

## **SECTION 1**

# **DOING BUSINESS WITH PWGSC - PACIFIC REGION**

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**Guide for Architectural and Engineering Consultants**

**November 2012**

**PUBLIC WORKS AND GOVERNMENT SERVICES CANADA  
PACIFIC REGION  
REAL PROPERTY BRANCH  
PROFESSIONAL AND TECHNICAL SERVICES**

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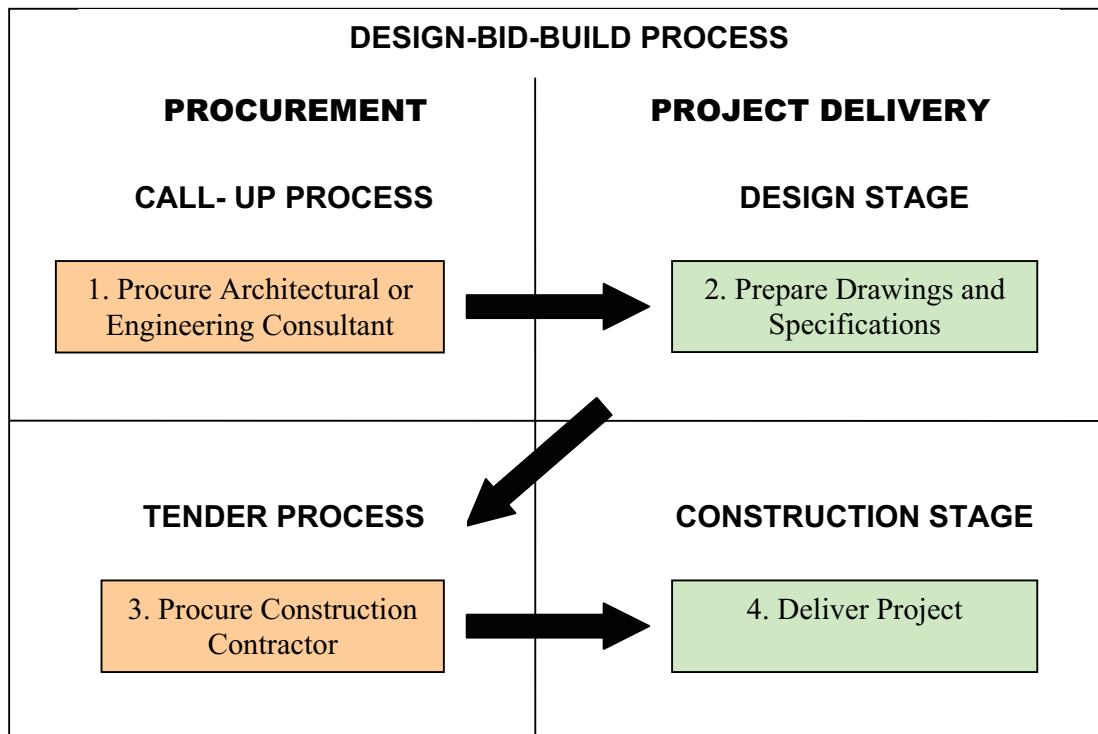
## I. PURPOSE OF GUIDE

The purpose of this Guide is twofold:

1. To provide guidance to architectural and engineering consultants (“consultants”) on **how to work with PWGSC’s** project managers, architects, engineers and other technical staff during a project.
2. To assist consultants and PWGSC staff to **prepare construction contract documents** (i.e. specifications and drawings). These documents are typically used in PWGSC’s tendering process for acquiring design or construction services.

This document provides guidance, including by identifying some of the mandatory requirements of PWGSC. By taking the time to understand and follow this Guide, you will know better what is expected of you. You will also have fewer deficiencies identified during PWGSC reviews resulting in faster turnarounds and greater efficiencies. Your cooperation will also help ensure consistency, accuracy, safety, security, effectiveness, and value for money.

This Guide has been designed primarily for a design–bid–build scenario which is a common procurement approach used by PWGSC. A simplified graphical illustration of the process is shown below.



## II. DESIGN MANAGEMENT / QUALITY MANAGEMENT

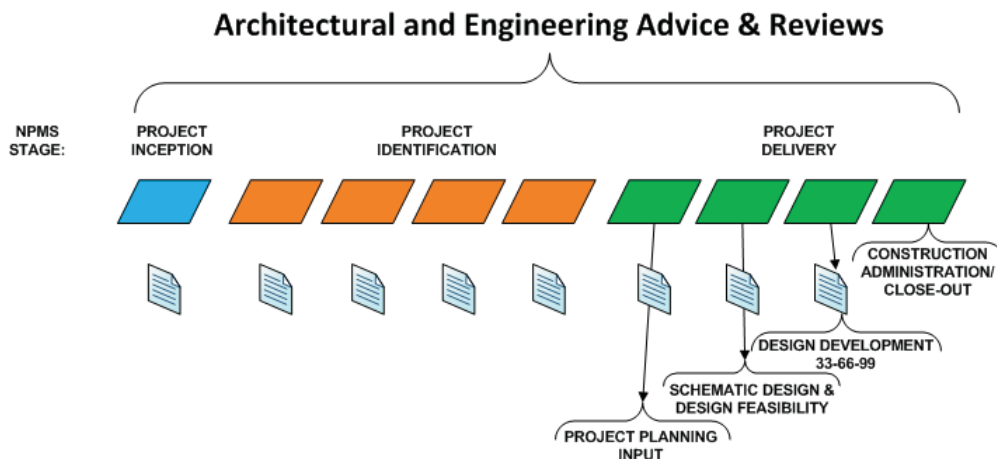
### A. PWGSC's Design Management Process

The Design Management process is an efficient and seamless flow of integrated activities performed by PWGSC's Architectural and Engineering Services (AES) staff and external consultants. It is important to understand that the design is the responsibility of the consultant. The process is aimed at assuring *that the design, procurement, and delivery of a project meet client requirements.*

The process is embedded in the prescribed protocols of the department's Quality Management System (QMS) (see Appendix 1) and works in parallel to the consultant's quality assurance program. Design Management activities and deliverables are guided by Standing Offers, the Royal Architectural Institute of Canada's Canadian Handbook of Practice (CHOP), and standards of the Architectural Institute of BC and of the Association of Professional Engineers and Geoscientists of BC.

The PWGSC Strategic Design Advisor (SDA)<sup>1</sup>, with assistance from the Design Manager (DM) and Design Team, supports the Project Manager (PM) and external client from the early project inception stage through to construction and commissioning (see Appendix 2 for a diagram of the National Project Management System) with advice, guidance, milestone reviews, and options with regard to design, technical aspects, project risk, best practices, financial matters, scheduling and project delivery.

Among PWGSC staff, A&E Reviews are usually referred to as "functional reviews" whereas reviews done by consultants on their own work are referred to as "technical reviews."



<sup>1</sup> The SDA role is currently being carried out by Design Managers until the SDA role is approved by Executive and incorporated into PWGSC processes.

The desired outcomes of Architectural and Engineering Advice & Reviews include the following, among other design parameters affecting the project:

- A clear design vision and objectives are formulated up-front
- The design meets the client's current and evolving needs
- The design is complete, taking into account all relevant factors as reflected in the Design Brief and Project Brief
- The design aligns with the schedule, budget and risk management plans
- The design packaging is consistent with plans for how to deliver the construction (e.g. Public-Private Partnership, design-bid-build, Construction Management, design-build, etc.)
- The design intent is accurately reflected in Requests For Proposals and statement of Required Services for consultants
- The design will enable a logical work program for construction delivery
- The design takes into account best practices and appropriate technologies
- The design meets federal government requirements, policies, and regulations
- The design meets the requirements and regulations of all levels of government having jurisdiction
- The design will result in a built environment that functions as intended
- Quality assurance has been applied to the design process internally and by the consultants

In the project delivery stage, the SDA oversees functional programming, schematic design and design feasibility, and design development. A&E Reviews are performed at project milestones/gates as defined and agreed in the project plan by the Project Manager and the SDA (e.g. at the conclusion of functional design, schematic design and design feasibility, and design development (33%/66%/99% phases).

In the construction documentation phase, an A&E Review includes the following:

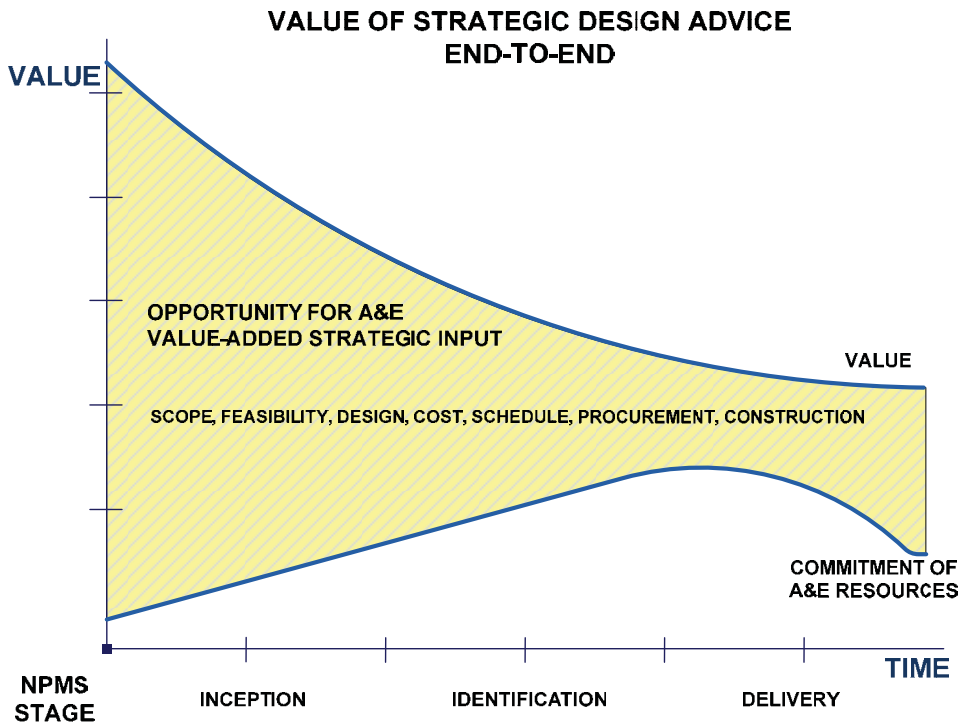
- The scope of work is clear and well-defined in the documentation
- The design is constructible
- Construction contract documents are consistent with the statement of Required Services and are correct and complete
- 33%/66%/99% drawings are defined and delivered as per the description of Required Services, the Standing Offer (if applicable), and professional industry standards (i.e. Architectural Institute of BC, Royal Architectural Institute of Canada's Doc. 6 and Canadian Handbook of Practice, Association of Professional Engineers & Geoscientists of BC)
- Materials are properly specified; building sciences best practices are incorporated; sustainability targets are met

- Quality Assurance is included in a project's specifications and all project contracts
- Specifications use the current edition of the six digit format Canadian National Master Construction Specification (NMS)
- Reference is made to the most current edition of the applicable standards
- Applicable national, provincial and local codes and regulations are specified

The SDA is responsible for obtaining and coordinating review comments from PWGSC and client staff and for communicating them to the consultant. The consultant must provide a written response to all milestone review comments. A template form used for the A&E Review is provided in Appendix 3.

During construction, AES monitors that construction is being executed as per the design intent as set out in construction documents and as per the project timeline/schedule. AES also has a role in construction administration (e.g. site meetings/reviews, change orders, RFI, shop drawings, etc).

The amount of effort that is invested in A&E Advice & Review depends to a great extent on the project. More complex or large projects benefit more from involvement by AES, while simpler projects require less time. As a rule, the greater the design management effort that is invested at the early stages of a project, the greater is the value added in the form of innovative solutions and fewer problems down the line.



## ***B. The Consultant's Responsibility for Quality***

As well as having to deliver in accordance with the contract for their work, consultants are expected to comply with the requirements of the Department and with the regulations of their professional association. Every consultant is subject to a regulatory body or association which outlines the quality assurance requirements; for example, the Royal Architectural Institute of Canada's Canadian Handbook of Practice, AIBC Practice Bulletins, and the Association of Professional Engineers and Geoscientists of BC bylaws. Consultants are to use their seal/stamp in accordance with the rules of their professional association.

Prime consultants are required to have their own parallel quality assurance program. You are expected to comply with the requirements of ISO 9001:2008 – Quality management systems – Requirements, published by the International Organization for Standardization (ISO) specifically on the following clauses:

- 4.1 General requirements
- 4.2.3 Control of documents
- 4.2.4 Control of records
- 5.2 Customer focus
- 7.2 Customer-related processes
- 7.3 Design and development
- 7.4 Purchasing
- 8.2 Monitoring and measurement
- 8.3 Control of nonconforming product
- 8.5.1 Continual Improvement
- 8.5.2 Corrective Action
- 8.5.3 Preventive Action

We do not require that the consultant be registered to ISO 9001; however, your quality management system must address the above requirements appropriate to the scope of work.

PWGSC will not serve as the consultant's quality assurance program for any discipline including, architectural, civil, structural, electrical, mechanical, etc. For example, PWGSC is not responsible for checking a structural engineering consultant's design details or calculations as this important aspect of quality and safety is addressed by a separate protocol under the respective regulatory body's bylaws, such as those of the Association of Professional Engineers and Geoscientists of BC (see <http://www.apeg.bc.ca/resource/publications/governancepolicies/documents/bylaws.pdf>). Obtaining an independent structural review, as per APEGBC, is the external consultant's own responsibility.

PWGSC's review processes are not intended to serve as an independent review process for consultants. Do not expect PWGSC to check your work.



PWGSC will at random request audits of the consultants' quality management processes over the length of a project:

**C. Application Notes – Three Scenarios:**

**SCENARIO #1 – Consultant Does the Design**

In this scenario, AES engages an external consultant to do the design and to prepare contract drawings and specifications for tender for construction. An SDA is responsible for leading the Architectural and Engineering Review process. Consultants involved are responsible for the design and for quality control of their own work in accordance with the requirements of their governing professional body. Professional consultants sign and seal the drawings and specifications.

**SCENARIO #2 – AES Does the Design**

In this scenario, AES is responsible for the design and staff prepare the contract drawings and specifications. This scenario is relatively rare. An SDA (a licensed in BC architect or engineer), through the A&E Advice & Review, is responsible for overseeing and guiding the design process. An internal team, under the guidance and supervision of the SDA, prepares the contract drawings and specifications. Independent third party AES staff are assigned to conduct peer reviews of the work of the internal design team. The SDA signs off on the completeness of the documentation.

**SCENARIO #3 – AES and Consultant Jointly do the Design**

In this scenario, AES collaborates with a consultant to jointly do the design and prepare contract drawings and specifications. Both Scenario #1 and #2 apply to each of the collaborative parties for their respective scope. Scope and responsibilities (architect/engineer of record, responsibility for sealing/signing for assignment) are agreed to by both parties and outlined in the contract.

### **III. WORKING WITH PWGSC**

#### **A. *The Consultant's Role***

As an external architectural or engineering consultant, we may ask you to take on any number of lead or supporting roles on a project. You may be involved in pre-design, design, construction, commissioning or close-out as per the contract for your work which sets out the Required Services. If your contract is a call-up under a Standing Offer Arrangement (SOA), then all the SOA requirements apply by reference.

**Pre-design** – We may engage consultants to undertake specific, pre-design tasks during the project inception or project identification stages. By being involved early in projects, AES working with their architectural or engineering consultants can foster innovative solutions. The consultant's tasks will support AES in providing advice, guidance, and options with regard to design, technical aspects, project risk, best practices, financial matters, scheduling and project delivery. For example, we may ask you to prepare a Functional Program or to write a Design Brief.

**Design Development** – During the project delivery stage, we typically ask a consultant to manage and coordinate a design team of internal and/or external disciplines developing specifications and drawings. The coordinating consultant, someone who is expert in the primary technical discipline of the work, is responsible for the design and for assembling all design and construction contract documents unless instructed otherwise. The coordinating consultant is usually an architect but could be a consultant in another discipline.

**Construction** – You may be engaged as a Project Architect or Project Engineer. Depending on the role definition, we typically expect you to be the lead (not PWGSC) in the day-to-day liaison with the general contractor, in reinforcing the project's technical requirements, in sorting out issues and challenges as they arise, and other tasks as set out in the Terms of Reference (TOR). You will be expected to deal with all contractor Requests for Information (RFI) by preparing On Site Instructions (SI) and/or Contemplated Change Notices (CCN) as may be required; and to prepare Change Orders (CO) when required. These are all to be done using the PWGSC forms (see Appendix 6 for links).

**Commissioning** – We may specify that a consultant manage the commissioning process.

**Close out** - At this point, the consultant will prepare the final as-built drawings for submission to the PM/SDA for review and approval.

The main players in a typical project and their roles are described in the table below. Use the terms for these roles on a consistent basis in any documents you prepare for PWGSC.

<b>PROJECT ROLES</b>	
<b>Technical Authority</b>	A PWGSC staff person who is identified in a Standing Offer for design and technical expertise and is responsible for the management of that Standing Offer.
<b>Contracting Authority</b>	The Contracting Authority is the PWGSC group responsible for administering the tender call and the contract. In the Pacific Region, it is the Acquisitions Unit, Real Property Contracting (“RPC”).
<b>Departmental Representative</b>	The Departmental Representative is defined as the PWGSC person that exercises the roles and attributes of Canada with respect to the contract. In the Pacific Region, the Departmental Representative is usually the Project Manager. <b>Do not use the terms “owner,” “engineer,” or “client” when referring to PWGSC’s representative.</b>
<b>Project Leader (PL)</b>	The client’s (i.e. the other government department) representative for the project.
<b>Project Manager (PM)</b>	A PWGSC Project Manager is assigned to every project. He/she provides overall leadership and direction for the project team and develops the Project Charter and Project Plan. The Project Manager has overall responsibility for project scope, budget, schedule, quality and documentation. He/she may out-task project management activities to an external consultant but must retain signing authority pursuant to the Financial Administration Act.
<b>Strategic Design Advisor (SDA)</b>	A PWGSC staff person who is responsible to the PWGSC Project Manager and client for overall leadership and direction of a multi-disciplinary design team that provides strategic design input, oversees reviews, and delivers construction contract documents to the Project Manager. The SDA supports the PM and external client during project inception, project identification and project delivery stages. The SDA may also act as the Design Manager depending on the project’s size and complexity.
<b>Design Manager (DM)</b>	The Design Manager is a PWGSC staff person responsible to the Strategic Design Advisor for day-to-day design management of the project from feasibility phases to completion.
<b>Design Team</b>	PWGSC professional and technical staff from various disciplines (e.g. mechanical, electrical, structural, civil, specifications, health & safety) assigned to the team to assist the Design Manager in the design management of the project.

<b>PROJECT ROLES</b>	
<b>Consultant</b>	An external architectural or engineering consultant that may take on any number of lead or supporting roles on a project as per the contract for the work which sets out the Required Services.
<b>Contractor</b>	Construction contractors use the drawings and specifications prepared by consultants to prepare a bid for construction and construct the works if they are the successful bidder.

## ***B. Required Services***

When executing a specific project, you must refer to the content in this Guide in conjunction with the description of Required Services (RS) in your contract. The Required Services describe the project-specific requirements while this Guide sets out PWGSC's requirements that are common to all projects. In the case of a conflict, the contract terms and statement of Required Services in your contract override this Guide.

Any proposed changes to your scope of work are to be discussed with the Departmental Representative but any resulting changes can only be authorized by a contract amendment.

## ***C. Proposed Scope of Work***

In your fee proposal, specify your deliverables (refer to descriptions of the Required Services, Terms, and Structure) together with cost breakdowns and promised delivery dates. Outline the team members, their hourly rates, and number of hours by person for every phase of the project.

You are required to submit a schedule for your work that we can use as a benchmark for assessing your progress and for billing. Include a project schedule in MS Project or Excel format outlining the major design and construction phases and subtasks/phases. Progress against your schedule is to be confirmed and reported monthly. Any adjustments/deviations to/from the schedule require submission of changes and written approval from the Strategic Design Advisor/Design Manager and Project Manager.

Before proceeding from one phase to the next (i.e. schematic design, 33%, 66%, 99% design, tender etc.), the consultant must seek approval from the SDA. The SDA, in turn, obtains written authorization from the PM indicating that a particular phase is complete.

Any changes to your project team must be done in accordance with General Conditions 23: Changes to the Consultant Team.

PWGSC requires effective time management to ensure that projects are planned, scheduled, monitored and controlled in a systematic manner towards timely completion of the planning, design and construction activities. Construction

documentation submitted at the 33%/66%/99% stages is a tangible indicator of project progress. Documentation that does not meet requirements will be returned to the consultant for revision. The consultant will be responsible for any schedule delays of their own making.

The SDA/Design Manager, in communication with the Project Manager, is responsible for monitoring the prime consultant's progress and performance.

#### ***D. PWGSC Roadmaps***

PWGSC has a well-defined National Project Management System (NPMS) <http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/index-eng.html> and a Quality Management System (QMS) as described in the Appendices. Note that this QMS applies to the Pacific Region of PWGSC. We encourage you to become familiar with these systems so that you have context for your work.

#### ***E. Project Monitoring and Control (Design, Schedule and Cost)***

(Reserved)

#### ***F. Preparing Construction Cost Estimates***

PWGSC uses four classes of cost estimates: Classes A, B, C, and D <http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/conn-know/couts-cost/definition-eng.html>. We require a Class A estimate prior to issuing tender-ready documents. The Class A estimate is generally expected to be within 5% to 10% of the actual contract award price for new construction. Tendering risks (e.g. cost overruns, delays, etc.) should be considered with financial implications calculated accordingly. The services of a professional estimator or quantity surveyor are often required and, if appropriate, you should include them in your project team. The cost estimate needs to clearly identify the cost for each technical discipline, e.g. civil, structural, mechanical, electrical, etc. Consultants are responsible for aligning the project construction cost with the cost estimate and design at each of the project phases, as per terms of the Required Services.

#### ***G. Construction Administration***

(Reserved)

#### ***H. Site Visits during Construction***

We require the prime consultant to sign off on progress claims from the construction contractor. We expect the prime consultant to know the construction's progress which means the prime and the sub-consultants on the

team must make regular site visits. For large or complex projects, the Terms of Reference may require the prime consultant to have an office on-site.

### ***I. Project Commissioning and Close-Out***

(Reserved)

### ***J. Invoicing***

The format and content of your invoices must be consistent with your contract, the requirements of the relevant Standing Offer (if applicable), and your fee proposal. Quote the project number and name, as well as the call-up number (if applicable) and contract number. See sample invoice in Appendix 4.

The invoice amount should be calculated as per your contract (i.e. hourly or percent complete for fixed fee contracts). Hourly tracking of team members is required and is to be provided if requested to support progress claims or project audits.

Make your invoices to the attention of the PWGSC Project Manager with a copy of the invoice to the project's SDA/Design Manager. The SDA/Design Manager will verify that the work was done as contracted. PWGSC will not pay an invoice until staff verify that the work was done as contracted; for example, in the case of design documentation, staff will verify that the work is indeed 33%/66%/99% complete before recommending an invoice for payment.

### ***K. Consultant Evaluation***

PWGSC evaluates the performance of consultants using the Consultant Performance Evaluation Performance Report Form (CPEPF). We assess quality of design, quality of results, project management, time planning and schedule control, and cost planning and control. <http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/2913-1-eng.html>

## IV. PREPARING CONSTRUCTION CONTRACT DOCUMENTS

This section sets out requirements for preparing construction contract documents, which include specifications, drawings, addenda, contemplated change notices, and other documentation. You can find web links to related information and PWGSC forms in Appendix 6. Review the documents that you prepare against the requirements set out below.

### A. *General*

#### 1. **Defining the Contractor's Scope of Work**

You are responsible for ensuring that the scope of work described in the construction contract documents is clear and well-defined and reflects the government's vision for the project. Your documents must be accurate, complete, and enable the contractor to properly price the work. Poorly defined scope of work can result in extra meetings, change orders, increased costs, delays, and an overall adverse impact on the project. Your construction contract documents must be free of loop holes or inconsistencies that could be exploited by contractors. Note that any change in the scope of work must be approved by PWGSC's Project Manager.

#### 2. **Knowledge of Site Conditions**

Because PWGSC does not specify mandatory site visits by the contractor as part of the tendering process, you cannot assume that contractors will visit the site to fill information gaps. The onus is on you to completely describe the scope of work in the documents. It is important that you visit the site to note on-site conditions and constraints. **Do not use notations such as "verify on site," "as instructed," or "to be determined on site by the departmental representative" as this promotes inaccurate bids and inflated prices.** You must not rely on as-built documentation to deal with information gaps. Such conditions are to be resolved and agreed to by the SDA, Project Manager, and consultant.

#### 3. **PWGSC Contracting Principles**

As a Federal Government department, PWGSC is bound to uphold certain principles for the public interest; e.g. a transparent contracting practices to ensure accountability. The requirement to uphold these principles means that PWGSC must ensure compliance with many government rules pertaining to the procurement of design and construction services. Hence, the Department uses contracting procedures that are different from those used in the private sector.

Here is a list of some of the ways in which PWGSC's requirements differ:

- PWGSC has a unique set of contractual terms and conditions drawn from the department's Standard Acquisition Clauses and Conditions (SACC) Manual: <http://ccua-sacc.tpsgc-pwgsc.gc.ca/pub/acho-eng.jsp>
- PWGSC does not use the Canadian Construction Document Committee (CCDC) or the Canadian Construction Association or British Columbia Construction Association standards or guides
- PWGSC does not specify mandatory site visits by the contractor as part of the tendering process so you must completely describe the scope of work
- Use of National Master Specification and PWGSC Pacific Region abridged specifications, as well as PWGSC documentation and forms (see Appendix 6)
- The construction contract documents that you prepare for tender are considered "final for construction" versus the private sector where documents prepared for tender may require a subsequent "issued for construction" edition

#### **4. Contractual Items**

A PWGSC tender package for construction contractors includes documents that cover contract items such as payments, warranties, pricing, taxes, and bid security. You are not to repeat in the specifications and drawings any contractual items that are already addressed in the other documents in the tender package.

