



**AFC File No: 2302**

July 25, 2023

Alto Utilities  
10397 Lodge Road  
Lake Country BC  
V4V 1V6

Attention: Mr. Keith Hansen  
Owner

Dear Keith,

**RE: Alto Utilities  
Asset Management Plan**

We are pleased to submit the developed Asset Management Plan (AMP) for Alto Utilities. The main objective when developing the AMP was to provide Alto Utilities with a functional tool that helps planning ahead to achieve the following two main objectives:

- Getting the most value from the assets owned by the utility.
- Having the financial resources available to replace the assets when necessary.

This AMP uses a tool developed in Excel that should be considered a live document. It provides the utility and their owners/operators a useful mean to continuously monitor the existing assets and their forecasted replacement dates and costs. The tool allows for cash flow analysis of the Renewal Reserve Fund and determining the appropriate annual contribution allocation.

This document provides a description of the Excel tool developed, its dashboard and instructions on how to use it for a successful asset management.

The developed AMP in this report includes the sections listed below:

- Alto Utilities System Information
- Asset Inventory
- Replace Asset Order
- Replacement Cost Calculations
- Contributions to Renewal Reserve Fund
- AMP Dashboard and AMP Analysis
- Renewal Timing

- Maximize Asset Useful Life
- Summary
- Appendix with water system maps

## 1. ALTO UTILITIES SYSTEM

The Alto Utilities System provides water to the Clearwater Subdivision and a few additional properties in Lake Country, BC. The system started operation in the early 1970s. It supplies potable water for domestic consumption of residential units, one school and one church.

### AREA OF SERVICE

Figure 1 shows the properties currently serviced by Alto Utilities highlighted in blue.

**Figure 1 – Properties Serviced by Alto Utilities Highlighted in Blue**



## WATER SOURCES

The system uses two wells as the water sources. Both wells draw water from provincially mapped confined Aquifer 344. A brief description of the two wells is summarized in Table 1.

**Table 1 – Groundwater Wells Summary**

Well ID	Well Tag Number	Finished Well Depth [m]	Diameter [mm]	Construction Date	Depth to Water [m]	Reported Well Yield [Usgpm]	Reported Well Yield [L/s]
Norh Well	83230	26.2	250	1977	1.1	588	37.1
South Well	83017	34.5	305	2002	1.5	620	39.1

Data Source:

Assessment of Differing Manganese Concentrations in Groundwater and Recommendations for a Third Production Well: Alto Utilities Production Wells, Lake Country, BC, Western Water Associates Ltd., February 7, 2023

## PRESSURE ZONES

The system is comprised of two pressure zones as described below:

- Upper Pressure Zone, serviced by Velda Reservoir with the top water level (TWL) at 523.5 m of elevation.
- Lower Pressure Zone, serviced by Cheryl Reservoir with the TWL at 486 m of elevation and Darlene Reservoir with the TWL at 503 m of elevation. Darlene Reservoir is connected to the system through the Darlene PRV.

## NUMBER OF CONNECTIONS

The properties serviced by Alto Utilities are as follows:

### Upper Pressure Zone

- 166 Single Family Units

### Lower Pressure Zone

- 230 Single Family Units
- 32 Multi-family units
- 1 Elementary School
- 1 Church

## 2. ASSET INVENTORY

The asset inventory is a list of items of value owned by the utility. Land has not been included in this AMP as it is not subjected to the same renewal process of all other assets. Each item included in the inventory has associated information as described below.

### ASSET CLASSES

The utility assets are categorized as one of the following alphabetically ordered classes with the indicated unit of measurement. Sub-classes are indicated where applicable.

- Air Release Valves (ARV) Each
- Blow Off Each
- Booster Station Each
- Building Each
- Container Each
- Fencing Each
- Gate Valve Each
  - Size (Diameter)
- Hydrant Each
- Pipe lineal metre (m)
  - Material
  - Size (Diameter)
- Pressure Reducing Valve (PRV) Each
- Reservoir volume in cubic metres (m<sup>3</sup>)
- Service Each
- Shed Each
- Tools Each
- Well Each
  - Case Diameter

### REPLACEMENT UNIT PRICE AND USEFUL LIFE

The estimated unit price for asset replacement and the anticipated useful life are included in this AMP for each of the identified Asset Classes. The total replacement unit price includes a 10% contingency allowance and a 15% engineering cost.



Table 2 shows the adopted values for the Alto Utilities AMP.

**Table 2 – Replacement Unit Price and Adopted Useful Life for Alto Utilities Assets**

Water System Asset Class	Unit	Replacement Unit Price	Engineering and Contingency	Total Estimated Replacement Unit Price	Adopted Useful Life [yr]
ARV	Each	\$15,000	\$3,750	\$18,750	50
Blow off	Each	\$7,250	\$1,813	\$9,063	50
Hydrant	Each	\$9,000	\$2,250	\$11,250	75
Services	Each	\$4,500	\$1,125	\$5,625	75
100 Gate Valve	Each	\$1,800	\$450	\$2,250	50
100 AC Pipe	m	\$150	\$38	\$188	75
100 PVC Pipe	m	\$150	\$38	\$188	100
150 Gate Valve	Each	\$2,000	\$500	\$2,500	50
150 PRV	Each	\$100,000	\$25,000	\$125,000	50
150 AC Pipe	m	\$200	\$50	\$250	75
150 PVC Pipe	m	\$200	\$50	\$250	100
200 Gate Valve	Each	\$2,400	\$600	\$3,000	50
200 AC Pipe	m	\$250	\$63	\$313	75
200 DI Pipe	m	\$250	\$63	\$313	75
200 PVC Pipe	m	\$250	\$63	\$313	100
250 Gate Valve	Each	\$3,500	\$875	\$4,375	50
250 PVC Pipe	m	\$350	\$88	\$438	100
Concrete Reservoir	m3	\$1,000	\$250	\$1,250	100
Booster Station	Each	\$200,000	\$50,000	\$250,000	50
300 Groundwater Well	Each	\$105,000	\$26,250	\$131,250	60
250 Groundwater Well	Each	\$85,000	\$21,250	\$106,250	60
Building	Each	\$95,000	\$23,750	\$118,750	75
Shed	Each	\$15,000	\$3,750	\$18,750	35
Container	Each	\$5,000	\$1,250	\$6,250	50
Tools	Each	\$20,000	\$5,000	\$25,000	50
Fencing	Each	\$18,000	\$4,500	\$22,500	30

## ITEM COUNT

Each one of the system assets is recorded in the Excel tool including its class, material and size when applicable, quantity unit and year installed. Optional fields for current condition description and service history comments are provided.

