**Professional Practice Management Plan (PPMP) Template for Very Large Firms (Change to Title of Your PPMP e.g. “Ministry of Innovation Professional Practice Management Plan”)**

***This template (Version 0.1) has been developed for very large firms, public sector firms or firms with multiple divisions, business lines or unique operating groups where the individual groups will have procedures unique to them. It has been created to show both professional engineering and geoscience. Where the firm only carries out work related to one of the professions, mention of the other can be eliminated in the policy, guiding principles and detailed procedures drafted for and by the public sector firm.***

***Where [firm] or [the firm] appears throughout, replace it with the public sector firm’s name.***

***Delete this table, it is for information about the template only, it should not appear in a firm’s PPMP.***

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| **PPMP Template Revision Table** | | |
| Version # | Date | Description |
| V 0.0 | 2021.05.11 | Initial Release for Use |
| V 0.1 | 2021.05.21 | Removed “and reviews” term from Checking section |
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***This template is provided as an example of a typical generic PPMP for firms as described above. Firms are free to develop their PPMP from scratch, from existing documents, or from this template. Regardless of how a firm’s PPMP is developed it must meet the requirements in the Bylaws of Engineers and Geoscientists BC. If this template is used to develop your firm’s PPMP, you are free to modify it in any way, however it must still meet the requirements in the Bylaws of Engineers and Geoscientists BC.***

## PPMP Review and Revision Record

This PPMP must be reviewed annually and updated as required to document evolving business practices of [the firm].

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| **Annual PPMP Review Record** | | | |
| Date | Reason | RO | Comments |
| yyyy.mm.dd | Annual Review |  |  |
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(consider adding area for each RR to acknowledge annual review, the annual review record can be a separate document)

When this PPMP is revised, the PPMP Version Table below must be updated to reflect the changes. Previous versions must be retained for a minimum of 10 years.

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| **PPMP Version Table** | | | |
| Version # | Date | By | Description |
| V 1.0 | yyyy.mm.dd | xxx | Initial Release for Use |
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## Introduction

This PPMP has been developed to meet the requirements set out in section 7.7.3 of the Bylaws of Engineers and Geoscientists BC.

As the Bylaw mandates, this PPMP includes the following sections or elements:

* Firm organizational structure.
* Name of the Responsible Officer.
* Name(s) of the Responsible Registrant(s) and the division, department or practice area for which they are responsible.
  + Include a table showing each group (department, division, function), discipline or practice area and the Responsible Registrant named for each if applicable. Depending on the size and breadth of the firm and how it is structured, a Responsible Registrant can be named for a group, department, division, function, discipline, or practice area. This decision is up to the firm.
* Practice areas or scope of engineering and/or geoscience in which the firm operates.
* Code of Conduct and policies regarding ethical behaviour with specific references to how these documents align and reinforce behaviours in keeping with:
  + Engineers and Geoscientists BC Code of Ethics.
  + Engineers and Geoscientists BC guidelines on human rights, equity, diversity and inclusion.
  + Ethical business practices addressing corruption, conflict of interest, and contractual matters.
* Continuing education and professional development policies and procedures including how they align with the Engineers and Geoscientists BC Continuing Education Program and help employees particularly professionals remain competent in their roles and practice areas.
* Quality Management policies and procedures covering the following required areas:
  + Professional Practice Guidelines
  + Retaining Project Documentation
  + Checking Engineering and Geoscience Work
  + Independent Review of Structural Design
  + Independent Review of High-Risk Activities or Work
  + Authenticating Documents
  + Direct Supervision
  + Field Review During Construction or Implementation

This PPMP will undergo an annual review and revision, as needed, to incorporate input from root cause analyses of nonconformances, internal audit findings, client feedback, user suggestions and management reviews.

All revisions made to this PPMP must be reviewed and approved in writing by the Responsible Officer and Responsible Registrant(s). Refer to the Issue/Revision Record at the front of this PPMP for the status.

Sections in this PPMP have been prepared as follows:

* Introduction and Purpose are Engineers and Geoscientists BC explanations and use Engineers and Geoscientists BC terminology. They are provided to help educate those using this PPMP.
* Policy, Guidelines for Detailed Procedures and Standard Operating Procedures are (firm name)’s and use (firm name)’s terminology. They are provided for use by all employees.

## [The Firm]

Include the following content in this section:

* What is the firm?
  + Why does the firm exist?
  + Whom does the firm serve?
  + How long has the firm been operating?
  + How large is the firm?
* Document who is the Responsible Officer and Responsible Registrant(s) for the firm.
  + Document the firm’s organizational structure. Include an organization chart of entire firm (leadership and divisions, departments or functions)
* Who are the firm’s clients (can be internal and external) and what types of projects are undertaken?
* In which engineering and/or geoscience practice areas does the firm operate?
* How long has the firm been operating?

## Engineering and/or Geoscience Group (Department or Division?)

Include a section for each engineering and/or geoscience group, if multiples, or combine in one section?

If there is a question about whether the firm carries out professional engineering or professional geoscience, refer to the *Professional Governance Act* *Engineers and Geoscientists Regulation* Part 2 Professional Engineers, and Part 3 Professional Geoscientists for definitions and guidance.

For each engineering and/or geoscience group:

* What does this group do?
* In which engineering or geoscience practice areas does this group practice? What is its scope of practice?
* How many registered professionals does this group employ?
* How is this group structured?
  + Include an organization chart of the group.

## Code of Conduct

### Introduction and Purpose

#### [Firm]’s Code of Conduct

[The firm] Code of Conduct sets out the behaviour and actions required of individuals employed by or under contract with [the firm]. It applies to all employees and contractors working for [the firm].

Add content for the following:

* Purpose of Code of Conduct – why does the firm have a Code of Conduct?
* Application – to whom does it apply and when?
* Highlights from the Code of Conduct about business practices addressing corruption, conflict of interest, and contractual matters.
* Link to [the firm’s] Code of Conduct

### Engineers and Geoscientists BC Code of Ethics

The Engineers and Geoscientists BC Code of Ethics has been established to support and inform professional registrants in fulfilling their duty to the public, clients, the professions, and their fellow professional registrants. The Code of Ethics is not intended to, nor does it define conduct for all situations that a professional registrant may encounter. Instead, it provides guidance to inform the behaviour, decisions, and professional judgment of professional registrants that Engineers and Geoscientists BC regulates. A professional registrant should incorporate ethics into their daily decision-making.

The Engineers and Geoscientists BC Code of Ethicsserves several purposes. It designates the standard of conduct expected of professional registrants in easily understandable terms. It distinguishes appropriate professional conduct from that which fails to meet a required standard. The Code of Ethics also provides a basis on which allegations of unprofessional conduct are adjudicated by the Discipline Committee or other groups charged with responsibilities related to the conduct of professional registrants.

The Code of Ethics, Schedule A of the Bylaws of Engineers and Geoscientists BC , applies to all registrants.

Refer to [the Engineers and Geoscientists BC Code of Ethics](https://www.egbc.ca/Complaints-Discipline/Code-of-Ethics/Code-of-Ethics)for more details about the Principles on which it is based.

### Policy

All employees and contractors working for [the firm] must understand and comply with the [the firm]’s Code of Conduct (insert link or include).

All professionals registered to practice by, or in training to be registered with, Engineers and Geoscientists BC, or other employees working on engineering and/or geoscience projects for [the firm] must comply with the Engineers and Geoscientists BC Code of Ethics.

All employees and contractors must comply with [the firm]’s policies and Code of Conduct with respect to human rights, equity, diversity, or inclusivity.

The [the firm]’s policies and Code of Conduct will be periodically reviewed to confirm that they comply with the Engineers and Geoscientists BC requirements and any related professional practice guidelines that have been published by Engineers and Geoscientists BC.

### References

* [the firm]’s Code of Conduct or related policies (add link)
* [Engineers and Geoscientists BC's Code of Ethics](https://www.egbc.ca/getmedia/81f5d90e-eed6-4118-b431-10978c03720d/Code-of-Ethics-Print-Version-Feb-5-2021.pdf.aspx)
* [Engineers and Geoscientists BC's Guide to the Code of Ethics](https://www.egbc.ca/getmedia/33d03861-5d04-43e9-b76b-ff57ba8b9bdb/EGBC-Guide-to-the-Code-of-Ethics-V2-0.pdf.aspx)
* [Engineers and Geoscientists BC's Code of Ethics FAQ’s](https://www.egbc.ca/Complaints-Discipline/Code-of-Ethics/Frequently-Asked-Questions)
* [Engineers and Geoscientists BC's Human Rights and Diversity Professional Practice Guidelines](https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories/Document/01525AMW3QAYXGAM5PGZHJJFFPSNEOROY3/Human%20Rights%20and%20Diversity%20Guidelines)
* Other references.

