KELLER ASSOCIATES

Technical Memorandum

PROFESSIONAL ENGINEER
LICENSED
17828
9/3/21
STATE OF IDAHO
RILEY D. BRADSHAW

TO: Nate Meikle – BCP Development, Inc.

FROM: Riley Bradshaw, P.E. – Keller Associates, Inc.
Marvin Fielding, P.E. – Keller Associates, Inc.

DATE: September 3, 2021

SUBJECT: **Ammon Development Water Study**

1.0 INTRODUCTION

BCP Development proposes to develop an area of land within the City of Ammon's Area of Impact, bounded by 21st South on the south, 52nd East on the west, 1st Street on the north, and the western boundary of the Quail Ridge subdivision on the east (see Figure 1, also in Appendix A). The area in question consists of approximately 689 acres and includes a variety of land use types ranging from low density to medium high density. Figure 1 also shows two potential school locations as well as a commercial area.

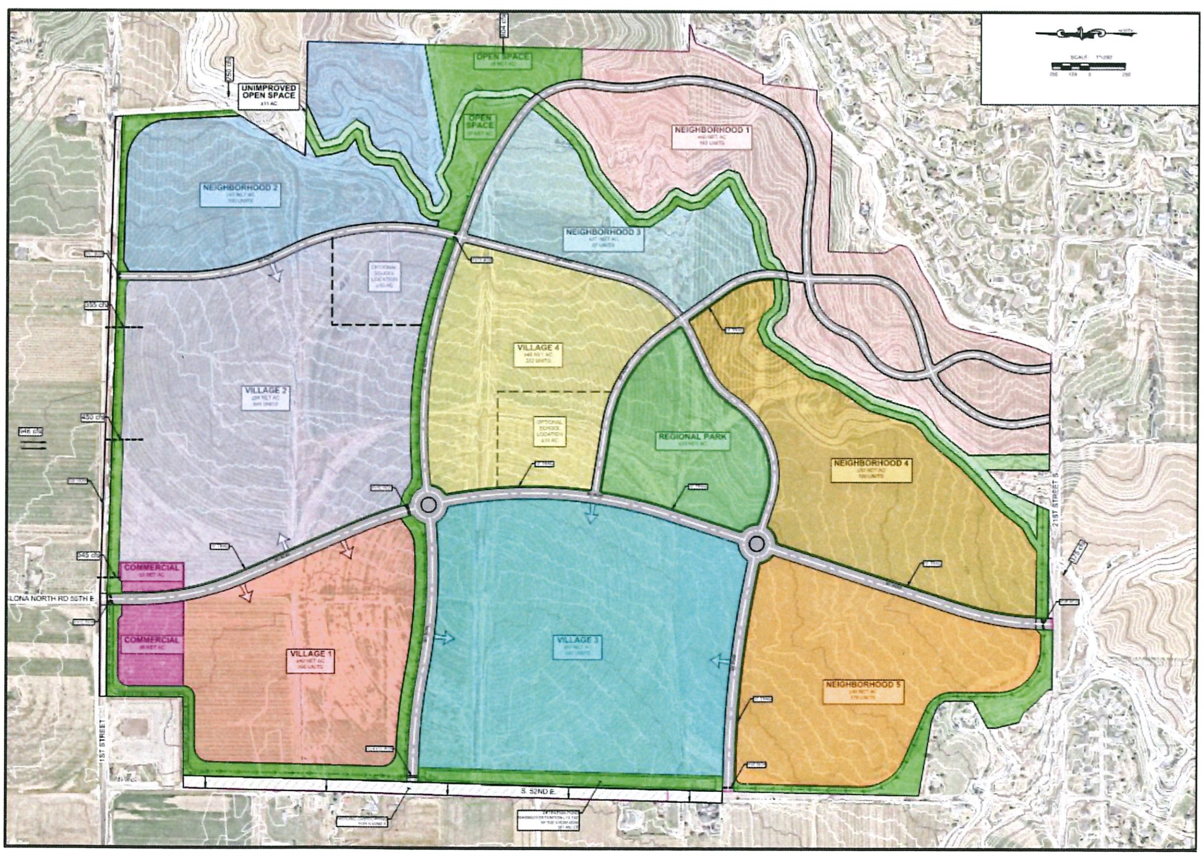

FIGURE 1 – Developer's Concept Layout dated 07-15-2021

The proposed development lies within a range of elevations that fall between those served by two of the City of Ammon's existing drinking water pressure zones (Zone 1 and Zone 2). As a result, at least one new pressure zone must be created to serve this development.

This technical memo documents this development's impacts to the City of Ammon's drinking water system and provides recommended system improvements to address those impacts. Drinking water system improvements were selected in order to comply with the City standards described in the 2018 Ammon Water Facilities Planning Study (WFPS) and with the Idaho Drinking Water Rules (IDAPA 58.01.08).

2.0 DRINKING WATER SYSTEM

2.1 DEMAND

To evaluate the development's drinking water needs as they pertain to state Drinking Water Rules, a maximum day demand (MDD) and peak hour demand (PHD) for the development were developed based on the land uses and number of residential units shown in the concept layout. Assumptions used to estimate a potable water demand per unit (household) were consistent with those used for other development requests since the implementation of the City's pressurized irrigation requirement. Per the City's request, the assumption for average household density was updated to 2.96 persons/household (average 2015-2019 household density, US Census Bureau QuickFacts). This results in a MDD of 0.37 gallons per minute (gpm)/household and PHD of 0.49 gpm/household (applicable for large area analysis only).

Commercial demands were estimated using water meter records for a similarly sized commercial area on 17th Street in Ammon, comprised of a variety of business types. Demands for the two school areas were estimated assuming that the school areas shown in the concept layout would accommodate the needs of all k-8th grade students generated by the development. It was assumed that all high school students would attend a high school outside of the development. State code guidelines for wastewater generation at schools were used to estimate a demand of 29 gallons per day (gpd)/student for k-5 and 35 gpd/student for grades 6-8.

Table 1 shows the MDD and PHD values estimated for the development. A Winter Day Demand (WDD) of 780 gpm for the entire development was also calculated for modeling purposes and represents a more typical demand outside of heavy demand times. Calculations related to the values presented in this section are found in Appendix B.

TABLE 1 - Development Drinking Water Demands

	MDD (gpm*)	PHD (gpm*)
2021 Existing Ammon System	11,310	16,250
Development Residential	1,170	1,530
Development Commercial	1.1	1.5
Development School	40	50
Development Total	**1,210**	**1,580**
Ammon Total w/ Development	12,520	17,840

* gpm = gallons per minute, an average of demand over the max day or peak hour

Current existing demands for the City of Ammon were taken from other modeling efforts performed for the City earlier this year (Brogan Creek Tech Memo dated 03-25-2021 and addenda).

