

5/25/2018



WASTEWATER REUSE / FACILITY PLAN UPDATE WORKING SESSION



Daniel Allison / Eric Lohan

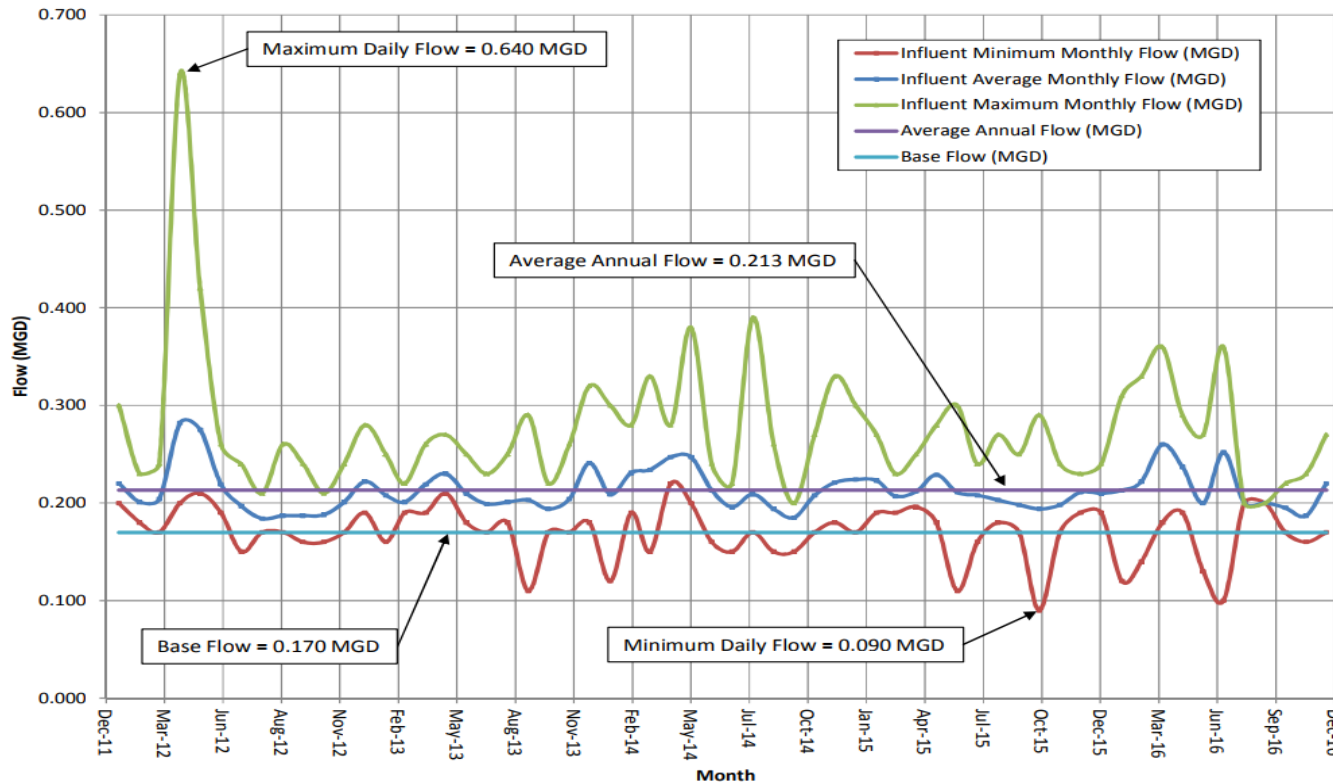
804.965.5590 | JONATHAN.LANCIANI@SUSTAINABLEWATER.COM



BASIS OF DESIGN

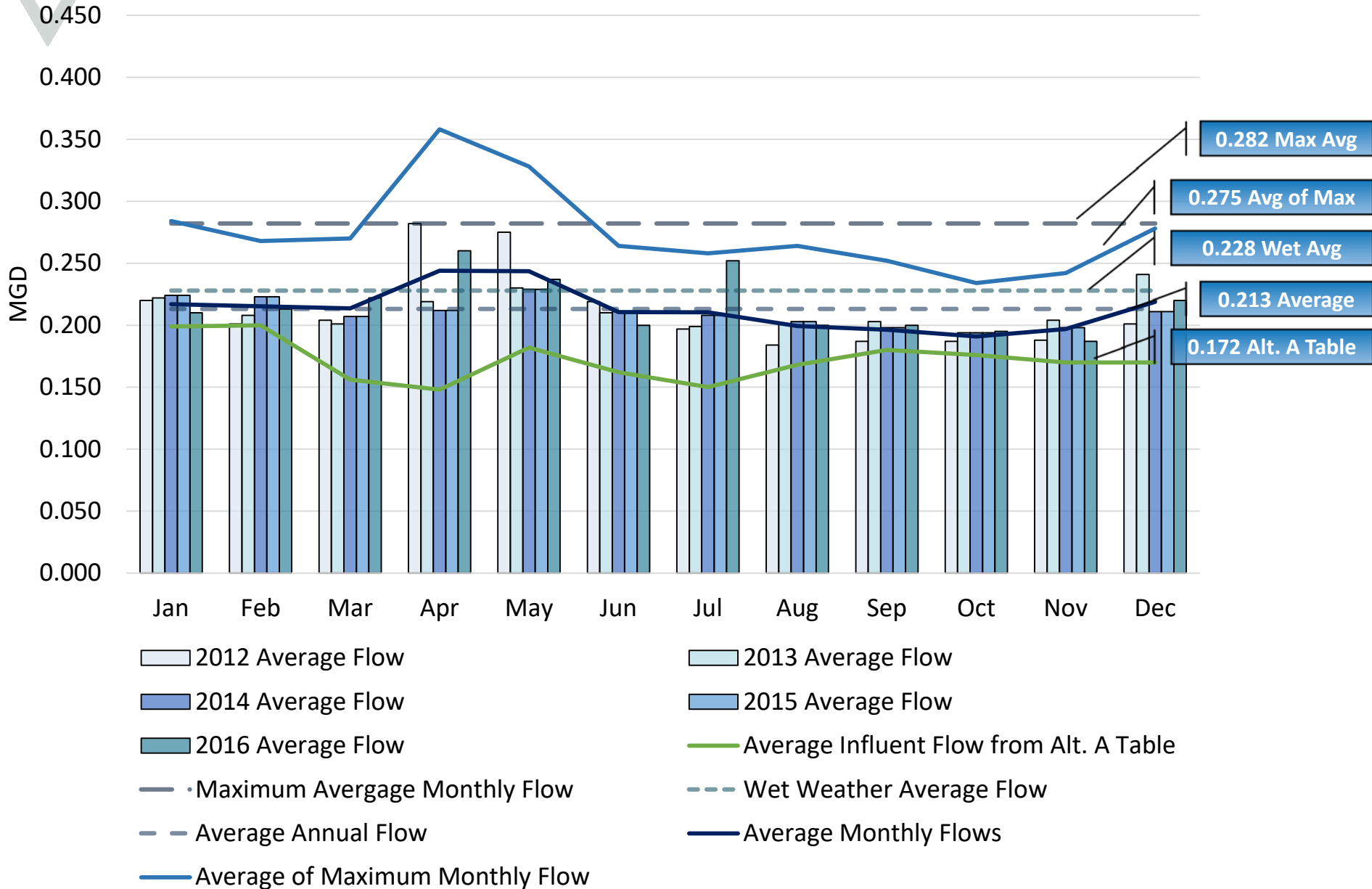
Table 1: Current and Estimated Future Wastewater Flow Rates, City of John Day (Courtesy of Anderson Perry)

	Historical (2012 -2016)	Future (2038)
AVERAGE BASE FLOW (GPD)	170,000	172,000
AVERAGE ANNUAL FLOW (GPD)	213,000	265,000
AVERAGE DRY WEATHER FLOW (GPD)	198,000	250,000
AVERAGE WET WEATHER FLOW (GPD)	228,000	280,000
MAXIMUM MONTH FLOW (GPD)	282,000	334,000
MAXIMUM DAILY FLOW (GPD)	640,000	692,000



