00	0.00	1087	1967	2138	2298
BHATHAWAY	Hathaway, Brad							
06/01/2014	90	62	40.00	0.00	1061	1740	1870	1993
CTYLER	Tyler, Caleb N							
06/06/2014	90	62	40.00	0.00	1061	1740	1870	1993
	<No Staff Member Listed>							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**1740**	**1870**	**1993**
				Max:	**1186**	**2075**	**2250**	**2413**
				Avg:	**1091**	**1855**	**2004**	**2144**

729 **17035 E HUDSON BAY RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	76	38	30.00	0.00	919	1133	1238	1336
	<No Staff Member Listed>							
09/25/2012	72	42	32.00	0.00	949	1277	1404	1523
JGERNNS	Gernns, Joshua							
10/08/2013	75	38	35.00	0.00	993	1230	1346	1454
JBRODIN	Brodin, Justin							
Subtotal Flow Tests:		**3**		**Min:**	**919**	**1133**	**1238**	**1336**
				Max:	**993**	**1277**	**1404**	**1523**
				Avg:	**953**	**1213**	**1329**	**1437**

730 **17451 E HUDSON BAY RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	75	25	20.00	0.00	750	790	864	934
	<No Staff Member Listed>							
09/25/2012	78	36	28.00	0.00	888	1057	1152	1240
JGERNNS	Gernns, Joshua							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

730 **17451 E HUDSON BAY RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/08/2013	75	30	35.00	0.00	993	1107	1211	1308
BHERMENET	Hermenet, Brandon							
06/01/2014	85	35	30.00	0.00	919	1059	1144	1224
	<No Staff Member Listed>							
06/06/2014	85	35	30.00	0.00	919	1059	1144	1224
	<No Staff Member Listed>							
Subtotal Flow Tests:		**5**		**Min:**	**750**	**790**	**864**	**934**
				Max:	**993**	**1107**	**1211**	**1308**
				Avg:	**893**	**1014**	**1103**	**1186**

731 **17245 E HUDSON BAY RD** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	30	20.00	0.00	750	876	988	1090
	<No Staff Member Listed>							
09/25/2012	78	28	22.00	0.00	787	853	929	1001
JGERNNS	Gernns, Joshua							
10/08/2013	80	25	25.00	0.00	839	879	956	1027
BHERMENET	Hermenet, Brandon							
06/01/2014	75	25	25.00	0.00	839	883	967	1044
CTYLER	Tyler, Caleb N							
06/06/2014	75	25	20.00	0.00	750	790	864	934
	<No Staff Member Listed>							
Subtotal Flow Tests:		**5**		**Min:**	**750**	**790**	**864**	**934**
				Max:	**839**	**883**	**988**	**1090**
				Avg:	**793**	**856**	**940**	**1019**

732 **E HUDSON BAY RD /END OF THE RD.** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	70	20	18.00	0.00	712	712	786	854
	<No Staff Member Listed>							
09/25/2012	58	20	20.00	0.00	750	750	851	942
JGERNNS	Gernns, Joshua							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

732 **E HUDSON BAY RD /END OF THE RD.** **AMERICAN**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/08/2013	62	15	17.00	0.00	692	651	731	804
BHERMENET	Hermenet, Brandon							
Subtotal Flow Tests:		**3**		**Min:**	**692**	**651**	**731**	**804**
				Max:	**750**	**750**	**851**	**942**
				Avg:	**718**	**704**	**789**	**866**

737 **CAPE HORN DR & N RAVEN PL** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	55	35.00	0.00	993	1593	1731	1861
	<No Staff Member Listed>							
09/18/2012	80	65	40.00	0.00	1061	2243	2438	2620
EFOTI	Foti, Eric A							
10/08/2013	80	37	60.00	0.00	1300	1556	1691	1818
JBRODIN	Brodin, Justin							
06/07/2014	90	60	35.00	0.00	993	1569	1686	1797
SMICHAEL	Michael, Seth							
06/05/2015	84	48	38.00	0.00	1034	1411	1526	1634
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**5**		**Min:**	**993**	**1411**	**1526**	**1634**
				Max:	**1300**	**2243**	**2438**	**2620**
				Avg:	**1076**	**1674**	**1814**	**1946**

738 **N RAVEN PL /BOTTOM OF HILL** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	125	58	40.00	0.00	1061	1352	1420	1486
	<No Staff Member Listed>							
09/18/2012	130	82	55.00	0.00	1244	1947	2040	2130
EFOTI	Foti, Eric A							
10/08/2013	130	95	72.00	0.00	1424	2643	2770	2892
JBRODIN	Brodin, Justin							
06/07/2014	135	92	60.00	0.00	1300	2211	2313	2411
SMICHAEL	Michael, Seth							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

738 N RAVEN PL /BOTTOM OF HILL WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06/05/2015	120	70	40.00	0.00	1061	1543	1624	1702
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**1352**	**1420**	**1486**
				Max:	**1424**	**2643**	**2770**	**2892**
				Avg:	**1218**	**1939**	**2033**	**2124**

739 34155 N PEND OREILLE DR & N PINE AVE WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	128	65	45.00	0.00	1126	1506	1580	1651
	<No Staff Member Listed>							
09/18/2012	125	75	45.00	0.00	1126	1681	1766	1847
EFOTI	Foti, Eric A							
10/08/2013	125	75	55.00	0.00	1244	1857	1951	2040
JBRODIN	Brodin, Justin							
06/07/2014	135	90	50.00	0.00	1186	1968	2059	2146
SMICHAEL	Michael, Seth							
06/05/2015	136	80	45.00	0.00	1126	1668	1745	1818
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**5**		**Min:**	**1126**	**1506**	**1580**	**1651**
				Max:	**1244**	**1968**	**2059**	**2146**
				Avg:	**1161**	**1736**	**1820**	**1900**

740 20104 CAPE HORN DR & N TERRACE DR WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	80	60	40.00	0.00	1061	1920	2087	2243
	<No Staff Member Listed>							
09/18/2012	88	72	55.00	0.00	1244	2717	2926	3123
EFOTI	Foti, Eric A							
10/08/2013	80	65	45.00	0.00	1126	2380	2587	2780
JBRODIN	Brodin, Justin							
06/07/2014	90	60	40.00	0.00	1061	1677	1802	1920
SMICHAEL	Michael, Seth							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

740 **20104 CAPE HORN DR & N TERRACE DR** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06/05/2015	90	66	40.00	0.00	1061	1891	2033	2166
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**1677**	**1802**	**1920**
				Max:	**1244**	**2717**	**2926**	**3123**
				Avg:	**1110**	**2117**	**2287**	**2446**

741 **20572 CAPE HORN DR** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	130	85	60.00	0.00	1300	2106	2208	2305
	<No Staff Member Listed>							
09/18/2012	130	90	55.00	0.00	1244	2148	2251	2351
EFOTI	Foti, Eric A							
10/08/2013	125	110	80.00	0.00	1501	4293	4509	4717
BHERMENET	Hermenet, Brandon							
07/13/2014	130	80	60.00	0.00	1300	1990	2086	2178
SMICHAEL	Michael, Seth							
06/05/2015	130	55	94.00	0.00	1627	2001	2097	2190
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1244**	**1990**	**2086**	**2178**
				Max:	**1627**	**4293**	**4509**	**4717**
				Avg:	**1394**	**2507**	**2630**	**2748**

742 **20400 CAPE HORN DR & E LOWER CAPE HORN RD** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	110	70	50.00	0.00	1186	1838	1945	2048
	<No Staff Member Listed>							
09/18/2012	118	90	55.00	0.00	1244	2447	2579	2705
EFOTI	Foti, Eric A							
10/08/2013	115	80	60.00	0.00	1300	2229	2353	2471
BHATHAWAY	Hathaway, Brad							
07/13/2014	100	80	60.00	0.00	1300	2748	2929	3100
SMICHAEL	Michael, Seth							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