#### **5. Administrative Simplicity**

Ensure that construction contract documents are written in a manner that simplifies PWGSC's administration of the contract as much as possible, while still being effective; e.g. number of meetings to attend, communication protocols, reporting requirements, etc.

#### **6. Bidding Format**

For the majority of construction projects, PWGSC requires bidders to submit a single price. Unless requested by the Project Manager, do not use options, alternative prices, conditional clauses, or anything that modifies the offer as it will make the contractor's bid non-compliant.

**Single Lump Sum** - For a single lump sum contract, you do not need to provide a bid form (it is provided by the Contracting Authority), nor do you need measurement for payment clauses in the specifications.

**Unit Price** - Unit price contracts are used when the quantity can only be estimated, e.g. earth work. When using this method, give an estimated quantity for bid purposes.

**Combined Price** – Combined price contracts have a mix of both lump sum and unit price items.

Use the following wording:



*[The work for this section] or [define the specific work if required, e.g. rock excavation] will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.*

Ensure there is a clear statement of how the measurement will be made.

A Unit Price Table designates the work to which a unit price arrangement applies.

- (a) The price per unit and the estimated total price must be entered for each item listed
- (b) Work included in each item is as described in the referenced specification section

<b>UNIT PRICE TABLE</b>					
<b>Item</b>	<b>Class of Labour, Plant or Material</b>	<b>Unit of Measurement</b>	<b>Estimated Quantity</b>	<b>Price per Unit, HST extra</b>	<b>Extended Amount Price, HST extra</b>
<b>TOTAL ESTIMATED QUANTITY</b>					
Transfer amount to subparagraph (1)(b) of BA03					

## **7. Cash Allowances**

Use cash allowances only under exceptional circumstances, where no other method of specifying is appropriate. You must assist the Project Manager to obtain the Contracting Authority's approval to use cash allowances in the specifications, in which case you could use *Section 01 21 00 – Allowances* of the NMS to specify the criteria. Use of cash allowances is almost never approved.

## **8. Professional's Signature and Seal**

Drawings and specifications are to be signed and sealed by the Professional Architect and Professional Engineer at the tender issue stage. Additional sets of signed/sealed drawings and specifications and BC Building Code schedules may be requested as needed for building permit submissions to the local authority having jurisdiction.

## 9. Permits

PWGSC asks for permits as if the work is being done in the private sector. Also, be aware of PWGSC's Good Neighbour Policy:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/cndns-eng.html>. The consultant will prepare the required documentation for obtaining approvals and permits from the applicable local authority on behalf of PWGSC. Confer with the PM to determine whether the consultant or contractor will submit the documentation to the local authority on behalf of PWGSC or whether PWGSC will take the further action. If the former, the consultant or the contractor will submit a documentation set(s) to the local authority and provide a documentation set(s) to PWGSC for the department's records. PWGSC, through the contractor, will pay for the permit application costs. PM/SDA/DM and consultant to confer to clarify any project specific adjustments to the above process.

### B. SPECIFICATIONS

#### 1. National Master Specifications

For the 33% milestone submission, include project specifications. **Confer with PWGSC's Strategic Design Advisor on the appropriate Specification Index and Outline Specification for the project.**

Specifications are to be based on the current edition of the six digit format Canadian National Master Construction Specification (NMS) in accordance with the *NMS User's Guide* (<http://www.tpsgc-pwgsc.gc.ca/biens-property/ddn-nms/index-eng.html>). The NMS is jointly produced by Construction Specifications Canada (CSC) and the Construction Specifications Institute (CSI) in the USA.

PWGSC's Pacific Region, like other regional units across the country, has its own abridged specification sections, which reflect the unique requirements of the federal, provincial and regional authorities having jurisdiction. However, the regional specification index may not always be appropriate for large or complex projects in which case the National Master Specification is better.

You are responsible for tailoring fully developed Division 01 specifications, in consultation with the Project Manager. You shall edit, amend and supplement specifications derived from the NMS as deemed necessary and produce a project specification that is free from conflict and ambiguity.

You must fully develop the three Division 01 specification sections that are common to all projects (see below), as well as identify and develop other sections that apply to the project in question in consultation with the Project Manager:

- **General Instructions** (Section 01 11 55) – This section covers a wide range of activities such as security, environmental protection, fencing, quality

assurance, etc., that must be considered and included in the specifications as appropriate.

- **Health and Safety Requirements** (Section 01 35 33). - The Government of Canada as a whole takes all matters of Construction and Occupational Health and Safety (OH&S) very seriously. Compliance with Federal and Provincial OH&S legislation and regulations is mandatory. Use of the Pacific Region Master Template NMS Section 013533 Health and Safety Requirements, as revised from time to time, is mandatory. Discuss the health and safety requirements with the Project Manager at the beginning of the work and request a copy of the Pacific Region Master Template.
- **Commissioning** (Section 01 91 00) – Commissioning is required for all projects, although its extent is determined by the size and complexity of the project. Discuss the commissioning requirement with the Project Manager at the beginning of the work and request a copy of the most current PWGSC Commissioning Manual (CP.1).

PWGSC-prepared specifications are to use the Construction Specifications Canada full page format, whereas consultants may use either the full page or the two column format.

Narrow scope sections of the NMS describing single units of work are preferred for more complex work, whereas, broad scope sections may be more suitable for simpler work. For example, for complex concrete work, separate sections for formwork, reinforcing steel, and concrete is preferred (i.e. “narrow” scope). Whereas for simpler work, a single section for concrete which includes formwork, reinforcing steel and concrete is preferred (i.e. “broad” scope).

## 2. Specifying Materials

Except for special circumstances, specifying brand names and model numbers is against departmental policy in order to avoid partiality. The method of specifying shall be by one or more of the prescriptive method, reference to recognized standards, and specification by a non-restrictive, non-trade name performance specification.

Where no standards exist and where a suitable non-restrictive, non-trade name prescriptive or performance specification cannot be developed because of complexity, you may specify by Acceptable Product or Minimum Standards. Discuss this situation in advance with the PWGSC Project Manager.

In this case, either list all trade names and model numbers of materials acceptable for the purpose as follows:

1. ABC Co. Model [\_\_\_\_\_],
2. DEF Co. Model [\_\_\_\_\_],
3. GHI Co. Model [\_\_\_\_\_],

Or, after describing the products, specify the name of a product as minimum acceptable product when the description alone or performance specifications would not be adequate. A statement must be added that the product specified as minimum standard does not exclude any other products. The specifications for the specified product will be used as the base for minimum acceptable standards during the shop drawings review. All products must meet or exceed the minimum standards.

You must use the phrase “acceptable products.” Do not use “standard of acceptance,” “approved products” or other similar phrases. Also, do not use “or equal” or “equivalent to.”

Sole sourcing for materials and work can be used for proprietary systems (i.e. fire alarm systems, EMCS systems). You must substantiate and/or justify sole sourcing and obtain approval from the Project Manager.

Wording for the sole source of work should be in Part 1 as:

“Designated Contractor

*.1 Hire the services of [\_\_\_\_\_] to do the work of this section.”*

Wording for the sole source of EMCS systems should be in Part 1 as:

“Designated Contractor

*.1 Hire the services of [\_\_\_\_\_] or its authorized representative to complete the work of all EMCS sections.”*

*and in Part 2 as “Materials*

Wording for the sole source of materials (i.e. fire alarm systems) should be in Part 2 as

“Acceptable materials

*.1 The only acceptable materials are [\_\_\_\_\_].”*

If an acceptable product must be used, according to PWGSC General Conditions, the contractor must provide the specified product.

Do not use the term “Acceptable Manufacturers” as this has been deemed to restrict competition and does not ensure the actual material or product will be acceptable. A list of words and phrases to avoid is included in the NMS User’s Guide.

### **3. Prescriptive vs. Performance Specification**

(Reserved)

#### **4. Standards**

As directed by the Division 01 specification index, make reference to the most current edition of the applicable standards, noting the exact title. Examples of recognized standards are those of the Canadian Gas Association (CGA), Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), or Underwriters Laboratories of Canada (ULC). Recognized standards are also published by trade associations such as the Canadian Roofing Contractors' Association (CRCA) or the Terrazzo, Tile & Marble Association of Canada (TTMAC). Canadian standards should be used wherever possible. *NMS Section 01 42 00 – References* provides web site addresses for standards organizations.

#### **5. National, Provincial and Local Codes and Regulations**

Always use or specify the applicable national, provincial, and local codes and regulations with a clause that states *“the most stringent will apply.”* It's PWGSC policy to follow and apply the most stringent of the national, provincial and local codes.

For building projects that house Federal Government employees or people in institutions under Federal Government Administration including prisoners, patients, students, etc. the Authority having jurisdiction over the design of these projects is the Fire Protection Engineering Services Branch of Labour Canada. This department is similar to a municipal government building department and reviews all projects within its jurisdiction for building code compliance to all Federal Government standards. It is the prime consultant's responsibility, with the help of the Design Manager, to engage this department for project reviews at the 33%/66%/99% stages. The Labour Canada contact is:

Manager, Fire Protection Engineering Services, Northwest Pacific Region  
Tel: (604) 666-0403  
Fax: (604) 666-6206  
Email: dan.jacob@hrsdc-rhdsc.gc.ca  
[http://www.hrsdc.gc.ca/en/labour/fire\\_protection/index.shtml](http://www.hrsdc.gc.ca/en/labour/fire_protection/index.shtml)

#### **6. Specialty Engineer**

When particular inspections or approvals are required (e.g. gluelam, seismic restraints, structural steel), identify that they must be done by a Professional Engineer/Architect registered in British Columbia or in the relevant jurisdiction. This Professional is responsible for the components designed or installed by the contractor and who signs and seals shop drawings and other documents.

#### **7. As-Built Documentation**

In the specifications, ensure you've defined the approach for preparing and reviewing as-built drawings. They are to be prepared by the contractor and reviewed and translated to the electronic drawings by the consultant. Identify for

the Project Manager any differences between the contractor's as-built drawings and the consultant's as-built drawings.

Assemble, finalize, and submit to the PWGSC Project Manager and SDA the as-built drawings and specifications electronically periodically when change orders, Requests for Information, and other changes occur, rather than wait until the end of the project. Submit the final as-built drawings and specifications in dwg format and pdf format on CD as per the statement of Required Services.

### **C. DRAWINGS**

- √ Follow generally accepted drawing conventions understandable by the construction trades.
- √ Drawings should show the quantities and configuration of the project, the project dimensions, and graphic details of how the project is to be constructed. Drawings should not describe the quality of the work.
- √ Follow PWGSC National CADD Standard as adapted to Pacific Region. Important standards are the ones pertaining to layering, title blocks, drawing size and achieving consistency across the documentation set. See the PWGSC National CADD Standard: <http://www.tpsqc-pwgsc.gc.ca/biens-property/cdao-cadd/index-eng.html>
- √ Consult with the Strategic Design Advisor/Design Manager to confirm the selection and use of CADD platform/tools that may be required for a particular project type or procurement method (i.e. version, platform, BIM, energy modeling, 3D rendering etc.).
- √ Make all drawings a uniform standard size in accordance with the PWGSC National CADD Standard. Ask the PWGSC Strategic Design Advisor/Design Manager for a paper space template and pick a size.

Appendix 5 contains a PWGSC Style Guide for Construction Contract Documents.

### **D. Documentation Submission**

For construction contract documents:

#### **What to Submit**

- Index to Specifications and Drawings
- Specifications -
  - Include a description of all units and estimated quantities for unit price table
  - Include a list of significant trades including costs
- Drawings
- Addenda (if required)

- BC Building Code Schedules A, B1, B2 and C (for construction phase)

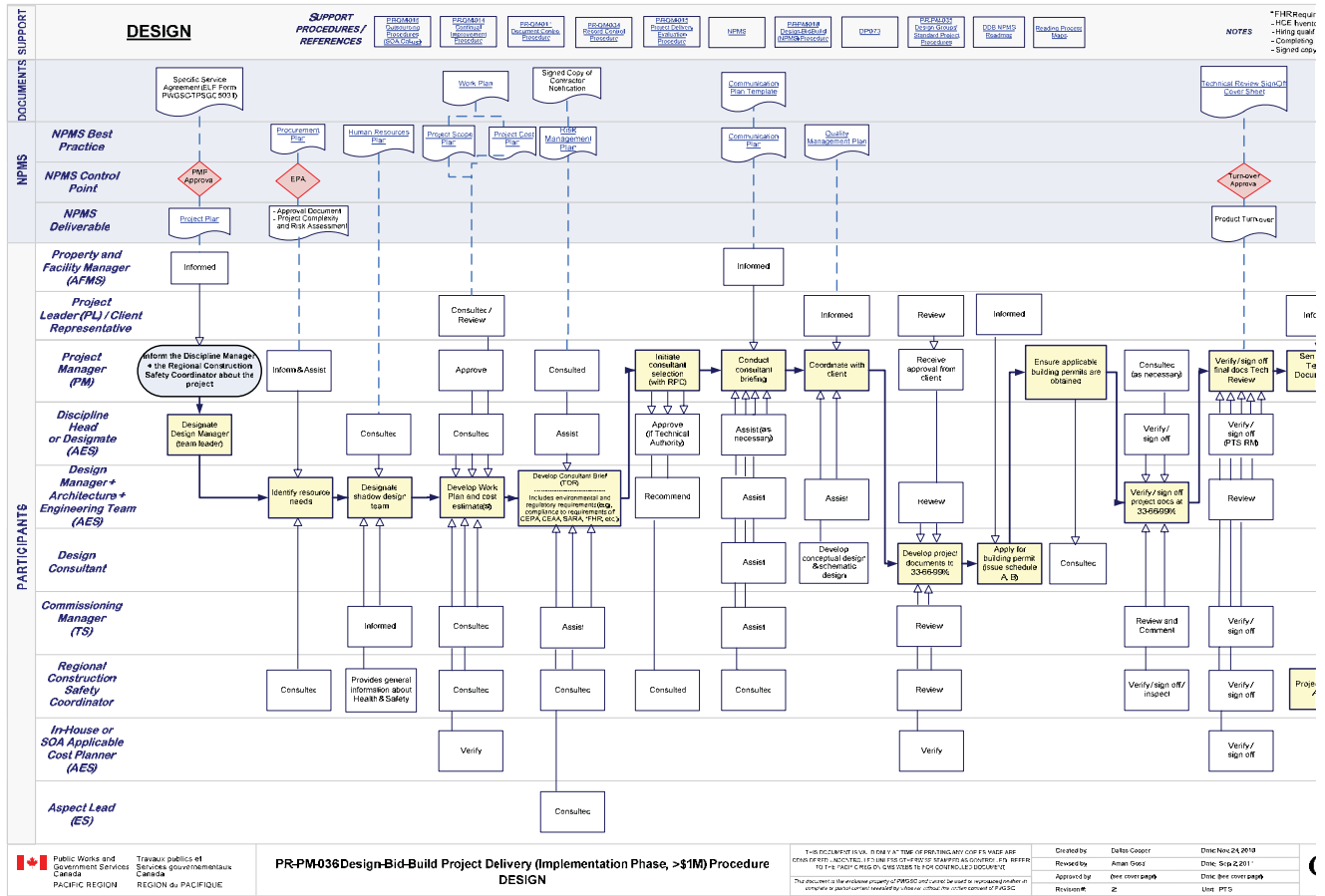
### **Submission Format**

- Confirm the intended recipients of your documents and obtain their name, email address and courier address.
- Unless otherwise indicated in the statement of Required Services for a specific project, at the required review and tender stages, submit your work in paper format (PWGSC is considering requiring submissions in electronic format in the future).
- Use your seal/stamp in accordance with the rules of your professional association. You do not need to stamp or seal at the 33% and 66% stages.
- If at any time you create electronic pdf documents, always use software conversions (rather than scanning) to improve functionality.
- In the design phase, you may be required to send paper copies to multiple offices, with a transmittal record to the PWGSC Strategic Design Advisor. In this case, print the specification pages one-sided on 216 mm x 280 mm white bond paper. Staple or otherwise bind drawings and specifications into sets. Where presentations exceed twenty sheets of drawings, you may bind the drawings for each discipline separately for convenience and ease of handling.
- At review stages and at the completion of the construction project, submit the final specifications in pdf format and original and as-built drawings in electronic pdf and dwg formats for record keeping purposes. Include any change orders and change of work documents. Submit a separate pdf and dwg file for each drawing.

### **PWGSC shall provide**

- √ Front and back cover
- √ Special addenda
- √ Instructions to tenderers
- √ Tender form
- √ Standard construction contract documents

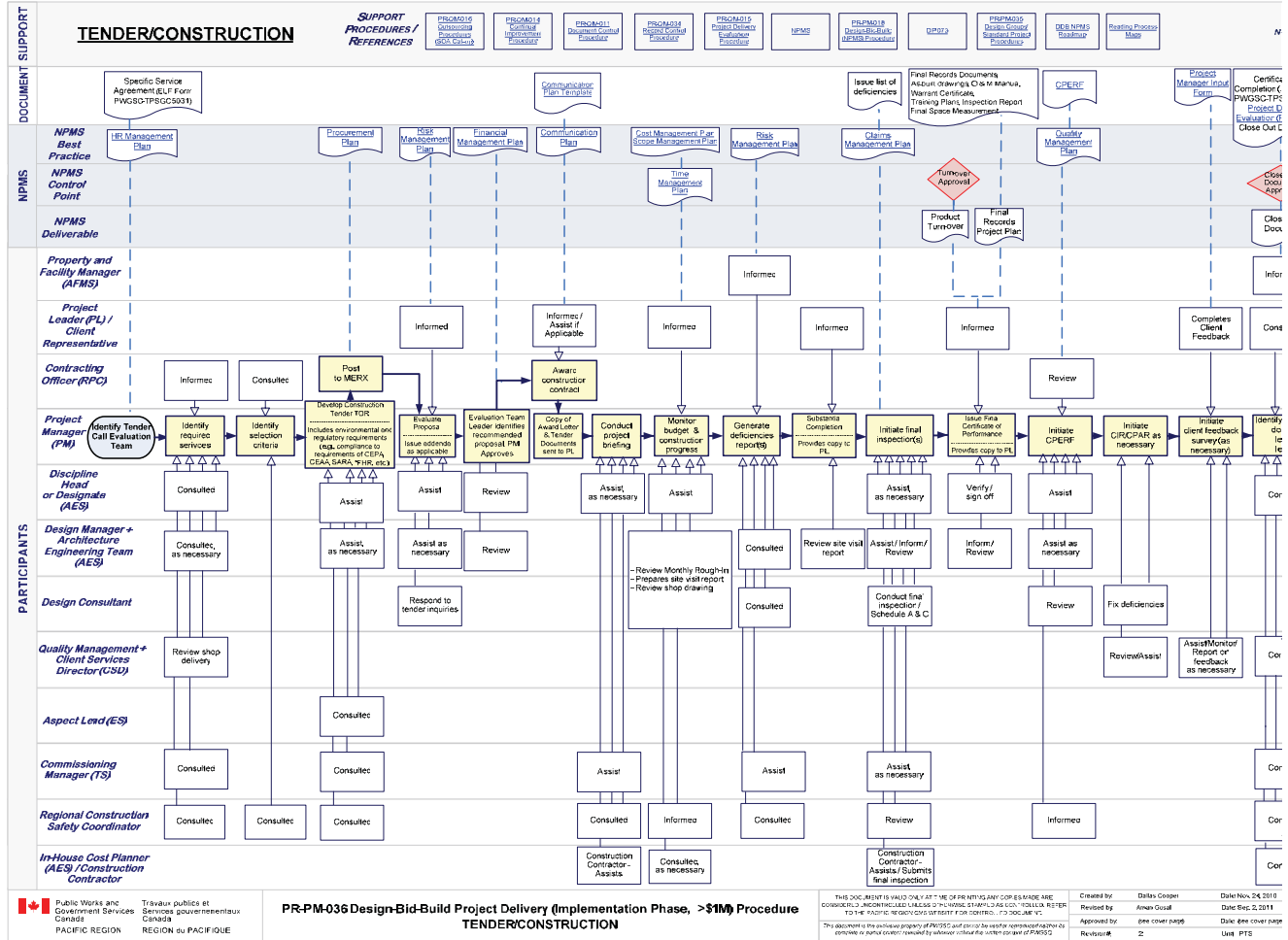
# APPENDIX 1 – QUALITY MANAGEMENT SYSTEM (QMS)<sup>2</sup>



<sup>2</sup> For reference only. Contact the Design Manager for the most recent version. See the PDF version for more detail.



# APPENDIX 1 – QUALITY MANAGEMENT SYSTEM (QMS) (Continuation)



Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada  
 PACIFIC REGION / REGION DU PACIFIQUE

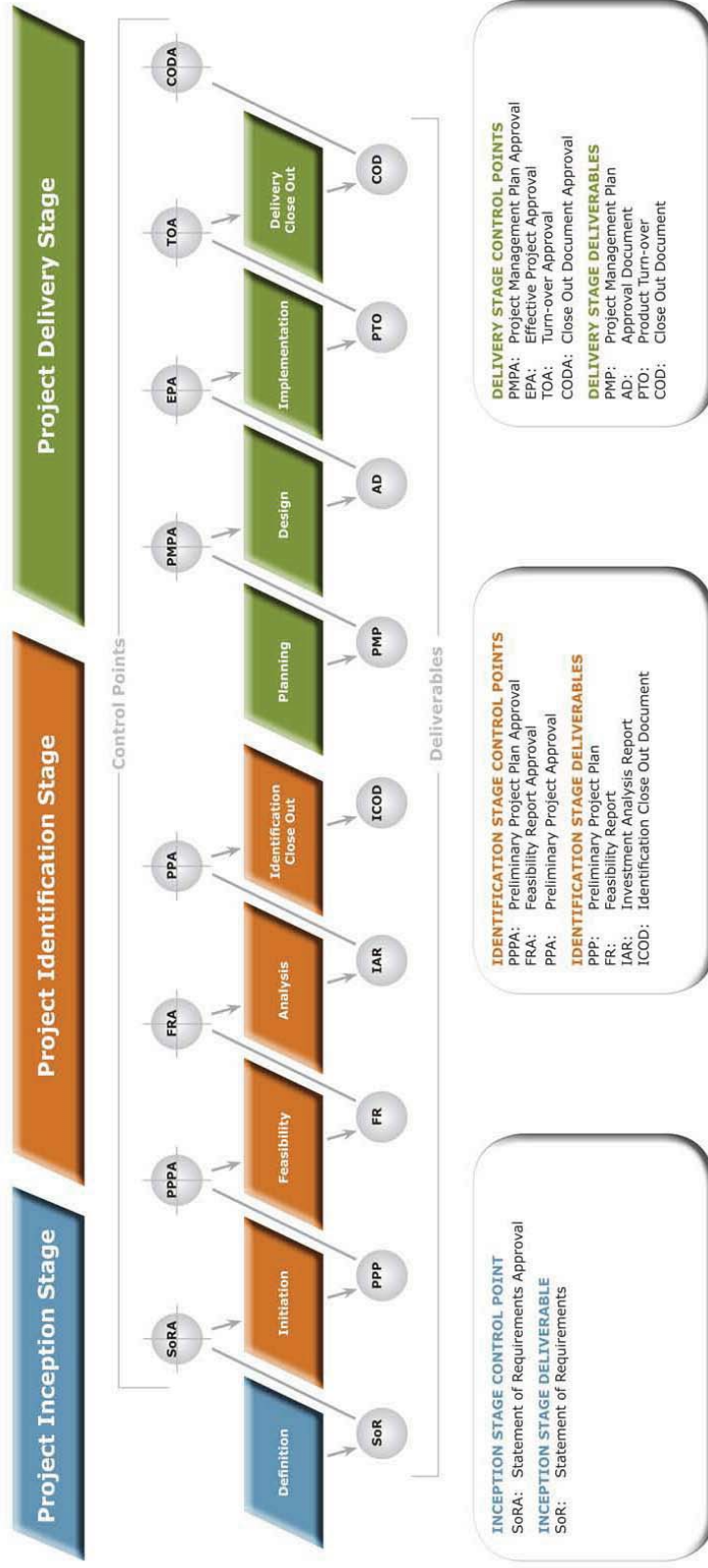
**PR-PM-036 Design-Bid-Build Project Delivery (Implementation Phase, >\$1M) Procedure**  
**TENDER/CONSTRUCTION**

THIS DOCUMENT IS VALID ONLY AS LONG AS NO REGULATORY CHANGES HAVE OCCURRED. UNCHANGED UNLESS STAMPED AS SUCH. REFER TO THE QUALITY MANAGEMENT SYSTEM FOR DETAILS.  
 This document is the exclusive property of PWGSC and shall not be used, reproduced, modified, or otherwise in any way without the written consent of PWGSC.

Created by: Darin Cooper	Date: Nov. 24, 2010
Revised by: Anah Goual	Date: Dec. 2, 2011
Approved by: one cover page	Date: see cover page
Revision #: 2	Use: PFS

## APPENDIX 2: NATIONAL PROJECT MANAGEMENT SYSTEM (NPMS)

### PWGSC National Project Management System (NPMS)





## APPENDIX 4 – SAMPLE INVOICE

(Reserved)

## APPENDIX 5 – PWGSC-PACIFIC STYLE GUIDE FOR CONSTRUCTION CONTRACT DOCUMENTS

This style guide is intended for construction contract documentation at the 33%/66%/99% and tender stages. This guide is updated regularly. Refer to the Required Services in your contract and to the Project Manager and Strategic Design Advisor for any additional or updated requirements.

### Language

- Use the imperative voice instead of the passive voice wherever possible:
  - Examples of imperative voice: Install new panel on east wall; Remove all existing wiring.
  - Examples of passive voice: New panel will be installed on east wall; Existing wiring to be removed.

