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August 27th, 2015  
1420-02

District of Lantzville  
7192 Lantzville Rd  
PO Box 100  
Lantzville, BC V0R 2H0

**Attention:** Mr. Fred Spears  
Director of Public Works

**Re:** District of Lantzville  
Water Supply & Distribution System Study

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We are pleased to submit four additional bound copies of our District of Lantzville Water Supply & Distribution System Study. This study has been updated from the previous version submitted in July, and includes cost estimates and recommendations relating to the provision of water service to the Northwinds / Southwinds area.

The report provides a comprehensive analysis of the District's water supply and distribution system, and projects water supply requirements to service the properties within the District's OCP Map 7 - Water Service Area that are presently not serviced.

A detailed computer network analysis of the water distribution system was carried out and improvements needed to meet pressure and flow, including fire flow, requirements under existing and future conditions have been identified, including: watermain looping; watermain upgrading; and reservoir storage expansion.

The District's current design water demand per lot is higher than the calculated usage over the past 19 years. A review of design standards for other mid-Island municipalities revealed that the District's design demand is in the middle range compared to the other municipalities and is similar to its closest neighbours (Nanaimo and Parksville).

To date, the District's water supply source has been able to meet the maximum day demand. This is due in part to the very low demands of the system users. The District's average day and maximum day demands per capita are between 60% and 65% of those of its closest neighbor; the City of Nanaimo.

It is essential that, though a review of current demands along with the estimated capacity of the wellfield suggests additional properties can be serviced, the District first carry out the wellfield upgrading works in an effort to increase the pumping capacity of the wells to that of the long-term sustainable yield. Upon confirmation of the increased pumping rates and their sustainability, consideration should then be given to providing service to additional properties.

The provincial government has recently enacted the Water Sustainability Act (Bill 18) which requires the registering and annual licensing of groundwater wells. The District should register the wells as soon as possible.

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District of Lantzille  
Mr. Fred Spears

We have enjoyed working on this important study. We would be pleased to discuss implementation of the recommendations with staff and Council and look forward to assisting the District in the further development of its water system.

Yours truly,

KOERS & ASSOCIATES ENGINEERING LTD.



*Rob Hoffman* Aug 27, 2015

Chris Holmes, PEng  
Project Engineer

Rob Hoffman, PEng  
Project Manager

Table 31 (continued)

Priority	Description	Quantity	Cost Estimate Class 'D' (excluding GST)
<b>Fire Flow Improvement Projects (Commercial, Institutional &amp; Industrial benefit)</b>			
10	Millard Drive (Peterson to Lancewood) Watermain Upgrade	325 m of 200 mm dia	\$185,000
11	Lynn Drive (Peterson to Lancewood) Watermain Upgrade	325 m of 200 mm dia	\$185,000
12	Lancewood Avenue (Rossiter to Lynn)	250 m of 200 mm dia	\$140,000
<b>Fire Flow Improvement Projects (Residential Area Benefit)</b>			
13	Replace Limited Capacity Hydrants (or in conjunction with main replacements)	8	\$3,500 each
14	Lantzville Rd (east and west of Superior Rd) Watermain Upgrade	1,500 m of 200 mm dia	\$840,000
15	Huddleston Rd Watermain Upgrade	175 m of 200 mm dia.	\$100,000
16	Harper Rd Watermain Upgrade	200 m of 200 mm dia.	\$110,000
17	Hall Rd Watermain Upgrade	150 m of 200 mm dia.	\$85,000
18	Saxon Cross Watermain Upgrade	150 m of 150 mm dia.	\$75,000
19	Forest Turn Watermain Upgrade	150 m of 150 mm dia.	\$75,000
20	Clark Crescent Watermain Upgrade	425 m - 250 mm 100 m - 150 mm	\$240,000 \$50,000
21	Geisler Pl & Chataway Pl Watermain Upgrade	275 m of 150 mm dia.	\$140,000
<b>Other Watermain Improvement Projects</b>			
22	AC Main Replacement (9 kilometres)	600 m/year for 15 years	\$340,000 per year
23	Looping through future development	TBD	Developer Driven
TBD	Relocate PRV on Lantzville Road to Ware Road	1	Developer Driven
TBD	Philip Road and Harby Road West Upgrade to service the Winds	1,250 m - 300mm	\$1,000,000
TBD	Harby / Vandenhoek / Superior Road supply line to the Winds	1,700 m - 250 & 300mm	\$1,300,000
TBD	Local Distribution in the Winds	2,500 m - 200mm	\$1,500,000