The cells in Excel are colour coded with blue and light blue cells allowing information editing. Grey and dark grey cells are calculated and should not be changed. The worksheet is protected to prevent changes of calculated cells.

Figure 2 shows a screen shot of the columns used for item counting in the AMP Tool.

**Figure 2 – AMP Worksheet used for Item Counting**

Item ID	Old Asset	Description	Class	Material Size	Quantity	Unit	Year Installed	Current Condition	Service History or Comments	Current Age	Expected Useful Life [yr]	Adjusted Useful Life [yr]
ARV1	400	ARV	ARV		1	each	1978			45	50	50
BO1	402	Blow off	Blow off		1	each	1978			45	50	50
BO2	403	Blow off	Blow off		1	each	1974			49	50	50
BO3	404	Blow off	Blow off		1	each	1987			36	50	50
BO4	405	Blow off	Blow off		1	each	1987			36	50	50
BO5	406	Blow off	Blow off		1	each	2003			20	50	50
BO6	407	Blow off	Blow off		1	each	2007			16	50	50
BO7	408	Blow off	Blow off		1	each	2007			16	50	50
BO8	409	Blow off	Blow off		1	each	2013		c/w test station	10	50	50
BO9	410	Blow off	Blow off		1	each	1972			51	50	50
GV1	300	200 Gate Valve	Gate Valve	200	1	each	1987			36	50	50
GV10	309	150 Gate Valve	Gate Valve	150	1	each	1975			48	50	50
GV11	310	150 Gate Valve	Gate Valve	150	1	each	1975			48	50	50
GV12	311	150 Gate Valve	Gate Valve	150	1	each	1975			48	50	50
GV13	312	150 Gate Valve	Gate Valve	150	1	each	1975			48	50	50
GV14	313	150 Gate Valve	Gate Valve	150	1	each	1975			48	50	50
GV15	314	150 Gate Valve	Gate Valve	150	1	each	1974			49	50	50

### 3. REPLACE ASSET ORDER

The Asset Replacement Order is dictated by the replacement date calculated by the AMP Tool. The replacement date is calculated based on the following factors:

- Useful Life in years for each asset class. The adopted useful life in years provides a guide on the expected life span of each asset.
- Adjusted Useful Life in years is the parameter used for calculation of the replacement date. It is equal to the adopted useful life by default. The Adjusted Useful Life field is editable to allow for unexpected changes on specific assets, this could increase or decrease the anticipated life span.
- Year of installation for each asset.
- Date of analysis.
- Remaining useful life in years.

### 4. REPLACEMENT COST CALCULATION

The current replacement cost is calculated as the Total Estimated Replacement Unit Price multiplied by the asset quantity recorded for each item.

The AMP Tool calculates the adjusted estimated replacement cost at the date of replacement based on adopted inflation rate and adopted return rate on the reserve funds invested by the utility.

The investment rate return is based on market conditions and the rates Alto Utilities has experienced in the previous years.

The inflation rate is based on CPI data published by Statistics Canada since 1850 and included in the AMP Tool for reference.

## 5. CONTRIBUTION TO RENEWAL RESERVE FUND

The AMP Tool provides two graphs based on the Renewal Reserve Fund Balance expected as per the following parameters previously calculated within the tool:

- Asset anticipated replacement date.
- Asset current replacement cost.
- Adopted Inflation Rate.
- Adopted Investment Return Rate.
- Asset replacement cost at replacement date.
- Adopted annual reserve fund contribution.

The AMP Tool allows changing in the dashboard the annual reserve fund contribution to always have a positive balance in the reserve fund. See next section of this report for AMP results.

## 6. AMP DASHBOARD AND PROPOSED PLAN

The AMP Dashboard requires the following input data:

- Date of analysis with the following format DD MM YYYY. The analysis date for the results included in this report is 30 06 2023.
- Adopted Inflation Rate. The adopted rate, based on historical CPI Index, for this report is 2.50 %.
- Adopted Annual Investment Return Rate. The adopted rate for this report is 4.25% which matches the historical rates experienced by Alto Utilities.
- Current Reserve Fund Balance. The used figure is \$653,780 according to information provided by Alto Utilities.