## Continuing Education Program

### Introduction

Registrant firms play an important role in supporting professionals they employ in the maintenance of their competency and meeting their requirements under the Engineers and Geoscientists BC’s Continuing Education Program. Employers can set standards that empower professionals to undertake appropriate and adequate continuing education activities.

Under the *Professional Governance Act* and the Continuing Education Program by Registrant Firms requirements as set out in section 7.6.16 of the Bylaws of Engineers and Geoscientists BC, all registrant firms must develop, maintain, and follow documented procedures to support professionals they employ in meeting their Continuing Education Program requirements and maintaining their competency with respect to their role and practice areas. The continuing education requirements are further explained in the [Guide to the Continuing Education Program](https://www.egbc.ca/getmedia/86710280-a428-4035-b596-e495bf36249d/EGBC-Guide-to-the-CEP-V1-0.pdf.aspx).

These internal procedures will vary among registrant firms but should outline a vision and goals for supporting continuing competency and education and policies supporting learning activities.

Registrant firms that have more than one professional in their employ must also provide support in meeting individual Continuing Education Program requirements by conducting an annual documented review with each professional. This review should be focused on the maintenance of the professional’s competence with respect to their role and area of practice at the firm. The review should identify potential gaps in the professional’s competency as well as identifying means and methods of addressing any identified gaps and maintaining their competency.

### Purpose

Professionals are required under the Engineers and Geoscientists BC Code of Ethics to “maintain competence in relevant specializations, including advances in the regulated practice and relevant science”. To support this important principle of professional practice, professionals are required under the *Professional Governance Act* and the Bylaws of Engineers and Geoscientists BC to create continuing education plans and meet mandated levels of continuing education.

This section describes the [The firm]’s documented procedure to be followed by its professionals to meet the required standard for continuing education and competence.

### Policy

Maintaining our collective competence [edit to suit the firm’s role and services]:

* Helps to protect public safety and the environment.
* Fosters excellence.
* Maintains and advances our knowledge and expertise.
* Enhances and expands our domains of practice.
* Enhances our image.
* Improves the quality and value of services we provide.
* Improves marketability.

Managers must conduct and document annual performance reviews [use firm’s terminology] with all their direct reports that will include (add items here, including ensuring competence for their role is maintained).

For professionals registered with Engineers and Geoscientists BC, performance reviews and learning plans will align with the Engineers and Geoscientists BC Continuing Education Program.

Learning plans will be supported through [choose the ones that apply or draft new]:

* Paid time off for professional development.
* Tuition or participation fees approved for programs, courses, or training.
* Registrations fees for approved conferences.
* In-house webinars, seminars, training, and workshops.
* Mentoring program.
* Career coaching.

### Detailed Procedures and References

Refer to or include [the firm]’s human resource policies regarding performance review, professional development, learning and/or continuing education.

## Professional Practice Guidelines and Practice Advisories

### Introduction

A professional practice guideline sets the minimum standards of competence, conduct and practice expected from a professional engaged in the activities it addresses. Professionals must have regard for applicable standards, policies, plans, and practices established by the government or by Engineers and Geoscientists BC, including Engineers and Geoscientists BC professional practice guidelines.

Professionals must establish, maintain, and follow documented procedures to:

* Stay informed of, knowledgeable about, and meet the intent of all applicable standards, policies, plans, and practices established by the government or by Engineers and Geoscientists BC, including professional practice guidelines relevant to their practice.
* Document in writing the reason(s) for a departure from any relevant portion of a professional practice guideline.

Engineers and Geoscientists BC publishes professional practice guidelines on specific professional services or activities where additional guidance is deemed necessary. Professional practice guidelines are written by subject matter experts and reviewed by stakeholders before publication. Engineers and Geoscientists BC’s preparation of professional practice guidelines is informed by a risk-based analysis of the professional activity or service that falls under regulated practice.

The use of professional practice guidelines is mandated by section 7.3.1 of the Bylaws of Engineers and Geoscientists BC and is supported by the Engineers and Geoscientists [*BC’s Guide to the Standard for the Use of Professional Practice Guidelines*](https://www.egbc.ca/getmedia/a8101b17-229a-4bd9-93cd-1d626168a9e4/EGBC-Use-of-Professional-Practice-Guidelines-V1-0.pdf.aspx).

During compliance audits, auditors will be confirming professionals are knowledgeable of, competent in, and meet the intent of professional practice guidelines relevant to their work.

### Purpose

Each professional practice guideline establishes the standards of competence, conduct and practice that all professionals are expected to meet when engaged in the relevant professional engineering or professional geoscience work. Professional practice guidelines may also assist in interpreting the standards of professional and ethical conduct established by the Bylaws of Engineers and Geoscientists BC.

Engineers and Geoscientists BC chooses professional practice guideline topics with a risk-based analysis, prioritizing professional practice guidelines that address practice activities involving increased risk to the safety, health and welfare of the public, including the protection of the environment and the promotion of health and safety in the workplace.

This section describes the [the firm]’s documented procedure to be followed by its professionals to meet the standard for the use of Engineers and Geoscientists BC professional practice guidelines.

### Policy

Projects undertaken must meet all regulatory and statutory requirements, and applicable professional practice guidelines and standards including meeting the intent of relevant Engineers and Geoscientists BC professional practice guidelines and practice advisories.

Professionals must stay informed of, knowledgeable about, and meet the intent of all applicable standards, codes, policies, plans, and practices established by the government or by Engineers and Geoscientists BC, including professional practice guidelines relevant to their practice.

Professionals will document in writing the reason(s) for a departure from any relevant portion of a professional practice guideline.

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across [the firm] and will inform any detailed procedures, if required, for use of professional practice guidelines in each division, department or practice areal ***{Use firm’s terminology}***

[The firm] and all professionals employed or under contract with [the firm] must have regard for applicable standards, policies, plans, and practices established by the government or by Engineers and Geoscientists BC, including professional practice guidelines by:

* Establishing, maintaining, and following documented procedures that describe how they will stay informed of, knowledgeable about, and meet the intent of all applicable standards, policies, plans, and practices established by the government or by Engineers and Geoscientists BC including:
  + Monitoring communications about changes to regulations, guidelines and standards including those from Engineers and Geoscientists BC.
  + Reviewing related websites including the Engineers and Geoscientists BC website to retrieve the current versions and to find out about updates to regulations, guidelines and standards.
  + Determining what impact these changes will have on [the firms]’s related practices and work.
  + Supporting related professional development to reinforce the use of professional practice guidelines.
* Before starting work on any project, professionals of record will identify, confirm and document regulatory and statutory requirements or advice including those found in ***{Edit to include those references applicable to the firm}****:*
  + Engineers and Geoscientists BC professional practice guidelines and practice advisories.
  + *BC Building Code*
  + Professional standards such as CSA, ASME, etc.
  + Other applicable legislation or standards.
* During the work, professionals of record will:
  + Have the work designed or developed to meet all regulatory and statutory requirements including those found in professional practice guidelines and practice advisories.
  + Carry out or have carried out reviews to confirm that all requirements have been met.
  + Document in writing the reasons for any departure from any relevant portion of a professional practice guideline or practice advisory.

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

## Document and Records Management

### Introduction

Retaining project documentation means retaining any document that is evidence of regulated practice activities, events or transactions, or is evidence that professionals have met their professional and contractual obligations, or that has been prepared and delivered for the project or work, regardless of the media used to create or store the records.

A professional must establish, maintain, and follow documented procedures for the retention and preservation of complete project documentation related to the regulated practice engaged in by the professional. Retaining complete project documentation is mandated by section 7.3.2 of the Bylaws of Engineers and Geoscientists BC and described in the [*Guide to the Standard for Retention of Project Documentation*.](https://www.egbc.ca/getmedia/c5848d85-3589-4e9e-ab73-65d1dc385aa8/V1-3-Retention-of-Project-Documentation_FINAL_2018-01-09-Web.pdf.aspx)

During compliance audits, auditors will be confirming registrants are complying with [firm]’s records management policies and procedures to ensure retention and preservation of complete project documentation for at least 10 years after the completion of the project or 10 years after the documentation is no longer used.

### Purpose

Retaining complete and easily retrievable documentation is critical to professional practice and helps professionals demonstrate that they are holding public safety paramount and serving the public interest as required by the *Professional Governance Act* and Code of Ethics*.*

Documentation or records, such as correspondence, email, minutes of meeting, reports, drawings, specifications, test reports, input data, and other records, may also:

* Provide accurate records of the basis for engineering and geoscience work and decision-making.
* Allow another qualified professional engineer, professional geoscientist, professional licensee engineering or professional licensee geoscience, unfamiliar with the work or service, to review the file and effectively carry on with the work.
* Facilitate well-run projects or work that meet objectives and professional standards.
* Allow a firm to demonstrate that it, and its professionals*,* have met required professional standards.
* Be useful in resolving issues and defending claims.
* Meet legal and regulatory requirements.

This section describes how project documents and records will be retained by [the firm]’s engineers and geoscientists.

