CITY OF HAMILTON

PLANNING AND ECONOMIC DEVELOPMENT DEPARTMENT

Economic Development Division

TO:	Mayor and Members General Issues Committee
COMMITTEE DATE:	May 7, 2014
SUBJECT/REPORT NO:	Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM) (PED14091) (City Wide)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Neil Everson (905) 546-2424 Ext. 2359 Carolynn Reid (905) 546-2424 Ext. 4381 Mike Zegarac (905) 546-2424 Ext. 6150
SUBMITTED BY: **SIGNATURE:**	Neil Everson Acting General Manager Planning and Economic Development Department

RECOMMENDATION:

(a) That a contribution of $4 Million to McMaster University, be approved to support the development of the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM) in Hamilton;

(b) That subject to the approval of Recommendation (a) above, that the contribution of $4 Million from the City of Hamilton be comprised of the following components and conditions;

(i) Declaration of the former CP Lands property comprised of 16.5 acres located at 0 Chatham Street, described as Part of Lot 20, Concession 3 (Barton) and Part of Park Lots 11, 12, 14 and 15 on Plan 6R-17420, as surplus to the requirements of the City of Hamilton;

(ii) The lands described in Recommendation (b) (i) of Report PED14091, be disposed of at fair market value (to be determined by an external appraisal) to McMaster University or an affiliate (McMaster Innovation Park), save and except any lands required for municipal infrastructure (roads, sanitary / storm sewers, ancillary structures and/or easements or rights of way to facilitate municipal infrastructure);

(iii) A cash contribution for the remaining amount necessary to meet the City of Hamilton's total commitment of $4 Million will be funded from the Shovel Ready Industrial Land Reserve Account # 110060;

(c) That the City of Hamilton's funding be conditional on McMaster University receiving the following specified financial contributions from the Province of Ontario (in the amount of $4 Million) and the Federal Economic Development Agency for Southern Ontario (in the amount of $8 Million) for the establishment and development of the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM);

(d) That a Memorandum of Understanding, including mutually agreed upon key Performance Indicators, be prepared in a form satisfactory to the City Solicitor, General Manager of Planning and Economic Development and City Council, prior to the disbursement of any City funding to McMaster University for the establishment of this Institute;

(e) That the Economic Development Division and/or McMaster University report back annually to City Council with a summary of the progress and economic benefits realized from this municipal investment.

EXECUTIVE SUMMARY:

Fraunhofer – IZI Institute for Cell Therapy and Immunology (Leipzig-Germany) (see Appendix "A" to Report PED14091) has expressed significant interest in working with McMaster University and the City of Hamilton to develop the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM). Start-up funding for this Institute will be based on a partnership between Fraunhofer, McMaster University, and the Federal, Provincial and Municipal levels of government.

McMaster University engaged Deloitte Professional Services to conduct a five year assessment of the qualitative and quantitative impact of BEAM to Hamilton, Ontario and Canada. Deloitte evaluated the direct, indirect and induced benefits resulting from the job creation, talent development, commercialization and projected consumer spending. This analysis is based on the strength of Hamilton's Life Sciences cluster, the world class McMaster Innovation Park and McMaster's reputation for specialized knowledge in bio-engineering and bio-manufacturing.

Lumira Capital is one of the leading venture capital companies in Canada that makes investments all over North America exclusively in the life sciences sector. It's Managing Director Brian Underdown, Ph.D. offers the following opinion on this initiative (see Appendix "B" to Report PED14091):

"McMaster's decision to bring together its strength in cell therapy with that of the engineering school is exactly what is required to put Hamilton at the front of the field of

solution providers for advanced manufacturing of cell therapy-based products. The Fraunhofer and McMaster have already made significant investment in this area and their proposed collaboration will expand McMaster's global reach and allow it to build additional relationships with European companies. The field of cell therapy has just begun to get traction in the pharmaceutical world and automation is a key to efficient production. I believe that a natural outcome of this new proposed McMaster/Fraunhofer collaboration is the translation of the work into commercial products made in Hamilton. As the City of Hamilton moves to expand its manufacturing base into the new economy, an investment in this project will be critical."

