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Appendix A

Terms of Reference

CITY OF COLWOOD
3300 Wishart Road, Colwood, B C V9C 1R1

(250) 478-5541 - Administration
(250) 478-5999 - Building Inspection
(250) 478-5999 - Bylaw Enforcement
(250) 478-5999 - Engineering
(250) 478-5530 - Finance & Property Taxes
(250) 478-8321 - Fire Department
(250) 478-5590 - Planning & Zoning
(250) 474-4133 - Public Works Yard
(250) 478-7516 – Fax

July 13, 2011

File No.: 1220-20-ENG-17911

SUBJECT: Request for Proposals (RFP-2011-06)
Engineering Services - Sewer Master Plan

General:

The City of Colwood is interested in receiving Proposals from qualified engineering firms for engineering services related to the development and preparation of a Sewer Master Plan (SMP).

Deadline for Submissions:

Proposals shall be accepted no later than 2:00 PM, Tuesday, August 16, 2011, at Colwood City Hall, and shall be addressed to:

Attention: Michael Baxter, P.Eng.
City Engineer

1. INITIAL MEETING:

An initial meeting for Proponents will be held Wednesday, July 20, 2011, at Colwood City Hall at 10:00 AM. Additional meetings related to this RFP, if any, will be discussed with interested parties.

2. PROJECT SCOPE:

The scope of work shall include, but not necessarily be limited to, the engineering analysis of all sewer catchment areas within the City of Colwood.

The successful Proponent shall ensure full and complete consideration of the following:

- existing sewered areas (*See note below);
- current OCP;
- current CRD Liquid Waste Management provisions, in particular the City's rights and obligations with respect to the CRD Trunk Sewer infrastructure
- current population data, as well as population density projections;
- the City's overall development expectations;
- local Federal Government lands and their potential for impacting the SMP;
- riparian areas, as well as any/all applicable environmental legislation;

*Note re: 'existing sewered areas':

Various geographic areas of the City are currently serviced by local sewers feeding into the regional CRD Trunk Sewer. Local DND lands also utilize the regional CRD Trunk Sewer, with several connection points along the Galloping Goose Regional Trail. It is expected that all engineering parameters of these existing sewer systems shall be reconciled within the new SMP framework. The remaining areas are serviced by on-site septic systems.

3. TERMS OF REFERENCE:

*For this section, 'City Engineer' is to mean 'City Engineer or his designated representative'.

In consultation with the City Engineer, the successful proponent shall:

- Review / reconcile existing sewered areas relative to the proposed SMP;
- In consultation with the City Engineer, review other related previous documentation;
- Liaise with Planning and Engineering re: population projections / future developments, as directed by the City Engineer;
- Propose routings with due consideration to construction logistics and costs;
- Identify any potential for greater efficiencies within the SMP through inter-municipal sewer-sharing agreements;
- Minimize statutory right-of-way procurements and provide cost-benefit analysis for proposed procurements;
- Minimize the use of force mains / lift stations;
- Consider siphons where appropriate;
- Lift stations proposed shall include:
  - details on sizing, pumping criteria, proposed locations;
  - recommendations on construction staging, due to the effect of the population growth 'continuum' on optimal pumping efficiencies;
  - recommendations on 'storage' options, in consideration of both current physical necessities as well as current 'probable' CRD sewage treatment plant plans; 'storage' considerations shall involve direct consultation with the City Engineer;
- Storage: an analysis of 'storage' requirements shall be performed with a view to:
  - Determination of 'flow milestones' at critical points in the sewer system as depicted by the SMP; and
  - Determination / recommendation of a sewer connection surcharge with a view to establishing a 'fund' for purposes of upgrading (increasing) the flow capacity of parts of the sewer system as development requirements exceed original design parameters;
- Consider City of Colwood treatment plants and their potential impact on the proposed SMP;

- Prepare comprehensive text, including data/research support for the SMP; text shall provide rationales for proposed routings, as well as cost / benefit considerations (see **'Deliverables'** below);

- Attend two (2) Transportation and Public Infrastructure Committee meetings to answer questions about the SMP;

4. STANDARDS AND SPECIFICATIONS:

The afore-mentioned engineering analysis shall adhere to and conform to the following standards, in order of priority:

1) Current MMCD – Platinum edition; then
2) Other City of Colwood Bylaws as they may affect the SMP; then
3) 'good engineering practice';

5. SCHEDULE:

Each Proposal shall include a schedule for the work. Proponents shall include a comprehensive bar chart indicating tasks / milestones to accompany their proposal. Each 'schedule task' shall be described separate from the bar chart.

Further, should options to a base proposal be included in the RFP submission, any ramifications to the base schedule are to be clearly shown on a separate bar chart included with the said 'option'.

Following are proposed 'milestone' dates for this project:

1)	RFP issued	July 13, 2011
2)	Initial Meeting	July 20, 2011
3)	Submission of Proposals	August 16, 2011
4)	Council considerations ('award')	September 12, 2011
5)	Submission of Draft Report	October 26, 2011
6)	Submission of Final Report	November 9, 2011

6. PROPONENT'S TEAM:

Proposals must set out the following:

1) Merits of the Proponent's firm, including:
   i) Experience with similar projects
   ii) Other related experience
   iii) Declaration of resources necessary for this project

2) Merits of the Proponent's Team members (including any sub-consultants):
   i) Qualifications
   ii) Local knowledge
   iii) Experience with similar projects
   iv) Other related experience

*Any changes to the stated Team members during the project must be done in consultation with – and as agreed by – the City Engineer.
**References may be required, at the discretion of the City Engineer.

7. PROJECT MEETINGS:

Integral to the City's need to maintain an accepted schedule for this project is the requirement for formal project meetings, at least bi-weekly, and shall include the successful Proponent's Team Leader (or designate, as agreed to by the City Engineer).

8. DELIVERABLES:

Deliverables shall consist of the following:

1) An executive summary: one (1) signed paper copy, with a pdf copy;
2) Digital:
   A digital, cadastral drawing with boundary lines defined within a relative positional accuracy of 10 cm with data geo-referenced to UTM NAD 83 (CSRS) 3.0.0.BC.1.CRD datum, all to current City of Langford's Drawing and Drafting Standards. Drawing shall show proposed sewer routings and existing sewers (including sewers under construction) with City of Colwood identification numbers, c/w:
   a) Any/all associated appurtenances
   b) Catchment boundaries areas
   c) Existing and proposed diameters/types(e.g. PVC, D.I., etc.)
   d) Undersized sewers noted
   e) Directions of flow
   f) Civic addresses
3) Three (3) hard (paper; colour) copies; one (1) digital; and one (1) pdf of the overall SMP, plan view, at 1:5000 scale;
4) Full supporting text (including digital copy) of the above-mentioned SMP engineering analysis using either SANSYS or approved (by the City Engineer) alternate software with complete supporting data and technical commentary for all proposed routings and ancillary structures, together with concomitant textual evidence of consideration/reconciliation of existing sewers.
   Technical commentary for sewer routings/ancillary structures shall provide evidence of construction cost-benefit analyses, and/or as directed by the City Engineer.

All deliverables shall become the sole property of the City of Colwood, including 'Copyright'.

9. CONFIRMATION OF INSURANCE:

Proposals shall provide confirmation and a description of the coverage of the 'professional liability insurance' covered by the firm and leading Team members, as well as **all** sub-consultants.

10. CONFIDENTIALITY:

All information, materials and products included in the Proposals submitted for this project shall become the sole property of the City of Colwood and may be subject to disclosure under the terms of the *Freedom of Information and Protection of Privacy Act.* If any portion of the Proposal contains trade secrets, intellectual property rights, or any

other secret right of information belonging to the Proponent, that portion(s) should be clearly marked as confidential.

11. NO CLAIM FOR COMPENSATION:

Except as expressly and specifically permitted in these Terms of Reference, no Proponent shall have any claim for any compensation of any kind whatsoever as a result of participating in this RFP, and by submitting a Proposal each Proponent shall be deemed to have agreed that it has no claim.

12. COLWOOD – CONSULTANT AGREEMENT:

The successful Proponent will enter into an agreement with the City of Colwood for the provision of engineering services. The agreement will be based on the Proposal submitted including the tasks to be carried out, the personnel committed and the fees to be charged.

13. AUTHORIZATION:

The Proposal submitted will be signed and sealed by ta representative of the firm authorized to commit the firm to the obligations described in this 'terms of reference'.

14. QUESTIONS AND CLARIFICATIOINS:

Any questions or requests for clarification related to this RFP shall be directed by e-mail to:

Rob Manion, @ rmanionconsulting@shaw.ca;

15. PROPOSAL SUBMISSIONS:

Four (4) copies of all Proposals are required; each copy shall be composed of 2 parts as follows, each part signed and sealed separately:

1) the Proposal text, c/w supporting information; and
2) the Proposal Price, inclusive of all taxes, with HST shown separately

16. EVALUATION PROCESS FOR SUBMISSIONS:

Please note that Proposals will NOT be opened in public as these are 'proposals' and as such contain substantive 'proprietary' performance offerings for a stipulated price and so will not be evaluated solely in regards to Proposal Price.

The evaluation of Proposals will be conducted by a team selected by, and chaired by, the City Engineer. ***Colwood City Council shall be the final authority on the selection of a successful Proposal.**

The evaluation process for the RFP submissions will be conducted as follows:

1) Proposals – of the first part, the 'text' - will be reviewed initially with associated 'Proposal Price' submissions unopened; this review is to determine if the City's requirements for an effective Sewer Master Plan will be satisfied by a given Proposal;

   If a Proposal is deemed to be unsatisfactory, i.e. will not satisfy the City's requirements for an effective SMP, in the sole discretion of the City Engineer, the Proposal will be returned with 'Proposal Price' unopened;

2) Proposals deemed to be satisfactory, in the sole discretion of the City Engineer, will then have their concomitant 'Proposal Price' submissions opened and attached for further review;

3) Proposals will then be reviewed in detail with a view to evaluating scope / effectiveness / acceptability of an overall Proposal as it is reflected by its concomitant 'Proposal Price'.

***Please note** that the proponent's 'Schedule' of the work is deemed to be an important parameter and will be an evaluated part of the Proposal.

Michael Baxter, P.Eng.,
City Engineer

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Appendix B

RDII Analysis Envelopes

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R² = 0.9216

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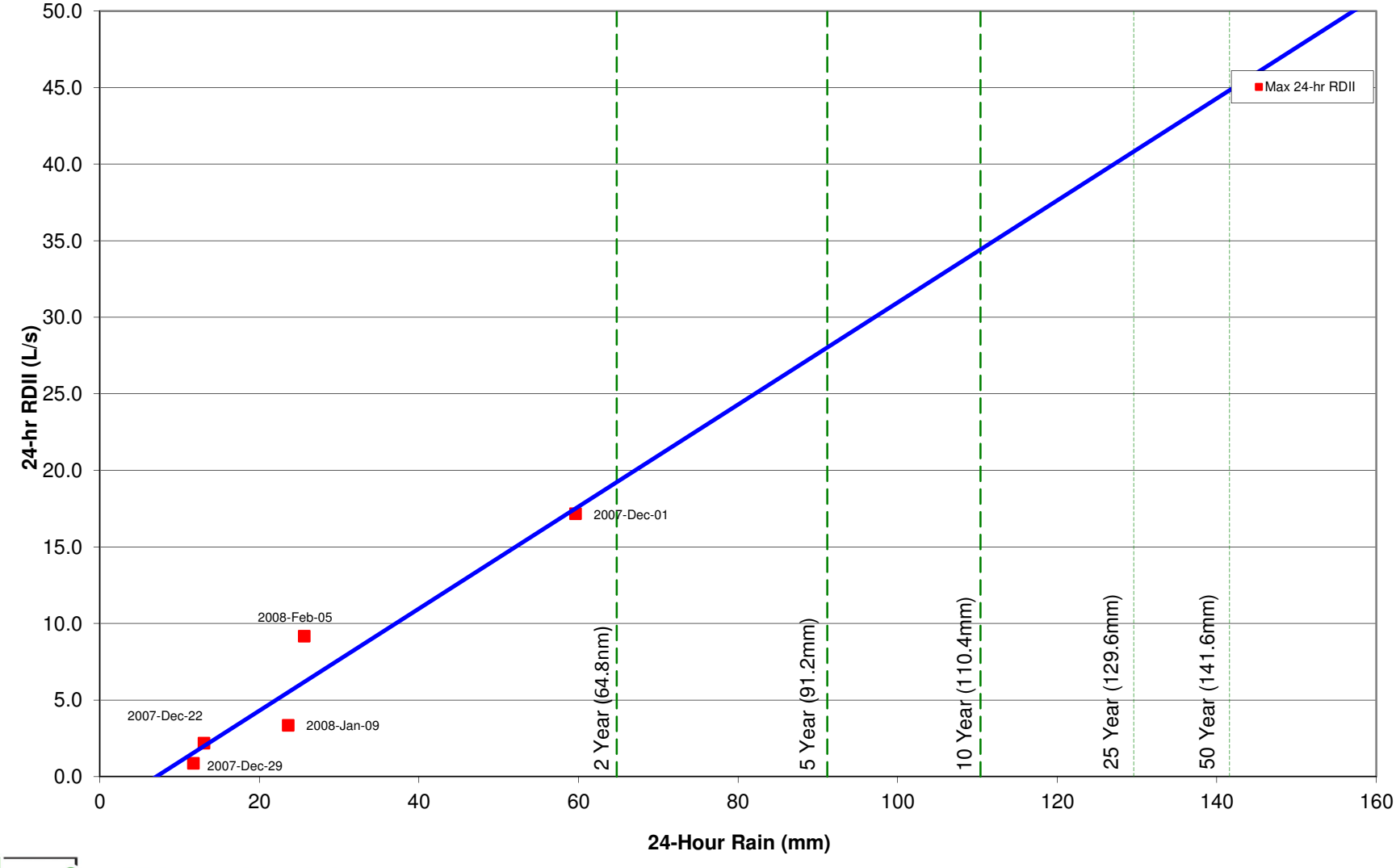
24-hr RDII Envelope



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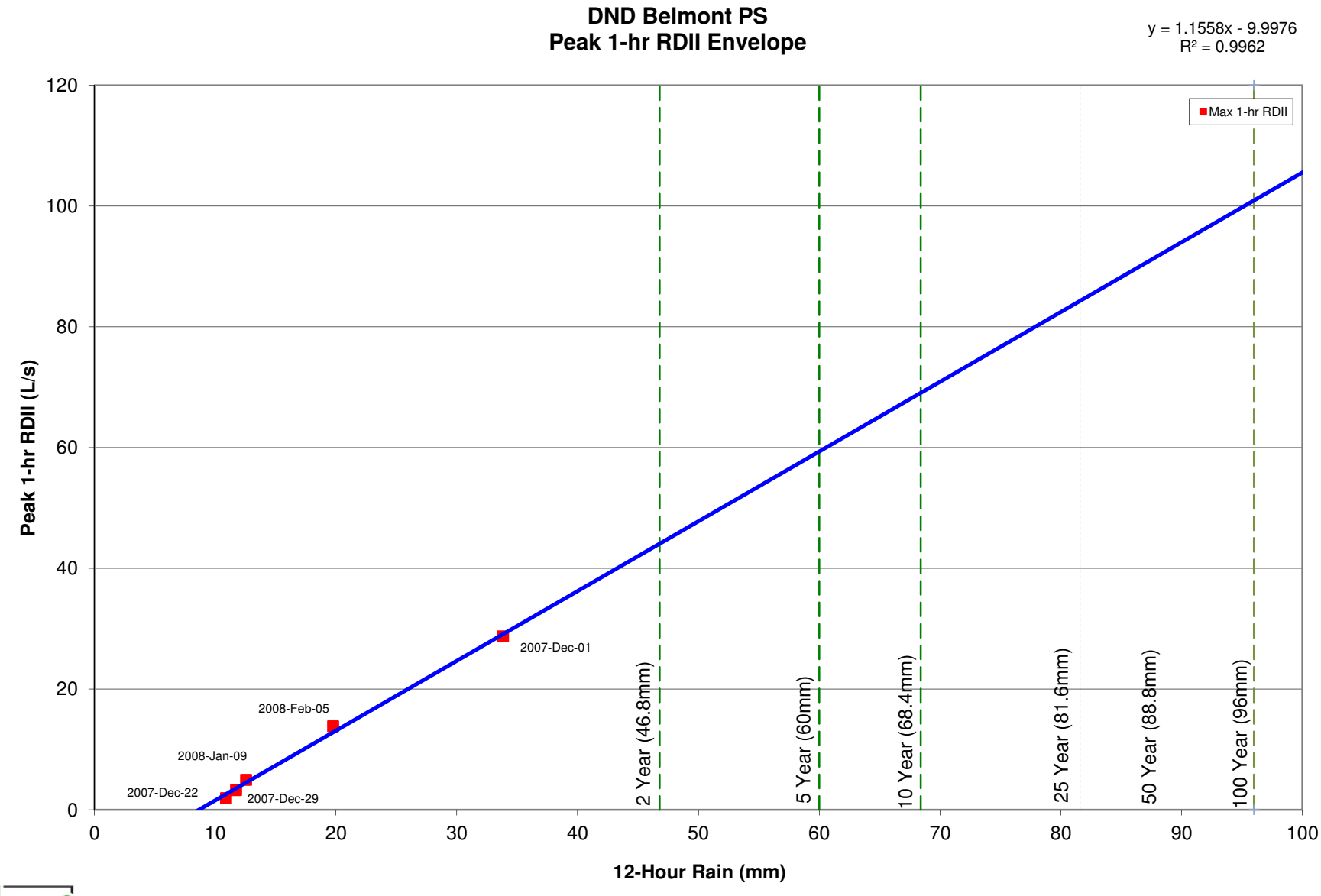

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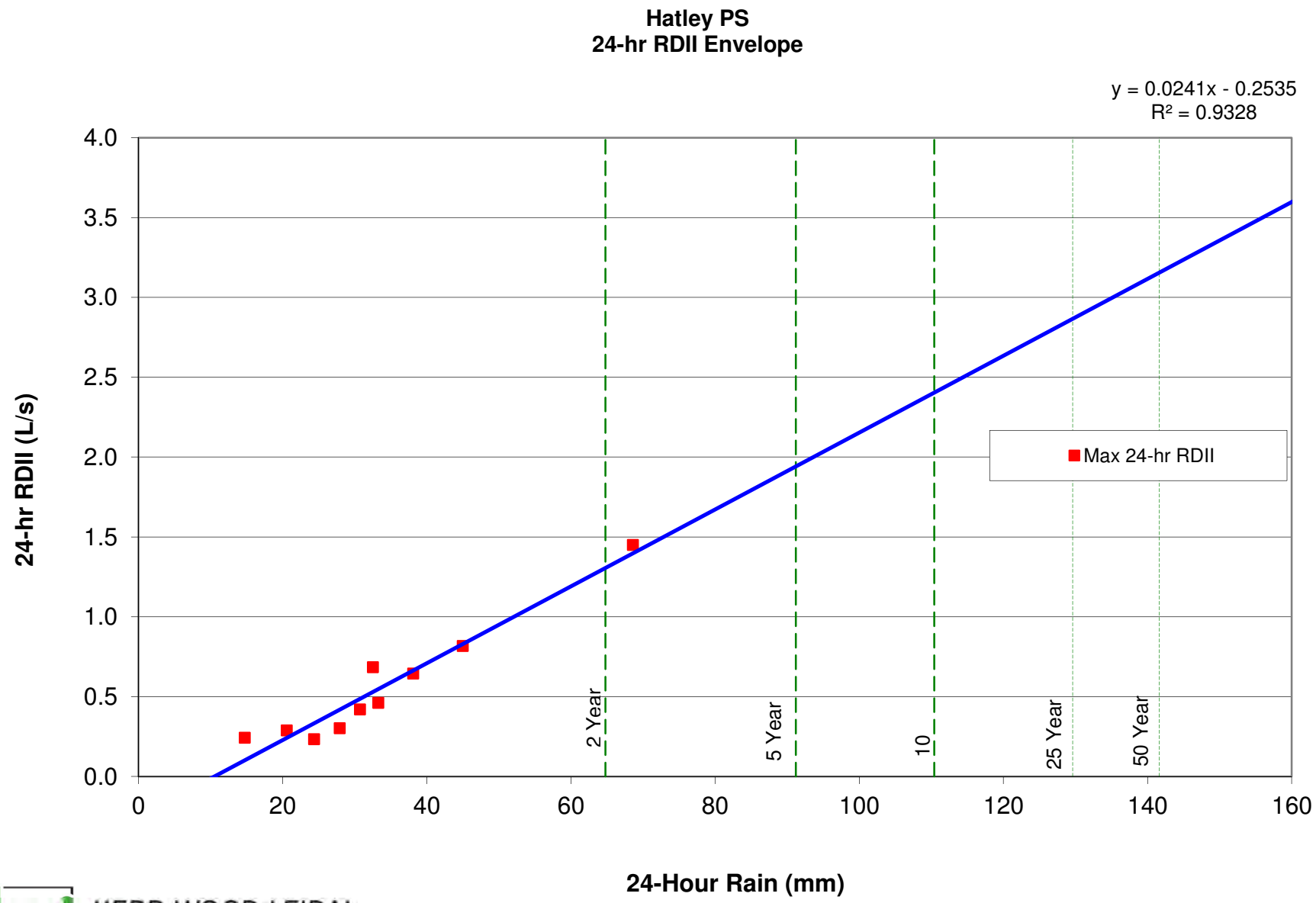

KERR WOOD LEIDAL
consulting engineers

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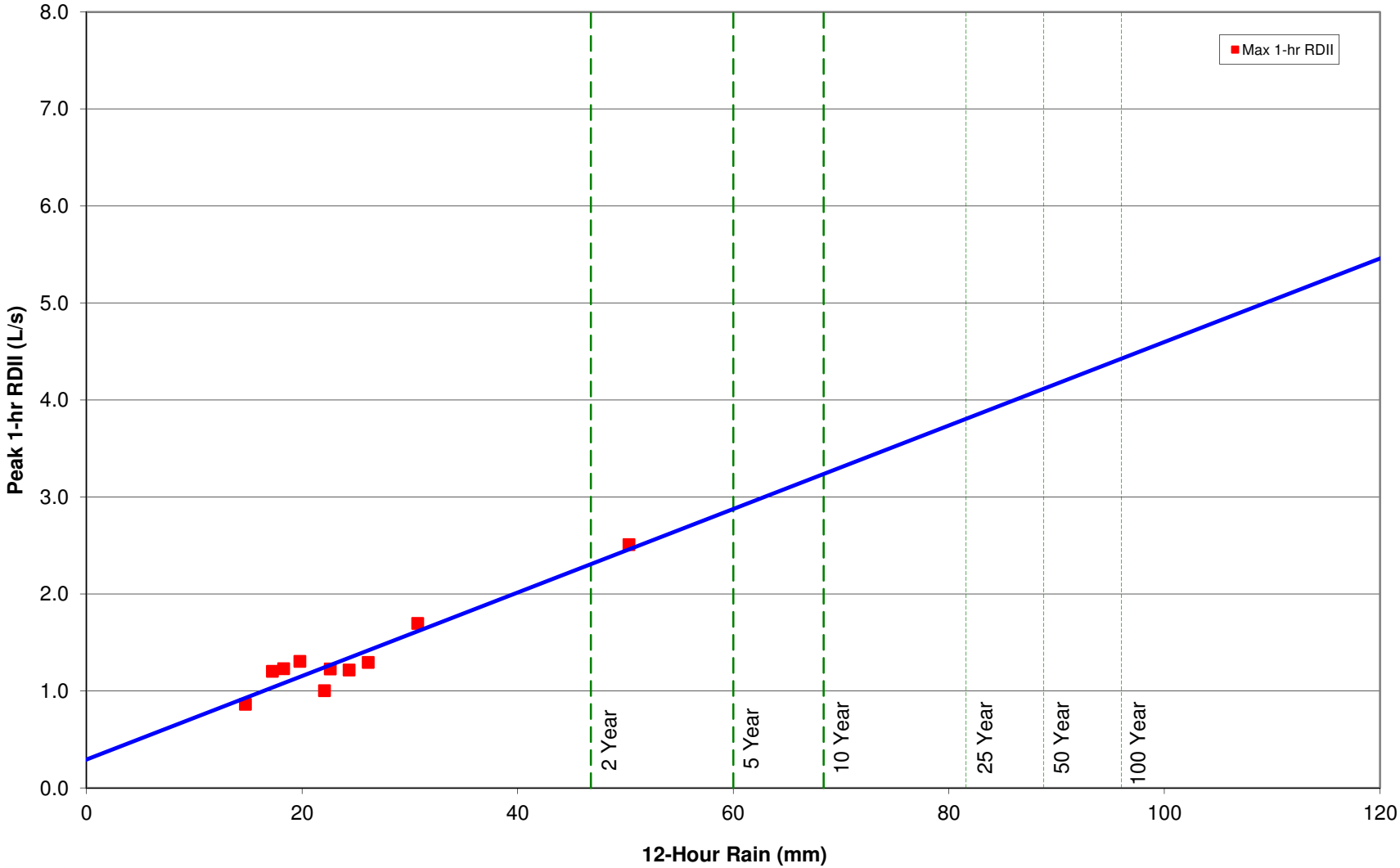