2.2 SUPPLY ANALYSIS

State Drinking Water Rules require that water system sources (almost exclusively groundwater in Eastern Idaho) provide PHD with any given pump out of service. This requirement can be reduced to meeting only MDD where water storage is available to make up the difference (see Storage Analysis). Ammon's typical mode of operation is to provide MDD with this "equalization" storage as this can reduce pumping costs and impacts to water rights.

Although Ammon's system has several pressure zones, all of its wells are currently located in pressure Zone 1 (valley floor). If the development were to be served through Zone 1 sources, it's impact to the system's "firm capacity" (the total groundwater supply with largest pump out of service) are shown in Table 2. If the development were served through new wells dedicated solely to this pressure zone those wells would need to provide the full 1,210 MDD of new system demand.

TABLE 2 – Supply Capacity Impacts

	Existing System	With Development
MDD (gpm)	11,310	12,520
Firm Capacity (gpm)	13,430	13,430
Surplus/(Deficit) (gpm)	2,110	905

The developer is unaware of any existing groundwater rights associated with this property. This development will need available groundwater rights of at least the MDD, assuming equalization storage is constructed to cover demands beyond MDD.

2.3 STORAGE ANALYSIS

Drinking water storage must provide for the firefighting, operational, and equalization storage needs of the zone(s) it serves. The City typically removes the need for stand-by/emergency storage by including backup power generation at well sites.

Fire flow storage is calculated as the total volume needed to supply the largest applicable fire flow (commercial/school fire event, see Delivery Analysis section). Equalization storage is the volume of water needed to meet any demands greater than the MDD for which well pumps are sized (such as PHD). Operational storage is the tank volume which empties between when the well pump turns off after filling the tank to when the pump is activated again. This reduces pump on/off cycles and has been estimated at 10% of total storage per the 2018 WFPS. Dead storage refers to the tank volume not accessible by booster pumps (minor, 1% assumed here). The total amount of storage needed for this development is shown in Table 3.

TABLE 3 – Storage Capacity Impacts

Category	Required (Gallons)
Dead	7,000
Operational	65,000
Fire Flow	450,000
Equalization	131,000
Standby/Emergency	0
TOTAL	**653,000**

2.4 DELIVERY ANALYSIS

Delivery capacity refers to the system's ability to deliver flow rates at acceptable pressures. The Idaho Drinking Water Rules require that drinking water systems meet the criteria in Table 4.

TABLE 4 - System Pressure Requirements

Flow Condition	Required Pressure
Typical Operating Range	40 psi – 80 psi
Fire Flow Event	20 psi minimum

Required firefighting flows for the City of Ammon depend on land use. Planning demands for new development were reviewed with the Ammon Fire Marshall and are shown in Table 5.

TABLE 5 - Fire Flow Requirements

Property Type	Required Fire Flow
Residential	1500 gpm for 2 hours
Commercial/School	2500 gpm for 3 hours
Industrial	4500 gpm for 4 hours

A pump station delivering flow to the development must be able to supply both PHD. It must also supply MDD during a fire event. Both conditions must be met with any pump out of service (code redundancy requirement). In the case of this development, total pumping capacity required is governed by the commercial/school fire flow requirement and MDD for the total shown in Table 6.

TABLE 6 - Delivery Capacity Impacts

	Flow Rate (gpm)
Fire Flow Demand	2,500
Max Day Demand	1,210
Minimum Pumping Capacity Required	3,710

2.5 SYSTEM IMPROVEMENTS

The proposed development covers a range of elevations that are not currently served by Ammon's drinking water system. This will require the establishment of a new pressure zone. While there are several ways in which the supply, storage, and delivery requirements of this development could be met, the proposed improvements represent our recommendation for a solution that keeps improvements within the developer's control. Other solutions involving sharing of resources with other pressure zones may exist that would require additional buy-in from the City and/or third-party landowners.

Based on discussions with a local hydrogeologist, there is a reasonable chance that a well drilled in the development could produce 2,000 gpm. This means that the new pressure zone will require two separate 1,300 gpm minimum wells, a primary well meeting MDD requirements and an equally sized redundant well. One cost effective solution for this would be to have a main wellhouse with a line-shaft vertical turbine pump and the necessary valves, meters, sampling, etc. for state compliance and to install the other well as a submersible pump piped to the main wellhouse. The submersible well would not need to be housed in a building and could simply be fenced for security.

Due to the variability of local hydrogeology, we recommend that test wells be drilled at proposed well sites to verify suitability prior to finalization and to verify that well areas of influence do not negatively impact neighboring properties. Separation between wells should follow the recommendations of a hydrogeologist but should be no closer than 100 ft from one another. Wells drilled further up the bench in this area have dealt with water quality issues (temperature, pH, etc.); we recommend that well sites be kept on the lower "flat" portion of the proposed development.

A single 653,000-gallon minimum tank should be constructed to meet storage needs. A booster station capable of delivering PHD and MDD plus fire flow should also be constructed adjacent to the tank and set to target a hydraulic grade of 4925 ft in order to ensure minimum pressures are produced during PHD and fire events. While the wells and tank/booster station could be located at two separate sites, transmission piping and other costs will be reduced by placing everything at the same site if space allows. This is the assumption used for the cost evaluation.

Backup power generation should be provided for all facilities; if site spacing is such that backup power cannot be efficiently run to all well and booster pumps from the single permanent generator, then a portable generator and necessary hookups should be provided for the submersible well. Space for a future chlorination system should also be provided at the wellhouse.

WaterCAD hydraulic modeling software was used to evaluate the placement and capacity of improvements required to meet the pressure and flow requirements previously described. A proposed system layout is shown in Figure 2. Pipe diameters shown are nominal and were sized to facilitate pressure requirements and future expansion of the zone to the north and south. See Appendix C for detailed modeling results.

