



# Water System Source Replacement Detailed Project Description

District of Lillooet



ENGINEERING ■ PLANNING ■ URBAN DESIGN

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# 1.0 Background

The District of Lillooet (DoL) water system is currently supplied by four sources: Town Creek Intake, Dickey Creek Intake, Rec Center Well, and Conway Park wells. The combined capacity of all sources generally meets water system demands with limited reserve capacity. The water quality and flow availability of the two creek intakes often cause the sources to be unusable during the peak demand season. Historically Town Creek has dried up completely during extremely dry summer periods. The quality of water available at both intakes has been severely impacted by recent forest fires in both watersheds. The water provided by the Conway Park well contains arsenic of a concentration which exceeds the Canadian Drinking Water Guidelines. A summary of the DoL source capacity is as follows:

|                   | <i>Available Flow</i> | <i>Quality Concerns</i>                       |
|-------------------|-----------------------|---|
| Town Creek        | 0 – 500 lpgm          | Turbidity exceeds 1 NTU 10 months of the year |
| Dickey Creek      | 100 – 500 lpgm        | Turbidity exceeds 1 NTU 10 months of the year |
| Conway Park Wells | 440 lpgm              | Arsenic concentrations exceed Guidelines      |
| Rec Center Well   | 600 lpgm              | None  |
| Total             | 1140 – 2400 lpgm      |   |

Required Peak Season Flow – 1500 lpgm to 1800 lpgm

As outlined above, DoL has one source that produces water in compliance with current drinking water quality guidelines and as demand increases beyond that source capacity, DoL must choose the next best available source and issue a water quality advisory to the users for either arsenic or turbidity. For 2011 DoL will be issuing a water quality advisory for turbidity sometime in March and a second water quality advisory for arsenic sometime in June. The advisories will remain in place until November. During the summer season DoL will be required to impose severe irrigation restrictions as capacity declines in the creek sources. DoL will also be required to place the system on Boil Water Notice if they use the surface sources while the turbidity exceeds 5 NTU.

DoL currently disinfects their surface sources with chlorine. No other treatment is provided. To comply with current standards, filtration plants would be required on each surface source.

DoL water system demands exceed the Canadian average per capita demand by a factor of three. Historically this high demand has not been an issue for DoL as the majority of their water supply came from gravity fed surface sources which represent low operational costs. With recent forest fires severely impacting water quality and new surface water treatment regulations being implemented, the ability to utilize these sources into the future has become uneconomical.

In April 2008 DoL completed a Water Master Plan to evaluate options for future water supply as well as to review the operation of the entire system. The Water Master Plan identified numerous system deficiencies as well as the high relative demand.

Per the recommendations of the Water Master Plan, DoL has constructed the Victoria Street booster station, North Lillooet booster station and replaced the Upper Zone reservoir. These projects have made it possible for DoL to move water into and out of all zones of their distribution system. This allows DoL water operators to select their best available sources and move that water to all customers. Prior to these projects being completed in 2009 residents who lived in the upper zone were always supplied by Town Creek regardless of water quality and residents of North Lillooet were always supplied by Dickey Creek regardless of water quality. The number of boil water orders for residents of the upper zone and North Lillooet were greatly reduced in 2010 as DoL staff were able to move water from the Conway Wells and Rec Center Well into those systems during periods of high turbidity. Now that the distribution system is completely interconnected it is possible to supply the entire system from one source. The upgrades completed in 2009 required the expenditure of the majority of DoL water capital funds leaving DoL unable at this time to finance any further system improvements.

In March 2009 DoL completed a water conservation plan. Using the plan DoL applied for and received a Towns for Tomorrow grant to complete universal metering of North Lillooet. Installation of water meters in North Lillooet began in the summer of 2010 and will be complete in the spring of 2011. Also per the recommendations of the conservation plan, DoL retained the services of a leak detection contractor to locate leaks within the distribution system. Unfortunately no large leaks were detected however DoL operators have located and repaired some minor leaks identified by the contractor.

In August 2009 there was a severe forest fire in the Town Creek watershed. The fire required all residents of DoL to be evacuated to Kamloops. DoL staff remained in Lillooet to assist forest firefighting crews with water supply to their tankers. During the fire event DoL staff experienced problems with their Rec Center Well pump but chose to run the pump continuously as it was able to produce some water and they were barely able to keep up with system demands. Following the forest fire event the Rec Center Well pump no longer functioned and the District water supply situation was desperate.

The Town Creek source was unusable because of contamination from ash and fire retardant, Dickey Creek and Conway Wells were the only available sources and their combined capacity represented 50% of their system demand. DoL was forced to ban irrigation for the remainder of 2009.

Following the forest fire DoL retained TRUE Consulting to evaluate their options for moving forward. As DoL requirements were desperate, some recommendations provided by TRUE Consulting were implemented immediately, primarily the reactivation of the Rec Center Well. The recommended plan for DoL was summarized in a document titled "Options to Address

Water Supply Impacts of the Forest Fire in the Town Creek Watershed” dated November 2009. The above document evaluated all available water supply and treatment options available and recommended a preferred course of action.

The preferred option is to convert the Dickey Creek Intake, Town Creek Intake and Conway Wells to emergency sources only and to utilize Rec Center and a new Seton Fan Well source as standby sources and to construct a new intake to Seton Lake by way of the BC Hydro Canal as the new primary source.

In response to these recommendations, DoL retained Summit Environmental Consultants to undertake a groundwater exploration program focusing on the Seton Fan as recommended by TRUE Consulting. The results of the exploration programs are contained in a report prepared by Summit dated November 2010 and conclude that shallow production wells can be constructed on the Seton Fan in a small area located within the Cayoose Campground which is owned by DoL.

## 2.0 Project Description

DoL source replacement project involves seven primary components as follows.

1. Universal Metering
2. Seton Fan Well Construction
3. Treated Water Supply Main from Seton Fan to Distribution System
4. High Lift Pumping and UV Station
5. BC Hydro Canal Intake and Raw Water Supply Main to High Lift UV Station
6. Piloting of Filtration at BC Hydro Canal
7. Construction of Filtration Plant at High Lift UV Station

A brief description of each component is provided below. Detailed cost estimates are contained in Appendix 1 and design drawings are contained in Appendix 3.

### 2.1 Universal Metering

The Water Conservation Plan lists three primary strategies that DoL must implement in order to reduce overall system demand by 20% to 30% as follows:

1. Leak Detection and Repair
2. Universal Metering
3. Public Education

DoL has already implemented a Leak Detection and Repair Program. Universal metering involves installing a water meter on each service connection. Through assistance from the Town for Tomorrow Grant Program, DoL has installed meters on all services in North Lillooet. The universal metering component of this project involves metering the remainder of DoL customers. There is also an allowance for some public education materials. Once complete, the universal metering program will reduce operating cost for DoL by approximately \$18,000 per year.

### 2.2 Seton Fan Well Construction

The Summit Environmental Groundwater Exploration Program concludes that two wells can be constructed on the Seton Fan. The combined capacity of the wells will be 1000 lgpm. The two wells will be located directly beside the Seton River and will be hydraulically connected to the river. The site in which the wells will be located is within the 200 year flood plain of the Fraser River and will therefore require fill and retaining walls to raise the ground elevation at the well head location. As the water produced by these wells will be considered as groundwater under

the direct influence of surface water treatment in the form of UV followed by chlorination with 20 minute contact time will be required. The wells will be drilled of a sufficient diameter and depth to each producing approximately 500 l/gpm. Each well will be equipped with a pitless adapter and a 25 Hp submersible vertical turbine well pump. A small building will be required near the wells to house electrical and control equipment. The wells will pump untreated raw groundwater to the high lift pumping and UV station.