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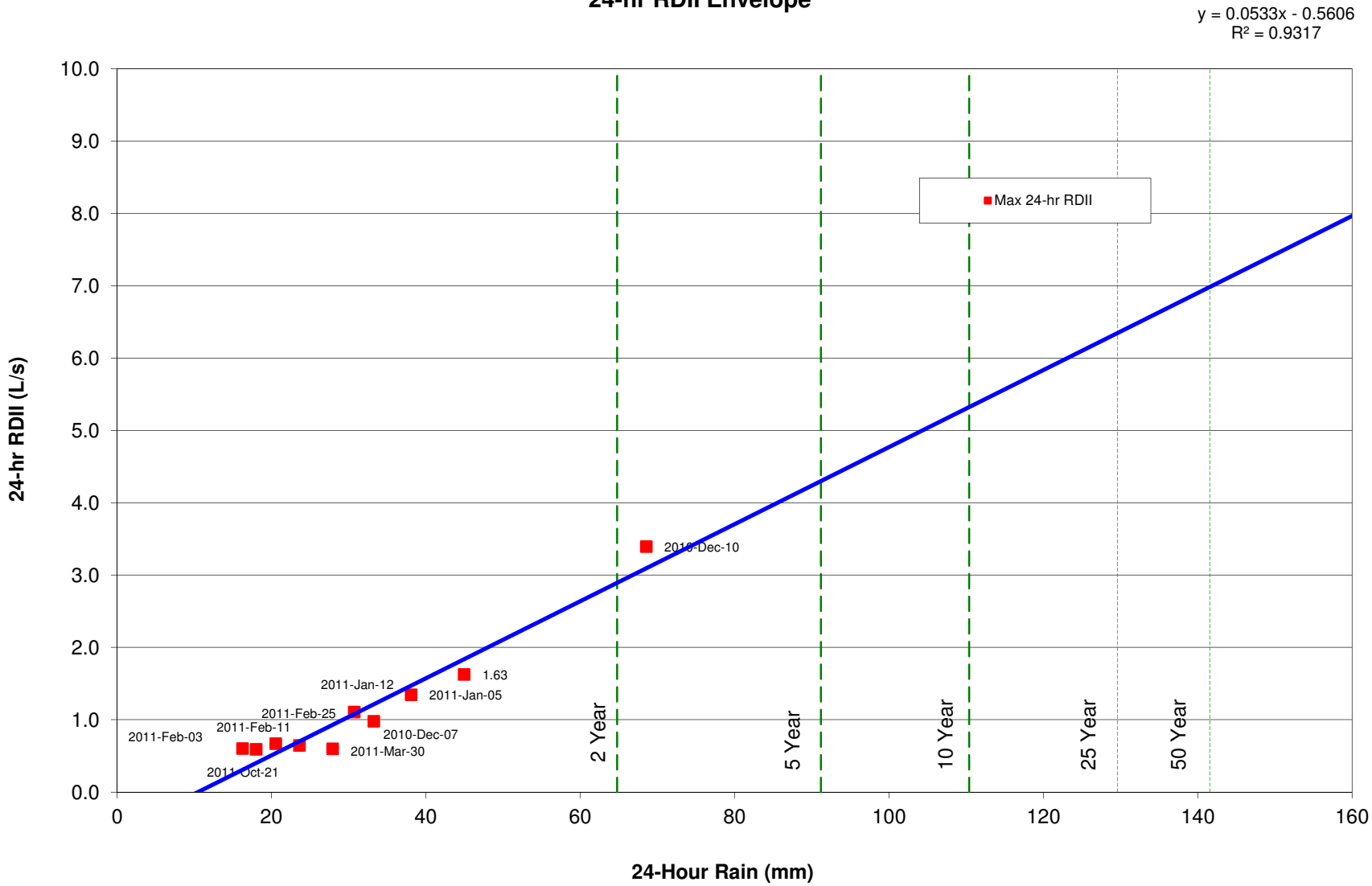

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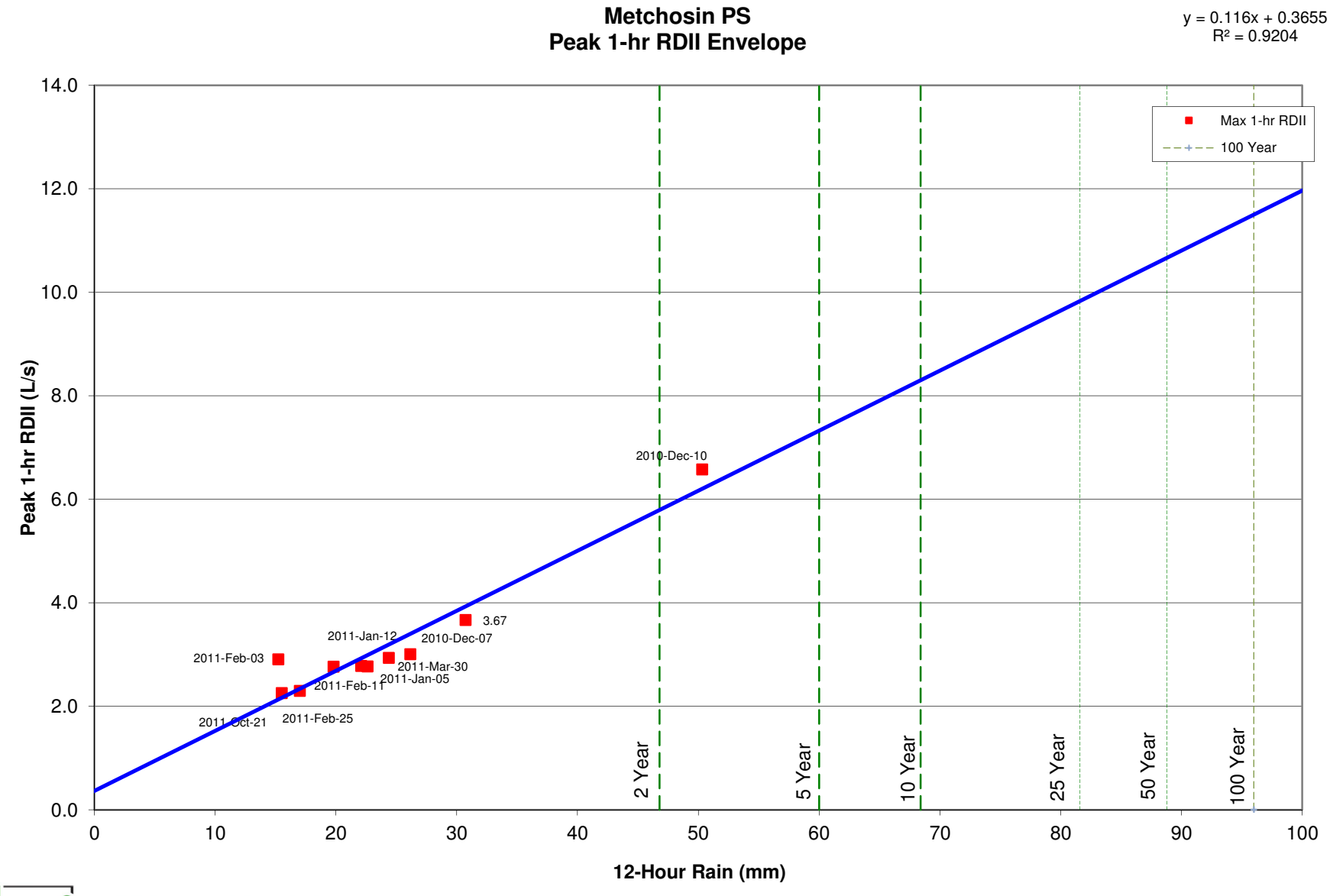

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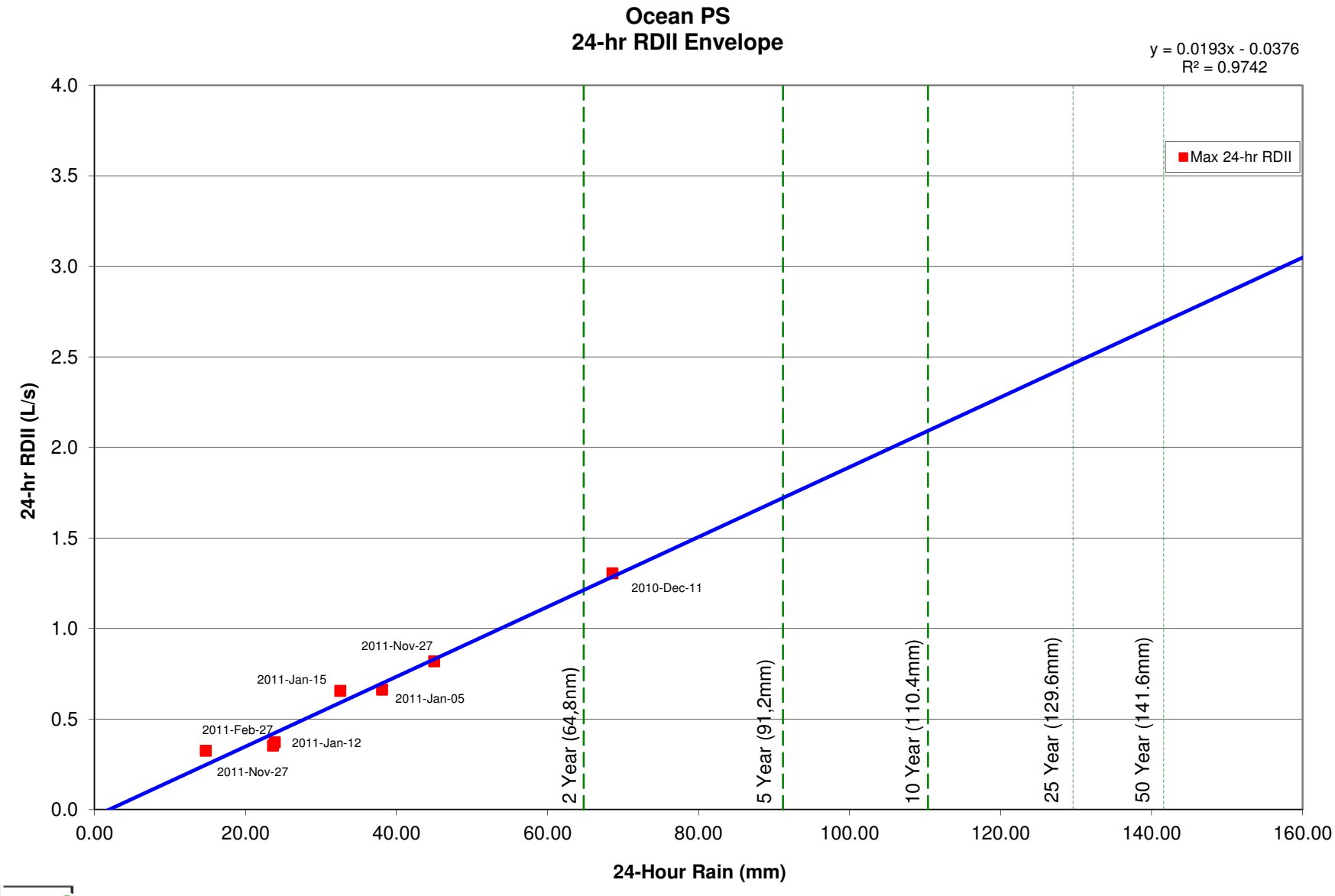

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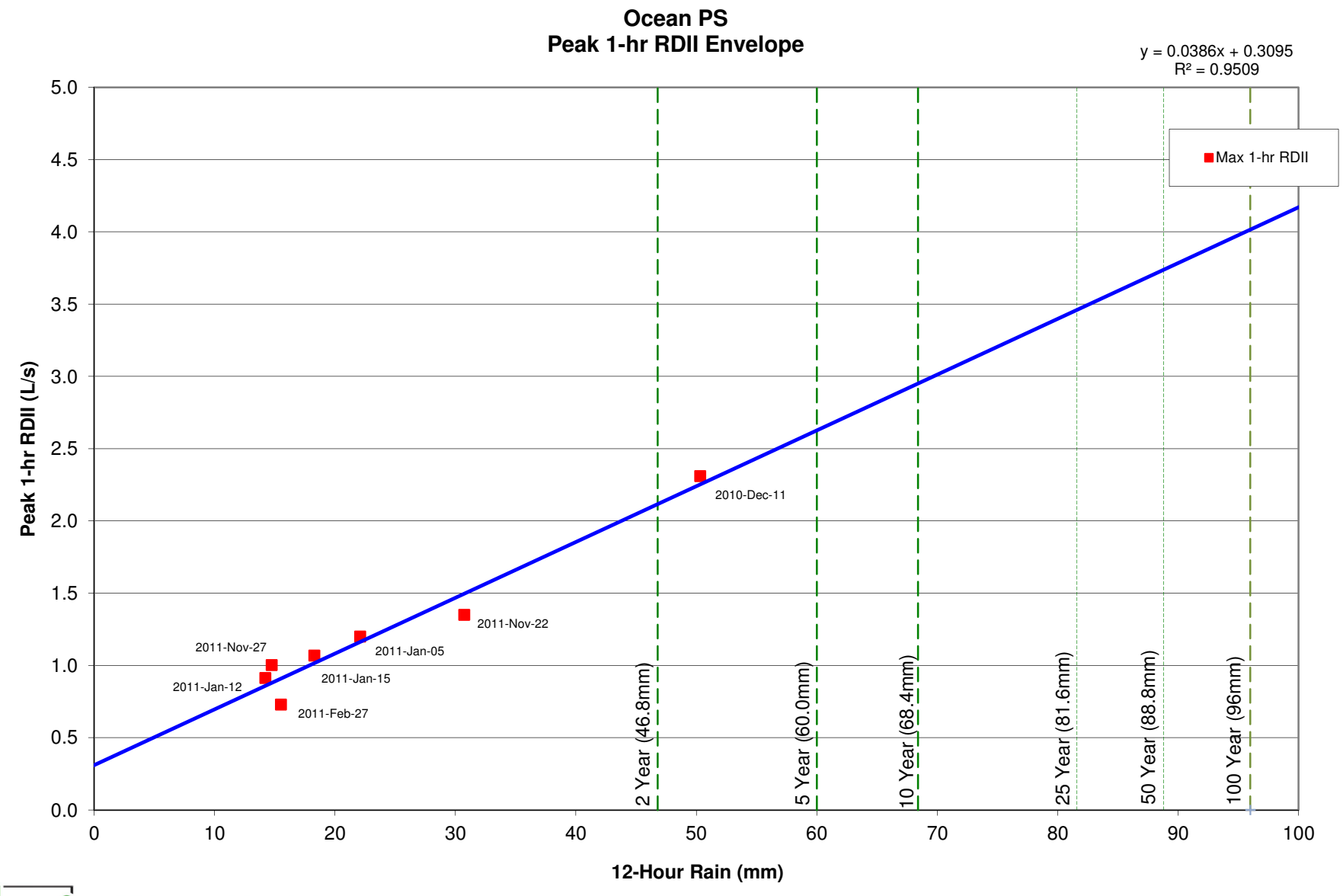

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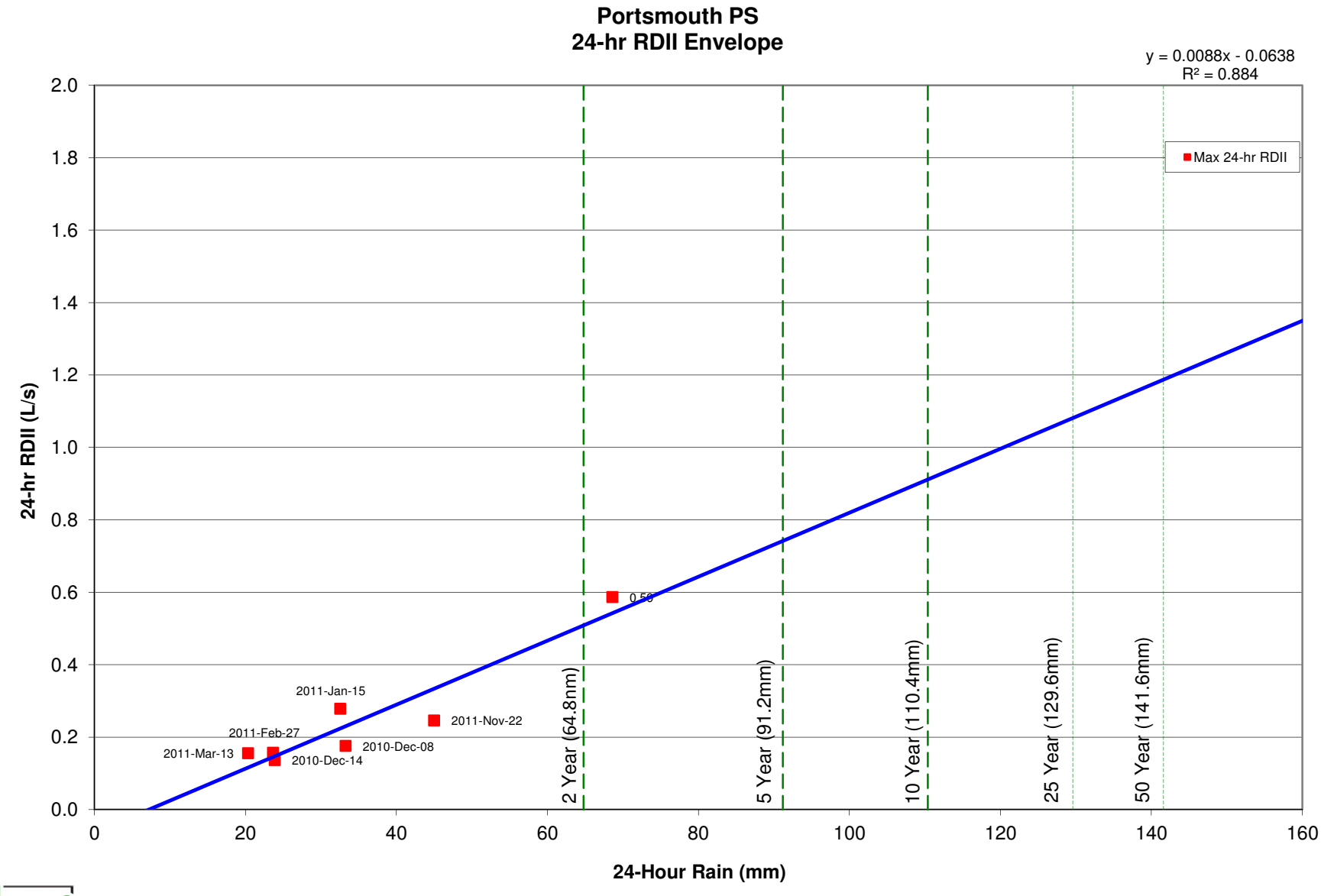

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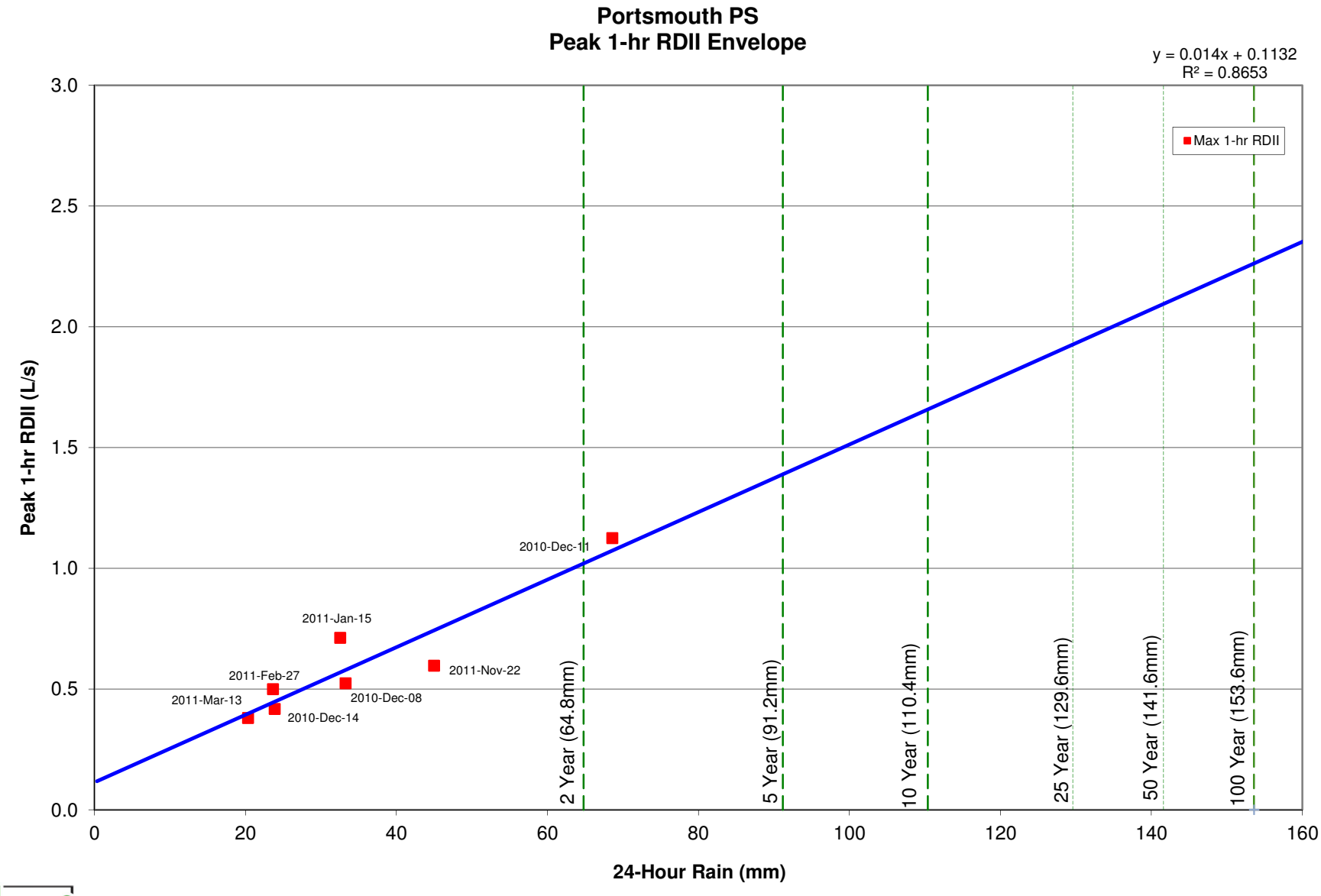

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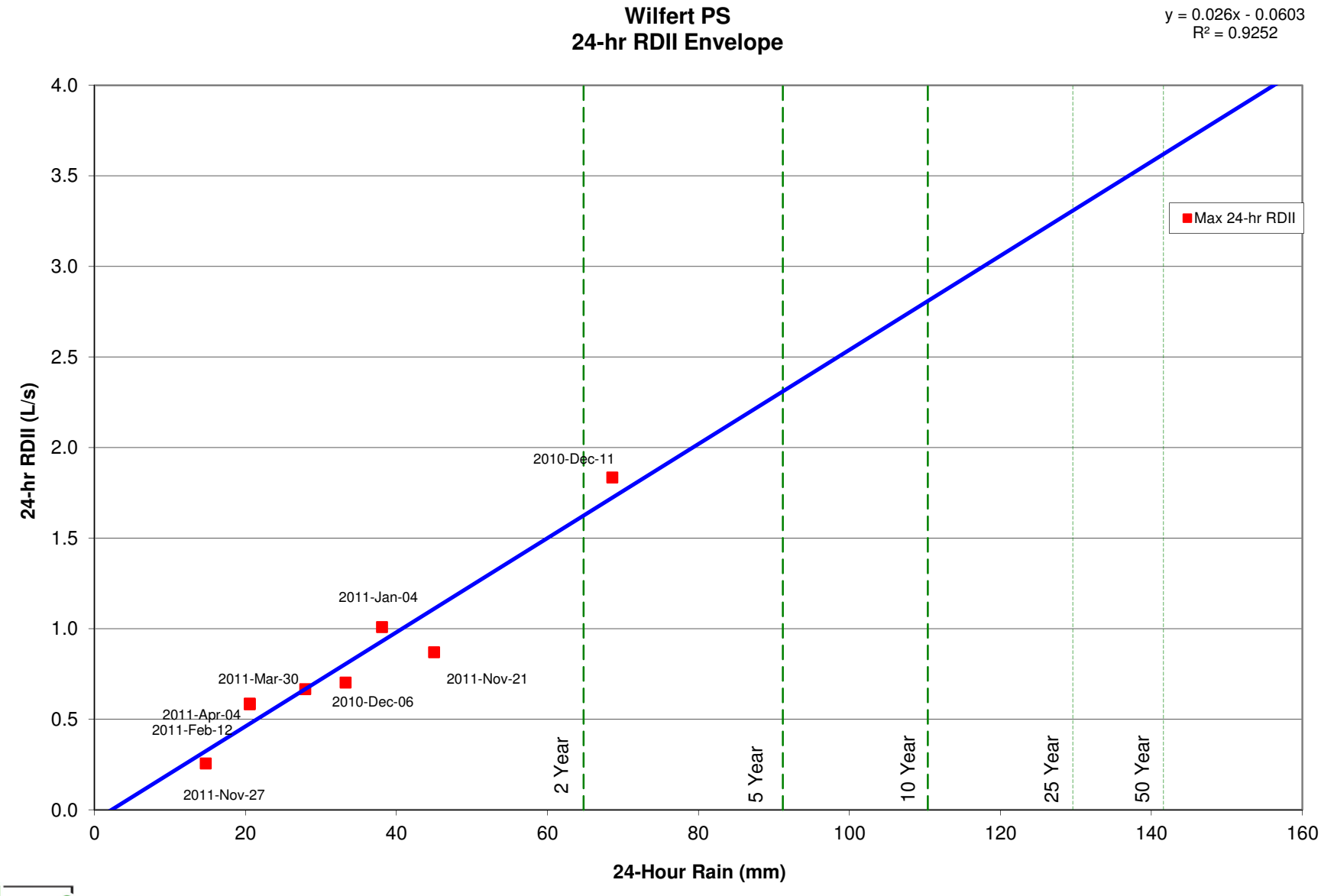