742 **20400 CAPE HORN DR & E LOWER CAPE HORN RD** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06/05/2015	124	80	55.00	0.00	1244	1979	2080	2177
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**5**		**Min:**	**1186**	**1838**	**1945**	**2048**
				Max:	**1300**	**2748**	**2929**	**3100**
				Avg:	**1254**	**2248**	**2377**	**2500**

743 **34396 CAPE HORN DR** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	98	62	45.00	0.00	1126	1709	1825	1934
	<No Staff Member Listed>							
09/18/2012	90	60	45.00	0.00	1126	1779	1912	2038
EFOTI	Foti, Eric A							
10/08/2013	95	60	42.00	0.00	1087	1640	1755	1864
JBRODIN	Brodin, Justin							
07/13/2014	100	60	40.00	0.00	1061	1543	1644	1740
	<No Staff Member Listed>							
06/05/2015	100	70	40.00	0.00	1061	1802	1920	2033
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**1543**	**1644**	**1740**
				Max:	**1126**	**1802**	**1920**	**2038**
				Avg:	**1092**	**1694**	**1811**	**1921**

744 **34216 N FLATTERY RD** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	115	72	50.00	0.00	1186	1820	1921	2017
	<No Staff Member Listed>							
09/18/2012	118	70	50.00	0.00	1186	1744	1838	1928
EFOTI	Foti, Eric A							
10/08/2013	120	90	65.00	0.00	1353	2592	2729	2860
107	Kaplan, Andrew							
06/07/2014	128	85	50.00	0.00	1186	1950	2046	2137
SMICHAEL	Michael, Seth							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

744 **34216 N FLATTERY RD** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06/05/2015	120	70	40.00	0.00	1061	1543	1624	1702
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**1543**	**1624**	**1702**
				Max:	**1353**	**2592**	**2729**	**2860**
				Avg:	**1194**	**1929**	**2031**	**2128**

745 **18982 E SLIDE BAY RD** **WATEROUS** **2002**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	115	65	65.00	0.00	1353	1913	2020	2121
	<No Staff Member Listed>							
09/18/2012	118	62	45.00	0.00	1126	1523	1605	1684
EFOTI	Foti, Eric A							
~~10/14/2013~~	~~15~~	~~70~~	~~55.00~~	~~0.00~~	~~1244~~	~~0~~	~~0~~	~~0~~
107	Kaplan, Andrew							
06/07/2014	125	65	45.00	0.00	1126	1523	1600	1674
SMICHAEL	Michael, Seth							
07/23/2015	122	62	40.00	0.00	1061	1413	1486	1556
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**1061**	**0**	**0**	**0**
				Max:	**1353**	**1913**	**2020**	**2121**
				Avg:	**1182**	**1274**	1593 **1342**	**1407**

746 **E HUDSON BAY RD** **WATEROUS** **2007**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	20	12.00	0.00	581	581	655	723
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**581**	**581**	**655**	**723**
				Max:	**581**	**581**	**655**	**723**
				Avg:	**581**	**581**	**655**	**723**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

747 **18284 E HUDSON BAY RD** **WATEROUS** **2007**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	65	18	10.00	0.00	531	519	578	633
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**531**	**519**	**578**	**633**
				Max:	**531**	**519**	**578**	**633**
				Avg:	**531**	**519**	**578**	**633**

748 **E HUDSON BAY RD** **WATEROUS** **2007**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	60	20	10.00	0.00	531	531	599	661
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**531**	**531**	**599**	**661**
				Max:	**531**	**531**	**599**	**661**
				Avg:	**531**	**531**	**599**	**661**

749 **E HUDSON BAY RD** **WATEROUS** **2007**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	100	20	10.00	0.00	531	531	566	599
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**531**	**531**	**566**	**599**
				Max:	**531**	**531**	**566**	**599**
				Avg:	**531**	**531**	**566**	**599**

750 **E HUDSON BAY RD** **WATEROUS** **2007**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	100	40	20.00	0.00	750	876	934	988
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**750**	**876**	**934**	**988**
				Max:	**750**	**876**	**934**	**988**
				Avg:	**750**	**876**	**934**	**988**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

751 E WALLER RD WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	50	20	12.00	0.00	581	581	679	766
	<No Staff Member Listed>							
09/20/2012	55	18	13.00	0.00	605	587	672	749
JGERNNS	Gernns, Joshua							
10/14/2013	42	12	5.00	0.00	375	317	388	450
107	Kaplan, Andrew							
05/31/2014	60	20	10.00	0.00	531	531	599	661
CTYLER	Tyler, Caleb N							
06/11/2015	70	24	15.00	0.00	650	680	750	815
MCONNER	Conner, Matthew							
Subtotal Flow Tests:		**5**		**Min:**	**375**	**317**	**388**	**450**
				Max:	**650**	**680**	**750**	**815**
				Avg:	**548**	**539**	**617**	**688**

752 E WALLER RD WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
~~09/01/2010~~	~~40~~	~~5~~	~~0.00~~	~~0.00~~	~~0~~	~~0~~	~~0~~	~~0~~
	<No Staff Member Listed>							
09/20/2012	40	10	10.00	0.00	531	427	531	620
JGERNNS	Gernns, Joshua							
10/14/2013	55	50	10.00	0.00	531	1519	1739	1938
JBRODIN	Brodin, Justin							
~~05/31/2014~~	~~50~~	~~15~~	~~0.00~~	~~0.00~~	~~0~~	~~0~~	~~0~~	~~0~~
CTYLER	Tyler, Caleb N							
06/11/2015	50	18	10.00	0.00	531	513	599	676
MCONNER	Conner, Matthew							
Subtotal Flow Tests:		**5**		**Min:**	**0**	**0**	**0**	**0**
				Max:	**531**	**1519**	**1739**	**1938**
				Avg:	**318**	**491**	820	**573**	**646**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

753	W MAIN AVE				MH		2009	
Date	**Static**	**Residual**	**Pitot**	**Pitot 2**	**GPM**	**20 PSI**	**10 PSI**	**0 PSI**
09/01/2010	85	64	50.00	0.00	1186	2183	2358	2523
	<No Staff Member Listed>							
10/04/2012	88	30	60.00	0.00	1300	1417	1526	1628
JGERNNS	Gernns, Joshua							
Subtotal Flow Tests:		**2**		**Min:**	**1186**	**1417**	**1526**	**1628**
				Max:	**1300**	**2183**	**2358**	**2523**
				Avg:	**1243**	**1800**	**1942**	**2075**

754	E 5TH ST				MH		2009	
Date	**Static**	**Residual**	**Pitot**	**Pitot 2**	**GPM**	**20 PSI**	**10 PSI**	**0 PSI**
09/01/2010	82	55	48.00	0.00	1163	1822	1975	2119
	<No Staff Member Listed>							
10/04/2012	82	30	44.00	0.00	1113	1224	1327	1423
JGERNNS	Gernns, Joshua							
Subtotal Flow Tests:		**2**		**Min:**	**1113**	**1224**	**1327**	**1423**
				Max:	**1163**	**1822**	**1975**	**2119**
				Avg:	**1138**	**1523**	**1651**	**1771**

755	N TERRACE DR				WATEROUS		250	
Date	**Static**	**Residual**	**Pitot**	**Pitot 2**	**GPM**	**20 PSI**	**10 PSI**	**0 PSI**
09/01/2010	60	40	25.00	0.00	839	1220	1376	1518
	<No Staff Member Listed>							
06/05/2015	68	50	28.00	0.00	888	1508	1670	1820
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**2**		**Min:**	**839**	**1220**	**1376**	**1518**
				Max:	**888**	**1508**	**1670**	**1820**
				Avg:	**863**	**1364**	**1523**	**1669**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

