



# COUNCIL MEETING

**DATE** April 12, 2019

**LOCATION** Dan Lambert Boardroom, 2<sup>nd</sup> Floor (Large Room, Upstairs)  
Engineers and Geoscientists BC Offices, 200 – 4010 Regent Street,  
Burnaby, BC

## Meeting Schedule

<b>08:30 – 09:35</b>	<b>Closed Session</b>
<b>09:35 – 10:30</b>	<b>Open Session</b>
<b>10:30 – 10:45</b>	<b>Morning Break</b>
<b>10:45 – 12:15</b>	<b>Open Session (continued)</b>
<b>12:15 – 13:15</b>	<b>Lunch Break</b>
<b>13:15 – 14:30</b>	<b>Open Session (continued)</b>
<b>14:30 – 14:45</b>	<b>Break Before In-Camera Session</b>
<b>14:45 – 15:45</b>	<b>In-Camera Session</b>
<b>15:45</b>	<b>Adjournment</b>

For more information, contact Tracy Richards at [trichards@egbc.ca](mailto:trichards@egbc.ca) or 604.412.6055.

# OPEN AGENDA

DATE	April 12, 2019
TIME	09:35 – 14:30
LOCATION	Dan Lambert Boardroom, 2 <sup>nd</sup> Floor (Large Room, Upstairs) Engineers and Geoscientists BC Offices, 200 – 4010 Regent Street, Burnaby, BC

09:35	<b>4. OPEN SESSION CALL TO ORDER</b> <i>Chair: Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC, President</i>	
09:35 (5 min)	4.1 Declaration of Conflict of Interest	
09:40 (5 min)	4.2 Safety Moment	
09:45 (15 min)	<b>5. OPEN CONSENT AGENDA</b> <b>MOTION: That Council approve all items (5.1 to 5.11) on the Open Consent Agenda.</b>	
	<b>5.1</b> February 1, 2019 Open Minutes <b>MOTION: That Council approve the February 1, 2019 Open Meeting minutes as circulated.</b>	February 1, 2019 Open Minutes
	<b>5.2</b> Appointments Approval <b>MOTION 1: That Council approve the recommended appointment as the Engineers and Geoscientists BC Representative to Engineers Canada Board of Directors as applicable.</b> <b>MOTION 2: That Council approve the recommended appointment as the Engineers and Geoscientists BC Representative to Pacific Northwest Economic Region (PNWER) as applicable.</b>	

	<p><b>MOTION 3: That Council approve the recommended appointments to the Discipline Committee as applicable.</b></p> <p><b>MOTION 4: That Council approve the recommended re-appointments to the ABCFP/ Engineers and Geoscientists BC Joint Practice Board as applicable.</b></p> <p><b>MOTION 5: That Council approve the recommended re-appointment to the Registration Committee as applicable.</b></p> <p><b>MOTION 6: That Council approve the recommended re-appointments to the Geoscience Committee as applicable.</b></p> <p><b>MOTION 7: That Council approve the recommended appointment and re-appointments to the Board of Examiners as applicable.</b></p>	
5.3	<p>Building &amp; Space Planning Task Force Term Extension</p> <p><b>MOTION: That Council approve the revised Terms of Reference to extend the term of the Building &amp; Space Planning Task Force Phase 1.</b></p> <p><i>Jennifer Cho, CPA, CGA, Chief Financial and Administration Officer on behalf of the Building &amp; Space Planning Task Force</i></p>	Extension of Term of Building & Space Planning Task Force Phase 1
5.4	<p>Retaining Wall Design and Field Review Services Guidelines (new)</p> <p><b>MOTION: That Council approves the Professional Practice Guidelines – Retaining Wall Design, Version 1.0 for final legal and editorial review prior to publication.</b></p> <p><i>Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development</i></p>	Professional Practice Guidelines – Retaining Wall Design, Version 1.0
5.5	<p>Groundwater at Risk of Pathogens Guidelines (new)</p> <p><b>MOTION: That Council approves the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.</b></p> <p><i>Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development</i></p>	Professional Practice Guidelines – Assessment of Groundwater at Risk of Pathogens (GARP), Version 1.0
5.6	<p>Watershed Assessment Guidelines (new)</p> <p><b>MOTION: That Council approves the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector for final legal and editorial review prior to publication.</b></p> <p><i>Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development</i></p>	Association of BC Forest Professionals (ABCFP)/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector.

	<p><b>5.7</b> Proposed AGM Special Rule</p> <p><b>MOTION: That Council approve that implementation of the AGM Special Rules of Order be deferred and be re-considered by the Governance Committee in advance of the 2020 AGM.</b></p> <p><i>Deesh Olychick, Director, Corporate Governance and Strategy</i></p>	AGM Special Rules of Order
	<p><b>5.8</b> Update on Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in Policy on Risk Based Limited Licence Assessment</p> <p><b>MOTION: That the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment be continued until April 2020 and that staff look into developing other 'low risk' profiles to test in this pilot. A final report will be brought to Council at the end of this time frame summarizing the findings of the pilot program.</b></p> <p><i>Philippe Kruchten, PhD, P.Eng., FEC, Chair of the Registration Committee</i></p>	Update on the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment
	<p><b>5.9</b> Registration Fairness Panel Annual Report</p> <p><b>MOTION: That Council receive the Annual Report of the Registration Fairness Panel for March 2018 to February 2019.</b></p> <p><i>Fairness Panel</i></p> <p><i>Garth Kirkham, P.Geo., FGC, Phil Sunderland, P.Eng., FEC, FGC (Hon.), and John Watson, P.Eng., FEC, FGC (Hon.), Chair of the Fairness Panel</i></p>	Registration Fairness Panel Annual Report
	<p><b>5.10</b> Financials as at February 28, 2019</p> <p><b>MOTION: That Council receive the Engineers and Geoscientists British Columbia financial results as at February 28, 2019.</b></p> <p><i>Jennifer Cho, CPA, CGA, Chief Financial and Administration Officer</i></p>	Financial Results as at February 28, 2019
	<b>5.11</b> Information Reports	
	<p><b>5.11.1</b> CEO &amp; Registrar Report</p> <p><i>Ann English, P.Eng., Chief Executive Officer &amp; Registrar</i></p>	CEO Report (Open)
	<p><b>5.11.2</b> Engineers Canada Directors' Report</p> <p><i>Russ Kinghorn, P.Eng., FEC, FGC (Hon.), Engineers and Geoscientists BC Director to Engineers Canada</i></p> <p><i>Jeff Holm, P.Eng., FEC, FGC (Hon.), Engineers and Geoscientists BC Director to Engineers Canada</i></p>	EC Directors' Report



## Engineers and Geoscientists BC Open Agenda

	<p>5.11.3 Geoscientists Canada Director's Report</p> <p><i>Garth Kirkham, P.Geo., FGC, Engineers and Geoscientists BC Director to Geoscientists Canada</i></p>	GC Director's Report
	<p>5.11.4 Canadian Engineering Qualifications Board Report</p> <p><i>Dr. Mahmoud Mahmoud, P.Eng., FEC, Canadian Engineering Qualifications Board Appointee</i></p> <p><i>Karen Savage, P.Eng., FEC, Canadian Engineering Qualifications Board Appointee</i></p>	CEQB Report
	<p>5.11.5 Corporate Regulation Update Report</p> <p><i>Lindsay Steele, P.Geo., Associate Director of Professional Practice, Standards and Development</i></p>	Corporate Regulation Update
	<p>5.11.6 Task Force on Landslide Risks With Respect to Development Within BC Update Report</p> <p><i>Lindsay Steele, P.Geo., Associate Director of Professional Practice, Standards and Development</i></p>	Land Risk Update
	<p>5.11.7 Update on Conceptual Pilot Program to Address the Recommendations in the Truth and Reconciliation Calls to Action Report</p> <p><i>Peter Mitchell, P.Eng., Director of Professional Practice, Standards and Development</i></p>	Truth and Reconciliation Pilot Program
	<p>5.11.8 Branch Engagement Report</p> <p><i>Ailene Lim, Acting Director, Programs and Professional Development</i></p> <p><i>Mara Buzgar, Program Coordinator</i></p> <p><i>Tim Verigin, Program Coordinator</i></p>	Branch Engagement Report
	<p>5.11.9 Nomination &amp; Election Review Task Force Recommendation Update</p> <p><i>Deesh Olychick, Director, Corporate Governance and Strategy</i></p>	NERTF Recommendations Report
	<p>5.11.10 30 x 30 Strategy Update</p> <p><i>Deesh Olychick, Director, Corporate Governance and Strategy</i></p>	30 By 30 Update
	<p>5.11.11 Bill 49 - Election Process Implications Update</p> <p><i>Deesh Olychick, Director, Corporate Governance and Strategy</i></p>	Bill 49 – Nomination and Election Implications Update
	<p>5.11.12 National Engineering and Geoscience Month Report</p> <p><i>Megan Archibald, Director of Communications and Stakeholder Engagement</i></p>	NEGM Report

	<p>5.11.13 Engineers and Geoscientists BC Road Map for 2018-2019</p> <p><i>Ann English, P.Eng., Chief Executive Officer &amp; Registrar</i></p>	Road Map
	<p>5.11.14 Committee Attendance Summary</p> <p><i>Ann English, P.Eng., Chief Executive Officer &amp; Registrar</i></p>	Committee Attendance Summary
10:00	<p><b>6.0 OPEN REGULAR AGENDA</b></p> <p><b>MOTION: That Council approve the Open Regular Agenda (with any additions from the Consent Agenda).</b></p>	
10:00 (20 min)	<p><b>6.1</b> Summary and Recommendations for 2018 AGM Motions - Climate Change Action Plan</p> <p><b>MOTION: That Council approves: (a) the development of a climate change action plan to achieve the following vision: the association is to model the way forward on what good business and professional practice looks like for engineering/geoscience professionals in BC; and (b) subject to the Council approved budget, an increase to the annual budget addressing climate change related initiatives from \$20K to \$50K to support the development and implementation of a climate change action plan for the association, and the integration of the climate change action plan into the association's strategic plan.</b></p> <p><i>Peter Mitchell, P.Eng., Director, Professional Practice, Standards &amp; Development</i></p>	Development of a Climate Change Action Plan for the Association
10:20 (10 min)	<p><b>6.2</b> Update and Recommendations* on the Project and Pilot re: Pan-Canadian Competency-Based Assessment for Geoscience Experience Evaluation</p> <p><i>*(subject to approval by the Geoscience Committee on April 11, 2019)</i></p> <p><b>MOTION 1: That Council approve the Geoscientists Canada Work Experience Competencies for the pilot assessment of experience towards professional geoscientist registration.</b></p> <p><b>MOTION 2: That Council approve that all Engineers and Geoscientists BC pilot applicants who are assessed and approved as meeting the Work Experience Competencies be considered to have met the professional geoscience experience requirements for registration.</b></p> <p><b>MOTION 3: That Council approve that all Engineers and Geoscientists BC pilot applicants be provided the option to undergo an experience assessment via the current traditional route should they be unsuccessful in meeting the geoscience work experience competencies.</b></p> <p><i>Jason Ong, Manager Examinations, Geoscience Registration &amp; MIT Program on behalf of Philippe Kruchten, PhD, P.Eng., FEC, Chair, Registration Committee</i></p>	Update and Recommendations on the Project and Pilot re: Pan-Canadian Competency-Based Assessment for Geoscience Experience Evaluation

10:30 (15 min)	<b>MORNING BREAK</b>	
10:45 (60 min)	<p><b>6.3 Engineers and Geoscientists BC 2020 Draft Budget</b></p> <p><b>MOTION 1: That Council approve a \$20 annual member fee increase with \$15 Levy effective January 1, 2020.</b></p> <p><b>MOTION 2: That Council approve the following adjustments be made to the Ancillary Fees effective July 1, 2019:</b></p> <p>a) Increase Academic Examination fee by \$35, from \$322.43 to \$357.43 and the Academic Examination Deferral Fee by \$35, from \$185 to \$220;</p> <p>b) Increase Application fee for First-Time applicants by \$25, from \$450 to \$475; and</p> <p>c) Increase Registration/Stamp/Certificate fee be increased by \$20, from \$250 to \$270.</p> <p><b>MOTION 3: That Council agrees non-practicing member fee reductions remain at 50% of the Practicing Member Fee.</b></p> <p><b>MOTION 4: That Council approve the FY2020 Engineers &amp; Geoscientists BC operating and capital budget.</b></p> <p><b>MOTION 5: That Council receive FY2021 proforma budget.</b></p> <p><i>Jennifer Cho, CPA, CGA, Chief Financial and Administration Officer</i></p> <p><i>Caroline Andrewes, P.Eng., CPA, CMA, Past President on behalf of the Executive Committee</i></p>	FY2020-FY2021 Budget Book
11:45 (30 min)	<p><b>6.4 Volunteer Attrition Risk</b></p> <p><b>MOTION: That Council direct staff to complete a volunteer analytics review and provide a summary report with mitigation strategies as appropriate at the September 2019 Council meeting.</b></p> <p><i>Ann English, P.Eng., Chief Executive Officer &amp; Registrar on behalf of the Executive Committee</i></p>	Councillor Agenda Item Request re: Volunteer Attrition Risk
12:15 (60 min)	<b>BREAK FOR LUNCH</b>	
13:15 (30 min)	<p><b>6.5 Engineers Canada Governance Update</b></p> <p><b>MOTION: No motion required, however feedback is requested.</b></p> <p><i>Ann English, P.Eng., Chief Executive Officer &amp; Registrar</i></p>	Engineers Canada Governance Update
13:45 (30 min)	<p><b>6.6 100th Anniversary Campaign Update</b></p> <p><b>MOTION: No motion required.</b></p> <p><i>Megan Archibald, Director, Communications &amp; Stakeholder Engagement</i></p>	100 <sup>th</sup> Anniversary Campaign Summary

## Engineers and Geoscientists BC Open Agenda

<b>14:15</b> <b>(15 min)</b>	<b>6.7</b> Professional Governance Act Update <b>MOTION: No motion required.</b> <i>Max Logan, Chief of Strategic Operations</i>	Bill 49 – Professional Governance Act Update
<b>14:30</b> <b>(15 min)</b>	<b>END OF OPEN SESSION AND BREAK BEFORE IN-CAMERA SESSION</b>	
<b>14:45</b> <b>(60 min)</b>	<b>IN-CAMERA SESSION</b>	

MINUTES OF THE OPEN SESSION OF THE THIRD MEETING OF THE 2018/2019 COUNCIL of Engineers and Geoscientists BC, held on FEBRUARY 1, 2019 in the DAN LAMBERT BOARDROOM, ENGINEERS AND GEOSCIENTISTS BC OFFICES, BURNABY, BC

## Present

### **Council**

Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC	President (Chair) (2018/2019)
Harlan Kelly, P.Eng.	Vice President (2018/2019)
Caroline Andrewes, P.Eng., CPA, CMA	Immediate Past President (2018/2019)
Leslie Hildebrandt, ICD.D., LL.B.	Councillor (2018/2019)
Suky Cheema, CPA, CA	Councillor (2018/2019)
David Wells, JD	Councillor (2018/2019)
Alan Andison, BA, LL.B.	Councillor (2018/2019)
Tim Watson, P.Eng.	Councillor (2018/2019)
Brock Nanson, P.Eng.	Councillor (2018/2019)
Susan MacDougall, P.Eng.	Councillor (2018/2019)
Kevin Turner, P.Eng., FEC, FGC (Hon.)	Councillor (2018/2019)
Jeremy Vincent, P.Geo.	Councillor (2018/2019)
Lianna Mah, P.Eng., FEC	Councillor (2018/2019)
Doug Barry, P.Eng.	Councillor (2018/2019)
Antigone Dixon-Warren, P.Geo.	Councillor (2018/2019)
Dr. Catherine Hickson, P.Geo., FGC	Councillor (2018/2019)
Dr. Nimal Rajapakse, P.Eng.	Councillor (2018/2019)

### **Guests**

Jeff Holm, P.Eng., FEC, FGC (Hon.)	Engineers and Geoscientists BC Director to Engineers Canada
Russ Kinghorn, P.Eng., FEC, FGC (Hon.)	Engineers and Geoscientists BC Director to Engineers Canada
Randy Meszaros, ASCT, PMP, C.E.T.	ASTTBC Representative
William Braidwood, P.Eng. & Brian Simons, P.Eng.	Guest Speaker(s)

### **Staff**

Ann English, P.Eng.	Chief Executive Officer & Registrar
Tony Chong, P.Eng.	Chief Regulatory Officer & Deputy Registrar
Jennifer Cho, CPA, CGA	Chief Financial & Administration Officer
Max Logan	Chief of Strategic Operations
Gillian Pichler, P.Eng.	Director - Registration
Efrem Swartz, LLB	Director - Legislation, Ethics & Compliance
Peter Mitchell, P.Eng.	Director – Professional Practice, Standards & Development
Megan Archibald	Director – Communications & Stakeholder Engagement
Deesh Olychick	Director – Corporate Governance and Strategy
Tracy Richards	Executive Assistant to Council and to the Chief Executive Officer & Registrar
Amber Hart	Executive Administrative Assistant

### **Regrets**

Larry Spence, P.Eng.	Councillor (2018/2019)
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## OPEN SESSION – CALL TO ORDER

Dr. Kathy Tarnai-Lokhorst, President and Chair, called the Open Session to order at 10:40 am. Tony Chong, P.Eng., Chief Regulatory Officer & Deputy Registrar acted as the Parliamentarian, Councillor Jeremy Vincent, P.Geo., acted as the Membership Engagement Champion and Councillor Susan MacDougall acted as the 30 by 30 Champion.

Guests: The Chair advised that joining for the Open Session would be Russ Kinghorn, P.Eng., FEC, FGC (Hon.) and Jeff Holm, P.Eng., FEC, FGC (Hon.) Engineers and Geoscientists BC Directors to Engineers Canada as well as Council Director Randy Meszaros, ASCT, PMP, C.E.T. as the ASTTBC representative. Joining the Open Session to speak to Item 6.4 will be guests, William Braidwood, P.Eng. and Brian Simons, P.Eng. Councillor Larry Spence, P.Eng., sent his regrets.

## DECLARATION OF CONFLICT OF INTEREST

None declared.

## SAFETY MOMENT

President Tarnai-Lokhorst provided a safety briefing advising Council of the Engineers and Geoscientists BC office emergency protocols and location of the emergency exits. Councillor Antigone Dixon-Warren, P.Geo. provided the Safety Moment for the meeting.

## CO-19-39 OPEN CONSENT AGENDA

**MOTION** It was moved and seconded that Council approve all items (5.1 to 5.11) on the Open Consent Agenda with the exception of Items 5.5 and 5.10 being moved to the Open Regular agenda.

**CARRIED**

*Motions carried by approval of the Consent Agenda:*

- 5.1. **MOTION** that Council approve the November 23, 2018 Open Meeting minutes as circulated.
- 5.2. **MOTION 1:** That Council approve the recommended appointment and re-appointments to the Discipline Committee as applicable.  
**MOTION 2:** That Council approve the recommended re-appointment to the Investigation Committee as applicable.  
**MOTION 3:** That Council approve the recommended appointments to the Standing Awards Committee as applicable.  
**MOTION 4:** That Council approve the recommended re-appointments to the Fairness Panel as applicable.

Individual, Designation	Position	Engineers and Geoscientists BC Volunteer Group/Outside Organization	Staff Contact	Start Date	Expiry Date	New/Returning/ * Returning Over 6 Years
<b>Re-appointments (under six years)</b>						
Ronald Yaworsky, P.Eng. 118801	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning
Roz Nielsen, P.Eng. 137812	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning
Peter Bobrowsky, P.Geo. 109458	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning
Edward Bird, P.Eng. 106422	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning
Bruce Nicholson, P.Eng., FEC 116237	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning
Dan Kunimoto, P.Eng. 107891	Member	Investigation Committee	Jesse Romano	February 1, 2019	February 1, 2021	Returning

<b>New Appointments and Re-Appointments (over six years)</b>						
Paul Adams, P.Eng., FEC 105218	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	*Returning Over 6 Years
Juergen Franke, P.Eng. 137328	Member	Discipline Committee	Jesse Romano	February 1, 2019	February 1, 2021	New
Dr. Donald Mavinic, P.Eng., FEC 116146	Member	Standing Awards Committee	Megan Archibald	February 1, 2019	February 1, 2021	New
Carol Park, P.Eng. 121425	Member	Standing Awards Committee	Megan Archibald	February 1, 2019	February 1, 2021	New
Greg Lord, P.Eng. 141998	Member	Standing Awards Committee	Megan Archibald	September 1, 2019	September 1, 2021	New
J. F. (John) Watson, P.Eng., FEC, FGC (Hon) 114390	Member	Fairness Panel	Mark Rigolo	February 14, 2019	February 13, 2021	*Returning Over 6 Years
G.D. (Garth) Kirkham, P. Geo., FGC 125992	Member	Fairness Panel	Mark Rigolo	April 12, 2019	April 11, 2021	*Returning Over 6 Years

5.3 **MOTION** that Council approve the appointments of the Government Appointees to the Committees, Sub-Committees, Branch Pairings and Task Forces as detailed herein.

5.4 **MOTION** that Council receives the Engineers and Geoscientists BC financial results as at November 30, 2018.

5.5 ADVISORY TASK FORCE ON CORPORATE PRACTICE TERMS OF REFERENCE – PHASE 3

This item was moved to the Open Regular Agenda.

5.6 **MOTION** that Council endorses the Certified Professionals Program Schedules CP-1, CP-2 and CP-3, pending final legal and editorial review.

- 5.7 **MOTION** that Council approves the Memorandum of Understanding between Engineers and Geoscientists BC and the Association of Chinese Canadian Engineering Professionals and Technologists.
- 5.8 **MOTION** that the Policy on the Deactivation of Applications be approved.
- 5.9 **MOTION** that the revisions to the Policy on Academic Qualification of Graduates of the BCIT Bachelor of Technology in Electronics Part-Time Program be approved.

5.10 CANDIDATE VIDEOS & ELECTION MATERIALS

This item was moved to the Open Regular Agenda.

- 5.11 **MOTION** that the following information reports were received by Council:

- CEO & Registrar Report
- Government Appointments Update Report
- Engineers Canada Directors' Report
- Geoscience Canada Director's Report
- Canadian Engineering Qualifications Board Report
- Divisions Activity Report
- Engineers and Geoscientists BC Road Map for 2018-2019
- Committee Attendance Summary

CO-19-40 OPEN REGULAR AGENDA

**MOTION** It was moved and seconded that Council approve the Open Regular Agenda with the addition of Items 5.5 and 5.10 from the Open Consent Agenda.

**CARRIED**

CO-19-41 MEMBER ENGAGEMENT PLAN UPDATE

Megan Archibald, Director, Communications & Stakeholder Engagement walked Council through a presentation updating Council on the Association's member engagement plan.

There was no motion associated with this item.



CO-19-42 PROFESSIONAL GOVERNANCE ACT UPDATE

**MOTION** It was moved and seconded that Engineers and Geoscientists BC staff communicate the risks associated with the pace of change proposed by government and recommend that the pace, volume and sequence of new regulations be readjusted based on the input of the affected regulators to ensure it is sustainable and achievable.

**CARRIED**

CO-19-43 BILL 49: ELECTION PROCESS IMPLICATIONS UPDATE

Immediate Past President, Caroline Andrewes, P.Eng., CPA, CMA provided Council with an update on the work of the Nominations and Elections Advisory Committee (the “Committee”) advising that the Committee is on target to deliver its recommendations to the sub-committee of Council in February.

There was no motion associated with this item.

CO-19-44 REQUEST TO REPEAL LIFE MEMBERSHIP BYLAW

Council welcomes members of the association to attend the Open sessions of meetings, and has a process in place to enable members to make presentations to Council. William Braidwood, P.Eng., (and his delegation consisting of Brian Simons, P.Eng.) attended the meeting to express concerns regarding recently-ratified changes to the Life Membership or Licensure Bylaw. As a result of these changes, the category of Life Membership or Licensure was repealed, and new obligations and a reduced fee for Non-Practising membership were introduced.

Council heard the members’ concerns and thanked them for attending. While they maintained that no change be made to the wording of the current Life Membership or Licensure Bylaw, they re-affirmed their intent to consider further reducing the annual fee for Non-Practising membership in future.

**MOTION 1** That Mr. Braidwood be thanked for bringing his concerns to the attention of the council.

**CARRIED**

**MOTION 2** That no change be made to the wording of the current Life Membership or Licensure Bylaw.

**CARRIED**

**MOTION 3** That Council maintain its intent to consider further reducing the annual fee for Non-Practising membership.

**CARRIED**

CO-19-45 STRATEGIC PLAN UPDATE

**MOTION 1** It was moved and seconded that the KPI “A legislative renewal plan is formulated, approved and implemented that has stakeholder support” is retired and replaced with “The Professional Governance Act is implemented in a manner consistent with the organization’s mission to serve the public interest as a progressive regulator that supports and promotes the engineering and geoscience professions.”

**CARRIED**

**MOTION 2** It was moved and seconded that Council approve extending the current strategic plan until June 30, 2021.

**CARRIED**

CO-19-46 VOTING RIGHTS FOR MITs

**MOTION** It was moved and seconded that the issue of voting rights for MITs be referred back to the Governance Committee for further consideration in the context of Bill 49 and other implications and report back to Council at the September 2019 meeting.

**CARRIED**

CO-19-47 REGISTRATION ADMISSIONS REPORT FOR CALENDAR 2018

Gillian Pichler, P.Eng., Director, Registration reported on registration trends for calendar 2018 and addressed Council’s questions. No motion was associated with this item.

CO-19-48 ADVISORY TASK FORCE ON CORPORATE PRACTICE TERMS OF REFERENCE – PHASE 3

**MOTION** It was moved and seconded that Council approve the revised Terms of Reference for the Advisory Task Force on Corporate Practice.

**CARRIED**

CO-19-49     CANDIDATE VIDEOS & ELECTION MATERIALS

**MOTION**     It was moved and seconded that Council delegate the decision on how to proceed with the candidate videos and any other changes required to the election process and election policy that may be required as a result of Bill 49 to a sub-committee of Council consisting of the four government appointees and the Past President.

**CARRIED**

**END OF OPEN SESSION**

The Open Session ended at 2:25 pm.

DRAFT



## OPEN SESSION

### ITEM 5.3

DATE	March 27, 2019
REPORT TO	Council for Decision
FROM	Jennifer Cho, CPA, CGA, Chief Financial and Administration Officer on behalf of the Building & Space Planning Task Force
SUBJECT	Extension of Term of Building & Space Planning Task Force Phase 1
LINKAGE TO STRATEGIC PLAN	Implement Best Practices in governance

Purpose	To review and approve the revision to the Terms of Reference to extend the term of the Building & Space Planning Task Force Phase 1.
Motion	That Council approve the revised Terms of Reference to extend the term of the Building & Space Planning Task Force Phase 1.

## BACKGROUND

Engineers and Geoscientists BC's Council has formed the Building & Space Planning Task Force to provide advice and guidance in developing options and ultimately a recommendation to Council that will address the future space needs of the organization for the next 15 to 20 years. Phase 1 of the Task Force is to oversee the process to assess the space needs for the next 15 – 20 years, determine the options to consider and explore to address these needs, pros/cons for each option and ultimately deliver a recommendation to Council

At their meeting on June 15, 2018 Council approved the Terms of Reference (TOR) for the Task Force Phase 1 so that staff could proceed with the recruitment of volunteers and bring the recommended appointments to Council for approval at the Council meeting in September 2018. Council at the September 7, 2018 meeting approved the appointments of the Task Force Phase 1 members.

## DISCUSSION

The Task Force met on November 27, 2018, January 21, 2019 and March 6, 2019. The Task Force has now determined the scope of work needed, the consultants required to assist with the project (architect, engineer, space planner, real estate specialist) as well as the timeline required to realistically complete the tasks assigned to them by Council. Currently, the Task Force has requested for RFP's for consultants required and expects to award the contracts out in April 2019. Consultant work will run from mid-April through till July 2019. Compilation of the results into a comprehensive report back to Council is estimated to be September 2019. However, there may be further follow up work required of the Task Force from the September Council meeting. Thus, the Task Force Phase 1 is requesting that Council extend their term to December 2019 as it is impossible to complete the work required by Council with their original term to end in April 2019.

## MOTION

That Council approve the revised Terms of Reference to extend the term for the Building & Space Planning Task Force Phase 1.

**ATTACHMENT A – Revised TOR for the Building & Space Planning Task Force Phase 1 with the revisions highlighted using tracked changes.**



## TERMS OF REFERENCE

### **1. Name:**

Building and Space Planning Task Force – Phase 1

### **2. Type/Reporting Relationship:**

2.1 Task Force

### **2.2 Reporting Relationship:**

The Task Force is appointed by Council and reports to Council.

### **3. Purpose:**

To assess the current and future space needs of the Association and develop high level options and recommendations to deliver to Council that address the space needs of the Association for the next 20-30 years.

### **4. Authorities of the Committee/Task Force:**

The Task Force is authorized to provide advice, guidance, and recommendations to Engineers and Geoscientists BC Council. Recommendations to Council will be based on a majority vote of all Task Force members.

### **5. Function/Deliverables:**

5.1 It is expected that the overall project will have at least the following three phases. Each phase may have a different task force. This terms of reference is only for the first phase at this time and the additional phase details is provided for information only.

#### **5.1.1 Phase 1 – Assessment & Planning Stage**

- Oversee process to determine current & future space needs of Association;
- Confirm goals/objectives, communication and alignment with overall purpose of project;
- Determine scope, deliverables, timeline for proposal process for selection of space planning and other consultants required to derive high level options that address the future space needs of the Association;
- Consideration of different options such as but not limited to buy new building/sell existing building, expand current building, lease new space/lease out or sell current building, open satellite office, and buy land to construct new building
- Oversee the work of the consultant(s) selected;
- Upon completion of Phase 1, deliver to Council options and recommendation that addresses the future space needs of the Association. Pros and Cons and high level cost estimates for each option should be included as a part of the report back to Council;
- Council may consider the recommendation and determine how to proceed.

#### **5.1.2 Phase 2 - Oversight of Development of Recommendation (Subject to Council Approval of Phase 1)**

- Provide guidance of development of project plan, timeline, budget, transition plan and identification of resources required to implement the recommendation;

- Report back to Council on the implementation plan including deliverables, timeline, budget, and resources required to complete the project.

#### **5.1.3 Phase 3 (Subject to Council Approval of Phase 2) – Oversight of Implementation of Recommendation**

- Develop project scope & consultant selection criteria of proposal process for selection of consultants required to complete the project (eg. Construction company, Commercial banking institution etc.);
- Oversee the selection process and select the consultants required to complete the project;
- Oversee implementation of recommendation;
- Report back to Council on progress of implementation of project for milestones achieved.

### **6. Resources:**

6.1 Funding for the work of the Task Force will be allocated and approved by Council upon receipt of a request from the Task Force.

### **7. Membership:**

7.1 The Task Force will be composed of five to seven members. Various types of experience and expertise are needed to round out that Task Force and therefore not all members of the Task Force need to be a member of Engineers and Geoscientists BC. The composition of the task force should ideally possess the following experience and expertise:

- Executive level experienced PEng or PGeo
- Architectural expertise (a member of AIBC member)
- Commercial real estate knowledge (a member of the Real Estate Council of BC)
- Structural Engineering expertise
- Space Planning expertise
- Current or past experience on Engineers and Geoscientists BC Council

7.2 In the event that a Task Force member is absent for three consecutive meetings, or resigns from the Task Force, the Task Force Chair may propose a replacement Task Force member to Council for consideration.

### **8. Term of Office:**

8.1 The terms of office are until ~~April 2019~~ December 2019 or later as directed by Council.

### **9. Selection of Officers:**

9.1 The members of the task force will elect the Chair.

### **10. Quorum:**

10.1 Majority of members.

### **11. Frequency of Meetings:**

11.1 Meetings are at the call of the Chair.

### **12. Conduct of Meetings:**

12.1 The Task Force may meet in person and/or by telephone conference, webcast or other electronic communications media where all members may simultaneously hear each other and participate during the meeting. Generally the latest edition of Robert's Rules should be adopted for the conduct of meetings.

12.2 The Task Force Chair may communicate with Task Force members by e-mail as appropriate.

12.3 The Task Force Chair may use e-mail to propose and call for a consent resolution. The Task Force Chair may or may not allow limited e-mail discussion on the matter. Beyond this, Task Force members

have the option of responding by moving, seconding or supporting the motion, or requesting that it be considered further at a meeting of the Task Force. A consent resolution is deemed to have been achieved if there are no negative votes or calls for in-person discussion, and the number of support votes are equal to or greater than the number required for a quorum. In the case where a member so requests, the motion is not carried, but instead may be brought forward for consideration at a subsequent meeting of the Task Force. (In the case of an urgent matter, this may occur at a special meeting conducted by telephone where the normal requirements for a quorum will prevail.) Any motion so carried is considered to take effect immediately, and should be ratified at the subsequent Task Force meeting and recorded in the minutes of that meeting.

12.4 Information circulated and discussed at meetings is non-confidential unless communicated otherwise.

**13. Minutes:**

13.1 Minutes, notes or recording of decisions are the responsibility of staff support.

**14. Periodic Reporting and Review of Terms of Reference:**

14.1 The Task Force Chair shall periodically report to Council on the progress of the Task Force.

**15. Staff Support:**

15.1 Staff support will be the Chief Executive Officer & Registrar and Chief Financial and Administration Officer. The administrative support for the Task Force will be provided by a member of staff as designated for this purpose.



OPEN SESSION

ITEM 5.4

DATE	March 21, 2019
REPORT TO	Council for Information
FROM	Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development
SUBJECT	Professional Practice Guidelines – Retaining Wall Design, Version 1.0
LINKAGE TO STRATEGIC PLAN	Enhance members' awareness and use of professional practice resources.

Purpose	For Council's review and decision to approve the Professional Practice Guidelines – Retaining Wall Design, Version 1.0 for final legal and editorial review prior to publication.
Motion	That Council approves the Professional Practice Guidelines – Retaining Wall Design, Version 1.0 for final legal and editorial review prior to publication.

## BACKGROUND

The Professional Practice, Standards and Development (PPSD) Department focuses on the proactive regulation of professional engineering and professional geoscience in BC. One of the important ways in which the Department delivers on the proactive regulation of the professions is through the development and revision of Professional Practice Guidelines. These guidelines identify the standard of practice that engineering/geoscience professionals are expected to provide when carrying out professional activities involving the practice of professional engineering and professional geoscience.

These professional practice guidelines establish a common level of expectation, for a variety of stakeholders on what constitutes good professional practice when carrying out a particular professional activity. These stakeholders include engineering/geoscience professionals, statutory decision makers, clients, the public and a variety of other groups.

## DISCUSSION

In the fall of 2017, work began on developing the *Professional Practice Guidelines – Retaining Wall Design*. It was determined that guidance was needed in this particular area of practice through many practice inquiries received, through issues identified during practice reviews, and through disciplinary cases. Design of retaining walls relates directly to public safety and based on recent failures around the province, development of this guideline was necessary to improve public safety, to improve clarity for designers, and to help make retaining wall design more consistent and reliable. The City of Nanaimo “Retaining Wall Guideline” was used as a base document, and was revised with the help of Garry Stevenson, P.Eng./P.Geo. of Klohn Crippen Berger.

An official review group was assembled to provide comment on the document and included the following individuals:

- Paul Evans, P.Eng., GIT, Thurber Engineering Ltd
- Arash Jamalirad, P.Eng., Tecta Building Consultants Inc
- Saqib Khan, P.Eng., McElhanney Consulting Services Ltd
- Matt Kokan, P.Eng., GeoPacific Consultants Ltd
- Robert Ng, P.Eng., Horizon Engineering Inc
- Bob Patrick, P.Eng., Tetrattech
- Glen Rutherford, P.Eng., Golder
- Kevin Turner, P.Eng., Westrek Geotechnical Services

In addition to the review by this group of individual specialists, the Engineers and Geoscientists BC Building Codes Committee, Consulting Practice Committee and Municipal Engineers Division were also consulted.

Finally, the revised document was submitted to the Professional Practice Committee for review. The following motion was passed:

“The Professional Practice Committee recommends that the Retaining Wall Design guidelines be brought forward to Council for approval, pending final legal and editorial review prior to publication.”

## RECOMMENDATIONS

That Council approves the *Professional Practice Guidelines – Retaining Wall Design*, Version 1.0 for final legal and editorial review prior to publication.

## **MOTION**

Council approves the *Professional Practice Guidelines – Retaining Wall Design*, Version 1.0 for final legal and editorial review prior to publication.

## **APPENDIX A – Professional Practice Guidelines – Retaining Wall Design, Version 1.0**

OPEN SESSION

ITEM 5.5

DATE	March 20, 2019
REPORT TO	Council for Decision
FROM	Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development
SUBJECT	Professional Practice Guidelines - Assessment of Groundwater at Risk of Containing Pathogens (GARP), Version 1.0
LINKAGE TO STRATEGIC PLAN	Goal 2: Establish, maintain and enforce qualifications and professional standards

Purpose	For Council's review and decision to approve the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.
Motion	That Council approves the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.

## BACKGROUND

The Professional Practice, Standards and Development (PPSD) Department focuses on the proactive regulation of professional engineering and professional geoscience in BC. One of the important ways in which the Department delivers on the proactive regulation of the professions is through the development and revision of Professional Practice Guidelines. These guidelines identify the standard of practice that engineering/geoscience professionals are expected to provide when carrying out professional activities involving the practice of professional engineering and professional geoscience.

These professional practice guidelines establish a common level of expectation, for a variety of stakeholders on what constitutes good professional practice when carrying out a particular professional activity. These stakeholders include engineering/geoscience professionals, statutory decision makers, clients, the public and a variety of other groups. The *Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP)* have been developed with the support of the BC Ministry of Health. These guidelines will assist Engineering

and Geoscience Professionals in carrying out an assessment of groundwater in a consistent manner while incorporating best practices.

## DISCUSSION

In 2015, to provide additional guidance on the intent of the ground water legislations, the Health Protection Branch of the Ministry of Health (MoH) of the Government of British Columbia released two guidance documents intended for a broader audience that includes public health officials, Water Suppliers, and Qualified Professionals. Specific to professional engineers and geoscientists, these Professional Practice Guidelines provide guidance on Water Source Investigations in response to the requirements under Section 6 of the *Drinking Water Protection Act* and Section 5(2) of the Drinking Water Protection Regulation, as described in the GARP and BC Drinking Water Treatment Objectives (DWTO) documents issued by the Health Protection Branch of the MoH.

Engineers and Geoscientists BC conducted a series of five continuing professional development events following the publication of this document and the guidance documents have continued to evolve during the meantime with the release of Version 3.0 of the GARP Guidance document at the MoH website.

The procedure outlined in the Engineers and Geoscientists BC Professional Practice Guidelines recommends that the GARP determination be undertaken as a coordinated effort between the Drinking Water Officer (DWO), Water Supplier and Qualified Professional. In addition, the guideline has been put into a new standard template developed by the Department to provide consistency and alignment between guidelines, requiring some additional sections to be added such as the section on “Roles and Responsibilities”.

The revisions were completed through a collaborative approach between Mark Bolton, P.Geo., Nick Sargent, P.Geo. (Retired)., and PPSD staff. Once the document was ready for review, it was sent to the subcommittee of the Provincial Drinking Water Leadership Team where the following individuals provided feedback on working drafts:

- Christine Bieber, P.Geo.
- Michael Zemanek, P.Eng.
- Alistair Stewart, P.Eng.
- Michael Wu, P.Eng.
- David Tamblyn, P.Eng.
- Wayne Radomske, P.Eng.
- Rory Beise

In addition, the following Engineers and Geoscientists BC groups provided feedback on the draft of these guidelines:

- Sustainability Committee
- Consulting Practice Committee

- Environmental Professionals Division

Finally, the revised document was submitted to the Professional Practice Committee for review. The following motion was passed:

“The Professional Practice Committee recommends that Council approves the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.”

## **RECOMMENDATIONS**

That Council approves the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.

## **MOTION**

That Council approves the Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens (GARP) for final legal and editorial review prior to publication.

## **APPENDIX A – Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens**

OPEN SESSION

ITEM 5.6

DATE	March 15, 2019
REPORT TO	Council for Decision
FROM	Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development
SUBJECT	Association of BC Forest Professionals (ABCFP)/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector.
LINKAGE TO STRATEGIC PLAN	Enhance members' awareness and use of professional practice resources.

Purpose	For Council's review and decision to approve the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector, for final legal and editorial review prior to publication.
Motion	That Council approves the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector.

## BACKGROUND

The Professional Practice, Standards and Development (PPSD) Department focuses on the proactive regulation of professional engineering and professional geoscience in BC. One of the important ways in which the Department delivers on the proactive regulation of the professions is through the development and revision of Professional Practice Guidelines. These guidelines identify the standard of practice that engineering/geoscience professionals are expected to provide when carrying out professional activities involving the practice of professional engineering and professional geoscience.

These professional practice guidelines establish a common level of expectation, for a variety of stakeholders on what constitutes good professional practice when carrying out a particular professional activity. These stakeholders include engineering/geoscience professionals, statutory decision makers, clients, the public and a variety of other groups.

## DISCUSSION

The ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector Guidelines were developed in response to concerns raised with respect to watershed and hydrologic assessments in British Columbia's (BC) forest sector, including matters related to the respective roles and responsibilities of registered professionals.

A letter to the Joint Practices Board (JPB) from the Division of Engineers and Geoscientists in the Resource Sector (DEGIRS) and signed by ten forest hydrology practitioners from ABCFP and Engineers and Geoscientists BC stated that:

*“Currently there is no consistent guidance for forest professionals, including statutory decision makers approving Forest Stewardship Plans (FSPs), as to when and where a certain level of hydrological assessment is appropriate.”*

*“There is no conventional definition of “hydrological assessment.” So even where a hydrologic assessment is specified in a FSP, in most cases what that assessment entails is not defined. This lack of definition has resulted in the development of hydrological strategies that are not measurable or verifiable.”*

*“The lack of guidance as to what is an appropriate hydrological assessment and when one should be carried out is resulting in serious inconsistencies in when and how hydrological assessments are used by forest professionals to meet their stewardship obligations and, by extension, in how well those obligations are being met.”*

*“For example, in many FSP-mandated hydrological assessments, there is a lack of content related to the cumulative hydrological effects of forest activities on water quality, water quantity or timing of flow at downstream elements potentially at risk.”*

*“Under the professional reliance model currently in effect in BC, once a FSP has been approved (see bullets 1 to 4 above), a Ministry of Forests Lands and Natural Resource Operations District Manager cannot refuse to issue a road or cutting permit based on an inadequate hydrological assessment. Government may verify that the assessment specified in the FSP was done, but does not review or approve the assessment specifically. Therefore, it is the responsibility of the relevant professional association(s), whose members complete them, to ensure that hydrological assessments are adequate for the conditions and risks involved.”*

The DEGIRS letter proposed that the JPB develop professional practice guidelines for hydrological assessments for the forest sector.

In addition a special investigation of community watersheds carried out by the Forest Practices Board (FPB) found deficiencies in both the management and the assessment of these watersheds. One of the Board's recommendations was:

*“Ensuring the content of professional assessments is meaningful the ABCFP and APEGBC should develop guidance for their members on the appropriate content of a watershed or hydrological assessment.”*



In response to these concerns, ABCFP and Engineers and Geoscientists BC established a group of primary drafters to develop guidelines for the standards of practice to be followed in managing hydrologic values and risks in watersheds where forest planning and operations are carried out in BC. The Executive of the Engineers and Geoscientists BC - Engineers and Geoscientists in the Resource Sector Division approved the members of Engineers and Geoscientists BC that acted as the primary drafters.

The ABCFP and Engineers and Geoscientists BC members who acted as the primary drafters of the attached guidelines include the following:

- Glynnis Horel, P.Eng., Geological Engineer., G.M. Horel Engineering Ltd.
- Dr. Martin Carver, P.Eng./P.Geo., Hydrologist and Geomorphologist , Aqua Environmental Associates
- Dr. Dave Wilford, P.Geo. RPF, Hydrologist ,BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Dr. Rita Winkler, RPF , Hydrologist, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Dr. Dave Wilford, P.Geo. Hydrologist , RPF, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Jamie Skinner, RPF, Forestry Superintendent – Planning, Tolko Industries Ltd.

Then, a professional editorial reviewer experienced with technical documents was hired to massage the document and complete an editorial review.

Next, these guidelines underwent a preliminary review by select specialists. All feedback was considered and further revisions were made.

Following is a list of the select specialists that provided input as part of the preliminary review process.

- Pierre Beaudry, RPF, Pierre Beaudry and Associates, Prince George BC, Forest Hydrologist
- Gordon Joyce, RPF Lands End Environmental Consulting Limited, Watershed Management, Environmental and Forest Management Planning
- David Maloney, P.Ag. Ministry of Forests, Lands, Natural Resource Operations and Rural Development,
- Michael Milne, ABCFP Limited Licensee , MJ Milne and Associates, Watershed Hydrologist
- Dr. Kim Green, P.Geo. PhD. Apex Geoscience Consultants Ltd. Watershed Geoscientist
- Dr. Dave Spittlehouse ,P.Ag, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development , Forest Climatology
- Dr. Doug VanDine, P.Eng./P.Geo. , Vandine Geological Engineering , Geological and Geotechnical Engineering
- Derek Marcoux, RPBio. Registrar, College of Applied Biology

These guidelines were then reviewed and approved by the ABCFP/Engineers and Geoscientists BC Joint Practice Board, and the Executive of the Engineers and Geoscientists in the Resource Sector Division.

Finally, the document was submitted to the Professional Practice Committee for review. The following motion was passed:

“The Professional Practice Committee recommends that Council approve the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector for final editorial and legal review prior to publication.”

## **RECOMMENDATIONS**

That Council approves the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector for final legal and editorial review prior to publication.

## **MOTION**

That Council approves the ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector for final legal and editorial review prior to publication.

## **APPENDIX A – ABCFP/Engineers and Geoscientists BC Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector, Version 1.0**



## OPEN SESSION

### ITEM 5.7

DATE	March 21, 2019
REPORT TO	Council for Decision
FROM	Deesh Olychick, Director, Corporate Governance & Strategy
SUBJECT	AGM Special Rules of Order
LINKAGE TO STRATEGIC PLAN	Identify and implement practices that improve Engineers and Geoscientists BC's ability to more effectively carry out its duty and objects

Purpose	To decide on whether to defer the membership vote on a AGM Special Rule which would require AGM motions from members to be submitted a minimum of 30 days ahead of the AGM.
Motion	That Council approve that implementation of the AGM Special Rules of Order be deferred and be re-considered by the Governance Committee in advance of the 2020 AGM.

## BACKGROUND

The Annual General Meeting (AGM) is an opportunity for members to hear from Council and senior staff on the association's strategic progress, key initiatives, and financial standing. It also provides an opportunity for members to participate in self-regulation by bringing forward motions for the consideration of Council.

Over the past several years, members have been encouraged to submit motions 30 days in advance. Advanced submissions allow for the motion to be reviewed in advance by the Governance Committee to ensure that it is order for consideration at the AGM (in accordance with Robert's Rules of Order) and secondly, it allows for the motion to be published ahead of the meeting, in order to support informed debate on the issue. It also provides the opportunity for the association to publish additional supplementary information that may support the debate.

In 2018, several enhancements were implemented to improve the process and encourage the submission of motions in advance of the AGM. This included:

- New guidelines outlining how member motions will be assessed by Council

- New submission guide outlining the process for submitting motions, information on presenting your motion in person, the Council review process as well as other ways (outside of the AGM) members can bring forward issues to Council
- New enhanced online form to submit the motion, allowing the member to provide additional information about how the motion aligns with the association's strategic plan and the motion's importance
- Extensive communication to inform members of the process and benefits of submitting motions in advance (direct member email, direct emails to stakeholder groups, web presence, and articles in Enews and Innovation)

For the 2019 AGM, only one motion was submitted in advance. Two additional motions were submitted at the meeting.

Last April, Council approved the Governance Committee's recommendation to introduce an AGM Special Rule to require that AGM motions from members be submitted a minimum of 30 days ahead of the AGM. In June 2018, Council approved that the AGM Special Rule be put to a membership vote concurrent with the 2019 election.

## DISCUSSION

Earlier this year, Council discussed various initiatives that may need to be deferred as a result of Bill 49. One of the initiatives discussed was deferral of the AGM Special Rules of Order.

Administering a vote on new AGM Special Rules will require a number of staff resources to support its success. This would involve developing a robust communication plan, member engagement, and drafting of the Special Rule. In addition, because this is a new process there will likely be a number of questions from members about why the new rules are necessary, how the process will work, how urgent motions will be considered and how it will impact the meeting. All of the above will require the time and attention of different members of the organization and Council to ensure it is thoughtfully communicated to members.

In addition, as a result of Bill 49 there will be a number of other changes to the 2019 election. These include communicating the new merit-based nomination process, and the elimination of the 25 member write-in provision. All of the above will require dedicated communication support (including responding to member enquiries).

It is therefore recommended that organizational resources be dedicated to supporting the mandatory changes associated with Bill 49. For the 2019 AGM, we would continue to encourage advanced submission of motions and the enhancements introduced in 2018 would continue to support the process for 2019. Members would still be permitted to submit motions on the day of the AGM before the deadline approved by the assembly (usually 10am).

## RECOMMENDATION

We recommend that organizational resources be dedicated to supporting the mandatory changes associated with Bill 49 and that the implementation of the Special Rules be deferred to a time in the future when there is more organizational capacity and election rules have entered a period of stability.

## MOTION

That Council approve that implementation of the AGM Special Rules of Order be deferred and be re-considered by the Governance Committee in advance of the 2020 AGM.

OPEN SESSION

ITEM 5.8

DATE	March 28, 2019
REPORT TO	Council for Decision
FROM	P.B.P. (Philippe) Kruchten, PhD, P.Eng., FEC, Chair of the Registration Committee
SUBJECT	Update on the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment
LINKAGE TO STRATEGIC PLAN	Continue to implement best practice in governance.

Purpose	To present an update on a pilot program to test tools to reduce the processing time of applications for Limited Licences.
Motion	That the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment be continued until April 2020 and that staff look into developing other 'low risk' profiles to test in this pilot. A final report will be brought to Council at the end of this time frame summarizing the findings of the pilot program.

## BACKGROUND

The time required to process applications for Engineering Licences is perceived to be too long by applicants and may be creating an impression that Engineering Licences are too difficult to obtain. Consequently, a study and analysis of the processing time for Engineering Licence applications was carried out in March 2018.

The data showed that there are areas where the processing of Engineering Licence applications is slower than other types of applications.

The data also indicated that some low risk profiles for Eng L applicants, analogous to ones used to process P. Eng. applications, could be used along with the streamlining of some process steps to reduce processing times.

## DISCUSSION

The analysis of process data by staff led to the conclusion that some improvements could be introduced based on the use of 'low risk' profiles, similar to the ones used for P. Eng. applications.

Staff analyzed data from past applications along with the outcome and found data to support establishing two 'low risk' profiles.

The first would apply to applicants who are members of an engineering faculty. A significant number of members of engineering faculties who apply for an Eng. L. are interviewed but the outcome of the interview and then discussion by the Limited Licence Subcommittee (LLSC) do not change the scope for which they applied. These applicants did not need to be interviewed.

The proposed criteria for 'low risk' applicants in this category are:

- Over 10 years of experience teaching and carrying out research at an institution of higher education
- An education matching the discipline of evaluation
- A minimum of four P.Eng., P.Geo., or PE in-discipline references, with a minimum of two supervisor references
- A positive reference profile, including positive supervisor's comments

Such applications will be reviewed by the Associate Director, Engineering Admissions before being sent to the Registration Committee, without a review by the LLSC. This would save considerable time and resources.

The second would apply to non-faculty applicants. A significant number applicants are interviewed but the outcome of the interview and then discussion by the Limited Licence Subcommittee (LLSC) do not change the scope for which they applied. These applicants did not need to be interviewed.

The proposed criteria for 'low risk' applicants in this category are:

- Over 10 years of experience
- An education matching the discipline of evaluation with a minimum two year technical diploma
- A minimum of four P.Eng., P.Geo., or PE in-discipline references, with a minimum of two supervisor references
- Positive reference profile, including positive supervisor's comments

All applications that meet these criteria will be sent to the Associate Director for confirmation and then the application shall be brought to the Limited License Sub-committee (LLSC). The scope and experience are reviewed by the LLSC. Once the scope is approved by the LLSC, the application is brought to the Registration Committee for final discussion, without an interview. This would save considerable time and resources.

At the April 27, 2018 meeting Council Carried a motion that the 'low risk' profiles and recommended tools be used in a pilot process by staff in the Registration Department to determine if they are effective in reducing the processing time of Eng. L. applications.

This report provides an update on the progress in applying these criteria to Eng. L. applicants.

The metric that we are using to gauge the effectiveness of these 'low risk' profiles is the time to first decision (TTFD). This is the KPI reported to Council for P. Eng. applications. It is defined as the number of calendar days between a milestone decision (one that either establishes approval of P. Eng. status, subject to completion of the PPE and online seminar, or assigns additional requirements) and the date of receipt of all documentation needed to make that decision.

For Canadian trained P. Eng. applicants, the target is 35 days with 85% being within 70 days.

In the twelve months to date, we have reached a decision on 17 applications, nine have a TTFD of less than 100 days. In comparison, in the three years prior to May 1, 2018, we reached a decision on 41 applications with only five having a TTFD of less than 100 days. The adoption of the 'low risk' profiles has decreased processing time for these types of applications.

The data set is small and more data need to be obtained to draw firmer conclusions.

Staff should also look into developing other 'low risk' criteria to bring forward for adoption into the pilot.

## RECOMMENDATIONS

Continue to run the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment.

Staff should look into developing other 'low risk' profiles to test in this pilot.

## MOTION

That the Pilot Program Utilizing 'Low Risk' Profiles and Recommended Tools Outlined in the Policy on Risk Based Limited Licence Assessment be continued until April 2020 and that staff look into developing other 'low risk' profiles to test in this pilot. A final report will be brought to Council at the end of this time frame summarizing the findings of the pilot program.



OPEN SESSION

ITEM 5.9

DATE	February 26, 2019
REPORT TO	Council for Information
FROM	Garth Kirkham, P.Geo., FGC Phil Sunderland, P.Eng., FEC, FGC (Hon.) John Watson, P.Eng., FEC, FGC (Hon.), Chair of the Fairness Panel
SUBJECT	Registration Fairness Panel Annual Report to Council March 2018 – February 2019
LINKAGE TO STRATEGIC PLAN	Continue to implement best practice in governance

Purpose	To summarize the operation and findings of the Fairness Panel over the past year.
Motion	That Council receive the Annual Report of the Registration Fairness Panel for March 2018 to February 2019.

## BACKGROUND

The Registration Fairness Panel (the 'Panel') is an independent, non-statutory body that examines the fairness of the process of an application when the Registration Committee (the Committee') rejects an appeal of a registration decision made by an applicant. The Panel is advisory to the Committee and reports to Council. It makes recommendations to the Committee and Registration Task Force on process, policies and procedures as warranted, and provides an annual report of its activities to Council. Its last annual report covered the period March 2017 to February 2018.

The Panel is composed of three past members of council or other senior members who have served on the Registration Committee. The current Fairness Panel members are Garth Kirkham P.Geo., FGC, John Watson, P.Eng., FEC, FGC (Hon.) and Phil Sunderland, P.Eng., FEC, FGC (Hon.). A pool of Expert Reviewers in engineering and geoscience supports the work of the Panel. The Panel consults with the Expert Reviewers at its discretion, normally when it determines that the technical competence of the applicant is at issue, rather than the process followed or adherence to policy.

## DISCUSSION

### Panel Activities March 2018 through February 2019

During the reporting period, the Panel held six meetings. This report by the Panel on its activities for the period March 2018 through February 2019 was presented at the Registration Committee meeting on April 3, 2019.

Table 1 sets out the history of appeals of registration decisions over the past ten years.

The Registration Committee reviewed 30 appeals from March 2018 to February 2019.

The Registration Committee referred 14 of those appeals to the Panel. There were no special referrals in this period.

The Panel agreed with the Registration Committee's original decision in 13 of the 14 appeals (91%). The Panel made a recommendation for registration in one of the appeals.

Table 2 shows the distribution by applicant type, where the applicant was educated and Panel recommendation for the appeals referred to the Panel.

The policy on appeals calls for the Committee to refer any instances to Council where it does not follow the Panel recommendation. There was not a referral of this nature during the reporting period.

Table 1 : Appeals/Referrals Reviewed by Registration Committee			
Year	Total	Referred to Fairness Panel	
		Appeals	Special Referrals
<b>2018 – 2019</b>	<b>30</b>	<b>14</b>	<b>0</b>
2017 – 2018	33**	20***	0
2016 – 2017	22*	18**	0
2015 – 2016	23*	16**	0
2014 – 2015	36	20	0
2012 – 2013	36	20	0
2011 – 2012	36	16	2
2010 – 2011	57	26	1
2009 – 2010	48	20	2
2008 – 2009	44	21	0

*\* This number includes the two appeals received for review by the Geoscience Committee.*

*\*\*This number includes the two appeals referred to the Fairness Panel from the Geoscience Committee*

*\*\*\* This number includes one appeal referred to the Fairness Panel from the Geoscience Committee*

Table 2: Appeals/Referrals Reviewed by the Fairness Panel		
Outcome	Applicant for Professional Engineer	
	Canadian	International
FP agrees with original RC Decision	3	10
FP recommends registration	1	0
<b>TOTAL</b>	<b>4</b>	<b>10</b>

*Note: FP = Fairness Panel, RC = Registration Committee*

#### Expert Reviewers

The Panel did not call on the services of the Expert Reviewer panel during the reporting period.

#### **MOTION**

That Council receive the Annual Report of the Registration Fairness Panel for March 2018 to February 2019.

OPEN SESSION

ITEM 5.10

DATE	March 25, 2019
REPORT TO	Council for Information
FROM	Jennifer Cho, CPA, CGA Chief Financial and Administration Officer
SUBJECT	Financial Results as at February 28, 2019
LINKAGE TO STRATEGIC PLAN	Implement Best Practices in governance.

Purpose	For Council to review financial results as February 28, 2019.
Motion	That Council receive the Engineers and Geoscientists British Columbia financial results as at February 28, 2019.

## BACKGROUND

As approved by Council at the September 12, 2014 meeting, quarterly financial reports will be made to the Executive Committee for review. The same information package will be provided to the Audit Committee for information. The timing of the Executive Committee and Council meetings did not match up to when February financial results were available for review, thus both the Executive and Audit Committees have not had a chance to review February financial results. As a result, a more detailed financial results summary is provided to Council for review.

## DISCUSSION

This update includes a comparison of year-to-date actual results to budget, with a summary of major variances.

	A	B	C	D	E	F
1		YTD			Annual Prior Year Actual	2019 Budget
2		Actual	Budget	Variance		
3	<b>REVENUE</b>					
4	Members	7,428	7,331	97	10,443	11,168
5	Others	3,621	3,158	463	4,989	4,988
6	<b>Total Revenue</b>	<b>11,049</b>	<b>10,489</b>	<b>560</b>	<b>15,432</b>	<b>16,156</b>
7						
8	<b>EXPENDITURES</b>					
9	Operating	10,155	10,703	548	15,199	16,524
10	<b>Operating Income Before External Contracts</b>	<b>894</b>	<b>(214)</b>	<b>1,108</b>	<b>233</b>	<b>(368)</b>
11						
12	<b>EXTERNAL CONTRACTS</b>					
13	Revenue	905	550	355	937	1,100
14	Expenditures	1,043	688	(355)	889	1,032
15	<b>Operating Income - External Contracts</b>	<b>(138)</b>	<b>(138)</b>	<b>0</b>	<b>48</b>	<b>68</b>
16						
17	<b>Net Operating Income/(Loss)</b>	<b>756</b>	<b>(352)</b>	<b>1,108</b>	<b>281</b>	<b>(300)</b>

## YEAR-TO-DATE REVIEW - BEFORE EXTERNAL CONTRACTS

### A. MEMBER FEES & OTHER REVENUES

Total revenues are \$560K (cell D6) over budget, primarily due to:

- Higher interim membership fees collected than anticipated
- Volume increase on application from overall membership categories
- Timing of National Competency Based Assessment program revenue
- Unexpected discipline recovery revenue from several cases
- Stronger than expected web advertisement revenue than anticipated
- Higher investment interest revenue than anticipated
- Higher Annual Conference and Professional Development revenue than expected

## B. EXPENDITURES

Expenditures are \$548K (cell D9) below budget primarily due to:

- Savings in salaries and benefits primarily due to unfilled positions
- Timing on succession planning project expenses
- Savings in legal expenses by using in-house legal staff
- Delayed expenses from venues and speakers which will catch up to budget in next quarter
- Savings due to timing on implementation of member and public engagement strategy

### Year-To-Date Review – External Contracts

The YTD contribution margin is on track towards annual budget.

A more detailed variance report by departments/programs is outlined in Attachment A.

### **FY2019 FORECAST**

The financial forecast for June 30, 2019 is that Engineers and Geoscientists BC will be in a surplus position of approximately \$1K.

There are large disciplinary hearings that have caused cost overruns but are somewhat offset by some successful recoveries of legal expenses from successful disciplinary cases. There are savings in salaries expenses due to unfilled positions, maternity leave replacements and delayed hiring. Other savings include unused contingency and delays with the FIPPA Phase 2 audit and PSA audit.

The following table illustrates the high level budget cost variances and the FY2019 forecast result (in \$'000's):

FY2019 Budget		(\$300K)
Plus significant budget revenue/cost variances:		
Large Disciplinary Hearings		(422K)
Higher than expected amortization (from capitalization of various IT projects)		113K
Salary savings from unfilled positions		100K
Higher than expected membership revenue		93K
Unbudgeted Legal Recoveries		83K
Bank Charges Savings from new contract		76K
Unused Contingency		70K
Delay FIPPA Audit Phase 2 to 2021		50K
Not going ahead with PSA Audit		50K
Employer Health Tax Savings (timing of payment)		48K
Innovation Magazine printing and postage savings		40K
<b>Estimated FY2019 Surplus</b>		<b>1K</b>

Most recently, there are a couple of factors that will affect the bottom line. A large disciplinary hearing has settled in our favor and the payment schedule of the decision will produce excess funds. However, there may be offsets to this surplus. For example, the Building & Space Planning Task Force is in the process of procuring consultants to complete their work and the consultant fees may come in over budget. As such, we are still forecasting a break-even scenario for year-end, however, the Association may very well be in a small surplus position with the changing factors to occur between now and end of June.

## RECOMMENDATIONS

That Council receive the Engineers and Geoscientists British Columbia financial results as at February 28, 2019.

## MOTION

That Council receive the Engineers and Geoscientists British Columbia financial results as at February 28, 2019.

## ATTACHMENT A – February 28, 2019 Program Statement

(in \$'000)	2018/19 Budget	2018/19 YTD Budget	FY2018/19 YTD Actual	YTD Actual vs YTD Budget Variance	Comments
REVENUES					
Member Services					
Affinity Program	413	282	275	(7)	
Annual Conference	304	304	341	37	
Professional Development	986	579	668	89	
Online Law & Ethics	0	0	0	0	
	1,703	1,164	1,284	119	
Communications & Stakeholder Engagement					
Innovation Magazine	190	127	109	(18)	
Sponsorship Revenue	8	3	7	3	
Membership Advantage Program for Students and Student Membership	45	2	7	6	
Employment Web Advertising	325	210	269	60	Continuing trend from prior year of higher revenue than budgeted
	568	341	392	51	
Professional Practice, Standards & Development					
Certified Professional Program	70	0	3	3	
Organizational Quality Management	246	180	172	(9)	
Grant	1,100	550	905	355	Variance due to project progress
	1,416	730	1,079	349	
Registration					
Academic Exams	35	17	38	21	
Applications/Registration	1,341	869	1,007	137	Variance due to volume increase on application from overall membership categories
Limited License	23	15	18	3	
Professional Practice Exams	449	284	281	(3)	
APEC Register	0	0	0	0	
Structural Qualifications	53	38	63	25	
Registration External Projects	102	68	0	(68)	Variance due to delay in implementation of Working in Canada Seminar
	2,003	1,292	1,407	115	
Annual Membership Fees	11,082	7,302	7,390	88	Higher interim membership fees collection
SPLI	0	0	0	0	
Late Fee	44	30	38	9	
Investment Revenue	56	37	113	76	
Discipline Recoveries	0	0	68	68	Unexpected discipline recovery from several cases
Other Revenue	84	18	15	(3)	
National Programs - CBA Engineer Canada	250	125	168	43	
National Programs - CBA Geo Canada	50	0	0	0	
TOTAL REVENUE	17,256	11,039	11,954	915	



EXPENDITURE					
(in \$'000)	2018/19 Budget	2018/19 YTD Budget	FY2018/19 YTD Actual	YTD Actual vs YTD Budget Variance	Comments
<u>Finance &amp; Corporate Services</u>					
Annual Invoicing	43	42	24	18	
Building Operations	390	260	247	13	
Administrative Services	83	54	16	39	Variance due to timing of expenses
Non Program Specific	733	568	536	32	
Salaries & Benefits	900	600	643	(43)	
	2,149	1,525	1,466	60	
<u>Human Resources</u>					
Staffing	30	20	11	9	
Training and Development	83	55	23	32	
Staff Recognition	48	27	25	2	
Occupational Health and Safety	1	1	1	0	
Volunteer Management	41	0	19	(19)	Variance due to timing of expenses
Compensation Management	5	3	5	(2)	
Strategic HR and Organizational Development	60	40	5	35	Variance due to timing of expenses
Green Team	1	1	0	1	
Non Program Specific	3	2	0	2	
Salaries & Benefits	302	202	193	8	
	575	351	284	67	
<u>Information Technology</u>					
Run - Business Continuity	391	238	208	31	
Telecommunications	75	50	33	16	
Grow - Systems & Development	30	20	8	12	
Non Program Specific	7	5	1	4	
Salaries & Benefits	1,054	703	706	(3)	
	1,558	1,016	957	59	
<u>Member Services</u>					
Affinity Program	1	1	0	1	
Annual Conference	402	402	368	34	
Professional Development	488	280	245	35	
Online Law & Ethics	10	10	0	10	
Mentoring	16	0	0	(0)	
Branches/Divisions	69	36	24	12	
Induction Ceremony and Former Presidents Dinner	82	55	44	11	
Gender Diversity	23	8	7	0	
Nomination & Election Task Force	6	3	0	3	
Non Program Specific	0	0	1	(1)	
Salaries & Benefits	850	567	605	(38)	
	1,946	1,360	1,294	66	

(in \$'000)	2018/19 Budget	2018/19 YTD Budget	FY2018/19 YTD Actual	YTD Actual vs YTD Budget Variance	Comments
<u>Communications &amp; Stakeholder Engagement</u>					
Awards	54	54	68	(14)	
Career Awareness	65	26	43	(17)	
Innovation Magazine	400	266	210	57	
Public Relations	134	55	58	(3)	
Publications	44	26	17	9	
Stakeholder Engagement	187	125	25	100	Timing of expenses for outreach/engagement targeting members, public and member engagement strategy
Student Membership & Sponsorship	53	29	28	1	
Branding Collateral Renewal	0	0	0	0	
Non Program Specific	18	11	8	3	
Salaries & Benefits	971	647	645	3	
	1,925	1,240	1,103	137	
<u>Council &amp; Executive</u>					
CCPE	459	204	206	(2)	
CCPG	93	0	0	0	
Council/Executive	268	148	121	27	
Elections	23	23	14	8	
Special Projects	90	0	15	(15)	
Government Relations	145	83	62	21	
Non Program Specific	7	3	3	0	
Salaries & Benefits	951	634	530	103	Savings mainly from delay in hiring of Corporate Secretariat position
	2,035	1,095	953	142	
<u>Professional Practice, Standards &amp; Development</u>					
Liaison with Authorities	2	1	0	1	
Practice Review	177	20	37	(17)	
Professional Practice	169	112	79	34	
Corporate Practice	0	0	0	0	
Certified Professional Program	64	37	57	(20)	
Climate Change Initiatives	20	4	1	3	
Organizational Quality Management	180	120	157	(37)	
Member CPD Requirements	91	60	17	43	
Sustainability	1	1	0	1	
Non Program Specific	14	9	8	2	
Grants	1,032	688	1,043	(355)	Variance due to project progress
Salaries & Benefits	1,325	883	797	86	Savings mainly from delay in hiring outreach manager position
	3,074	1,936	2,195	(259)	
<u>Legislation, Ethics &amp; Compliance</u>					
Discipline	217	145	473	(329)	Large-scale discipline is expensive than anticipated
Enforcement	14	9	1	8	
Investigations	133	88	15	74	Savings from using in-house legal staff which expected savings from this category
Non Program Specific	79	52	47	5	
Salaries & Benefits	841	561	550	11	
	1,283	855	1,086	(231)	

(in \$'000)	2018/19 Budget	2018/19 YTD Budget	FY2018/19 YTD Actual	YTD Actual vs YTD Budget Variance	Comments
<u>Registration</u>					
Academic Exams	24	12	21	(9)	
Applications/Registration	167	94	87	7	
Engineers In Training/Geoscientists In Training Prof. Certification	10	7	0	7	
Limited License	30	20	0	20	
Professional Practice Exams	379	229	201	28	
Structural Qualifications	12	12	6	6	
Registration External Projects	73	49	0	49	
Non Program Specific	20	13	0	13	
Salaries & Benefits	1,579	1,053	1,023	30	
	2,293	1,487	1,337	150	
National Programs	239	160	126	33	Variance due to delay in consulting services
<b>Total Expenditure from above</b>	17,077	11,025	10,801	224	
Incidental payroll savings	(170)	0	0	0	
Amortization	546	364	396	(32)	
Contingency	100	0	1	(1)	
Foundation	3	2	0	2	
Benevolent Fund Society	1	0	0	0	
<b>TOTAL EXPENDITURE</b>	<b>17,556</b>	<b>11,391</b>	<b>11,198</b>	<b>193</b>	
<b>SURPLUS/(DEFLICIT)</b>	<b>(300)</b>	<b>(352)</b>	<b>756</b>	<b>(1,108)</b>	

OPEN SESSION

ITEM 5.11.1

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Ann English, P.Eng., Chief Executive Officer & Registrar
SUBJECT	CEO and Registrar Report to Council
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

Purpose	This report highlights some of the activities of the Association related to policy work, implementation of the Strategic Plan and ongoing Regulatory duties since the February 1, 2019 meeting of Council
Motion	For information only.