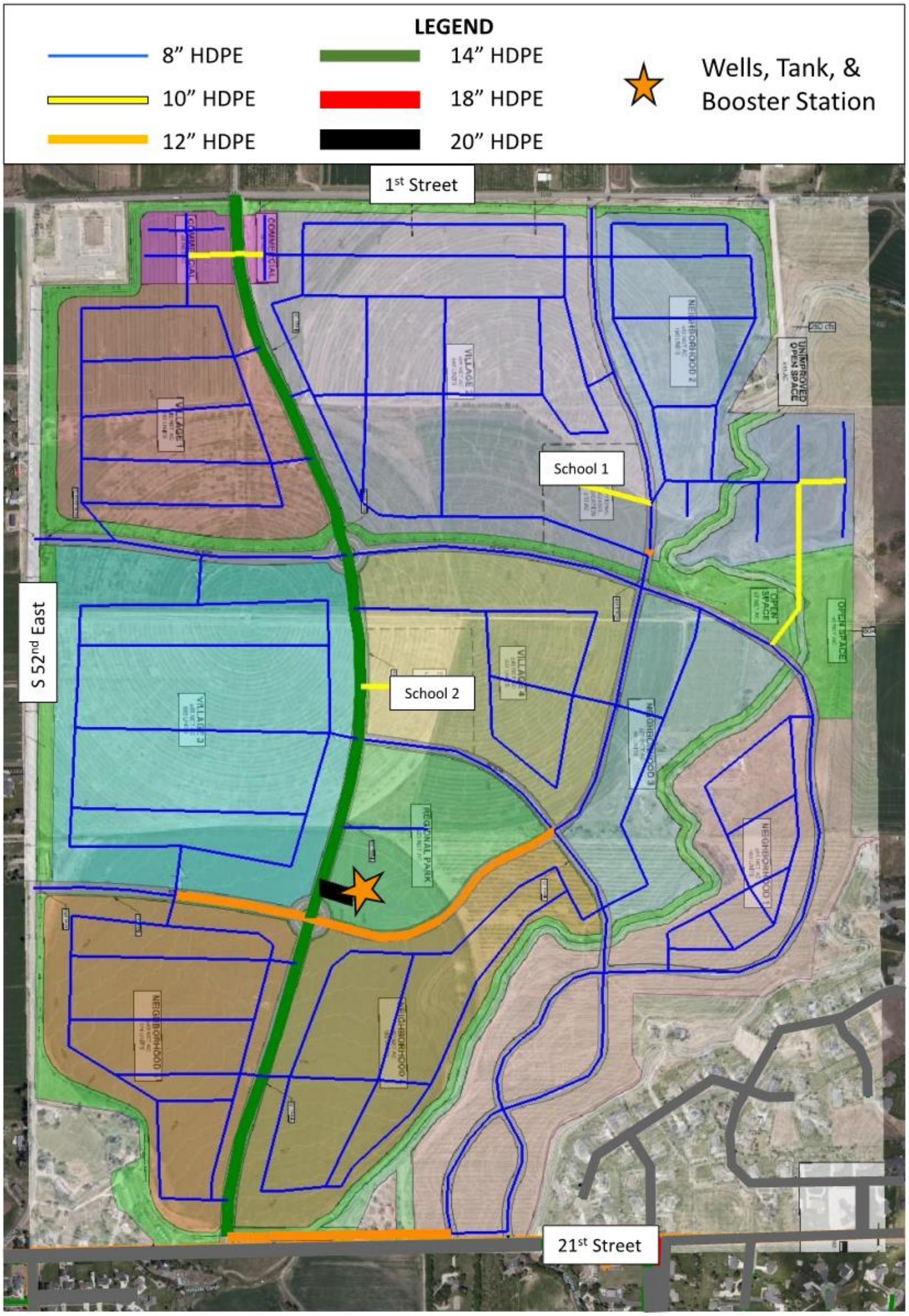

FIGURE 2 – Proposed Drinking Water Improvements

The system was modeled with DR 11 HDPE pipe and features a combination of 14" and 12" diameter water transmission lines for equivalent functionality to the recommendations found in the 2018 WFPS. 8" and 10" distribution lines shown were generically placed to provide even coverage over the development and do not correspond to actual minor street locations (unknown at time of evaluation). Planning and placement of actual drinking water distribution lines should follow roadway alignments. We recommend that the model be updated with actual water line locations in order to verify suitability of waterline and pump station placement before improvements are designed. Though not shown in Figure 2, we recommend that emergency supply from pressure zone 2 through a pressure reducing valve also be provided to mitigate the effects of a major catastrophe at the booster station.

It became apparent while modeling that the span of elevations encompassed by the development may be slightly too large to be contained within a single pressure zone without causing pressure issues (too high at the bottom or too low at the top). The City of Ammon has indicated that rather than split this development into two zones, individual pressure reducing valves (PRVs) should be installed on all homes whose pressures exceed the 80 psi maximum during low demand times (typically winter months). Modeling results in Appendix C show locations where pressures approach 80 psi; however, model results assume 5 psi variability and installation of individual PRVs should be determined by actual system pressures once constructed.

The modeling shows that the pumps in Table 7 satisfy the pressure and flow demands described previously. This exercise is only intended to provide estimates of pump size and number; these values should be confirmed through further analysis during design of the actual improvements. A booster station consisting of six pumps, two fire flow pumps, two main pumps and two smaller pumps, is proposed to meet the anticipated range of flows and to satisfy state redundancy requirements.

TABLE 7 – Model-Based Pump Selection

Wells	
Number of Wells	2
Minimum Design Flowrate Each (gpm)	1,300
Design Head (ft)	117
Estimated Horsepower Each	60
Booster Station	
Design Head (ft)	200
Target Hydraulic Grade (ft)	4,925
(2) 100 HP Fire Flow Pumps - Design Flowrate (gpm)	1,300
(2) Main Pumps - Design Flowrate (gpm)	800
(1) 40 HP Intermediate Pump - Design Flowrate (gpm)	500
(1) 30 HP Low-Flow Pump - Design Flowrate (gpm)	350

All facilities should feature variable frequency drives and meet all other City of Ammon requirements. The booster pumps presented assume full build-out conditions, it may be necessary to adjust or install temporary pumps to accommodate phased construction of the development. The developer will coordinate supply solutions for phased build out separately with the City.

An opinion of cost for the wells, tank, and booster station improvements is provided in Table 8. Costs assume a buried tank with the booster station constructed above, similar to the Ammon Well 13 project currently under construction. Pipeline costs have not been included in these values as the development layout (which will determine the length of pipe required) has not been finalized. Market volatility continues to be high for pipe and other infrastructure components; the costs shown include a 30% contingency amount and are order of magnitude level only. Additional details are presented in Appendix D.

Table 8 – Drinking Water Improvements Opinion of Cost

Engineer's Opinion of Cost	
Wells	$1,748,000
Tank and Site	$2,757,000
Booster Pump Station	$1,460,000
Professional Services	$1,213,000
TOTAL	**$7,177,000**