756 CAPE HORN DR /CAPE HORN CIRCLE WATEROUS 2002

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	85	55	40.00	0.00	1061	1611	1740	1862
	<No Staff Member Listed>							
Subtotal Flow Tests:		**1**		**Min:**	**1061**	**1611**	**1740**	**1862**
				Max:	**1061**	**1611**	**1740**	**1862**
				Avg:	**1061**	**1611**	**1740**	**1862**

757 E 5TH ST & E HIGHWAY 54

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/14/2013	87	47	40.00	0.00	1061	1402	1511	1614
	<No Staff Member Listed>							
05/31/2014	90	50	40.00	0.00	1061	1435	1543	1644
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**2**		**Min:**	**1061**	**1402**	**1511**	**1614**
				Max:	**1061**	**1435**	**1543**	**1644**
				Avg:	**1061**	**1418**	**1527**	**1629**

758 E HIGHWAY 54

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
~~10/05/2013~~	~~0~~	~~0~~	~~0.00~~	~~0.00~~	~~0~~	~~0~~	~~0~~	~~0~~
	<No Staff Member Listed>							
05/31/2014	90	70	20.00	0.00	750	1475	1586	1690
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		**2**		**Min:**	**0**	**0**	**0**	**0**
				Max:	**750**	**1475**	**1586**	**1690**
				Avg:	**375**	**737**	**1475**	**793**	**845**

759 E SLIDE BAY RD & N JEEPSTER RD WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/23/2015	130	80	45.00	0.00	1126	1724	1807	1886
BRENNISON	Rennison, Brett							

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

759 E SLIDE BAY RD & N JEEPSTER RD WATEROUS 250

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		1		Min:	1126	1724	1807	1886
				Max:	1126	1724	1807	1886
				Avg:	1126	1724	1807	1886

760 E DUWAMISH DR & CAPE HORN DR AMERICAN B62B

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/23/2015	40	18	10.00	0.00	531	504	628	733
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		1		Min:	531	504	628	733
				Max:	531	504	628	733
				Avg:	531	504	628	733

800 CAPE HORN DR & GRANDVIEW LN KENNEDY 150

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	100	58	45.00	0.00	1126	1595	1699	1799
	<No Staff Member Listed>							
09/18/2012	100	50	40.00	0.00	1061	1368	1457	1543
EFOTI	Foti, Eric A							
09/18/2012	100	50	40.00	0.00	1061	1368	1457	1543
EFOTI	Foti, Eric A							
10/08/2013	95	50	40.00	0.00	1061	1398	1496	1588
JBRODIN	Brodin, Justin							
07/13/2014	100	55	40.00	0.00	1061	1448	1543	1633
CTYLER	Tyler, Caleb N							
Subtotal Flow Tests:		5		Min:	1061	1368	1457	1543
				Max:	1126	1595	1699	1799
				Avg:	1074	1435	1530	1621

* Scheduled Flow Test

Hydrant Flow Test By Hydrant

District = "01 "

801 CAPE HORN DR & GLACIER LOOP KENNEDY 150

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	95	52	45.00	0.00	1126	1521	1627	1728
	<No Staff Member Listed>							
09/18/2012	90	40	30.00	0.00	919	1102	1185	1262
EFOTI	Foti, Eric A							
07/13/2014	100	50	25.00	0.00	839	1081	1152	1220
SMICHAEL	Michael, Seth							
06/05/2015	102	58	40.00	0.00	1061	1485	1580	1671
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**4**		**Min:**	**839**	**1081**	**1152**	**1220**
				Max:	**1126**	**1521**	**1627**	**1728**
				Avg:	**986**	**1297**	**1386**	**1470**

802 457 CAPE HORN DR WATEROUS 150

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	85	50	35.00	0.00	993	1387	1499	1603
	<No Staff Member Listed>							
09/18/2012	82	52	35.00	0.00	993	1470	1593	1709
EFOTI	Foti, Eric A							
10/08/2013	80	48	40.00	0.00	1061	1490	1619	1740
JBRODIN	Brodin, Justin							
07/13/2014	90	60	40.00	0.00	1061	1677	1802	1920
SMICHAEL	Michael, Seth							
06/05/2015	88	58	35.00	0.00	993	1545	1664	1776
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**993**	**1387**	**1499**	**1603**
				Max:	**1061**	**1677**	**1802**	**1920**
				Avg:	**1020**	**1513**	**1635**	**1749**

*** Scheduled Flow Test**

Hydrant Flow Test By Hydrant

District = "01 "

803 **842 GLACIER LOOP /AT THE Y** **WATEROUS** **250**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	115	6	45.00	0.00	1126	1045	1103	1159
	<No Staff Member Listed>							
09/18/2012	105	60	45.00	0.00	1126	1587	1686	1779
EFOTI	Foti, Eric A							
10/08/2013	100	50	40.00	0.00	1061	1368	1457	1543
BHERMENET	Hermenet, Brandon							
07/13/2014	110	80	50.00	0.00	1186	2146	2272	2392
CTYLER	Tyler, Caleb N							
06/05/2015	92	50	35.00	0.00	993	1328	1425	1516
BRENNISON	Rennison, Brett							
Subtotal Flow Tests:		**5**		**Min:**	**993**	**1045**	**1103**	**1159**
				Max:	**1186**	**2146**	**2272**	**2392**
				Avg:	**1098**	**1494**	**1588**	**1677**

804 **422 GLACIER LOOP** **WATEROUS** **150**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	38	10	3.00	0.00	291	229	291	343
	<No Staff Member Listed>							
09/18/2012	34	9	7.00	0.00	444	325	434	524
EFOTI	Foti, Eric A							
10/08/2013	35	10	8.00	0.00	475	360	475	570
107	Kaplan, Andrew							
07/13/2014	95	60	35.00	0.00	993	1499	1603	1703
SMICHAEL	Michael, Seth							
Subtotal Flow Tests:		**4**		**Min:**	**291**	**229**	**291**	**343**
				Max:	**993**	**1499**	**1603**	**1703**
				Avg:	**550**	**603**	**700**	**785**

*** Scheduled Flow Test**

TLFD

Hydrant Flow Test By Hydrant

District = "01 "

805 **635 GLACIER LOOP** **WATEROUS** **150**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/01/2010	90	48	35.00	0.00	993	1308	1406	1499
	<No Staff Member Listed>							
09/18/2012	95	45	40.00	0.00	1061	1321	1413	1501
EFOTI	Foti, Eric A							
10/08/2013	85	45	35.00	0.00	993	1291	1394	1492
JBRODIN	Brodin, Justin							
07/13/2014	90	60	40.00	0.00	1061	1677	1802	1920
CTYLER	Tyler, Caleb N							
06/05/2015	100	30	20.00	0.00	750	806	859	909
BBURROW	Burrow, Byron							
Subtotal Flow Tests:		**5**		**Min:**	**750**	**806**	**859**	**909**
				Max:	**1061**	**1677**	**1802**	**1920**
				Avg:	**971**	**1280**	**1374**	**1464**

