From Concept to Classroom

Leading Practices Manual for School Construction in Ontario
Prepared by: The Expert Panel on Capital Standards
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Contents

Preface

This manual aims to assist personnel at school boards involved in capital construction projects, from staff in planning and capital departments to directors and trustees, by guiding them through a typical capital construction process. The manual was written by members of the Expert Panel on Capital Standards, a committee, established by the Ministry of Education, that represents fourteen school boards with considerable capital construction experience (see Appendix A). The manual is designed to provide an overview, from the perspective of school boards, of leading practices in the construction and renovation of schools.

Members of the Expert Panel are mindful that the needs and practices of school boards across the province differ. The manual covers the key steps involved in the school construction process and provides links to additional information and resources. In addition, samples of related processes and policies are provided in the appendices to this document.

Each of the four main sections of the manual addresses one of the four key phases in the capital construction of schools:

- Phase 1: Pre-Design
- Phase 2: Pre-Tender
- Phase 3: Contract Preparation and Tender
- Phase 4: Construction

The four phases are best illustrated with a flowchart, shown on page 3, which serves as a framework for the document. The flowchart diagram provides an overview of the prototypical school construction process. Each of the rows in the diagram represents one of the four phases, and each part of the manual opens with the diagram for the appropriate phase.

The flowchart is not intended to be prescriptive or to imply that school boards should replace current practices that have proved, over time, to be effective in delivering school construction projects, including new-school construction, additions, alterations, and renovations, on time and within budget. Rather, the suggested process is meant to assist those boards that do not have a well- defined process in place and are interested in learning about the best practices of boards that have successfully undertaken capital construction projects.

School board staff are welcome to contact members of the Expert Panel (see Appendix B) to discuss any step in the capital construction process that is described in this manual

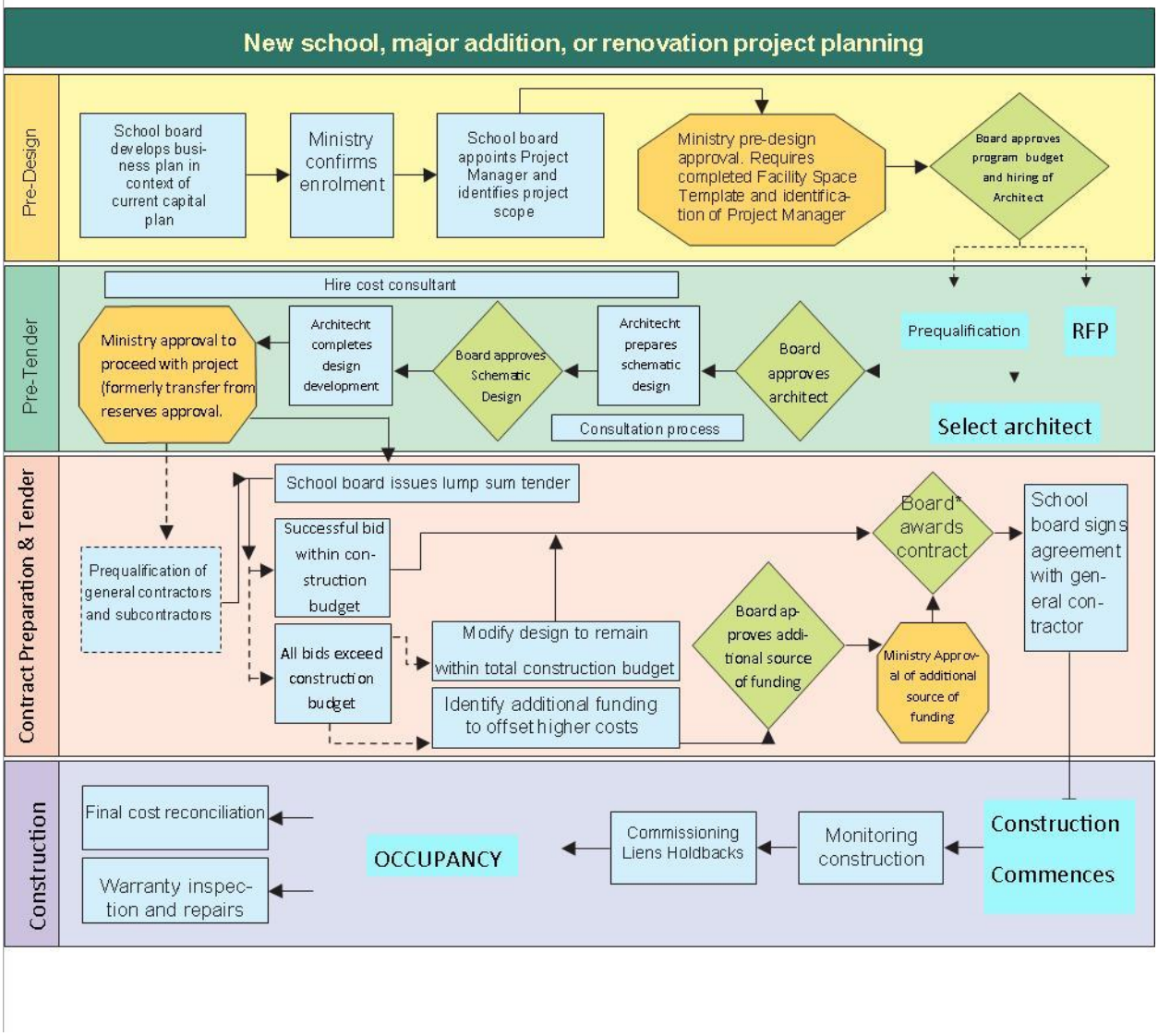
It is hoped that this manual will prove to be a useful resource for school boards. We would like to thank the Ministry of Education for establishing the Expert Panel on Capital Standards and for providing a forum to share, learn, and discuss our various board practices in an effort to identify leading practices in the capital construction of schools.

Note: The following information is intended as a practical guide only. It is not a substitute for the expertise and judgment of the professionals required in the undertaking of a capital construction project.

Expert Panel on Capital Standards

Toronto, 2010

The Project Planning Cycle



The term board (as opposed to “school board”) is often used in this manual to refer to the designated group in a school board with decision-making authority for a particular capital project. This board may be an appointed committee made up of staff and/or others, a subcommittee of the board of trustees, or the board of trustees.

Phase 1 – Pre-Design

Board Develops Business Plan in Context of Current Capital Plan

School boards will, further to ministry requirements, regularly update their capital plans to reflect current enrolment, built capacity, and projections. Any school board undertaking a major capital project must consider it in the context of the current capital plan and of available ministry grants. The first step for any board[1] responsible for a major capital project, whether it is a new school, an addition, or a major renovation, is to develop a business plan. The business plan will be used by both the school board and ministry to confirm the anticipated enrolment related to a project, the absence of alternatives, and the long-term need for the new permanent accommodation. All ministry approvals and the subsequent calculation of a school board's funding allocation will be based on the confirmed enrolment figure projected in the business plan.