### Policy

All [the firm]’s records will be classified and retained in the [records management system].

Records will be preserved and retained for the longer of 10 years after the end of a project or 10 years after the records is no longer in use ***{can be changed to show a longer retention period or permanent retention for all or some records, this includes indefinite retention}***.

Documents and records must be filed and stored [electronically in a standard directory structure or physical documents in a standard folder structure or a combination of electronic and physical document with a standard structure clearly showing which files are stored in each medium] when the project or work is active to allow for easy filing, retrieval and shared access by those involved.

Electronic records will be backed up [at least daily if not automatically synchronized] and stored securely [offsite].

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across [the firm] and will inform any detailed procedures, if required, for use of professional practice guidelines in each division, department or practice area, ***{Use firm’s terminology and only what is applicable to the firm, e.g., electronic versus physical document, etc.}.***

#### Document and Record Life Cycle

The flowchart is a generic and basic example of the document and record life cycle. The guiding principles for a documents and records control procedure included here follow this flow. Firms may have a more complex process.



#### Guiding Principles for Document and Records Management

**Setting up Project Filing**

* Request or confirm the project number or other identifier.
* Set up a project directory on the server and, if used, a file drawer (or other system as appropriate).
* Depending on the medium used, set up the standard project directory structure in the project directory and/or set up physical document folders using the standard folder structure.

**Preparing Documents**

* Use [the firm]’s document standards for consistent, professional appearance.
* Use standard templates and forms, where available.
* Use validated and approved software and media for creating and maintaining documents.
* Use standard file naming conventions to save document files.
* Include document identifiers (project name, project number, filename, file directory) in the document, as appropriate, or in document properties or metadata stored with each electronic file.
* Include project name, project number and topic in the subject line of project or work-related e-mail containing information that must be retained.
* Review, spellcheck and check documents to confirm they are correct, complete and ready to issue.

**Filing Documents**

* File documents in their appropriate directory or file folder in the standard project file structure.
* File all project or work e-mail messages that must be retained in the appropriate folder of their related project or work file structure. Email may be filed in any of several ways so that email records are with the retained project records by the time of closeout:
  + Saved to the project filing when sent or received.
  + Stored in a project-labelled Personal Folder or similar throughout the project and moved at closeout.
  + Periodically, converted and saved to a portfolio PDF and saved to the project filing.
  + Printed and save to physical document project files.
  + Other means to assure that project records retained at closeout include email records.
* File issued electronic documents in PDF/A exactly as issued. (Note: PDF/A format is not a requirement, but a recommended best practice)
* Set up a check-in/check-out system wherever multiple users have access to working documents.
* Train users and document managers in how to file and store documents.

**Revising Documents**

* Include a revision record indicating revision number, what was revised and by whom, on documents where version control is required (drawings, reports, etc.).
* Clearly identify what was revised for documents subject to version control.
* Create and/or use a standard checking process for all revisions.
* Train users in document revision procedures.

**Issuing Documents**

* Include an issue record, indicating purpose for issuing and when issued, on documents where version control is required (drawings, reports, etc.). The revision and issue records may be combined into one record. (consider whether separate procedures are required for documents internally vs. externally)
* When issuing electronic documents, providing and retaining the file in PDF/A exactly as issued. (Note: PDF/A format is not a requirement, but a recommended best practice. Depending on the electronic deliverable other methods of retaining a secure copy may be more appropriate)
* Use some form of transmittal (form, e-mail or other) as a record of what was sent to whom, when and how.
* Create an audit trail to record who receives which document revisions and when.
* Make sure the most recent or current revisions of documents are issued to those who require them.
* Train users and document managers in how to issue documents.

**Receiving Documents**

* Determine whether the document is a record to be retained or a document that is kept for convenience until no longer needed.
* Store documents in the project file to record when documents are received.
* If receiving physical documents, code and file in physical document project file structure, or scan, name and file in electronic file structure, or code and store in the physical document file.
* If receiving electronic documents, name, as appropriate or leave with originator’s filename and file in electronic file structure or print and file in the physical document system.
* As needed, set up a standard distribution indicating expectation of those receiving the document (e.g., approve, action by, information only, etc.).
* As needed, record actions taken based on received documents.
* Train users and document managers in procedures for documents they receive.

**Archiving Records**

* If not already developed, create a records management system that specifies the required retention period and media for retention of various categories of records.
* Specify how the integrity of the archived records is protected (e.g., separate, read-only directory).
* Cull non-records and convenience copies from files.
* For physical records, group, label and log records with their date of destruction.
* Indicate media and location (onsite, offsite, cloud, etc.) for archiving and storing electronic files (separate server, cloud drive, etc.).
* On closeout, transfer records to their storage medium and location.
* Secure access so only those with permission can access files.
* Limit access to confidential and personal information.
* Provide or arrange for storage with environmental controls to preserve records (protection from moisture, fire, etc.).
* Migrate records to current media or maintain hardware and software able to access them for the duration of their retention period.
* Train document managers about archiving and storage procedures.

**Destroying Records** (record destruction is not an Engineers and Geoscientists BC requirement)

Unless records are permanently retained:

* Destroy all records that have met all retention requirements and that are not under a legal hold for pending litigation or a regulatory requirement.
* Keep a record of what was destroyed, when and by whom

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

## Checking Engineering and Geoscience Work

### Introduction

Checking is a documented quality control processes to confirm that the engineering or geoscience work is complete, correct, meets all input requirements, and is suited for its intended use or purpose. Checks, as defined by Engineers and Geoscientists BC, encompass all the various checks that occur or ought to occur throughout the development, presentation, production and performance of any professional engineering or professional geoscience work in any sector.

Prior to checking, a risk assessment must be completed to determine the extent of checking required and whether an independent review is required; refer to section titled **Independent Review of High-Risk Professional Activities or Work,** of this PPMP.

Depending on the risk, checking may be carried out by a qualified individual independent of, or associated with, the work being checked, or by the professional*,* who prepared the work. Checking engineering and geoscience work is mandated by section 7.3.4 of the Bylaws of Engineers and Geoscientists BC and described in the [*Engineers and Geoscientists BC Guide to the Standard for Documented Checks of Engineering and Geoscience Work*](https://www.apeg.bc.ca/getmedia/b91b922e-3118-4aed-b7c7-55a36ec1d7a6/APEGBC-QMG-Documented-Checks-of-Engineering-Geoscience-Work.pdf.aspx).

Where work involves structural design, refer to the next section of this PPMP, **Independent Review of Structural Designs**.

During compliance audits, auditors will be confirming professionals are carrying out documented checks of engineering and geoscience work using a documented process appropriate to the risk associated with the work, and retaining records of those checks according to the procedures below.

### Purpose

Professionals are required to have documented checks of their engineering and geoscience work conducted, using a written quality control process that is appropriate to the level of risk associated with the work. Checks are used by professionals to confirm that work they have prepared meets all input requirements and is suitable for its intended purpose.

This section describes how checks of professional engineering or geoscience work will be carried out and documented in [the firm].

### Policy

Checks must be carried out to confirm that the work is complete, correct, meets all input requirements and is suitable for its intended purpose.

The responsibility for carrying out, or arranging to have carried out, required checks of professional engineering or geoscience work rests with the professional of record.

Those preparing professional engineering or geoscience work are required to check their work before providing it to others for documented checking and not rely solely on the checker(s) to find errors and omissions.

Self-checking as the only check for professional engineering and geoscience work, prior to issuance, will not be allowed. ***{This is optional if self-checking is allowed, revise to add parameters for when allowed or not allowed.}***

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across the firm and will inform the detailed procedures for checking professional engineering or geoscience work in each practice area/division/department.

Before proceeding with the work:

* Assess the competencies required to confirm that qualified professionals are available to perform the work. Only proceed with work, where qualified professionals are available.
* Assess the risk (refer to risk assessment process and template internally or use those in the Engineers and Geoscientists BC Guide to the Standard for Independent Review of High-Risk Professional Activities or Work), use it to determine the extent and levels of checking required and document and retain a record of the risk assessment.
* Identify qualified checkers to carry out the project checks.
* Include adequate time for all checks in the project plan and budget.
* Identify, confirm and document all input requirements to reference and use for the work and required checks.
* Identify, collect and conduct documented checks of all input data to confirm it is complete, correct, current and suitable prior to relying on it.
* Validate spreadsheets and software before using them in analysis or calculations. (validation of commercial engineering/geoscience software is often done centrally for a firm prior to it being installed on users computers, these validations should be documented and available to users and auditors)
* Check spreadsheet and software output using hand calculations, site measures, seasoned reviews of the output or other means suitable to the work being undertaken.
* Plan when, how, by whom and to what extent checks will occur during the work.
* Plan for independent review of activities or work assessed as high-risk or that involves structural design.
* Check all work, including calculations, as planned.
* Always self-check work before handing work off for others to check.
* Arrange for or review all final design or development work to confirm that it is complete, meets all input requirements and is suitable for its intended purpose.
* When checking one discipline or practice area in a document that includes other disciplines or practice areas, qualify the check to indicate what the check covers.
* Have all deliverables and professional documents, such as drawings, specifications and reports checked to confirm that they are correct, complete and consistent.
* Review, authenticate and have the permit to practice number applied to all professional documents before they are delivered to others who will rely on them.
* Keep a record of all checks legibly indicating the purpose, date of check or review, professional of record, checker’s name, issues of significance found and how the issues were addressed or the rationale for not addressing them.