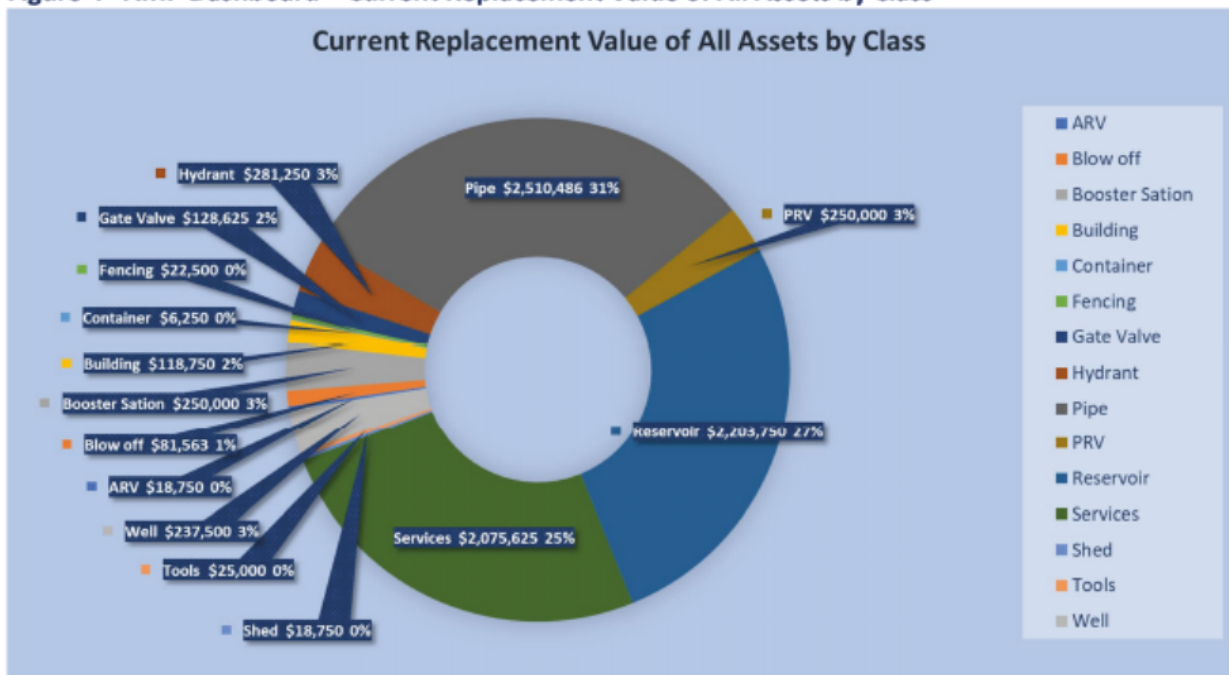
Figure 3 shows a screenshot of the above-described input data in the AMP Dashboard and the current calculated replacement cost in 2023 Canadian Dollars.

**Figure 3 – Top of AMP Dashboard**



The Dashboard presents a breakdown of the utility assets by asset class and shows the total class current replacement value. See Figure 4.

**Figure 4 – AMP Dashboard – Current Replacement Value of All Assets by Class**



The total current replacement value of the Alto Utilities renewable assets is estimated at \$8,241,932 in 2023 dollars. The three major asset classes are:

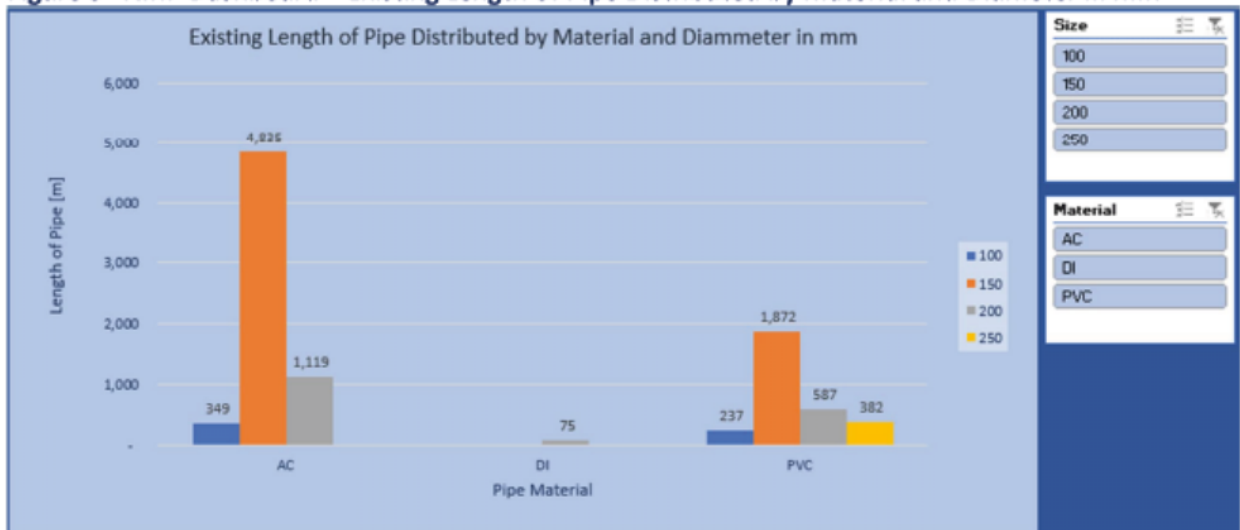
- Existing pipes at \$2,510,486 (31% of the total current asset replacement cost).
- Existing reservoirs at \$2,203,750 (27% of the total current asset replacement cost).
- Existing service connections at \$2,075,625 (25% of the total current asset replacement cost).

The three main classes represent 83% of the total asset replacement cost.

Given the importance of the pipe network, a dynamic chart summarizing the existing pipes, their length in metres, sizes in millimetres and material is included in the AMP Dashboard. The chart has slicers that allow the user to select one or various sizes (diameters in mm) and one or various pipe materials.

Figure 5 shows a screenshot of the Existing Length of Pipe Distributed by Material and Diameter in mm included in the Alto Utilities Dashboard.

**Figure 5 –AMP Dashboard – Existing Length of Pipe Distributed by Material and Diameter in mm**



The AMP Tool calculates the Future Replacement Cost of the assets at the estimated replacement date with adjustments by adopted inflation rate. The AMP Dashboard includes a dynamic chart that allows the user to see the anticipated replacement date for each asset class and year or a combination of both parameters (Asset class and year of replacement).

Figure 6 shows as an example the Future Replacement Cost for Gate Valves, Hydrants, PRV and Services.



**Figure 6 –AMP Dashboard – Dynamic Chart showing the Future Replacement Cost by Asset Class**



Once the future replacement cost is calculated by the AMP Tool, the balance of the Renewal Reserve Fund is calculated for each year assuming the following:

- Assets replaced at the estimated replacement date.
- Replacement of assets at the estimated future cost.
- Annual return investment rate as per adopted value in the AMP Dashboard.
- Accurate asset inventory included in the AMP Tool.
- Adopted annual contribution to the Renewal Reserve Fund.