All business plans should include the following:

- an explanation of why the new school, addition, or major renovation is needed, using information about projected enrolment growth from the school board's long-term capital plan an estimate of the impact that the new school, addition, or major renovation will have on the projected enrolment and on programs at surrounding schools
- the projected timeline for completion of the project (e.g., site selection and acquisition, architectural design, commencement of construction, school opening)
- a list of all ministry grant funding being requested and how the eligibility criteria will be satisfied
- a statement regarding the extent to which the board anticipates using other funding sources, such as operating funds or reserves, to supplement the ministry grant allocation
- for a new-school project, an indication of whether the school board will have to purchase a site, and how the site purchase will be financed and brought to a construction-ready state
- a statement detailing whether proceeding with the project is contingent on the outcome of an Accommodation Review Committee (ARC) process

Capital requests should be consistent with a school board's identified capital priorities as identified in its Capital Priorities Template in the School Facilities Inventory System (SFIS).

After the business plan has been reviewed by a ministry analyst, the school board will be notified in writing as to whether the requested capital project has been approved for funding.

Site Selection and Land Purchase

Good site selection is the first step in the development of a successful new- school project. The importance of a good site cannot be underestimated – it is the best guarantee that a school board will be able to control costs and ensure timely completion of the new school. Conversely, a poor site, selected without adequate understanding of the underlying soils, water, grades, and municipal services, can lead to excessive costs and significant time delays.

Although school boards play a role in the municipal planning process, in that they identify how many schools are required and where the schools are required, they often do not have final decision-making authority with respect to the eventual site. This makes it even more important for boards to carry out due diligence before purchasing land, by evaluating the suitability of a site according to various factors, including the following:

- site size, site shape, and basic topography and grading
- location of all access roads, road frontage, and flankage for the site
- location of all major site services, including water, sewer, storm sewer, gas, and hydro
- zoning and municipal architectural and design guidelines
- potential grades and storm water management features
- any potentially adverse adjacent uses, including railway rights of way, hydro corridors, major highways and thoroughfares, industrial or commercial uses
- basic soil structure, including soil-bearing capacity, height of the water table, presence of bedrock or unsuitable substrata
- whether the site is a farm or brownfield or has ever been used for industrial purposes
- existing vegetation, including significant species of flora that may have to be preserved
- the ecological sensitivity of the parcel of land, including on-site or adjacent wetlands, regulatory floodlines, woodlots, or trees

If a board does not have the necessary expertise to assess all the elements outlined above, professional advice is essential. Until all of the above factors are known, offers to purchase should be conditional, and may be developed to calculate the costs that will be borne by a school board during construction. Some standard assessments include a Phase 1 environmental site assessment and an archaeological assessment.

If additional work is required to prepare or remediate the site to bring it to a construction-ready state, boards should undertake an assessment of the potential costs of the work.

A school site selected by a board should accommodate the area of the building, provide adequate frontage for access to parking and for a drop-off area and/or bus loop, and provide adequate outdoor play areas for students. Sites that do not allow for the construction of all such facilities should be avoided or adjusted in shape and size as required.

Ministry funding for capital construction assumes soil conditions that would result in strip foundations or similar and other routine site costs, such as final grading, back-filling, landscaping, parking and curbs, hard and soft play areas, and on-site services.

School Board Appoints Project Manager

The Ministry of Education requires school boards to appoint a Project Manager (either internal staff or an external resource) for every capital project (effective November 1, 2009; see Memorandum 2009: SB32: “Introduction of New Accountability Measures for Capital Projects based on Preliminary Findings of the Expert Panel”, dated August 14, 2009). This requirement is part of the ministry’s process in confirming funding availability to the school board.

The Project Manager will serve as the point of contact between the school board and the ministry. During the duration of the project, the Project Manager will also be the key liaison between the school board and the architect/engineer, the general contractor, and all other consultants involved in the project. The Project Manager will oversee all aspects of the project, including monitoring the budget and project timelines and ensuring that processes are in place for eventualities such as change orders and other internal approvals.

Some key qualifications to look for in a Project Manager include the following:

- knowledge of building standards, including the Ontario Building Code
- experience, within the last ten years, managing multi-million dollar projects
- proven track record, with references, of completing construction projects on time and on budget
- demonstrated ability to manage the project budget effectively and to meet project schedules
- good working knowledge of the various municipal and building approval processes
- knowledge of and experience in undertaking projects in the education sector
- knowledge of contract administration and the ability to negotiate contracts
- knowledge of various construction project scheduling software
- good oral and written communication skills

Board Develops Scope of Capital Project

Based on the ministry-approved enrolment figure, the board will need to develop the remaining scope of the capital project. The scope of the project includes the following:

a) developing a building program (i.e., determining the institutional and operational spaces that need to be built, their size, and how they will be utilized)
b) determining the total project budget (construction costs plus soft costs), including revenue available
c) preparing detailed timelines for undertaking the project
d) exploring and addressing any costs that may fall outside the ministry's funding allocation

Developing a Building Program

The Elementary School Facility Space Template and the Secondary School Facility Space Template (available on the Ministry of Education website) are tools to assist the board in calculating the required number of rooms and specialized teaching areas, based on enrolment. By using the results of these templates to identify an initial distribution of rooms, the board can then choose to add or remove rooms, or modify the size of rooms, to accommodate identified local learning priorities within the overall area calculated, based on ministry benchmarks.

Determining the Total Project Budget

The total project budget represents the estimated cost to design, construct, furnish, and equip a school. The ministry allocation provides for soft costs, such as furniture and equipment, site plan fees, building permit and other associated municipal fees, inspection costs, architect fees, and taxes, so the total project budget must also account for these costs. Therefore, the total project budget must identify the following costs:

- the anticipated construction cost, including construction contingencies and allowances
- the anticipated soft costs associated with the design, approvals, and construction of the project (e.g., architect fees, cost consultant fees, disbursements and permits, furniture and equipment)
- any potential costs associated with site-specific issues
- any costs related to site acquisition or preparation that are not eligible under "Education Development Charges" and that must be addressed by the board undertaking the project
- net HST

The total project budget must not exceed the approved allocation identified by the ministry. See Appendix C for a sample total project budget.

Preparing Detailed Timelines

A preliminary set of timelines should be developed based on the four phases outlined in this manual, including key construction project milestones and any construction completion deadlines associated with the ministry grant. Click here to see a sample timeline for an elementary school construction.

