Review Process

The review process was led by the outgoing Director of the School of Architecture, Rick Haldenby. Following the undergraduate review, and the accreditation review by the Canadian Architectural Certification Board in 2011, faculty, staff and students were engaged in 2012 in the Vision 2015 Planning process in the Faculty of Engineering. The work undertaken by various committees informed the self study which was completed in fall 2012. An alumni survey was also undertaken which provided input.

The review team consisted of Dr. William Braham, Director of Master of Environmental Building Design Architecture, University of Pennsylvania, and Professor Christine Macy, Dean of the Faculty of Architecture and Planning, Dalhousie University. The internal reviewer was Rhona Hanning. The site visit occurred on June 26-27 2013. The reviewers’ report was received July 28 2013 (slightly outside the usual two-week timeframe, due to holiday and travel schedules).

The School Director’s term ended in December 2013. Although the assessment of the MArch Program contained in Section 2.1 (b) sums up its considerable strength, given that the Review Committee has made recommendations that there be modifications to the structure, it was decided that the new Director Dr. Ila Berman would undertake a planning retreat to evaluate new directions and opportunities. Hence the School response was received much later than the normal 10 weeks following receipt of the review.

The previous graduate review (2006-07) ranked the Program as “Good Quality with Report”, where the School was asked to report in 2009 on the adequacy of library resources and adequacy of student support. The report also flagged two additional issues to be examined at the next cyclical review, namely number of core faculty, and time to completion. The requested report was submitted in 2010. The Appraisal Committee of OCGS asked for further clarification on the two issues, and a response was submitted in October 11 on the two topics (library resources and student funding). This response was deemed satisfactory.

The 2011 accreditation review praised particular strengths of the program:

- the community of scholars, balancing practice and research skills;
- the unique degree format dependent on the strength of the pre-professional program gave the MArch a remarkable freedom from professional requirements and allowed it to focus on an independent, research-oriented thesis project;
- the Cambridge campus, which is a wonderful space and a source of pride to the community; and
- the integration of a broad set of courses, the Rome studio and Co-op placements into the curriculum as part of the Cultural History focus, leading to “an extended and comprehensive discussion of natural and built environments in the light of different values and notions of physical, political and spiritual order.” (CACB review section 5, reproduced in 2012 March Self Study document p84).
The accreditation review also highlighted some concerns:

- whether the operating budget for a separate campus had been satisfactorily established;
- that there was at the time of the review only one full Professor in the School, although with the new Director and promotions to rank since the accreditation, this has increased to five;
- curriculum development; in particular the difference between the density and demands of the BAS curriculum, and the very self-directed nature of the MArch, and the times to completion; and
- the fully independent thesis limits the further alignment of the graduate program with institutional goals of increased research excellence and the attraction of international students.

**Characteristics of the Program**

Professional education in Architecture in Canada began to change in the 1990’s, when the traditional five-year program (a 3-year pre-professional program and a 2-year BArch) gave way to a four-year undergraduate degree followed by a Master’s degree. Three schools offered a 3-4 year Master’s (for undergraduates without the BArch) but Waterloo opted to move to a four-year BAS (with additional co-op terms) and to add an MArch which accepted its first students in 2000. The MArch is the essential requirement for accreditation, and the requirement for entry to professional practice.

The Waterloo Master’s differs somewhat from others, in that many of the elements required for professional accreditation are in fact completed at the undergraduate level, which (along with the substantial co-op experience) renders the graduates from the BAS exceptionally well-prepared. As a result, the curriculum of the Master’s can be more open, and all students complete a self-directed thesis. It means that Waterloo BArch graduates have an incentive to remain in Waterloo for the MArch (otherwise they will have to repeat several elements in a Master’s elsewhere), but also that it is more difficult for BAS and BArch graduates from elsewhere to take their Master’s at Waterloo, as they typically require an additional year or more of preparatory elements.