## 2.3 Treated Water Supply Main from Seton Fan to Distribution

This water main connects the new sources to the distribution system. The water main will be 350mm dia. ductile iron pipe or DR14 C900 PVC. The water main begins at the high lift station at the Seton Fan and terminates at the DoL distribution system near the Conway Park wells. Construction of this water main will require trenchless crossings of both the highway and the railway. The water main alignment also traverses a steep slope between the railroad and the Seton Fan. All of the pipeline components will be located in public right of way or land already owned by DoL.

## 2.4 High Lift Pumping and UV Station

The High Lift facility is the first phase of a surface water filtration plant and will therefore be designed to be expanded to that use. The High Lift facility will be able to receive raw groundwater and raw surface water. The facility will receive raw water and disinfect the source with both UV and chlorination prior to pumping the water. The structure will be approximately 15m by 20m and contain two UV reactors, a 40 micron self-cleaning strainer, onsite chlorine generator, provision of four high lift pumps, wet well, and operator office space.

## 2.5 BC Hydro Canal Intake and Raw Water Supply Main to High Lift Facility

This raw water supply piping will convey raw water from the BC Hydro Canal to the High Lift Facility. Water will be extracted from the Canal by way of siphon. The submerged end of the siphon will be equipped with a fish screen. Provisions will be made to facilitate the removal of the fish screen for cleaning and to recharge the siphon should air enter the system. The raw water piping will be 450mm diameter and will generally follow existing roads. The supply main must cross the Seton River. This will be completed by directional drilling under the river.

## 2.6 Piloting of Filtration at BC Hydro Canal

The source water quality at the BC Hydro Canal is very high. The source does however contain fine silt that gives the water its distinct blue green colour. There are no health concerns with the silt however it is now known which filtration technology available will remove the silt in the most efficient manner. A detailed analysis is required to determine which technology will treat the water utilizing the least amount of footprint, chemicals, labour, energy and disposables.

## 2.7 Construction of Filtration Plant at High Lift Facility

This component requires the expansion of the high lift structure to house a premanufactured water filtration plant. Based on a review of technologies utilized by other water utilities, it has been assumed for budget estimate purposes that the filtration plant will be membrane technology which will utilize the available head of the source water to push through the micro filters. Filtered water will be discharged back to the High Lift wet well. Excess available head from the surface water will be converted to electricity to offset high lift pumping costs. Photovoltaic panels will also be installed to offset energy consumed by the building lights.



## 3.0 Phasing Plan

This project has been designed to accommodate phasing. Components 1 through 4 represent a standalone project and components 5, 6 and 7 represent possible additional phases for the overall project.

A summary of the phases is as follows:

### *Phase 1*

|                             |                    |
|-----------------------------|--------------------|
| • Universal Metering        | \$1,241,000        |
| • Seton Fan Wells           | \$594,000          |
| • Treated Water Supply Main | \$357,000          |
| • High Lift and UV          | <u>\$2,343,000</u> |
| Phase 1 Total               | \$4,535,000        |

Upon completion of Phase 1, DoL will have two sources in compliance with current water quality guidelines with a combined capacity of 1600 lgpm. This will meet the majority of DoL demand and limit water quality advisories to only a few weeks each summer. There will be no standby capacity meaning a mechanical failure could result in water shortages similar to 2009 following the forest fire in Town Creek Watershed.

### *Phase 2*

|                           |                    |
|---------------------------|--------------------|
| • BC Hydro Canal Intake   | \$1,149,000        |
| • Phase 1                 | <u>\$4,535,000</u> |
| Phase 1 and Phase 2 Total | \$5,684,000        |

Upon completion of Phase 2, DoL will have the ability to source 100% of their required demand from the BC Hydro Canal, leaving the Seton Fan wells and Rec Center well as standby source capacity. It is IHA policy that any new surface water source must have filtration. IHA is willing to approve Phase 2 as a logical step in the source replacement plan recognizing the BC Hydro Canal with UV disinfection represents a better unfiltered alternative to Town Creek, Dickey Creek and Conway wells and subject to the following conditions.

1. DoL commits to providing filtration as a long term plan.
2. Turbidity and UVT of the canal water is continuously monitored and the source is not used if UV disinfection is not providing 3 log removal of crypto or giardia.

Complying with the UV condition will not be difficult for DoL as the UV treatability of the canal water is very high. Committing to provide filtration as part of a long term plan will most likely result in a water user rate increase of \$200 to \$250 per year to save the required capital to construct a plant within a realistic timeframe.

### *Phase 3*

|                              |                    |
|------------------------------|--------------------|
| • Pilot Study                | \$125,000          |
| • Phase 1 and 2 Total        | <u>\$5,684,000</u> |
| Phase 1, 2 and Phase 3 Total | \$5,809,000        |

By completing Phase 3 DoL will be able to complete detailed design of their water treatment facility and to prepare Class A cost estimates. DoL would have much better information to assist in applying for future grants should they not be successful in receiving funding for Phase 4.

### *Phase 4*

|                                 |                    |
|---------------------------------|--------------------|
| • Filtration Plant              | \$4,318,000        |
| • Phase 1, 2, and 3 Total       | <u>\$5,809,000</u> |
| Phase 1, 2, 3 and Phase 4 Total | \$10,127,000       |

Phase 4 represents completion of DoL source replacement project. DoL will be able to source 100% of their demand from the BC Hydro Canal regardless of source water quality characteristics. The Seton Fan and Rec Center wells would remain as standby sources and the Conway, Town Creek and Dickey Creek sources would be shut down and remain as emergency sources. The operation and maintenance of the filtration facility will require a water user rate increase of \$200 to \$250 per year.

## 4.0 Detailed Expenditure Plan

A detailed expenditure plan has been prepared for each phasing option. The detailed timeline for each phase is contained in Appendix 2. As the majority of the project funding is proposed to be provided by GSPF it is assumed the District of Lillooet contribution occurs in the first fiscal year and that all further costs are funded by GSPF funds.

A summary of the expenditure schedules for each phasing option is presented as follows:

### Phase 1 – Seton Fan Wells with UV and High Lift Station

|                                  | Funding From<br>District of Lillooet | Funding From<br>Gas Tax Funds | Total       |
|----------------------------------|--------------------------------------|-------------------------------|-------------|
| Fiscal year ending March 31 2012 | \$100,000                            | \$1,972,534                   | \$2,072,534 |
| Fiscal year ending March 31 2013 | \$0                                  | \$2,290,583                   | \$2,290,583 |
| Fiscal year ending March 31 2014 | \$0                                  | \$171,883                     | \$171,883   |
| Total                            | \$100,000                            | \$4,435,000                   | \$4,535,000 |

### Phase 2 – BC Hydro Canal Intake plus Phase 1

|                                  | Funding From<br>District of Lillooet | Funding From<br>Gas Tax Funds | Total       |
|----------------------------------|--------------------------------------|-------------------------------|-------------|
| Fiscal year ending March 31 2012 | \$100,000                            | \$2,100,491                   | \$2,200,491 |
| Fiscal year ending March 31 2013 | \$0                                  | \$2,817,122                   | \$2,817,122 |
| Fiscal year ending March 31 2014 | \$0                                  | \$666,387                     | \$666,387   |
| Total                            | \$100,000                            | \$5,584,000                   | \$5,684,000 |