All instructions in the tender package are aimed at the contractor so avoid use of the word “contractor” wherever possible. Use of the imperative voice eliminates the need for any reference to a contractor.

### Technical Package

- Include the PWGSC Project Number (which is the same as the Work Breakdown Structure Element in PWGSC’s SIGMA financial system) on all specifications, drawings, and reports. Here is an example of the format for a project number: R.012345.001
- Use the required format for the index page and obtain the template from the Strategic Design Advisor
- List all sections and pages of the specifications and all drawings in the index
- Ensure titles of all appendices are listed on the index page, with each appendix having a unique title
- Ensure the names used in the index match the specification section, drawing names, and appendix names
- Ensure the page count for each listed item in the index matches the actual number of pages
- Use ISO date formatting: YYYY-MM-DD, e.g. 2010-10-02 meaning the 2<sup>nd</sup> day of October, 2010
- Use only metric dimensions on all specifications and drawings (no imperial dimensions). Always use industry-standard metric dimensions, for example, 53mm electrical conduit instead of 50mm (2” conduit)
- Use the same font style throughout the package, including documents from different disciplines

- Use black font on white paper for drawings and specifications unless colour would assist clarity in which case obtain the Strategic Design Advisor's approval
- Where schedules occupy entire sheets, locate them next to the drawing sheets or at the back of each set of drawings for convenient reference. See *CGSB 33-GP-7 Architectural Drawing Practices* for guidelines on schedule arrangements.

**Company References**

- Without specific authority from the PWGSC Project Manager, do not include references to any phone numbers, personal names, web sites, email addresses, street addresses or similar coordinates of suppliers, manufacturers, contractors or consultants
- Include your consulting firm's logo/name on all drawings below PWGSC's name at the upper right hand corner of the drawing
- You can place your consulting firm's project number near the lower right corner of drawings or on the cover page of your document

**Specifications**

- Follow the specification notes in the NMS
- You are responsible for including all pertinent sections of the NMS (see the section on Specifications)
- Write a brief description of the work and number of weeks allocated for its completion on the first page of the Division 01 sections
- Ensure a specification section exists for all elements of work included in the drawings
- Ensure the specification headers comply with PWGSC's format (confer with PWGSC's Strategic Design Advisor)
- Include the Project Name in the specification header for each specification section.
- Start with Division 01 Sections and start each Section on a new page
- Check the specification index to ensure that the correct specification section numbers are listed
- When making cross references, for example a specification section refers to another section, ensure the references exist and the correct numbers are used
- Erase all brackets of NMS specification choices not used for the project
- Include the Section Title, six digit Section Number, and specification date, along with the Project Number, on each page of the specifications

- Put a page number on all pages in the specifications (including appendices, photo pages, etc), except for drawings

### Drawings

- Do not put specifications on drawings** unless permission has been granted by the Strategic Design Advisor in advance. Such permission is not usually granted.
- Insert a unique drawing number and sheet number on every drawing
- Number drawings in sets according to the type of drawing and the discipline involved in accordance with the PWGSC National CADD Standard
- Comply with National Building Code requirements for design notes on all drawings (these are not the same as specification notes)
- Explanatory notes on drawings are expected
- Include a North Arrow on all floor and site drawings, as well as a set of benchmark locations to help the contractor to properly lay out the works
- Wherever possible, lay out drawings so that the north point is at the top of the sheet
- Orient all drawings in the same direction for easy cross-referencing
- If you are assuming a certain floor elevation (e.g.100.00 m), then provide a cross reference to tie it back to existing site elevations
- Include a scale bar on all drawings except sketches
- Include the names of PWGSC's Project Manager, Regional Manager of Architectural and Engineering Services, and other relevant staff in the title block. Ask PWGSC's Strategic Design Advisor for the names of the staff to include.
- Each submission to PWGSC is to be identified as a specific revision
- If extensive use of symbols, abbreviations, references, etc., provide a legend on the front sheet of each set of drawings or, in large sets of drawings, immediately after the title sheet and index sheets

### Addenda

- See the PWGSC Project Manager for the most current addendum template
- Ensure addenda items refer to an existing specification paragraph or drawing note
- Number consecutively every page of the addenda, including attachments
- Put the PWGSC Project Number and appropriate addendum number on every page

- Use the PWGSC National CADD Standard for any sketches
- Stamp and sign sketches



## **APPENDIX 6 – SELECTED REFERENCES AND FORMS**

This appendix has PWGSC web site links to relevant information and forms. Contact the PWGSC Project Manager for other forms not listed below.

Acquisitions:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>

Change Order:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/610-eng.html>

Construction Contract Administration Forms:

See your PWGSC Project Manager

Contemplated Change Notice:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/611-eng.html>

Legal Nature of Consultant's Role for Architectural and Engineering Contracts:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/conn-know/approv-procure/manuelga-pmmanual-6-eng.html>

Managing Construction Contract Changes:

See your PWGSC Project Manager

NMS Specification Standards

<http://www.tpsgc-pwgsc.gc.ca/biens-property/ddn-nms/index-eng.html>

NPMS

<http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/index-eng.html>

On Site Instruction:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/599-eng.html>

PWGSC National CADD Standard:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/cdao-cadd/index-eng.html>

Pre-Construction Start-up Meeting:

See your PWGSC Project Manager

Shop Drawings Review Process:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/conn-know/qualite-quality/atelier-shop-eng.html>

Specification Brief:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/conn-know/qualite-quality/aperçu-overview-eng.html>

Standard Acquisition Clauses and Conditions (SACC)

<http://ccua-sacc.tpsgc-pwgsc.gc.ca/pub/acho-eng.jsp>

Tenant Fit-Up Standards

<http://www.tpsgc-pwgsc.gc.ca/biens-property/amng-ftp/index-eng.html>

## **SECTION 2**

# **PACIFIC REGION SPECIFICATION REFERENCE MANUAL**



# PACIFIC REGION SPECIFICATION REFERENCE MANUAL





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Specification Checklist

### **APPENDIX “B”**

Departmental Input

### **APPENDIX “C”**

Templates and Samples

- .1 Cover Sheet Template
- .2 Sample Index
- .3 Sample Addendum Format



## INTRODUCTION

The PWGSC Specification Reference Manual is meant to expand on, or further define, the guidelines set out in the Specification Brief in the “Doing Business With A&ES” document that is part of the Standing Offer and Consultant contracts.

The manual has been prepared to assist consultants and specification writers in the production of construction specifications that are being prepared for the department. The intent is to provide consultants with a framework, format, and direction for their specifications. The department recognises that the Prime consultant is ultimately responsible for the production of the specification. The Reference Manual is an attempt to identify all departmental and Government of Canada policies that make PWGSC specifications unique from those that might be prepared for Provincial and Municipal governments, or for private sector projects. Public Works and Government Services (PWGSC) specifications are based on the procurement policies set forth by the Treasury Board of Canada to ensure maximum competition from as many bidders as possible. The Reference Manual attempts to establish guidelines so that the procurement policies can be incorporated into all specifications in a common format.

The instructions found throughout the specification guidelines have been developed over time in an attempt to ensure a common approach and appearance for all Pacific Region specifications. To some degree, use of the Reference Manual will avoid encountering some of the most commonly found issues that the department has routinely encountered during the tendering process and contract administration phase.

The most basic difference in the departmental specifications is that the Public Works and Government Services does not use CCDC contract documents. The department prepares and issues its own contracts which include; instructions to tenderers, tender forms, articles of agreement, terms of payment, general conditions, labour and insurance conditions. PWGSC also tenders its own projects primarily through MERX rather than through the construction associations.

Consultants should prepare their specifications in accordance with the “NMS User’s Guide” and will retain overriding responsibility for the product. They will edit, amend and supplement the National Master Specification (NMS) as deemed necessary to produce an appropriate project specification free from conflict and ambiguity.

Consultants are required to undertake their own quality control process and must review, correct and coordinate their specifications with those provided by their sub-consultants before issuing the documents to PWGSC for reviews. As part of its ISO 9000 certification, PWGSC Pacific Region has developed a Quality Management System (QMS) that requires the department to review all specifications, make comments on the content and provide feedback on each of the mandatory 33%, 66% and 99% submissions. Consultants will be required to provide responses to any of the PWGSC review comments and incorporate any of the feedback deemed to be non-contentious into their documents.

A checklist for specifications has been included in Appendix “A” to assist the consultant with quality control.



Consultants are responsible for coordinating and requesting from the department information necessary to ensure that the final product will meet the requirements of the client. Before beginning work on the specification, consultants should ask the Project Manager (PM) or Design Manager (DM) to provide the information that is included in the Departmental Input package, bound in appendix “B” of the guidelines.

## I. ORGANIZATION

*(Refer to the Templates and Samples in appendix “C”)*

- 1.1 The project title in the header must be coordinated with the project title found on the drawings. The two titles do not have to be identical but should be similar.
- 1.2 The department’s project number must appear in the header. The consultant’s project number should not appear in the document.
- 1.3 The header should be identical on all sections with the only exception being the section number and title.
- 1.4 No company references should appear in the document.

### EXAMPLE

#### PROJECT TITLE

Building/Facility – Location  
Project No. R.000000.001

#### GENERAL INSTRUCTION

Page |

## 2. FORMAT

- 2.1 Use of the most current version of the National Master Specification (NMS), with 3 part Masterformat, is mandatory.
- 2.2 Specifications are to be MS Word documents.
- 2.3 Employ the Construction Specifications Canada full page format.
- 2.4 Narrow scope sections describing individual units of work are preferred for more complexed work. Broad scope sections may be more suitable for less complexed work.
- 2.5 For specification sections not included in the NMS, but required for the project, follow the number and title recommendations of Masterformat 2004.
- 2.6 Currently there is no regional standard for font. To ensure that the document can be read easily you should not use font sizes below 10 pt.
- 2.7 Number each page and begin each section on a new page.

## 3. TERMINOLOGY

- 3.1 Use the term “Departmental Representative” in place of owner, engineer, consultant or architect. The Departmental Representative is defined as the person designated in the Contract, or by written notice to the contractor, to act as the administrator of the Contract on behalf of the crown.
- 3.2 Use of the term “Departmental Representative” will not mean that the consultant will be bypassed on critical stages of the contract administration. It simply means that the Contractor will be making submittals and requests for approvals through the Departmental Representative as opposed to the consultant directly. The Departmental Representative will then forward the information to the consultant.
- 3.3 When a specialty engineer is required to review shop drawings, grant approvals or make inspections, the term “professional engineer” should be used and not the “Departmental Representative”. The professional engineer must be registered in the Province of BC, or



the Yukon, whichever is applicable.

#### 4. REGIONAL MASTER SECTIONS

*(PWGSC Pacific Region has its own Regional Masters for 01 11 55 General Requirements, 01 35 33 Health and Safety and 01 74 21 where it is used for crown owned facilities. Electronic versions of these sections are presently not available to the consultant on the web site. Consultant should request that the Project Manager or Design Manager provide them with electronic versions of these masters.)*

- 4.1 01 11 55 - General Instructions is an abridged version of the NMS Division I that is intended to be used for small and medium sized projects. Use of this master should negate the need to include sections 01 11 00 Summary of Work, 01 29 83 Payment Procedures for Testing Laboratory Services, 01 342 17 & 01 32 18 Schedules, 01 41 00 Regulatory Requirements, 01 45 00 Quality Control and 01 74 11 Cleaning. The regional specification index may not always be appropriate for large or complex projects in which case the various Division I NMS sections should be used. Section 01 11 55 also includes several paragraphs critical for the management of the project including; Time of Completion, Hours of Work, Description of Work, Work Schedule, Cost Breakdown, Green Initiatives and Contractor's Use of Site. In consultation with the Project Manager and Design Manager you are responsible for editing 01 11 55, as well as any other additional NMS Division 01 specifications required, to complete the general requirements. You should do so in consultation with the Project Manager and Design Manager. The Project Manager and Design Manager should be providing the information outlined in the Departmental Input form found in appendix "B"
- 4.2 Under "Time of Completion", in 01 11 55, the contract period has to be entered in number of weeks. No calendar dates can appear in the specification as a completion date. You can indicate that a project is to be phased, however there must only be one completion date:

#### EXAMPLE

- .1 Complete the work within 30 weeks after Contract Award.
- .2 Perform work as per the following Phasing Plan:
  - Phase I - complete the following work in 10 weeks after contract award.
  - Phase II - complete the following work in 20 weeks after contract award.
  - Phase III - complete the following work in 30 weeks after contract award.
- .3 The regional master 01 35 33, Health & Safety must be used in place of the NMS section 01 35 30. Compliance with Federal and Provincial OH&S legislation and regulations is mandatory. Under Submittals 5.4 you should be inserting (5) days for reviews conducted by the Departmental Representative. Under Responsibility 6.0 you should select that the contractor is to assume responsibility as the Prime Contractor and under Project Site Conditions 9.1 you should list any site-specific hazards that you feel that the

#### 5. COMMISSIONING

- 5.1 Commissioning is an integral part of the National Project Management System (NPMS) used by PWGSC to deliver its projects.
- 5.2 Commissioning is an ongoing process that starts in the planning phase and ends at the





termination of the warranty period when the delivered, fully occupied facility has been proven to operate satisfactorily under all weather and occupancy conditions. The traditional commissioning phase of the project takes the built works from a static state, construction, through to a fully operational dynamic state. Activities associated with the commissioning process are recognized as crucial too the interim and the final acceptance of the project.

### 5.3 Commissioning Roles and Responsibilities:

5.3.1 **PWGSC QA Commissioning Manager:** Undertakes a quality assurance role on behalf of the PWGSC project team and is responsible for fulfilling the PWGSC Commissioning Quality Management System requirements. Provides technical advice on O&M matters. Reviews commissioning documentation from the Commissioning Authority at all stages of project delivery and provides support to the Project Manger in matters relating to commissioning.

5.3.2 **Design Consultants Commissioning Authority:** The Design Consultant shall engage and pay for a 3rd party Commissioning Authority. The Commissioning Authority develops the commissioning plan, design intent and proposed design solutions, prepares commissioning specifications, forms, training plan and other commissioning documentation. Witnesses and certifies performance of all commissioning activities, organizes and monitors all activities as per the contract agreement, and is responsible for its contractual design, construction and warranty related commitments. The Commissioning Authority represents the Owner's and User's interests, and is responsible for overseeing all commissioning activities during the development, implementation and post construction stages of the project.

5.3.3 **Construction Contractors Commissioning Agent:** The Construction Contractor shall engage and pay for a Commissioning Agent. The Commissioning Agent carries out many start-up and performance verification activities and carries out demonstrations and acceptance tests and related procedures. They coordinate matters relating to commissioning , refine the Commissioning Plan, develop the Commissioning Schedule, coordinate all commissioning activities in accordance with contract documents, including all tests for equipment, systems, integrated systems, and provides required documentation.

#### 5.3.4 **Specification sections:**

Section 01 91 13 General Commissioning (Cx) Requirements

Section 01 91 31 Commissioning (Cx) Plan

Section 01 91 33 Commissioning (Cx) Forms

Section 01 91 41 Commissioning (Cx) Training

Section 01 91 51 Building Management Manual

## 6. RELATED SECTIONS

6.1 When you are referencing other sections in the specification as “related sections”, you must ensure that those related sections are included as part of your specification.

## 7. MEASUREMENT

7.1 SI units of measurement are to be used exclusively. It is acceptable to include both metric and imperial dimensions, measurements and data as long as the metric appears before the imperial and the imperial is placed in parenthesis.



## 8. CODES AND STANDARDS

- 8.1 All projects within the Federal Jurisdiction must conform to the current National Building Code. The General Conditions however, also require that they conform to all Provincial, Territorial and Municipal codes and/or bylaws as part of PWGSC's "Good Neighbour" initiative. Where there are conflicts the most stringent code would apply.
- 8.2 In that references in the NMS may not always be up to date, it is the responsibility of of the consultant to ensure that the specification includes the latest version of all references quoted.
- 8.3 Canadian standards should be used where ever possible.

## 9. PERMITS

- 9.1 The General Conditions require that the contractor make application for, and pay for all Permits. This would include Building Permit. Consultant shall confirm If Building Permit is required and indicate this in the General Instructions Section.

## 10. SPECIFYING PRODUCTS

- 10.1 The practice of specifying brand names and model numbers for products is against departmental and treasury board policy except under exceptional circumstances. All product specifications are to be generic, prescriptive or performance based.
- 10.2 A brand name and model number can be used when you are "matching existing" materials, finishes or equipment. If this is applicable to your project, you should include the phrase "matching existing" after the brand name to identify to the tendering authority why you are calling for a sole source. (example: provide Corbin locksets to match existing.)
- 10.3 Brand names and model number can be used when you are selecting a product or equipment for which there is only one manufacture or supplier. You must be prepared to defend the position to the tendering authority that only a sole source product can meet your needs.
- 10.4 You can specify brand names and model numbers when a warranty will be affected or nullified by the use of non-compatible products or equipment. You should justify the selection of such a product to the tendering authority by providing an explanation in the specifications. (example: use product X to maintain the existing warranty.
- 10.5 You can specify brand names and model numbers when the performance of existing equipment will be affected or by the use of non-compatible products or equipment. You must justify the selection of such a product to the tendering authority by providing an explanation in the specifications. (example: equipment X is to be to supplied by firm "Y" to ensure compatibility with existing equipment.
- 10.6 A brand name can be included in the specification if a generic specification has been provided and you want to identify products that you are aware meet the descriptive or performance specification. Naming such products you must use the term "acceptable products". The policy is for you to name all products that meet the specification provided. Given that this is difficult, you must at least name a minimum of three (3) products meeting the specification.

### EXAMPLE

- .1 Provide non-layered and non-backed homogenous sheet vinyl flooring, 1.83 m wide, having a nominal thickness of 2.0mm consisting of through-grain vinyl granules with pattern and colour uniformly distributed throughout entire thickness. The pattern shall merge subtle



colour accents with a detailed terrazzo like visual providing monolithic appearance. Vinyl sheet flooring to meet wear-layer gauge and composition, flexibility, indentation and solvent resistance of Federal Specification L-F-475a(3) Type II, Grade A. Flooring to consist of PVC resins, plasticisers, stabilisers and fillers formulated to resist wear, chemical attack and scuffing: informing to the following additional minimal requirements:

- 1.1 Full load limit: 151kg
  - 1.2 Static load limit to ASTM F970: 363 kg/cm<sup>2</sup>
  - 1.3 Gloss: 60 ° specular, 16
  - 1.4 Wear resistance: 58,000 cycles by Taber Abrader with H18 and 1000 gram weight.
  - 1.5 Fire test data: to ASTM E648-0.45 wattscm or more.
  - 1.6 Slip resistance : to ASTM D2047 - Coefficient of slip resistance minimum 0.5.
  - 1.7 Acceptable products:
    - Tarket Granite Elite
    - Polyflor Finesse
    - Mipolam 400
    - Armstrong Multitech
    - Marley Eclipse
- .2 It is understood that a generic specification cannot guarantee that the designer/consultant will be assured of being able to get the exact colour or pattern of a particular material that you prefer or appears on an already prepared colour board. You can produce a descriptive or performance specification and note that “the colour or pattern is to match brand name. (example: pattern to match Marley Eclipse - granite.)

## 11. NAMING CONTRACTORS

- 11.1 Generally the practice of naming contractors or sub-contractors is against departmental and treasury board policy except under exceptional circumstances.
- 11.2 You can name a sole source contractor or sub-contractor to perform work on existing equipment to maintain warranties. You should justify the selection of a sole source contractor to the tendering authority by providing an explanation in the specifications.
- 11.3 You can name a sole source contractor or sub-contractor to supply and install equipment related to existing electronic safety and security systems and voice and data systems. You must justify the selection of a sole source contractor to the tendering authority by providing an explanation.

## 12. CASH ALLOWANCES

- 12.1 Cash allowances show only to be used for unknown costs at the time of tender for installation of public utilities and services. Exceptions can be made depending upon the circumstances. You should check with the Project Manager or the Design Manager.

## 13. CONTRACTING ISSUE

- 13.1 Public Works and Government Services do not use the CCDC contract documents. PWGSC prepares and issues its own contracts which include; instructions to tenderers, tender forms, articles of agreement, terms of payment, general conditions, labour conditions and insurance conditions. PWGSC also tenders its own projects publically through MERX.
- 13.2 Bidders participating in the Tender are allowed access to project site on the date indicated in the tender. Such site visit cannot be made mandatory under Treasury Board



requirement.

- 13.3 Do not include Separate or Alternate pricing unless authorized to do so by the Project Manager or Design Manager.
- 13.4 The department uses three types of contracts; Lump Sum, Unit Price and Mixed. The Mixed Contract is basically a Lump Sum Contract that includes Unit Prices based on estimated quantities. The Mixed Contract is used where only some of the items of work can not be estimated (i.e. earthwork) and the approval from the Project Manager or Design Manager is sought in advance.
- 13.5 Specifications must permit bidders to determine all quantities accurately and bid accordingly. If it is not possible to determine an exact quantity of the work, such as would be the case when repairing cracks in a concrete floor, give an estimate of the repair for bidding purposes. (example; repair 30 lin. m of cracks in concrete.) Adjustments can be made after award.

#### 14. WARRANTIES

- 14.1 It is the practice of PWGSC to call for a 12-month warranty and to avoid calling for extended warranties for more than 24 months. The 12 month warranty for all work is set out in the General Conditions.
- 14.2 When it is deemed necessary to extend a warranty beyond the 12 month period provided for in the General Conditions of the contract, obtain approval from the Project Manager or Design Manager. Typically this would apply to roofing work.
- 14.3 Any extended warranty must include a start date. Typically this is noted as --X—months from the date of substantial completion.

#### 15. REPORTS AND ATTACHMENTS

- 15.1 The departmental policy is to include in the specification, any project related reports that have either been commissioned by the department or the consultant. Common examples of such reports are geotechnical investigations, environmental assessments and pre-renovation/demolition hazardous material survey reports.
- 15.2 All reports and attachments should be bound in the specification in appendices and should include cover sheets prepared by the consultant and not the author of the report.
- 15.3 The specification index must include the cover sheet and the report .
- 15.4 The Project Manager or Design Manager may require that the consultant include numerous attachments that are required by the department, it's alternate service provider and or various clients departments. Common examples of such reports are the "Waste Reduction Work Plan Worksheet for PWGSC Construction, Renovation and Demolition Projects, (required for work in crown owned facilities) Appendix A and Job Hazard Analysis Checklist (required for work at the Esquimalt Graving Dock) and the following forms required by SNC Lavalin; Equipment Information Form CMMS, Operation and Maintenance Manual Checklist and Dismantling, Decommissioning or Deconstruction Notice. (required for work in crown owned facilities managed by SNC Lavalin)

#### 16. DRAWINGS (BOUND IN SPECS)

- 16.1 You can bind drawings with your specification providing that the result is legible. The maximum size of drawing that would be acceptable would be an A3 drawing, 280mm x 432mm sheet.
- 16.2 If you are including shop drawings or detail drawings from a manufacturer in your specification for reference purposes, the name of the company, product name and model



number must be blanked out.

## 17. SUBMISSIONS

- 17.1 Specifications are required to be submitted for all of the three required submissions. (33%, 66% and 99%)
- 17.2 Recognising the fact that the design and drawings are prepared in advance of the specifications, a specification outline, ideally submitted using the specification index, and one or two sections would be sufficient for the reviewer to determine if the 33% product will meet with the requirements set out in the guidelines.
- 17.3 The 66% and 99% submissions should be submitted “double sided” on 216mm x 280mm white bond and bound. A pdf. version of the submissions should be submitted as well.
- 17.4 The final submission should be submitted “single sided” on 216mm x 280mm white bond and should not be bound. A pdf version of the submissions should be submitted as well.
- 17.5 The final submission must bear a stamp or seal from the “Prime“ consultant. Refer to .18 Requirements for a Professional Stamp for details.
- 17.6 Submissions by email, or placed on FTP sites, will not be acceptable.

## 18. REQUIREMENTS FOR A PROFESSIONAL STAMP

- 18.1 Final submission of the specifications as “tender ready documents” are to be sealed and signed at the Index Section.
- 18.2 Only a rubber seal will be acceptable.
- 18.3 Some Design Managers and Project Managers will request an original specification, for their records, that has been both sealed and signed.

## 19. ADDENDUMS

- 19.1 Bidders can approach the Contracting Officer for requests for information up until the tender closing date. Addendums must be issued seven (7) days before the tender closes. Consequently issuing the addendum as quickly as possible is essential.
- 19.2 The consultant is required to prepare the addendum and submit it to the Project Manager. The department will issue the addendum on MERX.
- 19.3 A sample of the addendum format can be found in Appendix “C”



## APPENDIX A SPECIFICATION CHECKLIST

### .1 ORGANIZATION

- regional cover sheet template used.
- regional template for index followed.
- list of drawings in index matches titles and numbering found on drawings.
- specification includes all of the pages listed in the specification index.
- the index include a cover sheet c/w number of pages and any reports c/w number of pages.
- project title in header matches closely the project title on the drawings.
- correct departmental project number used.
- every page of all sections are numbered.
- common header used for all specification sections except for section number and title.
- no company names appear in either header or footer.

### .2 FORMAT

- uses 6 digit NMS in full page format.
- all sections begin on a new page.

### .3 TERMINOLOGY

- Department Representative to be used in place of Engineer,(exception specialty engineer)  
Owner, Consultant or Architect.

### .4 REGIONAL MASTERS

- 01 11 55 & 01 35 33 have been used.

### .5 COMMISSIONING

- 01 91 00 has been used.

### .6 RELATED SECTIONS

- sections referenced to as “related sections” are sections that actually exist in the specification.

### .7 MEASUREMENT

- Metric units have been used.

### .8 CODES AND STANDARDS

- Current and relevant codes or bylaws have been referenced.
- Canadian standards have been used where possible.

### .9 PERMITS

- Ensure that Building Permit whether or not required should be indicated in the General Instructions Section.