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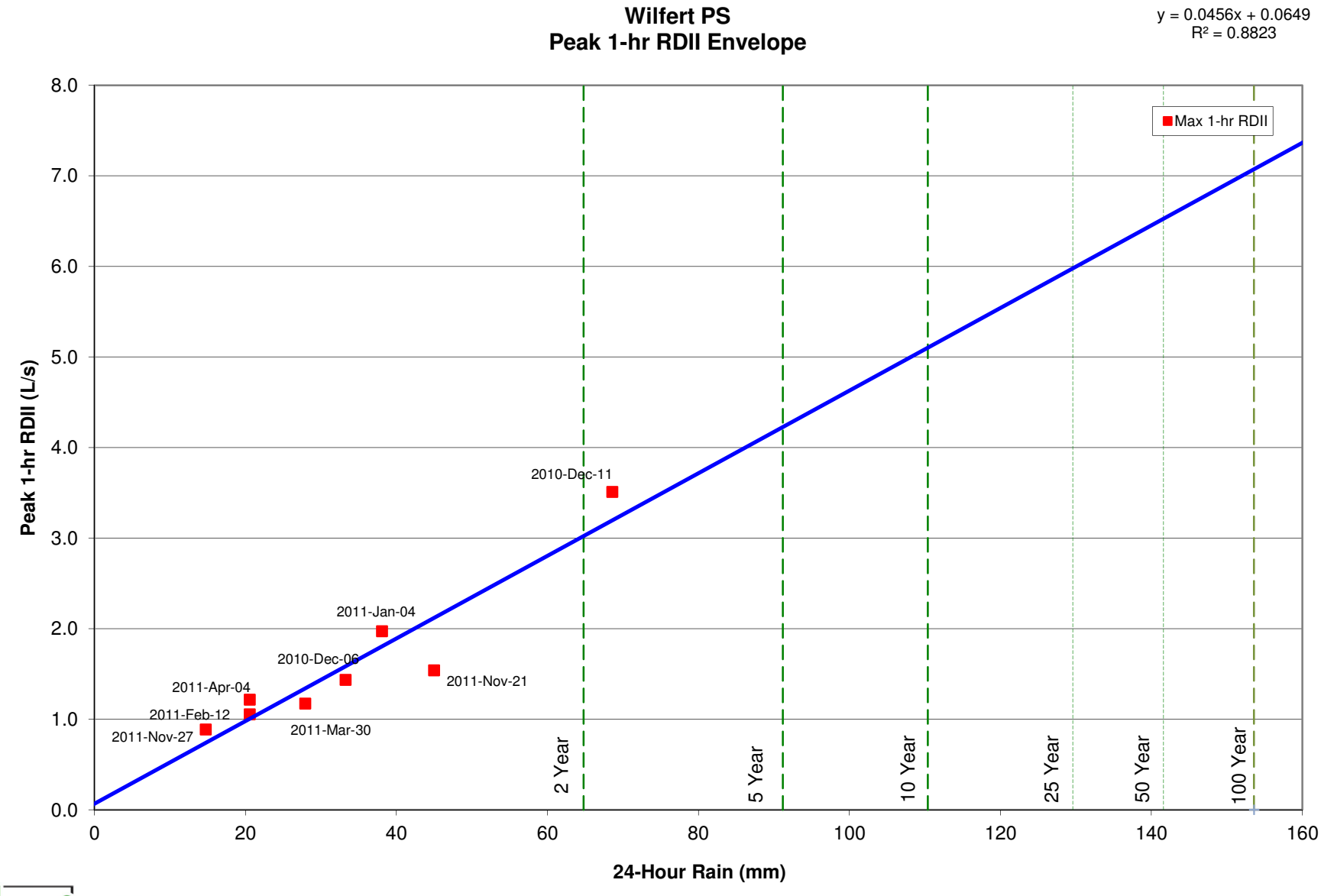

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Appendix C

Servicing Alternatives

Appendix C – Servicing Alternatives

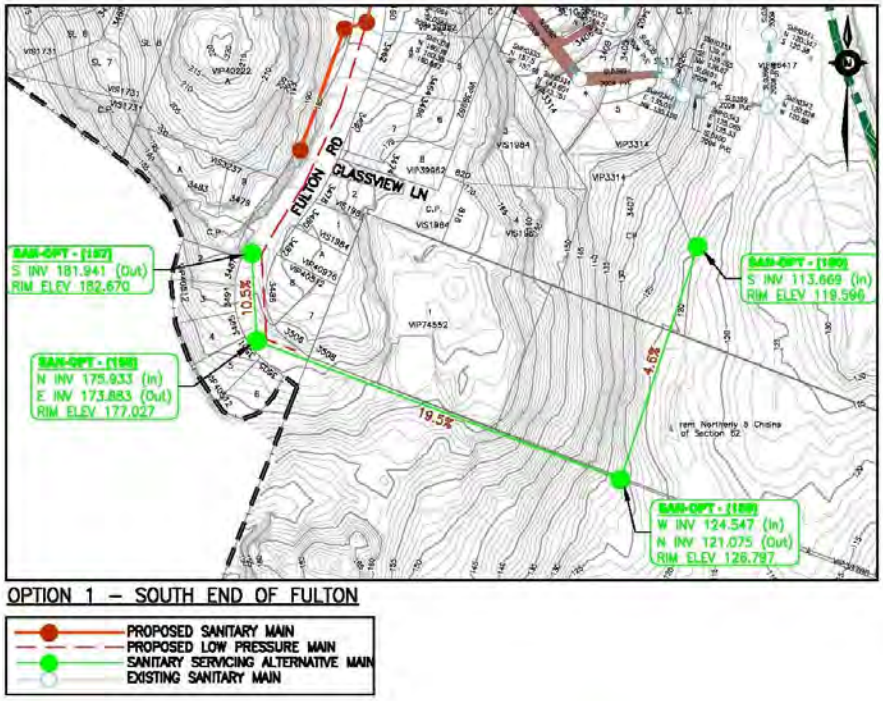
In developing the SMP for future servicing for the City, a number of alternative routes were identified. In most cases these alternatives show a more desirable or cost effective manner to service an area, but would require agreement from an outside party. In some cases we have shown servicing alternatives which may be the more cost effective means of servicing, however not until the project moves to the design stage can it be determined if this alternative is feasible and advantageous.

The servicing alternatives include the following:

- Connections to Langford's sanitary sewer system through an inter-municipal agreement (IMA). These IMAs include the elimination of a LPS system by allowing an area to flow by gravity to the Langford system, and a relatively pump station forcemain connection to the Langford system.
- In some cases LPS systems can be avoided if a right-of-way can be obtained from a private land owner. This would allow these areas to be serviced by a gravity sanitary sewer system.
- The elimination of a municipal pump station if a downstream development proceeds and gravity sewer routes can be provided.

Each of the servicing alternatives are described on the following pages as referenced by Figure 7-1.

Appendix C – Servicing Alternatives



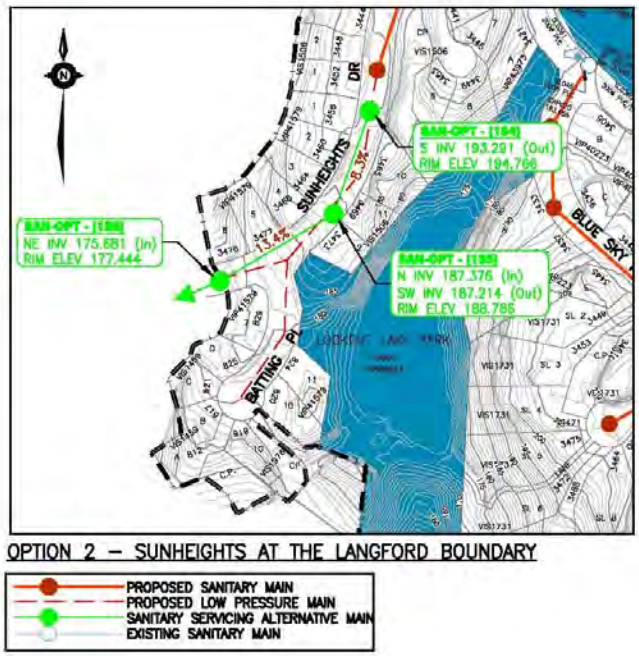
Servicing Alternative 1 : South End of Fulton

This option offers a gravity alternative to the SMP LPS, and would require the following:

- a 200 mm gravity main installed from about 3482 Fulton Road to the south end of Fulton; and
- a connecting 200 mm gravity main extended through Havenwood Park, and;
- a SROW through private the Common property at 3407 Haida Drive for purposes of continuing the gravity connection to the existing sewer between Haida Drive and Veterans Memorial Parkway.

*It may be prudent to install this gravity line on Fulton Road in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives



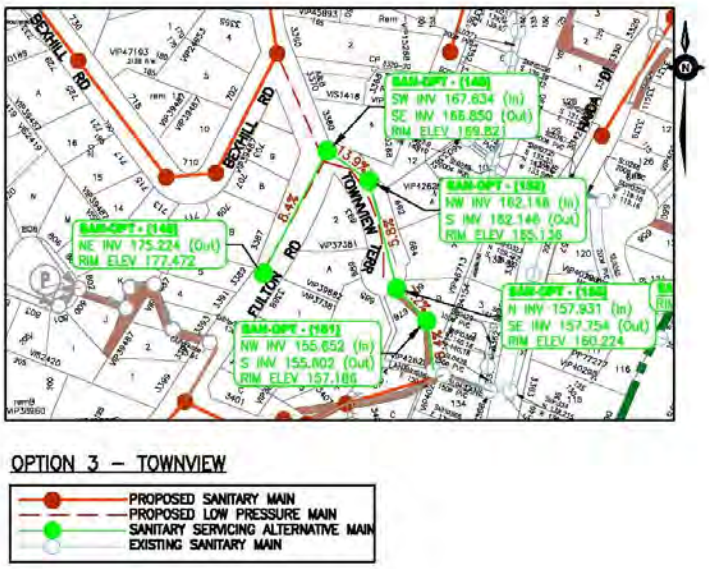
Servicing Alternative 2 : Sunheights, at the Langford Boundary

This option offers a gravity alternative to the SMP LPS, through the Langford sewer system should it reach this area prior to Colwood sewers, and would require the following:

- a 200 mm gravity main installed to the Langford boundary (at a minimum), and would further require an Inter-Municipal Agreement (IMA) between the cities of Colwood and Langford, as well as a Utility Agreement between Colwood and West Shore Environmental Services (WSES), the private utility that operates and maintains the Langford sewer system.

*It may be prudent to install this gravity line in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives



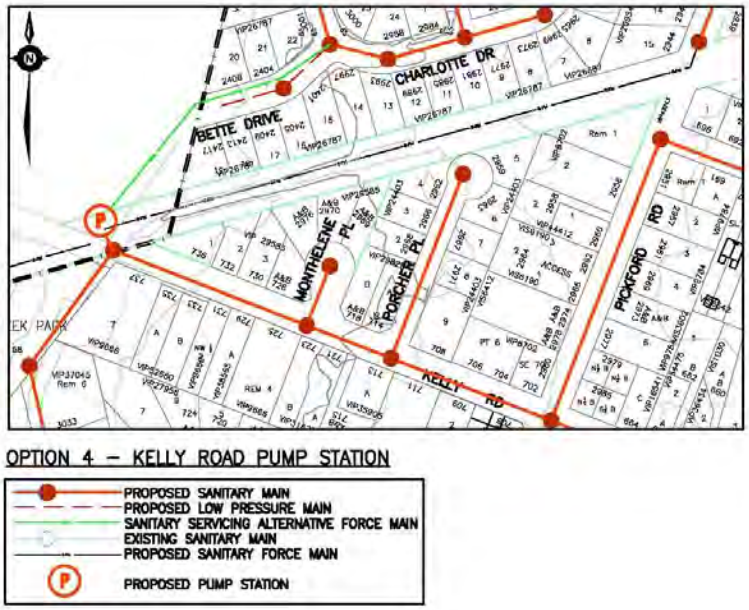
Servicing Alternative 3 : Townview

This option offers a gravity alternative to the SMP LPS on Townview Terrace and Fulton Road, and would require the following:

- a gravity sewer installed on Fulton, Townview, and through the existing SROW over 676 Townview Terrace, and;
- connection to the existing sanitary sewer between Townview Terrace and Haida Drive. It should be noted that the existing sanitary sewer at the tie-in location is only 150 mm in diameter

*It may be prudent to install this gravity line in a common trench with the SMP LPS should the LPS be installed first.

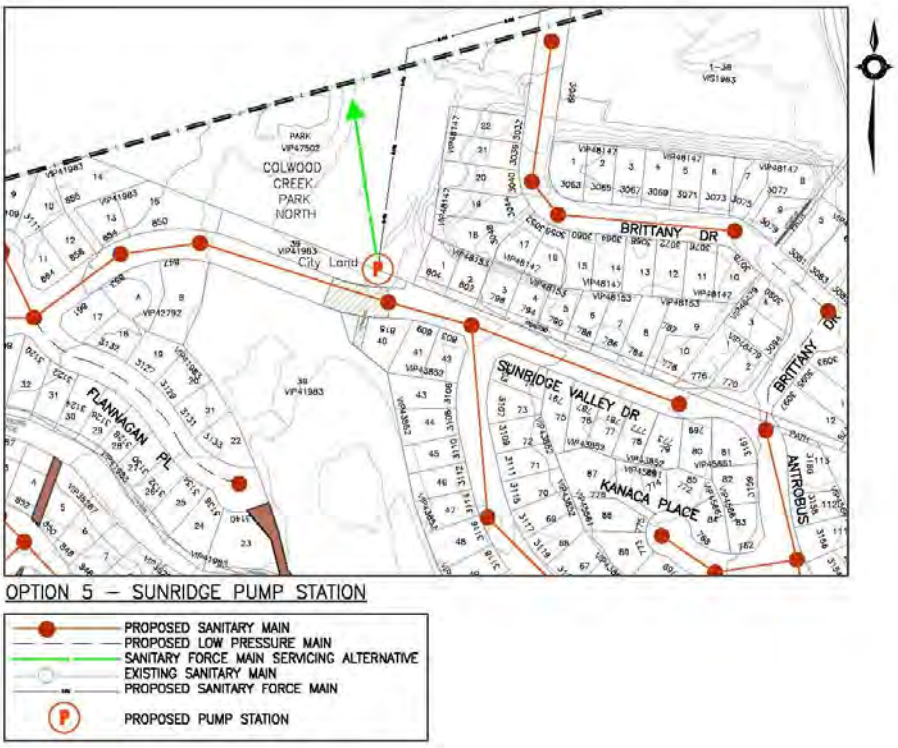
Appendix C – Servicing Alternatives



Servicing Alternative 4 : Kelly Road Pump Station, at Veteran's Memorial Parkway (Langford Boundary)

- This option offers an alternative forcemain route for the Kelly Road Pump Station. The SMP has the forcemain connecting to the gravity main at Pickford Road. The alternative route is to install the FM through Bette Drive and connect to the gravity system at Pickford/Charlotte; this would require a SROW over the parcel to the north of the pump station which is a Langford property. This option would reduce the required forcemain length.

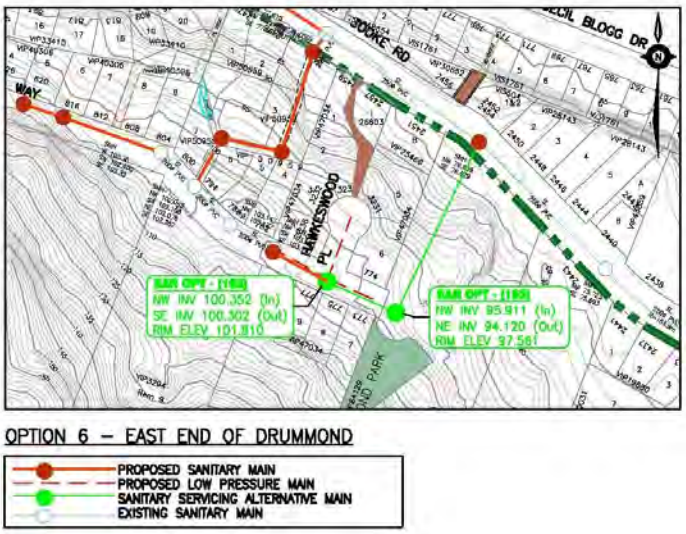
Appendix C – Servicing Alternatives



Servicing Alternative 5 : Sunridge Pump Station

This option would have the pump station's forcemain connect to the adjacent City of Langford sewer installed along the Galloping Goose Trail. This would allow for a shortened forcemain and also reduce the required pumping rate of the future pump station on Kelly Road. This option would require an Inter-Municipal Agreement (IMA) between the cities of Colwood and Langford, as well as a Utility Agreement between Colwood and WSES.

Appendix C – Servicing Alternatives



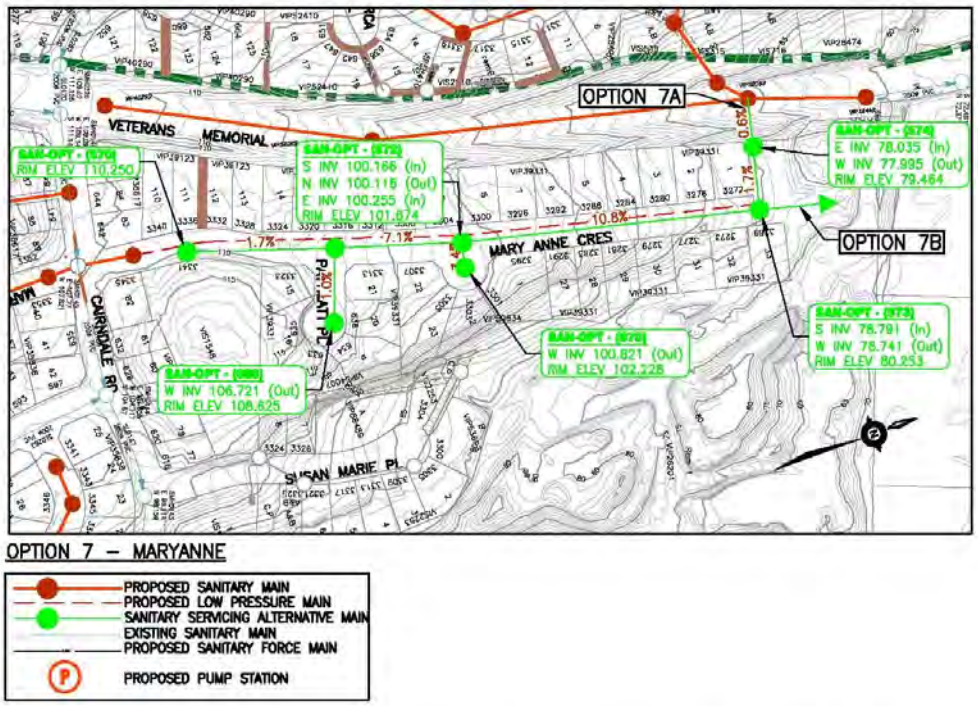
OPTION 6 – EAST END OF DRUMMOND

Servicing Alternative 6 : East End of Drummond

This option would require a 200 mm gravity sewer installed from Hawkeswood Place at Drummond Way to the end of Drummond, and would require a SROW over the lot between 2443 and 2451 Sooke Road.

*It may be prudent to install this gravity line in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives



OPTION 7 – MARYANNE

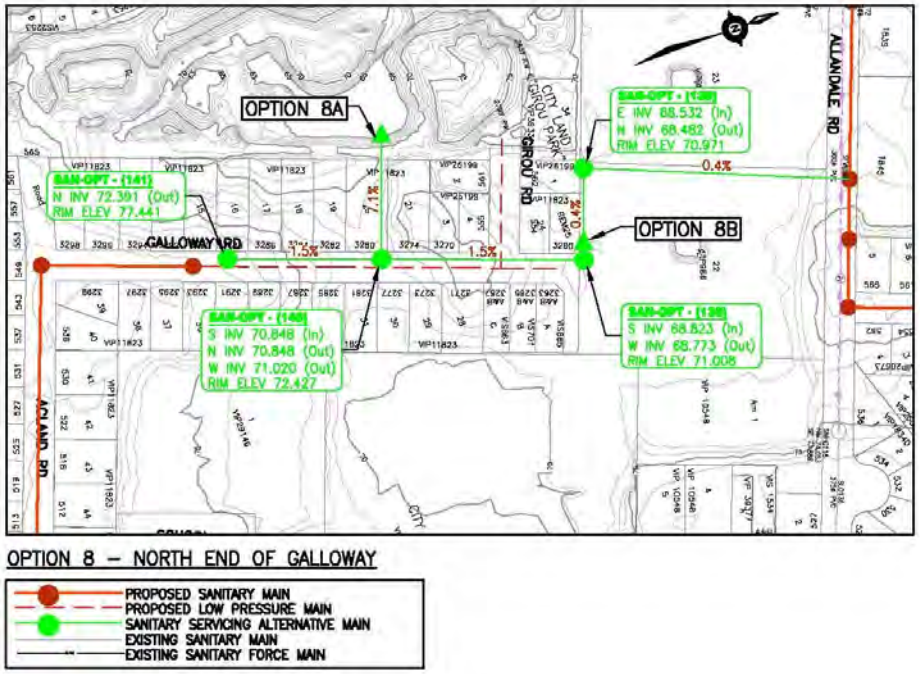
Servicing Alternative 7 : Maryanne

There are 2 options for a gravity main to service Maryanne;

*Both options require a 'base' 200 mm gravity main to be installed from Cairndale north through Maryanne; and

- the first option (7A) requires an additional 200 mm gravity main installed through a SROW over 3272 Mary Anne Crescent or the adjacent parcel to the north, to the existing sanitary sewer along Veterans memorial Parkway, and;
- similar to the first option, this option (7B) would see the gravity sewer at the north end of Mary Anne Crescent continue to the north, connecting to the Allandale gravity system.

Appendix C – Servicing Alternatives



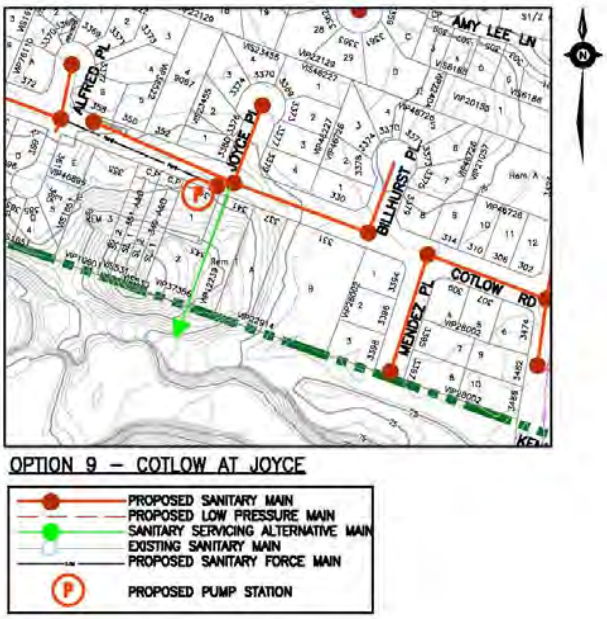
Servicing Alternative 8 : North End of Galloway

There are 2 options for a gravity main for the north end of Galloway as an alternative to a LPS system in this area.

- The first option would require a 200 mm gravity main installed from about 3292 Galloway, and a SROW over 3280 Galloway to the west. This system could connect to a future sewer system if the vacant parcel at the back of the lots on the west side of Galloway Road is developed.
- The second option would require a 200 mm gravity main installed through the currently vacant property to the north of Galloway to the existing Allandale Road Road allowance.

*It may be prudent to install this gravity line in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives

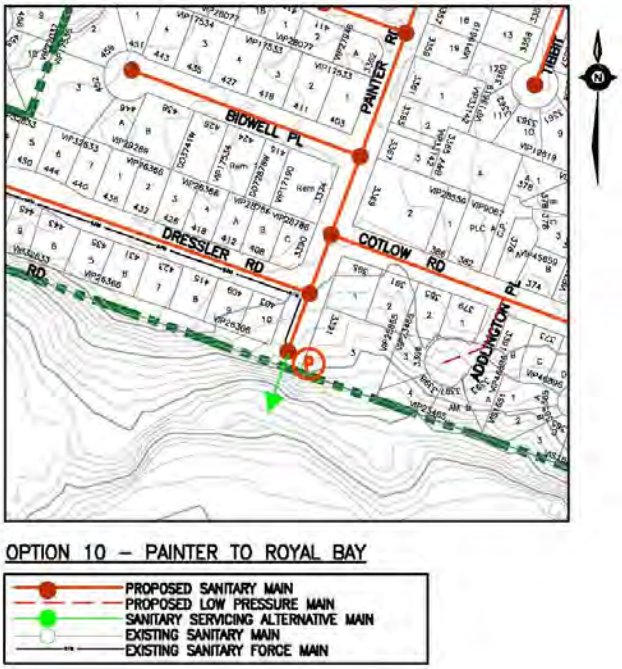


Servicing Alternative 9 : Pump Station at Cotlow / Joyce

This option would provide an alternative to a LPS system or a pump station in the vicinity of Cotlow and Joyce. This option would require a 200 mm gravity main installed through a SROW over 341 Cotlow Road; this would direct flow to a potential Royal Bay system.

