

TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 21, 2018
FROM:	KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR - ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER
SUBJECT	MEMORANDUM OF UNDERSTANDING WITH THE CANADIAN PLASTICS INDUSTRY ASSOCIATION AS PART OF THE LONDON WASTE TO RESOURCES INNOVATION CENTRE

RECOMMENDATION

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, with the support of the Director, Environment, Fleet and Solid Waste, the attached proposed by-law (Appendix A) **BE INTRODUCED** at the Municipal Council meeting to be held on March 6, 2018 to:

- a) authorize and approve a Memorandum of Understanding with the Canadian Plastics Industry Association with respect to advancing our joint waste to resources (waste management, diversion and/or conversion into products with beneficial uses) objectives with the mutual understanding that the combined expertise, influence and commitment are better applied together to support common goals attached as Schedule "A" to the by-law; and
- b) authorize the Mayor and the City Clerk to execute the Memorandum of Understanding authorized and approved in a), above.

PREVIOUS REPORTS PERTINENT TO THIS MATTER
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Relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Memorandum of Understanding with Bio-TechFar Inc. as Part of the London Waste to Resources Innovation Centre (June 7, 2017 meeting of the Civic Works Committee (CWC), Item #5)
- Memorandum of Understanding with Hawthorne Green Key Group as Part of the London Waste to Resources Innovation Centre (June 7, 2017 meeting of the CWC, Item #6)
- Memorandum of Understanding with Try Recycling Inc. as Part of the London Waste to Resources Innovation Centre (June 7, 2017 meeting of the CWC, Item #7)
- Memorandum of Understanding with the University of Western Ontario (Institute of Chemicals and Fuels from Alternative Resources) as Part of the London Waste to Resources Innovation Centre (December 12, 2016 meeting of the CWC, Item #8)
- Update and Next Steps: London Waste to Resources Innovation Centre and Green Shields Energy (October 4, 2016 meeting of the CWC, Item #10)
- Preliminary Concept for a London Waste to Resources Innovation Centre (February 3, 2015 meeting of the CWC, Item #4)

STRATEGIC PLAN 2015-2019

Municipal Council has recognized the importance of solid waste management, climate change, other related environmental issues and innovation in its 2015-2019 - Strategic Plan for the City of London ([2015 – 2019 Strategic Plan](#)) as follows:

Building a Sustainable City

- Strong and healthy environment

Growing our Economy

- Local, regional, and global innovation

Leading in Public Service

- Proactive financial management
- Excellent service delivery

BACKGROUND

PURPOSE

The purpose of this report is to provide Civic Works Committee and Council with a non-binding Memorandum of Understanding (MoU) to be signed by the City of London and the Canadian Plastics Industry Association (CPIA). In brief, the MoU sets out the mutual intentions of the City and CPIA to advance their joint waste to resources (waste management, diversion and/or conversion into products with beneficial uses) objectives. The MoU is based upon the mutual understanding that the combined expertise, influence and commitment of the parties are better applied together to support their common goals. This particular MoU is for a General Arrangement (Step 1) noting that any Formal Agreements (Step 2) would come back through Committee and Council.

CONTEXT

Municipal Council's Strategic Plan 2015-2019

The London Waste to Resources Innovation Centre is listed as a component of London's Strategic Plan 2015-2019 under local, regional and global innovation.

February 9, 2015 Council Direction - London Waste to Resources Innovation Centre

At its February 9, 2015 meeting, Council approved and adopted the following recommendation with respect to the London Waste to Resources Innovation Centre:

- a) *the concept of a London Waste to Resources Innovation Centre BE APPROVED IN PRINCIPLE; it being noted that the Centre would build upon the numerous innovative activities that have already occurred to date and are being planned for 2015 and 2016;*
- b) *the Civic Administration BE DIRECTED to:*
 - i) *identify potential partners, projects, resource requirements and funders;*
 - ii) *obtain initial feedback from potential partners; and,*
 - iii) *develop a scope of work for the London Waste to Resources Innovation Centre concept;*

London Waste to Resources Innovation Centre (LWRIC)

The primary goals of LWRIC are to:

- build on the existing foundation of traditional and innovative projects to divert waste from landfill and create value added products from residues and waste;
- create a focal point (location or locations) for the ongoing examination of innovative solutions for waste reduction, resource recovery, energy recovery and/or waste conversion into value-added materials, chemicals, heat and power;

- establish partnerships and collaborations between government, academia and businesses to synergistically build on existing strengths to create opportunities to prevent waste, to create products of value from waste, and to solve existing waste management challenges; and
- be known as an innovative centre of excellence with shared facilities and resources providing leadership, implementing best practices, undertaking leading edge research, providing knowledge and support to industry, while educating and training students, researchers and postdoctoral fellows in the various fields of resource and waste management.

Current MoUs

The City has four MoUs approved by Council (with further details provided in Appendix B):

- Bio-TechFar Inc; approved June 2017 with a current expiry date of December 31, 2019;
- Hawthorne Green Key Group; approved June 2017 with a current expiry date of June 30, 2020;
- Try Recycling; approved June 2017 with a current expiry date of December 31, 2019; and
- University of Western Ontario (Institute of Chemicals and Fuels from Alternative Resources); approved December 2016 with a current expiry date of December 31, 2019.

One MoU has expired:

- Green Shields Energy; expired December 31, 2017.

Direction of the Provincial Government

Waste Free Ontario Act, 2016

In November 2015, the Minister of the Environment and Climate Change (MOECC) introduced a new legislative framework for managing waste in Ontario under Bill 151, *Waste Free Ontario Act (WFOA)*. Bill 151 received Royal Assent in June 2016 and was proclaimed November 30, 2016.

Strategy for a Waste-Free Ontario: Building the Circular Economy

MOECC published the final Strategy for a Waste-Free Ontario: Building the Circular Economy in February 2017, a requirement of the WFOA, which outlines a road map for resource recovery and waste reduction for Ontario. It also:

- sets a vision and goals including interim waste diversion goals for 2020, 2030 and 2050;
- articulates key government actions to support implementation of the vision and goals; and
- identifies performance measures to measure progress towards achieving the vision and goals.

The Strategy focuses on moving Ontario towards a circular economy described as “a system where nothing is wasted and valuable materials destined for landfill are put back into the economy without negative effects on the environment.” This approach – a circular economy – has the potential to reduce greenhouse gas emissions, save and better utilize scarce resources, create jobs and create financial opportunities. To fulfil the vision, the Strategy has two visionary goals:

- a zero waste Ontario; and
- zero greenhouse gas emissions from the waste sector.

DISCUSSION

Step 1 – Memorandum of Understanding – General Arrangement

The first step in formalizing a working relationship with CPIA is to enter into a non-binding MoU. The MoU sets out the short-term objective of collaboration between the City and CPIA which includes carrying out research and development projects which generate knowledge, expertise and trained personnel with a focus on valorization of waste plastic (resource residues); and share waste plastic resources management expertise (policy, technology, education, sustainability frameworks) with the industry partners, Western University/Institute of Chemicals and Fuels from Alternative Resources (Western/ICFAR) and other stakeholders.

The responsibilities of the City are to include:

- Share waste management knowledge and expertise with CPIA and other partners including Western/ICFAR;
- Assist with funding applications and discussions/negotiations with potential partners;
- Provide access to the boardroom and education room in the Material Recovery Facility (MRF), W12A Landfill Site and other City facilities (Attachment A);
- Participate in project development, design and/or implementation;
- Participate, when available, in discussions, tours and related activities;
- Provide solid waste materials, in appropriate quantities, for resource recovery;
- Participate and/or make available resources to assist with student research;
- Assist with reporting, being available for media interviews and related matters; and
- Keep London Municipal Council informed of progress.

The responsibilities of CPIA are to include:

- Carry out research and development projects supported by grants, contracts which generate knowledge, expertise and trained personnel with a focus on valorization of waste plastic resources residues with the agreement and jointly with the City of London and other partners;
- Share waste plastic resources management expertise (policy, technology, education, sustainability frameworks) with the City, with the industry partners and Western/ICFAR;
- Act as window of access to plastic industry expertise and networking opportunities for the City, government agencies, Western/ICFAR and potential industry partners to maximize synergies of expertise, infrastructure and resources;
- Proactively engage in conversations with the City, industry partners, government(s) and Western/ICFAR to ensure continuous review and improvement of current initiatives and development of new projects; and
- Promote the partnership with the City and its successes within CPIA's membership and broadly to governments and other stakeholders through webinars, conferences and other CPIA communication channels.