The results for the Renewal Reserve Fund balance are presented in the AMP Dashboard on two dynamic charts. The charts are linked to the adopted annual contribution to the Renewal Reserve Fund. This contribution figure can be added in the AMP Dashboard.

The first of the two graphs shows the replacement costs and reserve balance in increments of five years. The second graph shows the same information on a year-by-year basis. Figure 7 shows the adopted annual contribution to the Renewal Reserve Fund and the 5-year increment renewal cash flow.

**Figure 7 –AMP Dashboard – 5 year increment Renewal Reserve Cash Flow**

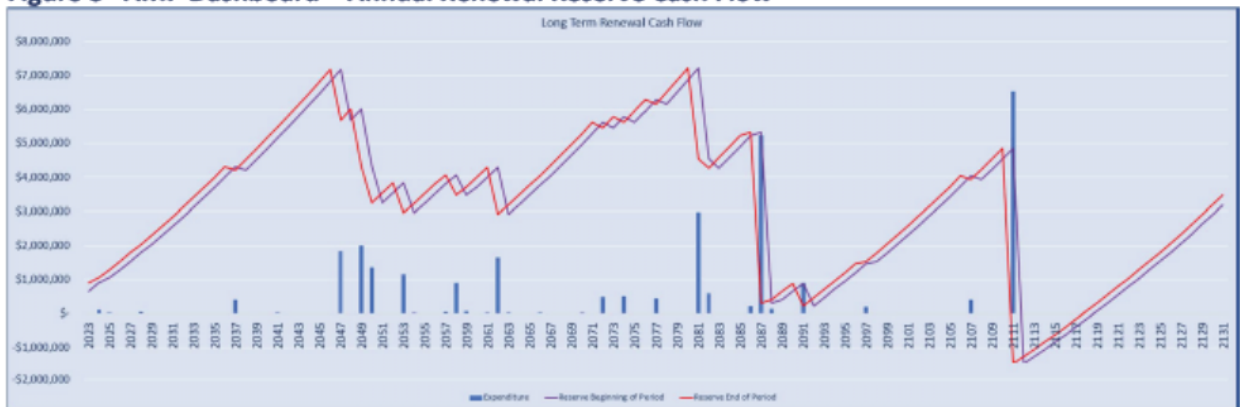


The above results show that with an adopted annual contribution of \$230,000 to the Renewal Reserve Fund, and previous assumptions, Alto Utilities will have enough funds to cover the anticipated renewal asset costs from now to the 2083-2088 lustrum.

Under the current AMP Analysis, there will be significant replacement expenses in the year 2087 with future estimated costs in the range of 5.2 million for pipe and reservoir upgrades that will use the available reserves.

The second cash flow graph shows that the reserve balance will be in the positive for the adopted conditions including the \$230,000 annual contribution to the reserve fund for the 2083-2088 lustrum. The reserve balance will be negative in 2111. Figure 8 show the annual renewal reserve fund balance.

**Figure 8 –AMP Dashboard – Annual Renewal Reserve Cash Flow**



The AMP Tool is not considered to be accurate for long term analysis and it should be treated as a tool that gives indication of the general tendency. The AMP Tool requires continuous revisions as market conditions change and inventory conditions are updated.

## 7. RENEWAL TIMING

The proposed asset renewal assumes that appropriate operation and maintenance budget is in place and the associated tasks are completed on time. Inadequate operation and maintenance will reduce the useful life of the existing assets.

It should be noted that the renewal costs do not address any regulatory upgrade requirements, expansions or upgrades due to growth of the system which should be funded from other sources than the Renewal Reserve Fund.

Table 3 summarizes the anticipated renewal time for this AMP.

**Table 3 – Renewal Timing**

Year	Assets to be Renewed	Total per year	Year	Assets to be Renewed	Total per year
2024	Blow Off, Fence, Gate Valve, Shed	\$ 102,116	2063	Blow Off	\$ 24,333
2025	Gate Valve	\$ 21,013	2066	Hydrant	\$ 32,530
2028	ARV, Blow Off, Gate Valve	\$ 43,913	2070	Gate Valve	\$ 7,181
2037	Blow Off, Gate Valve, PRV, Well	\$ 397,576	2072	Reservoir	\$ 475,746
2041	Gate Valve	\$ 6,824	2074	Reservoir	\$ 499,831
2047	Hydrant, Pipe, Services	\$ 1,824,591	2077	Building	\$ 450,529
2049	Hydrant, Pipe, Services	\$ 1,992,545	2081	Reservoir	\$ 2,973,326
2050	Container, Hydrant, Pipe, Services	\$ 1,361,198	2082	Services	\$ 579,485
2053	Blow Off, Hydrant, Pipe, Services	\$ 1,151,510	2086	Hydrant, Services	\$ 213,214
2054	Gate Valve	\$ 18,275	2087	Pipe, Reservoir	\$ 5,250,101
2057	Blow Off, Gate Valve	\$ 48,911	2088	Services	\$ 140,005
2058	Booster Station, PRV	\$ 889,952	2091	Pipe	\$ 896,428
2059	Tools	\$ 60,813	2097	Pipe	\$ 197,880
2061	Gate Valve	\$ 18,529	2107	Pipe	\$ 397,935
2062	Hydrant, Services, Well	\$ 1,640,509	2111	Pipe, Reservoir	\$ 6,527,296
			<b>Grand Total</b>		<b>\$ 28,244,092</b>

## 8. MAXIMIZE ASSET USEFUL LIFE

One of the objectives of the AMP is to maximize the asset useful life, this can be achieved with good maintenance programs. Good maintenance can defer the replacement time of the asset and reduce the annual contribution to the renewal fund.

