Final Assessment Report
Architectural Studies (BAS), Master of Architecture (MArch, MArch Co-op, MArch Water)

November 2018

Summary of the Program Review:

In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of an external evaluation and the internal response of the Honours Bachelor of Architectural Studies (BAS), and Master of Architecture (MArch), Master of Architecture (MArch Co-op), and Master of Architecture (MArch Water), programs delivered by the School of Architecture. A self-study (Volume I, II, III) was submitted to the Associate Vice-President, Academic and the Associate Vice-President, Graduate Studies and Postdoctoral Affairs on September 21, 2016. The self-study (Volume I) presented the program descriptions and learning outcomes, and an analytical assessment of these four programs, including the data collected from student and alumni surveys, along with the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty member with a key role in the delivery of the programs were included in Volume II of the self-study.

The external review as per our IQAP requirements was combined with the accreditation visit by the Canadian Architectural Certification Board (CACB). Given that the University would receive the Visiting Team Report (VTR) from the CACB, only one additional arm's-length external reviewer was selected to represent our institutional interests and provide a report. Dr. Terri Fuglem from the University of Winnipeg accompanied the CACB Visiting Team, which included five voting members and one non-voting observer. Dr. Fuglem's independent report, combined with the CACB report, met the requirements of Waterloo's IQAP.

The site visit to the University took place over four days from February 12-15, 2017. The visit included extensive interviews and tours, including meetings with the President, Vice-President, Academic & Provost; Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs; Dean of the Faculty of Engineering; the Faculty Associate Dean of Graduate Studies; Director of the School of Architecture, and Architecture faculty members, staff and current students (undergraduate and graduate). The review team also had an opportunity to visit student workshops, a fabrication lab, library, and exhibit space.

This final assessment report is based on information extracted, in many cases verbatim, from the self-study, Dr. Fuglem's report, and the program's response.

Program characteristics:

Honours Bachelor of Architectural Studies (BAS)

The Honours Bachelor of Architectural Studies program admitted its first students in 2001. (Prior to that year, the Architecture education at the Unviersity of Waterloo consisted of a BES followed by a BArch). One of the particularities of the Waterloo BAS program is that it meets an important accreditation requirement: comprehensive building design. In all other undergraduate Canadian programs, and in most international programs, the ability to work through all aspects of the design of the building and produce technical drawings and reports that cover design, structural, environmental, as well as heating and cooling aspects is typically covered in the graduate portion of the professional degree.

The Honours Bachelor of Architectural Studies degree provides the foundation of skills, knowledge, judgment and practical experience required for subsequent professional studies in architecture. Students acquire an understanding of the workings of society and culture, of the principles of physics, of materials and techniques of construction, of the human interaction with the natural and built environment, of historical process, of critical thought and of the diverse forms of creative expression.

Master of Architecture (MArch)

The Master of Architecture program admitted its first students in 2000, and had its first graduates by 2001. The professional Master of Architecture degree prepares graduate students for entry into the profession of architecture. Combining elements of a professional Master's program and a research-oriented Master's program, the MArch supports students as they engage in self-directed research. Over the course of a minimum three terms, students develop an independent research and design thesis while completing the required coursework for professional preparation. Introducing students to the ethical, legal, administrative and practical aspects of the profession, the program builds upon a firm commitment toward architecture as a cultural act and supports the development of critical thinking in architecture.

Master of Architecture (MArch Co-op)

The Master of Architecture co-operative program (MArch Co-op) was first offered in the Fall 2016, and had its first graduate in 2018. It is a two-year degree program that makes it possible for students entering Waterloo at the graduate level to experience a Waterloo co-operative education. The University of Waterloo offers students coming into the first year of the program the opportunity to take advantage of Waterloo's well-established co-op program.

Master of Architecture (MArch Water)

Ten departments jointly offer the collaborative program in Water, engaging with 130 faculty members involved in water research at the University of Waterloo, across the Faculties of Arts, Engineering, Environment, Mathematics and Science. Connecting to this large network, the Master of Architecture co-operative program (MArch Water) was first offered in the Fall 2015 to promote multidisciplinary as well as interdisciplinary perspectives related to water. The program had its first graduate in January 2019. The goal of the program is to supplement disciplinary (specialist) training offered in individual departments with perspectives from a variety of water-related disciplines. Students graduating from the collaborative program will be better equipped to work in multidisciplinary teams to solve increasingly complex water issues.