### Phase 3 – Filtration Pilot Study plus Phase 1 and Phase 2

|                                  | Funding From<br>District of Lillooet | Funding From<br>Gas Tax Funds | Total       |
|----------------------------------|--------------------------------------|-------------------------------|-------------|
| Fiscal year ending March 31 2012 | \$100,000                            | \$2,100,491                   | \$2,200,491 |
| Fiscal year ending March 31 2013 | \$0                                  | \$2,942,122                   | \$2,942,122 |
| Fiscal year ending March 31 2014 | \$0                                  | \$666,387                     | \$666,387   |
| Total                            | \$100,000                            | \$5,709,000                   | \$5,809,000 |

### Phase 4 – Filtration Plant plus Phase 1, Phase 2 and Phase 3

|                                  | Funding From<br>District of Lillooet | Funding From<br>Gas Tax Funds | Total        |
|----------------------------------|--------------------------------------|-------------------------------|--------------|
| Fiscal year ending March 31 2012 | \$100,000                            | \$2,100,731                   | \$2,200,731  |
| Fiscal year ending March 31 2013 | \$0                                  | \$5,841,322                   | \$5,841,322  |
| Fiscal year ending March 31 2014 | \$0                                  | \$2,084,947                   | \$2,084,947  |
| Total                            | \$100,000                            | \$10,027,000                  | \$10,127,000 |

# Appendix 1

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*Detailed Cost Estimate*



## DETAILED COST ESTIMATES

### ***Part 1 - Universal Water Meters***

|                     |   |      |     |         |                    |
|---------------------|---|------|-----|---------|--------------------|
| 1.1                 | Supply and install 20mm dia. meter in pit.  | ea.  | 748 | \$1,100 | \$822,800          |
| 1.2                 | Supply and install 25mm dia. meter in pit.  | ea.  | 96  | \$1,300 | \$124,800          |
| 1.3                 | Supply and install 37mm dia. meter indoors. | ea.  | 4   | \$1,200 | \$4,800            |
| 1.4                 | Supply and install 50mm dia. meter indoors. | ea.  | 2   | \$1,500 | \$3,000            |
| 1.5                 | Public Education Program                    | L.S. |     |         | \$25,000           |
| 1.6                 | Software and Meter Reading Equipment.       | L.S. |     |         | <u>\$20,000</u>    |
| Subtotal Part 1     |   |      |     |         | \$1,000,400        |
| Engineering @ 12%   |   |      |     |         | \$120,552          |
| Contingency @ 10%   |   |      |     |         | \$100,040          |
| Net HST @ 2%        |   |      |     |         | <u>\$20,008</u>    |
| <b>Total Part 1</b> |   |      |     |         | <b>\$1,241,000</b> |

### ***Part 2 - Seton Fan Well Construction***

|                     |   |                |      |          |                  |
|---------------------|---|----------------|------|----------|------------------|
| 2.1                 | Construct 300mm well to approximately 25m depth.                    | ea.            | 2    | \$45,000 | \$90,000         |
| 2.2                 | Pump test for 72 hours.   | ea.            | 2    | \$25,000 | \$50,000         |
| 2.3                 | Construct precast interlocking block retaining wall.                | m <sup>2</sup> | 120  | \$300    | \$36,000         |
| 2.4                 | Fill site to finished grade   | m <sup>3</sup> | 1800 | \$14     | \$25,200         |
| 2.5                 | Supply and install submersible pumps complete with pitless adapter. | ea.            | 2    | \$22,000 | \$44,000         |
| 2.6                 | Water Main and Appurtenances  |                |      |          |                  |
| 2.6.1               | 200Ø Valve  | ea.            | 2    | \$4,800  | \$9,600          |
| 2.6.2               | 250Ø Valve  | ea.            | 2    | \$7,200  | \$14,400         |
| 2.6.3               | 250Ø Tee  | ea.            | 2    | \$600    | \$1,200          |
| 2.6.4               | 250Ø PVC  | m              | 156  | \$170    | \$26,520         |
| 2.6.5               | 250Ø Bends  | ea.            | 4    | \$450    | \$1,800          |
| 2.7                 | Construct well control structure.                                   | L.S.           |      |          | \$50,000         |
| 2.8                 | Electrical and Controls   | L.S.           |      |          | \$110,000        |
| 2.9                 | BC Hydro Service Fees   | L.S.           |      |          | <u>\$20,000</u>  |
| Subtotal Part 2     |   |                |      |          | \$478,720        |
| Engineering @ 12%   |   |                |      |          | \$57,833         |
| Contingency @ 10%   |   |                |      |          | \$47,872         |
| Net HST @ 2%        |   |                |      |          | <u>\$9,575</u>   |
| <b>Total Part 2</b> |   |                |      |          | <b>\$594,000</b> |



**Part 3 - Treated Water Supply Main from Seton Fan to Conway Park**

|                               |   |                |      |         |                  |
|-------------------------------|---|----------------|------|---------|------------------|
| 3.1                           | Supply and install 350Ø DI water main.            | m              | 380  | \$240   | \$91,200         |
| 3.2                           | 350Ø Bends.                                       | ea.            | 8    | \$1,200 | \$9,600          |
| 3.3                           | Extra to construct bored crossing of Highway #99. | m              | 23   | \$800   | \$18,400         |
| 3.4                           | Extra to construct bored crossing of Railway.     | m              | 72   | \$1,200 | \$86,400         |
| 3.5                           | Extra to install pipe on grade over 30%..         | m              | 50   | \$600   | \$30,000         |
|                               | Restoration.                                      | m <sup>2</sup> | 2200 | \$14    | <u>\$30,800</u>  |
| Subtotal Part 3               |   |                |      |         | \$266,400        |
| Engineering @ 12%             |   |                |      |         | \$31,992         |
| Contingency @ 10%             |   |                |      |         | \$26,640         |
| Net HST @ 2%                  |   |                |      |         | \$5,328          |
| Archaeology @ 5%              |   |                |      |         | \$13,320         |
| Environmental Assessment @ 5% |   |                |      |         | <u>\$13,320</u>  |
| <b>Total Part 3</b>           |   |                |      |         | <b>\$357,000</b> |

**Part 4 - High Lift Pumping and UV**

|       |  |                |       |           |           |
|-------|--|----------------|-------|-----------|-----------|
| 4.1   | Fill site to subgrade.   | m <sup>3</sup> | 2000  | \$14      | \$28,000  |
| 4.2   | Construct wet well tank.   | l gal          | 40000 | \$5       | \$200,000 |
| 4.3   | Construct foundation floor slab and underslab piping.                    | m <sup>2</sup> | 300   | \$600     | \$180,000 |
| 4.4   | Construct building structure complete with insulation, roof, doors, etc. | m <sup>2</sup> | 300   | \$1,200   | \$360,000 |
| 4.5   | Building Equipment   |                |       |           |           |
| 4.5.1 | UV Reactors  | ea.            | 2     | \$150,000 | \$300,000 |
| 4.5.2 | 40 micron Strainer   | ea.            | 1     | \$38,000  | \$38,000  |
| 4.5.3 | Turbidity Analyzer   | ea.            | 2     | \$7,000   | \$14,000  |
| 4.5.4 | UVT Analyzer   | ea.            | 2     | \$15,000  | \$30,000  |
| 4.5.5 | Onsite Chlorine Generator  | ea.            | 1     | \$160,000 | \$160,000 |
| 4.5.6 | Flow Meter   | ea.            | 2     | \$9,000   | \$18,000  |
| 4.5.7 | Chlorine Residual Analyzer   | ea.            | 1     | \$4,000   | \$4,000   |
| 4.5.8 | High Lift Pumps  | ea.            | 2     | \$70,000  | \$140,000 |
| 4.5.9 | Piping and Fittings  | L.S.           |       |           | \$100,000 |
| 4.6   | Electrical and Controls  | L.S.           |       |           | \$240,000 |
| 4.7   | BC Hydro Service Fees  | L.S.           |       |           | \$20,000  |
| 4.8   | Heat Exchanger   | ea.            | 1     | \$7,500   | \$7,500   |
| 4.9   | Photovoltaic Allowance   | L.S.           |       |           | \$25,000  |