A utility operation key factor is implementing good tracking and documentation practices that support asset useful life. The adopted asset useful life for Alto Utilities can be reviewed and possibly extended in the future. It is highly recommended to document the watermain condition when there are breaks or repairs in the system. Alto Utilities has been fortunate as breaks have not occurred in the last few years which is an indication of the good condition of the system. Should breaks occur in the future, it is recommended to obtain pipe coupons to document the condition of the existing pipe. This is more important for AC pipes to support the useful life used in the AMP.

Table 4 summarizes recommended water service plan actions for different asset classes.

**Table 4 – Maintenance Recommendations**

Water System Asset Class	Recommendation
Pipes	<ul style="list-style-type: none"> <li>Monitor and document system leakage as indication of pipe and water service integrity</li> <li>When breaks occur, obtain pipe coupons for pipe condition assessment</li> <li>Check above ground conditions for potential leaks</li> <li>Monitor breaks and record location, frequency and soils information</li> <li>Flush mains of debris and biofilm growth annually</li> <li>Swabbing, air scouring or pigging only required if problems are noted during annual flushing</li> </ul>
Valves	<ul style="list-style-type: none"> <li>Exercise isolation vales at least every 2 years. Large valves (300mm and up) should be exercised every year.</li> <li>Check and maintain ARV every 6 months</li> <li>Exercise service curb stops at least every 2 years</li> </ul>
Hydrant	<ul style="list-style-type: none"> <li>Exercise isolation valve to hydrant annually</li> <li>Carry out complete tear down every 5 years or when problems such as stiff hydrant valve operation is encountered</li> </ul>
Reservoir and Concrete Sturctures	<ul style="list-style-type: none"> <li>Flush/clean at least once every two years. Drain and inspect for cracks. Patch and seal to maintain integrity of concrete structure</li> </ul>
Buildings	<ul style="list-style-type: none"> <li>Annual inspection and maintenance. Exterior waterproofing for roof and walls so the structural integrity is maintained.</li> </ul>



## 9. SUMMARY

This section provides a summary of the conclusions and recommendations after completion of the Alto Utilities AMP.

### CONCLUSIONS

- C1. The developed AMP Tool provides a life document for Alto Utilities that can be easily adjusted as new information is available. The tool is dynamic allowing the quick result generation once the input parameters are updated based on new information.
- C2. This AMP does not include the land owned by the utility, as land is considered a permanent asset that does not require renewal.
- C3. The lack of breaks and required repairs in the recent years is an indicator of the good condition of the system. It is important to systematically document any future breaks or leaks to collect information on the condition of the system to refine the adopted useful life for the assets owned by the utility.
- C4. Approximately 83% of the renewable assets current replacement value is comprised of only 3 asset classes. They are pipes (31%), reservoirs (27%) and services (25%).
- C5. Alto Utilities has been contributing to the Renewal Reserve Fund and the balance, at the time of completion of this AMP, is \$653,780.
- C6. The utility is in a good position as the available funds for asset renewal are enough to cover the expected renewal projects up to the year 2047. Planning for required upgrades beyond 2047 is important as the next 25 years are needed to build a strong reserve to cover the significant renewal costs the utility will experience in the long term (beyond 2047).
- C7. The earliest significant renewal expenditure is expected for the year 2037 with a total future replacement cost around \$398,000. The next significant renewal expenditure is expected to occur between the years 2047 to 2053 with an estimated combined future replacement cost in the range of 6.2 million dollars.
- C8. The AMP Tool, under the assumptions used in this plan, shows that annual contributions in the range of \$150,000 would allow the Utility to cover the anticipated replacement cost up to the year 2053, however the renewal projects after 2053 will require higher contributions or other funding.



The AMP Tool shows that increased annual contributions to the renewal reserve at \$230,000 would allow the utility to cover the anticipated renewal costs to the year 2111.

## RECOMMENDATIONS

- R1. It is recommended that the developed AMP Tool is used frequently, updating the assumptions used for this AMP and adjusting the utility operation to new information available in the future. The required annual contributions to the renewal reserve fund should be closely monitored and adjusted as required.
- R2. Alto Utilities should make annual contributions to the renewal reserve fund of \$230,000 to secure the funds for renewal projects for the existing assets. This figure might trigger water rate updates. It is recommended that Alto Utilities and the consulting engineer work on the currently planned rate study to determine the feasibility of the system operation.
- R3. Implementation of frequent maintenance programs that might increase the useful life of the existing assets which will result in deferred renewal projects. The developed APM Tool allows for modification of the adopted asset useful life and quick calculation of the long term renewal reserve balance. This gives the utility the option of quickly adjusting the AMP to respond to future requirements.
- R4. Systematically document the conditions encountered during future repairs and maintenance works on the system. The collected information will provide a solid background for asset useful life for the specific conditions of Alto Utilities.
- R5. Alto Utilities should maintain constant communication with the District of Lake Country (DLC) and be aware of any road renewal projects that the District is planning to complete in the area serviced by Alto Utilities. Coordination with the DLC for potential asset renewal at the time of road renewal projects might lower the replacement cost. The impact on annual contributions to the Renewal Reserve Fund can be easily determined using the AMP Tool.

Please review the above presented AMP and do not hesitate to contact us should you have comments.

AF CONSULTING LTD.