## 1. INTERNAL OPERATIONS

### a. COMPLIANCE STATEMENT

Engineers and Geoscientists BC has met all of its legal obligations. There are no outstanding lawsuits or other liabilities that would materially modify our financial position.

## 2. MEMBER AND PUBLIC AFFAIRS

### a. MEDIA INTERACTIONS

Through proactive media outreach, we generated provincial media coverage for National Engineering and Geoscience Month (NEGM) and our efforts to advance the 30x30 strategy. This included:

- February 22: CEO Ann English, P.Eng. was featured in Business in Vancouver's [Women in Business edition](#) (pages 28 and 29).

- March 1: [Op-Ed by President Kathy Tarnai-Lokhorst](#), P.Eng. published in The Province in both print and digital editions.
- March 2: [Coverage of the Science Games](#) in the Vancouver Sun.
- March 2: Coverage of the Vancouver Branch's Engineering and Geoscience Festival by Fairchild TV.
- March 4: President Kathy Tarnai-Lokhorst, P.Eng. and Christina Noel, EIT, appeared on [Global TV's morning show](#) to talk about why initiatives like NEGM are critical to our work to accelerate diversity in the professions.
- March 5: Christina Noel, EIT was interviewed on [Kamloops radio station CHNL](#) to discuss the importance of outreach to youth—especially young women—to increase awareness and interest in engineering and geoscience.
- March 24: President Kathy Tarnai-Lokhorst, P.Eng. was interviewed by Ming Pao about how parents can explore science with their kids, and encourage an interest in science as a career:  
[http://www.mingpaocanada.com/Van/htm/News/20190324/wj1h\\_r.htm](http://www.mingpaocanada.com/Van/htm/News/20190324/wj1h_r.htm)



## OPEN SESSION

### ITEM 5.11.2

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Engineers and Geoscientists BC Directors to Engineers Canada
SUBJECT	Engineers Canada Update
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

Engineers Canada (EC) is the national federation owned by the 12 engineering regulators (Engineers and Geoscientists BC is one), referred to as the “Regulators”. The Annual General Meeting of the members of Engineers Canada will be held in Quebec City on May 25.

1. The **Canadian Engineering Accreditation Board** has issued a call for interest for member-at-large positions. The call went out on March 12 to the engineering regulators, the National Council of Deans of Engineering and Applied Science (NCDEAS), and current members of the CEAB. Applications will be accepted until April 9, 2019.
2. **30 by 30 early win** - The Society for Canadian Women in Science and Technology (SCWIST) has received, with our support, a roughly \$1M grant from the federal government’s *Capacity-building Fund as part of the Budget 2018* announcement to support a viable and sustainable women’s movement across Canada. To support its pan-Canadian mandate, SCWIST will increase organizational effectiveness by creating a 5-year strategic plan that addresses administrative processes to support the growing organization; develop HR management and board governance structures to incorporate diverse groups; and increase financial sustainability. SCWIST will also form strategic partnerships and alliances to work collectively to advance gender equality and advocate for real change at the community, organizational and public policy level.
3. The **University of Victoria** has nominated two co-Champions for **30 by 30**: Dr. Alexandra Branzan, Associate Professor and Graduate Advisor in Electrical and Computer Engineering; and Michael Zastre, Faculty Member in Computer Science at the University of Victoria. Welcome Alexandra and Michael!

4. The **Engineers Canada Funding Task Force** has proposed 2 options for further discussion; retaining the status quo at \$10.21 per member, fully supported by affinity funding or a gradual small annual increase that would retain the assessed fees at approximately 30% of revenue. EGBC has submitted a letter that supports option 2 but stresses that the value proposition must be maintained. Alternatively, EGBC has asked to explore potential for a fee for service model.

BC, Saskatchewan and Manitoba do not participate in the insurance affinity program. Alberta and Nova Scotia have issued letters of intent to withdraw from the national insurance affinity program.

5. Governance committee continues to draft revised governance policies for discussion and approval. It is proposed that the Executive committee be dissolved in favour of a Human Resources committee to manage the CEO.
6. Nova Scotia has relaxed the one year of Canadian experience requirement for registration. NS will now accept that the intent of the requirement has been fulfilled by competency based assessment.
7. Our **Equitable Participation in Engineering Committee** met via teleconference to discuss strategy development: on SP3 – recruitment, retention and professional development of women in engineering; OP8 - sparking interest in the next generation and outreach; and OP9 - Indigenous peoples' participation in engineering education. Ann English has joined the committee as the CEO Group representative and will be onboarded over the next few weeks by the committee Chair and staff manager.
8. Jeanette Southwood and Cassandra Polyzou met via teleconference with Catherine Gignac, Chair of **Women in Mining Canada (WIMC)** to discuss 30 by 30 and WIMC's work to support students and women in mining, WIMC's [National Action Plan for Canada's Mining Employers](#), and their plans to evaluate the impact of their Action Plan.
9. President Annette Bergeron and Helen Wojcinski, PEO's 30 by 30 Champion, presented on 30 by 30 at the **Council on Licensure, Enforcement, and Regulation (CLEAR)** Symposium in Toronto. The theme of the Symposium this year was *Responding to Social Change: Bringing Regulatory Bodies Beyond 'Should' and Towards 'Do.'*
10. Joey Taylor, Jeanette Southwood, and Stephanie Price attended a meeting with **Senator Rosa Galvez, ing.**, one of the few engineers who have been appointed to the Senate, to discuss engineering accreditation, women in engineering, anti-corruption efforts in engineering, and the crucial role that engineers play on the global scale.

11. Engineers Canada and Polytechnique Montreal are delivering the **Massive Open On-Line Course (MOOC), “Sustainability in Practice”**, for a second time. The course started this past Wednesday, March 20, with access to the first of the four modules made available. Registration remains open to April 15 and the four self-study modules must be completed by May 17. The course is free and is accessed on-line. Information on the course and registration is available through the following link: <https://engineerscanada.ca/news-and-events/news/first-edition-of-sustainability-in-practice-class-wraps-up-with-great-success>. Please encourage your license holders to take this course for their professional development.

Respectfully submitted,

Jeff Holm, PEng, FEC and Russ Kinghorn, PEng, FEC



OPEN SESSION

ITEM 5.11.3

DATE	March 27, 2019
REPORT TO	Council for Information
FROM	Engineers and Geoscientists BC Director to Geoscientists Canada
SUBJECT	Geoscientists Canada Update
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

BACKGROUND

On January 25, 2019, Geoscientist Canada held the 57<sup>th</sup> directors' meetings in Toronto, ON. The directors' meetings addressed regular items of business and discussions.

A fulsome summary is included as an attachment. There were no significant action items that requires Engineers and Geoscientists BC Council attention.

In addition, the activities of Geoscientist Canada since the last board meeting are in the following:

DISCUSSION

The following are the activities and actions currently being performed and/or planned;

- CEO attendance and input on Task Group on Global Geoscience Professionalism. Discussions included production of the group's annual report, a new strategic plan, and budget.
- The AST II Work Experience Competencies (for the WECs) Subject Matter Experts (SMEs) met to develop the draft of the scoring rubric (draft to be brought to the CAs in Feb for review and comment).
- CEO participation in the Engineers Competency Based Assessment (CBA) User Steering Group meeting; provides on-going insight into the development of the engineers online CBA which provides valuable considerations for the development of the geoscience online WECs.

- Certification Marks – P.Geo. and Professional Geoscientist – Published in the Canadian Trade Marks Journal on Nov 14, 2018. Last day for public to oppose or provide comment is January 14, 2019
- AST II
  - Quarterly report filed; AST II Financial Forecast Update filed
  - RFP for Pre-arrival Tool consultant has been distributed and posted
  - Documents are being prepared for CA feedback on the developed scoring rubric for the Work Experience Competencies (WECs)
  - Receipt of a draft agreement, for review, from Engineers and Geoscientists BC concerning the current and future development of the online WEC module
- CEO attended a Mining Industry Human Resources Council (MiHR) webinar on the release of their Canadian Mining Labour Market Outlook 2019. Of note in the report,
  - The large number of retirees expected and the need for replacement (admittedly, this focused mainly on engineering)
  - The larger number of Science, Technology, Engineering, Math (STEM) graduates needed in the mining industry
  - Underrepresentation of women in the mining industry workforce (42% women in Canadian labour force vs. 16% in the mining industry)
  - Also the underrepresentation of immigrants and visible minorities
  - Gains in representation of Indigenous workers
- Discussion with G. Pope which led to the understanding that the National Professional Practice and Ethics Advisory Committee (NPPEAC) would hold their annual meeting, which includes all the admissions officials, immediately before or after the CGSC October meeting every other year.
- AST II – Documents have been prepared and are currently being reviewed and revised as we prepare to seek CA input, via an online survey, on the WECs and accompanying scoring rubric. The request for input will be sent out next week and responses from the CAs will be required by no later than March 8, 2019.
- CEO visited Engineers and Geoscientists BC Offices
  - Financial audit completed. Many thanks to Joanna Li and Jennifer Cho in the Engineers and Geoscientists BC office for their audit support. Audit report should be ready for Audit Committee review in early to mid-March.
  - Two meetings held with AST II project manager and Engineers and Geoscientists BC IT re the development of the online WEC component and accompanying

development agreement. Thanks to Gill Pichler and Jason Ong of Engineers and Geoscientists BC for their support.

- Meetings held with Jason Ong, which resulted in the first draft on geoscience WEC online screens and the beginnings of revisions to the applicants/validators/assessors training modules.
- GC historical files reviewed with Hugh Miller. Hugh would be pleased to assist GC in the future with various undertakings.
- Able to liaise with BMO representative and update required authorizations (signing authorities).
- Service agreement with Engineers and Geoscientists BC has been renewed for another year at \$15,000 for the year. Engineers and Geoscientists BC's estimated assessment of the annual cost came in at a slightly higher value, but felt they were able to offer GC the same rate as 2018.

#### **ACTION ITEM**

The next step is to take the priority list to the CA's for feedback which is the only action item to be presented to Council from the meeting.

Respectfully submitted,

Garth Kirkham, P.Geo., FGC

Director, Geoscientists Canada

#### **ATTACHMENT A – Agenda and Meeting Documents for 56<sup>th</sup> BOD Meeting for Geoscientists Canada**



## Geoscientists Canada – Post-Meeting Briefing Note

57th Meeting of Geoscientists Canada Board of Directors

Venue: GHD Office, (Boardroom)

111 Brunel Road #200, Mississauga, ON L4Z 1X3

Friday 25 January 2019; 8:30 AM to 4:30 PM

### Briefing Note

- Six Directors in person and three Directors participated by conference call.
- Also attending:
  - CGSC Chair
  - Two Geoscientists Canada staff.
- President Priddle chaired the meeting.

#### **Main agenda topics:**

- Review Implementation Renewal CA feedback.
- Update on CGSC activity and AST PH-II project.
- Approval of revised Terms of Reference of four (4) committees.
- Approval of Board Diversity Policy.
- Review of Int. Organization Relationship document.
- Discussion on National Awards.
- Approval of FGC candidates.



Board of Directors, Ex-Officio, and CEO at the 57th Meeting of Board

### Carried Board Motions (Abbreviated) and Action Items

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. The agenda of the 57<sup>th</sup> Meeting of the Geoscientists Canada Board of Directors meeting was approved.</li> <li>2. The minutes of the Geoscientists Canada 56<sup>th</sup> Board of Directors Meeting on 3 November 2018 were approved.</li> <li>3. The Terms of Reference of four committees by one omnibus motion were approved.</li> </ol> | <ol style="list-style-type: none"> <li>4. The Board Diversity Policy was approved.</li> <li>5. 2019 list of Fellow Geoscientists Canada Nominees to be elected Fellows of Geoscientists Canada was approved.</li> <li>6. Meeting adjourned.</li> </ol> |
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### Action Items

- #1. Professional Practice Committee (PPC) to review and assess the Canadian CPD table.
- #2 Rakesh Kumar to remove Directors email links from the Geoscientists Canada website and president@geoscientistscanada.ca to be added.
- #3 Andrea Waldie to contact PDAC to seek an invite to their H&S conference.
- #4 Andrea Waldie to approach APGO and EGBC to request the ability to share, with the other CAs, their agreements with securities commissions.
- #5 Directors to review the international organization relationship document and send their comments to CEO by Feb 28.
- #6 Security Committee to review QP short course with assistance from CEO.
- #7 Andrea Waldie to distribute 2016 legal opinion on crown immunity to all directors for information.

DATE	
REPORT TO	Council for Information
FROM	British Columbia/Yukon Regional Representative and Vice-Chair of the Engineers Canada Qualifications Board
SUBJECT	Engineers Canada Qualifications Board Update
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

## BACKGROUND

The Canadian Engineering Qualifications Board (CEQB) is a standing committee of the Engineers Canada Board responsible for developing new and maintaining national guidelines/white papers as well as examination syllabi that enable the assessment of qualifications, foster excellence in engineering practice/regulation as well as facilitate mobility of practitioners.

## DISCUSSION

At its January 29<sup>th</sup> meeting, CEQB approved that the term “Guidelines” for engineering license holders be replaced with “Public Guideline” and that “Model Guides” for regulators with “Regulators Guideline”. CEQB also approved that the Regulator Guideline on the Use of Syllabi and the Consultation Paper on Entrepreneurship be sent for consultation, which closed on April 11<sup>th</sup>.

The CEQB also held a face-to-face meeting on April 6<sup>th</sup> and 7<sup>th</sup> and approved that the Revised Guideline on Work Experience Using Competency-Based Assessment and the Draft White Paper on Environmental Engineering be sent for regulators consultations. Documents are available on-demand and consultation closes in June. An Engineers & Geoscientists British Columbia representative also provided an update on Canadian environment experience competencies.

The CEQB also kicked-off its consultation process for its 2020 work plan priorities. Regulators staff consultations will be conducted between April and July 2019. The Engineers & Geoscientists British Columbia Council will be able to submit items for the Engineers Canada Board’s consideration through their Engineers Canada Board directors from October to December 2019.

## OPEN SESSION

### ITEM 5.11.5

DATE	March 11, 2019
REPORT TO	Council for Information
FROM	Lindsay Steele, P.Geo. Associate Director, Professional Practice
SUBJECT	Corporate Regulation Update
LINKAGE TO STRATEGIC PLAN	Members and Organizations practice to high professional and ethical standards

Purpose	To update Council on Corporate Regulation.
Motion	For information only.

## BACKGROUND

The matter of whether Engineers and Geoscientists BC should have regulatory oversight over corporate entities in British Columbia is an issue that has been discussed by many Engineers and Geoscientists BC councils, particularly when major incidents involving engineering or geoscience have occurred. The matter is also raised on an ongoing basis by members and organizations that look to Engineers and Geoscientists BC to ensure that practitioners and companies within various sectors meet the same quality assurance standards.

The *Engineers and Geoscientists Act* contains provisions for the association to issue certificates of authorization — licences issued to allow individuals and businesses to provide professional engineering or geoscience services. However, nothing in the *Act* prevents companies from operating without such certificates.

In late 2014, Engineers and Geoscientists BC began examining this complex issue again to determine whether the association should pursue regulatory authority for corporate practice in order to enhance public protection. Council established an Advisory Task Force on Corporate Practice to guide the process of evaluation and member and stakeholder consultation. The task force comprises Engineers and Geoscientists BC members, licensees and industry representatives, including government, manufacturing, construction, the Association of Consulting Engineering Companies – BC (ACEC-BC), and others (the current task force has 19 members).

The mandate of the task force is: Through consultation with members and stakeholders, to examine the issue of regulating companies, organizations, and sole proprietorships that provide professional engineering and geoscience services, and to deliver recommendations to Council on matters identified in the TOR for the task force which outlines that their work is structured in the following three phases

- Phase 1. Strategic Consultation and Recommendation on whether to pursue regulatory authority for corporate practice. (Council approved the motions identified below at their April 28, 2017 meeting.)
- Phase 2. Recommend a Model for Corporate Practice Oversight (the attached report with recommendations completes this phase of the work of the task force)
- Phase 3. Develop a Business Plan (pending approval of the regulatory model proposed under phase 2)

The Phase 1 process included a detailed review of corporate regulatory models across Canada, and comprehensive engagement with members and stakeholders. The Task Force completed Phase 1 in April 2017 with the submission of its Phase 1 Recommendations Report to Council. The Phase 1 Recommendations Report indicated that the Task Force reached consensus in support of Engineers and Geoscientists BC pursuing regulatory authority over corporate practice.

Following are the motions approved by the Council at their meeting on April 28, 2017:

- Council thanks the Task Force for its comprehensive and thorough work on this project
- Council directs staff to publish the report “Phase 1 Recommendations Report of the Advisory Task Force on Corporate Practice”.
- Council approves:
  - a. That Engineers and Geoscientists BC pursue regulatory authority over corporate practice.
  - b. That a corporate regulatory model be developed which demonstrates positive impacts to protect the public interest and the environment, and provides benefit to the regulated organizations and professionals they employ.
  - c. That the corporate regulatory model be scaled according to the size and nature of the organization and be administratively efficient.
- Council directs staff to work with the Advisory Task Force on Corporate Practice to review its Terms of Reference as the first step in proceeding with phase 2 for the September 2017 Council meeting.

Phase 2 of the Task Force process began in Fall 2017 with direction from Council to further develop options for corporate practice oversight and recommend a model which:

- demonstrates positive impacts to protect the public interest and the environment;
- provides benefit to the regulated organizations and professionals that they employ; and,
- is scalable to accommodate the size and nature of organizations and be administratively efficient.

Council also directed the Task Force to give further consideration to the types of entities that should be subject to regulatory oversight.

The process undertaken by the Task Force to develop a recommended approach for corporate practice oversight included the following steps:

1. identifying the potential components of an approach to corporate regulation and options for each component;
2. surveying Task Force members on which options are most supported;
3. conducting further discussions with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) to seek information on the state of its corporate regulatory program;
4. consulting with the Association of Consulting Engineering Companies-BC (ACEC-BC) and reviewing their Phase 2 submission, included as Appendix 1; and,
5. deliberating on a recommended corporate regulatory model that meets the direction of Council.

Through the survey of Task Force members, it was recognized that many of the options receiving broad support from Task Force members were similar to components of either the APEGA regulatory model or the voluntary Organizational Quality Management Program. This focused the Task Force's attention on bringing the best elements of these models together to meet Council's direction.

The survey also demonstrated that Task Force members unanimously agreed to a set of principles to guide the development of a regulatory model. These principles state that the model should require organizations to:

- maintain effective professional practice standards in accordance with the Engineers and Geoscientists Act, Code of Ethics, and professional practice guidelines;
- ensure that all professional engineering and geoscience work is performed under the direction of an appropriately qualified professional engineer or geoscientist;
- ensure appropriate use of professional engineers/geoscientists' seals within the organization;
- provide appropriate professional development opportunities for engineering and geoscience employees;
- comply with anti-corruption measures; and,
- adhere to ethical business practices.

Agreement on these guiding principles and agreement that a BC approach to corporate regulation should build on the best elements of the APEGA and OQM programs provided the foundation for the Task Force's Phase 2 recommendations. The Task Force reached unanimous consensus on all seven of their recommendations for corporate regulation at their meeting on May 9, 2018. Please see Section 3 of the attached report and the 7 recommendations approved by the task force.

Following are the motions approved by the Council at their meeting on June 15, 2018:

1. Council approve Recommendations 1-7 in the Advisory Task Force on Corporate Practice Phase 2 Report to Council – Recommended Model for the Regulation of Engineering and Geoscience Organizations.



2. That Council direct staff to publish the Advisory Task Force on Corporate Practice Phase 2 Report to Council– Recommended Model for the Regulation of Engineering and Geoscience Organizations.
3. That a business plan be developed which is consistent with the regulatory model identified in Recommendations 1-7 in the Phase 2 Report of the Advisory Task Force on Corporate Practice – Recommended Model for the Regulation of Engineering and Geoscience Organizations.
4. That Council inform the provincial government of their response to the Phase 2 recommendations made by the Advisory Task Force on Corporate Practice.
5. That Council directs staff to work with the Advisory Task Force on Corporate Practice to review its Terms of Reference as the first step in proceeding with Phase 3.

A status update on the five items above was provided to Council in November 2018, at that time items 2 and 3 were already completed. The following provides an overview of the actions that have followed since that time related to items 1, 3 and 5.

## DISCUSSION

Since that time, we have made significant progress on the remaining items.

### Item 1 – Engagement and Sole Practitioner Consultation

PPSD staff and the Chair of the Advisory Task Force on Corporate Practice has been actively engaging with numerous groups and individuals to increase the awareness of both corporate regulation in general and how it relates to sole practitioners. In particular, we have held three formal meetings with external groups since January.

February 1 – The Associate Director, Professional Practice was asked by the City of Vancouver to speak at the Regional Engineers Advisory Committee meeting on professional reliance and corporate practice. Most in the room were familiar with the professional reliance review and the new Act, but they were not as familiar with corporate regulation and the fact that authority's having jurisdiction may be included. The resulting discussion was very beneficial with many attendees indicating that they will provide a response to the Intentions Paper. We have since received confirmation that the City of Vancouver submitted their response to the Intentions Paper, which indicated that they are beginning to develop their Professional Practice Management Plan, which will be a requirement of corporate regulation.

February 12 – The Association of Mineral Exploration of BC (AME) hosted a meeting to assist in the development of their response to the Intentions Paper. Engineers and Geoscientists BC staff were in attendance and provided an overview of corporate regulation. How corporate regulation will apply to sole practitioners was of particular interest to the group. AME provided a copy of their final submission to the Intentions Paper in which they recommend the EGBC model, but did note some concerns with how sole practitioners will be included.

February 13 - A free webinar on Corporate Regulation was presented by the chair of the Advisory Task Force on Corporate Practice and the Associate Director, Professional Practice. The goal of the webinar was to provide an overview of corporate regulation and to begin the consultation

process with sole practitioners. Over 450 people signed up and over 350 attended, this resulted in over 50 questions during the webinar and many more since. During the webinar, a poll was conducted asking attendees to indicate whether they supported the three-pillar model, practice review model or neither for sole practitioners, 63% indicated support for the three-pillar model. The webinar is available on the online store at no cost.

Following the webinar a brief survey was sent to those in attendance, which indicated that approximately 60% of the attendees were sole practitioners. A separate more in depth survey was released on March 8, the results of which are currently being compiled. In addition, a Q&A document on sole practitioners was published on the website in mid-March.

February 14 – Engineers and Geoscientists BC staff held a meeting with representatives from the four other regulators covered in the Professional Governance Act to discuss our corporate practice model and how we can work together going forward on this item. The meeting resulted in the other regulators providing positive feedback on our approach and timeline, but indicating that their efforts are currently being dedicated to other issues and they cannot yet commit to an exact timeline for corporate regulation implementation. We decided that the best course of action would be to develop a preliminary plan with some basic information that could be made available to the Government. We are currently working on this document.

February 27 – Engineers and Geoscientists BC staff met with the Vice President, Forestry of the BC Council of Forest Industries after being introduced to him at the Natural Resources Forum in Prince George by Christine Gelowitz from ABCFP. We discussed the corporate regulation model and its implementation. He did not express any concerns with the EGBC model and supported our auditing approach as he was previously a financial auditor. The meeting was successful in that he requested additional information and is planning to attend an OQM session.

March 22 – The Associate Director, Professional Practice provided a presentation to the Okanagan Branch in Kelowna BC. Items covered included the Professional Governance Act, Corporate Regulation and Professional Practice Resources. The group was well-engaged and provided valuable feedback.

March 25, 26 and 27 - Several focus group meetings were held in Vancouver, Kelowna and Victoria with sole practitioners to discuss corporate regulation. The feedback from these discussions along with the survey results will be considered when the Advisory Task Force on Corporate Practice prepare their recommendations on how sole practitioners should be included in corporate regulation.

### **Item 3 – Business Model**

Engineers and Geoscientists BC staff brought forward a preliminary business model including a list of assumptions, implementation timeline and staffing chart to a sub-group of the Advisory Task Force for feedback at the end of February. Prior to this PPSD staff spent several months developing the preliminary business model with the input from all of the other Engineers and Geoscientists BC departments that will

be impacted. The sub-group of the Advisory Task Force identified several areas within the assumption report that would require clarifications.. The next step will be to bring the business model and revised assumption report, implementation timeline and staffing chart to the entire Task Force on April 24 for approval. The Task Force will provide their recommendations to Council on the business model and sole practitioner coverage in June 2019.

#### **Item 5 – Terms of Reference**

The revised Terms of Reference for the Advisory Task Force on Corporate Practice were approved at the February 2019 Council meeting.

OPEN SESSION

ITEM 5.11.6

DATE	March 12, 2019
REPORT TO	Council for Information
FROM	Lindsay Steele, P.Geo. Associate Director, Professional Practice
SUBJECT	Landslide Risk Update
LINKAGE TO STRATEGIC PLAN	Clarify the association's regulatory role and responsibilities through ongoing communication and engagement with members and other stakeholders.
Purpose	To respond to 2017 AGM Motion 6 Regarding Landslide Risk.
Motion	For information only.

BACKGROUND

At the Engineers and Geoscientists BC Annual General Meeting in October 2017, Tim Smith, P.Geo., Eng.L., FGC, made the following motion which was carried :

*That Council give consideration to creating a task force to prepare a guidance document for the provincial government to establish tolerable levels of landslide risk with respect to residential development within BC.*

CARRIED

In considering this matter at an Engineers and Geoscientists BC Council meeting, the Council made the following recommendation:

*RECOMMENDATION: That this motion be referred to the Professional Practice Committee for consideration and report back to Council with recommendations. The Professional Practice Committee should review the work previously done on this issue in response to a similar AGM motion approved in 2012.*

In consideration of the direction given by the Engineers and Geoscientists BC Council as reflected in the above referenced motion, the following actions were taken:

- i) The three subject matter experts (SMEs) who prepared a response to a similar motion previously made by Tim Smith, P.Geo., Eng.L., FGC, at the 2012 AGM were consulted in preparing a response for consideration of the Professional Practice Committee.

(SMEs - Mike Currie, P.Eng., President, Kerr Wood Leidal Associates Ltd.; Matthias Jakob, P.Geo., Ph.D., Senior Geoscientist, BGC Engineering Inc.; and Mike Church, P.Geo., Ph.D., Professor Emeritus at UBC).

- ii) Dr. Carlos Ventura, P.Eng. Director of UBC's Earthquake Engineering Research Facility and Dr. Liam Finn, P.Eng. UBC professor and international expert on geotechnical slope stability issues and a primary author of the Engineers and Geoscientists BC Professional Practice Guidelines – Legislated Landslide Assessments for Proposed Residential Development in BC) were consulted in preparing a response for consideration of the Professional Practice Committee.
- iii) The Executive of the Engineers and Geoscientists in the Resource Sector Division was consulted in preparing a response for consideration of the Professional Practice Committee.

The attached document dated April 18, 2013 provides relevant background to the issue and the similar motion made by Tim Smith, P.Geo., Eng.L., FGC. As a result of the lack of action taken by government in 2013 in response to the recommendations made in the report dated April 18, 2013 Tim Smith, P.Geo., Eng.L., FGC, made the motion referenced above at the October 2017 AGM.

All three of the above referenced groups recommended against the association preparing a guidance document for the provincial government that would establish tolerable levels of landslide risk with respect to residential development within BC. Their concern being that this would set a dangerous precedent. The association is not in a position nor has the authority or capability to consider a range of societal interests (residential development; public safety due to natural hazards; industrial development; environmental protection are but a few examples of various competing interests/societal values) and then set public policy on what is an acceptable level of risk.

In addition, the recommendations in the 2013 report proposed that government take a more comprehensive approach with respect to how natural hazards are dealt with in BC rather than just looking at landslide risk. A broader approach was recommended so that standardized approaches are implemented which deal with a range of natural hazards and the associated risks (e.g. floods, landslides, avalanches).

On this basis the above three groups recommended an alternative to creating a task force that would prepare a guidance document for the provincial government to establish tolerable levels of landslide risk with respect to residential development within BC . Instead they proposed that Engineers and Geoscientists BC should renew its request to government that was made in 2013 and propose that the association work with the provincial government to not only establish a level of acceptable landslide risk but to work on addressing the three recommendations made in the report dated April 8, 2013.

Furthermore, as a result of the provincial government's review of professional reliance in the resource sector, they are already considering a wide variety of issues as it relates to their role and responsibility as well as that of other stakeholders when it comes to the use of self-regulated professionals under a variety of provincial legislation. On this basis, it would be timely to re-engage with the provincial government on the matter of acceptable levels of risk as it appears that they may be more receptive to dealing with this issue than they were in 2013.

At the September 2018 Council meeting the following motion was approved,

The Engineers and Geoscientists BC Council approves to renew its request to the British Columbia provincial government that was made in 2013, and propose that the association work with the provincial government to establish a level of acceptable natural hazard risk, as well as work on addressing the three recommendations made in the report dated April 8, 2013, which are as follows:

1. Establish a high-level government advisory body on natural hazard issues with multi-ministry involvement and broad representation from industry and the professions. The mandate of this advisory body should include reviewing relevant government legislation, regulation and precedents, and advising government on development of natural hazard policy and regulations.
2. Develop a more robust inventory of land subject to natural hazards. This should extend to standardizing approaches for natural hazard and risk mapping.
3. Develop additional tools to assist in the implementation of a risk-based approach in dealing with natural hazards and establish thresholds for natural hazard risk tolerance and acceptability.

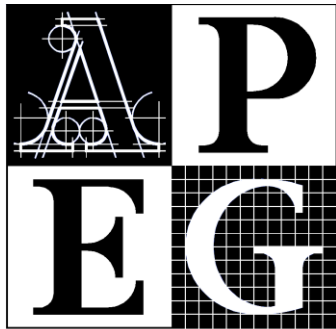
The following provides an update in regards to the September 2018 Council motion.

## DISCUSSION

A conference call was held by Engineers and Geoscientists BC staff with multi-ministry participation in relation to avalanche assessment and mitigation on October 31, 2018. During the meeting, a representative from the Ministry of Forest, Lands, Natural Resource Operations and Rural Development mentioned that there was at one time an inter-agency committee on landslides and they were in the process of reinitiating the work of this group. The expectation is that going forward this group will add other natural hazards discussions to their scope and will invite Engineers and Geoscientists BC to participate. There was general agreement from the group on the call, that this would be the best avenue to further discussions on items 2 and 3 above.

The group is expected to meet in spring/summer 2019.

## ATTACHMENT A –Council Report dated April 18, 2013



Professional Engineers  
 and Geoscientists of BC  
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DATE: April 18, 2013

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REPORT TO: Council for Decision

FROM: Peter R. Mitchell, P.Eng.  
 Director, Professional Practice, Standards  
 & Development

MOTION: The APEGBC Council approve the three recommendations developed in response to the motion passed at APEGBC's October 2012 AGM "that Council consider working with the provincial government to establish a level of acceptable landslide risk".

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#### BACKGROUND

APEGBC has had regular interaction with the BC government regarding natural hazards issues. In particular, APEGBC has encouraged development of a natural hazards policy, and to augment the current hazard-based approach with a risk-based approach. Key actions are summarized below.

- January 1976: three articles appeared in the *BC Professional Engineer* (the journal of the Association of Professional engineers of BC) recommending the development of a natural hazards policy for BC (attached).
- December 1976: an ad-hoc committee of leading experts in the field presented a brief to APEGBC Council on establishment of a natural hazards policy in BC and appointment of a Natural Hazards Policy Board (attached).
- April 1, 1977: the President of APEGBC (Art McLaren, P.Eng.), supported by a group of experts, met with Minister of Environment Jim Neilsen to explain why the BC government should adopt a natural hazards policy.
- 2005: Following submission of a proposal by APEGBC, the BC government funded development of the *APEGBC Guidelines for Legislated Landslide Assessment for Proposed Residential Development in BC*. Representatives from three BC ministries (Ministry of Environment, Ministry of Transportation and Ministry of Forests) and local governments participated in the review and development of this guideline which was approved by APEGBC Council.
- In March 2006 APEGBC submitted the *APEGBC Guideline for Legislated Landslide Assessment for Proposed Residential Development in BC* to the province in completion of the contract. This guideline included a provision for risk assessments to consider both hazard and consequence. The covering letter submitted to government with the completed guideline included a recommendation that a strategy be developed for the BC Government to adopt a defined level of landslide safety (landslide risk tolerance).
- October 2008: At the coroner's request, APEGBC responded to recommendations following the death of Eliza Kuttner, who was killed when her North Vancouver home was destroyed by a landslide (attached).



- 2009: APEGBC was asked by government to assist in amending the *BC Building Code* to implement a requirement for seismic slope stability.
- 2010: As a result of APEGBC's proposal, government funded revisions to the APEGBC *Guidelines for Legislated Landslide Assessments for Residential Development in BC* to address seismic slope stability assessments.
- 2010: With the introduction of the APEGBC landslide guidelines and with APEGBC's support, government amended the *BC Building Code* to specify the same design earthquake for structures and seismic slope stability.
- 2011: As a result of APEGBC's proposal, the BC Ministry of Transportation and Infrastructure funded an effort to revise its 2009 guidance document on subdivision approvals in areas of natural hazards. With the submission of their recommended re-draft of the MoTI document, APEGBC took the opportunity to reinforce the need to adopt a defined level of landslide safety.
- 2011: APEGBC submitted a proposal to the BC government to fund development of professional practice guidelines for flood assessments. This proposal was accepted, and the APEGBC *Guidelines for Legislated Flood Assessments in a Changing Climate in BC* were submitted to government in 2012. These guidelines include provision for risk assessments.
- 2013: With government funding, APEGBC developed the Seismic Retrofit Guideline. This guideline uses a risk-based approach to assess the potential seismic impact in retrofitting existing school buildings.

As a result of the above activities, APEGBC has earned a good reputation in working with government to improve public protection against natural hazards. However, APEGBC members continue to struggle in preparing professional assessments due to the lack of clear regulatory direction.

In response to the motion at the APEGBC 2012 AGM, APEGBC staff formed an advisory group of experienced practitioners to review previous work and submit an updated recommendation to government on natural hazards. The advisory group included:

- Mike Currie, P.Eng., President, Kerr Wood Leidal Associates Ltd.
- Matthias Jakob, P.Geo., Ph.D., Senior Geoscientist, BGC Engineering Inc.
- Mike Church, P.Geo., Ph.D. Professor Emeritus at UBC

The advisory group members worked closely with APEGBC staff in preparing this report.

## **DISCUSSION**

The current regulatory framework for natural hazards in BC is inconsistent, does not adequately cover the full range of natural hazards, and does not always provide clear direction to practitioners and regulators. Provincial legislation focuses on requiring APEGBC members to certify that land is "safe for the intended use". Neither the legislation nor other regulatory documents define "safe", or provide the necessary direction for natural hazard assessments to be performed consistently. This situation has created significant confusion amongst government, developers and APEGBC members. As a result, individual local governments may independently develop natural hazard regulations. While recent guidelines by APEGBC and others have significantly improved guidance for professional practice, the higher level regulatory framework for natural hazard risk management remains fragmented and incomplete.

Due to the above considerations, the advisory group suggests that APEGBC assume a leadership role in working with government to develop a consistent approach to dealing with natural hazards in BC. Additional considerations that make this initiative timely include the following.

- Developed nations are moving towards natural hazard risk management because a hazard-based approach does not characterize potential losses.
- The number, density and value of elements at risk are increasing in areas subject to natural hazards, which is the case in most of BC.
- The maps produced under the federal/provincial floodplain mapping program are now mostly outdated, and the program has been discontinued. All natural hazards (floods, earthquakes, landslides, snow avalanches, tsunamis, wildfires) warrant improved characterization through inventory and mapping since development continues to occur in areas which are exposed to natural hazards.
- Climate change significantly influences the frequency and magnitude of natural hazards. The consequences are best examined within a framework that evaluates the risks of climate change and land use change.
- Natural Resources Canada has adopted from the United States the HAZUS tool for natural hazard risk assessment. The federal government has recommended HAZUS for implementation across Canada.
- The BC government continues to devolve responsibility for natural hazards matters to local governments in the absence of a comprehensive regulatory framework.
- Ongoing project-specific decisions on natural hazards issues sometimes evolve into new standards of care without being embedded into regulatory documents.

#### **RECOMMENDATION**

As described in the Background section of this report APEGBC has approached the BC government several times on natural hazards issues. In the 1970's, the government was encouraged to develop a natural hazards policy for BC. More recently the government was requested to adopt "a defined level of landslide safety which could be implemented province wide". Government has not responded to these requests.

In response to the AGM motion, the advisory group recommends that APEGBC formally request the BC government to act on the following recommendations.

1. Establish a high level government advisory body on natural hazard issues with multi-ministry involvement and broad representation from industry and the professions. The mandate of this advisory body should include reviewing relevant government legislation, regulation and precedents, and advising government on development of natural hazard policy and regulations.
2. Develop a more robust inventory of land subject to natural hazards. This should extend to standardizing approaches for natural hazard and risk mapping.
3. Develop additional tools to assist in the implementation of a risk-based approach in dealing with natural hazards and establish thresholds for natural hazard risk tolerance and acceptability.

If Council approves these recommendations, this report would evolve into a letter that would be submitted from APEGBC to the BC Government. Senior government officials would be requested to meet with an APEGBC delegation to discuss APEGBC's concerns and recommendations.

Motion: That the APEGBC Council approve the above three recommendations developed in response to the motion passed at APEGBC's October 2012 AGM "that Council consider working with the provincial government to establish a level of acceptable landslide risk".

OPEN SESSION

ITEM 5.11.7

DATE	March 21, 2019
REPORT TO	Council for Information
FROM	Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development
SUBJECT	Truth and Reconciliation Pilot Program
LINKAGE TO STRATEGIC PLAN	Principle 5 - We foster diversity and inclusivity

Purpose	To update Council on the Truth and Reconciliation Pilot Program.
Motion	For information only.

BACKGROUND

At the 2017 Annual General Meeting, the following member motion was carried:

**“MOTION 5:** *That Council consider:*

1. *Establishing a Task Force in collaboration with the assembly of BC First Nations to review the recommendations contained within the Truth and Reconciliation Committee (TRC) report with the intent of determining how Engineers and Geoscientists BC can help to facilitate the recommendations within the mandate of the Act as well as within the context of the Code of Ethics. Develop guidelines for members to ensure that professional conduct and professional services performed and delivered by members are consistent with the recommendations of the TRC report and/or help to facilitate the intent of the recommendations.”*

At its meeting on November 24, 2017, Council referred the motion to the Professional Practice Committee for consideration and to report back to Council at their meeting on June 15, 2018.

At their meeting on January 24, 2018, the Professional Practice Committee considered the issue and agreed that staff should contract with Nalaine Morin of ArrowBlade Consulting Services in order to prepare a report, which would address the following:

- 1) Which of the Calls to Action relate to the primary duty of Engineers and Geoscientists BC as defined in the *Engineers and Geoscientists Act*, which is “to uphold and protect the public interest respecting the practice of professional engineering and geoscience.”
- 2) The action that would be appropriate for the association to take in response to each of the calls to action identified in 1) above.

At the June 15, 2018 Council meeting the report prepared by Nalaine Morin entitled “Truth and Reconciliation Calls to Action – Actions for EGBC” was approved and the Council referred the report to the Professional Practice Committee to develop an action plan for Council’s consideration identifying budgetary and other resources required to implement the recommendations in the report.

Following the June 15, 2018 Council meeting, Professional Practice staff worked with Nalaine Morin and other stakeholders to develop a Pilot Program that responded to the calls to action identified in Nalaine’s report using programs and resources the Association already had in place, allowing for timely action on this initiative.

The Pilot Program consisted of three main actions:

1. Form an Indigenous Engagement Working Group to review initiatives related to the Pilot Program.
2. Develop and present a Continuing Professional Development (CPD) event that approaches an engineering infrastructure project on Indigenous land from a technical standpoint, then from an Indigenous standpoint, and then from a combined collaborative approach. The event would finish off with a panel session of professionals providing their experience and lessons learned from working on projects on Indigenous land. Relates to Calls to Action 57 and 92.
3. Develop a plan to target career/community fairs in Indigenous communities and have Engineers and Geoscientists BC, representation from Industry, and Nalaine Morin attend and promote the professions of engineering and geoscience in a culturally sensitive and appropriate way. Relates to Calls to Action 7 and 92.

The Pilot Program concept and budget received approval at the November 23, 2018 Council meeting with the following motion:

*“Council approves the conceptual pilot program and budget of \$50,000 in order to address the recommendations in Nalaine Morin’s report “Truth and Reconciliation Calls to Action – Actions for EGBC”*

## DISCUSSION

Significant progress has been made to implement the Pilot Program since it was approved, as outlined below.

### 1. Formation of Indigenous Engagement Working Group

Based on recommendations from senior staff and Council members, a group of seven individuals with either an Indigenous background or experience working on Indigenous lands were chosen to be on the Indigenous Engagement Working Group:

- Allen Benson, EIT, Geotechnical Engineer, BGC Engineering
- Lana Eagle, Senior Advisor & Consultant, Lana Eagle Consulting
- Randy Hermann, P.Eng., Director of Engineering Access Program, University of Manitoba
- Heather Lawrence, Global Manager Indigenous Affairs, Teck Resources Ltd
- Freda Leong, P.Eng., Manager First Nations Infrastructure, Associated Engineering
- Ted Molyneux, P.Eng., Senior Water/Wastewater Engineer, Indigenous and Northern Affairs Canada
- Angela Smith-Rockwell, Manager First Nations Relations, Ministry of Forests, Lands, Natural Resource Operations & Rural Development

The working group met on January 17<sup>th</sup>, 2019 and March 13<sup>th</sup>, 2019 to discuss the CPD event and the outreach event. The working group provided constructive feedback and comments were instrumental in providing direction for the initiatives of the Pilot Program.

## **2. Development of CPD Event**

This session will revolve around how professionals can foster collaborative relationships with Indigenous communities when working on engineering and geoscience projects on Indigenous land. The session will take a practical approach by assessing a hypothetical project from both the technical and Indigenous perspective, and finish with a panel of experts sharing their experiences related to this topic.

The session will be split into two main parts:

### **Part 1: Project Case Study**

Nalaine Morin of ArrowBlade Consulting Services and Mary-Jane Piggott, Regional Manager BC Mining Environmental Group at Klohn Crippen Berger, were contracted to develop this portion of the CPD program.

An engineering infrastructure project on Indigenous land will be presented to the participants. The project will be presented within the context of setting the stage for an interactive dialogue at a project open house. The following steps will be followed:

1. Engineering consultant presents design (sets context for dialogue)
2. Indigenous technical representative sets stage for state of engagement (consultation to date, technical review, Traditional Knowledge)
3. Open house scenario (dialogue between engineering consultant and Indigenous technical representative)

There will be opportunity for audience dialogue and participation as the case study progresses. Although it is a hypothetical project, the content will use lessons learned from real projects.

## Part 2: Panel Discussion

There will be a facilitated panel session in which the panelists will have a chance to critique the project case study. In addition, the panelists will discuss their experience and knowledge about fostering collaborative relationships with Indigenous communities and combining traditional knowledge with western science. Heather Lawrence, member of the Indigenous Engagement Working Group, has agreed to facilitate the panel session. The confirmed panelists so far include:

- Sue Craig, M.Sc., P.Geo., VP of Community and Environment, Kutcho Copper Corp
- Rob Stevens, Ph.D., P.Geo., VP Regulatory and Technical Policy, Association for Mineral Exploration
- Andrew Rollo, M.Sc., P.Geo., Executive Director and Deputy Chief, Inspector - Major Mines Office, Mines Competitiveness and Authorizations Division, Ministry of Energy, Mines and Petroleum Resources
- Trudy Peterson, P.Eng., Manager of Housing Capital & Public Works, Lower Similkameen Indian Band

There was discussion at the last working group meeting that including an Indigenous Elder on the panel would be beneficial, so that is currently being pursued.

There will be a question and answer portion during both parts of the CPD session.

Our Member Services department is currently organizing the logistics of the CPD event, which will take place on May 15<sup>th</sup>, 2019 in Vancouver and will also be available by webcast.

## 3. Community/Career Fair Outreach

After discussing various outreach options with the Indigenous Engagement Working Group, it was determined that attending the 25<sup>th</sup> Annual Aboriginal Career Fair in Kelowna was the best fit for promoting the professions of engineering and geoscience to Indigenous youth. The event is organized by Ki Low Na Friendship Society, UBC Okanagan, and Okanagan College, and takes place on May 2<sup>nd</sup>, 2019. Nalaine and Mary-Jane will attend on behalf of Engineers and Geoscientists BC and will be at the association's booth to discuss opportunities within the professions with youth in attendance. Engineers and Geoscientists BC staff will also attend, and we are currently looking for a local Indigenous practitioner to participate as well.

The material for use at the event was also discussed with the Indigenous Engagement Working Group. Our Communications department presented materials developed by Queens University to encourage Indigenous youth to consider engineering as a profession. The working group supported the use of the material. There was discussion about making the material specific to BC Indigenous youth as well as adding geoscience content; however, since there is limited time and budget for undertaking such a big project, the Queens material will be used as-is for the event on May 2<sup>nd</sup>.



## OPEN SESSION

### ITEM 5.11.8

DATE	March 26, 2019
REPORT TO	Council for Information
FROM	Ailene Lim, Acting Director, Programs and Professional Development Mara Buzgar, Program Coordinator Tim Verigin, Program Coordinator
SUBJECT	Report on Branch Engagement
LINKAGE TO STRATEGIC PLAN	Establish, maintain and enforce qualifications and professional standards.

Purpose	To update Council on current Branch engagement.
Motion	For information only.

## BACKGROUND

Council has identified branches as playing a fundamental role in increasing member engagement. Branches currently support and drive member engagement in several different ways. All branches were asked to provide information updates to Council. Information presented here is based on those branches that provided reports. The reporting period for this report is July 2018 to March 2019.

## OUTREACH ACTIVITIES WITH COMMUNITY

Branches reported activities to promote the professions within schools that reached 745 elementary and high school students and 1873 university students. Branches also hosted five successful Popsicle Stick Bridge competitions throughout the month of March as part of National Engineering and Geoscience Month. Additional competitions are scheduled for April and May. In addition to promoting the professions in schools, the branches have engaged with community organizations such as colleges, and inter-cultural associations.

## EVENTS AND ACTIVITIES

In the reporting period from July 2018 to March 2019, the branches of Engineers and Geoscientists BC collectively hosted 85 events, which attracted 1563 registrants. Some events included:

- The Tri-City Branch organized a Tour of Motion: Mobility and Accessibility Solutions Provider, a Tour of the Surrey Biofuel Facility, and a Tour of Mariner Brewing.
- The Vancouver Branch hosted a successful Woman in Engineering and Geoscience panel discussion with 101 attendees.
- The Victoria Branch hosted a webinar and live discussion on Leadership: Enabling Everyone to be Their Best, with 27 attendees.
- The Vancouver Island Branch Parksville Dinner Meeting on Climate Change in Coastal BC was well attended with 56 attendees registered.
- The South Central Branch hosted three networking nights during the reporting period, and four technical talks with topics on the Old Fort Landslide, Clean Energy Generation, Geohazard Assessment and Emergency Response, and High Tech vs Low Tech in Rural Areas.
- The Okanagan Branch hosted a Tour of the BC Hydro Vernon District Office Tour, as well as a networking night at BNA Brewery.
- Burnaby/New Westminster hosted a Tour of the D-Wave Quantum Computer and a Tour of Concrete Precast Facility.
- East Kootenay Branch hosted their AGM alongside a presentation on the Fernie Arena Ammonia Leak.
- The West Kootenay Branch hosted a tour of the MIDAS FabLab and 3D Printing Facility. They also hosted their AGM with 46 attendees.
- The Central Interior Branch hosted a dinner presentation on Canfor's Biofuel Project that attracted 28 attendees.
- The Peace River Branch hosted their annual coffee shop social that attracts local members to connect with their branch.

## UPCOMING EVENTS

Below is a list of upcoming events for branches. The branches encourage Council to attend these events where possible. For more Branch Events please visit the [Branch Events Calendar](#).

BRANCH	DATE	EVENT TYPE	DESCRIPTION
Vancouver	April 11, 2019	Dinner Seminar	Seismic Simulations, Bridge Abutments, Universal Fare Gate Access, and Hybrid-Wood Based Modular Solutions
Victoria	April 17, 2019	Dinner Seminar	Talbot Awards and Presentation on Unmanned Aerial Vehicles for Infrastructure Monitoring



BRANCH	DATE	EVENT TYPE	DESCRIPTION
Fraser Valley	April 18, 2019	Tour	Tour of Powertech Labs
Sea to Sky	April 25, 2019	Dinner Seminar	The Design and Construction of the New Port Mann Bridge by Kiewit
South Central	April 28, 2019	Tour	Guided Geology Tour: Geological Environments of Kamloops
Tri-City	May 29, 2019	Tour	Tour of the Electrical Joint Training Committee and E2 Inc. Facility.

OPEN SESSION

ITEM 5.11.9

DATE	March 26, 2019
REPORT TO	Council for Information
FROM	Deesh Olychick, Director, Corporate Governance & Strategy
SUBJECT	Update on Nomination & Election Review Task Force Recommendations
LINKAGE TO STRATEGIC PLAN	Effective governance

Purpose	To provide a status update on the Nomination & Election Review Task Force Recommendations, in the context of Bill 49.
Motion	For information only.

## BACKGROUND

At the June 15, 2018 meeting of Council, the Nomination and Election Review Task Force delivered 28 recommendations for Council consideration. These recommendations were forwarded to the Governance Committee for further review as many of the recommendations required further consideration in the context of the Professional Standards Authority Audit and the Professional Reliance Review.

In August 2018, the Governance Committee reviewed the recommendations and agreed that due to the current uncertainty regarding the timing and extent of the professional reliance recommendations, that many of the Task Force recommendations should be deferred until the *Professional Governance Act* implications are better understood. The Governance Committee considered that some recommendations could be actioned sooner and directed staff to conduct some follow up work. However, due to immediate Bill 49 implications on the nomination and election process, progress on these deliverables has been delayed.

To provide Council with an update on the Task Force recommendations and the current status of these recommendations, a summary table is provided as Attachment A. The table outlines the Task Force recommendations, relevant recommendations from the Professional Standards Authority Audit and new requirements under the *Professional Governance Act*.

Action on the Task Force recommendations is categorized as follows:

- **In progress:** Sub-Committee of Council or Governance Committee has directed further work on this item.
- **Requires further review:** In the context of Bill 49, further review of this item will be required by the Sub-committee of Council and/or the Governance Committee
- **Completed/ No longer applicable:** In the context of Bill 49, these items are no longer applicable or have been completed.

**A summary of the recommendations by category is provided below:**

#### **IN PROGRESS**

1. Cultivating Leaders for Board Governance
2. Remove Council experience requirement for Vice President
3. Move to three-year terms for Councillors (Government will direct timing)
4. Reduce the elected board size (Government will direct timing)
5. Implement honorariums for President, Vice President and Councillors, based on recommendations of a qualified third party
6. Developing a linkage between members of the academic community and the association as a better vehicle to bring engineering and geoscience issues forward to Council
7. Appoint an independent Chief Elections Officer to oversee the election process
8. Eliminate paper ballots by 2021

#### **REQUIRE FURTHER REVIEW**

1. Adopt a President-Elect System
2. The second VP be selected by Council
3. Provide voting rights to members in training
4. Nominating Committee Composition
5. Branch rotations to the Nominating Committee
6. Amend candidate statements to include skills and experience of candidates

#### **COMPLETED / NO LONGER APPLICABLE**








1. Faculty member requirement on Council
2. Mandatory geographical representation on Council
3. Mandatory Eng. L. or Geo.L. position on Council
4. Retain practice of 25 signatures for Nomination by Members
5. Retain two different dates for candidates endorsed by the Nominating Committee and those supported by 25 members of the Association
6. For Nomination by 25 members, implement an online nomination format






7. For online nomination process, include a statement that the nominator feels the nominee is a suitable and qualified candidate for the position
8. Develop defensible guidelines for the Nominating Committee to use when evaluating incumbent candidates
9. Adopt a professionally produced candidate video program
10. Terms of Reference of Governance Committee be amended to include review of the relevance of the Q&A for election material
11. Retain current ballot format
12. Eliminate mailing of election postcards to members without a valid email address on file
13. Retain current voting window
14. Do not publish any additional voter demographics






Further work on the Task Force recommendations will be routed through the Governance Committee, with the exception of amending candidate statements to include skills and experience of candidates which has been delegated to the Sub-committee of Council as part of the decisions for the 2019 election.

**ATTACHMENT A -      Status Update on Nomination and Election Review Task Force  
Recommendations**







STATUS UPDATE ON NOMINATION AND ELECTION REVIEW TASK FORCE RECOMMENDATIONS

In Progress	Requires Further Review	Completed or No longer applicable	Task Force Rationale	Professional Standards Authority Audit	Professional Governance Act – Bill 49	Current Status
						
Cultivating Leaders for Board Governance						
1. Implement a formal program to identify and develop members as part of sustainable succession planning  	<ul style="list-style-type: none"><li>• Commitment to develop volunteers</li><li>• Allows for qualified candidates to be recruited from amongst the membership</li><li>• Enhances awareness of the role of Council and opportunities to participate</li><li>• Investing in current volunteers leads to a larger, more diverse pool of qualified candidates</li></ul>	No specific recommendation, however, report comments on the need for relevant experience and appropriate mix of skills on Council.	No specific recommendation.	Governance Committee directed staff to develop options, budget considerations and a timeline in support of this recommendation.  Due to immediate Bill 49 implications, progress on this deliverable has been delayed.		
Governance						
2. Adopt a President-Elect System  	<ul style="list-style-type: none"><li>• Previous Council experience is essential to operate effectively as President</li><li>• Improves continuity and stability of Council by ensuring that incoming President is well-informed of the issues</li><li>• Positions the President to better lead Council in support of its strategic long-term goals</li></ul>	Recommends that EGBC consider ways to promote continuity of strategic leadership.	Council composition defined as:  1 President 1 Vice President 5 Registrant Councillors 4 Public Appointees  Past President serves in a non-voting capacity	Governance Committee recommended that this recommendation be deferred until Bill 49 implications are better understood.  Government has indicated that it expects all five regulators to have consistent governance structures – should we wish to pursue, this would require consultation with other regulators.		
3. Remove Council Experience Requirement for Vice President (President-Elect)  	<ul style="list-style-type: none"><li>• The Council experience requirement restricts the pool of candidates that can be considered by the Nominating Committee</li><li>• Removing this requirement allows the Nominating Committee flexibility to access a wider pool of candidates based on their skills and qualifications</li><li>• Makes the process consistent for both nomination processes</li></ul>	Report comments that “There is a risk of significant disruption to the organisation’s effectiveness if a candidate lacking relevant experience were to be elected President or Vice-President”.	Specific Council experience requirement is not specified in Bill 49, however, all nominations must follow merit-based selection principles.	The Nomination & Election Advisory Group recommends that the experience requirement for Vice President be one year Council experience or equivalent experience (Council experience is preferred but some flexibility should be offered for Council equivalent experience, such as chairing another association committee or leadership in another organization).  The sub-committee of Council supports this recommendation but implementation would require a bylaw change.		
4. The second Vice-President be elected by Council and be appointed to the Executive Committee  	<ul style="list-style-type: none"><li>• Two VPs could lead to improved distribution of responsibilities</li><li>• Appointment process allows Council to determine the most appropriate for the role</li><li>• Could be a stepping-stone to run for President-elect the following year and would further support continuity on Council.</li></ul>	Recommends that EGBC consider ways to promote continuity of strategic leadership.	Council composition defined as:  1 President 1 Vice President 5 Registrant Councillors 4 Public Appointees  Past President serves in a non-voting capacity	The Nomination & Election Advisory Group supports a scenario whereby the Vice President is selected by the Council. This alternative scenario would provide for a consistent staggering of Councillor elections each year: 2-2-2.  It is unclear as to whether this scenario would be permissible under Bill 49. Government has indicated that it expects all five regulators to have		






				<p>consistent governance structures – would require consultation with other regulators.</p> <p>The sub-committee of Council has directed staff to explore with Government an alternative scenario whereby the Vice President is selected by the Council, and to report back to the sub-committee of Council.</p>
<p>5. Move to three-year terms for Councillors</p> <p> *Government will direct timing</p>	<ul style="list-style-type: none"> <li>Supports continuity and stability of Council</li> <li>Research on contemporary boards supports a three-year board progression</li> <li>Increases competition as fewer positions are required to be filled each year</li> </ul>	<p>Recommend that EGBC consider ways to promote continuity of strategic leadership.</p>	<p>The term for a councilor to hold office is 3 years.</p>	<p>Consistent with PGA requirements. Some staggering of terms will be required in initial implementation years to ensure continuity of Council and avoiding a scenario where 100% of Council changes in a given year.</p> <p>The sub-committee of Council has endorsed the above transitional provisions that were recommended by the Nomination &amp; Election Advisory group.</p>
<p>6. Reduce the elected board size to 9, with each three year term rotated</p> <p> *Board size will be as per composition specified in Bill 49</p>	<ul style="list-style-type: none"> <li>PSA cites that optimal board size for effectiveness is eight to 12</li> <li>Following recommendation 5, board size would be reduced to 9</li> </ul>	<p>Recommend that EGBC review the size of Council to promote its ability to carry out its functions effectively.</p> <p>Recommend that EGBC review the options for increasing the proportion of appointed councillors, including, for example, how many appointed councillors would be optimal and whether it would be appropriate to reduce the number of elected councillors at the same time.</p>	<p>Bill 49 reduces the elected registrants to 5, plus the President and Vice President.</p> <p>Council composition defined as:</p> <ul style="list-style-type: none"> <li>1 President</li> <li>1 Vice President</li> <li>5 Registrant Councillors</li> <li>4 Public Appointees</li> </ul> <p>Past President serves in a non-voting capacity</p>	<p>Government has delayed the transitional provisions to reduce the size of Council. Council composition will not change for the 2019/2020 Council year.</p> <p>See note above on supporting Council continuity and the need for appropriate staggering of terms.</p>
<p>7. Implement honorariums for President, Vice President and Councillors, based on recommendations of a qualified third party</p> <p></p>	<ul style="list-style-type: none"> <li>Honorariums are currently paid to public appointees</li> <li>Research shows that it is fairly common practice for board members to be compensated</li> <li>Role of Council has become increasingly complex with the expectation of significant preparation</li> <li>Honorariums provide acknowledgement and recognition for the service being provided</li> </ul>	<p>No specific recommendation, however, report indicates that remuneration for President is normal in a number of other regulatory regimes.</p>	<p>No restrictions specified in Bill 49</p>	<p>Governance Committee directed staff to develop options, budget considerations and a timeline in support of this recommendation.</p> <p>Funds to engage a third party to review and provide recommendations has been budgeted for the 2019/2020 budget.</p> <p>Evaluation on hold until Bill 49 requirements are better defined, in particular Councillor committee requirements.</p>
<p>8. Provide voting rights to members in training</p> <p></p>	<ul style="list-style-type: none"> <li>This was an AGM motion carried by members for Council consideration</li> <li>Provides members entering the profession a stake in their future, is more inclusive and encourages election and general association participation earlier (member engagement)</li> </ul>	<p>N/A</p>	<p>An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.</p>	<p>In 2019, Council directed that this item be referred back to the Governance Committee for further consideration in the context of Bill 49 and other implications and report back to Council at the September 2019 meeting.</p>
<p>9. Continue with the Faculty Member Requirement on Council</p> <p></p>	<ul style="list-style-type: none"> <li>The faculty member brings the skills and experience of the education community</li> </ul>	<p>N/A</p>	<p>Not permissible under PGA.</p>	<p>Once the Engineers &amp; Geoscientists Act is repealed, this will no longer be a requirement.</p>




	<ul style="list-style-type: none"><li>• The position helps bring the perspective of the academic community to Council discussions</li><li>• Council may wish to consider whether this position should be appointed rather than elected</li></ul>			
10. Develop a linkage between members of the academic community and the association as a better vehicle to bring engineering and geoscience issues forward to Council 	<ul style="list-style-type: none"><li>• Although the TF supports the faculty member position on Council, it considered whether a committee structure would provide for issues from the broader academic community to be considered by Council</li><li>• There may be additional ways to provide a linkage</li></ul>	N/A	N/A	Governance Committee directed staff to develop options, budget considerations and a timeline in support of this recommendation.  Due to immediate Bill 49 implications, progress on this deliverable has been delayed.
11. Do not adopt mandatory geographical representation on Council 	<ul style="list-style-type: none"><li>• Nominating Committee already considers geography in the development of its list of candidates</li><li>• Reserving seats for special interests in geographical representation generally contributes to large board size (contrary to research on contemporary board size)</li></ul>	N/A	Regulations are expected to encourage diversity, although no specific diversity characteristics are expected.	No action required.  Nominating Committee considers geographical diversity in the development of its list of nominees.
12. Do not adopt a mandatory Eng. L or Geo. L. position on Council 	<ul style="list-style-type: none"><li>• Nominating Committee already considers engineering and geoscience licensees in the development of its list of candidates</li><li>• No restrictions for Eng. L.'s or Geo L's to run for council</li><li>• Reserving board seats contributes to large board size (contrary to research on contemporary board size)</li></ul>	N/A	Candidates must be registrants. No other requirements specified.	No action required.  Nominating Committee considers engineering and geoscience licensees in the development of its list of nominees.
<b>Nomination Process</b>				
13. Retain current practice of 25 signatures for Nomination by Members 	<ul style="list-style-type: none"><li>• Accepting nominations by 25 members supports a democratic process</li><li>• The required 25 signatures is adequate as the number is not onerous enough to be considered a barrier but still supports a democratic process</li></ul>	Recommend that EGBC review the options for achieving a more appropriate balance between ensuring Council's ability to lead the organisation and enabling members' participation.	Nomination by Members no longer permissible.	All members have been encouraged to apply to the Nominating Committee by April 8, 2019.
14. Retain two different dates for candidates endorsed by the Nominating Committee and those supported by 25 members of the Association 	<ul style="list-style-type: none"><li>• Allows members the option to consider running if they are not satisfied by the list produced by the Nominating Committee</li><li>• Not all interested candidates make the final list of Nominating Candidates so this provides an avenue for those to run under support by 25 members</li></ul>	Recommend that EGBC review the options for achieving a more appropriate balance between ensuring Council's ability to lead the organisation and enabling members' participation.	Nomination by Members no longer permissible.	No longer applicable



15. For Nomination by 25 members, implement an online nomination format where members can log-in and nominate individuals 	<ul style="list-style-type: none"> <li>Simplifies the process</li> <li>Allows for easier verification that the nominee is supported individually by members</li> </ul>	Recommend that EGBC review the options for achieving a more appropriate balance between ensuring Council's ability to lead the organisation and enabling members' participation.	Nomination by Members no longer permissible.	No longer applicable
16. For the online nomination process, include a statement that the nominator feels that the nominee is a suitable and qualified candidate for the position being nominated 	<ul style="list-style-type: none"> <li>Intended to encourage the nominator to read the qualifications for the role and determine the nominee's suitability for the role</li> </ul>	Recommend that EGBC review the options for achieving a more appropriate balance between ensuring Council's ability to lead the organisation and enabling members' participation.	Nomination by Members no longer permissible.	No longer applicable
17. In relation to the five appointed members of the Nominating Committee, two should be past presidents, and that for all five, there should be a staggered term of two years, with a one-time optional renewal. For all new members to the committee, there should be an orientation in regards to the role of the Nominating Committee and Council 	<ul style="list-style-type: none"> <li>Having a new committee year is problematic; need to build some continuity to the process to allow for longer-term planning</li> <li>Past presidents have all served as Chair of the committee and have in-depth working knowledge of the committee's role and the role of Council</li> </ul>	N/A	Bill 49 does not specify Nominating Committee composition.  Bill 49 expands the role of the nominations committee to include appointing the chairs of each committee established under the Professional Governance Act.	The 2018/19 Nominating Committee supports this recommendation, however, with expanded scope of the Committee (selecting Committee Chairs), composition and qualifications to serve on the Nominating Committee will need to be re-considered.  This item will need to be forwarded to the Governance Committee for further discussion.
18. Review branch rotations to the Nominating Committee with the purpose of ensuring continuity   	<ul style="list-style-type: none"> <li>Improve continuity on Nominating Committee</li> <li>Ensure that current rotation is still representative of the membership</li> </ul>	N/A	In addition to making all nominations for election to Council, Bill 49 expands the role of the nominations committee to include appointing the chairs of each committee established under the Professional Governance Act.	In 2018, Council recommended that branches review the branch rotations to the Nominating Committee with the purpose of ensuring continuity. The branches conducted a review and adopted a new process for branch appointments to the Nominating Committee.  However, as noted above, with the expanded scope of the Committee, composition and qualifications to serve on the Nominating Committee will need to be re-considered.
19. Develop defensible guidelines for the Nominating Committee to use when evaluating incumbent candidates   	<ul style="list-style-type: none"> <li>Want to ensure that there is a fair evaluation process in place</li> </ul>	N/A	Bill 49 specifies that a nomination committee must administer the nomination of registrants who are qualified to be nominated for election to the council in accordance with the process and selection principles referred to in section 25 (1), the bylaws and applicable regulations.  All nominations must follow merit-based selection principles.	The sub-committee of Council has approved a new candidate selection framework for use by the Nominating Committee, subject to any additions specified in Regulation.
<b>Election Process</b>				
20. Appoint an Independent Chief Elections Officer to oversee the election process   	<ul style="list-style-type: none"> <li>The association must be able to censor statements and protect the association from claims of defamation and reputational risk</li> <li>An independent role removes any perception of bias or perceived conflict</li> </ul>	N/A	No requirement specified	Governance Committee directed staff to develop options, budget considerations and a timeline in support of this recommendation.  Regulations and Bylaws will require review to determine how this change could be implemented. Due to immediate Bill 49 implications, progress on this deliverable has been delayed.