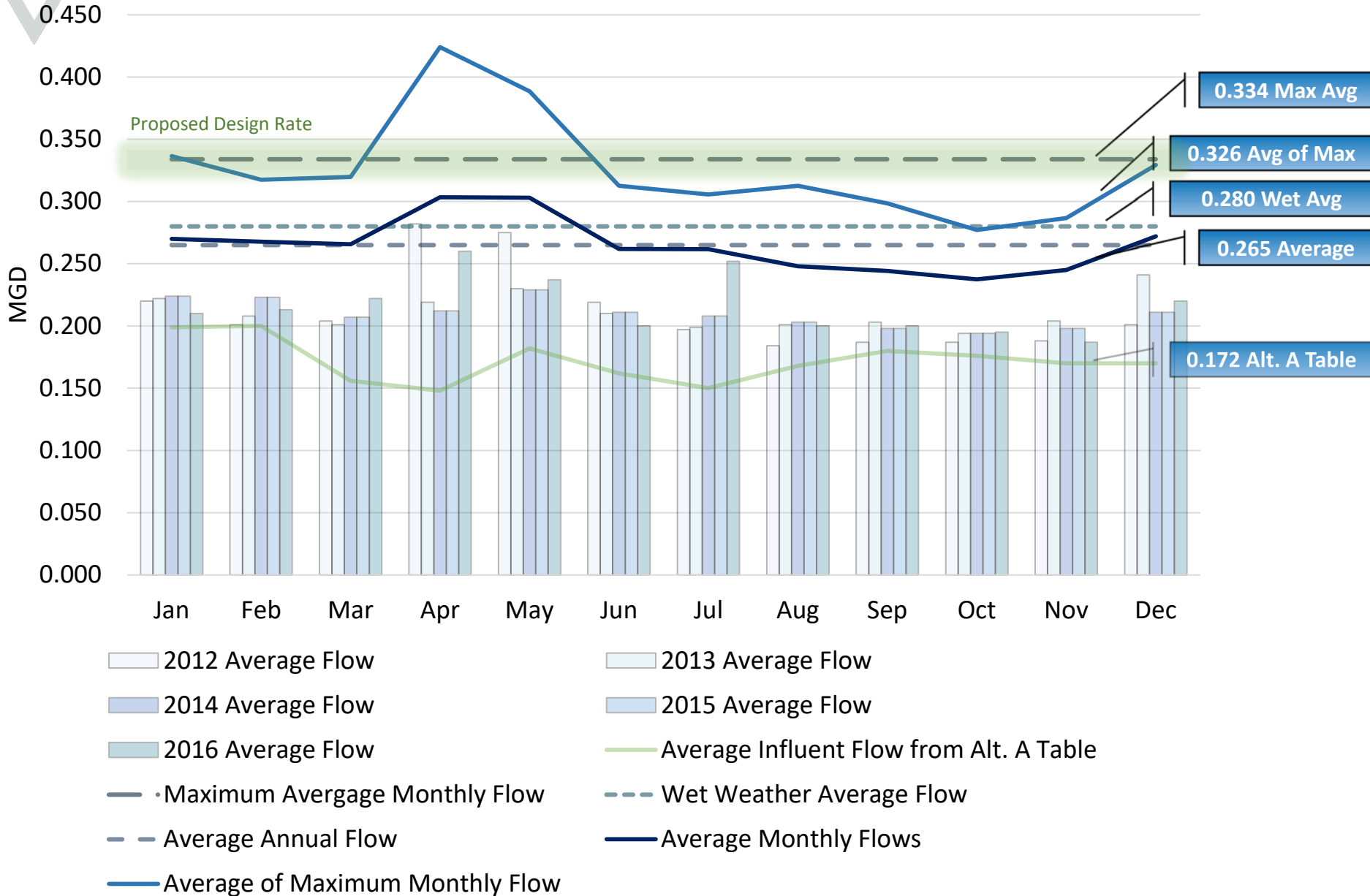


EXISTING INFLUENT FLOW (2012-2016)



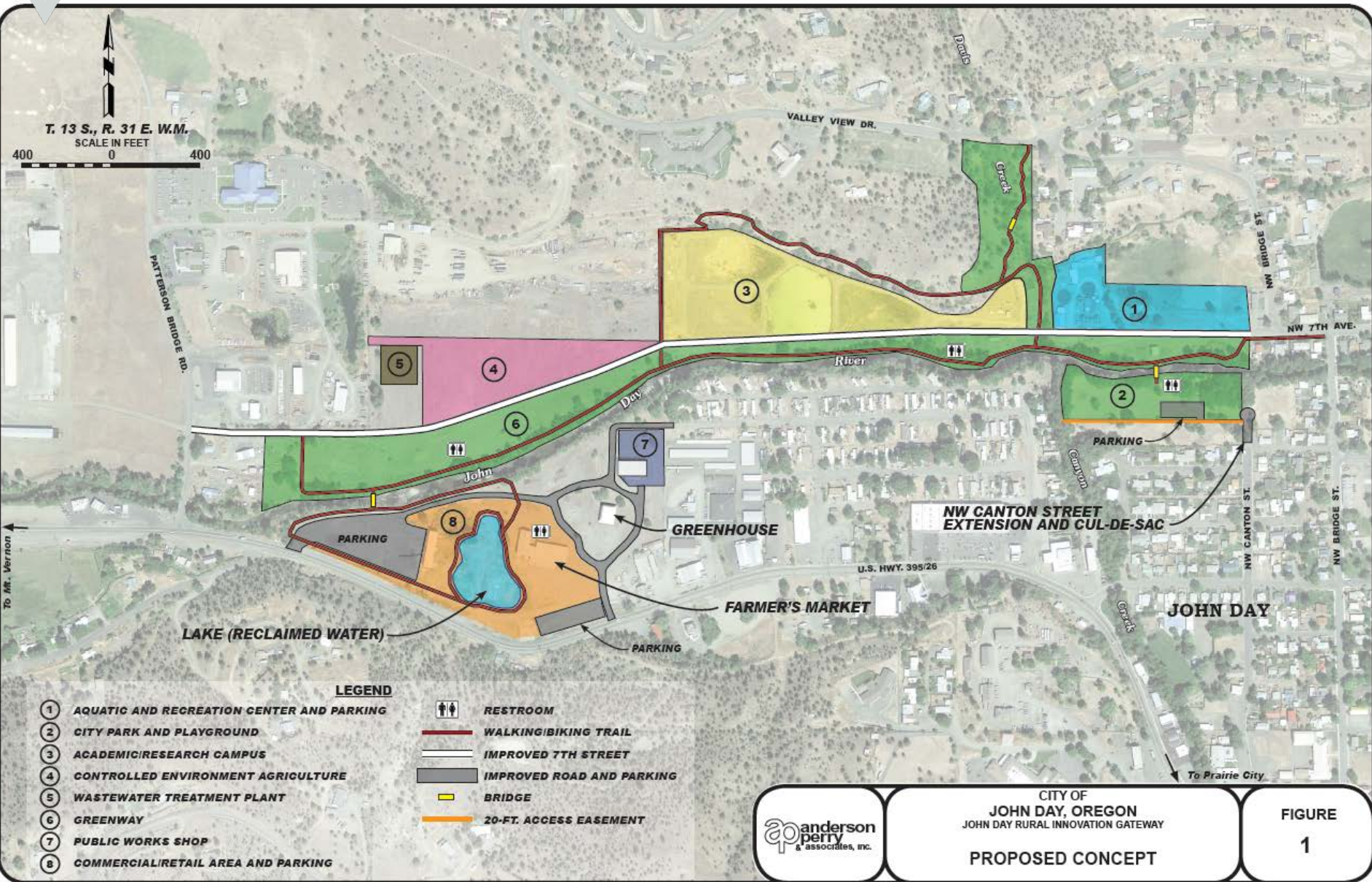


FUTURE INFLUENT FLOW (2038)





REUSE DEMANDS



- 1 AQUATIC AND RECREATION CENTER AND PARKING
- 2 CITY PARK AND PLAYGROUND
- 3 ACADEMIC/RESEARCH CAMPUS
- 4 CONTROLLED ENVIRONMENT AGRICULTURE
- 5 WASTEWATER TREATMENT PLANT
- 6 GREENWAY
- 7 PUBLIC WORKS SHOP
- 8 COMMERCIAL/RETAIL AREA AND PARKING