*Faccini*  
2023-09-13  
Antonio Faccini, M.Eng, P.Eng  
Project Manager



Enclosure: Excel File with AMP Tool



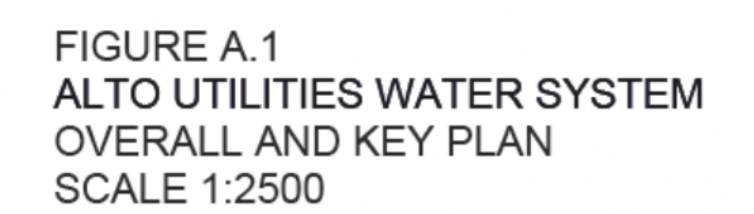


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Water & Environmental Engineering

**AFC File No: 2302**

## APPENDIX WATER SYSTEM MAPS











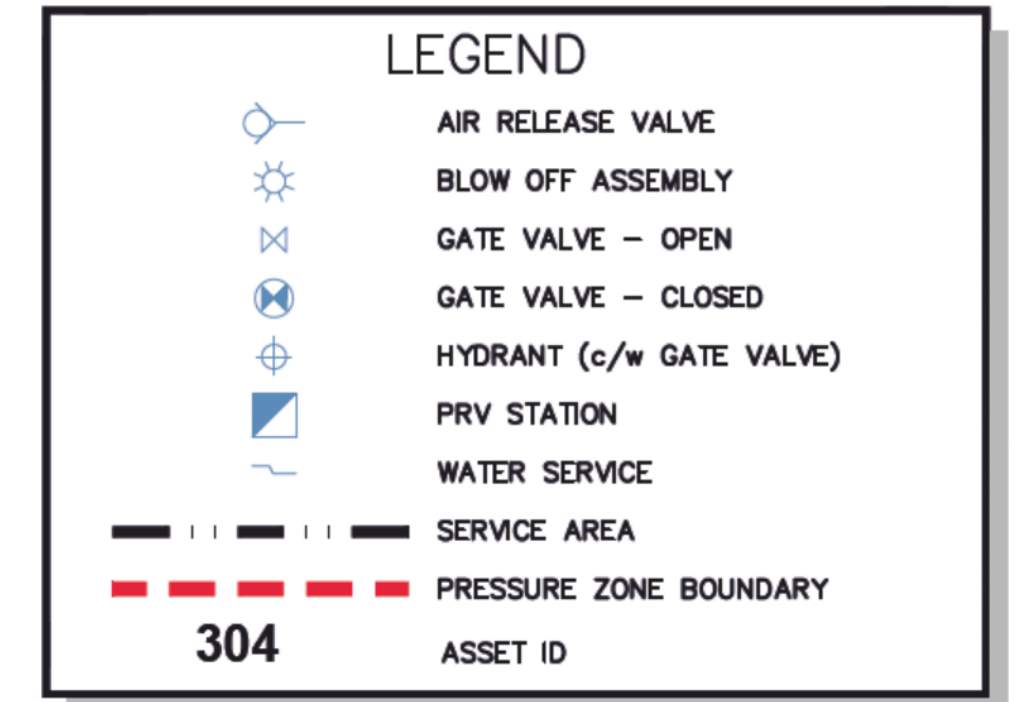
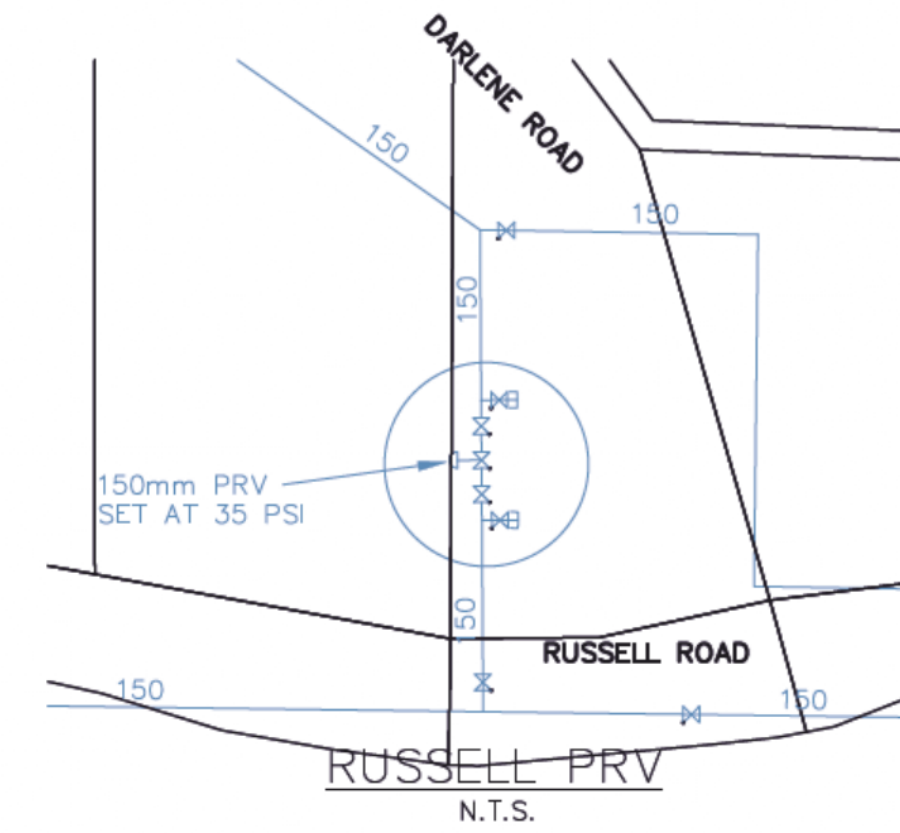
VELDA RESERVOIR #2  
TWL 523.5m (1717.5')  
400.0cu m