[Firm] requires checks to be documented using the following process/procedure (this can be at a global level or it can be required at the department or operating unit level. Best practice would be to have a global method, that is to be used by default unless a department or operating unit has a specific policy/procedure/standard checking record)

* Identify the method for recording checks, it could be a standard form, checking ledger, recording the required information on a checking copy of the document, etc. This should be developed to be an in-process function suited to the type of work being done. The process may be different depending on what is being checked, e.g., calculation checking record may vary from a report checking record or input data checking record.

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

## Independent review of Structural Designs

### Introduction

Independent review of structural design is a documented evaluation of the design concept, details, and documentation, based on a qualitative examination of the substantially complete structural design documents that occurs before those documents are issued for construction.

The independent reviewer must be a professional engineer or professional licensee engineering with appropriate qualifications and experience involving the type of structure being reviewed. The level of experience required for a specific structure will depend on the risk and complexity of the structure. The independent reviewer's experience must be sufficient to critique concepts and identify deficiencies in structures with complexity equal to or greater than the structure being reviewed. Having a minimum of six years of experience with a particular structural system is considered to be appropriate to act as an independent reviewer.

Risk assessments must be conducted to confirm the level and extent of independent review required. There are two types of independent review:

* **Type 1 Independent Review** is an independent review carried out by an appropriately qualified and experienced professional engineer who was not involved in preparing the design but may be employed at the same firm as the professional of record who is responsible for the design.
* **Type 2 Independent Review** is an independent review carried out by an appropriately qualified and experienced professional engineer who was not involved in preparing the design and is not employed at the same firm as the professional of record who is responsible for the design.

Independent reviews are mandated for virtually all structural designs carried out in BC by section 7.3.5 in the Bylaws of Engineers and Geoscientists BC and described in the Engineers and Geoscientists BC’s [*Guide to the Standard for Documented Independent Review of Structural Designs*](https://www.egbc.ca/getmedia/b8eb4a64-2f86-415b-98fb-b11aae4f46fa/EGBC-Documented-Indep-Rev-of-Structural-Designs-V2-0.pdf.aspx).

During compliance audits, auditors will be confirming that professionals who are carrying out structural design are arranging to have documented independent reviews carried out for structural designs they prepare or directly supervise, and that appropriate records documenting the reviews are being retained.

**The exceptions for single family or two-family homes has been excluded as it is unlikely this would apply to very large or public sector firms.**

### Purpose

Independent reviews are carried out because virtually all structural designs present some risk to the public. The independent review provides an objective, independent reassessment of the adequacy of the structural design approach, execution, and documentation, to reduce the potential for severe consequences from a structural failure that could harm to the public.

This section describes how independent review of structural designs will be carried out and documented in [the firm].

### Policy

Independent reviews of structural designs must be carried out for all unique designs, including permanent or temporary structures related to construction before the related drawings are issued for construction or maintenance.

Risk assessments must be conducted to confirm the level and extent of independent review required.

Where [the firm] does not have experience with the type and scale of structure, or the structure is innovative and complex, involves emerging technology or does not have well-defined solutions, a qualified independent reviewer will be sourced externally. Otherwise, the independent reviewer will be a qualified structural engineer or professional licensee engineering, employed by [the firm], who has not been involved in the design.

Repetitive structural designs will be independently reviewed initially and periodically to confirm their continued adequacy. The initial and subsequent independent reviews must be documented and filed in a location where engineers relying on those reviews have access to them and can reference the review records.

### Guiding Principles for Detailed Practice Area Procedures

Although prescriptive, this high-level procedure applies across [the firm] and will inform the detailed procedures for independent review of structural designs in each division, department or practice area ***{use firm’s terminology}*** where structural designs are prepared.

To avoid surprises later in the design evolution, arrangements should be made to have independent reviews carried out periodically throughout the design.

Arrange to have the work checked to confirm that the work and documents meet all requirements and are suitable for their intended purpose.

The final review must be based on the substantially complete structural design documents. The focus of the review should be the initial assumptions, design criteria, appropriateness of the proposed concept, and the final design solution.

Conduct a documented risk assessment. The extent and detail of independent review of structural designs will vary depending on the:

* Severity and likelihood of consequences a structural failure.
* Complexity of the design or structure.
* Use of innovative technology.
* Departure from established practices.
* Level of assessed risk associated with the structure.
* Experience of the professional of record and reviewer.

Select an independent reviewer who:

* Is a registered professional engineer or professional licensee engineering in BC,
* Has appropriate experience with the type of structure being reviewed,
* Has sufficient experience to critique concepts and identify deficiencies in structures with a complexity equal to or greater than that being reviewed,
* If possible, has a minimum of 6 years of experience with the structural system being reviewed, and
* Has not been involved in preparing the design.
* Where [the firm] does not have experience with the type and scale of the work, or the work is innovative and complex, involves emerging technology or does not have well-defined solutions, identify and engage a qualified external resource to carry out the independent review.

The engineer of record for the structural designwill provide the following documents to the independent reviewer:

* Structural plans and supporting documents, plus plans and supporting documents of other disciplines that may be necessary to review the structural design, or as otherwise requested by the reviewer.
* The structural specifications, plus specifications of other disciplines that may be necessary to review the structure, or as otherwise requested by the reviewer.
* If applicable, all geotechnical reports and any follow-up documentation between the engineer of record and the geotechnical engineer.
* If it is not incorporated in the drawings and specifications, a summary sheet documenting:
* The structural system and design approach, in sufficient detail to identify the lateral and vertical load resisting systems, including any special or unconventional aspects.
* Site-specific design data including climatic and seismic criteria.
* Project or work-specific design data, including seismic parameters, soil bearing capacity, lateral soil pressure, pile capacity, etc.
* The design loads from use and traffic, snow, rain, wind, superimposed dead loads, and equipment.
* Any special loading conditions or performance criteria.
* Structural design notes and calculations, when requested by the reviewer.

The engineer of record, responsible for the primary structural system, will confirm that any specialty components designed by others are in general conformance with the design of the primary structural system. The engineer designing the specialty components will be responsible for having the design for those components independently reviewed.

The engineer of record will review the independent reviewer’s comments, address them, or provide rationale for not doing so, and retain the reviewer’s report and any follow up communication or documentation as a record in the project files.

The independent reviewer will carry out the independent review as follows:

1. Review the design criteria, loads, including loads imposed by components designed by other disciplines and loads from adjacent structures, and performance requirements.
2. Review geotechnical requirements and material properties.
3. Review the concept and integrity of the gravity and lateral load-resisting systems.
4. Review the continuity of load paths for both gravity and lateral loads.
5. Review the structural plans and supporting documents to determine whether they are sufficient to identify the essential components of the structural system and provide sufficient information to guide the construction of the structure.
6. Where appropriate, perform design calculations on a representative sample of structural elements, to determine whether the analysis, design and detailing generally comply with the appropriate codes and standards.
7. Discuss any concerns with the engineer of record. It is the responsibility of the engineer of record to adequately resolve concerns noted in the independent review.
8. Provide and authenticate a formal record of the independent review to the engineer of record*,* highlighting any concerns (Refer to the [Checklist and Signoff for Independent Review](#Checklist) of Structural Design at end of this section or in appendix??).
9. If significant concerns are noted, request that the design be revised and resubmitted.

The engineer of record remains responsible for the structural design despite it being independently reviewed. The independent reviewer is responsible for the quality of the review.

Retained records include:

1. Mark-ups of drawings,
2. Email exchanges,
3. Completed [Checklist and Signoff for Independent Review](#Checklist) of Structural Design authenticated by the independent reviewer, and/or
4. Record of actions taken by the engineer of record to address the independent reviewer’s comments or the rationale for not addressing a comment.

### References

Refer to any standard operating procedures in groups or departments if needed or delete if procedure above is sufficient.

* [Checklist and Signoff for Independent Review](https://aqualibraconsulting-my.sharepoint.com/personal/marg_latham_aqualibraconsulting_ca/Documents/Documents/1BUSINESS/Aqua%20Libra/Clients/APEGBC/5Corporate%20Regulation/PPMP%20Templates/Public%20Sector%20PPMP%20Template-2021-01-06.docx#Checklist) of Structural Designs
* [Guide to the Standard for Documented Independent Review of Structural Designs](https://www.egbc.ca/getmedia/b8eb4a64-2f86-415b-98fb-b11aae4f46fa/EGBC-Documented-Indep-Rev-of-Structural-Designs-V2-0.pdf.aspx)

## Independent Review of High-Risk Professional Activities or Work

### Introduction

Independent review of high-risk professional activities or work is a documented evaluation of the design concept, details, and documentation, based on a qualitative examination of the substantially complete documents for high-risk professional activity or work that occurs before those documents are issued to those who will rely on them, such as for construction or implementation.