LEGEND

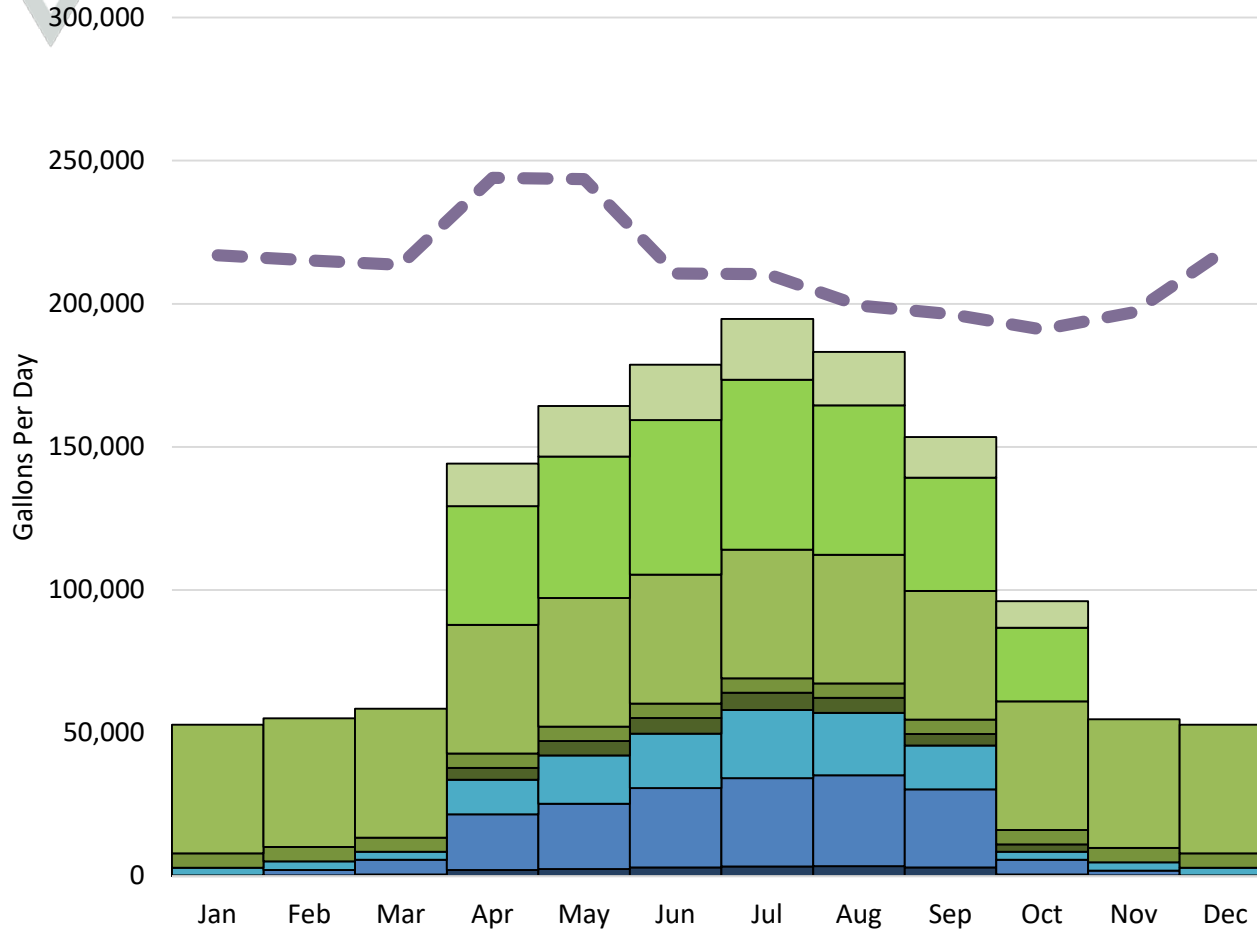
	RESTROOM
	WALKING/BIKING TRAIL
	IMPROVED 7TH STREET
	IMPROVED ROAD AND PARKING
	BRIDGE
	20-FT. ACCESS EASEMENT

CITY OF
JOHN DAY, OREGON
 JOHN DAY RURAL INNOVATION GATEWAY
PROPOSED CONCEPT

FIGURE
1



REUSE DEMANDS WITHIN JOHN DAY

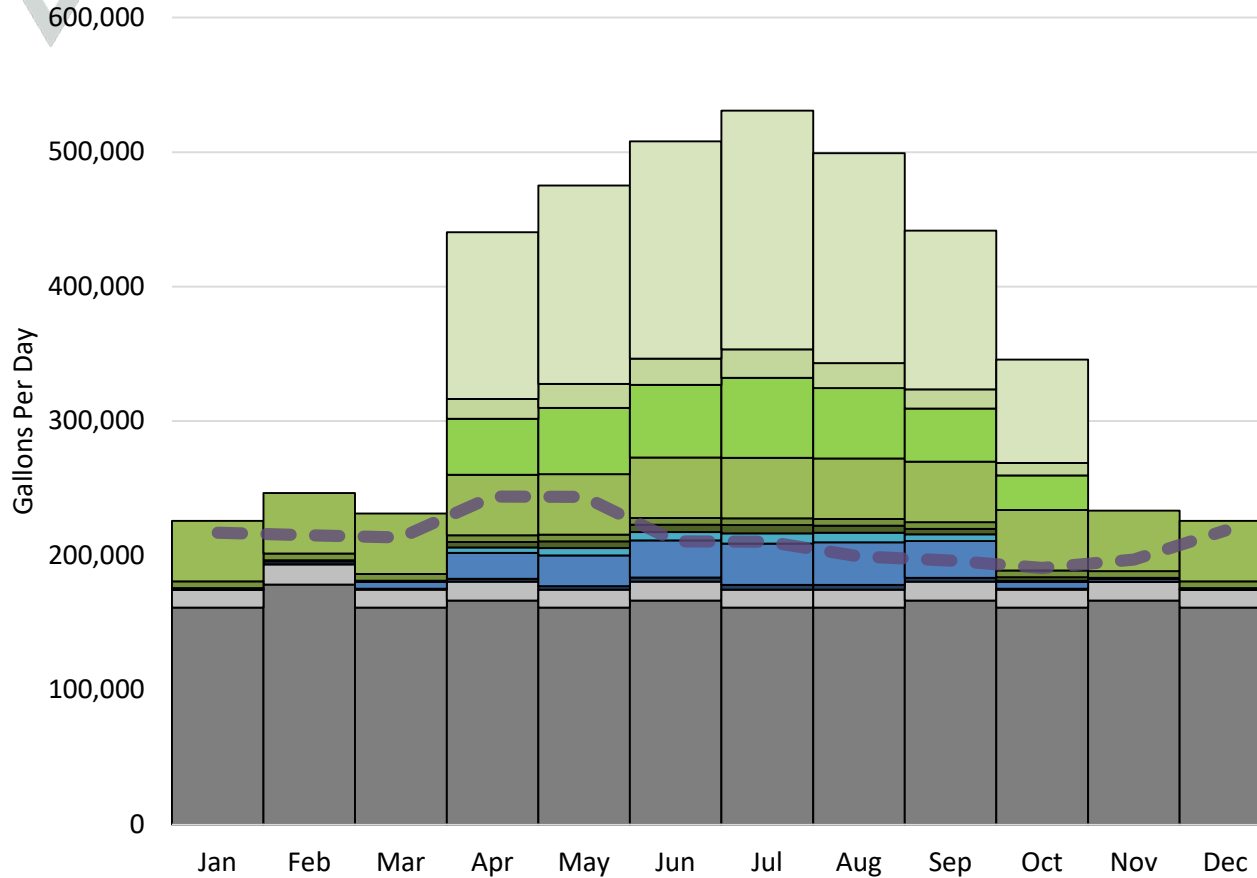


Demand	Est. Annual Volume (MGY)
Hydroponic Greenhouse Cooling (Phase 1)	0.6
Hydroponic Greenhouse Cooling (At Scale)	5.9
Pond Evaporation	3.8
7th Street Park/Ball Fields	1.0
Hydroponic Crop Demands (Phase 1)	1.8
Hydroponic Crop Demands (At Scale)	18.3
Greenway Irrigation	9.8
Park Irrigation	3.5
Total Demands	44.8