Staff are recommending that the City enter into this partnership and commit the monies required to fulfil McMaster's request for partnership funding. Further, that a memorandum of understanding be developed by the City's Legal Services Department in consultation with McMaster and Fraunhofer IZI.

Alternatives for Consideration – See page 10.

FINANCIAL – STAFFING – LEGAL IMPLICATIONS

***Financial*:** Staff recommends that the main component of the City's $4 Million contribution be comprised of the CP lands whose appraised value is estimated at $2.5 Million (to be confirmed prior to May 7th). This approach minimizes the reliance on reserves or the Tax Levy. This is important due to the forecast funding pressures for the 2015 Tax-supported Capital Budget. The most current discretionary funding forecast for 2015 shows a deficit of $4.4 Million assuming program funding at 2014 levels (i.e., roads at $48 Million).

Any required cash contribution by the City would be funded from the Shovel Ready Industrial Land (land banking) Reserve #110060 which has a current balance of $4.4 Million as at March 31, 2014.

Taking into consideration the requested financial contribution of $4 Million, staff recommend that a report be prepared regarding the extension of Development Charge (DC) demolition credits for the McMaster Innovation Park (MIP). The original DC demolition credit was created in 2004 when the Camco Inc. plant closed and the property at 175 Longwood Road South was put up for sale. MIP purchased the property in 2005 and proceeded to demolish the former factory building, leaving them with DC demolition credits for 600,150.87 square feet of industrial development. Back in 2010, MIP requested an extension on their expiring demolition credits from July 31, 2010 to July 31, 2015. Council chose to grant a three year extension to July 31, 2013, and required MIP to provide annual updates respecting the progress of the project. In a subsequent request from MIP (refer FCS10051a), Council has granted a further extension to July 31, 2015.

Staffing: The Economic Development Division's Director of Economic Development Neil Everson and its Life Sciences Specialist Carolynn Reid will be the City staff leads on this project.

Legal: An approved Memorandum of Understanding will be required prior to the release of any City funding to McMaster University and that VP Research and International Affairs, or Director and/or CEO of the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM) be required to make an annual presentation to City Council.

HISTORICAL BACKGROUND:

In 2010 Council approved the Hamilton Economic Development Strategy 2010 - 2015, which recommended that staff resources be directed to the development of six clusters in which the City had demonstrated strengths. The primary reason for this strategy was the diversification of the City's economy through the attraction of high-technology/advanced manufacturing companies to Hamilton. This would result in increased non-residential assessment and the creation of high-skilled, high paying jobs.

One of these clusters was ***Life Sciences***, a sector where there has been a convergence of a number of industries including health, environment, information technology, agriculture and manufacturing. Life Sciences would build on Hamilton's inherent strengths in medicine and the research capabilities at McMaster University, Hamilton Health Sciences, St. Joseph's Healthcare and their related research facilities. The City's role was to focus on the creation of a supportive business environment for this cluster and assist in the commercialization of local research and clinical trials. In order to support innovation and the development of this Life Sciences cluster, the need for world class infrastructure investment at the local level was identified.

McMaster University educates approximately 24,500 full-time students per year and is home to a network of internationally recognized faculty, researchers, institutes and centres. It has three major roles in the local, provincial and national economies with regards to innovation, education, research and economic development. McMaster trains the knowledge leaders of the future and plays a major role in providing the right type of human capital to attract investment. McMaster's students, researchers and faculty is the talent pool that creates this new knowledge but also the new opportunities to access and apply knowledge from all over the world for the benefit of local enterprise through collaborative industry-institution research projects - such as the Fraunhofer Institute.

The Hamilton Chamber of Commerce just recently developed the report '***Building a Life Sciences Cluster – A Case for Hamilton'***. It was an exercise of the Innovation and Technology Committee of the Chamber with the contribution of many community stakeholders including the City of Hamilton Economic Development Department staff

and McMaster University. It was noted in the recommendations that "Champions must emerge. Key industry stakeholders in both the private and public sectors must create a unified vision, convene to identify specific goals and act as a champion group that leads the development of a local cluster mentality."