Independent review of high-risk professional activity or work must be carried out by a professional engineer, professional geoscientist, professional licensee engineering or professional licensee geoscience with appropriate experience in the type and scale of the professional activity or work subject to the documented independent review. The level of experience required for a specific high-risk professional activity or work will depend on the risk and complexity of the work. The independent reviewer's experience must be sufficient to critique concepts and identify deficiencies in professional activities or work with complexity equal to or greater than the high-risk professional activity or work being reviewed.

Independent reviews may be one of two types:

**Type 1 Independent Review,** an independent review carried out by an appropriately qualified and experienced professional who has not been previously involved in the high-risk professional activities or work and is employed at the same firm as the professional of record.

**Type 2 Independent Review,** an independent review carried out by an appropriately qualified and experienced Professional who has not been previously involved in the high-risk professional activities or work and is not employed at the same firm as the professional of record.

Before starting professional activities or work, professionals must conduct a risk assessment to determine whether the activities or work are high-risk and, if so, whether a Type 1 independent review or Type 2 independent review is required.

Independent reviews of high-risk professional activities or work are mandated by section 7.3.6 of the Bylaws of Engineers and Geoscientists BC and described in the Engineers and Geoscientists BC’s [*Guide to the Standard for Documented Independent Review of High-Risk Professional Activities or Work*](https://www.egbc.ca/getmedia/ef5d5b68-115d-4d5c-80b8-b47d278823f6/EGBC-Documented-Indep-Rev-of-HRPAW-V1-0.pdf.aspx).

During compliance audits, auditors will be confirming that professionals who are carrying out high-risk activities or work are arranging to have documented independent reviews carried out for the high-risk activities or work they prepare or directly supervise, and that appropriate records documenting the reviews are being retained.

### Purpose

Professionals have an obligation to assess the risk of work they carry out and complete their work in a manner that appropriately mitigates the risk to the public and the environment. Independent reviews are required when the professional activity or work they have assessed is deemed to be high risk because it involves the potential for severe consequences that could harm the public or damage the environment.

Professional practice guidelines may specify professional activities or work that must undergo an independent review despite not being assessed as high-risk by the professional. A professional may choose to conduct an independent review even though their work is not deemed to be high-risk.

This section describes how independent review of high-risk professional activities or work will be carried out and documented in [the firm].

### Policy

Risk assessments will be conducted for all professional work and activities as follows:

* For low-risk work, risk assessments will be carried out, documented, retained as a record, and updated annually. The initial low risk assessments and subsequent annual assessments must be filed in a location where professionals relying on those assessments have access to them and can reference them.
* For medium and high-risk work assess the risk before proposing or accepting contracts. (adjust wording to suit nature of firm’s operations)

Where work is deemed to be high-risk or where mandated by regulation, an independent review will be carried out.

Where [the firm] does not have experience with the type and scale of the professional activities or work, or the work is innovative and complex, involves emerging technology or does not have well-defined solutions, a qualified independent reviewer will be sourced externally. Otherwise, the reviewer will be a qualified engineering or geoscience professional, employed by [the firm], who has not been involved in the design.

### GUIDING PRINCIPLES FOR DETAILED PRACTICE AREA PROCEDURES

This high-level procedure applies across the firm and will inform any more detailed procedures for assessing project risk and carrying out independent reviews of high-risk professional activities or work in each division, department or practice ***{use firm’s terminology}***.

Professionals of records must:

* Conduct a risk assessment that considers:
  + Hazards associated with the work.
  + Severity and likelihood of consequences.
  + Complexity of the work.
  + Effect of errors or omissions on hazards during construction or implementation.
  + Nature of the assumptions made during the work.
  + Innovation or departure from previous practice.
  + Regulations or authorities requiring independent review of the work.
* For work deemed high-risk due to the severity of consequences resulting from errors or omissions, plan the work to allow for an independent review.
* Where [the firm] does not have experience with the type and scale of the work, or the work is innovative and complex, involves emerging technology or does not have well-defined solutions, identify and engage a qualified external resource to carry out the independent review.
* To avoid surprises and significant rework, confirm the various stages, from concept to construction or implementation documents, when the work will be independently reviewed.
* Arrange to have the work checked to confirm that the work and documents meet all requirements and are suitable for their intended purpose.

(It is recommended that a standardized risk assessment record be developed to suit the nature of the firm’s work and be referenced here or link to the [Documented Risk Assessment Template](#_DOCUMENTED_RISK_ASSESSMENT) in the Appendix.)

***For Work Involving Design and Construction***

The independent reviewer must:

* Determine the extent of independent review required and record the rationale for this determination.
* Review the design criteria, sources of risk identified in the risk assessment (including risks imposed by components designed by other disciplines and risks from external sources), and performance requirements.
* Review statutory and regulatory requirements.
* Review geographical and/or environmental requirements.
* Review material properties.
* Review appropriateness and implementation of mitigation measures.
* Review the concept and integrity of the design.
* Where applicable, review the integration of third-party components and artifacts into the work.
* Examine representative samples of the assumptions in the work, components, and detailing.
* Review supporting documents to determine whether they are sufficient to identify the essential components of the work and provide sufficient information to guide the construction or implementation.
* Evaluate documents related to the work to ensure they are complete, consistent, coordinated and in general compliance with the appropriate codes, standards, and other requirements.
* Perform calculations on a representative sample of components to determine whether the analysis, design and detailing generally comply with the appropriate codes, standards, and other requirements.
* Document additional steps taken as well as steps which were deemed not applicable to the work and discuss with the professional of record.
* Discuss any concerns with the professional of record. The professional of record must adequately resolve concerns noted in the independent review.
* Provide a formal record of the independent review to the professional of record highlighting any concerns (see **Appendix A:** **Checklist and Signoff for an Independent Review of High-Risk Professional Activities or Work**). If significant concerns are noted, the professional of record must revise the work and resubmit the revised work for an independent review.
* If requested, provide the record of the independent review to any authority charged with approving the work.
* Retain and preserve the record of the independent review for a minimum of 10 years.

***For Work Involving Assessments, Investigations, Reviews, or Reports***

The independent reviewer must:

* Determine the extent of review required and record the rationale for this determination.
* Review hazards identified in the risk assessment (including risks imposed by the work of other professionals and risks from external sources).
* Review the context or situation, available data, and performance criteria for the work.
* Where applicable, review geographical and/or environmental requirements and conditions.
* Where applicable, review test/experimental procedures and results.
* Where applicable, review the integration of third-party components and artifacts into the work.
* Review appropriateness and implementation of mitigation measures.
* Review the assumptions made by the professional of record for the work.
* Review the concept and integrity of the result of the work.
* Review supporting documents to determine whether they are sufficient to identify the result of the work, and, where applicable, provide sufficient information to guide the construction or implementation.
* Review statutory and regulatory requirements.
* Evaluate documents related to the work to ensure they are complete, consistent, coordinated and in general compliance with the appropriate codes, standards, and other requirements.
* Document additional steps taken as well as steps which were deemed not applicable to the work and discuss with the professional of record.
* Discuss any concerns with the professional of record. The professional of record must adequately resolve concerns noted in the independent review.
* Provide a formal record of the independent review to the professional of record highlighting any concerns (see **Appendix A:** **Checklist and Signoff for an Independent Review of High-Risk Professional Activities or Work**). If significant concerns are noted, the professional of record must revise the work and resubmit it for an independent review.

* The independent reviewer must provide the review record to any authority charged with approving the work upon request.
* Retain and preserve the record of the independent review for a minimum of 10 years.

### References

Refer to any standard operating procedures in groups or departments if needed or delete if procedure above is sufficient.

* *Checklist and Signoff for an Independent Review of High-Risk Professional Activities or Work* ***{add link and include form in Appendix}***

## Authenticating Documents

### Introduction

Section 7.3.7 of the Bylaws of Engineers and Geoscientists BC mandates that professionals authenticate documents, containing information related to regulated practice, that they prepare or are prepared under their direct supervision, before those documents are delivered to others who will rely on the information contained in them. This professional obligation is further described in the Engineers and Geoscientists BC’s [*Guide to the Standard for the Authentication of Documents*](https://www.egbc.ca/getmedia/bf1c2174-de3b-45b2-812f-cceb6958e1e8/EGBC-Authentication-of-Documents-V3-0.pdf.aspx).