### .10 SPECIFYING PRODUCTS

- brand names or product names have not been used. (except in acceptable products clauses)
- when acceptable products have been named, at least 3 products have been listed.
- if a brand name or product name has been used, an explanation or justification has been included as to why the use of a sole source is necessary.

### .11 NAMING CONTRACTORS



if a contractor or sub-contractor has been named to perform specific items of work, an explanation or justification has been included to why the use of a sole source is necessary.

#### **.12 CASH ALLOWANCE**

cash allowances cover to be used for utility installation costs only.

#### **.13 CONTRACTING ISSUES**

no reference to CCDC.  
no reference to bonding requirements.  
no reference of insurance conditions.  
no reference to terms of payment or holdbacks.  
no reference to alternate or separate pricing.

#### **.14 WARRANTIES**

any extended warranties (those beyond 12 months) include a start date. (i.e. 24 months from date of substantial completion.)

#### **.15 REPORTS AND ATTACHMENTS**

each report is in a separate appendix.  
each report has a cover sheet prepared by the consultant.

#### **.16 DRAWINGS (BOUND IN SPECS)**

each report is in a separate appendix.

#### **.17 SUBMISSIONS**

33%, 66% & 99% Submission for Review  
hard copies, double sided and bound.

#### **.18 FINAL SUBMISSION FOR TENDER**

Hard copies, single sided and not bound. Signed and sealed at the Index Pages.  
3 CD copies of PDF and MS Word files of the specification.

#### **.19 CONSULTANT VERIFICATION**

specification has been produced using MS Word.  
current version of the NMS has been used to prepare the specification.  
Canadian standards have been used where possible,



## APPENDIX B DEPARTMENTAL INPUT

- .1 Project number
- .2 Project Description, Building/Facility and Location
- .3 Completion date in number of weeks.
- .4 Use of Site Issues:
  - .1 Number of parking stalls available for construction purposes.
  - .2 Locations for storage of materials and site office.
  - .3 Access to water on site.
  - .4 Access to power on site.
  - .5 Access to existing sanitary facilities.
  - .6 Hours of Work.
- .5 Security requirements.
- .6 Closeout requirements:
  - .1 Number of maintenance manuals required.
  - .2 Format for as-built drawings.
  - .3 Maintenance materials and tools.
- .7 Reports commissioned by the department:
  - .1 Geotechnical.
  - .2 Environmental assessment.
  - .3 Hazardous material surveys.
- .8 Alternate Service Provider requirements:
  - .1 Equipment Information Form CMMS.
  - .2 Operation and Maintenance Manual Checklist.
  - .3 Dismantling, Decommissioning or Deconstruction Notice.
- .9 Client Requirements.





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## **APPENDIX C    TEMPLATES & SAMPLES**

1.    Sample Spec Cover Sheet
2.    Sample Spec Index
3.    Sample Addendum Format



# Public Works and Government Services Canada

Requisition No. \_\_\_\_\_

MERX I.D. No. \_\_\_\_\_

### SPECIFICATIONS

For Port Hardy Airport Maintenance Garage  
Vehicle Exhaust Refit  
Port Hardy, BC

PWGSC Project No : R.048877.001

### APPROVED BY:

\_\_\_\_\_  
Regional Manager, AES

\_\_\_\_\_  
Date

\_\_\_\_\_  
Regional Construction Safety  
Coordinator

\_\_\_\_\_  
Date

### TENDER:

\_\_\_\_\_  
Project Manager

\_\_\_\_\_  
Date

*This document is the document referred to as "Plans and Specifications" and marked "A" in the Articles of Agreement.*

**SPECIFICATIONS**

00 00 01	Index .....	2
<b>Division 1</b>	<b>General Requirements</b>	
01 11 55	General Instructions .....	8
01 33 00	Shop Drawings, Product Data and Samples .....	4
01 35 33	Health and Safety .....	8
01 51 00	Temporary Utilities .....	2
01 52 00	Construction Facilities.....	2
01 56 00	Temporary Barriers and Enclosures .....	2
01 61 00	Common Product Requirements .....	4
01 74 19	Waste Management and Disposal .....	2
01 78 30	Closeout Submittals.....	5
<b>Division 2</b>	<b>Existing Conditions</b>	
02 41 18	Deconstruction, Removals and Alterations. ....	3
<b>Division 3</b>	<b>Concrete</b>	N/A
<b>Division 4</b>	<b>Masonry</b>	N/A
<b>Division 5</b>	<b>Metals</b>	
05 51 33	Fixed Metal Ladders.....	2
<b>Division 6</b>	<b>Wood, Plastics, and Composites</b>	
06 10 11	Rough Carpentry.....	4
<b>Division 7</b>	<b>Thermal and Moisture Protection</b>	
07 55 52	Protected Membrane Roofing.....	7
07 62 00	Sheet Metal Flashing and Trim .....	3
07 92 10	Joint Sealing .....	4
<b>Division 8</b>	<b>Openings</b>	N/A
<b>Division 9</b>	<b>Finishes</b>	N/A

**Drawings Index** (bound separately)

A100	Cover Sheet
A101	Chemistry Building Roof Plan & Elevation

---

A102	Physics Building Roof Plan & Elevation
A103	Site Photos

**END OF INDEX**

SAMPLE

*The following changes in the Tender Documents are effective IMMEDIATELY.  
This addendum will form part of the Contract Documents*

**Amend/revise the Standard Contract Documents as follows:**

**SAMPLE**

**End of Addendum**

## **SECTION 3**

# **PWGSC NATIONAL CADD STANDARD**



Public Works and  
Government Services  
Canada

Travaux publics et  
Services gouvernementaux  
Canada

Canada



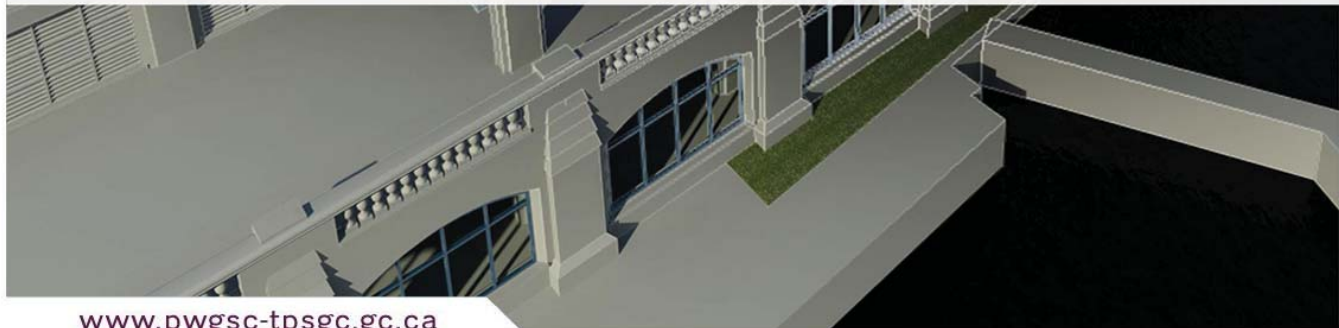
# PWGSC

## National CADD Standard

Computer-Aided Design and Drafting



November 2011



[www.pwgsc-tpsgc.gc.ca](http://www.pwgsc-tpsgc.gc.ca)

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## 1.0 Introduction

Computer-Aided Design and Drafting (CADD) is an integral component of information management for Public Works and Government Services Canada (PWGSC). The production of digital files by CADD is an important corporate asset. The greatest payback for CADD and related technology is in the reuse of the digital data for facilities management and as a foundation for future projects. If CADD files are to be an effective source of information, they must adhere to a standardized set of criteria that all CADD users will understand.

As an ongoing effort to keep up with changing technology, we are pleased to introduce the third edition of the PWGSC National CADD Standard. A concerted effort has been made not only to simplify the standard, but also to reinforce the requirements in areas we feel are critical to our goals.

PWGSC is aware of the emerging technology and processes related to building information modelling (BIM). As BIM represents a significant change, a new BIM standard, by necessity, will be created, facilitating the transition in the architecture, engineering, and construction (AEC) industry.

In addition, some of the regions have developed a regional CADD standard, which is to be used as a complement to this national standard.

For questions or further information regarding this document, please contact the National CADD Coordinator at the following e-mail address:

[CADD-CDAO@pwgsc-tpsgc.gc.ca](mailto:CADD-CDAO@pwgsc-tpsgc.gc.ca)

For a list of regional contacts, please visit the PWGSC National CADD Standard Web site and regional pages at:

<http://www.tpsgc-pwgsc.gc.ca/cdao-cadd/index-eng.html>

### 1.1 Scope

This standard applies to all services that generate CADD data files for PWGSC, including both internal PWGSC CADD service(s), and external consultant(s).

All CADD data files submitted to PWGSC must meet this standard.

## 2.0 Project Delivery

### 2.1 Drawing File Format

PWGSC requires all files to be compatible with Microsoft® Operating Systems. The CADD drawing format required for drawings is the AutoCAD® native format DWG file, i.e., they may not be submitted in Adobe® PDF, Autodesk® DWF, or any other simplified format unless specified in the contract. PWGSC will not supply or accept formats that are no longer supported by Autodesk®.

### 2.2 Project Start-up

All project drawings must be created using the PWGSC National CADD Standard. To ensure this requirement is met, PWGSC will undertake drawing coordination and quality assurance.

Where CADD services will be provided externally, the PWGSC project manager or technical authority will convey its requirements to the consultant or CADD service. PWGSC will provide the pertinent CADD drawings for the related facility or property, the drawing templates, the regional supplement to this standard and the symbol library if applicable. . All new work must meet this standard irrespective of the condition of any existing files provided at the outset of work.

The PWGSC National CADD Standard is available on the PWGSC Web site at <http://www.tpsgc-pwgsc.gc.ca/biens-property/cdao-cadd/index-eng.html>.

#### 2.2.1 Regional supplement and symbol library

Some of the regions have developed regional supplement and/or a symbol library, which is to be used as a complement to this national standard. The regional supplements are available on the PWGSC Web site at: <http://www.tpsgc-pwgsc.gc.ca/cdao-cadd/index-eng.html>

#### 2.2.2 CADD Base Plans

The CADD base plans maintained by PWGSC have been drawn from building and property surveys. The intent is to use the files for project drawings, and then the PWGSC regional CADD RA will be in charge of updating the base plans once the project is completed and measurements of the affected area(s) are verified.

Existing digital information, when available, is used to form the foundation for new project drawings. Any areas critical to the project should be verified by field checking.

New digital drawing files created must be modified to include the most up-to-date information contained in the National CADD Standard. Older legacy CADD data that is used in new drawing files must be updated to the current standard.

The project start-up meeting with the project manager or technical authority and CADD Coordinator should address the extent to which the existing digital files require verification and updating. All new work must meet this standard irrespective of the condition of any existing files provided at the outset of the work.

#### 2.2.3 Template Drawing

Drawing templates set the default metric units, text styles, and dimension styles. Recognizing the differences between engineering drawings and architectural drawings, the templates are provided with dimension styles and lettering for multiple disciplines. PWGSC templates must be used to start a new project. Please visit the PWGSC National CADD Standard Web site or contact the PWGSC project manager regarding the use of drawing templates.

## 2.3 Quality Assurance of CADD Data

PWGSC will carry out quality assurance of delivered CADD data files to ensure adherence with the PWGSC National CADD Standard and regional supplements.

### 2.3.1 Digital File Review

- **Colour Assignment**

PWGSC colour/line weight assignment must be used. ([See 3.2.5 Colour Assignment Standard](#))

- **Layer Management**

The PWGSC Layering Standard must be used. ([See 3.2 Layering Standard](#))

Standard layer names must be used.

Entities must be in the correct layers.

- **Text Style Management**

Only standard AutoCAD® SHX fonts or TTF fonts can be used. ([See 3.4 Text Style Standard](#))

- **Dimension Style Management**

The PWGSC naming convention must be used. ([See 3.5 Dimension Style Standard](#))

Associative dimensions must be used.

- **Linetype and Hatch Pattern Management**

Only standard AutoCAD® and/or PWGSC linetypes and hatch patterns can be used. ([See 3.6 Linetype and Hatch Standard](#))

Linetype display variables must be used correctly.

- **External Referencing**

The use of external references is authorized only if certain conditions are met. ([See 1.2.1 External References \(XREF\)](#))

- **PWGSC Title Blocks and Graphic Scales**

PWGSC title blocks must be used. Please visit the PWGSC National CADD Standard Web site or contact the PWGSC project manager.

Title blocks must contain the minimum information ([See 3.7 Title Blocks and Graphic Scales](#)).

Graphic scales or written scales must accompany all plans, sections, details, and elevations, etc.

- **1:1 Metric Model**

Drawings must be modelled at full size using the International System of Units (S.I.)

- **Real-World Coordinate System**

Maintain coordinate systems integrity for 2D drawings.

### 2.3.2 Drawing file approval

PWGSC has jurisdiction over all drafting-related aspects of the final drawing, including but not limited to drawing content, title block layout, symbols, and font usage continuity throughout a drawing set. All drawings must be completed to the satisfaction of PWGSC.

In the absence of a drawing submission schedule, PWGSC reserves the right to request CADD data files at the midpoint (50%) of the scheduled work to conduct a CADD drafting review.

Note that the content of the digital CADD data file is just as important as the printed content, and no drawing will be accepted as final until all issues are resolved.

Delivered work that fails to meet any requirement in any of these areas will result in the work being deemed unacceptable. The consultant/CADD service will be required to correct the problem(s) at their cost. Furthermore, PWGSC will exercise its option to withhold payment of the contracted work as set out in the contract terms until the work is made right.

Alternatively, PWGSC may, if the consultant/CADD service refuses to correct the problem, make the corrections to the CADD data files and printed drawing plans and deduct the cost thereof from the consultant's/CADD service's fee. The consultant/CADD service grants to PWGSC an irrevocable licence to make such corrections and use the corrected CADD data files and printed drawing plans as it sees fit. Furthermore, PWGSC reserves the right to use the printed drawing plans resulting from the CADD data files with no payment obligation until the CADD data files are corrected.

### 2.3.3 External References (XREF)

The use of external references will be conditionally authorized if the regional supplement of the CADD standard where the work is being performed permits the use of xrefs.

When this condition is met, xrefs may only be used in conjunction with the "Sheet Set Manager" to support the transmission of drawing files in a compressed format.

In all the other cases, external references must be converted into blocks. (Do not BIND XREFs, instead use BIND INSERT.) **Under no circumstances should a drawing contain referenced symbols; they must be inserted as blocks.**

### 2.3.4 Raster Images

When separate raster images are included in a drawing, all related files containing images and information on coordinates, rotation angles, scaling, etc. are to be provided. As these files are essential for their geo-referencing, they must be delivered intact. Raster images should be used as a reference only and cannot replace the vector data normally required in drawing files.

### 2.3.5 Digital Signature

Drawing files containing digital signatures are not accepted and can not legally replace printed copies signed and stamped as original.


## 2.4 Work Completed

When work is complete and the drawing files are delivered to PWGSC, they must be reviewed for compliance with the National CADD Standard. The CADD service shall maintain the drawings in a suitable manner until all drawings for the project are verified and accepted by PWGSC. Once completed, a PWGSC will archive the file(s) in an electronic document and record management system.

## 2.4.1 File Delivery


File transfer will be stipulated by PWGSC on a per project basis by one of the methods listed below:

- Submission and upload of drawing files to a project collaboration tool (PCT) designated by the contact person.
- Submission and upload of drawing files to an information management tool designated by the contact person.
- Submission and transfer of drawing files through e-mail.
- Should a file transfer exceed the e-mail file transfer limit, the file can be uploaded to an FTP site if permitted under regional rules.
- In the case of inability to access a FTP site, lack of Internet access, no permission, or security considerations of the drawing content (unencrypted Protected B, Protected C, Confidential, Secret, Top Secret), a portable electronic storage media (CD, DVD, USB key, etc.) will be delivered to the designated contact person.

 Note: The FTP sites are not secure. Therefore, files containing sensitive information (requiring security clearance greater than Protected A) cannot be uploaded to this site and must be transferred via a portable electronic storage media.

After uploading the file, e-mail the following information to the designated contact person:

- Project location
- Project name
- Project number
- Fully qualified URL path/file name(s) link

 Notes:

- Uploaded files must be named using only alphanumeric characters with no spaces.
- All files are deleted from the site every second day. Timely notification is required to ensure file retrieval.
- No files are to be presented as an executable (.exe extension).
- Files should not be password-protected
- Files should not contain any electronic signature.
- Drawings should not contain hyperlinks.


## 2.5 Production of Contract Drawings


The following formats should be applied.

### 2.5.1 Sheet Size for Page Setup

This table shows the sheet designations and sizes for the drawing page setup. Drawing sheet size will conform to the following specifications:

<u>Sheet Designation</u>	<u>Overall Size (mm)</u>
B1	707 x 1000
A0	841 x 1189
A1	594 x 841
A2	420 x 594
11 x 17 (Tabloid / Ledger)	279 x 432
14 x 8.5 (Legal Landscape)	356 x 216
8.5 x 14 (Legal Portrait)	216 x 356
11 x 8.5 (Letter Landscape)	279 x 216
8.5 x 11 (Letter Portrait)	216 x 279

 Note: The paper size naming may vary depending on the printer drivers.

 Note: When drawings larger than A0 are required, it is recommended that they use a width of 841 mm and a length in increments of 150 mm. Digital files of standard PWGSC or client title block formats will be provided in the required standard sizes and **must not be altered or modified without authorization.**

## 2.6 Disclaimers and Limitation of Liabilities

Maps, drawings, and data produced for PWGSC purposes should be considered for illustrative or reference purposes only by users outside of PWGSC.

PWGSC and its agents, consultants, contractors, or employees provide these materials and information “as is” without warranty of any kind, implied or express, as to the information being accurate or complete, and without any warranty of merchantability and fitness for a particular purpose.

PWGSC does not assume any legal liability or responsibility for the accuracy, completeness, or usefulness of the maps, drawings, data, or information incidental thereto. PWGSC recommends that users exercise their own skill and care with respect to their use or seek professional advice.

Under no circumstances will PWGSC be liable to any person or business entity for any direct, indirect, special, incidental, consequential, or other damages as a result of any use of the maps, drawings, data, or any information incidental thereto, including, without limitation, any lost profits or business interruption.

## 2.7 Copyright

The Copyright Act protects all works (including drawings, charts, photos, etc.) from being copied without permission. Copying a work is called ‘copyright infringement’. Copying including ‘cutting and pasting’, reproducing, publishing or transmitting any work without permission *by any means* is considered copyright infringement. All work is copyright protected even if it does not explicitly say so.

Without prejudice to any rights or privileges of the Crown, where any work is, or has been, prepared or published by or under the direction or control of Her Majesty or any government department, the copyright in the work shall, subject to any agreement with the author, belong to Her Majesty. The copyrights ownership can also be transferred to the client by written contract. **Use of any PWGSC content without permission, in whole or in part, is strictly forbidden.**

## 3.0 PWGSC Computer Aided Drafting Standard

This section describes the general PWGSC Computer Aided Drafting Standard. Specific instructions can be added in the context of a request for proposal.

### 3.1 File Presentation

Files presented must conform to the following rules:

- A drawing must be purged of all definitions that are not used, such as layer names, text styles, dimension styles, layer filters, and blocks.
- A drawing must not contain any object definitions without geometry, such as empty text or blocks without objects.
- No objects should reside on layer "0" or "DEFPOINTS" except for objects contained in a block definition and dimensions. Use the "Plot/Non plot" layer property instead of the Defpoints layer.
- A drawing must not contain errors that are detectable using the Audit command.
- Drawings are to be modelled at full scale (real-world units) in model space, with text, symbols, hatch patterns, and line widths adjusted by the required scale factor.

All presented files must also adhere to the following rules of best practice:

- When appropriate to the type of drawing, lines must be drawn in an orthogonal mode.
- All vector endpoint intersections must be drawn with closed corners.
- The drawing must be saved with properly formatted Page Setup (Paper Size, Plot Style, Plot Area, Plot Scale, etc.). The main layout must be active and all the viewports adjusted and locked to the correct scale.

### 3.2 Layering Standard

All digital CADD files must follow the PWGSC Layering Standard. The standard facilitates data management by using a layering structure and naming convention to organize the drawing data in the CADD files into related data groups.

[See Annex A – CADD Layers](#) for the complete Standard Layer List.

[See Annex B – Layer Field Descriptions](#) for the abbreviations and descriptions lists used to create layer names.

#### 3.2.1 Sorting Graphic Data into Related Data Groups

Layers are used to sort the graphical data types depicted by the line work into related data groups. (They are not intended for use in sorting line weights, line types, colours, or other schemes.)

Layering is the only way to identify what the entities on a graphical screen represent without resorting to annotations. For example, it answers questions such as whether a rectangle represents a building outline, a concrete pad, a storage tank, or whether it is an annotation box. All digital CADD files must follow the PWGSC Layering Standard to create the appropriate layers to accommodate the grouping of related data.

To simplify the layering, drawing data can be broken into two major groupings: principal data and supporting data. The level of complexity and number of layers required for the two groups are significantly different.

### 3.2.2 Principal Data

Principal data is contained mainly in the plan views of the facility, i.e., the base plan, floor plan, site plan, etc.

This type of data requires strict adherence to layer naming and proper grouping of data. The line work used to depict facility components must always be drawn using the most up-to-date and accurate information available. Line work depicting objects must be placed in the proper standard layer according to the data type being represented. For example, in a floor plan, the walls, doors, windows, and bathroom fixtures must be grouped under separate layers.

### 3.2.3 Supporting Data

Supporting data is made up of sections, details, elevations, schedules, legends, and title blocks, etc.

This type of data requires minimal layering breakdown. Line work in a detail representing different components does not need to be placed in separate layers. For example, a building construction detail can be drawn with foundation wall, frame wall, floor, and roof line work in a single layer, although the dimensions, annotation, and hatching should be separated.

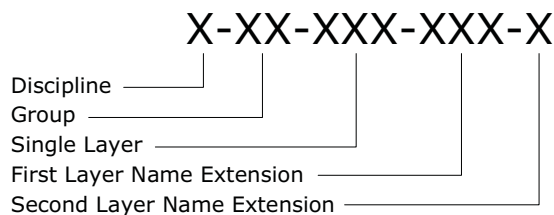
### 3.2.4 Layering Naming Convention

Layering of CADD information must adhere to the layering naming convention described in this section.

The layer is the basic tool for organizing and managing graphic information. Layers are used to sort graphic objects into groupings of related data. PWGSC has developed a modular, alphanumeric layer nomenclature format designed to sort graphic data in a specific manner.

The layer name format consists of five fields separated by hyphens.

- The first three fields—Discipline, Group, and Single Layer—are mandatory.
- The last two fields—First Layer Name Extension and Second Layer Name Extension—are optional fields that allow a more precise data identification where necessary.



[See Annex A – CADD Layers](#) for a list of the most frequently used layer names and their descriptions.

[See Annex B – Layer Field Descriptions](#) for a complete list of the field abbreviations and descriptions for the last four of the five fields of the layer name structure.

Two-field layer names (X-XX) can only be used under special conditions and must have PWGSC approval.

#### **Discipline Field**      **X-XX-XXX**

The Discipline field identifies the discipline responsible for the layer content. Where an object cannot be associated with a specific discipline, or is applicable to all disciplines, the special abbreviation of “G” may be used to indicate “General Information.”



## Discipline Field Abbreviations List:

A	Architecture
B	Bridges and Dams Engineering
C	Civil Engineering, Site Design, and Landscape Architecture
E	Electrical Systems
G	General Information
H	Mechanical
I	Interior Design
L	Legal Surveys
M	Marine
R	Real Property Space Management
S	Building Structure

**Group Field** X-~~XX~~-XXX

The Group field identifies groupings of common types of drawing information relevant to each discipline. The Group abbreviations defined for each discipline are listed in the Standard Layer List in [Annex A – CADD Layers](#). In addition, there are some common Group abbreviations defined for use with all disciplines for supporting graphic data such as sections, details, and others. [Annex B – Layer Field Descriptions](#) contains a complete list of all Group abbreviations and their descriptions.

Examples of common Group field abbreviations:

DT	Details, Sections, Elevations
GL	Global
GR	Grid
LG	Legend
PL	Plan
SC	Schedules
TL	Title Block

**Single Layer Field** X-XX-~~XXX~~

The Single Layer field subdivides the classifications to identify each layer more precisely. Single Layer abbreviations allow information pertaining to Physical Properties, Materials, Graphics, Text and discipline related data such as building systems to be included. The Single Layer abbreviations are listed in the Standard Layer List in [Annex A – CADD Layers](#) and [Annex B – Layer Field Descriptions](#).

**First Layer Name Extension (Optional)** X-XX-XXX-~~XXX~~-X

The First Layer Name Extension, like the Single Layer field, allows information pertaining to Physical Properties, Materials, Graphics, Text and discipline related data to be included. The extensions use the same abbreviations as the Single Layer field. They may be used with any valid layer from the Standard Layer List. They may also be used as a Single Layer field value where appropriate.

Examples of common Single Layer and First Layer Name Extension abbreviations for all disciplines: ([See Annex B - Layer Field Descriptions](#) for a complete list.)