*It may be prudent to install a gravity line in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives

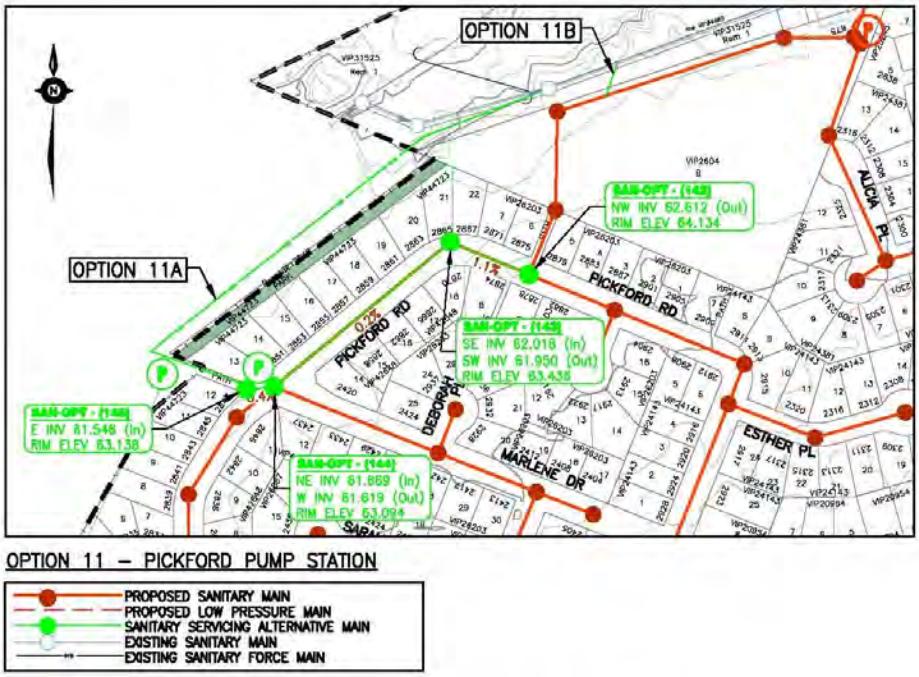


Servicing Alternative 10 : Pump Station (*temporary) at the south end of Painter, at the Royal Bay Boundary

This option would provide an alternative to a pump station at the south end of Painter Road. A gravity main through the potential Royal Bay system could direct all flows to the Metchosin Pump Station.

*It may be prudent for the future pump station to be installed temporarily if the Painter Road area is serviced prior to the Royal bay development proceeding.

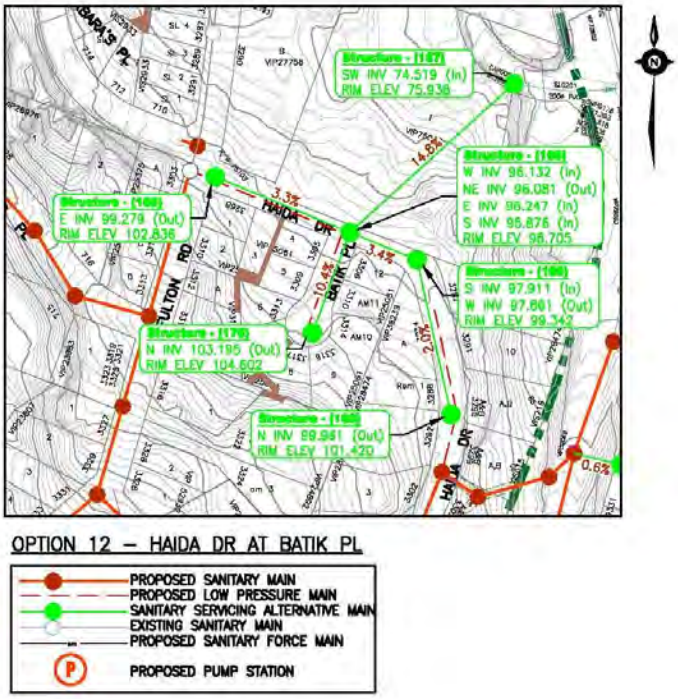
Appendix C – Servicing Alternatives



Servicing Alternative 11 : Pump Station at Pickford Road

This option would provide an alternative to the deep gravity sewer along Pickford Road and through the David Cameron School grounds. This option could involve a pump station at the rear of 2847 Pickford Road (City of Langford) and forcemain through Langford to the CRD's NWT (11A), or a pump station at Pickford Road and Marlene Drive complete with a forcemain along Pickford and the school property (11B).

Appendix C – Servicing Alternatives

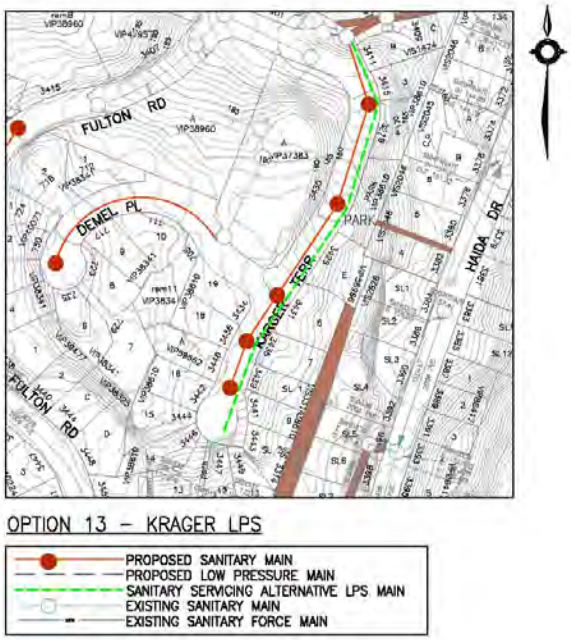


Servicing Alternative 12: Haida Drive at Batik Place

This option would involve a gravity sewer installed along Haida Drive and Batik Place as an alternative to a LPS system. This option would require a SROW over the property between Haida Drive and Allandale Road.

*It may be prudent to install this gravity line in a common trench with the SMP LPS should the LPS be installed first.

Appendix C – Servicing Alternatives



Servicing Alternative 13: Karger Terrace

As an alternative to a gravity sanitary sewer along Karger Terrace, a low pressure sewer system could be installed. As the majority of the properties will have to pump to a gravity sewer system anyway (due to them being significantly lower than the road elevation), this option may be the appropriate means to service this area.

KERR WOOD LEIDAL
consulting engineers

Appendix D

CRD Trunk Connection Correspondence

KERR WOOD LEIDAL
consulting engineers

Vancouver Island
201 - 3045 Douglas Street
Victoria, BC V8T 4N2
T 250 595 4223
F 250 595 4224

Technical Memorandum

DATE: April 17, 2012

TO: Capital Regional District (CRD)
Dan Robson, AScT

CC: Malcolm Cowley, P.Eng.

FROM: Jeff Howard, P.Eng.

RE: **COLWOOD SEWER MASTER PLAN**
Connection to the CRD's Northwest Trunk
Our File 2417.003-300

Introduction

We provide this technical memorandum outlining the available capacity in the CRD Northwest Trunk between the connection of the two 600 mm Langford sewer mains (Meaford Avenue) and the current Colwood connection point (Aldeane Flume, near the Galloping Goose Trail and Sooke Road intersection). We have prepared hydraulic capacity calculations in order to determine the capacity available for Colwood to connect to this section of the CRD's Northwest Trunk. These calculations are provided below.

Hydraulic Calculations

The capacity analysis for this section of the CRD's Northwest Trunk was performed with InfoSewer software by Innovyze. The parameters input to the modelling software were as follows:

- Length, size, and elevation data from the CRD Northwest Trunk record drawings (Dwgs. 15-S132-2, 15-S124-2, 15-S124-3, 15-S138-3, 15-S138-4, 15-S138-5 and 15-S135-2);
- Pipe diameter of 773.2 mm for Cast Iron OD PVC DR41 (Average ID according to Big Brute Brochure, Large Diameter Pressure Pipe (350mm-1200mm), Performance Under Pressure, Ipex Inc.);
- Manning's roughness coefficient n = 0.011, and;
- The hydraulic grade line at the downstream end of the pipe was set to full, depth/Diameter (d/D) = 1.0.

The model was run with various flow rates at the upstream end of this trunk section until the pipe at the upstream end was flowing without surcharge. It was determined that a flow rate of 500 L/s resulted in some surcharging (max 200 mm) in the trunk. However at the upstream end (at the location of a potential flow meter), the pipe is no longer surcharging. The results of this model run are displayed graphically below.

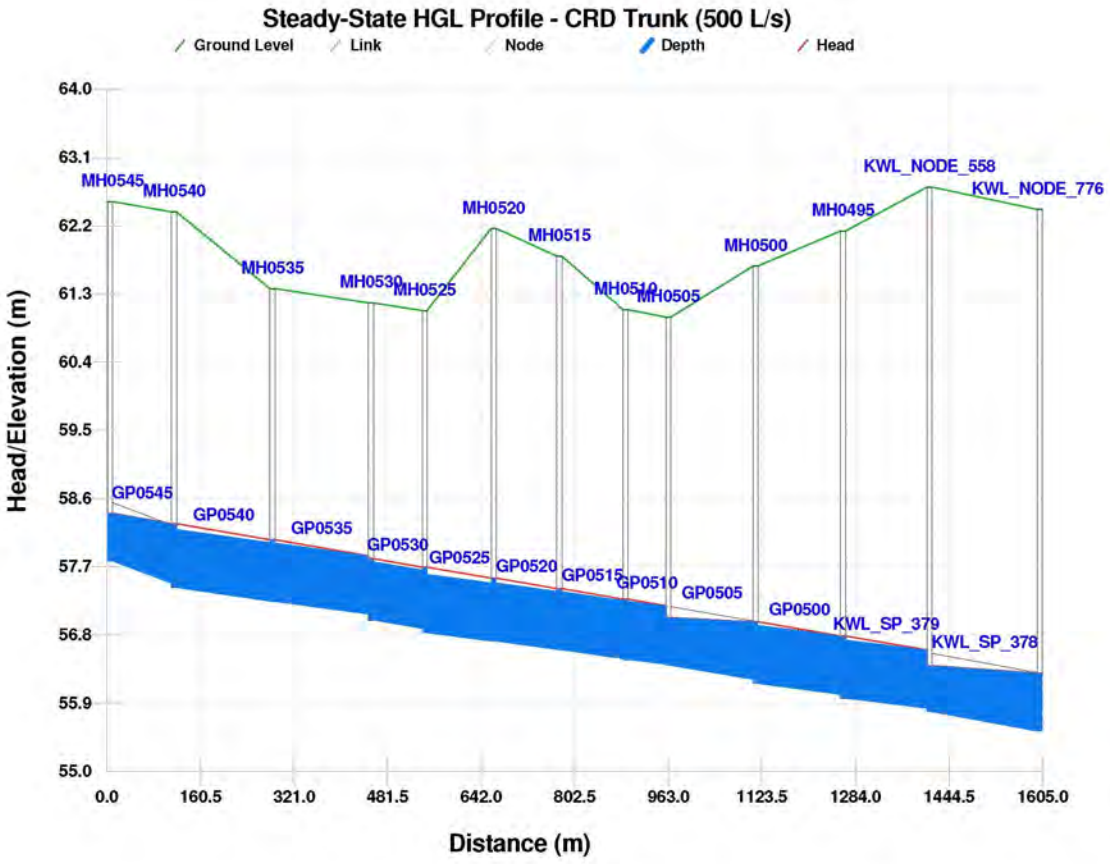


Figure 1: Hydraulic Profile of the CRD's Northwest Trunk, Colwood Connection to Langford

The downstream and upstream extents of the above profile are illustrated in Figure 2 and Figure 3 below.

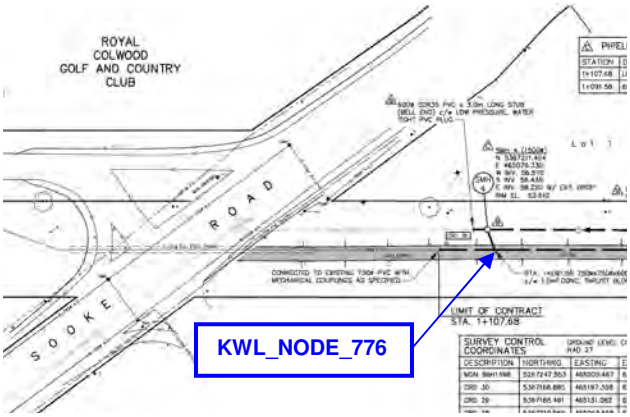


Figure 2: Downstream Extent of Hydraulic Profile

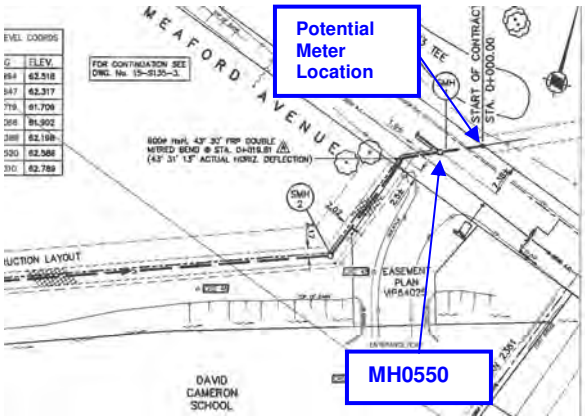


Figure 3: Upstream Extent of Hydraulic Profile

Analysis

Based on the above calculations, this section of the Northwest Trunk can accommodate a flow rate of 500 L/s without surcharging the Langford sewer system.

It should be noted that the Royal Colwood Golf Course connects to the Northwest Trunk at MH0530. The invert elevation of this 150 mm connection is El. 60.25 m. This is well above the hydraulic grade line for a flow of 500 L/s, therefore this connection is not impacted by the small amount of surcharge at this manhole.

It would be advantageous for the City of Colwood to service a portion of the municipality by connecting to this portion of the Northwest Trunk (downstream of MH0550). CRD's Bylaw No. 2312 sets a maximum allocation for the City of Langford of 370 L/s. Therefore, there is 130 L/s of capacity available in this portion of the Northwest Trunk for contributions from Colwood.

The CRD's Bylaw No. 2312 has a maximum allocation for the City of Colwood of 347 L/s. Regardless of the above analysis or the location of Colwood's connections, we understand that this remains the limit for peak flows from Colwood. Therefore, all flows from Colwood will need to be measured.

The meter which measures flows from Langford ("Meaford" meter) is located on Aldeane Avenue, downstream of the Royal Colwood Golf Course connection. In order to measure the flows from Colwood, a permanent flow meter could be installed on the Colwood main immediately before it connects to the CRD Trunk. Alternatively, the existing "Meaford" meter could be moved upstream of the Colwood connection (immediately downstream of MH0550). The later option would allow Colwood's flows to be calculated in the same manner as they currently are, Parsons meter minus flows from Langford meter. The 500 L/s flow will not result in a surcharge of the potential flow meter location (immediately downstream of MH0550).

Submission

We submit this memorandum to the CRD for your review. On behalf of the City of Colwood, we also request a response regarding the following:

1. Acceptance of the City of Colwood connecting to the CRD's Northwest Trunk between MH0550 and KWL_NODE_776 (Figure 2 and 3 above) with a maximum peak flow rate of 130 L/s. This acceptance would not modify the City's maximum peak flow rate to the CRD of 347 L/s.
2. Subject to design and construction to the CRD's satisfaction, acceptance of the proposed measurement of the above flow (at the City of Colwood's cost) by either:
   - permanent flow meters installed on Colwood main(s) prior to connecting to the CRD, or;
   - relocating the existing "Meaford" flow meter upstream of the Colwood connection, likely immediately downstream of MH0550.

If you require further information or require clarification please contact the undersigned.

KERR WOOD LEIDAL ASSOCIATES LTD.

Prepared by:

Jeff Howard, P.Eng.
Project Manager

Reviewed by:

Andrew Boyland, P.Eng.
Technical Reviewer

JH/jh

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.

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Revision History

Revision #	Date	Status	Revision	Author
0	Apr 17, 2012		Submitted to the CRD	J. Howard

KERR WOOD LEIDAL
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Vancouver Island
201 - 3045 Douglas Street
Victoria, BC V8T 4N2
T 250 595 4223
F 250 595 4224

May 4, 2012

Capital Regional District
479 Island Highway
Victoria, BC
V9B 1H7

Dear: Dan Robson, AScT
CC: Malcolm Cowley, P.Eng.

RE: COLWOOD SEWER MASTER PLAN
Connection to the CRD's Northwest Trunk
Our File 2417.003

During our meeting on April 25, 2012 (regarding the CAST project), Malcolm Cowley requested a plan identifying the area within Colwood that could potentially connect to the upstream end of the CRD trunk near the Langford boundary.

This potential area is identified on the attached figure. Additionally, we have calculated the peak wet weather flow (100-year return period) for the future development scenario for this catchment to be 37 L/s.

We provide this information to supplement our technical memorandum submitted on April 17, 2012.

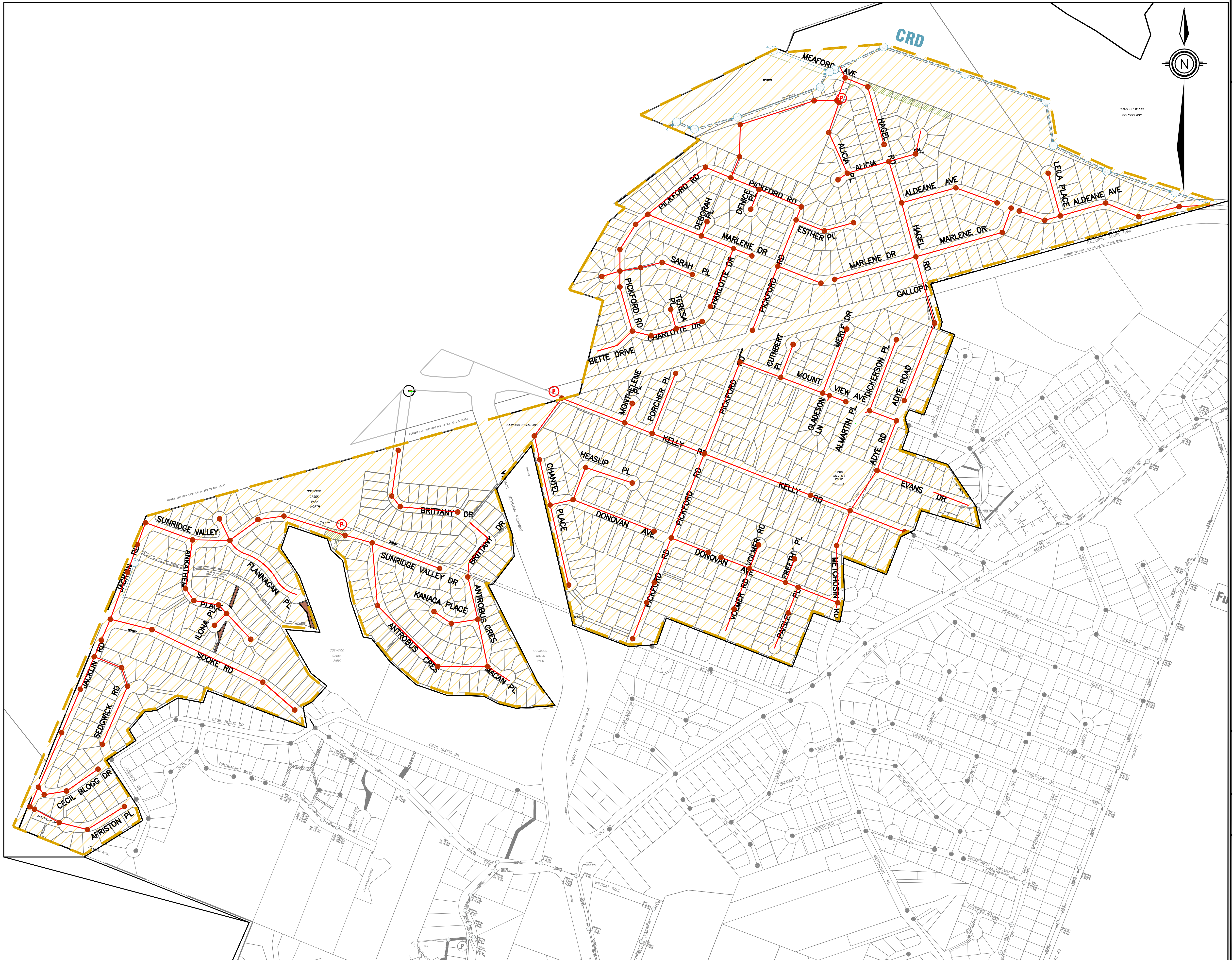
We look forward to your response. If you have any questions please contact the undersigned.

Yours truly,

KERR WOOD LEIDAL ASSOCIATES LTD.

Jeff Howard, P.Eng.
Project Manager

JH/jh
Encl.



LEGEND

POTENTIAL SEWER CATCHMENT AREA TO CAPITAL REGIONAL DISTRICT NORTHWEST TRUNK

KERR WOOD LEIDAL
consulting engineers

0 100 (1:7,500) 400m

Project No.	Date
2417.003	MAY 4, 2012

POTENTIAL CATCHMENT TO CAPITAL REGIONAL DISTRICT NORTHWEST TRUNK

FIGURE

SAVED 4-May-2012 9:10 AM

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Making a difference...together

Environmental Sustainability
625 Fisgard Street, PO Box 1000
Victoria, BC, Canada V8W 2S6

T: 250.360.3078
F: 250.360.3079
www.crd.bc.ca

July 16, 2012

File: 5318-WC/ETS

Michael Baxter, P.Eng.
City of Colwood
3300 Wishart Road
Victoria, BC V9C 1R1

Dear Mr. Baxter:

RE: COLWOOD SEWER MASTER PLAN
POTENTIAL FUTURE CONNECTIONS TO CRD NORTHWEST TRUNK SEWER

This letter is in response to a May 4, 2012 letter and April 17, 2012 technical memo received from your consultant, Kerr Wood Leidal (KWL), regarding Colwood's Sewer Master Plan.

We understand that KWL is in the process of preparing a sewer master plan for the City of Colwood to be used as a blueprint for the development of your sewer system heading into the future. In developing the plan, KWL has identified two catchments south of Royal Colwood Golf Course and west of Sooke Road that could connect to the CRD northwest trunk (NWT) sewer by gravity (see attached Figure 1 provided by KWL).

The proposed catchment details provided by KWL, (as shown on the map) are noted as follows:

- Total Catchment Area = 126.3 hectares
- Future Number of Parcels = 868
- Future Population Estimate = 3092
- Average Dry Weather Flow = 7.91 L/s
- Peak Wet Weather Flow = 37.3 L/s (including an inflow & infiltration rate for a 100-yr storm event)

Based on the hydraulic analysis of the NWT sewer completed by KWL it appears that there is about 130 L/s of spare capacity available in this section of NWT (between Meaford Avenue and Sooke Road) to accommodate these catchments.

As you know, the total maximum design capacity allotted to the City of Colwood, as specified in Bylaw 2312 is 347 L/s (measured at Parson's Meter at the Colwood/View Royal border). Colwood's current sewage flow is under their allocated capacity.

The existing CRD meter station that measures Langford's flow is located on Aldeane Avenue downstream of proposed Colwood connection point #2. Therefore, in order to measure flows and allocate costs to each municipality appropriately, Colwood will have to either: install a new meter at connection point #2 or relocate the CRD meter on Aldeane Avenue further west towards Langford (upstream of connection point #2). It would likely be less expensive and more beneficial to Colwood to relocate the CRD meter, if it is technically feasible.

Therefore, based on the foregoing, the CRD does not object in principal to the proposed sewer catchment areas and connection points. An official review and approval will be completed when the time comes for Colwood to submit a formal sewer connection application. The latest versions of the sewer service bylaw, planning documents, and/or service agreements shall govern when the new service connection application(s) are received.

Later this year the CRD is planning to complete its own Core Area Sewer Strategic Plan, and it would be greatly appreciated if you would send us a copy of your sewer master plan when it is complete so that we can incorporate Colwood's information into our overall plan.

Meanwhile, should you have any questions or require further information, please call me at 250.360.3066.