	<ul style="list-style-type: none"> <li>Provides an additional layer of protection against claims of unfair treatment</li> </ul>			
<p>21. Amend the candidate statement form to include relevant skills experience (financial fluency, strategic planning, governance experience, etc.)</p> 	<ul style="list-style-type: none"> <li>Skills related to financial fluency, governance, strategic planning, risk management, HR, and others are relevant and important skills for Council</li> <li>Supports informed decision making by allowing voters to better assess the skills and competencies of candidates</li> </ul>	<p>No specific recommendation, however, report states “as councilors are elected individually, there is little opportunity to ensure an appropriate mix of skills.”</p> <p>Report also comments on the Nominating Committee providing one measure for putting forward quality candidates.</p>	<p>An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.</p>	<p>The new nomination form approved by the sub-committee of Council requires candidates to detail their experience in the following key skills and competencies: leadership, financial literacy, risk management, human resources, strategy, regulatory understanding, governance and technical proficiency.</p> <p>The sub-committee of Council will be reviewing whether any subsequent changes should be made the candidate statement form which is made available as part of the election material presented to members.</p>
<p>22. Adopt a professionally produced candidate video program to be available to all candidates</p> 	<ul style="list-style-type: none"> <li>Videos provide another medium to assist members in making an informed decision</li> <li>Public speaking is required for Councillors, particularly President and Vice President; videos allow candidates to showcase their competency in this area</li> </ul>	N/A	N/A	<p>The sub-committee of Council approved the use of candidate videos as an ongoing component of the election material for the positions of President and Vice President.</p>
<p>23. Terms of Reference of the Governance Committee be amended to include review of the relevance of the Q&amp;A</p> 	<ul style="list-style-type: none"> <li>Support inclusion of Q&amp;A's in candidate material</li> <li>Would like the task of reviewing the questions delegated</li> </ul>	N/A	N/A	No action required.
<p>24. Retain current ballot format</p> 	<ul style="list-style-type: none"> <li>The 2018 Nominating Committee asked the TF to review the ballot formatting to ensure that members voting are aware of the process by which the candidate has been nominated</li> <li>TF feels that members have a responsibility to review candidate statements before marking their ballot; process by which a candidates was nominated is already included in candidate statements</li> <li>Adding how a member was nominated or any other information on the ballot itself could create bias</li> </ul>	N/A	<p>An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.</p>	No action required.
<p>25. Eliminate mailing of election postcards to members without a valid email address on file</p> 	<ul style="list-style-type: none"> <li>Current process of mailing postcards is not a good use of resources (time, cost and environmental impact)</li> <li>It is the responsibility of a professional to provide an email address to the regulator</li> <li>Election takes place at the same time each year, postcard notification is unnecessary</li> </ul>	N/A	<p>An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.</p>	No postcards will be mailed for the 2019 election.

26. Eliminate paper ballots within a three-year period 	<ul style="list-style-type: none"><li>• Only 0.2% of ballots received are paper ballots</li><li>• 100% electronic balloting saves time and effort</li><li>• Eliminates the need to verify whether duplicate ballots have been submitted</li><li>• Three years provides adequate notice to members</li></ul>	N/A	An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.	In progress. In 2018, Council approved discontinuing the practice of paper ballots beginning with the 2021 election.
27. Retain current voting window 	<ul style="list-style-type: none"><li>• Current voting window is about a month</li><li>• Provides sufficient time for members to thoroughly review election material and make an informed decision</li></ul>	N/A	An election of registrant councilors is to be conducted in accordance with the bylaws made by the council and the regulations that may be made by the Lieutenant Governor in Council.	No action required.
28. Do not publish any additional voter demographics but collect additional voter demographics for the purpose of better understanding member engagement 	<ul style="list-style-type: none"><li>• Don't support the publication of additional voter demographics as it may affect the anonymity of the voter, particularly in less populated branches</li><li>• Don't see the value in publishing it</li><li>• Do see value in using the information internally to better understand member engagement</li></ul>	N/A	N/A	No action required.



## OPEN SESSION

### ITEM 5.11.10

DATE	April 12, 2019
REPORT TO	Council for Information
FROM	Deesh Olychick, Director, Corporate Governance & Strategy
SUBJECT	30 by 30 Update
LINKAGE TO STRATEGIC PLAN	We foster diversity and inclusivity

Purpose	To update Council on the progress made on the 30 by 30 initiative.
Motion	For information only.

## BACKGROUND

In September 2018, Council endorsed the association's 30 by 30 Strategy. Our strategy leverages building diversity through our current member programs, building relationships and partnerships in support of shared gender diversity goals, and finding ways to support women and girls at every step along their career path.

With the addition of a staff resource to support the implementation of the strategy, the action plan is in development. As part of its development, we are currently reviewing a number of program areas to determine how these programs can be optimized to further support 30 by 30. In addition, we are working on a partnership with ASTTBC and ACEC-BC to further advance this initiative.

At this time, we are pleased to share some of the progress and upcoming programming in support of 30 by 30.

### 30 by 30 Champions Group

The 30 by 30 BC Champions Group has now surpassed 40 members. This group is comprised of Engineers and Geoscientists BC members, academics, and branch representatives. An online Community Wiki was created to provide a collaborative platform where best practices, learnings and experiences can be shared.

## **Engineers Canada**

In February, the association was present at the annual Engineers Canada meeting in Ottawa where we had the opportunity to present on our strategy and the importance of data collection and research in its development. The meeting also provided an opportunity to network and collaborate on actions to combat barriers in both recruitment and retention efforts. Engineers Canada is in the process of consolidating the feedback and will share it with each regulator once complete.

## **National Engineering and Geoscience Month (NEGM)**

To increase public awareness, 30 by 30 was the underlying narrative in our outreach for NEGM 2019. In addition to Science Games and 12 branch activities, the association had an increased media presence with coverage in the Vancouver Sun, The Province, Business in Vancouver, and on-site media coverage of Science Games, with an accompany interview on Global TV Morning News. Print interviews with President Dr. Katherina Tarnai-Lokhorst and CEO Ann English, as well as television and radio interviews with President Tarnai-Lokhorst and EIT Christina Noel emphasized 30 by 30 and the need for women in engineering. More information about our media coverage can be found on our website at [www.egbc.ca/negm](http://www.egbc.ca/negm)

## **BC Science Outreach Workshop**

Engineers and Geoscientists BC collaborated with the University of British Columbia to deliver a presentation at the 2019 BC Science Outreach Workshop on March 4 hosted by Science World. The workshop was presented to over 40 individuals who work to promote STEM across the province and addressed the importance of partnerships and collaborations to advance women and other underrepresented groups in STEM fields.

## **Mentoring Mix and Mingle**

The annual Mentoring Mix and Mingle takes place each spring with the goal of bringing together current and prospective mentors and mentees to the Engineers and Geoscientists BC Mentorship Program. This year emphasis is on diversity and inclusion in the workplace with a presentation from a leading expert in this field. The importance of mentorship in the progression of women in engineering fields is being endorsed and supported by making the event available in the Lower Mainland and in locations throughout the province. Four branches are collaborating by hosting simultaneous events around the province where the opening remarks and speaker presentation are live streamed to the branch followed by their own mentoring networking session.

## **Website**

Website content supporting our work for 30 by 30 is being reviewed, updated, and incorporated into a larger Diversity and Inclusion web presence. Recommendations on website presence have been considered in the restructure and content development. The new pages will include the 30 by 30 initiative, but also expand to include industry tools, resources, examples and association advances.

### **Creating Connections 6.0 Sponsorship**

Engineers and Geoscientists BC is a proud sponsor of the upcoming Creating Connections 6.0 conference taking place May 3 and 4 in downtown Vancouver. Presented by West Coast Women in Engineering, Science and Technology this biennial conference focusses on diversity and how to attract, engage, and retain women and other underrepresented groups in STEM.

### **International Women in Engineering Day – June 23, 2019**

The association is currently working to finalize programming leading up to International Women in Engineering Day on June 23. This year initiatives include in-person and web events. The association is also working with Engineers Canada to assist in the development and promotion of a national initiative to celebrate the day.

### **30<sup>th</sup> Anniversary of École Polytechnique**

In commemoration of the 30th anniversary of the École Polytechnique massacre on December 6, 2019, the association is looking to identify ways to appropriately recognize this event. Plans will be shared once finalized.

OPEN SESSION

ITEM 5.11.11

DATE	March 25, 2019
REPORT TO	Council for Information
FROM	Deesh Olychick, Director, Corporate Governance & Strategy on behalf of the Sub-Committee of Council
SUBJECT	Bill 49 – Nomination & Election Implications
LINKAGE TO STRATEGIC PLAN	We support effective governance

Purpose	To inform Council on the decisions of the Sub-committee of Council related to the nomination and election processes.
Motion	For information only.

## BACKGROUND

At its November 23, 2018 meeting, Council created an advisory group to examine the election implications of Bill 49 and delegated the decision on how to move forward with the 2019 election, the transitional requirements and the candidate selection framework to a Sub-committee of Council consisting of the four public appointees and the immediate past president. In addition, at its February meeting, Council also delegated the decision on how to proceed with the candidate videos to the Sub-committee of Council.

Through its review of Bill 49 and the nomination and election implications, the Nomination and Election Advisory Group made several recommendations to the Sub-committee of Council. The following is a summary of the subsequent decisions made by the Sub-committee of Council.

## TRANSITIONAL PROVISIONS

**ITEM 1 SUMMARY:** The *Professional Governance Act* specifies that the term for President and Vice President can be up to three years. It is at the discretion of each regulator to set the term for President and Vice President. The advisory group recommended to the sub-committee that one-year terms for these two positions be maintained. The significant time demands for these two roles was noted and it was recognized that the time commitment could potentially reduce the pool of candidates, should terms be extended.

**MOTION:** It was moved and seconded that the sub-committee of Council approves maintaining one year terms for the office of President and for the office of Vice President

**CARRIED**

**ITEM 2 SUMMARY:** The *Professional Governance Act* will require us to transition from a Council of 17 to 12. Government has informed us that this transition will not happen in 2019. The advisory group discussed various scenarios and a key criteria in their evaluation was Council continuity, in particular avoiding the possibility that at any time, there would be a 100% turnover of Council. Given the complexity of the organization and the need for the functions of the organization to continue uninterrupted, future elections would ideally involve a combination of continuing and new Councillors.

After careful consideration of various scenarios, the advisory group recommended to the sub-committee that in order to support adequate staggering of Council terms, once the transitional provisions of the *Act* are in place, Council terms would need to be adjusted in the first election year. This would mean that of the five newly elected registrant Councillors, two members of Council would serve a three-year term, two members of Council would serve a two-year term and one member of Council would serve a one-year term. After the transitional year, all subsequent terms would be three-year terms. This would provide for a 1-2-2 rotation for Councillor elections, meaning that in each year, at least one Councillor position, but no more than two, would become vacant. It is recognized that Government would need to grant authority to adjust terms in this manner for the first election following the implementation of these Bill 49 provisions.

**MOTION:** It was moved and seconded that the sub-committee of Council endorses the transitional provisions as recommended by the advisory group

**CARRIED**

**ITEM 3 SUMMARY:** Ideally, a 2-2-2 rotation for Councillor elections would be preferred and would further enhance continuity on Council, with two councillor positions becoming vacant each year. The advisory group discussed an alternative process for selecting the Vice President. In this alternate scenario, the Vice-President would be selected by the Council from the pool of elected Councillors. This scenario would provide for a consistent staggering of Councillor elections each year: 2-2-2. This alternate scenario would require discussion with Government as to whether it would be permissible under the new *Act* and regulations.

**MOTION:** It was moved and seconded that the sub-committee of Council directs staff to explore with Government an alternative scenario whereby the Vice President is selected by the Council, and to report back to the sub-committee of Council

**CARRIED**

## CANDIDATE SELECTION FRAMEWORK

**ITEM 4 SUMMARY:** The advisory group reviewed the practices of other regulators and recommended a candidate selection framework that includes a combination of a gap analysis, a systematic assessment of candidate skills and competencies, as well as diversity considerations. Below is a summary of the process that will guide the Nominating Committee's work.

1. Confirm criteria and desired skills and competencies for Council positions, and the number of openings available for each position.
2. Conduct a gap analysis to prioritize desired skills, competencies, and experience for the upcoming year, including consideration of diversity.
3. Assess the qualifications of potential nominees using a rating matrix based on the desired skills and competencies, as well as interviews and reference checks, to confirm experience and competencies, as appropriate.
4. Finalize list of nominees to stand for election.

**MOTION:** It was moved and seconded that the sub-committee of Council approves the candidate selection framework as recommended by the advisory group for use by the Nominating Committee, subject to any additions specified in Regulation

**CARRIED**

**ITEM 5 SUMMARY:** The advisory group identified the following key skills and competencies required to support effective governance for the professions of engineering and geoscience:

- Leadership
- Financial literacy
- Risk Management
- Human Resources
- Strategy
- Regulatory Understanding
- Governance
- Technical Proficiency

The advisory group recommended to the sub-committee that potential nominees should be required to detail their experience in these areas as part of the nomination form (as applicable). The advisory group recognizes that there will be some competencies required for all candidates and others that only some candidates will need; a gap analysis will be key in determining the needs for each upcoming Council year.



**MOTION:** It was moved and seconded that the sub-committee of Council approves the skills and competences as recommended by the advisory group for use by the Nominating Committee, subject to any additions specified in Regulation

**CARRIED**

**ITEM 6 SUMMARY:** The advisory group strongly advocates for the importance of board diversity and ensuring its prominence in our outreach efforts. The sub-committee supports the objective to have a diverse Council reflective of the organization's membership and approved the following motions:

**MOTION:** It was moved and seconded that the sub-committee of Council directs the Nominating Committee to nominate a diverse slate of candidates to ensure that the Council is diverse and reflective of the organization's membership.

The nominating committee process will support this objective by engaging in active outreach to encourage a diverse pool of candidates to apply. This includes inviting more applicants, if necessary, to support the diversity objective.

For the purpose of Council composition and nominated candidates, diversity includes designation (P.Eng. and P.Geo), discipline, region, gender and ethnicity, including underrepresented groups.

**CARRIED**

**ITEM 7 SUMMARY:** In order for the Nominating Committee to assess the skills and competencies of potential nominees, a new nomination form has been created. The new form asks potential nominees to provide a written summary of their interest for serving on Council, outline their professional, educational and volunteer experience, detail their experience in the eight skills and competencies identified (as applicable), and answer a series of conflict of interest and disclosure statements.

**MOTION:** It was moved and seconded that the sub-committee of Council approves the nomination form as recommended by the advisory group for use by the Nominating Committee, subject to editorial and legal review

**CARRIED**

**ITEM 8 SUMMARY:** The current bylaw requires the Nominating Committee to nominate at least one or more candidates for the office of President, at least two candidates for the office of Vice President and at least three more candidates than positions available for Councillor. Traditionally, the Nominating Committee nominates one candidate for the position of President. Because there will no longer be nominations by 25 members, the advisory group recommends that voters always be provided with a choice of nominees. To that end, the following motions were presented and approved by the sub-committee:

**MOTION:** It was moved and seconded that the sub-committee of Council directs the Nominating Committee to nominate at least two candidates for the office of President

**CARRIED**

**MOTION:** It was moved and seconded that the sub-committee of Council endorses the advisory group's recommendation of nominating more candidates than openings, at least N+1

**CARRIED**

## **CANDIDATE VIDEOS**

**ITEM 9 SUMMARY:** The sub-committee reviewed the feedback from the post-vote survey and determined that there is value to continue the candidate videos for the positions of President and Vice President as public speaking for both these roles is required and videos allow voters to see how well each candidate can express their views and communicate.

**MOTION:** It was moved and seconded that the sub-committee of Council approves the use of candidate videos as an ongoing component of the election material for the positions of President and Vice President.

**CARRIED**

## OPEN SESSION

5.11.12

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Megan Archibald, Director, Communications and Stakeholder Engagement
SUBJECT	National Engineering and Geoscience Month: Summary
LINKAGE TO STRATEGIC PLAN	Promote and protect the professions of engineering and geoscience (subject to goals 1 & 2).

Purpose	To provide an update of the activities of National Engineering and Geoscience Month in BC.
Motion	For information only.

## BACKGROUND

National Engineering and Geoscience Month (NEGM) is a celebration of engineering and geoscience held every year in March. This month-long event promotes awareness of the engineering and geoscience professions, highlights career choices in these fields and reminds the public of the many ways in which engineering and geoscience touch everyday life.

## DISCUSSION

NEGM was promoted through the association's main communications channels, including the website, ENews, and Twitter. This year, we focused our messaging on the particular importance of engaging girls and young women, and our ongoing efforts to achieve 30x30. Our campaign included an official Proclamation from government, advertising in print and digital media, and events and outreach activities around the province.

We also delivered a successful media strategy to gain earned media for many of our events, enabling us to promote our efforts towards 30x30 and gender parity, and engaged government at our flagship event, the Science Games.

## Media Coverage

We circulated two news releases on March 1 and March 4 to BC-wide media outlets, and supported that with direct media outreach. We were pleased to see significant media pickup as a result of these efforts, with delivery of our key messages throughout the coverage.

Our narrative focused on highlighting the need for more women in the professions, the incredibly diverse career opportunities available to young people, and the importance of sparking an interest in science and technology at a young age. To generate interest and media engagement, we worked with Christina Noel, EIT as one of our spokespeople, whose interest in engineering began at a young age when she participated in a popsicle stick bridge building competition in Kamloops. She later moved on to receive several scholarships from the Foundation, and is now working as an environmental engineer-in-training. Christina's story demonstrates the positive impact initiatives like NEGM can have on inspiring young people to consider careers in the professions.

Media coverage included:

- February 22: CEO Ann English, P.Eng. was featured in Business in Vancouver's [Women in Business edition](#) (pages 28 and 29).
- March 1: [Op-Ed by President Kathy Tarnai-Lokhorst](#), P.Eng. published in The Province in both print and digital editions.
- March 2: [Coverage of the Science Games](#) in the Vancouver Sun.
- March 2: Coverage of the Vancouver Branch's Engineering and Geoscience Festival by Fairchild TV.
- March 4: President Kathy Tarnai-Lokhorst, P.Eng. and Christina Noel, EIT, appeared on [Global TV's morning show](#) to talk about why initiatives like NEGM are critical to our work to accelerate diversity in the professions.
- March 5: Christina Noel, EIT was interviewed on [Kamloops radio station CHNL](#) to discuss the importance of outreach to youth—especially young women—to increase awareness and interest in engineering and geoscience.
- March 24: President Kathy Tarnai-Lokhorst, P.Eng. was interviewed by Ming Pao about how parents can explore science with their kids, and encourage an interest in science as a career: [http://www.mingpaocanada.com/Van/htm/News/20190324/wj1h\\_r.htm](http://www.mingpaocanada.com/Van/htm/News/20190324/wj1h_r.htm)

## Advertising

Our advertising campaign this year featured fun “did you know” facts intended to encourage families to learn more about the professions, and the diverse nature of engineering and geoscience.



The ads were featured in the Vancouver Sun (print and online) throughout the month of March in order to maximize provincial coverage.

We also marked International Women's Day (March 8) with a [print ad](#) in the Vancouver Sun.

## Government Engagement

We secured an [official Proclamation](#) from government, deeming March "National Engineering and Geoscience Month."



Our flagship event, the Science Games, took place on Saturday, March 2 at the TELUS World of Science, where Minister Melanie Mark helped award medals to our Division 1 participants (grades 1-3).

Minister Mark congratulated participants on their achievements, spoke about the incredible impact engineering and geoscience have on our daily lives, and reinforced the exciting opportunities available in the professions.

MLA Bowinn Ma also spoke in the Legislature on Monday, March 4 about the critical role these professions play in society, and voiced support for Engineers and Geoscientists BC's commitment to 30x30. (remarks available on her [Facebook page](#))



## Member and Public Engagement

Engineers and Geoscientists BC branches hosted 12 family-oriented events and activities throughout the province, such as the Vancouver Branch's Engineering and Geoscience Fest, and several popsicle stick bridge building competitions. We also co-hosted the ever-popular NEGM drawing contest for kids aged 4-12 with our colleagues at ASTTBC.

We partnered with the Britannia Mine Museum for Dig Day, a fun and educational event featuring hands-on activities and professional geoscientists to help kids explore the world of geoscience.

We saw positive engagement on social media, with about 15,000 impressions (estimated views) of our 13 NEGM-focused tweets throughout March. We also received 31 new followers, had 33 link clicks, and generated 19 retweets and 54 likes.



## OPEN SESSION

### ITEM 5.11.13

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Ann English, P.Eng. Chief Executive Officer and Registrar
SUBJECT	Council Road Map (as at April 12, 2019)
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

Purpose	To provide Council with the current status of the actionable items listed on the Council Road Map for 2018/2019
Motion	For information only.

## BACKGROUND

The attached document summarizes the expected agenda items that are planned to be brought forward to Council during the 2018/2019 Council year. The items are aligned with the Strategic Plan and assist Council in seeing the progress on elements of the Plan. This road map is not exclusive and other additional items may be added throughout the year but will serve as a focus for this year's meetings.

Please note that the following items on the Work Plan have been carried forward to the June 21, 2019 and September 13, 2019 Council meetings:

The following Professional Practice Guidelines: Geotechnical Engineering Services for Building Projects (revision), Building Enclosure Engineering Services (revision), Professional Practice (revision), Design and Installation of Elevating Devices (revision) will be presented for review at the June 21, 2019 Council meeting. The Professional Practice Guidelines entitled: Software Engineering (new), Formwork and Falsework (new) and Professional Services in the Forest Sector – Forest Roads (revision) will be brought forward to the September 13, 2019 Council meeting. All of these guidelines are being developed by volunteer authors and reviewers who have many other commitments. Unfortunately, this combined with the time commitment staff has had to dedicate towards professional reliance and the new Act has resulted in a delay on these guidelines.

The President/Council Honorarium Recommendation discussion will be carried forward to the June 21, 2019 Council meeting as we are awaiting relevant information to be provided by the BC Government concerning legislative changes under Bill 49 before we can move forward.

Kindly note the following additions to the Work Plan:

- Professional Governance Act Update – Update on Practice Rights
- Professional Practice Guideline – Watershed Assessment Guidelines

#### **ATTACHMENT A – Council Road Map (as at April 12, 2019)**



Engineers and Geoscientists BC Council Road Map for 2018-2019

	Strategies	November 23 (Council Meeting)	January 31 (Half Day Council Forum)	February 1 (Council Meeting)	April 11 (CANCELLED)	April 12 (Council Meeting)	June 20 (Full Day Council Forum)	June 21 (Council Meeting)	September 12 (Full Day Council Forum)	September 13 (Council Meeting)	October 17-19 (AC & AGM)
Goal 1 To uphold and protect the public interest through the regulation of the professions.	Clarify the association's regulatory role and responsibilities through ongoing communication and engagement with members and other stakeholders.	Member Engagement Plan Update		Member Engagement Plan Update		Fairness Panel Annual Report			Strategic Planning		
		Professional Governance Act Update		Discussion on Life Membership Bylaw							
	Identify and implement practices, programs, policies, bylaws, and Act amendments that improve Engineers and Geoscientists BC's ability to more effectively carry out its duty and objects.	Life Membership Bylaw Update									
		Recommendation on Milestone Volunteer Recognition Program		Proposed AGM Special Rule		President/Council Honorarium Recommendation				Non-Practising Member Fee Review and Recommendation	
				Proposed AGM Motion - Voting Rights for MITs		Nomination & Election Review Task Force Recommendations Update					
				Task Force on Landslide Risks With Respect to Development Within BC Update							
Goal 2 Establish, maintain and enforce qualifications and professional standards.	Enhance members' awareness and use of professional practice resources.			Professional Practice Guidelines: 1. Retaining Wall Design and Field Review Services (new) 2. Guidelines:Groundwater at Risk of Pathogens (new)		Professional Practice Guidelines: 1. Software Engineering (new) 2. Formwork and Falsework (new) 3. Professional Services in the Forest Sector - Forest Roads (revision)			CPD Program Update		
				Professional Practice Guidelines: 3. Geotechnical Engineering Services for Building Projects (revision)							
				Professional Practice Guidelines: 4. Building Enclosure Engineering Services (revision) 5. Professional Practice (revision) 6. Design and Instalation of Elevating Devices (revision)		Professional Practice Guidelines: 1. Watershed Assessment Guidelines(new)				Update on Pilot Program to Address the Recommendations in Truth and Reconciliation Calls to Action Report	
				Update on Conceptual Pilot Program to Address the Recommendations in Truth and Reconciliation Calls to Action Report							
	Deliver timely, outcomes-focused complaints and enforcement processes.	Quarterly I&D and Enforcement Reports		Quarterly I&D and Enforcement Reports		Quarterly I&D and Enforcement Reports				Year End I&D and Enforcement Reports	
				Update on High Profile Discipline Files							
	Develop a system for corporate regulation that demonstrates enhanced public protection.	Corporate Regulation Update				Corporate Regulation Update		Phase 3 Consultation Report			
								Report to Council by Advisory Task Force on Corporate Practice			

Engineers and Geoscientists BC Council Road Map for 2018-2019

	Participate in initiatives that improve national harmonization of regulatory processes.					Update on pan-Canadian project and pilot re: Competency-Based Assessment for Geoscience Experience Evaluation		Update on pan-Canadian project for Assessment of Engineering Experience			
Goal 3 Promote and protect the professions of engineering and geoscience (subject to goals 1 & 2).	Implement the new brand and increase awareness of the high standards that Engineers and Geoscientists BC must meet.		Induction Ceremony (to occur on Jan. 22/19)			100th Anniversary Campaign Update	Induction Ceremony (date to be confirmed)		Induction Ceremony		
	Assess and improve admission processes and tools to facilitate robust and timely assessment of applicants.	Report: Bridge Eng.L. to P.Eng. (Reg) Update: Move EngL to Competency Assessment (Reg)		Registration/Admissions Report for Calendar 2018				Update/Policy on the Assessment of Canadian Environment Experience using Canadian Environment Experience Competencies and the on the Application of the Working in Canada Seminar		Registration/Admissions Report for Fiscal 2019	
						Update on Pilot Program utilizing 'low risk' profiles and recommended tools outlined in Policy on Risk Based Limited License Assessment					
		30 x 30 Strategy Update									
	Implement processes that support Engineers Canada's 30 by 30 program for improving the number of women in the professions.										
	Clarify the association's regulatory role and responsibilities through ongoing communication and engagement with members and other stakeholders.					30 x 30 Strategy Update		Dean's Presentation		Policy: Move EngL to Competency Assessment (Reg)	Appointment of Councillors to Committees
Sustaining Operations		Budget Guidelines		KPI Update		2020 Budget				2019 Audited Financial Statements	Approval of Auditors
		Building Security Renovation Update		Risk Register		Building & Space Renewal Task Force Recommendations				KPI Update	
		Risk Register		Benefits Program Consideration		Risk Register				Risk Register	
Bill 49 Impacts		Practice Rights Update		General Update, Election Plans, Intentions Paper Update		Practice Rights Update					
						General Update		General Update		General Update	

Item Completed

New Item

Items Advanced

OPEN SESSION

ITEM 5.11.14

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Ann English, P.Eng. Chief Executive Officer and Registrar
SUBJECT	Council Attendance Summary (as at April 12, 2019)
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions.

Purpose	To provide updates on the Council attendance summary
Motion	For information only.

## BACKGROUND

The Council Attendance Summary is used to track individual Councillor attendance at the Council meetings and other related events and Committee meetings that Councillors are a part of (e.g. the Executive Committee, the Governance Committee, the Registration Committee, etc.). Each Councillor is assigned a column which is regularly updated.

At the end of the Council year, each Councillor's column will be tallied and a percentage applied. The intent in curating this summary is to provide information that will assist with future correspondence relating to things such as the election; this will enable staff to display the high level of dedication that is required of candidates. The Council Attendance Summary will also provide a clear visual of the amount of meetings that the average Councillor is required to attend and how many meetings each Committee holds.

## ATTACHMENT A – Council Attendance Summary

		Dr. Kathy Tarnai-Lokhorst, P.Eng., FEC	Harian Kelly, P.Eng.	Caroline Andrewes, P.Eng., CMA, CPA	Suky Cheema, CA, CPA	David Wells, JD	Ken Lalogue, CPA, CA, TEP	John Turner, P. Ag. (ret)	Alan Anderson, BA, LLB.	Leslie Hildebrandt, ICD.D., LLB.	Brook Nanson, P.Eng.	Larry Spence, P.Eng.	Susan MacDougall, P.Eng.	Kevin Turner, P.Eng., FEC, (Hon.)	Jeremy Vincent, P.Geo.	Lianne Mah, P.Eng., FEC	Doug Barry, P.Eng., FEC	Dr. Catherine Hickson, P.Eng.	Tim Watson, P.Geo., FGC	Antigone Dixon-Warren, P.Geo.	Dr. Nimal Rajapakse, P.Eng.
Oct 20, 2018 (Inaugural Council)		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✗	✓		
Nov 2, 2018 (Prof. Practice Comm)												✓		✓							
Nov 7, 2018 (Reg Comm)					✓					✓							✓			✗	
Nov 7, 2018 (Geoscience Comm)																	✗		✓		
Nov 13, 2018 (Orientation)		✓	✓	✓								✓				✓			✓		
Nov 13, 2018 (Exec Comm)		✓	✓	✓			✓		✓		✓										
Nov 13, 2018 (CPD Comm)										✓						✓					
Nov 21, 2018 (Councillor Agenda Teleconference)		✓	✓	✓	✗	✗	✗	✓		✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗
Nov 23, 2018 (Council)		✓	✓	✓	✓	<del>✓</del>	✗	✓		✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓
Dec 5, 2018 (Governance Comm)				✓	✓	✗									✓			✓			
Dec 5, 2018 (Nominating Comm)				✓																	
Dec 10, 2018 (30 x 30 Champions)												✓									✗
Dec 10, 2018 (CPD Comm)										✓						✓					
Dec 11, 2018 (Exec Comm)		✓	✓	✗			✓			✓											
Dec 12, 2018 (Reg Comm)					✓					✓							✓			✓	
Dec 13, 2018 (CCAG)														✓					✗		
Jan 7, 2019 (Prof. Practice Comm)												✓		✓							
Jan 18, 2019 (VP Visit to West Kootenay Branch)			✓	✓																	
Jan 17, 2019 (CCAG)														✓					✓		
Jan 18, 2019 (Audit Comm)					✓				✓					✓		✓		✓			
Jan 22, 2019 (Induction Ceremony)		✓	✓	✓	✗	✓			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Jan 23, 2019 (Reg Comm)					✓			✓		✓							✓			✓	
Jan 23, 2019 (VP Visit to Richmond/Delta Branch)			✓																		
Jan 30, 2019 (Councillor Agenda Teleconference)		✓	✓	✓	✗	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗
Jan 31, 2019 (Council Forum)		✓	✓	✓	✓	✓			✓	<del>✓</del>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Feb 1, 2019 (Council)		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Feb 4, 2019 (CPD Comm)										✓						✓					
Feb 6, 2019 (Geoscience Comm)																		✗		✓	
Feb 13, 2019 (Bill 49 Election & Nomination Sub-Comm)				✓	✓	✓			✓	✓											
Feb 20, 2019 (Exec Comm)		✓	✓	✗		✓					✓										
Feb 27, 2019 (Nominating Comm)				✓																	
Feb 27 - Mar 1, 2019 (EC Winter Meetings)		✓																			
Feb 28, 2019 (CCAG)														✓					✓		
Mar 4, 2019 (CPD Comm)										✓						✓					
Mar 6, 2019 (Reg Comm)								✓		✓								✓			✗
Mar 7, 2019 (VP Visit to Vancouver Branch)			✓																		
Mar 11, 2019 (Exec Comm)		✗	✓	✓		✓					✓						✓				
Mar 14, 2019 (Proff. Practice Comm)													✓		✓						
Mar 26, 2019 (Nominating Comm)				✓																	
Apr 3, 2019 (Opposition Caucus Luncheon)		✗	✓	✓	✗	✓			✗	✗	✗	✗	✗	✓	✓	✗	✓	✗	✓	✓	✗
Apr 3, 2019 (Government Caucus Reception)		✓	✓	✓	✗	✓			✗	✗	✗	✗	✗	✓	✓	✗	✓	✗	✓	✓	✗
Apr 10, 2019 (Councillor Agenda Teleconference)		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✗
Apr 11, 2019 (Geoscience Comm)																		✓		✗	
Apr 12, 2019 (Council)		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓

Attendance Required

Attendance Not Required

Attendance for Partial Meeting

✓

✓

✓

OPEN SESSION

ITEM 6.1

DATE	March 22, 2019
REPORT TO	Council for Decision
FROM	Peter Mitchell, P.Eng., Director, Professional Practice, Standards and Development
SUBJECT	Development of a Climate Change Action Plan for the Association
LINKAGE TO STRATEGIC PLAN	Goal #2: Establish, maintain and enforce qualifications and professional standards.

Purpose	To consider the Motion from the 2018 AGM regarding the development of an association Climate Change Action Plan to support membership.
Motion	That Council approves: (a) the development of a climate change action plan to achieve the following vision: the association is to model the way forward on what good business and professional practice looks like for engineering/geoscience professionals in BC, (b) subject to the Council approved budget, an increase to the annual budget addressing climate change related initiatives from \$20K to \$50K to support the development and implementation of a climate change action plan for the association, and the integration of the climate change action plan into the association's strategic plan.

## BACKGROUND

At the 2018 Annual General Meeting, the following resolution was made as a result of a member motion:

*That council consider undertaking and putting the necessary resources into the development of a comprehensive Climate Change Action Plan that will provide direction on the roles and duties of EGBC's members in addressing this issue.*

At the November 23, 2018 Council meeting, Council considered this motion and assigned action to the Climate Change Advisory Group (CCAG). At its meeting on December 13, 2018, the CCAG met to discuss the steps that would be required to develop a climate change action plan in response to Council direction. The CCAG discussed the major components of a climate change

action plan; what a plan for a regulatory body may look like and in particular, how it must respond to the changing needs and obligations of the association as well as the membership. The recommended response proposed by the CCAG as reflected in this report was reviewed with the Sustainability Committee, Environmental Professionals Division (EPD), and the Energy Efficiency and Renewable Energy Division (EERED) and received their support.

## DISCUSSION

### **What has been accomplished:**

The association has established position papers both on the aspect of adaptation (2014) and mitigation (2016) that commit the association to raise awareness, and to provide information and assistance to engineering and geoscience professionals while setting expectations that members consider in their professional practice. The 2017 Climate Change Awareness Survey conducted by the association not only showed that a clear majority of members feel that it is important and urgent to incorporate climate considerations into practice but also revealed that members want the association to do more to support their efforts. Three out of four members responding to the survey felt taking action should be urgent (74% of respondents felt it was “very urgent”, “urgent” or “somewhat urgent” to take action). In support of the above referenced position papers and the survey, staff from Professional Practice Standards and Development (PPSD) department continue to work with practice committees and divisions in responding to the evolving requirements that members are expected to meet in addressing this issue.

Due to the work that has been accomplished through the input and support of these groups, the association is seen as a progressive leader developing practical tools which guide members in their professional practice as it relates to addressing a changing climate from the perspective of mitigation and adaptation.

With respect to mitigation, the association has:

- Developed joint practice guidelines in cooperation with the Architectural Institute of BC that mitigates climate change due to the focus on the reduction of greenhouse gas emissions through achieving energy efficiency in the design of buildings.
- Played a lead role in the successful development and implementation of the BC Energy Step Code including its integration into the BC Building Code. In BC, 30% of the greenhouse gas emissions come from buildings. The new Energy Step Code will make significant ongoing contributions to climate change mitigation. As a result of the association’s role in the development of the Energy Step Code, in 2017 the association received a Special Recognition Award presented by the Minister of Environment and Climate Change Strategy.
- Developed the policy to enable the association’s annual conference to be carbon neutral through sponsorship.

With respect to initiatives addressing climate change adaptation, the association has:

- Developed professional practice guidelines on developing climate resilient designs for highway infrastructure. These guidelines have been recognized by BC's Auditor General as constituting national level best practice on adaptation.
- Worked on a multi-year contract with BC Ministry of Health to develop Professional Practice Guidelines for the Preparation of "One Water" System Risk Management Plans in British Columbia. These professional practice guidelines include guidance on how to manage risks associated with adapting to climate change. Utilizing a draft of these practice guidelines, four water system risk management plans have been developed for pilot communities and efforts are underway to build awareness and support within the water sector for the development of water system risk management plans, which include addressing climate change.
- Liaised with Engineers Canada and other stakeholders in finding a home for the Public Infrastructure Engineering Vulnerability Committee's Protocol (PIEVC protocol). The PIEVC protocol is a nationally recognized methodology for assessing, managing, and adapting public infrastructure so risks from a changing climate are addressed.

**What is currently being done:**

There are several climate change related initiatives currently being supported by the Professional Practice Standards and Development Department and they include:

1. Developing professional practice guidance that address both climate change mitigation and adaptation and how these are integrated into sustainable practices in engineering and geoscience (e.g. Engineers and Geoscientists BC's Sustainability Guidelines, Engineers Canada's Sustainability in Practice Course).
2. Maintaining the Climate Change Information Portal (e.g. identifying resources such as future projections of BC Building Code related climate design parameters).
3. Providing feedback on climate change related intentions papers, public policy documents and other projects initiated by the public and private sectors that have implications for the practice of the professions (e.g. participation in and promotion of BC Housing's Mobilizing Building Adaptation and Resilience Project).
4. Detailing a professional's obligations with respect to addressing climate change and the legal risks faced by members if they do not account for the changing climate (e.g. CPD event on "Understanding the Changing Legal Climate: Canadian Climate Law for Engineers and Other Professionals").

5. Formulating Professional Practice Guidelines on System Risk Management Planning for water utilities which include addressing climate risks from climate change (draft practice guidelines have been developed and workshops have been delivered in order to obtain feedback).
6. Developing Practice Resources, which have a Climate Change Lens applied to them (e.g. facilitating the provision of webinar recordings from Natural Resources Canada on the “Application of Climate Lens – General Guidance”).
7. Creating the Engineers and Geoscientists BC Online Sustainability Primer (e.g. update to the existing climate change primer).
8. Supporting Communities of Practice by offering Continuing Professional Development Events (e.g. CPD events on highway infrastructure climate risk assessments)<sup>1</sup>.
9. Providing input into the development of Codes and Standards impacting the practice of the professions when it comes to climate change adaptation and mitigation (e.g. Engineers and Geoscientists BC input into the development of the CSA S900.1, Climate Change Adaptation for Wastewater Treatment Plants).

PPSD has invested time to ensure that these initiatives progress at a pace which supports the market transformation to energy efficiency and climate resiliency. These initiatives provide concrete examples of the deliverables achieved to date that support members and licensees through the \$20K budget currently allocated to the CCAG annually.

**What is being proposed:**

Climate change affects practically all areas of engineering/geoscience practice and the association needs to develop a more consistent and planned level of support so members and licensees are better equipped to address climate change in their professional practice. There have been robust discussions at the Climate Change Advisory Group regarding the development of the climate change action plan. Members have supported the development of a broad, high-level vision and goal-setting document that covers the broad spectrum of services that the association provides. The relevant committees and divisions such as EPD, EERED and Sustainability Committee have recommended the plan should also allow for enhanced support and resources so the work the association is presently undertaking (please refer to the nine examples provided above) through these departmental initiatives is enhanced.

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<sup>1</sup> Efforts are underway to build the connections to establish a community of practice for carrying out GHG mitigation and resilience assessments to support the application of climate lens in major infrastructure projects.



Blending the two suggestions, the following high-level vision for the climate change action plan has been established:

**Vision:** *The association is to model the way forward on what good business and professional practice looks like for engineering/geoscience professionals in BC.*

Having this vision would allow the association to be proactive in order to deliver timely guidance on what constitutes good professional practice when it comes to addressing climate change and this would assist the association's various regulatory processes when it comes to enforcing standards for professional practice. The CCAG will be working with the Sustainability Committee, EPD and EERED in developing the Mission, Principles and Goals that form the framework for the association's climate change action plan and exploring touch points with the overarching Engineers and Geoscientists BC strategic plan and linking it to other initiatives.

Some of the strategies to achieve those goals would be to:

1. carry out a scoping exercise in providing the details on what the climate change action plan would look like over a five-year period. The CCAG has requested an annual increase in the budget from \$20K to \$50K (an increase of \$10K for CCAG, and a new budget of \$20K for Sustainability Committee), as they have recognized that the work of "climate action" is not just for the CCAG, it is for the organization as a whole.
2. provide ongoing support by having the nine initiatives identified above resourced through the formal allocation of budget and staff resources, and
3. develop a coordinated approach to address professional practice-related climate change issues through the work of the CCAG, Sustainability Committee, EPD, and EERED.

The group discussed that the climate change action plan should focus on providing a level of support to achieving the vision that is more strategically resourced. As a result, it has been identified that formally recognizing climate change at the level of a departmental program within PPSD would:

- provide the necessary support to developing the plan respecting the services and operations that EGBC provides and,
- ensure adequate focus is provided to improve and better coordinate the support being provided (see the above list of nine existing departmental initiatives).

## RECOMMENDATION

In recognition of the fact that climate change is impacting the practice of Engineers and Geoscientists BC professionals working in all sectors and based on the extensive discussions involving the practice committees and Divisions, staff recommend that Council approve the following motion in response to the motion approved at the 2018 Annual General Meeting.

## MOTION

That Council approves:

(a) the development of a climate change action plan to achieve the following vision: the association is to model the way forward on what good business and professional practice looks like for engineering/geoscience professionals in BC; and

(b) subject to the Council approved budget, an increase to the annual budget addressing climate change related initiatives from \$20K to \$50K to support the development and implementation of a climate change action plan for the association, and the integration of the climate change action plan into the association's strategic plan.

OPEN SESSION

ITEM 6.2

DATE	March 28, 2019
REPORT TO	Council for Decision
FROM	Philippe Kruchten, P.Eng., Chair, Registration Committee
SUBJECT	Update and Recommendations* on the Project and Pilot re: Pan-Canadian Competency-Based Assessment for Geoscience Experience Evaluation <i>*(subject to approval by the Registration Committee on April 3, 2019 and the Geoscience Committee on April 11, 2019)</i>
LINKAGE TO STRATEGIC PLAN	Goal 2: Establish, maintain and enforce qualifications and professional standards. Strategy 4: Participate in initiatives that improve national harmonization of regulatory processes.

Purpose	To update Council regarding the work to date as part of Geoscientists Canada's Admissions Support Tools (AST) Phase II Project and to seek permission to participate in the piloting of the developed Work Experience Competencies using the Engineers and Geoscientists BC Competency Experience Reporting System.
Motion	<ol style="list-style-type: none"> <li>1. That Council approve the Geoscientists Canada Work Experience Competencies for the pilot assessment of experience towards professional geoscientist registration;</li> <li>2. That Council approve that all Engineers and Geoscientists BC pilot applicants who are assessed and approved as meeting the Work Experience Competencies be considered to have met the professional geoscience experience requirements for registration; and</li> <li>3. That Council approve that all Engineers and Geoscientists BC pilot applicants be provided the option to undergo an experience assessment via the current traditional route should they be unsuccessful in meeting the geoscience work experience competencies.</li> </ol>

BACKGROUND

At the September 7, 2018 Council meeting, an update was provided regarding the progress of Geoscientists Canada's Admissions Support Tools (AST) Project – Phase II which focused on the

development of a competency-based assessment tool for the evaluation of geoscience experience for registration of Professional Geoscientists (P.Geo.). Geoscientists Canada received confirmation from Employment and Social Development Canada (ESDC) that its funding proposal for the Admission Support Tools (“AST”) Project – Phase II had been accepted. As an International Qualification Recognition Program, the AST Project has received a total of \$589,000 over 24 months beginning on January 29, 2018.

This phase of the AST project built on the first phase (completed in 2014), which resulted in the development of the [Competency Profile for Professional Geoscientists at Entry to Practice](#). Through its Canadian Geoscience Standards Council (“CGSC”), Geoscientists Canada worked with its constituent associations to develop a competency based-assessment tool for the purposes of assessing geoscience work experience. The development and implementation of these tools at a national, collaborative level will help to further standardize licensing requirements across Canada and streamline the registration of those applying for the P.Geo. designation. During the development of the AST project, Engineers and Geoscientists BC demonstrated its existing competency assessment framework and online system for engineering experience and expressed its willingness to work with the Geoscientists Canada to develop a similar tool for assessment of geoscience competencies.

In January 2018, a Competency Working Group was developed with representatives from several jurisdictions (including Engineers and Geoscientists BC). A competencies consultant was also retained to help lead the development of identifying specific competencies that should be assessed through geoscience experience with the assistance of a Subject Matter Expert (SME) group comprised of volunteers from various jurisdictions across Canada. Delbert Ferguson, P.Geo./Eng.L. is a member of the association’s Geoscience Committee and served as an SME representing BC. A draft set of *Work Experience Competencies* and *Workplace Examples* was developed. This is equivalent to what is referred to on the engineering side as *Key Competencies* and *Indicators*. There have been a series national consultations sessions, workshops, and meetings of the CGSC to monitor the development throughout 2018 and 2019.

## DISCUSSION

The CGSC recently met on March 23-24, 2019. At that meeting, the feedback from the latest round of consultations with all associations was discussed as well as the comments received from the day prior at the March 22, 2019 workshop that included various experience assessors from across Canada. A motion was passed to approve the 29 Work Experience Competencies as well as the associated scoring rubric and move forward with a pilot. It should be noted that the structure of the Geoscientists Canada competencies and scoring rubric have been intentionally developed for use with the existing competency system currently used in engineering.

The final approval of the competency framework for piloting as part of the AST- Phase II project, will be before the Geoscientists Canada Board at its meeting on April 10, 2019.

Geoscientists Canada and Engineers and Geoscientists BC have been discussing the use of the existing competency system for the purposes of running the pilot and possibly offering of the system post-pilot through service agreements for jurisdictions that would like to utilize it as part of their registration for geoscientists. This work is in parallel with the Pan-Canadian Competency Project that is currently in progress with Engineers Canada and engineering regulators across the country. An agreement has recently been signed between Engineers and Geoscientists BC and Geoscientists Canada to enhance Engineers and Geoscientists BC's competency-based assessment tool (SaaS CBA) to support usage by geoscientists. This agreement includes piloting the system for geoscience applicants across Canada, from May 1, 2019 and through the end of September 2019.

At the CGSC meeting, there was a consensus agreement from members and Geoscience Admissions Officials (GAOs) that the incentive of waiving the application fee for pilot participants should be offered by each individual jurisdiction. A total of at least 20 participants across all jurisdictions is being sought and each association is invited to provide pilot applicants. Applicants for the pilot should range from Canadian to internationally educated as well as entry-to-practice level to mature practitioners so that data can be collected from a diverse range of applicant backgrounds. The main requirement is that applicants have accumulated enough experience to undergo an experience assessment (a minimum of four years is required). It is also being recommended that pilot applicants who are deemed as unsuccessful in meeting the requirements based on the geoscience competencies should be given the opportunity to have their experience assessed using the current traditional route. Engineers and Geoscientists BC staff have already begun identifying potential candidates who are GIT members as well as applicants for P.Geo. membership. A formal invitation and agreement to participate in the pilot is being developed in concert with Geoscientists Canada.

Each jurisdiction has also been invited to nominate up to two assessors to participate in the pilot. These individuals will be required to sign confidentiality agreements before they are granted access to the competency system. The assessments for all pilot participants will be made available for all assessors; however, only the nominated assessors for each jurisdiction's pilot applicant will have their recommendations officially acted upon by that specific association.

To support the pilot, training tools are being developed for all participants. Applicants, validators, and assessors will receive customized training similar in format to what is currently being offered for engineering competency users. Upon completion of the pilot, Geoscientists Canada will be reviewing the results as well as the feedback that would be garnered from all stakeholders involved.

## RECOMMENDATIONS

Due to the timing of meetings as well as the pilot start date of May 1, 2019, this update has been provided in advance for Council's consideration prior to scheduled meetings of the association's Geoscience and Registration Committees. At the time of this memo, the Geoscience Committee

has yet to meet to pass a formal recommendation; however, it has been receiving updates regarding the project and has been participating in the progress to date in the consultation sessions and workshops. In principle, the Geoscience Committee supports participating in the pilot and this will be discussed at its next meeting on April 11, 2019. The Registration Committee will meet on April 3, 2019 and is expected to support the following recommendations.

## **MOTIONS**

# 1. That Council approve the Geoscientists Canada Work Experience Competencies for the pilot assessment of experience towards professional geoscientist registration.

#2. That Council approve that all Engineers and Geoscientists BC pilot applicants who are assessed and approved as meeting the Work Experience Competencies be considered to have met the professional geoscience experience requirements for registration.

#3. That Council approve that all Engineers and Geoscientists BC pilot applicants be provided the option to undergo an experience assessment via the current traditional route should they be unsuccessful in meeting the geoscience work experience competencies.

## **ATTACHMENT A – Work Experience Competencies and Workplace Examples**

## **ATTACHMENT B – Assessment Rubric**

WORK EXPERIENCE COMPETENCIES		WORKPLACE EXAMPLES	
1. PROFESSIONAL COMPETENCIES			
1.1	Comply with relevant legislation, regulations, and statutory reporting requirements		
		a	Apply for licenses and permits
		b	Undertake stakeholder consultations
		c	Complete and file reports and notifications
1.2	Practice within the bounds of personal expertise and limitations		
		a	Undertake self-assessment to identify personal limits
		b	Seek advice from professionals with more appropriate expertise
		c	Refer client to other professionals
1.3	Increase relevant knowledge, skills and level of performance over time		
		a	Attend conferences, workshops or courses related to area of practice
		b	Undertake focused research or learning to address knowledge gaps
		c	Obtain relevant specialty training or certification
1.4	Maintain constructive working relationships		
		a	Undertake and apply diversity training
		b	Provide and accept constructive feedback
		c	Contribute to workplace conflict resolution
1.5	Apply ethical principles		
		a	Communicate consequences of disregarding professional advice
		b	Respond to unethical behaviour of others
		c	Identify and address conflict of interest
1.6	Respond to obligations and responsibilities to the public, to the natural environment, to clients and to employers		
		a	Undertake work activities in a manner that minimizes environmental impact
		b	Make decisions consistent with client or employer needs that protect the safety, health and welfare of the public
		c	Provide accessible and appropriate information to minimize public concerns
1.7	Contribute to health and safety in the workplace		
		a	Proactively address workplace health and safety
		b	Identify unsafe practices or hazardous situations
		c	Contribute to development of site-specific health and safety requirements
2. COMPETENCIES IN SCIENTIFIC METHOD			
2.1	Apply scientific principles		
		a	Use mathematical and statistical principles to analyze data
		b	Use principles of chemistry and physics to interpret data
		c	Formulate, test and evaluate hypothesis
2.2	Effectively utilize scientific literature		
		a	Undertake a literature search
		b	Critically analyze and incorporate published research
		c	Identify and acknowledge relevant sources
2.3	Identify uncertainty and ambiguity in data, and limits to knowledge		
		a	Identify bias in data collection
		b	Evaluate margin of error on results
		c	Display uncertainty in analytical results or interpretation
2.4	Apply principles of quality assurance and quality control (QA / QC)		
		a	Follow established protocols in data collection or analysis
		b	Review project outcomes relative to quality standards
		c	Establish QA / QC standards
2.5	Undertake relevant investigation and due diligence		
		a	Research complete background information
		b	Review similar situations to identify known hazards and risks
		c	Consider potential unanticipated outcomes
3. COMPETENCIES IN AREA OF GEOSCIENCE			
3.1	Plan investigations based upon purpose of study, incorporating existing site-specific information and appropriate approaches		
			Examples of investigations:
		a	geological mapping
		b	geophysical survey
		c	baseline monitoring
		d	geohazard assessment
		e	drilling program
		f	sampling program
		g	environmental site assessment
		h	research project
3.2	Acquire, process and analyze data using appropriate methodologies		
		a	Use effective devices and instruments to acquire data
		b	Apply locational tools and principles to georeference data
		c	Analyze and process data using 3-D modelling software
3.3	Incorporate relevant data from other sources		
		a	Integrate historical and current data
		b	Include local or regional information
		c	Identify analogs

3.4	Interpret and evaluate data to construct models consistent with purpose of investigation		
		a	Prepare and interpret logs, sections or maps
		b	Prepare and interpret spreadsheets, charts or diagrams
		c	Apply geoscience principles to generate models
3.5	Critically evaluate models		
		a	Address uncertainty and bias
		b	Compare and contrast analogous models
		c	Evaluate validity of model relative to objectives
3.6	Formulate conclusions and recommendations		
		a	Define drilling targets
		b	Assess site suitability and determine mitigation measures
		c	Assess feasibility based on resource estimation
		d	Provide alternative solutions and make recommendations
3.7	Adapt methodologies to address unfamiliar situations		
		a	Modify mapping or sampling methodologies in unfamiliar terrain or geological settings
		b	Adapt approach based on stakeholder values
		c	Integrate additional knowledge & skills to address unfamiliar situations
		d	Develop new techniques
4. COMPLEMENTARY COMPETENCIES			
4.1	Deliver and comprehend oral communication		
		a	Participate in a consultation or working group
		b	Deliver a geoscience lecture or presentation
		c	Describe a geoscience model to a client, peer or supervisor
4.2	Deliver and comprehend written communication		
		a	Prepare and respond to business correspondence
		b	Write a project or funding proposal
		c	Interpret and synthesize written information
4.3	Communicate technical information effectively to a variety of audiences		
		a	Create or adapt a presentation for technical and non-technical audiences
		b	Create or modify written material for technical and non-technical audiences
		c	Deliver a geoscience presentation to students
4.4	Manage activities		
		a	Plan or coordinate geoscience field work
		b	Plan or coordinate data collection or analysis
		c	Organize a conference, workshop or meeting
4.5	Use time management skills		
		a	Prioritize activities to meet deadlines
		b	Use scheduling tools
		c	Adapt schedule to changing situations
4.6	Provide direction to others		
		a	Provide instructions to students
		b	Advise team members or co-workers
		c	Supervise the work of others
4.7	Contribute to budgetary management		
		a	Evaluate quotes
		b	Estimate costs
		c	Control expenditures
4.8	Apply basic principles of risk management		
		a	Mitigate risk associated with field work
		b	Coordinate activities to manage risk
		c	Communicate business risks associated with geoscience interpretations
4.9	Contribute to secure data management		
		a	Use data security software
		b	Protect confidential information or materials
		c	Develop or follow organizational data management protocols
4.10	Maintain comprehensive professional records		
		a	File and archive comprehensive and clear field observations
		b	Label, store and catalogue samples
		c	Prepare and retain business and administrative records



## **ASSESSMENT RUBRIC**

### **Preamble**

For each Work Experience Competency (WEC), PGeo candidates will document work experience that they believe demonstrates a level of competence relative to the task described.

The perceived Level of Competence for each WEC will be rated on a scale of 0 through 5, where 3 represents the level expected for entry-to-practice<sup>1</sup> (etp). Ratings will be based upon the Level of Competence definitions shown below. Repeated and reliable performance is expected for ratings of level 3 or higher.

The Level of Competence for each WEC will be rated independently by the candidate, by their validator, and by the appropriate CA's assessor.

The CA assessor's rating will be based upon the assessor's review of the workplace experience that the candidate provides, and will take into account, but not be dependent upon, the ratings of the candidate and the validator. The assessor's rating will be final and binding.

Within each Competency Category, the CA assessor's Level of Competence rating for each WEC will be averaged arithmetically to obtain a Category Score for Level of Competence. In order to meet the work experience requirement for the PGeo credential, a candidate must achieve a Category Score for Level of Competence of 3.0 or higher in each category. In the event that a candidate receives a Level of Competence score of 0 (no exposure) for any WEC, the corresponding Category Score is automatically reduced to 0.

### **Approach to Levels of Competence**

Level of Competence is a function of 3 variables:

- Level of complexity of the task expressed in the WEC
- Level of supervision provided in candidate's performance of the task
- Level of risk based upon the outcome of the task expressed

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<sup>1</sup> The rating scale goes beyond that required for etp, to include higher levels of achievement, with the intent to recognize that P.Geo. candidates may be experienced geoscientists who possess such higher-level abilities.

## Definitions of Levels of Competence

Competence Level	The candidate's provided example demonstrates:
<b>0</b>	No exposure to the competency.
<b>1</b>	A general awareness of the competency and its significance in practice.
<b>2</b>	Application of the competency, or components of the competency, with considerable supervision, in situations of low complexity and low risk.
<b>3 (etp)</b>	Application of all components of the competency with limited supervision, in situations of moderate complexity and moderate risk. This may include situations in which the candidate supervises others in application of aspects of the competency, while maintaining accountability for their work.
<b>4</b>	Application of the competency with minimal supervision, in situations of considerable complexity and moderate risk. This may include situations in which the candidate supervises others in application of aspects of the competency, while maintaining accountability for their work.
<b>5</b>	Application of the competency without supervision, in situations of significant complexity and high risk. This may include situations in which the candidate supervises others in application of aspects of the competency, while maintaining accountability for their work.

## CONFIDENTIAL

### ITEM 6.3

DATE	March 27, 2019
REPORT TO	Council for Decision
FROM	Executive Committee Jennifer Cho, CPA, CGA Chief Financial and Administration Officer
SUBJECT	Draft Engineers & Geoscientists BC FY2020 Budget Summary & FY2021 Proforma Budget
LINKAGE TO STRATEGIC PLAN	Implement Best Practices in governance

Purpose	For Council to review and approve an annual member fee increase and FY2020 budget. To inform Council of the FY2021 Proforma budget.
Motion	<ol style="list-style-type: none"> <li>1. That Council approve a \$20 annual member fee increase with \$15 Levy effective January 1, 2020.</li> <li>2. That Council approve the following adjustments be made to the Ancillary Fees effective July 1, 2019: <ol style="list-style-type: none"> <li>a. Increase Academic Examination fee by \$35, from \$322.43 to \$357.43 and the Academic Examination Deferral Fee by \$35, from \$185 to \$220;</li> <li>b. Increase Application fee for First-Time applicants by \$25, from \$450 to \$475</li> <li>c. Increase Registration/Stamp/Certificate fee be increased by \$20, from \$250 to \$270</li> </ol> </li> <li>3. That Council agrees non-practicing member fee reductions remain at 50% of the Practicing Member Fee</li> <li>4. That Council approve the FY2020 Engineers &amp; Geoscientists BC operating and capital budget.</li> <li>5. That Council receive FY2021 proforma budget.</li> </ol>

## BACKGROUND

At the April 27, 2018 Council meeting, Council approved the 2018/19 Budget and accepted the 2019//20 proforma budget as presented. The three year budget was fully aligned with the Association's Strategic Plan. With a three year budget, many advantages are realizable such as the following:

- Initiatives can be funded beyond fiscal years
- Enables longer term planning and more effective management of disruptions
- Greater predictability of budget and fee increases
- A directly linked three year budget to a three year strategic plan where years 2 and 3 budgets can be adjusted with updates to the plan and other minor "tweaking" as required

Since April 2018, the landscape of what the organization faces has changed. There are new expectations and pressures on the organization that will affect the 2019/20 budget. Examples of expectations and pressures are:

- Bill 49 implications
- FIPPA (Freedom of Information & Protection of Privacy) Compliance requirements
- Greater degree of security compliance
- Building and Space Planning needs
- Increasing number of investigations, disciplinary hearings and FOI (Freedom of Information) requests
- Increasing demands of support for climate change and emerging fields/practice issues
- 30 x 30 initiative implementation
- Corporate Regulation
- Competency Based Assessment National (Engineers Canada & Geoscientists Canada)

As a part of the budgeting process, Council met on January 31, 2019 and reviewed the draft FY2020 budget initiatives and fee scenarios. Council's input at this forum has been taken into account into the draft budget options.

In addition, Council at the February 1, 2019 Council meeting approved the extension of the current strategic plan for an additional year in light of the expectations and pressures mentioned and in particular the changing environment due to Bill 49 legislation.

The Executive Committee met on February 20, 2019 and March 11, 2019 to reviewed the different scenarios of the draft Engineers and Geoscientists BC FY2020 (Year 3) budget and provide guidance for a finalized budget to present to Council at the April meeting to be approved. The draft budget scenarios have been prepared in accordance with the Council approved FY2020 Budget Guidelines (**Attachment A** – Status of Budget Guidelines). Details of the draft FY2020 budget scenarios are in **Tab B** of the budget binder.

## WHERE WE ARE AT CURRENTLY - FY2019 FORECAST AS AT JANUARY 31, 2019

The financial forecast for June 30, 2019 is that Engineers and Geoscientists BC will be in a surplus position of approximately \$1K.

There are large disciplinary hearings that have caused cost overruns but are somewhat offset by some successful recoveries of legal expenses from successful disciplinary cases. There are savings in salaries expenses due to unfilled positions, maternity leave replacements and delayed

hiring. Other savings include unused contingency and delays with the FIPPA Phase 2 audit and PSA audit.

The following table illustrates the high level budget cost variances and the FY2019 forecast result (in \$'000's):

FY2019 Budget		(\$300K)
Plus significant budget revenue/cost variances:		
Large Disciplinary Hearings		(422K)
Higher than expected amortization (from capitalization of various IT projects)		113K
Salary savings from unfilled positions		100K
Higher than expected membership revenue		93K
Unbudgeted Legal Recoveries		83K
Bank Charges Savings from new contract		76K
Unused Contingency		70K
Delay FIPPA Audit Phase 2 to 2021		50K
Not going ahead with PSA Audit		50K
Employer Health Tax Savings (timing of payment)		48K
Innovation Magazine printing and postage savings		40K
<b>Estimated FY2019 Surplus</b>		<b>1K</b>

## TWO DRAFT BUDGET SCENARIOS TO CONSIDER

Feedback from Council at the January forum was to prepare scenarios that would include:

- a Bill 49 Levy
- Funding for Bill 49 Contingency Expense to address uncertainty of funds required to implement Bill 49 legislation
- Funding to replenish Building reserves

Based on this feedback and the Council approved Budget Guidelines, two-draft budget scenarios have been created for Council to consider. **Scenario A Keep Pace** - a \$444 annual fee (\$14 fee increase & \$15 Bill 49 Levy) and **Scenario B Future Forward** - a \$450 annual fee (\$20 fee increase & \$15 Bill 49 Levy). Both scenarios are in compliance with the Budget Guidelines. Both scenarios would maintain the fee rate for year 3 and year 4. Both scenarios have a \$100K Bill 49 Contingency fund in Year 3 and \$150K in Year 4 and increase to general contingency from \$100K to \$250K in Year 4.

The two scenarios are identical in what they include (all initiatives and savings found in **Tab F and H) EXCEPT** for the following areas:

1. **Scenario A** - \$444 annual fee (\$14 fee increase/\$15 Bill 49 Levy) vs **Scenario B** - \$450 annual fee (\$20 fee increase and \$15 Bill 49 Levy)
2. **Scenario A** allows for a transfer of \$83K in Year 3 and \$231K in Year 4 to the Property, Equipment and Systems Replacement fund (Building Fund) to replenish the reserves. **Scenario B** allows for a transfer of \$176K in Year 3 and \$434K in Year 4 to the Property, Equipment and Systems Replacement fund (Building Fund) to replenish the reserves.

Below are a summary of the two scenarios.

	Scenario A - Keep Pace		Scenario B - Future Forward	
	FY2020 Budget (Year 3)	FY2021 Budget (Year 4)	FY2020 Budget (Year 3)	FY2021 Budget (Year 4)
2% Inflation	\$8.00	\$8.00	\$8.00	\$8.00
Fee Increase	\$6.00	\$7.00	\$12.00	\$7.00
Bill 49 Levy	\$15.00	(\$15)	\$15.00	(\$15)
Increase/(Decrease) for the year	\$29.00	\$0.00	\$35.00	\$0.00
Base Fee	\$415.00	\$444.00	\$415.00	\$450.00
<b>New Annual Fee</b>	<b>\$444.00</b>	<b>\$444.00</b>	<b>\$450.00</b>	<b>\$450.00</b>
<b>Revenue</b>	19,030,772	19,901,002	19,123,970	20,103,814
<b>Operating Expenses</b>	18,848,263	19,419,555	18,848,262	19,419,555
<b>Gross Surplus/(Deficit)</b>	182,510	481,447	275,708	684,259
<b>General Contingency Increase</b>	-	100,000	-	100,000
<b>Bill 49 Contingency</b>	100,000	150,000	100,000	150,000
<b>Surplus/(Deficit)</b>	<b>82,510</b>	<b>231,447</b>	<b>175,708</b>	<b>434,259</b>
<b>Transfer to Building Fund</b>	82,510	231,447	175,708	434,259
<b>Transfer to General Operating Fund</b>				

## BENCHMARKING TO SISTER ASSOCIATIONS & INFLATION CONSIDERATION

Please refer to **Tab D** in the budget book for the benchmark comparison of annual dues to sister associations across the country. Engineers and Geoscientists BC is currently on the lower end of the spectrum in terms of annual dues. The current national average of annual dues is \$449. Currently, Engineers and Geoscientists BC is at \$415. Both Scenario A (\$444) and B (\$450) has an annual fee that is still on par with the current national average.

This chart is updated to January 2019 and does not take into account 2020 fee increases that sister associations may apply.

## RESERVES

As per budget guideline 5, a review and assessment of the appropriate level of funding for the General Operating Fund, Property, Equipment and Systems Replacement Fund and the Legal & Insurance Fund is to be done as a part of the budgeting process.

The projections of three fund balances are as per below:

<b>Scenario A - Keep Pace (\$444 Annual Fee)</b>	<b>General Operating Fund ('000's)</b>	<b>Property, Equipment and Systems Replacement ('000's)</b>	<b>Legal and Insurance ('000's)</b>	<b>Total Funds ('000's)</b>
June 30, 2018	8,272	445	500	9,217
FY2019 Forecast	1			
<b>June 30, 2019 Forecast</b>	<b>8,273</b>	<b>445</b>	<b>500</b>	<b>9,218</b>
FY2020 Budget	83			
FY2020 Budget - transfer	(83)	83		
<b>June 30, 2020 Forecast</b>	<b>8,273</b>	<b>528</b>	<b>500</b>	<b>9,301</b>
FY2021 Budget	231			
FY2021 Budget - transfer	(231)	231		
<b>June 30, 2021 Forecast</b>	<b>8,273</b>	<b>759</b>	<b>500</b>	<b>9,532</b>
<b>Scenario B - Future Forward (\$450 Annual Fee)</b>	<b>General Operating Fund ('000's)</b>	<b>Property, Equipment and Systems Replacement ('000's)</b>	<b>Legal and Insurance ('000's)</b>	<b>Total Funds ('000's)</b>
June 30, 2018	8,272	445	500	9,217
FY2019 Forecast	1			
<b>June 30, 2019 Forecast</b>	<b>8,273</b>	<b>445</b>	<b>500</b>	<b>9,218</b>
FY2020 Budget	176			
FY2020 Budget - transfer	(176)	176		
<b>June 30, 2020 Forecast</b>	<b>8,273</b>	<b>621</b>	<b>500</b>	<b>9,394</b>
FY2021 Budget	434			
FY2021 Budget - transfer	(434)	434		
<b>June 30, 2021 Forecast</b>	<b>8,273</b>	<b>1,055</b>	<b>500</b>	<b>9,828</b>

The reserves at June 30, 2019 are projected to be approximately \$9.2M. Council can at any point in time re-appropriate the Legal & Insurance Fund and the Property, Equipment and Systems Replacement Fund back to the General Operating Fund.

As the Property, Equipment and Systems Replacement Fund is depleted after the building renovations, it will be prudent to replenish this fund for future building repairs or future space requirements. It is recommended that any surplus funds from the current fiscal year end be transferred to this fund which is in line with Budget Guideline 9, Council is to strive to replenish the fund towards a target of \$1.6M. Future planning for the association needs in terms of office space that are beyond 10 years from now will start in the coming months and appropriate consideration for how much in funds is needed for this project. Funds in the Property, Equipment, and Systems Replacement Fund could be appropriated towards future building plans if maintenance is not required. As mentioned earlier, both Scenarios A & B have the ability to produce funds to replenish this reserve in FY2020, however Scenario B will provide the ability to replenish the

reserve faster.

As per independent consultant MNP, Industry standard of total reserve funds is 3-6 months of operating expenses. As per the projection above, the Association has an appropriate and healthy level of reserves currently based on the projected surplus in the current year and taking into account the projected FY2020 budget in both options. The Association will be able to maintain a minimum 6 months of operating expense (based on FY2018 actual expenses of \$1.5M per month).

## ADJUSTMENTS ON THE ANCILLARY FEES

The Executive Committee reviewed the ancillary fees and recommends that Council approves the adjustments made to the ancillary fees as noted in motion 2. Please refer to **Tab C** for further information on Ancillary fees.

## REVIEW OF THE NON-PRACTICING FEES

In June 2018, Council approved the reduction of non-Practicing status member fees to 50% of the annual fee and a further review of this fee for possibility of further reduction in 2020.