## Physical Properties:

ABV	Above ground, above grade
EME	Emergency
EQP	Equipment
EXT	Exterior
HOR	Horizontal
INT	Interior
NOD	Node, horizontal reference point
OPN	Openings
UND	Underground, below grade
VER	Vertical

## Materials:

ASP	Asphalt
BLK	Block
BRK	Brick
CON	Concrete
CRP	Carpet
FIN	Finishes
INS	Insulation
STL	Steel
STO	Stone
TIM	Timber

## Graphics:

3DM	3D model components of 2D symbols
CLR	Colours
DIG	Digitized or vectorized from scanned image
HAT	Hatching
LIN	Line work
OLN	Outlines
PRO	Profiles
SPC	Special
SYM	Symbols, bubbles, detail notation, bar scales
TAB	Tables
TMP	Temporary

## Texts:

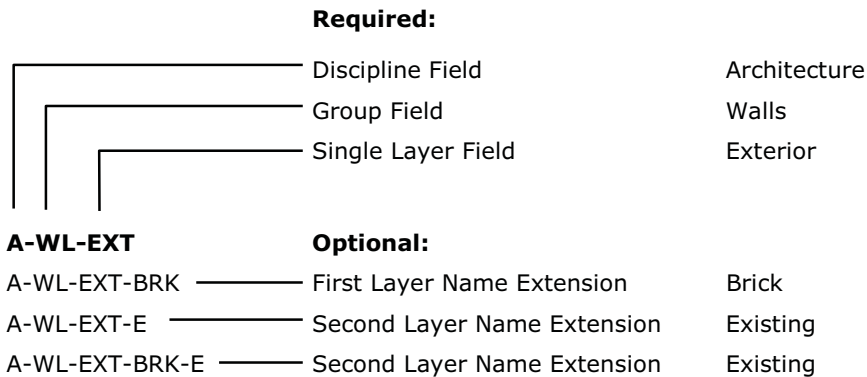
ATT	Attributes
DIM	Dimensions
IDN	Identification numbers or names
SPT	Spot elevations
TXT	Text, notations

**Second Layer Name Extension (Optional)** X-XX-XXX-XXX-**X**

The Second Layer Name Extension allows information pertaining to Geometry, Construction, Status, Second Language, and Numerical Options to be included. The extensions may be used with any valid layer from the Standard Layer List. [Annex B – Layer Field Descriptions](#) contains a complete list of all Second Layer Name Extension abbreviations and their descriptions.

Valid Layer Name Formats:

Four variants of the layer name format will be accepted, as indicated below:



Free Text Examples:

☞ Add an underscore character at the end of a valid layer name to append free text to the layer name.

**M-SN-SPT\_-1.0** Soundings at -1.0 m depth

**M-SN-HWL\_14 January 1990** High Water Line on a specific date

Existing Floor Plan Examples:

☞ Where plans are specifically titled "New" (or "Existing"), the "N" (or "E") Second Layer Name Extension modifier indicating the construction status may be omitted, but all disparate construction status extensions must be included.

- A-WL-INT-N** Architecture - Wall - Interior - New
- A-WL-INT-X** Architecture - Wall - Interior - Remove
- A-WL-OLN** Architecture - Wall Outline - Exterior ("Existing" implied)
- A-DR-INT** Architecture - Door - Interior ("Existing" implied)
- A-DR-INT-N** Architecture - Door - Interior - New
- A-WD-EXT** Architecture - Window - Exterior ("Existing" implied)

Symbols Examples:

☞ When a symbol is placed to represent an object, it must be placed in a symbols layer.

- E-SD-SYM** Electrical - Site Distribution - Symbols (Power poles, luminary, etc.)
- G-GL-SYM** General - Global - Symbols (Key plans, north arrow, bar scale, etc.)

Detail Examples:

☞ Supporting data such as dimensions, annotation, and hatching should be separated as indicated in the examples below. Colour should be set “Bylayer” for the majority of the entities in a layer and specifically where necessary to obtain varying line weights in that layer.

- G-DT-LIN**      General - Detail - Line work (Wall, floor and roof line work)
- G-DT-TXT**      General - Detail - Text (Annotations, title, graphic scale, etc.)
- G-DT-DIM**      General - Detail - Dimensions
- G-DT-HAT**      General - Detail - Hatching (Insulation, wood grain, etc.)

Schedule Examples:

- A-SC-LIN**      Architecture - Schedule - Line work (Schedule grid or Line work)
- A-SC-TXT**      Architecture - Schedule - Text (Schedule data, annotation)

Plan Views Examples:

Supporting data can also appear on plan views.

- H-PL-TXT**      Mechanical - Plan - Text (Titles, graphic scale, annotation bubbles)
- S-PL-DIM**      Structural - Plan -Dimensions

### 3.2.5 Colour Assignment Standard: Layer Colours and Pen Weights

Colour is to be used as a method of defining line weight to the plotter. Layers must be assigned appropriate colours and entities should be created with colour “Bylayer” where possible, except as provided for in the creation of symbols. If a CTB is provided by PWGSC, it must be used.

Suggested Line Weight Settings:

**Extra Thin - 0.10 mm**

Centre Lines / Axis, Grid Lines

**Thin - 0.15 to 0.25 mm**

Dimension Lines	Hatching Intermediate	Contour Lines
Leader and Extension	Lines Phantom Lines	Text - Normal

**Medium - 0.30 mm to 0.50 mm**

Hidden Lines	Index Contour Line
Text - Sub Headings	Visible Object Outlines

**Thick - 0.70 mm**

Cutting Lines	Match Lines	Reference Lines
Section Lines	Text - Titles/Major Headings	Viewing Planes

**Extra Thick - 1.00 mm**

Title Sheet Border

### 3.2.6 Provision for Creation of New Layers

Because the Standard Layer List ([Annex A – CADD Layers](#)) does not cover all possibilities, the layering standard provides for the ability to create new layer names for new objects as required.

As in the preceding example of E-SD-SYM, a quick look in the Standard Layer List under the Electrical Systems section would indicate that this layer name is invalid since it is not on the list. However, it is an acceptable layer name created by adding an existing *First Layer Name Extension* to an existing *Discipline-Group* abbreviation.

The rules for creating new layer names are as follows:

- a) A proper standard layer name for the object must not already exist.
- b) Must follow the standard layer name format.
- c) Must use an existing Discipline abbreviation. (**E-SD-SYM**)
- d) Must use an existing Group abbreviation. (**E-SD-SYM**)  
Must use an existing three-character Single Layer field abbreviation or First Layer Name Extension. (**E-SD-SYM**)

## 3.3 Block Standard

AutoCAD® blocks are used to group entities. Graphic blocks shall **not** be exploded. Blocks representing simple objects or simple symbols shall not contain nested blocks (blocks made of blocks). The use of groups is preferable when grouping blocks together, for example, a table with chairs around it. Most symbols should be created with linetype and colour "Byblock." This allows complete control over the appearance of the symbol. By default a symbol will take on the properties of the layer it is placed on, but it can be changed to suit requirements independent of the layer settings.

There are two different ways of creating and inserting AutoCAD® blocks, depending on their complexity. The basic rules are as follows:

#### 1. Simple blocks with one data type, e.g., toilet fixtures, furniture:

- a) Create the block on layer "0."
- b) The block must be inserted on the proper layer, e.g., office chair inserted on layer I-FU-SET.

#### 2. Complex graphics requiring the use of multiple data types:

- a) Create each data type on its proper layer.
- b) Colour and linetype must be "Bylayer" or "Byblock" so that these two attributes may be assigned to the symbol regardless of the layer properties the symbol is inserted on, e.g., title blocks created with objects on different layers.

Objects that could be represented by AutoCAD® blocks are categorized as being either symbols or graphics.

### 3.3.1 Graphics


Graphics are AutoCAD® blocks that are dimensionally accurate pictorial representations of real objects. A graphic may be a simplified representation of a building component or assembly such as a desk or chair, but it is accurate with respect to the component's principal dimensions.

Drawing scale does not affect the insertion of graphics. Graphics may be fixed or variable, and basic rules for their creation and insertion must be followed:

1. Fixed - Not scaled
  - a) Objects must be created full size.
  - b) Graphics must be inserted with 1-by-1 scale in model space.
2. Variable - Scaled to represent different size objects such as doors, round tables, etc.
  - a) Objects must be created inside a 1-by-1 square
  - b) Blocks must be inserted using the actual dimensions of the objects they represent in model space.

### 3.3.2 Symbol (Annotative)

Symbols are AutoCAD® blocks that are pictorial representations of objects not drawn to scale, such as an electrical outlet symbol. Drawing scale affects symbols in the same manner as annotation and therefore must be inserted into a working drawing at a scale factor corresponding to the drawing or plot scale as required.

 Note: It is now possible to create annotative blocks that can scale themselves automatically to any given scale. To avoid confusion, it is strongly recommended to use only one method throughout each project drawing set: the traditional method that lets the user choose the insertion scale, or the Annotative option that automatically manages the insertion scale.

Basic rules for the creation of symbols must be followed:

- a) Symbols should be drawn at actual plotted size and not smaller than 2.5 mm. The Annotative option can also be selected when creating the block.
- b) Symbols should be inserted using the plotted scale if they are inserted in model space, and 1 if they are inserted in paper space (layout), i.e., 50x on a 1:50 floor plan in model space, or 1x on a 1:1 drawing sheet in paper space. If the block was created with the annotative option selected, it will scale itself automatically during the insertion.

### 3.3.3 Block Library

Taking into account the specific needs of each project and the huge diversity, there is no national block library.

- a) If a block library is provided with a project, the consultant/CADD service must use it.
- b) All the blocks should be created respecting the rules described in this block standard.
- c) Use of blocks should be uniform throughout each project drawing set.
- d) If no blocks are provided, the consultant/CADD service must have their block library pre-approved by PWGSC.

### 3.3.4 Block Naming

A good structure for block naming is very important to allow for the creation and management of schedules, inventories, legends, etc. If the consultant/CADD service uses their own block library, they need to use a pertinent naming convention that must be pre-approved by the lead technologist.

## 3.4 Text Style Standard

Text styles for use in drawings must be created using Standard AutoCAD® SHX, the following TTF font files: Arial, Arial Narrow, and StylusBT and any font files specifically provided by PWGSC.

Annotative text styles are allowed.


Text style usage should be uniform throughout each project drawing set and limited to a maximum of four different font files per project that will be determined in collaboration with PWGSC.

The height of text styles must be set to 0 (not fixed) so that it can be changed to suit different scaling requirements.

All French characters should be accented whether upper or lower case.

Private company logos must not contain a special font file.

Paragraphs must be created with MTEXT objects.

 Note: It is now possible to create annotative text styles that can size themselves automatically to any given scale. To avoid confusion, it is strongly recommended to use only one method throughout each project drawing set: traditional text styles or annotative text styles.

### 3.4.1 Text Style Naming

Text style names should reflect the information below:

- Usage
- Font name
- Any other special effects (if required)

Examples:

<b>NOTES_SIMPLEX</b>	Text style with SIMPLEX used for notes
<b>TITLE_ARIAL_WF-1.2</b>	Text style with ARIAL and width factor 1.2 used for titles
<b>SPECIAL_SIMPLEX_OA-20</b>	Text style with SIMPLEX, oblique angle 20 used for special notes
<b>NOTES_ARIAL_ANNO</b>	Text style with ARIAL and Annotative property enabled for notes

### 3.4.2 Text height

**Standard text height for:**

Notes, dimensions, annotations, etc.	2.5 mm
Major headings	4.5 mm, 5.0 mm
Subheadings	3.5 mm.

Text smaller than 2.5 mm can only be used under special conditions and must have PWGSC approval.

## 3.5 Dimension Style Standard

All dimensioning must be created on entities in model space with associative dimensions.

Annotative dimension styles are now allowed. However, as for blocks and text styles, it is strongly recommended to use only one method throughout each drawing set: traditional dimension styles set with different overall scales to suit different printing scales, or annotative dimension styles that are set up automatically based on the drawing scale.

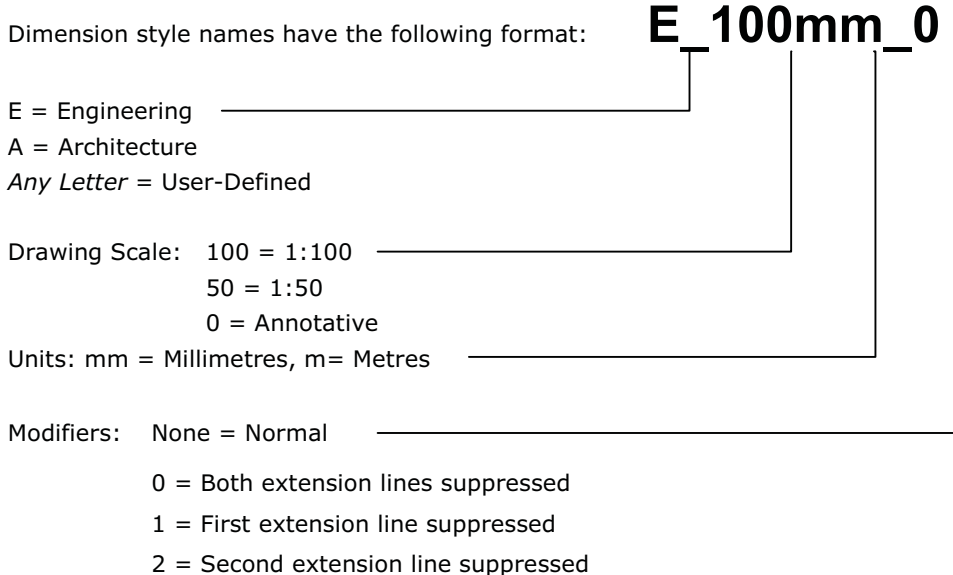
Two dimensioning formats are used to cover most applications for PWGSC projects:

- a) Engineering with arrowheads for dimension terminators
- b) Architectural with ticks for dimension terminators

### 3.5.1 Dimension Style Naming

Dimension style usage should be uniform throughout each project drawing set. Using dimension styles reduces the time necessary to create, edit, and maintain dimensions. Dimension styles are created by specifying values for a number of dimension variables and saving the style with a unique name. The dimension style controls the appearance of all the dimensions created while the dimension style is active. Changes to the dimension style will automatically be reflected in the associated dimensions.

Usage of override properties is not allowed and the dimensions must be associative. A new dimension style should be created to work with different properties.



#### Examples:

- A\_50mm** Normal Architectural dimension for floor plans
- A\_0mm\_Anno** Architectural dimension with Annotative property enabled
- A\_50mm\_0** Architectural dimension with no extension lines to dimension to grid lines
- E\_1000m** Normal Engineering dimension for site plans with metres as base unit

### 3.6 Linetype and Hatch Standard

The appearance of linetypes in a drawing is determined by the system variables LTSCALE, PSLTSCALE, MSLTSCALE, and MEASUREMENT.

- The MEASUREMENT variable determines which linetype description file to use for linetype loading:
  - “1” sets the default files to the **metric** unit files **acadiso.lin** and **acadiso.pat**. (See Note 1 below.)
  - “0” sets the default files to the **imperial** unit files **acad.lin** and **acad.pat**. These must not be used. (See Note 2 below.)
- The LTSCALE variable sets the global linetype scale factor.
- The PSLTSCALE controls linetype appearance in paper space.
- The MSLTSCALE controls the linetype appearance in model space in conjunction with the annotative scale (CANNOSCALE system variable in AutoCAD 2008+). When using MSLTSCALE, the variable LTSCALE should be set to between 0.5 and 1.



- Note 1: Drawings must not contain linetypes, complex linetypes or hatch patterns other than those respectively defined in the acadiso.lin and acadiso.pat files supplied with the AutoCAD® based Autodesk products or other linetypes supplied by PWGSC.
- Note 2: The linetypes and hatch patterns contained respectively in the acad.lin and acadiso.pat files should not be used because they are drawn to be used with imperial drawings. For consistent linetype appearance and plotting results, the required values for the variables are as follows:

**1. Final Drawings:** Title sheet must be in paper space with multiple, variously scaled VIEWPORTS.

- a) MEASUREMENT = 1
- b) LTSCALE between 0.5 and 1.0 (See Note 3 below.)
- c) PSLTSCALE = 1 (On)

- Note 3: The LTSCALE value should be set between 0.5 and 1.0 while printing in paper space depending on the size of the linetypes used in the drawing.

Do not set the linetype scale at the entity level. The Current Object Scale in the Linetype Properties dialog box (system variable CELTSCALE) must be set to 1.0 to ensure that the creation of new entities do not have entity-level linetype scaling.

For consistent hatch pattern plotting and scanning results, grey scale SOLID hatch patterns are not permitted on contract drawings.

## 3.7 Title Blocks and Graphic Scales

### 3.7.1 Title Block Set-up

Completed drawings must adhere to the following composition standard:

- a) Title block sheets must always be inserted in a layout (paper space) at 0,0,0 with scale factor of 1 and rotation angle of 0.
- b) Model space graphics must appear in the layout in correctly scaled VIEWPORTS.
- c) There must be only one (1) title block per layout.
- d) The title block is not to be exploded. Attributes must be used to enter title block information.
- e) No entities outside the title block perimeter.

### 3.7.2 Information in Title Blocks

All project drawings must be compiled on standard sheets and must be in accordance with the PWGSC corporate identity. The lead technologist for each project will coordinate the size of the sheet to be used and provide a standard title block and the content of the title block fields.

Each title block must contain the information below:

- a) Project name
- b) Address
- c) Drawing name, e.g. floor plan, building
- d) Measured or designed by and date
- e) Drawn by and date
- f) Approved by and date
- g) Project manager
- h) PWGSC project number
- i) Tender
- j) Drawing number

- k) Revision chart
- l) Consultant or CADD service identification
- m) North arrow
- n) Site plan (if pertinent)

### 3.7.3 Headings, Titles, and Graphic Scales

To facilitate scaling from reduced or enlarged reproductions, each plan, section, detail, elevation, profile, etc. on a completed drawing sheet shall be accompanied by a graphic scale. The graphic scale shall be located immediately below the pertinent heading on final plot.

## 3.8 Systems of Measurement and Preferred Scales

The International System of Units (S.I.) must be used to prepare all drawings.

The unit for linear dimensioning is the millimetre, except where the scope of the drawing requires the use of the metre, such as in site plans.

Integers shall indicate millimetres, e.g. 435, 4300. Decimal numbers with three decimal places shall indicate metres, e.g. 5.435, 4.300.

All other dimensions and notations should be followed by the unit symbol.

Preferred Viewport Scale:

1:1	1:25	1:500
1:2	1:50	1:1000
1:5	1:100	1:2000
1:10	1:200	1:5000
1:20	1:250	1:10000

## 4.0 Drawing File Naming Conventions

All CADD information submitted must be arranged in a logical format so that it can be easily accessed and modified by the user. This standard provides a framework for the information and will assist in data entry, manipulation, storage, and retrieval at different stages of the design and operation of the facility over its life cycle.

## Annex A – CADD Layers

The Standard Layer List below lists the most-used layer names defined under the PWGSC Layering Standard. New layer names can always be created using the field abbreviations and extensions listed in [Annex B – Layer Field Descriptions](#). The French abbreviations are listed just as a reference and should only be used with drawings annotated in French.

A layer name may include an additional subdivision for grouping subsets of layers that represent building systems or categories of related data. Each subdivision contains a primary layer (underlined) and supplementary layers (in grey) to subdivide the information with greater precision. The use of supplementary layers is optional and depends on a drawing's requirements.

<b>Architecture</b>		
<b>English Abv'n</b>	<b>Description</b>	<b>French Abv'n</b>
<b>A-CI</b>	<b>Circulation</b>	<b>A-CI</b>
A-CI-CVY	Horizontal conveyors, moving sidewalks	A-CI-HOR
<u>A-CI-ELE</u>	<u>Elevators</u>	<u>A-CI-ELE</u>
A-CI-ELE-BRF	Lift platforms for barrier-free access	A-CI-ELE-ACF
<u>A-CI-RMP</u>	<u>Ramps</u>	<u>A-CI-RAM</u>
A-CI-RMP-BRF	Barrier-free ramps	A-CI-RAM-ACF
<u>A-CI-STR</u>	<u>Stairs, stairwells, and ladders</u>	<u>A-CI-ESC</u>
A-CI-STR-ESC	Escalators	A-CI-ESC-ROU
<b>A-CL</b>	<b>Ceilings</b>	<b>A-PF</b>
A-CL-BKH	Bulkheads	A-PF-GYP
<u>A-CL-FIN</u>	<u>Ceiling finishes</u>	<u>A-PF-FIN</u>
A-CL-FIN-IDN	Ceiling finishes description	A-PF-FIN-NUI
<u>A-CL-GRD</u>	<u>Physical ceiling grid</u>	<u>A-PF-TRA</u>
A-CL-GRD-SCD	Planning grid lines	A-PF-TRA-SCD
A-CL-OPN	Openings, penetrations, skylights	A-PF-OUV
<b>A-DK</b>	<b>Deck</b>	<b>A-TR</b>
A-DK-BAR	Deck railings	A-TR-BAR
A-DK-OLN	Deck outline	A-TR-CON
<b>A-DR</b>	<b>Doors</b>	<b>A-PO</b>
<u>A-DR-EXT</u>	<u>Exterior doors, jambs, casework, swings</u>	<u>A-PO-EXT</u>
A-DR-EXT-IDN	Exterior doors identification numbers	A-PO-EXT-NUI
<u>A-DR-INT</u>	<u>Interior doors, jambs, casework, swings</u>	<u>A-PO-INT</u>
A-DR-INT-IDN	Interior doors identification numbers	A-PO-INT-NUI
A-DR-INT-PRT	Interior doors in a partition wall	A-PO-INT-CLS
<b>A-EM</b>	<b>Emergency</b>	<b>A-UR</b>
<u>A-EM-HAT</u>	<u>General hatching</u>	<u>A-UR-HAC</u>
A-EM-HAT-COR	Corridor hatching	A-UR-HAC-COR
A-EM-HAT-STR	Staircase hatching	A-UR-HAC-ESC
A-EM-HAT-WAL	Wall hatching	A-UR-HAC-MUR
<u>A-EM-OLN</u>	<u>General outline</u>	<u>A-UR-CON</u>
A-EM-OLN-COR	Corridor outline	A-UR-CON-COR
A-EM-OLN-STR	Staircase outline	A-UR-CON-ESC
A-EM-OLN-WAL	Wall outline	A-UR-CON-MUR

A-EM-SYM	Emergency symbols: exit signs, stairs, first aid kit location, etc.	A-UR-SYM
A-EM-TXT	Emergency text	A-UR-TEX
<b>A-FL</b>	<b>Floors</b>	<b>A-PC</b>
<u>A-FL-CTP</u>	<u>Countertops</u>	<u>A-PC-CMP</u>
A-FL-CTP-PRT	Countertops on partitions	A-PC-CMP-CLS
<u>A-FL-FIN</u>	<u>Floor finishes</u>	<u>A-PC-FIN</u>
A-FL-FIN-IDN	Floor finishes description	A-PC-FIN-NUI
A-FL-LEV	Floor level changes, ramps, truck wells	A-PC-NIV
A-FL-MIL	Architectural specialties, casework and millwork	A-PC-EBE
A-FL-OPN	Openings, floor hatching	A-PC-OUV
A-FL-OVH	Overhead items, skylights, overhangs, soffits	A-PC-SUS
A-FL-RAS	Raised floors	A-PC-SUR
<b>A-GL</b>	<b>General</b>	<b>A-GL</b>
A-GL-ATT	Attributes	A-GL-ATT
A-GL-DIM	General architectural dimensions	A-GL-DIM
A-GL-IDN	Identification, elevation points	A-GL-NUI
A-GL-RME	Read Me general drawing info.	A-GL-LIS
A-GL-TMP	Under construction lines, temporary aids	A-GL-TEM
A-GL-TXT	General text (street names)	A-GL-TEX
<b>A-PL</b>	<b>Plan Information</b>	<b>A-PN</b>
A-PL-OLN	Open-to-Below plan information outline	A-PN-CON
<b>A-RF</b>	<b>Roofs</b>	<b>A-TO</b>
A-RF-OLN	Roofs edge and features	A-TO-CON
A-RF-OPN	Roof openings for fans, stacks and ducts	A-TO-OUV
A-RF-OVH	Overhead items, roof above, canopies, soffits	A-TO-SUR
A-RF-WLK	Roof boardwalks, catwalks	A-TO-PAS
<b>A-WD</b>	<b>Windows</b>	<b>A-FN</b>
A-WD-EXT	Exterior window panes and frames	A-FN-EXT
<u>A-WD-INT</u>	<u>Interior window panes and frames, side windows</u>	<u>A-FN-INT</u>
A-WD-INT-PRT	Interior windows in a partition wall	A-FN-INT-CLS
A-WD-OVH	Overhead windows, skylights	A-FN-SUR
A-WD-SIL	Window sills	A-FN-ALL
<b>A-WL</b>	<b>Non-Structural Walls</b>	<b>A-MU</b>
<u>A-WL-ACC</u>	<u>Architectural or protection elements, guards</u>	<u>A-MU-ACC</u>
A-WL-ACC-BRF	Barrier-free accessories (grab bars, etc.)	A-MU-ACC-ACF
<u>A-WL-EXT</u>	<u>Exterior walls</u>	<u>A-MU-EXT</u>
A-WL-EXT-HAT	Exterior walls hatching	A-MU-EXT-HAC
<u>A-WL-FIN</u>	<u>Wall finishes</u>	<u>A-MU-FIN</u>
A-WL-FIN-IDN	Wall finishes description	A-MU-FIN-NUI
<u>A-WL-HED</u>	<u>Door and window headers</u>	<u>A-MU-LIN</u>
A-WL-HED-PRT	Door and window headers on partition	A-MU-LIN-CLS

<u>A-WL-INT</u>	<u>Interior walls</u>	<i>A-MU-INT</i>
A-WL-INT-LOW	Interior walls - low walls	<i>A-MU-INT-BAS</i>
A-WL-INT-LOW-PRT	Interior partitions - low walls	<i>A-MU-INT-BAS-CLS</i>
A-WL-INT-PRT	Interior partition walls	<i>A-MU-INT-CLS</i>
A-WL-OLN	Wall outlines, building footprints, sheds, etc.	<i>A-MU-CON</i>
A-WL-WSR-PRT	Washroom partitions	<i>A-MU-SAT-CLS</i>

