



---

## Technical Memorandum

---

**DATE:** May 18, 2012

**TO:** Dave Newman, Director of Engineering, Town of Gibsons

**FROM:** Karl Mueller, P.Eng.

**RE: REVIEW OF PROWSE ROAD PUMP STATION COST ESTIMATE**  
**Our File 2132.010-300**

---

### 1. Introduction

Kerr Wood Leidal Associates Ltd. (KWL) has been retained by the Town of Gibsons (ToG) to produce a cost estimate for upgrading the Prowse Road Sewage Pumping Station with the intent of using the estimate to apply for design and construction grant funding. The ToG has made available to KWL the existing station record drawings and the Condition Assessment and Evaluation Study conducted by Paragon Engineering Ltd. (Paragon) in 2009.

### 2. Background

The Paragon study reports that several key components of the existing pump station are in poor condition including valves and piping in wet well. The pumps are in fair condition. However, the wet well is undersized for future flows and prevents pumps from achieving optimal operation.

The Paragon study recommended replacing the existing wet well with a new larger, deeper wet well to allow sufficient storage volume for adequate pump cycling under increased future flows, and converting the existing drywell into a valve chamber. Paragon recommended a larger 3.0 m diameter wet well approximately 8.0 m deep and replacing the existing 88 Hp submersible sewage pumps with larger 105 Hp submersible units.

KWL was retained to review the pump station concept and to provide an updated cost estimate for the pump station construction that ToG could use in their grant application process. As described below KWL updated the Paragon estimate to account for inflation from 2009 to 2012. Also KWL provided a construction cost estimate for an alternate solution.

This technical memorandum summarizes the alternate pump station concept and assumptions made in developing the cost estimate.

### 3. Concept Development

The Prowse Road Sewage Pumping Station is located approximately 40 meters away from Gibsons Marina and the ground water table is expected to be close to ground surface. Wet well excavation complete with conventional shoring techniques will require extensive dewatering given the high water table and shoring penetrations for existing pipes.



Bypass pumping will be required for an extended period (expected four-month duration) to allow the new wet well construction and to convert the existing dry well into a valve chamber. Successful bypass pumping will require a temporary pump station complete with duty and standby pumping units and electrical controls.

Given the expected dewatering and bypass pumping costs we recommend a new station adjacent to the existing station and using the existing station as the bypass pumping station. For the purposes of this assignment we will estimate a new station adjacent to the existing station constructed with the caisson method. The caisson method may prove more cost effective for the following reasons:

- **Reduced excavation and shoring:** The caisson construction method constructs the wet well at grade while excavating within the structure and then allowing the chamber to sink under its own weight. This method practically eliminates excavation shoring costs as the wet well is used as the shoring. Excavation volumes are significantly reduced.
- **Reduced bypass pumping:** Constructing a new pumping station adjacent to the existing pumping station will allow it to remain operational during construction. This minimizes the impact to the existing sewer system, greatly reduces the temporary operating risk and greatly reduces the bypass pumping cost.

## 4. Cost Estimate Criteria

This cost estimate is classified as Class C and has been prepared with limited site information and probable conditions affecting the project. The estimate approach and assumptions are stated below:

- **Civil construction:** This section includes costs of site and structural work associated with building the new wet well, valve chamber, and flowmeter chamber. Record drawings were used to obtain quantities for earthworks. Published sources such as The Blue Book and recent tendered rates are used for equipment and labour costs. Material prices are sourced through supplier material price lists and budget quotes.
- **Mechanical work:** This section includes the cost for all mechanical equipment. The pumps were assumed to be the same two submersible sewage pumps (Flygt 105 Hp NP 3301.180 HT – 460) sized in the Paragon report with pricing updated from the supplier. Station piping costs are estimated based on KWL's experience in past similar projects.
- **Electrical work:** This section includes costs for all electrical control components, power supply, and a new diesel-driven generator set, and all associated labour costs. Costs in this section are based on KWL's experience in past similar projects and budget quotes from suppliers for the major equipment. The estimate is based on providing all electrical controls and power supply housed within a new standalone kiosk and renovating the controls building to house the standby generator.
- The existing electrical building may not meet code (building and electrical) and may need to be replaced or have the generator housed in a separate enclosure. For this estimate we have assumed the building is not adequate for the purpose and have made an allowance for renovation or replacement.
- Ground conditions are unknown at this time and may affect the selected construction methods and the estimated costs.

In updating the Paragon cost estimate, KWL:



- Consulted the Construction Price Indexes provided by Statistics Canada. The CPI from 2009 to 2011 is 4.1% with the data for 2012 not yet published. To inflate the estimate from 2009 to 2012, we assume a linear interpolation and used a CPI of 6.2%.
- Also the Engineering and Construction Management line item was changed from a standard percentage estimate to an estimate based on the expected scope of work.
- The Contingency allowance was changed to 25% to match the new estimate.
- An environmental monitoring allowance was added.

## 5. Conclusion and Recommendations

The Town of Gibsons is applying for grant funding to replace the Prowse Road Lift Station. The Paragon study (2009) recommended replacing the wet well with a new larger, deeper wet well and converting the dry well to a valve chamber. KWL did not review this estimate in detail, but did inflate the estimate to 2012 values. The probable construction cost (2012 values) is estimated at \$1,584,000 (incl. non-recoverable HST).

KWL completed an estimate for a new pump station constructed adjacent to the existing station using the caisson construction method with electrical controls housed in a new kiosk and existing building renovated. The probable construction cost is estimated at \$2,024,000 (incl. non-recoverable HST). Refer to the attached estimates for a detailed breakdown.

The Engineering and Construction Management portion of the estimates was estimated separately, included in both cost estimates, and are included here for reference. As this estimate is for budgeting purposes we have assumed a relatively senior design and construction team. Actual proposal costs may vary.

### KERR WOOD LEIDAL ASSOCIATES LTD.

Prepared by:

Reviewed by:

---

Victor Wang, E.I.T.  
Design Engineer

---

Karl Mueller, P.Eng.  
Project Engineer

VW/KM/am  
Encls.



## Statement of Limitations

This document has been prepared by Kerr Wood Leidal Associates Ltd. (KWL) for the exclusive use and benefit of the intended recipient. No other party is entitled to rely on any of the conclusions, data, opinions, or any other information contained in this document.

This document represents KWL's best professional judgement based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practising under similar conditions. No warranty, express or implied, is made.

## Copyright Notice

These materials (text, tables, figures and drawings included herein) are copyright of Kerr Wood Leidal Associates Ltd. (KWL). The Town of Gibsons is permitted to reproduce the materials for archiving and for distribution to third parties only as required to conduct business specifically relating to the Prowse Road Pump Station Upgrade. Any other use of these materials without the written permission of KWL is prohibited.

## Revision History

Revision #	Date	Status	Revision	Author
1	Apr. 19, 2012	Draft		VW/KM
2	May 8, 2012	Final	Finalized estimates, minor revisions.	KM
3	May 18, 2012	Final	Added non-recoverable HST to total cost	VW/KM