Summary of strengths, challenges and weaknesses based on self-study:

As the professional education in Architecture at Waterloo overlaps both the undergraduate and graduate programs, it is challenging to independently consider their individual strengths. The rigorous structure and professional character of the undergraduate program allows for the necessary freedom at the graduate level to carry on independent research and advance students' critical thinking skills, which in turn augments knowledge developed during the undergraduate degree. For those students joining solely at the graduate level, the School determines based on a review of their education whether they can join directly in the Thesis year or if they are to be admitted in the two-year Masters' program and have an opportunity to engage in a cooperative work term.

Undergraduate Program

Strengths:

Curriculum, cultural history and the Rome program

The curriculum incorporates cultural history, which is a feature that is unique to Architecture at Waterloo. It inspires an affection for a broad range of critical study and creative endeavor within the School. It explains why Waterloo Architecture has produced plays, has a wonderful library, a spectacular collection of rare books, and has operated a program in Rome for more than 30 years.

Cooperative education and the relation to the profession

The School's cooperative system offers a program in which there is no barrier between education and practice. By the time a Waterloo student reaches the graduate program, they will have on average 2 to 3 years of professional experience, some of it international. Last year, nearly 45% of the co-op work placements were outside Canada. The level of practical experience afforded in the undergraduate program has a positive impact on the graduate

program, enabling Waterloo Architecture MArch students to reach a level of independence normally associated with post-professional research degrees.

Internationally recognized faculty

Faculty members work in computation, responsive architecture, urban theory, Renaissance history, Waterloo region architecture, landscape infrastructure, Holocaust history, political installations, building and environmental sciences, artistic and architectural design, intersections between art and urbanism, psychology, contemporary theory, landscape, structural steel and building performance. Waterloo Architecture is characterized by the intensity and diversity of a group of faculty, many recognized internationally and through awards, publications and exhibitions.

Collegiality and the project of education

Students are drawn from across the country and beyond its borders. Around 1350 applicants apply for 75 places. The entire School community is involved in admitting students with artistic talent, capacity in abstract thought, critical ability, social imagination, maturity, self-confidence, and interest in making.

Community: Cambridge, Engineering Faculty, Waterloo and beyond

The School's identity derives from the fact that it is a community in which all members regard each other as equals. The main aim of Waterloo Architecture is to act and to lead, not to set itself apart as an educational institution somehow separate from the rest of the world, but to be a vivid and motivating force for ideas and actions that engage the world outside and the local Cambridge community. Waterloo Architecture is weaving itself in the community to produce a rare learning environment for which Waterloo Architecture has come to be known.

Weaknesses:

Isolation – Physical and Academic

While the strong community engagement of the School with the city of Cambridge represents both a strength and an opportunity, students are, at the same time, often isolated by the location. Students are generally limited to using the facilities available on the Architecture campus, which are in most cases more modest than those available on Waterloo's main campus. Students are also isolated in the sense they are removed from larger urban environments that could have the potential to contribute to their architectural education. Though co-op provides opportunities for students to live in other urban environments, this physical isolation presents challenges to the School's ability to expand learning networks and broaden the audience for student work.

Density and rigidity of the undergraduate curriculum

Though the rigorous course requirements at the undergraduate level provide students with an excellent foundation for professional practice, it can also restrict students' abilities to begin specializing within their areas of interest. In certain cases, the amount and intensity of courses can have an impact on the quality of work produced, as well as having implications on student health. The School is looking for ways to alleviate this, both by reviewing the mode and number of assessments within each course, as well as by considering a reduction in the number of courses and credits per term.

Challenges:

Human and physical resources to better integrate digital technology

Digital technology is advancing at a slower pace at Waterloo than at some other architecture schools, reflected in the modest resources the Architecture School currently has available for digital design and fabrication. The School has just completed the hire of a new faculty member to improve the integration of digital design and fabrication within the curriculum, and help make the digital resources more robust. Still, one of the program's challenges in the coming years will be to continue to integrate digital technology in a manner that is coherent with the School's core values and vision.