Step 2 – Formal Agreement for Demonstration Pilot Projects

The City and CPIA will work together to develop a Formal Agreement(s) to undertake activities that involve capital works, contracts with funding agencies, contracts with secondary educational institutions, private companies and investors. Any Formal Agreement will follow the same approval processes as this General Arrangement and require Council approval.

ACKNOWLEDGEMENTS

This report was prepared with assistance from Mike Losee, Division Manager, Solid Waste Management. This report has followed the template for by-law approval and MoU signing approved by the City Clerk and Legal Services.

PREPARED AND SUBMITTED BY:	RECOMMENDED BY:
JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE	KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER

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Appendix A A by-law to authorize and approve a Memorandum of Understanding between Canadian Plastics Industry Association, and The Corporation of the City of London and to authorize the Mayor and the City Clerk to execute the Memorandum of Understanding

Schedule A Memorandum of Understanding

Attachment A Overview of City of London Solid Waste Management Facilities

Attachment B Overview of the Canadian Plastics Industry Association

Appendix B Existing and Previous Memorandums of Understanding

c Carol Hochu, President & CEO, Canadian Plastics Industry Association, 5955 Airport Rd #125, Mississauga, Ontario L4V 1R9

Joseph P. Hruska, Vice President Sustainability, Canadian Plastics Industry Association, 5955 Airport Rd #125, Mississauga, Ontario L4V 1R9

Appendix A

Bill No.
2018

By-law No. A.-

A by-law to authorize and approve a Memorandum of Understanding between Canadian Plastics Industry Association, and The Corporation of the City of London and to authorize the Mayor and the City Clerk to execute the Memorandum of Understanding.

WHEREAS section 5(3) of the *Municipal Act, 2001*, S.O. 2001, c. 25, as amended, provides that a municipal power shall be exercised by by-law;

AND WHEREAS section 9 of the *Municipal Act, 2001*, S.O. 2001, c. 25, as amended, provides that a municipality has the capacity, rights, powers and privileges of a natural person for the purpose of exercising its authority under this or any other Act;

AND WHEREAS it is deemed appropriate for The Corporation of the City of London (the "City") to enter into a Memorandum of Understanding with the Canadian Plastics Industry Association to carry out research and development projects which generate knowledge, expertise and trained personnel with a focus on valorization of waste plastic (resource residues); and share waste plastic resources management expertise (policy, technology, education, sustainability frameworks) with the industry partners, Western University/Institute of Chemicals and Fuels from Alternative Resources (Western/ICFAR) and other stakeholders;

AND WHEREAS it is deemed appropriate to authorize the Mayor and the City Clerk to execute the Memorandum of Understanding on behalf of the City;

NOW THEREFORE the Municipal Council of The Corporation of the City of London enacts as follows:

1. The Memorandum of Understanding between The Corporation of the City of London and Canadian Plastics Industry Association, attached as Schedule A to this by-law, is hereby authorized and approved.
2. The Mayor and the City Clerk are hereby authorized to execute the Memorandum of Understanding authorized and approved under section 1 of this by-law.
3. This by-law shall come into force and effect on the day it is passed.

PASSED in Open Council March 6, 2018

Matt Brown
Mayor

Catharine Saunders
City Clerk

First Reading – March 6, 2018
Second Reading – March 6, 2018
Third Reading – March 6, 2018

Schedule A

Memorandum of Understanding

Between

The Corporation of the City of London (“City”)

And

Canadian Plastics Industry Association (CPIA)

Whereas the City has established a special policy area in the City’s Official Plan, referred to as the Waste Management and Resource Recovery Area, that plans for the continued evolution of the W12A Landfill and nearby lands into an “Integrated Waste Management Centre” that utilizes environmentally responsible and sustainable operations and practices and achieves a high standard of compatibility with its environs and neighbours;