~~**900**~~ ~~**11585 E SIMS LN**~~ ~~**WATEROUS**~~ ~~**250**~~

~~Date~~	~~Static~~	~~Residual~~	~~Pitot~~	~~Pitot 2~~	~~GPM~~	~~20 PSI~~	~~10 PSI~~	~~0 PSI~~
~~09/01/2010~~	~~70~~	~~38~~	~~25.00~~	~~0.00~~	~~839~~	~~1068~~	~~1178~~	~~1280~~
	<No Staff Member Listed>							
~~09/12/2012~~	~~50~~	~~20~~	~~15.00~~	~~0.00~~	~~650~~	~~650~~	~~759~~	~~856~~
BHERMENET	Hermenet, Brandon							
~~10/06/2013~~	~~70~~	~~20~~	~~20.00~~	~~0.00~~	~~750~~	~~750~~	~~828~~	~~899~~
EFOTI	Foti, Eric A							
~~05/30/2014~~	~~70~~	~~22~~	~~18.00~~	~~0.00~~	~~712~~	~~728~~	~~803~~	~~873~~
JBRODIN	Brodin, Justin							
~~08/03/2015~~	~~68~~	~~30~~	~~22.00~~	~~0.00~~	~~787~~	~~893~~	~~989~~	~~1078~~
KWRIGHT	Wright, Kody							
~~**Subtotal Flow Tests:**~~		~~**5**~~		~~**Min:**~~	~~**650**~~	~~**650**~~	~~**759**~~	~~**856**~~
				~~**Max:**~~	~~**839**~~	~~**1068**~~	~~**1178**~~	~~**1280**~~
				~~**Avg:**~~	~~**747**~~	~~**817**~~	~~**911**~~	~~**997**~~

*** Scheduled Flow Test**

Appendix 2-E

Groundwater Water Right Information

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

WEST-EAST AXIS ℄
SOUTH-NORTH AXIS ℄
DEPTH
ELEV. 2270.5 W.
E.
S.
N.
Extra Heavy Oil Well Casing 18⅝" OD & 17¾" Inside Diameter
ELEV. 2250
ELEV. 2200
ELEV. 2150
ELEV. 2100
ELEV. 2047.5
STATIC WATER LEVEL
As of August 18 1943
ELEV. 2000
ELEV. 1939.7 BOTTOM OF WELL
PLUMB LINE EXTENDED FROM ℄ AT TOP OF WELL
Gravel & Boulders
Gravel
Gravel & Boulders
Course Gravel
Loose Gravel
Gravel & Boulders
Course Gravel
Course Gravel & Boulders
Course Gravel
Course Gravel & Small Boulders
Fine Pea Gravel
Medium Gravel
Loose Gravel
Course Gravel
Sand & Gravel
Hard Sand on Sandstone
Course Gravel
Sand & Gravel
Hard Sand or Sandstone
Course Gravel
Sand & Gravel
Course Gravel
Course Gravel & Sand
Fine Sand & Gravel
Fine Gravel & Sand
Course Sand
Gravel & Boulders
Gravel
Course Sand & Fine Gravel
25
50
75
100
125
150
175
200
225
250
275
300
330.8
3' Column pipe 270 ft
5' of Pump Bowls
10' of Suction Pipe
2' of Strainer
Drive shoe made from split casing welded to main well casing.
WELL NO. 7
SCALE ~ 1"=10' VERT. 1"=10' HORZ.
CONTRACT ~ NO. 6195
CONTRACTOR ~ A.A. DURAND & SON
ADDRESS ~ WALLA WALLA, WASH.
WORK ON WELL BEGAN ~ JULY 2, 1943.
WORK COMPLETED ~ AUG. 16, 1943.
U. S. NAVAL TRAINING STATION
FARRAGUT, IDAHO
WATER SYSTEM
WELL NO. 7
PROFILES

Close

IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

9/19/2018

WATER RIGHT NO. 95-9880

Owner Type	Name and Address
Current Owner	BAYVIEW WATER & SEWER DISTRICT PO BOX 637 BAYVIEW, ID 83803-0637 2086833948

Priority Date: 07/17/1981
Basis: License
Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	3/15	11/15	1.67 CFS	504 AFA
COMMERCIAL	1/01	12/31	0.5 CFS	103.7 AFA
DOMESTIC	1/01	12/31	0.54 CFS	229.2 AFA
FIRE PROTECTION	1/01	12/31	1.67 CFS	
Total Diversion			1.67 CFS	

Location of Point(s) of Diversion:

GROUND WATER | SWNW | Sec. 03 | Township 53N | Range 02W | KOOTENAI County

Place(s) of use:

Place of Use Legal Description: IRRIGATION KOOTENAI County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
53N	02W	2	1	NWNW	6	2	SENW	4						
		3	1	NENE	6	2	NWNE	6						
			3	NENW	16	4	NWNW	8						
54N		34	2	SWNE	20	1	SENE	3						
				SWNW	4		SENW	15						
			3	NESW	15		NWSW	15		SWSW	15	4	SESW	7
		35	4	SWNW	4									

Place of Use Legal Description:COMMERCIAL same as IRRIGATION

Place of Use Legal Description:DOMESTIC same as IRRIGATION

Place of Use Legal Description:FIRE PROTECTION same as IRRIGATION

Total Acres: 144

Dates:
Licensed Date: 08/19/1985
Decreed Date:
Enlargement Use Priority Date:
Enlargement Statute Priority Date:
Water Supply Bank Enrollment Date Accepted:
Water Supply Bank Enrollment Date Removed:
Application Received Date:
Protest Deadline Date:
Number of Protests: 0

Other Information:
State or Federal:
Owner Name Connector:
Water District Number:
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Civil Case Number:
Old Case Number:
Decree Plantiff:

Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Close

Close

IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

9/19/2018

WATER RIGHT NO. 95-9460

Owner Type	Name and Address
Current Owner	BAYVIEW WATER & SEWER DISTRICT PO BOX 637 BAYVIEW, ID 83803-0637 2086833948

Priority Date: 08/27/1998
Basis: License
Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
MUNICIPAL	01/01	12/31	1.7 CFS	731.4 AFA
FIRE PROTECTION	01/01	12/31	1.7 CFS	
Total Diversion			1.7 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SWNW	Sec. 03	Township 53N	Range 02W	KOOTENAI County
GROUND WATER	NESW	Sec. 03	Township 53N	Range 02W	KOOTENAI County

Place(s) of use: Large POU Info

Conditions of Approval:

1.	004	The issuance of this right does not grant any right-of-way or easement across the land of another.
2.	180	A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustration purposes.
3.	126	Place of use is within the service area of Bayview Water and Sewer District as provided for under Idaho law.
4.	174	This right authorizes the diversion of ground water within the Rathdrum Prairie Ground Water Management Area (RPGWMA). Use of water under this right shall be subject to the provisions of the management plan approved by the director for the RPGWMA.
5.	01M	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 determine the amount of water diverted from power records and shall annually report the information to the department.
6.	077	Water shall not be diverted for fire protection use under this right except to fight or repel an existing fire.

Dates:
Licensed Date: 02/15/2008
Decreed Date:
Permit Proof Due Date:
Permit Proof Made Date:
Permit Approved Date:
Permit Moratorium Expiration Date:
Enlargement Use Priority Date:
Enlargement Statute Priority Date:
Water Supply Bank Enrollment Date Accepted:
Water Supply Bank Enrollment Date Removed:
Application Received Date:
Protest Deadline Date:
Number of Protests: 0

Other Information:
State or Federal:
Owner Name Connector:
Water District Number:
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Civil Case Number:
Old Case Number:
Decree Plantiff:
Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:

Mitigation Plan: False

Close

Appendix 2-F

Initial Structural Assessment – Farragut Reservoir

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

J-U-B ENGINEERS, INC.

J-U-B COMPANIES THE LANGDON GROUP GATEWAY MAPPING INC.

PROJECT MEMO

DATE: December 20, 2017

TO: Bayview Water and Sewer District, Bayview, ID

FROM: David L. Barnett, S.E.

PROJECT: Bayview Water Storage Reservoir

SUBJECT: Initial Structural Assessment

PROFESSIONAL ENGINEER REGISTERED 5785 STATE OF IDAHO DAVID LEWIS BARNETT 12/19/17

This memo is a summary of our observations and conclusions concerning the structural condition of the existing elevated water storage reservoir owned and operated by the Bayview Water and Sewer District (the District) and located on the grounds of Farragut State Park in Kootenai County, Idaho.

