FINAL REPORT OF THE PROJECT COMMITTEE FOR THE RE-LOCATION OF THE DEPARTMENT OF MATHEMATICS, TO THE BAHEN CENTRE (PHASE I)

November 28th, 2004

Prepared by Campus and Facilities Planning

I. Membership

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II. Terms of Reference

This Project Committee was co-chaired by Ray de Souza, Director of Planning and Infrastructure, Faculty of Arts and Science and Elizabeth Sisam, Director of Campus and Facilities Planning. The Project Committee was charged with the following terms of reference:

1. Make recommendations and provide a detailed space program indicating how the space and facilities for the Department of Mathematics, including the Mathematics Library can be consolidated and re-located to the Bahen Centre for Information Technology, 40 St. George Street, 6th Floor.
2. Identify locations and present a phasing for the future expansion and the eventual inclusion of the Statistics Department in 215 Huron Street.
3. Identify the space program as it is related to the existing and planned enrolment targets as approved in the departmental academic plans.
4. Demonstrate that the proposed space programs will take into account the Council of Ontario Universities and the University's own space standards. Identify all additional space needs consistent with the COU standards.
5. Confirm the suitability of the new space for the temporary housing of the Economics Department.
6. Identify all space on the University of Toronto campuses as well as all rental space that will become available for re-allocation centrally as a result of the relocation of the departments and library.

7. Provide a total project cost, including construction, renovation, data and communications.
8. Provide the operating costs.
9. Provide a total project cost estimate identifying all resource implications including a projected increase to the annual operating cost for the University. Identify an overall cost per square foot and funding.
10. Identify all costs associated with the transition during the renovation of suites and secondary effects resulting from the realization of this project.
11. Identify all sources of proposed funding for this project.

III. Background Information

History

Recent external and Ontario Council of Graduate Studies reviews of the Department have expressed serious concerns about space that that has been assigned to the Department of Mathematics. This Project Planning Committee has reviewed the space requirements and activities and proposes to locate the Department of Mathematics on the 6th Floor of the Bahen Centre for Information Technology, at 40 St. George Street in Phase I and to complete the consolidation of the Department later in Phase II, at 215 Huron Street.
The Bahen Centre, although completed for occupancy in 2002, was not finished on the 6th floor, which remains unused today. The building envelope allowed for this extra floor, and the construction of the facility maximized the building area of the entire site although the space was not required in the original space program. The 6th floor plate is large, as it follows the floors below, which were laid out to be large research labs, not office space. This plan results in a space that although sufficiently large enough for the Department of Mathematics, does not meet the daylight requirements of the faculty.

215 Huron Street, directly adjacent to the west side of the Bahen Centre can provide additional space as Department of Philosophy moves into the Medical Arts Building at 170 St. George Street. Constructed as an office building, 215 Huron Street has windows on all sides. The 6th floor of the Bahen Centre and the 7th floor of 215 Huron Street are sufficiently close and at similar enough levels that a future bridge could easily link the two – consolidating the Department over two different buildings. Other space in 215 Huron street will also permit the Department of Statistics to be relocated to this precinct.

The Bahen Centre is conveniently located at the south end of the St. George campus, with streetcar access and within walking distance of the Robarts library. It also houses considerable computing resources and is adjacent to the Fields Institute for Mathematical Studies.

It is proposed that the Mathematics Library be expanded and relocated to the 6th Floor of the Bahen Centre as part of Phase I to effectively use the large floor plate. Later reports will detail Phase II, comprising the remainder of the Department of Mathematics, the re-location of the Department of Statistics to 215 Huron Street and the bridge link between the 6th floor of the Bahen Centre and the 7th floor of 215 Huron Street.

Previous Action Taken:

At the Planning and Budget meeting held on November 10th, 2004, the Committee approved an interim Project Planning Report for the Department of Mathematics Phase I subject to a review of the final Project Planning Report by the Planning and Budget Committee at its meeting on December 7th, 2004. The interim approval was necessary to ensure that the project could also be considered and reviewed by the Academic Board on November 11th, 2004 and the Business Board on November 8th, 2004 to advance to Governing Council for final approval on December 16th, 2004.

This project is supported by the Faculty of Arts and Science; there is some urgency for it to be completed by August 2005, as it will provide the staging space necessary to accommodate the Department of Economics during the renovation of the Economics Building at 150 St. George Street. By using this area for staging, funds budgeted for temporary rental accommodation can be directed towards maintenance and operations costs of the 6th floor Bahen Centre, rather than to an outside provider. Once the Economics Building is completed the space will be vacated and become the new home for the Department of Mathematics.

IV. Statement of Academic Plan

Department of Mathematics

The Department of Mathematics is widely recognized as the strongest in Canada and ranks among the top ten mathematics departments among publicly funded universities in North America. The Department's goal in the next few years is to solidify its reputation as a major international research and teaching centre, providing leadership in mathematical research nationally and internationally, and attracting and training the next generation of leaders.