- Hydroponic Greenhouse Cooling (Phase 1) ■ Hydroponic Greenhouse Cooling (At Scale)
- Pond Evaporation ■ 7th Street Park/Ball Fields
- Hydroponic Crop Demands (Phase 1) ■ Hydroponic Crop Demands (At Scale)
- Greenway Irrigation ■ Park Irrigation
- Wastewater Resources



ALL REUSE DEMANDS



- Log Deck (Malheur Lumber) Hydroponic
- Greenhouse Cooling (Phase 1) Pond
- Evaporation
- Hydroponic Crop Demands (Phase 1)
- Greenway Irrigation
- Golf Course (33 Acres)
- Torrefaction (Malheur Lumber)
- Hydroponic Greenhouse Cooling (At Scale)
- 7th Street Park/Ball Fields
- Hydroponic Crop Demands (At Scale)
- Park Irrigation
- Wastewater Resources

Demand	Est. Annual Volume (MGY)
Log Deck (Malheur Lumber)	60.0
Torrefaction (Malheur Lumber)	5.0
Hydroponic Greenhouse Cooling (Phase 1)	0.6
Hydroponic Greenhouse Cooling (At Scale)	5.9
Pond Evaporation	3.8
7th Street Park/Ball Fields	1.0
Hydroponic Crop Demands (Phase 1)	1.8
Hydroponic Crop Demands (At Scale)	18.3
Greenway Irrigation	9.8
Park Irrigation	3.5
Golf Course (33 Acres)	29.4
Total Demands	139.2



TREATMENT BASIS OF DESIGN

Table 2: Expected Influent Characterization

Parameter	Unit	Average	Min	Max
BIOLOGICAL OXYGEN DEMAND (BOD5)	mg/L	204	87	363
TOTAL KJELDAHL NITROGEN (TKN) *	mg/L	46.6	--	--
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	203	31	460
PH	S.U.	7.87	7.65	8.04
TOTAL DISSOLVED SOLIDS	mg/L	375	354	396

* Design Basis derived from only one TKN sample currently. Sustainable Water is requesting further testing.

ARTIFICIAL RECHARGE:

- BOD5: 10 MG/L
- TSS: 10 MG/L
- TN:

SURFACE DISCHARGE

- BOD5: 10 MG/L
- TSS: 10 MG/L
- TN:

Table 4: Treatment Requirements by Class, State of Oregon

Analyte	Class A	Class B	Class C	Class D
Beneficial Use Category				
Irrigation (Including processed food crops)	All	Some	Some	Some
Industrial Commercial Construction	All	Some	Some	None
Impoundments / Artificial Groundwater Recharge	All	Some	Some	None
Turbidity (NTU)				
24-hr mean (Col/ml)	2			
5% of time during 24-hr period (Col/ml)	5			
Maximum at any time	10			
Monitoring Frequency	Hourly			
Total Coliforms (Organisms / 100ml)				
7-day median	2.2	2.2	23	
Maximum in any sample	23	23		
Maximum in 2 consecutive samples			240	
Monitoring Frequency	Daily	3 / week	1 / week	
E. Coli (Organisms / 100ml)				
30-day log mean				126
Maximum in any sample				406
Monitoring Frequency				1 / week



TREATMENT BASIS OF DESIGN

Parameter	Units	Average Influent	Artificial Recharge	Surface Water	Oregon Class A	CA Title 22	US EPA Irrigation	US FDA FSMA	Discharge	General Reuse	Agricultural Reuse
BOD5	mg/l	204	10	5?			10		5-10	2	2
TSS	mg/l	200	10	5?					5	5	5
pH	SU	7.87					6.5-8.4		6-8	6.5-7.5	6.5-7.5
TKN	mg/l	46							2	2	2
NO3-NO2	mg/l	0							8	8	38
TN	mg/l	46	10	5?					10	10	40
TP	mg/l	8		2?					2	1	8
Turbidity	NTU	-			2	2	2		2	2	2
Total Coliforms	CFU / 100 ml	-			2.2	2.2			20	2.2	ND
E. coli/ Fecal	CFU / 100 ml	-					200	ND	2.2	ND	ND
TDS	mg/l	375					450		375	375	375
Cl2	mg/l						1		0	2	1