Exploring and Addressing Costs outside the Ministry's Funding Allocation

If there are any costs that may not fall into the categories normally covered by the ministry allocation, the board must identify another source of funding or revenue to address these additional costs and inform the ministry of the source and availability of this additional funding.

Ministry Provides Pre-Design Approval

A board must complete a Facility Space Template for an elementary, secondary, or JK–12 school as the first approval point for the construction of a new school or a major addition or retrofit that costs more than 50 per cent of the value of the existing school. The ministry must approve the template before the board can retain the services of an architect.

These templates have been designed by school board officials to assist boards in developing a school configuration that allows them to evaluate potential square footage modifications (e.g., reducing the size of a gym to increase the number of regular classrooms), and so provide the flexibility to address local school needs while achieving the ministry's area benchmarks.

Based on proposed enrolment, the Elementary School Facility Space Template and the Secondary School Facility Space Template generate the gross floor area of the school, the total number of classrooms, and the floor areas for all instructional and operational areas and include a gross-up area of 38% and 42%, respectively. All boards should share this building program information with their architect upon hiring, so that the architect clearly understands the gross floor area assumptions and funding assumptions on which the ministry has agreed to provide funding.

The ministry also requires the school board to identify the appointed Project Manager.

Board Approves Program and Budget

After the ministry has approved the Facility Space Template, the board may approve the program and budget and proceed with the project by hiring an architect to undertake schematic design. Processes across school boards differ, but an informed decision to proceed with the project should be based, at a minimum, on the following information:

- the total project budget, broken down into the various costs identified above
- the proposed space utilization (e.g., type of school, number and size of regular classrooms, specialized rooms and their size)
- the target opening date

If the necessary expertise to assess the scope of work cannot be provided by board staff, the school board may need to hire an architect or a cost consultant to complete a feasibility study for siting the school and to develop a preliminary total project budget. In such cases, the school board contracts with the architect only for the feasibility study and confirmation of the scope of work to be done. If the board decides to proceed with the project, a competitive process is then undertaken to select an architect to see the project through to completion.

Subject to any requirement for additional funding, as discussed below, the school board is responsible and will be held accountable for implementing appropriate measures to ensure that the total project budget remains within the ministry's allocation. The ministry requires the school board to obtain pre-design and pre-tender approvals before undertaking any new major capital projects, including new schools, additions, and major renovations. Additional board funding sources, above and beyond the ministry allocation, that may be required to complete the project must be identified to the ministry when pre-design and pre-tender approvals are sought. Ministry approval also applies to transfer of funds from capital reserves. A board that fails to comply with these requirements may be held responsible for all costs related to the dissolution of contracts.

Phase 2 – Pre-Tender

Board Selects Architect

Note: The terms architect and architectural firm are used interchangeably to refer to an architect in independent practice or an architectural firm.

Following the "design-bid-build" project delivery model, the school board retains an architect[2] to develop a design and prepare drawings and specifications. Once the design is completed, the drawings and specifications are developed and prepared for a stipulated price tender package for the purposes of selecting a contractor, who constructs the project in accordance with the drawings and specifications and schedules prepared by the architect.

Successful execution of capital construction projects requires that contracts be awarded to architectural firms that are suitably experienced in the type of work and construction technology involved, that are financially and managerially sound, and that are able to complete deliverables in a timely manner. Boards generally procure the services of an architect using one or both of the following methods:

- prequalification
- request for proposal

Prequalification

Prequalification is the process whereby a board assesses the suitability of a firm to carry out a particular contract before inviting the firm to submit a bid. Prequalification may be followed by a closed competitive bidding procedure in which only those firms that meet specified prequalification criteria are invited to submit a bid to provide professional consulting services to the board. Alter- natively, a firm may be appointed from the list of prequalified firms, and fees may be negotiated according to the scale and complexity of the project.

At the prequalification stage, a board should know clearly what services it requires and how much time it has to complete the project. Prequalification has a number of advantages, including the following:

- Well-qualified firms will price their bids in the knowledge that they are competing against other qualified bidders who meet realistic minimum competence criteria, and with the assurance that inadequately qualified competitors who submit unrealistically low bids will be excluded.
- Clients can gauge the interest that the contract generates among qualified firms and, in the event that only a limited number of applications are received, can make necessary adjustments in the procurement process.
- Potential conflicts of interest of an applicant with other parties involved in the prequalification process may be exposed.

- The amount of work and time involved in evaluating bids from unqualified proponents is reduced.

How to Prequalify Architects

As part of the prequalification process, a board may require a written submission outlining qualifications, experience, and references, as well as an interview process, to screen architectural firms. If a board decides to require more than a submission and an interview, it is strongly recommended that the school board pay a fee to compensate firms for any design, costing, or scheduling work requested and that any limits on compensation be disclosed at the outset.

See Appendix D for a sample policy on the prequalification of architects, “Selection of Architects”.

Request for Proposal (RFP)

After the prequalification process, a school board can issue an RFP requesting prequalified architects to submit a proposal for services to design and construct a project.

Selection Criteria

Boards should consider the following criteria when examining the qualifications of an architect:

- experience on projects of a similar size and type to the board’s project, and capacity to handle the board’s project on top of current work load
- demonstrated ability (through, for example, references from other boards) to complete projects on budget and on time
- demonstrated commitment to work within defined budgets and to observe and meet provincial benchmarks
- experience in developing energy-efficient school designs
- confirmation of professional liability insurance

The Ontario Association of Architects has prepared a guide entitled A Client’s Guide to Engaging an Architect in Ontario to assist clients in working with architects to define project services and compensation.

Consulting with another board that has experience in selecting architects and negotiating contracts would be advantageous and should be considered very early in the process. See Appendix B for the list of Expert Panel members available to provide advice.

Board Approves Architect

Once the prequalification process and/or RFP process has been completed and an architect has been selected, the firm selected should be approved by the board. It is very important that the architect know from the outset of the con- tract what the construction portion of the total project budget is, and commit to working within this budget.

Developing a Contract

Both the Royal Architectural Institute of Canada and the Ontario Association of Architects have template contracts that can be used in developing a contract:

- The Royal Architectural Institute of Canada, Canadian Standard Form of Contract for Architectural Services, Document Six (2008 Edition)
- Ontario Association of Architects, Standard Form of Contract for Architect's Services, Document 600 (2008)

Board Hires Cost Consultant

Effective November 1, 2009, as part of the request for Approval to Proceed with the project (formerly Transfer from Reserve Approval), the ministry requires a letter from a senior board official confirming that the project estimate by a cost consultant is within the total project budget.

The role of the cost consultant is to review the design, provide objective costing analysis and advice, and report to the board on options to ensure that the proposed capital expenditure is within the approved project budget. It is recommended that the cost consultant be hired simultaneously with the architect so that the cost consultant's review forms part of the materials that go to the board for approval.