The Department consists of 51.25 FTE tenure stream faculty members, across three campuses; of these, 7.5 FTE are at the Scarborough Campus and 6.5 FTE are at the Mississauga campus. There are 3.75 FTE CLTA, 2.65 FTE Senior Lecturers and 5.75 FTE Lecturers on the St. George campus. There are also a number of CLTA, lecturers and senior lecturers at the other campuses. The tri-campus department functions as a unified intellectual community with all graduate activity, and most UTSC and UTM appointments spending significant time at the St. George campus. The Department presently has 8 administrative staff as well as 1.85 FTE computer system programmers. In addition, there is a librarian for the Mathematics and Statistics library as well as a library technician. The faculty/student ratio is small relative to comparable publicly funded American or Canadian universities.

On the St. George campus, 5500 students are taught with fewer than 40 tenure stream faculty. There has been some effort on the part of the university to rectify the situation with an allocation of 8 FTE faculty at the St. George in the academic plan *Stepping Up for 2004-2010* (7 retirements will take place during this period). In addition, the Department is continuing to search for 2 Senior CRC positions. The Department has also attempted to compensate for the low faculty/student ratio with a significant increase the number of postdoctoral fellows. The

number fluctuates from year to year, but in 2003-04 there were 40 and 2004-05 there are 34, with the same numbers expected in coming years. As in any leading mathematics department, there is a steady flow of visitors, research collaborators and speakers at the weekly colloquia and many seminars. Approximately 20 visitors stay for one month or more, and another 100 visitors are here for shorter stays. The Department has a very successful graduate program with about 30 M.A. and 60 Ph.D. students. The graduate program is expected to expand by one third during the next five years.

The Department is presently housed in a number of sites across the campus. The largest group is in the east half of the fourth floor of Sidney Smith Hall. There are also a number of offices, a lounge and the departmental seminar room on the west end of the fifth floor of Sidney Smith Hall, as well as a several other offices elsewhere in the building. Over the past five years some of the graduate students have been moved to offices in 1 Spadina Crescent, others to New College and new faculty have been accommodated on two floors of an extension of the Earth Sciences building on Russell Street. A risk management lab is also located at 1 Spadina Crescent with a single faculty member and several postdoctoral fellows and graduate students. A computational laboratory was constructed in the basement of Whitney Hall, also accommodating several graduate students and postdoctoral fellows. The Mathematics and Statistics Library is located in the basement of Sidney Smith Hall.

There are also a number of extra departmental groups. The Masters in Mathematical Finance program, while operated by the School of Graduate Studies and not the Mathematics Department itself, is nevertheless closely linked to the department both by research subject because several faculty members lead and teach in the program. It is presently in rented space at 720 Spadina Avenue.

The Fields Institute is a cooperative venture of the Ontario Ministry of Training, Colleges and Universities, NSERC and Carlton U., McMaster U., U. of Ottawa, U. of Waterloo, U. of Western Ontario and York U. as well as the University of Toronto and a number of affiliate universities and corporate sponsors. Their primary activity composes thematic programs of either one half or a full year. The Fields Institute is located in space near to the Bahen Centre at 222 College Street and is leased from the university.

IAIM (Institute for Applied and Interdisciplinary Mathematics) is a proposed interdisciplinary centre intended to bring together mathematically orientated researchers from different departments around the University. The intent is to create a cohesive network of mathematical scientists at the university with an incubator facility in which to stimulate and nurture interdisciplinary mathematics in both research and teaching. It has been designated as a divisional priority in the Stepping Up plan with AIF funding requested for January 2005.

Research and graduate (as well as undergraduate) training in mathematics is a highly collaborative and somewhat spontaneous venture. The poor quality, inadequacy, and inaccessibility of some of the space being spread across campus and through several separate buildings has greatly hindered the research potential and training ability of the Department. This is the critical issue of the Department, highlighted, for example in the recent OCGS report where

the graduate program was evaluated as "Good quality with a report", the indicated report being required by 2006 to report on progress addressing the space issue.

An excerpt from the OCGS report:

> "The amount of the quality of office space available to the graduate students in the Department of Mathematics is totally inadequate and an embarrassment for a university of the caliber of the University of Toronto… It is hard to imagine that the graduate students would be able do any serious research on the premises of the Department under such difficult conditions… We want to stress the fact that the Department as a whole is keenly aware of the space problem and that the measures that have been taken to try to deal with are likely the best that could have been taken under the circumstances".

If the Department is to maintain its status as one of the world's leading departments, it is essential that the entire department including the library be moved to a single, central location with space configured in a way that makes it possible for the Department to excel in its various functions. The Department's main research facilities are the library, the computer system and the computational lab. Adequate space must be available for each, located to make their use convenient. From the OCGS report "We think that is particularly important for the preservation of the quality of the graduate program that the mathematics library is kept in the same building as the Mathematics Department."