VELDA RESERVOIR #1  
TWL 523.5m (1717.5')  
568cu m

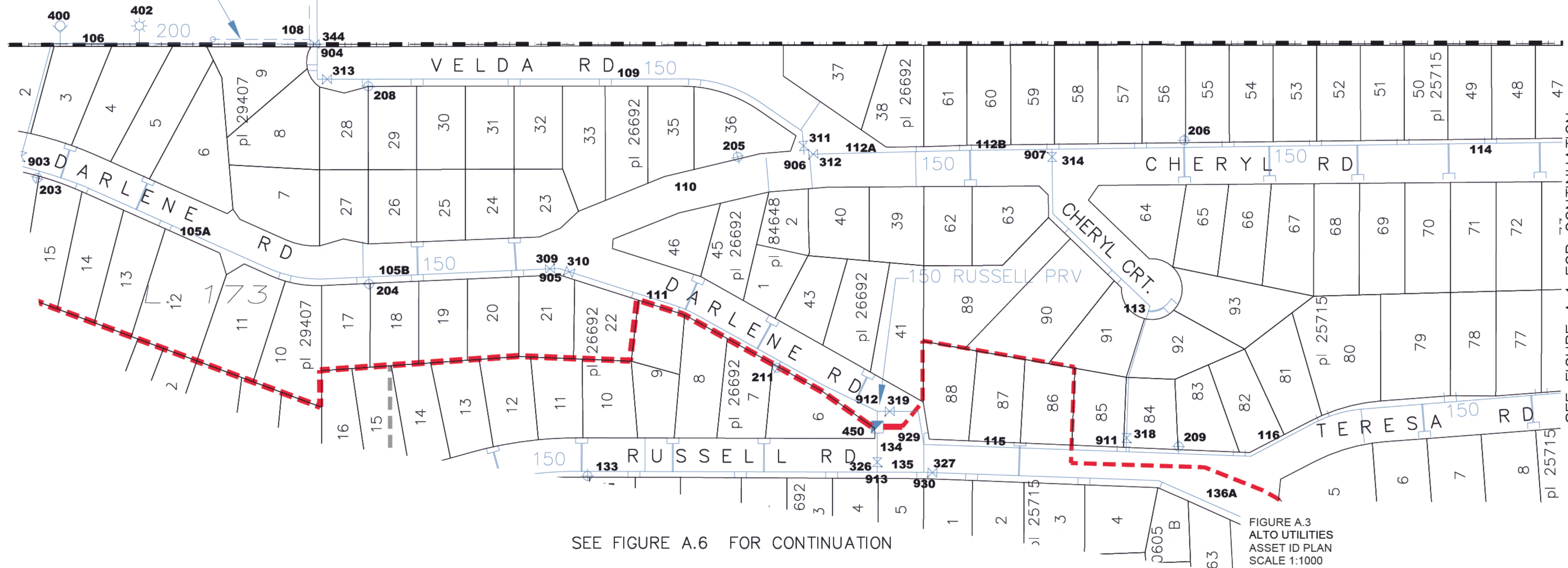
MAINLINE VALVE  
(OPEN)

200 INLET/OUTLET  
200 OVER FLOW/DRAIN

RESERVOIR  
DRAIN TO  
MANHOLE



SEE FIGURE A.2 FOR CONTINUATION



SEE FIGURE A.4 FOR CONTINUATION

SEE FIGURE A.6 FOR CONTINUATION

FIGURE A.3  
ALTO UTILITIES  
ASSET ID PLAN  
SCALE 1:1000



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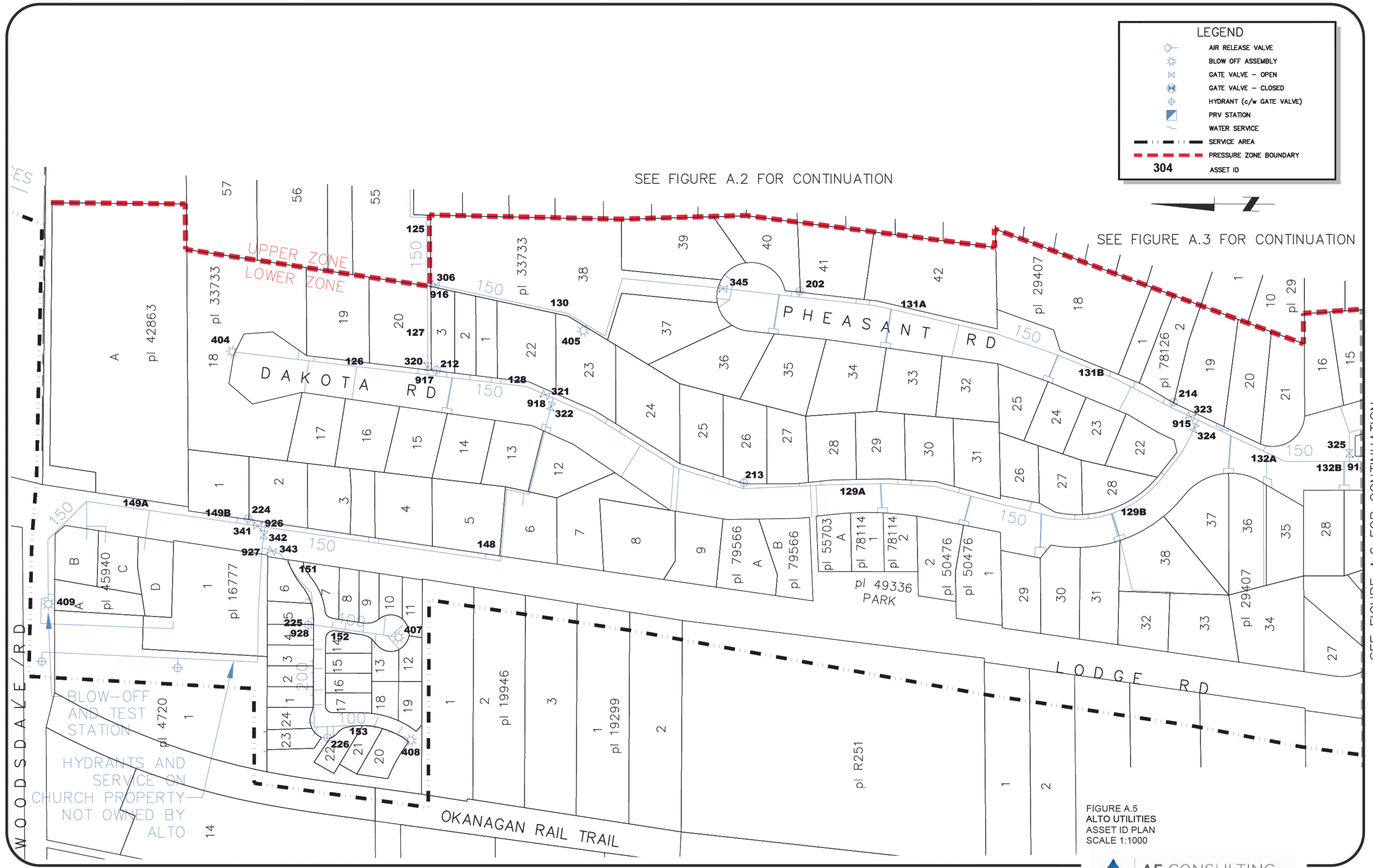
SEE FIGURE A.3 FOR CONTINUATION