APPENDICES

Appendix A – Developer's Concept Layout

Appendix B – Calculations

Appendix C – Modeling Results

Appendix D – Cost Estimates

APPENDIX A – DEVELOPER’S CONCEPT LAYOUT

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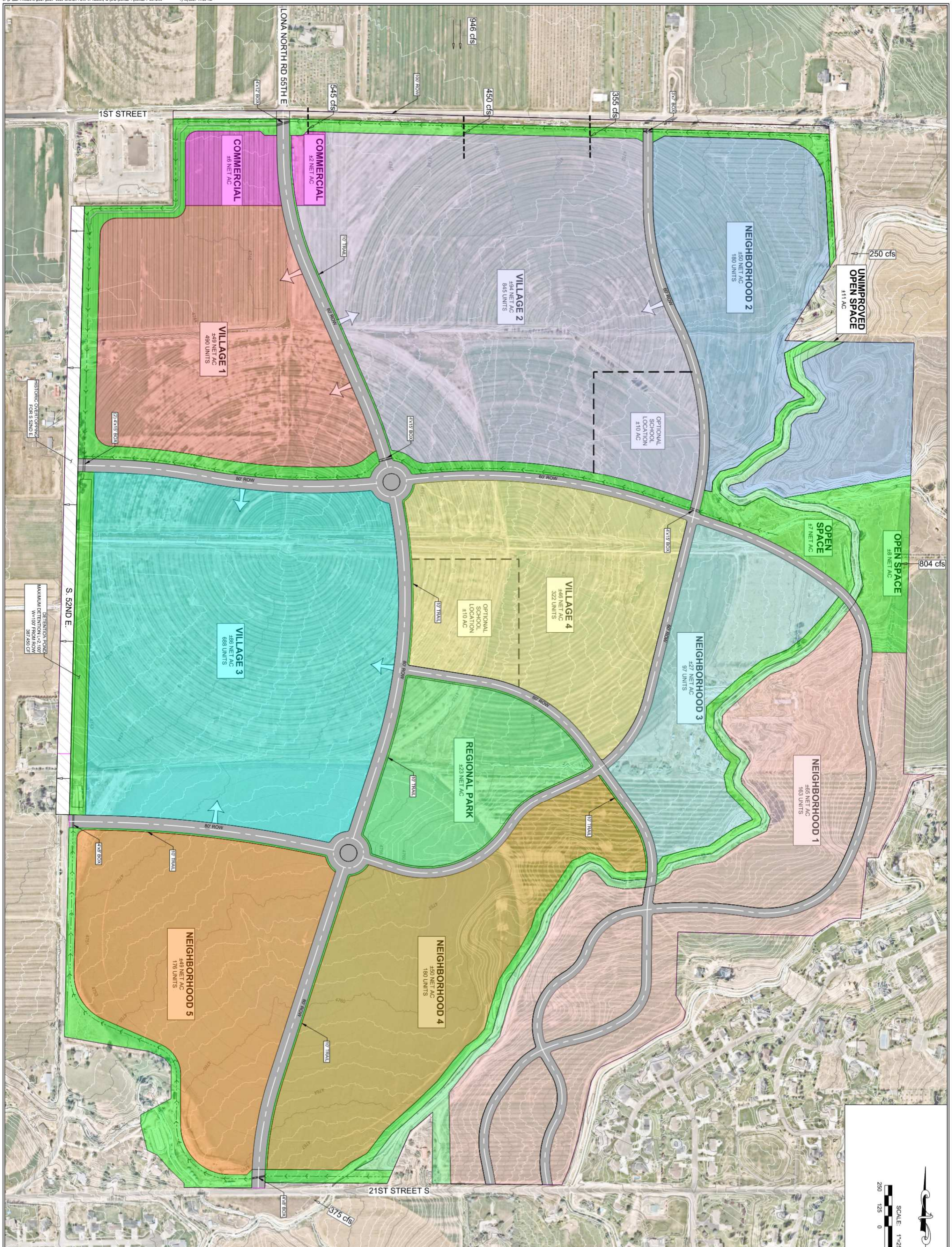

SHEET 1	LEI PROJECT #: 2021-0020 DRAWN BY: VS DESIGNED BY: GDM/JWA SCALE: 1"=250' DATE: 7/15/2021	REVISIONS 1. - 2. - 3. - 4. - 5. -	**FLAGSHIP HOMES** CITY OF AMMON, IDAHO CONCEPT PLAN	NOT FOR CONSTRUCTION

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APPENDIX B - DRINKING WATER CALCULATIONS

DEMANDS

Base Demands (GPM)		
	117	gpcd winter day demand (2018 WFPS)
	2.96	people/household (2015-2019 average density per US Census Bureau QuickFacts)
	1.5	Culinary Winter to Summer Factor (from Kuna)
	1.03	Avg Winter Day to MDD Factor (previous modeling, see #219067)
	1.35	Avg Winter Day to PHD Factor (previous modeling)
	3141.00	Total Housing Units
	9297.36	Subdivision Population Added
Residential		
MDD	0.37	GPM/household
PHD	0.49	GPM/household (0.51 gpm/household used in 2019/2020 modeling)
MDD	1,167	GPM, Total Residential Demand Added
PHD	1,530	GPM, Total Residential Demand Added
Commercial		
	1,039	gpd Avg Winter Day
	1,558	gpd max month
MDD	1.1	GPM Total
PHD	1.5	GPM Total
School		
	25.1%	School age (5-17) % of Population (US Census Bureau QuickFacts)
	1,167	k-5 students
	583	6-8 students
	778	9-12 students
	33,546	Elementary School GPD
	20,419	Jr High GPD
	0	High School GPD
MDD	38.60	GPM, Schools Total
PHD	50.59	GPM, Schools Total
TOTAL NEW DEMAND		
MDD	1,207	GPM
PHD	1,582	GPM
WDD	781	GPM
TOTAL SYSTEM DEMAND (Current and New)		
MDD	12,520	GPM
PHD	17,835	GPM
Fire Flow Demands (GPM)		
Residential	1500	for 2 hrs
Commercial/K-12	2500	for 3 hrs
College/Industrial	4500	for 2 hrs

Assumes Elementary and Jr High only, no High School. Gal/Day/Student values from IDAPA 58.01.03 with 20% consumption assumed to go from wastewater to potable water usage.

Elementary (cafeteria, no showers) = 29 gal/day/student

Jr High (cafeteria, showers) = 35 gal/day/student

Commercial Demand Details

Address	Business	Jan 2016 Metered Usage (Gal/Month)	
1615 Market Way	Taqueria El Rodeo	1029	
1639 Market Way	Posh Hair and Nail Salon	3449	
3379 E 17th St	Subway Restaurant	5471	
1675 Market Way	Domino's Pizza	9790	
1655 Market Way	Petal Passion Floral	312	
1665 Market Way	Ripp'd Nutrition	899	
3415 E 17th St	Ace Hardware	2338	
3475 E 17th St.	Walgreens	8829	
3456 E 17th St.	Business Park	91	
	TOTAL:	32208	gal/month
		1,039	gpd
		0.72	avg gpm

This area of Ammon has mixed commercial/business usage and is approximately 8 acres in total to match the commerical area of this subdivision. Intersection of Ammon Road and 17th Street.