As such, the Executive Committee reviewed the impact and possibility of a further reduction of non-practicing member fee to 25% of the annual fee as a part of the budgeting process. Included in **Tab C** is a comparison of all non-practicing professional engineers and geoscientists by sister associations. From this information, scenarios were created to reflect different projections of percentage of total members to be non-practicing. The scenarios used were low projection of 5%, medium situation of 7%, Canada average 9% and 3 largest regulators average 13% in order to analyze financial impact on the budget and reserves. More detailed information has been included in **Tab C** regarding this topic.

The Executive Committee had detailed and lengthy discussions and determined that the impact on the resulting budget and additional fees required on practicing members to sustain a further reduction of non-practicing member fees is too significant at this time. Thus, the Executive Committee concluded and recommends that the non-practicing status member fees stay at 50% of the annual fee.

## RECOMMENDATION

Due to the uncertainty that Bill 49 legislation brings, a more flexible and future forward Scenario B (\$450 annual membership fee/ \$20 annual fee increase and \$15 special levy) is recommended by the Executive Committee.



## MOTION

1. That Council approve a \$20 annual member fee increase with \$15 Levy effective January 1, 2020.
2. That Council approve the following adjustments be made to the Ancillary Fees effective July 1, 2019.
  - a. Increase Academic Examination fee by \$35, from \$322.43 to \$357.43 and the Academic Examination Deferral fee from \$185 to \$220
  - b. Increase Application Fee for First-Time applicants by \$25, from \$450 to \$475
  - c. Increase Registration/Stamp/Certificate fee be increased by 20, from \$250 to \$270
3. That Council agree non-practicing member fee reductions remains at 50% of the Practicing Member Fee
4. That Council approve the FY2020 Engineers & Geoscientists BC operating and capital budget.
5. That Council receive FY2021 proforma budget.

## ATTACHMENT A – Status of Budget Guidelines

<b>Attachment A - Status of Budget Guidelines</b>	
<b>Budget Guidelines</b>	<b>Status</b>
The Sustainable Financial Management Policy will be the foundation for guiding budget preparation.	Achieved
Apply the Engineers & Geoscientists BC Strategic Plan, Council Work Plan (Roadmap) and Key Performance Indicators to budget development.	Applied
Fee increase for 2020 will be the result of cost of living increase, plus any necessary replenishments to meeting reserve levels specified by Council, and any funding necessary for approved special initiatives or new programs	Applied
Consider potential changes to prior year budget as follows: Opportunities for efficiencies by programs & departments; new program initiatives/nondiscretionary budget changes.	\$296K savings in Scenario A and B.
Review and assess the requirements and appropriate level of funding for the General Operating Fund, Property, Equipment and Systems Replacement Fund and the Legal and Insurance Fund.	Applied
Staffing levels be generally determined by authorized program improvements, growth and membership growth.	Achieved. Additional 9 FTE and 3 contractors in 2020 in scenario A and B if approved.
Review program contribution margins and strive for financial self-sustainability on a direct cost basis with the exception of CPD guidelines related courses to operate at most on a break-even basis.	Applied
Final 2020 budget approval should be sought at the Council meeting in April 2019.	Applied
Strive for a minimum transfer of \$300K into the property, equipment and systems replacement fund in order to replenish the fund to build towards a future target of \$1.6M fund balance to support future building maintenance costs.	Not fully met. Scenario A is transfer of 83K in FY2020 and \$231K in FY2021. Scenario B is transfer of \$176K in FY2020 and \$434K in FY2021.

# Engineers and Geoscientists BC

## FY2020- FY2021 Budget Book

### Table of Contents

#	Item	Purpose	Attachment #
1)	Sustainable Financial Policy (SFP) Compliance a) SFP Compliance Analysis	Shows compliance with all policies	A
2)	Program Statements a) Scenario A - Program Statements with \$444 Annual Fee b) Scenario B - Program Statements with \$450 Annual Fee	Program Statement level Budgets for 2019/2020, Proforma Budget for 2020/2021	B
3)	Other Fees a) Ancillary Fees b) Non-Practicing Fee Reduction	Annual review of ancillary fees and review of non-practicing fee reduction	C
4)	Benchmark Report of Engineers and Geoscientists BC and other provincial associations	Provides one-page analysis comparing key financial and operational measures	D
5)	Capital Budget for 2019/2020 & 2020/2021	Provides a proposed capital budget for 2019/2020, 2020/2021 required to support the operations of the Association.	E
6)	Pie Chart for Changes to Budget by Expenses and Two Year Proposed Program Initiatives Listing	Listing of new program initiatives	F
7)	Two Year Proposed new FTEs	Listing of new FTEs	G
8)	Two Year Program Savings	Listing of program savings	H

<b>Appendix A - Status of Budget Guidelines</b>	
<b>Budget Guidelines</b>	<b>Status</b>
The Sustainable Financial Management Policy will be the foundation for guiding budget preparation.	Achieved
Apply the Engineers & Geoscientists BC Strategic Plan, Council Work Plan (Roadmap) and Key Performance Indicators to budget development.	Applied
Fee increase for 2020 will be the result of cost of living increase, plus any necessary replenishments to meeting reserve levels specified by Council, and any funding necessary for approved special initiatives or new programs	Applied
Consider potential changes to prior year budget as follows: Opportunities for efficiencies by programs & departments; new program initiatives/nondiscretionary budget changes.	\$296K savings in Scenario A and B.
Review and assess the requirements and appropriate level of funding for the General Operating Fund, Property, Equipment and Systems Replacement Fund and the Legal and Insurance Fund.	Applied
Staffing levels be generally determined by authorized program improvements, growth and membership growth.	Achieved. Additional 9 FTE and 3 contractors in 2020 in scenario A and B if approved.
Review program contribution margins and strive for financial self-sustainability on a direct cost basis with the exception of CPD guidelines related courses to operate at most on a break-even basis.	Applied
Final 2020 budget approval should be sought at the Council meeting in April 2019.	Applied
Strive for a minimum transfer of \$300K into the property, equipment and systems replacement fund in order to replenish the fund to build towards a future target of \$1.6M fund balance to support future building maintenance costs.	Not fully met. Scenario A is transfer of 83K in FY2020 and \$231K in FY2021. Scenario B is transfer of \$176K in FY2020 and \$434K in FY2021.

## Sustainable Financial Policy

Policy	Outcome
All initiatives and financial expenditures are aligned to the Strategic Plan.	All program initiatives and savings are identified and linked to at least one strategic plan objective.
There is an annual review of economies, efficiencies and effectiveness of current expenditures, revenue strategies and initiatives.	Cost management and operation efficiencies are a important part of the budget process. Significant savings had been identified and have been incorporated.
The Applications and Registration program (the intake process) will be financially self-sustaining on a direct cost basis.	Contribution margin of \$461K is budgeted in FY2019.
The Continuing Professional Development instructional and service delivery will be financially self-sustaining on a direct cost basis.	16% net margin budgeted each year.
All other programs with direct revenues should strive to be financially self-sustaining on a direct cost basis.	Most other programs such as affinity were self-sustaining recovering all direct costs including salaries and benefits.
Membership growth is actively pursued.	Membership growth is funded in the operating budget which includes the allocation of staff time to registration outreach programs. A variety of advertising and branding initiatives are to be implemented.
The annual member fee is reviewed each year	As part of budget review and approval process.

FY2020 FY2021 - Draft Program Statements with \$444 annual fee

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FY2020 FY2021 - Draft Program Statements with \$444 annual fee

	B	E	L	O	P	Q	R	S	T	U	V
2		FY2019 Revised	FY2020 Presented to Council on Apr 28, 18	FY2020 Revised	Changes from FY2020 v1	Comments	Initiatives Item #	FY2021	Changes from FY2020 Revised	Comments	Initiatives Item #
71	Budgets	(0)									
72	Programs & Professional Development										
73	Affinity Program	1,250	1,250	1,250	0			1,250	0		
74	Annual Conference	402,137	385,622	400,514	14,892			376,507	(24,007)		
75	Professional Development	487,655	497,629	522,629	25,000	higher venue costs		522,629	0		
76	Online Law & Ethics	10,000	0	0	0			0	0		
77	Mentoring	16,000	16,000	16,000	0			16,000	0		
78	Salary Survey	0	0	0	0			0	0		
79	Branches/Divisions	68,550	68,550	68,550	0			68,550	0		
80	Member CPD Requirements	105,600	0	0	0	moved to PPSD		0	0		
81	Induction Ceremony and Former Presidents Dinner	82,020	82,020	72,020	(10,000)	reduce from 3 times a year to twice a year		72,020	0		
82	Diversity Initiative	7,500	7,500	35,500	28,000	addition funds needed to implement the program and action plan		35,500	0		
83	Nomination & Election Task Force	5,600	5,600	5,600	0			5,600	0		
84	Non Program Specific		0	2,500	2,500			2,500	0		
85	Salaries & Benefits	850,383	876,105	993,237	117,132			1,020,566	27,329		
86		2,036,695	1,940,276	2,117,800	177,524	0		2,121,122	3,322	0	
87		(0)									
	Communications & Stakeholder Engagement										
88	Awards	54,042	56,742	56,467	(275)			56,467	0		
89											
90	Career Awareness	64,500	64,500	69,500	5,000	increase to develop indigenous outreach materials which is offset by reduction of grant disbursement	26	64,500	(5,000)		
91	Innovation Magazine	399,870	404,170	369,170	(35,000)	reduce to align with actual		369,170	0		
92	Employment Web Advertising	0	0	0	0			0	0		
93	Public Relations	133,550	133,550	113,250	(20,300)	reallocate funds to 100th Anniversary celebration		113,250	0		
94	Publications	44,191	44,191	26,191	(18,000)	reduce as guideline design work is now done in-house		26,191	0		
95	Stakeholder Engagement	186,800	71,800	155,800	84,000	additional funds for 100th Anniversary celebration		71,800	(84,000)		
96	Student Membership & Sponsorship	52,800	52,800	52,800	0			52,800	0		
97	Branding Collateral Renewal	0	0	0	0			0	0		
98	Brand Strategy	0	0	0	0			0	0		
99	Non Program Specific	17,600	17,600	3,600	(14,000)			3,600	0		
100	Salaries & Benefits	971,177	996,957	929,845	(67,112)			878,003	(51,843)		
101		1,924,530	1,842,310	1,776,623	(65,687)	0		1,635,781	(140,843)		
102		0									
103	Council & Executive										
104	Engineers Canada Assessment	458,899	474,970	497,920	22,950	based on 4% volume increase	2	497,920	0		
105	Geoscientists Canada Assessment	92,754	100,097	100,097	0			100,097	0		
106	Council/Executive	267,760	220,260	357,000	136,740	\$100K Developing proposal for Bill 49	3	337,000	(20,000)		
107	Nomination Committee			27,500	27,500	Consulting fees for enhancements to Nomination process	4	27,500	0		
108	Governance Committee			21,000	21,000	Consulting fees for Nomination and Elections Task Force		21,000	0		
109	Executive committee			3,000	3,000			3,000	0		
110	Elections	22,670	22,670	57,770	35,100	\$20K to hire an independent chief of Elections Officer; \$20K videos for Candidates	7 & 15	69,770	12,000	increase due to new contract rates for online voting provider	5
111	Government Relations	145,400	147,338	164,838	17,500	increase staff travel expenses for Bill 49	39	164,838	0		
112	Special Project: Legislative Consultation	30,000	30,000	30,000	0			30,000	0		
113	Special Project: Freedom of Information and Protection of Privacy Act (FIPPA) Audit	50,000	0	0	0			50,000	50,000	delay from previous year	6
114	Special Project: Labor Market Studies	10,000	10,000	0	(10,000)	Studies not expected to take place		0	0		
115	Non Program Specific	6,592	6,592	7,000	408			7,000	0		
116	Salaries & Benefits	950,808	959,983	1,220,198	260,215	Public Affairs Specialist (Contract), Executive Administrative Assistant to CFAO and Director, Corp. Governance & Strategy (Contract)	8	1,250,797	30,598		
117		2,034,883	1,971,910	2,486,324	514,414	0		2,558,922	72,598		
118		(0)									
	Professional Practice, Standards & Development										
119	Liaison with Authorities	1,500	1,500	5,000	3,500			5,000	0		
120	Practice Review	176,600	176,600	176,600	0			176,600	0		
121	Professional Practice	168,955	168,955	168,955	0			168,955	0		
122	Corporate Practice	0	0	0	0			66,000	66,000		
123	Certified Professional Program	64,300	53,500	53,500	0			53,500	0		
124											
125	Climate Change Initiatives	20,000	20,000	30,000	10,000	additional support on professional practice guidelines focused on climate change adaptation and mitigation		30,000	0		
126	Organizational Quality Management	180,000	202,500	165,000	(37,500)	savings which address transition from OQM program to corporate practice training		(15,000)	(180,000)		
127	Member CPD Requirements	90,600	5,169	5,169	0	moved from MS		5,169	0		
128	Sustainability	900	900	20,900	20,000			20,900	0		
129	Non Program Specific	14,251	14,251	14,251	0			14,251	0		
130	Grants	1,032,000	952,000	952,000	0			952,000	0		
131	Salaries & Benefits	1,325,232	1,369,740	1,552,605	182,865	Practice Advisor and Administrative Assistant		1,728,487	175,882	Natural Resource/Emerging Discipline Focus Practice Advisor	22
132		3,074,338	2,965,115	3,143,980	178,865	0		3,205,862	61,882		
133											

FY2020 FY2021 - Draft Program Statements with \$444 annual fee

	B	E	L	O	P	Q	R	S	T	U	V
		FY2019 Revised	FY2020 Presented to Council on Apr 28, 18	FY2020 Revised	Changes from FY2020 v1	Comments	Initiatives Item #	FY2021	Changes from FY2020 Revised	Comments	Initiatives Item #
2	Budgets										
134	Legislation, Ethics & Compliance										
135	Discipline	217,139	217,139	227,139	10,000	Discipline Panel honorarium	29	227,139	0		
136	Enforcement	13,552	13,552	13,552	0			13,552	0		
137	Investigations	132,775	132,775	132,775	0			132,775	0		
138	Code of Ethics	0	0	0	0			0	0		
139	Non Program Specific	78,705	78,705	117,705	39,000	additional funds for general legal expense		117,705	0		
140	Salaries & Benefits	840,822	936,422	1,070,263	133,841	Investigator, Enforcement Officer and Compliance Officer	9, 10, 11	1,271,320	201,058	Articled Student and Legal Administrative Assistant	41 & 42
141		1,282,993	1,378,593	1,561,434	182,841	0		1,762,491	201,058		
142											
143	Registration										
144	Academic Exams	23,500	23,500	44,900	21,400			46,400	1,500		
145	Applications/Registration	167,400	179,400	174,900	(4,500)			174,900	0		
146	Engineers In Training/Geoscientists In Training Prof. Certification	10,000	25,000	10,000	(15,000)	reduction on postage		10,000	0		
147	Limited License	30,000	30,000	0	(30,000)			0	0		
148	Professional Practice Exams	378,714	372,214	368,214	(4,000)			396,641	28,427		
149	APEC Register	0	0	0	0			0	0		
150	Structural Qualifications	11,800	11,800	8,800	(3,000)			8,800	0		
151	Registration External Projects	73,000	104,125	25,000	(79,125)	Government may delay two proposed projects		25,000	0		
152	Non Program Specific	19,636	19,636	4,000	(15,636)			4,000	0		
153	Salaries & Benefits	1,579,218	1,629,812	1,591,001	(38,811)			1,635,171	44,170		
154		2,293,268	2,395,487	2,226,815	(168,672)	0		2,300,912	74,097		
155											
156	National Programs - All	239,354	161,046	188,710	27,664			193,577	4,867		
157											
158	Total expenses from above	17,167,503	17,301,719	18,176,199	874,480			18,329,843	153,644		
159											
160	Amortization	545,860	528,643	668,564	139,921	\$10K for office space furniture	36	666,212	(2,352)		
161	Contingency	100,000	150,000	100,000	(50,000)			250,000	150,000		
162	Bill 49 Contingency			100,000	100,000			150,000	50,000		
163	Incidental payroll savings	(170,000)	(50,000)	(100,000)	(50,000)	reduced to match FY2019 actual savings		100,000	200,000		
164	Maternity /Parental leave top-up program			0	0			170,000	170,000		45
165	Foundation	3,000	3,000	3,000	0			3,000	0		
166	Benevolent Fund Society	500	500	500	0			500	0		
167	Total expenses	17,646,863	17,933,862	18,948,263	1,014,400			19,669,555	721,292		
168											
169	Surplus/(deficit)	(390,817)	270,721	82,510	(188,211)			231,447	148,938		
170	Building Reserve		250,000	82,510				231,447			
171	Addition to General Fund	(390,817)	20,721	0				0	0		



FY2020 FY2021 - Draft Program Statements with \$450 annual fee

	B	E	L	O	P	Q	R	S	T	U	V
		FY2019 Revised	FY2020 Presented to Council on Apr 28, 18	FY2020 Revised	Changes from FY2020 v1	Comments	Initiatives Item #	FY2021	Changes from FY2020 Revised	Comments	Initiatives Item #
2	Budgets										
3											
4	Revenues										
5	Member Services										
6	Affinity Program	413,000	418,000	418,000	0			424,000	6,000		
7	Annual Conference	303,800	303,800	298,800	(5,000)			305,250	6,450		
8	Professional Development	986,492	986,492	1,011,492	25,000	6% reduction (\$45K) to account for 9 free sessions in CPD revenue, offset by higher distance education \$20K based on current trend		1,011,492	0		
9		1,703,292	1,708,292	1,728,292	20,000	0		1,740,742	12,450		
10	Communications & Stakeholder Engagement										
11	Innovation Magazine	190,000	190,000	190,000	0			190,000	0		
12	Sponsorship Revenue	7,800	7,800	7,800	0			7,800	0		
13	Student Membership	45,000	45,000	89,000	44,000	True up MAPS revenue to actual		89,000	0		
14	Employment Web Advertising	325,000	330,000	415,000	85,000	expect 3% price increase plus 4% volume increase based on historical data		415,000	0		
15		567,800	572,800	701,800	129,000	0		701,800	0		
16	Professional Practice, Standards & Development										
17	Certified Professional Program	70,000	52,500	52,500	0			52,500	0		
18	Organizational Quality Management	246,000	291,000	246,000	(45,000)			0	(246,000)	budget will be moved to Corporate Practice Budget	
19	Grant	1,100,000	1,000,000	1,000,000	0			1,000,000	0		
20		1,416,000	1,343,500	1,298,500	(45,000)	0		1,052,500	(246,000)		
21	Registration										
22	Academic Exams	34,800	34,800	75,249	40,449	reflect \$35/exam fee increase		75,249	0		
23	Applications/Registration	1,341,250	1,376,150	1,464,220	88,070	reflect \$25 application fee increase plus \$20 certificate fee increase		1,468,220	4,000		
24	Limited License	22,500	29,250	19,000	(10,250)			19,000	0		
25	Professional Practice Exams and Books	449,214	439,214	439,214	0			467,641	28,427		
26	Structural Qualifications	52,714	53,014	61,000	7,986			62,500	1,500		
27	Registration External Projects	102,084	104,125	25,000	(79,125)	Government may delay two proposed projects		25,000	0		
28		2,002,562	2,036,553	2,083,683	47,130			2,117,610	33,927		
29	Annual Membership Fees	11,081,964	11,993,298	12,723,964	730,666	includes one-time fee increase of \$35 for first 6 months in FY2020 (balance of deferred revenue from PY) plus \$35 fee increase for last 6 months in FY2020		13,903,431	1,179,467		
30	Late Fee	44,328	47,973	52,500	4,527			52,500	0		
31	Investment Revenue	56,165	58,731	75,231	16,500	true up to actual (YTD as at Jan 31,19 at \$75K)		75,231	0		
32	Discipline Recoveries	60,000	60,000	60,000	0			60,000	0		
33	Other Revenue	23,936	20,935	25,000	4,065	includes bank interest and recoveries from Geoscientist Canada \$15,000		25,000	0		
34	National Programs - Competency-Based Assessment (CBA) Engineer Canada	250,000	255,000	255,000	0			255,000	0		
35	National Programs - CBA Geo Canada	50,000	62,500	75,000	12,500			75,000	0		
36	National Programs - OQM National	0	45,000	45,000	0			45,000	0		
37	Total revenues	17,256,047	18,204,583	19,123,970	919,387	0		20,103,814	979,844		
38				0	0			0			
39	Expenses										
40											
41	Finance & Corporate Services										
42	Annual Invoicing	43,106	44,399	40,399	(4,000)			43,907	3,508		
43	Building Operations	390,462	396,502	435,462	38,960	anticipated increase on Property Tax and building insurance along with external parking fee increase due to increase of FTEs	1	435,462	0		
44	Administrative Services	82,520	32,235	48,149	15,914	finance/software consultant costs		68,149	20,000	risk management delayed from Yr 3 to Yr 4	33
45	Green Team	1,282	0	0	0	moved to HR		0	0		
46	Building Task Force	0	47,647	120,000	72,353	additional funding for consulting services and travel and meeting expenses		120,000	0		
47	Non Program Specific	732,952	754,215	702,008	(52,206)	Mostly from savings from new contract for credit card processing fees. reallocation of portion of salaries to Executive		703,801	1,793		
48	Salaries & Benefits	899,995	928,025	887,063	(40,962)			911,700	24,637		
49		2,150,318	2,203,023	2,233,081	30,058	(0)		2,283,019	49,938		
50		0									
51	Human Resources										
52	Staffing	30,300	181,768	172,500	(9,268)			102,500	(70,000)	removal of CEO and executive recruitment from FY2020	
53	Training and Development	82,500	84,100	84,100	0			84,100	0		
54	Staff Recognition	47,750	49,000	53,000	4,000			54,600	1,600		
55	Occupational Health and Safety	1,300	2,300	2,300	0			2,300	0		
56	Volunteer Management	41,000	36,000	36,000	0			37,000	1,000		
57	Compensation Management	5,000	70,000	95,000	25,000	addition funding for Triennial total compensation program		5,000	(90,000)	remove completion of Triennial review	
58	Strategic HR and Organizational Development	60,000	140,000	110,000	(30,000)	defer implementation of Succession Planning recommendations partially to FY2021		40,000	(70,000)	succession planning funding no longer estimated to be as large	
59	Green Team	0	1,320	2,000	680			2,100	100		
60	Non Program Specific	2,950	2,950	2,950	0			2,950	0		
61	Salaries & Benefits	302,438	318,887	337,688	18,801			347,020	9,332		
62		573,238	886,325	895,538	9,213	0		677,570	(217,968)		
63		0									
64	Information Technology										
65	Run - Business Continuity	391,470	367,425	418,475	51,050	shifting from licensed services to subscription services, office suite tools, & new conferencing system.		434,353	15,878		
66	Telecommunications	74,957	73,157	69,042	(4,115)			69,042	0		
67	Grow - Systems & Development	30,000	20,000	10,000	(10,000)	less expectation of utilizing consultants for non-capitalized projects		10,000	0		
68	Non Program Specific	7,000	7,000	10,000	3,000			10,000	0		
69	Salaries & Benefits	1,054,460	1,090,052	1,038,377	(51,675)			1,067,192	28,815		
70		1,557,887	1,557,634	1,545,894	(11,740)	0		1,590,587	44,693		
71		(0)									

FY2020 FY2021 - Draft Program Statements with \$450 annual fee

	B	E	L	O	P	Q	R	S	T	U	V
		FY2019 Revised	FY2020 Presented to Council on Apr 28, 18	FY2020 Revised	Changes from FY2020 v1	Comments	Initiatives Item #	FY2021	Changes from FY2020 Revised	Comments	Initiatives Item #
2	Budgets										
72	Programs & Professional Development										
73	Affinity Program	1,250	1,250	1,250	0			1,250	0		
74	Annual Conference	402,137	385,622	400,514	14,892			376,507	(24,007)		
75	Professional Development	487,655	497,629	522,629	25,000	higher venue costs		522,629	0		
76	Online Law & Ethics	10,000	0	0	0			0	0		
77	Mentoring	16,000	16,000	16,000	0			16,000	0		
78	Salary Survey	0	0	0	0			0	0		
79	Branches/Divisions	68,550	68,550	68,550	0			68,550	0		
80	Member CPD Requirements	105,600	0	0	0	moved to PPSD		0	0		
81	Induction Ceremony and Former Presidents Dinner	82,020	82,020	72,020	(10,000)	reduce from 3 times a year to twice a year		72,020	0		
82	Diversity Initiative	7,500	7,500	35,500	28,000	addition funds needed to implement the program and action plan		35,500	0		
83	Nomination & Election Task Force	5,600	5,600	5,600	0			5,600	0		
84	Non Program Specific		0	2,500	2,500			2,500	0		
85	Salaries & Benefits	850,383	876,105	993,237	117,132			1,020,566	27,329		
86		2,036,695	1,940,276	2,117,800	177,524			2,121,122	3,322		0
87		(0)									
88	Communications & Stakeholder Engagement										
89	Awards	54,042	56,742	56,467	(275)			56,467	0		
90	Career Awareness	64,500	64,500	69,500	5,000	increase to develop indigenous outreach materials which is offset by reduction of grant disbursement	26	64,500	(5,000)		
91	Innovation Magazine	399,870	404,170	369,170	(35,000)	reduce to align with actual		369,170	0		
92	Employment Web Advertising	0	0	0	0			0	0		
93	Public Relations	133,550	133,550	113,250	(20,300)	reallocate funds to 100th Anniversary celebration		113,250	0		
94	Publications	44,191	44,191	26,191	(18,000)	reduce as guideline design work is now done in-house		26,191	0		
95	Stakeholder Engagement	186,800	71,800	155,800	84,000	additional funds for 100th Anniversary celebration		71,800	(84,000)		
96	Student Membership & Sponsorship	52,800	52,800	52,800	0			52,800	0		
97	Branding Collateral Renewal	0	0	0	0			0	0		
98	Brand Strategy	0	0	0	0			0	0		
99	Non Program Specific	17,600	17,600	3,600	(14,000)			3,600	0		
100	Salaries & Benefits	971,177	996,957	929,845	(67,112)			878,003	(51,843)		
101		1,924,530	1,842,310	1,776,623	(65,687)		0	1,635,781	(140,843)		
102		0									
103	Council & Executive										
104	Engineers Canada Assessment	458,899	474,970	497,920	22,950	based on 4% volume increase	2	497,920	0		
105	Geoscientists Canada Assessment	92,754	100,097	100,097	0			100,097	0		
106	Council/Executive	267,760	220,260	357,000	136,740	\$100K Developing proposal for Bill 49	3	337,000	(20,000)		
107	Nomination Committee			27,500	27,500	Consulting fees for enhancements to Nomination process	4	27,500	0		
108	Governance Committee			21,000	21,000	Consulting fees for Nomination and Elections Task Force		21,000	0		
109	Executive committee			3,000	3,000			3,000	0		
110	Elections	22,670	22,670	57,770	35,100	\$20K to hire an independent chief of Elections Officer; \$20K videos for Candidates	7 & 15	69,770	12,000	increase due to new contract rates for online voting provider	5
111	Government Relations	145,400	147,338	164,838	17,500	increase staff travel expenses for Bill 49	39	164,838	0		
112	Special Project: Legislative Consultation	30,000	30,000	30,000	0			30,000	0		
113	Special Project: Freedom of Information and Protection of Privacy Act (FIPPA) Audit	50,000	0	0	0			50,000	50,000	delay from previous year	6
114	Special Project: Labor Market Studies	10,000	10,000	0	(10,000)	Studies not expected to take place		0	0		
115	Non Program Specific	6,592	6,592	7,000	408			7,000	0		
116	Salaries & Benefits	950,808	959,983	1,220,198	260,215	Public Affairs Specialist (Contract), Executive Administrative Assistant to CFAO and Director, Corp. Governance & Strategy (Contract)	8	1,250,797	30,598		
117		2,034,883	1,971,910	2,486,323	514,413		1	2,558,922	72,599		
118		(0)									
119	Professional Practice, Standards & Development										
120	Liaison with Authorities	1,500	1,500	5,000	3,500			5,000	0		
121	Practice Review	176,600	176,600	176,600	0			176,600	0		
122	Professional Practice	168,955	168,955	168,955	0			168,955	0		
123	Corporate Practice	0	0	0	0			66,000	66,000		
124	Certified Professional Program	64,300	53,500	53,500	0			53,500	0		
125	Climate Change Initiatives	20,000	20,000	30,000	10,000	additional support on professional practice guidelines focused on climate change adaptation and mitigation		30,000	0		
126	Organizational Quality Management	180,000	202,500	165,000	(37,500)	savings which address transition from OQM program to corporate practice training		(15,000)	(180,000)		
127	Member CPD Requirements	90,600	5,169	5,169	0	moved from MS		5,169	0		
128	Sustainability	900	900	20,900	20,000			20,900	0		
129	Non Program Specific	14,251	14,251	14,251	0			14,251	0		
130	Grants	1,032,000	952,000	952,000	0			952,000	0		
131	Salaries & Benefits	1,325,232	1,369,740	1,552,605	182,865	Practice Advisor and Administrative Assistant		1,728,487	175,882	Natural Resource/Emerging Discipline Focus Practice Advisor	22
132		3,074,338	2,965,115	3,143,980	178,865		0	3,205,862	61,882		
133											

FY2020 FY2021 - Draft Program Statements with \$450 annual fee

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		FY2019 Revised	FY2020 Presented to Council on Apr 28, 18	FY2020 Revised	Changes from FY2020 v1	Comments	Initiatives Item #	FY2021	Changes from FY2020 Revised	Comments	Initiatives Item #
2	Budgets										
134	Legislation, Ethics & Compliance										
135	Discipline	217,139	217,139	227,139	10,000	Discipline Panel honorarium	29	227,139	0		
136	Enforcement	13,552	13,552	13,552	0			13,552	0		
137	Investigations	132,775	132,775	132,775	0			132,775	0		
138	Code of Ethics	0	0	0	0			0	0		
139	Non Program Specific	78,705	78,705	117,705	39,000	additional funds for general legal expense		117,705	0		
140	Salaries & Benefits	840,822	936,422	1,070,263	133,841	Investigator, Enforcement Officer and Compliance Officer	9, 10, 11	1,271,320	201,058	Articled Student and Legal Administrative Assistant	41 & 42
141		1,282,993	1,378,593	1,561,434	182,841	0		1,762,491	201,058		
142											
143	Registration										
144	Academic Exams	23,500	23,500	44,900	21,400			46,400	1,500		
145	Applications/Registration	167,400	179,400	174,900	(4,500)			174,900	0		
146	Engineers In Training/Geoscientists In Training Prof. Certification	10,000	25,000	10,000	(15,000)	reduction on postage		10,000	0		
147	Limited License	30,000	30,000	0	(30,000)			0	0		
148	Professional Practice Exams	378,714	372,214	368,214	(4,000)			396,641	28,427		
149	APEC Register	0	0	0	0			0	0		
150	Structural Qualifications	11,800	11,800	8,800	(3,000)			8,800	0		
151	Registration External Projects	73,000	104,125	25,000	(79,125)	Government may delay two proposed projects		25,000	0		
152	Non Program Specific	19,636	19,636	4,000	(15,636)			4,000	0		
153	Salaries & Benefits	1,579,218	1,629,812	1,591,001	(38,811)			1,635,171	44,170		
154		2,293,268	2,395,487	2,226,815	(168,672)			2,300,912	74,097		
155											
156	National Programs - All	239,354	161,046	188,710	27,664			193,577	4,867		
157											
158	Total expenses from above	17,167,503	17,301,719	18,176,198	874,479			18,329,843	153,645		
159											
160	Amortization	545,860	528,643	668,564	139,921	\$10K for office space furniture	36	666,212	(2,352)		
161	Contingency	100,000	150,000	100,000	(50,000)			250,000	150,000		
162	Bill 49 Contingency			100,000	100,000			150,000	50,000		
163	Incidental payroll savings	(170,000)	(50,000)	(100,000)	(50,000)	reduced to match FY2019 actual savings		100,000	200,000		
164	Maternity /Parental leave top-up program			0	0			170,000	170,000		45
165	Foundation	3,000	3,000	3,000	0			3,000	0		
166	Benevolent Fund Society	500	500	500	0			500	0		
167	Total expenses	17,646,863	17,933,862	18,948,262	1,014,399			19,669,555	721,293		
168											
169	Surplus/(deficit)	(390,817)	270,721	175,708	(95,013)			434,259	258,551		
170	Building Reserve		250,000	175,708				434,259			
171	Addition to General Fund	(390,817)	20,721	0				0	0		

## CONFIDENTIAL

DATE	March 27, 2019
REPORT TO	Council for Decision
FROM	Gillian Pichler, P.Eng., Director, Registration
SUBJECT	Registration Ancillary Fee Review and Recommendations
LINKAGE TO STRATEGIC PLAN	Principle: 7. We provide sufficient resources to fulfill our responsibilities.

Purpose	To update and to make recommendations to Council on Engineers and Geoscientists BC's registration ancillary fees
Motions	That the following adjustments be made to the Ancillary Fees effective July 1, 2019:
	a. the Academic Examination fee be increased by \$35, from \$322.43 to \$357.43 and the Academic Examination Deferral Fee by \$35, from \$185 to \$220 increase from the examination provider;
	b. the Application Fee for new applicants for P.Eng./P.Geo., registration or licence, Limited Licence and Member-in-Training if not within 12 months of graduation, be increased by \$25, from \$450 to \$475 for first-time applicants and from \$300 to \$325 or Members-in-Training applying for professional registration or licence; and
	c. the Registration/Stamp/Certificate fee be increased by \$20, from \$250 to \$270

Engineers and Geoscientists BC is the fourth largest engineering jurisdiction in Canada with respect to membership and the second largest jurisdiction in which regulatory and member services activities are combined, Alberta being the largest.

### Legislation Related to the Setting of Fees

The Act empowers the Council to:

- a. (Section 21) set the annual fee for members (P.Eng., P.Geo.) and licensees (P.Eng., P.Geo., Eng.L. and Geo.L.) and holders of Certificates of Authorization;

- b. *pass, alter and amend bylaws for application, admission, licensing and professional liability insurance and any other fees except, with respect to members, licensees and certificate holders, late fees, annual fees and reinstatement fees*
- c. *(Section 14.1) impose a fee for interprovincial agreements to practice*

The Bylaws (Sections 7 and 10) allow Council to set examination, examination of credentials (application) and administrative (licensing) fees.

## REGISTRATION ANCILLARY FEES

### BACKGROUND

Registration Ancillary Fees are those set by Council with respect to b. and c. in the previous section. They include all categories of application and examination of credentials fees, and examination, seminar and registration (stamp, certificate and registration) fees.

On March 15, 2018, the Executive Committee accepted that no increase would be made to Ancillary Fee levels through fiscal 2020, subject to an annual review to identify extenuating circumstances that merit changes to the fees.

#### Sustainable Financial Policy & Budget Process Guidelines

Council's Sustainable Financial Policy states in part:

*The Applications and Registration program (the intake process) will be financially self-sustaining on a direct cost basis.*

Traditionally since January 2013, due to inflated registration-related fees at that time, an annual review has been done to

- *Review opportunities for a decrease in registration related ancillary fees; and*
- *Review program contribution margins on a direct cost basis.*

#### Fee Adjustments since 2016

- In 2018, a new fee for the Working in Canada Seminar was included in the budget, beginning in FY2019.
- In 2016 with the inception of Computer-Based Testing for the Professional Practice Examination, Council raised the fee to \$310.
- In 2016 the online Professional Engineering and Geoscience Practice in BC Online Seminar replaced the in-person/CD Law & Ethics Seminar and the fee was reduced from \$345 to \$275.
- In 2015, Council reduced the transfer fee for Professional Engineers and Professional Geoscientists from other Canadian jurisdictions by \$50 to \$250 to better align it with those of other jurisdictions.

### Contribution Margins

On a direct cost basis, historical net contributions from activities included in the intake process are in the order of \$300,000 to \$400,000.

For Fiscal 2020, the contribution margin is expected to increase due to cost reductions and revenue increases; however the entire registration department budget, including membership queries, research and development shows a shortfall of \$185,861. The Fiscal 2020 budget is particularly challenging and registration/membership operations have been budgeted to more aggressively address shortfalls in non-intake areas. The anticipated contribution margin of \$460,824 for intake/admission includes the fee increases requested in this report. Information on the split between intake and non-intake registration activities is in Appendix A.

	Intake Contribution Margin	Other Non-Intake Programs	Net Direct Loss
FY 2020 Forecast	\$ 460,824	\$ (646,685)	\$ (185,861)

### Engineers and Geoscientists BC Fees Typically Higher than other Jurisdictions

Appendix A also compares the association's registration ancillary fees to comparable fees in selected other jurisdictions. The overall cost to complete an individual (non-company) application is higher in BC than in Alberta or Saskatchewan, largely due to the \$250 registration (one time administration) fee that is only charged by BC, Manitoba and Ontario; and BC's mandatory *Professional Engineering and Geoscience Practice in BC* seminar.

Changes in costs and programs have resulted in the motions to increase three of the ancillary fees beginning in fiscal 2020.

#### i. Increase Academic Examination Fee by \$35

In November 2018, Professional Engineers Ontario (PEO) from which the association sources its engineering academic examinations, announced a \$35 increase per examination, including examinations deferred after the association's order is placed with PEO. The increased fee will likely be effective for the May 2019 session. There are two sessions each year – in May and December.

The notice period was not long enough to change the fee for the May 2019 session; however approval of this fee by Council in April as part of the budget will allow enough time for it to take effect for the December 2019 session.

#### ii. Increase Application Fee for First-Time Applicants by \$25 and Registration Fee by \$20

Evaluation of first-time (in Canada) applicants for professional registration or licence requires a high proportion of registration department staff and volunteer resources.

Increasing the application fee by \$25 for approximately 1,400 first-time (non-transfer) applicants for professional registration or licence and for members-in-training who have not applied within twelve months of graduation will provide an additional \$35,000 in revenue. Approximately 1,650 Member-in-Training applicants who apply shortly after graduation have their application fee waived and pay a reduced fee when applying for professional registration or licence.

The current first-time applicant fee is \$450 before tax and the reduced fee for members-in-training who did not pay an application fee previously is \$300. The fee increase will result in fees of \$475 and \$325 respectively.

The highest volume registration ancillary fee-generative activity the one-time registration fee that covers the cost of the registration or licensing and the stamp and certificate. It is currently \$250. Increasing it by \$20 to \$270 will afford an additional \$40,000 over approximately 2,000 registrations.

## RECOMMENDATIONS

- i. that the following adjustments be made to the Ancillary Fees effective July 1, 2019:
  - a. the Academic Examination fee be increased by \$35, from \$322.43 to \$357.43 and the Academic Examination Deferral Fee from \$185 to \$220, to reflect a \$35 increase from the examination provider;
  - b. the Application Fee for new applicants for P.Eng./P.Geo. registration or licence, Limited Licence and Member-in-Training if not within 12 months of graduation, be increased by \$25, from \$450 to \$475 for first-time applicants and from \$300 to \$325 or Members-in-Training applying for professional registration or licence; and
  - c. the Registration/Stamp/Certificate fee be increased by \$20, from \$250 to \$270.

## Appendix A – Registration Ancillary Fee Comparison with Other Provinces

# Appendix A – Ancillary Fee Comparison with Other Provinces

(Fee structures differ among jurisdictions as some bundle fees or have fees for different stages of assessment. The fees reported here are those closest in structure to Engineers and Geoscientists BC fees.)

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Cost of Registration Process for 6 Provinces

(Not including academic examinations or corporate practice application fees that may be applicable in AB, MB, ON and SK)

Cost of Registration for New (First time in Canada) P.Eng. and P.Geo. Applicants (without Academic Examinations)

	BC Proposed FY 20	BC FY 19	AB	SK (CDN)	SK (INTL)	MB (CDN GEO)	MB (INTL)	ON	QC (CDN)	QC (INTL)
Application incl Academic Assessment	\$475	\$450	\$500	\$100	\$300	\$100	\$419	\$300	\$505	\$776
Professional Practice Examination	\$310	\$310	\$230	\$305	\$305	\$248	\$248	\$165	\$200	\$200
Law & Ethics Seminar	\$275	\$275								
Min One Year EIT or GIT Fee				\$350	\$350	\$208	\$208			
Registration Fee	\$275	\$250				\$119		\$250		
Sub-Total	\$1,335	\$1,285	\$730	\$755	\$955	\$675	\$875	\$715	\$705	\$976
TOTAL WITH INTERVIEW	\$1,335	\$1,285	\$730	\$755	\$955	\$675	\$1,375	\$715	\$705	\$976
Ranking (most to least expensive)	2	3	7	6	5	10	1	8	9	4

Notes:

- i. Saskatchewan requires all P.Eng. and P.Geo. applicants to become EITs or GITs. This involves a minimum of one year of annual EIT fees of \$350
- ii. All fees are exclusive of Corporate Permits or Certificates which are required in all provinces except for BC and Québec
- iii. Manitoba charges \$500 for an interview. Other CA's consider this to be part of the application fee

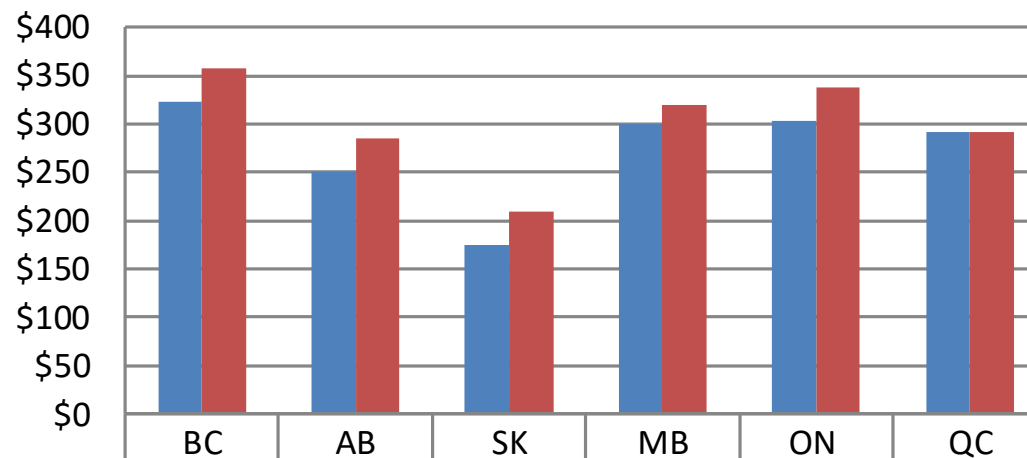
**Cost of Registration for Applicants who have P.Eng. Or P.Geo. With another jurisdiction**

	BC Proposed FY 20	BC FY 19	AB	SK	MB	ON	QC (CDN)
Application	\$250	\$250	\$250	\$300	\$0	\$300	\$440
Registration Fee	\$275	\$250			\$119	\$250	
Professional Examination							\$200
<b>TOTAL</b>	<b>\$525</b>	<b>\$500</b>	<b>\$250</b>	<b>\$300</b>	<b>\$119</b>	<b>\$550</b>	<b>\$640</b>

Note: OIQ requires applicants from other provinces to write sections of their Professional Exam

## Academic Examination Fees

### Average Fee per Academic Exam



■ 2018	BC	AB	SK	MB	ON	QC
	\$320	\$250	\$175	\$300	\$303	\$292
■ 2019 sourced from PEO with increase	\$357	\$285	\$210	\$320	\$338	\$292

## Intake Process: Included and Excluded Activities re: Sustainable Financial Policy

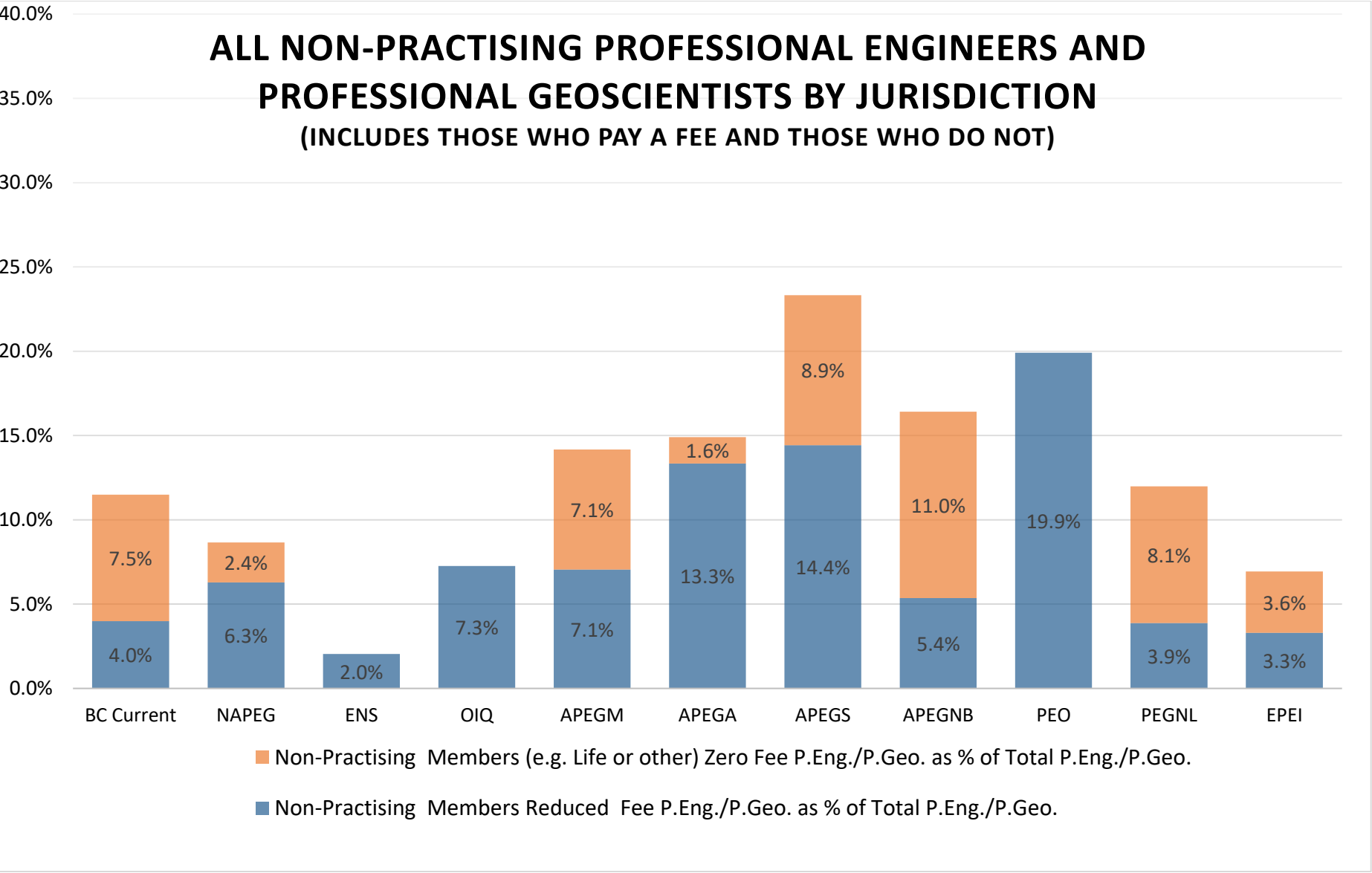
### a. Included Activities

- i. processing and evaluations of applications for:
  - a. EIT/GIT
  - b. P.Eng./P.Geo. (Registered Membership)
  - c. Licence (Non-Resident)
  - d. Provisional Membership
  - e. Limited Licence
  - f. Designated Structural Engineer
  - g. Reinstatements to Membership or Licence in the above categories
- ii. outreach to Internationally Trained Engineers
- iii. administration costs related to (i), including:
  - a. staff & volunteer training & out of pocket & travel expenses
  - b. outreach to Internationally Trained Engineers, students and other prospective non-member applicants
  - c. Administration of activities associated with the Registration Committee, Geoscience Committee, and Registration Task Force
  - d. budgeting activities related to (i)
- iv. legislation and policy development specifically related to (i) through (iii)
- v. statistical research and reporting related to (i) that is for internal use aimed at monitoring and improving the process.
- vi. Information Technology design, development, maintenance projects, including project management and support of the online application system

### b. Excluded Activities

- i. changes to member status currently set out in Bylaw 10
  - a. Resignations and Removals
  - b. Non-Practising Membership
  - c. Conversions from Non-Practising to Practising Membership
- ii. the Enhanced Engineering/Geoscientist in Training Program and the Accredited Employer Training Program including,
  - a. program research, development and administration,
  - b. interim review of experience.
  - c. general presentations, outreach, training and support to Engineers and Geoscientists in Training, their supervisors, mentors and employers
- iii. Annual fee renewal activities
- iv. Member support and maintenance, including replacement stamps, certificates, confirmations of membership to external parties, removals from the register and roll,
- v. Support to Council and Executive that is not directly related to the current admissions process, such as the AGM, ASTTBC Joint Board, Incidental Practice, analysis of admissions issues across Canada
- vi. General Engineers and Geoscientists BC overhead as long as there is no approved policy to allocate it to operational programs (overhead includes building and support systems expenses, & maintenance, finance, administration and IT salaries to support the intake process)
- vii. External Relations:
  - a. development, negotiation of Mobility Agreements
  - b. Engineers Canada and Geoscientists Canada activities and reporting
  - c. Grant-funded programs and pilots
  - d. Government relations not directly related to a specific application for admission

- e. agreements with third parties (e.g. Memoranda of Understanding, Mutual Recognition Agreements).
  - f. Advisory Committee (external) activities
  - g. support to third-party research activities
- viii. Support to Pan-Canadian Competency Based Assessment Project
- ix. Staff activities not related to the intake process



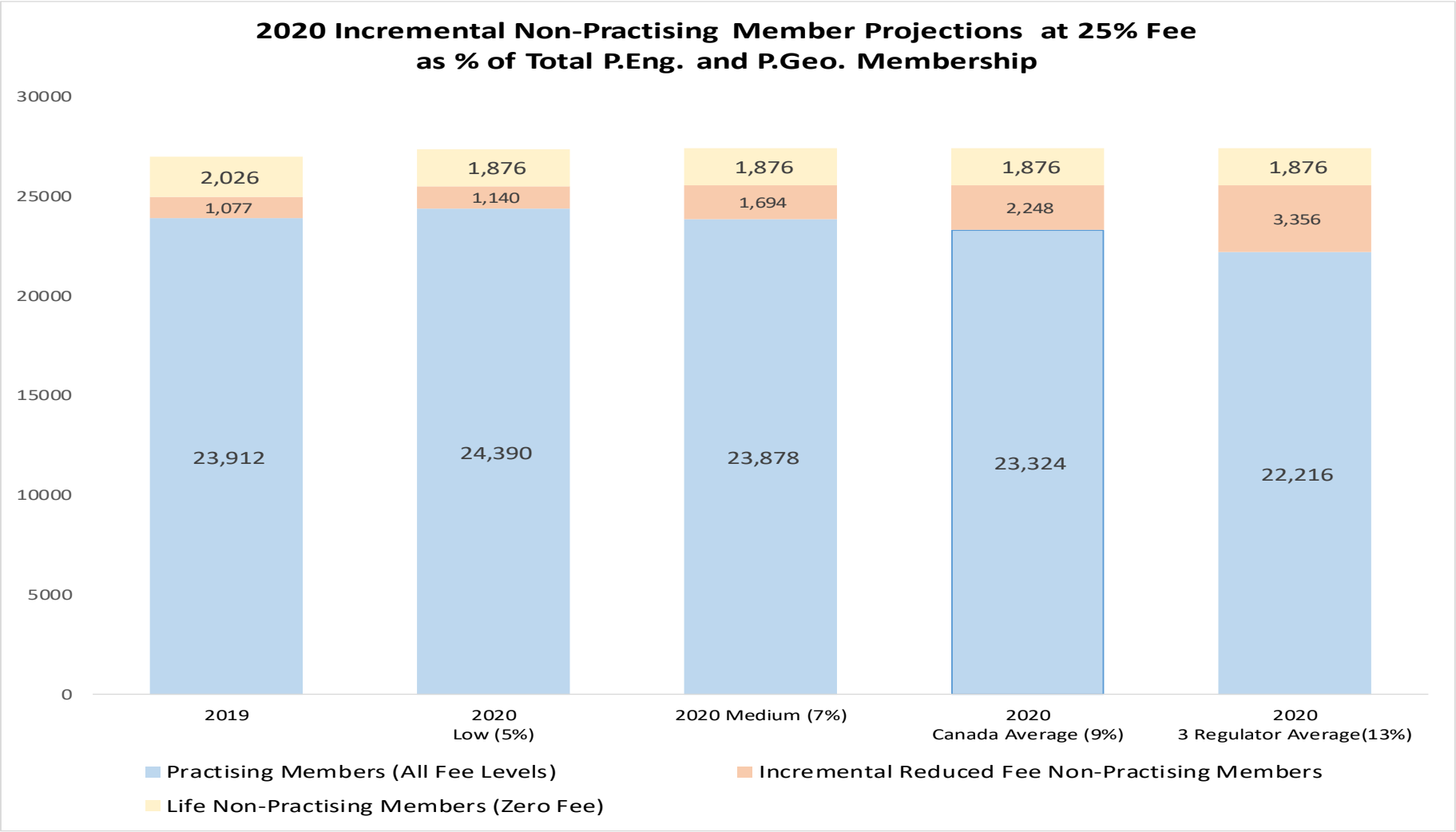
## Assumptions of Expected Uptake to Proposed New Non-Practicing Fee of 25% Full Fee

- 2020 vs 2019 Growth of total cohort of Professional Engineers and Professional Geoscientists net of attrition = 2.5%
- Revenue Losses based on a 100% Member fee of \$450
- Low (5%), Medium (7%), Canada Average (9%) and 3 Largest Regulators Average(13%) projections are based on the percentage of total Non-Practicing Members paying a reduced fee versus total P.Eng. & P.Geo. membership
- With Life Members added, the total Non-Practicing Membership Projection is Low (12%), Medium (14%), Canada Average (16%) and 3 Largest Regulators Average(20%)
- An incremental 10% or 69 of the current Non-Practicing Members 60 years of age and over will resign solely due to no 'zero fee option' being introduced
- 175 practicing members will migrate to Non-Practicing in 2020 if the fee remains at 50% based on age categories

Non-Practicing Fee Reduction

2020 Projections:

Practicing vs Non-Practicing Membership





## Non-Practicing Fee Reduction

## Sensitivity Analysis

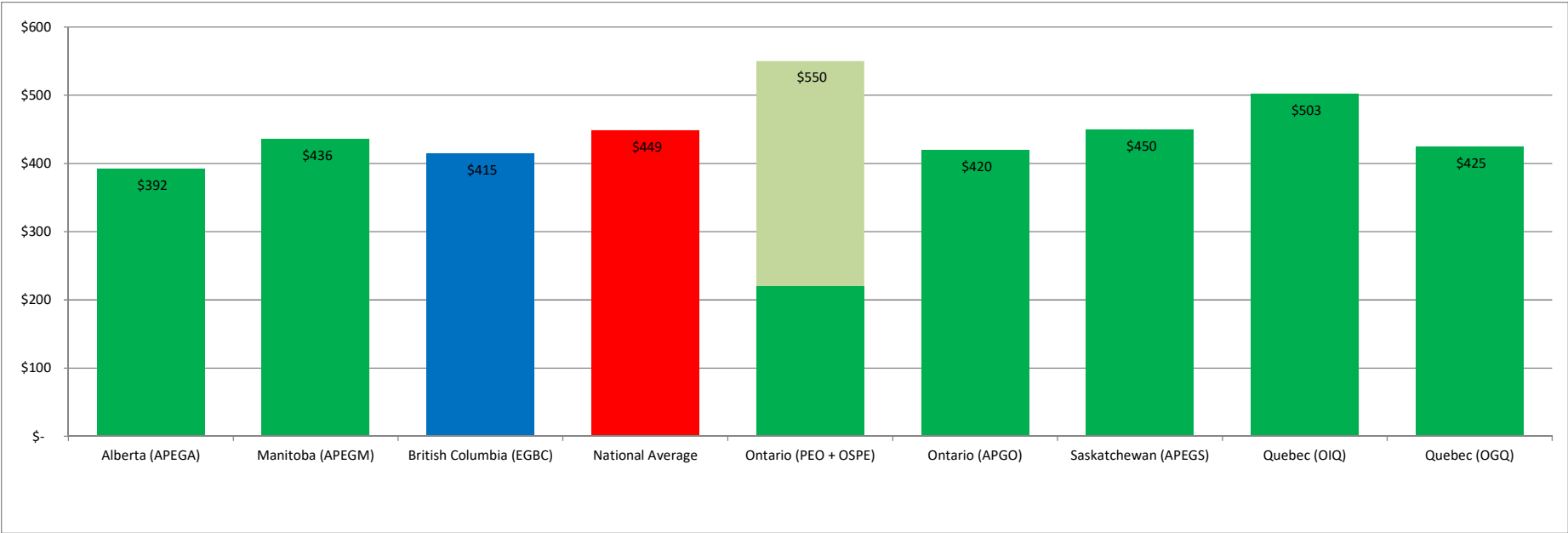
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## Non-Practicing Fee Reduction

### Fee Comparison – Subsidy (2019 base Fee \$415)

	Current - Non-Practicing member paid 50% of Full fee	Non-Practicing Fee is 25% of full fee - Scenario Low	Non-Practicing Fee is 25% of full fee - Scenario Medium	Non-Practicing Fee is 25% of full fee - Scenario High	Average across Canada	3 Largest Regulator Average
		5%	6%	7%	9%	13%
\$ subsidy per member who paid in full	\$ 8.00	\$ 11.00	\$ 13.00	\$ 15.00	\$ 20.00	\$ 29.00
<b>New Annual Fee</b>	<b>\$ 450.00</b>	<b>\$ 455.00</b>	<b>\$ 459.00</b>	<b>\$ 467.00</b>	<b>\$ 472.00</b>	<b>\$ 488.00</b>
Total Annual Fee Increase from current annual fee - \$415		\$40.00	\$44.00	\$52.00	\$57.00	\$73.00
<b>Reduction of non-Practicing fee in Yr 3 (FY2020)</b>	-	(90,545)	(152,952)	(267,808)	(340,583)	(590,622)
<b>Projected Surplus With Additional Fee Increase</b>	<b>175,706</b>	<b>162,832</b>	<b>162,564</b>	<b>171,998</b>	<b>176,909</b>	<b>175,498</b>

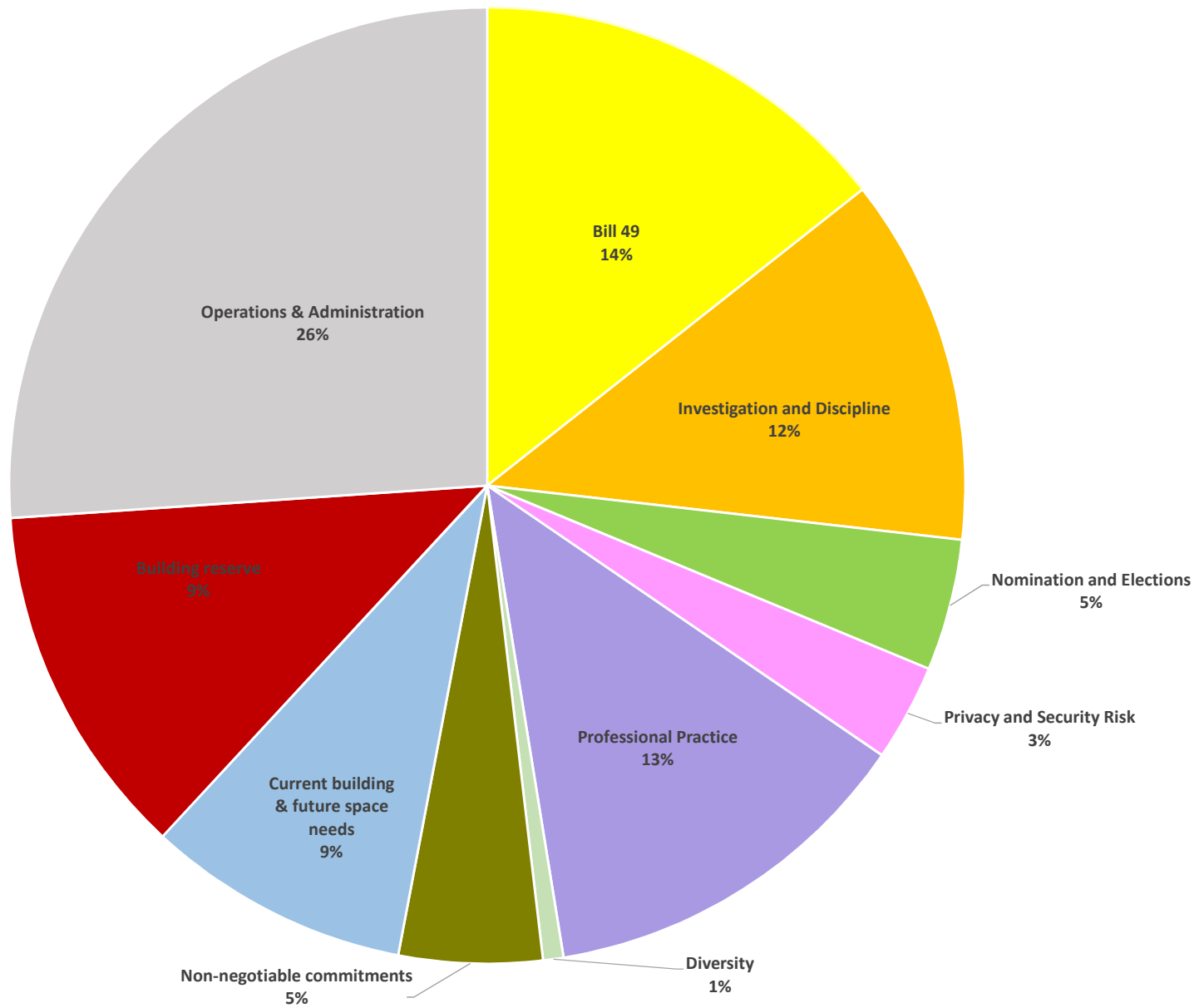
Engineers Geoscientists BC and other Provincial Associations Annual Fee as at January 2019



## Engineers and Geoscientists BC Capital Acquisition Plan

Capital Budgets	FY2018	FY2019	FY2020 Revised	FY2021
Consultants for Capital Project Work	25,000	25,000	25,000	25,000
Client Infrastructure (>\$1000)	2,000	2,000	2,000	2,000
iPhone refresh	1,200	12,000	1,200	1,200
Laptop refresh	9,500	9,630	6,420	6,420
DR Nodes 1, 2, 3 & PR Node 3	35,000		-	
PR Nodes 1, 2, 4, 5, 6	-	43,750	-	
Production SAN	80,000	-	-	
DR SAN	-	86,000	-	
CISCO Firewall	-	9,000	-	
Core switches	-	-	9,000	9,000
Internal capitalized assets	123,926	127,644	285,460	294,024
Furniture, fixture and equipment	20,000	20,000	220,000	220,000
	<b>296,626</b>	<b>335,024</b>	<b>549,080</b>	<b>557,644</b>

FY 2020 Changes to Budget by Expense Category based on Scenario B



Engineers and Geoscientists BC

FY2020 & FY2021 PROPOSED NEW INITIATIVES

<b>Mandatory</b>	Essential to deliver mandated obligations and commitments under the Act and/or other legislated non-discretionary requirements.
<b>Critical</b>	Essential to deliver the Strategic Plan outcomes, mitigate identified risks and be in compliance with Policies.
<b>Sub-Critical</b>	Supports effective business processes that can be delayed or deleted but with consequences.

Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
3	Bill 49	Mandatory	Council	Developing proposal for Bill 49	In response to Bill 49, a proposal to respond to the various areas will require consultant services. Some areas that will require response will be practice rights, regulation of companies, and declaration of conflict of interest. In particular, a proposal in response to the possibility of a merger with ASTTBC needs to be developed for government.	\$ 100,000		Y	1b, 1c	H	These Bill 49 items will have a long term strategic impact on the organization and the professions that it regulates. In addition, the demands associated with these items, particularly the proper evaluation of a merger/amalgamation are outside the current organizational expertise. Outside, expert consulting advice will be required.
8	Bill 49	Mandatory	Council	Public Affairs Specialist - 2 years contract	To date, government relations activities have been coordinated by the communications officer on a part-time (25-30%) basis, with strategic advice provided by an outside government relations agency. With the demands of Bill 49 and an ongoing requirement to develop policy, draft letters and policy responses and coordinate other government relations activities, the time requires exceeds current organizational capacity. It is necessary to create a new Public Affairs Specialist position to provided dedicated support for policy response, government relations and stakeholder/member engagement related to Bill 49. This position will be responsible for coordinating the policy development activities of the organization as they relate to the Professional Governance Act and associated regulations, bylaws and policies. In addition, the position would be responsible for coordinating the government relations engagement activities of the organization including proactive outreach and engagement with provincial government officials necessary for the development and communication of effective public policy.	\$ 94,406	\$ 96,965	Y	4c	H	Without dedicated full time support, policy evaluation and response would be less effective as would the government relations/engagement program. Member communication and engagement would continue to be under-resourced.
39	Bill 49	Sub-Critical	Council	Travel expenses for Bill 49	Staff travel expenses for Bill 49	\$ 15,500		Y	4g	H	Some opportunities for attendance by video conferencing, although majority of participants are present in person, making our contributions less effective than attending in person, particularly on critical discussion topics.
34	Current building & future space needs	Critical	FCS	Building & Space Planning Task Force	Need consultants to finish Ph 1 of development of recommendations and then continue to Ph 2 to develop recommendation (ie. Architects, real estate agents, engineers, accountants, lawyers) & to hire Project Manager during the implementation stage in Yr. 4	\$ 100,000	\$ 100,000	Y	4g	J	This would delay the development of space planning and building out options for the future of the building. Time is limited as current building will not last more than 2 years. Solutions are required to address the space issue sooner rather than later as time is required to implement solutions.
36	Current building & future space needs	Critical	FCS	Office space furniture	To address the incoming new staff, furniture solutions are the most cost efficient way to address space needs. Current office space does not have enough cubicle to sit incoming new staff. Total funding is \$100K capital expenditure which results in additional \$10K per year amortization for the next 10 years. This solution should tie the organization over for the next 2 years for space needs.	\$ 10,000	\$ 10,000	N	4g	J	No seating available for incoming new staff. Other options such as leasing additional offsite office space are more expensive and counter productive.
37	Current building & future space needs	Sub-Critical	FCS	Building & Space Planning Task Force Travel Expenses	Travel and meeting expenses for out of town and local members for the Building & Space Planning Task Force committee	\$ 20,000	\$ 20,000	N	4g	J	Skype options could be used for members who are not in the lower mainland, however some meetings do require physical attendance to be more effective.
25	Diversity	Critical	MS	Diversity Outreach Coordinator - 1 FTE	Council supported the creation (and funding) of this position on an interim basis for the balance of the 18/19 fiscal year in order to develop the action plan. Assumed government funding is in place to cover cost, however, if it falls through EGBC will need to fund for this position to assist with running the 30 by 30 Initiative.	\$ -	\$ -	N	4g		Without dedicated resources on an ongoing basis the organization will not be able to implement the action plan and momentum on the 30 by 30 strategy will be lost.