Most students in accredited professional MArch programs complete a thesis, and in institutions across North America this may take one of various forms, from directed research studios to fully independent research theses. The MArch structure is unique in relation to other disciplines in that thesis programs most often combine traditional research with design. At Waterloo research methodology is taught in the first semester of the MArch program (M1), although its form, which is typical for MArch theses at most architectural schools is distinct from research courses in other fields in that it is studio-based and combines the study of research and design methodologies with program development and precedent analysis. The content and structure of this coursework is already being augmented in response to the recommendations of the review.

Post-professional Masters programs in advanced areas of specialization in addition to offering a doctorate is something that Waterloo Architecture is also considering.

**Significant strengths of program**

The School has an excellent reputation. 2012 AZURE Magazine ranked it among the top five in North America. Graduates have little difficulty in getting jobs in the field within 6 months of graduation, and all the alumni responding to the survey were employed. Almost two-thirds were employed in architecture firms, with the others publishing and
exhibiting design research, or teaching or engaged in further study. Master’s students have many achievements; one won the first NSERC Innovation award to go to an Architecture student; every year half-a-dozen win OGS and SSHRC fellowships; graduate students have over the last 12 years won two CMHC Housing Research Awards and three Canadian Green Building Council scholarships; four thesis projects have resulted in buildings.

The School of Architecture at Waterloo is the only one in Canada with a permanent international campus, and graduates work in more than 20 countries worldwide. Many students undertake international co-op terms.

**Academic Programs Offered: Master’s program goals**

The School currently offers the BAS in addition to the MArch.

The Master’s program aims:
- to prepare students for professional practice;
- through a self-directed research thesis to provide graduates with superior research skills and areas of individual specialization; and
- to advance knowledge in architecture through research and engagement in practice.

**Specific Learning Outcomes**

There are 31 Student Performance Criteria (SPC) required for professional accreditation, organized according to four categories, intended to foster an integrated approach to learning that cuts across subject categories:

A: Critical Thinking and Communication [9 SPC]

B: Design and Technical Skills [12 SPC]

C: Comprehensive Design [4 SPC]

D: Leadership and Practice [6 SPC]

These criteria, in turn, encompass two levels of accomplishment:
- Understanding: means the assimilation and comprehension of information without necessarily being able to see its full implication,
- Ability: means the skill in using specific information to accomplish a task, in correctly selecting the appropriate information, and in applying it to the solution of a specific problem.

All but two of the criteria in section B, and all four of the criteria in section C, are achieved in the undergraduate program; the other criteria are specific learning outcomes of the graduate program (see Self Study for details). The six criteria from section D are developed throughout both the BAS and the MArch. The nine criteria in section A are closely related to some of the Graduate Degree level Expectations.

**Faculty**
At the end of the reporting period for the Self Study (June 2012) there were 19 faculty members able to supervise in the Master's (and one individual set to begin July 1 2012). Of these, 18 were tenure stream, and 2 were Lecturers. There was in addition one cross-appointed faculty member, and also adjunct faculty who serve on committees.

Faculty members have won many distinguished awards and prizes:
- Fellow of Royal Architectural Institute of Canada
- Governor General’s Medal in Architecture
- Canada Council Prix de Rome
- North American Gold Holcim Award
- Association of Collegiate Schools of Architecture Design Award (3)
- Canadian Architect Award of Excellence (2)
- North American Wood Design Award
- Member, Royal Canadian Academy of Arts
- National Jewish Book Award
- Representing Canada at the Canadian Pavilion of the Venice International Architectural Biennale

Research funding averages around $300,000/year, about half from TriCouncil agencies, and the balance from largely public sector/non-profits, and a modest amount from the private sector. As noted in the review: 'one third of the faculty are highly productive researchers or research-practitioners, with between eight and 18 research outcomes per year (eg. grants received, peer reviewed publication in significant journals, juried design awards and exhibitions, etc.). One has exceptional productivity at 40 such outcomes annually. Another third are averaging between four and seven research outcomes annually.’ Over the period since the past review, faculty have each published on average either one book chapter or one refereed journal article each per year; presented one conference paper and one or two invited presentations per year, had one design or creative project each per year, and one exhibition of their work/curated an exhibition/published design work. Of course some faculty focus more on the scholarly publications, while others focus more on the design and creative projects and exhibitions, so this represents an overall average.