### Design Fire Flows

33. The DoL requires fire flows demand calculations to be done in accordance with the Fire Underwriters Survey (FUS). The demand requirements will vary, depending on the building design, the floor area, the number of stories, the construction materials, the permitted distance from adjacent buildings (existing and future), and whether a fire sprinkler system is installed.
34. For single family residential properties, a minimum design fire flow of 75 L/s is consistent with other nearby local jurisdictions with similar housing styles. For Commercial, Industrial and Institutional uses, the range of design fire flows can vary greatly depending on a variety of factors.

### Fire Hydrants

35. Fire hydrants should be equipped with three nozzles, including one 100 mm diameter pump nozzle. The District has been replacing the old fire hydrants that have only two hose nozzles, both 65 mm diameter. There are eight hydrants yet to be replaced; all in the Lower Pressure zone.
36. The DoL maximum spacing for fire hydrants is 150 m, with every home to be located within 120 m of a hydrant. The FUS recommends differing spacing based on land-use. For Multi-Family, Commercial, Industrial and Institutional, a maximum of 90 m is recommended, and subject to building code requirements regulating the distance between the building's sprinkler system connection point and the closet hydrant.

### Reservoir Storage Volume

37. Reservoirs should be sized to include storage for:
  - Firefighting,
  - Emergencies (such as watermain break), and
  - Equalization to manage hourly peaks.
38. The Upper Zone reservoir (Aulds Rd) with its storage capacity of 240 m<sup>3</sup> (53,000 ig) is undersized to meet existing conditions design criteria. To meet projected demands over the next 25 years (to Year 2040), a total storage volume between 964m<sup>3</sup> and 1,112 m<sup>3</sup> will be needed. This includes a storage allowance for a fire flow of 75 L/s for 2 hours and the servicing of 348 additional lots. Increasing the size of this reservoir may offset and potentially delay storage improvements needed in the Lower Zone.

The current Upper Zone reservoir is inadequate for existing needs and further extensions to the distribution system should not be implemented until a new facility is brought online.

39. The Lower Zone reservoir (Ware Rd) has a storage capacity of 1,887 m<sup>3</sup> (415,000 ig). The expanded storage will be driven by the target fire flows the District adopts for its commercial, industrial, and institutional properties. Accommodating future expansion at the existing site will be difficult, but opportunities to increase storage at the higher elevation reservoir, or at future balancing reservoirs within the District can be explored in further detail.

50. Unless other storage options are pursued in the Northwinds area, or additional looping from the Winchelsea area can be obtained, the upgrade to the existing Philips and Harby Road west watermains must be completed prior to extending the water system into the Northwind/Southwind.
51. Almost 60% of the District's watermains are made of Asbestos Cement. The majority are over 40 years old. The life span of AC mains ranges from 30 to 90 years. The District has for each of the past several years replaced sections of the AC mains as funds become available.

**General**

52. Prevailing science on climate change indicates that the local Vancouver Island region will experience drier summers and wetter winters in the foreseeable future, and other local municipal governments are taking these factors into consideration when developing their long range infrastructure improvement plans.

14. Review and resolve the readings discrepancies between the bulk water meters at the Ware Road Reservoir.
15. Conduct an inspection on the exterior roof surface of the Ware Road Reservoir and review coating options if warranted. Review code requirements and implement seismic restraint improvements for the mechanical piping at the pump station.
16. Update the water study every 5 years, subject to the rate of growth, to review capital project needs based on changes in water demands (per capita, maximum day, peak hour) resulting from population growth.
17. Update the water Development Cost Charge (DCC) for the various land use categories in the DCC Bylaw based on the proposed system improvement projects presented in this report.
18. Keep abreast of ongoing climate change research and its potential impact on aquifer recharge rates, especially when making infrastructure policy decisions.
19. Ensure that the new Upper Pressure Zone reservoir is in place and that the upgrades to the existing water distribution system in the Upper Zone are completed prior to extending service to the Winds.