Engineers and Geoscientists BC

FY2020 & FY2021 PROPOSED NEW INITIATIVES

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Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
26	Diversity	Critical	Comm	Career Awareness	Budget increase to support outreach to Indigenous students (as part of the Truth and Reconciliation Pilot approved by Council). A portion of this funding would also support the development of lesson plans for new curriculum to support diversity initiatives.	\$ 10,000	\$ 10,000	Y	4b		Required to deliver these initiatives. Without funding, indigenous outreach not possible. Curriculum (to support 30x30) would be deferred.
9	Investigation and Discipline	Mandatory	LEC	Investigator - 1 FTE	The core function of handling investigations is falling behind as the backlog of open files grows. Average number of files is in the mid to high 60's and there was a spike in 2016 to 93. Summer students currently assist with a burst of help, however, once they end their term, the backlog grows.	\$ 73,612	\$ 103,142	N	2a		Consequences include longer clearance time for files or worst still, the investigation process overlooks critical information which are important for the Investigation Committee. The outcome could be detrimental to the member(s) and/or the public. As it stands right now, it is taking much too long to complete the investigation process for the more complex files.
10	Investigation and Discipline	Mandatory	LEC	Enforcement Officer - 1 FTE	With the current staff complement, the department is unable to keep up with outstanding files. For example, during the last quarter ending Sept. 2018, we opened 34 files and at the end of the quarter, 31 files remain untouched. APEGA and PEO have a ratio of 1 staff to 100 files and with the addition of a new staff the ratio at EGBC would be 1.7 to 100 files.	\$ 65,388	\$ 91,499	N	2a		EGBC will become ineffectual in meeting its mandate to enforce unauthorized practice or unauthorized use of title. Serious consequences may occur when non-licensed members practice engineering or geoscience.
11	Investigation and Discipline	Mandatory	LEC	Compliance Officer - 0.4 FTE	The Compliance Officer position is currently part-time at 0.6 FTE. The incumbent is primarily responsible for the complaints in-take process. In re-assessing the workload and department's need to address the bottle-neck in the complaints process, a full time Compliance officer is required.	\$ 32,679	\$ 33,668	N	2a		Lengthy delays in taking the necessary actions after the receipt of complaints will occur. Furthermore, keeping the complainant and/or the member(s) complained against informed throughout the complaints management process will unlikely occur due to lack of resources.
29	Investigation and Discipline	Critical	LEC	Discipline Panel Honorarium	Additional funding required to implement the new Council Policy on "Payment of Honoria to Discipline Committee Inquiry Panel".	\$ 10,000	\$ 10,000	N	4g		Council will have to rescind the new policy. This will make it difficult to recruit members to serve on discipline panels.
4	Nomination and Elections	Mandatory	Council	Nominations Committee	Consulting fees for enhancements to Nomination process required by Bill 49 (eg. background checks, interviews by an independent third party)	\$ 25,000	\$ 25,000	N	4c	B	Without improved process supported by outside expertise, nomination process would be under resourced and would not be optimized to consistently select the best candidates.
5	Nomination and Elections	Mandatory	Council	Online voting provider	Increase cost for online voting provider due to new contract rates	\$ -	\$ 12,000	N	4c		No choice in increase cost from vendor.
7	Nomination and Elections	Mandatory	Council	Elections	Cost to hire an independent Chief of Elections Officer to eliminate perception of conflict of interest. This was a Nominations and Elections Review Taskforce recommendation.	\$ 20,000	\$ 20,000	N	4c	B	Continued criticism of election process and associated legal costs. Increased reputational risk and loss of confidence by government in election process.
15	Nomination and Elections	Critical	Council	Videos for Candidates	Addition funding for videos for all Council candidates (last year on a pilot basis videos were produced for President and VP candidates). This provides a better means for voters to evaluate candidate capabilities. Videos were supported by members in a recent post-election survey.	\$ 20,000	\$ 20,000	N	4c	B	Could be seen as ignoring member feedback for improving elections process. Lost opportunity to provide a better means to evaluate candidate capabilities and improve voter participation.
1	Non-negotiable commitments	Mandatory	FCS	General Operating Cost Increase	Anticipated Property Tax increase of possible 20% + as appealing 60% increase in property assessment (20K), building insurance increase, and external parking increase for increased number of staff	\$ 38,960	\$ 38,960	N	4g		Property taxes are mandatory for payment. Insurance costs are not controllable.

<b>Mandatory</b>	Essential to deliver mandated obligations and commitments under the Act and/or other legislated non-discretionary requirements.
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Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
2	Non-negotiable commitments	Mandatory	Council	Increased cost of national assessments (Engineers Canada) based on 4% volume increase	National assessment fee increase due to membership growth	\$ 22,950	\$ 22,950	N	1a, 1b, 2b, 3d, 4b, 4g		Mandatory fees to pay if EGBC is a part of the national bodies.
12	Non-negotiable commitments	Mandatory	Reg	Academic Exams	Increase in PEO academic exam rate of \$35/exam offset by increase in revenue of \$35/exam, volume increase, and savings in room rentals and invigilators.	\$ (19,049)	\$ (19,049)	N	2c	F	EGBC will have to make up the anticipated costs.
13	Non-negotiable commitments	Mandatory	IT	Shifting from licensed services to subscription services	Industry shift from licensed services to subscription services. Vendors are now leveraging the ability to change pricing, however, services provided far exceed that were available before. Informz tool is one of these services with price increases used for blast emails to members for billing and other communications to members.	\$ 8,000	\$ 8,000	N	4b, 4g	I, K	This is a non-discretionary expense unless we want to stop using the software.
16	Non-negotiable commitments	Critical	Council	Governance Committee	Consulting fees to support a review of honoraria for Council and Committee members.	\$ 20,000	\$ 20,000	N	4c	B	Outside expertise required in order to conduct a review and provide recommendations on current practice and costs/benefits. Without outside consulting support, this item would have to be deferred.
14	Operations & Administration	Critical	Council	Executive Administrative Assistant (Contract)	The current administrative support is at full capacity. To address upcoming needs of the organization, additional administrative support is required. A new Executive Administrative Assistance is being requested to support the CFAO and Director, Corporate Governance & Strategy. Support is required for the Audit and Risk Committee, Building and Space Planning Task Force, to support the new demands of Bill 49 on the nomination and election processes, compiling information with respect to tracking progress on the strategic plan, business continuity and the risk register, improving organization of corporate records, as well as additional support for Council forums.	\$ 72,658	\$ 74,603	N	4c	J, B, A	Without the admin support, senior level positions would be performing admin duties which is not a good use of resources. Time would be better spent on strategic duties. This work can not be absorbed within existing resources.
17	Operations & Administration	Critical	Council	Shift Strategic Planning Session	Funding to shift strategic planning session for new three year plan into year 4	\$ 20,000	\$ -	Y	4b	A	If the current strategic plan is extended for an additional year, the budget to support the planning session would need to be shifted by one year, to next year. Without funding, planning would be without a professional facilitator and would be done at the Association offices producing a less than ideal planning session.
18	Operations & Administration	Critical	Council	Review and update Business Continuity Plan	Consultant cost to review the current Business Continuity Plan. The plan has been in place for over 5 years without a detailed review for improvements.	\$ 10,000	\$ -	Y	4g	K	Possible omissions or changes to current risk factors may not be captured in the plan, thus making the plan not full proof. For example, data breach/cyber security break issues not addressed in current plan.
19	Operations & Administration	Critical	Council	Business Continuity Table Top Exercise	Consultant cost to facilitate a business continuity table top exercise. Focus would be on privacy breach.		\$ 10,000	Y	4g	I, K	It is best practice to hold a table top exercise every few years to ensure that key staff assigned responsibilities in the plan are aware and can execute the plan. Without this exercise, it would be difficult to know where the deficiencies would be.
24	Operations & Administration	Critical	HR	Triennial total compensation program	Additional funding to complete triennial total compensation program review; original estimate not sufficient with most recent quote (65K vs 90K)	\$ 25,000		Y	4h	J	Total compensation would be at risk to not be compliant with P50 Policy. Could see turnover rates rise. Would be difficult to recruit good talent if compensation not at market levels.



Engineers and Geoscientists BC

FY2020 & FY2021 PROPOSED NEW INITIATIVES

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Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
27	Operations & Administration	Critical	Comm	Communications Officer - 1 year Contract	The organization's corporate communications needs (issues management, media relations, stakeholder engagement, consultations, etc.) regularly exceed the resources available to meet them, and as a result, the department's two most senior positions often absorb the overflow – resulting in staff overload, tactical delivery, continuity issues, and little ability to achieve the strategic communications goals of the organization.	\$ 75,140	\$ -	Y	1a		Currently communications suffers from a lack of strategic planning and execution. Day to day orientation prevents organization from solidifying its position. Without funding, strategic progress, including the development of an overarching communications plan and program will not occur. In addition, support for 100th Anniversary and consultations on corporate regulation and CPD program likely to be under-resourced.
28	Operations & Administration	Critical	Comm	Employment Web Advertising Revenue	Increase advertising price by 3% + 4% volume increase.	\$ (59,000)	\$ (59,000)	N	3b		No recent increase and nominal amount unlikely to impact volumes.
30	Operations & Administration	Critical	IT	Misc. New Systems	General funding reserved for other business systems required to be purchased throughout the year to address business needs.	\$ 22,140	\$ 22,140	N	4b, 4g	I, K	An example is LEC, one of the Depts looking at an investigation/discipline file management software package to allow more effective tracking of their files so that appropriate warnings and management reports can be generated. Without the proposed funding the option of acquiring a suitable tool will not be possible.
33	Operations & Administration	Critical	FCS	Risk Management	To roll out next phase of risk management or facilitate a session and build out in one or two risk areas. Next phase of risk management would entail building out more granular departmental level risks. A structure/framework of this would need be developed which would require the assistance of a consultant.	\$ -	\$ 20,000	Y	4c		Would slow down the process of rolling out risk management. Building out detailed risks at department level and more research or work on high level risks could be stagnated.
35	Operations & Administration	Critical	Reg	Application Fee/Certification Fee	Increase in application fee by \$25, increase of certificate fee by \$20, volume increase offset by delay in uptake in Working in Canada program.	\$ (73,570)	\$ (73,750)	N	2c		EGBC will have to make up the anticipated expenses.
38	Operations & Administration	Sub-Critical	FCS	Additional Color Copier (Lease)	Require additional color copier as there is an increase in staff and programs leading to. Current copier usage is increasing and wait times for copiers has increased.	\$ 13,000	\$ 13,000	N	4g		Longer wait times for staff and offsite printing services will be procured resulting in increased printing costs.
41	Operations & Administration	Sub-Critical	LEC	Articled Student - 1 FTE	Due to recent difficulties with recruiting staff to fill authorized positions, the LEC Dept. recruited Articled Students as an alternative. The two that we recruited recently have proven themselves to be very cost-effective. A position is therefore requested to assist in handling the increase of FOI requests, as well as aid in investigations files and discipline hearing processes by preparing witnesses.	\$ -	\$ 69,707	N	2a		Other staff in the LEC Dept. will have to handle the work proposed for this position. Or could be contracted out at a higher cost.
42	Operations & Administration	Sub-Critical	LEC	Legal Administrative Assistant - 1 FTE	The ratio of admin to LEC staff is 1 to 6. The current Legal Admin Assistant's workload can not support additional work. With additional files and staff, additional admin assistance is required.	\$ -	\$ 47,668	N	2a		This bottleneck will impact the output/performance of the Department.
43	Operations & Administration	Critical	IT	New Conference/Events Conferencing System	This new Conference and Event Management system will be hosted in Canada (thereby become FIPPA compliant), have more mobile features, features that conference attendees have come to expect, and have the potential to allow migration of current CPD events from iMIS to a more mature platform. The migration of CPD events from iMIS will reduce our dependency on iMIS and place us in a position to negotiate lower future iMIS support costs.	\$ 5,600	\$ 5,600	N	4b, 4g	I, K	Will require the continued usage of a system that is not FIPPA compliant; the continued business effort to support individuals not wishing to register via a system that is not FIPPA compliant; continues the requirement to utilize two different systems for conference event and all other events; roadblocks the effort to reduce our usage of iMIS and control the corresponding high support costs.

<b>Mandatory</b>	Essential to deliver mandated obligations and commitments under the Act and/or other legislated non-discretionary requirements.
<b>Critical</b>	Essential to deliver the Strategic Plan outcomes, mitigate identified risks and be in compliance with Policies.
<b>Sub-Critical</b>	Supports effective business processes that can be delayed or deleted but with consequences.

Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
44	Operations & Administration	Sub-Critical	Comm	100th Anniversary	Current budget of \$75K will fund kick-off event at the conference, sponsorship of a Science World Road Show tour, celebration/party for key stakeholders and branches. However, \$50K additional funding is required for advertising and enhancement for celebration party.	\$ 50,000		Y	3c, 3d		Lost opportunity to promote the Association and profession to the public and key stakeholders. Significant milestone anniversary will go unnoticed by members and the public.
45	Operations & Administration	Sub-Critical	General	Maternity/Parental Leave Top Up	To demonstrate support for the 30 by 30 initiative and to model the values we want to see reflected in the broader engineering and geoscience professions, a Pregnancy / Parental Leave Top-up Program should be implemented to support staff who take pregnancy and/or parental leave. Research has been completed to understand the frequency and benefit scope of similar programs offered by other associations, Top Employers and similar P50 organizations. A program that would be in alignment with our Total Compensation Philosophy of compensating at the P50 level of a similar organization would cost on average \$170K per year and would fluctuate depending on the number of staff that take advantage of the benefit.	\$ -	\$ 170,000	N	4e		The organization would fall behind when comparing benefit offerings of similar organizations. Missed opportunity to: (a) offer a program that strongly aligns with our 30x30 initiative, (b) model the values we want to see reflected in the broader engineering and geoscience professions, (c) improve the competitiveness of EGBC's benefit offering to assist in attracting and retaining top talent.
46	Operations & Administration	Critical	General	3% merit increase	Based on the function of our merit matrix, the goals of our Total Staff Compensation Policy, as well as input from Mercer on market salary projections for the coming year, the budgeted increase to all salary and benefits is set at 3% for the 2019/2020 fiscal year. We are confident that this will allow us to continue to meet the requirements of our Total Staff Compensation Policy.	\$ 220,012	\$ 249,584	N	4g	J	The main consequence of having less or no budgeted salary increase for the fiscal year would risk the association not meeting the requirements of our Total Staff Compensation Policy and our compensation philosophy of paying at the median / P50 compensation level for a similar role in a similar organization. This would lead to the association becoming less competitive in the market and risk not be able to appropriately attract and retain talent required to meet the staffing needs of the organization.
6	Privacy and Security Risk	Mandatory	Council	FIPPA Audit Phase 2	An audit to measure compliance with BC's information and privacy laws and make recommendations to improve privacy and access practices, policies and guidelines. Areas that will be assessed include management policies & procedures; collection, use, disclosure, and retention of information; protection and safeguard of information; and access processes.		\$ 50,000	Y	4c	I	It is best practice to be in compliance with FIPPA requirements. First step is to learn of the deficiencies. The deficiencies or short comings to compliance could result in legal liability issues and end up costing the organization its reputation and financial penalties if not addressed.
31	Privacy and Security Risk	Critical	IT	Penetration Testing & Phishing Tools	Tools to perform repeated scans of websites for cyber attack; to scan the internal and external network and server infrastructure to ensure they are appropriately hardened and secured; automates the process of testing for newly discovered vulnerabilities as they are identified by security experts.	\$ 14,075	\$ 14,075	N	4b, 4g	I, K	EGBC will be more vulnerable to data breaches and possibly ransomware.
32	Privacy and Security Risk	Critical	IT	Office 365 E3 + AIP	Next phase of office suite tools that provides an integrated suite of features that enhance productivity while providing technology to support Data Loss Protection (preventing unauthorized data leaving the organization) and Advanced Information Protection (securing access to documents after they have left our internal systems). Includes productivity enhancements that support the integration of Skype text and video conferencing, team planning, collaboration and document management. Replaces the need to license many existing tools and technologies.	\$ 33,800	\$ 33,800	N	4b, 4g	I, K	\$27,362 would need to be spent to license existing office software and server technology. New technologies would not be available to support the planned strategies used to address Data Loss Protection (preventing unauthorized data leaving the organization ) or Advanced Information Protection (securing access to documents after they have left our internal systems). Lack of Data Loss Protection or Advanced Information Protection technologies would prevent the implementation of services to mitigate risks associated with data breaches and our ability to fully satisfy FIPPA requirements.

Engineers and Geoscientists BC

FY2020 & FY2021 PROPOSED NEW INITIATIVES

	Essential to deliver mandated obligations and commitments under the Act and/or other legislated non-discretionary requirements.
Mandatory	
Critical	Essential to deliver the Strategic Plan outcomes, mitigate identified risks and be in compliance with Policies.
Sub-Critical	Supports effective business processes that can be delayed or deleted but with consequences.

Item #	Category	Priority	Department	Initiative Title	Description	Yr. 3 - FY2020 Amount	Yr. 4 - FY2021 Amount	One Time Funding	Strategic Plan #	Risk Register #	Consequence if Foregone
20	Professional Practice	Critical	PPSD	Climate Change Action Plan and Subsequent Implementation	In response to the AGM motion calling for the addition of resources towards the preparation of an Action Plan and following up on Council's directions, the Climate Change Advisory Committee has determined that \$50k would be required for a consultant to develop this action plan and the same amount each year to follow up on its implementation with input from DEP and DEERE.	\$ 30,000	\$ 30,000	N	1b., 2b.	D	Preparation of the Climate Change Action Plan will not occur. EGBC will be less able to fulfill its mandate to develop, maintain and enforce professional practice standards.
21	Professional Practice	Critical	PPSD	Climate Change Focus Practice Advisor - 1 FTE	Given the increasing demands for staff support on Climate Change related activities, the proposal is to dedicate an existing Practice Advisor F/T to this work and back fill with a new Practice Advisor starting in FY2020. This new Practice Advisor position would focus on emerging fields/practice issues	\$ 121,440	\$ 129,105	N	2b		EGBC will not be able to respond to practice enquiries from its members in an effective and timely manner. This could result in members not meeting the necessary quality management or professional practice standards. Furthermore, the ability to develop new and/or update existing guidelines will be limited.
22	Professional Practice	Critical	PPSD	Natural Resource/Emerging Discipline Focus Practice Advisor - 1 FTE	This new Practice Advisor (proposed to start in FY2021) would focus on natural resources. This position will provide general practice advice on guidelines, assurance statements, CPD, Corporate Practice, joint practice issues, ethical issues, quality management issues etc. The demand from a growing membership for professional practice advice has increased substantially in recent years.		\$ 94,106	N	2b		EGBC will not be able to respond to practice enquiries from its members in an effective and timely manner. This could result in members not meeting the necessary quality management or professional practice standards. Furthermore, the ability to develop new and/or update existing guidelines will be limited.
23	Professional Practice	Critical	PPSD	Administrative Assistant - PPSP - 1 FTE	The scope and volume of work carried out by the Dept. is increasing at a rapid pace. With one AA providing admin support to the large number of Committees/Jt. Boards, and general support to the other staff in the PPSP Dept., it is clear that this is not sustainable. A new admin support position is requested to assist with administrative support to over 12 practice related committees and joint practice boards, as well as supporting the other 10 programs delivered by PPSP.	\$ 37,147	\$ 67,699	N	2b		The scope and volume of work carried out by the Dept. is increasing at a rapid pace. With one AA providing admin support to the large number of Committees/Jt. Boards, and general support to the other staff in the PPSP Dept., it is clear that this is not sustainable. If no additional AA is added, the more senior positions in the Dept. will have to spend their time carrying out admin support functions which is not the most cost-effective option. Furthermore, the inadequate AA resources in the Dept. can reduce the effectiveness of the Department.
						\$ 1,284,888	\$ 1,591,472				

Description and Justification for additional Full Time Employees in FY2020-FY2021 Budget

FTE #	FTE TITLE	POSITION RESPONSIBILITIES & SALARIES (INCLUDING BENEFITS)	IMPLICATIONS IF POSITION ELIMINATED				
1	Diversity Outreach Coordinator- (2 year contract)	<p>The Diversity Outreach Coordinator is responsible for managing Engineers and Geoscientists BC’s diversity initiatives in support of 30 by 30, coordinating efforts across the organization in support of building diversity across various program areas and building key partnerships to support collective efforts. Government funding is expected to cover the expense of this position.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$0</td><td>\$0</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$0	\$0	Without dedicated resources on an ongoing basis, the organization will not be able to implement the action plan and momentum on the 30 by 30 strategy will be lost.
Year 3 – FY2020	Year 4 – FY2021						
\$0	\$0						
2	Executive Administrative Assistant to CFAO and Director, Corp. Governance & Strategy - (2 year contract)	<p>Executive Administrative assistant to CFAO and Director, Corp. Governance &amp; Strategy. Support is required for the Building &amp; Space Planning Task Force, Audit/Risk Committee and increasing admin demands of the CFAO. Couple this need with the admin support required for the Director, Corp, Governance &amp; Strategy to support the new demands of Bill 49 on the nomination and election process, compiling information with respect to tracking progress on the strategic plan, business continuity and the risk register, improving organization of corporate records, as well as additional support for Council Forums.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$72,658</td><td>\$74,603</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$72,658	\$74,603	Without the admin support, senior level position would be performing admin duties which is not a good use of resources. Time would be better spent on strategic duties. This work cannot be absorbed within existing resources.
Year 3 – FY2020	Year 4 – FY2021						
\$72,658	\$74,603						
3	Public Affairs Specialist– (2 year contract)	<p>This position will be responsible for coordinating the policy development activities of the organization as they relate to the Professional Governance Act and associated regulations, bylaws and policies. In addition, the position would be responsible for coordinating the government relations engagement activities of the organization including proactive outreach and engagement with provincial government officials necessary for the development and communication of effective public policy.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$94,406</td><td>\$96,965</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$94,406	\$96,965	Without dedicated full time support, policy evaluation and response would be less effective as would the government relations/engagement program. Member communication and engagement would continue to be under-resourced.
Year 3 – FY2020	Year 4 – FY2021						
\$94,406	\$96,965						
4	Investigator	<p>The core function of handling investigations is falling behind as the backlog of open files grows. Average number of files is in the mid to high 60'sand there was a spike in 2016 to 93. Summer students currently assist with a burst of help; however, once they end their term, the backlog grows.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$73,612</td><td>\$103,142</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$73,612	\$103,142	Consequences include longer clearance time for files or worst still, the investigation process overlooks critical information which are important for the Investigation Committee. The outcome could be detrimental to the member(s) and/or the public. As it stands right now, it is taking much too long to complete the investigation process for the more complex files.
Year 3 – FY2020	Year 4 – FY2021						
\$73,612	\$103,142						
5	Enforcement Officer	<p>The Enforcement Officer would manage the intake of all new enforcement files and deal with many of the lower-level enforcement.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$65,388</td><td>\$91,499</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$65,388	\$91,499	EGBC will become ineffectual in meeting its mandate to enforce unauthorized practice or unauthorized use of title. Serious consequences may occur when non-licensed members practice engineering or geoscience.
Year 3 – FY2020	Year 4 – FY2021						
\$65,388	\$91,499						

FTE #	FTE TITLE	POSITION RESPONSIBILITIES & SALARIES (INCLUDING BENEFITS)	IMPLICATIONS IF POSITION ELIMINATED				
6	Compliance Officer – to make up 1 full time position	<p>The Compliance Officer is primarily responsible for the complaints in-take process. In re-assessing the workload and department's need to address the bottle-neck in the complaints process.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$32,679</td><td>\$33,668</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$32,679	\$33,668	<p>Lengthy delays in taking the necessary actions after the receipt of complaints will occur. Furthermore, keeping the complainant and/or the member(s) complained against informed throughout the complaints management process will unlikely occur due to lack of resources.</p>
Year 3 – FY2020	Year 4 – FY2021						
\$32,679	\$33,668						
7	Articled student	<p>Due to recent difficulties with recruiting staff to fill authorized positions, the LEC Dept. recruited Articled Students as an alternative. The two that we recruited recently have proven themselves to be very cost-effective. The articled student would be able to handle the FOI requests as the SLRA could direct the work of the articled student. An articled student is less expensive than a paralegal and would be able to handle a variety of tasks on the department in addition to handling the FOI portfolio. For instance, the articling student would also have the ability to assist the Investigation Manager or Investigator in complex investigations by preparing for investigative interviews, analyzing documents or researching legal precedents. The articling student would also be able to support to the discipline process by researching, analyzing and compiling precedent cases ahead of Consent Order discussions as well as determining the relevant documents. The articling student could also assist the discipline hearing process by preparing witnesses to give evidence and providing general support to the new Discipline lawyer and the external legal counsel. The Director also needs the assistance of an articling student on legal matters pertaining to governance, policy development, privacy, and the overall legal needs of the Association.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$0</td><td>\$69,707</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$0	\$69,707	<p>Other staff in the LEC Dept. will have to handle the work proposed for this position. Or could be contracted out at a higher cost.</p>
Year 3 – FY2020	Year 4 – FY2021						
\$0	\$69,707						
8	Legal Administrative Assistant (LAA)	<p>Administrative support is needed for opening new files and supporting the Compliance Officer during the intake process. The LAA drafts correspondence provides support in preparing document packages for designated reviewers and the IC. She also arranges for all the investigative interviews including preparing document packages, arranging court reporters and performs many other administrative duties such as scheduling, arranging catering, making travel arrangements for committee members and witnesses. In particular, due to the increase in the number of discipline files, the LAA is required to assemble the document packages going to the Discipline Review Panels and external lawyers.</p> <p>The LAA also works with the Director to managing the invoices of the department and to complete special projects. The LAA also manages the corporate name approval process for the LEC department.</p> <table><tr><th>Year 3 – FY2020</th><th>Year 4 – FY2021</th></tr><tr><td>\$0</td><td>\$47,668</td></tr></table>	Year 3 – FY2020	Year 4 – FY2021	\$0	\$47,668	<p>This bottleneck will impact the output/performance of the Department. Current staffing can not absorb more tasks.</p>
Year 3 – FY2020	Year 4 – FY2021						
\$0	\$47,668						

FTE #	FTE TITLE	POSITION RESPONSIBILITIES & SALARIES (INCLUDING BENEFITS)	IMPLICATIONS IF POSITION ELIMINATED				
9	Climate Change Focus Practice Advisor	<p>Given the increasing demands for staff support on Climate Change related activities, the proposal is to dedicate an existing Practice Advisor F/T to this work and back fill with a new Practice Advisor starting in FY2020. This new Practice Advisor position would focus on emerging fields/practice issues</p> <table><tr><td><b>Year 3 – FY2020</b></td><td><b>Year 4 – FY2021</b></td></tr><tr><td>\$121,440</td><td>\$129,105</td></tr></table>	<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>	\$121,440	\$129,105	EGBC will not be able to respond to practice enquiries from its members in an effective and timely manner. This could result in members not meeting the necessary quality management or professional practice standards. Furthermore, the ability to develop new and/or update existing guidelines will be limited.
<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>						
\$121,440	\$129,105						
10	Natural Resource/Emerging Discipline Focus Practice Advisor	<p>This new Practice Advisor (proposed to start in FY2021) would focus on natural resources. This position will provide general practice advice on guidelines, assurance statements, CPD, Corporate Practice, joint practice issues, ethical issues, quality management issues etc. The demand from a growing membership for professional practice advice has increased substantially in recent years.</p> <table><tr><td><b>Year 3 – FY2020</b></td><td><b>Year 4 – FY2021</b></td></tr><tr><td>\$0</td><td>\$94,106</td></tr></table>	<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>	\$0	\$94,106	EGBC will not be able to respond to practice enquiries from its members in an effective and timely manner. This could result in members not meeting the necessary quality management or professional practice standards. Furthermore, the ability to develop new and/or update existing guidelines will be limited.
<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>						
\$0	\$94,106						
11	Administrative Assistant, Professional Practice & Ethics	<p>This Administrative Assistant to provide administrative support to over 12 practice related committees and joint practice boards, as well as supporting the other 10 programs delivered by PPSD. (new AA starts in Dec 2019).</p> <table><tr><td><b>Year 3 – FY2020</b></td><td><b>Year 4 – FY2021</b></td></tr><tr><td>\$37,147</td><td>\$67,699</td></tr></table>	<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>	\$37,147	\$67,699	The scope and volume of work carried out by the Dept. is increasing at a rapid pace. With one AA providing admin support to the large number of Committees/Jt. Boards, and general support to the other staff in the PPSD Dept., it is clear that this is not sustainable. If no additional AA is added, the more senior positions in the Dept. will have to spend their time carrying out admin support functions which is not the most cost-effective option. Furthermore, the inadequate AA resources in the Dept. can reduce the effectiveness of the Department.
<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>						
\$37,147	\$67,699						
12	Communications Officer – (1 year Contract)	<p>The organization’s corporate communications needs (issues management, media relations, stakeholder engagement, consultations, etc.) regularly exceed the resources available to meet them, and as a result, the department’s two most senior positions often absorb the overflow – resulting in staff overload, tactical delivery, continuity issues, and little ability to achieve the strategic communications goals of the organization.</p> <table><tr><td><b>Year 3 – FY2020</b></td><td><b>Year 4 – FY2021</b></td></tr><tr><td>\$75,140</td><td>\$0</td></tr></table>	<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>	\$75,140	\$0	Currently communications suffers from a lack of strategic planning and execution. Day to day orientation prevents organization from solidifying its position. Without funding, strategic progress, including the development of an overarching communications plan and program ill not occur. In addition, support for 100th Anniversary and consultations on corporate regulation and CPD program likely to be under-resourced.
<b>Year 3 – FY2020</b>	<b>Year 4 – FY2021</b>						
\$75,140	\$0						

Engineers and Geoscientists BC Savings for FY2020 and FY2021 Budget

#	Department	Program	Title	Description	Yr 3 Amount	Yr 4 Amount
A	IT	Business Continuity	Reduction in some IS support costs	Reduction is primarily a shifting of costs from support (which would be recorded in this account) to subscriptions services (recorded in SaaS)	(9,700)	
B	IT	Business Continuity	Reduction in software costs	\$15,000 reallocation of costs from software being licensed (Prepaid software) to software being utilized as a service (SaaS).	(15,000)	
C	IT	Telecommunications	Reduction in office licenses for software	\$5,250 associated with Office 365 E3 replacing the need to license Skype for Business.	(5,250)	
D	IT	Grow - Systems & Development	Reduction of IS consultants	Less expectation of utilizing consultants for non-capitalized projects	(10,000)	
E	FCS	Annual invoicing	Digital member cards savings	Savings of printing costs from switching member cards to digital	(4,000)	
F	FCS	NPS	Bank Charges	Net bank charges saving from current new contract plus volume increase	(60,000)	
G	HR	Staffing - recruitment	Recruitment costs savings	Savings from recruitment fees in Yr3 and removing costs of CEO recruitment in Yr 4	(9,768)	(70,000)
H	HR	Compensation Management	Triennial Compensation review every three years	Removal of Triennial review from completion in Yr 2020	-	(90,000)
I	HR	Strategic HR and Organizational Development	Succession Planning Phase 1 Complete	Saving from partial deferral to Yr. 4 and removal due to completion of succession planning project complete in Yr 4	(30,000)	(70,000)
J	Comm	Innovation Magazine	Innovation magazine postage savings	\$15K savings on postage to align with historical actuals and \$20K savings on printing to align with historical actuals	(35,000)	-
K	Comm	Publications	Guideline design and printing cost savings	Removal \$15K due to guideline design now done in-house and saving of \$3K on printing fewer guidelines	(18,000)	-
L	Comm	Career Awareness	Reduction of career awareness grants	Reduce grant disbursement	-	(5,000)
M	Comm	Stakeholder Engagement	100th anniversary celebrations one time funding	Remove one-time allocation for 100th anniversary celebrations	-	(34,000)
N	Council	Labour Market Studies	No more participation in labour market studies	Labour market studies not seen to produce much value, thus not a large need to participate in this.	(10,000)	-
Q	Reg	EIT/GIT Prof. Certification	Promotional costs for MIT accredited program to go national covered in existing budget	Funds to take MIT Accredited Program National no longer required as covered in communications budget	(15,000)	
R	Reg	Applications/Registrations	Meetings	Reduce by \$5,000 to \$18,000	(5,000)	
S	Reg	Limited License	Contract Services	Remove a further \$15,000 that was left in for Bill 49 work if needed.	(15,000)	
T	Reg	Structural Qualifications	Contract Services	Balance Contract Services with IStructE Exam Revenue (this adjusts an oversight in budget submitted Nov 26	(3,000)	

Engineers and Geoscientists BC  
Savings for FY2020 and FY2021 Budget

#	Department	Program	Title	Description	Yr 3 Amount	Yr 4 Amount
U	Reg	Non-Program Specific	Variance expenses	Reduce Contract Services to \$2K (\$10K savings); Reduce meetings to \$1.5K (\$3.136K savings), reduce Misc. to \$0.5K ((\$3.5K savings) reduce staff travel to \$0 (\$1K savings)	(15,636)	
V	PPSD	OQM	OQM Training	OQM Training will stop to allow the development of corporate practice training (replacing OQM training)	(15,000)	
W	MS	Induction Ceremony	reduce from 3 events to 2 events per year	The Professional Member Induction Ceremony is currently scheduled three times a year. Move this format to twice a year. The actual cost for 3 ceremonies is \$86,000. Note that \$10K increase was requested in draft budget submitted to support increased cost of hosting 3 events per year.	(20,000)	
		TOTAL Savings			\$ (295,354)	\$ (269,000)



## OPEN SESSION

### ITEM 6.4

DATE	March 26, 2019
REPORT TO	Council for Decision
FROM	Executive Committee
SUBJECT	Councilor Agenda Item Request re: Volunteer Attrition Risk
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions

Purpose	To consider the request from a Council member regarding volunteer attrition risk.
Motion	That Council direct staff to complete a volunteer analytics review and provide a summary report with mitigation strategies as appropriate at the September 2019 Council meeting.

## BACKGROUND

Councillor Doug Barry, P.Eng. submitted an agenda item request for consideration. This agenda item request was submitted in response to concerns raised by William Braidwood, P.Eng. at the February 1, 2019 council meeting where he and his delegation voiced concerns surrounding the recently ratified changes to the Life Membership or Licensure Bylaw.

## DISCUSSION

Councillor Barry has requested that:

1. Council direct Staff to study the likelihood of losing members that retire and the resulting impact to voluntarism capacity.
2. When the severity of the risk is understood, Council and Staff shall consider options to better retain retired members and encourage these members to continue to participate in our profession in the capacity of non-practicing.

The Committee discussed the request and decided that it should come forward as an agenda item for consideration at the April 12, 2019 Council meeting and that Staff would generate a short list of very specific actionable items that can be executed for Council's consideration asking if the proposed action items would address this issue adequately.

This is the list of action items recommended:

- Execute data demographic analytics of those who have dropped their membership
- Compare this analysis against the total membership
- Review for all committee membership
- Review for regulatory critical committee membership
- Provide summary report for September 2019 Council meeting along with mitigation strategies as appropriate.

## **RECOMMENDATIONS**

It is recommended by the Executive Committee that Council consider this request and direct staff to proceed with an analysis of volunteer attrition risk and potential mitigation strategies and report back to Council for their consideration at the September Council meeting.

## **MOTION**

That Council direct staff to complete a volunteer analytics review and provide a summary report with mitigation strategies as appropriate at the September 2019 Council meeting.

## **ATTACHMENT A – Agenda Item Request Form, Councillor Doug Barry, P.Eng. dated February 21, 2019**

Agenda Item Request Form	
Item Title:	
Short Description of Issue:	
What specific decision needs to be made?	
How is this issue related to the strategic plan?	
Have you raised this item with the related committee/ division/ branch?	Yes/No
Have you raised this item with the staff member responsible for this program area?	Yes/ No
Requested by:	
Date:	

**OPEN SESSION**

**ITEM 6.5**

<b>DATE</b>	March 26, 2019
<b>REPORT TO</b>	Council for Decision
<b>FROM</b>	Ann English, P.Eng., Chief Executive Officer & Registrar
<b>SUBJECT</b>	Engineers Canada Governance Update
<b>LINKAGE TO STRATEGIC PLAN</b>	To uphold and protect the public interest through the regulation of the professions

<b>Purpose</b>	To provide Council with information about planned Governance changes at Engineers Canada.
<b>Motion</b>	No motion required.

**BACKGROUND**

Engineers Canada has undergone a substantive review of its Governance processes for the past two years. It will bring forward motions at its upcoming May meeting for consideration of the Members. A presentation will be provided to Council on these changes for information and discussion. The discussion will be helpful for the Engineers and Geoscientists BC President to consider when they attend the May meeting representing Engineers and Geoscientists BC.

**RECOMMENDATIONS**

None.

**MOTION**

No motion required.



## OPEN SESSION

### ITEM 6.6

DATE	March 28, 2019
REPORT TO	Council for Information
FROM	Megan Archibald, Director, Communications and Stakeholder Engagement
SUBJECT	100 <sup>th</sup> Anniversary Campaign Summary
LINKAGE TO STRATEGIC PLAN	Goal 3: Promote and protect the professions of engineering and geoscience (subject to goals 1 & 2).

Purpose	To provide an overview of Engineers and Geoscientists BC's 100 <sup>th</sup> Anniversary campaign.
Motion	No motion required.

## BACKGROUND

On April 5, 1919, engineers from across Canada gathered in Montreal to draw up the first “model registration bill” – on which all provincial acts were later based. A year later, on April 17, 1920, the first *Engineering Profession Act* was brought into law in BC, which would constitute what would later become the Association of Professional Engineers of the Province of British Columbia.

In 2020, Engineers and Geoscientists BC will be celebrating its 100<sup>th</sup> Anniversary, along with several other Canadian engineering and geoscience regulators. This significant milestone provides an opportunity to celebrate the many contributions of these professions, and support the continued success of these professions into the future.

## DISCUSSION

Our 100<sup>th</sup> Anniversary campaign will celebrate 100 years of ethics, excellence, and progress; a proud history of safety, innovation, and building the economy of British Columbia. Through this campaign, we'll look back at the ways our professions have changed, and we'll also look forward, to the future of these professions and how we will invest in their continued success. In looking forward, we intend to centre our narrative on the changing nature of the professions (from buildings

and bridges to increasingly diverse fields and technology) and the ways in which we are becoming an increasingly modern, agile regulator.

### **Campaign Objectives**

Our campaign will focus on four key objectives:

1. Commemorating this milestone;
2. Celebrating our achievements;
3. Engaging our members; and
4. Investing in the future.

We believe it will be most important to bring this celebration to life for those who have been involved and invested in the association over the years, and whose contributions have made it possible for us to achieve our mandate – primarily volunteers (past and present). And while not all of our members are involved as volunteers, many feel a strong connection with the association, and see themselves reflected in what we do, and represented by us; this will be important to them as well.

As well, we will seek to engage the public by centering our narrative around the impact the professions have had on the growth of our province, and our investment in growing the next generation of professionals.

Our campaign will launch this October, at the association's 100<sup>th</sup> Annual General Meeting, and will be delivered throughout 2020.

A presentation on the campaign details, including how each of our four objectives will be brought to life, will be shared at the Council meeting.



## OPEN SESSION

### ITEM 6.7

DATE	April 12, 2019
REPORT TO	Council for Information
FROM	Max Logan, Chief of Strategic Operations
SUBJECT	Professional Governance Act Update
LINKAGE TO STRATEGIC PLAN	To uphold and protect the public interest through the regulation of the professions

Purpose	To provide Council with an update on Bill 49 (Professional Governance Act), the anticipated next steps, and the potential impacts on the organization associated with the volume and pace of change proposed by government.
Motion	No motion required.

## BACKGROUND

In November, 2018, the BC Government took its first step in implementing the Professional Reliance Review, passing the Professional Governance Act (PGA). The legislation will eventually replace the individual governing legislation for five professional regulators, including Engineers and Geoscientists BC. The legislation also consolidates oversight of professional regulators in an Office of the Superintendent of Professional Governance, which will set consistent governance standards across the five professions.

While the Act sets out the broad policy framework, the majority of the Act requires the development of supporting, more detailed, regulations. These regulations must be approved by Cabinet before the associated provisions of the Act, and the new requirements on the five professional regulators, take effect.

## DISCUSSION

Immediately following the passing of the PGA, government staff indicated that they intended to move swiftly to implement a number of the new provisions of the Act in spring 2019. These included:

- New requirements for nominations and elections
- Establish Office of the Superintendent
- Appoint Professional Governance Advisory Committee
- Duty to report
- Whistleblower protection
- Offences and injunction
- Annual reporting
- Designating additional regulatory bodies under the Office

These changes were proposed to be implemented concurrently with consultation on the items contained in the Intentions Paper: Declarations of Competence and Conflict of Interest, Corporate Regulation and Independent Practice Rights.

During its January meeting, Council directed staff to “communicate the risks associated with the pace of change proposed by government and recommend that the pace, volume and sequence of new regulations be readjusted based on the input of the affected regulators to ensure it is sustainable and achievable.” Since the meeting, staff have communicated these concerns to elected officials and Ministry staff, and has been successful in convincing government to change its implementation plan.

At the last implementation consultation meeting government staff indicated that they now intend to implement the PGA in three broad phases:

1. Administrative Powers and Priority Regulations
2. Repeal of Existing Statutes
3. New Powers

The majority of phase one will be devoted to administrative items required to establish the new Office. These include establishing an Advisory Committee, offences and injunctions and annual reporting (the Office’s obligations to report to the Legislature). In addition, requirements for a new merit based nomination process will be implemented this spring as well. These requirements will specify that candidates for election must be nominated using a merit based process, and as a result 25 member write-in nominations will no longer be permitted. Changes to Council composition, term lengths and other election requirements, as well as the other items specified above, will be deferred to subsequent stages.



Phase two, expected in early 2020 will be focused on the repeal of existing statutes, including the Engineers and Geoscientists BC Act, and transferring the relevant provisions to new regulations under the PGA. It is expected that the remaining election requirements will be implemented in this phase, likely impacting the 2020 election and AGM.

Phase three, the timing of which has not been communicated, is expected to include any new powers and regulatory tools not currently contained in the existing statutes. This would include Practice Rights, Corporate Regulation and Declarations.

At this time, it is unclear which phase certain items previously noted as a high priority (Duty to Report, Whistleblower Protection, and Bylaw making authority for Councils) will be implemented.

While the pace of implementation now appears to be more reasonable, there remains a great deal of uncertainty in terms of the implementation timing and how much consultation (and associated staff resources) will be required to ensure a smooth implementation. Staff have been asking government to share a proposed implementation plan so that we can provide advice on optimal phasing and timing and begin the process of resource planning and allocation. Government staff have indicated that the draft plan will be shared once a new Superintendent is appointed, which is estimated to be in April.

## RECOMMENDATIONS

Staff will continue to work closely with government to develop an implementation plan that is reasonable, is sequenced to optimize a smooth implementation and best supports the organization's need to protect the public interest.

As new information becomes available, staff will keep Council and members apprised.

## MOTION

No motion required.



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BRITISH COLUMBIA

# APPENDICES

## OPEN AGENDA

- |          |            |
|----------|------------|
| Item 5.4 | Appendix A |
| Item 5.5 | Appendix A |
| Item 5.6 | Appendix A |

CIVIL AND TRANSPORTATION INFRASTRUCTURE  
PROFESSIONAL PRACTICE GUIDELINES

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# RETAINING WALL DESIGN

PUBLISHED [MONTH], [DAY], 2017



ENGINEERS &  
GEOSCIENTISTS  
BRITISH COLUMBIA

1-9 MONTH XX 2017

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# PREFACE

These *Professional Practice Guidelines - Retaining Wall Design* have been developed with the support of the City of Nanaimo. These guidelines will assist professionals in undertaking the design and construction of Retaining Walls in a consistent manner, incorporating best practices such as providing complete documentation and following appropriate quality management procedures. The focus of these guidelines is on the geotechnical aspects of Retaining Walls, however, some regulatory and structural issues are also discussed.

These guidelines have been written for the information of Engineers and Geoscientists BC professionals, statutory decision-makers, regulators, the public at large and a range of other stakeholders who might be involved in, or have an interest in, Retaining Wall design in BC.

These guidelines provide a common level of expectation for various stakeholders with respect to the level of effort, due diligence, and standard of practice to be followed when carrying out Retaining Wall design and construction in BC.

These guidelines outline the appropriate standard of practice at the time that they were prepared. However, this is a living document that is to be revised and updated, as required, in the future, to reflect the developing state of practice.

Although these guidelines are intended to be used on projects in BC, the guidance provided can also be considered by Engineering Professionals while working in other jurisdictions in Canada or other global jurisdictions.

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**Appendix A:** Retaining Wall Assurance Statement

**Appendix B:** Figures

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## LIST OF FIGURES

- **Figure 1**      **Terminology and Wall Definitions**
- **Figure 2**      **Terminology and Wall Definitions**
- **Figure 3**      **Terminology and Wall Definitions**

# ABBREVIATIONS

ABBREVIATION	TERM
<b>AHJ</b>	Authority Having Jurisdiction
<b>BC</b>	British Columbia
<b>BCBC</b>	British Columbia Building Code
<b>CIP</b>	cast-in-place
<b>CFEM</b>	Canadian Foundation Engineering Manual
<b>CHBDC</b>	Canadian Highway Bridge Design Code
<b>CSA</b>	Canadian Standards Association
<b>FHWA</b>	Federal Highways Administration
<b>MFLNRORD</b>	Ministry of Forests, Lands, Natural Resources Operations and Rural Development
<b>MoTI</b>	Ministry of Transportation and Infrastructure
<b>MSE</b>	Mechanically Stabilized Earth
<b>VBBL</b>	Vancouver Building By-law

# DEFINED TERMS

TERM	DEFINITION
<b>Act</b>	Engineers and Geoscientists Act [RSBC 1996] Chapter 116.
<b>Association</b>	The Association of Professional Engineers and Geoscientists of the Province of British Columbia, also operating as Engineers and Geoscientists BC.
<b>Authority Having Jurisdiction (AHJ)</b>	The jurisdictional body (usually municipal) with authority to administer and enforce the British Columbia Building Code (BCBC), the City of Vancouver Building By-law (VBBL), the National Building Code of Canada (NBCC) or a local building bylaw or code.
<b>Bylaws</b>	The Bylaws of Engineers and Geoscientists BC made under the <i>Act</i> .
<b>Cantilever Retaining Wall</b>	Either cast-in-place (CIP) or precast concrete, this type of Retaining Wall consists of a concrete stem and a concrete foundation slab, both of which are relatively thin and reinforced to resist the applied moments and shear forces resulting from the lateral earth loading.
<b>Engineers and Geoscientists BC</b>	The Association of Professional Engineers and Geoscientists of the Province of British Columbia, also operating as Engineers and Geoscientists BC.
<b>Engineering Professional(s)</b>	Professional engineers and licencees, who are licensed to practice by Engineers and Geoscientists BC.
<b>Engineer of Record</b>	For the purposes of these guidelines, the Engineer of Record is an Engineering Professional with the appropriate education, training, and experience to provide professional services related to Retaining Wall design and field review as described in these guidelines. The Engineer of Record takes overall responsibility for all aspects of the design and field reviews for the Retaining Wall.

<b>Geotechnical Materials</b>	Geotechnical Materials include soil, rock, mineral ore, and lightweight fill such as pumice or bottom ash
<b>Mechanically Stabilized Earth (MSE) Wall</b>	A soil-retaining system, employing either strip or grid-type, metallic or polymeric tensile reinforcements in the soil mass, and a Wall Facing element that is either vertical or nearly vertical. For the purpose of this guidelines, Geosynthetic Reinforced Soil (GRS) technology, which uses a geosynthetic as the reinforcing element in the soil-retaining system, is considered to be an MSE wall.
<b>Prefabricated Modular Wall</b>	A soil-retaining system employing interlocking soil-filled timber, synthetic polymer, reinforced concrete, or steel modules or bins to resist earth pressures by acting as a gravity Retaining Wall.
<b>Retaining Wall</b>	Vertical or near-vertical structure erected to hold back Geotechnical Materials and any pore water they contain. Retaining Walls typically stabilize soil and rock from downslope movement and provide lateral support for steep to vertical grade changes.
<b>Gravity Wall</b>	A structure providing lateral support for a mass of soil that owes its stability primarily to its own weight and to the weight of the soil located directly above its base. It depends entirely on the weight of the stone or concrete masonry and of any soil resting on the masonry for its stability, and only a nominal amount of steel is placed near the exposed faces to prevent surface cracking due to temperature changes.
<b>Segmental Block Gravity Wall</b>	A soil-retaining system employing manufactured interlocking blocks, usually of concrete. A lower wall may comprise only the blocks retaining soil; a higher wall may use the blocks as facing for a MSE wall.
<b>Semi-Gravity Wall</b>	Similar to a Gravity Wall in that it is a structure providing lateral support for a mass of soil that owes its stability primarily to its own weight and to the weight of the soil located directly above its base, however a Semi-Gravity Wall is more slender and requires reinforcement consisting of vertical bars and dowels continuing into the footing.
<b>Wall Facing</b>	Material(s) placed on the face of a stable slope to prevent surficial erosion, sometimes called revetment. Wall Facing typically refers to rock, concrete paving, or other hard surfacing.

<b>Slope Protection</b>	Material(s) placed on the face of a stable slope to prevent surficial erosion, sometimes called revetment. Slope Protection typically refers to vegetation but can also include manufactured products such as erosion control blankets.
<b>Stacked Rock Wall</b>	A soil-retaining system employing interlocking pieces of rock to resist lateral earth pressures by acting as a Gravity Wall. These walls can be constructed with or without mortar.

# 1.0 INTRODUCTION

Engineers and Geoscientists British Columbia (the Association) is the regulatory and licensing body for the engineering and geoscience professions in British Columbia (BC). To protect the public, the Association establishes, maintains, and enforces standards for the qualifications and practice of its members and licensees.

The Association provides various practice resources to its members and licensees to assist them in meeting their professional and ethical obligations under the *Engineers and Geoscientists Act*. One of those resources are professional practice guidelines, which establish the standard of practice for specific professional activities. The Association works with experts in their fields to develop professional practice guidelines where additional guidance is beneficial or required.

These *Professional Practice Guidelines – Retaining Wall Design* provide guidance on professional practice for Engineering Professionals who design Retaining Walls. This includes the considerations that need to be addressed during Retaining Wall design, as well as how an Engineering Professional meets their obligations regarding quality management requirements, specifically regarding project documentation and the need for independent structural review.

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## 1.1 PURPOSE OF THESE GUIDELINES

This document provides guidance on professional practice for Engineering Professionals who are involved in the design of Retaining Walls in British Columbia.

These guidelines provide a common approach for carrying out a range of professional activities related to Retaining Wall design.

Following are the specific objectives of these guidelines:

1. Describe the standard of practice that Engineering Professionals should follow when providing professional services related to Retaining Wall design.
2. Specify the tasks and/or services that Engineering Professionals should complete to meet the appropriate standard of practice and fulfill their professional obligations under the *Act*. These obligations include the member's primary duty to protect the safety, health, and welfare of the public and the environment.
3. Describe the roles and responsibilities of the various participants/stakeholders involved in these professional activities. The document will assist in delineating the roles and responsibilities of the various participants/stakeholders, which will include the Engineer of Record and the owner.
4. Identify the qualifications required to carry out professional activities related to the design of Retaining Walls.

5. Provide guidance on the use of a Retaining Wall assurance statement (**Appendix A**). This assurance statement assists to ensure that the appropriate considerations have been addressed (both regulatory and technical) for the specific professional activities that were carried out.
6. Provide guidance on how to meet the seven quality management requirements under the *Act* and Bylaws when carrying out the professional activities identified in these professional practice guidelines.

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## 1.2 ROLE OF ENGINEERS AND GEOSCIENTISTS BC

These guidelines were prepared by subject matter experts and reviewed at various stages by a formal review group. The final draft of the guidelines underwent a final consultation process with various committees and divisions of Engineers and Geoscientists British Columbia (the Association). The guidelines were approved by the Association's Council and, prior to publication, underwent final legal and editorial reviews. The guidelines form part of Engineers and Geoscientists BC's ongoing commitment to maintaining the quality of services that members and licensees provide to their clients and the general public.

An Engineering Professional must exercise professional judgment when providing professional services; as such, application of these guidelines will vary depending on the circumstances.

The Association supports the principle that appropriate financial, professional, and technical resources should be provided (i.e., by the client and/or the employer) to support Engineering Professionals who are responsible for carrying out professional activities, so they can comply with the standard of care provided in these guidelines. These guidelines may be used to assist in the level of service and terms of reference of an agreement between an Engineering Professional and a client.

These guidelines are intended to assist Engineering Professionals in fulfilling their professional obligations, especially regarding the first principle of the Association's Code of Ethics Principle, which is to "hold paramount the safety, health and welfare of the public, protection of the environment and promote health and safety in the workplace." Failure to meet the intent of these guidelines could be evidence of unprofessional conduct and lead to disciplinary proceedings by the Association.

---

## 1.3 INTRODUCTION OF TERMS

For the purposes of these guidelines, the Engineer of Record is the Engineering Professional responsible for all aspects of the design and field reviews for the Retaining Wall. Additional terms are introduced in the following sections; however see the **Defined Terms** section at the front of the document for a full list of definitions specific to these guidelines.

### 1.3.1 GENERAL

A Retaining Wall is a vertical or near-vertical structure erected to hold back Geotechnical Materials and any pore water they contain. Geotechnical Materials include soil, rock, mineral ore, and lightweight fill such as pumice or bottom ash. Retaining Walls typically stabilize soil and rock from downslope movement and provide lateral support for steep to vertical grade changes.

A reinforced slope is a constructed earth slope (an inclined surface, either natural or constructed) containing reinforcing elements (for example, geogrid) within the soil mass and Slope Protection/Wall Facing to provide erosion protection. A reinforced slope steeper than 45° (1H:1V) should be treated as a Retaining Wall for the purposes of these guidelines.

Slope Protection/Wall Facing is material(s) placed on the face of a stable slope to prevent surficial erosion, sometimes called revetment. Slope Protection typically refers to vegetation but can also include manufactured products such as erosion control blankets. Wall Facing typically refers to rock, concrete paving, or other hard surfacing. Slope Protection/Wall Facing is not considered a Retaining Wall if slope stability analysis shows the slope is stable with and without the Slope Protection/Wall Facing.

A Retaining Wall is considered critical to the stability of a building foundation when any part of it lies within the zone of influence of the foundation, typically defined as being below a 1H:1V plane extending downwards from the outside of a building footing. The zone of influence should be confirmed with stability analysis for foundations within or near the 1H:1V plane.

### **1.3.2 TYPES OF RETAINING WALLS**

The following are types of Retaining Walls for the purpose of these guidelines:

- **Cantilever Retaining Wall:** Either cast-in-place (CIP) or precast concrete; this type of Retaining Wall consists of a concrete stem and a concrete foundation slab, both of which are relatively thin and reinforced to resist the applied moments and shear forces resulting from the lateral earth loading. Although these walls are predominately reinforced concrete walls, they also could include reinforced masonry cantilever walls.
- **Gravity Wall:** A structure providing lateral support for a mass of soil that owes its stability primarily to its own weight and to the weight of the soil located directly above its base. It depends entirely on the weight of the stone or concrete masonry and of any soil resting on the masonry for its stability, and only a nominal amount of steel is placed near the exposed faces to prevent surface cracking due to temperature changes.
- **Semi-Gravity Wall:** Similar to a Gravity Wall in that it is a structure providing lateral support for a mass of soil that owes its stability primarily to its own weight and to the weight of the soil located directly above its base; however, a Semi-Gravity Wall is more slender and requires reinforcement consisting of vertical bars and dowels continuing into the footing.
- **Segmental Block Gravity Wall:** Utilizes manufactured interlocking blocks, usually of concrete, to retain the soil. Lower walls may act as gravity walls while higher walls use the blocks as the Wall Facing element in MSE walls. Types of Segmental Block Gravity Walls include Lock-Block walls and proprietary walls such as Allan Block walls.
- **Mechanically Stabilized Earth (MSE) Wall:** A soil-retaining system, employing either strip or grid-type, metallic, or polymeric tensile reinforcements in the soil mass, and a Wall Facing element that is either vertical or nearly vertical. These walls are sometimes referred to as structural earth walls and retained soil systems. They typically use a range of proprietary Wall Facing elements and require soil reinforcement for stability. Also included in this category are green walls in which the



Slope Protection supports vegetation growth. For the purpose of these guidelines, Geosynthetic Reinforced Soil (GRS) technology, which uses a geosynthetic as the reinforcing element in the soil-retaining system, is included in this document as an MSE wall.

- Prefabricated Modular Wall: A soil-retaining system employing interlocking soil-filled timber, synthetic polymer, reinforced concrete, or steel modules or bins to resist earth pressures by acting as a Gravity Wall.
- Stacked Rock Wall: A soil-retaining system employing interlocking pieces of rock to resist lateral earth pressures by acting as a Gravity Wall. These walls can be constructed with or without mortar. These are also referred to as rockeries, stacked rock, dry-stacked, or dry-stone walls. If a Stacked Rock Wall is used in conjunction with soil reinforcement, it is considered an MSE Wall.

### 1.3.3 RETAINING WALL TERMINOLOGY

Figures 1, 2 and 3 depict various aspects of a typical Retaining Wall, as discussed in these guidelines. More detailed explanations of these and other terminology are as follows:

- Backslope: Average ground inclination measured from the top of the Retaining Wall to the crest of the slope of Retained Soil (see Figure 1a).
- Blanket Drain/Chimney Drain: A vertical drain directly against the back of a Retaining Wall, or an inclined drain on the surface of a cut slope where seepage is occurring to reduce water flow into the Retaining Wall backfill zone. A Blanket Drain provides full coverage along the length of the wall while a Chimney Drain provides intermittent coverage.
- Broken Backslope: Backslope that reduces to a flatter/horizontal grade (see Figure 1b).
- Drainage System: An engineered system consisting of a permeable medium, hydraulically connected to subsurface pipes or weep holes through the Retaining Wall or beyond the end(s) of the wall, which collects and discharges water; intended to reduce hydrostatic pressures and prevent erosion.
- Embedment Depth: Depth from finished grade level in front of the Retaining Wall to the base of the wall footing; the minimum Embedment Depth is typically greater than the frost considerations and may also provide stability.
- External Stability: Stability of the Retaining Wall relating to rotation (overturning), sliding (translation), and bearing capacity failure modes. (see Figures 3a and 3b for rotation and sliding)
- Global Stability: Stability against deep-seated failure that encompasses the entire Retaining Wall.
- Internal Stability: Stability against failure of materials comprising the Retaining Wall (for example, reinforced concrete in the case of CIP Cantilever Retaining Walls, soil reinforcing in the case of MSE Walls).
- Reinforced Fill Zone: The composite backfill and reinforcement zone in an MSE Wall.
- Restrained (Non-Yielding) Walls: Retaining Walls that are prevented from moving sufficiently for active pressures to develop behind the wall.

- Retained Soil: Fill (typically compacted mineral soil) immediately behind Gravity Walls or CIP Cantilever Retaining Walls, and the backfill behind the Reinforced Fill Zone in MSE Walls, as well as the in-situ Geotechnical Materials which require the Retaining Wall for stability.
- Slope Protection is material(s) such as vegetation or manufactured products like erosion control blankets that are placed on the face of a stable slope to prevent surficial erosion.
- Toe Slope: Average ground inclination measured from the exposed bottom of the wall to the toe of the slope in front of the wall.
- Unrestrained (Yielding) Walls: Retaining Walls that are able to move sufficiently to allow active pressures to develop behind the wall in the limiting condition.
- Wall Batter: Slope of the front and/or back face of a Retaining Wall. Negative Wall Batter is when the top of the front face overhangs the bottom of the exposed wall.
- Wall Height: Distance from the bottom of the exposed wall to the top of the Retaining Wall (see Figure 2). Where the Backslope above the wall or a Toe Slope below the wall is steeper than 2H:1V, the global stability needs to be addressed and the slope needs to be considered in the wall design.. The Wall Height does not include the height of a guard where one is utilized.
- Wall Movement: Rotational and/or sliding movement (as shown in Figure 3). Rotational movement results in an increase or decrease in the Wall Batter, whereas sliding movement does not significantly impact the Wall Batter.
- Wall Facing is material(s) such as rock, concrete paving, or other hard surfacing that are placed on the face of a stable slope to prevent surficial erosion.

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## 1.4 SCOPE OF THE GUIDELINES

These guidelines apply to the types of Retaining Walls discussed in Section 1.4.1. The focus is on the geotechnical aspects of Retaining Wall design; however, some regulatory and structural issues are also discussed. These guidelines are not intended to be prescriptive, nor are they intended to serve as a substitute for engineering judgement and experience. Engineers and Geoscientists BC recognizes that professionals and contractors may pursue innovative Retaining Wall design and construction. In such instances, it must be demonstrated that the proposed Retaining Wall will meet or exceed safety and performance expectations as outlined in these guidelines.

### 1.4.1 RETAINING WALLS COVERED IN THESE GUIDELINES

These guidelines cover the following Retaining Wall types:

- Cantilever Retaining Wall
- Gravity Wall and Semi-Gravity Wall (for example, mass concrete, bin walls, gabion walls)
- Segmental Block Gravity Wall

- MSE Wall
- Stacked Rock Wall

Retaining Walls, as described in BCBC or VBBL Part 9, Division A, Sentence 9.3.2.9.(4) and Appendix A, should adhere to the requirements within these guidelines but must also consider any additional requirements as outlined in the BCBC or VBBL.

#### **1.4.2 RETAINING WALLS NOT COVERED IN THESE GUIDELINES**

These guidelines do not cover the following Retaining Wall types:

- Retaining Walls less than 1.2 m high<sup>1</sup>, unless failure would impact a structure or impact life safety.
- Terraced Retaining Walls less than 1.2 m high<sup>2</sup>, with:
  - Average slope angles less than 45° to the horizontal (1H:1V).
  - Step-back distances (distances between successive walls when used in a series) greater than the Wall Height.
  - An acceptable global factor of safety for the entire terraced slope.
- Where Slope Protection/Wall Facing is not required for stability (ie. factor of safety of the slope without the Slope Protection/Wall Facing is greater than 1.5 for static conditions).
- Retaining Walls for which specialized design is typically required (for example, soil nail walls, shotcrete and anchor walls, sheet pile walls, shoring systems), unless such walls are intended to be permanent walls.
- Retaining structures that are part of excavation and foundation systems for buildings, as identified under Section 4.2. of the BCBC or VBBL.
- Structures intended to retain water or to provide a protective barrier to dynamic/impact forces.

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### **1.5 APPLICABILITY OF THE GUIDELINES**

These guidelines provide guidance on professional practice for Engineering Professionals who carry out design of Retaining Walls. These guidelines are not intended to provide systematic instructions for how to carry out these activities; rather, these guidelines outline the considerations to be aware of when carrying out these activities.

An Engineering Professional's decision not to follow one or more aspects of these guidelines does not necessarily mean a failure to meet his or her required professional obligations. Such judgments and decisions depend upon weighing facts and circumstances to determine whether other reasonable

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<sup>1</sup> Note that various AHJs specify various Wall Heights, above which retention of an Engineering Professional is required. The Engineering Professional should check the requirements in the jurisdiction they are working in.

<sup>2</sup> See footnote 1.

and prudent Engineering Professionals, in similar situations, would have conducted themselves similarly.

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## 1.6 ACKNOWLEDGEMENTS

[Insert text here.]

# 2.0 ROLES AND RESPONSIBILITIES

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## 2.1 COMMON FORMS OF PROJECT ORGANIZATION

Retaining Wall are used for a wide variety of purposes which include building projects, bridge projects, or landscaping projects. Project organization and makeup of the project team will vary according to the needs of the project and the parties involved.

Regardless of the project organization, the various participants have particular responsibilities as described below for Retaining Wall projects.

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## 2.2 RESPONSIBILITIES

The following outlines the responsibilities of the various potential project team members in order to ensure the design and construction of a Retaining Wall meets the appropriate standards of public safety and the requirements of the applicable building code.

### 2.2.1 OWNER

The owner should:

- retain the appropriate Engineering Professionals, as required, to complete the scope of the project;
- establish or agree to serviceability requirements equal to or more stringent than those shown in Table 1;
- establish a design life greater than or equal to the minimum shown in Table 1;
- obtain required approvals, licenses and permits from the Authority Having Jurisdiction (AHJ) or other jurisdictional body;
- identify appropriate scopes of work and realistic schedules of work and develop the associated contracts with all Engineering Professionals before their services are required;
- recognize that drawings, specifications and other documents prepared by the Engineering Professionals are for the project and should not be used or copied for other projects without the consent of the Engineering Professionals; and
- receive the assurance statement from the Engineer of Record upon completion of the design activities as outlined in these guidelines.

After construction of the Retaining Wall is completed, the owner should:

- ensure periodic assessments are taking place to see if performance criteria continue to be met;
- undertake any remedial measures identified during these assessments; and
- have a qualified Engineering Professional, familiar with the design and construction of the Retaining Wall, review any proposed changes to the wall. Such changes may include: increasing the Wall Height, removing fill from in front of the wall, alterations to the Drainage System, change to loading conditions, and construction of a structure above or below the wall.

### **2.2.2 ENGINEER OF RECORD**

The Engineer of Record takes overall responsibility for all aspects of the design and field reviews for the Retaining Wall.

The Engineering Profession who is acting as the Engineer of Record must determine what expertise are required for the project based on the type of wall and the site conditions. The Engineer of Record must then determine if he or she has the appropriate education, training and experience (see Section 5.2) to undertake all aspects of the design and field reviews. If not, he or she must engage the appropriate Engineering Professional(s) to assist with the project.

The Engineer of Record must:

- Develop a scope for the project and review it with the Owner;
- Consider whether an Engineering Professional specializing in the structural or geotechnical engineering fields should be retained to assist with the project;
- Follow Section 3 of these guidelines when undertaking design and field review of the Retaining Wall;
- Where applicable, coordinate, integrate and review the work of any Engineering Professionals providing specialized services in structural or geotechnical engineering; and
- Sign and seal the Assurance Statement located in Appendix A.

# 3.0 GUIDELINES FOR PROFESSIONAL PRACTICE

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## 3.1 OVERVIEW

### 3.1.1 DESIGN LIFE

The design life of an engineered structure is the period of time (post-construction) over which the structure is expected to meet specific limiting criteria, generally in terms of allowable stresses, strains, and displacements. Often, the design life indicates when major renovations (costing 50% or more of the value of the structure) may be required. The design, construction, environmental conditions, and maintenance of that specific structure greatly influence its useful design life.

Table 1 – Retaining Wall Design Guide is a chart that provides guidance on design issues including typical maximum allowable static plus seismic wall movement, typical minimum design life and design requirements. The guidance is provided based on the Wall Height and the potential impact to the structural integrity of adjacent facilities or structures.

The design life of a Retaining Wall includes both stability and serviceability aspects. For stability considerations, the design life depends on the consequence of a failure (refer to Table 1). For serviceability considerations, a minimum design life of the Wall Facing materials of 20 years should be used for all types and categories of Retaining Wall. This implies that some reconstruction/replacement of the Wall Facing may be acceptable after 20 years, and access to do the work should be available. Note that Table 1 is a general guide but bylaws of AHJs and other jurisdictional bodies may include requirements that supersede Table 1.

### 3.1.2 FAILURE

For these guidelines, failure implies that a Retaining Wall has not met its intended function within its design life. This intended function is specific to each Retaining Wall and must be identified at the time of design.

Types of failure include:

- Collapse: Retaining Walls must be designed for “no collapse” under both static loading and the design earthquake loading. For these guidelines, collapse is defined as a failure that could endanger human life or cause damage to an adjacent structure(s) (for example, a Retaining Wall falling over as a result of slow creep, blocks dislodging, or the wall toppling).

- Repairable Damage: The owner may elect to have the Retaining Wall designed to experience repairable damage during the design earthquake, which means the Retaining Wall can be repaired following an earthquake without complete reconstruction.
- Extreme Damage: This normally applies to a severe loading event in which the Retaining Wall may suffer damage requiring complete reconstruction, but collapse does not occur.
- Excessive movement: A Retaining Wall may displace or rotate sufficiently to impact the function of the area above the retained soil. Examples are cracking of pavement and displacement of structures founded on the retained soil.



**Table 1: Retaining Wall Design Guide**

Wall Height (m)	Potential to Impact Structural Integrity of Adjacent Facilities/Structures	Typical Maximum Allowable Static plus Seismic Wall Movement (mm)		Typical Minimum Design Life (Years) *****	Design Requirements
		Rotational	Sliding		
<1.2*	No impact	No restriction	No restriction	No restriction	Typically no design is required*; No restrictions; No building permit typically required**; No field reviews required.
≥1.2* to <3	No impact	Prevent negative Wall Batter	No restriction	20	Building permit typically required; Field reviews required; Use either yielding or non-yielding lateral earth pressure calculation methods; No collapse, damage allowed.
≥3 to 9	No impact	Prevent negative Wall Batter	<150	30	Building permit typically required; Field reviews required; Use either yielding or non-yielding lateral earth pressure calculation methods; No collapse, damage allowed; Limit Stacked Rock Walls to 3.7 m high (and 4.6 m for Stacked Rock Walls designed as MSE Walls***).
<9	Will impact	<25****	<50	50	Building permit typically required; Field reviews required; No collapse, damage allowed.
≥9 and Special designs *****	All cases	Special design*****	Special design*****	50	Building permit typically required; Field reviews required; No collapse, damage allowed.

\* Note that various AHJs and other jurisdictional bodies may specify their own Wall Heights above which retention of an Engineering Professional is required. The Engineering Professional should check the requirements in the jurisdiction they are working in.