**Part 4 - High Lift Pumping and UV (continued)**

|      |             |      |  |                     |                    |
|------|-------------|------|--|---------------------|--------------------|
| 4.10 | Landscaping | L.S. |  |                     | <u>\$25,000</u>    |
|      |             |      |  | Subtotal Part 4     | \$1,889,500        |
|      |             |      |  | Engineering @ 12%   | \$226,760          |
|      |             |      |  | Contingency @ 10%   | \$188,950          |
|      |             |      |  | Net HST @ 2%        | <u>\$37,790</u>    |
|      |             |      |  | <b>Total Part 4</b> | <b>\$2,343,000</b> |

**Part 5 - BC Hydro Canal Intake**

|     |  |                |      |                               |                    |
|-----|--|----------------|------|-------------------------------|--------------------|
| 5.1 | Construct intake to BC Hydro Canal.                | L.S.           |      |                               | \$18,000           |
| 5.2 | Supply and install 450Ø DR17 HDPE                  | m              | 980  | \$260                         | \$254,800          |
| 5.3 | Extra to construct drilled crossing of Seton River | m              | 130  | \$2,000                       | \$260,000          |
| 5.4 | Pavement repair                                    | m <sup>2</sup> | 2400 | \$45                          | \$108,000          |
| 5.5 | Restoration.                                       | m <sup>2</sup> | 3480 | \$14                          | \$48,720           |
| 5.6 | Energy recovery equipment at High Lift.            | L.S.           |      |                               | \$28,000           |
| 5.7 | Additional High Lift Pumps                         | ea.            | 2    | \$70,000                      | <u>\$140,000</u>   |
|     |  |                |      | Subtotal Part 5               | \$857,520          |
|     |  |                |      | Engineering @ 12%             | \$102,826          |
|     |  |                |      | Contingency @ 10%             | \$85,752           |
|     |  |                |      | Net HST @ 2%                  | \$17,150           |
|     |  |                |      | Archaeology @ 5%              | \$42,876           |
|     |  |                |      | Environmental Assessment @ 5% | <u>\$42,876</u>    |
|     |  |                |      | <b>Total Part 5</b>           | <b>\$1,149,000</b> |

**Part 6 - Piloting of Filtration Plants**

|     |  |      |  |                     |                  |
|-----|--|------|--|---------------------|------------------|
| 6.1 | Direct filtration                            | L.S. |  |                     | \$25,000         |
| 6.2 | Chemically assisted filtration               | L.S. |  |                     | \$25,000         |
| 6.3 | Ballast Floc complete with direct filtration | L.S. |  |                     | \$25,000         |
| 6.4 | Pressurized membrane                         | L.S. |  |                     | \$25,000         |
| 6.5 | Vacuum membrane.                             | L.S. |  |                     | \$25,000         |
|     |  |      |  | <b>Total Part 6</b> | <b>\$125,000</b> |



**Part 7 - Filtration Plant**

|                                       |  |                |     |         |                    |
|---------------------------------------|--|----------------|-----|---------|--------------------|
| 7.1                                   | Pre-packaged Filtration Equipment                                | L.S.           |     |         | \$2,500,000        |
| 7.2                                   | Building floor slab and underslab piping.                        | m <sup>2</sup> | 400 | \$600   | \$240,000          |
| 7.3                                   | Backwash piping and treatment tank.                              | L.S.           |     |         | \$120,000          |
| 7.4                                   | Clean in place piping and storage tank.                          | L.S.           |     |         | \$70,000           |
| 7.5                                   | Treatment Plant Structure complete with roof, doors, insulation. | m <sup>2</sup> | 400 | \$1,200 | \$480,000          |
| 7.6                                   | Backwash disposal piping.  | m              | 200 | \$120   | \$24,000           |
| 7.7                                   | Plant offloading, installation and piping                        | L.S.           |     |         | \$200,000          |
| 7.8                                   | Electrical   | L.S.           |     |         | \$50,000           |
| 7.9                                   | Start and commissioning.   | L.S.           |     |         | <u>\$40,000</u>    |
| Subtotal Part 7                       |  |                |     |         | \$3,724,000        |
| Engineering @ 12% (not including 7.1) |  |                |     |         | \$147,120          |
| Contingency @ 10%                     |  |                |     |         | \$372,400          |
| Net HST @ 2%                          |  |                |     |         | <u>\$74,480</u>    |
| <b>Total Part 7</b>                   |  |                |     |         | <b>\$4,318,000</b> |

**SUMMARY**

|                                    |                     |
|------------------------------------|---------------------|
| Part 1 - Universal Metering        | \$1,241,000         |
| Part 2 - Seton Fan Wells           | \$594,000           |
| Part 3 - Treated Water Supply Main | \$357,000           |
| Part 4 - High Lift and UV          | \$2,343,000         |
| Part 5 - BC Hydro Canal Intake     | \$1,149,000         |
| Part 6 - Pilot Study               | \$125,000           |
| Part 7 - Filtration Plant          | <u>\$4,318,000</u>  |
| <b>Total Parts 1 to 7</b>          | <b>\$10,127,000</b> |



## Appendix 2

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### *Expenditure Timelines*

### Cost and Construction Schedule for District of Columbia - Phase I

[illegible]

| Project Component | 2011       | 2012               | 2013               | 2014             |
|-------------------|------------|--------------------|--------------------|------------------|
| Engineering       | \$0        | \$199,179          | \$21,871           | \$19,634         |
| Construction      | \$0        | \$1,011,644        | \$1,044,701        | \$158,015        |
| Contingency       | \$0        | \$165,164          | \$164,478          | \$12,052         |
| Acquisition       | \$0        | \$1,500            | \$1,500            | \$0              |
| Operating         | \$0        | \$11,700           | \$1,500            | \$0              |
| Administrative    | \$0        | \$25,000           | \$25,000           | \$0              |
| Non-FTE           | \$0        | \$0                | \$0                | \$0              |
| <b>Total</b>      | <b>\$0</b> | <b>\$1,242,483</b> | <b>\$1,219,050</b> | <b>\$187,699</b> |

### Cost and Construction Schedule for District of Ulloor - Phase 2

[illegible]**Cost and Construction Schedule for District of Columbia - Phase 2**

### Summary of Budget Expenditures by Fiscal Year

| Project Component |                | 2011 | 2012        | 2013        | 2014        |
|-------------------|----------------|------|-------------|-------------|-------------|
| 1                 | Urbanization   | \$0  | \$2,078,556 | \$200,556   | \$90,016    |
| 2                 | Transportation | \$0  | \$1,297,162 | \$2,237,700 | \$597,648   |
| 3                 | Environment    | \$0  | \$1,417,710 | \$253,370   | \$50,705    |
| 4                 | Technology     | \$0  | \$18,557    | \$2,187     | \$18,452    |
| 5                 | Infrastructure | \$0  | \$10,557    | \$2,187     | \$16,452    |
| 6                 | Health         | \$0  | \$3,044     | \$3,758     | \$10,333    |
| 7                 | Other          | \$0  | \$0         | \$0         | \$0         |
| 8                 | Total          | \$0  | \$6,897,327 | \$7,636,563 | \$1,724,154 |

**Cost and Construction Schedule for District of Lillicoat - Phase 3**

[illegible]