The Mathematics Department also needs a dedicated seminar room as well as a departmental lounge. It is not an exaggeration to say that a significant amount of the mathematical work of a good department takes place in the department lounge. It is also crucial for the success of IAIM that it has well designed space which will attract researchers from around the University and is conducive to interaction. Teaching vast numbers of undergraduates does not only take place in the classrooms. Large classes require that significant numbers of students will need academic assistance, in and out of office hours. This appears to be more the case in mathematics than in other disciplines and puts extra demand on the infrastructure. If the hallways in the department are too cramped the result will be that with other faculty will unable to do their work.

It must be stressed that the result of inadequate space is that opportunities for teaching and research are missed because people simply give up and work at home.

From the OCGS report again:

> "we observed that the shared offices meant for the graduate students were practically all empty – nearly all the students we talked to during the interviews told us that they work at home…one of the important elements of a successful graduate program is the vitality of scientific discussions among graduate students. This can only happen if the students are able to work in comfortable offices, located in the same building."

The same holds true for the faculty and their research and teaching. If the University truly desires to move up into the worldwide elite of publicly funded universities, the Mathematics Department will enthusiastically build on the University's successes to help make it possible, but this can only be achieved with space comparable to peer and competitor institutions. The current space situation is simply an embarrassment.

V. SPACE PROGRAM

Department of Mathematics: Overview of Existing Space:

The Department of Mathematics presently occupies approximately 2000 net assignable square meters scattered in six locations across the St. George campus, and includes the Mathematics Library. The departmental home is within Sidney Smith Hall with incomplete satellite activities at 1 Spadina Crescent, Whitney Hall, the Earth Sciences Centre, Wetmore Hall and University College. Within Sidney Smith Hall the Department is randomly scattered over four floors.

Most of the space allocated the Department and Library is in Sidney Smith Hall, a building that is severely overcrowded and houses almost twice the number of occupants for which it was designed. Problems related to space in Sidney Smith for this Department and others within the Faculty of Arts and Science have been the focus of discussions for many years. Other problems that limit the ability to resolve space problems are the lack of capacity for increased infrastructure required in today's facilities and the presence of asbestos making even the most minor changes unaffordable. Consolidation and necessary expansion of the Department of Mathematics activities to Sidney Smith Hall is therefore impossible.

Mathematical Sciences Library

The "Mathematical Sciences Expansion Plan" dated September 15th, 2003, detailed the requirements of the Library. A total area of 275 nasm was identified for the collection, 25 nasm for study areas, and 30 nasm for support space.

Currently, the mathematics library houses some 39,900 volumes in 222 stacks located in 160.62 nasm. This averages 180 volumes, per stack, and exceeds the Council of Ontario University's space standard of 125 volumes per stack. Using COU space standards, the library would require 319 stacks, at .75 nasm per stack, or 239.25 nasm for the current collection.

The study area in the existing library consists of 18 seats at four tables, and two computer stations in 60.47 nasm. Tables are pushed against the walls, and all 18 seats cannot be accommodated.

Doubling the accommodations would allow for 36 study spaces at tables at four per table (92.25 nasm). Four computer stations with space for note taking and one printer and one copier require a further 14.86 nasm. The calculation of nasm based on actual furnishings and seating space shows a greater amount of space is necessary to accommodate the number of seats planned.

The support space for 2 staff is planned to be reduced from the current 46 nasm, which includes a public computing area to 30 nasm. The total space allocation for the mathematics library is proposed to be 430 nasm.

Nominal Space Allocation:

The Phase I allocation reflects the space requirements of the Department of Mathematics which can be accommodated at this time. All space requirements will be reviewed prior to the implementation of Phase II to ensure that all space to the 2009 complement plan, including what is not accommodated in Phase I, is appropriately allocated on the upper floors of 215 Huron Street. The following chart summarizes the space requirements:

Department of Mathematics Space Program								
	FTE	**nasm**	**Share**	**Total nasm**	**Phase I Bahen**	**nasm**	**Phase II 215 Huron**	**nasm**
Program Element					# of rooms		# of rooms	
Offices								
Department Chair	1	23	100%	23.00	1	23		
Associate Chair and Graduate Director	2	18	100%	36.00	2	36		
Faculty	45.25	13	100%	585.00	31	403	14	182
Faculty (administrative replacement)	4	13	50%	26.00	2	26		
UTM / UTSC Faculty and Lecturers	14	13	50%	91.00	7	91		
Post Doctoral Fellows	30	13	50%	195.00	10	130	5	65
Emeritus Professors	11	13		39.00	3	39		
Graduate Students - PhD (60 +20)	79.8	4		319.20	5	60	22	259
Graduate Students - MA (30 +10)	39.9	4		159.60	3	36	11	132
Administrative Staff	9.85	13		130.00	10	130		
Departmental Support								
Library		430		430		430		
Teaching Assistant Consultation Room (capacity 8)		24		24.00	2	24		
Waiting area dedicated for reception		5		5.00	1	5		
Boardroom (capacity 20)		45		45.00	1	45		
Small Committee Room (capacity 8)		15		15.00	1	15		
Servery (kitchenette)		13		13.00	1	13		
Faculty, Staff and Grad Student Lounge		70		70.00	1	70		
Photocopy /Fax /Office Supplies /Storage		12		12.00	1	12		
Mail		15		15.00	1	15		
Storage (files and a/v)		18		0.00		18		
Computer Lab (20 stations)		35		35.00	1	35		
Computer Machine Room		24		24.00	1	24		
Seminar Room (capacity 40)		72		72.00	1	72		
TOTAL PROGRAM AREA				**2363.80**		**1752**		**638**

VI. Functional Plan

Design Considerations

The 6th floor of the Bahen Centre has three types of glazing admitting natural light. These are:

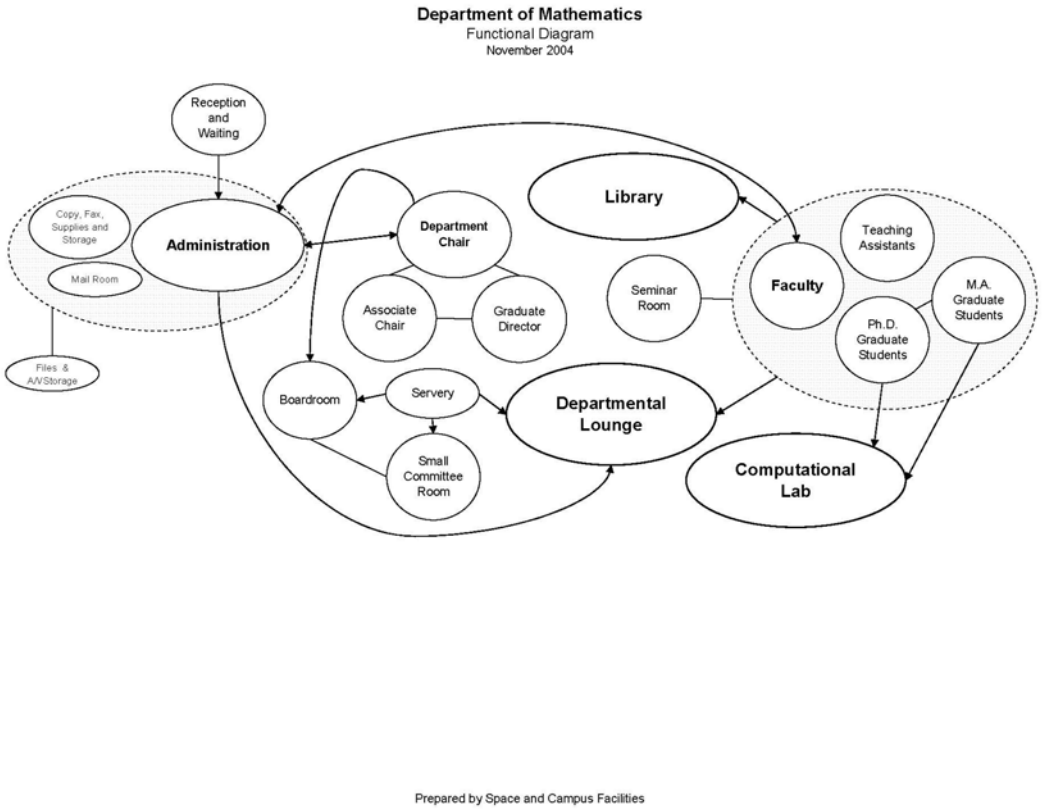
1. 42 traditional office style windows. Not all are operable. There are an additional four windows which are located such that they do not allow for offices.
2. 14 clerestory type windows, in the upper portion of the wall which provides direct access to daylight.
3. 45 linear metres of glazing channels, installed floor to ceiling, with access to interior daylight space (such as the atrium). The glazing channels provide diffuse indirect daylight and an obscured view.

The minimum number of offices requiring windows is 48 (for chairs and faculty). Other offices where possible would have clerestory windows or glazing channels to allow for indirect light. Space not suitable for office accommodation will be used to house the library.

Phase II of the consolidation plan will provide the balance of the space program required to accommodate the Department. As a bridge between the two buildings (at the 6th floor Bahen and the 7th floor or 215 Huron Street) recommended for Phase III, would allow for the accommodation of faculty in 215 Huron in adjacent, easily accessible space.

Functional Space Allocation Diagram

See diagram next page.