AGRICULTURE REUSE

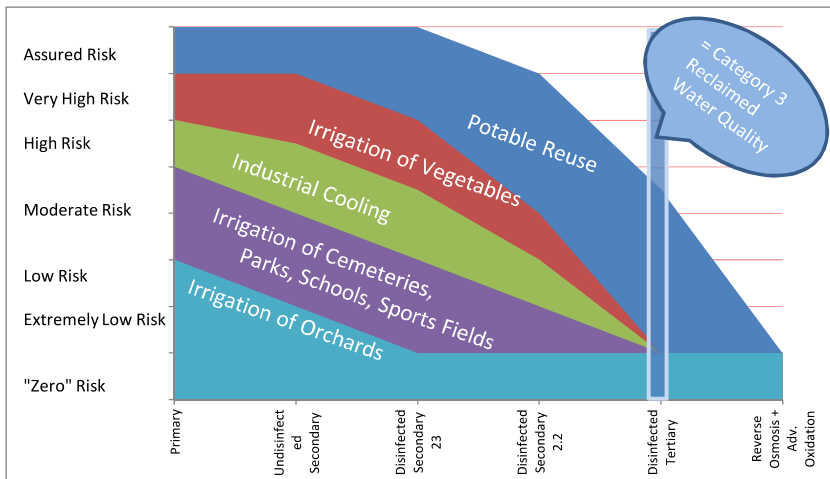


Figure 4 Risk vs. Treatment Level for Five Uses of Recycled Water

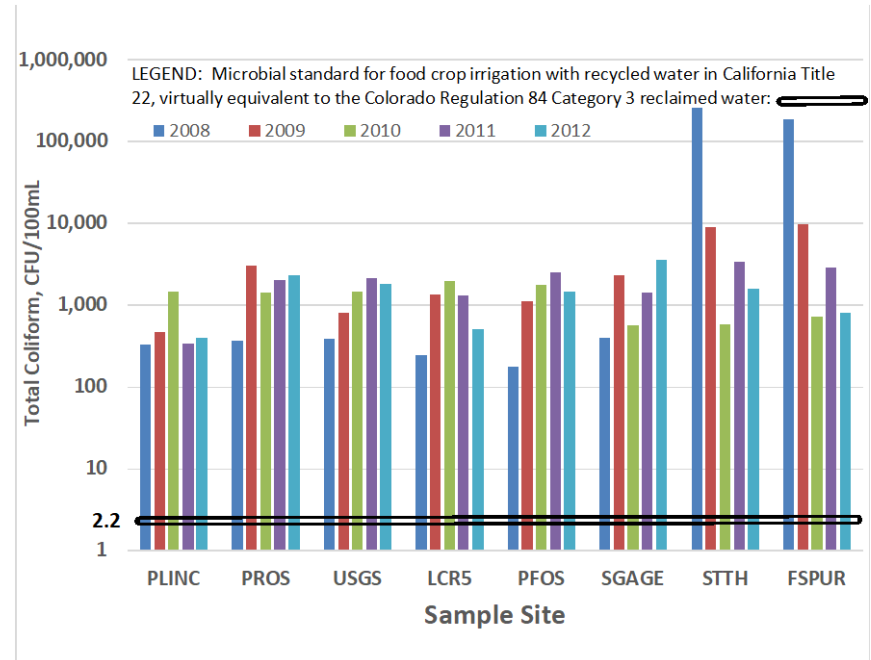
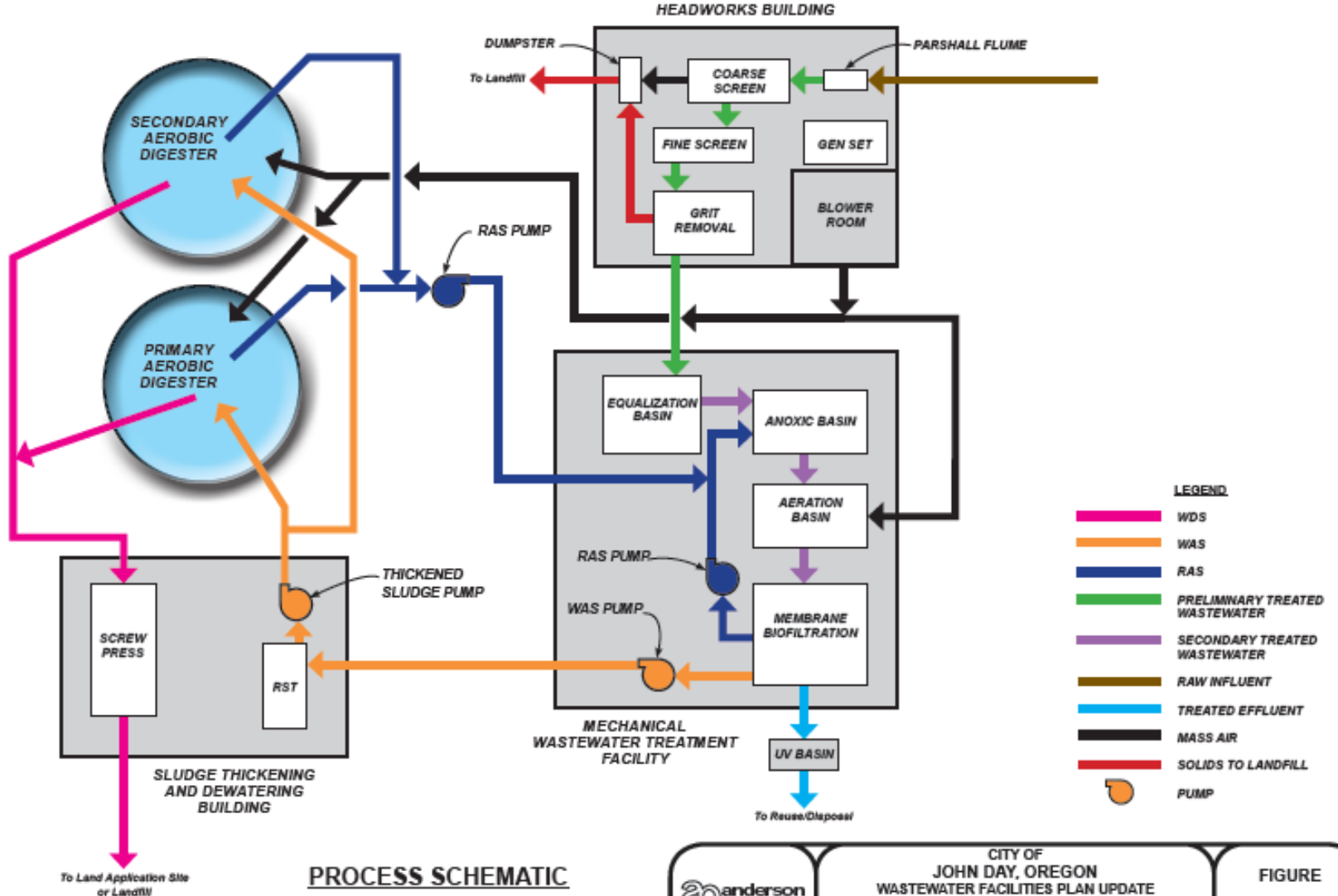


Figure 5 Results of Five-Year Microbial Monitoring on 8 Sites²⁰ on Cache La Poudre River
 Source: Colorado State University, courtesy of Prof. Douglas A. Rice, Ph.D., Laboratory Director, Colorado State University - EHS