### Water and Construction Schedule for District of Columbia - Phase 3

| Project Completed          | 2011 | 2012        | 2013        | 2014      |
|----------------------------|------|-------------|-------------|-----------|
| Engineering                | 40   | \$10,040    | \$26,524    | \$60,018  |
| Construction               | 40   | \$1,371,052 | \$265,700   | \$577,640 |
| Contingency                | 40   | 0           | 0           | 138,052   |
| Operating                  | 40   | \$10,527    | \$31,187    | \$18,452  |
| Insurance and Depreciation | 40   | \$10,527    | \$31,187    | \$18,452  |
| Net IRET                   | 40   | \$3,045,044 | \$44,254    | \$10,125  |
| Total                      | 40   | \$2,206,644 | \$2,842,122 | \$606,307 |

Cost and Construction Schedule for District of Illinois - Phase 3

| Line No. | Item Description | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2439 | 2440 | 2441 | 2442 | 2443 | 2444 | 2445 | 2446 | 2447 | 2448 | 2449 | 2450 | 2451 | 2452 | 2453 | 2454 | 2455 | 2456 | 2457 | 2458 | 2459 | 2460 | 2461 | 2462 | 2463 | 2464 | 2465 | 2466 | 2467 | 2468 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 | 2475 | 2476 | 2477 | 2478 | 2479 | 2480 | 2481 | 2482 | 2483 | 2484 | 2485 | 2486 | 2487 | 2488 | 2489 | 2490 | 2491 | 2492 | 2493 | 2494 | 2495 | 2496 | 2497 | 2498 | 2499 | 2500 | 2501 | 2502 | 2503 | 2504 | 2505 | 2506 | 2507 | 2508 | 2509 | 2510 | 2511 | 2512 | 2513 | 2514 | 2515 | 2516 | 2517 | 2518 | 2519 | 2520 | 2521 | 2522 | 2523 | 2524 | 2525 | 2526 | 2527 | 2528 | 2529 | 2530 | 2531 | 2532 | 2533 | 2534 | 2535 | 2536 | 2537 | 2538 | 2539 | 2540 | 2541 | 2542 | 2543 | 2544 | 2545 | 2546 | 2547 | 2548 | 2549 | 2550 | 2551 | 2552 | 2553 | 2554 | 2555 | 2556 | 2557 | 2558 | 2559 | 2560 | 2561 | 2562 | 2563 | 2564 | 2565 | 2566 | 2567 | 2568 | 2569 | 2570 | 2571 | 2572 | 2573 | 2574 | 2575 | 2576 | 2577 | 2578 | 2579 | 2580 | 2581 | 2582 | 2583 | 2584 | 2585 | 2586 | 2587 | 2588 | 2589 | 2590 | 2591 | 2592 | 2593 | 2594 | 2595 | 2596 | 2597 | 2598 | 2599 | 2600 | 2601 | 2602 | 2603 | 2604 | 2605 | 2606 | 2607 | 2608 | 2609 | 2610 | 2611 | 2612 | 2613 | 2614 | 2615 | 2616 | 2617 | 2618 | 2619 | 2620 | 2621 | 2622 | 2623 | 2624 | 2625 | 2626 | 2627 | 2628 | 2629 | 2630 | 2631 | 2632 | 2633 | 2634 | 2635 | 2636 | 2637 | 2638 | 2639 | 2640 | 2641 | 2642 | 2643 | 2644 | 2645 | 2646 | 2647 | 2648 | 2649 | 2650 | 2651 | 2652 | 2653 | 2654 | 2655 | 2656 | 2657 | 2658 | 2659 | 2660 | 2661 | 2662 | 2663 | 2664 | 2665 | 2666 | 2667 | 2668 | 2669 | 2670 | 2671 | 2672 | 2673 | 2674 | 2675 | 2676 | 2677 | 2678 | 2679 | 2680 | 2681 | 2682 | 2683 | 2684 | 2685 | 2686 | 2687 | 2688 | 2689 | 2690 | 2691 | 2692 | 2693 | 2694 | 2695 | 2696 | 2697 | 2698 | 2699 | 2700 | 2701 | 2702 | 2703 | 2704 | 2705 | 2706 | 2707 | 2708 | 2709 | 2710 | 2711 | 2712 | 2713 | 2714 | 2715 | 2716 | 2717 | 2718 | 2719 | 2720 | 2721 | 2722 | 2723 | 2724 | 2725 | 2726 | 2727 | 2728 | 2729 | 2730 | 2731 | 2732 | 2733 | 2734 | 2735 | 2736 | 2737 | 2738 | 2739 | 2740 | 2741 | 2742 | 2743 | 2744 | 2745 | 2746 | 2747 | 2748 | 2749 | 2750 | 2751 | 2752 | 2753 | 2754 | 2755 | 2756 | 2757 | 2758 | 2759 | 2760 | 2761 | 2762 | 2763 | 2764 | 2765 | 2766 | 2767 | 2768 | 2769 | 2770 | 2771 | 2772 | 2773 | 2774 | 2775 | 2776 | 2777 | 2778 | 2779 | 2780 | 2781 | 2782 | 2783 | 2784 | 2785 | 2786 | 2787 | 2788 | 2789 | 2790 | 2791 | 2792 | 2793 | 2794 | 2795 | 2796 | 2797 | 2798 | 2799 | 2800 | 2801 | 2802 | 2803 | 2804 | 2805 | 2806 | 2807 | 2808 | 2809 | 2810 | 2811 | 2812 | 2813 | 2814 | 2815 | 2816 | 2817 | 2818 | 2819 | 2820 | 2821 | 2822 | 2823 | 2824 | 2825 | 2826 | 2827 | 2828 | 2829 | 2830 | 2831 | 2832 | 2833 | 2834 | 2835 | 2836 | 2837 | 2838 | 2839 | 2840 | 2841 | 2842 | 2843 | 2844 | 2845 | 2846 | 2847 | 2848 | 2849 | 2850 | 2851 | 2852 | 2853 | 2854 | 2855 | 2856 | 2857 | 2858 | 2859 | 2860 | 2861 | 2862 | 2863 | 2864 | 2865 | 2866 | 2867 | 2868 | 2869 | 2870 | 2871 | 2872 | 2873 | 2874 | 2875 | 2876 | 2877 | 2878 | 2879 | 2880 | 2881 | 2882 | 2883 | 2884 | 2885 | 2886 | 2887 | 2888 | 2889 | 2890 | 2891 | 2892 | 2893 | 2894 | 2895 | 2896 | 2897 | 2898 | 2899 | 2900 | 2901 | 2902 | 2903 | 2904 | 2905 | 2906 | 2907 | 2908 | 2909 | 2910 | 2911 | 2912 | 2913 | 2914 | 2915 | 2916 | 2917 | 2918 | 2919 | 2920 | 2921 | 2922 | 2923 | 2924 | 2925 | 2926 | 2927 | 2928 | 2929 | 2930 | 2931 | 2932 | 2933 | 2934 | 2935 | 2936 | 2937 | 2938 | 2939 | 2940 | 2941 | 2942 | 2943 | 2944 | 2945 | 2946 | 2947 | 2948 | 2949 | 2950 | 2951 | 2952 | 2953 | 2954 | 2955 | 2956 | 2957 | 2958 | 2959 | 2960 | 2961 | 2962 | 2963 | 2964 | 2965 | 2966 | 2967 | 2968 | 2969 | 2970 | 2971 | 2972 | 2973 | 2974 | 2975 | 2976 | 2977 | 2978 | 2979 | 2980 | 2981 | 2982 | 2983 | 2984 | 2985 | 2986 | 2987 | 2988 | 2989 | 2990 | 2991 | 2992 | 2993 | 2994 | 2995 | 2996 | 2997 | 2998 | 2999 | 3000 | 3001 | 3002 | 3003 | 3004 | 3005 | 3006 | 3007 | 3008 | 3009 | 3010 | 3011 | 3012 | 3013 | 3014 | 3015 | 3016 | 3017 | 3018 | 3019 | 3020 | 3021 | 3022 | 3023 | 3024 | 3025 | 3026 | 3027 | 3028 | 3029 | 3030 | 3031 | 3032 | 3033 | 3034 | 3035 | 3036 | 3037 | 3038 | 3039 | 3040 | 3041 | 3042 | 3043 | 3044 | 3045 | 3046 | 3047 | 3048 | 3049 | 3050 | 3051 | 3052 | 3053 | 3054 | 3055 | 3056 | 3057 | 3058 | 3059 | 3060 | 3061 | 3062 | 3063 | 3064 | 3065 | 3066 | 3067 | 3068 | 3069 | 3070 | 3071 | 3072 | 3073 | 3074 | 3075 | 3076 | 3077 | 3078 | 3079 | 3080 | 3081 | 3082 | 3083 | 3084 | 3085 | 3086 | 3087 | 3088 | 3089 | 3090 | 3091 | 3092 | 3093 | 3094 | 3095 | 3096 | 3097 | 3098 | 3099 | 3100 | 3101 | 3102 | 3103 | 3104 | 3105 | 3106 | 3107 | 3108 | 3109 | 3110 | 3111 | 3112 | 3113 | 3114 | 3115 | 3116 | 3117 | 3118 | 3119 | 3120 | 3121 | 3122 | 3123 | 3124 | 3125 | 3126 | 3127 | 3128 | 3129 | 3130 | 3131 | 3132 | 3133 | 3134 | 3135 | 3136 | 3137 | 3138 | 3139 | 3140 | 3141 | 3142 | 3143 | 3144 | 3145 | 3146 | 3147 | 3148 | 3149 | 3150 | 3151 | 3152 | 3153 | 3154 | 3155 | 3156 | 3157 | 3158 | 3159 | 3160 | 3161 | 3162 | 3163 | 3164 | 3165 | 3166 | 3167 | 3168 | 3169 | 3170 | 3171 | 3172 | 3173 | 3174 | 3175 | 3176 | 3177 | 3178 | 3179 | 3180 | 3181 | 3182 | 3183 | 3184 | 3185 | 3186 | 3187 | 3188 | 3189 | 3190 | 3191 | 3192 | 3193 | 3194 | 3195 | 3196 | 3197 | 3198 | 3199 | 3200 | 3201 | 3202 | 3203 | 3204 | 3205 | 3206 | 3207 | 3208 | 3209 | 3210 | 3211 | 3212 | 3213 | 3214 | 3215 | 3216 | 3217 | 3218 | 3219 | 3220 | 3221 | 3222 | 3223 | 3224 | 3225 | 3226 | 3227 | 3228 | 3229 | 3230 | 3231 | 3232 | 3233 | 3234 | 3235 | 3236 | 3237 | 3238 | 3239 | 3240 | 3241 | 3242 | 3243 | 3244 | 3245 | 3246 | 3247 | 3248 | 3249 | 3250 | 3251 | 3252 | 3253 | 3254 | 3255 | 3256 | 3257 | 3258 | 3259 | 3260 | 3261 | 3262 | 3263 | 3264 | 3265 | 3266 | 3267 | 3268 | 3269 | 3270 | 3271 | 3272 | 3273 | 3274 | 3275 | 3276 | 3277 | 3278 | 3279 | 3280 | 3281 | 3282 | 3283 | 3284 | 3285 | 3286 | 3287 | 3288 | 3289 | 3290 | 3291 | 3292 | 3293 | 3294 | 3295 | 3296 | 3297 | 3298 | 3299 | 3300 | 3301 | 3302 | 3303 | 3304 | 3305 | 3306 | 3307 | 3308 | 3309 | 3310 | 3311 | 3312 | 3313 | 3314 | 3315 | 3316 | 3317 | 3318 | 3319 | 3320 | 3321 | 3322 | 3323 | 3324 | 3325 | 3326 | 3327 | 3328 | 3329 | 3330 | 3331 | 3332 | 3333 | 3334 | 3335 | 3336 | 3337 | 3338 | 3339 | 3340 | 3341 | 3342 | 3343 | 3344 | 3345 | 3346 | 3347 | 3348 | 3349 | 3350 | 3351 | 3352 | 3353 | 3354 | 3355 | 3356 | 3357 | 3358 | 3359 | 3360 | 3361 | 3362 | 3363 | 3364 | 3365 | 3366 | 3367 | 3368 | 3369 | 3370 | 3371 | 3372 | 3373 | 3374 | 3375 | 3376 | 3377 | 3378 | 3379 | 3380 | 3381 | 3 |
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## Appendix 3