The reservoir structure is a cast-in-place, reinforced concrete standpipe, approximately 38-feet in diameter and 101-feet tall. The structure was built around 1942 as part of the Farragut Naval Training Station, which trained seamen for Naval service during World War II (WWII). At some time in the past, the reservoir was obtained by the Bayview Water and Sewer District and is currently operated as part of its municipal water supply system for the residents of the Bayview, ID area.

Approximately the top third of the standpipe is used for water storage with a concrete reservoir floor at the ⅔ level. The lower ⅔ of the standpipe is empty with the exceptions of the concrete support walls, pilasters, and struts; wooden access stair system; and piping and mechanical and electrical systems. The roof over the standpipe was originally of wood construction, but has since been replaced with a structural steel roof in the mid 1980s. **Figure 1** shows the standpipe in use sometime during WWII.

There are two concrete standpipes of similar construction located on the Farragut State Park grounds, which are operated by the Idaho Department of Parks and Recreation.

Though a records search was performed, no plans for the original construction of the standpipe were found. Plans for the replacement steel roof (J-U-B 1986) were obtained, as well as videos of recent underwater tank interior cleaning and inspection services performed on the tank.

Our review is based on: observations taken during a field inspection trip on December 14, 2017; the records noted above; and our knowledge of structural practices and codes at the time of construction.

a 7825 Meadowlark Way, Coeur d'Alene, ID 83815 p 208 762 8787 f 208 762 9797 w www.jub.com

Figure 1 – Reservoir in Use During WWII

Structural Conditions Observed

The overall condition of the structure is in fair or moderate condition. Most of the concrete support structure, up to the level of the tank bottom, appears to be in good condition. Some cracking and spalling on the concrete is evident, but it is not excessive for a structure of this age.

The cracking, leaking and accumulation of leachates on the concrete surfaces just below the floor of the tank itself is notable. Cracks and leaking can be seen both on the outside of the tank (**Figure 2**) and the inside of the tank (**Figure 3 Figure 4** and **Figure 5**). Small lime stalactites and thick lime accumulation can be observed on the underside of the tank floor, the support walls, and pilasters near the floor (**Figure 3** and **Figure 4**). It is likely that this cracking/leaking issue has been going on for quite some time – likely many decades.

What this leaking has done to the overall structural integrity of the reservoir is impossible to say, with any certainty. The amount, layout, and spacing of reinforcing steel within the structure is completely unknown at this time, as is its condition.

Items which are incidental, but necessary, and in poor condition include both the door to the outside upper platform and the outside upper platform itself. These represent a serious safety issue for personnel that must access the roof of the reservoir through the ladder mounted to the outside of the structure. The whole access system should be evaluated for compliance with current Occupational Safety and Health Administration (OSHA) safety codes.

Structural Condition Based on Age of Construction

Though building codes were in effect at the time of the reservoirs original construction, the need for specialized earthquake engineering was not adopted into building codes until the late 1950s or early 1960s. Therefore, it is likely that the structure was not specifically designed to resist the effects of a maximum expected local earthquake.

Reinforced concrete structures tend to have a degree of built-in inherent strength. The reservoir location is in a low seismic probability zone and though nothing is known about the tank's foundation, it is likely that it is founded on dense granular material, which is in its favor.

Current codes for reinforced concrete construction published by the American Concrete Institute (ACI) recognize the need for special detailing of reinforcing steel for water retaining structures used for municipal water and wastewater structures. The amount of steel provided in the tanks construction are likely quite low compared to what the ACI would recommend for new construction and is likely the reason for the observed cracking and leaking on the upper portions of the reservoir.

Conclusions and Recommendations

We are often asked "How long will my structure last?" or "What is the life expectancy of my structure?". There is no definitive answer to these questions as there are no established procedures to determine these types of numbers. On the one hand, there are concrete bridges and aqueducts built by the Romans that are over 2,000 years old and still in use today. On the other hand, we see poorly designed or constructed structures that last only a few years or decades.

This reservoir structure has been in operation about 75 years. Some would say it has "stood the test of time", but that says nothing about its remaining useful life. My opinion, after looking at the structure and its current condition, is that its useful life is about 100-years total. This gives the reservoir structure about 25 years remaining, assuming it is maintained properly from this point on.

The most serious issue in relation to long-term life of the reservoir is the cracking and leaking currently observed. A complete water-proof coating system should be applied to the inside of the tank in order to prevent further leaking. There are a number of products available to do this and a study should be started to investigate and select an appropriate product for this particular reservoir.

The access to the roof of the structure should be evaluated for compliance with current OSHA requirements and new and/or rehabilitated access provided accordingly. This study may find that both the interior stair system and the exterior ladder system are non-compliant.

For long-term planning, beyond the 25 years of expected remaining useful life for the reservoir structure, we recommend that the District investigate funding mechanisms to provide for the construction of a replacement storage reservoir, designed to meet current code requirements.

Figure 2 – Typical Tank Elevation View

Note: Staining on the upper third of the concrete walls is due to water seeping through cracks in the concrete structure.

Figure 3 – Lime Deposits and Leakage on the Underside of the Floor Supporting the Water

Figure 4 – Cracks with Small Stalactites Forming on the Bottom of the Tank Floor

Figure 5 – Water Seeping Down the Interior Face of the Reservoir Shaft

Figure 6 – Interior View of Access Stairs

Figure 7 – Access Ladder to Roof of Reservoir

Figure 8 – Reservoir Roof and Access Hatch

Appendix 2-G

Cross-Connection Control Resolution

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

RESOLUTION NO. 03-3

A RESOLUTION OF THE BAYVIEW WATER AND SEWER DISTRICT, KOOTENAI COUNTY, IDAHO, ESTABLISHING REGULATIONS FOR CROSS CONNECTION CONTROL

BE IT RESOLVED by the Board of Directors of the Bayview Water and Sewer District as follows:

Sections:

1.0 Purpose
2.0 Definitions
3.0 Responsibility
4.0 Implementation
5.0 Severability
6.0 Effective Date

Section 1.0 Purpose. The purposes of this Resolution are to:

A. Protect the District Water System from the possibility of contamination or pollution by isolating, within customer systems, such contaminants or pollutants which could backflow or back-siphon into the District Water System; and

B. Provide for the maintenance of a continuing program for cross-connection control, which will systematically and effectively prevent the District's Water System from being compromised by any such contaminants or pollutants.

Section 2.0 Definitions. Whenever in this Resolution, or in any document governed by this Resolution, any of the following terms are used, said terms shall be defined as follows:

A. Approved. Accepted by the Board as meeting an applicable specification stated or cited in this Resolution, or as suitable for the proposed use.

B. Auxiliary Water Supply. Any water supply, other than the District's Water System, available to a customer's system. Such auxiliary waters may include water from another purveyor's public potable water supply, or any natural source(s) such as a well, spring, river, stream, etc. or "used waters" or "industrial fluids". Such auxiliary waters may be polluted or contaminated, or they may be objectionable, and may constitute an unacceptable water source over which the District does not have control.

C. Backflow. The flow of water (or other liquids, mixtures, or substances), under pressure, into the District's Water System from any source(s) other than the District's own source(s).

D. Backflow Preventer. A device or means designed to prevent backflow or back-siphonage.

1. Airgap. A means of backflow prevention utilizing the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device, and the flood level rim of said vessel. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the top of the rim of the vessel; provided, however, that in no case shall the air-gap be less than one (1) inch. When an air-gap is used at the service connection to prevent the contamination or pollution of the District's Water System, an emergency by-pass shall be installed around the air-gap system and an approved reduced pressure principle device shall be installed by the by-pass system.