SEE FIGURE A.6 FOR CONTINUATION

FIGURE A.4  
ALTO UTILITIES  
ASSET ID PLAN  
SCALE 1:1000





LEGEND

AIR RELEASE VALVE

BLOW OFF ASSEMBLY

GATE VALVE - OPEN

GATE VALVE - CLOSED

HYDRANT (c/w GATE VALVE)

PRV STATION

WATER SERVICE

SERVICE AREA

PRESSURE ZONE BOUNDARY

ASSET ID

304

FIGURE A.5  
ALTO UTILITIES  
ASSET ID PLAN  
SCALE 1:1000

SEE FIGURE A.2 FOR CONTINUATION

SEE FIGURE A.3 FOR CONTINUATION

SEE FIGURE A.6 FOR CONTINUATION

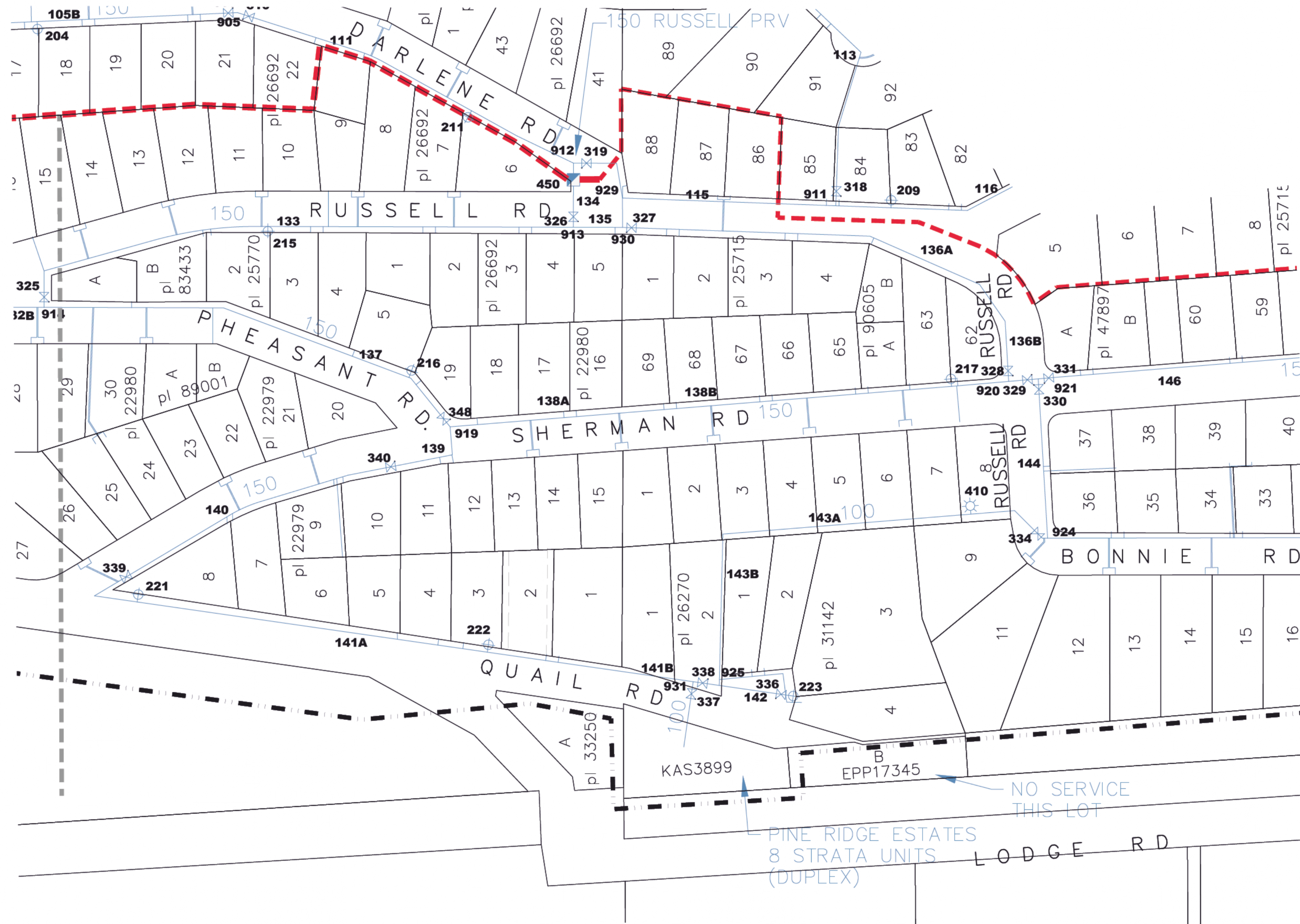
BLOW-OFF  
AND TEST  
STATION

HYDRANTS AND  
SERVICE ON  
CHURCH PROPERTY  
NOT OWNED BY  
ALTO



SEE FIGURE A.4 FOR CONTINUATION

SEE FIGURE A.5 FOR CONTINUATION



SEE FIGURE A.7 FOR CONTINUATION

FIGURE A.6  
ALTO UTILITIES  
ASSET ID PLAN  
SCALE 1:1000