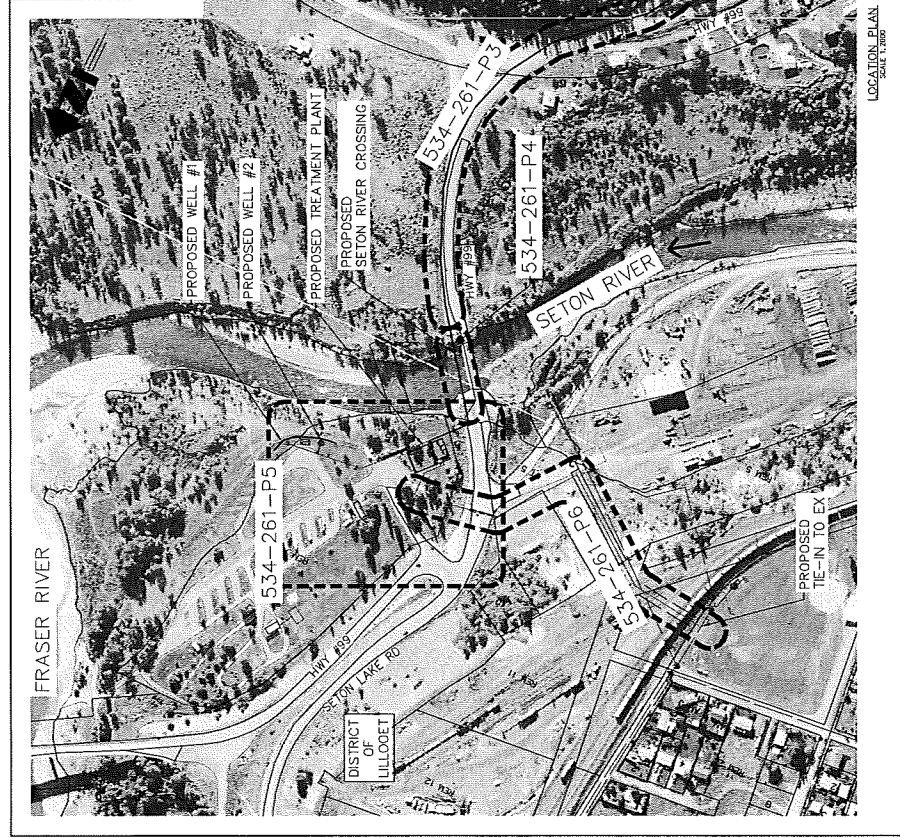
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*Design Drawings*