It is important to note, however, that the cost consultant must be retained by the school board and not by the architect, to ensure independent evaluations.

The cost consultant's confirmation should be based on a review at two points – the first, after the architect has completed the schematic design documents, and the second, after the architect has completed 80 per cent of the construction tender documents. A school board using a repeat design is exempt from this requirement. If the cost consultant identifies that the cost of construction exceeds allocated funding, the board may wish to identify variable features for costing within the tender (e.g., brick exterior versus masonry block) rather than try to negotiate savings with the general contractor after the tender closes. Alternatively, the school board may use its own funding to finance the shortfall. This information must be included in the business plan and pre-tender approval submissions to the ministry.

The Consultation Process

School boards use a variety of consultation methods to obtain feedback from education stakeholders on a new school or major addition. Some boards establish a user committee composed of some or all of the following:

- Project Manager
- school superintendent
- facility services supervisor
- principal
- trustees
- school council representatives
- student representatives

A user committee can provide initial feedback to the Project Manager in advance of the development of the schematic design or in response to the draft schematic design. The committee's mandate is time-limited and, once the schematic design has been approved, it can be disbanded or engaged to communicate subsequent developments.

Architect Prepares Schematic Design

Once a client-architect agreement is in place, the architect and cost consultant may work with members of the user committee to develop the schematic design documents. These documents can include the following:

- site plan
- spatial relationship diagrams
- principal floor plans
- building sections
- elevations
- general specifications

At the schematic design phase, the architect should discuss alternative design approaches and, under the direction of the Project Manager, both the architect and the cost consultant should confirm that the preferred design is withinthe ministry-approved and school board–approved gross floor area and total project budget.

Board Approves Schematic Design

Before the architect proceeds to prepare more detailed design documents, the board may want to confirm its acceptance of the schematic design documents. In reaching a decision, the board will confirm that the design is within the ministry-approved gross floor area and the construction portion of the total project budget.

Architect Completes Design Documents

After the schematic design documents are completed and before Approval to Proceed with the project is requested from the ministry, the architect will work with board staff on a variety of tasks, including the following:

- finalizing drawings and specifications, including tender and instruction to bidders that are compliant with the Ontario government's Supply Chain Guideline (April 2009)
- making application for municipal site plan approval and a building permit and assisting the school board in acquiring a Site Plan Agreement with the municipality
- assisting with preparation of tendering information and construction contract conditions

While it is the responsibility of the architect to cross-check and coordinate the detailed design drawings against the exact specifications, some school boards have found it cost-effective to contract a "plans examiner" to undertake the task of confirming the completeness of these documents by ensuring that every element in the specifications and drawings is reflected and consistent in the tender documents. This additional level of review has the benefit of reducing the number of errors and omissions and the risk of cost overruns.

Ministry Provides Approval to Proceed with Project

Ministry approval is required before a school board can enter into any new capital financial commitments, tender a capital project, or transfer funds from its capital reserves.

The request to proceed should include the following:

- the school board's capital financial template
- a letter from a senior board official confirming that the cost consultant's estimate of the total cost of construction is within the board's approved allocation, or, if it is not, identifying the other sources of funds that the board will use to cover the costs.

Once the ministry has given approval to proceed with the project, the school board can proceed to issue the tender.

Phase 3 - Contract Preparation and Tender

Procurement Policies and Procedures

The Ontario Supply Chain Guideline (April 2009) identifies a common set of procurement policies and procedures for managing the procurement of goods, services, and construction across the broader public sector, which includes school boards. Effective March 2010, all school boards must adopt these policies and procedures within their existing practices. The threshold for competitive procurement of goods, services, and construction is $100,000. While competitive procurement applies to procurement over thresholds, boards are encouraged to consider open or at a minimum invitational competitive procurement to maximize their chances of securing more favourable pricing for contracts below thresholds. Section 5.3.8.2.2 of the Supply Chain Guideline, “Competitive Documents”, sets out a list of requirements that must be included in a Request for Tender.

Prequalification of General Contractors and Subcontractors

Boards often undertake prequalification of general contractors and major sub-contractors to ensure that only contractors who meet the board’s expectations with respect to expertise, financial security, experience constructing schools, and ability to complete deliverables on time can submit a bid. The call for prequalification of contractors must be publicly advertised.

Useful references in preparing a Request for Prequalification include:

- Supply Chain Guideline (April 2009), s. 5.3.8.1.3 (Request for Supplier Qualifications) and 5.3.8.2.1 (Vendors of Record Suppliers List)
- CCDC [Canadian Construction Documents Committee] 11 – Contractor’s Qualification Statement

The above resources provide information on the general, financial, and health and safety requirements often included in Requests for Prequalification, as well as provincial requirements related to registering suppliers on a list.

School Board Issues Lump Sum Tender

Tender documents (lump sum tenders) are provided only to the approved list of prequalified contractors for bidding. After the close of the tender, the bids are reviewed and a general contractor is recommended. Use of the standard contract form and documents provided in CCDC 2 – Stipulated Price Contract (2008) for each aspect of the tendering process is recommended. Members from the school board sector have developed Supplementary Conditions to CCDC 2 that more accurately reflect the interests of school boards; therefore, it is strongly recommended that boards review

both documents and append appropriate Supplementary Condition provisions in preparing their own contracts.

Before advertising the tender package, it is useful to review CCDC 23 – A Guide to Calling Bids and Awarding Contracts (2005) to ensure that the bid documents provide bidders with all the available information about the project. It is also helpful to have a cost consultant review the tender package for clarity, timeliness, and completeness.

Evaluating Tenders

Tenders may be evaluated in accordance with CCDC 23, and the requirements respecting signature, seal, security deposit, and bonding should be strictly enforced. School boards must comply with the Supply Chain Guideline when projects exceed $100,000 in construction costs. As part of the tender evaluation process, the architect must analyse all opened tenders for compliance with the specific requirements. The architect should also provide the school board with a letter advising that the firm has reviewed the tenders and found them to be compliant, and that it recommends awarding a contract.

It is advisable that a school board seek legal advice should it decide to not award the construction contract to either the lowest tenderer or any tenderer.

If the tendered amount and soft costs are within the total project budget approved by the ministry, the school board may proceed to accept the tender. If the tendered amount exceeds the amount approved by the ministry when it provided Approval to Proceed, the board will need to pursue one of the following two options:

- modify the design so that it falls within the total project budget, or
- identify additional school board funds that will be used to offset the higher costs

Should all tenders exceed the ministry-approved funding, a school board has the option of reviewing all bids to see what features can be modified in order to bring the cost within the ministry's allocation. For this reason, if a board is concerned that a project may exceed its cost estimate, it can ask bidders to provide separate prices for specific items. Separate pricing allows the board, when awarding a contract to the successful bidder, to delete or add items based on the stated prices in order to achieve the optimal outcome for the project without exceeding the funding allocation.