Yours truly,

Malcolm Cowley, P.Eng.
Manager, Engineering Design Services
Environmental Engineering
Environmental Sustainability Department

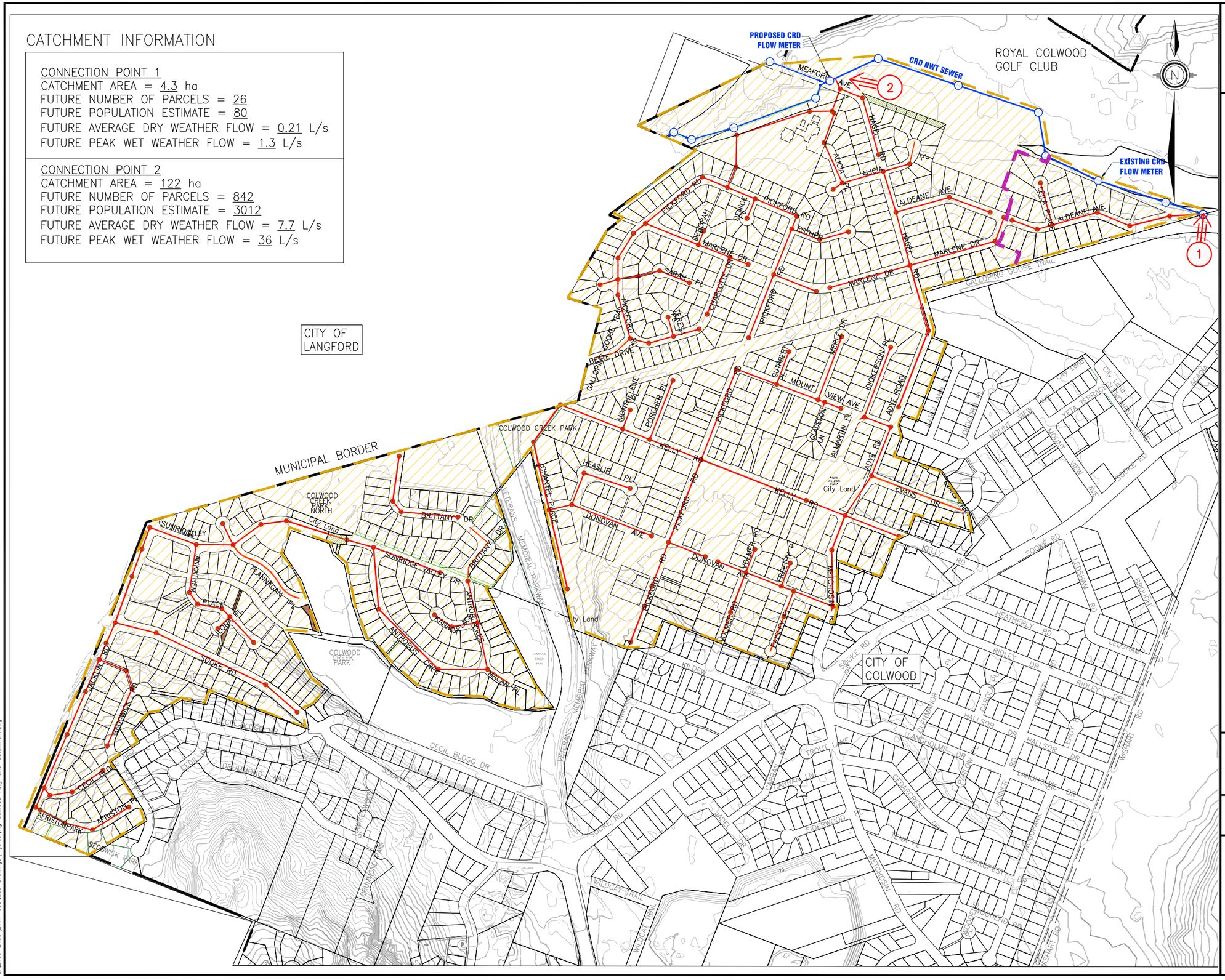
MC/mer

cc: Dan Telford, P.Eng., Senior Manager, Environmental Engineering, CRD
Dan Robson, AScT, Engineering Technologist, Infrastructure Engineering, CRD
Tim Tanton, P.Eng., Senior Manager, Infrastructure Engineering, CRD
Jeff Howard, P.Eng., Project Manager, KWL
Rob Manion, P.Eng., R Manion Consulting

CATCHMENT INFORMATION

CONNECTION POINT 1
CATCHMENT AREA = 4.3 ha
FUTURE NUMBER OF PARCELS = 26
FUTURE POPULATION ESTIMATE = 80
FUTURE AVERAGE DRY WEATHER FLOW = 0.21 L/s
FUTURE PEAK WET WEATHER FLOW = 1.3 L/s

CONNECTION POINT 2
CATCHMENT AREA = 122 ha
FUTURE NUMBER OF PARCELS = 842
FUTURE POPULATION ESTIMATE = 3012
FUTURE AVERAGE DRY WEATHER FLOW = 7.7 L/s
FUTURE PEAK WET WEATHER FLOW = 36 L/s



REVISED JULY 16, 2012

LEGEND

- POTENTIAL SEWER CATCHMENT AREA TO CAPITAL REGIONAL DISTRICT NORTHWEST TRUNK
- SUB CATCHMENT BOUNDARY
- (#) PROPOSED CONNECTION POINT
- EXISTING CRD NWT SEWER
- PROPOSED COLWOOD SEWERS

kwl

0 100 (1:7,500) 400m

Project No.	Date
2417.003	JULY 16, 2012

POTENTIAL CATCHMENT TO CAPITAL REGIONAL DISTRICT NORTHWEST TRUNK

FIGURE 1

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KERR WOOD LEIDAL
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Appendix E

SD62 Correspondence – David Cameron School Route

SOOKE SCHOOLS 62
Shaping Tomorrow Today

SCHOOL DISTRICT NO. 62 (SOOKE)
3143 JACKLIN ROAD,
VICTORIA, BRITISH COLUMBIA • V9B 5R1
TELEPHONE: 250-474-9800 FAX: 474-9825
WEBSITE: WWW.SD62.BC.CA

May 18th, 2012

City of Colwood
3300 Wishart Road
Victoria, B.C. V9C 1R1

Attention: Michael Baxter, City Engineer
c/o Rob Manion, Consultant

Dear Sirs:

Re: Proposal to Route City Sanitary Sewer through David Cameron School Lands (future)

Thank you for your letter of April 24th, in which you outlined the possibility of the Colwood City sewer line being routed in or around David Cameron School. We understand that you are trying to formulate possible routes in the neighbourhood and one such route could be through our property.

You have proposed an option whereby the School District could exchange a suitable easement through our property for the City waiving the sewer connection fee for the school. Of course, we will want an estimate of the annual charges for the school.

As you pointed out, we are very familiar with this type of partnership exchange and we are interested in this specific proposal. Therefore, we encourage you to pursue this idea as you plan the sewer route in that neighbourhood.

Please consider this a letter of encouragement as your planning proceeds. An official easement process will require Board approval when the time comes.

Please keep us posted on your plans in this regard, and thank you again for taking the initiative.

Yours truly,

David Lockyer
Secretary-Treasurer

c: Pete Godau, Facilities Manager

CITY OF COLWOOD

3300 Wishart Road | Colwood | BC V9C 1R1 | (T) 250 478 5999 (F) 250 478 7516

mbaxter@colwood.ca | www.colwood.ca

File: 3220-20-MEA-675 and 5340-02-SEW-18410

April 24, 2011

School District #62
3143 Jacklin Road
Victoria, B.C. V9B 5R1

Attention: Dave Lockyer, Treasurer, School District #62
Peter Godau, Facilities Manager, School District #62

Re: Proposal to route City Sanitary Sewer through David Cameron School Lands (future)

Dear Sirs:

The City of Colwood is currently developing a Sewer Master Plan in support of the future planning / development needs of the City. One of the most desirable routes necessitated by topography is a route from Pickford Road through the south-westerly area of the David Cameron School yard, then through the existing parking lot to Meaford Avenue. This route would remain outside of the playing field structure, with manholes only at the property boundary areas, all as shown on the attached planning drawing. Construction schedule would be at the complete discretion of SD 62, most likely during the summer months, and would probably take about a month to complete including full restoration.

There is no plan yet as to what year or decade this construction would take place but we assume that it will eventually be required. Further, it is assumed that any such (future) agreement between the City and School District 62 would involve a 'quid pro quo' consideration, most probably the supply of a free sewer connection for David Cameron School. Annual maintenance fees would apply.

Ordinarily, the levy for a City sewer connection for an institution the size of David Cameron School (3900 m2 floor space) would be about $ 48,250 (see City of Colwood Bylaw No.1431).

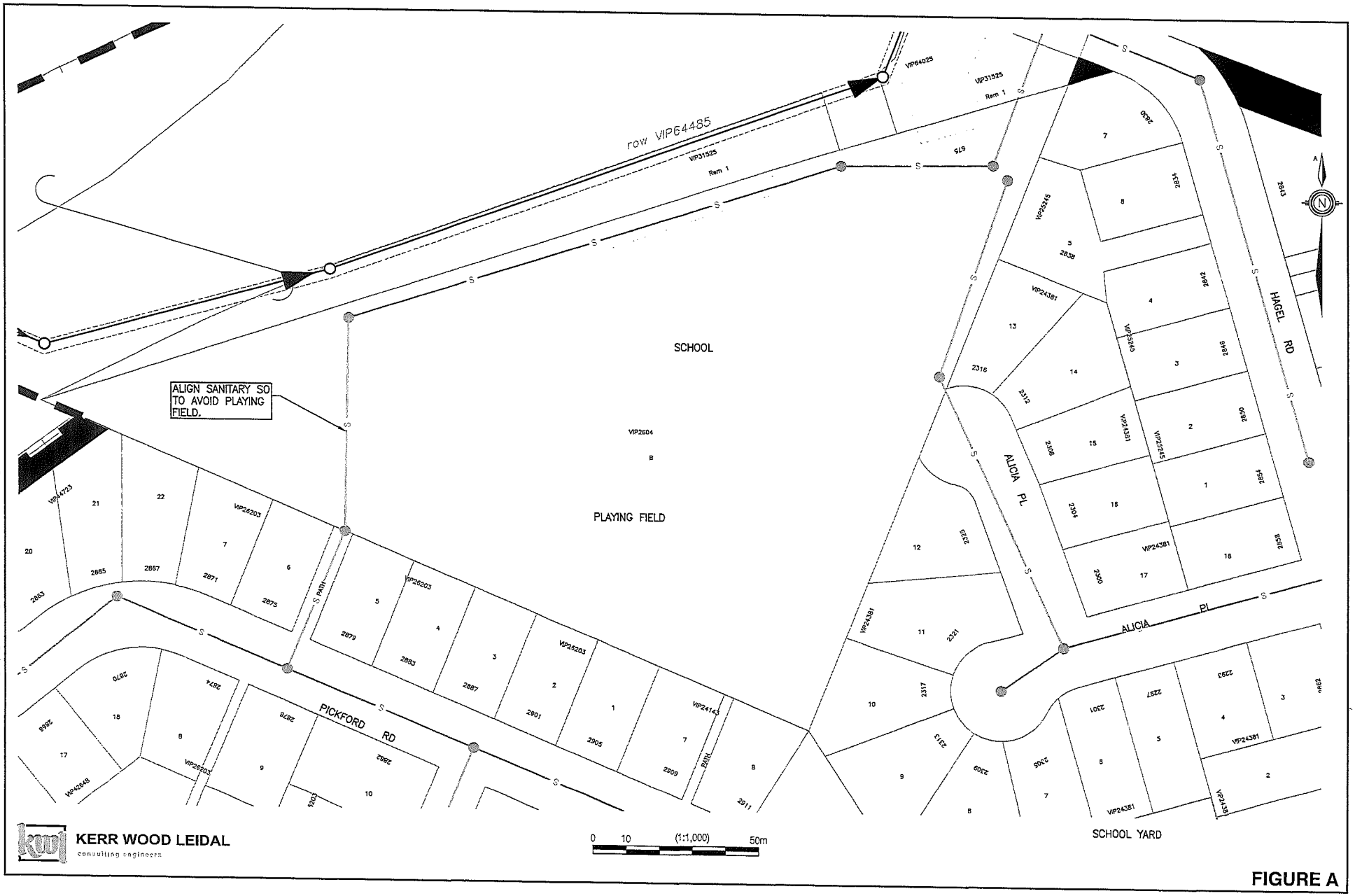
Please note that a similar agreement has previously occurred in respect of Colwood Elementary School, the nature of which was apparently just a registered SROW in favour of the City in return for a free sewer connection (no other supporting documentation has been found).

This Proposal is being submitted with a view to obtaining a written response by SD 62 indicating a 'high probability' of reaching a 'quid pro quo' agreement when construction of this sewer comes to fruition, with nothing binding at this time. Such a 'notional agreement' is necessary in order for the City to depict this route on the Sewer Master Plan. We would also appreciate any efforts you can make in the future to protect the route or to notify the City if you have to construct anything that might obstruct the route in the future.

The City thanks the School District for any cooperation in this regard.

Yours truly,

Michael Baxter, P. Eng
City Engineer



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consulting engineers

FIGURE A

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KERR WOOD LEIDAL
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COLWOOD SMP - APPENDIX F
Unit Prices for Sewer Infrastructure Cost Estimating
Excluding Engineering and Contingencies
Gravity Mains - Page 1 of 2

June 5, 2012
Our File: 2417-003

Diameter (mm)	Average Depth (m)	Gravity Main Upgrades		New Gravity Mains		
		Minor Roads	Major Roads	Minor Roads	Minor Roads in Bedrock	Major Roads
		Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)
150	2	$ 421	$ 622	$ 525	$ 704	$ 727
	2.5	$ 501	$ 746	$ 637	$ 858	$ 882
	3	$ 696	$ 1,036	$ 859	$ 1,149	$ 1,198
	4	$ 1,006	$ 1,473	$ 1,192	$ 1,584	$ 1,658
	5	$ 1,421	$ 2,001	$ 1,629	$ 2,149	$ 2,210
200	2	$ 438	$ 643	$ 543	$ 736	$ 748
	2.5	$ 517	$ 762	$ 653	$ 891	$ 897
	3	$ 713	$ 1,052	$ 875	$ 1,186	$ 1,215
	4	$ 1,024	$ 1,491	$ 1,210	$ 1,630	$ 1,676
	5	$ 1,440	$ 2,021	$ 1,649	$ 2,204	$ 2,229
250	2	$ 461	$ 669	$ 565	$ 773	$ 774
	2.5	$ 538	$ 782	$ 673	$ 929	$ 918
	3	$ 734	$ 1,074	$ 897	$ 1,229	$ 1,236
	4	$ 1,047	$ 1,514	$ 1,233	$ 1,681	$ 1,699
	5	$ 1,465	$ 2,045	$ 1,673	$ 2,264	$ 2,254
300	2	$ 555	$ 808	$ 660	$ 904	$ 912
	2.5	$ 644	$ 938	$ 779	$ 1,080	$ 1,073
	3	$ 873	$ 1,281	$ 1,035	$ 1,427	$ 1,444
	4	$ 1,247	$ 1,764	$ 1,432	$ 1,967	$ 1,950
	5	$ 1,573	$ 2,203	$ 1,781	$ 2,433	$ 2,412
350	2	$ 625	$ 902	$ 729	$ 1,000	$ 1,006
	2.5	$ 719	$ 1,039	$ 854	$ 1,189	$ 1,175
	3	$ 974	$ 1,421	$ 1,137	$ 1,574	$ 1,583
	4	$ 1,381	$ 1,943	$ 1,567	$ 2,165	$ 2,128
	5	$ 1,726	$ 2,409	$ 1,935	$ 2,663	$ 2,617
375	2	$ 653	$ 919	$ 757	$ 1,040	$ 1,024
	2.5	$ 748	$ 1,054	$ 884	$ 1,233	$ 1,190
	3	$ 1,012	$ 1,436	$ 1,174	$ 1,630	$ 1,599
	4	$ 1,430	$ 1,959	$ 1,615	$ 2,238	$ 2,144
	5	$ 1,781	$ 2,425	$ 1,989	$ 2,748	$ 2,634
450	2	$ 866	$ 1,252	$ 970	$ 1,349	$ 1,356
	2.5	$ 952	$ 1,388	$ 1,088	$ 1,554	$ 1,524
	3	$ 1,326	$ 1,885	$ 1,488	$ 2,109	$ 2,048
	4	$ 1,642	$ 2,322	$ 1,827	$ 2,604	$ 2,508
	5	$ 2,026	$ 2,848	$ 2,234	$ 3,181	$ 3,056

Class D estimate: this is a preliminary estimate which, due to little or no site information, indicates the approximate magnitude of cost of the proposed project. This overall cost estimate has been derived from lump sum or unit costs for a similar project.

KERR WOOD LEIDAL
consulting engineers

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COLWOOD SMP - APPENDIX F
Unit Prices for Sewer Infrastructure Cost Estimating
Excluding Engineering and Contingencies
Gravity Mains - Page 2 of 2

June 5, 2012
Our File: 2417-003

Diameter (mm)	Average Depth (m)	Gravity Main Upgrades		New Gravity Mains		
		Minor Roads	Major Roads	Minor Roads	Minor Roads in Bedrock	Major Roads
		Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)
525	2	$ 980	$ 1,404	$ 1,085	$ 1,508	$ 1,508
	2.5	$ 1,079	$ 1,554	$ 1,214	$ 1,735	$ 1,689
	3	$ 1,501	$ 2,109	$ 1,663	$ 2,359	$ 2,271
	4	$ 1,837	$ 2,574	$ 2,023	$ 2,892	$ 2,759
	5	$ 2,249	$ 3,135	$ 2,458	$ 3,515	$ 3,344
600	2	$ 1,148	$ 1,617	$ 1,252	$ 1,729	$ 1,721
	2.5	$ 1,264	$ 1,788	$ 1,399	$ 1,985	$ 1,923
	3	$ 1,753	$ 2,420	$ 1,915	$ 2,704	$ 2,583
	4	$ 2,118	$ 2,922	$ 2,304	$ 3,285	$ 3,108
	5	$ 2,567	$ 3,532	$ 2,776	$ 3,968	$ 3,741
750	2	$ 1,254	$ 1,732	$ 1,358	$ 1,877	$ 1,836
	2.5	$ 1,336	$ 1,860	$ 1,471	$ 2,110	$ 1,995
	3	$ 1,827	$ 2,495	$ 1,990	$ 2,841	$ 2,657
	4	$ 2,197	$ 3,001	$ 2,383	$ 3,448	$ 3,187
	5	$ 2,651	$ 3,616	$ 2,859	$ 4,157	$ 3,824
900	2	$ 1,479	$ 1,629	$ 1,583	$ 2,193	$ 1,733
	2.5	$ 1,589	$ 1,708	$ 1,725	$ 2,475	$ 1,843
	3	$ 1,906	$ 2,056	$ 2,069	$ 2,984	$ 2,219
	4	$ 2,281	$ 2,494	$ 2,467	$ 3,617	$ 2,679
	5	$ 2,740	$ 3,015	$ 2,948	$ 4,351	$ 3,223

Class D estimate: this is a preliminary estimate which, due to little or no site information, indicates the approximate magnitude of cost of the proposed project. This overall cost estimate has been derived from lump sum or unit costs for a similar project.

KERR WOOD LEIDAL
consulting engineers

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COLWOOD SMP - APPENDIX F
Unit Prices for Sewer Infrastructure Cost Estimating
Excluding Engineering and Contingencies
Pump Stations and Forcemains

June 5, 2012
Our File: 2417-003

Pump Station

Size (HP)	Unit Cost ($/hp)	Cost ($)
3	$ 66,667	$ 200,000
5	$ 40,000	$ 200,000
10	$ 23,100	$ 231,000
15	$ 19,067	$ 286,000
20	$ 16,250	$ 325,000
25	$ 14,200	$ 355,000
30	$ 12,667	$ 380,000
40	$ 10,450	$ 418,000
50	$ 8,980	$ 449,000
60	$ 7,883	$ 473,000
80	$ 6,400	$ 512,000
100	$ 5,420	$ 542,000
120	$ 4,725	$ 567,000
140	$ 4,200	$ 588,000
160	$ 3,788	$ 606,000

Forcemains

		Forcemain Upgrades		New Forcemains		
		Minor Roads	Major Roads	Minor Roads	Minor Roads in Bedrock	Major Roads
Diameter (mm)	Average Depth (m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)	Unit Cost ($/m)
100	1.1	$ 273	$ 422	$ 273	$ 388	$ 422
150	1.15	$ 302	$ 454	$ 302	$ 427	$ 454
200	1.2	$ 335	$ 490	$ 335	$ 472	$ 490
250	1.25	$ 381	$ 542	$ 381	$ 530	$ 542
300	1.3	$ 501	$ 707	$ 501	$ 686	$ 707
350	1.35	$ 536	$ 762	$ 536	$ 742	$ 762
375	1.375	$ 579	$ 819	$ 579	$ 799	$ 819
400	1.4	$ 625	$ 881	$ 625	$ 858	$ 881
450	1.45	$ 694	$ 965	$ 694	$ 947	$ 965
500	1.5	$ 772	$ 1,058	$ 772	$ 1,046	$ 1,058

Class D estimate: this is a preliminary estimate which, due to little or no site information, indicates the approximate magnitude of cost of the proposed project. This overall cost estimate has been derived from lump sum or unit costs for a similar project.

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
Gravity Main Upgrade Projects - Page 1 of 1

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Central	KWL_SP_548	KWL_NODE_518	KWL_NODE_3403	300	103	2.859	$873	$89,742
Central	KWL_SP_549	KWL_NODE_520	KWL_NODE_526	375	120	5.391	$1,781	$213,626
Central	KWL_SP_550	KWL_NODE_521	KWL_NODE_531	375	110	2.335	$748	$82,644
Central	KWL_SP_553	KWL_NODE_531	KWL_NODE_519	375	55	2.756	$1,012	$56,114
Central	KWL_SP_554	KWL_NODE_523	KWL_NODE_522	375	49	4.583	$1,781	$87,192
Central	KWL_SP_555	KWL_NODE_528	KWL_NODE_523	375	38	4.906	$1,781	$67,638
Central	KWL_SP_556	KWL_NODE_524	KWL_NODE_521	375	43	3.709	$1,430	$61,127
Central	KWL_SP_557	KWL_NODE_525	KWL_NODE_524	375	33	4.014	$1,781	$58,921
Central	KWL_SP_558	KWL_NODE_522	KWL_NODE_525	375	56	4.391	$1,781	$99,034
Central	KWL_SP_559	KWL_NODE_519	KWL_NODE_520	375	80	4.808	$1,781	$142,824
Central	KWL_SP_560	KWL_NODE_530	KWL_NODE_527	300	51	5.094	$1,573	$80,344
Central	KWL_SP_562	KWL_NODE_526	KWL_NODE_529	375	120	4.114	$1,781	$213,637
Central	KWL_SP_569	KWL_NODE_570	KWL_NODE_569	750	90	3.155	$2,197	$198,649
Central	KWL_SP_570	KWL_NODE_568	KWL_NODE_567	750	85	4.046	$2,651	$224,767
Central	KWL_SP_571	KWL_NODE_575	KWL_NODE_574	750	122	3.245	$2,197	$268,250
Central	KWL_SP_572	KWL_NODE_577	KWL_NODE_576	750	16	4.975	$2,651	$41,581
Central	KWL_SP_573	KWL_NODE_567	KWL_NODE_566	750	19	4.713	$2,651	$50,086
Central	KWL_SP_574	KWL_NODE_566	KWL_NODE_565	750	35	4.570	$2,651	$93,556
Central	KWL_SP_575	KWL_NODE_564	KWL_NODE_563	750	117	3.297	$2,197	$257,507
Central	KWL_SP_576	KWL_NODE_576	KWL_NODE_575	750	127	4.248	$2,651	$336,543
Central	KWL_SP_579	KWL_NODE_565	KWL_NODE_564	750	180	3.699	$2,197	$395,360
Central	KWL_SP_580	KWL_NODE_572	KWL_NODE_571	750	81	2.812	$1,827	$147,305
Central	KWL_SP_581	KWL_NODE_573	KWL_NODE_572	750	135	2.894	$1,827	$246,558
Central	KWL_SP_582	KWL_NODE_574	KWL_NODE_573	750	118	3.013	$2,197	$259,632
Central	KWL_SP_583	KWL_NODE_571	KWL_NODE_570	750	144	3.076	$2,197	$316,056
Central	KWL_SP_584	KWL_NODE_569	KWL_NODE_568	750	85	3.252	$2,197	$186,591
Central	KWL_SP_551B	KWL_NODE_3416	KWL_NODE_518	300	49	3.279	$1,247	$61,620
Central	KWL_SP_548B	KWL_NODE_3403	KWL_NODE_530	300	51	3.710	$1,247	$64,059
Sooke	KWL_SP_501	KWL_NODE_742	KWL_NODE_540	750	26	4.529	$3,616	$94,112
Sooke	KWL_SP_565	KWL_NODE_578	KWL_NODE_559	750	177	4.444	$3,616	$640,198
Sooke	KWL_SP_566	KWL_NODE_559	KWL_NODE_742	750	57	3.081	$3,001	$170,165
Sooke	KWL_SP_567	KWL_NODE_563	KWL_NODE_562	750	68	3.994	$3,001	$204,492
Sooke	KWL_SP_568	KWL_NODE_560	KWL_NODE_578	750	140	5.069	$3,616	$504,507
Sooke	KWL_SP_577	KWL_NODE_561	KWL_NODE_560	750	140	4.409	$3,616	$506,914
Sooke	KWL_SP_578	KWL_NODE_562	KWL_NODE_561	750	136	4.388	$3,616	$492,216

Sum		$7,014,000
Engineering	15%	$1,052,000
Contingency	25%	$1,753,500
Total		**$9,819,500**

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
Upgrade Pump Station Projects - Page 1 of 1

May 1, 2013
Our File: 2417-003

Neighbourhood	ID	Horsepower	Unit Cost / HP	Cost	Engineering (25%)	Contingency (25%)	Total Cost
Lagoon / Dunsmuir	Perimeter PS	15	$19,067	$286,005	$71,501	$71,501	$429,008
Metchosin / Latoria	Metchosin PS	300	$3,788	$1,136,400	$284,100	$284,100	$1,704,600
Triangle Mountain	Sewell PS	N/A	N/A	$100,000	$25,000	$25,000	$150,000
			Sum	$1,522,405	$380,601	$380,601	**$2,283,608**

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
Forcemain Extension Projects - Page 1 of 1

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	From	To	Diameter (mm)	Length (m)	Unit Cost	Cost
Lagoon / Dunsmuir	KWL_SP_537	KWL_NODE_509	KWL_NODE_515	450	160	$965	$154,306
Lagoon / Dunsmuir	KWL_SP_538	KWL_NODE_515	KWL_NODE_3664	450	128	$965	$123,787
Lagoon / Dunsmuir	KWL_SP_539	KWL_NODE_510	KWL_NODE_514	450	90	$965	$87,215
Lagoon / Dunsmuir	KWL_SP_540	KWL_NODE_514	KWL_NODE_509	450	111	$965	$107,351
DND Belmont / Royal Roads	KWL_SP_544	KWL_NODE_516	KWL_NODE_511	450	112	$965	$107,803
Lagoon / Dunsmuir	KWL_SP_538B	KWL_NODE_3664	KWL_NODE_516	450	36	$965	$35,161

Sum		$616,000
Engineering	15%	$92,000
Contingency	25%	$154,000
Total		**$862,000**