Fraunhofer- Gesellschaft is Europe's largest application-based research organization. They shape technology, design products and improve existing methods and techniques in areas of health, security, communication, energy and the environment. As a result, the work undertaken by their researchers and developers has a significant impact on people's lives.

Facts and Figures on Fraunhofer at a Glance:

- Largest organization for applied research in Europe;
- Currently operate a total of 67 institutes and research units in Germany and 35 affiliated international research centres worldwide;
- Workforce of more than 20,000 staff who are primarily qualified scientists and engineers;
- €2 Billion (approximately $3,054,800,000 CAD) annual research budget of this €1.7 Billion (approximately $25,965,800,000 CAD) is generated through contract research; more than 70 percent of the contract research revenue is derived from contracts with industry and from publicly financed research projects; almost 30 percent is contributed by the German federal and state governments in the form of base funding; and,
- Affiliated international research centres and representative offices provide contact with the regions of greatest importance to present and future scientific progress and economic development.

Fraunhofer-Gesellschaft is engaged in a number of international activities mainly in Europe, North and South America, Asia and the MENA-Region. Fraunhofer operates subsidiaries in Europe (Germany, Austria, Italy, Portugal, Sweden and United Kingdom) and also in North and South America (United States, Chile). Fraunhofer has 109 clients from industry, 95 academic partners, 53 non-university partners and 25 clinical partners.

Fraunhofer USA is a wholly-owned subsidiary of the Fraunhofer-Gesellschaft and presently comprises seven research and development units (Fraunhofer Centres) and two marketing offices. Each Fraunhofer Centre in the USA is affiliated with at least one of the Fraunhofer Institutes in Germany and are coordinated and supported by the Fraunhofer USA headquarters in Plymouth, Michigan.
In 2011 the Fraunhofer Gesellschaft Institute for Chemical Technology (ICT) in Pfinztal Germany, established in cooperation with the University of Western Ontario a Fraunhofer Project Centre for Composites Research in London, Ontario. The main focus of research at the Fraunhofer Project Centre is fiber composites for lightweight construction in various markets and especially the automotive sector. Its vision is to accelerate the adoption of advanced composites technologies and processes by North

American industry, to offer an excellent environment for the transfer of know-how to industry, leaders, engineers and technicians and to accelerate the development cycle for new products by industry. Both entities being situated in the heart of automotive manufacturing in Ontario will jointly work on composite technologies adapted to the local demands of each region's industry. The activities of both research entities will utilize and increase the expertise to accelerate composite innovations as lightweight solutions.

Fraunhofer Year One Results in London, Ontario:

- Creation of 20 highly skilled research positions;
- Establishment of a Regional resource centre for regional Small Medium Enterprises (SMEs) developing their Research and Development - accessing space, services and research expertise;
- Increased awareness of Ontario research talent on an international scale; and,
- Internships for students to work abroad, learn from leaders in their field and bring their knowledge back to Ontario.

Fraunhofer Chooses McMaster University, Hamilton, Ontario:

Fraunhofer – IZI Institute for Cell Therapy and Immunology (Leipzig-Germany) has expressed a keen interest in a number of research areas in which McMaster University is recognized as a global leader and specifically, their expertise in health sciences and engineering. The Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM) will be a joint venture between McMaster University and Fraunhofer IZI to be located at the McMaster Innovation Park (MIP) and focusing on commercializing cell therapies and biomedical engineering.

The research focus will be automated microprocessor development and instrumentation for the production of individual human cells for therapeutic applications. It will also concentrate on point-of-care diagnostics and bio-interfaces (i.e. point of care diagnostic tools such as handheld infectious disease management systems). BEAM will be the only Fraunhofer Project Centre developing these technologies. No other group in North America has assembled a comparable collection of scientists and technologies. There is only one company worldwide (Invetech in Australia) that is addressing a similar market space as BEAM. BEAM aims to fill existing gaps in the cell manufacturing industry, notably automated solutions and miniaturization of processes.