Whereas the remaining life expectancy of the W12A Landfill as of January 1, 2017 is approximately eight years or less;

Whereas the City wishes to examine, support, conduct research and/or implement projects under the broad classification(s) of resource recovery, energy recovery and/or waste conversion within the special policy area, in other locations in London, or in collaboration with others outside of London as part of its continuous improvement system for solid waste management. The continuous improvement system is described in several public documents including City of London Continuous Improvement System for Waste Management (1997), A Road Map to Maximize Waste Diversion in London (2007) and Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste (2013);

Whereas the City wishes to pursue projects, relationships and partnerships for the purposes of innovation, creativity, best practices and excellence in solid waste management and is proposing to operate, subject to final Municipal Council approval, under a banner known as the London Waste to Resources Innovation Centre (LWRIC);

Whereas CPIA which represents the Canadian plastics value chain has the aspirational goal of Zero Plastics to landfill, endorses Sustainable Materials Management practices such as reduction, reuse, recycling and recovery under London’s broad classification(s) of resource recovery, energy recovery and/or waste conversion, CPIA now wants to extend its relationship and in partnership with the City for mutual benefits;

Whereas CPIA has various research and policy interests in the broad sector of solid waste plastics resource management that represent significant secondary resource management current and future opportunities at the local, regional, Canada-wide and international levels;

Whereas the City and CPIA recognize that the current framework direction for waste management and waste diversion in Ontario has been set through the *Waste Free Ontario Act, 2016* and the Strategy for a Waste-Free Ontario: Building the Circular Economy (February 2017); and

Whereas the City and CPIA recognize that the current set policy framework direction for waste resource management and diversion in Ontario to support a Circular Economy also requires a Sustainable Materials Management life cycle approach to be more environmentally, economically and socially sustainable to manage all plastics (and other waste resources) to achieve the aspirational goal of no plastics to landfill through Integrated Waste Resource Management recovery systems that make use of a hierarchy of technologies from conventional recycling to advanced resource recovery technologies.

1.0 Purpose of the Memorandum

This Memorandum of Understanding (“MoU”) is intended to set out the mutual intentions of the City and CPIA to advance their joint waste conversion, resource and energy recovery and policy objectives. The MoU is based upon the mutual understanding that the combined expertise, influence and commitment of the parties are better applied together to support their common goals. The MoU establishes the non-legally binding framework and set of principles for enhanced and focused coordination and collaboration to support their shared interests in waste diversion, waste conversion and resource and energy recovery.

The parties to this MoU acknowledge that if they wish to jointly carry out specific initiatives that may arise out of this MoU, they will have to engage in further discussion and prepare necessary agreements to define, authorize and execute, among other things, each party’s roles and responsibilities, resource allocation and other details.

The MoU is not an exclusive arrangement and does not restrict either party from pursuing their mandates either on their own or in collaboration with any other party.

2.0 Short Term Objective

The short term objective of the collaboration between the City and CPIA is to:

- build on the existing foundation of traditional and innovative projects to divert waste from the landfill and create value added products from waste plastic resources;
- create a focal point (location or locations) for the ongoing examination of innovative solutions for waste reduction, resource recovery, energy recovery and/or waste conversion;
- work on and promote research and other innovations to support overall policy changes and improvements to current legislated frameworks of the Province that will recognize and include Sustainable Materials Management life cycle and Circular Economy practices and frameworks to continuously improve environmental, economic and social sustainability of society;
- establish partnerships and collaborations between government, academia and businesses to build on existing strengths to create opportunities to prevent waste, to create products of value from waste plastic resources and other materials, and to solve existing waste resource management challenges;
- be known as a Centre of Excellence with resources providing leadership, implementing best practices, undertaking leading edge research, providing support and/or training, and providing resources for industry, academia and others in the various fields of resource and waste management; and
- be it known that CPIA is one of a number funding partners in the University of Western Ontario/Institute for Chemicals and Fuels from Alternative Resources (Western/ICFAR) to support overall research and policy goals of CPIA and the City of London through advanced research on new products and advanced innovative technologies to manage plastic and other solid waste resources.