## Bridges and Dams Engineering

English Abvn	Description	French Abvn
<b>B-AP</b>	<b>Approach Slabs</b>	<b>B-DA</b>
B-AP-PLN	Approach slabs in plan view	B-DA-PLN
<b>B-DK</b>	<b>Deck and Components</b>	<b>B-TA</b>
B-DK-BAR	Barriers, railings	B-TA-BAR
B-DK-CRB	Curbs, sidewalks	B-TA-BOR
B-DK-DRN	Deck drains	B-TA-DRA
B-DK-JNT	Expansion joints	B-TA-JOC
B-DK-PLN	Deck plan	B-TA-PLN
B-DK-REB	Deck reinforcing	B-TA-ACR
B-DK-STG	Steel grating	B-TA-GRI
<b>B-GL</b>	<b>General</b>	<b>B-GL</b>
B-GL-DIM	Dimensions	B-GL-DIM
B-GL-HAT	Hatching	B-GL-HAC
B-GL-LAY	Layout line work	B-GL-TRI
B-GL-TXT	Text	B-GL-TEX
<b>B-SB</b>	<b>Substructure</b>	<b>B-SO</b>
B-SB-ABU	Abutments	B-SO-CUL
B-SB-APR	Approach slabs	B-SO-APR
B-SB-BRG	Bearing	B-SO-POR
B-SB-FTG	Footing	B-SO-SEM
B-SB-LIN	Bearing plan line work	B-SO-TRI
B-SB-PIR	Piers	B-SO-PIL
B-SB-REB	Substructure reinforcing	B-SO-ACR
<b>B-SR</b>	<b>Scour Protection</b>	<b>B-PA</b>
B-SR-GAB	Gabions	B-PA-GAB
B-SR-RRP	Riprap	B-PA-PIR
<b>B-SS</b>	<b>Superstructure</b>	<b>B-SP</b>
B-SS-BEM	Beams	B-SP-POU
B-SS-BRC	Bracing	B-SP-ENT
B-SS-CTW	Catwalks	B-SP-PAS
B-SS-REB	Superstructure reinforcing	B-SP-ACR
B-SS-SNL	Stringers	B-SP-LON

<b>Civil Engineering, Site Design and Landscape Architecture</b>		
English Abvtn	Description	French Abvtn
<b>C-BH</b>	<b>Borehole Data (Geotechnical)</b>	<b>C-FO</b>
C-BH-IDN	Borehole identification numbers	C-FO-NUI
C-BH-LOG	Borehole logs and data	C-FO-SCH
C-BH-SMP	Soil sample locations	C-FO-SON
C-BH-SPR	Stratigraphic profiles	C-FO-STR
C-BH-SYM	Symbols	C-FO-SYM
C-BH-WEL	Geotechnical or environmental monitoring wells	C-FO-PUA
<b>C-DI</b>	<b>Diesel Fuel Distribution</b>	<b>C-DI</b>
C-DI-MAN	Diesel fuel manholes	C-DI-PUA
C-DI-MET	Diesel fuel meters	C-DI-CPT
C-DI-PIP	Diesel fuel pipelines	C-DI-PIP
C-DI-VAL	Diesel fuel valves	C-DI-VAN
<b>C-EN</b>	<b>Environment</b>	<b>C-EN</b>
C-EN-CTM	Contamination zone	C-EN-CTM
C-EN-TNK	Holding tank	C-EN-RSV
<b>C-GL</b>	<b>General</b>	<b>C-GL</b>
C-GL-PIC	Inserted pictures	C-GL-IMA
<b>C-HY</b>	<b>Hydrology</b>	<b>C-HY</b>
C-HY-CAT	Catchments area	C-HY-BAV
C-HY-FLO	Flow, discharge	C-HY-ECO
C-HY-ICE	Ice thickness	C-HY-GLA
<b>C-LD</b>	<b>Landscaping</b>	<b>C-AX</b>
C-LD-ANT	Antenna	C-AX-ANT
C-LD-ART	Artwork, special features	C-AX-OBA
C-LD-BRD	Foot bridges	C-AX-PAS
C-LD-CON	Concrete features, slabs	C-AX-GRA
C-LD-FEN	Fencing	C-AX-CLO
C-LD-FIL	Filling zone	C-AX-REM
C-LD-FLG	Flagpoles	C-AX-MAT
C-LD-FTN	Fountains, pools	C-AX-BSN
C-LD-FUR	Site furnishings, benches, garbage cans, etc.	C-AX-MOB
C-LD-GRA	Grading	C-AX-NVL
<b>C-LD-IRR</b>	<b>Irrigation system</b>	<b>C-AX-IRR</b>
C-LD-IRR-PIP	Irrigation system piping	C-AX-IRR-TUY
C-LD-IRR-SYM	Irrigation heads, controls, valves	C-AX-IRR-SYM
C-LD-RWL	Retaining walls	C-AX-SOU
C-LD-SPO	Equipment, sports facilities, goal nets, shooting targets, etc.	C-AX-EQU
C-LD-STR	Stairs (not attached to buildings)	C-AX-ESC
C-LD-SWK	Sidewalks	C-AX-TRO
C-LD-TER	Terraces, courtyards, patios (not attached to buildings)	C-AX-TER



C-LD-TOE	Toe of erosion control, armourstone, riprap, berms	C-AX-BRV
C-LD-TOP	Crest of erosion control, armourstone, riprap, berms	C-AX-HRV
C-LD-TRL	Trails, footpaths	C-AX-SEN
C-LD-TUN	Tunnels	C-AX-TUN
C-LD-TXT	Descriptive information text	C-AX-TEX
<b>C-NZ</b>	<b>Natural Gas Distribution</b>	<b>C-GN</b>
C-NZ-MAN	Natural gas manholes	C-GN-PUA
C-NZ-MET	Natural gas meters	C-GN-CPT
C-NZ-PIP	Natural gas pipelines	C-GN-PIP
C-NZ-VAL	Natural gas valves	C-GN-VAN
<b>C-OI</b>	<b>Oil Distribution</b>	<b>C-PE</b>
C-OI-MAN	Oil manholes	C-PE-PUA
C-OI-MET	Oil meters	C-PE-CPT
C-OI-PIP	Oil pipelines	C-PE-PIP
C-OI-VAL	Oil valves	C-PE-VAN
<b>C-PG</b>	<b>Propane Gas Distribution</b>	<b>C-GP</b>
C-PG-MAN	Propane gas manholes	C-GP-PUA
C-PG-MET	Propane gas meters	C-GP-CPT
C-PG-PIP	Propane gas pipelines	C-GP-PIP
C-PG-VAL	Propane gas valves	C-GP-VAN
<b>C-PR</b>	<b>Profile Data</b>	<b>C-PR</b>
C-PR-HOR	Horizontal profiles	C-PR-HOR
C-PR-VER	Vertical profiles	C-PR-VER
<b>C-RO</b>	<b>Roads</b>	<b>C-RO</b>
C-RO-ACR	Fire department access routes	C-RO-URG
C-RO-ALI	Alignment	C-RO-TRC
C-RO-ASP	Asphalt road	C-RO-ASP
C-RO-BAR	Barrier	C-RO-BAR
C-RO-BRD	Bridges, overpasses, etc.	C-RO-PON
C-RO-CLI	Road centreline	C-RO-MED
C-RO-CNT	Highway construction staging	C-RO-OCC
C-RO-CRB	Curbs	C-RO-BOR
C-RO-GRL	Guides, guard rails, median dividers, bollards	C-RO-PRT
C-RO-GRV	Gravel road	C-RO-GRV
C-RO-GUT	Gutter lines	C-RO-CAN
C-RO-HWY	Highway plan	C-RO-TRR
C-RO-JER	Jersey barrier	C-RO-JER
C-RO-MRK	Markings and road striping	C-RO-MAC
C-RO-MSH	Mass hauling diagrams	C-RO-SCH
C-RO-RMP	Ramps, on-ramps, loading docks, etc.	C-RO-RAM
<u>C-RO-ROD</u>	<u>Drivable road limits (asphalt) road, lots</u>	<u>C-RO-LIM</u>
C-RO-ROD-APX	Drivable road limits' approximate location	C-RO-LIM-APX
C-RO-SHO	Shoulders	C-RO-ACT
C-RO-STG	Staging layout plan	C-RO-PHA

C-RO-STR	Bridge abutments, piers, and supports	C-RO-PIL
C-RO-SWK	Sidewalks	C-RO-TRO
C-RO-TRL	Trails, footpaths	C-RO-SEN
C-RO-TUN	Road tunnels, underpasses, etc.	C-RO-TUN
C-RO-TXT	Road description, information text	C-RO-TEX
<b>C-RW</b>	<b>Railways</b>	<b>C-CF</b>
C-RW-ALI	Alignment	C-CF-TRC
C-RW-BRD	Bridges	C-CF-PON
C-RW-CLI	Rail centrelines	C-CF-MED
C-RW-RAI	Railway lines, switches	C-CF-DIA
C-RW-RMP	Ramps	C-CF-RAM
C-RW-STR	Bridge abutments, piers, trestles, and supports	C-CF-PIL
C-RW-TUN	Tunnels	C-CF-TUN
<b>C-SA</b>	<b>Sanitary Sewer</b>	<b>C-ES</b>
C-SA-CAT	Drainage catch areas	C-ES-BAV
C-SA-CLE	Cleanout	C-ES-RNT
C-SA-IND	Industrial sewer	C-ES-IND
C-SA-IOT	Sanitary inlet outlet structure	C-ES-SES
<u>C-SA-MAN</u>	<u>Sewer manholes, catch basins</u>	<u>C-ES-PUA</u>
C-SA-MAN-IDN	Text regarding t/g elevation, inverts elevation, etc.	C-ES-PUA-TEX
C-SA-PMP	Pumping stations	C-ES-PMP
<u>C-SA-SEP</u>	<u>Septic system</u>	<u>C-ES-SEP</u>
C-SA-SEP-FIL	Septic field filling zone	C-ES-SEP-REM
C-SA-SEP-PIP	Septic field piping	C-ES-SEP-TUY
C-SA-SEP-TNK	Septic tank	C-ES-SEP-RSV
<u>C-SA-SEW</u>	<u>Sewer lines system</u>	<u>C-ES-EGO</u>
C-SA-SEW-ABN	Abandoned sanitary sewer lines	C-ES-EGO-ABN
C-SA-SEW-CMB-MLI	Combined main sewer lines	C-ES-EGO-CMB-PRI
C-SA-SEW-CMB-SLI	Combined service sewer lines	C-ES-EGO-CMB-SEV
C-SA-SEW-MLI	Main sanitary sewer lines	C-ES-EGO-PRI
C-SA-SEW-SLI	Sanitary service sewer lines	C-ES-EGO-SEV
<u>C-SA-SYM</u>	<u>Junction symbols</u>	<u>C-ES-SYM</u>
C-SA-SYM-IDN	Text description - type of junction	C-ES-SYM-TEX
C-SA-TMT	Sewage treatment areas	C-ES-TEU
C-SA-TXT	General text: length of sewer, slope, material, etc.	C-ES-TEX
<b>C-SF</b>	<b>Natural Site Features</b>	<b>C-CS</b>
C-SF-DBR	Debris, rubble, loose rock and soil	C-CS-DEB
C-SF-MAR	Marshes, wetlands	C-CS-TEH
C-SF-PIT	Borrow pit	C-CS-BEM
<u>C-SF-RMN</u>	<u>Archaeological remnants</u>	<u>C-CS-VST</u>
C-SF-RMN-ABV	Archaeological remnants above ground	C-CS-VST-AUD
C-SF-RMN-UND	Archaeological remnants underground	C-CS-VST-SOU
C-SF-TRE	Trees, tree lines	C-CS-ARB
C-SF-TRE-TXT	Text describing trees	C-CS-ARB-TEX
C-SF-TXT	Site feature description text	C-CS-TEX
C-SF-WTR	Natural boundaries watercourses, shorelines	C-CS-LBM

<b>C-SI</b>	<b>Signs and Guideposts</b>	<b>C-SI</b>
C-SI-GDP	Guideposts	<i>C-SI-POT</i>
C-SI-SGL	Sign layouts and details	<i>C-SI-DET</i>
C-SI-SGN	Signs	<i>C-SI-ECR</i>
C-SI-TXT	Signage text	<i>C-SI-TEX</i>
<b>C-SV</b>	<b>Survey Control, Non-Legal</b>	<b>C-LV</b>
C-SV-BEN	Local bench marks	<i>C-LV-RNL</i>
C-SV-BND	Non-legal boundaries	<i>C-LV-LIP</i>
C-SV-CHN	Chainage	<i>C-LV-CHI</i>
C-SV-CLN	Radial ties, traverse lines, control lines	<i>C-LV-LCH</i>
<u>C-SV-CPT</u>	<u>Control points</u>	<u><i>C-LV-POA</i></u>
C-SV-CPT-HOR	Horizontal control points	<i>C-LV-POA-HOR</i>
C-SV-CPT-VER	Vertical control points	<i>C-LV-POA-VER</i>
C-SV-GRD	Survey grid	<i>C-LV-QUA</i>
C-SV-HOR	Horizontal alignment	<i>C-LV-HOR</i>
C-SV-LIM	Limits of contract, non-legal	<i>C-LV-LIM</i>
C-SV-LIN	Survey feature connectivity line work	<i>C-LV-TRI</i>
C-SV-MON	Found legal monuments	<i>C-LV-RAR</i>
<u>C-SV-PAR</u>	<u>Parcel line work</u>	<u><i>C-LV-PAC</i></u>
C-SV-PAR-TXT	Parcel text	<i>C-LV-PAC-TEX</i>
C-SV-PNT	Survey points	<i>C-LV-POL</i>
C-SV-SEL	Super elevation	<i>C-LV-SUE</i>
<u>C-SV-STA</u>	<u>Station equation labels</u>	<u><i>C-LV-STA</i></u>
C-SV-STA-IDN	Station labels	<i>C-LV-STA-NUI</i>
C-SV-STA-PTS	Station points	<i>C-LV-STA-PTS</i>
C-SV-STB	Setbacks	<i>C-LV-MAR</i>
C-SV-VER	Vertical alignment	<i>C-LV-VER</i>
<b>C-SW</b>	<b>Storm Water Drainage and Systems</b>	<b>C-EP</b>
C-SW-CAT	Drainage catchments areas	<i>C-EP-BAV</i>
C-SW-CUL	Culverts	<i>C-EP-PON</i>
C-SW-DCL	Ditch centre lines	<i>C-EP-MED</i>
C-SW-IOT	Storm inlet outlet structure	<i>C-EP-SES</i>
<u>C-SW-MAN</u>	<u>Catch basins, manholes</u>	<u><i>C-EP-PUA</i></u>
C-SW-MAN-IDN	Manhole description text: elevation, direction	<i>C-EP-PUA-TEX</i>
C-SW-MNG	Storm water management pond	<i>C-EP-BSN</i>
C-SW-PMP	Pumping stations	<i>C-EP-PMP</i>
<u>C-SW-SEW</u>	<u>Sewer lines system</u>	<u><i>C-EP-EGO</i></u>
C-SW-SEW-ABN	Abandoned storm sewer lines	<i>C-EP-EGO-ABN</i>
C-SW-SEW-MLI	Storm main sewer lines	<i>C-EP-EGO-PRI</i>
C-SW-SEW-SLI	Storm service sewer lines	<i>C-EP-EGO-SEV</i>
C-SW-SUB	Subdrains	<i>C-EP-DRA</i>
<u>C-SW-SYM</u>	<u>Junction symbols</u>	<u><i>C-EP-SYM</i></u>
C-SW-SYM-IDN	Junction description text	<i>C-EP-SYM-TEX</i>
C-SW-TXT	Text describing length of sewer, slopes, material	<i>C-EP-TEX</i>

<b>C-TP</b>	<b>Topographical Information</b>	<b>C-TG</b>
C-TP-MAJ	Major contours	C-TG-COP
C-TP-MIN	Minor contours	C-TG-COS
C-TP-SPT	Spot elevation	C-TG-POC
<b>C-TP-SRF</b>	<b><u>Surface model line work</u></b>	<b><u>C-TG-MNT</u></b>
C-TP-SRF-BRL	Surface model break lines	C-TG-MNT-LCO
C-TP-SRF-TXT	Surface calculation text	C-TG-MNT-TEX
C-TP-TOE	Bank (toe)	C-TG-BRV
C-TP-TOP	Top of bank	C-TG-HRV
<b>C-VG</b>	<b>Vegetation</b>	<b>C-VG</b>
<b>C-VG-FLW</b>	<b><u>Flowers</u></b>	<b><u>C-VG-FLR</u></b>
C-VG-FLW-ANN	Annual flowers	C-VG-FLR-ANN
C-VG-FLW-PER	Perennial flowers	C-VG-FLR-VIV
<b>C-VG-GCV</b>	<b><u>Ground cover</u></b>	<b><u>C-VG-CVS</u></b>
C-VG-GCV-DEC	Deciduous ground cover	C-VG-CVS-CDC
C-VG-GCV-EVR	Evergreen ground cover	C-VG-CVS-PST
C-VG-GCV-ORN	Ornamental ground cover	C-VG-CVS-ORN
<b>C-VG-GRS</b>	<b><u>Grass area</u></b>	<b><u>C-VG-PEL</u></b>
C-VG-GRS-SED	Seeded grass area	C-VG-PEL-ESM
C-VG-GRS-SOD	Sodded grass area	C-VG-PEL-EGZ
<b>C-VG-SRB</b>	<b><u>Shrubs</u></b>	<b><u>C-VG-ABT</u></b>
C-VG-SRB-DEC	Deciduous shrubs	C-VG-ABT-CDC
C-VG-SRB-EVR	Evergreen shrubs	C-VG-ABT-PST
C-VG-SRB-ORN	Ornamental shrubs	C-VG-ABT-ORN
<b>C-VG-TRE</b>	<b><u>Trees</u></b>	<b><u>C-VG-ARB</u></b>
C-VG-TRE-DEC	Deciduous trees	C-VG-ARB-CDC
C-VG-TRE-ORN	Flowering trees, fruit trees	C-VG-ARB-ORN
C-VG-VIN	Vines	C-VG-VIG
<b>C-WM</b>	<b>Water and Fire</b>	<b>C-CE</b>
C-WM-FHY	Fire hydrants	C-CE-BOI
C-WM-FRL	Fire lines	C-CE-CAX
<b>C-WM-MAN</b>	<b><u>Manholes, storage, valves</u></b>	<b><u>C-CE-PUA</u></b>
C-WM-MAN-IDN	Text describing; t/g elevation, t/pipe elevation	C-CE-PUA-TEX
C-WM-PMP	Pumping stations	C-CE-PMP
C-WM-RAW	Raw water lines	C-CE-CEN
<b>C-WM-SYM</b>	<b><u>Junction symbols</u></b>	<b><u>C-CE-SYM</u></b>
C-WM-SYM-IDN	Text describing type of junction	C-CE-SYM-TEX
C-WM-TXT	Water main descriptive text	C-CE-TEX
C-WM-WEL	Water wells	C-CE-PUE
<b>C-WM-WLI</b>	<b><u>Water line</u></b>	<b><u>C-CE-CED</u></b>
C-WM-WLI-MLI	Water main	C-CE-CED-PRI
C-WM-WLI-SLI	Water service line	C-CE-CED-SEV

**Electrical Systems**

English Abvn	Description	French Abvn
<b>E-CK</b>	<b>Clock Systems</b>	<b>E-HO</b>
E-CK-EQP	Clock equipment	E-HO-EQU
E-CK-REC	Clock locations	E-HO-PRS
E-CK-WRG	Wiring	E-HO-CAB
<b>E-DA</b>	<b>Data Systems</b>	<b>E-DN</b>
E-DA-EQP	Data equipment	E-DN-EQU
E-DA-OUT	Data outlets, jacks	E-DN-PRS
E-DA-WRG	Wiring	E-DN-CAB
<b>E-EG</b>	<b>Emergency Generation</b>	<b>E-AS</b>
E-EG-COD	Conduits	E-AS-COD
E-EG-EQP	Emergency power generation equipment	E-AS-EQU
E-EG-GEN	Generators, control switchboards	E-AS-GEN
<b>E-EL</b>	<b>Emergency Lighting</b>	<b>E-EU</b>
E-EL-CLG	Emergency luminaries ceiling-mounted	E-EU-PFD
E-EL-ESG	Exit signs	E-EU-SOS
E-EL-EXT	Emergency outside luminaries attached to buildings, poles	E-EU-EXT
E-EL-WAL	Emergency luminaries wall-mounted	E-EU-MUR
<b>E-EP</b>	<b>Emergency Power Equipment</b>	<b>E-RU</b>
E-EP-CTL	Motors and controls	E-RU-MOC
E-EP-DCB	DC battery systems	E-RU-ACU
E-EP-REC	Receptacles	E-RU-PRS
E-EP-TEN	Special tenant systems	E-RU-LOC
E-EP-UPS	UPS and conditioned power	E-RU-ASC
<b>E-EW</b>	<b>Emergency Power Wiring and Cabling</b>	<b>E-CU</b>
E-EW-CBT	Cable trays, ducts, and raceways	E-CU-CCC
E-EW-CLG	Ceiling-mounted wiring	E-CU-PFD
E-EW-CLT	Control wiring for emergency lighting	E-CU-CCE
E-EW-EXP	Exposed inside/outside wiring	E-CU-EXT
<u>E-EW-HVD</u>	<u>High voltage wiring</u>	<u>E-CU-HTE</u>
E-EW-HVD-CLG	High voltage in ceiling space	E-CU-HTE-PFD
<u>E-EW-LVD</u>	<u>Low voltage wiring</u>	<u>E-CU-BTE</u>
E-EW-LVD-CLG	Low voltage in ceiling space	E-CU-BTE-PFD
E-EW-LVD-FLR	Low voltage under floor	E-CU-BTE-PCH
E-EW-PAN	Electrical panel for emergency power	E-CU-PAN
E-EW-UPS	Uninterruptible power system (UPS)	E-CU-ASC
<b>E-FR</b>	<b>Electrical Fire Protection</b>	<b>E-AI</b>
E-FR-ELD	Electromagnetic locking devices	E-AI-DVE
E-FR-EQP	Equipment: master fire warning panel, alarm, annunciator panels	E-AI-EQU
E-FR-SIG	Signalling devices	E-AI-SIG
E-FR-SYM	Electrical FP symbols: pull stations, heat, smoke detectors	E-AI-DDA
<u>E-FR-VCE</u>	<u>Emergency voice communication</u>	<u>E-AI-CVU</u>
E-FR-VCE-WRG	Emergency voice communication wiring	E-AI-CVU-CAB

<b>E-FW</b>	<b>Flat Wiring</b>	<b>E-CP</b>
E-FW-CBL	Flat wiring cable location	E-CP-CAB
E-FW-CNB	Flat wiring connection boxes	E-CP-BOJ
<b>E-GD</b>	<b>Grounding</b>	<b>E-MT</b>
E-GD-WRG	Wiring, rods, bus plates	E-MT-EQU
<b>E-LP</b>	<b>Lightning Protection</b>	<b>E-PT</b>
E-LP-EQP	Equipment and devices	E-PT-EQU
E-LP-WRG	Wiring	E-PT-CAB
<b>E-NG</b>	<b>Normal Power Generation</b>	<b>E-AN</b>
E-NG-COD	Conduits	E-AN-COD
E-NG-EQP	Normal power generation equipment	E-AN-EQU
E-NG-GEN	Generators, control switchboard	E-AN-GEN
<b>E-NL</b>	<b>Normal Lighting</b>	<b>E-EN</b>
E-NL-CLG	Luminaries ceiling-mounted	E-EN-PFD
E-NL-CTL	Lighting controls	E-EN-COM
E-NL-EXT	Outside luminaries attached to buildings, poles	E-EN-EXT
E-NL-WAL	Luminaries in workspace and wall-mounted	E-EN-MUR
<b>E-NP</b>	<b>Normal Power Equipment</b>	<b>E-RN</b>
E-NP-CTL	Motors and controls	E-RN-MOC
E-NP-EQP	Normal power equipment: ceiling fans, etc.	E-RN-EQU
E-NP-HVD	High voltage distribution	E-RN-HTE
E-NP-LVD	Low voltage distribution	E-RN-BTE
E-NP-MEC	Electrical connections to mechanical equipment	E-RN-MEC
E-NP-OUT	Outlets, receptacles	E-RN-PRS
E-NP-PAN	Electrical panels	E-RN-PAN
E-NP-RAD	Radiant heating panels	E-RN-RAD
E-NP-TEN	Special tenant systems	E-RN-LOC
<b>E-NW</b>	<b>Normal Power Wiring and Cabling</b>	<b>E-CN</b>
E-NW-CBT	Cable trays, ducts, and raceways	E-CN-CCC
E-NW-CTL	Control wiring lighting	E-CN-CCE
E-NW-EXP	Exposed inside/outside wiring	E-CN-EXT
<u>E-NW-HVD</u>	<u>High voltage wiring</u>	<u>E-CN-HTE</u>
E-NW-HVD-CLG	High voltage wiring in ceiling space	E-CN-HTE-PFD
<u>E-NW-LVD</u>	<u>Low voltage wiring</u>	<u>E-CN-BTE</u>
E-NW-LVD-CLG	Low voltage wiring in ceiling space	E-CN-BTE-PFD
E-NW-LVD-FLR	Low voltage under floor	E-CN-BTE-PCH
E-NW-LVD-WOR	Low voltage in workspace	E-CN-BTE-PTV
E-NW-PST	Power poles with receptacles	E-CN-COL
E-NW-TEN	Tenant systems in workspace	E-CN-RPT
E-NW-UPS	Ups and conditioned power	E-CN-ASC
<b>E-PA</b>	<b>Sound and PA Systems</b>	<b>E-SV</b>
E-PA-EME	Emergency	E-SV-URG
E-PA-EQP	Sound equipment, speakers	E-SV-EQU
E-PA-OUT	Outlets	E-SV-PRS