Department of Mathematics
Functional Diagram
November 2004
Reception and Waiting
Copy, Fax, Supplies and Storage
Mail Room
Administration
Files & A/VStorage
Department Chair
Associate Chair
Graduate Director
Library
Seminar Room
Faculty
Teaching Assistants
M.A. Graduate Students
Ph.D. Graduate Students
Boardroom
Servery
Small Committee Room
Departmental Lounge
Computational Lab
Prepared by Space and Campus Facilities

VII. Environmental Impact

Environmental Protection Policy

The Bahen Centre for Information Technology was constructed in compliance with the University's Environmental Protection Policy dated 7 March 1994.

VIII. Special Considerations

Standards of Construction

As well as complying with current building codes and regulations, the design team must consider the University's design standards.

The finishes and lighting of the 6th floor of the Bahen Centre will be in keeping with those of the rest of the building, in the 'public' circulation areas. The University does not intend to replicate the use of specific materials requiring costly detailing. The design must however; compliment the existing finishes with the ambience of the environment maintained. Likewise, standard sizes for doors will be utilized. The HVAC system will be similar in concept and zoning (with the exception of the area designated for the library) to that used elsewhere in the building, although if deemed an improvement, other control systems may be considered.

Except for the library, the raised floor system will be maintained, and the mechanical and electrical services installed in a similar way to those of the rest of the BCIT. Partitions will also be similar with a system of pilasters mounted on office walls in order to support shelving.

In order to provide natural light into the interior, an allowance for glazed transoms to be used at all exterior rooms has been included in the construction budget.

Accessibility and Personal Safety

The design of the floor layout will have to comply with provincial codes and regulations and the University's own design standards.

The new facilities will be designed such that they are accessible and inclusive for and by persons with disabilities. In addition to requirements laid out in the University's Design Standards developed by Operations and Services, consultation with the University's Coordinator of Special Services for Persons with Disabilities should be undertaken prior to finalization of the concept design. Every realistic provision should be made in the design for the needs of people with disabilities.

Universal elements necessary to provide a fully accessible environment include the following:

- All new light switches, electrical outlets, proximity card readers, kitchenettes and vision panels in doors throughout the building should be located at a height that they can be used by a person in a wheelchair.
- All new doors are to be large enough for the passage of a wheelchair/scooter and be equipped with lever-style handles.
- Office machines should be located on low tables.
- Classroom writing surfaces, where designated, should be designed to be easily accessed and used by wheel-chair users.
- All washrooms have automatic openers.
- Colour and textures should be used to indicate change in surface to the visually impaired.

The security system for the 6th floor must be compatible with that used elsewhere in the building.

Computing and Communications Services

The Department's existing equipment will be relocated to this new location.

Deferred Maintenance

As the building was completed in 2003, there is no requirement to address deferred maintenance in the total project cost estimate.

IX. Resource Implications

Construction Cost Estimate

The quantity surveying firm of Curran McCabe Ravindran Ross Incorporated was involved throughout the construction of the BCIT in providing costing services. They have reviewed the proposed draft floor layout and have advised that a base construction budget of $1237 per square metre is reasonable for fitting out the presently 'shelled' space. The base construction is estimated to be $3,507,500 when tendered in the spring of 2005. An allowance for the glazed transoms, previously identified, of $100,000 has been added for a total construction estimate of $3,607,500.

Infrastructure Upgrades

No upgrades are contemplated as it has been determined that the existing building infrastructure will support the mechanical and electrical demands of the low service office activities planned for this floor.

Landscaping and Site Improvements

Not applicable.

Equipment Costs

There is miscellaneous minor equipment for the library and servery areas included in the schedule, in the amount of $21,500.

Computing and Communications Costs

The Department will be responsible for all their network and computers. The budget includes a nominal amount, $30,700 to support backbone service to the 6th floor.

Furnishings Costs

The total project cost estimate allows for new furnishings throughout, budgeted to be $651,900. The furnishings are itemized on the Furniture and Equipment schedule included in appendix C.

Moving Costs

There is an allowance of $102,000 to cover the cost of moving the library and office contents to the new facilities.

Secondary Effects

Existing surplus materials from the construction of the Bahen Centre will be moved to another storage site on the campus.

The total funding for this project will be provided by the Department of Mathematics and the Faculty of Arts and Science. Additionally, the funds allocated to rental space by the Department of Economics will be allocated to this project. As a result, there is no impact on the level of borrowing to be provided through the University.

X. Total Project Cost Estimate

The Total Project Cost (TPC) estimate as per Table 1, appendix D identifies the cost for this project to be $5,680,000.

XII. Operating Costs

Operating costs for net additional space is the responsibility of the Faculty and is normally estimated on the basis of comparison with existing peer buildings of similar size and occupancy. Based on the latest direct and indirect operating costs (fiscal year 2002/2003) for the BCIT of $122.37 per net assignable square metre (nasm), the Department of Mathematics with a programmed area total of 1752 nasm has an estimated annual operating cost of approximately

$214,392.24**;** actual costs will not be realized until the Department of Mathematics has been fully operational for at least one complete cycle.