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Gravity Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Central	KWL_SP_2006	KWL_NODE_3520	KWL_NODE_3508	200	47	0.86	$543	$25,335
Central	KWL_SP_2017	KWL_NODE_3067	KWL_NODE_568	200	8	1.21	$543	$4,208
Central	KWL_SP_2020	KWL_NODE_3427	KWL_NODE_666	200	70	2.02	$653	$45,891
Central	KWL_SP_2051	KWL_NODE_3508	KWL_NODE_478	200	37	1.75	$543	$20,079
Central	KWL_SP_2054	KWL_NODE_3512	KWL_NODE_478	200	21	1.70	$543	$11,327
Central	KWL_SP_2079	KWL_NODE_3422	KWL_NODE_793	200	96	1.78	$543	$52,072
Central	KWL_SP_2099	KWL_NODE_3444	KWL_NODE_3446	200	87	2.71	$875	$76,026
Central	KWL_SP_2100	KWL_NODE_3417	KWL_NODE_368	200	99	1.86	$543	$53,607
Central	KWL_SP_2101	KWL_NODE_3430	KWL_NODE_3417	200	108	1.78	$543	$58,847
Central	KWL_SP_2103	KWL_NODE_3445	KWL_NODE_3437	200	60	2.56	$875	$52,836
Central	KWL_SP_2104	KWL_NODE_3446	KWL_NODE_3445	200	63	3.78	$1,210	$76,611
Central	KWL_SP_2106	KWL_NODE_3464	KWL_NODE_3450	200	89	2.82	$875	$77,975
Central	KWL_SP_2135	KWL_NODE_3519	KWL_NODE_3511	200	32	1.84	$543	$17,340
Central	KWL_SP_2136	KWL_NODE_3511	KWL_NODE_380	200	69	1.89	$543	$37,606
Central	KWL_SP_2137	KWL_NODE_3533	KWL_NODE_3519	200	88	1.61	$543	$47,644
Central	KWL_SP_2138	KWL_NODE_3527	KWL_NODE_3526	200	46	1.64	$543	$25,005
Central	KWL_SP_2139	KWL_NODE_3537	KWL_NODE_3527	200	94	1.57	$543	$51,042
Central	KWL_SP_2140	KWL_NODE_3541	KWL_NODE_3537	200	118	1.69	$543	$63,962
Central	KWL_SP_2141	KWL_NODE_3542	KWL_NODE_3541	200	85	1.98	$543	$46,338
Central	KWL_SP_2142	KWL_NODE_3543	KWL_NODE_3542	200	75	1.71	$543	$40,504
Central	KWL_SP_2144	KWL_NODE_3505	KWL_NODE_3498	200	18	1.55	$543	$9,505
Central	KWL_SP_2145	KWL_NODE_3525	KWL_NODE_3505	200	64	1.71	$543	$34,726
Central	KWL_SP_2146	KWL_NODE_3398	KWL_NODE_3402	200	21	1.61	$543	$11,495
Central	KWL_SP_2147	KWL_NODE_3415	KWL_NODE_3398	200	57	1.66	$543	$30,704
Central	KWL_SP_2148	KWL_NODE_3436	KWL_NODE_3415	200	64	2.01	$653	$41,451
Central	KWL_SP_2149	KWL_NODE_3402	KWL_NODE_527	200	78	3.96	$1,210	$94,311
Central	KWL_SP_2150	KWL_NODE_3410	KWL_NODE_3402	200	38	2.75	$875	$33,259
Central	KWL_SP_2151	KWL_NODE_3454	KWL_NODE_3410	200	119	2.68	$875	$104,234
Central	KWL_SP_2152	KWL_NODE_3465	KWL_NODE_3454	200	39	2.05	$653	$25,677
Central	KWL_SP_2153	KWL_NODE_3498	KWL_NODE_3465	200	104	2.22	$653	$67,865
Central	KWL_SP_2154	KWL_NODE_3501	KWL_NODE_3498	200	32	1.79	$543	$17,409
Central	KWL_SP_2155	KWL_NODE_3497	KWL_NODE_3501	200	65	1.75	$543	$35,037
Central	KWL_SP_2156	KWL_NODE_3500	KWL_NODE_3497	200	82	2.09	$653	$53,430
Central	KWL_SP_2157	KWL_NODE_3503	KWL_NODE_3500	200	72	1.56	$543	$38,809
Central	KWL_SP_2158	KWL_NODE_3534	KWL_NODE_3663	200	60	2.03	$653	$39,418
Central	KWL_SP_2159	KWL_NODE_3540	KWL_NODE_3534	200	56	1.94	$543	$30,360
Central	KWL_SP_2160	KWL_NODE_3545	KWL_NODE_3540	200	117	1.41	$543	$63,312
Central	KWL_SP_2161	KWL_NODE_3529	KWL_NODE_3512	200	79	1.79	$543	$42,870
Central	KWL_SP_2162	KWL_NODE_3532	KWL_NODE_3529	200	69	1.41	$543	$37,368
Central	KWL_SP_2163	KWL_NODE_3531	KWL_NODE_3521	200	131	2.05	$653	$85,582
Central	KWL_SP_2164	KWL_NODE_3536	KWL_NODE_3531	200	80	2.02	$653	$52,214
Central	KWL_SP_2165	KWL_NODE_3544	KWL_NODE_3536	200	55	1.84	$543	$30,117
Central	KWL_SP_2166	KWL_NODE_3507	KWL_NODE_3497	200	65	1.97	$543	$35,453
Central	KWL_SP_2167	KWL_NODE_3521	KWL_NODE_3507	200	59	1.75	$543	$31,807
Central	KWL_SP_2168	KWL_NODE_3526	KWL_NODE_3521	200	83	2.04	$653	$54,196
Central	KWL_SP_2169	KWL_NODE_350	KWL_NODE_3526	200	114	1.74	$543	$62,076
Central	KWL_SP_2170	KWL_NODE_3486	KWL_NODE_3476	200	95	2.09	$653	$62,145
Central	KWL_SP_2171	KWL_NODE_3492	KWL_NODE_3486	200	27	1.56	$543	$14,386
Central	KWL_SP_2172	KWL_NODE_3473	KWL_NODE_3442	200	40	3.81	$1,210	$48,217
Central	KWL_SP_2173	KWL_NODE_3476	KWL_NODE_3473	200	18	3.66	$1,210	$21,862
Central	KWL_SP_2174	KWL_NODE_3478	KWL_NODE_3476	200	39	1.63	$543	$21,269
Central	KWL_SP_2175	KWL_NODE_3496	KWL_NODE_3478	200	70	1.69	$543	$37,757
Central	KWL_SP_2176	KWL_NODE_3431	KWL_NODE_504	200	56	1.75	$543	$30,133
Central	KWL_SP_2180	KWL_NODE_3385	KWL_NODE_3394	200	100	2.00	$543	$54,209
Central	KWL_SP_2181	KWL_NODE_3394	KWL_NODE_525	200	209	3.01	$1,210	$253,230
Central	KWL_SP_2182	KWL_NODE_3137	KWL_NODE_3067	200	120	1.22	$543	$64,926
Central	KWL_SP_2185	KWL_NODE_3119	KWL_NODE_569	200	136	1.80	$543	$73,881
Central	KWL_SP_2186	KWL_NODE_3127	KWL_NODE_3119	200	53	1.67	$543	$28,522
Central	KWL_SP_2187	KWL_NODE_3157	KWL_NODE_3127	200	133	1.88	$543	$71,960
Central	KWL_SP_2188	KWL_NODE_3139	KWL_NODE_3142	200	59	1.71	$543	$31,967
Central	KWL_SP_2189	KWL_NODE_3136	KWL_NODE_3152	200	58	1.76	$543	$31,658
Central	KWL_SP_2190	KWL_NODE_3148	KWL_NODE_3143	200	85	1.70	$543	$45,995
Central	KWL_SP_2191	KWL_NODE_3138	KWL_NODE_3130	200	63	1.67	$543	$34,029
Central	KWL_SP_2192	KWL_NODE_3123	KWL_NODE_3132	200	60	1.73	$543	$32,371
Central	KWL_SP_2193	KWL_NODE_3362	KWL_NODE_577	200	159	2.52	$1,215	$192,966
Central	KWL_SP_2194	KWL_NODE_3365	KWL_NODE_3362	200	166	1.75	$748	$124,183
Central	KWL_SP_2195	KWL_NODE_3366	KWL_NODE_532	200	114	1.73	$543	$62,007
Central	KWL_SP_2196	KWL_NODE_3367	KWL_NODE_3366	200	26	1.52	$543	$14,014
Central	KWL_SP_2197	KWL_NODE_3312	KWL_NODE_507	200	127	2.27	$653	$82,854
Central	KWL_SP_2199	KWL_NODE_3350	KWL_NODE_3309	200	65	1.86	$543	$35,475
Central	KWL_SP_2200	KWL_NODE_3341	KWL_NODE_3350	200	63	1.76	$543	$34,003

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Gravity Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Central	KWL_SP_2201	KWL_NODE_3250	KWL_NODE_3228	200	117	1.81	$543	$63,318
Central	KWL_SP_2202	KWL_NODE_3306	KWL_NODE_3250	200	39	2.53	$875	$34,511
Central	KWL_SP_2203	KWL_NODE_3228	KWL_NODE_3224	200	13	1.58	$543	$6,920
Central	KWL_SP_2204	KWL_NODE_3294	KWL_NODE_3306	200	45	3.00	$875	$39,183
Central	KWL_SP_2205	KWL_NODE_3274	KWL_NODE_3294	200	63	2.46	$653	$41,071
Central	KWL_SP_2206	KWL_NODE_3309	KWL_NODE_3274	200	115	2.14	$653	$74,901
Central	KWL_SP_2207	KWL_NODE_3338	KWL_NODE_3309	200	36	1.48	$543	$19,437
Central	KWL_SP_2208	KWL_NODE_3368	KWL_NODE_3338	200	46	1.44	$543	$24,831
Central	KWL_SP_2209	KWL_NODE_3353	KWL_NODE_3369	200	143	2.56	$875	$124,853
Central	KWL_SP_2210	KWL_NODE_3384	KWL_NODE_3337	200	59	1.94	$543	$31,908
Central	KWL_SP_2211	KWL_NODE_3374	KWL_NODE_3384	200	45	1.71	$543	$24,325
Central	KWL_SP_2212	KWL_NODE_3284	KWL_NODE_3301	200	83	2.76	$875	$72,734
Central	KWL_SP_2213	KWL_NODE_3277	KWL_NODE_3284	200	90	2.14	$653	$58,548
Central	KWL_SP_2214	KWL_NODE_3337	KWL_NODE_3277	200	96	2.24	$653	$62,405
Central	KWL_SP_2215	KWL_NODE_3298	KWL_NODE_3337	200	58	2.06	$653	$37,520
Central	KWL_SP_2216	KWL_NODE_3305	KWL_NODE_3298	200	50	1.45	$543	$26,944
Central	KWL_SP_2217	KWL_NODE_3326	KWL_NODE_3305	200	23	1.20	$543	$12,226
Central	KWL_SP_2229	KWL_NODE_3272	KWL_NODE_3278	200	59	1.77	$543	$31,830
Central	KWL_SP_2250	KWL_NODE_3332	KWL_NODE_3295	200	110	2.03	$653	$71,914
Central	KWL_SP_2251	KWL_NODE_3330	KWL_NODE_3332	200	132	1.85	$543	$71,614
Central	KWL_SP_2252	KWL_NODE_3336	KWL_NODE_3330	200	56	1.50	$543	$30,359
Central	KWL_SP_2253	KWL_NODE_3359	KWL_NODE_3336	200	49	1.44	$543	$26,528
Central	KWL_SP_2254	KWL_NODE_3347	KWL_NODE_6	200	76	1.70	$543	$41,162
Central	KWL_SP_2255	KWL_NODE_3318	KWL_NODE_3377	200	51	2.30	$653	$33,456
Central	KWL_SP_2256	KWL_NODE_3339	KWL_NODE_3318	200	92	1.47	$543	$49,892
Central	KWL_SP_2257	KWL_NODE_3191	KWL_NODE_3130	200	90	2.39	$653	$58,664
Central	KWL_SP_2258	KWL_NODE_3130	KWL_NODE_13	200	100	2.61	$875	$87,136
Central	KWL_SP_2259	KWL_NODE_3202	KWL_NODE_3215	200	53	3.11	$1,210	$64,072
Central	KWL_SP_2260	KWL_NODE_3215	KWL_NODE_3130	200	81	3.05	$1,210	$98,536
Central	KWL_SP_2261	KWL_NODE_3261	KWL_NODE_3215	200	182	1.16	$543	$98,782
Central	KWL_SP_2262	KWL_NODE_3280	KWL_NODE_3261	200	39	2.05	$653	$25,672
Central	KWL_SP_2263	KWL_NODE_3260	KWL_NODE_3280	200	46	1.83	$543	$24,756
Central	KWL_SP_2264	KWL_NODE_3132	KWL_NODE_571	200	93	2.83	$875	$80,966
Central	KWL_SP_2265	KWL_NODE_3143	KWL_NODE_3132	200	99	2.81	$875	$86,268
Central	KWL_SP_2266	KWL_NODE_3152	KWL_NODE_3143	200	97	2.69	$875	$85,149
Central	KWL_SP_2267	KWL_NODE_3142	KWL_NODE_3152	200	94	2.25	$653	$61,437
Central	KWL_SP_2268	KWL_NODE_3154	KWL_NODE_3142	200	92	1.42	$543	$50,029
Central	KWL_SP_2270	KWL_NODE_3147	KWL_NODE_570	250	190	2.65	$897	$170,644
Central	KWL_SP_2271	KWL_NODE_3150	KWL_NODE_3147	200	177	2.43	$653	$115,483
Central	KWL_SP_2272	KWL_NODE_1080	KWL_NODE_3150	200	101	1.87	$543	$54,678
Central	KWL_SP_2277	KWL_NODE_3278	KWL_NODE_3237	200	134	2.22	$897	$120,425
Central	KWL_SP_2278	KWL_NODE_3295	KWL_NODE_3278	200	35	2.10	$897	$31,449
Central	KWL_SP_2279	KWL_NODE_3369	KWL_NODE_3295	200	116	2.62	$1,215	$140,316
Central	KWL_SP_2280	KWL_NODE_3377	KWL_NODE_3369	200	41	3.05	$1,676	$68,400
Central	KWL_SP_2281	KWL_NODE_3372	KWL_NODE_3377	200	180	1.82	$748	$134,644
Central	KWL_SP_2328	KWL_NODE_3475	KWL_NODE_3422	200	248	1.92	$543	$134,836
Central	KWL_SP_2329	KWL_NODE_3514	KWL_NODE_3475	200	177	1.52	$543	$96,315
Central	KWL_SP_2564	KWL_NODE_3413	KWL_NODE_3403	200	157	1.35	$543	$85,270
Central	KWL_SP_2591	KWL_NODE_3391	KWL_NODE_519	200	180	3.55	$1,210	$217,720
Central	KWL_SP_2592	KWL_NODE_3650	KWL_NODE_531	200	46	2.89	$875	$39,948
Central	KWL_SP_2594	KWL_NODE_3382	KWL_NODE_3370	200	41	3.01	$1,210	$50,090
Central	KWL_SP_2595	KWL_NODE_3370	KWL_NODE_3363	200	91	3.27	$1,210	$109,859
Central	KWL_SP_2596	KWL_NODE_3349	KWL_NODE_3345	200	55	2.06	$653	$36,078
Central	KWL_SP_2597	KWL_NODE_3303	KWL_NODE_529	200	44	2.91	$875	$38,137
Central	KWL_SP_2598	KWL_NODE_3375	KWL_NODE_3303	200	48	3.42	$1,210	$58,642
Central	KWL_SP_2599	KWL_NODE_3363	KWL_NODE_3375	200	70	3.71	$1,210	$84,511
Central	KWL_SP_2600	KWL_NODE_3342	KWL_NODE_3370	200	53	2.73	$875	$46,763
Central	KWL_SP_2601	KWL_NODE_3345	KWL_NODE_3342	200	17	2.33	$653	$11,115
Central	KWL_SP_2602	KWL_NODE_3358	KWL_NODE_3345	200	34	2.34	$653	$22,000
Central	KWL_SP_2603	KWL_NODE_3386	KWL_NODE_3358	200	86	2.59	$875	$75,663
Central	KWL_SP_2606	KWL_NODE_3333	KWL_NODE_511	200	49	3.62	$1,210	$59,153
Central	KWL_SP_404C	KWL_NODE_3224	KWL_NODE_FUTURE	200	2	1.31	$543	$1,075
Colwood Corners	KWL_SP_2000	KWL_NODE_3244	KWL_NODE_3234	200	46	1.59	$543	$25,213
Colwood Corners	KWL_SP_2130	KWL_NODE_3186	KWL_NODE_164	200	7	1.42	$543	$3,702
Colwood Corners	KWL_SP_2131	KWL_NODE_3233	KWL_NODE_3186	200	90	2.41	$653	$58,494
Colwood Corners	KWL_SP_2132	KWL_NODE_3234	KWL_NODE_3233	200	232	2.79	$875	$202,697
Colwood Corners	KWL_SP_2133	KWL_NODE_3245	KWL_NODE_3234	200	74	1.82	$543	$40,037
Colwood Corners	KWL_SP_2134	KWL_NODE_3246	KWL_NODE_3245	200	46	2.01	$653	$30,165
Kelly	KWL_SP_2005	KWL_NODE_3024	KWL_NODE_3032	300	46	3.62	$1,432	$65,653
Kelly	KWL_SP_2039	KWL_NODE_3275	KWL_NODE_3354	200	174	2.65	$1,215	$210,745
Kelly	KWL_SP_2042	KWL_NODE_3177	KWL_NODE_2	200	24	2.04	$897	$21,096

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
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Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Kelly	KWL_SP_2043	KWL_NODE_3181	KWL_NODE_3177	200	83	1.76	$543	$44,813
Kelly	KWL_SP_2044	KWL_NODE_3185	KWL_NODE_3181	200	68	1.49	$543	$36,764
Kelly	KWL_SP_2048	KWL_NODE_3631	KWL_NODE_3210	200	10	1.47	$543	$5,502
Kelly	KWL_SP_2049	KWL_NODE_3209	KWL_NODE_3198	200	35	1.53	$543	$19,096
Kelly	KWL_SP_2050	KWL_NODE_3658	KWL_NODE_3205	200	8	1.47	$748	$5,945
Kelly	KWL_SP_2085	KWL_NODE_3032	KWL_NODE_3022	300	48	4.45	$1,781	$86,198
Kelly	KWL_SP_2218	KWL_NODE_3249	KWL_NODE_3237	200	41	1.78	$748	$30,466
Kelly	KWL_SP_2219	KWL_NODE_3301	KWL_NODE_3267	200	64	3.39	$1,676	$106,922
Kelly	KWL_SP_2220	KWL_NODE_3354	KWL_NODE_3301	200	211	3.66	$1,676	$354,356
Kelly	KWL_SP_2222	KWL_NODE_3218	KWL_NODE_3217	200	55	1.83	$543	$30,073
Kelly	KWL_SP_2224	KWL_NODE_3217	KWL_NODE_3205	200	86	1.90	$543	$46,579
Kelly	KWL_SP_2225	KWL_NODE_3227	KWL_NODE_3213	200	96	1.68	$543	$52,304
Kelly	KWL_SP_2226	KWL_NODE_3279	KWL_NODE_3227	200	43	1.65	$543	$23,181
Kelly	KWL_SP_2227	KWL_NODE_3267	KWL_NODE_3249	200	53	2.42	$897	$47,430
Kelly	KWL_SP_2228	KWL_NODE_3299	KWL_NODE_3267	200	173	2.48	$653	$112,811
Kelly	KWL_SP_2230	KWL_NODE_3051	KWL_NODE_3049	200	69	1.96	$543	$37,640
Kelly	KWL_SP_2231	KWL_NODE_3090	KWL_NODE_3051	200	99	1.89	$543	$53,658
Kelly	KWL_SP_2232	KWL_NODE_3325	KWL_NODE_3287	200	116	1.48	$543	$63,141
Kelly	KWL_SP_2233	KWL_NODE_3302	KWL_NODE_3354	200	67	3.05	$1,210	$80,454
Kelly	KWL_SP_2234	KWL_NODE_3320	KWL_NODE_3302	200	77	2.34	$653	$49,962
Kelly	KWL_SP_2235	KWL_NODE_3287	KWL_NODE_3320	200	80	1.85	$543	$43,517
Kelly	KWL_SP_2236	KWL_NODE_3221	KWL_NODE_3225	200	87	1.87	$543	$47,452
Kelly	KWL_SP_2237	KWL_NODE_3283	KWL_NODE_3299	200	127	2.03	$653	$82,934
Kelly	KWL_SP_2238	KWL_NODE_3220	KWL_NODE_3225	200	51	1.93	$543	$27,559
Kelly	KWL_SP_2239	KWL_NODE_3219	KWL_NODE_3222	200	51	1.83	$543	$27,582
Kelly	KWL_SP_2240	KWL_NODE_3222	KWL_NODE_3217	200	27	2.25	$653	$17,855
Kelly	KWL_SP_2241	KWL_NODE_3225	KWL_NODE_3222	200	78	2.26	$653	$50,695
Kelly	KWL_SP_2242	KWL_NODE_3231	KWL_NODE_3225	200	62	1.42	$543	$33,405
Kelly	KWL_SP_2243	KWL_NODE_3232	KWL_NODE_3213	200	80	1.59	$543	$43,441
Kelly	KWL_SP_2244	KWL_NODE_3028	KWL_NODE_3044	200	165	2.00	$543	$89,752
Kelly	KWL_SP_2245	KWL_NODE_3020	KWL_NODE_3042	200	94	2.79	$875	$82,124
Kelly	KWL_SP_2246	KWL_NODE_3035	KWL_NODE_3020	200	49	2.22	$653	$31,957
Kelly	KWL_SP_2247	KWL_NODE_3044	KWL_NODE_3035	200	94	2.69	$875	$82,040
Kelly	KWL_SP_2248	KWL_NODE_3049	KWL_NODE_3044	200	48	2.07	$653	$31,017
Kelly	KWL_SP_2249	KWL_NODE_3199	KWL_NODE_3049	200	175	1.98	$543	$94,934
Kelly	KWL_SP_2269	KWL_NODE_3237	KWL_NODE_3190	200	123	2.34	$897	$110,339
Kelly	KWL_SP_2273	KWL_NODE_3190	KWL_NODE_4	200	131	1.33	$748	$98,292
Kelly	KWL_SP_2274	KWL_NODE_3135	KWL_NODE_3176	200	75	2.18	$897	$67,652
Kelly	KWL_SP_2275	KWL_NODE_3205	KWL_NODE_3135	200	115	1.54	$748	$86,155
Kelly	KWL_SP_2276	KWL_NODE_3657	KWL_NODE_3205	200	10	1.62	$748	$7,533
Kelly	KWL_SP_2282	KWL_NODE_3213	KWL_NODE_3145	200	182	2.01	$653	$118,691
Kelly	KWL_SP_2283	KWL_NODE_3324	KWL_NODE_3279	200	78	1.75	$543	$42,506
Kelly	KWL_SP_2287	KWL_NODE_3184	KWL_NODE_3176	200	118	1.57	$543	$64,025
Kelly	KWL_SP_2288	KWL_NODE_3193	KWL_NODE_3134	200	139	1.77	$543	$75,166
Kelly	KWL_SP_2289	KWL_NODE_3156	KWL_NODE_3145	200	230	3.13	$1,210	$277,996
Kelly	KWL_SP_2290	KWL_NODE_3211	KWL_NODE_3207	200	57	1.47	$543	$30,930
Kelly	KWL_SP_2291	KWL_NODE_3188	KWL_NODE_3187	200	20	2.19	$653	$13,322
Kelly	KWL_SP_2292	KWL_NODE_3187	KWL_NODE_3164	200	146	2.30	$653	$95,463
Kelly	KWL_SP_2293	KWL_NODE_3182	KWL_NODE_3188	200	113	1.57	$543	$61,213
Kelly	KWL_SP_2294	KWL_NODE_3164	KWL_NODE_3174	200	49	2.59	$875	$42,614
Kelly	KWL_SP_2295	KWL_NODE_3195	KWL_NODE_3187	200	31	1.52	$543	$17,060
Kelly	KWL_SP_2296	KWL_NODE_3207	KWL_NODE_3195	200	74	1.67	$543	$40,262
Kelly	KWL_SP_2297	KWL_NODE_3189	KWL_NODE_3207	200	170	1.13	$543	$92,509
Kelly	KWL_SP_2298	KWL_NODE_3176	KWL_NODE_3156	200	85	2.92	$875	$74,653
Kelly	KWL_SP_2299	KWL_NODE_3168	KWL_NODE_3176	200	97	2.08	$653	$63,552
Kelly	KWL_SP_2300	KWL_NODE_3208	KWL_NODE_3168	200	107	1.92	$543	$58,310
Kelly	KWL_SP_2301	KWL_NODE_3201	KWL_NODE_3193	200	168	1.63	$543	$90,995
Kelly	KWL_SP_2302	KWL_NODE_3632	KWL_NODE_3198	200	10	2.21	$653	$6,304
Kelly	KWL_SP_2303	KWL_NODE_3197	KWL_NODE_3200	200	138	1.77	$543	$74,684
Kelly	KWL_SP_2304	KWL_NODE_3200	KWL_NODE_3194	200	90	2.43	$653	$58,872
Kelly	KWL_SP_2305	KWL_NODE_3198	KWL_NODE_3200	200	14	2.31	$653	$9,452
Kelly	KWL_SP_2306	KWL_NODE_3204	KWL_NODE_3210	200	153	1.79	$543	$82,907
Kelly	KWL_SP_2307	KWL_NODE_3210	KWL_NODE_3208	200	58	2.29	$653	$37,534
Kelly	KWL_SP_2308	KWL_NODE_3079	KWL_NODE_3076	200	42	1.57	$543	$22,707
Kelly	KWL_SP_2309	KWL_NODE_3076	KWL_NODE_3042	200	136	2.20	$653	$88,824
Kelly	KWL_SP_2310	KWL_NODE_3108	KWL_NODE_3101	200	130	2.15	$653	$84,732
Kelly	KWL_SP_2311	KWL_NODE_3101	KWL_NODE_3076	200	59	2.24	$653	$38,782
Kelly	KWL_SP_2312	KWL_NODE_3145	KWL_NODE_3101	200	113	2.99	$875	$98,588
Kelly	KWL_SP_2313	KWL_NODE_3166	KWL_NODE_3145	200	198	2.23	$653	$129,382
Kelly	KWL_SP_2314	KWL_NODE_3194	KWL_NODE_3166	200	88	2.31	$653	$57,340
Kelly	KWL_SP_2315	KWL_NODE_3179	KWL_NODE_3194	200	71	1.81	$543	$38,417