\*\* Refer to bylaws of the AHJ or other jurisdictional body for specific requirements regarding permits.

\*\*\* Guidance comes from BC MoTI, Technical Circular T-01/10, Rock Stacked Retaining Walls, February 2010. The Engineering Professional should carefully consider the use of stacked rock for walls greater than those limits.

\*\*\*\* Horizontal movement measured at the top of the Retaining Wall (see Figure 3).

\*\*\*\*\* Special design refers to Retaining Wall types not specifically covered by these guidelines; for example, soil nailed walls, sheet pile walls, and others, used as permanent Retaining Walls.

\*\*\*\*\* Ministry of Forests, Lands, Natural Resources Operations and Rural Development calls for a minimum design service life of 45 years for permanent Retaining Walls.

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## 3.2 REGULATORY REQUIREMENTS

### 3.2.1 REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION

Retaining Walls are regulated in some jurisdictions. Relevant bylaws should be reviewed to ensure conformance of the Retaining Wall design to the bylaw requirements, as well as any permit requirements. Some possible regulations that may influence Retaining Wall design include:

- required clearances
- limits on Wall Height
- limits on slopes of excavations and fills
- aesthetic considerations
- requirements for structural design

### 3.2.2 CANADIAN HIGHWAY BRIDGE DESIGN CODE

The design of Retaining Walls for highway projects is regulated by CAN/CSA-S6-14 Canadian Highway Bridge Design Code (CHBDC) (CSA 2014) and for highway projects under the jurisdiction of the BC Ministry of Transportation and Infrastructure (BC MoTI) by the BC Supplement to CAN/CSA-S6-14 BC Ministry of Transportation Bridge Standards and Procedures Manual (BC MoTI 2016).

### 3.2.3 MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

MoTI has further requirements in their Technical Circular entitled “Rock Stacked Retaining Walls” (BC MoTI 2010). This document applies to Stacked Rock Walls proposed under the MoTI Subdivision Process. There is guidance specific to where these types of walls can be used, height restrictions imposed on these walls, and specific design and construction requirements.

MoTI, in its Supplement to the Canadian Highway Bridge Design Code specifies maximum heights for MSE walls of 9 m and 12 m for walls using extensible (geo-grid) and inextensible (steel) reinforcing elements, respectively.

### 3.2.4 MINISTRY OF FORESTS, LANDS, NATURAL RESOURCES OPERATIONS AND RURAL DEVELOPMENT

Ministry of Forests, Lands, Natural Resources Operations and Rural Development (MFLNRORD) has guidance in its Engineering Manual (BC MFLNRORD 2018) on design life requirements and minimum factors of safety.

### 3.2.5 OTHER CODES AND GUIDELINES

Other codes and guidelines are available and may be used when insufficient guidance is available. Some examples include:

- Canadian Foundation Engineering Manual (CFEM), 4<sup>th</sup> Edition, 2006
- American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges, 17<sup>th</sup> Edition, 2002 (including interim revisions)
- AASHTO LRFD Bridge Design Specifications, 5<sup>th</sup> Edition, 2010
- US Department of Transportation, Federal Highway Administration (FHWA), Publication No. FHWA–NHI-10-024 (Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes- Volume 1).
- Chapter 4 of FHWA, Publication No. FHWA-HRT-11-026 (Geosynthetic Reinforced Soil Integrated Bridge System Interim Implementation Guide).

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## 3.3 RETAINING WALL PERFORMANCE REQUIREMENTS

### 3.3.1 PERFORMANCE EXPECTATIONS

Retaining Walls must be designed and constructed such that they continue to meet design and performance criteria under static and dynamic loading conditions over their design life.

Examples of design and performance criteria include:

- Total and differential settlement, rotation and sliding over the design life is compatible with the function, performance requirements, and wall materials.
- Non-collapse during the design seismic event.
- Drainage System remains functional.
- Durability of Wall Facing

### 3.3.2 FACTOR OF SAFETY

The minimum factor of safety for Retaining Wall design must be established based on the specific site requirements. Table 2 lists generally accepted design criteria for Retaining Walls, however an Engineering Professional should always check with the local AHJ or other jurisdictional body to determine what requirements are in place. If there are no factor of safety requirements, the ones provided in Table 2 should be used. Where these factors of safety cannot be met, the AHJ or other jurisdictional body should be notified.

**Table 2: Design Criteria**

Design Condition	Minimum Factor of Safety		
	Static Loading	1-in-475-year Seismic Event	1-in-2,475-year Seismic Event
<b>Global Stability</b>			
Long-term	1.5	1.2	1.1*
End of Construction/Transient Loading	1.3	N/A	N/A
<b>External Stability</b>			
Sliding	1.5**	1.2	1.1*
Overturning	2.0	1.5	1.1*
Bearing	2.0 to 3.0***	1.5	1.1*
<b>Performance</b>			
Long-term	Varies depending on end use	Repairable Damage No Collapse	Extreme Damage No Collapse

\* Where factor of safety is close to or less than 1.0 using the peak horizontal acceleration, performance should be assessed based on the deformation criteria.

\*\* 2.0 if passive resistance in front of wall is included in the calculation.

\*\*\* The selection of this factor of safety is contingent on the method analysis employed.

## 3.4 RETAINING WALL PROJECT APPROACH

The typical approach that an Engineer of Record for a Retaining Wall project should undertake is outlined in the following steps. At the discretion of the Engineer of Record, it may be appropriate to combine some steps depending on the complexity of the project. In addition, the level of detail and documentation included at the various steps should be backed up by a rationale that is supported by technical analysis.

1. Initial Assessment
2. Geotechnical Investigation
3. Conceptual Design
4. Detailed Design
5. Field Reviews and Design Changes
6. Assurance Statements

Each of these is discussed in detail in this section.

As noted earlier, bylaws of AHJs or other jurisdictional bodies may impose specific requirements on Retaining Wall design. These requirements should be reviewed at the start of the project to ensure they are incorporated into initial layouts, investigations, design and specifications.

### 3.4.1 INITIAL ASSESSMENT

An initial assessment for the project should be undertaken. This includes:

- Confirming the owner's design requirements and design criteria regarding wall type, design life, minimum factors of safety and serviceability requirements;
- Determining any specific requirements from the AHJ or other jurisdictional body; and
- Investigating the physical setting and existing conditions for the location of the Retaining Wall including topography, property lines, easements, existing and/or proposed utilities, access issues if any, and so on. This may require a site survey.

### **3.4.2 GEOTECHNICAL INVESTIGATION**

The geotechnical investigation must be tailored to the specific application. The investigation will normally be performed after the initial assessment. Considerations that need to be taken into account and reported on include:

- Site history with respect to stability or other geotechnical behavior including previous earthworks, landslides and/or mining activities.
- Subsurface conditions, including depth of groundwater and likely variations.
- Backfill materials including unit weight, soil strength, and hydraulic conductivity parameters.
- Unit weight and soil strength parameters for native soils; include consolidation parameters, if appropriate.
- Where relevant, Peak Ground Acceleration (PGA) and spectral responses acceleration  $S_a(T)$  corresponding to the Retaining Wall location, typically obtained from Earthquakes Canada (<http://earthquakescanada.nrcan.gc.ca/>) for the 1-in-475-year and 1-in-2475-year seismic events.
- Other site-specific conditions that may influence the design and construction (for example, riparian areas, sensitive vegetation, protected species, flooding potential).

Regardless of Wall Height and type, the soil and groundwater parameters used for design must be justified. The level of investigation and testing required will depend on the Wall Height and potential to impact structural integrity of adjacent facilities/structures (Table 1).

For Retaining Walls which can potentially impact the structural integrity of adjacent facilities/structures, and if soft or potentially liquefiable soil conditions are present, site-specific seismic ground response analyses should be undertaken.

### **3.4.3 CONCEPTUAL DESIGN**

Taking the information from the initial assessment and the geotechnical investigation, a conceptual Retaining Wall design can be developed for achieving the proposed grade separation, while taking into

account the actual site conditions, the availability of materials, geotechnical conditions, aesthetics, access, surrounding developments, as well as the owner's design requirements and design criteria.

During this phase, the advantages and disadvantages of various wall types should be considered. Having a reliable topographic survey showing proposed site grading and a conceptual drainage layout will assist with the development of a conceptual Retaining Wall design.

After performing a concept evaluation, the preferred design should be selected, discussed with the owner, and then advanced to the detailed design stage.

### **3.4.4 DETAILED DESIGN**

#### *3.4.4.1 Design Method*

Depending on the type of Retaining Wall, an appropriate design methodology should be developed and followed. The following steps are suggested:

- Determine the project requirements and constraints in order to confirm input parameters (Retaining Wall location and Wall Height, soil parameters, groundwater conditions, traffic surcharge, etc.) (see **Sections 3.4.1 and 3.4.2**)
- Identify potential Retaining Wall type(s) and establish design approach (see **Section 3.4.3**).
- Determine the external loading conditions including the potential for scour or flooding.
- Determine lateral earth pressures; these will vary with the type of Retaining Wall used, for example, yielding or non-yielding (see **Section 3.4.4.1.1**).
- Determine seismic lateral earth pressures; these will vary for the type of Retaining Wall used (see **Section 3.4.4.1.1**).
- Evaluate Internal Stability, External Stability and Global Stability (see **Section 3.4.4.1.2**).
- Assess drainage requirements (see **Section 3.4.4.1.3**)
- Estimate deformation (settlement and potential for rotation and lateral deformation) and mitigation, if required.
- Determine bearing pressure and foundation treatment.
- Consider liquefaction potential and mitigation if required.
- Develop documentation including drawings, specifications and reports, as appropriate.

Throughout the design process, the Engineer of Record must consider the following:

- Any regulatory requirement of the local Authority Having Jurisdiction or other jurisdictional body.
- For geotechnical aspects, requirements of the CFEM 2006, the CHBDC 2014 and any other applicable document referenced in **Section 3.2 Regulatory Requirements**.

- For structural materials or Wall Facing, requirements of applicable Canadian Standards Association (CSA) standards including those listed in the BCBC or VBBL under Section 4.3. Design Requirements for Structural Materials.

Included in the detailed design are preparation of “Issued For Construction” drawings and specifications that capture the intent of the design. The drawings should include, at a minimum:

- a profile along the length of the wall showing variations in Wall Height, fill height behind the wall, and invert elevations of wall foundations drains; and
- cross-sections showing typical wall details, including Wall Batter, foundation preparation, leveling pad details, drainage provisions, erosion protection of exposed slopes above the wall, and guardrail details (if required).

There must be sufficient information and guidance provided so that the Retaining Wall construction meets the intent of the design. In addition to drawings, the following are examples of what may be required:

- Material specifications
- Placement and compaction specifications
- Drainage system requirements
- Construction sequence, if it affects geotechnical conditions and safety
- Dewatering requirements
- Construction constraints (for example, temporary excavations)
- Quality control requirements for construction materials and their placement.
- Erosion control during construction.
- The effort to be expended during the field review by the Engineer of Record.

Documented checks of engineering work must be completed and retained as per Engineers and Geoscientists BC Bylaw 14(b)(2). See **Section 4.1.5 Documented Checks of Engineering and Geoscience Work** for more information. Checking is completed to confirm the adequacy and appropriateness of the design, including confirmation that the prepared work meets the input requirements and the appropriate standard of practice. For any Retaining Walls over 3.0 m high or deemed to be high risk, Engineers and Geoscientists BC recommends that documented independent review be undertaken, as per Bylaw 14(b)(4). See **Section 4.1.7 Documented Independent Review of Structural Designs** for more information.

Additional services that an Engineering Professional may provide include development of a monitoring program and/or a maintenance program for the Retaining Wall. Monitoring is helpful to confirm that the ongoing performance of the Retaining Wall is meeting expectations. Regular maintenance will help avoid conditions that could adversely affect the wall behavior.

#### 3.4.4.1.1 Lateral Earth Pressures

Retaining Walls should be designed to support the appropriate full lateral earth, surcharge, and water pressures as well as earthquake loadings. Lateral earth pressures under both static and seismic loading should be determined using the methods given in CFEM 2006, CHBDC 2014, or other recognized codes and guidelines mentioned in **Section 3.2.5 Other Codes and Guidelines**. Specific lateral earth pressure aspects relating to all Retaining Walls should:

- Include the compaction pressures that will be imposed by the compaction equipment to be used in the wall construction (see CFEM 2006 and CHBDC 2014 (including the MoTI Supplement to CHBDC S6-14) for guidance on typical values).
- Be “at-rest” earth pressures for retained soils subject to long-term creep.
- Consider the impact/loading effects of a slope located above the Retaining Wall.
- Disregard passive resistance in the top 300 mm of material in front of the Retaining Wall or more if it may be removed. If passive resistance is utilized in the wall design, consideration of required wall movement to develop passive resistance with respect to wall performance and displacement limits must be considered.
- Be selected considering the allowable Retaining Wall deformations.
- Consider equipment loading and other types of surcharges that could be imposed during or after construction.

Deformations for slopes and Retaining Walls under static loads should be determined using the methods given in CFEM 2006.

Seismic deformations of slopes and Retaining Walls may be estimated using the approaches developed by Bray as outlined in *Engineers and Geoscientists BC Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC* (2008) and Bray et al. (2010), using the 1 in 2475-year earthquake mandated in BCBC 2018.

Consideration needs to be given to having adequate setback from a slope that exists below the Retaining Wall.

#### 3.4.4.1.2 Global Stability

Where a Retaining Wall is located on a slope, its impact on the stability of the slope needs to be analyzed. This may include assessment of seismic slope stability. Suggested methods as outlined in *Engineers and Geoscientists BC Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in B.C (2008)* could be used, however the governing jurisdictional body may have specific requirements.

#### 3.4.4.1.3 Drainage

The following should be considered when assessing drainage requirements for Retaining Walls:



- Adequate drainage is needed behind each Retaining Wall unless the wall has been designed for full hydrostatic pressure or a geotechnical report demonstrates the backfill is free-draining. Adequate drainage may require a blanket/chimney drain consisting of material with a hydraulic conductivity well in excess of that of the backfill material. The drainage layer must not clog with time and the backfill must be sufficiently free-draining to prevent the build-up of seepage pressures within the active zone behind the Retaining Wall.
- Water from the drainage system should be discharged via drain pipes or weep holes through the wall that remain accessible.
- Cleanouts should be considered for Retaining Wall drains to facilitate maintenance.
- The impact of external sources of water, including stormwater, should be minimized by directing runoff away from the Retaining Wall.

As a guide, free-draining backfill consists of material with no more than 5% by mass passing the 0.075 mm sieve on the fraction smaller than 2 mm.

#### **3.4.4.1.4 Specific Design Criteria**

Some specific design criteria related to certain wall types are outlined below:

- As per the MoTI requirement that the maximum height of a Stacked Rock Wall not exceed 3.7 m for Gravity Walls and 4.6 m when used as the Wall Facing of an MSE Wall, the Engineering Professional should carefully consider the difficulties of construction before considering higher Stacked Rock Walls than prescribed here.
- For generally accepted Stacked Rock Wall guidance and specifications, refer to ARC (2009), City of Seattle (2004), FHWA (2006) and BC MoTI (2010). As noted in FHWA (2006), ARC (2009) was developed for use by contractors and provides some useful “rules of thumb”; however, ARC (2009) does not provide detailed design guidance. For Stacked Rock Wall Retaining Walls adjacent to self-supporting slopes (for example, hard glacial till slopes), prescriptive wall dimensions (for example, City of Seattle 2004) may be used.
- For MSE Walls, CFEM notes that typical reinforcement lengths are 50% to 70% of the Wall Height. Guidelines and references such as FHWA (which CFEM references) and the MoTI Supplement to CHBDC S6-14 commonly recommend a minimum reinforcement length of 70% of the Wall Height. MSE walls should generally be designed with a minimum soil reinforcement length of 70% of the Wall Height unless a rationale exists for adopting a shorter length.
- Unless constructed on rock foundations, the Embedment Depth at the front face of an MSE Wall shall not be less than:
  - The frost depth, if sensitive to settlement
  - 600 mm on sloping ground (4H:1V or steeper) or where the soil in front of the Retaining Wall toe could be removed due to erosion or future excavation

#### 3.4.4.2 Documentation

The following aspects should be documented:

- Owner's requirements regarding wall type, design life and serviceability requirements
- Site plan/legal survey, including the location of the proposed Retaining Wall(s) and adjacent structures and utilities
- Wall Height
- Soil stratigraphy
- Groundwater condition
- External loading
- Slope Protection/Wall Facing type
- Fill materials
- Soil reinforcement type and length, if required
- Drainage provisions
- Global Stability analysis
- Internal Stability analysis
- External Stability analysis

Reporting should be prepared to document the investigation and design process. As a minimum, reporting should include the results of the site/geotechnical investigation; design criteria (soil properties, wall loads, method of design); the drainage requirements and design; wall type; detailed geotechnical design recommendations including Global Stability, lateral earth pressures, and estimated displacements; limitations; construction recommendations; and if applicable, recommendations for monitoring and maintenance.

Some jurisdictions may require a comprehensive report, in particular for higher Retaining Walls with potential to impact the structural integrity of adjacent structures/facilities. Alternatively, reporting may be in the form of a memorandum and/or as part of design calculations or drawings.

The detailed design will result in preparation of the following documentation that should be provided to the owner:

- Technical specifications
- Any applicable instructions or guidance
- "Issued For Construction" drawings

- Assurance statement in **Appendix A** of these guidelines.

### **3.4.5 FIELD REVIEWS AND DESIGN CHANGES**

During construction of the Retaining Wall, the Engineer of Record must have field reviews carried out and documented. Refer to **Section 4.1.6 Documented Field Reviews During Implementation** for more information on field reviews.

If design changes during construction result in departures from the technical specifications and “Issued For Construction” drawings, these changes should be documented and provided to the Owner. Good engineering practice is to revise the “Issued For Construction” drawings with a set of sealed “Final Design Drawings” that reflect all of the design changes made during construction as outlined in the *Quality Management Guidelines – Use of Seal* (Engineers and Geoscientists BC 2018).

Some jurisdictions may ask for “As-Built” drawings or “As-Constructed” drawings. The Engineer of Record is discouraged from using the term “As-Built” drawings or “As-Constructed” drawings and is instead instructed to follow the protocol for “Record Drawings” laid out in the *Quality Management Guidelines – Use of Seal* (Engineers and Geoscientists BC 2018) if the Engineer of Record is being asked for such drawings.

### **3.4.6 ASSURANCE STATEMENTS**

When the construction of the Retaining Wall is completed, the Engineer of Record should complete the assurance statement found in Appendix A, and any other legal instrument the AHJ or other jurisdictional body may request. The assurance statement, along with the appropriate design documentation, are to be provided to the owner. The intent of the assurance statement is to confirm that the Retaining Wall design meets the specified performance criteria and that permanent wall lateral deformations will meet the requirements for service level performance and damage level performance.

# 4.0 QUALITY MANAGEMENT IN PROFESSIONAL PRACTICE

Engineering Professionals must adhere to the applicable quality management requirements during all phases of the work, as per the Association's Bylaws. It is also important to be aware of whether additional quality management requirements exist through other AHJs, other jurisdictional bodies, or through service contracts.

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## 4.1 QUALITY MANAGEMENT REQUIREMENTS

Engineering Professionals must adhere to the applicable quality management requirements during all phases of the work, in accordance with the Association's Bylaws. It is also important to be aware of whether additional quality management requirements exist from AHJs or through service contracts.

To meet the intent of the quality management requirements, Engineering Professionals must establish and maintain documented quality management processes for the following activities:

- The application of relevant Professional Practice Guidelines
- Authentication of professional documents by the application of the professional seal
- Direct supervision of delegated professional engineering/geoscience activities
- Retention of complete project documentation
- Regular, documented checks using a written quality control process
- Documented field reviews of engineering/geoscience designs/recommendations during implementation or construction
- Where applicable, documented independent review of structural designs prior to construction

### 4.1.1 PROFESSIONAL PRACTICE GUIDELINES

Pursuant to the *Act*, s.4(1) and Bylaw 11(e)(4)(h), Engineering Professionals are required to comply with the intent of any applicable professional practice guidelines related to the engineering work they undertake. One of the three objectives of the Association, as stated in the *Act* is “to establish, maintain, and enforce standards for the qualifications and practice of its members and licensees.” Practice guidelines are one means by which the Association fulfills this obligation.

These professional practice guidelines establish the standard of practice for Retaining Wall design. Engineering Professionals who carry out Retaining Wall design are required to meet the intent of these guidelines.

#### **4.1.2 USE OF SEAL**

In accordance with the *Act*, s.20(9), Engineering Professionals are required to seal all professional engineering documents they prepare or deliver in their professional capacity to others who will rely on the information contained in the documents. This applies to documents that Engineering Professionals have personally prepared and those that others have prepared under their direct supervision.

Failure to seal these engineering documents is a breach of the *Act*.

As outlined in **Section 3.4.4.2 Documentation**, there are various forms of documentation produced during Retaining Wall design. Documents that require sealing are any that include engineering and may include, but are not limited to, reports, specifications, drawings, memos and field instructions. The Engineering Professional must also seal the Assurance Statement located in Appendix A.

For more information, refer to *Quality Management Guidelines – Use of Seal* (Engineers and Geoscientists BC 2018).

#### **4.1.3 DIRECT SUPERVISION**

In accordance with the *Act*, s.1(1) and 20(9), Engineering Professionals are required to directly supervise any engineering work they delegate. When working under the direct supervision of an Engineering Professional, unlicensed persons or non-members may assist in performing engineering work, but they may not assume responsibility for it. Engineering Professionals who are limited licensees may only directly supervise work within the scope of their license.

With regard to direct supervision, the Engineering Professional having overall responsibility should consider:

- the complexity of the project and the nature of the risks;
- which aspects of the work should be delegated;
- the training and experience of individuals to whom work is delegated; and
- the amount of instruction, supervision, and review required.

Careful consideration must be given to delegating field reviews. Due to the complex nature of field reviews, Engineering Professionals with overall responsibility should exercise judgment when relying on delegated field observations, and should conduct a sufficient level of review of the documents prepared as part of the delegated field review activities in order to have confidence in the quality and accuracy of the field observations. (See **Section 4.1.6 Documented Field Reviews During Implementation or Construction.**)

For more information, refer to the *Quality Management Guidelines – Direct Supervision* (Engineers and Geoscientists BC 2018a).

#### **4.1.4 RETENTION OF PROJECT DOCUMENTATION**

In accordance with Bylaw 14(b)(1), Engineering Professionals are required to establish and maintain documented quality management processes that include retaining complete project documentation for a minimum of ten (10) years after the completion of a project or ten (10) years after engineering documentation is no longer in use.

These obligations apply to Engineering Professionals in all sectors. Project documentation in this context includes documentation related to any ongoing engineering work, which may not have a discrete start and end, and may occur in any sector.

Many Engineering Professionals are employed by organizations, which ultimately own the project documentation. Engineering Professionals are considered compliant with this quality management requirement when a complete set of project documentation is retained by the organizations that employ them using means and methods that are consistent with the Association's Bylaws and guidelines.

For more information, refer to the *Quality Management Guidelines – Retention of Project Documentation* (Engineers and Geoscientists BC 2018b).

#### **4.1.5 DOCUMENTED CHECKS OF ENGINEERING AND GEOSCIENCE WORK**

In accordance with Bylaw 14(b)(2), Engineering Professionals are required to undergo documented quality checking and review of engineering work appropriate to the risk associated with that work.

Regardless of the sector they work in, Engineering Professionals must meet this quality management requirement. In this context, 'checking' means all professional deliverables must undergo a documented quality checking process before being finalized and delivered. This process would normally involve either a self-check, an internal check by another Engineering Professional within the same organization, or an external check (i.e., one outside the organization). Whichever check has been carried out, it must be documented.

Engineering Professionals are responsible for ensuring that the checks being performed are appropriate to the level of risk. Considerations for the level of checking should include the type of document and the complexity of the subject matter and underlying conditions; quality and reliability of background information, field data, and elements at risk; and the Engineering Professional's training and experience.

It is important to note that checking is a requirement for all Retaining Wall projects, not just projects that have a structural engineering aspect to them.

For more information, refer to the *Quality Management Guidelines – Documented Checks of Engineering and Geoscience Work* (Engineers and Geoscientists BC 2018b).

#### **4.1.6 DOCUMENTED FIELD REVIEWS DURING IMPLEMENTATION OF CONSTRUCTION**

In accordance with Bylaw 14(b)(3), field reviews are reviews conducted at the site of the construction or implementation of the engineering work. They are carried out by an Engineering Professional or a subordinate acting under the Engineering Professional's direct supervision (see **Section 4.1.3 Direct Supervision**).

Field reviews enable the Engineering Professional to ascertain whether the construction or implementation of the work substantially complies in all material respects with the engineering concepts or intent reflected in the engineering documents prepared for the work.

For Retaining Walls, some of the geotechnical engineering aspects of field reviews may include:

- reviewing temporary excavation stability and foundation bearing services prior to Retaining Wall installation
- confirming drainage measures are adequate to prevent hydrostatic pressures during the wall design life.
- Conduct field reviews that the Engineer of Record, in his or her professional discretion, considers necessary to ascertain whether the work substantially complies in all material respects with the plans and supporting documents prepared by the Engineer of Record. In instances where the backfilling could affect the structural integrity of adjacent structures, the Engineer of Record must ensure that the frequency and level of intensity of field reviews are appropriate for the site conditions.
- Confirmation that all other materials meet the specification.

For Stacked Rock walls, detailed field review during construction is particularly important because performance depends on the individual rock quality and the quality of construction in order to achieve optimal placement of individual rocks that produce an integral structure. The Engineer of Record must perform field reviews to confirm that:

- Rocks are intact and massive with no open fractures, foliation, or other planes of weakness.
- Continuous or horizontal joints within the Retaining Wall are avoided.
- Good contact between adjacent rocks, especially on the front face of the Retaining Wall, is provided.
- Voids left between rocks with smaller pieces are filled to prevent migration of the backfill.

Field reviews should be carried out at intervals appropriate to the stage of construction to observe the quality and the progress of the construction. The timing and number of field reviews are at the discretion of the Engineer of Record.

For more information, refer to the *Quality Management Guidelines – Documented Field Reviews during Implementation or Construction* (Engineers and Geoscientists BC 2018d).

#### **4.1.7 DOCUMENTED INDEPENDENT REVIEW OF STRUCTURAL DESIGNS**

Bylaw 14(b)(4) refers to an independent review in the context of structural engineering. An independent review is a documented evaluation of the structural design concept, details, and documentation based on a qualitative examination of the substantially complete structural design documents, which occurs before those documents are issued for construction. It is carried out by an experienced Engineering Professional qualified to practice structural engineering, who has not been involved in preparing the design.

As outlined in the *Quality Management Guidelines – Documented Independent Review of Structural Designs* (Engineers and Geoscientists BC 2018e), independently supported structures designed in

BC such as retaining walls may require having an independent review performed. Engineers and Geoscientists BC recommends that as best practice, any Retaining Walls over 3.0 m high or deemed to be high risk, be included in this requirement to have documented independent reviews conducted by a qualified professional.

For more information, refer to *Quality Management Guidelines – Documented Independent Review of Structural Designs* (Engineers and Geoscientists BC 2018e).



# 5.0 PROFESSIONAL REGISTRATION & EDUCATION, TRAINING, AND EXPERIENCE

---

## 5.1 PROFESSIONAL REGISTRATION

It is the responsibility of Engineering Professionals to determine whether they are qualified by training and/or experience to undertake and accept responsibility for the carrying out of design and field review tasks related to Retaining Walls. (Code of Ethics Principle 2).

---

## 5.2 EDUCATION, TRAINING, AND EXPERIENCE

Retaining Wall design and field review, as described in these guidelines, requires minimum levels of education, training and experience in many overlapping areas of engineering. The Engineering Professional taking responsibility must adhere to the Association's Code of Ethics (to undertake and accept responsibility for professional assignments only when qualified by training or experience) and, therefore, must evaluate his/her qualifications and must possess the appropriate education, training, and experience to provide the services.

The level of education, training, and experience required of the Engineering Professional should be adequate for the complexity of the project. Typical qualifications for the lead Engineering Professional or a team of professionals include education and experience in the following areas:

- Civil engineering
- Structural engineering
- Soil mechanics and geotechnical engineering

The academic training for the above skill sets can be acquired by taking formal university or college courses or through continuing professional development. There may be some overlap in courses and specific courses may not correlate to specific skill sets. An Engineering Professional should also remain current with evolving topics, through continuing professional development. Continuing professional development can include taking formal courses; attending conferences, workshops,

seminars, and technical talks; reading technical publications; searching the web; and participating in field trips.

# 6.0 REFERENCES AND RELATED DOCUMENTS

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# LIST OF APPENDICES

**Appendix A:** Retaining Wall Checklist

**Appendix B:** Figures

# APPENDIX A: ENGINEER OF RECORD – RETAINING WALL ASSURANCE STATEMENT

PROFESSIONAL PRACTICE GUIDELINES  
RETAINING WALL DESIGN AND FIELD REVIEW SERVICES

# ENGINEER OF RECORD - RETAINING WALL ASSURANCE STATEMENT

---

Note: This statement is to be read and completed in conjunction with the *Professional Practice Guidelines – Retaining Wall Design* (these guidelines).

*[Print clearly and legibly]*

TO: **OWNER**

DATE: \_\_\_\_\_

\_\_\_\_\_  
Name

\_\_\_\_\_  
Address

FOR: **PROJECT**

I am a qualified Engineers and Geoscientists BC-registered professional and the **Engineer of Record** for the project identified above.



# ENGINEER OF RECORD - RETAINING WALL ASSURANCE STATEMENT

In preparing the Retaining Wall design, I have confirmed that the following activities have been completed:

## **General (all Retaining Walls):**

*Check that the following items have been addressed:*

- ☐ 1. Reviewed requirements of the governing jurisdiction, and referenced all other codes, specifications, and guidelines used.
- ☐ 2. Established design criteria based on applicable codes and confirmed criteria with owner.
- ☐ 3. Conducted geotechnical investigation to determine site conditions and appropriate geotechnical parameters for analysis and design.
- ☐ 4. Determined external loading conditions (for example, traffic and construction surcharge loads, potential scour, or flooding).
- ☐ 5. Provided lateral earth pressures recommendations for static and seismic loading (these will vary based on the type of wall used).
  
- ☐ 6. Analyzed static Global Stability of slope – minimum factor of safety >1.5
- ☐ 7. Analyzed seismic Global Stability of slope, if applicable – minimum factor of safety 1.1 or acceptable wall displacement
- ☐ 8. Assessed liquefaction potential (provided mitigation measures, if applicable).
- ☐ 8. Provided recommendations for general site and wall drainage.
- ☐ 9. Provided recommendations for erosion protection, Slope Protection/Wall Facing.
- ☐ 10. Assessed the potential impact of wall construction on the slopes above and below the wall.
- ☐ 11. Assessed the potential impact of the wall on adjacent structures.

## **Gravity Walls:**

*Check that the following items have been addressed:*

- ☐ 1. Analyzed for overturning, sliding, and bearing capacity under static conditions.
- ☐ 2. Analyzed for overturning, sliding, and bearing capacity under seismic conditions, if applicable.
- ☐ 3. Completed internal design of the wall (structural design).
- ☐ 4. Detailed an adequate Drainage System.
  
- ☐ 5. Provided appropriate information and guidance for wall construction, including placement specifications, temporary slopes, drainage works, quality control requirements.

**Stacked Rock Walls:**

*Check that the following items have been addressed:*

- ☐ 1. Analyzed for overturning, sliding, and bearing capacity under static conditions.
- ☐ 2. Analyzed Internal Stability including sliding between rocks at different heights within the wall.
- ☐ 3. Analyzed for overturning, sliding, and bearing capacity under seismic conditions, if applicable.
- ☐ 4. Detailed an adequate Drainage System.
- ☐ 5. Demonstrated by previous performance or laboratory testing that the rock proposed for use in the wall will be durable.
- ☐ 6. Provided appropriate information and guidance for wall construction, including placement specifications, rock sizes/weights and stacking requirements, temporary slopes, drainage works, quality control requirements.

**Mechanically Stabilized Earth Walls:**

*Check that the following items have been addressed:*

- ☐ 1. Analyzed for overturning, sliding, and bearing capacity and Internal Stability under static conditions.
- ☐ 2. Analyzed for overturning, sliding, and bearing capacity and Internal Stability under seismic conditions, if applicable.
- ☐ 3. Provided specifications for soil reinforcement.
- ☐ 4. Minimum soil reinforcement length is 70% of the Wall Height or justification provided for alternate length.
  
- ☐ 5. Detailed an adequate Drainage System.
- ☐ 6. Provided appropriate information and guidance for wall construction, including placement specifications, temporary slopes, drainage works, quality control requirements.

**Reinforced Concrete Cantilever Retaining Walls:**

*Check that the following items have been addressed by the geotechnical and structural engineer as appropriate:*

- ☐ 1. Analyzed for overturning, sliding, and bearing capacity under static conditions.
- ☐ 2. Analyzed for overturning, sliding, and bearing capacity under seismic conditions, if applicable.
- ☐ 3. Completed internal design of the wall (structural design).
- ☐ 4. Detailed an adequate Drainage System.
  
- ☐ 5. Provided appropriate information and guidance for wall construction, including placement specifications, temporary slopes, drainage works, quality control requirements.

**Submittals:**

*Check that the following items have been addressed:*

- ☐ 1. Site plan showing wall location, wall footprint, existing and proposed ground slopes behind and in front of wall, location of roads, structures, utilities, etc., in the vicinity of the wall, and discharge location of the wall foundation drains.

- ☐ 2. Profile along the length of the wall showing variations in Wall Height, fill height behind the wall, invert elevations of wall foundations drains, etc.
- ☐ 3. Cross-section showing typical wall details, including Wall Batter, foundation preparation, leveling pad details, drainage provisions, erosion protection of exposed slopes above the wall, guardrail details (if required), etc.
- ☐ 4. Specifications for backfill and Retained Soil gradation, placement and compaction requirements, field review and compaction testing to meet stability and performance design requirements, erosion control during construction, etc.
- ☐ 5. Monitoring and maintenance plan, if applicable.

Exceptions or modifications to these guidelines or assurances in this assurance statement have been discussed with the owner and accepted into the design as follows.

*[Print clearly and legibly]*

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---

I certify that I am an Engineering Professional as in these guidelines.

---

Name (print)

---

Signature

---

Date

---

---

---

Address

---

Phone

(Affix Professional seal here)

Email

*If the Engineering Professional is a member of a firm, complete the following:*

I am a member of the firm \_\_\_\_\_ and I sign this letter on behalf of the firm. *(Print name of firm*

# APPENDIX B:

## FIGURES

- Figure 1 Terminology and Wall Definitions
- Figure 2 Terminology and Wall Definitions
- Figure 3 Terminology and Wall Definitions

FIGURE I

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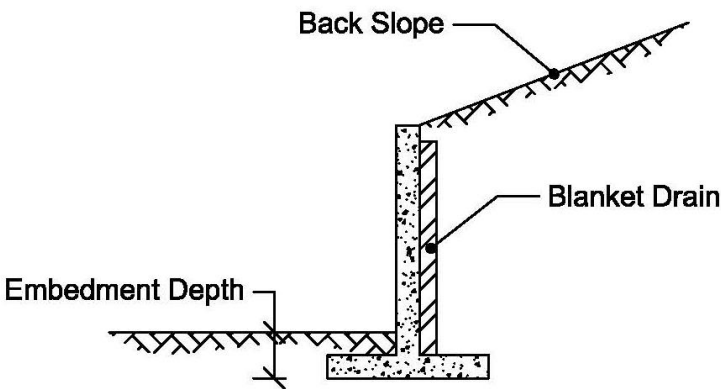


Figure 1a

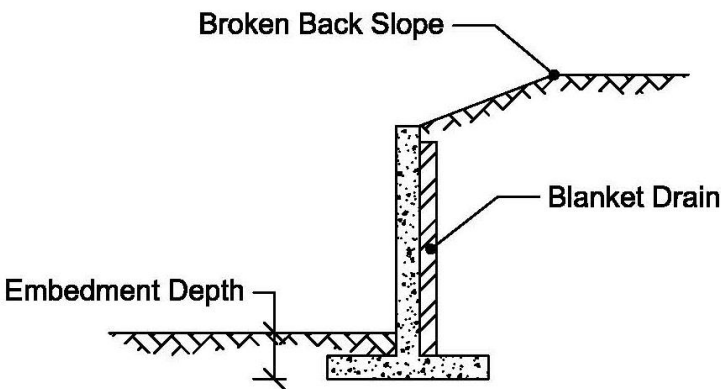


Figure 1b

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CLIENT

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NANAIMO BC

EBA Engineering  
Consultants Ltd.



CITY OF NANAIMO  
RETAINING WALL GUIDELINE

TERMINOLOGY AND WALL DEFINITIONS

PROJECT NO.  
N13101365

OFFICE  
NANAIMO

DWN  
LJK

CKD  
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DATE  
December 16, 2010

# FIGURE 2

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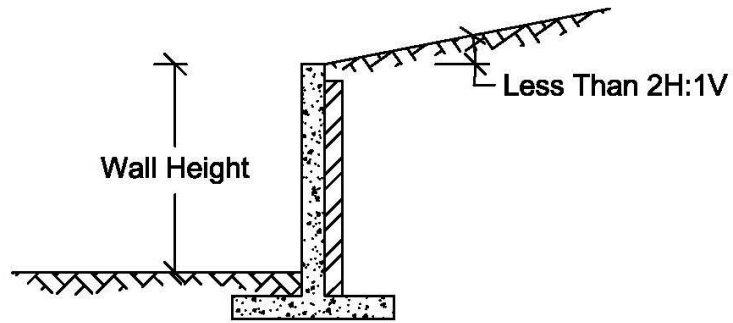


Figure 2a

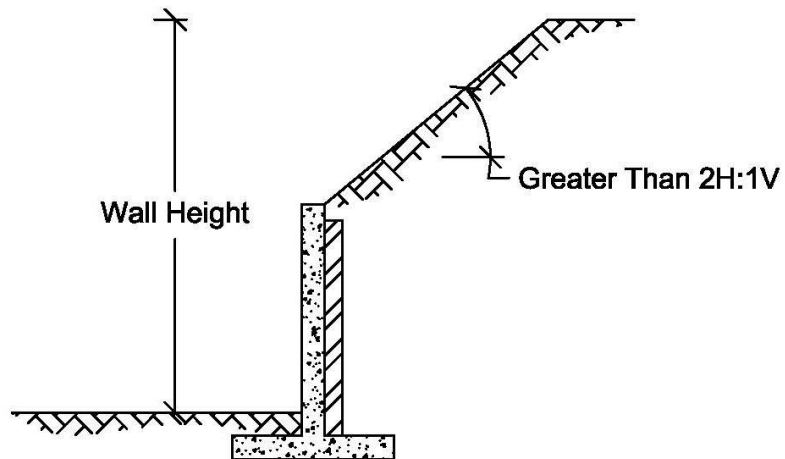


Figure 2b

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RETAINING WALL GUIDELINE

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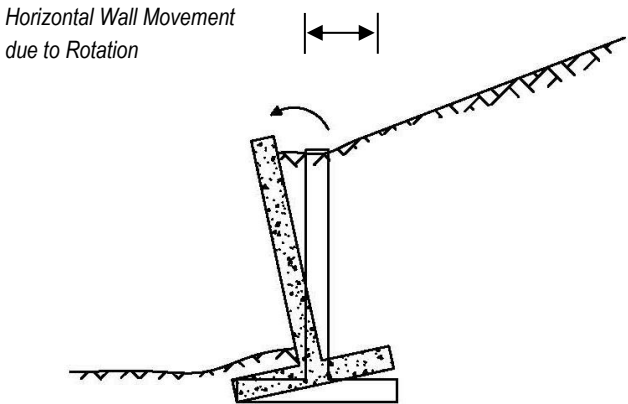
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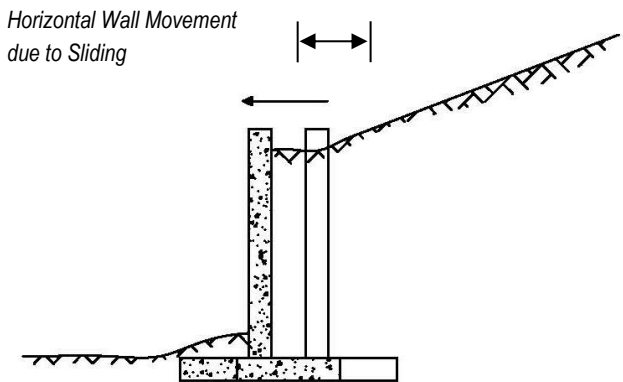
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FIGURE 3

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a) Rotation



b) Translation

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	CLIENT		CITY OF NANAIMO RETAINING WALL GUIDELINE			
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			OFFICE NANAIMO	DATE December 16, 2010		



CIVIL AND TRANSPORTATION INFRASTRUCTURE

PROFESSIONAL PRACTICE GUIDELINES

---

# ASSESSMENT OF GROUNDWATER AT RISK OF CONTAINING PATHOGENS

PUBLISHED [MONTH], [DAY], 2015

**[Note:** The Published date will be the date the guidelines are posted on the association website and officially available to members.]



ENGINEERS &  
GEOSCIENTISTS  
BRITISH COLUMBIA

V1.0 MONTH XX, 2011

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# PREFACE

The Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens have been developed with the support of the BC Ministry of Health. These guidelines will assist Engineering and Geoscience Professionals in carrying out an assessment of groundwater in a consistent manner while incorporating best practices.

In 2015, to provide additional guidance on the intent of the ground water legislations, the Health Protection Branch of the Ministry of Health of the Government of British Columbia released two guidance documents:

- Guidance Document for Determining Ground Water at Risk of Containing Pathogens (GARP), Version 3 (GARP document: available at: [https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/how-drinking-water-is-protected-in-bc/garp\\_assessment\\_oct\\_2017.pdf](https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/how-drinking-water-is-protected-in-bc/garp_assessment_oct_2017.pdf)); and
- Drinking Water Treatment Objectives (Microbiological) for Ground Water Supplies in British Columbia, Version 1 (DWTO document: available at: [http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/documents/ground\\_water\\_treatment\\_objectives\\_nov2015.pdf](http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/documents/ground_water_treatment_objectives_nov2015.pdf))

The Ministry's guidance documents are intended for a broader audience that includes public health officials, Water Suppliers, and Qualified Professionals. It is also relevant to the work done by the Groundwater Specialists with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development. These Professional Practice Guidelines were developed in response to issues raised in these guidance documents and to address those issues as they pertain to the practice of professional engineering and professional geoscience.

It is important to note that these guidelines are not intended to replace any provisions of these guidance documents and commentary but to provide guidance in applying them.

These guidelines outline the appropriate standard of practice to be followed at the time that they were prepared. However, this is a living document that is to be revised and updated, as required in the future, to reflect the developing state of practice.

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# ABBREVIATIONS

ABBREVIATION	TERM
<b>BC</b>	British Columbia
<b>GARP</b>	Groundwater At Risk of containing Pathogens
<b>DWTO</b>	Drinking Water Treatment Objectives
<b>DWO</b>	Drinking Water Officer
<b>ASTTBC</b>	Applied Science Technologists and Technicians of British Columbia

# DEFINED TERMS

TERM	DEFINITION
<b>Act</b>	<i>Engineers and Geoscientists Act</i>
<b>association</b>	Engineers and Geoscientists BC, formerly known as the Association of Professional Engineers and Geoscientists of British Columbia or APEGBC
<b>Drinking Water Officer (DWO)</b>	A person appointed under section 3 of the <i>Drinking Water Protection Act</i> or their delegate.
<b>Engineers and Geoscientists BC</b>	Formerly known as the Association of Professional Engineers and Geoscientists of British Columbia or APEGBC
<b>engineering/geoscience professional(s)</b>	Professional engineers, professional geoscientists and licensees, licensed to practice by Engineers and Geoscientists BC
<b>Groundwater at Risk of Containing Pathogens (GARP)</b>	Any groundwater source that is likely to be contaminated from any sources of human disease-causing microorganisms (pathogens) including various types of bacteria, viruses and protozoa (e.g., <i>Giardia</i> and <i>Cryptosporidium</i> ). Contamination may be continuous or intermittent.
<b>Professional of Record</b>	The engineering/geoscience professional taking overall responsibility for an engineering or geoscience related activity or service.
<b>Qualified Professional</b>	An individual who is registered with the Engineers and Geoscientists of British Columbia with competency in the field of hydrogeology and experience in evaluating sources of ground water supply.
<b>Water Source Investigation</b>	Investigation that is conducted to assess potential risks to a water source and, ultimately, support a GARP determination. Up to three levels of water source investigations may be required to assess potential risks: Level 1 Review of existing records and field inspection; Level 2 Preliminary hydrogeological investigation; and Level 3 Detailed hydrogeological investigation.



<b>Water Source Investigation Report</b>	Written findings of a Water Source Investigation attested to by the Qualified professional
<b>Water Supplier</b>	A person who is the owner of a water supply system under the <i>BC Drinking Water Protection Act</i> .

# 1.0 INTRODUCTION

The presence of pathogens in water that is used for human consumption can pose a drinking water health hazard that endangers the public health. In British Columbia (BC), groundwater that, in the opinion of a Drinking Water Officer (DWO) is at risk of containing pathogens (GARP) must be disinfected in consideration of the BC Drinking Water Treatment Objectives (DWTO). Contamination may be continuous or intermittent, such as seasonal flooding.

The *Drinking Water Protection Act* and the Drinking Water Protection Regulation give Drinking Water Officers (DWOs) the flexibility and discretion to address public health risks through treatment requirements in operating permits. The *Drinking Water Protection Act* outlines general requirements for Water Suppliers, and the Drinking Water Protection Regulation sets out more specific requirements.

In part, Section 6 of the *Drinking Water Protection Act* states:

...a Water Supplier must provide...drinking water from the water supply system that

- a) is potable water, and
- b) meets any additional requirements established by the regulations or by its operating permit.

Similarly, Section 5(2) of the *Drinking Water Protection Regulation* states in part:

...drinking water from a water supply system must be disinfected by a Water Supplier if the water originates from

- a) surface water, or
- b) ground water that, in the opinion of a Drinking Water Officer, is at risk of containing pathogens.

Ultimately, the DWO is responsible for making a GARP determination that will provide the basis for establishing the measures that a water supply system needs to take to protect public health. It is in the interests of a Water Supplier, having chosen to use a particular water source, to provide information to the DWO that assists in that determination. Where a DWO or Water Supplier considers that additional information is required, the Water Supplier may retain a Qualified Professional to undertake one or more Water Source Investigations and to provide a professional opinion regarding hazards to the water source.

The procedure outlined in the GARP document recommends that the GARP determination be undertaken as a coordinated effort between the DWO, Water Supplier and Qualified Professional. Communication between these parties is necessary and should begin at an early stage in the GARP determination process.

---

## 1.1 PURPOSE OF THESE GUIDELINES

This document provides guidance on professional practice for engineering/geoscience professionals who conduct Water Source Investigations in response to the requirements under Section 6 of the *Drinking Water Protection Act* and Section 5(2) of the Drinking Water Protection Regulation, as described in the GARP and DWTO documents issued by the Health Protection Branch of the BC Ministry of Health.

These Professional Practice Guidelines, in conjunction with the GARP and DWTO documents issued by the Ministry, address:

- Responsibilities of the various participants/stakeholders;
- Professional practice standards;
- Quality assurance/quality control; and
- Professional registration and education, training and experience.

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## 1.2 ROLE OF ENGINEERS AND GEOSCIENTISTS BC

These guidelines were prepared by subject matter experts and reviewed at various stages by a review group. The final draft of the guidelines underwent a final consultation process with various committees and divisions of Engineers and Geoscientists British Columbia (the association). The guidelines were approved by the association's Council and, prior to publication, underwent final legal and editorial reviews. The guidelines form part of Engineers and Geoscientists BC's ongoing commitment to maintaining the quality of services that members and licensees provide to their clients and the general public.

An engineering/geoscience professional must exercise professional judgment when providing professional services; as such, application of these guidelines will vary depending on the circumstances. The association supports the principle that appropriate financial, professional, and technical services should be provided to support engineering/geoscience professionals who are responsible for carrying out professional activities, so they can comply with the standard of practice established in these guidelines. These guidelines may be used to assist in the level of service and terms of reference of an agreement between an engineering/geoscience professional and a client.

By following these guidelines, engineering/geoscience professionals will fulfill their professional obligations, especially regarding the first principle of the association's Code of Ethics Principle, which is to "hold paramount the safety, health and welfare of the public, protection of the environment and promote health and safety in the workplace." Failure to meet the intent of these guidelines could be evidence of unprofessional conduct and lead to disciplinary proceedings by the association.

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## 1.3 SCOPE OF THE GUIDELINES

These Professional Practice Guidelines apply to Water Source Investigations that are prepared in support of GARP determinations, and in response to the requirements under the *Drinking Water Protection Act* and the Drinking Water Protection Regulation: Within this document, the written findings of a Water Source Investigation are referred to as a Water Source Investigation Report. These Guidelines apply to reporting under Section 8 of the BC Guidance Document for Determining GARP. The approach outlined in the GARP and DWTO documents provides some flexibility in designing and implementing Water Source Investigations, and interpreting the results from the investigations. Investigations and interpretations that are developed for one particular water source will not necessarily be applicable to other water sources. Therefore, these Guidelines do not provide a prescriptive approach to water source investigations; rather, they discuss the standard of practice that a Qualified Professional should meet when conducting water source investigations, and which fulfills the Qualified Professional's obligations under the self-governing legislation regulating their practice. These obligations include the Qualified Professional's primary duty to protect the safety, health and welfare of the public and the environment.

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## 1.4 APPLICABILITY OF THE GUIDELINES

These Professional Practice Guidelines are influenced by current provincial legislation and its application by local government, provincial case law, advances in knowledge and evolution of general professional practices in BC: from time to time, they may require updating.

These guidelines provide guidance on professional practice for engineering/geoscience professionals who carry out groundwater assessments. These guidelines are not intended to provide step-by-step instructions for carrying out this activity. Rather, the guidelines outline the considerations that go into these assessments.

An engineering/geoscience professional's decision not to follow one or more aspects of these guidelines does not necessarily mean a failure to meet their required professional obligations. Such judgments and decisions depend upon weighing facts and circumstances to determine whether other reasonable and prudent engineering/geoscience professionals, in similar situations, would have conducted themselves similarly.

Conversely, following these Professional Practice Guidelines does not guarantee that the conclusions and recommendations contained within the Water Source Investigation Report will be accepted by the DWO.

Please note that provincial legislation may not apply on land under federal jurisdiction. The approving authority on lands under federal jurisdiction often use provincial legislation and guidance as indicators of best practices, but the applicability of these guidelines should be reviewed with the approving authority at the project scoping stage.

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## 1.5 ACKNOWLEDGEMENTS

These guidelines were prepared on behalf of Engineers and Geoscientists BC by professional engineers and geoscientists in the sector and were reviewed by several diverse parties, stakeholders and members of several Engineers and Geoscientists BC internal and external committees. The authors and reviewers are listed in **Appendix D: Contributors**. Engineers and Geoscientists BC and the authors thank the reviewers for their constructive suggestions. Authorship and review of these guidelines does not necessarily indicate the individuals and/or their employers endorse everything in these guidelines.

# 2.0 ROLES AND RESPONSIBILITIES

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## 2.1 RESPONSIBILITIES

The Client should be aware that the findings of the Qualified Professional could possibly result in the groundwater source being considered GARP and/or the Approving Authority requiring risk mitigation measures, potentially including treatment as recommended in the DWTO document; in this regard, it is useful if the Approving Authority is engaged early in the planning process for the water source investigation(s). The Qualified Professional should be aware that his/her report will ultimately be submitted to, and likely reviewed by, the Approving Authority.

This section describes some of the typical responsibilities of a Client, Approving Authority and Qualified Professional. Section 2.1.2 describes some of the typical responsibilities of a Qualified Professional when asked by an Approving Authority or Client to review a Water Source Investigation Report prepared by another Qualified Professional.

### 2.1.1 CLIENT

The Client is typically a Water Supplier that could be a local government, First Nation government or private owner. When deciding how to manage potential risks to their groundwater source, the Client should inform themselves about the costs to conduct Water Source Investigations and consider these against the costs to treat the water supply to DWO specifications.

Prior to a water source investigation, it is helpful if the Client is knowledgeable about, and can provide the Qualified Professional with the following:

- During the water source investigation, it is helpful if the Client:
  - shows the Qualified Professional the location of the water supply well;
  - provides any data or information that the Client has on file that is pertinent to the water source investigation;
  - allows the Qualified Professional unrestricted access to the property; and
  - obtains access, if required, to areas beyond the property.
- After the water source investigation, it is helpful if the Client:
  - reviews the Water Source Investigation Report, and understands the limitations and qualifications that apply;
  - discusses the report with the Qualified Professional and seeks clarification;

- notifies the Qualified Professional if land use at the site or surrounding properties change or vary from those described in the report; and
- includes the Qualified Professional in discussions with the DWO regarding the water source investigation.

## 2.1.2 PROFESSIONAL OF RECORD

The Qualified Professional is responsible for conducting water source investigations, or taking responsibility for the water source investigations, that are unbiased and evidence-based. The Qualified Professional is also responsible for providing a professional opinion regarding the risk that a water source is GARP to support the DWO in making a GARP determination. The DWO is not responsible for the professional practice of the Qualified Professional; professional practice remains the responsibility of the Professional of Record.

Prior to initiating the water source investigation, the Qualified Professional and Client should complete an agreement confirming scope, schedule and compensation for the investigation. As discussed in the GARP document, it is recommended that the scope and schedule for the Water Source Investigation be developed in collaboration with the DWO who will ultimately provide the GARP determination. The Qualified Professional's cost estimate should indicate what services are included, and what circumstances may cause a change to the scope of work and associated costs.

It is the responsibility of the Qualified Professional to obtain the necessary information to conduct water source investigations. As outlined in the GARP document, the Qualified Professional may obtain information from a variety of sources to build lines of evidence that assess potential risks to a ground water source. The Qualified Professional is responsible for assessing the quality of the information obtained for water source investigations, assessing potential uncertainty and identifying potential implications for the interpretation.

If aspects of the Water Source Investigation are delegated to subordinates, they should only be carried out under the direct supervision of the Qualified Professional. The Qualified Professional assumes full responsibility for all work delegated. The Qualified Professional of Record provides an assurance statement (**Appendix B**) with the Water Source Investigation Report and must seal the final report with signature and date. This assurance statement will confirm that the appropriate requirements were met (both regulatory and technical) for the assessment that was carried out.

After the Water Source Investigation has been conducted, the Qualified Professional should:

- clarify questions the Client and/or DWO may have with regards to the Water Source Investigation and/or the professional opinion provided;
- in the event that the Client and/or DWO identify gaps in the report submission that should justifiably have been in the original scope of work, address those omissions or deficiencies; and
- perform follow up work if requested by the Client and/or the DWO, and if retained by the Client to do so.

A Qualified Professional should clearly indicate to his/her Client the possible consequences if recommendations from the Water Source Investigation are not followed. To fulfill the Qualified Professional's obligations under the Engineers and Geoscientists BC Code of Ethics, if a Client or the DWO fails or refuses to accept the conclusions and recommendations of the Water Source Investigation Report, the Qualified Professional should:

- advise the Client and/or the DWO in writing of the potential consequences of the Client's actions or inactions, and
- consider whether the situation warrants notifying Engineers and Geoscientists BC, the Water Supplier (if different from the Client) and/or appropriate authorities.

The above actions should be taken particularly if workplace safety, public health or the environment is potentially jeopardized.

### Reviews of Water Source Investigation Reports

A Qualified Professional may be engaged by a Client and/or DWO to conduct an independent external peer review of a Water Source Investigation Report prepared by another Qualified Professional. This type of review is not the same as an internal or external peer review conducted at the request of the Qualified Professional prior to submitting the report to his/her Client and/or the DWO.

For the reviewing Qualified Professional to conduct an appropriate review the reviewing Qualified Professional must receive a copy of the water source investigation; furthermore, it will be helpful if the requesting DWO or Client:

- recognizes that the Association's respective codes of ethics require that members follow respectful protocols when reviewing the work of other members. In particular, Engineers and Geoscientists BC Code of Ethics Principle 7 (c) states that a member should not, except in cases where review is usual and anticipated, evaluate the work of a fellow member without the knowledge of, and after communication with, that member where practicable.
- provides the reviewing Qualified Professional with additional necessary background information, and the reason for the review
- reviews the review letter or report, and
- if necessary, discusses the review letter or report with the reviewing Qualified Professional and seeks clarification.

The reviewing Qualified Professional should consider whether there may be a conflict of interest and act accordingly, and conduct himself/herself with fairness, courtesy and good faith towards colleagues and provide honest and fair comment.

The reviewing Qualified Professional should:

- confirm with the Client who is approving the work regarding the terms, condition and the scope of work as it relates to the review and the ownership of the information contained in the water source investigation;



- inform the Qualified Professional who prepared the Water Source Investigation Report of the review, and the reasons for the review, and document in writing that the Qualified Professional was so informed;
- ask the Qualified Professional who prepared the report if the reviewing Qualified Professional should know about unreported circumstances that may have limited or qualified the Water Source Investigation and/or the report, and
- contact the Qualified Professional who prepared the report if the results of the review identify safety or environmental concerns, in order to allow the opportunity for the Qualified Professional to comment prior to further action.

The review should be appropriately documented in a letter or a report. The reviewing Qualified Professional should submit a signed, sealed and dated review letter or report including: limitations and qualifications with regards to the review, and results and/or recommendations arising from the review.

The reviewing Qualified Professional should clarify questions the DWO or Client may have about the review letter or report.

Occasionally, a Qualified Professional is retained to provide a second opinion. This role goes beyond that of reviewing the work of the original Qualified Professional. The second Qualified Professional should carry out sufficient pre-field work, field work, assessment and comparisons, as required, to accept full responsibility for his/her opinion regarding the water source investigation.

### **2.1.3 THE APPROVING AUTHORITY**

The requirement for water source investigations comes from the DWO who is ultimately responsible for the determination of whether a groundwater source is GARP.

Before the Water Source Investigation is initiated, it is helpful if the DWO:

- informs the Client and the Qualified Professional why a Water Source Investigation is required;
- identifies concerns and/or uncertainty regarding hazards to the ground water source; and
- provides additional information that he/she feels is necessary to conduct a water source investigation.

After the water source investigation, it is helpful if the DWO:

- reviews the Water Source Investigation Report, and
- if necessary, discusses the report with the Qualified Professional and seeks clarification.

While the DWO does not approve the Qualified Professional's report, the DWO will be making their GARP determination based on the screening criteria and taking the technical, economic and practical considerations into account while developing treatment/risk mitigation measures. As the Water Source Investigation Report will form the basis of the DWO's technical understanding of a GARP determination, it is critical that all Water Source Investigation Reports completed by Qualified

Professionals contain all relevant supporting documentation and that they are written in a manner that allows the DWO to make a GARP determination based on a clear technical understanding.

## 3.0 GUIDELINES FOR PROFESSIONAL PRACTICE

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### 3.1 GARP Determination Process

The GARP determination process typically includes the following stages, also provided in the flow chart in **Appendix C**:

- Stage 1 Hazard Screening and Assessment: the groundwater source is screened for hazards that are considered to be present are assessed individually as to whether the hazard makes the source potentially GARP. Stage 1 is supported by up to three levels of water source investigation.
- Stage 2 GARP Determination: the DWO reviews the hazards identified in Stage 1 cumulatively to make an overall determination if the groundwater source is potentially GARP, GARP-viruses only, or at low risk of containing pathogens.
- Stage 3 Risk Mitigation: for groundwater sources that are determined to be GARP, measures are put in place to mitigate risks either through further investigating specific hazards, corrective measures, or through treatment acceptable to the DWO.
- Stage 4 Long-term Monitoring: all groundwater sources require ongoing monitoring to confirm that the water quality is consistent with the results of Stage 1 and that hazards have not changed.

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### 3.2 Water Source Investigations

A Water Source Investigation is required when a DWO or Water Supplier considers that additional information is necessary to understand a water source. The objective of water source investigations is to reduce uncertainty regarding the identified hazards and to support the DWO in making a GARP determination. The increasing levels of investigation from Level 1 through to Level 3 are intended to further reduce uncertainty related to specific issues identified during the water source investigation. The monitoring stage, Stage 4 may also, at the discretion of the DWO, be used to reduce uncertainty, prior to resorting to mitigation measures, potentially including those outlined in the DWTO document.

Water source investigations are not carried out under the traditional consultant-client-approving authority model, i.e. the Qualified Professional does not:

- work in isolation from the Client and DWO

- make decisions independent from the Client
- independently provide a report or plans and specifications that must be followed by a contractor; recommendations should be provided to the Client for consideration

Generally, a Qualified Professional would be called in when the DWO considers expert advice is required. As such, the Qualified Professional should take the lead, in consultation with the DWO, in developing the scope of investigation that can provide technical information needed to make the GARP determination. The DWO will take the opinion of the Qualified Professional into consideration when assessing the hazards and completing a GARP determination. Therefore, it is recommended that the Water Supplier, DWO and Qualified Professional should collaborate to develop the scope for water source investigations that reflect a shared understanding of the water source and address the information needs of the DWO.

The GARP document does not provide a prescriptive approach to water source investigations; rather, the GARP determination process presented in the Ministry's GARP document provides flexibility to develop and implement water source investigations that are appropriate to the site-specific conditions. The document acknowledges that multiple lines of evidence may be required to reduce uncertainty to a level that is acceptable to the DWO. Qualified Professionals are expected to use judgment in selecting appropriate methodologies, level of effort and scope of assessment for the water source investigations.

Depending on the site-specific conditions and the hazards identified, an appropriate level of effort is required to conduct water source investigations. The Qualified Professional should conduct such work as is appropriate for the complexity of the water source, which could include input from a variety of sources including individuals who are not members of Engineers and Geoscientists BC but registered with other regulatory bodies and have competency and/or experience with groundwater sources such as well drillers registered with the Province of BC, Technologists registered with Applied Science Technologists & Technicians of BC (ASTTBC), etc. The Qualified Professional will assess the input from these various information sources and use professional judgement to provide an opinion in the form of a report regarding the potential that a water source is GARP. The Qualified Professional would consider options listed in Section 8 of the BC Guidance Document and would justify options used in the investigations.

The Water Source Investigation Report is an important document used to inform significant decisions for GARP determinations. For this reason, it is recommended that in addition to experienced individuals conducting the assessment, the assurance statement in Appendix B should be completed in conjunction with the investigation report and should be signed off by a Qualified Professional for submission to the Water Supplier and the DWO.

Qualified Professionals are expected to be competent in field investigation and assessment techniques and to keep abreast of advancements in scientific knowledge applicable to their work. If the Qualified Professional delegates aspects of the work, such as field investigation, to subordinates, the Qualified Professional must satisfy himself/herself of the subordinate's qualifications and skill level, and the Qualified Professional must provide sufficient instruction so that the work is carried out competently.

While water source investigations conducted under these guidelines may identify floodplain areas, water source investigations are not flood hazard assessments. There are specific statutory requirements and professional guidelines for flood hazard assessments; these do not fall under the

GARP document. Furthermore, a Water Source Investigation does not address other possible natural hazards. In the course of a water source investigation, if a Qualified Professional identifies possible landslide, flood or other hazards that might affect the subject property or the property of others, the Qualified Professional has a professional responsibility to draw these hazards to the attention of the Client and, if necessary, the authority having jurisdiction over land use.

# 4.0 QUALITY MANAGEMENT IN PROFESSIONAL PRACTICE

Engineering/geoscience professionals must adhere to the applicable quality management requirements during all phases of the work, as per the association's bylaws. It is also important to be aware of whether additional quality management requirements exist through other authorities having jurisdiction or through service contracts.

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## 4.1 QUALITY MANAGEMENT REQUIREMENTS

Engineering/geoscience professionals are obligated to abide by the quality management requirements set out in the association's bylaws. To meet the intent of those requirements, engineering/geoscience professionals must establish and maintain documented quality management processes for the following activities:

- The application of relevant Professional Practice Guidelines
- Authentication of professional documents by the application of the professional seal
- Direct supervision of delegated professional engineering/geoscience activities
- Retention of complete project documentation
- Regular, documented checks using a written quality control process
- Documented field reviews of engineering/geoscience designs/recommendations during implementation or construction
- Where applicable, documented independent review of structural designs prior to construction.

### 4.1.1 PROFESSIONAL PRACTICE GUIDELINES

As per the *Engineers and Geoscientists Act*, s.4(1) and Bylaw 11(e)(4)(h), engineering/geoscience professionals are required to comply with the intent of any applicable professional practice guidelines related to the engineering or geoscience work they undertake. One of the three objectives of the Association, as stated in the *Act* is “to establish, maintain, and enforce standards for the qualifications and practice of its members and licensees.” Practice guidelines are one means by which the association fulfills this obligation.

#### **4.1.2 USE OF THE SEAL**

According to the *Engineers and Geoscientists Act*, s.20(9), engineering/geoscience professionals are required to seal all professional engineering or professional geoscience documents that they will deliver to others who will rely on the information contained in the documents. This applies to documents that engineering/geoscience professionals have personally prepared and those that others have prepared under their direct supervision.

Failure to seal engineering or geoscience documents that they prepare and deliver in their professional capacity or have prepared and delivered under their direct supervision in any sector is a breach of the *Act*.

For more information, refer to the Quality Management Guideline – Use of the Seal, available on the association's website.

#### **4.1.3 DIRECT SUPERVISION**

According to the *Engineers and Geoscientists Act*, s.1(1) and 20(9), engineering/geoscience professionals are required to directly supervise any engineering or geoscience work that they delegate. When working under the direct supervision of an engineering/geoscience professional, unlicensed persons or non-members may assist in performing engineering and geoscience work, but they may not assume responsibility for it. Engineering/geoscience professionals who are limited licensees may only directly supervise work within the scope of their license.

With regard to direct supervision, the engineering/geoscience professional having overall responsibility should consider:

- the complexity of the project and the nature of the risks;
- which aspects of the work should be delegated;
- the training and experience of individuals to whom work is delegated; and
- the amount of instruction, supervision, and review required.

Careful consideration must be given to delegating fieldwork. Due to the complex nature of fieldwork, direct supervision is difficult and care must be taken so delegated work meets the standard expected by the engineering/geoscience professional with overall responsibility. Typically, such direct supervision could take the form of specific instructions on what to observe, check, confirm, record, and report to the supervising professional. Engineering/geoscience professionals with overall responsibility should exercise judgment when relying on delegated field observations, and they should conduct a sufficient level of review to have confidence in the quality and accuracy of the field observations.

For more information, refer to the Quality Management Guideline – Direct Supervision, available on the association's website.

#### **4.1.4 RETENTION OF PROJECT DOCUMENTATION**

As per Bylaw 14(b)(1), engineering/geoscience professionals are required to establish and maintain documented quality management processes that include retaining complete project documentation for a minimum of ten (10) years after the completion of a project or ten (10) years after engineering or geoscience documentation is no longer in use.

These obligations apply to engineering/geoscience professionals in all sectors. Project documentation in this context includes documentation related to any ongoing engineering or geoscience work, which may not have a discrete start and end, and may occur in any sector.

Many engineering/geoscience professionals are employed by organizations, which ultimately own the project documentation. Engineering/geoscience professionals are considered compliant with this quality management requirement when a complete set of project documentation is retained by the organizations that employed them at the time the Water Source Investigation was undertaken using means and methods that are consistent with the association's bylaws and guidelines.

For more information, refer to the Quality Management Guideline – Retention of Project Documentation, available on the association's website.

#### **4.1.5 DOCUMENTED CHECKS**

As per Bylaw 14(b)(2), engineering/geoscience professionals are required to undergo documented quality checking and review of engineering and geoscience work appropriate to the risk associated with that work.

Regardless of the sector, engineering/geoscience professionals are required to meet this quality management requirement. In this context, 'checking' means all professional deliverables must undergo a documented checking and review process before being finalized and delivered. This process would normally involve an internal review by another engineering/geoscience professional within the same organization. Where an appropriate internal reviewer is not available, an external reviewer (i.e., one outside the organization) must be engaged. Where an internal or external review has been carried out, this must be documented.

Engineering/geoscience professionals are responsible for ensuring that the checks being performed are appropriate to the level of risk. Considerations for the level of review should include the type of document and the complexity of the subject matter and underlying conditions; quality and reliability of background information, field data, and elements at risk; and the engineering/geoscience professional's training and experience.