Identifying Additional Funding to Offset Higher Costs

If the tendered amount for the capital project is higher than the amount on which the Approval to Proceed was based, the school board will be required to identify a source of funding to offset the higher costs and will need addition- al ministry approval for the higher amount before the contract can be awarded. It is within the discretion of the ministry not to accept the additional source of funding if the additional funding is not intended to fund pupil places.

Post-Bid Negotiations

If after the close of the tender the lowest bid received exceeds the total project budget and the school board does not have additional funding to contribute to the project, it may select from among a range of options, each with its own risks and advantages. There are many considerations that need to be taken into account, and no uniform practice among school boards. A board may wish to refer to CCDC 23 – A Guide to Calling Bids and Awarding Contracts, in which various options are identified. It is also advisable that board staff contact one of the Expert Panel members listed in Appendix B and/or consult with legal counsel in the course of deciding which option to pursue.

Board and Ministry Approve Additional Source of Funding

Assuming that both the board and the ministry approve the additional source of funding, the school board would proceed as usual to award the contract and sign a contract (CCDC 2) with the general contractor.

Board Awards Contract

When additional approval for the higher cost is required, the school board shall not sign a contract before receiving ministry approval. If it proceeds without approval, the ministry can hold the school board responsible for all costs related to the dissolution of contracts.

The following document should be used in developing a contract:

CCDC 2 – Stipulated Price Contract (2008)

School Board Signs Contract with General Contractor

Once the school board has awarded the contract, the formal contract has been signed, and documents confirming all mandatory requirements of the tender (bonding, insurances, health and safety data, building permits, site plan agreements, etc.) have been obtained, construction can begin. Construction of the project is the sole responsibility of the general contractor and is to be carried out in accordance with the terms of the contract and administered by the architect and the Project Manager through to completion.

Immediately after the contract is awarded, the Project Manager, through the architect, should ask the general contractor for the following materials:

- a detailed project schedule that has been reviewed and approved by the architect
- a schedule of values, showing the total project cost divided into various components of the work breakdown structure (e.g., mechanical, electrical, foundation, site work). This schedule will assist in confirming progress draws

(payments to the general contractor during the course of construction). The architect reviews and approves this schedule as well.
- detailed shop drawings and other submittals, certified by the architect and/or engineer as confirmation that they are in accordance with what was requested in the tender (e.g., steel shop drawings). The drawings help to ensure that the correct equipment/materials are ordered and received on time. For components that cannot be drawn, actual samples will be provided (e.g., brick, flooring, windows).

It is strongly recommended that a preconstruction meeting be held. Topics for discussion should include the authority, roles, responsibilities, practice, and procedures of all parties, to ensure the smooth administration of the con- tract. Participants should decide when site meetings will occur, who is expected to attend, and who will be responsible for the minutes of meetings, as well as for the documentation and working timelines required for progress payments and change orders.

Bonds

While the school board is not responsible for obtaining bonding, it is responsible for ensuring receipt of bonding. It is the responsibility of the general contractor to obtain bonding as specified in the contract documents. A bond provides owners with performance security in that it ensures a completed project in the event of default and payment protection to sub-trades and suppliers. Various types of bonds are routinely required as part of the capital construction process. The most frequently requested bonds are the following:

- **Bid bond** – Intended to protect the school board from the “lowest irresponsible bidder” by providing assurance that the contractor will enter into a contract and provide the required security. Typically,10 per cent of the tender amount is required. If the contractor defaults, the surety pays the difference between the successful bid and the second bidder.
- **Performance bond** – Intended to protect performance of the contract in accordance with its terms and conditions in the event that the contractor is in default and the default is declared.
- **Labour and materials bond** – Intended to ensure that the contractor will pay all direct subcontractors and suppliers of materials and services provided to the bonded project.

School boards should only accept bonds issued by duly licensed surety firms. It is best to specify this requirement in the tender specifications and contract.

To confirm a surety company’s status or for clarification regarding the various surety products, contact the Surety Association of Canada. Additional information on bonds can be found in CCDC 22 – A Guide to Construction Surety Bonds.

Insurance

A board should satisfy itself that existing insurance policies include construction insurance up to a specified amount. The board may want to include construction insurance in the bid form as a separate price and compare the cost of purchasing any additional construction insurance directly. Purchasing addition- al insurance in no way removes the general contractor's risk and liability, but identifying the school board as co-insured on the policy adds extra protection.

Common types of insurance include:

- general liability insurance
- broad form property insurance
- automobile liability insurance
- builder's risk insurance

No payments should be made by the school board until it has been provided with written confirmation that bonding and insurance are in place.

For additional information on insurance, refer to CCDC 21 – A Guide to Construction Insurance (2000) Construction Insurance (2000).

Phase 4 - Construction

Construction Commences

The architect will oversee the construction process to ensure that all the design plans are adhered to and that progress is made on a timely basis. The architect's role also includes administering the building contract, submitting financial reports, and giving advice on maintenance regimes. Particular responsibilities of the architect with respect to construction include the following:

- **Payment certification:** Assessing the eligibility for and certifying entitlement to progress payments that are to be paid to the builder over the course of construction
- **Change orders:** Providing, in writing, an explanation to the Project Manager of why a change order is necessary or why a variation to the contract is being processed, whether the change is required to deal with such unforeseen circumstances as may arise during the building process or to meet changing requirements in relation to the building that are identified only after the contract has been signed
- **Supervision:** Ensuring that the project is constructed in accordance with the contract documents, determining practical completion, and certifying the "substantial performance" of the contract and final completion of work.

All capital projects must be carefully monitored to avoid a situation where a significant number of change orders causes costs to exceed the total project budget. If the capital project has been well planned, change orders should not present a significant issue. School boards are strongly encouraged to develop a policy or procedure on how change orders will be handled to allow the continuation of work within projected timelines. A sample change order policy is included in Appendix E of this document.

Some change orders could present a material change to the design. Should this be the case, the board may need to confirm with the general contractor that the existing bonding and insurance are still appropriate.

Monitoring Construction

Generally, weekly or bi-weekly meetings will be held during the construction phase. Participants often include the Project Manager, the architect, the general contractor, and appropriate sub-consultants. Minutes of all meetings should be kept; ideally, they should be prepared by the architect for the benefit of both the school board and the general contractor.

Progress Payments

As the job progresses, the general contractor will generally apply for progress payments, or “draws”, on a monthly basis. The progress draws are based on the value of the work done in the payment period. The value of this work is judged in relation to the contract work breakdown structure. The progress request is typically accepted by the Project Manager and the school board only after certification by either the architect or the engineer through a Certificate of Payment.