OPTION B



PROCESS SCHEMATIC

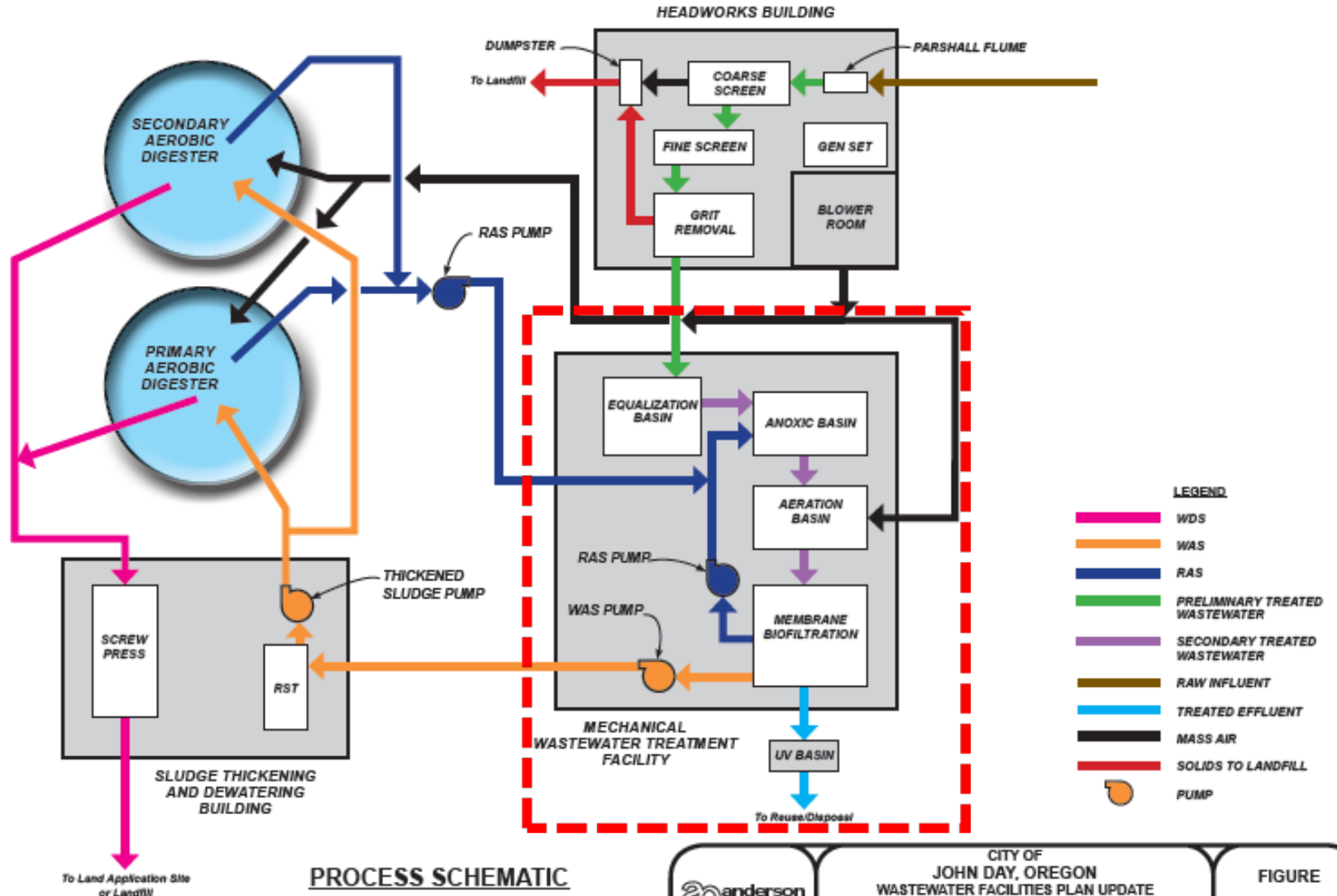


CITY OF JOHN DAY, OREGON
 WASTEWATER FACILITIES PLAN UPDATE
 ALTERNATIVE B - MECHANICAL WASTEWATER TREATMENT FACILITIES

FIGURE 4-4B



OPTION B: WATERHUB SCOPE

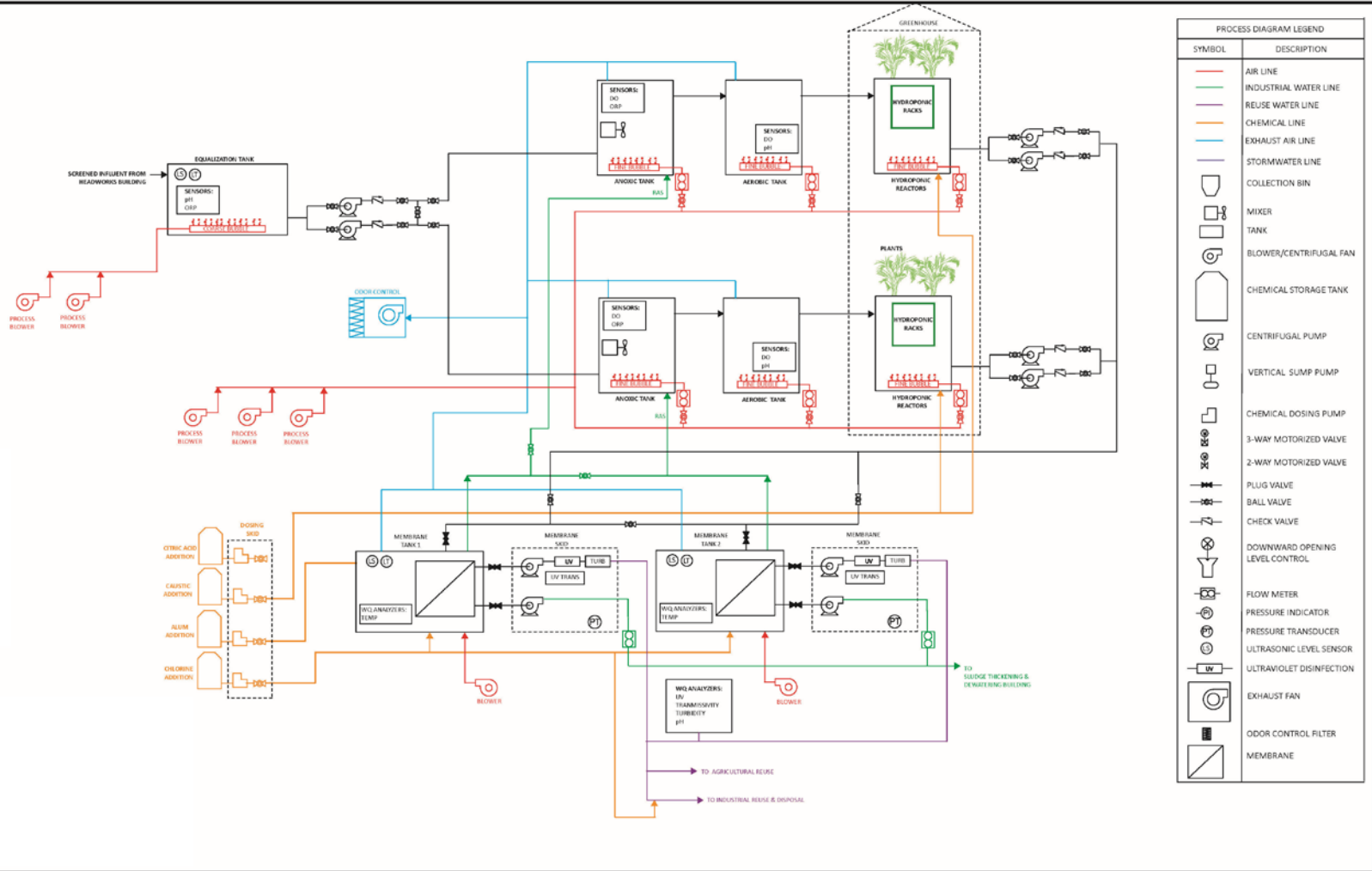


PROCESS SCHEMATIC





PROPOSED PROCESS FLOW



PROCESS DIAGRAM LEGEND	
SYMBOL	DESCRIPTION
	AIR LINE
	INDUSTRIAL WATER LINE
	REUSE WATER LINE
	CHEMICAL LINE
	EXHAUST AIR LINE
	STORMWATER LINE
	COLLECTION BIN
	MIXER
	TANK
	BLOWER/CENTRIFUGAL FAN
	CHEMICAL STORAGE TANK
	CENTRIFUGAL PUMP
	VERTICAL SUMP PUMP
	CHEMICAL DOSING PUMP
	3-WAY MOTORIZED VALVE
	2-WAY MOTORIZED VALVE
	PLUG VALVE
	BALL VALVE
	CHECK VALVE
	DOWNWARD OPENING LEVEL CONTROL
	FLOW METER
	PRESSURE INDICATOR
	PRESSURE TRANSDUCER
	ULTRASONIC LEVEL SENSOR
	ULTRAVIOLET DISINFECTION
	EXHAUST FAN
	ODOR CONTROL FILTER
	MEMBRANE