Model Demand Summary

Area	Base MDD	Units	Total MDD	Nodes	Demand per Node	
Commercial	-	-	1.11	10	0.11	
Village 1	0.37	490	182.07	11	16.55	
Village 2	0.37	845	313.98	29	10.83	- Not including school area
Neighborhood 2	0.37	180	66.88	24	2.79	
Village 3	0.37	688	255.64	16	15.98	
Village 4	0.37	322	119.65	6	19.94	- Not including school area
Neighborhood 3	0.37	97	36.04	4	9.01	
Neighborhood 1	0.37	163	60.57	15	4.04	
Regional Park	-	0	-	1	0.00	
Neighborhood 5	0.37	176	65.40	21	3.11	
Neighborhood 4	0.37	180	66.88	22	3.04	
School - Village 2			19.30		19.30	
School - Village 4			19.30		19.30	

SUPPLY ANALYSIS

Existing System					
Well ID	Production (gpm)	Motor hp	VFD	Emergency Power?	Year Drilled
Well 2	325	25	No	No	1952
Well 3 (inactive)		50	No	No	1957
Well 5	1000	100	No	No	1967
Well 6 (inactive)		75	Yes	Yes	1973
Well 7	1850	200	No	No	1968
Well 8	4200	400	Yes	Yes	1996
Well 9	1850	200	Yes	Yes	2001
Well 10	3000	400	Yes	Yes	2008
Well 11	3000	500	Yes	Yes	2008
Well 13	2400	200	Yes	Yes	2020
Total	17625				
Firm Capacity	13425				

System Wide			
	2020 Pop	**2021 + Development**	
MDD	11,313	12,520	gpm
Firm Capacity	13,425	13,425	gpm
Surplus/(Deficit)	2,112	905	gpm

Zone Specific			
	2020 Pop	**2021 + Development**	
MDD	0	1,210	gpm
Firm Capacity	0	0	gpm
Surplus/(Deficit)	0	(1,210)	gpm

Well Assumptions

		Elev	Static H2O Depth	H20 Elev	
	Well 11	4740	52	4688	ft
	Well 9	4819	124	4695	ft
		New Well Elev		4755	ft
	Lift to Surface from 4688'			67	ft
		Lift to Tank (buried)		0	ft
		Minor Losses		10	ft
Drawdown, Decline, Seasonal Variation				40	ft
			TDH	117	ft

		New Wells			
		Q	H	hp calc	hp Actual
	Prime	1300	117	53	60
Redundant		1300	117	53	60

DELIVERY ANALYSIS

		WDD	780	gpm		
		MDD	1210	gpm		
		MDD+FF	3710	gpm		
		PHD	1580	gpm		
		Option 2				
		Booster				
		Q	H	hp calc	hp Actual	
		800	200	56	60	
		800	200	56	60	
		1300	200	91	100	
		1300	200	91	100	
			Flow Range Served (GPM)			
(2) 100 HP Fire Pumps			750	to	1300	each
(2) 60 HP Main pumps			400	850	800	each
Combo of 30 HP and 50 HP			200	to	850	
40 HP Intermediate Pump			250	to	500	
30 HP Low Flow Pump			175	to	350	
*Assumes safe operation of pumps in middle third of curve, with Design Point being upper end of that third (i.e. lower end equals design point divided by 2).						

Per state code, must be able to produce the larger of Peak Hour Demand or Max Day Demand Plus Fire Flow with any pump out of service.

Target hydraulic grade for pumps was determined through hydraulic modeling, see Appendix C.

Alternate option for pump sizing below:

		Option 1				
		Booster				
		Q	H	hp calc	hp Actual	
		1000	200	70	75	
		1000	200	70	75	
		1000	200	70	75	
		1000	200	70	75	
			Flow Range Served (GPM)			
(4) 75 HP Main pumps			500	to	1000	each
Combo of 30 HP and 50 HP			200	to	1000	
50 HP Intermediate Pump			300	to	600	
30 HP Low Flow Pump			200	to	400	

STORAGE ANALYSIS

Fire Storage

Largest Fire Flow =		2500	gpm
	for:	3	hrs
Required Fire Storage		450000	gal
		0.4500000	MG