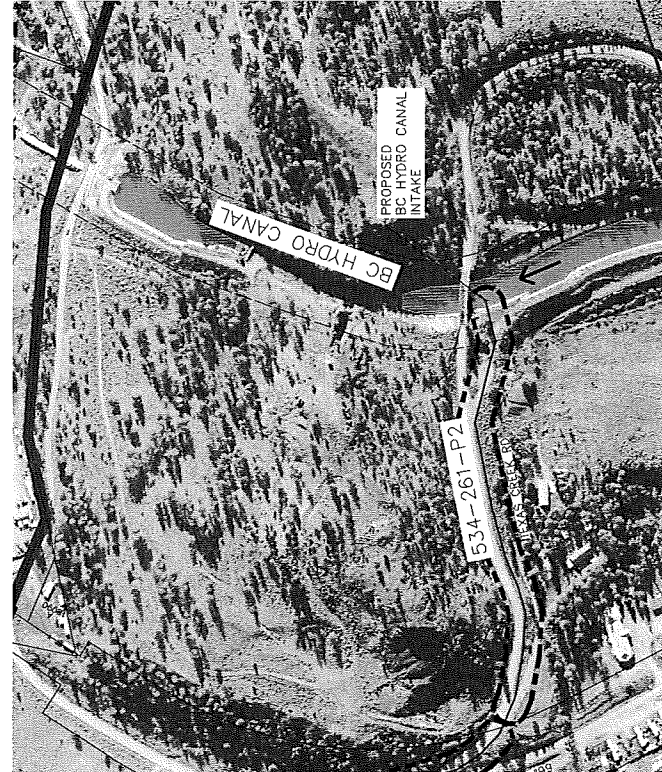
# DISTRICT OF LILLOOET WATER SYSTEM SOURCE REPLACEMENT

## DRAWING INDEX

- 306-141:1-P1 KEY PLAN AND DRAWING INDEX
- 306-141:1-P2 PROPOSED RAW WATER SUPPLY MAIN - STA: 0+000 to 1+390
- 306-141:1-P3 PROPOSED RAW WATER SUPPLY MAIN - STA: 1+390 to 1+760
- 306-141:1-P4 PROPOSED RAW WATER SUPPLY MAIN - STA: 1+760 to 1+960
- 306-141:1-P5 PROPOSED TREATMENT PLANT SITE PLAN
- 306-141:1-P6 PROPOSED TREATED WATERMAIN - STA: 2+000 to 2+380



LOCATION PLAN  
SHEET 1 OF 6



THIS DRAWING HAS  
BEEN REDUCED BY 50%

| NO. | REVISION          | DATE       | BY       | CHKD.    |
|-----|-------------------|------------|----------|----------|
| 1   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 2   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 3   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 4   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 5   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 6   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
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| 8   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 9   | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |
| 10  | ISSUED FOR PERMIT | 2018-01-10 | W. J. B. | W. J. B. |

DATE: 2018-01-10

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DATE: 2018-01-10

BY: W. J. B.

CHKD.: W. J. B.

DATE: 2018-01-10

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CHKD.: W. J. B.

DATE: 2018-01-10

BY: W. J. B.

**TRUE**  
CONSULTING GROUP  
SUITE 101, 1015 FALCON RD  
VICTORIA, BC V8W 2E1  
TEL: 250-383-1111  
WWW.TRUECONSULTING.COM

DISTRICT  
OF  
LILLOOET

WATER SYSTEM  
SOURCE  
REPLACEMENT

KEY PLAN  
AND  
DRAWING INDEX

DATE: 2018-01-10  
BY: W. J. B.  
CHKD.: W. J. B.

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DATE: 2018-01-10

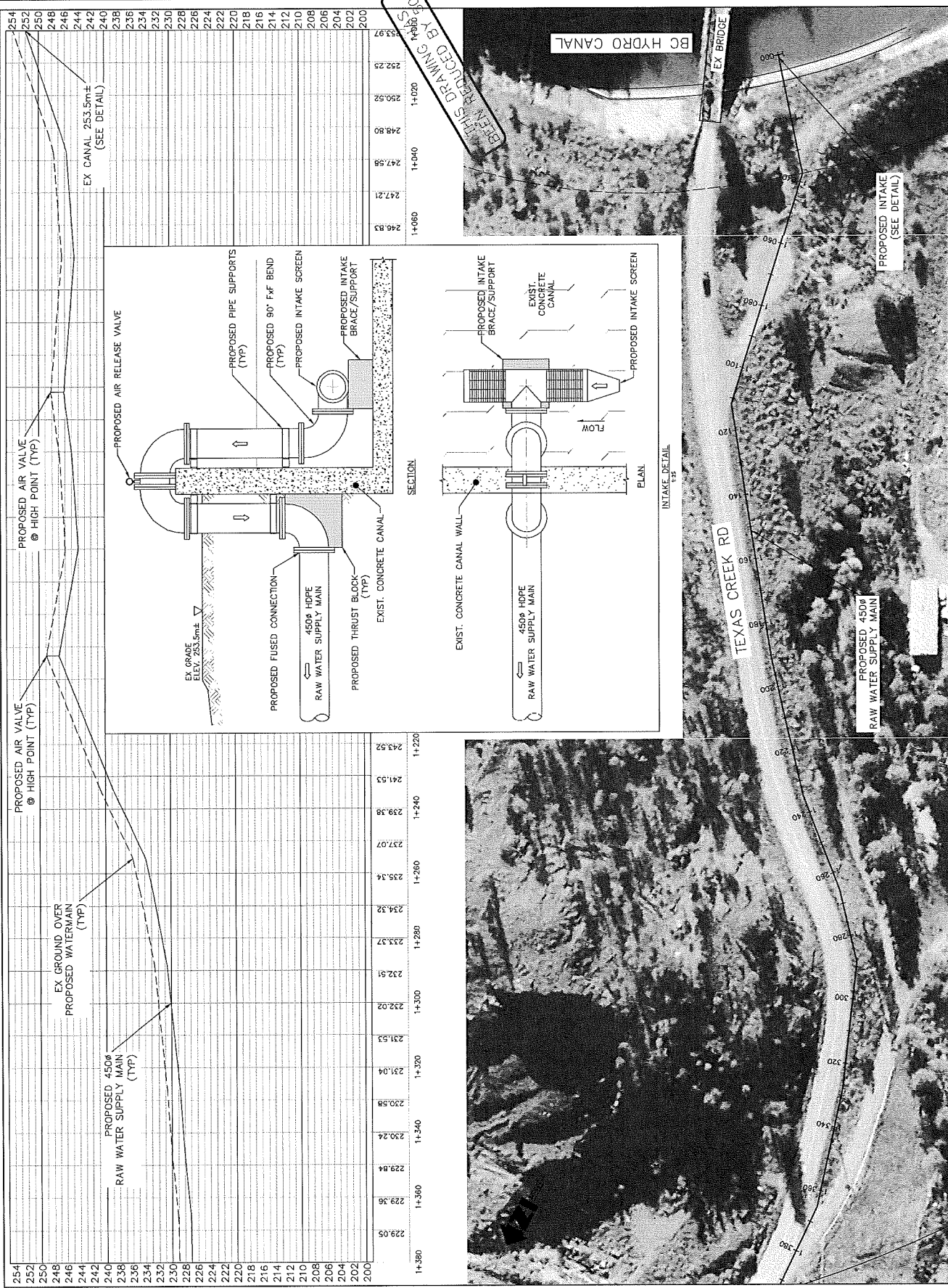
BY: W. J. B.

CHKD.: W. J. B.