Staff

The faculty are supported by 12 full-time staff (not including security services staff, and co-op students on temporary contracts).

Students

The large majority of students come from the Waterloo BAS program. External applicants from an appropriately accredited school can be accepted, but typically need to do one or two qualifying terms, if not more. Master’s student numbers have grown since the program began.

Although the program is described as requiring three terms, in practice the average time to completion over the last decade has averaged seven to eight terms, and hence there are typically closer to 150 students in the program at a given time (peaking at 182 in 2009/10). No students have transferred to other programs during the program’s history, and on average only three students a year withdraw, indicating a very high completion rate.
About half of the students enrolled are funded (related to the fact that somewhat less than half are in the three terms in which the program is officially supposed to be completed). The average funding per student is around $12,000/year, and most students have the opportunity of being a teaching assistant at least once. Students have also been successful in winning external scholarships as well as internal university scholarships. Given that only half the students are funded at a given time, average funding per student (all students) is closer to $5000. This is however higher than at other Canadian schools for the MArch, since students taking professional degrees are typically not guaranteed funding.

The caliber of the students is evidenced by their excellent success in publications, conference presentations, exhibits, awards and scholarships (detailed in the Self Study).

The alumni survey showed that graduates found employment promptly after graduation, and the large majority remained in the profession at the time of survey. Of about 32 who responded, just less than half reported publications/conference presentations/exhibits.

**Space**

As befits a School of Architecture, “(t)he new building in Cambridge is a first-rate facility, custom-designed for the requirements of the School of Architecture” (Reviewers’ report).

**Reviewers’ Observations:**

The reviewers provided a long and detailed report, and commented very positively on various aspects of the program:

“Overall, the quality of student theses is very good…Quality indicators include a large number of design awards received by students in the past six years, many from the Ontario Association of Architects.”

“…the School has a national reputation for producing exceptionally qualified alumni..”

“By and large, the program produces excellent work.”

“…the co-op based BAS degree, … is arguably the strongest undergraduate program in Canada..”

“The Vision 2015 Strategic Plan of the Faculty of Engineering identifies four general goals specific to graduate education: increase graduate enrolment, improve graduate programs, improve graduate operations, and enhance graduate student experience. The program’s activities since the last external review have been consistent with all these goals.”

They also made a few concluding observations, along with a very few succinct recommendations:

1. Because the accredited degree is the combined BAS-MArch, most students expect to proceed from the undergraduate to the graduate program (provided they maintain the requisite academic standing).
2. The BAS provides an excellent foundation for advanced work in the design studio and in design research, but does not adequately prepare students for independent research.
3. The graduate cohort is large and students have developed their own support systems, including a graduate society and research clusters.

4. Although most students complete the Master of Architecture, progress through the program is slow, requiring on average 2.5 years in addition to the five years required to complete the BAS. This makes the duration of an accredited architecture degree from Waterloo the longest in Canada.

Reviewers’ Summary and Recommendations

1. The faculty reflect on the role of research in a professional school of architecture and to other graduate programs within the field, its relationship to innovative design practice, and to research conducted elsewhere in the university.

2. That because of its unique structure, the program has been limited in its ability to attract more international students, which might be addressed with both an enhancement to the structure of the existing program to support these students and additional graduate degree offerings such as a non-professional or post-professional Masters programs.

3. The faculty consider creating a one-year coursework-based Master of Architecture option, followed by a post-professional research Master degree with thesis.

Response to Recommendations

As a response to the recommendations of the OCGS Reviewers’ Report the new Director of the School set up an Architecture Curriculum Committee and held a strategic planning retreat with the School of Architecture faculty to have an in-depth discussion in response to the external review and its recommendations. This was followed up with an environmental scan of its aspirant peer programs, and an internal assessment and curricular review of both the undergraduate and graduate programs at the School. The intention of this process is:

- to develop strategies and adjust the curriculum to strengthen and refine the MArch program and its structure;
- to enhance the program to better attract international graduate students and those coming from outside institutions;
- to improve retention and completion rates of graduate students; and
- to plan for the development of additional offerings at the graduate level.