During the construction phase and for the specified statutory period (i.e., 45 days afterwards), the school board may safely make progress payments to the general contractor for all amounts except the statutory holdback. However, if the board receives notice from subcontractors or suppliers that liens are outstanding and unlikely to be paid by the general contractor, the school board will need to review its contract with the general contractor to determine what steps it can legally take.

It is the school board’s responsibility to know if liens have been registered against its property. Sub-searches on property title should be completed to reduce the risk of a lien being registered unknowingly by a subcontractor, supplier, or other service provider. It is imperative that payment be made as quickly as possible after an acceptable lien sub-search has been performed, preferably on the same day, to minimize the risk of a lien being placed on the property after the sub-search but before the general contractor receives payment.

General contractors must submit a statutory declaration when submitting a progress draw, declaring that the subcontractors and suppliers to the contractor have been paid. The statutory declaration provides limited protection for

the school board because it specifies that only those parties with whom the contractor has a direct relationship have been paid for supplies/services rendered. It does not apply to other parties who provide supplies/services to the subcontractors and suppliers.

A recent survey of school boards reflects a variety of practices with respect to performing sub-searches. Some boards conduct a sub-search for every progress draw, some for every other payment, and some only if problems are suspected. Some school boards set a minimum dollar value (ranging from $100,000 to

$500,000) for performing a sub-search and some rely on the statutory declaration that is submitted with each progress draw request.

It is recommended that all school boards establish a dollar threshold (e.g., $0, $100,000, $250,000) for conducting sub-searches and that they conduct a sub-search for every progress draw that meets this criterion. (See Appendix F for a sample school board progress draw policy.) A sub-search generally costs between $50 and $125.

Outlined below are some additional good practices and tasks that boards often undertake during the construction phase. These tasks are generally undertaken by the Project Manager or a designate:

- Obtain site reviews of construction and reports of all site visits from architect/consultant (e.g., engineer).
- Review with consultants that the general contractor is carrying out work in a safe manner that meets the requirements of the Occupational Health and Safety Act and regulations made under the act.
- Communicate decisions through the architect to the general contractor.
- Review work and construction schedule regularly, and ensure remedial action by the general contractor as required.
- Coordinate participation of school board maintenance technicians in operational review of system mock-ups/installation.
- Provide ongoing advice and information to architect, consultants, and general contractor relating to specific school board requirements.
- Review, evaluate, and approve change orders after adequate review by architect and consultants.
- Review and approve all payments to architect.
- Provide keying schedule (policy), locker numbering, and other operational requirements, such as interior and exterior school signage, school name, and school colours, to architect and general contractor.
- Approve materials selection and colour scheme and coordinate purchase of furniture and equipment.
- Provide Superintendent of Schools and principal with furniture and equipment budget.
- Provide periodic progress reports to board.
- Assign head caretaker to the new school sufficiently in advance of completion that he or she may become familiar with the building systems and organization.

Commissioning

Commissioning is the process whereby an independent consultant (a “com- missioning agent”) verifies, through testing, that all of the new school’s operating systems perform in accordance with design specifications and operational needs. This process of verification includes but is not limited to all mechanical systems, air and water balancing, control systems, energy monitoring and control systems (EMCS), equipment start-up and sequencing, emergency generator, and life safety systems (e.g., sprinklers, kitchen hood suppression systems, fire alarm system, extinguishers, elevators, security systems, and PA systems). Takeover of the newly constructed school and commissioning are as important a stage for overall project success as the design and construction of the capital project. A smooth transition in passing the school from its construction phase to its final use is also relevant to school board assessment and the success of the project. Key areas of concern during the takeover and occupancy phase include the following: safety planning; resource planning; communication; moving of staff, furniture, and files; staff orientation and training on all operating systems and equipment; and staging.

It is recommended that boards include procedures outlined in the document OAA/OGCA Take-Over Procedures, which clearly sets out the procedures required to facilitate the closing stages of a construction contract and the take-over of the project by the board, in their contract with the general contractor.

The commissioning process often focuses on building systems (e.g., boiler, HVAC), but it can be customized for each project.

For additional information on commissioning, refer to the Canadian Handbook of Practice for Architects, Volume 2, subsection 2.3.12, “Take-over Procedures, Commissioning, and Post-occupancy Evaluation”.

Liens and Holdbacks

Any person or corporation that provides labour, services, or supplies to improve real property can place a lien. A lien is a legal hold against the owner’s (i.e., the school board’s) property and allows unpaid contractors, labourers, suppliers, and even architects and engineers to claim against the owner’s property until they are paid. To make a lien legally actionable, the lien holder must register it on title. A lien may be registered during the performance of the work or services or supply of materials or within 45 days of completion or abandonment of performance. If a lien is not registered within the statutory period it ceases to exist. Registration gives a lien holder 90 days after the work has been completed or the materials have been placed or furnished to commence a legal action.

As noted earlier, the general contractor will typically apply for monthly progress draws through the course of construction, based on the value of work done during the particular month. After the progress draw request is accepted by the board and/or certified by the architect or engineer, the school board makes the payment. However, the Construction Lien Act requires that the school board, as owner, retain a “statutory holdback” at all times of at least 10 per cent of the value of the work done. The holdback will be held until released to the general contractor on the expiration of lien rights.

Should a lien be registered against the school board’s property, a “notice holdback” of an amount equal to the value of any registered lien plus 25 per cent may be retained by the board from subsequent payments until the lien is discharged. Options other than retaining a notice holdback are also available, so it is advisable that the school board consult a lawyer.

Subject to certain publication notices and timelines, the Construction Lien Act permits the release of holdbacks once a project is “substantially complete”. Substantial performance is achieved when the project is ready for its intended use and the cost of finishing the work or rectifying deficiencies is not more than 3% of the first $500,000 of the contract price, 2% of the next $500,000, and 1% of the balance. At this point, a Certificate of Substantial Performance may be issued by the architect. Once the certificate has been issued, the con- tractor will publish a notice attesting to substantial performance and informing any interested parties that they have 45 days from the date

of publication to register a lien or forgo protection of the Construction Lien Act. After this point, to protect against the completion of outstanding work and deficiencies, the school board may retain any further payments until the architect issues a Certificate of Total Completion (when cost to complete all outstanding work and deficiencies is deemed to be the lesser of 1% or $1,000) and the expiration of all remaining lien rights is determined.

Workplace Safety and Insurance Board Certification

A Workplace Safety and Insurance Board (WSIB) Statutory Declaration listing outstanding accounts and monies paid and a WSIB Certificate of Clearance shall be submitted by the general contractor to the architect/board with each monthly progress draw and before the release of the statutory holdback.