Maintaining the quality of student experience

The School currently finds itself in the middle of a transition in the curriculum, in attempts to address previously-identified inadequacies. While it has been agreed the courses could be improved and streamlined, the transition includes the risk of making an already rigorous curriculum more dense. Furthermore, it will be a challenge to ensure that the School can continue to be committed to all streams (Design Studio, Cultural History and Theory, Landscape and Urbanism, Environment and Technology, and Visual and Digital Media) so that they all remain an integral part of students' education.

Adjusting to the New Resource Allocation Model

The University has moved towards a new budget model, involving revision of the ways in which funds are allocated, in an effort to promote transparency and efficiency. Reduced resources represent an acute challenge to the School, given conditions that are unlike most programs: the success and strength of the program are largely based on the emphasis on design, the accreditation body requires a faculty to student ratio of 1:15, and there is a constant need for practitioners in the capacity of adjuncts, reviewers or examiners. The School will have to ensure it has the resources needed to deliver the curriculum, maintain a culture that promotes research and continue activities that are crucial to the School.

Graduate Program

Strengths:

Strength of Faculty and diversity of their research and practices

The School is home to many strong faculty, whose diverse research interests benefit the program at both the undergraduate and graduate level. These faculty members foster an openness to diverse research topics for students to pursue in their own independent research work.

High level of Autonomy

The MArch program is extremely open and flexible, with its promotion of student autonomy in research and learning. General consensus amongst faculty and students in the School is that the self-directed, self-initiated character of the MArch is one of the program's greatest strengths.

Critical thinking

While most students enter the program with skills that stem from rigorous curriculum and professional work of their previous program, the MArch specifically allows students to augment these skills with a focus on developing their critical thinking abilities. The graduate program promotes a level of critical thinking not developed through more structured curriculum, allowing students to set the pace and scope of their research.

Community connections – local and global

The strong culture of student initiatives and connection to the Cambridge community allows students to build stronger relationships with specific communities, both locally and globally. The flexibility of the program is such that if students secure funds to travel abroad or undertake field research, they can take up to a term to do so. Many students avail themselves of this opportunity with research trips that vary from a few days to up to four months.

Weaknesses:

Time to completion

While the autonomy of the graduate program is considered one of the program's greatest strengths, it can also be perceived as a weakness since the lack of structure affects some students' times to completion. The main concerns with longer times to completion are the delays for students entering the profession and the demands on resources for supervision.

Increase of Faculty Supervisory Loads

Combined, the effect of an increasing cohort and an average of a two-year completion time means that some 100 to 130 graduate students require to be supervised at any given time. With the equivalent of 21 full-time faculty, this translates to the supervision of an average of

5 to 7 students per faculty member. This adds stress for faculty availability for supervision and other teaching assignments.

Level of preparation to the Graduate Program

Given that the graduate program is a primarily independent research degree, the level of research preparedness needs to be high. There have been traditionally few opportunities for students to learn skills relating to extended research, and the craft of communicating research through writing. Restructuring undergraduate streams to emphasize critical thinking and research will help better prepare students for the MArch.

Challenges:

Promoting research by design

The School has always valued giving students the freedom to choose and pursue their own unique research interests within the broader discipline, which has resulted in an increasing number of theses that are primarily written, rather than design work. The challenge is to encourage more students to pursue design work at the graduate level. Furthermore, this form of research must be communicated as a legitimate form of not only architectural research, but also academic, and 'fundable' research.

Continuing to attract the best students

One of the greatest challenges facing the graduate program is to continue to attract high-quality students. To attract new students to Waterloo, the two-year MArch was created but designed as a delayed entry, requiring a year of undergraduate study. Promoting the First Year MArch as a genuine graduate-level program will hopefully continue to increase applications to Waterloo MArch, and allow the school to admit competitive students. On the other hand, the School is concerned that since the undergraduate program is so widely regarded across North America and many places in Europe, we often lose our most successful undergraduate students as they choose to pursue graduate studies in other competitive schools, mostly those in the United States.