E-PA-SYM	Symbols	<i>E-SV-SYM</i>
E-PA-WRG	Wiring	<i>E-SV-CAB</i>
<b>E-PH</b>	<b>Telephone Systems</b>	<b><i>E-TE</i></b>
E-PH-EQP	Equipment	<i>E-TE-EQU</i>
E-PH-OUT	Outlets	<i>E-TE-PRS</i>
E-PH-PAN	Telephone panel	<i>E-TE-PAN</i>
E-PH-WRG	Wiring	<i>E-TE-CAB</i>
<b>E-SD</b>	<b>Site Distribution and Electrical Equipment</b>	<b><i>E-DS</i></b>
E-SD-COD	Conduits	<i>E-DS-COD</i>
E-SD-DUC	Concrete ducts	<i>E-DS-CBE</i>
E-SD-EQP	Site distribution equipment: transformers, pedestals	<i>E-DS-EQU</i>
<b><u>E-SD-HVD</u></b>	<b><u>High voltage distribution</u></b>	<b><i>E-DS-HTE</i></b>
E-SD-HVD-ABV	High voltage distribution - above grade	<i>E-DS-HTE-AER</i>
E-SD-HVD-UND	High voltage distribution - below grade	<i>E-DS-HTE-SOU</i>
<b><u>E-SD-LTG</u></b>	<b><u>Lighting and wiring</u></b>	<b><i>E-DS-ECL</i></b>
E-SD-LTG-ABV	Lighting and wiring - above grade	<i>E-DS-ECL-AER</i>
E-SD-LTG-UND	Lighting and wiring - below grade	<i>E-DS-ECL-SOU</i>
<b><u>E-SD-LVD</u></b>	<b><u>Low voltage distribution</u></b>	<b><i>E-DS-BTE</i></b>
E-SD-LVD-ABV	Low voltage distribution - above grade	<i>E-DS-BTE-AER</i>
E-SD-LVD-UND	Low voltage distribution - below grade	<i>E-DS-BTE-SOU</i>
<b><u>E-SD-MAN</u></b>	<b><u>Manhole, handwells, junction box, pull pit ground inspection box</u></b>	<b><i>E-DS-PUA</i></b>
E-SD-MAN-IDN	Text describing; t/g elevation, line elevation	<i>E-DS-PUA-IDN</i>
E-SD-MUN	Municipal and utility services	<i>E-DS-MUN</i>
E-SD-POL	Poles and towers (electrical, communication)	<i>E-DS-POT</i>
E-SD-SUB	Substations	<i>E-DS-SST</i>
<b><u>E-SD-TEL</u></b>	<b><u>Telephone lines</u></b>	<b><i>E-DS-TEL</i></b>
E-SD-TEL-ABV	Telephone lines - above grade	<i>E-DS-TEL-AER</i>
E-SD-TEL-UND	Telephone lines - below grade	<i>E-DS-TEL-SOU</i>
E-SD-TXT	Text describing type of distribution system	<i>E-DS-TEX</i>
<b><u>E-SD-VID</u></b>	<b><u>Video lines</u></b>	<b><i>E-DS-VID</i></b>
E-SD-VID-ABV	Video lines – above grade	<i>E-DS-VID-AER</i>
E-SD-VID-UND	Video lines – below grade	<i>E-DS-VID-SOU</i>
<b>E-SE</b>	<b>Security Systems</b>	<b><i>E-SS</i></b>
E-SE-ALM	Intrusion alarms	<i>E-SS-SAA</i>
E-SE-CTL	Intrusion controls and controllers	<i>E-SS-COT</i>
E-SE-ELK	Electrical security locks	<i>E-SS-VEE</i>
E-SE-LAN	Intrusion system LAN	<i>E-SS-REL</i>
E-SE-SEN	Motion sensors	<i>E-SS-DEI</i>
E-SE-VCL	Video controllers (digital)	<i>E-SS-COM</i>
E-SE-VCM	Video cameras and monitors	<i>E-SS-EQU</i>
E-SE-WRG	Intrusion controller wiring	<i>E-SS-CAB</i>
<b>E-SG</b>	<b>Signal Systems</b>	<b><i>E-SI</i></b>
E-SG-EQP	Equipment	<i>E-SI-EQU</i>
E-SG-OUT	Outlets	<i>E-SI-SOR</i>
E-SG-WRG	Wiring	<i>E-SI-CAB</i>

<b>E-SM</b>	<b>Electrical Schematics</b>	<b>E-SM</b>
E-SM-CLK	Clock system schematics	E-SM-HOL
E-SM-DAS	Data systems schematics	E-SM-DAT
E-SM-EFP	Electrical fire protection schematics	E-SM-ALI
<b><u>E-SM-EPR</u></b>	<b><u>Emergency distribution schematics</u></b>	<b><u>E-SM-ALU</u></b>
E-SM-EPR-GEN	Emergency generation schematics, generators	E-SM-ALU-GEN
E-SM-EPR-LTG	Emergency lighting schematics	E-SM-ALU-ECL
E-SM-EPR-EQP	Emergency power equipment	E-SM-ALU-EQU
E-SM-EPR-TXT	Text for emergency distribution	E-SM-ALU-TEX
E-SM-EPR-WRG	Emergency wiring schematics	E-SM-ALU-CAB
E-SM-GND	Grounding schematics	E-SM-MIT
E-SM-HVD	High voltage (>750v) emergency distribution	E-SM-HTE
E-SM-KRK	Kirk key interlocks	E-SM-KRK
E-SM-LAN	Local area network schematics	E-SM-REL
E-SM-LTP	Lightning protection schematics	E-SM-PRF
E-SM-LVD	Low voltage emergency distribution	E-SM-BTE
<b><u>E-SM-MMS</u></b>	<b><u>Maintenance management system (MMS) tag numbers</u></b>	<b><u>E-SM-SGE</u></b>
E-SM-EPR-MMS	MMS tag numbers for emergency distribution	E-SM-ALU-SGE
E-SM-HVD-MMS	MMS tag numbers for high voltage distribution	E-SM-HTE-SGE
E-SM-NPR-MMS	MMS tag numbers for normal power distribution	E-SM-ANV-SGE
<b><u>E-SM-MTR</u></b>	<b><u>Metering</u></b>	<b><u>E-SM-CPT</u></b>
E-SM-MTR-EQP	Metering equipment, switch board	E-SM-CPT-EQU
E-SM-MTR-TXT	Metering text	E-SM-CPT-TEX
E-SM-MTR-WRG	Metering wiring	E-SM-CPT-CAB
<b><u>E-SM-NPR</u></b>	<b><u>Normal power distribution schematics</u></b>	<b><u>E-SM-ANV</u></b>
E-SM-NPR-EQP	Normal power distribution equipment	E-SM-ANV-EQU
E-SM-NPR-LTG	Normal lighting schematics	E-SM-ANV-ECL
E-SM-NPR-TXT	Text for normal power distribution	E-SM-ANV-TEX
E-SM-NPR-WRG	Normal power wiring	E-SM-ANV-CAB
E-SM-PAS	Public address system schematics	E-SM-COV
E-SM-SGN	Signal schematic	E-SM-SGN
E-SM-TEL	Telephone schematics	E-SM-TEL
E-SM-UPS	Uninterruptible power system (UPS)	E-SM-ASC
E-SM-VID	Video system schematics	E-SM-VID
<b>E-SY</b>	<b>Electricity on System Furniture</b>	<b>E-EA</b>
E-SY-LAN	LAN network jack	E-EA-REL
E-SY-LTG	Normal powered lighting	E-EA-ECL
E-SY-OUT	Electrical outlet	E-EA-PRS
E-SY-PST	Electrical posts on system furniture	E-EA-COL
E-SY-TEL	Telephone outlet	E-EA-TEL
<b>E-VD</b>	<b>Video Conferencing Systems</b>	<b>E-VD</b>
E-VD-EQP	Equipment	E-VD-EQU
E-VD-OUT	Outlets	E-VD-PRS
E-VD-WRG	Wiring	E-VD-CAB



**General Information**

English Abvn	Description	French Abvn
<b>G-DT</b>	<b>Details</b>	<b>G-DT</b>
G-DT-DIM	Detail, section, elevation dimensions	<i>G-DT-DIM</i>
G-DT-HAT	Detail, section, elevation hatching	<i>G-DT-HAC</i>
G-DT-LIN	Detail, section, elevation linework	<i>G-DT-TRI</i>
G-DT-TXT	Detail, section, elevation annotation, text	<i>G-DT-TEX</i>
<b>G-GL</b>	<b>General</b>	<b>G-GL</b>
G-GL-CAL	Callout blocks	<i>G-GL-BUF</i>
G-GL-SYM	Symbols, key plan, north arrow, bar scale	<i>G-GL-SYM</i>
<u>G-GL-TXT</u>	<u>Text</u>	<u><i>G-GL-TEX</i></u>
G-GL-TXT-E	English text	<i>G-GL-TEX-A</i>
G-GL-TXT-F	French text	<i>G-GL-TEX-F</i>
G-GL-XRE	External reference	<i>G-GL-XRE</i>
<b>G-LG</b>	<b>Legend</b>	<b>G-LE</b>
G-LG-LIN	Symbol legend line work	<i>G-LE-TRI</i>
G-LG-TXT	Symbol legend text	<i>G-LE-TEX</i>
<b>G-TL</b>	<b>Title Block</b>	<b>G-CT</b>
G-TL-ATT	Attributes for title block	<i>G-CT-ATT</i>
G-TL-LGO	Logos	<i>G-CT-LOG</i>
G-TL-LIN	Line work for title block	<i>G-CT-TRI</i>
G-TL-RME	Title block read me layer	<i>G-CT-LIS</i>
G-TL-SYM	Title block insertion Layer	<i>G-CT-SYM</i>
G-TL-TXT	Text for title block	<i>G-CT-TEX</i>
G-TL-VPT	Viewport boundaries	<i>G-CT-MET</i>

<b>Mechanical</b>		
English Abvn	Description	French Abvn
<b>H-CS</b>	<b>Control Systems</b>	<b>H-SR</b>
H-CS-AIR	Control air piping	H-SR-AIR
H-CS-EQP	Control systems equipment	H-SR-EQU
H-CS-SYM	Control system symbols: thermostats, humidistat, sensors, etc.	H-SR-SYM
H-CS-TXT	Control system text	H-SR-TEX
H-CS-WRG	Control wiring	H-SR-CAB
<b>H-DW</b>	<b>Domestic Water</b>	<b>H-ED</b>
H-DW-CLD	Domestic cold water	H-ED-EFR
H-DW-EQP	Domestic water equipment: pumps, water softeners, filters, etc.	H-ED-EQU
<u>H-DW-FIX</u>	<u>Plumbing fixtures</u>	<u>H-ED-APP</u>
H-DW-FIX-PRT	Plumbing fixtures on partitions	H-ED-APP-CLS
<u>H-DW-HOT</u>	<u>Domestic hot water</u>	<u>H-ED-ECD</u>
H-DW-HOT-RCL	Domestic hot water recirculation	H-ED-ECD-REC
H-DW-HOT-TNK	Domestic hot water tanks	H-ED-ECD-RSV
H-DW-ROW	Reverse osmosis water (medical)	H-ED-EOI
<b>H-FP</b>	<b>Fire Protection</b>	<b>H-PI</b>
<u>H-FP-CEX</u>	<u>Chemical extinguishing system</u>	<u>H-PI-EXC</u>
H-FP-CEX-PIP	Chemical extinguishing piping	H-PI-EXC-TUY
H-FP-CEX-EQP	Chemical extinguishing equipment	H-PI-EXC-EQU
H-FP-EPE	Explosion-proof equipment	H-PI-EQA
H-FP-EQP	Fire protection equipment: fire hose cabinet, fire dampers, etc.	H-PI-EQU
<u>H-FP-FEX</u>	<u>Foamed extinguishing system</u>	<u>H-PI-EXM</u>
H-FP-FEX-PIP	Foamed extinguishing piping	H-PI-EXM-TUY
H-FP-FEX-EQP	Foamed extinguishing equipment	H-PI-EXM-EQU
<u>H-FP-SPK</u>	<u>Sprinkler system</u>	<u>H-PI-GIC</u>
H-FP-SPK-PIP	Sprinkler piping	H-PI-GIC-TUY
H-FP-SPK-EQP	Sprinkler equipment	H-PI-GIC-EQU
H-FP-SPK-SYM	Sprinkler system symbols: sprinkler heads, backflow preventer, etc.	H-PI-GIC-SYM
H-FP-SPK-TXT	Sprinkler system text	H-PI-GIC-TEX
H-FP-SPK-ZNS	Sprinkler system zones	H-PI-GIC-ZON
<u>H-FP-STP</u>	<u>Standpipe system</u>	<u>H-PI-CMG</u>
H-FP-STP-PIP	Standpipe piping	H-PI-CMG-TUY
H-FP-STP-EQP	Standpipe equipment	H-PI-CMG-EQU
H-FP-SYM	Fire protection symbols: fire extinguisher, hydrants	H-PI-SYM
H-FP-TXT	Fire protection text	H-PI-TEX
<b>H-HC</b>	<b>Heating and Cooling</b>	<b>H-CH</b>
<u>H-HC-CHL</u>	<u>Chilled water</u>	<u>H-CH-ERF</u>
H-HC-CHL-RET	Chilled water return	H-CH-ERF-RET
H-HC-CHL-SUP	Chilled water supply	H-CH-ERF-ALM
H-HC-CNV	Convectors	H-CH-CNV
<u>H-HC-COT</u>	<u>Cooling tower water</u>	<u>H-CH-TRF</u>
H-HC-COT-RET	Cooling tower water return	H-CH-TRF-RET
H-HC-COT-SUP	Cooling tower water supply	H-CH-TRF-ALM

<b>H-HC-GLY</b>	<b>Glycol</b>	<i>H-CH-GLY</i>
H-HC-GLY-RET	Glycol return	<i>H-CH-GLY-RET</i>
H-HC-GLY-SUP	Glycol supply	<i>H-CH-GLY-ALM</i>
<b>H-HC-HWA</b>	<b>Heating water</b>	<i>H-CH-ECF</i>
H-HC-HWA-RET	Heating water return	<i>H-CH-ECF-RET</i>
H-HC-HWA-SUP	Heating water supply	<i>H-CH-ECF-ALM</i>
H-HC-HYD	Hydronic equipment	<i>H-CH-HYD</i>
H-HC-RAD	Radiant heat tubing	<i>H-CH-TCR</i>
H-HC-REF-EQP	Refrigerant equipment	<i>H-CH-FRI-EQU</i>
H-HC-RFG	Refrigerant gas	<i>H-CH-GAF</i>
H-HC-RFL	Refrigerant liquid	<i>H-CH-FLF</i>
<b>H-HC-STM</b>	<b>Steam</b>	<i>H-CH-VAP</i>
H-HC-STM-RET	Steam condensate (return)	<i>H-CH-VAP-RET</i>
H-HC-STM-SUP	Steam supply	<i>H-CH-VAP-ALM</i>
H-HC-STM-EQP	Steam equipment	<i>H-CH-VAP-EQU</i>
<b>H-PB</b>	<b>Plumbing</b>	<b>H-PB</b>
<b>H-PB-CMA</b>	<b>Compressed air</b>	<i>H-PB-AIC</i>
H-PB-CMA-EQP	Compressed air equipment	<i>H-PB-AIC-EQU</i>
H-PB-CO2	Carbon dioxide gas	<i>H-PB-CO2</i>
<b>H-PB-DWV</b>	<b>Drainage waste and vent system</b>	<i>H-PB-REV</i>
H-PB-DWV-SYM	Symbols: roof drains, floor drains, etc.	<i>H-PB-REV-SYM</i>
H-PB-DWV-VEN	Ventilating circuit, vents	<i>H-PB-REV-EVE</i>
H-PB-DWV-WST	Drainage circuit	<i>H-PB-REV-EEU</i>
H-PB-EQP	Plumbing equipment: pumps, coils motors, grease interceptor, etc.	<i>H-PB-EQU</i>
<b>H-PB-FOI</b>	<b>Fuel oil</b>	<i>H-PB-MAZ</i>
H-PB-FOI-EQP	Fuel equipment	<i>H-PB-MAZ-EQU</i>
H-PB-FOI-RET	Fuel oil return	<i>H-PB-MAZ-RET</i>
H-PB-FOI-SUP	Fuel oil supply	<i>H-PB-MAZ-ALM</i>
H-PB-FOI-VEN	Fuel oil vent	<i>H-PB-MAZ-EVE</i>
H-PB-HEG	Helium gas	<i>H-PB-HEL</i>
H-PB-HYG	Hydrogen gas	<i>H-PB-HYG</i>
H-PB-MAN	Access holes	<i>H-PB-PUA</i>
H-PB-MEG	Methane gas	<i>H-PB-MTH</i>
H-PB-NGA	Natural gas	<i>H-PB-GAN</i>
H-PB-NIT	Nitrogen gas	<i>H-PB-AZO</i>
H-PB-OXY	Oxygen gas	<i>H-PB-OXY</i>
H-PB-PGA	Propane gas	<i>H-PB-GAP</i>
H-PB-SYM	Plumbing symbols: gauges, fittings, valves elbows, unions, reducer	<i>H-PB-SYM</i>
H-PB-VAC	Cleaning system, vacuum	<i>H-PB-NET</i>
<b>H-PP</b>	<b>Fuel and Process Piping</b>	<b>H-TC</b>
H-PP-MAN	Manholes fuelling stations	<i>H-TC-PUA</i>
H-PP-MET	Meters	<i>H-TC-CPT</i>
H-PP-PIP	Fuel and process piping	<i>H-TC-TUY</i>
H-PP-PMP	Pumping stations	<i>H-TC-PMP</i>

H-PP-TNK	Fuel tanks	<i>H-TC-RSV</i>
H-PP-VAL	Valves	<i>H-TC-VAN</i>
<b>H-SM</b>	<b>Mechanical Schematics and Riser Diagrams</b>	<b><i>H-SM</i></b>
H-SM-CSY	Control system schematics	<i>H-SM-COM</i>
H-SM-DRS	Duct riser diagrams	<i>H-SM-CMC</i>
H-SM-DUC	Duct schematic diagrams	<i>H-SM-COD</i>
H-SM-PIP	Piping schematic diagrams	<i>H-SM-TUY</i>
H-SM-PRS	Piping riser diagrams	<i>H-SM-CMT</i>
H-SM-SYM	Symbols	<i>H-SM-SYM</i>
H-SM-WST	Waste schematics	<i>H-SM-EEU</i>
<b>H-VA</b>	<b>Ventilation and Air Conditioning</b>	<b><i>H-VC</i></b>
H-VA-COA	Combustion air ductwork	<i>H-VC-ACO</i>
H-VA-EQP	Equipment: fans, dampers, coils, filters, etc.	<i>H-VC-EQU</i>
<b>H-VA-EXH</b>	<b><u>Exhaust air system</u></b>	<b><i>H-VC-AEV</i></b>
H-VA-EXH-DUC	Exhaust air ductwork	<i>H-VC-AEV-COD</i>
H-VA-EXH-GRI	Exhaust grilles	<i>H-VC-AEV-GRI</i>
H-VA-INS	Duct insulation, acoustical lining	<i>H-VC-ISO</i>
<b>H-VA-OTA</b>	<b><u>Outside air system</u></b>	<b><i>H-VC-AEX</i></b>
H-VA-OTA-DUC	Outside air ductwork	<i>H-VC-AEX-COD</i>
H-VA-OTA-GRI	Outside air grilles	<i>H-VC-AEX-GRI</i>
<b>H-VA-RET</b>	<b><u>Return system</u></b>	<b><i>H-VC-REP</i></b>
H-VA-RET-DUC	Return ductwork	<i>H-VC-REP-COD</i>
H-VA-RET-GRI	Return grills	<i>H-VC-REP-GRI</i>
<b>H-VA-SUP</b>	<b><u>Supply system</u></b>	<b><i>H-VC-AMA</i></b>
H-VA-SUP-DUC	Supply ductwork	<i>H-VC-AMA-COD</i>
H-VA-SUP-DIF	Supply diffusers	<i>H-VC-AMA-DIF</i>
H-VA-VAV	Variable air volume boxes	<i>H-VC-DAV</i>
H-VA-VEN	Flue, vent, breaching	<i>H-VC-EVE</i>

## Interior Design

English Abvn	Description	French Abvn
<b>I-BP</b>	<b>Blocking Plan</b>	<b>I-BE</b>
I-BP-DIM	Dimensions	I-BE-DIM
I-BP-OLN	Sector outlines	I-BE-CON
I-BP-TXT	Text, notes	I-BE-TEX
<b>I-EI</b>	<b>Employee Information</b>	<b>I-EM</b>
I-EI-IDN	Employee identification	I-EM-NUI
<b>I-EQ</b>	<b>Equipment</b>	<b>I-EQ</b>
I-EQ-CMP	Computers	I-EQ-ORD
I-EQ-OEQ	Office equipment	I-EQ-EXI
I-EQ-SPC	Special equipment	I-EQ-SPE
<b>I-FU</b>	<b>Furniture</b>	<b>I-MO</b>
I-FU-ACC	Accessories, coat trees, racks	I-MO-ACC
I-FU-ART	Artwork	I-MO-ART
I-FU-CAB	Storage cabinets, files	I-MO-RAG
I-FU-CLR	Furniture colour	I-MO-COU
I-FU-DSK	Desks, freestanding work surfaces	I-MO-SUT
I-FU-NOF	Non-office furniture, first aid room beds, etc.	I-MO-APE
I-FU-PLT	Plants	I-MO-PLT
I-FU-SET	Seating	I-MO-SIE
I-FU-SHL	Shelving	I-MO-ETA
I-FU-TAB	Tables	I-MO-TAB
I-FU-TXT	Annotations, text furniture	I-MO-TEX
I-FU-SIZ	Furniture size	I-MO-DIM
<b>I-SI</b>	<b>Signage</b>	<b>I-SI</b>
I-SI-EQP	Barrier-free signs	I-SI-ACF
I-SI-OFF	Office signage	I-SI-BUR
I-SI-SPC	Special signage	I-SI-SPE
<b>I-SY</b>	<b>System Furniture</b>	<b>I-EA</b>
I-SY-CLR	Panel colour	I-EA-COU
I-SY-OVH	Panel overhead storage, etc.	I-EA-SUR
I-SY-SCR	Panels, screens	I-EA-ECA
I-SY-SIZ	Panel sizes	I-EA-DIM
I-SY-SUR	Work surfaces for system furniture	I-EA-SUT

## Legal Surveys

English Abvn	Description	French Abvn
<b>L-AZ</b>	<b>Airport Zoning</b>	<b>L-ZA</b>
L-AZ-ZNS	Zoning surfaces, runway strips, centrelines	L-ZA-ZON
<b>L-GL</b>	<b>General</b>	<b>L-GL</b>
L-GL-TXT	General text	L-GL-TEX
<b>L-CF</b>	<b>Cadastral Fabric</b>	<b>L-CD</b>
L-CF-BDY	Legal surveyed boundary	L-CD-LIF
L-CF-DIM	Parcel segment labelling, bearings, and distance	L-CD-DIM
L-CF-EAS	Limited interest estate, easement, right of way	L-CD-DRO
L-CF-OTH	Other parcels/boundaries	L-CD-AUT
L-CF-STB	Setbacks	L-CD-MAR
L-CF-SYM	Symbols: coordinate monument, control point	L-CD-SYM
L-CF-TXT	Parcel labelling, description, property ID, book number, etc.	L-CD-TEX
<b>L-SP</b>	<b>Legal Site Plan</b>	<b>L-PS</b>
L-SP-CAN	Canadian boundaries	L-PS-FCN
L-SP-CLS	CLSR boundaries, reserves, parks	L-PS-RTC
L-SP-PRO	Provincial boundaries	L-PS-PRV
L-SP-REG	Regional and municipality boundaries	L-PS-MUN
<b>L-SV</b>	<b>Legal Survey</b>	<b>L-LT</b>
L-SV-CLN	Radial ties, traverse lines, control lines	L-LT-LCH
L-SV-GRD	Survey grid	L-LT-QUA
<u>L-SV-PNT</u>	<u>Survey points</u>	<u>L-LT-POL</u>
L-SV-PNT-ELV	Survey point elevation	L-LT-POL-ELV
L-SV-PNT-IDN	Survey point number text	L-LT-POL-NUI
L-SV-PNT-TXT	Survey point description	L-LT-POL-TEX
L-SV-SYM	Symbols: survey pins, iron bars, etc.	L-LT-SYM
L-SV-TXT	Identification text	L-LT-TEX

<b>Marine</b>		
English Abvn	Description	French Abvn
<b>M-BW</b>	<b>Breakwater Features</b>	<b>M-BL</b>
M-BW-OLN	Breakwater outline	M-BL-CON
M-BW-TOE	Toe of breakwater	M-BL-BRV
M-BW-TOP	Crest of breakwater, berms	M-BL-HRV
<b>M-GL</b>	<b>General</b>	<b>M-GL</b>
M-GL-DIM	Dimensions	M-GL-DIM
M-GL-HAT	Hatching	M-GL-HAC
M-GL-LAY	Layout line work	M-GL-TRI
M-GL-TXT	Text	M-GL-TEX
<b>M-NV</b>	<b>Navigation</b>	<b>M-NA</b>
M-NV-BUO	Buoys	M-NA-BOU
M-NV-CAR	Cards	M-NA-SYM
M-NV-COR	Navigation corridors, channels	M-NA-TVN
M-NV-EQP	Floating aids, marker buoys, fog horns	M-NA-EQU
M-NV-SPA	Spars	M-NA-MAT
<b>M-SK</b>	<b>Skid-way, Haul-outs, Slipways</b>	<b>M-CA</b>
M-SK-BED	Vessel beds	M-CA-PLF
M-SK-BLK	Anchor blocks, haul out blocks	M-CA-BLA
M-SK-FTG	Footings	M-CA-SOA
M-SK-GUA	Guards	M-CA-GUA
M-SK-OLN	Skid-way outline	M-CA-CON
M-SK-RAI	Railway	M-CA-TRC
M-SK-SKD	Skid timbers, skid poles	M-CA-POU
M-SK-SLB	Concrete slabs, precast panels	M-CA-DPP
M-SK-SSP	Steel sheet piling	M-CA-PAL
<b>M-SN</b>	<b>Hydrographic Survey Information, Non Legal</b>	<b>M-RH</b>
M-SN-DAT	Chart datum contour, 0.00 m	M-RH-ZDC
M-SN-DRG	Dredged area or limits	M-RH-LID
M-SN-HNT	High normal tide	M-RH-MHN
M-SN-HWL	High water lines	M-RH-LHM
M-SN-LNT	Low normal tide	M-RH-MBN
M-SN-LWL	Low water lines	M-RH-LBM
M-SN-MAJ	Major sea bottom contours	M-RH-PFM
M-SN-MIN	Minor sea bottom contours	M-RH-SFM
M-SN-SPT	Soundings, spot elevations	M-RH-SON
M-SN-TID	Tide gauges, tidal equipment, tide datum	M-RH-EQU
<b>M-WF</b>	<b>Wharf Features</b>	<b>M-CQ</b>
M-WF-BEM	Pile caps, beams	M-CQ-POU
M-WF-BRC	Bracing, wales	M-CQ-ENT
M-WF-CAI	Caissons	M-CQ-FLO
M-WF-CRW	Crown slopes, crowns	M-CQ-SOM
M-WF-CTW	Catwalks	M-CQ-PAS
M-WF-CWK	Cribwork, ballast floor	M-CQ-CCV