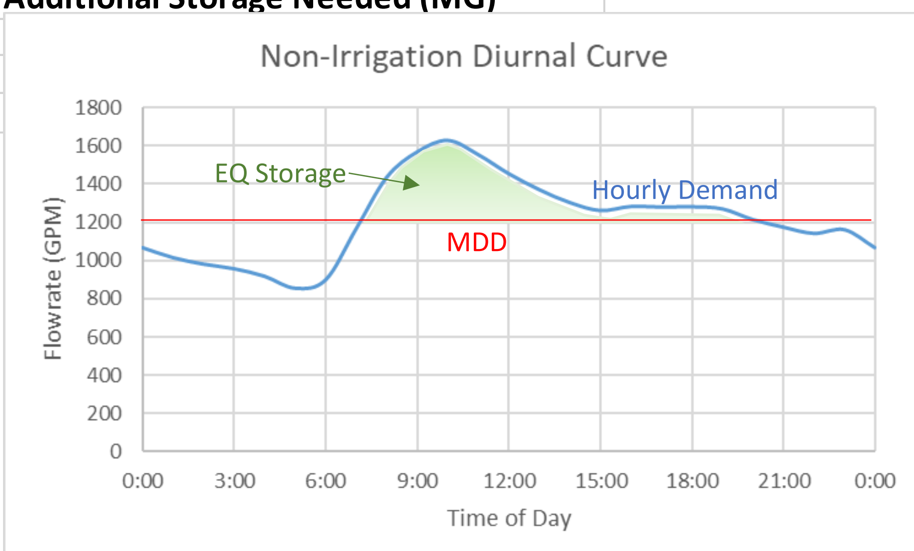
Operational and Dead Storage

Operational Storage Req'd:		10%
	Dead Storage Req'd:	1%

Equalization Storage if Well Capacity = MDD

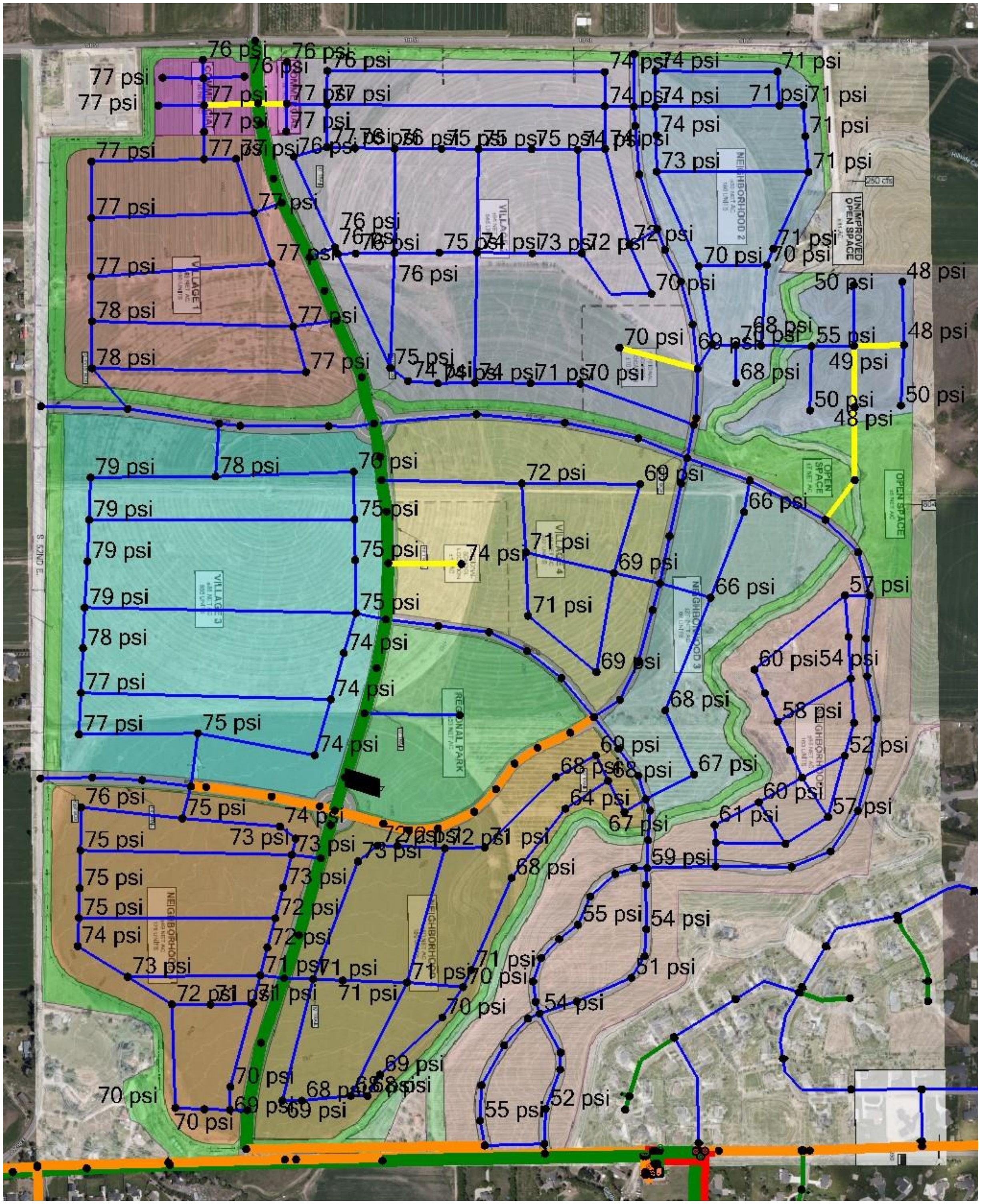
Development MDD(gpm)	Cumulative Storage (gal)	EQ Storage (gal)	Hour	Smooth Unit Demand
1068	-8324	-9887	0:00	0.885
1016	-19773	-12473	1:00	0.842
982	-33270	-14220	2:00	0.814
958	-48213	-16112	3:00	0.794
919	-65495	-19159	4:00	0.761
856	-86532	-19736	5:00	0.710
900	-104967	-10446	6:00	0.745
1166	-107425	5604	7:00	0.966
1435	-93759	17651	8:00	1.189
1568	-72123	23428	9:00	1.299
1627	-46903	22995	10:00	1.348
1553	-26133	17788	11:00	1.287
1454	-11327	12302	12:00	1.204
1370	-1530	7778	13:00	1.135
1303	4230	4519	14:00	1.080
1262	7509	3916	15:00	1.045
1283	12062	4456	16:00	1.063
1280	16421	4399	17:00	1.060
1281	20860	4111	18:00	1.061
1270	24642	2103	19:00	1.052
1214	25066	-762	20:00	1.006
1175	23118	-2917	21:00	0.973
1142	19232	-3308	22:00	0.946
1161	16502	-5527	23:00	0.962
1068			*23:59*	0.885
1218			AVERAGE:	
	0.03	0.13	Required EQ Storage (MG)	
		0.131	EQ Deficit (MG)	
		0.653	**Additional Storage Needed (MG)**	
Population:	9297			
MDD:	1,207	gpm		

Equalization storage is the cumulative amount of volume over a day required by the system beyond the well supply capacity serving the tank.



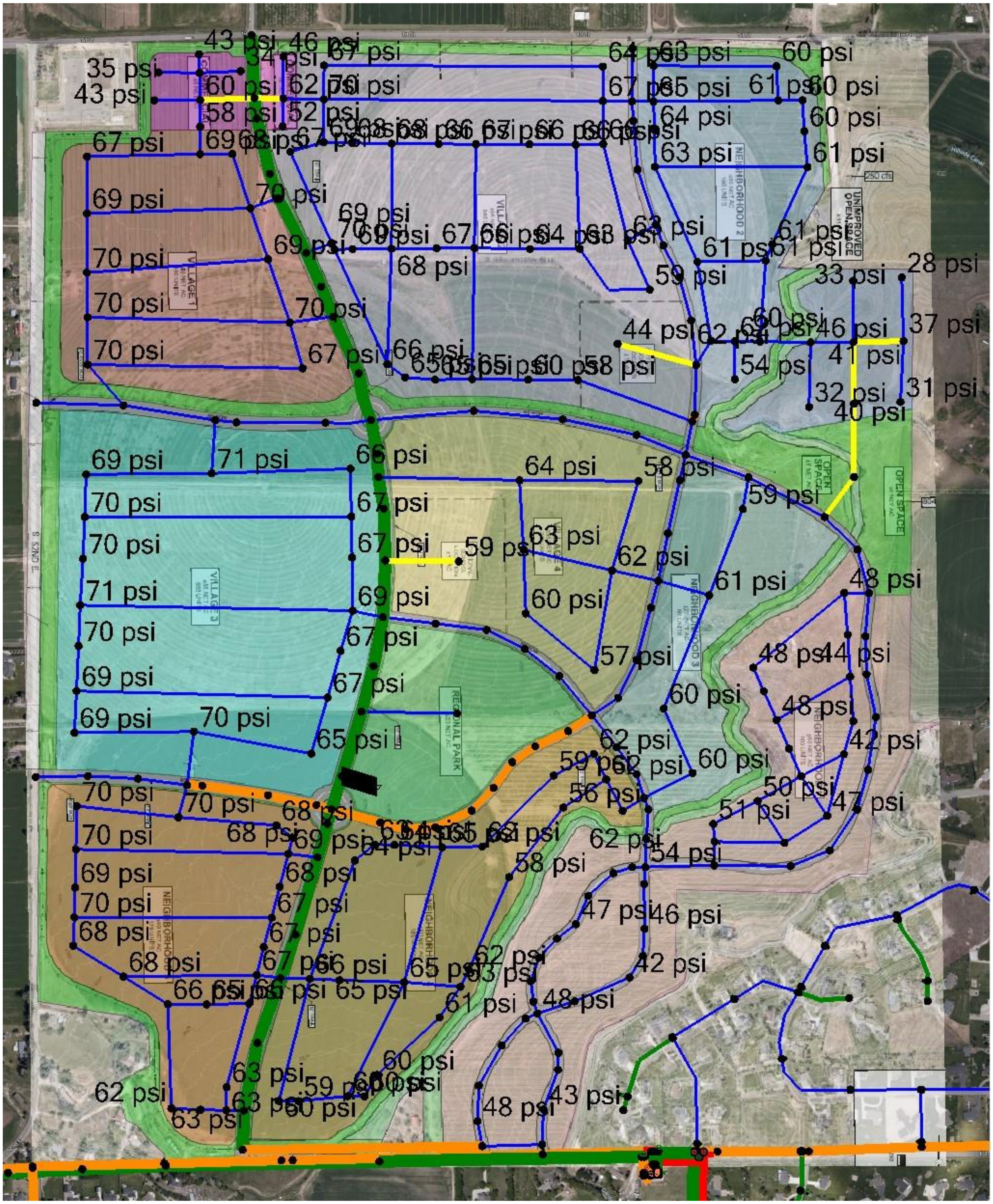
APPENDIX C - DRINKING WATER MODELING RESULTS