2. Reduced Pressure Principle Device. A backflow prevention device consisting of an assembly of two (2) independently operating approved check valves with an automatically operating differential relief valve between the two (2) check valves, tightly closing shut-off valves on either side of the check valves, plus properly located test cocks for the testing of the check and relief valves. The entire assembly shall meet the design and performance specifications and approval of a recognized and approved testing agency for backflow prevention assemblies. The device shall operate to maintain the pressure in the zone between the two (2) check valves at a level less than the pressure of the inlet of the device. At cessation of normal flow, the pressure between the two (2) check valves shall be no less than the pressure at the inlet of the device. In case of leakage of either of the check valves, the differential relief valve shall operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. When the inlet pressure is two (2) pounds per square inch (psi) or less, the relief valve shall open to the atmosphere. To be approved, these devices must be readily accessible for in-line maintenance and testing, and shall be installed in a location where no part of the device will be submerged.

3. Double Check Valve Assembly. A backflow prevention device consisting of an assembly of two (2) independently operating approved check valves with tightly closing shut-off valves on each side of the check valves, plus properly located test cocks for the testing of each check valve. The entire assembly shall meet the design and performance specifications and approval of a recognized and approved testing agency for backflow prevention devices. To be approved, the devices must be readily accessible for in-line maintenance and testing.

E. Back-Siphonage. The flow of water (or other liquids, mixtures, or substances) into the District's Water System from any source(s) other than the District's own source(s), caused by a sudden reduction of pressure in the District's Water System.

F. Board. The Board of Directors of the Bayview Water and Sewer District.

G. Contamination. The impairment of the quality of the potable water supply by sewage, industrial fluids or waste liquids, compounds, or other materials, to a degree which creates an actual hazard to the public health through poisoning or through the spread of disease.

H. Control. The right and power over the sanitary quality of water.

I. Cross-Connection. Any physical connection, or other arrangement of piping or fixtures, between two (2) otherwise separate piping systems, one (1) of which contains potable water and the other of which contains non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow or back-siphonage may occur into the District's Water System. A metered water service connection between the District's Water System and a customer system, which is cross-connected to a contaminated fixture, industrial fluid system, or with a potentially contaminated supply or auxiliary water system, constitutes a type of cross-connection. Other types of cross-connections include, but are not necessarily limited to, connectors such as swing connections, removable sections, four-way plug valves, spools, dummy sections of pipe, swivel or changeover devices, sliding multiport tube, solid connections, etc.

J. Cross-Connection Control by Containment. The installation of an approved backflow prevention device in any customer system at the metered water service connection.

K. Designee or Designate. An employee of the District designated by the Board to enforce the provisions of this Resolution.

L. District. The Bayview Water and Sewer District.

M. Hazard, Degree of. This term is derived from an evaluation of the potential risk to the public health and the adverse effect of the hazard upon the District's Water System.

1. Hazard - Health. Any condition, device, or practice in the District's Water System or its operation, which could create, or in the judgment of the Board may create, a danger to the health and well-being of any water customer.

a. Hazard - Plumbing. A plumbing type cross-connection in a customer system that has not been properly protected by an air-gap separation or back-flow prevention device is deemed to constitute a health hazard.

2. Hazard - Pollutant. An actual or potential threat to the physical properties, or to the potability, of the District's Water System, which could constitute a nuisance, or be aesthetically objectionable, or could cause damage to the District's Water System, but would not be dangerous to health.

3. Hazard - System. An actual or potential threat of severe damage to the physical properties of the system, or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the District's Water System.

N. Industrial Fluids System. Any system containing a fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollutant, or plumbing hazard if introduced into the District's Water System. "Industrial Fluids Systems" include, but are not necessarily limited to: polluted or contaminated waters; all types of process waters and "used waters" originating from the District's Water System which may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulated cooling waters connected to an open cool tower and/or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, irrigation canals or systems, etc.; oils, gases, glycerin, paraffin, caustic and acid solutions, and the liquid and gaseous fluids used for industrial or other purposes or for fire-fighting purposes.

O. Master. The Water Master of the District, appointed by the Board.

P. Pollution. The presence of any foreign substance (organic, inorganic, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health, but which does adversely and unreasonably affect such waters for domestic use.

Q. Water - Metered Water Service Connection. The terminal end of a service connection from the District's Water System (that is, where the District loses control over the water at its point of delivery to the customer's system), being the downstream end of the meter. There should be no unprotected takeoffs from the service line ahead of any backflow prevention device. Service connections shall also include metered or un-metered water service connections from a fire hydrant and all other temporary or emergency water service connections to the District's Water System.

R. Water - Nonpotable. Water which is not safe for human consumption or which is of questionable potability.

S. Water - Potable. Any water which, according to recognized standards, is safe for human consumption.

T. Water System. The water system is made up of two (2) parts; namely, the District's Water System and the District's customer's system.

1. The District's Water System consists of the source and the distribution system under the complete control of the District, up to the point where the customer systems begin.

a. The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.

b. The distribution system shall include the network of conduits used for the delivery of water from the source to the customer system.

2. The customer system consists of all water components beyond the metered water service connections.

U. Water - Used. Any water supplied by the District from the District's Water System to a customer system after it has passed through the metered water service connection and is no longer under the control of the District.

Section 3.0 Responsibility.

A. The Board shall be responsible for the protection of the District's Water System from contamination or pollution due to the backflow or back-siphonage of contaminants or pollutants through the metered water service connections.

B. If, in the judgment of the Board or Water Master, or any other designee of the Board, an approved back-flow prevention device is required at any metered water service connection for the safety of the District's Water System, the Board, Water Master, or any other authorized designee of the Board shall give notice, in writing, to the affected customer to install an approved backflow prevention device at each of such customer's metered water service connections. Within the time prescribed by the Board, Water Master, or other authorized designee, the customer shall install such approved device or devices at the customer's own expense. Any failure, refusal, or inability on the part of the customer to install said device or devices shall immediately constitute grounds for discontinuing water service to such metered water service connections until such device or devices have been properly installed to the District's satisfaction.

C. If the customer files with the District a written protest of the degree of hazard involved and commensurate degree of protection required to be provided, the

matter shall be referred by the District to the appropriate health agency. If the protest involves a new meter installation, the District shall not commence water service until after the health agency has delivered its written decision to the District. The written decision of the health agency shall be final.

Section 4.0 Implementation.

A. No metered, un-metered, or any form of water service connection to any premises shall be placed into service by the District unless the District's Water System is protected as required by State laws and regulations and by this Resolution. Service of water to any premises shall be immediately discontinued by the District if a backflow prevention device required by this Resolution is not installed, tested and maintained, or if it is found that a backflow prevention device has been removed, by-passed, or if any unprotected cross-connection exists on the premises. Service shall not be restored until such conditions or defects are corrected to the satisfaction of the District.

B. All customer systems shall be open for inspection at all reasonable times to authorized representatives of the District to enable the District to ascertain the existence of cross-connection or other structural or sanitary hazards, including violations of this Resolution. When such a condition becomes known, the District shall deny or immediately discontinue service to the premises by providing for a physical break in the service line until the customer has corrected the condition(s) in conformance with State laws and District resolutions relating to plumbing and water supplies, and in conformance with any other regulations adopted pursuant thereto.

C. An approved backflow prevention device shall be installed on each metered water service connection to a customer system at or near the property line or immediately inside the building being served; but, in all cases, such device shall be installed before the first branch line leading off the service wherever the following conditions exist:

1. In the case of premises having an auxiliary water supply which is not, or may not be, of safe bacteriological or chemical quality, and which is not acceptable as an additional source by the District, the District's Water System shall be protected against backflow from the premises by the installation of a backflow prevention device in the customer's system appropriate to the degree of hazard.

2. Whenever backflow protection has been found necessary on a customer's system, then all metered water service connections shall be protected by an approved backflow device, regardless of whether any are not being used.