Maintaining the vitality of the program

Since students are free to choose their topic and will often work independently and in fields seemingly unrelated to their peers, it is a challenge to provide a single structure to support what is a broad academic culture. The students have developed their own approach to this potential isolation, creating research clusters and community events. Each of these groups operate with varying levels of faculty involvement (informal conversations to formal lectures), are self-sustaining and motivating, and require minimal institutional support. The

approach reflects a program that values independence, experimentation, student initiative, peer learning, knowledge transfer, professionalism and entrepreneurship – attributes that need to be constantly cultivated.

Summary of key findings from the external reviewers: The School of Architecture at the University of Waterloo offers robust architectural education, at both the undergraduate and graduate levels. Its reputation, both nationally and internationally, remains strong. The cultural history component, the co-op curriculum, the Rome program and the self-directed MArch thesis continue to attract high quality students. More recently, the considerable successes of some faculty have become well known (the Venice Biennale exhibitions, prominent publications, the work of alumni, etc.). The students have also shown a capacity for vital community initiatives (such as the Bridge project, On Empathy, Treaty Land, Global Stories, etc.). The high desirability and employability of graduates from both the BAS and MArch programs are well known.

The current and ongoing concerns for maintaining this high level of expectation and for further growth include: the operating deficit, the spatial and resource requirements for new programs, the relationship of the main University campus to the satellite campus, the need for equity across faculty in teaching and administrative loads, time-to-completion in the MArch program and the enhancement and growth in research initiatives.

Program response to external reviewer recommendations:

1. **Detailed auditing of faculty loads (teaching and administrative) over five year spans**

   Response
   The Director, with the assistance of the Administrative Academic Manager has already begun a more formal tracking of teaching assignments over the past year. Given the diversity of teaching (studio, seminar, courses) within the School of Architecture, teaching tasks are calibrated in time (days/week) to amount to the 40% teaching requirement that is typical of most faculty appointments. This assessment, which is ongoing, is tracked annually and an average is computed over three years.

   The administrative load, though tracked, is less formally categorized. Over the next year, Architecture plans to create two tailored documents, the first for the annual and bi-annual Performance Evaluation, and the second for Tenure and Promotion. These could include provision on how service load might be fulfilled.

2. **Limiting the MArch Thesis to one or two terms with set deadlines and prominent external examiners**

Response
While the reviewer recommended limiting the MArch Thesis to one to two terms, it would in fact be detrimental to the program both financially and in relation to the dynamism of the student body. It would also be in contradiction with the current model. The Waterloo Architecture Thesis is set to be flexible and take between a minimum of three terms to a maximum of six terms. The School intends to maintain this flexibility, which enables their students to yield very strong work and engage in field research both in Canada and abroad.

However, in response to concerns raised in the review and voiced within the School, the School is working on improving the structure of the graduate degree, establishing additional benchmarks (interim reviews or presentation) to ensure that the majority of students can take less than 6 terms to complete their thesis. They are also considering an option within the Master's degree that would better support students who wish to complete within three to four terms. This more structured path would likely be desirable for a number of students engaged in Design Theses. The ambition is to run a pilot of this model in 2017-2018. As of Fall 2018, the program has implemented new processes (including compulsory end-of-term reviews for students in their 3rd and 4th term of thesis), and updated the graduate handbook to clarify expectations.

3. **Limiting the number of Thesis students supervised by one Faculty member (e.g. three students)**

Response
Architecture is currently working towards the creation of a balloting system that will enable them to distribute the supervisory load more evenly while still maintaining good fit between students and faculty members. The system provides an opportunity for both students and faculty to meet and submit a ranking of three to five students/professors from which supervisors are assigned. This system was tested in Fall 2017 and resulted in a balanced distribution of students amongst faculty for 2017-2018, and again for the year 2018-2019. The intention is to continue with the balloting system, refining it as needed.

4. **Setting minimum enrolments in graduate electives**

Response
Architecture aims for enrolments of an average of 12 to 15 students in graduate elective courses. As of Winter 2017, graduate electives which do not meet an enrolment of 10 students within two weeks of the beginning of the term are either not offered, or not counted as part of a faculty's teaching load. If, under exceptional circumstances, a course

with lower enrolment is offered, the average enrolment in graduate electives during that term should remain above 10 overall.