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Kelly	KWL_SP_2395	KWL_NODE_3023	KWL_NODE_3022	200	49	2.19	$653	$32,098
Kelly	KWL_SP_2396	KWL_NODE_3025	KWL_NODE_3024	300	123	3.74	$1,432	$176,573
Kelly	KWL_SP_2397	KWL_NODE_3056	KWL_NODE_3025	300	81	3.88	$1,432	$116,525
Kelly	KWL_SP_2398	KWL_NODE_3027	KWL_NODE_3031	200	32	2.16	$653	$20,631
Kelly	KWL_SP_2399	KWL_NODE_3089	KWL_NODE_3064	200	54	1.49	$543	$29,336
Kelly	KWL_SP_2400	KWL_NODE_3107	KWL_NODE_3089	200	42	1.46	$543	$23,014
Kelly	KWL_SP_2401	KWL_NODE_3144	KWL_NODE_3094	200	59	1.74	$543	$32,225
Kelly	KWL_SP_2406	KWL_NODE_3253	KWL_NODE_3144	200	101	2.12	$653	$65,671
Kelly	KWL_SP_2407	KWL_NODE_3169	KWL_NODE_3072	200	93	1.81	$543	$50,477
Kelly	KWL_SP_2408	KWL_NODE_3196	KWL_NODE_3169	200	28	2.05	$653	$18,006
Kelly	KWL_SP_2409	KWL_NODE_3180	KWL_NODE_3196	200	116	1.84	$543	$63,072
Kelly	KWL_SP_2412	KWL_NODE_3038	KWL_NODE_3052	200	52	1.20	$543	$28,239
Kelly	KWL_SP_2413	KWL_NODE_3057	KWL_NODE_3053	200	127	3.07	$1,210	$153,035
Kelly	KWL_SP_2414	KWL_NODE_3065	KWL_NODE_3057	200	173	2.68	$875	$151,178
Kelly	KWL_SP_2415	KWL_NODE_3052	KWL_NODE_3065	200	101	2.03	$653	$65,760
Kelly	KWL_SP_2416	KWL_NODE_3064	KWL_NODE_3052	200	98	1.49	$543	$52,924
Kelly	KWL_SP_2417	KWL_NODE_3082	KWL_NODE_3064	200	88	1.56	$543	$47,497
Kelly	KWL_SP_2418	KWL_NODE_3053	KWL_NODE_3047	200	57	3.27	$1,210	$68,529
Kelly	KWL_SP_2419	KWL_NODE_3112	KWL_NODE_3053	200	145	1.40	$543	$78,867
Kelly	KWL_SP_2420	KWL_NODE_3113	KWL_NODE_3100	200	48	1.87	$543	$26,161
Kelly	KWL_SP_2421	KWL_NODE_3214	KWL_NODE_3172	200	34	2.09	$653	$22,386
Kelly	KWL_SP_2422	KWL_NODE_3140	KWL_NODE_3124	200	99	3.14	$1,210	$119,921
Kelly	KWL_SP_2423	KWL_NODE_3171	KWL_NODE_3140	200	29	2.25	$653	$19,003
Kelly	KWL_SP_2424	KWL_NODE_3153	KWL_NODE_3171	200	50	2.22	$653	$32,837
Kelly	KWL_SP_2425	KWL_NODE_3172	KWL_NODE_3153	200	24	1.92	$543	$12,973
Kelly	KWL_SP_2426	KWL_NODE_3226	KWL_NODE_3172	200	71	2.12	$653	$46,309
Kelly	KWL_SP_2428	KWL_NODE_3396	KWL_NODE_3364	200	247	2.26	$897	$221,655
Kelly	KWL_SP_2429	KWL_NODE_3409	KWL_NODE_3396	200	85	1.76	$748	$63,822
Kelly	KWL_SP_2430	KWL_NODE_3094	KWL_NODE_3103	200	47	2.01	$653	$30,525
Kelly	KWL_SP_2431	KWL_NODE_3059	KWL_NODE_3047	200	129	2.10	$653	$84,285
Kelly	KWL_SP_2432	KWL_NODE_3070	KWL_NODE_3059	200	53	2.23	$653	$34,377
Kelly	KWL_SP_2433	KWL_NODE_3100	KWL_NODE_3070	200	70	2.72	$875	$61,525
Kelly	KWL_SP_2434	KWL_NODE_3124	KWL_NODE_3100	200	75	3.24	$1,210	$91,044
Kelly	KWL_SP_2435	KWL_NODE_3103	KWL_NODE_3124	200	101	2.82	$875	$88,351
Kelly	KWL_SP_2448	KWL_NODE_3408	KWL_NODE_796	200	63	2.59	$1,215	$76,992
Kelly	KWL_SP_2464	KWL_NODE_3411	KWL_NODE_3408	200	33	3.11	$1,676	$55,934
Kelly	KWL_SP_2465	KWL_NODE_3041	KWL_NODE_3037	200	64	2.56	$875	$55,656
Kelly	KWL_SP_2466	KWL_NODE_3081	KWL_NODE_3071	200	56	1.47	$543	$30,284
Kelly	KWL_SP_2467	KWL_NODE_3083	KWL_NODE_3041	200	90	2.36	$653	$58,886
Kelly	KWL_SP_2468	KWL_NODE_3071	KWL_NODE_3083	200	87	1.85	$543	$47,148
Kelly	KWL_SP_2469	KWL_NODE_3085	KWL_NODE_3083	200	23	1.45	$543	$12,524
Kelly	KWL_SP_2470	KWL_NODE_3039	KWL_NODE_3029	200	38	1.59	$543	$20,679
Kelly	KWL_SP_2471	KWL_NODE_3054	KWL_NODE_3029	200	42	1.70	$543	$23,005
Kelly	KWL_SP_2472	KWL_NODE_3029	KWL_NODE_3043	200	44	1.86	$543	$23,634
Kelly	KWL_SP_2473	KWL_NODE_3063	KWL_NODE_3054	200	44	1.65	$543	$24,127
Kelly	KWL_SP_2474	KWL_NODE_3167	KWL_NODE_3151	200	93	1.72	$543	$50,657
Kelly	KWL_SP_2475	KWL_NODE_3163	KWL_NODE_3134	200	170	1.74	$543	$92,122
Kelly	KWL_SP_2476	KWL_NODE_3093	KWL_NODE_3133	200	89	2.09	$653	$58,285
Kelly	KWL_SP_2479	KWL_NODE_3151	KWL_NODE_3096	300	100	1.84	$660	$65,974
Kelly	KWL_SP_2480	KWL_NODE_3173	KWL_NODE_3151	300	139	1.57	$660	$91,589
Kelly	KWL_SP_2481	KWL_NODE_3111	KWL_NODE_3086	200	40	1.44	$543	$21,700
Kelly	KWL_SP_2482	KWL_NODE_3077	KWL_NODE_3063	200	66	1.56	$543	$35,557
Kelly	KWL_SP_2483	KWL_NODE_3074	KWL_NODE_3069	200	31	1.53	$543	$16,689
Kelly	KWL_SP_2484	KWL_NODE_3069	KWL_NODE_3031	200	116	1.58	$543	$63,112
Kelly	KWL_SP_2485	KWL_NODE_3031	KWL_NODE_3045	200	150	2.84	$875	$131,135
Kelly	KWL_SP_2486	KWL_NODE_3086	KWL_NODE_3069	200	69	1.50	$543	$37,676
Kelly	KWL_SP_2487	KWL_NODE_3106	KWL_NODE_3086	200	125	1.51	$543	$68,069
Kelly	KWL_SP_2488	KWL_NODE_3095	KWL_NODE_3091	200	41	1.42	$543	$22,011
Kelly	KWL_SP_2489	KWL_NODE_3084	KWL_NODE_3078	200	39	1.77	$543	$21,199
Kelly	KWL_SP_2490	KWL_NODE_3091	KWL_NODE_3084	200	52	1.79	$543	$28,404
Kelly	KWL_SP_2491	KWL_NODE_3115	KWL_NODE_3091	200	54	1.63	$543	$29,559
Kelly	KWL_SP_2492	KWL_NODE_3045	KWL_NODE_3060	200	56	3.82	$1,210	$67,475
Kelly	KWL_SP_2493	KWL_NODE_3043	KWL_NODE_3027	200	60	2.06	$653	$38,946
Kelly	KWL_SP_2494	KWL_NODE_3034	KWL_NODE_3029	200	32	1.49	$543	$17,322
Kelly	KWL_SP_2495	KWL_NODE_3078	KWL_NODE_3034	200	92	1.63	$543	$50,158
Kelly	KWL_SP_2496	KWL_NODE_3075	KWL_NODE_3062	200	43	1.93	$543	$23,400
Kelly	KWL_SP_2497	KWL_NODE_3060	KWL_NODE_3056	300	46	4.29	$1,781	$81,174
Kelly	KWL_SP_2498	KWL_NODE_3062	KWL_NODE_3060	300	61	1.90	$660	$40,226
Kelly	KWL_SP_2499	KWL_NODE_3092	KWL_NODE_3062	300	92	1.78	$660	$60,809
Kelly	KWL_SP_2500	KWL_NODE_3096	KWL_NODE_3092	300	28	1.73	$660	$18,657
Kelly	KWL_SP_2501	KWL_NODE_3120	KWL_NODE_3096	200	61	1.66	$543	$33,091

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Kelly	KWL_SP_2502	KWL_NODE_3129	KWL_NODE_3120	200	61	1.54	$543	$33,252
Kelly	KWL_SP_2503	KWL_NODE_3116	KWL_NODE_3141	200	113	2.52	$875	$99,061
Kelly	KWL_SP_2504	KWL_NODE_3155	KWL_NODE_3116	200	88	1.65	$543	$47,949
Kelly	KWL_SP_2505	KWL_NODE_3050	KWL_NODE_3023	200	121	1.86	$543	$65,481
Kelly	KWL_SP_2506	KWL_NODE_3141	KWL_NODE_3071	200	87	2.34	$653	$56,863
Kelly	KWL_SP_2507	KWL_NODE_3134	KWL_NODE_3141	200	112	2.61	$875	$98,311
Kelly	KWL_SP_2508	KWL_NODE_3162	KWL_NODE_3134	200	181	2.28	$653	$118,065
Kelly	KWL_SP_2509	KWL_NODE_3160	KWL_NODE_3162	200	52	1.53	$543	$28,216
Kelly	KWL_SP_2510	KWL_NODE_3161	KWL_NODE_3146	200	55	1.35	$543	$29,611
Kelly	KWL_SP_2511	KWL_NODE_3146	KWL_NODE_3133	200	32	1.83	$543	$17,598
Kelly	KWL_SP_2512	KWL_NODE_3133	KWL_NODE_3102	200	95	2.75	$875	$83,280
Kelly	KWL_SP_2513	KWL_NODE_3102	KWL_NODE_3117	200	72	2.82	$875	$62,868
Kelly	KWL_SP_2514	KWL_NODE_3117	KWL_NODE_3036	200	84	2.56	$875	$73,561
Kelly	KWL_SP_2515	KWL_NODE_3036	KWL_NODE_554	200	68	1.74	$543	$36,920
Kelly	KWL_SP_2516	KWL_NODE_3174	KWL_NODE_184	200	190	3.22	$1,210	$229,979
Kelly	KWL_SP_2517	KWL_NODE_3192	KWL_NODE_3174	200	125	2.08	$653	$81,663
Kelly	KWL_SP_2518	KWL_NODE_3203	KWL_NODE_3159	200	227	1.46	$543	$122,921
Kelly	KWL_SP_2519	KWL_NODE_3080	KWL_NODE_3097	200	35	1.71	$543	$18,870
Kelly	KWL_SP_2521	KWL_NODE_3099	KWL_NODE_563	200	27	3.43	$1,676	$45,233
Kelly	KWL_SP_2523	KWL_NODE_3109	KWL_NODE_3118	200	33	1.59	$543	$17,719
Kelly	KWL_SP_2524	KWL_NODE_3118	KWL_NODE_3087	200	154	2.91	$875	$134,964
Kelly	KWL_SP_2525	KWL_NODE_3122	KWL_NODE_3109	200	31	1.46	$543	$16,876
Kelly	KWL_SP_2526	KWL_NODE_3087	KWL_NODE_3099	200	52	3.10	$1,210	$62,550
Kelly	KWL_SP_2527	KWL_NODE_3097	KWL_NODE_3118	200	85	2.68	$875	$74,229
Kelly	KWL_SP_2528	KWL_NODE_3073	KWL_NODE_3080	200	39	1.11	$543	$21,242
Kelly	KWL_SP_2607	KWL_NODE_3037	KWL_NODE_3032	200	6	2.97	$875	$5,350
Kelly	KWL_SP_4001	KWL_NODE_3072	LANGFORD_TRUNK	200	11	0.58	$543	$5,777
Kelly	KWL_SP_FUTURE2	KWL_NODE_3047	FUTURE2WW	200	6	0.60	$543	$3,270
Kelly	KWL_SP_FUTURE3	KWL_NODE_3042	FUTURE3WW	200	6	1.27	$543	$3,255
Lagoon / Dunsmuir	KWL_SP_2046	KWL_NODE_3387	KWL_NODE_3315	200	119	3.24	$1,210	$143,788
Lagoon / Dunsmuir	KWL_SP_2055	KWL_NODE_3432	KWL_NODE_3422	200	23	1.95	$543	$12,326
Lagoon / Dunsmuir	KWL_SP_2086	KWL_NODE_3016	KWL_NODE_466	200	117	2.19	$653	$76,320
Lagoon / Dunsmuir	KWL_SP_2087	KWL_NODE_3018	KWL_NODE_3017	200	52	2.60	$875	$45,390
Lagoon / Dunsmuir	KWL_SP_2116	KWL_NODE_3329	KWL_NODE_644	200	28	2.36	$897	$25,056
Lagoon / Dunsmuir	KWL_SP_2117	KWL_NODE_3308	KWL_NODE_3335	200	182	2.07	$897	$163,154
Lagoon / Dunsmuir	KWL_SP_2118	KWL_NODE_3241	KWL_NODE_3238	200	11	1.43	$543	$6,095
Lagoon / Dunsmuir	KWL_SP_2119	KWL_NODE_3268	KWL_NODE_3241	200	100	2.06	$653	$65,508
Lagoon / Dunsmuir	KWL_SP_2121	KWL_NODE_3311	KWL_NODE_3293	200	81	1.43	$543	$43,695
Lagoon / Dunsmuir	KWL_SP_2122	KWL_NODE_3293	KWL_NODE_3335	200	83	2.09	$653	$54,296
Lagoon / Dunsmuir	KWL_SP_2124	KWL_NODE_3321	KWL_NODE_3241	200	94	2.95	$875	$82,484
Lagoon / Dunsmuir	KWL_SP_2126	KWL_NODE_3247	KWL_NODE_3321	200	49	2.09	$653	$32,111
Lagoon / Dunsmuir	KWL_SP_2127	KWL_NODE_3304	KWL_NODE_3241	200	54	1.58	$543	$29,417
Lagoon / Dunsmuir	KWL_SP_2128	KWL_NODE_3335	KWL_NODE_3329	200	44	2.76	$1,215	$53,467
Lagoon / Dunsmuir	KWL_SP_2320	KWL_NODE_3653	KWL_NODE_3014	200	20	1.66	$543	$11,052
Lagoon / Dunsmuir	KWL_SP_2321	KWL_NODE_3654	KWL_NODE_3014	200	12	1.98	$543	$6,251
Lagoon / Dunsmuir	KWL_SP_2322	KWL_NODE_3014	KWL_NODE_592	200	43	1.76	$543	$23,606
Lagoon / Dunsmuir	KWL_SP_2529	KWL_NODE_3316	KWL_NODE_3262	200	119	1.96	$748	$89,192
Lagoon / Dunsmuir	KWL_SP_2530	KWL_NODE_3307	KWL_NODE_3317	200	92	1.89	$543	$49,762
Lagoon / Dunsmuir	KWL_SP_2531	KWL_NODE_3282	KWL_NODE_3290	200	91	2.69	$875	$79,950
Lagoon / Dunsmuir	KWL_SP_2532	KWL_NODE_3264	KWL_NODE_3255	200	52	1.24	$543	$28,093
Lagoon / Dunsmuir	KWL_SP_2533	KWL_NODE_3296	KWL_NODE_3266	200	90	3.52	$1,210	$108,645
Lagoon / Dunsmuir	KWL_SP_2534	KWL_NODE_3317	KWL_NODE_3296	200	27	3.73	$1,210	$32,867
Lagoon / Dunsmuir	KWL_SP_2535	KWL_NODE_3290	KWL_NODE_3317	200	87	3.41	$1,210	$104,657
Lagoon / Dunsmuir	KWL_SP_2536	KWL_NODE_3255	KWL_NODE_3290	200	87	2.09	$653	$56,533
Lagoon / Dunsmuir	KWL_SP_2537	KWL_NODE_3327	KWL_NODE_3255	200	91	1.21	$543	$49,437
Lagoon / Dunsmuir	KWL_SP_2538	KWL_NODE_3292	KWL_NODE_323	200	192	4.02	$1,649	$316,064
Lagoon / Dunsmuir	KWL_SP_2539	KWL_NODE_3266	KWL_NODE_3292	200	101	3.94	$1,210	$121,936
Lagoon / Dunsmuir	KWL_SP_2540	KWL_NODE_3262	KWL_NODE_3266	200	24	2.65	$1,215	$28,754
Lagoon / Dunsmuir	KWL_SP_2541	KWL_NODE_3256	KWL_NODE_3262	200	111	1.78	$543	$60,226
Lagoon / Dunsmuir	KWL_SP_2542	KWL_NODE_3288	KWL_NODE_3387	200	72	2.65	$875	$63,029
Lagoon / Dunsmuir	KWL_SP_2543	KWL_NODE_3344	KWL_NODE_3288	200	36	1.34	$543	$19,713
Lagoon / Dunsmuir	KWL_SP_2544	KWL_NODE_3379	KWL_NODE_3331	200	158	1.80	$543	$85,898
Lagoon / Dunsmuir	KWL_SP_2545	KWL_NODE_3331	KWL_NODE_3315	200	54	3.86	$1,210	$65,402
Lagoon / Dunsmuir	KWL_SP_2546	KWL_NODE_3313	KWL_NODE_3258	200	257	1.34	$543	$139,465
Lagoon / Dunsmuir	KWL_SP_2547	KWL_NODE_3395	KWL_NODE_3313	200	113	1.27	$543	$61,212
Lagoon / Dunsmuir	KWL_SP_2548	KWL_NODE_3418	KWL_NODE_3390	200	96	1.93	$543	$51,836
Lagoon / Dunsmuir	KWL_SP_2549	KWL_NODE_3348	KWL_NODE_3291	200	57	1.74	$543	$30,749
Lagoon / Dunsmuir	KWL_SP_2550	KWL_NODE_3291	KWL_NODE_3331	200	85	3.39	$1,210	$103,211
Lagoon / Dunsmuir	KWL_SP_2551	KWL_NODE_3390	KWL_NODE_3348	200	52	1.76	$543	$28,326
Lagoon / Dunsmuir	KWL_SP_2552	KWL_NODE_3448	KWL_NODE_3418	200	138	1.68	$543	$74,955
Lagoon / Dunsmuir	KWL_SP_2553	KWL_NODE_3271	KWL_NODE_3281	200	90	1.89	$543	$49,104

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Gravity Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Lagoon / Dunsmuir	KWL_SP_2554	KWL_NODE_3286	KWL_NODE_3271	200	91	1.46	$543	$49,367
Lagoon / Dunsmuir	KWL_SP_2555	KWL_NODE_3405	KWL_NODE_3360	200	190	1.97	$543	$102,874
Lagoon / Dunsmuir	KWL_SP_2556	KWL_NODE_3406	KWL_NODE_3322	200	203	2.73	$875	$177,592
Lagoon / Dunsmuir	KWL_SP_2557	KWL_NODE_3322	KWL_NODE_3351	200	112	2.33	$653	$72,755
Lagoon / Dunsmuir	KWL_SP_2558	KWL_NODE_3356	KWL_NODE_3351	200	179	2.75	$875	$156,474
Lagoon / Dunsmuir	KWL_SP_2559	KWL_NODE_3351	KWL_NODE_3276	200	111	2.42	$653	$72,455
Lagoon / Dunsmuir	KWL_SP_2560	KWL_NODE_3425	KWL_NODE_3322	200	136	1.39	$543	$73,899
Lagoon / Dunsmuir	KWL_SP_2561	KWL_NODE_3414	KWL_NODE_3399	200	169	3.16	$1,210	$204,375
Lagoon / Dunsmuir	KWL_SP_2565	KWL_NODE_3258	KWL_NODE_3239	200	40	2.06	$653	$26,234
Lagoon / Dunsmuir	KWL_SP_2566	KWL_NODE_3315	KWL_NODE_3258	200	41	3.09	$1,210	$49,198
Lagoon / Dunsmuir	KWL_SP_2567	KWL_NODE_3281	KWL_NODE_3291	200	89	2.49	$653	$57,940
Lagoon / Dunsmuir	KWL_SP_2568	KWL_NODE_3276	KWL_NODE_3281	200	27	2.06	$653	$17,582
Lagoon / Dunsmuir	KWL_SP_2569	KWL_NODE_3340	KWL_NODE_3276	200	157	1.64	$543	$85,259
Lagoon / Dunsmuir	KWL_SP_2570	KWL_NODE_3360	KWL_NODE_3340	200	46	1.65	$543	$24,851
Lagoon / Dunsmuir	KWL_SP_2571	KWL_NODE_3399	KWL_NODE_3406	200	111	3.29	$1,210	$134,866
Lagoon / Dunsmuir	KWL_SP_2572	KWL_NODE_3404	KWL_NODE_3399	200	47	2.18	$653	$30,858
Lagoon / Dunsmuir	KWL_SP_2573	KWL_NODE_3334	KWL_NODE_514	200	39	2.18	$897	$35,402
Lagoon / Dunsmuir	KWL_SP_2574	KWL_NODE_3346	KWL_NODE_3334	200	105	1.47	$543	$56,980
Lagoon / Dunsmuir	KWL_SP_2575	KWL_NODE_3270	KWL_NODE_3319	200	68	2.28	$653	$44,123
Lagoon / Dunsmuir	KWL_SP_2576	KWL_NODE_3269	KWL_NODE_3236	200	43	1.75	$543	$23,353
Lagoon / Dunsmuir	KWL_SP_2577	KWL_NODE_3236	KWL_NODE_3149	200	52	1.62	$543	$28,408
Lagoon / Dunsmuir	KWL_SP_2578	KWL_NODE_3300	KWL_NODE_3269	200	56	1.68	$543	$30,180
Lagoon / Dunsmuir	KWL_SP_2579	KWL_NODE_3285	KWL_NODE_3254	200	45	1.56	$543	$24,556
Lagoon / Dunsmuir	KWL_SP_2580	KWL_NODE_3017	KWL_NODE_3016	200	99	2.24	$653	$64,797
Lagoon / Dunsmuir	KWL_SP_2581	KWL_NODE_3149	KWL_NODE_3018	200	63	1.85	$543	$34,012
Lagoon / Dunsmuir	KWL_SP_2582	KWL_NODE_3254	KWL_NODE_3236	200	41	2.30	$653	$26,866
Lagoon / Dunsmuir	KWL_SP_2583	KWL_NODE_3263	KWL_NODE_3254	200	12	3.25	$1,210	$14,789
Lagoon / Dunsmuir	KWL_SP_2584	KWL_NODE_3319	KWL_NODE_3263	200	94	3.97	$1,210	$114,218
Lagoon / Dunsmuir	KWL_SP_2585	KWL_NODE_3252	KWL_NODE_3319	200	130	2.86	$875	$113,694
Lagoon / Dunsmuir	KWL_SP_2586	KWL_NODE_3323	KWL_NODE_514	200	105	1.99	$543	$57,097
Lagoon / Dunsmuir	KWL_SP_2587	KWL_NODE_3378	KWL_NODE_3664	200	119	1.79	$543	$64,602
Lagoon / Dunsmuir	KWL_SP_2590	KWL_NODE_3400	KWL_NODE_3378	200	191	1.35	$543	$103,548
Lagoon / Dunsmuir	KWL_SP_2593	KWL_NODE_3393	KWL_NODE_3650	200	192	3.27	$1,210	$231,989
Lagoon / Dunsmuir	KWL_SP_2604	KWL_NODE_3373	KWL_NODE_516	200	65	3.43	$1,210	$78,452
Lagoon / Dunsmuir	KWL_SP_2605	KWL_NODE_3383	KWL_NODE_3373	200	56	2.83	$875	$48,630
Lagoon / Dunsmuir	KWL_SP_FUTURE4	KWL_NODE_3239	FUTURE4WW	200	3	0.90	$543	$1,854
Metchosin / Latoria	KWL_SP_2023	KWL_NODE_3455	KWL_NODE_3447	200	59	1.96	$543	$31,784
Metchosin / Latoria	KWL_SP_2024	KWL_NODE_3452	KWL_NODE_3451	200	54	1.41	$543	$29,496
Metchosin / Latoria	KWL_SP_2025	KWL_NODE_3451	KWL_NODE_3455	200	80	2.26	$653	$52,012
Metchosin / Latoria	KWL_SP_2097	KWL_NODE_3257	KWL_NODE_3058	200	100	1.63	$543	$54,366
Metchosin / Latoria	KWL_SP_2098	KWL_NODE_3058	KWL_NODE_3662	200	36	1.60	$543	$19,512
Metchosin / Latoria	KWL_SP_2102	KWL_NODE_3437	KWL_NODE_3430	200	123	1.80	$543	$66,727
Metchosin / Latoria	KWL_SP_2105	KWL_NODE_3450	KWL_NODE_3444	200	84	1.82	$543	$45,579
Metchosin / Latoria	KWL_SP_2107	KWL_NODE_3453	KWL_NODE_3440	200	63	2.00	$543	$34,087
Metchosin / Latoria	KWL_SP_2108	KWL_NODE_3461	KWL_NODE_3453	200	52	3.86	$1,210	$63,276
Metchosin / Latoria	KWL_SP_2109	KWL_NODE_3489	KWL_NODE_3461	200	153	5.00	$1,649	$252,311
Metchosin / Latoria	KWL_SP_2110	KWL_NODE_3523	KWL_NODE_3489	200	122	1.41	$543	$66,277
Metchosin / Latoria	KWL_SP_2112	KWL_NODE_3407	KWL_NODE_3257	200	63	1.87	$543	$33,927
Metchosin / Latoria	KWL_SP_2113	KWL_NODE_3440	KWL_NODE_3407	200	93	2.53	$875	$81,049
Metchosin / Latoria	KWL_SP_2114	KWL_NODE_3438	KWL_NODE_3440	200	51	2.19	$653	$33,198
Metchosin / Latoria	KWL_SP_2115	KWL_NODE_3447	KWL_NODE_3438	200	79	1.22	$543	$42,951
Triangle Mountain	KWL_SP_1078	KWL_NODE_785	KWL_NODE_787	200	38	2.23	$891	$33,720
Triangle Mountain	KWL_SP_1079	KWL_NODE_786	KWL_NODE_785	200	35	1.85	$736	$25,403
Triangle Mountain	KWL_SP_1080	KWL_NODE_788	KWL_NODE_787	200	32	1.69	$736	$23,256
Triangle Mountain	KWL_SP_2001	KWL_NODE_3420	KWL_NODE_796	200	16	1.87	$748	$11,678
Triangle Mountain	KWL_SP_2002	KWL_NODE_3463	KWL_NODE_3420	200	72	2.95	$1,186	$85,646
Triangle Mountain	KWL_SP_2003	KWL_NODE_3468	KWL_NODE_3463	200	43	1.55	$736	$31,284
Triangle Mountain	KWL_SP_2004	KWL_NODE_787	KWL_NODE_3468	200	38	1.12	$736	$28,097
Triangle Mountain	KWL_SP_2009	KWL_NODE_3593	KWL_NODE_484	200	65	4.59	$2,204	$143,287
Triangle Mountain	KWL_SP_2010	KWL_NODE_3589	KWL_NODE_3593	200	15	4.11	$2,204	$33,365
Triangle Mountain	KWL_SP_2011	KWL_NODE_3598	KWL_NODE_3589	200	84	4.20	$2,204	$185,132
Triangle Mountain	KWL_SP_2056	KWL_NODE_3462	KWL_NODE_3432	200	49	1.66	$736	$35,714
Triangle Mountain	KWL_SP_2059	KWL_NODE_3479	KWL_NODE_3462	200	28	1.66	$736	$20,937
Triangle Mountain	KWL_SP_2060	KWL_NODE_3487	KWL_NODE_3479	200	46	2.14	$891	$40,956
Triangle Mountain	KWL_SP_2061	KWL_NODE_3499	KWL_NODE_3487	200	106	2.79	$1,186	$126,144
Triangle Mountain	KWL_SP_2062	KWL_NODE_3516	KWL_NODE_3499	200	77	1.77	$736	$56,907
Triangle Mountain	KWL_SP_2063	KWL_NODE_3530	KWL_NODE_3516	200	91	2.20	$891	$80,926
Triangle Mountain	KWL_SP_2088	KWL_NODE_3603	KWL_NODE_3587	200	63	1.69	$736	$46,631
Triangle Mountain	KWL_SP_2323	KWL_NODE_3646	KWL_NODE_3474	200	11	2.76	$1,186	$12,623
Triangle Mountain	KWL_SP_2324	KWL_NODE_3645	KWL_NODE_3612	200	8	2.74	$1,186	$9,815
Triangle Mountain	KWL_SP_2325	KWL_NODE_3612	KWL_NODE_3611	200	46	2.60	$1,186	$54,103