Deficiencies

Throughout the entire construction process, the architect/engineer will monitor for any deficiencies during site visits and bring these to the attention of the general contractor for follow-up. When the architect and the general contractor are satisfied that sufficient progress has occurred to confirm substantial performance, the architect, consultants, general contractor, and board representative will conduct a final inspection of the project. If the architect issues a Certificate of Substantial Completion, then the general contractor may publish notification of substantial performance in the Daily Commercial News (DCN) to start the 45-day lien period.

Following substantial performance, when all outstanding and/or deficient work has been corrected, the project is certified as completed. Total performance usually occurs when the lesser of $1,000 or 1 per cent of the contract amount is outstanding.

As part of the determination of substantial performance, a commissioning agent may be asked in the process of testing the major school equipment (e.g., boilers, humidifiers, chillers) to prepare a summary report of deficiencies. The commissioning agent's report will also be provided to the general contractor for follow-up and correction of deficiencies.

Although commissioning agents may not be readily available at all times, school boards that regularly undertake significant capital construction projects recommend investing the additional time and expense to hire a commissioning agent, because the agent works independently of the general contractor and may uncover deficiencies that might otherwise go undetected.

Warranty Inspection and Repairs

Eleven months after "substantial completion", a meeting will be organized by the school board with the architect, the general contractor, and other consultants, as required, to

identify all repairs and warranty adjustments. The warranty inspection will result in a report outlining any outstanding warranty items or latent deficiencies. A copy of the report will be provided to the general con- tractor to make the necessary repairs within an agreed time schedule.

The warranty period for roofs, windows, and so on, are often longer than a year, so similar meetings will take place before subsequent anniversary dates from “substantial completion” to identify any repair to extended warranty items. Extended warranties do exist for some features, including windows, roofs, and HVAC systems.

Final Cost Reconciliation

As a final accountability measure, school boards will undertake a final summary of accounting when the project is 100 per cent complete and all bills and invoices have been paid. Most school boards will present the final summary of accounting to their board of trustees, especially if the total project cost exceeds the project budget.

In addition to cost reconciliation, board staff should undertake a post- construction review to assess the overall capital construction process and to inform future projects. Some of the things boards commonly review include the following:

- contractor and sub-trades performance
- architect and consultant performance, including analysis of the cost and reasons for change orders
- list of warranties (review with maintenance department and custodial staff)
- compliance with ministry SFIS reporting requirements (by updating capital construction information)

Appendix A - Members of the Expert Panel on Capital Standards

Name	Position
Ralph Benson (Chair)	Superintendent of Corporate Planning, York District School Board
Sandi Ackroyd	Assistant Manager, Plant Department, Rainbow District School Board
Kevin Bushell	Executive Officer, Facility Services and Capital Planning, Thames Valley District School Board
Glenn Clarke	Controller of Plant, Simcoe Muskoka Catholic District School Board
Giacomo Corbacio	Superintendent, Facility Management Services, Halton Catholic District School Board
Fred Chrystal	Superintendent, Planning and Facilities, Ottawa Catholic District School Board
Gerry Cullen	Superintendent of Facility Services, Halton District School Board
Bryce Eldridge	Superintendent of Plant, York Catholic District Board
Suzanne Labrecque	Directrice du secteur de l'immobilisation de l'entretien et de la planification, CSD du Centre-Sud-Ouest
Lewis Morgulis	Manager of Facility Planning, York District School Board
Luc Poulin	Directeur du Service des immobilisations, CSD catholique du Centre-Est
Paul Scinocca	Manager of Capital/Renewal Projects, Upper Grand District School Board

Name	Position
Wolfgang Stumpf	Manager of Design, Dufferin-Peel Catholic District School Board
Arnie Wohlgemut	Senior Manager Facility Services, Waterloo Catholic District School Board
Randy Wright	Controller, Planning & Accommodation, Peel District School Board

Appendix B - Expert Panel Contacts

Name	Email	School Board	Phone Number
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Glenn Clarke	gclarke@smcdsb.on.ca	Simcoe Muskoka Catholic DSB	705-722-3555
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Name	Email	School Board	Phone Number
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Randy Wright	randy.wright@peelsb.com	Peel DSB	905-890-1010 Ext 2203

Appendix C - Sample Total Project Budget

Construction/Site Development

Activity	Cost
Construction Estimate	$6,950,000.00
Building Permit	$69,500.00
Design Contingency	$173,750.00
Project Coordination	$40,000.00
net HST	$119,887.50
Construction/Site Development Subtotal	$7,353,137.50

Architects/Consultants

Activity	Cost
Architect	$520,000.00
Other Consultants	$20,000.00
Survey/Testing/Permits	$25,000.00
net HST	$9,416.67
Architects/Consultants Subtotal	$574,416.67

Furniture and Equipment

Activity	Cost
Furniture and Equipment	$320,000.00

Project Budget Totals

Name	Amount
Construction and Soft Cost Subtotal	$8,247,554.17
Project Contingency	$206,188.85
Total	$8,453,743.02

Note: Figures are for purposes of illustration only.

Appendix D - Sample Board Policy on the Prequalification of Architects

Selection of Architects

Statement of Policy

It is the policy of this Board that architects on capital projects initiated by the school board be recommended for Board approval by the Physical Planning and Building Committee, as a result of interviews and in accordance with the procedures established by the Board.

Procedure for Selection

Out of the Board's file of architects expressing written interest in a commission with the Board, a Pre-selection Committee, comprising a Superintendent of Education, the Controller of Planning and Accommodation Support Services, and the Manager of Planning and New School Accommodation, will review all submissions and choose a significant number of architectural firms (that will afford the Architect Selection Committee a wide selection, but no more than twenty.), based on the Criteria for the Selection of Architects.

These firms will be notified that they have been chosen by the Prequalification Committee and they will be requested to prepare a specific proposal for the Committee's review. This proposal shall include the completion of the Architect's Qualification Statement and shall include pictures, descriptions of previous work, design statements, and other information chosen by the firms to describe their work.

Once the Architect's Qualification Statements, and other pertinent data that the architects elect to prepare are received, the Prequalification Committee shall expand to include the Chair of the Physical Planning and Building Committee and the Chair of the Board (or their designates). This Committee will be known as the Architect Selection Committee.

Out of the original prequalified submissions, the Architect Selection Committee will select up to seven architectural firms for each category of work. A report, including a brief resume on each of the architectural firms to be interviewed by the Physical Planning and Building Committee of the Board, will be prepared. These architects shall be interviewed by the Physical Planning and Building Committee. The order of architect interviews will be established by a draw.

The Physical Planning and Building Committee will make its recommendation to the Board, choosing one architectural firm for each category of work.