5. **Auditing and re-distributing credit load for cultural history and technology courses in the undergraduate program to better reflect course demands**

   Response
   Over the next year, the Undergraduate Committee will continue to evaluate the curriculum and offer solutions if the perceived imbalances are real. In addition to the review of credit load for the cultural history courses and technical courses, the Committee will seek to reduce the total amount of course and class times in the denser years (and 1A in particular). The ambition is to create more openness in the schedule and more flexibility in course selections. In May 2018, the School of Architecture faculty voted to reduce the total credit count from 29.5 credits to 28 credits, eliminating one course in the 1A term and 2 courses in upper years, while integrating a greater proportion of elective courses. This will be implemented as of September 2019.

6. **Achieving greater alignment with the University's strategic direction toward transformative research and entrepreneurship; encouraging and emphasis on architectural innovation that stems from interdisciplinary research; supporting new ideas and initiatives with informal and formal events that cross communities; offering structured mentoring and grant-writing support**

   Response
   Building on the importance and recognition of many of Architecture faculty's work, the School must promote the awareness of current interdisciplinary research as well as its growth. The School will work to better support funding applications, motivate additional publications and ensure greater dissemination. The ambition is to increase funded research over the next five years, supporting this goal by the creation of a position of Associate Director, Research. This project goes hand in hand with improving procedures for faculty development that caters to the disciplinary and inter-disciplinary potentials of architecture research within the University, as well as the creation of programs and facilities that foster transformative interdisciplinary research.

   Architecture celebrated its 50th anniversary in 2017-2018, and it will continue to seek additional support for events, lecture series and the dissemination of research. To support new initiatives (design-build collaboration with First Nations, new interdisciplinary research), the School will pursue the approval for a financially viable Integrated Design program and/or new research facilities to support new research and collaborations.

7. **Careful auditing resources (human, equipment, space) when implementing new programs and initiatives in light of the new budget model**

   Response
   The School is currently carefully reviewing a proposed new undergraduate program in Integrated Design. The review will consider facilities, human resources and equipment. In consideration of the implementation of the Waterloo Budget Model, the School is planning carefully so as to measure the impact of any changes and growth on the current budget of the School of Architecture. This new program would be in additional to Architectural Engineering, a collaborative program between the School of Architecture and the Department of Civil and Environmental Engineering that enrolled its first students in September 2018. Significant demand exists for such a program, and its addition would improve the financial viability of the School, while also enriching the academic diversity on the Cambridge Campus.

   While growth of the Cambridge student population with Architectural Engineering and Integrated Design will certainly make the programs in Cambridge more viable financially, it is clear that this growth will need to be supported by renewed efforts in outreach and fundraising. In collaboration with Engineering Advancement, a fundraising plan has been drafted. While this plan indicates the need for support by a fundraising professional over the next six months, and a development officer within the next year, there are currently no resources to fund support specifically for Architecture. At the same time, it is recognized that fundraising is undertaken by a small team who oversees Faculty focused activities, and there are no professionals assigned to any specific unit or department. University and Engineering Advancement will however continue to support Architecture on any leads the School can provide.

8. **Revisiting the name and vision statement of the Faculty of Engineering to be more inclusive of the School of Architecture. The main vision statement "to become a truly world-class school of engineering," does not accommodate the aims of the School of Architecture, the only non-engineering unit in the Faculty**

   Response
   The Faculty of Engineering has announced its intention to initiate conversations around the next strategic plan. Together with the Faculty, the School of Architecture will continue to work on a more inclusive vision for architecture in the Faculty of Engineering's strategic planning exercise.