Project:
WaterHub® Reclamation System and Ancillary Improvements

Title/Description:
Proposed Process Flow Diagram

Client:
City of John Day

Location:
John Day, OR

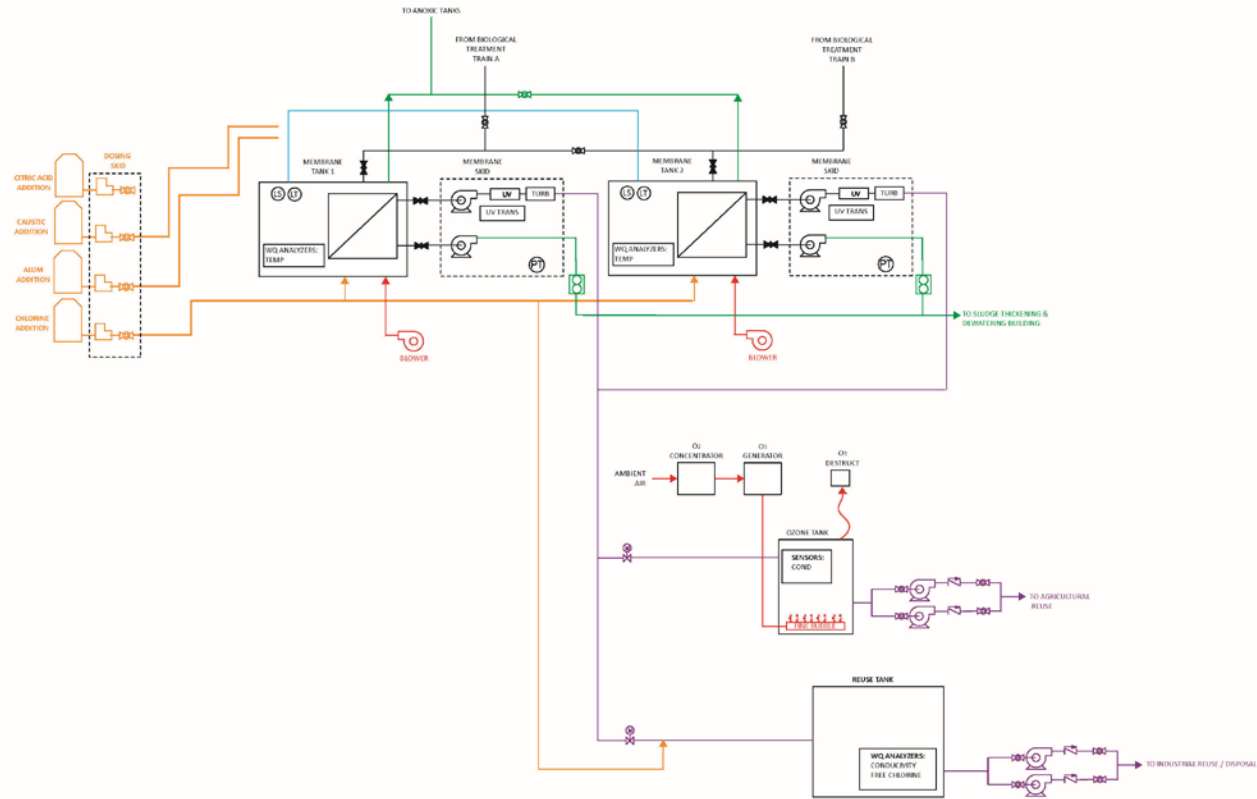
Initial:
05/18/18

Revision:
-





PROPOSED PROCESS FLOW



PROCESS DIAGRAM LEGEND	
SYMBOL	DESCRIPTION
	AIR LINE
	INDUSTRIAL WATER LINE
	REUSE WATER LINE
	CHEMICAL LINE
	EXHAUST AIR LINE
	STORMWATER LINE
	COLLECTION BIN
	MIXER
	TANK
	BLOWER/CENTRIFUGAL FAN
	CHEMICAL STORAGE TANK
	CENTRIFUGAL PUMP
	VERTICAL SUMP PUMP
	CHEMICAL DOSING PUMP
	3-WAY MOTORIZED VALVE
	2-WAY MOTORIZED VALVE
	PLUG VALVE
	BALL VALVE
	CHECK VALVE
	DOWNWARD OPENING LEVEL CONTROL
	FLOW METER
	PRESSURE INDICATOR
	PRESSURE TRANSDUCER
	ULTRASONIC LEVEL SENSOR
	ULTRAVIOLET DISINFECTION
	EXHAUST FAN
	ODOR CONTROL FILTER
	MEMBRANE

Project:
WaterHub® Reclamation System and Ancillary Improvements

Title/Description:
Proposed Process Flow Diagram -
Membrane and Permeate System

Client:
City of John Day

Location:
John Day, OR

Initial:
05/18/18

Revision:
-





TANK VOLUMES

Tank Volumes

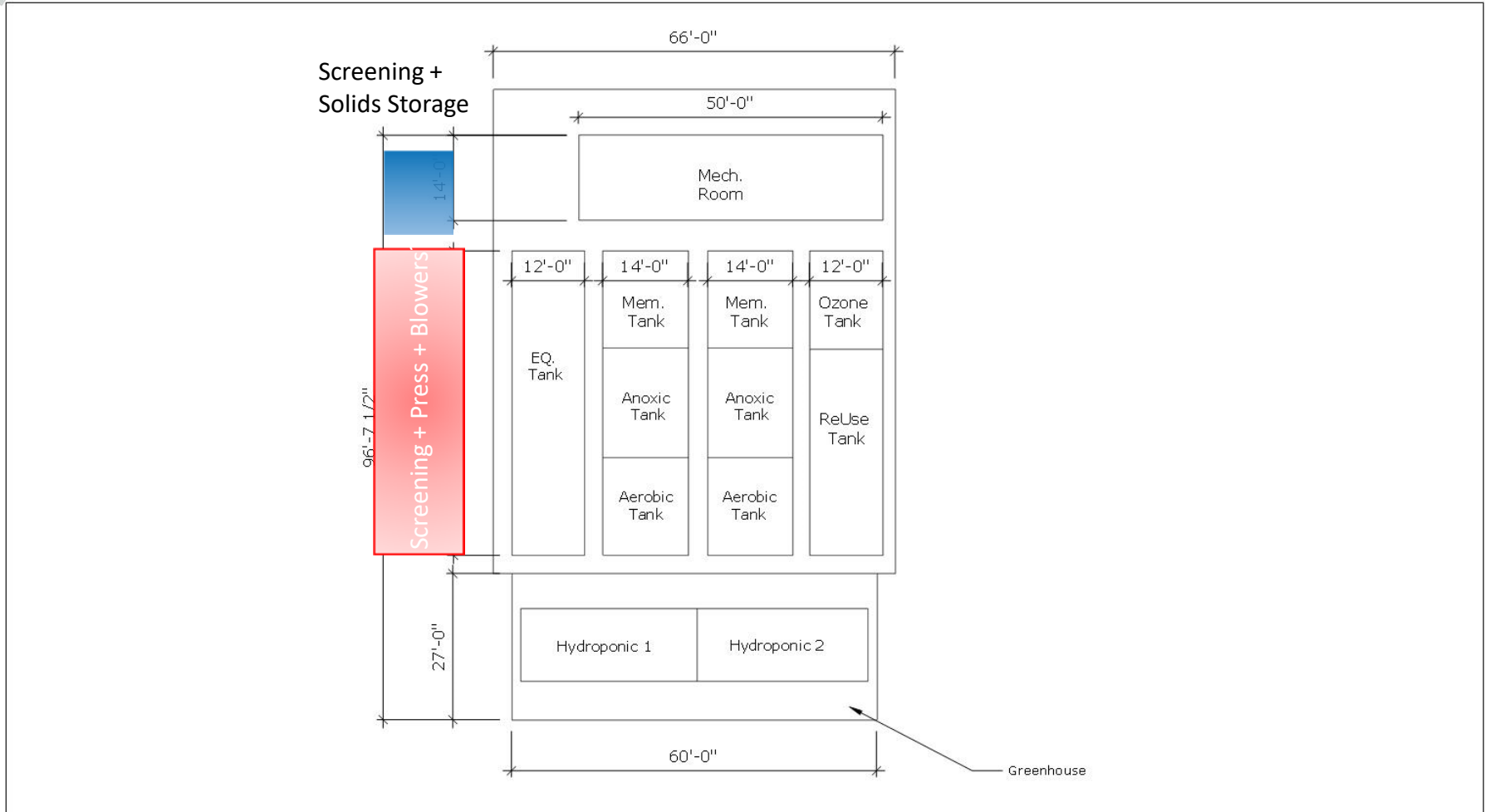
EQ Tank	gal	49,831
Anoxic-A	gal	16,444
Aerobic-A	gal	20,929
Hydroponic-A	gal	31,596
Anoxic-B	gal	16,444
Aerobic-B	gal	20,929
Hydroponic-B	gal	31,596
Membrane Tank-A	gal	12,458
Membrane Tank-B	gal	12,458
Ozone Tank	gal	13,935
Reuse Tank	gal	28,294

Hydraulic Residence Time

Bio Treatment Volume	gal	162,854
HRT - Avg. Wet Month	hrs	14.0
HRT - Maximum	hrs	11.7
EQ Tank Volume	gal	49,831
HRT - Avg. Wet Month	hrs	4.3
HRT - Maximum	hrs	3.6