The Fraunhofer IZI management team met with multiple universities in Quebec and Ontario and only found McMaster University to have the correct collection of scientific expertise to meet their needs. The technological capital in Hamilton was considered highly complementary to the technologies existing at Fraunhofer IZI and it is anticipated that combining technologies should result in multiple commercial opportunities.

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS:

RELEVANT CONSULTATION:

- London Economic Development Corporation;
- Fraunhofer Project Centre @ Western University, London, Ontario;
- Fraunhofer IZI Leipzig-Germany;
- McMaster University Faculty of Engineering;
- LUMIRA Capital (venture capital company);
- Mayor's Office;
- City Manager's Office;
- Corporate Services Department;
- Legal Services Department; and,
- Senior Management Team.

ANALYSIS AND RATIONALE FOR RECOMMENDATION:

The technological capital in Hamilton is considered highly complementary to the technologies existing at Fraunhofer IZI and it is anticipated that combining technologies should result in multiple commercial opportunities.

The need for personalized medicines derived from the patient's own cells for the treatment of cancer, infectious diseases, multiple chronic diseases and the regeneration of damaged tissues are a rapidly growing reality. There is an unmet need to provide the growth capacity in personalized cell manufacturing for ultimately hundreds of thousands of individual patients to meet these needs.

This gap represents a tremendous business opportunity for Fraunhofer and the Hamilton partnership to capitalize on our local expertise in medicine and engineering. The result will be the development of a brand new industry centred on bio-medical manufacturing such as the production of the required instrumentation that will allow for multiple parallel manufacturing of cell therapies under strict and robust sterile conditions; the development of systems management tools; and the production of sterile environment enclosures that will be required by companies worldwide as they tackle the challenge of personalized cell therapies at the most advanced stages. These engineering specialties will include: nanotechnology, material science, microfluidics, software engineering, biosensors, cell biology, stem cell biology and immunology.

This collaboration between McMaster and Fraunhofer-IZI is expected to spawn a number of partnerships with numerous North American companies including many in the GTA and has already attracted the attention of many life sciences companies some of which are clients of Fraunhofer in Europe. These companies are now interested in establishing themselves in the vicinity of the project centre – namely, Hamilton. Companies located in Germany that are reportedly considering a subsidiary in Hamilton include the following: Miltenyi Biotec, Bergisch Gladbach, SoNovum AG, Leipzig and

TissUse GmbH, Berlin. Others interested in GMP automation projects at BEAM: Prima BioMed, Australia, Northwest Biotherapeutics, United States, Biospherix Ltd., United States, Corning, United States and Qiagen, Germany.

This is a unique and ideal opportunity for the City of Hamilton to capture the true economic value of the research that is conducted in McMaster University facilities. BEAM will develop a new biomedical industry focused on cell therapies and attracting highly qualified scientists to the City of Hamilton and expanding the Province of Ontario's global reputation. Establishing capacity for the provision of cell growth of all types will benefit the life sciences sector supply chain. Automation, instrumentation and sensor companies will benefit from increased activity, processing and production requirements. Making use of existing manufacturing capabilities at McMaster University and companies with in the City of Hamilton will generate manufacturing spin-out, I.e., plastics, specialized materials as well cutting-edge new developments will require specialized trainees, all of whom exist or will be trained in Hamilton.

The collaboration will engage the entire McMaster University community and offer an outlet for commercializing basic discoveries made by all McMaster University scientists operating in the same market sphere as BEAM. Notably, the McMaster Immunology Research Centre, the McMaster Biointerfaces Institute are playing key roles in this activity as are the faculties of Health Sciences, Engineering and Science. The project centre and its resulting spin-off opportunities are expected to create 70-100 direct and indirect jobs. Many of these positions will be filled by highly qualified individuals who will be relocating to Hamilton with their families from across Canada and from overseas. The new facility will attract visiting scientists and industry researchers from around the world as they collaborate on research projects unique to the Hamilton facility.