MAXIMUM DAY DEMAND



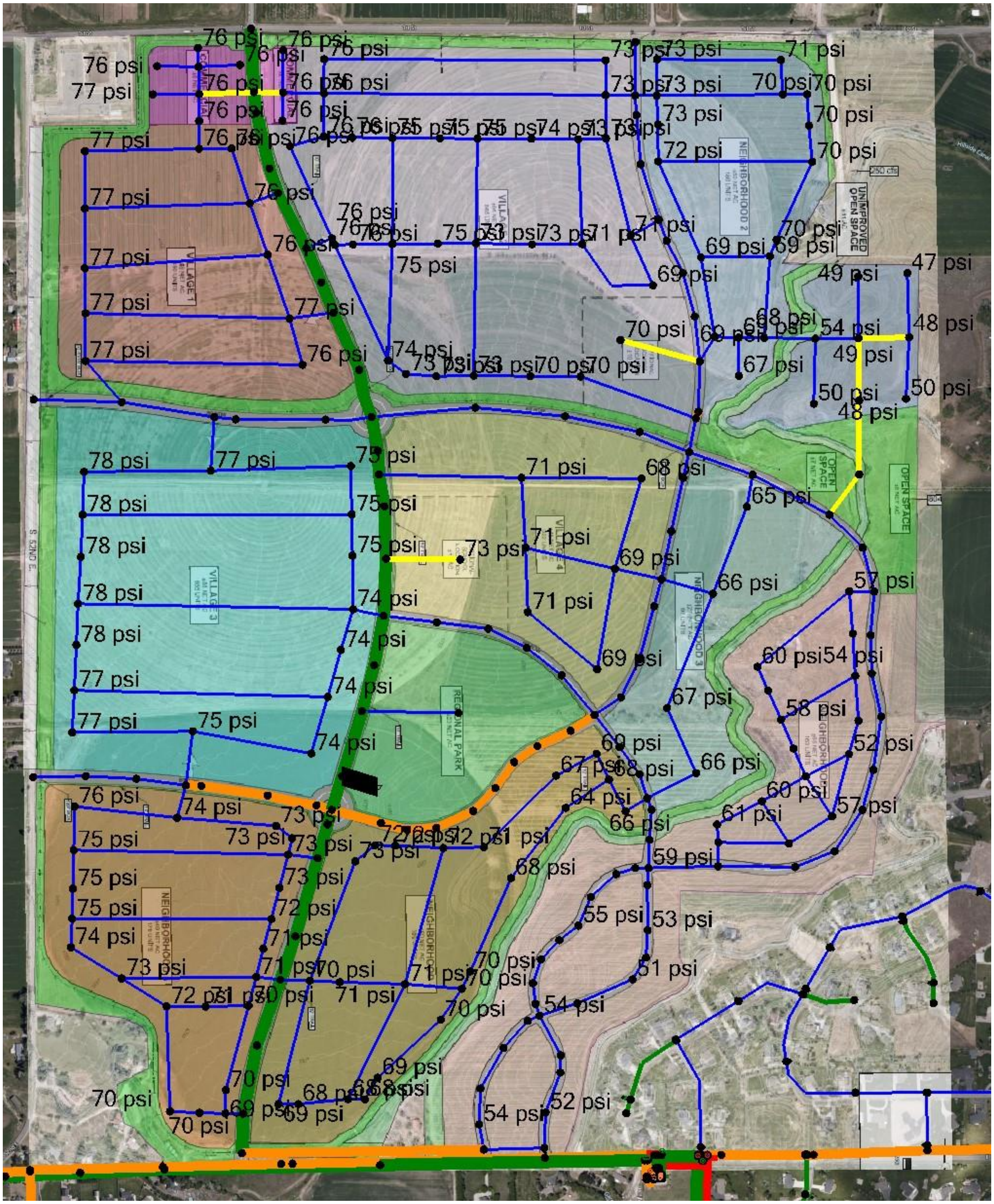
*For all model runs a 5 psi buffer from specified pressure limits was used to ensure satisfactory performance. All scenarios feature a booster station supplying 4,925 ft target discharge hydraulic head. All results produced in Bentley’s OpenFlows WaterCAD CONNECT Edition hydraulic modeling software.