3. In the case of premises on which any industrial fluid, or any other objectionable substance, is handled in such a fashion as to create an actual or potential hazard to the District's Water System, including the handling of process waters and waters

originating from the District's Water System which have been subject to deterioration in quality, the installation of a backflow prevention device appropriate to the degree of hazard shall be required.

4. Whenever the following conditions exist on any premises, the District's Water System shall be protected against backflow by the installation of a backflow prevention device:

a. Internal cross-connections that cannot be permanently corrected or controlled; or

b. Intricate plumbing and piping arrangements; or

c. Where entry to all portions of the premises is not readily accessible for inspection purposes, making it impractical or impossible to ascertain whether or not dangerous cross-connections exist.

D. The type of protective device required under the foregoing paragraph "C" shall depend upon the degree of hazard, which exists as follows:

1. In the case of any premises where there is an auxiliary water supply as stated in subsection C.1 of this Section, and such supply is not subject to any of the following rules, the District' Water System shall be protected by an approved air-gap separation or an approved reduced pressure principle backflow prevention device.

2. In the case of any premises where there is water or a substance that would be objectionable, but not hazardous to health, if introduced into the District's Water System, the District's Water System shall be protected by an approved double check valve assembly.

3. In the case of premises where there is any material dangerous to health which is handled in such a fashion as to create an actual or potential hazard to the District's Water System, the District's Water System shall be protected by an approved air-gap separation or an approved reduced pressure principle backflow prevention device. Examples of premises where these conditions will exist include sewage treatment plants, sewage pumping stations, chemical manufacturing plants, hospitals, mortuaries, and plating plants.

4. In the case of any premises where there are "uncontrolled" cross-connections, either actual or potential, the District's Water System shall be protected by an approved air-gap water separation or an approved reduced pressure principle backflow prevention device.

5. In the case of any premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete in-plant cross-connection survey, the District's Water System shall be protected against backflow or back-siphonage from the premises by the installation of a backflow prevention device. In this case, maximum protection will be required; that means an approved air-gap separation or an approved reduced pressure principle backflow prevention device shall be installed in each metered (or other) water service connection to the premises.

6. In general, a double check-valve will be deemed sufficient when any one (1) of the following conditions exist:

a. Pressure in the customer system may, at any time, exceed the water pressure in the District's Water System.

b. The customer system includes more than one (1) metered water service connection.

c. Where a swimming pool is maintained.

d. Where a closed elevated storage tank is maintained.

e. Auxiliary water system (not interconnected).

f. The customer system is so extensive that it is not easily observed or checked as to maintenance and use.

g. Building with house pump and/or storage tank.

h. Chemically treated potable water system.

i. Commercial laundry.

j. Dairy or other cold storage plant.

k. Fire system with pumps and/or water storage tank.

l. Manufacturing, processing, or fabricating plant using nontoxic materials.

m. Manufactured and/or mobile home parks.

n. Irrigation systems where nothing is injected into the customer's systems.

o. Apartments and other multi-family accommodations (rental or owner occupied).

p. Churches, temples, and similar places of religious worship.

q. Any connection that the District or its designee may consider a cross-connection.

7. A reduced pressure backflow preventer, as near to the metered water service connection as possible will be required where sewage, toxic wastes, or other injurious materials are pumped, processed, or treated. In general, a reduced pressure backflow preventer will be required when any one (1) of the following conditions exist:

a. Sewage treatment plant or pump station.

b. Auxiliary water system (interconnected)

c. Winery.

d. Building with sewage ejectors.

e. Cannery, parking house, or reduction plant.

f. Car wash with water reclamation system.

g. Centralized heating and air-conditioning plant.

h. Chemical plant.

i. Civil works (not subject to State inspection)

j. Dye works.

k. Film processing or other laboratory.

l. Fire system with auxiliary supply.

m. Hospital, mortuary, or crematorium.

n. High school or college and other such secondary school and higher education facilities.

o. Food processing plant.

p. Restaurant, bar, cafe, lounge, and other such eating and/or drinking establishments.

q. Rendering plant.

r. Veterinary or pet hospital.

s. Steam boiler.

t. Plating facility or metal finisher.

u. Irrigation system where anything is injected into the customer system.

v. Manufacturing, processing, or other fabricating plant using toxic material.

w. Paper production plant.

x. Restricted, classified, or other closed facility.

y. Sand and/or gravel plant.

z. Where a cross-connection is maintained.

aa. Any connection that the District may consider to be a cross-connection.

E. Any backflow prevention device required by this Resolution shall be of a model and size approved by the District. The term "Approved Backflow Prevention Device" shall mean a device that has been manufactured in full conformance with the standards established by the American Water Works Association, as set forth in its publication entitled "AWWA C506-78 Standards for Reduced Pressure Principle and Double Check Valve Backflow Prevention Devices" (or the most current update thereof) and, that has met completely the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California, as set forth in its Manual of "Specifications of Backflow Prevention Devices" and said publications, including any amendments or revisions thereto, which are hereby adopted and incorporated into this Resolution as fully as if set out at length herein. Final approval shall be evidenced by a "Certificate of Approval" issued by an approved testing laboratory, certifying full compliance with said AWWA Standards and FCCC and HR Specifications.

F. The following testing laboratory is hereby approved by the Board to test and certify backflow preventers:

Foundation for Cross-Connection Control and Hydraulic Research
University of Southern California
University Park
Los Angeles, CA 90007

1. Testing laboratories other than the laboratory listed herein will be added to an approved list as they are approved by the Board.

2. Backflow preventers which may be subjected to back pressure or back-siphonage that have been fully tested and have been granted a Certificate of Approval by said approved laboratory and are listed on the laboratory's current list of "Approved Devices" may be used.

G. The District will make available a list of approved backflow device testers. The list is not to be construed to be restrictive or recommended by the District. Anyone desiring inclusion on the list shall provide the District with valid certification acceptable to the District.

H. It shall be the duty of the customer/user at any premises where backflow prevention devices are installed to have certified inspections and operational tests made once per year. In those instances where the District deems the hazard to be great enough, it may require certified inspections at more frequent intervals. These inspections and tests shall be at the expense of the customer/user, and shall be performed by a qualified manufacturer's representative, by an approved certified tester, or by Certified District personnel. It shall be the duty of the District to see that these timely tests are made. The customer/user shall notify the District, in advance, when the tests are to be undertaken by anyone other than the District, so that District personnel may witness the tests if it is so desired. These devices shall be repaired, overhauled, or replaced at the expense of the customer/user whenever said devices are found to be defective. Records of such tests, repairs, and overhaul shall be kept and made available to the District.

I. All presently installed backflow prevention devices which do not meet the requirements of this Resolution shall be replaced by a backflow prevention device meeting the requirements of the Resolution when the District finds that the device constitutes a hazard to health.

Section 5.0 Severability. If any clause, sentence, paragraph, section, or part of this Resolution or the application thereof to any person or circumstances shall be adjudged by any court of competent jurisdiction to be invalid, such order or judgment shall be confined in its operation the controversy in which it was rendered and shall not affect or invalidate

the remainder of any part thereof to any other person or circumstances and to this end, the provisions of each clause, sentence, paragraph, section, or part of this Resolution are hereby declared to be severable.

Section 6.0 Effective Date. This Resolution shall take effect and be in force immediately upon its adoption. This Resolution, or a summary thereof, shall be published once in a newspaper of general circulation within ten (10) days of its adoption.

Adopted this 12th day of August, 2003.