To facilitate a holistic approach, the MArch curricular review was developed in concert with a curricular review of the BAS program to respond, not only to issues within the graduate program, but also, given that the MArch is the first professional degree to which the BAS leads, to the transition between programs. A summary of the results of this process and the proposed modifications to the program to respond to these recommendations is below.

Program Modifications Phase I:
Eliminate the “Qualifying” terms for external applicants to the MArch program

Graduates of Waterloo’s BAS have already completed the Comprehensive Building Design requirement for professional certification as part of their undergraduate training. Graduates of most other pre-professional
(undergraduate programs) from other institutions in Canada and internationally typically need to complete this requirement as part of their graduate professional training.

The University Senate approved in June 2014 the School of Architecture’s major modification, namely to offer required courses for the Comprehensive Building Design requirement at the graduate level, such that applicants from other universities could enter the graduate program at Waterloo directly, rather than having to undertake qualifying terms. Graduates from the Waterloo BAS would be exempted from these courses, based on prior completion as part of the BAS, which is a longer program than most pre-professional undergraduate programs taught elsewhere.

The above set of modifications will bring the MArch program into alignment with the structure and accreditation requirements of the discipline, while also supporting the internationalization of the program, and the cohesion of the entering graduate class.

Program Modifications Phase II:
MArch Curricular Revisions

The strategic planning and curricular review process over the past year has lead to a series of proposed modifications to the MArch program (that will be submitted to the university in the fall of 2014) to strengthen the structure of the program, to improve graduate retention and completion rates and to attract a larger pool qualified students from other institutions to graduate study at Waterloo Architecture. These modifications are consistent with three elements of the University’s strategic plan 2013-17, namely: research excellence and impact, educational quality, and student opportunities.

a) Co-op Opportunities for Graduate Students coming from other institutions

Given that co-op is a recognized strength of University of Waterloo, as well as in the BAS program, it is proposed to offer a co-op/internship experience at the end of the first year of the MArch, for students entering from other institutions. This is an important enhancement to their professional training. This curriculum modification will be brought for approval in fall 2014.

b) International Opportunities: Global Cities Electives

The Rome Program is one of the essential components of the pre-professional curriculum exposing students first-hand to the study of architectural history and contemporary urban environments. Building upon this legacy the School is planning on offering this opportunity to external students after the first year of the MArch program, while expanding its global study initiatives through an augmented series of study abroad electives focused on international architecture and urbanism in Europe, Asia and South America. These new curriculum options will be brought through the approval process starting in 2014-15.

c) MArch Thesis Structure revisions:

The School proposes to address the reviewers’ suggestions regarding the role of research, and in particular how this impacts the MArch thesis. It is intended first to provide more opportunities for advanced architectural research at the upper level of the undergraduate program. It is intended to explore enabling undergraduate students to complete
the BAS at the end of the winter (rather than the spring) to improve retention and to help them prepare for the thesis, and enable a smoother transition into the graduate program, and on the other hand, to provide a more developed structure in the MArch program in support of advanced design research.

i) Thesis Research and Design
The new curriculum proposal will transform the existing one semester Arch 692 studio into a more highly structured and coordinated two-semester thesis research and design sequence to better support and direct the development of MArch thesis work and to more substantially incorporate innovative design research into the program. The two-semester sequence is a standard thesis framework for most graduate first professional architectural degree programs and will bring the Waterloo MArch into better alignment with the academic calendar and structure, available support systems and expectations of its peer and aspirant peer institutions. The first semester would be dedicated to thesis research and the second semester to thesis design and/or development, followed by a minimum of one additional independent semester for thesis completion and documentation. Thesis studios will allow for review of students’ work at the end of winter term, with final presentation of theses at the end of spring term.