MAXIMUM DAY DEMAND WITH FIRE FLOWS

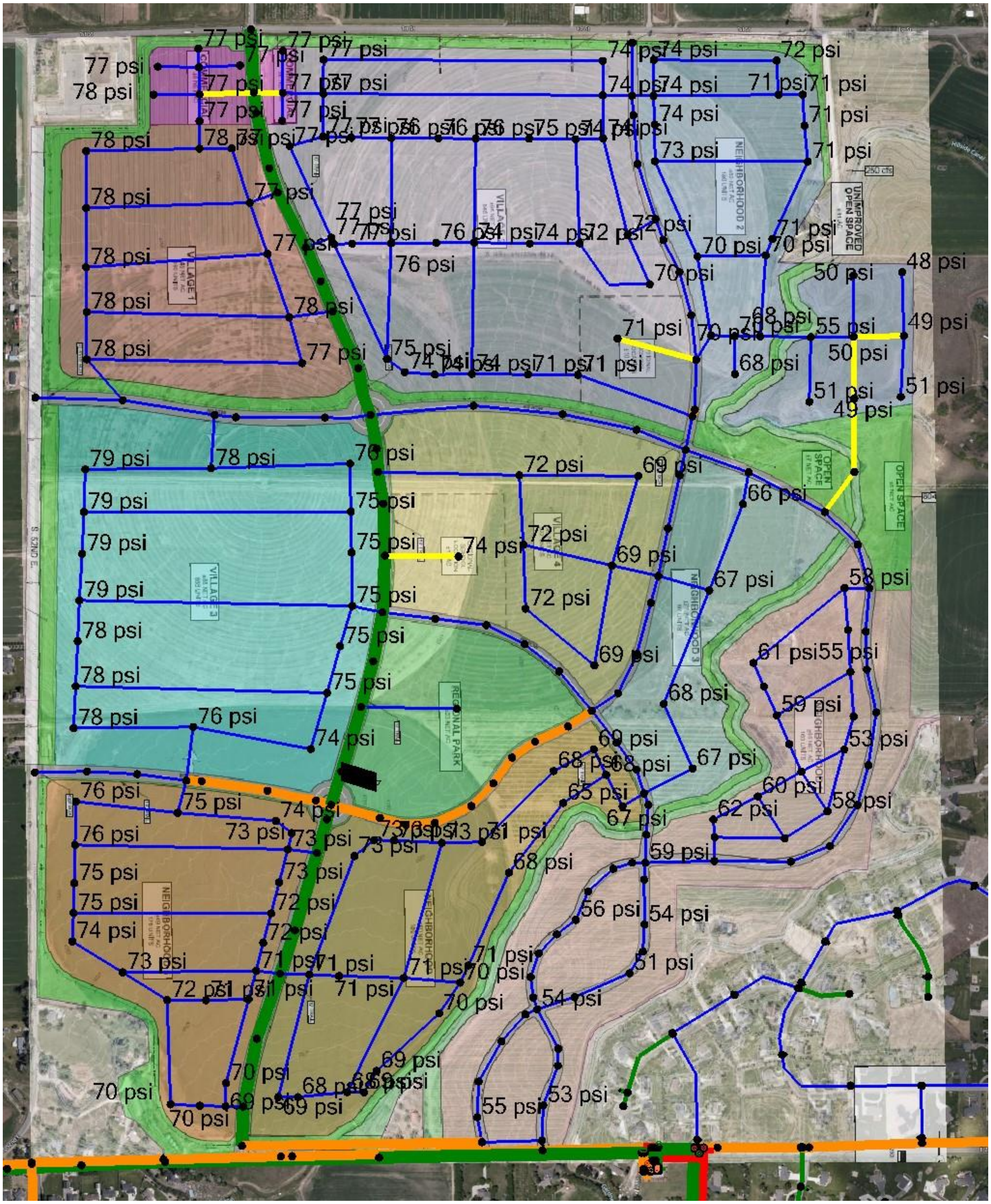


Pressures shown are the residual pressure at each node under its assigned fire flow requirement. All nodes met or exceeded MDD plus fire flow requirements without dropping any node in the zone below 20 psi.

PEAK HOUR DEMAND



WINTER DAY DEMAND



*Any nodes that report pressures above 75 psi (80 psi max minus 5 psi factor of safety modeling buffer) may exceed state standards for max pressure depending on actual system performance.

APPENDIX D - OPINION OF COST

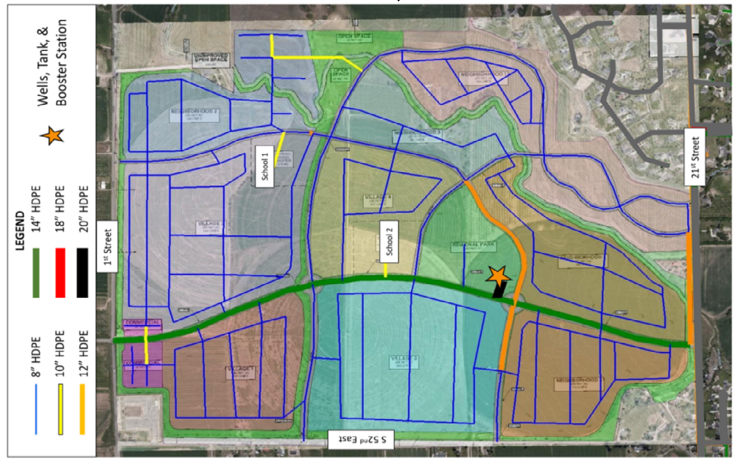
Capital Improvements Project BCP Development	**Project Location:** Ammon, ID

Project Identifier:
BCP Development

Objectives:
- Create a new pressure zone by installing wells, a tank, and a booster station.

Potential Issues:
- Current supply chain and labor issues

Assumes:
- Wells, tank, and booster station are built at the same site.
- Tank is buried cylindrical AWWA Type 3 prestressed concrete.
- Booster station sits above tank as at Well 13 facility.
- **Does not include transmission/distribution line costs (including emergency PRVs from Zone 2 or canal crossings) as subdivision layout has not yet been finalized.**



General Line Items	Unit	Unit Price	Estimated Quantity	2019 Cost
Wells				
Test Well	EA	$ 45,000	2	$ 90,000
Well Drilling	EA	$ 200,000	2	$ 400,000
Well Pump (Vertical Turbine) - 60 HP	EA	$ 100,000	1	$ 100,000
Well Pump (Submersible) - 60 HP	EA	$ 80,000	1	$ 80,000
Mechanical Piping	LS	$ 60,000	1	$ 60,000
Main Well Building - CMU Construction	SF	$ 210	1500	$ 315,000
IndoorBackup Generator	LS	$ 203,000	1	$ 203,000
Booster Station Building				
Booster Station Building - CMU Construction	SF	$ 210	2030	$ 426,300
Fire Flow Pumps (Vertical Turbine) - 100 HP	EA	$ 96,000	2	$ 192,000
Main Pumps (Vertical Turbine) - 60 HP	EA	$ 78,000	2	$ 156,000
Intermediate Pump (Vertical Turbine) - 40 HP	EA	$ 69,600	1	$ 70,000
Low-Flow Pump (Vertical Turbine) - 30 HP	EA	$ 48,000	1	$ 48,000
Mechanical Piping	LS	$ 150,000	1	$ 150,000
Tank & Site				
Cast-in-Place Concrete Tank - 660,000 gallons	LS	$ 726,000	1	$ 726,000
Yard Piping	LS	$ 290,000	1	$ 290,000
Site Concrete and Asphalt	LS	$ 83,000	1	$ 83,000
Plumbing, Electrical, and HVAC	LS	$ 750,000	1	$ 750,000
Instrumentation and Controls (SCADA)	LS	$ 50,000	1	$ 50,000
Site Grading	LS	$ 20,000	1	$ 20,000
Landscaping & Fencing - Basic	LS	$ 50,000	1	$ 50,000
Construction Subtotal				***$ 4,259,300***
Mobilization	%	10%		$ 426,000
Contingency - % of construction costs	%	30%		$ 1,278,000
Total Construction Costs				***$ 5,963,300***
Professional Services				
Additional Services (Permitting, Geotech, Legal)	LS	$ 20,000	1	$ 20,000
Engineering and CMS	LS	$ 1,193,000	1	$ 1,193,000
Total Project Cost (rounded)	***$7,177,000***			