For more information, refer to the Quality Management Guideline – Documented Checks of Engineering and Geoscience Work, available on the association's website.

#### **4.1.6 FIELD REVIEWS**

As per Bylaw 14(b)(3), field reviews are reviews conducted at the site of the construction or implementation of the engineering or geoscience work. They are carried out by an engineering/geoscience professional or a subordinate acting under the professional's direct supervision. Field reviews enable the engineering/geoscience professional to ascertain whether the construction or implementation of the work substantially complies in all material respects with the engineering or geoscience concepts or intent reflected in the engineering or geoscience documents prepared for the work.

Engineering/geoscience professionals are required to establish and maintain documented quality management processes, which include carrying out documented field reviews of their domestic projects or work during implementation or construction. Domestic works or projects include those



located in Canada and for which an engineering/geoscience professional meets the registration requirements for the engineering or geoscience regulatory body that has jurisdiction.

For more information, refer to the Quality Management Guideline – Documented Field Reviews during Implementation or Construction, available on the association's website.

# 5.0 PROFESSIONAL REGISTRATION & EDUCATION, TRAINING, AND EXPERIENCE

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## 5.1 PROFESSIONAL REGISTRATION

It is the responsibility of engineering/geoscience professionals to determine whether they are qualified by training and/or experience to undertake and accept responsibility for carrying out assessments of groundwater. (Code of Ethics Principle 2).

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## 5.2 EDUCATION, TRAINING, AND EXPERIENCE

Assessment of Groundwater at Risk of Containing pathogens, as described in these guidelines, requires minimum levels of education, training and experience in many overlapping areas of engineering and geoscience. The engineering/geoscience professional taking responsibility must adhere to the association's Code of Ethics (to undertake and accept responsibility for professional assignments only when qualified by training or experience) and, therefore, must evaluate his/her qualifications and must possess the appropriate education, training, and experience to provide the services.

The level of education, training, and experience required of the engineering/geoscience professional should be adequate for the complexity of the project. Typical qualifications for the lead engineering/geoscience professional or a team of professionals may include education and experience in the following areas:

- Hydrogeology
- Water chemistry
- Drinking water microbiology
- Public health issues related to drinking water
- Legislation related to surface water, groundwater, and drinking water
- Risk Assessment and risk management

The academic training for the above skill sets can be acquired by taking formal university or college courses or through continuing professional development. There may be some overlap in courses and specific courses may not correlate to specific skill sets. An engineering/geoscience professional should also remain current with evolving topics, through continuing professional development. Continuing professional development can include taking formal courses; attending conferences, workshops, seminars, and technical talks; reading technical publications; searching the web; and participating in field trips.

# 6.0 REFERENCES AND RELATED DOCUMENTS

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## 6.1 References

The following regulations and references are cited in the main guideline and in the appendices.

### 6.1.1 REGULATIONS

*Drinking Water Protection Act*

Drinking Water Protection Regulation

*Engineers and Geoscientists Act*

Groundwater Protection Regulation

Health Hazard Regulation

### 6.1.2 WEB REFERENCES

Ministry of Health. 2017. GUIDANCE DOCUMENT FOR DETERMINING GROUNDWATER AT RISK OF CONTAINING PATHOGENS (GARP) [https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/how-drinking-water-is-protected-in-bc/garp\\_assessment\\_oct\\_2017.pdf](https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/how-drinking-water-is-protected-in-bc/garp_assessment_oct_2017.pdf) [accessed: 26/06/2018]

Ministry of Health. 2015. DRINKING WATER TREATMENT OBJECTIVES (MICROBIOLOGICAL) FOR GROUND WATER SUPPLIES IN BRITISH COLUMBIA. [http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/documents/ground\\_water\\_treatment\\_objectives\\_nov2015.pdf](http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/documents/ground_water_treatment_objectives_nov2015.pdf) [Accessed: 26/06/2018]

# LIST OF APPENDICES

**Appendix A:** Regulatory Requirements

**Appendix B:** Assurance Statement

**Appendix C:** GARP Determination Flowchart

**Appendix D:** Contributors

# APPENDIX A: REGULATORY REQUIREMENTS

## **C-1: Drinking Water Protection Act**

The *Drinking Water Protection Act* states that:

### **Part 2 – Drinking Water supply**

Water supply systems must provide potable water

**6** Subject to the regulations, a Water Supplier must provide, to the users served by its water supply system, drinking water from the water supply system that

- (a) Is potable water, and
- (b) Meets any additional requirements established by the regulations or by its operating permit.

## **C-2: Drinking Water Protection Regulation**

The drinking water protection regulation state that:

### **Treatment**

....

- (2) For the purposes of section 6 (b) of the Act, drinking water from a water supply system must be disinfected by a Water Supplier if the water originates from
  - (a) surface water, or
  - (b) ground water that , in the opinion of a Drinking Water Officer, is at risk of containing pathogens.

## **C-3: Groundwater Protection Regulation**

The groundwater protection regulation states that:

### **Registers of well drillers and well pump installers**

**7** The comptroller must

- (a) establish and maintain
  - (i) a register of well drillers who are authorized to operate in British Columbia, and
  - (ii) a register of well pump installers who are authorized to operate in British Columbia,

- (b) include in the registers the following information in respect of each well driller and well pump installer:
  - (i) full name;
  - (ii) business contact information, including business name, if any, address, telephone number and, if available, email address and fax number;
  - (iii) the registration number issued by the comptroller and the date of registration;
  - (iv) a reference to any certificates of qualification held by the well driller or qualified well pump installer;
  - (v) in the case of a well driller, the class of well driller assigned by the comptroller in accordance with section 9 *[registration and classification of well driller]*,
- (c) make available to the public during normal business hours, or by posting on a publicly available website, a list of well drillers and well pump installers, which list may include any of the information set out in paragraph (b), and
- (d) remove from the register any person who
  - (i) fails to meet a requirement for registration,
  - (ii) fails to maintain a requirement for registration, including any requirement for maintaining a certificate issued by another province or territory of Canada, or
  - (iii) is no longer actively working in Canada as a well driller or well pump installer.

#### **Application for registration as well pump installer**

10 (1) A person may apply to the comptroller for registration as a well pump installer by completing and submitting an application in the form and with the content specified by the comptroller.

(2) A prospective registrant described in subsection (1) must provide with an application proof satisfactory to the comptroller that the prospective registrant

- (a) is an individual who is at least 19 years of age, and
- (b) holds, for the purposes of the definition of "well pump installer" in section 48 (1) *[definitions]* of the Act, one of the following prescribed qualifications:
  - (i) a Certificate of Qualification as a Well Pump Installer issued by the Province of British Columbia;
  - (ii) a certificate issued by another province or territory of Canada that is equivalent to a certificate referred to in subparagraph (i);

- (iii) a certificate as a Ground Water Pump Technician issued by the Canadian Ground Water Association before April 26, 2013.

### **Registration of well pump installer**

- 11 (1) If the comptroller approves a person's application under section 10 (1) to be registered as a well pump installer, the comptroller must
- (a) add the person to the register of well pump installers, and
  - (b) issue an identification card to the person that identifies that person as a well pump installer.
- (2) Promptly after this regulation comes into force, the comptroller must
- (a) ensure that every person is added to the register of well pump installers who, immediately before the date this regulation comes into force, was registered in the register of qualified well pump installers under the former regulation, and
  - (b) issue an identification card to every person added to the register of well pump installers under paragraph (a) that identifies that person as a well pump installer.

### **Notice to comptroller**

- 12 (1) A registered well driller or registered well pump installer must advise the comptroller in writing within 60 days after
- (a) any changes to the information included in the register in relation to the well driller or well pump installer, as the case may be, or
  - (b) the person ceasing to work in Canada as a well driller or well pump installer, as the case may be.
- (2) The comptroller is not required to issue an identification card under section 9 or 11, as applicable, to a registered well driller or registered well pump installer if the registered well driller or registered well pump installer has not complied with subsection (1).

### **C-4: Health Hazard Regulation**

The Health hazard regulation states that:

#### **Distance of wells from possible source of contamination**

- 8 (1) A person who installs a well, or who controls a well installed on or after July 20, 1917, must ensure that the well is located at least
- (a) 30 m from any probable source of contamination,
  - (b) 6 m from any private dwelling, and
  - (c) unless contamination of the well would be impossible because of the physical conformation, 120 m from any cemetery or dumping ground.



(2) A person who controls a well installed before July 20, 1917, must

- (a) remove any source of contamination within the distances set out in subsection (1), or
- (b) subject to subsection (3), decommission the well in accordance with Ground Water Protection Regulation.

(3) Subsection (2) (b) does not apply to a well located within 6 m of a private dwelling unless it can be shown that the well should be abandoned for a reason other than proximity to a private dwelling.

(4) A well that does not meet the requirements of this section is prescribed as health hazard.

# APPENDIX B: ASSURANCE STATEMENT

Note: This statement is to be read and completed in conjunction with the attached Water Source Investigation Report, *Engineers and Geoscientists BC Professional Practice Guidelines – Assessment of Groundwater at Risk of Containing Pathogens* (these guidelines) & Ministry of Health's Guidance Document for Determining Groundwater at Risk of Pathogens and is to be provided for the Determination of Groundwater at Risk of Containing Pathogens for the purposes of the *Drinking Water Protection Act*. It is important to note that the focus of this assurance statement is on providing assurance that the qualified professional has followed the suggested standard of practice defined in these guidelines – not on guaranteeing that the risks identified will be mitigated.

To: The Approving Authority/ Water Supplier

Date: \_\_\_\_\_

\_\_\_\_\_  
(Jurisdiction and address)

For the water source:

Water Supply System Name: \_\_\_\_\_ Well ID Plate Number: \_\_\_\_\_

Owner Name: \_\_\_\_\_ Owner Email: \_\_\_\_\_

Well Address: \_\_\_\_\_

GPS Coordinates of the Well: Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

Source of Coordinates (check one): GPS [ ] Google Earth [ ] Other (Please specify) [ \_\_\_\_\_ ]

Well Depth: \_\_\_\_\_ Well Diameter: \_\_\_\_\_

The undersigned hereby gives assurance that he/she is a professional registered with Engineers and Geoscientists BC, and the Qualified Professional for the project and attests that the standard of practice established in the guidelines has been applied in developing each deliverable/report that combined will comprise the Water Source Investigation Report.

The Water Source Investigation Report must be read in conjunction with this statement. The report supports and accurately reflects the assurances made in this assurance statement.

\_\_\_\_\_  
Name (print)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Telephone

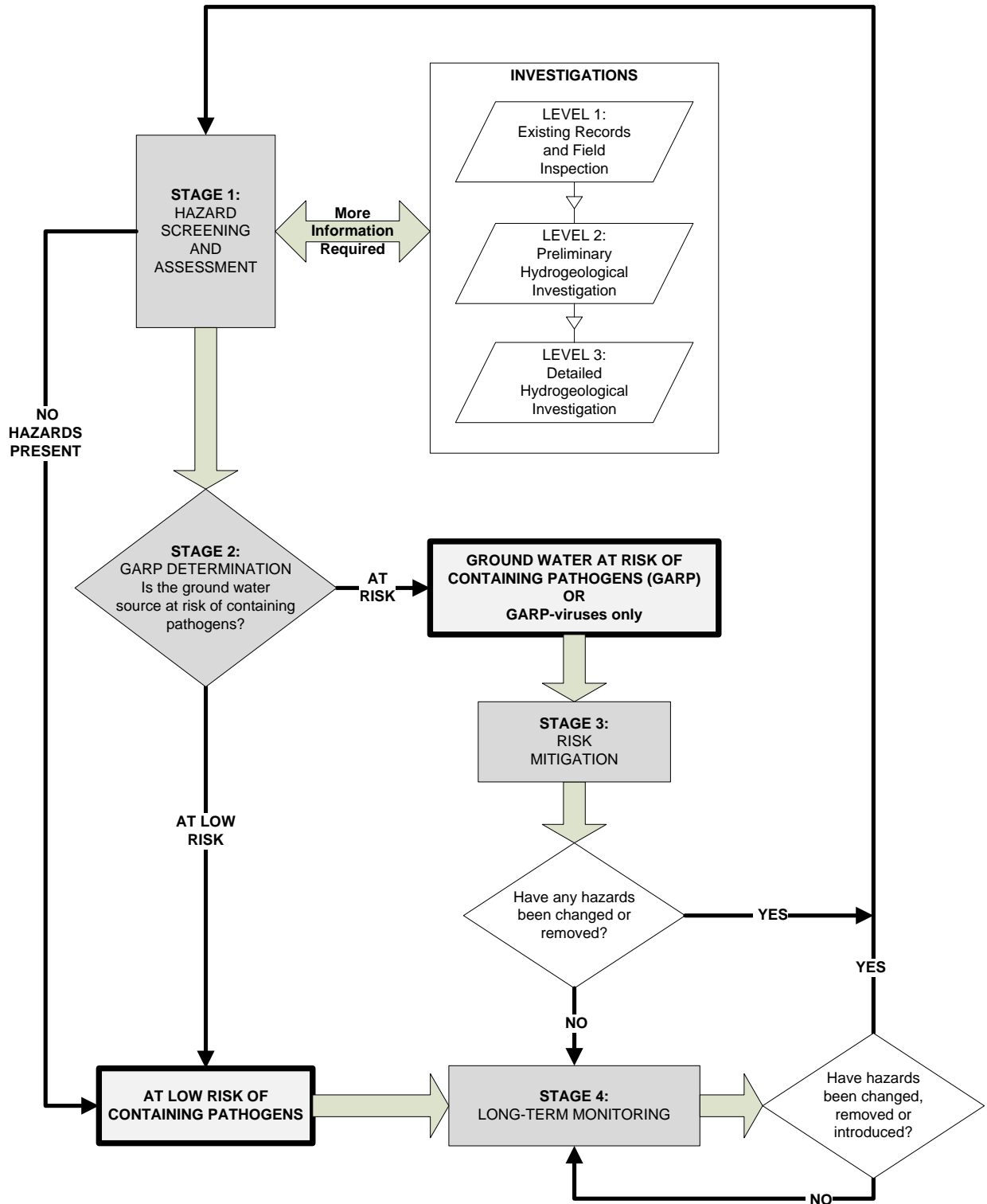
(Affix professional seal here)

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm \_\_\_\_\_

(Print name of firm)

# APPENDIX C: GARP DETERMINATION FLOWCHART



# APPENDIX D: LIST OF CONTRIBUTORS

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**PROFESSIONAL PRACTICE GUIDELINES: WATERSHED ASSESSMENT AND  
MANAGEMENT OF HYDROLOGIC AND GEOMORPHIC RISK IN THE FOREST SECTOR**

**DRAFT – 2019-02-27**

*Association of BC Forest Professionals*

*Engineers and Geoscientists BC*

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## **Acknowledgments**

These guidelines have been prepared by a Task Force of the Association of BC Forest Professionals (ABCFP) and Engineers and Geoscientists BC (EGBC Joint Practices Board (JPB). ABCFP and EGBC acknowledge the efforts of the JPB Task Force members, the ABCFP Professional Practice Committee, and the EGBC Division of Engineers and Geoscientists in the Resource Sector (DEGIRS) in preparing this document, the College of Applied Biology in reviewing the document, and of the members of the three associations who provided review comments (Appendix A).

## PREFACE

These professional practice guidelines—Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector (referred to herein as the guidelines)—were prepared by a team comprising members of ABCFP and EGBC. In this document, these are referred to as the association(s). the College of Applied Biology (CAB) contributed to the development of the guidelines by reviewing and commenting on the content of the document.

ABCFP's Code of Ethics (Bylaw 11) Section 3.1 states that the responsibility of a member to the public is "to advocate and practice good stewardship of forest land based on sound ecological principles to sustain its ability to provide those values that have been assigned by society." Water, aquatic ecosystem health, and public safety are examples of values assigned by society. To properly assess the potential hydrologic and geomorphic risks to these values from forest management activities, forest professionals often turn to specialist assessments for the forest lands under their management.

The primary duty of EGBC, as defined in the *Engineers and Geoscientists Act*, is "to uphold and protect the public interest respecting the practice of professional engineering and the practice of professional geoscience." The *Engineers and Geoscientists Act* imposes a specific obligation "to establish, maintain, and enforce standards for the qualifications and practice of its members and licensees."

The guidelines in this document were developed in response to concerns raised with respect to watershed and hydrologic assessments in British Columbia's (BC) forest sector, including matters related to the respective roles and responsibilities of registered professionals.

A letter to the Joint Practices Board (JPB) from the Division of Engineers and Geoscientists in the Resource Sector (DEGIRS), dated October 31, 2013 and signed by ten forest hydrology practitioners from ABCFP and EGBC stated that:

- "Currently there is no consistent guidance for forest professionals, including statutory decision makers approving Forest Stewardship Plans (FSPs), as to when and where a certain level of hydrological assessment is appropriate.
- "There is no conventional definition of "hydrological assessment." So even where a hydrologic assessment is specified in a FSP, in most cases what that assessment entails is not defined. This lack of definition has resulted in the development of hydrological strategies that are not measurable or verifiable.
- "The lack of guidance as to what is an appropriate hydrological assessment and when one should be carried out is resulting in serious inconsistencies in when and how hydrological assessments are used by forest professionals to meet their stewardship obligations and, by extension, in how well those obligations are being met.
- "For example, in many FSP-mandated hydrological assessments, there is a lack of content related to the cumulative hydrological effects of forest activities on water quality, water quantity or timing of flow at downstream elements potentially at risk.

- “Under the professional reliance model currently in effect in BC, once a FSP has been approved (see bullets 1 to 4 above), a Ministry of Forests Lands and Natural Resource Operations District Manager cannot refuse to issue a road or cutting permit based on an inadequate hydrological assessment. Government may verify that the assessment specified in the FSP was done, but does not review or approve the assessment specifically. Therefore, it is the responsibility of the relevant professional association(s), whose members complete them, to ensure that hydrological assessments are adequate for the conditions and risks involved.”

The DEGIRS letter proposed that the JPB develop professional practice guidelines for hydrological assessments for the forest sector.

In a special investigation of community watersheds, the Forest Practices Board (FPB) found deficiencies in both the management and the assessment of these watersheds (British Columbia Forest Practices Board 2014). One of the Board’s recommendations was:

**“Ensuring the content of professional assessments is meaningful.** The ABCFP and APEGBC should develop guidance for their members on the appropriate content of a watershed or hydrological assessment. This should include:

- the elements necessary to address government’s objectives for community watersheds including where the surface water source has changed to a groundwater source;
- procedures for considering cumulative hydrological effects at the watershed scale;
- integration of the needs of licensed waterworks; and
- examples of recommendations providing clear direction for implementation.”

In response to these concerns, ABCFP and EGBC Councils directed the JPB to establish a task force to develop guidelines for the standards of practice to be followed in managing hydrologic values and risks in watersheds where forest planning and operations are carried out in BC. This included standards of practice for members who carry out watershed assessments, and standards of practice for members who require and use watershed assessments to meet their legal and non-statutory stewardship requirements. This document:

- sets out the standard of practice for forest professionals who are responsible for managing hydrologic and geomorphic risks to values, including requiring development of a watershed risk management framework that establishes risk tolerance criteria, identifies when and what type of specialist assessments are to be carried out, and determines how risks are to be evaluated and managed for watershed values (Section 2), and
- sets out the standard of practice for members of ABCFP and EGBC who undertake watershed assessments, including the disturbances and watershed processes to be investigated (Section 3), and provides guidelines for carrying out hydrologic assessments (as distinct from watershed assessments).

These guidelines have been written for the information of ABCFP and EGBC members, statutory decision makers, regulators, the public at large, and a range of other stakeholders who might be involved in—or have an interest in—watershed risk management in BC. They provide a common level of expectation with respect to the degree of effort, due diligence, and standard of practice to be followed when managing watershed risks and carrying out watershed assessments in BC. The guidelines outline the appropriate standard of practice at the time that they were prepared. This document follows the most current language from the International Association for Standardization 31000:2018, Risk Management – Guidelines, in order to be consistent with both national and international standards. However, standards of practice are expected to be revised and updated as required to reflect the evolving state of practice.

There are certain situations that cannot be addressed by professional practice guidelines. There is currently no legislation that regulates total land use planning on the basis of watershed units, nor is there a statutory requirement for government to allocate harvesting rights on the basis of cumulative hydrologic and geomorphic effects in individual watershed units. In some specific watersheds and regions, government orders have been issued that express risk tolerance for fish habitat by imposing a maximum clearcut area threshold; but except in these cases, risk tolerance criteria have not been set by government for watershed values that could be affected by forest development activities. In the absence of specific legislation on these matters, these guidelines (Section 2) set out a process for forest professionals to exercise due diligence in assessing and managing risks in watersheds.

[These guidelines have been formally adopted by the Councils of ABCFP and EGBC, and form part of their ongoing commitment to maintain the quality of services members provide to their clients and the general public. Members remain professionally accountable for their work under the respective legislation regulating their professional work.] *Note: Statement to be included in Final Council approved guidelines.*

## DEFINITIONS

The definitions in this section are specific to these guidelines. These definitions are adapted from Risk Management -- Guidelines (CSA ISO 31000:18), LMH 66 (Pike et al 2010), and the International Glossary of Hydrology (WMO 2012). Members should indicate in their professional work what conventions they follow for terms used; and should provide definitions if they use terms other than as defined here.

Members should be aware that orders issued under the authority of the Land Act or Government Actions Regulation may have definitions of terms for watershed processes that are specific to the provisions of the order. The definitions are not the same in all orders, and not necessarily the same as the conventional use of the terms. Some examples are noted in Appendix B.

### ***ABCFP***

Association of British Columbia Forest Professionals.

### ***CAB***

College of Applied Biologists

### ***Consequence***

The effect on human well-being, property, the environment, or other things of value; or a combination of these. Consequence can be certain or uncertain and have positive or negative effects. Most commonly, consequence is considered to be the change, loss, or damage to *risk elements* caused by a harmful event such as a flood or landslide.

### ***EGBC***

Engineers and Geoscientists British Columbia.

### ***Forest management activities***

Activities carried out by *forest professionals* and others affecting forest ecosystems, including but not limited to, forest harvesting and roads, silviculture, forest wildfire prevention, suppression and post-wildfire risk management, forest pathogen suppression and post-attack rehabilitation, right-of-way clearing, etc.

### ***Forest Professional***

A registered member of ABCFP.

### ***Geomorphology***

The science of landforms with emphasis on their origin, evolution, form and distribution across the physical landscape.

### ***Hydrologic assessment***

An investigation of a particular area, site, process or event within a watershed unit, consistent with Appendix F of these guidelines. For the purpose of these guidelines, this type of assessment can involve a study of both hydrologic and geomorphic processes but may not include either the full scope of a *watershed assessment* or the entire area of a *watershed unit*. The objectives and scope of these assessments can vary widely, depending on the reason for the assessment.

### ***Hydrologic recovery***

In this document, hydrologic recovery refers to stand-scale interactions between forests and hydrologic processes, and means the extent to which a regenerating forest stand compares to a reference stand (typically a pre-disturbance stand) with respect to characteristics affecting streamflow response (rainfall interception, snowpack development and ablation behaviour).

### ***Hydrology***

The science that deals with the waters above and below the land surfaces of the Earth; their occurrence, circulation and distribution, both in time and space; their biological, chemical and physical properties; and their interaction with their environment.

### ***Hydrometric***

Pertaining to the measurement of components of the hydrological cycle including rainfall, flow characteristics of surface water, groundwater and water quality.

### ***Licensee***

An individual, company or Provincial Crown agency that has the legal right to carry out forest management activities on public or private land.

### ***Likelihood***

Chance of something happening. Likelihood is often expressed as the chance of occurrence over a given time period using relative terms such as very low to very high or very unlikely to almost certain. “Probability” is a mathematical expression of likelihood.

### ***Member***

A registered professional forester, registered forest technologist or special permit holder registered and in good standing with ABCFP; or a professional engineer, professional geoscientist, or holder of non-resident or limited license registered and in good standing with EGBC.

### ***Mitigate***

To take measures in advance to offset or reduce the likelihood of negative effects; for example, distributing harvest areas with regard to aspect, elevation zone, or other factors to reduce the likelihood that peak flow increases *will* occur, or to reduce the possible magnitude of peak flow increases, or to establish Standard Operating Procedures for road construction to reduce the potential for instability or drainage problems.

### ***Point of interest***



A point identified to establish the lower limit of a drainage area that is the subject of a watershed or hydrologic assessment. Typically, it is at the location of a value of interest (e.g., a water intake); or at a stream confluence or shoreline; or at the downstream limit of a fish bearing reach of interest.

***Professional Biologist***

Member of CAB.

***Professional Engineer***

Member of EGBC.

***Professional Geoscientist***

Member of EGBC.

***Remediate***

To take measures to fix effects after they have occurred; for example, deactivation of old unstable roads, implementing sediment control measures on active roads, etc.

***Risk***

The chance of injury or loss, expressed as a combination of the consequence of an event and the associated likelihood of occurrence.

Note: If specialists choose to use terms such as “hazard” that are not in these guidelines, they should define the term as it is used in their reports. The use of the term “hazard” to mean “likelihood” is discouraged.

***Risk analysis***

The systematic use of information to comprehend the nature of risk and to estimate the level of risk.

***Risk assessment***

The overall process of risk identification, risk analysis and risk evaluation.

***Risk elements***

*Values* that are put at risk by an identified source of harm, or potential harm.

***Risk evaluation***

The process of comparing the results of risk analysis with risk tolerance criteria to determine if the risk is acceptable, tolerable or unacceptable; weighs the estimated level of risk against the expected benefits.

***Risk identification***

The process of finding, recognizing and describing risks; involves identifying the values, the sources of risk (sources of potential harm), their causes and the potential consequences.

***Risk management***

Coordinated activities to control risks.

***Risk tolerance criteria***

References against which the significance of a risk is evaluated. Generally these are associated with defined qualitative or quantitative risk levels.

***Specialist***

An individual with specialized training, certification, and experience in a particular occupation, practice or branch of learning. Such individuals include but are not limited to registered professionals with specialized expertise such as fisheries, hydrology, geomorphology or fluvial geomorphology, slope stability, terrain mapping, erosion control and sediment management, aquatic or riparian terrestrial habitats, water quality, windthrow, forest health, human health; and non-professionals that may be individuals with certification in specific occupational skills. Typically, the lead specialist for a watershed or hydrologic assessment would be a specialist in hydrology and/or geomorphology.

***Stakeholder***

Any individual, group, or organization able to affect, be affected by, or believe they might be affected by, a decision or activity. Note that a decision-maker can be a stakeholder.

***Subordinate***

Any person, directly supervised by an EGBC professional or ABCFP professional who assists in the practice of the relevant profession; for example, a member in training, another person not registered or licensed to practice the profession(s) or another EGBC/ABCFP professional

***Values***

The specific or collective set of natural resources and human developments in a watershed that have measurable or intrinsic worth; can include human life and bodily harm, public and private property (including buildings, structures, lands, resources, recreational sites, and cultural heritage features), transportation systems/corridors, utilities and utility corridors, water supplies (for domestic, commercial, industrial or agricultural use);, aquatic and terrestrial habitats, visual resources and timber.

***Vulnerability***

A measure of the robustness (or alternatively the fragility) of a thing of value, and its exposure to a source of risk

***Watershed assessment***

Identification and analysis of hydrologic and geomorphic processes in a watershed unit that is consistent with Section 3 of these guidelines.

***Watershed unit***

The surface drainage area upstream of a defined *point of interest*. A watershed assessment may be for a single watershed unit, or may subdivide a large drainage area into smaller watershed units for the purpose of the assessment.

## 1.0 INTRODUCTION

These guidelines set out the standard of practice for forest professionals who have the responsibility to manage the hydrologic and geomorphic risks that forest management activities within their control may pose to the values in a watershed, and the standard of practice for members of both the ABCFP and EGBC undertaking watershed assessments used for forest management. It is not a manual of procedures for conducting the various technical components of a watershed assessment or for prescribing risk control measures. Members have a professional obligation to maintain proficiency in any technical work they undertake, including keeping informed on advances in knowledge in their area of practice.

Effective watershed management requires the following:

- an understanding of watershed processes and physical characteristics, including sensitive areas, past disturbances, current condition, and potential responses to future disturbances or actions,
- future objectives for watershed condition and watershed values,
- a defensible decision-making process for balancing risks and benefits,
- selection of strategies and prescribed measures to achieve the objectives set for watershed condition and values,
- oversight and quality control of these strategies and measures during implementation to ensure that they are carried out as prescribed,
- monitoring to determine whether the chosen strategies and prescribed measures have had the intended results (revising as necessary), and
- re-examination of watershed condition at appropriate intervals to determine whether the watershed trend in disturbance and recovery is in line with the longer-term objectives set for the watershed.

Forest professionals need to be aware of and understand the effects of other land use practices; however, where land use and ownership are mixed, watershed condition may be affected by factors beyond the control of forest professionals and forest land managers.

### 1.1 SCOPE

Section 1 of these guidelines sets out the basic concepts upon which the guidelines are based and provides a summary of the legal context. It also describes the appropriate knowledge, skill sets, and experience that members should have when providing professional services related to decision-making for watershed risk management, and when carrying out watershed assessments. Finally, it sets out the general professional practice expectations for members engaged in watershed risk management and watershed assessment.

Section 2 of these guidelines explains how to develop a framework for managing hydrologic and geomorphic risks in watersheds. A framework is a written document that provides the context, scope, and standards for identifying and managing these risks given forest management activities in a licensee's

operating area including when to undertake specialist assessments and what type of specialist assessment is required. Specialist assessments could range from site-level investigations to watershed assessments (Section 3).

Section 3 of these guidelines provides guidance for specialists undertaking watershed assessments. Various other site- and area-specific assessments (including hydrologic assessments) may be undertaken to investigate particular processes or events within a watershed unit.

Consistent with the JPB's terms of reference, these guidelines pertain to the practice of members of ABCFP and EGBC, and are for watershed risk management and watershed assessments associated with management of forests in British Columbia. It is recognized that watershed assessments, or similar assessments, may be carried out for purposes other than for managing forests or by members of other professional associations. While these guidelines were not intended to address such assessments some aspects of these guidelines may be informative in the preparation of watershed assessments for other purposes or done by other persons.

To be consistent with both national and international current standards, these guidelines follow language from the CSA ISO 31000:18, Risk Management – Guidelines (2018).

Watershed assessments completed under these guidelines may identify floodplain areas, landslides, and potentially unstable terrain within watershed units, and may make recommendations for those areas pertinent to watershed risk management for forest management activities. However, the assessments and analyses covered under these guidelines are **not** terrain stability assessments, landslide hazard assessments for residential development, flood hazard assessments or floodplain maps for residential development, or flood frequency analyses for community planning or the design of infrastructure. Refer to the applicable guidelines:

- Professional Practice Guidelines: Professional Services in the Forest Sector—Terrain Stability Assessments (APEGBC/ABCFP 2010)
- Professional Practice Guidelines: Legislated Flood Assessments in a Changing Climate in BC (APEGBC/ABCFP/NRCan 2012)
- Professional Practice Guidelines: Legislated Landslide Assessments for Proposed Residential Developments in BC (APEGBC May 2010)
- Professional Practice Guidelines: Flood Mapping in BC (APEGBC 2017)

Similarly, while a watershed or hydrologic assessment may comment on the potential for forest removal and regrowth to affect infiltration and groundwater or for forest roads to intercept subsurface seepage, the assessments under these guidelines are not groundwater investigations and are not source water assessments for water supply systems under the Drinking Water Protection Act.

### 1.1.1 BASIC CONCEPTS

These guidelines are based on the following requirements (see Appendix B):

- adherence to the *Foresters Act*, R.S.B.C. 2003, c. 19,

- adherence to the *Engineers and Geoscientists Act* R.S.B.C. 1996, c. 116 (as amended),
- fulfillment of members' professional obligations to protect the interests of the public, worker safety, and the environment,
- reliance on the training, experience, and professionalism of members, and
- involvement of specialists with expertise in a range of disciplines where needed.

The British Columbia (BC) government has granted the ABCFP and EGBC legislative authority to regulate members working in the forest sector. This authority includes determining which professional activities members of the respective associations can carry out. These guidelines have been prepared by the JPB, which comprises members of both associations. The JPB was mandated by the Councils of the associations, in a Memorandum of Understanding originally signed in 1994 and updated most recently in 2015, to make recommendations to the Councils on matters related to the practice overlap between the professions.

The associations recognize that the management of forested watersheds in the context of forest development, and risk management decisions, are included within the definition of the practice of forestry and are not an area of practice overlap. However, watershed assessment as described in these guidelines is an area of practice overlap as set out in the language of the respective acts.

The provincial government regulates forest management in BC separately on Crown versus private land. The *Foresters Act* does not distinguish the practice of forestry by land ownership. Watershed management practices as described in this document must be consistent with all applicable legislation governing the practice of forestry and forest management on the area managed by the forest professional. These professional practice guidelines apply to members of ABCFP and EGBC regardless of land ownership or employment situation.

In the event of any inconsistencies or contradictions between these guidelines and legislation, the latter shall prevail.

### 1.1.2 LEGAL CONTEXT

The legal context surrounding watershed management and watershed assessments for forest management includes (Appendix B):

- the acts and bylaws governing ABCFP and EGBC
- the regulation of forest practices on Crown land
  - *Forest and Range Practices Act* (FRPA)
  - Forest Planning and Practices Regulation (FPPR)
  - Government Actions Regulation (GAR))
  - legal orders established under the *Land Act*, and
- the *Private Managed Forest Land Act*, and accompanying Private Managed Forest Land Regulation.

As of the date of these guidelines, watershed assessments are a specific legal requirement only in the Haida Gwaii and Great Bear Land Use Objectives Orders. They are triggered when certain thresholds are reached or before variations from specified treatments can be made. Elsewhere in the regulatory regime, watershed assessments only become a legal requirement if they are committed to in an approved FSP as a means of addressing objectives outlined in regulations or land use orders on Crown land. Watershed assessments are not a requirement in any part of the legal context governing forest operations on private forest lands.

While watershed assessments are not currently a legal requirement in most circumstances, many forest professionals managing both Crown and private forest lands complete watershed assessments to meet their stewardship obligations, and to make informed decisions about forest management activities. Section 2 provides guidance to forest professionals for developing a framework that sets out when a watershed assessment is needed.

The *Drinking Water Protection Act* (DWPA) also has implications for the stewardship obligations of forest professionals, though it does not impose direct requirements or limitations on forest operations. Under the DWPA, water suppliers can be directed to undertake a source assessment that includes identifying threats. These threats may be to water quantity or quality, or may relate to the potential for damage to infrastructure. Source assessments carried out in watersheds where forest operations are taking place often identify forest operations as threats or risks. Where threats have been identified, a forest professional may have a watershed assessment done to provide guidance for forest planning in the water supply watershed.

## **1.2 PROFESSIONAL PRACTICE EXPECTATIONS**

### **1.2.1 PROFESSIONAL CONDUCT AND APPLICABILITY OF THE GUIDELINES**

Professional due diligence refers to the standard of practice required of a member acting reasonably and prudently in any given situation, and can be described as exercising the same care as that used by a reasonable professional under the same or similar circumstances. It includes taking all necessary steps to enable the member to demonstrate to those who may question his/her work that appropriate consideration was given to all relevant factors. A crucial aspect of professional due diligence includes keeping and maintaining appropriate documents and files.

By following the guidelines in this document, a member will fulfill his/her professional obligations, especially with regard to the relevant Code of Ethics and his/her duty to protect public safety and the environment. Failure of a member to meet the intent of these guidelines could be evidence of unprofessional conduct, and could lead to disciplinary proceedings by the relevant professional regulatory body. However, a member's decision not to follow one or more aspects of these guidelines does not necessarily mean that he/she fails to meet their professional obligations. Such judgments and decisions depend upon weighing facts and circumstances to determine whether another reasonable and prudent member, in a similar situation, would have conducted himself/herself similarly. A member who

does not follow these guidelines is expected to explain why, and to note what steps were taken to achieve an equivalent standard of practice.

A member must exercise professional judgment when providing professional services. As such, application of these guidelines will vary depending on the circumstances. The associations support the principle that a member should receive fair and adequate compensation for professional services, including services provided to comply with these guidelines. However, an insufficient fee does not justify services that do not meet the intent of these guidelines. These guidelines can assist in establishing the objectives and scope of watershed assessments, level of service, and terms of reference of a member's agreement with a client.

These guidelines are influenced by current provincial legislation and its application by local government, provincial case law, advances in knowledge, and evolution of general professional practices in BC. As such, they may require updating from time to time.

### 1.2.2 PRINCIPLES OF STEWARDSHIP AND SUSTAINABILITY

ABCFP's Bylaw 12.6.1 (Standards of Professional Practice—Stewardship) states that “members demonstrate stewardship by balancing present and future values against the capacity of the land to provide for those values.”

EGBC's Sustainability Guidelines (2016) require that “within their scope of practice, EGBC professionals have a responsibility to:

1. maintain a current knowledge of sustainability,
2. integrate sustainability into professional practice,
3. collaborate with peers and experts from concept to completion,
4. develop and prepare clear justifications to implement sustainable solutions, and
5. assess sustainability performance and identify opportunities for improvement”

The foundation principle of these guidelines is the involvement of members from both associations in the assessment and management of forested watersheds. In setting out how this is to be achieved, these guidelines support the sustainability goals of both associations.

### 1.2.3 ROLES AND RESPONSIBILITIES

See Sections 2 and 3 for roles and responsibilities specific to risk management and watershed assessment, respectively.

The associations encourage their members to disclose to the client whether or not they hold professional liability insurance that covers the services to be undertaken by the member. In particular, a member of EGBC must comply with the requirements of EGBC Bylaw 17 regarding professional liability insurance. All members must sign and seal their work.

#### 1.2.4 SUPERVISION OF SUBORDINATES AND SPECIALISTS

A member may delegate tasks to others who work under his/her direct supervision, or may rely on the work of other members or non-professionals who have the skill sets necessary to complete a task and take responsibility for it. The member who is delegating should provide sufficient direction to other team members commensurate with their level of expertise. When seeking advice from a specialist, the member is responsible for checking that the specialist is qualified and competent to give that advice, and that the advice given makes sense based on the member's own personal knowledge.

In this document, a "subordinate" is defined to mean "any person, directly supervised by an ABCFP professional or an EGBC professional, who assists in the practice of the relevant profession; for example, a member in training, another person not registered or licensed to practice the profession(s), or another ABCFP/EGBC professional." "Direct supervision" means the responsibility for the conduct and control of the work of a subordinate. EGBC members must comply with EGBC Quality Management Guidelines for Direct Supervision.

The member accepts full responsibility for all work delegated to a subordinate and must be certain that the delegated work meets the standard expected by the member. In providing direction to a subordinate, the member having overall responsibility should consider:

- the complexity of the work and the level of risk,
- which aspects of the professional work, and what proportion of those aspects, should be delegated,
- the training and experience of individuals to whom work is delegated, and
- the amount of instruction, supervision, and review required.

In the case of field work, such supervision would typically take the form of specific instructions on what to observe, check, confirm, test, record, and report back to the member. The member should exercise judgment when relying on delegated field observations by conducting a sufficient level of review to be satisfied with the quality and accuracy of those field observations.

There are a number of ways in which the work of different members on a project team can be incorporated into a comprehensive document. One way is for the author of the assessment to include the signed and sealed reports of other specialists who are registered professionals as appendices in the author's report. Typically, the author would incorporate the findings of the other specialists into his/her report, with appropriate references. Another way is for the individual specialists' reports (where the specialist is a registered professional) to be completed as modules, each addressing a component of the assessment, which are then compiled in an umbrella document that synthesizes the findings of the various modules. In either case, the protocols noted above should be put in place, and each member must sign and seal and take responsibility for his/her own work. It is expected that specialists will submit a Statement of Assurance on completion of their work (see examples, Appendix G).



When using the work of specialists who are not registered professionals, the author would typically incorporate the specialist's input into his/her professional report, appropriately referenced and with supporting information provided in an appendix, as applicable, including a Statement of Assurance from the specialist. The non-professional specialist's input thus informs the professional report that is signed and sealed by the author.

#### 1.2.5 SUPPORTING RATIONALE

Members must provide documented rationale to support their professional judgments and decisions, including methods chosen, conclusions reached, and judgments made. Forest professionals have an obligation to demonstrate how conclusions have been reached (ABCFP 2014). Their rationales for risk management decisions should be based on information from watershed and/or other specialist assessments and analyses, and on their own knowledge and experience. The rationale explains the reasoning behind the professional judgment and recommendations.

The basis for judgments in specialist reports can derive from findings in the scientific literature, comparison to past events in similar nearby sites, reference to other studies in the region, and other defensible explanations. Reports should clearly distinguish between what is fact (as directly observable, measurable or verifiable) and what is inferred; and should indicate the extent of any uncertainty. Such uncertainties should be identified and discussed in the report and incorporated into rationales.

#### 1.2.6 QUALITY MANAGEMENT AND DOCUMENTATION

Quality management is required for all professional work completed by members. The purpose of quality management is to check that the completed work is technically correct and complies with applicable codes, standards, and regulatory requirements. Quality management by members requires the implementation of suitable protocols to ensure that appropriate quality assurance and quality control reviews are completed.

For ABCFP registered members and special permit holders or certificate holders entitled to practice in this area, the Standards of Professional Practice contain competence and due diligence direction to ensure the quality of professional work. Competence requires that professional practice include three essential components: knowledge, completeness and correctness, and professional care (ABCFP Bylaw 12.2). ABCFP members exercise due diligence in professional practice by being prudent and doing all work with constant and careful attention (ABCFP Bylaw 12.5). An ABCFP member can exercise due diligence in professional practice by satisfying himself/herself that (Standards of Professional Practice: Guidelines for Interpretation for Bylaw 12.5.1 Due Diligence):

- “All relevant legal requirements have been met;
- The member has a clear understanding of client or employer objectives and how they relate to other values or interests which are relevant to the work or may impact it;
- The member is personally familiar with all relevant characteristics of the area affected by the work;

- All appropriate background information has been gathered and incorporated;
- The member has consulted with all appropriate experts or specialists for those areas for which the member is not qualified to practice or express an opinion;
- When external advice is sought from a specialist, that specialist is qualified and competent to give that advice and the advice given makes sense based on the member's own personal knowledge;
- When data is collected by another person, that person is qualified and competent to collect that data and the data collected makes sense based on the member's own personal knowledge;
- Sufficient data was collected to the required standards; and
- The member has made a proper assessment of risks and outcomes.”

and that:

- rationales for decisions to accept, control, or reduce risks have been documented, and
- the forest professional has signed and sealed the work for which he/she is responsible.

Forest professionals must retain all documentation, including checklists and reference to standard operating procedures or other mechanisms that demonstrate that all appropriate procedures were followed and confirm that all relevant steps and considerations were included. They must also retain all background information including specialist assessments upon which they relied to formulate the rationale for their decisions. The requirement for documentation applies both to development of a framework and to decisions made under that framework.

For EGBC members and holders of non-resident or limited licenses, a quality management program must satisfy the requirements of EGBC Quality Management Bylaws 14(b) (1), (2), (3), and (4). These requirements encompass:

- retention of complete project documentation for a minimum of 10 years,
- documented checks of engineering and geoscience work,
- documented field reviews (if assessments or analysis make recommendations for specific site works) to ascertain whether the significant aspects of the work are in general compliance with the plans and supporting documents,
- direct supervision, and
- use of the EGBC seal.

#### 1.2.7 INDEPENDENT REVIEW OF PROFESSIONAL WORK

The associations consider independent reviews to be an important part of quality management of professional practice. The need for and scope of an independent review is based on the professional judgment of the member. The specialist should consider the complexity of the hydrologic and geomorphic environment; the potential level of risk; the availability, quality, and reliability of background information and field data; and the specialist's training and experience. The reviewing member should also be a specialist who is qualified to carry out the review competently. The review

should be documented in a signed and sealed letter or report from the reviewing member that includes an assessment of the limitations and qualifications with regards to the review and its results.

Occasionally, a member is retained to provide a second opinion, which goes beyond the scope of reviewing the work of the original member. The second member should carry out sufficient pre-field work, field work, assessment, and comparisons, as required, to accept full responsibility for his/her second opinion findings.

### 1.3 EDUCATION, TRAINING, AND EXPERIENCE

Professional competence refers to having sufficient knowledge, ability, and experience to correctly undertake and complete the necessary tasks. The member must adhere to their respective Code of Ethics and have the appropriate education, training, and experience consistent with the services required. Professional competence gives the public, employer, and the professions as a whole confidence that the professional has the capacity to deal adequately with any matters undertaken on their behalf. A member who offers specialty services requires education, training, and experience in the area of specialty. Members who undertake professional work without sufficient skills may be subject to disciplinary action.

Professional competence in a subject area is gained from a combination of these sources:

- formal study such as university courses, or equivalent knowledge gained from short courses, workshops, and self-study,
- work experience, usually with mentoring by a senior professional with relevant expertise,
- continuing professional development: keeping abreast of emerging literature, research and studies; attending conferences, workshops, seminars, and technical presentations; reading new texts and periodicals; reading relevant web content; and participating in field trips, and
- typically, a minimum of five years of work experience in this field of practice working under the supervision or mentoring of a senior professional.

A professional level of knowledge means a combination of the equivalent of university-level courses plus sufficient work experience to have gained professional competence, as would be judged by other competent professionals undertaking the same work. Where a member of either association does not have the full skill set for a particular professional activity, the required skills can be met using a team approach. Each team member must be competent in his/her own tasks and have an understanding of how his/her work fits within the overall objectives of the team. The professional coordinating the team must also have sufficient knowledge to assess the accuracy of the results provided by each team member to achieve the intended outcome (see Section 1.3).

#### 1.3.1 FOREST PROFESSIONAL LEADING THE DEVELOPMENT OF A WATERSHED RISK MANAGEMENT FRAMEWORK

In these guidelines, “forest professional” refers to the member of ABCFP with the responsibility for making forest management decisions on watershed values, and “specialist” refers to members of either association or non-members who undertake watershed, hydrologic, or other assessments to support the forest professional.

A forest professional who leads the development of a watershed risk management framework (Section 2) must be a member in good standing of ABCFP. The member should have experience leading interdisciplinary teams and working with stakeholders; have a basic understanding of watershed processes and management; and have good communication and technical writing skills. The forest professional is responsible for establishing the scope of watershed assessments and other specialist assessments, for understanding sources of risk and consequences in determining acceptable risk, for accepting or not accepting recommendations, and for balancing multiple values in all final decisions regarding activities in a watershed.

### 1.3.2 SPECIALIST COMPLETING OR LEADING A WATERSHED ASSESSMENT

It is generally accepted that forest hydrology is an interdisciplinary field practised by members of several professions with varied academic backgrounds. Members of ABCFP and EGBC undertaking watershed assessments in BC (Section 3) should have demonstrated knowledge of: fundamental hydrologic and fluvial processes at both forest stand/stream reach and watershed scales, forest ecology, resource management, cumulative hydrologic effects, data analysis, and report writing. They must also have the ability to apply scientific principles and judgment to evaluate watershed condition and disturbance (see Appendix C).

The member leading a watershed assessment normally has a graduate degree in science, an applied science or equivalent that is focused on forest hydrology and/or geomorphology, or is in a relevant discipline such as geoscience, engineering, or forestry, and has at least five years of professional experience. If a member does not have a graduate degree or equivalent, he/she is expected to involve a qualified senior specialist. This specialist will either undertake a peer review or complete those aspects of the assessment/analyses for which the member does not have the required training. All watershed assessments completed by a less experienced professional should be reviewed by a qualified professional.

The skills required of a specialist completing or leading a particular watershed assessment vary depending on the key issues. For example, if terrain stability, sediment sources, or channel morphology are likely to be most significant, then it would be appropriate for the specialist to have a strong background in geomorphology or fluvial geomorphology with a working knowledge of hydrologic processes. If stream flow change is likely to be the most pressing concern, then the specialist would normally have a strong background in forest hydrology with a working knowledge of geomorphic processes. All members conducting watershed assessments should have good communication and technical writing skills.

If the specialist does not have the full range of expertise for a particular assessment, a team approach is recommended to include specialists with expertise in those areas. It is the responsibility of all members to practice only within the scope of their expertise and to recommend to the forest professional to engage other more appropriately qualified professionals when necessary. Refer to Section 1.2.4 regarding incorporating the work of other specialists.

## **2.0 PROFESSIONAL PRACTICE IN MANAGEMENT OF HYDROLOGIC AND GEOMORPHIC RISKS IN FORESTED WATERSHEDS**

This section sets out the standard of professional practice for forest professionals who have the responsibility to manage hydrologic and geomorphic risks in forested watersheds.

As outlined in Figure 1, risk management requires a framework that:

- is appropriate in the context of the licensee's organization, regulatory environment, and physical extent of operations,
- identifies the watershed values that could be put at risk by management actions or outside influences (the sources of harm) including climate change (Risk identification),
- estimates the existing risk level and the change in risk that could be caused by additional disturbance (Risk analysis),
- establishes risk tolerance criteria for the identified values (a step in Risk evaluation),
- sets out a logical process for comparing risk levels to the risk tolerance criteria (Risk evaluation),
- identifies measures to avoid, limit, or reduce risk (Risk treatment),
- provides for communication with affected parties both within the licensee's organization and potentially affected parties outside the licensee's organization (External Communication), and
- includes a monitoring and review process to check the effectiveness of the system (Monitoring and Verifying Outcomes).

### **2.1 FRAMEWORK FOR THE MANAGEMENT OF HYDROLOGIC AND GEOMORPHIC RISK**

A framework is a written document that provides the context, scope, and standards for managing risks from forest management activities in a licensee's operating area. A framework is intended to optimize the use of organizational resources by focusing the greatest efforts on the areas of greatest concern. In managing risks to watershed values, the following principle should apply: as the severity of consequence increases, the degree of caution applied to risk management also increases.

Depending on the size and complexity of the licensee's operating area, a licensee may have a single framework that applies to all operating areas, or separate frameworks for individual operations and watersheds. A framework can apply to a licensee's holdings throughout the province or to a specific area such as a woodlot. If objectives have been set by the provincial government for a watershed, the framework must incorporate those objectives. For watershed units that have experienced impacts from historic logging practices, natural disturbances or watershed processes, it is desirable to have management objectives that allow for recovery of watershed function and values.

A framework that applies to a small area or individual watershed unit may be quite simple. However, if a single framework is to be applied over a large area, it may need to accommodate a wide variety of hydrologic regimes, geomorphic conditions, watershed values, and societal concerns. Areas of special emphasis in this type of framework would typically include:

- watersheds that provide community water supplies,
- watersheds where there are potentially high consequences for non-forest development such as residential, commercial or industrial development, or critical agricultural or public infrastructure,
- watersheds designated by law as being of special significance (such as Fisheries Sensitive Watersheds), and
- watersheds with red-listed aquatic species or with especially sensitive, degraded, or productive fish habitat.

A checklist to assist with developing a framework is in Appendix D.

## 2.2 RISK MANAGEMENT

### 2.2.1 WATERSHED RISK MANAGEMENT CONTEXT

A risk management framework should consider the licensee's internal organizational context and should:

- set out roles and responsibilities for application of the framework, communication protocols, lines of authority and decision-making responsibilities within the licensee's organization, including decisions associated with various levels of risk,
- integrate with other organizational systems the licensee may have for quality control, reporting systems, document management, environmental management, etc.,
- integrate with operational strategies or standard operating procedures that a licensee may have in place that are relevant to watershed processes (e.g., a terrain stability management model (APEGBC 2008), road construction and maintenance standards and procedures),
- document resources the organization has available to support the framework, and
- identify any limiting factors.

A framework should consider the external regulatory contexts of the licensee's operating area and should:

- consider public health and safety, worker safety, public infrastructure, the property of others, and other values required to be considered by legislation (e.g., subjects indicated in the *Forest and Range Practices Act* (FRPA) Sections 149 and 150 for lands that these sections are applicable to),
- identify and align with:
  - the regulatory regime applicable to the licensee's operating area under the framework; for example, legislation applicable to private managed forest land and Crown land tenures
  - regulatory operational rules that may be specific to the operating area; for example, Government Actions Regulation orders for land use objectives or identified resource features, such as community watersheds or Fisheries Sensitive Watersheds, and

- other existing watershed or management objectives, management systems, or commitments that a licensee may have in place such as FSPs, and certification programs, and
- define the geographic area to which the framework applies.

Good professional practice supports a framework that considers the physical contexts of the licensee's operating area and,

- identifies major watershed units, regional climate, dominant stream flow regime, general geomorphic and terrain characteristics, biogeoclimatic zones, typical forest types and hydrologic characteristics, etc., and
- notes any specific challenges in the operating area; for example, multiple land uses or tenure holders in watershed units.

### 2.2.2 MULTIPLE TENURES IN A WATERSHED

Watershed management faces particular challenges when forest tenures and land ownership in a watershed unit are fragmented, and when there are multiple forest tenures and/or land uses such as agricultural, industrial, commercial, or residential development. There is currently no general legislation that regulates total land use planning on the basis of watershed units, nor is there a statutory requirement for government to consider cumulative hydrologic effects when issuing harvesting rights.

Where a licensee's operating area is only part of a watershed unit, the framework should provide guidance to the forest professional for making risk-based planning decisions in this situation. Members are not expected to assume responsibility for matters beyond their scope of authority. However, neither can forest professionals ignore the potential for harm to be caused by forest management activities under their direction.

Where there are multiple forest management or land tenures in a watershed unit, the most desirable and professionally responsible outcome is that the forest professional engages the cooperation of those who manage other tenures with respect to risk management in the watershed. This could be achieved, for example, by sharing information and conducting joint watershed assessments and risk analyses, or by mutually agreeing on risk tolerance criteria and risk mitigation strategies.

The framework should indicate what course to take to achieve this cooperation. If this course is unsuccessful, the forest professional must document the efforts made and provide a rationale for decisions made for the licensee's operations in the absence of a risk management strategy that covers the total watershed. In keeping with ABCFP's Code of Ethics Bylaw 11.3.4, if the forest professional believes that a practice is detrimental to good stewardship of forest land, or Bylaw 11.3.10 to the safety, health, and welfare of the public then, he/she shall notify the responsible person promptly. A Practice Bulletin on the Duty to Resolve or Report provides the direction to forest professionals in such circumstances.



### 2.2.3 RISK TOLERANCE CRITERIA

The framework should identify the types of harm that could affect the values as a result of forest management activities, and the consequences that would be of concern (the risk tolerance). When setting risk tolerance criteria, different risk elements (e.g., human safety, infrastructure, ecological values) should be evaluated separately (see Appendix E for examples).

The risk management framework should either identify the values to be considered or describe a procedure by which these are identified. Identification of values may arise from the licensee's existing information base; from targeted assessments, inventories or government data sources; and through communication with local governments, First Nations, non-governmental stakeholders, and others. A framework is intended to optimize the use of organizational resources by focusing specialist assessments where forest management activities may have a potential detrimental effect on watershed values.

A value becomes a risk element when a source of harm, or potential harm, to the value is identified.

At this time, risk tolerance thresholds have not been set by government for watershed values that could be affected by forest development activities. Thus, it rests with the forest professional developing the framework to exercise due diligence in defining risk tolerance criteria. The definition of due diligence includes ensuring forest professionals have made a proper assessment of risks and outcomes, and have consulted the appropriate expert or specialists in those areas where they are not qualified (ABCFP 2014).

In determining risk tolerance criteria for values in a framework (human safety, water quality and supply, ecology, infrastructure, etc.), a forest professional should recognize in the framework that those deriving direct economic benefits from forest harvesting may have different levels of risk tolerance than others who could be affected by forest management activities but do not benefit directly from them. The framework should provide guidance regarding the establishment of risk tolerance criteria for specific values that considers both the accuracy and uncertainty of available information. Criteria set in a framework for acceptable or tolerable risk should take into consideration the relative severity of the consequences, the ability to mitigate the consequences with risk control measures, and the possibility and practicability of remediating consequences should they occur.

In future, levels of acceptable, tolerable, and unacceptable risk set in a framework should be consistent with any standards that may be set by provincial government and precedents set in case law.

### 2.2.4 ADDRESSING CLIMATE CHANGE IN WATERSHED RISK MANAGEMENT

Climate change is expected to affect forest stand structure, tree growth, and species distribution as a result of ecological responses currently underway and including a higher frequency of wildfire, insect attack and disease, increased moisture stress, and changes in the growing season. Combined with increased variability in weather, these changes are also affecting hydrologic and geomorphic processes. For example, terrain stability may change (improve in some regions and worsen in others) in

conjunction with changes in precipitation, snowmelt patterns, windthrow, and forest species. Stream hydrographs are expected to continue adjusting in response to changes in temperature and precipitation. Depending on the stream flow regime, forest cover changes may exacerbate or compensate for these hydrograph changes. Additionally, local and provincial governments and others are implementing climate change adaptation initiatives that alter forest management practices in specific zones and regions of the province. For example, fuel-management measures in wildland fire-interface zones (*e.g.*, shaded fuel breaks, fire-resistant tree species, and creation of open stands in high-risk fire areas) have implications for watershed hydrology and members should be aware of these developments by consulting with Association websites and other appropriate resources.

Changes in forest species, regeneration patterns, and growth rates are also expected to affect rates of post-disturbance hydrologic recovery. These changes are relevant to risk tolerance criteria set in the framework, risk control measures and assumptions made in specialist assessments, and levels of uncertainty faced in assessing and managing hydrologic and geomorphic risks when planning forest development. For example, if landslide frequency increases as a result of increased frequency and intensity of rainstorms, a framework could call for revisiting risk tolerance criteria for potential landslides to affect stream channels and watershed values. Another example is if extreme floods are occurring more frequently, this could affect targets set in a framework for recovery of floodplains destabilized by historic floodplain logging. The forest professional should confirm that specialist assessments adequately consider projected forest changes when identifying or analysing risks and should also consider how these changes affect the “shelf life” of specialist assessments.

## **2.3 RISK ASSESSMENT**

Risk assessment comprises the steps of risk identification, risk analysis, and risk evaluation (ISO 2018; Fig. 1). Risk identification involves identifying and describing sources of risk and the potential consequences. Risk analysis estimates the level of risk, typically as an expression of the severity of the consequence combined with likelihood of occurrence. Risk evaluation compares the risk levels estimated in a risk analysis with risk tolerance criteria.

Both forest professionals and specialists have roles in risk identification and risk analysis, while risk evaluation is the responsibility of forest professionals. Section 2.8 addresses the role of the forest professional in risk assessment.

### **2.3.1 RISK IDENTIFICATION**

The forest professional is responsible for identifying watershed values and their locations. Risks to watershed values associated with forest management activities can arise from:

- changes in streamflow regime, including the frequency, magnitude, volume and timing of flows,
- increases in fine and coarse sediment delivery to streams,
- loss or introduction of wood into streams,
- mass-wasting events (*e.g.*, landslides, erosion),

- changes in riparian vegetation that affect channel processes and quality of aquatic habitat, and
- the collective effects of all of the above.

A forest professional can choose a phased approach, which may involve retaining a specialist to undertake an office review of existing information to identify potential sources of risk, to review whether any or all aspects of the existing information requires updating, or to characterize a large watershed at an overview level for the purpose of identifying where a more detailed review or specialist assessments should be focused. Based on the identified sources of risk, the framework should provide guidance to the forest professional on how to select the appropriate type and scope of specialist assessments in order to estimate risk levels with an adequate level of confidence. The framework should indicate when site-level or targeted assessments are needed and when a watershed assessment is needed (Section 3). Possible triggers in a framework for conducting watershed assessments should also include any commitments made in formal plans (e.g., Forest Stewardship Plans) or corporate policy; and regulatory directives (e.g., Land Act or GAR orders),

The forest professional, in consultation with the specialist(s), should then identify the necessary resources and the most effective approach to adequately investigate the hydrologic and geomorphic processes affecting or affected by forest management activities, and the consequent effects on values.

The forest professional is responsible for obtaining the required information from the appropriate specialists to make defensible decisions consistent with the level of risk and the objectives for the watershed. The forest professional is also expected to use resources wisely and cost-effectively. The framework should provide guidance on determining the need for and scope of specialist assessments and inventories to inform risk assessment, and should integrate with other risk assessment guidance that the licensee may have in place for terrain stability, windthrow, streams, fans, floodplains, snow avalanches, karst, etc.

### 2.3.2 RISK ANALYSIS

A risk analysis to inform forest management decisions evaluates both the existing risk level (e.g., the potential for stream flow change to occur as a consequence of past disturbance in the watershed), and the change in risk that might be caused by further disturbance (e.g., future forest harvesting scenarios) or recovery.

The forest professional may include certain risk analyses for watershed-scale effects such as stream flow change in the scope of a watershed assessment (Section 3), and have site-level assessments done to make risk decisions on specific roads and harvest areas. Examples of site-level assessments that include risk analyses are terrain stability assessments, windthrow assessments, hydrologic assessments (Appendix F), and geotechnical assessments of old roads. For some sources of risk, such as stream flow change, data limitations and limited scientific knowledge about the region may result in considerable uncertainty in risk estimates.

### 2.3.3 RISK EVALUATION

The forest professional evaluates risk by comparing the existing and, if applicable, the change in risk estimated in the risk analysis, to risk tolerance criteria that outline the consequences of concern established in the framework (see Section 2.2.3). On the basis of this comparison, the framework should provide guidance for determining whether the risks are acceptable, tolerable, or unacceptable, and who within the licensee's organization is responsible for this decision. The forest professional may seek input or further investigation from specialists to elaborate on consequences; for example, to more clearly determine the nature of the effects on watershed risk elements and the type of harm that could result (see supplementary notes in Appendix E). The forest professional considers whether the risks can be kept within acceptable or tolerable limits with available mitigative measures. If this is not practical, then the proposed activity is scaled back or withdrawn.

In making risk-based decisions, the forest professional should take into account uncertainties with respect to the accuracy of information available, and uncertainties inherent in assumptions used for identification and analysis of risk. In some situations, risk evaluation may involve balancing the risks of carrying out the forest management activity against the risks that would occur if the forest management activity were not carried out. An example would be increasing watershed area disturbed above an established threshold through forest salvage, versus increasing the likelihood of negative forest health agents (e.g., insect infestation, disease) and fire.

When the forest professional is evaluating risk, he/she considers the results of all relevant specialist assessments and analyses, and also considers the societal factors on which the risk tolerance levels are based.

## **2.4 RISK TREATMENT**

Once risk has been evaluated, and it has been determined that measures for reducing risk are required, the forest professional considers the options available for risk control. Measures for reducing risk are aimed at either reducing the likelihood of occurrence, or reducing the severity of the consequence. Some risk control measures are undertaken at the planning stage and are incorporated into forest harvesting and road layout plans. Others involve standard measures, practices, and procedures to mitigate risk and promote consistency in carrying out forest operations. In some instances, allowing time for recovery of geomorphic and hydrologic processes may be an effective means of remediating risk.

In most cases, if the risks associated with forest management activities are deemed unacceptable, they are managed by avoiding, limiting, or reducing the source of risk. Less commonly, the vulnerability of risk elements is reduced through protection measures. Occasionally, licensees seek other solutions for offsetting risk.

Examples of measures to avoid, limit, or reduce sources of risk include:

- road maintenance, deactivation, and sediment management measures to control erosion and limit muddy runoff,

- windthrow treatments of wind-susceptible cutblock boundaries in proximity to values of concern,
- limiting harvesting on steep terrain to areas that meet acceptable risk tolerance criteria for landslides and snow avalanche initiation zones,
- limiting harvest levels in watershed zones where logging could cause an unacceptable likelihood of stream flow changes, and
- remedial work on old roads to stabilize over-steepened fill slopes and restore drainage patterns.

Examples of reducing risk element vulnerability include increasing the capacity of an existing bridge or building a debris flow deflection berm to protect risk elements on a fan.

When relying on a risk control measure, the forest professional should consider past performance including whether or not a particular treatment has been successful at achieving the objective; and also whether the licensee's organization has been consistent in carrying out prescribed measures as intended by the forest professional. Key questions to assist with risk evaluation and selecting risk control measures are included in Appendix E.

#### 2.4.1 OVERSIGHT AND QUALITY CONTROL OF RISK TREATMENTS

Quality control requires specific actions within the licensee's organization including:

- checklists reviewed against measures prescribed in watershed management strategies, FSPs, or specialist assessments such as terrain stability assessment,
- communicating the objectives and intent of the measures in relation to watershed values with contractors and company staff, and
- field reviews and/or inspections during site works, and sign-off of constructed works (APEGBC/ABCFP 2014).

It is the forest professional's responsibility to check that practices and procedures relied upon for risk control are in place and are effective for their intended purpose. If the systems are not in place in the licensee's organization to reliably deliver risk control measures, the forest professional should advise the licensee that due diligence may not be met with respect to risk management.

#### 2.5 EXTERNAL COMMUNICATION

To meet a forest professional's obligation to manage for watershed values assigned by society (ABCFP 2014), it is the responsibility of the forest professional to be aware of the relevant concerns regarding possible forest management activity effects on watershed values and specific risk elements. Through communication with First Nations, government, and non-government stakeholders, "forest professionals must make a reasonable effort to gather the full range of interests (ABCFP 2009)." The need to incorporate a specific communication protocol into a risk framework depends on whether the licensee already has communication protocols in place for other purposes. The forest professional should confirm that these are sufficient and, if not, pursue greater engagement.

In certain circumstances, a forest professional may have to convey adverse findings to parties who may not be directly involved, but who have a compelling need to know (for example, the risk to human life or property of a debris flow identified during the course of a specialist's investigation). In keeping with the ABCFP Code of Ethics, if a forest professional discovers or is made aware that there is a material risk to the environment or to the safety, health, and welfare of the public, the forest professional has a responsibility to draw these risks to the attention of the appropriate authorities.

## **2.6 MONITORING AND VERIFYING OUTCOMES**

Forest professionals are required, as part of their professional practice standards, to produce measurable and verifiable professional work, and to be able to provide a rationale for the methods used in measuring and verifying outcomes (ABCFP 2014).

When monitoring the outcomes of specific risk management strategies affecting natural processes in a watershed, the objective is to evaluate the effectiveness of those strategies in achieving the intended outcomes, and to check for unintended outcomes. When interpreting monitoring information, the uncertainties and unknowns with respect to the methods of measurement and causes of change must be stated. Where other forest management and non-forest activities, or a changing climate, could affect watershed conditions and risks, it may not be possible to separate the effects of forest management activities that forest professionals can control from those that they cannot.

Where risks are high, or changes in hydrologic or geomorphic processes need to be quantified, an effective monitoring design that incorporates spatial and temporal variability is required to enable the attribution of specific effects. For example, when tracking the trend of recovery or disturbance in a floodplain, monitoring may include either comparisons of air photo series over time, direct field observations, or measurements at established monitoring sites.

## **2.7 IMPLEMENTING AND UPDATING A WATERSHED RISK MANAGEMENT FRAMEWORK**

Plans for implementing a watershed risk management framework should include:

- roles and responsibilities for applying the framework and implementing results from specialist assessments,
- training of, and communication with, individuals who carry out practices on which the success of risk control measures rely, such as contractors and operators who implement development plans, and
- an independent review process consistent with good professional practice.

The framework should provide for revisiting watershed condition at appropriate intervals (depending on the tenure) to see whether the objectives set for the watershed are being met. In addition, the framework should identify what other circumstances would trigger a review of watershed condition and/or management strategies. For example, if:

- monitoring results suggest unintended outcomes,
- natural events have caused a material change in watershed condition,
- forest management or non-forest activities have changed the risks to values and elements of concern,
- there are advances in scientific knowledge or methods of analysis, and
- there are new findings on climate change that warrant revisiting the hydrologic analysis.

The framework should contain provisions for updates as experience is gained with the framework, as new information becomes available, if there are changes to values or risk elements in the area to which the framework applies, and in response to regulatory changes, case law, or professional practices requirements. Updates may also be required following reviews of the effectiveness of risk tolerance criteria and risk control measures in achieving the desired outcomes.

## **2.8 RESPONSIBILITIES**

### **2.8.1 FOREST PROFESSIONALS**

A forest professional who develops a risk management framework is responsible for defining the content, implementing, updating and signing off the framework (Section 2.1). Any components that are developed by specialists must be signed off by those professionals. A management representative of the licensee may also sign off the framework.