It is important to note that any measureable impacts can take time to occur. The lag time for such municipal investments need be considered when evaluating the impacts of the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM). The City of Hamilton intends to assess the economic benefits of the grant by the City to McMaster University through Key Performance Indicators which will be identified in the Memorandum of Understanding. These are to include:

- The number of jobs created at BEAM, both full-time and part-time;
- The number of businesses, including businesses located in Hamilton and businesses located outside of Hamilton that contact BEAM for the various services;
- The number of new businesses that are established at BEAM; and,
- The number of new businesses that are established in Hamilton that are reasonably associated to some degree with, have involvement with or access to BEAM.

McMaster University engaged Deloitte Professional Services to conduct a five year assessment of the qualitative and quantitative impact of the Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM) to Hamilton, Ontario and Canada (see Appendix “C”). Deloitte evaluated the direct, indirect and induced

benefits resulting from job creation, talent development, commercialization and consumer spend based on the strength of Hamilton's life sciences cluster, it's world class McMaster Innovation Park and its breadth and depth of specialized knowledge in bioengineering and bio manufacturing. Investment in BEAM (see Appendix "D") will:

- Generate economic benefit to Hamilton - $70 Million cumulatively over five years;
- Generate incremental economic impact to Ontario and Canada - $5 Million and $6 Million respectively;
- Strengthen industry and academia collaborations – eight proposed industrial partnerships;
- Drive commercialization and draw venture capital funding - $0.2 Million in licensing revenue;
- Attract top scientific and entrepreneurial talent – 74 direct jobs and 28 indirect jobs;
- Develop the next generation of researchers – 30 graduate and 18 undergraduate students trained; and,
- Attract visitors to Hamilton – 80 visitors each year.

Economic Development Division staff consulted with their counterparts in the London (Ontario) Economic Development Corporation and they provided the following information regarding the Fraunhofer investment:

- Targets were outlined in the report to council June 15, 2011 (New Economy Project International Composite Research Centre Conditional Capital Grant Agreement);
- They mutually agreed not to provide specific targets (i.e. # of jobs) since it is a research based initiative and takes time to reach full complement;
- London did identify leveraged investment by the province and federal government, etc., as a required deliverable (outlined in their report to Council);
- The Project Centre started up in the summer of 2013 and to date has not reported results back to Council. Results are anticipated in the fall 2014; and,
- The London Fraunhofer Project Centre has already expanded by approximately 5,000 sf.

Investment into Hamilton's life science cluster will maximize the economic value derived from innovations and ensure the continued growth of the City's bio-economy. The establishment of the Fraunhofer institute in Hamilton will undoubtedly contribute to Hamilton's #1 ranking as the most diversified economy in the country by the Conference Board of Canada.

ALTERNATIVES FOR CONSIDERATION:

That the City of Hamilton chooses not to participate in this partnership with Fraunhofer, McMaster University and the other two levels of government. The relocation of the Institute to another Ontario municipality or outside Ontario may be a consequence.

ALIGNMENT TO THE 2012 – 2015 STRATEGIC PLAN:

Strategic Priority #1
A Prosperous and Healthy Community

WE enhance our image, economy and well-being by demonstrating that Hamilton is a great place to live, work, play and learn.

Strategic Objective

1.1 Continue to grow the non-residential tax base.
1.2 Continue to prioritize capital infrastructure projects to support managed growth and optimize community benefit.
1.6 Enhance Overall Sustainability (financial, economic, social and environmental).

Strategic Priority #3
Leadership and Governance

WE work together to ensure we are a government that is respectful towards each other and that the community has confidence and trust in.

Strategic Objective

3.1 Engage in a range of inter-governmental relations (IGR) work that will advance partnerships and projects that benefit the City of Hamilton.
3.2 Build organizational capacity to ensure the City has a skilled workforce that is capable and enabled to deliver its business objectives.

APPENDICES AND SCHEDULES ATTACHED:

Appendix “A” – Presentation: Fraunhofer Institute for Cell Therapy and Immunology

Appendix “B” – Correspondence LumiraCapital

Appendix “C” – Presentation: Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing (BEAM)

Appendix “D” – Deloitte Economic Impact Forecast Assessment: Fraunhofer Project Centre for Biomedical Engineering and Advanced Manufacturing.

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