M-WF-CWL	Cope walls, cope beams	<i>M-CQ-MPC</i>
M-WF-DRK	Derricks, cranes, gallows	<i>M-CQ-GRU</i>
M-WF-DRN	Drains, scuppers	<i>M-CQ-DRA</i>
M-WF-FND	Fenders	<i>M-CQ-DEF</i>
M-WF-FST	Floating wharves	<i>M-CQ-QUF</i>
M-WF-FTG	Footings, mattresses, deck substructures	<i>M-CQ-SEM</i>
M-WF-FWL	Firewalls	<i>M-CQ-MCF</i>
M-WF-GUA	Guards	<i>M-CQ-BAR</i>
M-WF-GWY	Gangways	<i>M-CQ-PAE</i>
M-WF-JNT	Construction, control joints	<i>M-CQ-JOC</i>
M-WF-LAD	Ladders	<i>M-CQ-ECH</i>
M-WF-MOR	Mooring cleats, mooring rings, bollards	<i>M-CQ-TAA</i>
M-WF-OLN	Wharf and dolphin outlines	<i>M-CQ-CON</i>
M-WF-PIL	Piles and bents	<i>M-CQ-PIL</i>
M-WF-SSP	Steel sheet piling	<i>M-CQ-PAL</i>
M-WF-TIE	Tie rods, anchor blocks, tie back walls	<i>M-CQ-TBA</i>



## Real Property Space Management

English Abvtn	Description	French Abvtn
<b>R-BC</b>	<b>Building Common Areas "Accessory B"</b>	<b>R-CB</b>
R-BC-COR	Shared public corridors	R-CB-COR
R-BC-OLN	General shared building outline	R-CB-CON
R-BC-RMS	Shared rooms	R-CB-SAL
<b>R-BS</b>	<b>Building Service Areas</b>	<b>R-SB</b>
R-BS-OLN	General building service outline	R-SB-CON
R-BS-RMS	Building service rooms	R-SB-SAL
R-BS-SFT	Vertical shafts, elevators, stairs (takes walls over RMS)	R-SB-PUV
<b>R-EX</b>	<b>Exterior Site Areas</b>	<b>R-EX</b>
R-EX-OLN	Exterior site areas	R-EX-CON
<b>R-FC</b>	<b>Floor Common Areas</b>	<b>R-AE</b>
R-FC-CNV	Convectors (baseboard, radiators)	R-AE-CNV
R-FC-COL	Building structure, columns (interior and perimeter)	R-AE-COL
R-FC-COR	Primary circulation	R-AE-COR
R-FC-ENC	Encroachments (unusable space)	R-AE-EMP
R-FC-FIR	Fire egress cross over areas, fire refuge areas	R-AE-SOS
R-FC-LOB	Floor elevator lobbies	R-AE-HAL
R-FC-OLN	General outline of floor common areas	R-AE-CON
R-FC-RMS	Electrical, telecom, janitor's closets	R-AE-SAL
<u>R-FC-WSR</u>	<u>Washrooms</u>	<u>R-AE-SAT</u>
R-FC-WSR-BRF	Accessible washrooms	R-AE-SAT-ACF
<b>R-GA</b>	<b>Gross Area</b>	<b>R-AB</b>
R-GA-EXT	Exterior gross area	R-AB-EXT
R-GA-INT	Interior gross area	R-AB-INT
<b>R-GL</b>	<b>General</b>	<b>R-GL</b>
R-GL-TXT	Street names for space audit	R-GL-TEX
<b>R-PK</b>	<b>Parking</b>	<b>R-ST</b>
R-PK-0000-BRF	Barrier-free parking	R-ST-0000-ACF
R-PK-0000-DEP	Parking number - department name (Special use only)	R-ST-0000-MIN
R-PK-DIV	Parking divisions	R-ST-DIV
R-PK-EXT	Exterior parking (Special use only)	R-ST-EXT
R-PK-IDN	Parking identification numbers	R-ST-NUI
R-PK-INT	Interior parking (Special use only)	R-ST-INT
R-PK-OLN	Outlines	R-ST-CON
R-PK-SPC	Special parking	R-ST-SPE
<b>R-SU</b>	<b>Surface Maintenance Building</b>	<b>R-SU</b>
R-SU-CLG	Ceiling finishes	R-SU-PFD
R-SU-COR	Primary corridors	R-SU-COR
R-SU-DEP	Space allocation by department	R-SU-MIN
R-SU-DIV	Division of area	R-SU-DIV
R-SU-EXT	Exterior finishes	R-SU-EXT

<b>R-SU-FLR</b>	<b>Floor finishes</b>	<i>R-SU-PCH</i>
R-SU-FLR-HIG	High-traffic area	<i>R-SU-PCH-ELV</i>
R-SU-FLR-LOW	Low-traffic area	<i>R-SU-PCH-BAS</i>
R-SU-GRP	Space allocation by group / branch	<i>R-SU-GRP</i>
R-SU-IDN	Surface identification number	<i>R-SU-NUI</i>
R-SU-OLN	Outlines	<i>R-SU-CON</i>
R-SU-RMS	Rooms	<i>R-SU-SAL</i>
R-SU-SFT	Shafts	<i>R-SU-PUV</i>
R-SU-SPC	Special surfaces	<i>R-SU-SPE</i>
R-SU-WAL	Walls	<i>R-SU-MUR</i>
R-SU-WIN	Windows	<i>R-SU-FEN</i>
<b>R-UC</b>	<b>User Common</b>	<b>R-AC</b>
R-UC-COR	Shared public corridors	<i>R-AC-COR</i>
R-UC-OLN	General shared user outline	<i>R-AC-CON</i>
R-UC-RMS	Shared rooms	<i>R-AC-SAL</i>
<b>R-US</b>	<b>Usable</b>	<b>R-AU</b>
R-US-001, 002...	Usable area polygons by location	<i>R-AU-001, 002</i>
R-US-COR	Primary circulation areas	(Special use only) <i>R-AU-COR</i>
R-US-DEP	Space allocation by department	(Special use only) <i>R-AU-MIN</i>
R-US-DIV	Division of areas	<i>R-AU-DIV</i>
R-US-GRP	Space allocation by group / branch	(Special use only) <i>R-AU-GRP</i>
R-US-IDN	Location identification numbers	<i>R-AU-NUI</i>
R-US-OLN	General usable outlines	(Special use only) <i>R-AU-CON</i>
R-US-RMS	Room identification numbers	(Special use only) <i>R-AU-SAL-NUI</i>
R-US-UNT	Space allocation by units	(Special use only) <i>R-AU-UNI</i>
<b>R-ZN</b>	<b>Zoning</b>	<b>R-ZO</b>
R-ZN-CLE	Cleaning zoning	<i>R-ZO-NET</i>
R-ZN-FIR	Fire egress zoning	<i>R-ZO-SOS</i>
R-ZN-SEC	Security zoning	<i>R-ZO-SEU</i>

<b>Structure</b>		
English Abvn	Description	French Abvn
<b>S-CL</b>	<b>Ceilings</b>	<b>S-PF</b>
S-CL-BEM	Ceiling beams	S-PF-POU
<b>S-FL</b>	<b>Floors</b>	<b>S-PC</b>
S-FL-BEM	Floor beams	S-PC-POU
S-FL-BRC	Bracing	S-PC-ENT
S-FL-DEK	Decking, waffle	S-PC-PLA
S-FL-FRM	Framing	S-PC-CHR
S-FL-JNT	Joints, expansion, construction	S-PC-JOC
S-FL-JST	Joists	S-PC-PLP
S-FL-OLN	Floor outlines	S-PC-CON
S-FL-OPN	Floor openings	S-PC-OUV
S-FL-SLB	Floor slabs	S-PC-DPP
S-FL-STR	Structural landings	S-PC-ESC
<b>S-FN</b>	<b>Foundations</b>	<b>S-FD</b>
S-FN-FIL	Backfill, soil line	S-FD-REM
S-FN-FTG	Footings	S-FD-SEM
S-FN-OLN	Foundation outlines	S-FD-CON
S-FN-PIL	Piles, caissons, piers	S-FD-PIE
<b>S-GR</b>	<b>Structural Grid</b>	<b>S-QU</b>
S-GR-EXT	Structural grid lines outside building	S-QU-EXT
S-GR-INT	Structural grid lines inside building	S-QU-INT
<b>S-RF</b>	<b>Roofs</b>	<b>S-TO</b>
S-RF-BEM	Beams	S-TO-POU
S-RF-BRC	Bracing	S-TO-ENT
S-RF-DEK	Decking, waffle	S-TO-PLA
S-RF-FRM	Framing, roof trusses	S-TO-CHR
S-RF-JNT	Joints, expansion, construction	S-TO-JOC
S-RF-JST	Joists	S-TO-PLP
S-RF-OLN	Roof outlines	S-TO-CON
S-RF-OPN	Roof openings	S-TO-OUV
S-RF-SLB	Roof slabs	S-TO-DPP
<b>S-WL</b>	<b>Walls, Columns</b>	<b>S-MU</b>
S-WL-BRC	Cross bracing	S-MU-ENT
S-WL-BRG	Bearing walls	S-MU-POR
S-WL-COL	Columns	S-MU-COL
S-WL-JNT	Joints, expansion, construction	S-MU-JOC
S-WL-OPN	Wall openings	S-MU-OUV
S-WL-RWL	Retaining walls	S-MU-STM

## Annex B – Layer Field Descriptions

Ext.	Description	Ext.	Description
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### Group Field

The following table lists the Group field abbreviations that can be used to create new layer names. This is the second part of the layer name following the Discipline field:

X-**XX**-XXX

AP	Approach Slabs	OI	Oil Distribution
AZ	Airport Zoning	PA	Sound and PA Systems
BC	Building Common Areas "Accessory B"	PB	Plumbing
BH	Borehole Data (Geotechnical)	PG	Propane Gas
BP	Blocking Plan	PH	Telephone Systems
BS	Building Service Areas	PK	Parking
BW	Breakwater Features	PL	Plan
CF	Cadastral Fabric	PP	Fuel and Process Piping
CI	Circulation	PR	Profile Data
CK	Clock Systems	RF	Roofs
CL	Ceilings	RO	Roads
CS	Control Systems	RW	Railways
DA	Data Systems	SA	Sanitary Sewer
DI	Diesel Fuel Distribution	SB	Substructure
DK	Deck	SC	Schedules
DM	Dams	SD	Site Distribution and Electrical Equipment
DR	Doors	SE	Security Systems
DT	Details	SF	Natural Site Features
DW	Domestic Water	SG	Signal Systems
EG	Emergency Generation	SI	Signage
EI	Employee Information	SK	Skid-way, Haul-outs, Slipways
EL	Emergency Lighting	SM	Schematics
EM	Emergency	SN	Hydrographic Survey Information, Non-Legal
EN	Environment	SP	Legal Site Plan
EP	Emergency Power Equipment	SR	Scour Protection
EQ	Equipment	SS	Superstructure
EW	Emergency Power Wiring and Cabling	SU	Surface Maintenance Building
EX	Exterior Site Areas	SV	Survey
FC	Floor Common Areas	SW	Storm Water and Drainage
FL	Floors	SY	System Furniture
FN	Foundations	TL	Title Block
FP	Fire Protection	TP	Topographical Information
FR	Electrical Fire Protection	UC	User Common
FU	Furniture	US	Usable
FW	Flat Wiring	VA	Ventilation and Air Conditioning
GA	Gross Area	VD	Video Conferencing Systems
GD	Grounding	VG	Vegetation
GL	Global	WD	Windows
GR	Grid	WF	Wharf Features
HC	Heating and Cooling	WL	Walls, Columns
HY	Hydrology	WM	Water and Fire
LD	Landscaping	ZN	Zoning
LG	Legend		
LP	Lightning Protection		
NG	Normal Power Generation		
NL	Normal Lighting		
NP	Normal Power Equipment		
NV	Navigation		
NW	Normal Power Wiring and Cabling		
NZ	Natural Gas		

## Single Layer Field and First Layer Name Extension

Ext.	Description	Ext.	Description
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The following table lists the Single Layer field and First Layer Name Extension abbreviations that can be used to create new layer names. This is the third or fourth part (if required) of the layer name following the Group field:

X-XX-**XXX** X-XX-XXX-**XXX**-X

3DM	3D model components of 2D symbols	CLK	Clock system
ABN	Abandoned	CLE	Cleaning, clean out
ABU	Abutments	CLN	Control lines
ABV	Above ground, above grade	CLR	Colours
ACC	Accessories	CLS	CLSR boundaries, reserves, parks
ACR	Fire department access routes	CLT	Control wiring for emergency lighting
AIR	Control air piping	CMA	Compressed air
ALI	Alignment	CMB	Combined sewers
ALM	Intrusion alarms	CMP	Computers
ANN	Annual flowers	CNB	Flat wiring connection boxes
ANT	Antenna	CNV	Convectors
APC	Approach surface (airport)	CO2	Carbon dioxide gas
APP	Approximate	COA	Combustion air ductwork
APR	Approach slabs	COD	Conduits
ART	Artwork	COL	Columns
ASP	Asphalt	CON	Concrete
ATT	Attributes	CNT	Construction
AWP	Acid waste piping (medical)	COR	Corridors
BAR	Barriers, railings	COT	Cooling tower
BDY	Legal limits, fee simple, admin., control	CRB	Curbs
BED	Vessel beds	CRP	Carpet
BEM	Beams	CRW	Crown slopes, crowns
BEN	Local benchmarks	CSY	Control system schematics
BIR	Bird hazard (airport)	CPT	Control points
BKH	Bulkheads	CTL	Controls
BLK	Block	CTM	Contamination (environment)
BND	Boundaries	CTP	Countertops
BRC	Bracing	CTW	Catwalks
BRF	Barrier-free	CUL	Culverts
BRG	Bearing	CVY	Horizontal conveyors, moving sidewalks
BRD	Bridges	CWL	Cope walls, cope beams
BRK	Brick	CWK	Cribwork, ballast floor
BRL	Break lines	DAS	Data systems schematics
BRM	Crest of breakwater, berms	DAT	Chart datum contour, 0.00 m
BUO	Buoys	DBR	Debris, rubble, loose rock and soil
BYP	By-pass box	DCB	DC battery systems
CAB	Cabinet	DCL	Ditch centre lines
CAI	Caissons	DEC	Deciduous
CAL	Callout blocks	DEK	Deck
CAN	Canadian boundaries	DEP	Space allocation by department
CAR	Cards	DIF	Diffusers
CAT	Catchments area	DIG	Digitized or vectorized from scanned Image
CBL	Flat wiring cable location		
CBT	Cable trays, ducts, and raceways	DIM	Dimensions
CEX	Chemical extinguisher	DIV	Divisions
CHL	Chilled water	DRA	Drainage
CHN	Chainage	DRG	Dredged area or limits
CLD	Cold water	DRK	Derricks, cranes, gallows
CLG	Ceiling-mounted equipment, wiring, or finishes	DRN	Drains, scuppers
CLI	Centrelines	DRS	Duct riser diagrams
		DSK	Desks, work surfaces, tables

Ext.	Description	Ext.	Description
DUC	Ducts	GRV	Gravel
DWV	Drainage waste and vent system	GUA	Guards
EAS	Easement	GUT	Gutter lines
EFP	Electrical fire protection schematics	GWY	Gangways
ELD	Electromagnetic locking devices	HAT	Hatching
ELE	Elevators	HED	Door and window headers
ELK	Electrical security locks	HEG	Helium gas
ELV	Elevation (survey points)	HIG	High
EME	Emergency	HNT	High normal tide
ENC	Encroachments (unusable space)	HOR	Horizontal
EPE	Explosion-proof equipment	HOT	Hot water
EPR	Emergency power wiring & equipment	HTE	Heating units
EQP	Equipment	HVD	High voltage distribution
ESC	Escalator	HWA	Heating water
ESG	Exit signs	HWL	High water lines
EVR	Evergreen	HWY	Highway plan
EXH	Exhaust	HYD	Hydronic equipment
EXJ	Expansion joints	HYG	Hydrogen gas
EXP	Exposed inside/outside wiring	ICE	Ice thickness
EXT	Exterior	IDN	Identification
FDR	Floor drains	IMP	Imports (Revit families)
FEN	Fencing	IND	Industrial
FEX	Foamed extinguisher	INS	Insulation
FHY	Fire hydrants	INT	Interior
FIL	Backfill, soil line	IOT	Inlet outlet
FIN	Finishes	IRR	Irrigation system
FIR	Fire egress	JER	Jersey wall
FIX	Plumbing fixtures	JNT	Joints
FLG	Flagpoles	JST	Joists
FLO	Flow, discharge	KRK	Kirk key interlocks
FLR	Floor-mounted equipment, wiring or finishes	LAD	Ladders
FLU	Flue, vent, breaching	LAN	Local area network
FLW	Flowers	LAY	Layout line work
FND	Fenders	LEV	Floor level changes, ramps, truck wells
FOI	Fuel oil	LGT	Lighting control schematics and diagrams
FRL	Fire lines	LIM	Limits
FRM	Framing	LIN	Line work
FST	Floating wharfs	LNT	Low normal tide
FTG	Footing	LOB	Floor elevator lobbies
FTN	Fountains, pools	LOG	Borehole logs and data
FUR	Site furnishings, benches, garbage cans, etc.	LGO	Logos
FWL	Fire walls	LOW	Low
GAB	Gabions	LTG	Normal powered lighting
GCV	Ground cover	LTP	Lightning protection schematics
GDP	Guideposts	LVD	Low voltage distribution
GEN	Generators	LWL	Low water lines
GLY	Glycol	MAJ	Major contours
GLZ	Glass, glazing	MAN	Manholes
GND	Grounding schematics	MAR	Marshes, wetlands
GPS	Global Positioning System	MEC	Electrical connections to mechanical equipment
GRA	Grading	MEG	Methane gas
GRD	Grid	MET	Meters
GRI	Grilles	MIL	Architectural specialties, casework and millwork
GRL	Guides, guardrails, median dividers, bollards	MIN	Minor contours
GRP	Space allocation by group / branch	MLI	Main lines
GRS	Grass, lawn area	MMS	Maintenance Management System
		MNG	Storm water management pond

Ext.	Description	Ext.	Description
MON	Monuments	RFL	Refrigerant liquid
MOR	Mooring cleats, bollards	RLN	Reference lines
MRK	Markings and road striping	RME	Read Me info
MSH	Mass hauling diagrams	RMN	Remnants (archaeology)
MTR	Metering wiring & equipment	RMP	Ramps
MUN	Municipal and utility services	RMS	Rooms
NGA	Natural gas	ROD	Drivable road limits (asphalt) road, lots
NIT	Nitrogen (medical)	ROW	RO water or distilled water (medical)
NOD	Node, horizontal reference point	RPL	Reference plan
NOF	Non-office furniture, first aid room beds, etc.	RPS	Real Property information
NPR	Normal power schematics, risers	RRP	Riprap
OEQ	Office equipment	RWL	Retaining walls
OFF	Office signage	SAF	Life safety
OLN	Outlines	SAN	Sanitary
OPN	Openings	SCD	Secondary
ORN	Ornamental	SCR	System furniture panels, screens
OUT	Outlets	SEC	Security zoning
OTA	Outside air	SED	Seeded area
OTH	Other	SEL	Super elevation
OVH	Overhead	SEN	Motion sensors
OXY	Oxygen (medical)	SET	Seating
PAN	Distribution panel (electrical, telephone)	SEP	Septic (field, tank, etc.)
PAR	Parcel line work	SEW	Sewer
PAS	Public address system schematics	SFT	Shafts
PER	Perennial	SGL	Sign layouts and details
PGA	Propane gas	SGN	Signs
PIC	Inserted pictures	SHL	Shelving
PIL	Piles	SHO	Shoulder
PIP	Pipes, piping	SIG	Signalling devices
PIR	Piers	SIL	Window sills
PIV	Post indicator valve	SIZ	Size
PIT	Borrow pit	SKD	Skid timbers, skid poles
PLM	Plume outline	SLB	Slabs
PLN	Approach slabs in plan view	SLI	Service lines
PLT	Plants	SMP	Soil sample locations
PMP	Pumping stations	SND	Sand
PNT	Survey points	SNL	Stringers
POL	Poles and towers (electrical, communication)	SOD	Sodded
PRI	Primary	SPA	Spars
PRF	Profiles	SPC	Special
PRO	Provincial boundaries	SPK	Sprinkler system
PRS	Piping riser diagrams	SPO	Sports facilities, goal nets, etc.
PRT	Partitions (walls)	SPR	Stratigraphic profiles
PST	Posts	SPT	Spot elevations
RAD	Radiant heat	SRB	Shrubs
RAI	Railway	SRF	Surface model line work
RAS	Raised floors	SSP	Steel sheet piling
RAW	Raw water lines	STA	Stations (survey)
RCK	Rock	STB	Setbacks
RCL	Recirculation	STG	Staging layout plan
RDR	Roof drains	STI	Strip (airport)
REB	Reinforcing	STL	Steel
REC	Receptacles	STM	Steam
REF	Refrigerant equipment	STO	Stone
REG	Regional and municipality boundaries	STP	Standpipe
RET	Return	STR	Stairs, stairwells, and ladders
RFG	Refrigerant gas	SUB	Sub
		SUP	Supply
		SUR	Work surfaces, D-tops, P-tops, etc.

Ext.	Description	Ext.	Description
SWK	Sidewalks	VAC	Vacuum piping
SYM	Symbols	VAL	Valves
TAB	Tables	VAV	Variable air volume boxes
TEL	Telephone	VCE	Emergency voice communication
TEN	Tenant	VCL	Video controllers (Digital)
TER	Terraces	VCM	Video cameras and monitors
TID	Tide gauges, tidal equipment, tide datum	VEN	Vents
TIE	Tie rods, anchor blocks, tie-back walls	VER	Vertical
TIM	Timber	VID	Video system schematics
TMP	Temporary	VIN	Vines
TMT	Sewage treatment areas	VPC	Valve pump chamber
TNK	Tanks	VPT	Viewports
TOE	Toe of bank, breakwater, berms	WAL	Wall-mounted equipment or wiring
TOP	Top of bank, crest of breakwater, berms	WEL	Well
TRE	Trees	WIN	Windows
TRL	Trails	WLI	Water lines
TRS	Transitional surface (airport)	WLK	Roof boardwalks, catwalks
TUN	Tunnels	WOR	Working area
TXT	Text	WRG	Wiring
UCD	Underlying cadastral fabric, deeds, lots, plans	WSR	Washrooms
UND	Underground, below grade	WST	Waste schematics
UNT	Space allocation by units	WTR	Watercourse
UPS	Ups and conditioned power	XRE	External reference
		ZNS	Zoning surfaces



## Second Layer Name Extension

Ext.	Description	Ext.	Description
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The following table lists the Second Layer Name Extension abbreviations that can be used to create new layer names. This is the fourth or fifth part of the layer name following the Single Layer field or First Layer Name Extension:

X-XX-XXX-**X**    X-XX-XXX-XXX-**X**

- |        |                           |
|--------|---------------------------|
| 1 to 9 | Options or Phases 1 to 9  |
| A      | English Text (Anglais)    |
| B      | As Built (As Constructed) |
| E      | Existing                  |
| F      | French Text               |
| M      | To be Moved or Relocated  |
| N      | New                       |
| P      | Planned or Proposed       |
| S      | Base                      |
| X      | To Be Removed             |

## Annex C – Glossary

“**As-built**” shall mean a set of construction drawings reflecting on-site changes required during the project as well as the original design intent.

“**AutoCAD®**” shall mean the CADD software developed by Autodesk® Inc.

“**Base plan**” shall mean a clean, two-dimensional floor plan of a building drawn from field surveys containing all pertinent graphic information. The intent is to use base plan files for project drawings, then update them once a project is complete and the area affected is re-measured.

“**CADD**” shall mean Computer-Aided Design and Drafting.

“**CAFM**” shall mean Computer-Aided Facilities Management.

“**CLSR**” shall mean Canadian Land Survey Records.

“**DM-5**” shall mean Enterprise Document and Record Management. This is a PWGSC internal electronic document filing system (formally known as EDRM or TIDIS).

“**DOS**” shall mean the Disk Operating System which manages the flow of information to and from various parts of the Personal Computer system.

“**GIS**” shall mean Geospatial Information System.

“**Layers**” shall mean the AutoCAD® system of dividing drawing elements.

“**Legacy drawings**” shall mean older hardcopy drawings, microfiche aperture cards not in digital format, or older CADD files not produced to the present standard.

“**PWGSC**” shall mean the Department of Public Works and Government Services Canada.

“**RPB**” shall mean Real Property Branch, a branch of PWGSC.

“**SDIM**” shall mean Spatial Data Information Management, a general term referring to managing CADD/CAFM/GIS drawings.