Implementation Plan:

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Detailed auditing of faculty loads (teaching and administrative) over five-year spans;	Continue to track teaching load.	Director, with the assistance of Administrative Academic Manager (no resource)	Immediate and for the next 5 years (as suggested), with 3-year assessment for teaching, and 2 year for service.
2.	Limiting the MArch Thesis to one or two terms with set deadlines and prominent external examiners;	The MArch Thesis is set to be flexible and take between a minimum of three terms to a maximum of six terms. This flexibility is an integral part of the School's graduate degree. To respond to the comments, while maintaining integrity of the Waterloo Architecture MArch thesis model: 1) Architecture will work to ensure that the majority of students take less than 6 terms to complete their thesis. It will do this by (1.1) strengthening the structure of TRD1 and TRD2, possibly establishing additional benchmarks and deadlines, and monitoring the impact of the changes; and (1.2) clarifying expectations both for completion and supervisory loads. 2) To better support shorter-term design theses, the School will explore the	Director, Graduate Officer and Graduate Committee (no resource required)	Regularize time to completion by 2019.

		possibility of a parallel thesis path. If deemed desirable, it will run a pilot structure that could support students pursuing a design thesis who intend to complete within three to four terms.		
3.	Limiting the number of thesis students supervised by one faculty member (e.g. three students);	Require each faculty member to take a minimum of 3 to 4 students annually, and a maximum of 10 overall. This takes into account our faculty complement and limiting the length of studies to a maximum of 6 terms.	Director, Graduate Officer and Graduate Committee (no resource required)	Piloted a balloting system in Fall 2017, successfully allocating 3 to 4 thesis students to each full-time faculty member. Regularize supervisory load by 2019.
4.	Setting minimum enrolments in graduate electives;	Unless exceptional circumstances dictate otherwise, the minimum enrolment should be 10 in any graduate elective.	Director (no resource required)	Immediate
5.	Auditing and re-distributing credit load for cultural history and technology courses in the undergraduate program to better reflect course demands	Assess the actual cause of the perceived imbalance (i.e. course content, single course load or semester course load). Recalibrate if necessary.	Director, Undergraduate officer and Undergraduate Committee (no resource required)	Complete assessment by 2019. Review impact in two years.
6.	Achieving greater alignment with the University's strategic direction toward transformative research and entrepreneurship; encouraging and emphasis on architectural innovation that stems from interdisciplinary research; supporting new ideas and initiatives with informal and formal events that cross communities; offering structured mentoring and grant-writing support;	Establish a mechanism to better support multidisciplinary and architecture research; Reconnect to alumni through celebrations of the 50th anniversary in 2017-2018; Pursue the approval for a financially viable Integrated Design program and initiate fundraising; Seek additional support for events and the lecture series.	Director, Associate Directors with various committees (Integrated Design, 50th and fundraising committees) Resources required: Fundraising by Architecture, and support from Engineering and the University.	Establish structured research support by the end of 2019, and monitor impact on graduate student recruitment; Celebrations of 50th anniversary in 2017-2018 provided opportunity to reconnect with some alumni; Find additional support for events and the lecture series by the end of 2019.

7.	Careful auditing resources (human, equipment, space) when implementing new programs and initiatives in light of the new budget model;	Ongoing	Director, Administrative Officer, Architecture Financial Officer, and Faculty Financial Officer. (no resource required to conduct the audit)	Approval of Integrated Design on hold until clarity on growth income flow is obtained; Set up process for ongoing review by the end of 2019.
8.	Revisiting the name and vision statement of the Faculty of Engineering to be more inclusive of the School of Architecture. The main vision statement "to become a truly world-class school of engineering," does not accommodate the aims of the School of Architecture, the only non-engineering unit in the Faculty.	Address the issue of a more inclusive vision in the upcoming Engineering strategic planning sessions.	Dean, Directors and Chairs. (no resource required)	Integrate a more inclusive vision in the Faculty of Engineering's next Strategic Plan, due to be completed by May 2020.

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

UNIVERSITY OF WATERLOO

Date of next program review: 2023/24
Date

Signatures of Approval:

Chair/Director — APRIL 8. 2019 — Date

AFIW Administrative Dean/Head (*For AFIW programs only*) — Date

Faculty Dean — APRIL 10, 2019 — Date

Associate Vice-President, Academic
(For undergraduate and augmented programs) — April 15, 2019 — Date

Associate Vice-President, Graduate Studies and Postdoctoral Affairs
(For graduate and augmented programs) — April 15, 2019 — Date