XIII. Funding Sources and Cash Flow Analysis

The total funding for this project will be provided by the Faculty of Arts and Science and the Department of Mathematics. Additionally, the funds allocated to rent temporary space for the Department of Economics while their project is under construction will be allocated to this project. As a result, there is no impact to the level of borrowing to be provided by the University.

Since the project has been fully funded, there is no allowance for financing costs.

XIV. Schedule

It is projected that the construction of the fit-up for the 6th floor of Bahen will commence as soon as possible following approval.

Following is the planned schedule:

Governance approval to proceed/start of design	December 2004
Construction Completion	July 2005
Economics Move – in	August 2005
Economics Vacates / Math Move – in	August 2006

XV. Recommendations

The Project Committee for the Relocation of the Department of Mathematics recommends the following:

- THAT the project scope as identified in the Final Project Planning Report (dated November 28, 2004) for relocation of the Department of Mathematics to the 6th Floor of the Bahen Centre, Phase I be approved, allocating 1752 nasm on the 6th floor of the Bahen Centre.

- THAT the project scope as identified be approved in principle at a cost of $5,680,000 with the sources identified

XV. APPENDICES

A. Environmental Impact
B. Building Floor Plan
C. Furniture and Equipment Schedule
D. Total Project Cost Estimate
E. Room Data Sheets (available upon request)

APPENDIX A: Environmental Impact

Environmental Impact

University of Toronto Environmental Protection Policy

PREAMBLE

The University of Toronto is committed to being a positive and creative force in the protection and enhancement of the local and global environment, through its teaching, research and administrative operations. Recognizing that some of its activities, because of their scale and scope, have significant effects on the environment, the University as an institution, and all members of the university community, have the responsibility to society to act in ways consistent with the following principles and objectives:

FUNDAMENTAL PRINCIPLES

- Minirnisation of negative impacts on the environment
- Conservation and wise use of natural resources
- Respect for biodiversity

SPECIFIC OBJECTIVES

In adopting these fundamental principles, the University will be guided by ethical attitudes towards natural spaces, and will take all reasonable steps to meet the following objectives:

- Minirnise energy use, through efficient management and practice
- Minimise water use, through efficient management and practice
- Minimise waste generation through reduction, reuse and recycling
- Minimise polluting effluent and emissions into air, land and water
- Minimise noise and odour pollution
- Minimise and where possible eliminate use of chemicals, including outdoor salt, pesticides herbicides and cleaning agents
- Include biodiversity and environmental concerns in planning and landscape decisions
- Meet and where possible exceed environmental standards, regulations and guidelines

IMPLEMENTATION

To implement this Environmental Protection Policy:

- An Environmental Protection Advisory Committee (EPAC) will be established consisting of administrative staff, academic staff and student groups, to be chaired by a member of the University's academic staff. The Committee will provide advice to the Assistant Vice-President, Operations and Services, on programs to meet the environmental protection objectives. Membership of the committee will be made known to the community to ensure that new and existing initiatives are brought forward for consideration. The meetings of EPAC will be open.
- Facilities and Services, through the Waste Management Department will facilitate the development, implementation and evaluation of environmental protection programs, and will liaise with the EPAC and all three campuses on the programs.
- In this role Facilities and Services will:
  - Regularly review university policies to ensure consistency with this policy;
  - Carry out appropriate environmental audits and pilot projects;
  - Undertake education and training programs to inform the University Community about this and how its members, both personally and collectively, can best meet the objectives set forth in it;
  - Inform all contractors, service operations and users of University facilities that they must comply with the requirements of the policy;
  - Annually issue a report concerning the University's impact on the environment, summarizing initiatives undertaken and identifying matters which require particular attention.

Approved by Business Board of the Governing Council on March 7, 1994.

Environmental Checklist for Users Committees (5/99)

1. General planning principles: Consideration of alternatives, Life cycle approach

2. Minimize Energy Use
   a) Thermal Energy: Heating, Cooling
   b) Lighting/Use of Natural Light
   c) Ventilation/Windows
   d) Machinery/Equipment
   e) Orientation of Building - effect on building energy needs
   f) Roof Design

3. Minimize Water Use (Maximize Reuse)
   a) Flushing b) Washing - hands and body
   c) Building Cleaning d) Drinking
   e) Experimental/Labs f) Equipment Cooling
   g) Outdoor Vegetation - choice and watering (see #4)

4. Utilization and Diversion of Rainwater
   a) Use of Roof Water b) Porous Pavements

5. Waste Management (offices, classrooms, food outlets, outdoors, and construction/demolition)
   a) Reduction b) Reuse
   c) Recycling d) Treatment and Disposal - possible on campus