3.0 General Arrangement

This MoU sets out the General Arrangement between the parties that will be the basis for working together.

The responsibilities of the City are to include:

- Share waste management knowledge and expertise with CPIA and other partners including Western/ICFAR;

- Assist with funding applications and discussions/negotiations with potential partners;
- Provide access to the boardroom and education room in the Material Recovery Facility (MRF), W12A Landfill Site and other City facilities (Attachment A);
- Participate in project development, design and/or implementation;
- Participate, when available, in discussions, tours and related activities;
- Provide solid waste materials, in appropriate quantities, for resource recovery;
- Participate and/or make available resources to assist with student research;
- Assist with reporting, being available for media interviews and related matters; and
- Keep London Municipal Council informed of progress.

The responsibilities of CPIA are to include:

- Carry out research and development projects supported by grants, contracts which generate knowledge, expertise and trained personnel with a focus on valorization of waste plastic resources residues with the agreement and jointly with the City of London and other partners (Attachment B);
- Share waste plastic resources management expertise (policy, technology, education, sustainability frameworks) with the City, with the industry partners and Western/ICFAR;
- Act as window of access to plastic industry expertise and networking opportunities for the City, government agencies, Western/ICFAR and potential industry partners to maximize synergies of expertise, infrastructure and resources;
- Proactively engage in conversations with the City, industry partners, government(s) and Western/ICFAR to ensure continuous review and improvement of current initiatives and development of new projects; and
- Promote the partnership with the City and its successes within CPIA's membership and broadly to governments and other stakeholders through webinars, conferences and other CPIA communication channels.

4.0 Formal Agreement

The parties agree to work together to develop a Formal Agreement to undertake activities that involve capital works, contracts with funding agencies, contracts with private companies and investors.

The Formal Agreement will follow the same approval processes as this General Arrangement.

5.0 Effective Date and Duration

This MoU will come into effect upon the date it has been signed by all signatories and will remain in effect until March 31, 2020.

This MoU will be reviewed two months prior to the anniversary date and any agreed to amendments added to the MoU. Substantive changes will trigger the approval process for the MoU and this determination is at the discretion of the City and CPIA.

A participant may withdraw from this MoU by providing a sixty (60) written notice to the other parties.

This MoU is subject to approval processes required by each of the parties.

DATED this _____ day of _____.

IN WITNESS WHEREOF:

THE CORPORATION OF THE CITY OF LONDON

By:

Name: Matt Brown

Title: Mayor

By:

Name: Catharine Saunders

Title: City Clerk

I/We have authority to bind the City.

Canadian Plastics Industry Association (CPIA)

By:

Name: Carol Hochu

Title: President & CEO

By:

Name: Joseph P. Hruska

Title: Vice President Sustainability

I/We have authority to bind the corporation.

ATTACHMENT A

OVERVIEW OF CITY OF LONDON WASTE MANAGEMENT FACILITIES (www.london.ca)

The City contributes to the health of the environment and its citizens through appropriate collection and management of garbage, recyclables, yard materials, household special waste, and other designated waste materials. This involves providing pick-up and drop-off services within London, processing and creating products of value from compostable/recyclable/reusable materials; and disposing of garbage in an environmentally responsible manner, including the ongoing monitoring and management of closed landfills and other sites producing methane.

To support these services the City owns and operates an array of Solid Waste diversion and disposal assets valued at over \$64 Million. These range from public waste and recycling bins, to drop off depots and one active landfill (W12A) and many closed landfill sites.

The City also owns a centralized Material Recovery Facility (MRF) which provides recycling services to London and several neighbouring communities. The MRF was newly constructed in 2011 and is operated and maintained by an outside contractor.

Drop off locations (Community EnviroDepots) are provided for special wastes including household special waste, yard materials, electronics, scrap metal, tires, roofing, etc. Solid Waste is responsible for maintaining these assets in serviceable condition between replacement cycles, ensuring compliance with Provincial regulations and maintaining the continuity of solid waste services to the citizens of London and other customers.

General household waste is primarily collected by the City while recycling pick-up and processing services are contracted out. The City owns and operates a fleet of garbage truck.