Section 7.3.7 of the Bylaws of Engineers and Geoscientists BC also mandates that all authenticated documents display the registrant firm’s permit to practice number. To satisfy the requirements set out in this Bylaw, only a Responsible Registrant or individuals authorized by the Responsible Registrant may apply the permit to practice number. Professionals authenticating a document are responsible for confirming that all permit to practice requirements have been met prior to authenticating the document.

The seal may be a manual seal which is an ink stamp, or a digital image of a seal accompanied by an approved digital certificate*.* A document is authenticated when the manual seal is applied, signed, and dated with the date the seal is applied, by the professional whose name is on the seal, or when the approved digital certificate is applied to the digital version of the seal, by the professional whose name is on the seal.

During compliance audits, auditors will be confirming policies and procedures for the appropriate authentication of professional documents are being adhered to and that all professional documents are being appropriately authenticated prior to them being delivered to parties who will be relying upon them.

### Purpose

The Engineers and Geoscientists BC seal is used to authenticate documents related to regulated practice. When signed and dated, or when an approved digital certificate is applied, a professional’s seal indicates to the user of the document that the document has been prepared and delivered in the professional capacity of, or directly supervised by, a qualified professional, who is taking responsibility for the contents of the document for it’s intended use.

The professional’s seal indicates that the document has not been altered, and that it contains the original information for which the professional accepted responsibility. The seal is a mark of reliance, an indication that others can rely on the fact that the opinions, judgments, or designs in the sealed documents were provided by a professional held to high standards of knowledge, skill, and ethical conduct. It is not a warranty.

The application of the permit to practice number is a confirmation that all permit to practice requirements have been met.

Legal liability is different from professional responsibility. Whether or not professional’s authenticate documents they prepare or directly supervise, they are liable for the content. However, if they issue an unauthenticated professional document to others who will be relying on the engineering or geoscience content, they will be in breach of the Bylaws of Engineers and Geoscientists BC.

This section describes how professional documents will be authenticated in [the firm].

### Policy

Any professional document that a professional prepares or directly supervises must be authenticated before it is issued to others who will rely on its engineering or geoscience content.

[The firm]’s permit to practice number must appear on all authenticated documents. The Responsible Registrant(s) is responsible for, and the only individual who can authorize the application of the permit to practice number on professional documents issued by [the firm]. The Responsible Registrant must set or agree to policies regarding the application of the permit to practice number in professional documents for the area(s) of practice for which they are responsible.

The seal must remain in the care and control of the professional to whom it was issued and may only be signed and dated, or digitally certified, by that individual.

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across the firm and will inform any more detailed procedures for authenticating documents in each division, department or practice ***{use firm’s terminology}***.

Professionals of record will:

* Maintain the care and control of their professional seal.
* Review all professional documents to the extent they deem necessary to take professional responsibility for the engineering/geoscience content.
* Confirm that all permit to practice requirements have been met and that the permit to practice number is included on all authenticated documents.
* Decide when and whether a professional document is ready to be authenticated.
* Use a signed and dated manual seal or apply a digital seal with digital certification approved by Engineers and Geoscientists BC to authenticate all professional documents that they prepare or directly supervise before those documents are delivered to others who will rely on them.
* For manual seals, the date must be the date the seal was applied.
* Authenticate all professional documents that:
  + the professional has prepared in their professional capacity or has been prepared under their direct supervision,
  + contain content related to the regulated practice, and
  + will be relied on by others.
* Authenticate all record drawings that contain changes to the engineering/geoscience content not previously issued in an authenticated document.
* If authenticating record drawings that include information provided by others not under the professionals direct supervision, the following declaration must be included on the drawing:

*“The seal and signature of the undersigned on this drawing certifies that the design information contained in these drawings accurately reflects the original design and the material design changes made during construction that were brought to the undersigned’s attention. These drawings are intended to incorporate addenda, change orders, and other material design changes, but not necessarily all site instructions.*

*The undersigned does not warrant or guarantee, nor accept any responsibility for the accuracy or completeness of the as-constructed information supplied by others contained in these drawings, but does, by sealing and signing, certify that the as-constructed information, if accurate and complete, provides an as-constructed system which substantially complies in all material respects with the original design intent.”*

* Any email correspondence which contains professional engineering or geoscience advice, or decisions issued in a professional capacity will be followed up with an appropriately authenticated document.
* Retain a record copy of all authenticated documents in the project file. (clearly define the format of the record copies e.g., originally authenticated documents, photocopies or scans of authenticated documents, or digitally sealed and certified PDF files. [choose appropriate ones for firm])

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

## Direct Supervision

### Introduction

As required by section 7.3.8 of the Bylaws of Engineers and Geoscientists BC, professionals must meet the requirement of Direct Supervision in all areas of regulated practice where there is delegation to subordinates. This professional obligation is further described in the Engineers and Geoscientists BC’s [*Guide to the Standard for Direct Supervision*](https://www.apeg.bc.ca/getmedia/c4e4640b-ddf3-45bc-b30a-aec2b6a2199a/APEGBC-QMG-Direct-Supervision.pdf.aspx).

Delegating means to undertake certain activities, work, or decisions related to the regulated practice on behalf of a professional who takes professional responsibility for the work of the subordinate. To directly supervise work delegated to a subordinate means to control and conduct the activities, work, or decisions related to the regulated practice that have been delegated to a subordinate. A subordinate may be any individual who engages in the regulated Practice under the direct supervision of a professional. Typically, these individuals are engineers or geoscientists -in-training, technologists, another non-professional or less experienced professionals.

During compliance audits, auditors will be confirming professionals are directly supervising any engineering or geoscience work that they delegate to subordinates who are non-professionals or professionals whose level of experience is insufficient for the activity or work.

### Purpose

When professionals authenticate documents, or otherwise take professional responsibility for professional engineering or geoscience work, they are exposing themselves to personal liability for the work*.* When they delegate engineering or geoscience work, they remain responsible for that work*.* Adequate and appropriate direct supervision mitigates their risk and ensures that professionals retain appropriate control of that work*.* Direct supervision also allows more experienced professionals to assist in the professional development of those less experienced.

This section describes the delegation and direct supervision of engineering and geoscience work in [the firm].

### Policy

Professionals must directly supervise any engineering or geoscience work that they delegate to a subordinate. When doing so, professionals must retain appropriate control of and take professional responsibility for that work.

A subordinate may be an engineer-in-training (EIT) or a geoscientist-in-training (GIT), technologist, a non-professional, or a less experienced professional to whom a professional delegates engineering or geoscience work.

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across the firm and will inform any more detailed procedures for direct supervision in each division, department or practice ***{use firm’s terminology}***.

To delegate work to a subordinate, professionals of recordwill:

* Assess the work that may be delegated to confirm the knowledge, experience and capabilities required, and any tools or resources (e.g., standards, codes, etc.) that can be used to successfully implement the work.
* Assess the subordinates to confirm that they have the required knowledge, capability and experience and to identify any gaps that must be addressed.
* Make required tools and resources available and address any gaps in them, including identifying subject matter experts to be consulted during the work.
* Address gaps in the subordinate’s knowledge, skills and experience by setting up a monitored learning experience.
* Establish the subordinate’s scope of work, duties, responsibilities, authorities, and limits on acting alone.
* Create a plan defining when and how the subordinate’s work will be reviewed.
* Delegate the work to the subordinate and communicate the scope of work, duties, responsibilities, authorities, limits on acting alone, and the timing and process for required reviews.
* Be available to answer questions.
* Be involved in all engineering or geoscience decisions.
* Review the subordinate’s work, as planned.
* Retain documentation to demonstrate that professional reviews of the subordinate’s work took place.

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

## Field Reviews

### Introduction

Field reviews are a professional obligation mandated in section 7.3.3 of the Bylaws of Engineers and Geoscientists BC and further described in the Engineers and Geoscientists BC’s [*Guide to the Standard for Documented Field Reviews During Implementation or Construction*](https://www.egbc.ca/getmedia/7e377ff5-08cd-4cba-9c6a-8c16c7854875/APEGBC-QMG-Documented-Field-Reviews-During-Implementation-or-Construction.pdf.aspx).

Field reviews must be completed during the construction, manufacturing, fabrication, implementation, testing, or commissioning of work related to the regulated practice by a professional, or a subordinate under the professional’s direct supervision, in a manner that is appropriate to the level of risk that has been assessed through a documented risk assessment.

Field reviews are used to determine whether the construction, manufacturing, fabrication, implementation, testing, or commissioning of work related to the regulated practice substantially complies with the concepts or intent reflected in the documents prepared for the work related to the regulated practice.

Decisions about the number and extent of field reviews must always remain at the professional’s discretion. Consequently, professionals may not, in their agreements with employers, clients, owners, or anyone else, agree in advance to limit the number or extent of field reviews. Professionals can provide estimates of the number of anticipated field reviews or the costs per field review to employers, clients, or owners. The professional must always have the discretion to increase the number or extent of reviews should circumstances warrant it.

Where possible, the professional of record responsible for preparing documents developed for implementation or construction should be responsible for field reviews.