Criteria for the Selection of Architects

Professional Qualifications

The consultants must hold professional qualifications and be registered by their professional organizations and licensed to practice in Ontario.

Experience

Preference will be given to firms with recent satisfactory experience in school construction in Southern Ontario. However, consideration will be given to firms that have designed other types of buildings and indicate potential ability to introduce superior design or achieve economies in school construction.

Control of Costs

To be selected, architects must produce evidence of their ability to control costs and to design schools within the estimates approved by the Board. The finalists must indicate, in writing, that they agree to sign the Board/Architect Agreement, which stipulates that they will redesign any of their projects, at their own expense, to bring the cost within the approved estimates.

Size of Firm

Preference will be given to firms in which the supervision of construction is conducted by a principal of the firm. The ability of the firm to produce sketch plans and prepare contract documents within the specified periods will also be a consideration for selection.

Quality Control

Preference will be given to architectural firms that have a proven record of maintaining quality control throughout the construction of the project.

Fee

The consultants must be prepared to accept the fee schedule as approved by the Board and prepare all documentation on the percentages as outlined in the Board/Architect Agreement.

Location of Office

Other factors being equal, preference will be given to firms located within 50 km of the [municipality/region]

Appendix E - Sample Board Policy on Change Orders

Purpose

This policy outlines the procedure by which all construction project changes will be implemented. The procedure is based on a philosophy that all changes will be held to an absolute minimum, and only necessary changes will be approved. This procedure closely aligns with procedures outlined in construction industry standard contract format CCDC 2 – Stipulated Price Contract (2008).

Definitions

i. **Change Directive and Contemplated Change Order** – A change directive (example attached)[4] is a written instruction, prepared by the architect and signed by the Board, directing a change in the work [as specified in the contract documents] that may be outside the general scope of the contract documents. A change directive is initiated as a result of work requiring immediate attention (not stopping work in progress). A Contemplated Change Order form is then completed as soon as possible.

ii. **Change Order** – A change order (example attached) is a written amendment to the contract, prepared by the architect and signed by the Board and the general contractor, stating their agreement on: a change in the work; the financial amount of the adjustment in the contract price, if any; and the extent of the adjustment in the construction completion date, if any.

iii. **Site Instruction** – Site instruction (example attached) is a written instruction, prepared and signed by the architect, providing direction in the work within the general scope of the contract documents. A site instruction shall not be construed as an authorized change to the contract price and/or the construction completion date.

Procedure

With respect to change orders, the following provisions must be observed:

1. The construction contract approved by the Board should be such that the Board will not require modification to the floor plan, equipment, component systems, finishes, or any other significant details.
2. The architectural firm, in its agreement with the Board, agrees that no fees or reimbursable expenses shall be paid to the architect or the sub- consultants that relate to errors or omissions of the architect or the sub-consultants resulting in extra cost or changes to the contract.
3. All Contemplated Change Order forms and change orders will be evaluated by Board representatives and must be cost-estimated accurately. The following chart identifies signing-level approvals:

$ Level	Project Manager	Manager, Design and Construction	Controller, Planning and Accommodation	Associate Director, Operational Support Services
Change orders <$5,000	Signature Required	Signature not Required	Signature not Required	Signature not Required
Change orders <$10,000	Signature Required	Signature Required	Signature not Required	Signature not Required
Change orders $10,000–$100,000	Signature Required	Signature Required	Signature Required	Signature not Required
Change orders >$100,000	Signature Required	Signature Required	Signature Required	Signature Required

Administration = Project Manager; Manager, Design and Construction; Controller, Planning and Accommodation; Associate Director, Operational Support Services

4. Any required changes, such as those related to the correction of previously undetected problems in site conditions, directions from authorities with jurisdiction over the site, or changes in codes, will be approved only after a thorough evaluation of their prospective costs.
5. All changes processed and approved will identify any impact on construction completion and occupancy dates, the budget, the contingency or miscellaneous account, and so on, and will include reference to outstanding or remaining contract funds;
6. The Board will not pay for the architect's or sub-consultant's fees relating to Contemplated Change Order forms or change orders to ease the flow of work (unless otherwise negotiated by the Board and the architect as a cost-reduction measure);
7. The Board will avoid approving changes for new items or equipment that may be desirable but unnecessary.
8. The Board will not delegate any authority to the architect to issue changes unilaterally.
9. The Board will aggressively seek justification from the general contractor for any construction delay and will pursue alternative methods to minimize the impact on the schedule for project completion.

10. Change orders related to requests from principals of schools will be kept to an absolute minimum and will require authorization from the Superintendent of Education and the Controller of Planning and Accommodation before they can be undertaken. No change orders will be approved unless they are related to health and safety, regulatory requirements, or system instructional program needs.
11. When a change in the work is proposed or required, the architect shall provide a notice describing the proposed change in the work to the general contractor. This will require completion of a Contemplated Change Order form (example attached). The general contractor shall present, in a form acceptable to the architect and the Board, the contract price adjustment, if any, and the construction completion adjustment, if any, for the proposed change in the work.
12. When the Board and general contractor agree to the adjustments in the contract price and construction completion schedule, such agreement shall be effective immediately and shall be recorded in a Change Order form (example attached), signed by the architect, the Board, and general contractor. The value of the work performed as the result of a change order shall be included in applications for progress payment.
13. The Construction Change Order Tracking form (example attached) must be completed and updated for all approved change orders.
14. No Contemplated Change Order forms or change orders that cause the contract price to exceed the board-approved total project cost will be approved.

Appendix F - Sample Board Practice for Progress Draw Payment

- The architect submits an invoice for a progress draw to the plant department, where it is reviewed to ensure that it accurately reflects the amount of work performed and that there are no errors.
- If approved, the invoice is coded and forwarded to the budget department for checking (coding, approvals, contract, etc).
- The budget department sends an e-mail to the lawyer, usually one to two days prior to vendor payment, providing the site name, the site description, and the date by which a sub-search is required.
- The progress draw invoice is forwarded to the accounting department for processing. The cheque is prepared and dated for the sub-search date, then forwarded back to the budget department along with an invoice backup.
- On the morning of the payment, the lawyer (who has been asked to respond before noon) e-mails budget department staff with the results of the sub-search and confirms release of payment or informs of lien(s).
- The lawyer's e-mail is printed and attached to the vendor invoice.
- If title is clear, approval for release of payment is indicated on backup documentation and the cheque and invoice are sent back to the accounting department, which calls the vendor to pick up the payment (pick-up prior to 4:00 pm) on the same day as the title search.
- If a lien is found, the cheque is cancelled and the plant department is advised of the lien.
- The contractor is notified that payment is being held pending clearance of the lien.
- When the contractor advises that the lien has been cleared, the process is repeated.