534-261-P1

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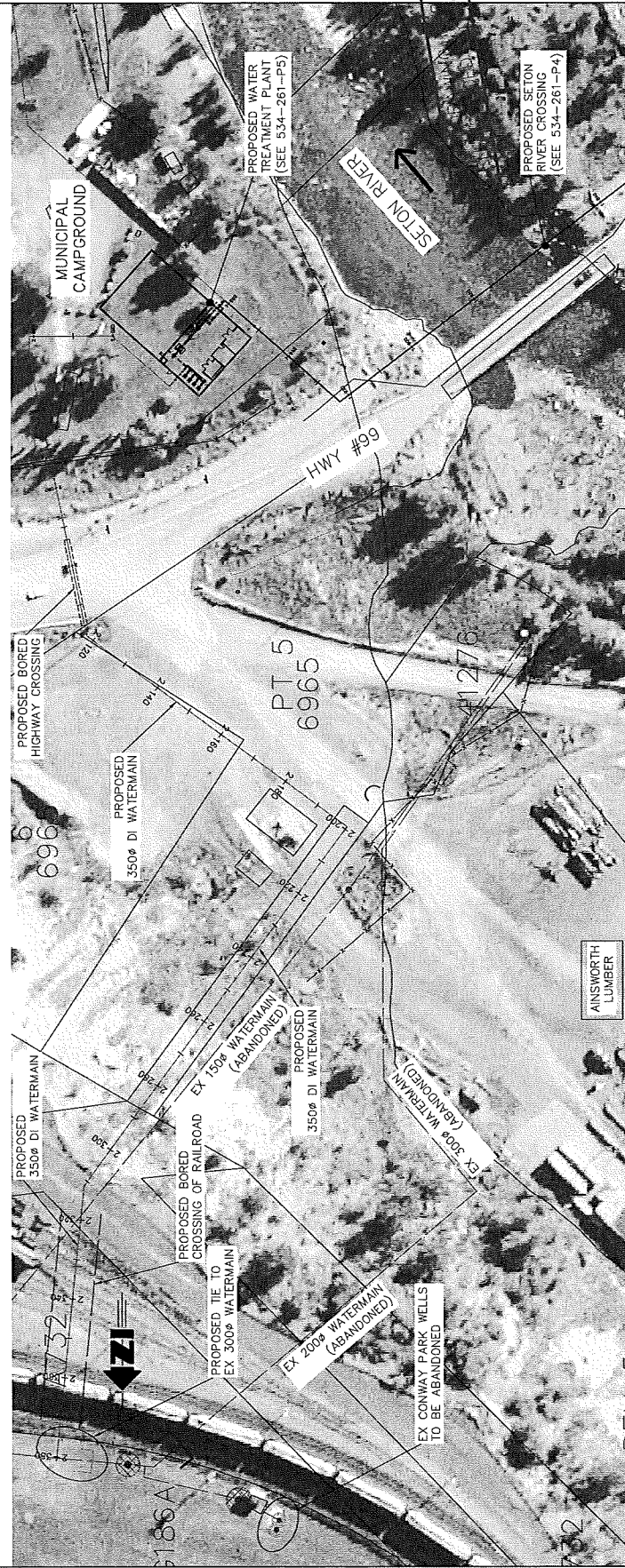
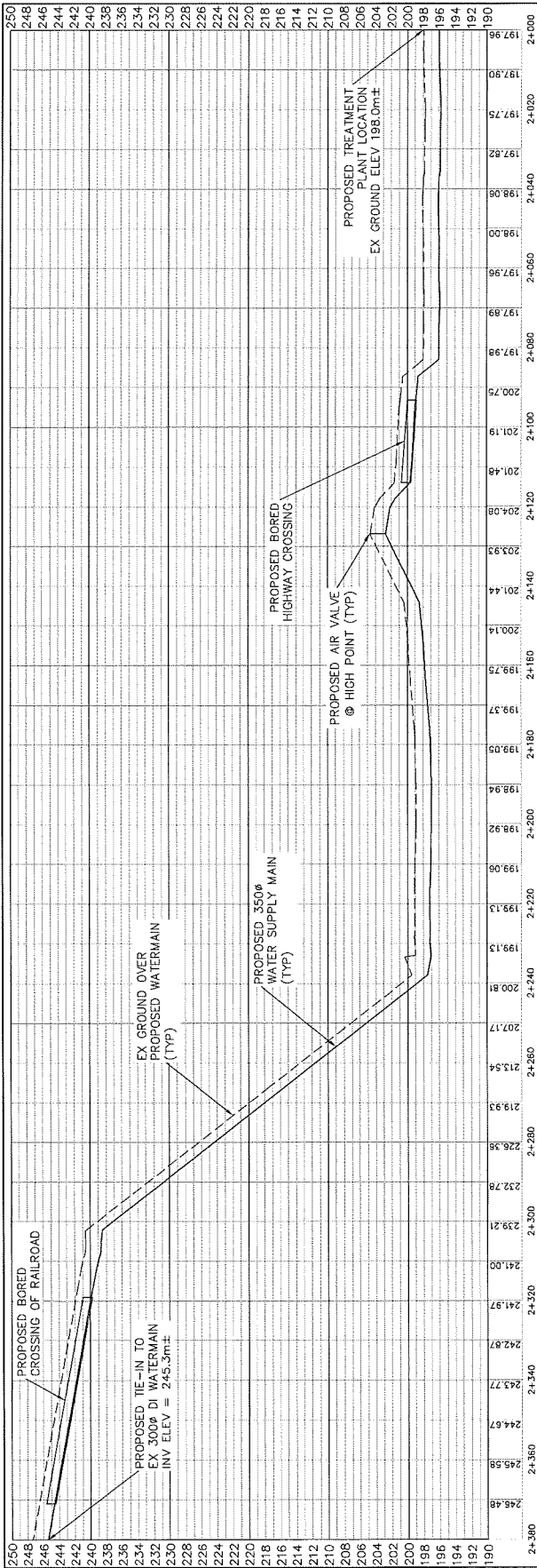


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CONSULTANTS GROUP  
SINCE 1978, TRUE CONSULTANTS GROUP HAS BEEN PROVIDING ENGINEERING, ARCHITECTURAL, AND PLANNING SERVICES TO THE COMMUNITY.

**DISTRICT OF LILLOOET**

**WATER SYSTEM SOURCE REPLACEMENT**

**PROPOSED TREATED WATERMAIN**

STA: 2+400 to 2+380

534-261-P6

1

| ISSUED FOR |                | DATE |                |
|------------|----------------|------|----------------|
| 1          | 2+400 to 2+380 | 1    | 2+400 to 2+380 |
| 2          | 2+380 to 2+360 | 2    | 2+380 to 2+360 |
| 3          | 2+360 to 2+340 | 3    | 2+360 to 2+340 |
| 4          | 2+340 to 2+320 | 4    | 2+340 to 2+320 |
| 5          | 2+320 to 2+300 | 5    | 2+320 to 2+300 |
| 6          | 2+300 to 2+280 | 6    | 2+300 to 2+280 |
| 7          | 2+280 to 2+260 | 7    | 2+280 to 2+260 |
| 8          | 2+260 to 2+240 | 8    | 2+260 to 2+240 |
| 9          | 2+240 to 2+220 | 9    | 2+240 to 2+220 |
| 10         | 2+220 to 2+200 | 10   | 2+220 to 2+200 |
| 11         | 2+200 to 2+180 | 11   | 2+200 to 2+180 |
| 12         | 2+180 to 2+160 | 12   | 2+180 to 2+160 |
| 13         | 2+160 to 2+140 | 13   | 2+160 to 2+140 |
| 14         | 2+140 to 2+120 | 14   | 2+140 to 2+120 |
| 15         | 2+120 to 2+100 | 15   | 2+120 to 2+100 |
| 16         | 2+100 to 2+080 | 16   | 2+100 to 2+080 |
| 17         | 2+080 to 2+060 | 17   | 2+080 to 2+060 |
| 18         | 2+060 to 2+040 | 18   | 2+060 to 2+040 |
| 19         | 2+040 to 2+020 | 19   | 2+040 to 2+020 |
| 20         | 2+020 to 2+000 | 20   | 2+020 to 2+000 |