6. Effluent and Emissions (reduce, reuse, recycle, and dispose)
   a) Indoor (Air Toxicity, Noise, Odours, Ventilation)
   b) Outdoor Air - laboratory emissions
   c) Water - Hazardous Wastes
   d) Land

7. Reduce Harmful Chemicals
   a) Outdoor Salts b) Pesticides/Herbicides
   c) Cleaning Agents

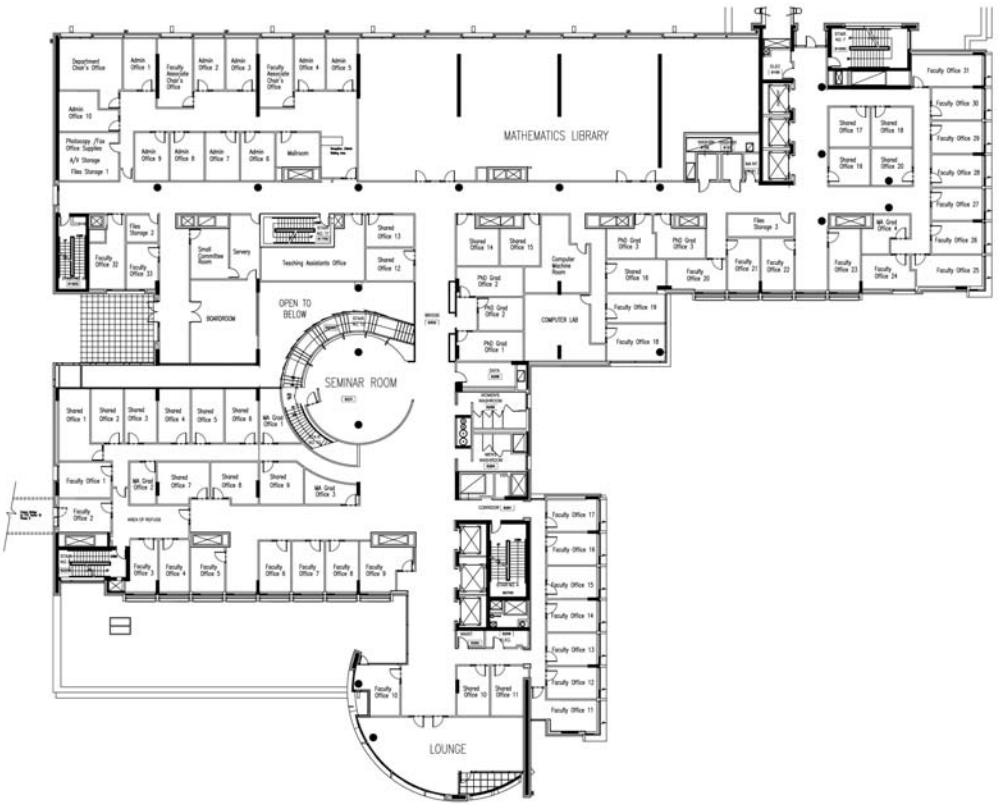
8. Outdoor Environment
   a) Encourage Biodiversity (encourage and protection of species)
   b) Landscaping/Shading - effect on building energy needs in summer and winter
   c) Use of outdoor space (e.g. rest areas, roof gardens)

9. Monitoring and Metering of Use of Resources and Wastes
   a) Water b) Electricity
   c) Heat d) Wastes

10. Visibility of Environmental Concerns
   a) Pilot Projects b) Posters/Displays

11. Material Choice (Use of endangered/exotic materials, off-gassing)
   a) Building Fabric
   b) Fixtures and Furnishings

APPENDIX B: Building Floor Plan



6th Floor Bahen, Department of Mathematics

APPENDIX C: Furniture and Equipment Schedule

Mathematics- F&E schedule	**Furniture**				**Equipment**			
	item	#	unit	extn	item	#	unit	extn
FACULTY OFFICES				$0				$0
1 Private Faculty Office Chair	allow	1	$6,000	$6,000				$0
2 Ass Chr Off	allow	2	$6,000	$12,000				
33 Private Faculty Office (Standard)	desk w ped	33	$900	$29,700				$0
	ego chr	33	$400	$13,200				
	5D FC	66	$500	$33,000				
	sm table	33	$250	$8,250				
	vis chr	66	$80	$5,280				
	shelving	1320	$50	$66,000				
	misc	33	$20	$660				
7 Shared Faculty Offices (capacity=2)	desk w ped	14	$900	$12,600				$0
	divider	1	$500	$500				
	ego chr	14	$400	$5,600				
	sm table	7	$250	$1,750				
	vis chr	14	$80	$1,120				
	shelving	210	$50	$10,500				
13 Emeritus & post docs	desk	39	$700	$27,300				$0
	divider	26	$500	$13,000				
	ego chr	39	$400	$15,600				
	5D FC	13	$500	$6,500				
	shelving	390	$50	$19,500				
15 Grad PhD workstns	whstn	15	$1,500	$22,500				
	ego chr	15	$400	$6,000				
	5D FC	15	$500	$7,500				
	shelving	90	$50	$4,500				
9 Grad MA workstns	whstn	9	$1,500	$13,500				
	ego chr	9	$400	$3,600				
10 Private Administrative Office	allow	10	$3,730	$37,300				
1 Library	display unit	2	$1,000	$2,000	security	1	$5,000	$5,000
	end panels	100	$200	$20,000				
	table	5	$2,000	$10,000				
	arm chr	8	$1,000	$8,000				
	chr	20	$150	$3,000				
	desk	2	$1,500	$3,000				
	comp table	4	$600	$2,400				
	cabt	3	$500	$1,500				
1 TA office for 8	whstn	8	$1,500	$12,000				
	ego chr	8	$400	$3,200				
	5D FC	2	$500	$1,000				
	shelving	48	$50	$2,400				