Students who wish to extend their thesis development period—to allow them to work as graduate research assistants on special projects with faculty, supplement their education with additional opportunities to obtain teaching experience through graduate teaching assistants, or travel in support of their research—will be able to do so, up to a maximum of three additional consecutive semesters (one year) to complete their degrees.

For external students, the MArch degree would therefore take a minimum of two and maximum of three years to complete. For students with a BAS degree, the MArch degree program would take a minimum of one year (3 semesters) and a maximum of two years (6 semesters) to complete.

ii) Architectural Analysis and Research Methodologies
In addition to the restructuring of the thesis research and design studio sequence, a new course in architectural analysis and research methodologies will be offered in the fall semester as a companion course to the thesis research and design studios. This course in architectural analysis and research methods is intended to better enable students to position their work within the context of a larger theoretical discourse while giving them the methodological tools for precedent, program and site analysis, to prepare them for the undertaking of an architectural or urban thesis.

iii) Elective Coursework in support of Thesis
Students currently take elective coursework as a support for thesis research. The addition of a new core architectural theory course as well as required elective coursework in the areas of history/theory, building and environmental technologies, digital media, and urbanism and landscape that will be introduced to the undergraduate curriculum in the final year of the BAS program will not only encourage students to explore advanced research areas before they embark on thesis, but will also enable the expansion of offerings through the vertical sharing of 500 level electives in support of thesis research.

d) Funding Support for Graduate Students
The School has several avenues for improving financial support for graduate students. This will also be facilitated by ensuring graduates from the BAS who wish to complete in 12 months, can do so: since currently most graduate students are funded in the first 12 months of the MArch.

**e) Promote the Program Internationally through Publication, Exhibition and Outreach**

The Graduate Program must become as well known internationally as the undergraduate program is nationally. Future efforts for the program include enhancing the vehicles used to communicate about the School through publication (physical and digital), lectures/symposia, exhibition and other forms of outreach. The international reputation of the architecture faculty is also a key contributor to the promotion of the program as are opportunities for students to study with prominent visiting faculty from other academic institutions.

**Program Proposals Phase III:**
**Non-professional and Post-professional Design programs**

As a final phase to the strategic planning efforts, in the coming year the School of Architecture will be further developing its proposal for a new Integrated Design program with both undergraduate and graduate degrees that focuses on the need for design in the contemporary digital industry. The new design program will operate at the nexus of industrial design, communication design and interaction design as well as emerging fields in new digital design technologies. These degree programs will be grounded in coursework in relation to five parallel academic streams in: design, culture, technology, communication and entrepreneurship.

As part of this process, the Architecture School will also be exploring the potential of post-professional degree programs in additional areas of architectural specialization such as urban design and landscape, cultural history/theory, material technologies and other areas of advanced inquiry that would enable graduate students to further their study at the School.

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<th>Two-Year Plan: Action steps</th>
<th>Who is responsible?</th>
<th>Who will provide resources?</th>
<th>Timeline</th>
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<tr>
<td>Phase 1: Eliminate requirement for qualifying year for students with Bachelors from elsewhere</td>
<td>Director</td>
<td>Not needed</td>
<td>Effective June 2014</td>
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<tr>
<td>Phase 2: Curriculum changes to MArch</td>
<td>Director</td>
<td>Director to discuss with Dean and Provost, if/as more resources are needed</td>
<td>Curriculum to be reviewed and approved 2014/15, Effective Sept 2015</td>
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<td>- Co-op possibility for students from non co-op undergraduate programs</td>
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<td>- Provide more international opportunities, especially for those who did not attend Rome program</td>
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<td>- Revise curriculum to support timely thesis completion</td>
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<td>- Improve graduate funding support</td>
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<td>- Enhance program promotion and</td>
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<td>Phase 3: New programs in Integrated Design</td>
<td>Director</td>
<td>Dean/Provost</td>
<td>Effective Sept 2016 or thereafter</td>
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This report will be discussed at the Senate Graduate and Research Committee on September 8 2014, and the October 2015 meeting of Senate.