Field reviews are a professional practice and are not the same as site or quality control inspections carried out by an owner’s representative to confirm that the owner’s requirements or contractual obligations have been met.

### Purpose

Field reviews are periodic reviews conducted at the site of the implementation or construction of professional engineering or professional geoscience work, that professionals in their professional discretion consider necessary to ascertain whether the implementation or construction of work substantially complies in all material respects with professional engineering or professional geoscience concepts, or intent reflected in the documents prepared for such work.

Field reviews also help professionals keep employers, clients, owners and other relevant professionals informed about the quality of the implementation or construction work as it pertains to compliance with the documents prepared for the work.

This section describes how field reviews during construction or implementation will be carried out in [the firm].

### Policy

Professionals of record for a discipline or practice area must carry out or directly supervise field reviews during construction, manufacturing, fabrication, implementation, testing, or commissioning ***{choose which apply}*** of professional engineering or geoscience work that they have prepared or directly supervised.

Field reviews determine whether the construction, manufacturing, fabrication, implementation, testing, or commissioning of work substantially complies with the engineering or geoscience documents prepared for the work.

Where a project has multiple professionals of record, a coordinating professional may be assigned to coordinate the activities of the various professionals of record for the project.

### Guiding Principles for Detailed Practice Area Procedures

This high-level procedure applies across the firm and will inform any more detailed procedures for field reviews in each division, department or practice ***{use firm’s terminology}***.

The timing of field reviews must take into consideration and reflect the following:

* The number of field reviews that are deemed necessary, based on a professional exercising reasonable professional judgment, to ascertain whether the implementation or construction of work substantially complies in all material respects with the professional engineering or professional geoscience concepts, or intent reflected in the documents prepared for the work.
* The level and nature of risk, complexity, unknown conditions, and duration of the implementation or construction.
* The standard of practice for the type and nature of work to be reviewed.
* The requirements of related Engineers and Geoscientists BC professional practice guidelines and/or practice advisories.
* The legislation, codes, standards, or other regulatory requirements that may be relevant and applicable to the nature of the field review to be carried out.
* The level of detail provided in the documentation prepared for the project or work.
* The experience, reputation, and method of selection (that is, public tender, prequalified bidders, or negotiated) of those implementing or constructing the work.
* The number of deficiencies found early in the project or work.
* The experience of the professional of record.

***For Construction***

The professional of record will:

* Assess and record the nature and risk of the engineering or geoscience work involved, and the complexity of the engineering or geoscience services to be completed, during the construction phase.
* Determine the number, timing and focus of field reviews required to meet the standard of care for the work and adjust the extent of reviews as needed during construction.
* Determine whether field reviews are suitable for delegation and determine whether qualified subordinates are available.
* Based on the risk assessment, document, and agree on the extent and scope of required field reviews, including any requirements for testing or surveying.
* Communicate to the contractor or party responsible for the construction before construction begins the specific aspects of construction activities that must be reviewed and requirements for providing notice of when they will be ready to observe, test or survey.
* Where field reviews will be delegated to a subordinate, provide direction about the required efforts, reporting detail, specific aspects of construction activities to be observed, tested or surveyed, and limits of acting alone.
* Prepare and authenticate any required certificates or letters of assurance. ***{Does [the firm] do this?}***

The field reviewer will:

* Carry out field reviews as required and planned.
* If any equipment is used during the field review, ensure the equipment is maintained and calibrated as per the manufacturer’s recommendations, and maintain a record of the maintenance and calibrations.
* If not the professional of record, as directed by the professional of record, adjust the extent of field reviews required based on the number of issues observed.
* Document all field reviews, including date, time, location, work reviewed, observations and directions given.
* Where critical work is or will be covered before it can be reviewed, require that it be uncovered or require photos, as appropriate.
* Where appropriate, take photographs or videos to capture and document observations made during field reviews and create an audit trail for any photographic or video records by:
  + Checking the equipment, date and time settings before taking photographs.
  + Including a description of what was photographed along with the date, time, location and photographer.
  + Enhancing, cropping or otherwise editing photographs only for clarity, and retaining the original, unaltered photo along with the edited photo.
  + Downloading and storing all photographs taken to their appropriate subdirectory in their respective project directory.
  + Creating a non-editable back-up of all photographs.
* Provide directions about nonconforming work and required resolution to the contractor or party responsible for the construction in writing.
* Leave the means and methods for correcting nonconforming work to the contractor or party responsible for the construction.
* If not the professional of record, notify the professional of record of any required or proposed revisions to the work that will result in changes in the cost, schedule, or function to seek and receive approval to proceed before proceeding to have the work revised.
* If not the professional of record, involve the professional of record in engineering or geoscience decisions resulting from field reviews.
* Continue to report nonconforming work observed in field reviews until it is rectified.
* Confirm and document how the contractor or party responsible for the construction has addressed any nonconforming work observed in field reviews.
* Retain all field review records in their appropriate subdirectory in their respective project directory.

***For Fabrication or Manufacturing of Engineered Products***

The professional of record will:

* Assess and record the nature and risk of the engineering work involved, and the complexity of the engineering services to be completed, during the fabrication or manufacturing phase.
* Review the quality control processes and procedures for the fabrication or manufacturing shop.
* Review quality control records of inspections and tests.
* Review shop or fabrication drawings and specifications for the work.
* Based on the risk assessment, determine the number, timing and focus of fabrication or manufacturing inspections required to meet the standard of care for the work and adjust the extent of reviews needed.
* Determine whether inspections are suitable for delegation and determine whether qualified subordinates are available.
* Where inspections will be delegated to a subordinate, provide direction about the required efforts, reporting detail, and specific aspects, that must be observed, tested, measured or surveyed.

The field reviewer will:

* Carry out shop inspections and testing as required and planned.
* As directed by the professional of record, adjust the extent of inspections required based on the number of issues observed.
* Document all inspections, including date, time, location, work reviewed, observations and directions given.
* Involve the professional of record in engineering decisions resulting from inspections.
* Have nonconforming work corrected and document how the work has been corrected.
* Retain all inspection records in their appropriate directory.

***For Out of Province Engineered and Supplied Equipment***

Where professionals are specifying equipment, products, or components that are designed and manufactured or fabricated out of province for use on projects, the professional must:

* Prepare and authenticate a performance specification for the equipment.
* Indicate that the manufacturer or fabricator must certify that the equipment meets the performance specifications. This will relieve the professional of any requirement to carry out field reviews at the place of fabrication.
* Check the quality of equipment when received.
* If BC occupational health and safety legislation imposes any requirements for guards and safety switches, check that the equipment meets those requirements.
* Confirm that the equipment meets any Technical Safety BC requirements.
* Carry out or directly supervise field reviews of electrical, gas, or water feeds to the equipment.

### References

***Refer to any detailed procedures for engineering/geoscience groups.***

### 

## Appendixes

* **Checklist and Signoff for Independent Review of Structural Designs**
* **Checklist and Signoff for Independent Review of High-Risk Activities and Work**

### CHECKLIST AND SIGNOFF FOR an INDEPENDENT REVIEW of Structural Designs

*[Print clearly and legibly]*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | **ENGINEER OF RECORD** |
| **RE:** |  |  |  |
|  | Name of project or work |  | P.Eng. or P.L.Eng. name |
|  |  |  |  |
|  | Address of project or work |  | Firm name |
|  |  |  |  |
|  |  |  | Permit to Practice number |
|  |  |  |  |
|  |  |  | Address of firm |
|  |  |  |  |
|  |  |  |  |

|  |  |  |
| --- | --- | --- |
| ITEM | REVIEWED | REMARKS |
|  | INITIALS |  |
| 1. Design code loadings and serviceability limits |  |  |
| 2. Material specifications and geotechnical recommendations |  |  |
| 3. Concept and integrity of the gravity load resisting system |  |  |
| 4. Concept and integrity of the lateral load resisting system (e.g., wind, seismic) |  |  |
| 5. Drawing completeness and continuity of load paths |  |  |
| 6. Design check of representative structural elements |  |  |
| 7. Review of representative structural details |  |  |
| 8. Concerns discussed with the Engineer of record |  |  |

|  |  |  |
| --- | --- | --- |
|  |  | **INDEPENDENT REVIEWER** |
|  |  |  |
|  |  | P.Eng. or P.L.Eng. name |
|  |  |  |
|  |  | Firm name |
|  |  |  |
|  |  | Permit to Practice number |
|  |  |  |
|  |  | Address of firm |
|  |  |  |
|  |  |  |
|  |  |  |
| Date: (yy/mm/dd) |  | Signature |

### CHECKLIST AND SIGNOFF FOR an INDEPENDENT REVIEW of Structural Designs

*[Print clearly and legibly]*

|  |  |  |  |
| --- | --- | --- | --- |
| TO: | **ENGINEER OF RECORD** | DATE: |  |
|  |  |  |  |
|  | P.Eng. or P.L.Eng. name |  |  |
|  |  |  |  |
|  | Firm name |  | Permit to Practice number |
|  |  |  |  |
|  | Address |  |  |
|  |  |  |  |
| RE: | Project name |  |  |
|  |  |  |  |
|  | Address of project |  |  |
|  |  |  |  |

The undersigned hereby records that an Independent Review of the project or work, based on the attached list of the structural plans and supporting documents prepared by the Engineer of record for the structural components, has been completed by this Independent Reviewer.