		sm table	1	$250	$250				
		vis chr	4	$80	$320				
1	Reception	recept desk	1	$3,000	$3,000				
		arm chr	2	$800	$1,600				
		sofa	1	$1,500	$1,500				
		c tbe	1	$500	$500				
1	Conference Rm (capacity=20)	tables	10	$600	$6,000				
		sw chrs	20	$400	$8,000				
		credenza	1	$1,500	$1,500				
		wb	2	$25	$50				
1	Sm Conf	tables	4	$600	$2,400				
		sw chrs	8	$400	$3,200				
		credenza	1	$1,500	$1,500				
		wb	2	$25	$50				$0
1	servery					misc	1	$2,000	$2,000
1	Faculty & Admin Staff Lounge	table	2	$600	$1,200	fr	1	$1,000	$1,000
		chrs	16	$100	$1,600	mwave	1	$300	$300
		arm chr	10	$800	$8,000	coffee	1	$100	$100
		café table	4	$500	$2,000	kettle	1	$50	$50
		sofa	3	$1,500	$4,500	misc	1	$25	$25
1	Copy/Fax room	table	1	$600	$600	equip allow	1	$5,000	$5,000
		cabts	4	$500	$2,000				
1	Faculty Mail room	table	1	$600	$600	allow	1	$100	$100
		mailboxes	100	$50	$5,000				
1	Storage	FC	5	$500	$2,500				
		shelving	40	$50	$2,000				
1	Grad Stu Comp Lab	wkstn	20	$1,000	$20,000				
		ego chr	20	$400	$8,000				
1	Seminar Room	5' tables	21	$500	$10,500				
		chrs	40	$300	$12,000				
1	AV Stor	shelving	20	$50	$1,000				
	Server Room					allow	1	$5,000	$5,000
	sub-total				$562,830				$18,575
	misc + contingency	allow at 5%			$28,142				$929
	PST + GST	at 10.031%			$60,929				$2,011
	Estimated total budget				**$651,901**				**$21,515**

APPENDIX D: Total Project Cost Estimate

Project Title: **Mathematics in 6th floor BCIT**

TABLE 1: Total Project Cost Estimates

Column 1 will be completed with the Project Planning Report.
Column 1-5 will be included in the Project Implementation Report.

Items	Project Planning Report	Concept Design	Design Devel't	Drawings @ 90%	Tender	100% Complete
Construction Cost , Note A	3,607,500					
Construction Contingency	217,050					
Applicable GST	88,347					
Total Construction Costs, including taxes	**$3,912,897**					
Infrastructure Upgrades in Sector	0					
Secondary Effects, Note B	10,000					
Demolition	0					
Landscaping	0					
Permits & Insurance	23,350					
Professional Fees	685,845					
Computing Infrastructure, Note C	30,700					
Telephone Terminations, Note D	36,800					
Audio/Visual	0					
Moving	102,300					
Staging	0					
Furnishings: Department , Note E	651,900					
Furnishings: Classrooms	0					
Equipment, Note E	21,500					
Security & access systems, Note F	0					
Signage: Interior & Exterior, Note G	25,600					
Signage: Donor Recognition	0					
Groundbreaking & Building opening	5,100					
Miscellaneous	10,000					
Project Contingency	163,700					
Finance Contingency, Note H	0					
Total Project Cost Estimate GST included	**$5,679,692**	**$0**	**$0**	**$0**	**$0**	**$0**

prepared jcb Nov26 2004

Notes:

A calculated as 30,500 sq ft @ $115.00, plus 2,000 sq ft transom glazing @ $50.00 no allowance for other features over the building standard.

B allow to clear area

C allowance for CNS costs

D allow for sets and relocation costs.

E see F&E schedule

F included in construction amount

G premium over base amount in construction

H project fully funded as required to preclude interest charges

APPENDIX E: Room Data Sheets (available upon request)