In a large operation with multiple values and a complex physical environment, a forest professional may establish a framework development team that includes:

- other forest professionals with specific operational roles in the organization,
- specialists who contribute advice on areas such as groundwater, geomorphology, hydrology, water supply infrastructure, water quality, terrain stability, windthrow, aquatic ecosystem health, etc.,
- a management representative who can provide input on corporate expectations, risk tolerance, and systems and quality control within the organization for delivery of the intended measures, and who may request a legal review of the framework document, and
- individuals who are responsible for conducting activities under standard operating procedures or practices that affect watershed objectives (e.g., road construction and maintenance practices, production, and hauling).

In a smaller operation with a limited operating area, a single forest professional may develop a more limited framework and may also be the person who implements it. A forest professional would usually consult with a hydrology or geomorphology specialist in developing even a simple framework. In either case, all forest professionals must make sure that their watershed management decisions meet the

professional requirements concerning the public interest and their professional obligations (ABCFP 2014).

When working under a framework, the forest professional is responsible for obtaining input from specialists when specific expertise is required to inform forest management decisions; and for having the specialist undertake a study of suitable scope and level of effort. Specialist input is needed when the information required for a risk decision is beyond the expertise of the forest professional. The type and scope of specialist assessments that may be required will depend on the hydrologic and geomorphic characteristics of the operating area, the values involved, and the licensee's management plan.

When retaining specialists, the forest professional should:

- complete an agreement with the specialist confirming the scope, schedule, and compensation for the work to be done; the need for and scope of other specialty services; the need for external independent reviews if anticipated; distribution and ownership of all work products; and confidentiality of data if applicable,
- provide clear terms of reference to the specialist regarding the purpose of the assignment; any insurance or certifications required; and the reports, maps, documents, or other records that are required to be submitted by the specialist,
- indicate the intended use of the specialist's information,
- indicate whether the specialist will be required to submit a Statement of Assurance, and
- confirm with the specialist what circumstances may cause a change to the scope of work and associated costs.

When a forest professional is engaging multiple specialists to form a project team, the forest professional should clarify the role of each specialist, including who is the lead specialist (if the lead is not the forest professional); set up protocols for communication, information sharing, and reviews between the specialists; and, in consultation with the specialists, decide on how the individual specialist reports will be integrated. This will avoid both gaps and duplication of work, as there may be overlap in the areas of expertise of individual specialists. If there are differences of professional opinion between the specialists, the forest professional should set out a process for resolving these differences where possible. Members are expected to make their best efforts to resolve differences of professional opinion. If they cannot be resolved, the forest professional should set out how these differences are to be addressed in the specialists' reports, which might include external independent reviews by members who are not part of the project team.

While an individual specialist assessment may be focused on a specific concern or information need, the forest professional still has the responsibility for considering the full range of values and for seeking the appropriate specialist input needed to inform those additional risk decisions.

## 2.8.2 SPECIALISTS



When retained by a forest professional, the specialist is responsible for:

- clarifying the purpose and scope of work with the forest professional,
- informing the forest professional of the project information that he/she requires,
- advising the forest professional of the level of effort required to meet the forest professional's objective for the study,
- informing the forest professional of the consequences of inadequate investigation if the agreed scope of work is limited,
- maintaining an independent objective perspective in carrying out the assessment and providing advice; and
- signing a Statement of Assurance on completion of his/her work, if requested by the forest professional or the author of the assessment.

A specialist who is a member of ABCFP or EGBC is responsible for:

- verifying to the forest professional or author that he/she has the necessary skills and professional qualifications to complete or contribute to the work, and
- conforming to all professional obligations associated with the work, including completing the work to an acceptable professional standard, and signing, sealing, and taking responsibility for professional work that he/she has completed.

A specialist who is a non-member of ABCFP or EGBC, is responsible for:

- adhering to the requirements for membership of their professional organization (if applicable), including Code of Ethics and practice guidelines/ standards,
- ensuring they possess the required expertise and that they work within the scope of practice defined in their profession,
- verifying to the forest professional or author that he/she has the necessary skills, training, and experience to complete or contribute to the aspects of the assessment or analysis being done, including providing evidence of academic or technical certifications and/or insurance as applicable, and
- providing records, notes, reports, or other information as requested by the forest professional or lead specialist.

One example of a non-member specialist is a Professional Biologist (RPBio), registered with the College of Applied Biology.

The specialist should confirm with the forest professional what services are included in the cost estimate. If a change to the scope of work and associated costs becomes necessary, this must be communicated to the forest professional as soon as practicable.

Where information gaps are identified, the specialist should confirm with the forest professional whether other specialists will be brought in as team members to fill those gaps, or whether the gaps will be noted for further work.

## 3.0 PROFESSIONAL PRACTICE IN WATERSHED ASSESSMENT

### 3.1 OBJECTIVES

Watershed assessments inform the risk identification and risk analysis steps in a watershed risk management framework (Figure 1). The rationale for pursuing a watershed assessment may be based on a variety of information, including a field review of trigger indicators (e.g., GIS-generated riparian logging or stream crossing indicators), reported issues in the watershed, overview-level office-based characterization of the watershed unit, or commitments made in a FSP or other planning process (see Section 2).

This section sets out the professional responsibilities for ABCFP and EGBC members who undertake watershed assessments. It does not provide technical procedures for conducting the various components of a watershed assessment. Members have a professional obligation to maintain proficiency in any technical work they undertake, including keeping informed on advances in science in their area of practice.

The objectives for a watershed assessment vary with the purpose, watershed complexity, the nature of the sources of risk, the watershed values, and the forest professional's specific requirements as set out in the framework. Most commonly, a watershed assessment provides recommendations to a forest licensee that assists it in avoiding unacceptable consequences from its forest management practices.

Objectives for a watershed assessment would include some or all of the following:

- characterizing a watershed unit to determine baseline conditions for future comparison,
- determining the present physical condition of a watershed unit, the extent of past natural and anthropogenic disturbance, and current recovery trends,
- tracking trends over time with respect to collective hydrologic and geomorphic effects from forest and non-forest development, fire or extreme floods, and/or other land uses,
- identifying sources of risk to values of interest in the watershed,
- assessing the change in risks to values from proposed forest management activities,
- providing input to guide forest management planning, and
- determining watershed condition and trend in order to identify and prioritize restoration opportunities, and select management strategies that promote recovery of geomorphic and hydrologic processes.

A watershed assessment:

- investigates watershed characteristics, channel characteristics, geomorphic and hydrologic processes, sensitivity to disturbance, and disturbance history,
- undertakes analyses appropriate for the scope and purpose of the study which may include analyzing hydrometric and climate data; estimating hydrologic recovery of regenerating forest

stands, landslide frequency and rates of sediment production; and characterizing risk sources and consequences pertaining to the values of interest, and

- evaluates and synthesizes the above information to allow the specialist to draw conclusions and develop guidance or recommendations to meet the purpose of the study.

Some watersheds may have, or be near to, watersheds with streamflow and environmental data sets that can be analysed and incorporated into the watershed assessment. However, many watersheds have limited or no hydrologic data available or even regional studies for comparison. Some data can be acquired from complementary studies, such as channel and sediment source surveys, source water assessments, and terrain stability assessments.

### **3.2 VALUES AND RISK ELEMENTS**

A watershed assessment may be undertaken to address a particular value, such as a community water supply, or multiple values. If the scope of the watershed assessment does not include the full range of values present in the watershed, then this should be stated in the terms of reference and in the specialist's report. Regardless of the scope of a particular watershed assessment, the forest professional remains responsible for considering the full range of values, and for seeking appropriate specialist input needed to inform those additional risk decisions.

A value becomes a risk element when a source of harm or potential harm to the value is identified.

Some values may have multiple aspects with different vulnerabilities, each of which could be a risk element. For example, if the value of concern is a community water supply, that could include the physical infrastructure (e.g., intake, reservoirs, treatment plant, distribution system, etc.) in addition to water quality, quantity, and timing of flows. A watershed assessment for a community water supply should therefore evaluate the potential for forest management activities to affect each of these aspects. Additionally, in the case of a designated Community Watershed or Water Supply Area, if the water system infrastructure has substantially changed since the watershed was designated (for example, moving from a surface water intake to a groundwater source), then the watershed assessment should note this and consider whether the risk elements and sources of risk may have changed.

If, during the investigation, the specialist discovers values that the forest professional may be unaware of, the specialist should confirm with the forest professional whether these additional values should be addressed in the watershed assessment.

### **3.3 WATERSHED CHARACTERISTICS**

The watershed unit encompasses the catchment area that drains to a defined point(s) of interest. Depending on the purpose of the watershed assessment, the point of interest could be a shoreline, stream confluence, or location of a value of interest such as a water intake. The specialist delineates or confirms watershed sub-units as appropriate for the watershed processes and risk elements.

A watershed assessment would typically comment on the potential significance of forest removal and forest regeneration on processes such as infiltration, soil moisture, surface and subsurface flow as well as on the potential for forest roads to intercept seepage and enhance surface flows.

The specialist compiles and reviews existing background information to characterize the watershed unit (see Pike and Wilford 2013). Relevant information can include:

- mapping, imagery and spatial data,
- anthropogenic information (roads, land ownership, water intakes/diversions, reservoirs, etc.),
- climate, hydrometric, water quality and other data,
- existing reports, and
- physiographic information (bedrock, terrain, landslide hazard, topography, streams, forest cover, etc.)

The specialist should consider the date, scale, reliability, and accuracy of background information and the potential effects that unreliable and inaccurate information could have on the assessment.

### **3.4 DISTURBANCE REGIME AND RECOVERY**

Disturbance refers to changes in the physical state of a watershed due to hydrologic, geomorphic, and other watershed processes and their variability over time. Disturbance can be caused by natural or human-related activity. The specialist characterizes the disturbance regime and ranks the relative importance of different sources of disturbance to identify and describe risk sources, and to develop rationales to support his/her conclusions regarding sources of risk to values.

Watershed disturbance derives from inherent landscape characteristics, land use impacts, and climatic events. The agents of natural disturbance include wildfires, insects, disease, windstorms, rainstorms, snow avalanches and flood events, all of which are affected by a changing climate. Some disturbances are caused by a single event (such as a wildfire) while others result from ongoing processes (such as mass wasting in a dynamic mountainous environment).

In addition to natural disturbance, land use activities alter the vegetative cover, can disrupt hydrologic and geomorphic processes, and can directly damage channels. Examples of such activities include forest harvesting; road construction; agriculture; mines and quarries; linear corridors such as pipelines, transmission lines and railroads; and other residential, commercial, and industrial development.

The specialist considers recovery from past disturbances when interpreting both current watershed condition and longer-term trends, and the potential effects of additional forest management activities. This is important information for the forest professional when assigning risk tolerance criteria for new activities, and for setting watershed condition objectives. The specialist should indicate the methods and criteria used to assess recovery.

Aspects of recovery assessed by the specialist typically include:

- revegetation of sediment sources, including landslide paths, stream escarpments, eroded gullies, trails; and road cut slopes, fill slopes and ditch lines,
- hydrologic recovery of regenerating forest stands with respect to characteristics affecting streamflow response (rainfall interception, snowpack accumulation and ablation),
- riparian vegetation regrowth (including on stream banks and bars), and its contribution to reducing channel bank erosion, improving channel planform stability, increasing slope stability of adjacent gully sidewalls, and supplying large wood, and
- alterations in channel morphology caused by historic logging practices, landslides, wildfires or extreme floods with respect to sediment loading, bedload transport, channel structure (stone lines, steps, pools); and changes to the presence and function of wood in the channel.

Watershed sensitivity is the likelihood that watershed condition will be affected by disturbances. It considers the potential for changes in watershed processes such as runoff and sediment generation and the potential for associated changes in stream channels and/or water quality. It is distinct from the vulnerability of values and risk elements. In determining watershed sensitivity to disturbance, the specialist considers watershed characteristics such as:

- hydrologic factors including climate, peak flow regime, runoff response, surface water storage (lakes, icefields, wetlands); and extent of permeable surficial deposits that may provide groundwater storage for contribution to base flows,
- terrain stability factors, including climatic zone and relative exposure to landslide-causing storms, geomorphic susceptibility to landslides and erosion, presence of natural landslides, extent of potentially unstable terrain in the watershed, and hillslope connectivity to waterbodies, and
- stream sensitivity factors, including the extent of alluvial stream channels, presence of fans, and presence and extent of floodplains, wetlands, and estuaries.

The specialist considers these factors together with the disturbance history and recovery in the watershed when commenting on risk tolerance thresholds and recommending management strategies to meet objectives for watershed condition.

### 3.5 CLIMATE CHANGE

Evidence of climate change is widespread and has implications for rates of watershed disturbance and hydrologic processes. For example, shifts attributed to climate change include changes in flood characteristics; increased landslide occurrence and increased delivery of sediment to channel networks. The watershed assessment should discuss and address such implications in the risk analysis and in the final recommendations and provide rationales based on the current science. The specialist should:

- use supplementary tools (e.g., [http://www.climatewna.com/climateBC\\_map.aspx](http://www.climatewna.com/climateBC_map.aspx) (Wang et al 2016); Pacific Climate Impact Consortium website <https://pacificclimate.org/>) and information to determine how climate variables are expected to change in future within the study area,

- interpret the climate change information in the context of watershed processes in the study area, and discuss how potential changes may pose risks to values in the future, and
- discuss the expanded uncertainty in sources of risk linked to hydrologic and geomorphic processes associated with the projected climate futures in the study area.

EGBC requires its members to stay informed about the changing climate and consider potential impacts in their professional work. ABCFP requires its members to expand their awareness and develop competencies that enable adequate consideration of the effects of climate change on forests while seeking new approaches to adapt in their practices (ABCFP 2014). The forest professional and the specialist should consider the changes in risk that could result from these shifts and the time frames over which they could become significant.

### **3.6 COMPONENTS OF A WATERSHED ASSESSMENT RELATED TO RISK**

Risk assessment comprises the steps of risk identification, risk analysis, and risk evaluation (CSA ISO 31000: 18; Fig. 1; see also Section 2.3). Risk identification involves identifying and describing sources of risk and their potential consequences. Risk analysis estimates the level of risk, as an expression of the severity of the consequence combined with likelihood of occurrence. Risk evaluation compares the risk levels estimated in a risk analysis with risk tolerance criteria.

Both forest professionals and specialists contribute to risk identification and risk analysis, while risk evaluation is the responsibility of forest professionals (see Section 2). Thus Section 3 of these guidelines focuses only on risk identification and risk analysis by a specialist as part of a watershed assessment.

#### **3.6.1 RISK IDENTIFICATION**

A watershed assessment identifies and characterizes sources of risk to the value(s) from natural hydrologic and geomorphic processes, from natural and/or human-induced disturbances, and from the collective effects of these processes.

Hydrologic and geomorphic processes identified as having the potential to harm a specific value are a source of risk. Note that what can harm one value may actually benefit another. For example, large wood in a stream system can threaten infrastructure (e.g., bridges, water intakes, reservoirs, etc.), and may increase flood levels and trigger channel migration that erodes private property. However, the supply of large wood is also essential for aquatic habitat structure and channel morphology in alluvial stream channels.

Sources of risk to watershed values may arise from:

- changes in timing, magnitude, and frequency of stream flows,
- increases or decreases in fine and coarse sediment in streams,
- loss or introduction of wood into streams,

- mass-wasting events (landslides, debris flows, erosion),
- changes in riparian vegetation that affect channel processes and quality of aquatic habitat, and
- the collective effects of all the above.

The specialist characterizes the above sources of risk and determines their location within the watershed, and then considers each of these watershed responses relative to the value of concern to determine whether it presents a risk to that value. If it does, then the value is an element in relation to that risk source.

Examples of risk identification completed in a watershed assessment include:

- the potential for stream flow and channels to change due to natural and human-induced changes in the watershed, and to affect a value of concern,
- the potential for low flows to decline, affecting adequacy of community water supplies and aquatic ecology,
- landslide potential (as indicated by the landslide history):
  - zones of steep, potentially unstable terrain, combined with hillslope connectivity to streams or other values of concern
  - sections of old roads on steep slopes, combined with sediment delivery potential to a value of concern,
- the potential for a value located on a fan to be affected by debris floods or debris flows caused by natural events, or by forest management activities in the catchment area upstream of the fan or on the fan surface,
- the potential for loss of riparian vegetation to compromise wood supply to the stream, bank erosion resistance and sidewall stability of slopes adjacent to stream channels,
- the potential for sediment from erosion of road cuts, fill slopes and ditch lines to degrade water quality or aquatic habitat, and
- the potential for sediment generation from traffic on stream-adjacent roads to degrade water quality.

The relative importance of these risk sources varies depending on regional conditions and watershed characteristics. For example, in regions of the province with snow-melt dominated peak flows, forest removal may be a primary concern, whereas in outer coastal watersheds subject to extreme rainstorms, landslide occurrence may be the primary concern. The identified risk sources, together with the disturbance and recovery history, are recorded in the watershed assessment and may help to inform the forest professional's decisions on risk tolerance criteria for watershed values (e.g., for future effects on fish habitat found to be already degraded).

Depending on the purpose of the watershed assessment, other risk sources may need to be considered; for example, the effects on water quality of the release of hazardous materials, acid rock drainage, pathogens, nutrient release, etc. Where this is the case, the scope of the assessment should reflect these aspects and the appropriate specialists should be included in the project team.



Risk identification also includes considering risks associated with future forest development. The specialist considers both the existing state of disturbance and recovery and the changes that are expected to arise from future forest development activities.

In identifying and describing sources of risk, the specialist should, as appropriate for the scope of the assessment:

- use current science and methods to evaluate sources of risk, and indicate the methods and criteria used,
- analyze available climate and hydrometric data and interpret the significance of the findings in relation to stream flow regimes, and possible responses to disturbance,
- quantify the various risk sources to the extent that it is meaningful to do so and indicate the uncertainties around the analysis, and
- undertake field checking of risk sources that were identified in the office review (Section 3.3).

### 3.6.2 RISK ANALYSIS

Risk analyses for forest planning are done both at the watershed scale and at the site level. For some kinds of risk sources, the watershed assessment provides strategic-level risk ratings and identifies where site-level risk assessments are required for forest planning. The forest professional uses results from both watershed-level and site-level risk analyses to complete risk evaluation, and incorporates those results into the harvest and road plans. Examples of watershed-scale risk analyses include changes in streamflow and water quality. Site-level risk analyses include terrain stability assessments, windthrow assessments, hydrologic assessments of fans, geotechnical assessments of old roads, and sediment control plans for stream-adjacent roads. Additional examples of watershed-scale and site-level risk analyses are in Table E-2, Appendix E.

For sources of risk associated with stream flow change, limitations in climate and hydrometric data and scientific knowledge relevant to the region may result in considerable uncertainty in estimates of risk levels. Risk analysis may range from a quantitative approach in data-rich situations to professional opinion in others. The specialist should clearly report the level of confidence accompanying risk ratings and communicate the uncertainty to the forest professional.

Whereas risk identification determines whether a value may be affected by a particular source of harm, it does not necessarily describe the nature of the effect. A specialist undertaking a watershed assessment examines the physical effects that the various risk sources could have on the risk elements. A forest professional will often need detailed information on these consequences to evaluate the identified risks against risk tolerance criteria in the framework. Therefore, in the scope of a watershed assessment, the forest professional may in some cases ask for an expanded determination of consequences and the nature of harm that could be done to the risk element(s). More advanced determinations of consequence may require the involvement of other specialists. Expanded determination of consequences may take into account the vulnerability and worth of risk elements and/or other factors such as replaceability,

magnitude and duration of harm, feasibility of remedies, etc. (Wise et al 2004 and Appendix E of these guidelines).

Risk ratings combine the likelihood of occurrence with the severity of the consequence. It is not sufficient to describe these with only qualitative ratings. The specialist should also clearly describe the nature of the hydrologic or geomorphic events and the physical effects they could have on the values. The forest professional needs a clear indication of the nature of the events that could cause harm and the kind of harm that could be done to the values.

### 3.7 FIELD WORK

The specialist must exercise professional judgment in determining the extent of field work appropriate to the type and scope of the watershed assessment, considering the availability and accuracy of background information. Watershed assessments typically take a phased approach beginning with an office review of imagery, background reports, information in the public domain and spatial data products; and followed by field verification. Where there is limited background information, more field work may be needed. Field sites are identified from the office review and may have input from the forest professional or other team specialists. Field sites could include:

- stream reaches potentially affected by landslides, historic logging or other land uses (e.g., agriculture, recreational vehicle use),
- alluvial fans and floodplains,
- risk elements such as water intake structures, fish habitat, recreation features and facilities,
- instream or riparian restoration sites,
- steep and stream-adjacent road sections,
- landslides,
- stream crossings, ditchwater flows and water diversions, and
- cutblocks to check status of regeneration, and
- deactivation or rehabilitation measures on roads.

Access may limit the extent and timing of the field work, particularly in watersheds with private land holdings, extensive road deactivation, few driveable roads, or in remote areas where field reconnaissance must be conducted by helicopter. Limitations on field work should be indicated in the specialist's report.

The specialist should record the extent of field investigation and sites visited, dates of field work, field personnel, field methods, means of access, conditions at time of field assessment (weather, ground cover, flood level, etc.), and any limitations that may have affected the assessment (e.g., access to private property, physical barriers, roads grown in or inaccessible, snow cover, washouts, high stream flows). A good photographic record can help to support the specialist's rationale statements.

### 3.8 RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

The specialist presents conclusions on current watershed condition and recovery trend, on identified risks to watershed values, and on the possible significance of those risks. Conclusions are drawn by synthesizing results from background information, field investigation, data analyses, current science, and reports/information from other specialists (if available and relevant). Recommendations for watershed management must follow logically from the conclusions made based on this synthesis, and must tie back to the objectives of the watershed assessment. The rationale for the conclusions and recommendations must be clear and must be consistent with current scientific knowledge. The specialist presents the findings of the watershed assessment, including:

- the results of a specific risk analysis, if included in the scope of the watershed assessment,
- knowledge gaps and the assessments or inventories that would fill those gaps,
- recommendations for site-level investigations and risk analyses needed for the forest professional to complete the risk evaluation of planned forest management activities, and
- options for specific management strategies for future harvesting and roads to avoid consequences of concern.

The specialist should comment on the potential for climate change to:

- shift hydrologic regimes, providing the implications for watershed values,
- alter trends in recovery from disturbances,
- exacerbate the risks identified, and
- change risk scenarios in the future.

### **3.9 WATERSHED ASSESSMENT REPORT**

Report content will vary depending on the objectives and scope of the watershed assessment. Typical content includes, but is not limited to the following.

#### *Scope:*

- the purpose and objectives of the assessment, including values and risk elements that were considered, and who commissioned the assessment.

#### *Methods:*

- the information used in the assessment, including that provided by the forest professional,
- definitions of terms used (particularly those that may have more than one meaning in the literature), references or manuals referred to, and protocols followed for classification conventions,
- the methods, standards, conventions, and guidelines followed or referred to with respect to specific aspects of the assessment,

- the extent of the field work, methods used, and any conditions that may have limited the work, and
- the assessment team, including other specialists and reviewers, if applicable.

If specialists use terms such as “hazard” that are not in these guidelines, they must define the term as it is used in their reports. The use of the term “hazard” to mean “likelihood” is discouraged.

*Results, conclusions, recommendations, and limitations:*

- results of investigations and analyses completed as part of the work,
- appropriate maps, figures, photographs, tables, or other supporting information suitable for the scale and scope of the assessment,
- rationales clearly linked to findings in the investigation,
- conclusions developed by evaluating and synthesizing background materials, analyses, and field findings,
- recommendations or options for risk control measures following from the conclusions and as applicable to the scope of the study, and
- assumptions, uncertainties, and limitations of the study, including the need for follow-up work.

The report should be clearly written with sufficient detail to:

- allow the forest professional and other specialists reading the report to understand the methods, information used, and supporting rationale for conclusions and recommendations,
- enable the forest professional to understand the sources of risk and risk levels, and be able to either undertake an evaluation in relation to risk tolerance or seek the appropriate site-specific assessments for risk analyses, and
- allow the forest professional to implement the recommendations and evaluate options provided.

The specialist should identify where he/she has relied on the work of other professionals, and should integrate the relevant work into the report, including clarifying any associated limitations.

The report should include a statement of limitations. Examples of items typically addressed under limitations include:

- standard of care followed while carrying out the analysis,
- data availability,
- level of confidence in different aspects of the analysis,
- assumptions and uncertainties in the various analyses and judgments made in the report,
- scope limitations due to multiple licensees,
- factors that may have limited the assessment, such as restricted access, quality of background information, and terrain or weather conditions at the time of the field work, and
- restrictions on the use of the report (e.g., to the client or licensee for its intended purpose).

Some aspects of a watershed assessment may be qualitative and subjective based on observed conditions. The report should distinguish between what is fact, as physically observed, measured and verifiable; what is inferred from observations of physical conditions, data analysis, and findings in the scientific literature; and what is uncertain or unknown. In choosing and applying quantitative methods of analysis, the specialist should acknowledge the assumptions and limitations of the methods and of the data; and take them into consideration when interpreting the results and advising the forest professional. If numerical values are provided in a report, the specialist should indicate the basis for those numbers and how they are arrived at. It is the specialist's responsibility to be aware of current scientific literature and new studies as they emerge, and to consider the science in the context of the watershed unit that is the subject of the assessment. For example, in future hydrologic models may become an important aspect of watershed assessment and the specialist should stay informed on these new developments

A watershed assessment cannot be relied on in perpetuity. Although the specialist should attempt to anticipate reasonable changes that could affect the results of the assessment, the "shelf life" of the assessment depends on natural processes that occur over time, and on changes in land use and site development not anticipated in the assessment. The specialist should indicate under what conditions the watershed assessment will apply and what circumstances may render the assessment no longer reflective of the watershed condition.

### **3.10 RESPONSIBILITIES**

As discussed in Section 1.3.2, the required technical strengths of a specialist carrying out or leading a watershed assessment may depend on what are expected to be the key issues.

#### **3.10.1 SPECIALIST**

When retained to undertake a watershed assessment, the specialist is responsible for:

- clarifying the scope of work with the forest professional,
- agreeing on terms of engagement including ownership and distribution of work products and confidentiality,
- confirming with the forest professional what values are to be considered and how consequences are to be defined for the values of interest,
- confirming whether the scope of the assessment includes evaluating the change in risk that would result from a proposed plan for harvest areas and roads,
- informing the forest professional of the project information that he/she requires,
- advising the forest professional of the level of effort required to meet the forest professional's objectives for the study, including the extent of field investigation required,
- confirming with the forest professional what services are included in the cost estimate, and what circumstances may cause a change to the scope of work and associated costs,
- informing the forest professional of the consequences of inadequate investigation if the agreed scope of work is limited,

- verifying to the forest professional that he/she has the necessary skills and professional qualifications to complete the watershed assessment,
- identifying to the forest professional any aspects of a project that are beyond his/her expertise and noting whether the involvement of other specialists is needed for the purpose and objectives of the assessment; for example, expertise in water quality issues associated with human health such as water chemistry and pathogens; or specialists in aquatic ecology,
- maintaining an independent objective perspective in carrying out the assessment and providing advice; and
- on completion of his/her work, signing a Statement of Assurance if requested by the forest professional.

The need for additional member or non-member specialists will depend on the purpose of the assessment and the expertise required to address the project objectives. For example, if objectives include assessing potential impacts on fish populations and/or fish habitat, then a fish biologist (e.g., Registered Professional Biologist, RPBio) would usually be involved at the risk identification phase to characterize the fish populations and vulnerabilities; and at the risk analysis phase to determine the likely consequences of disturbances on these values.

In some cases, a review of an existing watershed assessment may find that only certain aspects require updating. The specialist should clarify with the forest professional what aspects are to be updated, the level of effort required, and any limitations this may place on the specialist's assessment.

In certain circumstances, the specialist may have to convey adverse findings to parties who may not be directly involved, but who have a compelling need to know (for example, a debris flow or flood likelihood identified during the specialist's investigation). In keeping with the associations' respective Codes of Ethics, if in the course of a watershed assessment the specialist discovers or determines that there is a material risk to the environment or to the safety, health, and welfare of the public, the specialist has a professional responsibility to draw this to the attention of the forest professional responsible for the project and, if necessary, to the authorities with jurisdiction over land use in the area.

### 3.10.2 FOREST PROFESSIONAL

The forest professional is responsible for the following.

- Setting out the scope of work with the specialist including:
  - confirming the study area,
  - developing terms of reference that are suitable for the intended purpose of the assessment; for example, addressing specific concerns for a community water supply or for commitments made in an FSP,
  - identifying values to be considered,
  - confirming with the specialist how consequences are defined,
  - determining whether the purpose of the watershed assessment is to provide guidance for forest planning, and whether it includes review of a specific proposed plan,

- establishing the level of effort and method of field investigation,
  - deciding whether a phased approach will be used,
  - defining the scope of risk identification and risk analysis,
  - confirming with the specialist how knowledge gaps are to be addressed (i.e., whether they are to be identified in the watershed assessment as a need for follow-up work, or whether the scope of the watershed assessment is to include these further investigations, inventories, or other specialist assessments), and
  - confirming whether the assessment is to prescribe specific measures or to provide options to reduce or mitigate identified risks.
- If there are other licensees or land owners in the watershed unit, informing the specialist of whether field access to these lands is available, and whether arrangements have been made with the other licensees or land owners to share information.
  - If information is not being shared by other licensees, confirming with the specialist what information will be used, what level of effort will be required in investigating these other areas, and how these areas will be addressed in the specialist's report.
  - Putting in place an agreement with the specialist as described in Section 2.8.1.

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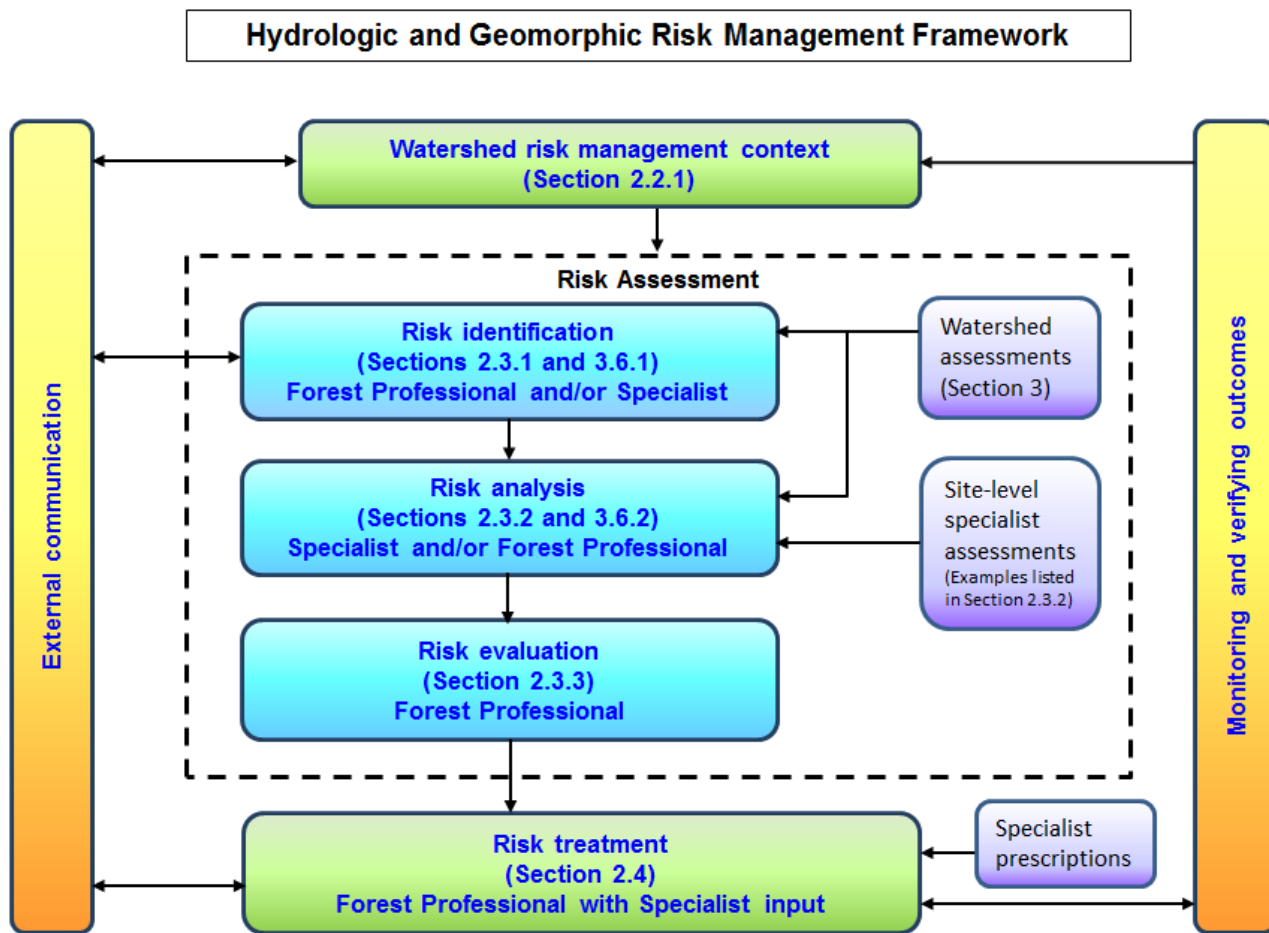


Figure 1. A framework for the management of hydrologic and geomorphic risk (adapted from CSA ISO 31000:18).

## **APPENDIX A: Authors and Groups Who Provided Review Comments**

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## **APPENDIX B: Legal Context**

This appendix summarizes the legal context; the actual legislation should be referred to for details. These Guidelines were prepared between July 2015 and October 2018, and the statutes or policy statements discussed in this section may have changed thereafter.

Only in the Haida Gwaii and Great Bear Land Use Objectives Orders, are watershed and hydrologic assessments a specific legal requirement, triggered when certain thresholds are reached or before variations from the specified treatments can be made. Elsewhere in the regulatory regime, watershed or hydrologic assessments only become a legal requirement when they are committed to in an approved Forest Stewardship Plan on crown land. Watershed or hydrologic assessments are not a requirement in any part of the legal context governing forest operations on private forest lands.

### ***Professional acts and bylaws***

ABCFP and EGBC's bylaws require members to protect the environment and the health and safety of the public. These are obligations regardless of land ownership or of how forest operations are regulated on that land. Watershed analysis and management help members to meet those obligations.

#### ***Foresters Act and Bylaws***

Bylaw 11.3.1 of the Code of Ethics requires members "to advocate and practice good stewardship of forest land based on sound ecological principles to sustain its ability to provide those values that been assigned by society"; and Bylaw 11.3.3 requires members "to seek to balance the health and sustainability of forests, forest lands, forest resources, and forest ecosystems with the needs of those who derive benefits from [them]".

#### ***Engineers and Geoscientists Act and Bylaws***

Bylaw 14 (a) 1 of the code of Ethics requires members to "hold paramount the safety, health and welfare of the public, the protection of the environment, and promote health and safety within the workplace".

### ***Forest and Range Practices Act (SBC 2002) and regulations***

The Forest and Range Practices Act governs forest practices on crown land. S. 150 (2) gives the Lieutenant Governor in Council quite broad general powers for prescribing requirements in relation to community watersheds. The Government Actions Regulation and Forest Planning and Practices Regulation under FRPA establish objectives for community watersheds and for fisheries sensitive watersheds; and the requirement of Forest Stewardship Plans to address these objectives. Neither FRPA nor the regulations (GAR, FPPR) specify a requirement for watershed assessments to be completed; but if a Forest Stewardship Plan commits to carrying out watershed or hydrologic assessments as a means of meeting the objectives, then that commitment becomes a legal requirement upon approval of the Forest Stewardship Plan. Similarly, if a Forest Stewardship Plan commits to watershed or hydrologic

assessments as a means of meeting objectives in Orders for higher level land use plans, then they also become a legal requirement.

***Land Act (RSBC 1996) Chapter 245*** [downloaded February 22, 2016]

Section 93.4 of the Land Act provides authority for the Minister to establish objectives for the purposes of the Forest and Range Practices Act. Objectives that were previously established under the Forest Practices Code of British Columbia Act are continued under Section 93.8 of the Land Act.

Land Use Objectives Orders for Cariboo-Chilcotin, Clayoquot Sound, Haida Gwai and Great Bear were made under the Land Use Objectives Regulation authorized by Section 93.4 of the Land Act. Higher Level Plan Orders that continue from the Forest Practices Code of British Columbia Act include those for Vancouver Island, Kootenay Boundary and Revelstoke Higher Level Plan Areas. Some of these orders contain language specific to avoiding impacts to hydrologic and/or geomorphic processes.

For example, the Vancouver Island Land Use Plan Higher Level Plan Order designates Enhanced Forestry Zones that are intended “to increase the short-term availability of timber”, subject to a number of provisions, including not significantly impacting “specific hydrologic ... values” and “avoid or mitigating adverse hydrologic impacts.... in watersheds with significant sensitivity or significant fisheries values”.

The Great Bear and Haida Gwaii orders have provisions to protect fans and floodplains, and to sustain natural hydrologic processes. In these orders fans and floodplains are protected regardless of whether or not they are fish-bearing.

***Haida Gwaii Land Use Objectives Order (2010) and Great Bear Rainforest Order (2016)***

The land use objectives orders for both Haida Gwaii and Great Bear ecosystem-based management areas set thresholds or prescribe minimum treatments for many objectives. For some objectives it is possible to harvest above the thresholds or vary the treatment provided that certain conditions are met. One such condition is that watershed or hydrologic assessments be completed by a qualified professional. The Great Bear order has such a provision in the objectives for important fisheries watersheds, Type 1 and Type 2 aquatic habitat, upland streams and active fluvial units. The Haida Gwaii Order includes this provision in the objectives for upland streams and sensitive watersheds.

Specialists conducting watershed assessments should be aware that each order has definitions specific to that order. The definitions are not necessarily the same for both orders, and not necessarily the same as the conventional use of the term. For example, equivalent clearcut area in the Great Bear order is defined to mean “an indicator that quantifies the percentage of the forested portion of a watershed that has been altered by harvesting, fires, insects or disease and has not recovered to a state of Hydrologically Effective Greenup”; whereas equivalent clearcut area in the Haida Gwaii order is defined to mean “an indicator which expresses, as a percentage of an entire watershed, the degree to which regenerating forest stands are hydrologically similar to clearcuts, relative to the hydrologic status

of the original stands”. The Great Bear order defines an active fluvial unit to mean “an active floodplain, where water flows over land in a normal flood event, and includes low and medium benches and the hydrogeomorphic zone of an active fan”. The Haida Gwaii order defines an active fluvial unit to mean “an active floodplain, where water flows over land in a 1 in 100 year flood event, and includes low and medium benches and the zone of an active fan where active hydrogeomorphic processes are currently evident or would likely be initiated if harvesting and/or road building were to occur”.

***Private Managed Forest Land Act (SBC 2003) Chapter 80*** [downloaded 2015-07-07]

This act and the accompanying Private Managed Forest Land Council Regulation govern forest practices on private land that is classified as managed forest land under the Assessment Act. Neither the act nor the regulation requires watershed assessments to be carried out; both have provisions for protecting water quality and fish habitat including specifying numbers and sizes of trees to be retained along streams.

***Drinking Water Protection Act (SBC 2001)*** [downloaded 2015-07-07]

This act regulates drinking water supplies for the purpose of protecting public health. It does not require forest licensees to undertake watershed assessments in water supply areas and does not impose limits on forest harvesting activities; but it does provide authority for a drinking water officer to order that a water supplier prepare an assessment of the drinking water source. One of the purposes of the assessment is to assess threats to drinking water. Some of these assessments done by water suppliers have identified forest harvesting activities as a threat. The drinking water officer has broad powers under the Act to order that assessments be done, to direct the scope of the assessment, and to order that joint assessments be done if more than one water supplier uses the same water source. The drinking water officer may also order the water supplier to prepare an assessment response plan if the source assessment identified threats to drinking water.

Section 4 prohibits any person from introducing into a water supply any substance which could cause the owner of the water system to have to limit use of the water because of a possible threat to health. However, it specifically exempts this prohibition from applying to persons carrying out an activity that has been lawfully authorized or regulated by other regulations. Forest harvesting activities authorized under FRPA or under the Private Managed Forest Land Act would presumably fall under this exemption because those acts have specific provisions for protection of drinking water sources. Additionally, forest professionals need to keep in mind their stewardship obligations with respect to the public benefit.

## APPENDIX C: Skill Set for Undertaking Watershed Assessments (Section 3)

<b>1.0</b>	<b>Basic requirement:</b> Graduate degree in Science or Applied Science, or equivalent
<b>2.0</b>	<b>Subject areas and equivalent level of knowledge</b>
<b>2.1</b>	<b><i>Introductory university-level courses or technology program equivalents</i></b>
	Water resource science
	Airphoto interpretation
	Field geology
	Field surveying/field techniques/field measurements
	Soil science/soil physics/forest soils/soil mechanics
	Slope stability analysis
	Weather and climate
<b>2.2</b>	<b><i>Introductory and advanced university-level courses</i></b>
	Forest hydrology/engineering hydrology/surface hydrology
	Geomorphology/landforms/surficial geology/Quaternary geology/fluvial geomorphology
	Hydrogeology/groundwater geology/water quality
	Data analysis and statistics
<b>2.3</b>	<b><i>General familiarity and understanding of subject matter</i></b>
	BC Terrain Classification System/terrain stability mapping classification for forestry
	Biogeoclimatic Ecosystem Classification system (BEC)
	Forest access systems/forest harvesting systems/silvicultural systems
	Forest health/forest science/forest ecology/plant-water relationships
	GIS/CADD/cartography/digital information sources/modelling/remote sensing
	Aquatic habitats/fish biology/aquatic ecology
	Risk assessment methods used in forest management
<b>2.4</b>	<b><i>Familiarity and understanding of subject matter, specific to region</i></b>
	Relationships among hydrology, meteorology, and terrain
	Soil characteristics and stability behaviour
	Fluvial processes and influences of vegetation, sediment input and stream flow change
	Common road construction, harvesting and silvicultural systems
	Landform characteristics and terrain response to road construction
	Types and causes of landslides associated with forest development
	Windthrow occurrence and influence on slope stability and stream channel morphology
<b>3.0</b>	<b>Field experience</b>
	Typically, a member with suitable experience would have five years of experience relevant to watershed processes and forest hydrology with a strong field component. Less experienced members should involve an appropriately qualified specialist.
	Field experience in the region to gain an understanding of regional stream flow regimes; fluvial morphology, regional surficial geology, and stream channel response to disturbances caused by forest development.

NOTE: In a particular watershed assessment the required skill set will vary depending on the key issues and the complexity of the watershed.

## APPENDIX D: Example of a Watershed Risk Management Framework Checklist

Preliminary Checklist for developing a Watershed Risk Management Framework		
Forest professional:	<i>[name, position title]</i>	
Other team members as applicable:	<i>[name, professional designation or position]</i>	
Area/operations that WRMF is to apply to:	<i>[describe]</i>	
Regulatory context that applies to operating area	<i>Applicable</i>	<i>Addressed</i>
Private Managed Forest Land Act, Forest and Range Practices Act, and associated regulations		
Land use orders <i>[list]</i>		
Special designations (Community Watershed, Fisheries Sensitive Watershed, other)		
Other management certification and models <i>[list]</i>		
Environmental or organizational management certifications, ISO/CSA		
Terrain stability management model		
Watershed values (or classes of watershed values) <i>[list]</i>		
Human life and safety		
Aquatic habitat (may have sub classes, including channel and floodplain stability)		
Community, agricultural, industrial or commercial water supplies, licensed domestic water intakes		
Infrastructure including highways, railways, pipelines, powerlines, industrial facilities, etc.		
Communities or other non-forest development located on fans, in floodplains, or downstream or downslope of licensee's activities		
Forest values (soil productivity, forest stands, etc.)		
Risk tolerance criteria – consequences of concern for each of the values, and tolerable risk levels (see examples, Appendix E)		
For each value, what consequences would the licensee/forest professional consider unacceptable		
Signing authorities in licensee's organization for different levels of risk		
Communications		
Internal in licensee organization and external with stakeholders and regulatory authorities		
Other licensees/ forest land owners operating in the same watershed(s)		
Process for assessing and evaluating risks to values		
Policy/procedure for how to identify and analyze risks, when to use specialists and what type of specialist assessments to undertake, and for making risk decisions		
Practices and procedures for site works to limit risks <i>[list]</i>		
Standard Operating Procedures for road construction and stream crossing structures, sediment management and working around streams		
Oversight and quality control for risk control measures <i>[list]</i>		
Policy/procedure setting out when oversight and quality control measures are needed to ensure that site works are done as intended in plans prepared by forest professionals or specialists		
Supporting resources <i>[list]</i>		
Existing assessments and reports		
Watershed geodatabase		
Reviewing and updating the framework		
Timeframe or circumstances that would require review, update or revisions to framework		
Other considerations specific to licensee's operations		
Date	Comments	

NOTE: This list provides examples only; other items may be required for a particular operating area.



## APPENDIX E: Supplementary Examples of Risk Assessment

### Risk identification

Risk identification involves identifying the values that are present and sources of harm or potential harm to those values. Table E-1 gives an example of risk identification for a forest licensee's operations in a watershed. In this example, the licensee's land base in the watershed includes several separate parcels that are not contiguous; and therefore risk identification includes determining what values are present and which of those would be or would not be affected by the licensee's operations.

Table E-1. EXAMPLE – Risk identification for ACME Ltd. operations by watershed unit for Rapid River Watershed

Watershed unit	Total area ha	ACME area		Risk elements	Potential to be affected by ACME operations
		ha	%		
Total watershed	23,500	7,385	31%	Anadromous and resident fish habitats	Potential to be affected by riparian condition along streams on ACME land; by sediment from ACME operations upslope and upstream from fish habitat; and by increased peak flows or shifts in timing of stream flows from ACME harvesting. <i>NOTE: Land use activities by other forest licensees and landowners also have the potential to affect fish habitat in the watershed (sediment, riparian, stream flows).</i>
Lower valley	3,500	0	0	Rural residential, agriculture lands on floodplain River crossings on floodplain – highway, railway, pipeline, public road	Potential to be affected by increased flood magnitudes and/or flood frequencies caused by harvesting on ACME lands upstream <i>NOTE: Land use activities by other forest licensees and landowners also have the potential to affect peak flows in the floodplain.</i>
Mid valley	3,000	180	6%	Reservoir on tributary creek	Not affected by ACME activities; ACME does not have operating area upslope or upstream of the reservoir.
Upper valley	5,500	2,200	40%	Investment in in-stream restoration works	Potential to be affected by windthrow and sediment from ACME's adjacent operations.
Basin 1	8,000	4,480	56%	Power transmission line	Potential to be affected by harvesting of steep terrain on ACME land upslope of towers
Basin 2	3,500	525	15%	Water intake and reservoir, property of others	Potential to be affected by sediment or landslides from ACME roads upslope of these risk elements <i>NOTE: Land use activities by other forest licensees and landowners also have the potential to affect these risk elements</i>

NOTE: The scope of a particular watershed assessment may not include risk analyses for all values in the watershed. The forest professional still has responsibility for managing risk to all values.

## Risk analysis

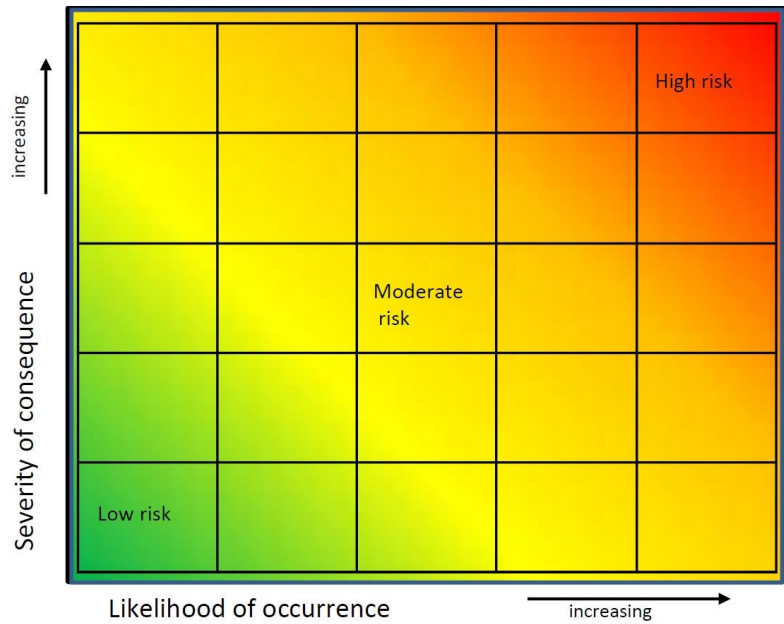
Risk analysis estimates the level of risk to a value as the nature of harm that could be done to the value (the consequence) combined with the likelihood of that harm occurring. Risk analyses are done at several scales. “Strategic level” as used here refers to assessments at a larger scale (for example 1:20,000), often primarily office based with limited field reconnaissance. “Site level” refers to a finer scale (for example 1:5,000) used for harvest and road plans issued for the conduct of the activity, and involves more extensive field investigation. Risk analyses related to stream flows and stream flow change are done in watershed-scale assessments. Watershed assessments also typically determine strategic-level risk ratings for other disturbances and activities and identify where further risk analyses need to be done at the site level. However, there may be times when a forest professional chooses to include certain site-level investigations and risk analysis in the scope of a watershed assessment. Table E-2 gives examples of strategic and site level input to risk analysis.

Table E-2. Examples of risk analyses done at strategic and site levels for planning of forest management activities

Source of risk	Strategic level and site level input to risk analysis
Stream flow change: <ul style="list-style-type: none"> <li>▪ Increased peak flows</li> <li>▪ Decreased low flows</li> <li>▪ Shifts in timing of flows</li> </ul>	Watershed assessment: Estimates potential for stream flow change and risk analysis for effects on watershed values; part of comprehensive watershed scale assessment Hydrologic assessment: Risk analysis of stream flows only; does not include other aspects of watershed assessment
Possible landslides from existing roads affecting values	Watershed assessment: Provides strategic-level identification of landslide likelihood for existing road sections and values that could be affected Site level assessment: Risk analysis from field geotechnical assessment of road condition to analyze risk and prescribe remedial measures
Hydrologic and geomorphic processes affecting values on fans	Watershed assessment: Provides strategic-level identification of fan landforms, values on fans, and geomorphic/ hydrologic processes in catchment area upstream of fan Site level assessment: Risk analysis from field investigation to estimate likelihood of debris flows/debris floods initiating and affecting values on fan (LMH 57, LMH 61)
Windthrow in riparian buffers along cutblock boundaries	Watershed assessment: Provides strategic-level identification of windthrow occurrence and effects on existing riparian buffers; potential to affect stream channels Site level assessment: Risk analysis done in windthrow assessment of cutblock boundaries
Sediment sources affecting water intake or fish habitat	Watershed assessment: Provides strategic-level identification of sediment sources, connectivity to stream and likelihood of affecting intake; including landslides, roads, eroding stream escarpments, channel sediment, runoff from haul roads, etc. Site level assessment: Risk analysis from field investigation of individual sediment sources to streams, to estimate risk levels and prescribe measures for managing sediment (e.g. sediment management plan for haul roads)
Collective effects of multiple risk sources	Watershed assessment: Identifies interactions between hydrologic/geomorphic processes and forest /non-forest development; provides strategic-level risk ratings for combined effects Site level assessment: Risk analysis from field investigation of sites potentially affected by these interactions.
Climate change	Watershed assessment: Provides strategic-level view of climate change effects on hydrologic/ geomorphic processes, e.g. changes in snowpack, precipitation, storm intensity, timing of snowmelt, length of low water periods; and the potential for these changes to affect values Risk analysis: Select time frame relevant to the value; e.g., risks to temporary culverts may be low whereas risks to bridges with a long life span may be significant to bridge design.

Risk matrices similar to Figure E-1 can be a useful tool for preliminary risk screening, or for conceptually representing categories of acceptable and unacceptable risk for various values. They are constructed by defining categories of different severity for values or risk elements, such that each square in Figure E-1 corresponds to a defined risk category. Risk relationships and risk matrices may be expressed differently for different values. Examples of matrices used in BC for analyzing risks are in Wise et al. 2004, in MOF 2002 and in MOF 2016. The Public Infrastructure Engineering Vulnerability Committee (PIEVC 2011) uses risk matrices to estimate level of risk according to a scoring procedure, then goes on to more advanced risk evaluation for high risk categories. Other agencies such as the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development and the BC Ministry of Transportation and Infrastructure are also developing guidance for estimating risk and incorporating climate change effects into design of infrastructure.

Figure E-1. Conceptual risk diagram (adapted from PIEVC 2011, Fig. 6)



Risk analysis often requires more specific determination of consequences and the nature of harm than is conceptually represented in simple risk matrices. When a forest professional retains a specialist to do a risk analysis it is important that the forest professional and the specialist understand and agree on the scope and level of effort of the analysis; for example, whether it is to be a partial or more detailed risk analysis and to what extent consequences are to be determined. Table E-3 gives examples of consequences of concern identified for the purpose of estimating risk levels and setting risk tolerance criteria.

Table E-3. Examples identifying consequences of concern to assist with risk analysis. Note: This table presents examples only and does not imply an intended risk tolerance.

Values/risk elements	Considerations	Consequences of concern	Licensee's intended outcome
Public safety, public infrastructure, facilities, occupied buildings	Civil or even criminal liability No remedy for loss of life Potentially high financial costs to remedy damage or loss	Possible injury or loss of life Destruction of risk element Damage to risk element	No injury or loss of life Damage or loss of facilities or infrastructure kept within defined limits
Community water intake	Legal liability Potential costs to remedy damage or need for increased treatment	Physical damage to water intake Prolonged turbidity event	Avoid liability to licensee of increased treatment costs or damage to treatment facilities.
Instream restoration works or research monitoring sites	Loss of investment Remedies may or may not be possible Legal liability if instream work	Destruction of instrumented monitoring sites Destruction of instream restoration works	Loss of investment is avoided Violations of applicable environmental legislation are avoided
Mainline forest roads with public use	Extent of public use, importance of road link. Remedy – access can be restored.	Unsafe conditions for road users Access cut off to community or high public use area	Safe road conditions and/or loss of access restored within a defined time frame
Habitat critical to fish life processes	Legal liability (provincial and federal legislation) Remedies may or may not be possible	Material adverse effect, permanent destruction of habitat, degradation of habitat that is more than transitory.	Violations of applicable environmental legislation are avoided Habitat degradation is not sustained past a defined period
Riparian buffer for LWD, channel stability	LWD may enter stream reach from upstream or upslope sources Effect on channel stability depends on extent of loss of riparian buffer	Channel erosion, instability resulting from loss of riparian buffer Loss of long-term LWD supply	Loss of riparian buffer does not result in channel instability Sufficient long-term supply of LWD is maintained

## Risk evaluation

Risk evaluation compares the risk level estimated in risk analysis with risk tolerance criteria to determine if the risk is acceptable, tolerable or unacceptable. Risk control measures typically are directed at reducing either the likelihood of occurrence or the severity of the consequence. Risk evaluation and selection of risk control measures often require greater consideration of the possibility and practicability of mitigative or remedial measures than can be determined from risk matrices. A “critical questions” approach can be helpful to risk analysis, risk evaluation and selection of risk treatments; for example:

- what is the vulnerability of the value to identified sources of risk
- what is the nature of harm and the potential magnitude and duration of harm,
- would the value be rendered unusable or unsafe,
- what is the potential cost consequence to the licensee,
- are harm mitigation or remediation measures feasible,
- is the value transferable,

- what are the uncertainties in the risk assessments and in the possible harm mitigation or remediation measures,
- what is the potential for damage to the licensee's corporate reputation,
- what is the likelihood of success of harm mitigation measures over the short and long term,
- if harm mitigation measures rely on practices or standard operating procedures, what is the track record at achieving the intended results, and
- are oversight and quality control measures in place to be sure that the mitigation measure being relied upon will be carried out as intended?

### **Examples of risk tolerance criteria**

Several BC municipalities (North Vancouver, Squamish, and Chilliwack) have adopted quantitative geohazard risk criteria, primarily related to human fatalities and residences (APEGBC 2010, APEGBC 2012). When risks to residences and other infrastructure with human safety risk elements (highways, other occupied buildings etc.) are present, the forest professional can refer to these precedents in developing risk tolerance criteria.

### **References**

APEGBC 2010. Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia (Appendix C)

APEGBC 2012. Guidelines for Legislated Flood Assessments in a Changing Climate in BC (Sec. 3.7.3 and Appendix F, Section 5.1)

MOF 2002. Forest road engineering guidebook. B.C. Ministry of Forests, For. Prac. Br., B.C. Min. For., Victoria, B.C. Forest Practices Code of British Columbia Guidebook. (Appendix 10).  
<https://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/Road/FRE.pdf>

B.C. Ministry of Forests, Lands and Natural Resource Operations (MOF). 2016. Engineering Manual. (Appendix 6.1).

BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). 2013. Review of Landslide Management in British Columbia. Province of British Columbia. Internal document (unpublished). 59 pp

PIEVC 2011. Engineering Protocol. Public Infrastructure Engineering Vulnerability Committee, Engineers Canada

Wise, M.P., G.D. Moore, and D.F. VanDine (editors). 2004. Landslide risk case studies in forest development planning and operations. B.C. Min. For., Res. Br., Victoria, B.C. Land Manage. Handb. No. 56. 116 pp  
<https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh56.htm>

## APPENDIX F: Hydrologic Assessments

This Appendix should be read in conjunction with Section 1 of the Guidelines.

### Purpose and scope of hydrologic assessments

A hydrologic assessment is not a comprehensive watershed assessment. Hydrologic assessments are carried out to investigate site-specific concerns related to a disturbance (natural or development-related) that has occurred; or to assess the potential impacts from development or an event that has not yet occurred. A hydrologic assessment is an investigation of a specific area, site, process or event within a watershed unit; for example:

- assessment of a specific watershed process such as stream flow,
- assessment of a specific area within a watershed unit, such as an individual or group of cutblocks (e.g., in order to meet the objectives of land use plans or address a specific issue),
- assessment of the effects of a hydrologic or geomorphic event such as an extreme flood on a specific risk element such as a water intake, a structure, constructed spawning channel, high value habitat reach, etc.,
- assessment of the potential effect of a proposed cutblock or road on a specific risk element, and
- assessment of specific feature such as a fan or floodplain to determine the hydrogeomorphically or fluvially active portion of the feature so as to assess the risk to values on the feature and/or to develop appropriate strategies for harvesting or road construction (Wilford et. al 2005, Wilford et. al 2009).

Depending on the purpose of the assessment, the scope could vary widely. A hydrologic assessment could be based on airphoto interpretation and review of office information, or could include detailed field work.

A hydrologic assessment should:

- clearly define the purpose and scope of the project,
- choose a methodology and level of effort appropriate for the project objectives and scope of the study,
- compile and use relevant background information
- conduct field investigation appropriate for the purpose of the project,
- define terms used, references or manual s referred to, and protocols followed for classification conventions,
- evaluate and synthesize background materials, analyses and field findings,
- develop rationales clearly linked to findings in the investigation,
- connect conclusions and results to the purpose of the project, and
- state assumptions, uncertainties and limitations of the study including the need for follow-up work.

## **The watershed unit**

If the study area is not an entire watershed unit above a point of interest, then the subject site should be put into the context of the watershed unit in which it is contained. Watershed hydrologic characteristics should be described, at least at an overview level; for example, regional climate zone and typical peak flow regime (snowmelt, rain, rain-on-snow), biogeoclimatic zone, relief, features that may influence stream flows or the site or stream reach in question, such as lakes, ponds, wetlands, artificial flow controls, diversions, stormwater systems or water extraction should be noted. The extent of existing land use modification (residential, commercial, industrial, agricultural) throughout the watershed unit may be important. It is helpful to include a map delineating approximate boundaries of the watershed unit and showing the study area within that watershed unit.

The intent of considering the study area in the context of the watershed unit is:

- to understand the relative importance of the subject site, even if it is a small site. For example, in a watershed unit that has been extensively impacted by human activities or natural processes, small intact stream reaches may have a disproportionate importance for fish habitat,
- to identify whether changes in the assessment area caused by operations could have an impact on values downstream in the watershed unit,
- to identify whether changes anticipated in the assessment area caused by operations will contribute to cumulative effects downstream, and
- to identify whether processes elsewhere in the watershed unit could affect or are affecting the subject site.

Depending on the nature of the study and its purpose, more in-depth discussion of watershed processes, or involvement of a specialist, may be needed to properly assess the significance of the site of interest.

## **Hydrologic assessments of proposed cutblocks**

Hydrologic assessments of proposed cutblocks are often done in response to objectives set in higher level plans, such as in Enhanced Forestry Zones. Depending on the site, the primary concern may be water quality and/or water quantity (flow), fish habitat condition or cumulative effects on streams downslope or downstream of the cutblock.

A hydrologic assessment in a large block, e.g., in an enhanced forestry zone, may address the following:

- the potential for greater extent of “green” roads, more stream crossings and greater transport of sediment from ditches and road crossings into small streams,
- increased sediment transport to streams and increased scour or erosion in small streams due to increased runoff,
- greater lengths of riparian buffers exposed to windthrow, and

- additional factors that should be considered in a terrain stability assessment, such as the greater extent of harvested steep slopes that may be subject to post-harvesting landslides; and the greater lengths of boundaries along gullies or escarpments that could increase the likelihood of boundary-edge landslides or gentle over steep landslides.

Hydrologic assessments of proposed cutblocks should consider:

- potential effects on downstream values/risk elements;
- whether there are specific watershed management strategies in place from previous plans or specialist assessments and whether they still reasonably represent the current condition of the watershed unit containing the subject site; and
- whether the proposed operations may contribute to unacceptable cumulative effects; for example by considering how significant the proposed operation is relative to processes upstream and downstream.

Field work for a hydrologic assessment of a cutblock may need to extend to examination of downstream sites and/or values.

### **Limitations and qualifications of assessment**

The report should indicate the limitations of the assessment. Examples of items typically addressed under limitations include:

- the standard of care followed while carrying out the assessment,
- level of confidence in different aspects of the assessment,
- factors which may have limited the assessment, such as restricted access, quality of background information, terrain or weather conditions at the time of the field work, and
- restriction of the use of the report to the client for its intended purpose.

Some aspects of hydrologic assessments may be qualitative and subjective based on observed conditions. The report should distinguish between what is fact, as physically observed, measured and verifiable; what is inferred from observations of physical conditions, data analysis, or findings in the scientific literature; and what is uncertain or unknown.

A hydrologic assessment cannot be relied on in perpetuity. Although the member should attempt to anticipate reasonable changes that could affect the results of the assessment, the “shelf life” of the assessment depends on natural processes that occur over time; or on changes in land use or site development not anticipated in the assessment. The member should indicate over what time frame and under what conditions the hydrologic assessment will apply; and what circumstances may render the assessment no longer reflective of the site conditions.



## **EXAMPLE CHECKLIST FOR HYDROLOGIC ASSESSMENT REPORTS**

Checklists and templates are valuable tools in quality control of professional work. Below are examples of checklist points for the content of a hydrologic assessment report. The information may be presented under different headings or in a different order. Not all may be applicable to a particular report. Content of standard templates used for reports should be checked in every case to be sure that the content is relevant and accurate for the particular assessment.

### **Introduction**

- Client or employer - who commissioned the assessment
- Physical site location
- Purpose and scope of assessment – be specific
- What question(s) does the client/employer want answered?
- List of project tasks and level of effort
- Values to be considered (fish, water intake, infrastructure, property of others, buildings, etc)
- If the author notices public health/safety/environment concerns outside the scope of the assessment, how and by whom are they to be addressed

### **Assessment team**

- Primary author and reviewer
- Other team members (if applicable)
- External peer reviewers (if applicable)

### **Information used in the assessment**

- Include source, date and scale for all information.
- Imagery (type, scale and date), spatial data, climate/hydrometric information, fish data, , topographic mapping, bedrock/surficial geology, inventories (watersheds/streams/soils/vegetation/terrain/fish/etc.), previous reports or studies, surveys by others, etc.
- Information provided by client/employer

### **Methods**

- Any guidelines, handbooks, technical bulletins, terminology conventions, etc. that were followed or referred to with respect to specific aspects of the assessments
- Extent of field investigation; dates of field work; who conducted field work; means of access (vehicle, all-terrain vehicle, on foot, helicopter, etc); methods of field measurements (e.g, range finder, hip chain, tape measure, hand-held inclinometer)
- Conditions at the time of field assessment – high flow, low flow, raining, snowing, ground conditions clear, some snow cover present, etc.
- Methods of analyses

- Any limitations that affected the assessment (e.g., access to private property of others, physical barriers, grown in, snow cover, washouts, high stream flows, availability or quality of information, etc.)

### **Watershed overview**

- Size, topography, relief, general climatic/hydrologic environment, existing land uses, waterbodies (streams, lakes, wetlands, ponds)
- Indicate subject site in context of watershed, if study does not encompass entire watershed
- Watershed character and disturbances (mass wasting, landslides, wildfires, erosion, road conditions, significant zones for hydrologic response (e.g. elevation zones, aspects, etc.), stream channel types and condition, floodplains, fans, riparian condition, forest cover...)
- Conditions potentially affecting hydrologic response or channel hydraulics (e.g., existing channel or floodplain alteration, armouring, diversions, channel constrictions, instream structures, pipes/effluent, culverts, flow controls or diversions, water extraction, etc.)

### **Analyses – examples (as applicable)**

- Climate and hydrometric data
- Hydrologic Recovery
- Risk to values of interest

### **Results/Conclusions**

- Should follow logically from background material, field observations and analysis
- Should refer back to project objectives
- Should include rationales for judgments made

### **Recommendations or options to manage risk**

- Should follow logically from results/conclusions
- Should refer back to project objectives

### **Limitations**

- Should indicate any factors that may have limited the assessment
- Typically restrict the use of the report to the client/employer for its intended purpose
- Indicate over what time frame and under what the conditions the assessment will apply; and under what circumstances may it no longer represent site conditions

### **Figures, maps and tables**

- Typically would include a location map showing the subject site(s) relative to watershed boundaries and other important features
- May include tables presenting climate or hydrometric data, field data for stream reaches, etc.
- Photographs – should include date taken, direction facing (upstream/downstream, compass direction), object for scale in photo where appropriate

## **APPENDIX G: ASSURANCE STATEMENTS**

This appendix contains examples of the following documents:

- Watershed or Hydrologic Assessment Assurance Statement – Registered Professional
- Supporting Specialist Assurance Statement – Registered Professional
- Supporting Specialist Assurance Statement – Specialist other than Registered Professional

**Note:** This Statement is to be read and completed in conjunction with the Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector and is to be provided for watershed assessments or hydrologic assessments when requested by a client.

Date: \_\_\_\_\_

Name and location of project area

Name of Registered Professional: \_\_\_\_\_

Professional designation:

Professional association:

I have signed, sealed and dated the attached

- ☐ watershed assessment report, or
- ☐ hydrologic assessment report

in general accordance with the Professional Practice Guidelines – Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Sector and the scope of work in Attachment A.

Signature, seal and date

## Supporting Specialist Assurance Statement – Registered Professional

To: [the client]

Date: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Name and designation

With reference to the following project area:

\_\_\_\_\_  
Name and location of project area

The undersigned hereby gives assurance that he/she is a Registered Professional:

Name of specialist: \_\_\_\_\_

Professional designation: \_\_\_\_\_

Professional association: \_\_\_\_\_

This is to advise that I have completed the following work [or attachment with scope of work], and have submitted signed and sealed documents to the client in respect of the work completed by me:

\_\_\_\_\_

\_\_\_\_\_

I confirm that I have liaised as required with the client, lead specialist or forest professional for the purposes of my services.

I hereby give my assurance that I am a Registered Professional and that the work undertaken on this project by me falls within my area of professional expertise.

Signature, seal and date

## Supporting Specialist Assurance Statement – Specialist other than Registered Professional

To: [the client]

Date: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Name and designation

With reference to the following project area:

\_\_\_\_\_  
Name and location of project area

The undersigned hereby gives assurance that he/she has the following qualifications for the work undertaken:

Name of specialist: \_\_\_\_\_

Area of specialization: \_\_\_\_\_

Qualifications: \_\_\_\_\_

*Include relevant academic background, certifications or technical memberships, as applicable. Attach additional documents if needed.*

This is to advise that I have completed the following work [or attachment with scope of work], and have submitted such records to the client as he/she requested in respect of the work completed by me:

\_\_\_\_\_

\_\_\_\_\_

I confirm that I have liaised as required with the client, lead specialist or forest professional for the purposes of my services.

I hereby give my assurance that I am qualified and competent to carry out the work I have undertaken on this project.

Signature and date