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Gravity Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Triangle Mountain	KWL_SP_2330	KWL_NODE_3548	KWL_NODE_3547	200	33	1.89	$736	$24,184
Triangle Mountain	KWL_SP_2331	KWL_NODE_3549	KWL_NODE_3548	200	53	2.14	$891	$47,097
Triangle Mountain	KWL_SP_2332	KWL_NODE_3552	KWL_NODE_3549	200	52	1.55	$736	$37,986
Triangle Mountain	KWL_SP_2333	KWL_NODE_3553	KWL_NODE_3552	200	84	1.41	$736	$61,522
Triangle Mountain	KWL_SP_2339	KWL_NODE_3640	KWL_NODE_3608	200	10	2.18	$891	$8,902
Triangle Mountain	KWL_SP_2340	KWL_NODE_3608	KWL_NODE_3601	200	41	2.29	$891	$36,284
Triangle Mountain	KWL_SP_2343	KWL_NODE_3601	KWL_NODE_483	200	34	1.18	$736	$25,175
Triangle Mountain	KWL_SP_2344	KWL_NODE_3613	KWL_NODE_3608	200	75	2.28	$891	$67,225
Triangle Mountain	KWL_SP_2352	KWL_NODE_3597	KWL_NODE_481	200	47	2.02	$891	$41,709
Triangle Mountain	KWL_SP_2353	KWL_NODE_3610	KWL_NODE_3597	200	53	1.95	$736	$38,648
Triangle Mountain	KWL_SP_2354	KWL_NODE_3615	KWL_NODE_3610	200	81	1.96	$736	$59,504
Triangle Mountain	KWL_SP_2355	KWL_NODE_3621	KWL_NODE_3615	200	38	1.59	$736	$27,774
Triangle Mountain	KWL_SP_2356	KWL_NODE_3624	KWL_NODE_3621	200	33	1.01	$736	$24,600
Triangle Mountain	KWL_SP_2357	KWL_NODE_3625	KWL_NODE_3624	200	41	0.96	$736	$30,005
Triangle Mountain	KWL_SP_2358	KWL_NODE_3609	KWL_NODE_3599	200	56	1.68	$736	$41,461
Triangle Mountain	KWL_SP_2359	KWL_NODE_3619	KWL_NODE_3609	200	102	2.94	$1,186	$120,880
Triangle Mountain	KWL_SP_2360	KWL_NODE_3567	KWL_NODE_3560	200	46	1.28	$736	$34,013
Triangle Mountain	KWL_SP_2361	KWL_NODE_3583	KWL_NODE_3567	200	68	2.02	$891	$60,828
Triangle Mountain	KWL_SP_2362	KWL_NODE_3599	KWL_NODE_3583	200	71	1.48	$736	$52,492
Triangle Mountain	KWL_SP_2363	KWL_NODE_3604	KWL_NODE_3599	200	36	1.49	$736	$26,532
Triangle Mountain	KWL_SP_2364	KWL_NODE_3605	KWL_NODE_3604	200	32	1.45	$736	$23,655
Triangle Mountain	KWL_SP_2370	KWL_NODE_3587	KWL_NODE_485	200	27	1.69	$736	$20,030
Triangle Mountain	KWL_SP_2371	KWL_NODE_3538	KWL_NODE_3528	200	50	2.45	$891	$44,795
Triangle Mountain	KWL_SP_2372	KWL_NODE_3546	KWL_NODE_3538	200	50	2.49	$891	$44,951
Triangle Mountain	KWL_SP_2373	KWL_NODE_3551	KWL_NODE_3546	200	158	1.41	$736	$116,620
Triangle Mountain	KWL_SP_2374	KWL_NODE_3539	KWL_NODE_3528	200	62	2.37	$891	$54,906
Triangle Mountain	KWL_SP_2375	KWL_NODE_3606	KWL_NODE_3584	200	96	2.82	$1,186	$113,622
Triangle Mountain	KWL_SP_2376	KWL_NODE_3528	KWL_NODE_3485	200	99	2.35	$891	$88,414
Triangle Mountain	KWL_SP_2377	KWL_NODE_3547	KWL_NODE_3539	200	60	2.80	$1,186	$71,488
Triangle Mountain	KWL_SP_2378	KWL_NODE_3550	KWL_NODE_3547	200	39	3.18	$1,630	$63,547
Triangle Mountain	KWL_SP_2379	KWL_NODE_3559	KWL_NODE_3550	200	161	1.90	$736	$118,322
Triangle Mountain	KWL_SP_2380	KWL_NODE_3562	KWL_NODE_3559	200	47	2.35	$891	$41,669
Triangle Mountain	KWL_SP_2381	KWL_NODE_3578	KWL_NODE_3562	200	88	2.58	$1,186	$104,647
Triangle Mountain	KWL_SP_2382	KWL_NODE_3584	KWL_NODE_3578	200	33	2.58	$1,186	$38,687
Triangle Mountain	KWL_SP_2383	KWL_NODE_3611	KWL_NODE_3606	200	60	2.09	$891	$53,647
Triangle Mountain	KWL_SP_2384	KWL_NODE_3614	KWL_NODE_3612	200	39	1.69	$736	$28,497
Triangle Mountain	KWL_SP_2385	KWL_NODE_3616	KWL_NODE_3614	200	52	1.76	$736	$38,363
Triangle Mountain	KWL_SP_2386	KWL_NODE_3622	KWL_NODE_3616	200	51	1.71	$736	$37,377
Triangle Mountain	KWL_SP_2387	KWL_NODE_3580	KWL_NODE_93	200	52	1.86	$736	$38,081
Triangle Mountain	KWL_SP_2388	KWL_NODE_3590	KWL_NODE_3580	200	114	2.15	$891	$101,212
Triangle Mountain	KWL_SP_2389	KWL_NODE_3595	KWL_NODE_3590	200	51	2.31	$891	$45,096
Triangle Mountain	KWL_SP_2390	KWL_NODE_3602	KWL_NODE_3595	200	35	2.25	$891	$30,894
Triangle Mountain	KWL_SP_2391	KWL_NODE_3617	KWL_NODE_3602	200	99	1.71	$736	$72,493
Triangle Mountain	KWL_SP_2392	KWL_NODE_3618	KWL_NODE_3617	200	59	1.61	$736	$43,545
Triangle Mountain	KWL_SP_2393	KWL_NODE_3620	KWL_NODE_3618	200	45	1.64	$736	$33,257
Triangle Mountain	KWL_SP_2394	KWL_NODE_3623	KWL_NODE_3620	200	99	1.52	$736	$72,597
Triangle Mountain	KWL_SP_2402	KWL_NODE_3289	KWL_NODE_3253	200	46	2.12	$891	$40,908
Triangle Mountain	KWL_SP_2403	KWL_NODE_3439	KWL_NODE_3419	200	71	1.48	$736	$52,475
Triangle Mountain	KWL_SP_2404	KWL_NODE_3443	KWL_NODE_3439	200	95	1.55	$736	$69,861
Triangle Mountain	KWL_SP_2405	KWL_NODE_3494	KWL_NODE_3460	200	56	1.73	$736	$41,329
Triangle Mountain	KWL_SP_2427	KWL_NODE_3364	KWL_NODE_3253	200	86	2.47	$897	$77,546
Triangle Mountain	KWL_SP_2436	KWL_NODE_3457	KWL_NODE_3456	200	43	1.76	$736	$31,575
Triangle Mountain	KWL_SP_2437	KWL_NODE_3517	KWL_NODE_3506	200	88	2.15	$891	$78,238
Triangle Mountain	KWL_SP_2438	KWL_NODE_3506	KWL_NODE_3494	200	59	2.44	$891	$52,186
Triangle Mountain	KWL_SP_2439	KWL_NODE_3518	KWL_NODE_3491	200	94	2.50	$1,186	$111,230
Triangle Mountain	KWL_SP_2440	KWL_NODE_3460	KWL_NODE_3457	200	11	1.92	$736	$7,813
Triangle Mountain	KWL_SP_2441	KWL_NODE_3522	KWL_NODE_3518	200	46	2.01	$891	$40,954
Triangle Mountain	KWL_SP_2442	KWL_NODE_3524	KWL_NODE_3522	200	70	1.79	$736	$51,342
Triangle Mountain	KWL_SP_2443	KWL_NODE_3441	KWL_NODE_3419	200	59	1.77	$736	$43,725
Triangle Mountain	KWL_SP_2444	KWL_NODE_3419	KWL_NODE_3289	200	36	1.63	$736	$26,664
Triangle Mountain	KWL_SP_2445	KWL_NODE_3449	KWL_NODE_3441	200	39	1.99	$736	$28,767
Triangle Mountain	KWL_SP_2446	KWL_NODE_3481	KWL_NODE_3449	200	127	1.90	$736	$93,747
Triangle Mountain	KWL_SP_2447	KWL_NODE_3490	KWL_NODE_788	200	72	1.59	$736	$52,686
Triangle Mountain	KWL_SP_2449	KWL_NODE_3504	KWL_NODE_3490	200	29	1.73	$736	$21,182
Triangle Mountain	KWL_SP_2452	KWL_NODE_3510	KWL_NODE_3495	200	58	4.48	$2,204	$127,627
Triangle Mountain	KWL_SP_2453	KWL_NODE_3495	KWL_NODE_3477	200	39	2.01	$891	$34,429
Triangle Mountain	KWL_SP_2454	KWL_NODE_3477	KWL_NODE_3459	200	55	2.48	$891	$48,576
Triangle Mountain	KWL_SP_2455	KWL_NODE_3502	KWL_NODE_3477	200	66	1.76	$736	$48,885
Triangle Mountain	KWL_SP_2456	KWL_NODE_3433	KWL_NODE_3411	200	58	2.56	$1,215	$70,254
Triangle Mountain	KWL_SP_2457	KWL_NODE_3459	KWL_NODE_3433	200	182	1.98	$736	$134,154
Triangle Mountain	KWL_SP_2458	KWL_NODE_3466	KWL_NODE_3459	200	54	2.17	$891	$48,488

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Gravity Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Triangle Mountain	KWL_SP_2459	KWL_NODE_3491	KWL_NODE_3466	200	152	2.56	$1,186	$180,254
Triangle Mountain	KWL_SP_2460	KWL_NODE_3456	KWL_NODE_3443	200	119	1.68	$736	$87,881
Triangle Mountain	KWL_SP_2461	KWL_NODE_3458	KWL_NODE_3456	200	19	1.93	$736	$14,089
Triangle Mountain	KWL_SP_2462	KWL_NODE_3469	KWL_NODE_3458	200	46	2.12	$891	$40,621
Triangle Mountain	KWL_SP_2463	KWL_NODE_3488	KWL_NODE_3469	200	77	1.71	$736	$56,867
Triangle Mountain	KWL_SP_2611	KWL_NODE_3485	KWL_NODE_3474	200	17	0.07	$736	$12,493
Triangle Mountain	KWL_SP_4000	KWL_NODE_3474	KWL_NODE_687	200	129	1.79	$736	$94,891
Triangle Mountain	KWL_SP_2611B	KWL_NODE_3474	KWL_NODE_687	200	129	0.50	$736	$94,891

Sum		$30,018,000
Engineering	15%	$4,503,000
Contingency	25%	$7,504,500
Total		**$42,025,500**

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Pump Station Projects - Page 1 of 1

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	Horsepower	Unit Cost / Hp	Cost	Engineering (25%)	Contingency (25%)	Total Cost
Central	Future 1	5	$40,000	$200,000	$50,000	$50,000	$300,000
Kelly	Future 2	5	$40,000	$200,000	$50,000	$50,000	$300,000
Kelly	Future 3	10	$23,100	$231,000	$57,750	$57,750	$346,500
Lagoon / Dunsmuir	Future 4	3	$66,667	$200,000	$50,000	$50,000	$300,000
Lagoon / Dunsmuir	Future 5	3	$66,667	$200,000	$50,000	$50,000	$300,000
			Sum	$1,031,000	$257,750	$257,750	**$1,546,500**

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COLWOOD SMP - APPENDIX F
Sewer Infrastructure Cost Estimating
New Force Main Projects

June 12, 2012
Our File: 2417-003

Neighbourhood	ID	FROM	TO	Diameter (mm)	Length (m)	Average Depth (m)	Unit Cost	Cost
Central	KWL_SP_2007	KWL_NODE_3472	KWL_NODE_3520	50	171	0.25	$273	$46,675
Central	KWL_SP_2008	KWL_NODE_3635	KWL_NODE_3472	50	191	0.82	$273	$52,233
Central	KWL_SP_2018	KWL_NODE_3649	KWL_NODE_3223	50	85	0.80	$273	$23,114
Central	KWL_SP_2019	KWL_NODE_3223	KWL_NODE_3229	50	20	0.22	$273	$5,423
Central	KWL_SP_2123	KWL_NODE_3651	KWL_NODE_504	50	66	1.51	$273	$18,073
Central	KWL_SP_2143	KWL_NODE_3641	KWL_NODE_3543	50	131	1.52	$273	$35,799
Central	KWL_SP_2177	KWL_NODE_3229	KWL_NODE_3235	50	88	0.22	$273	$24,195
Central	KWL_SP_2178	KWL_NODE_3235	KWL_NODE_3385	50	94	0.73	$273	$25,732
Central	KWL_SP_2179	KWL_NODE_3648	KWL_NODE_3223	50	36	1.00	$273	$9,823
Central	KWL_SP_2183	KWL_NODE_3126	KWL_NODE_3	50	18	0.92	$422	$7,500
Central	KWL_SP_2184	KWL_NODE_3628	KWL_NODE_3126	50	218	0.85	$273	$59,627
Central	KWL_SP_2198	KWL_NODE_3655	KWL_NODE_3274	50	44	1.70	$273	$12,149
Kelly	KWL_SP_2040	KWL_NODE_3012	KWL_NODE_3185	150	11	1.41	$302	$3,376
Kelly	KWL_SP_2074	KWL_NODE_3110	KWL_NODE_3411	50	53	1.60	$422	$22,487
Kelly	KWL_SP_2075	KWL_NODE_3125	KWL_NODE_3110	50	81	0.16	$273	$22,114
Kelly	KWL_SP_2076	KWL_NODE_3230	KWL_NODE_696	100	79	4.42	$422	$33,308
Kelly	KWL_SP_2077	KWL_NODE_3216	KWL_NODE_3230	100	45	6.89	$273	$12,175
Kelly	KWL_SP_2078	KWL_NODE_3055	KWL_NODE_3216	100	66	4.25	$273	$18,044
Kelly	KWL_SP_2221	KWL_NODE_3212	KWL_NODE_3221	50	46	1.42	$273	$12,631
Kelly	KWL_SP_2223	KWL_NODE_3206	KWL_NODE_3218	50	76	1.54	$273	$20,690
Kelly	KWL_SP_2284	KWL_NODE_3659	KWL_NODE_3195	50	45	1.89	$273	$12,332
Kelly	KWL_SP_2285	KWL_NODE_3630	KWL_NODE_3659	50	68	2.18	$273	$18,614
Kelly	KWL_SP_2286	KWL_NODE_3629	KWL_NODE_3168	50	197	1.45	$273	$53,794
Kelly	KWL_SP_2316	KWL_NODE_3061	KWL_NODE_3046	50	64	1.00	$273	$17,408
Kelly	KWL_SP_2317	KWL_NODE_3040	KWL_NODE_3100	50	46	1.08	$273	$12,633
Kelly	KWL_SP_2318	KWL_NODE_3026	KWL_NODE_3040	50	82	0.16	$273	$22,533
Kelly	KWL_SP_2319	KWL_NODE_3048	KWL_NODE_3026	50	45	0.76	$273	$12,234
Kelly	KWL_SP_2410	KWL_NODE_3066	KWL_NODE_3061	50	48	1.00	$273	$13,177
Kelly	KWL_SP_2411	KWL_NODE_3046	KWL_NODE_3082	50	28	0.78	$273	$7,567
Kelly	KWL_SP_2477	KWL_NODE_3068	KWL_NODE_3078	50	42	1.65	$273	$11,497
Kelly	KWL_SP_2478	KWL_NODE_3626	KWL_NODE_3068	50	42	1.53	$273	$11,468
Kelly	KWL_SP_2610	KWL_NODE_3661	KWL_NODE_3055	100	15	2.17	$273	$4,000
Kelly	KWL_SP_FUTURE2SPB	KWL_NODE_3647	KWL_NODE_3042	150	600	1.70	$302	$181,109
Kelly	KWL_SP_FUTURE3B	KWL_NODE_3627	KWL_NODE_3173	150	421	1.05	$302	$127,110
Lagoon / Dunsmuir	KWL_SP_2045	KWL_NODE_3242	KWL_NODE_3387	50	34	2.07	$273	$9,263
Lagoon / Dunsmuir	KWL_SP_2047	KWL_NODE_3243	KWL_NODE_3242	50	29	0.16	$273	$7,926
Lagoon / Dunsmuir	KWL_SP_2069	KWL_NODE_3000	KWL_NODE_3435	150	386	4.42	$302	$116,361
Lagoon / Dunsmuir	KWL_SP_2070	KWL_NODE_3240	KWL_NODE_3000	150	30	1.36	$302	$9,102
Lagoon / Dunsmuir	KWL_SP_2125	KWL_NODE_3238	KWL_NODE_3288	150	112	1.72	$302	$33,654
Lagoon / Dunsmuir	KWL_SP_2129	KWL_NODE_3652	KWL_NODE_3340	50	119	2.15	$273	$32,485
Metchosin / Latoria	KWL_SP_2021	KWL_NODE_3643	KWL_NODE_3451	50	77	1.16	$273	$21,158
Metchosin / Latoria	KWL_SP_2022	KWL_NODE_3642	KWL_NODE_3452	50	85	1.11	$273	$23,345
Metchosin / Latoria	KWL_SP_2026	KWL_NODE_3644	KWL_NODE_3328	50	53	1.91	$273	$14,528
Metchosin / Latoria	KWL_SP_2111	KWL_NODE_3328	KWL_NODE_3407	50	54	1.29	$273	$14,739
Metchosin / Latoria	KWL_SP_2068B	KWL_NODE_3435	KWL_NODE_416	150	1706	5.98	$302	$514,755
Metchosin / Latoria	KWL_SP_451B	KWL_NODE_737	KWL_NODE_511	300	2049	2.63	$501	$1,027,165
Triangle Mountain	KWL_SP_2057	KWL_NODE_3471	KWL_NODE_3479	50	41	0.93	$388	$15,712
Triangle Mountain	KWL_SP_2058	KWL_NODE_3634	KWL_NODE_3471	50	69	0.73	$388	$26,700
Triangle Mountain	KWL_SP_2064	KWL_NODE_3556	KWL_NODE_3559	50	52	0.80	$388	$20,330
Triangle Mountain	KWL_SP_2065	KWL_NODE_3557	KWL_NODE_3556	50	119	0.73	$388	$46,056
Triangle Mountain	KWL_SP_2082	KWL_NODE_3576	KWL_NODE_3593	50	57	1.10	$388	$22,294
Triangle Mountain	KWL_SP_2083	KWL_NODE_3577	KWL_NODE_3581	50	33	1.21	$388	$12,693
Triangle Mountain	KWL_SP_2084	KWL_NODE_3480	KWL_NODE_786	50	42	2.82	$388	$16,397
Triangle Mountain	KWL_SP_2089	KWL_NODE_3574	KWL_NODE_3595	50	73	1.35	$388	$28,193
Triangle Mountain	KWL_SP_2090	KWL_NODE_3633	KWL_NODE_3574	50	55	0.29	$388	$21,135
Triangle Mountain	KWL_SP_2334	KWL_NODE_3636	KWL_NODE_3562	50	77	0.93	$388	$30,023
Triangle Mountain	KWL_SP_2336	KWL_NODE_3638	KWL_NODE_3637	50	73	8.31	$388	$28,461
Triangle Mountain	KWL_SP_2337	KWL_NODE_3637	KWL_NODE_3636	50	18	1.64	$388	$7,039
Triangle Mountain	KWL_SP_2338	KWL_NODE_3639	KWL_NODE_3636	50	81	2.33	$388	$31,492
Triangle Mountain	KWL_SP_2341	KWL_NODE_3575	KWL_NODE_3582	50	48	4.72	$388	$18,767
Triangle Mountain	KWL_SP_2342	KWL_NODE_3566	KWL_NODE_3575	50	50	2.38	$388	$19,227
Triangle Mountain	KWL_SP_2345	KWL_NODE_3607	KWL_NODE_3613	50	67	8.15	$388	$25,995
Triangle Mountain	KWL_SP_2346	KWL_NODE_3582	KWL_NODE_3607	50	75	10.49	$388	$29,074
Triangle Mountain	KWL_SP_2347	KWL_NODE_3572	KWL_NODE_3582	50	43	3.94	$388	$16,825
Triangle Mountain	KWL_SP_2348	KWL_NODE_3581	KWL_NODE_3576	50	57	1.21	$388	$21,956
Triangle Mountain	KWL_SP_2349	KWL_NODE_3579	KWL_NODE_3577	50	34	1.47	$388	$13,280
Triangle Mountain	KWL_SP_2350	KWL_NODE_3571	KWL_NODE_3579	50	43	2.22	$388	$16,516
Triangle Mountain	KWL_SP_2351	KWL_NODE_3565	KWL_NODE_3571	50	37	1.99	$388	$14,166
Triangle Mountain	KWL_SP_2450	KWL_NODE_3467	KWL_NODE_3480	50	46	1.81	$388	$17,790
Triangle Mountain	KWL_SP_2451	KWL_NODE_3470	KWL_NODE_3480	50	34	1.83	$388	$13,068

Sum		$3,308,000
Engineering	15%	$496,000
Contingency	25%	$827,000
Total		**$4,631,000**