I am a member of the firm \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 (Name of Firm)

with the Permit to Practice number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 (Permit to Practice Number)

and I sign this letter on behalf of the firm.

I certify that I am a Professional Registrant as defined below.

|  |  |  |
| --- | --- | --- |
|  | DATE: |  |
|  | |  |
| Name | |  |
|  | |  |
| Signed | |  |
|  | |  |
| Address | |  |
|  | |  |
|  | | (Affix PROFESSIONAL SEAL here) |
| Telephone | |  |

**NOTE**:

1. The above letter must be signed by a Professional Registrant (professional engineer or professional licensee engineering, licensed to practice by Engineers and Geoscientists BC) qualified to conduct an Independent Review of the structural design being reviewed.

2. This letter is endorsed by Engineers and Geoscientists BC.

### CHECKLIST AND SIGNOFF FOR an INDEPENDENT REVIEW of High-Risk Professional Activities or Work

*[Print clearly and legibly]*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | **PROFESSIONAL OF RECORD** |
| **RE:** |  |  |  |
|  | Name of project, activity, or work |  | Name of professional and designation  (P.Eng., P.Geo., P.L.Eng. or P.L.Geo.) |
|  |  |  |  |
|  | Address of project, activity, or work |  | Firm name |
|  |  |  |  |
|  |  |  | Permit to Practice number |
|  |  |  |  |
|  |  |  | Address of firm |
|  |  |  |  |
|  |  |  |  |

|  |  |  |
| --- | --- | --- |
| ITEM | REVIEWED | REMARKS |
|  | INITIALS |  |
| 1. Assumptions for Professional Activities or Work |  |  |
| 2. Concept for Professional Activities or Work |  |  |
| 3. Criteria for carrying out Professional Activities or Work |  |  |
| 4. Calculations or Analysis |  |  |
| 5. Representation or Output (e.g., drawings, reports, spreadsheets, models, etc.) |  |  |
| 6. Design check of representative elements |  |  |
| 7. Review of representative details |  |  |
| 8. Applicable codes, standards and regulations |  |  |
| 9. Review of Risk Assessment |  |  |
| 10. Qualifications of Reviewer for Type 2 Review |  |  |
| 11. Concerns discussed with the Engineer of record |  |  |

|  |  |  |
| --- | --- | --- |
|  |  | **INDEPENDENT REVIEWER** |
|  |  |  |
|  |  | Name of professional and designation  (P.Eng., P.Geo., P.L.Eng. or P.L.Geo.) |
|  |  |  |
|  |  | Firm name |
|  |  |  |
|  |  | Permit to Practice number |
|  |  |  |
|  |  | Address of firm |
|  |  |  |
|  |  |  |
|  |  |  |
| Date: (yy/mm/dd) |  | Signature |

**CHECKLIST AND SIGNOFF FOR an INDEPENDENT REVIEW of High-Risk professional Activities or Work**

*[Print clearly and legibly]*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TO: | **ENGINEER OF RECORD** | DATE (yy/mm/dd): | |  |
|  |  | |  |  |
|  | Name of professional and designation  (P.Eng., P.Geo., P.L.Eng. or P.L.Geo.) | |  |  |
|  |  | |  |  |
|  | Firm name | |  | Permit to Practice number |
|  |  | |  |  |
|  | Address of firm | |  |  |
|  |  | |  |  |
| RE: | Name of project, activity, or work | |  |  |
|  |  | |  |  |
|  | Address of project, activity, or work | |  |  |
|  |  | |  |  |

The undersigned hereby records that an Independent Review of the professional activity or work, based on the Documentation prepared by the Engineer of record for the professional activity or work, has been completed by this Independent Reviewer.

I am a member of the firm \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 (Name of Firm)

with the Permit to Practice number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 (Permit to Practice Number)

and I sign this letter on behalf of the firm.

I certify that I am a Professional Registrant as defined below.

|  |  |  |
| --- | --- | --- |
|  | DATE (yy/mm/dd): |  |
|  | |  |
| Name of professional and designation  (P.Eng., P.Geo., P.L.Eng. or P.L.Geo.) | |  |
|  | |  |
| Signed | |  |
|  | |  |
| Address | |  |
|  | |  |
|  | | (Affix PROFESSIONAL SEAL here) |
| Telephone | |  |

**NOTE**:

1. The above letter must be signed by a Professional Registrant (professional engineer, professional geoscientist, professional licensee engineering or professional licensee geoscience, licensed to practice by Engineers and Geoscientists BC) qualified to conduct an Independent Review of the professional activity or work being reviewed.

### DOCUMENTED RISK ASSESSMENT TEMPLATE (PAGE 1 OF 3)

*[Print clearly and legibly]*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | PROFESSIONAL OF RECORD |
| RE: |  |  |  |
|  | Name of project, activity, or work |  | Name of professional and designation  (P.Eng., P.Geo., P.L.Eng., or P.L.Geo.) |
|  |  |  |  |
|  | Address of project, activity, or work |  | Firm name |
|  |  |  |  |
|  |  |  | Permit to Practice number |
|  |  |  |  |
|  |  |  | Address of firm |
|  |  |  |  |

**Table A: Type of Risk Assessment**

|  |  |  |
| --- | --- | --- |
| TYPE OF RISK ASSESSMENT | | |
| Global | Repetitive/Iterative | Project-Specific |

**Table B: Considerations for Risk Assessment**

|  |  |
| --- | --- |
| CONSIDERATIONS FOR RISK ASSESSMENT | REMARKS (INITIAL CONDITION) |
| Expertise of Professional of Record |  |
| Experience of subordinates |  |
| Previous experience with similar projects |  |
| Level of complexity |  |
| Innovative features |  |
| Departures from previous practice |  |
| Applicable codes, standards, and regulations that define Risk tolerance |  |
| Formal Hazard identification techniques used (i.e., FMEA, FTA, ETA, HAZOP, STPA, SWIFT) |  |

Documented Risk Assessment (Page 2 of 3)

**Table C: Hazard Identification**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **HAZARD NUMBER** | **HAZARD IDENTIFICATION** | **CONSEQUENCE** | **SEVERITY OF CONSEQUENCEa** | **LIKELIHOOD OF CONSEQUENCEb** | **LEVEL OF RISKc** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

a See Appendix B, Section B2 of the *Guide to the Standard for Independent Review of High-Risk Professional Activities or Work* (*Guide*), and Table D of this Risk Assessment.

b See Appendix B, Section B3 of the *Guide* and Table D of this Risk Assessment.

c See Appendix B, Section B4 of the *Guide* and Table D of this Risk Assessment.

**Table D: Individual Hazard and Overall Risk Assessment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **INDIVIDUAL HAZARD AND OVERALL RISK ASSESSMENT** | | | | | |
| Severity of Consequencea | Insignificant | Minor | Moderate | Critical | Catastrophic |
| Likelihood of Consequencea | Improbable | Remote | Occasional | Probable | Frequent |
| Level of Riska | Minimal | Low | Moderate | High | Extreme |

a  As described in Appendix B of the *Guide* *to the Standard for Independent Review of High-Risk Professional Activities or Work*, and the tables and Risk matrix set out there, or based on another procedure developed by the Professional Registrant or Firm.

**Table E: Type of Independent Review Required**

|  |  |  |
| --- | --- | --- |
| **TYPE OF INDEPENDENT REVIEW REQUIRED**a | | |
| None | Type 1 | Type 2 |

a The type of Independent Review must be determined after the initial Risk Assessment, thereby allowing any mitigation measures applied to the Professional Activity or Work to be part of the scope of the Independent Review.

Documented Risk Assessment (Page 3 Of 3)

**Table F: Applying Mitigation Measures**

|  |  |  |  |
| --- | --- | --- | --- |
| **HAZARD NUMBERa** | **MITIGATION MEASURES PROPOSED/IMPLEMENTED** | **REMARKS/JUSTIFICATION** | **REVISED LEVEL OF RISKb** |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |

a See Table B of this Risk Assessment.

b See Appendix B, Section B4 of the *Guide* *to the Standard for Independent Review of High-Risk Professional Activities or Work* and Table C of this Risk Assessment.

**Table G: Final Remarks**

|  |
| --- |
| **FINAL REMARKS** |
| (For example, recommended timing and/or intervals for Independent Review; reference supporting documents used for Hazard identification or Risk Assessment) |
|  |
|  |
|  |
|  |
|  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Date: (yy/mm/dd) |  | Signature |