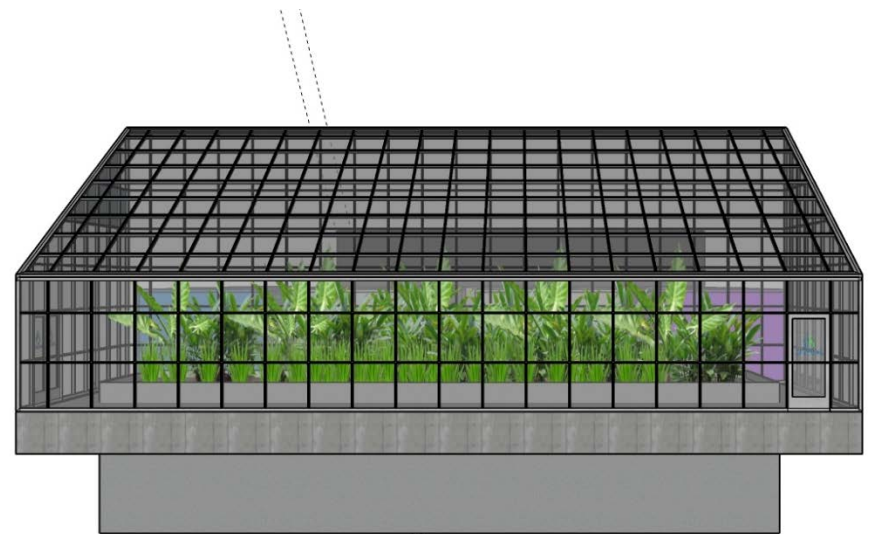
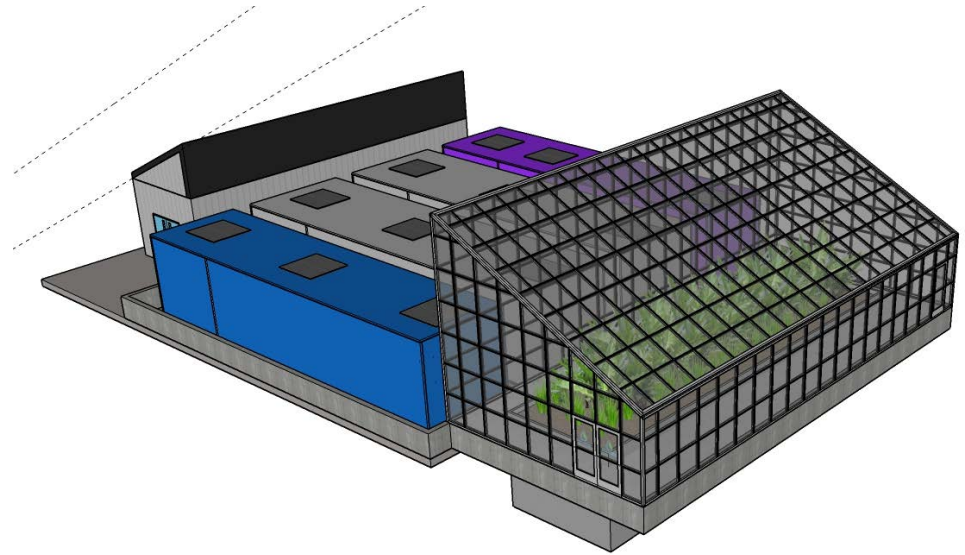
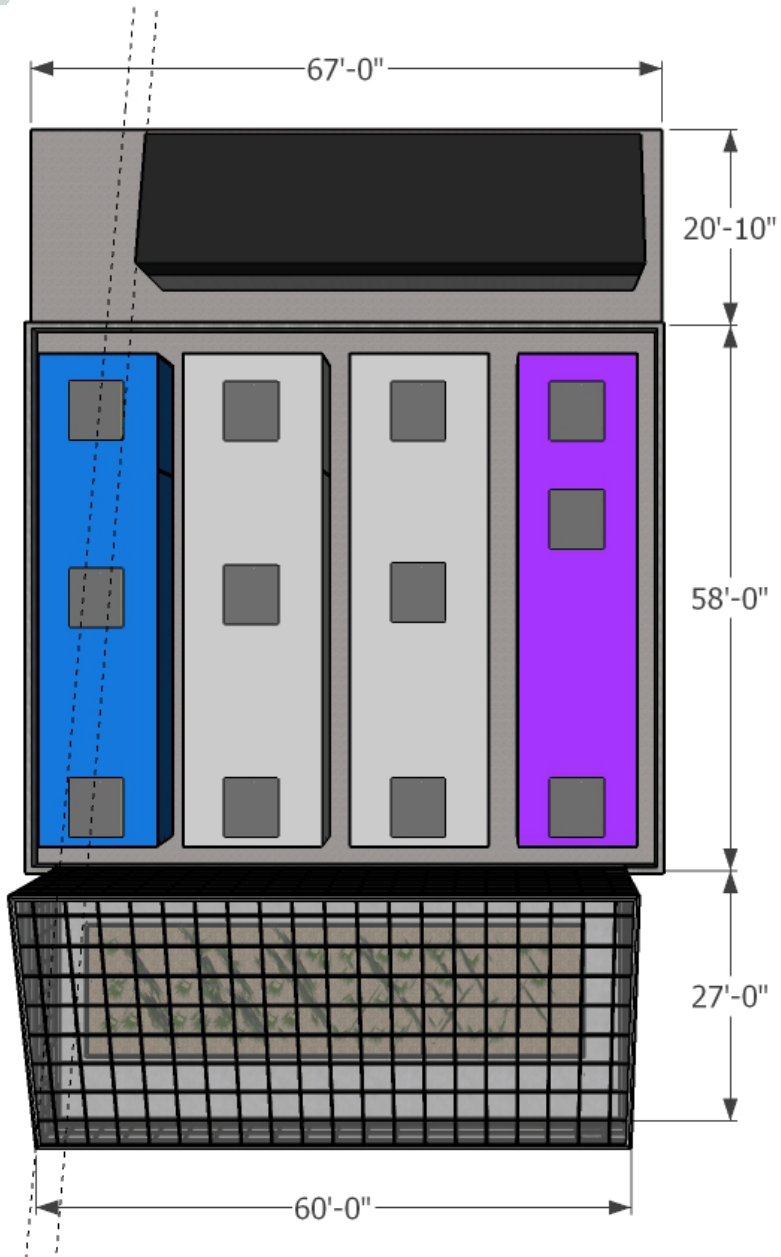
GENERAL ARRANGEMENT



Project: WaterHub® Reclamation System and Ancillary Improvements		Title/Description: Building Footprint				A 04 A
Client: City of John Day	Location: John Day, OR	Initial: 05/21/18	Revision: -			



MASSING

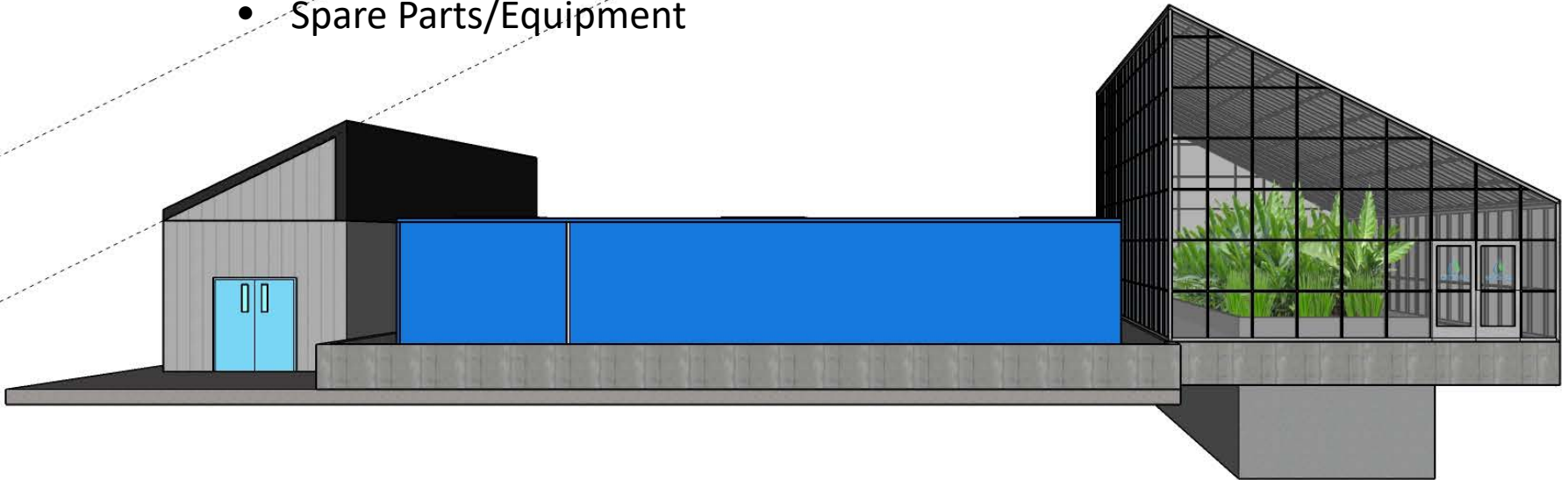




MASSING

Ancillary Spaces ???

- Operator Office
- Lab
- Bathroom
- Tour/Research
- Spare Parts/Equipment





NEXT STEPS

- Confirm Basis of Design
 - Treatment Volume
 - Redundancy
 - Reuse
 - Scope
- Understand Procurement / Commercial Goals:
 - Assuming a two-step RFQ/P Process (similar to greenhouse vendors)
 - What rules govern paid consultants bidding on projects?
 - Reach out to funders for Wastewater Plant, Hydroponic Operation?
- Preliminary Project Budget
 - Level of Prefabrication?
- Presentation Materials
 - 3D Models
 - Renderings in Site
 - Cost Estimates (?)

SUSTAINABLE WATER®

EXTENDING THE LIFECYCLE OF WATER

Daniel Allison | Office: (804) 965-5590
Daniel.Allison@sustainablewater.com