_____
Charles Waller; Chairman
Board of Directors
Bayview Water and Sewer District

ATTEST:

I, Debra Peck, Secretary/Treasurer of the Bayview Water and Sewer District, certify that the foregoing resolution was passed by the Board of Directors of the Bayview Water and Sewer District, by a vote of a majority of the members thereof, at a regular meeting held on the 12th day of August, 2003, of which all directors were duly notified, and said Resolution was adopted by the following vote:

AYES, and in favor thereof,	Board members:_____
NOES,	Board members:_____
ABSENT,	Board members:_____
ABSTAIN,	Board members:_____

I further certify that I have carefully compared the same with the original Resolution on file and of record in my office; that said Resolution is a full, true, and correct copy of the original Resolution adopted at said meeting; and that said Resolution has not been amended, modified, or rescinded since the date of its adoption, and is now in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the official seal of the BAYVIEW WATER AND SEWER DISTRICT on August 12, 2003.

_____
Debra Peck; Secretary/Treasurer BWSD

SEAL

Appendix 2-H

2017 Water Quality Report

Technical Review Submittal

THIS PAGE WAS INTENTIONALLY LEFT BLANK

2017 Annual Drinking Water Quality Report

Bayview Water and Sewer District

We're pleased to present to you the 2017 Annual Quality Water Report. This report is designed to inform you about the quality water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. Our water sources are two wells located in Farragut State Park. As of year end 2017, we had 473 service connections serving a population of 1277 full time and part time residences.

We are pleased to report that our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact **Bob Kuchenski, Licensed Water System Operator, at 208-683-3949.** We want our valued customers to be informed about their water service. If you want to learn more, please attend any of our regularly scheduled meetings. They are held on the **3rd Wednesday of every month at 3pm at the Bayview Community Center located at 20298 E. Perimeter Rd. in Bayview. Four times per year, meetings are held on the third Thursday of the month at 7pm. Visit our website at http://bayviewwaterandsewer.com for more details.**

Bayview Water and Sewer District routinely monitors for constituents in your drinking water according to Federal and State laws. This table shows the results of our monitoring for the period of **January 1st to December 31st, 2017** unless otherwise indicated. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents. It's important to remember that the presence of these constituents does not necessarily pose a health risk.

What does this mean?

MCL's (Maximum Contaminant Levels - see definitions below) are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having a health effect.

As you can see by the table below, our system had no violations, with the exception of one monitoring violation. Our water system is required to take 2 routine coliform/e-coli monitoring samples each month. When we changed operators last August, we took the 2 specified samples, one from Bayview and one from the Dromore area. Unknown to us at the time was that one sample was required from Bayview and one from the Cape Horn area. Since the routine sample was not taken from the Cape Horn area, it was considered a monitoring violation. *The health effects of this missing sample are unknown*. We're proud that your drinking water meets or exceeds all Federal and State requirements. We have learned through our monitoring and testing that some constituents have been detected. However, the EPA has determined that your water IS SAFE at these levels.

We at Bayview Water and Sewer District work around the clock to provide top quality water to every tap. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life and our children's future. Please call our office at (208)683-3949 if you have questions.

2017 Consumer Confidence Report (CCR)

I. Water System Information

Water System Name: Bayview Water and Sewer District	PWS ID #: 1280014
Water System Operator: Bob Kuchenski	
Address: PO Box 637	Tel #: 208-683-3949
City, State, Zip Code: Bayview, ID 83803	
Population Served: 1277	Number of Connections: 473
Date of CCR Distribution: 6/20/2018	For Calendar Year: 2017
Regularly Scheduled Meeting(s): Visit **http://bayviewwaterandsewer.com** for dates and times.	

II. Water Sources

Groundwater Sources (springs, wells, infiltration galleries):	
1) Source #: 1	a) Sample Site Location: Pump house #7
	b) Location Description: Farragut State Park, Highway 54
2) Source #: 2	a) Sample Site Location: Pump house #8
	b) Location Description: Farragut State Park, Kinglet Road
Groundwater/Surface Water Contamination Sources (if known): Erosion of natural deposits	
Source Water Assessment or Protection Plan Available? Yes, online at: http://www2.deq.idaho.gov/water/swaOnline/Search	

III. Special Compliance Violations

Treatment techniques: na
Monitoring/Reporting: 1
Public notification/Record keeping: na
Special monitoring requirements: na
Administrative or judicial orders: na
Consent orders: na
Notice of Violations (NOV): na

IV. Definitions

Action Level (AL): The concentration of a contaminant, which, if exceeded, triggers treatment, or other requirements which a water system must follow.

Maximum Contamination Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
Maximum Contamination Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million corresponds to one minute in two years or a single penny in $10,000.
Parts per billion (ppb) or Micrograms per liter - one part per billion corresponds to one minute in 2,000 years, or a single penny in $10,000,000.
Picocuries per liter (pCi/L) - picocuries per liter is a measure of the radioactivity in water.
Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
WAIVER (Waived) - Waivers are granted for chemicals known to NOT be contained within a geographic area. The Bayview Water and Sewer District is within the Rathdrum Prairie Aquifer Wellhead Protection Area, which is protected from certain constituents by the State of Idaho.
None Detected (ND) – no contaminant detected.

V. Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800)426-4791 or http://www.epa.gov/safewater/hotline/.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800)426-4791 or http://www.epa.gov/safewater/hotline/.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Contaminants that may be present in source water before we treat it include:
Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.
Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

Lead Informational Statement (Health effects and ways to reduce exposure)

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. ***The utility named above*** is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your drinking water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available form the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

VI. Level of Detected Chemical and Radiological Contaminants and Associated Health Effects Language

Unless otherwise noted, the data presented in this water quality table is from testing done between January 1 - December 31, 2017.

Contaminant	Violation (Y/N)	MCL	MCLG	Lowest Level Detected:	Highest Level Detected:	Date Tested (mm/yy):	Typical Source of Contamination	Health Effects Language
Radioactive Contaminants & Inorganic Contaminants (Units)								
Arsenic (ppb)	N	10	0	4.4	4.4	7/17	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.	
Barium (ppm)	N	2	2	.033	.033	7/17	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.	
Gross Alpha, Radon & Uranium (PCI/L)	N	15	0	.403	.403	9/16	Erosion of natural deposits.	

VII. Reporting Lead/Copper

- **Lead/Copper:**

Contaminant	Date(s) Collected	90th Percentile	Action Level	MCLG	#of sites above Action Level	Violation Y/N	Possible Source of Contamination
Lead (ppb)	8/16	2	15	0	0	N	Corrosion of household plumbing systems: Erosion of natural deposits.

Copper (ppm)	8/16	.047	1.3	1.3	0	N	Corrosion of household plumbing systems: Erosion of natural deposits.

VIII. Level of Detected Contaminants and Associated Health Effects Language for Systems that must comply with the Disinfection/Disinfection by Products Rule, Surface Water Treatment Rule, and the Long Term 1 Enhanced Surface Water Treatment Rule.

Unless otherwise noted, the data presented in this water quality table is from testing done between January 1 - December 31, 2017.

Contaminant	Violation (Y/N)	MCL	MCLG	Highest Level Detected	Running Annual Average*	Range*	Typical Source of Contamination	Health Effects Language (include only if system exceeds MCL)
Disinfection By Products (applies to all systems practicing chlorination) * *running annual average and range apply only to systems collecting disinfection by products on a quarterly basis. Systems that collect DBPs on an annual or less frequent basis should report detections in the highest level detected column and omit running annual averages and range data.*								
Total Trihalomethanes	N	80	n/a	3.24			Byproduct of drinking water chlorination.	
Haloacetic Acid Group 5	N	60	n/a	0			Byproduct of drinking water chlorination.	

- **Chlorine:**

Maximum Residual Disinfectant Level Contaminant	Violation (Y/N)	MCL	MCLG	Highest Level Detected	Running Annual Average	Sample Date	Typical Contamination Source	Health Effects Language (include only if MCL is exceeded)
Chlorine	N	MRDL = 4	MRDLG = 4	.7	.4	Monthly	Water additive used to control microbes	