The W12A Landfill consists of a number of assets including landfill cells, buildings, leachate and gas collection systems and stormwater maintenance ponds. This facility operates within its Operation Plan, with additional disposal cells being brought online to accommodate waste in accordance with its Environmental Compliance Approval. Based on projected use, the current landfill will reach capacity in about 2023, at which point it will require an expansion (or other long term disposal solution) to provide the city with the space needed to meet its future needs.

The W12A buildings (Incl. Site Works & Equipment) includes the roads, curbs and landscaping as well as the administration, maintenance and scale house buildings. The W12A Leachate Collection System collects and conveys leachate for treatment. This system is capable of meeting the current City's needs and is expanded as new disposal cells are constructed. The Landfill Gas Collection System collects and conveys landfill gas to the on-site landfill gas flare for destruction. This system is capable of meeting current City's needs and is expanded as new disposal cells are constructed.

On-site W12A Stormwater Management Ponds and site drainage infrastructure collect and treat surface runoff from snow and rain that impact the site. Maintenance occurs on a planned basis, with investments identified through regular inspections.

Any expansion or examination of alternatives will be undertaken as per the requirements of the Environmental Assessment Act.

Buffer land is comprised of City owned land adjacent or near the W12A Landfill that has been acquired to provide an appropriate buffer from existing operations and to provide buffering for possible future landfill expansion and resource recovery facilities. It is expected that additional land will be acquired for these purposes over the next several years.

ATTACHMENT B

OVERVIEW OF THE CANADIAN PLASTICS INDUSTRY ASSOCIATION

CPIA Profile www.plastics.ca

Since 1943, the Canadian Plastics Industry Association (CPIA) has been the voice of the Canadian plastics industry.

With over 2,422 companies employing 76,530 workers, Canada's \$17.6 billion plastics industry is a sophisticated, multi-faceted sector encompassing plastic products manufacturing, machinery, moulds, and resins.

CPIA is a dynamic, member driven, not-for-profit association dedicated to the growth of plastics businesses and helping the industry reach its full potential.

We are an advocacy association and we speak with one powerful voice to improve environmental, economic and social sustainability through the benefits of plastics across all sectors of society.

CPIA's Areas of Focus:

Reputation Enhancement & Outreach

We create a more positive public and political climate for the industry by proactively promoting the benefits of plastics through our Intelligent Plastics campaign.

Post-Use Resource Recovery Leadership

We work with government and the private sector to increase recycling and energy recovery rates.

Issues & Opportunities Management

CPIA educates and promotes the environmental, economic and social benefits of plastics, defends the industry against specific product attacks, and fosters innovation.

CPIA is fully committed to building upon the industry's long history of innovation and achievement by taking advantage of new opportunities, building the plastics brand image and meeting industry challenges as they arise.

We work with governments and partners across the country on a number of groundbreaking recycling initiatives and advanced resource recovery initiatives.

Through relationships with similar associations around the world, we are efficiently and effectively promoting and protecting plastics globally.

Through forums and other networking events, CPIA brings together leaders in the industry to share ideas, discuss business opportunities, and promote trade and innovation.

Mission

To be the trusted national voice and chief advocate for plastics in Canada, providing leadership on pivotal issues and policies throughout the plastics lifecycle and promoting and defending the sustainable economic, environmental and social benefits of the plastics industry and our products.

Vision

An increasing appreciation for & use of plastics, driven by a responsible and globally competitive Canadian industry.

APPENDIX B

EXISTING AND PREVIOUS MEMORANDUMS OF UNDERSTANDING

The City has four Memorandums of Understanding (MoUs) approved by Council:

- **Bio-TechFar Inc.** – a working relationship to undertake testing and research; write and present reports; develop data/information including a feedstock inventory; and work with industry, government and academic partners on the viability of its proprietary pyrolysis technology and processes to create higher value resources from biomass waste that would normally be sent to recycling and/or disposal facilities. Bio-Techfar have developed a proprietary pyrolysis technology, referred to as the BT-100/500, that has successfully converted a range of biomass materials into pyrolysis-oil and pyrolysis-char for both energy and non-energy applications. Bio-Techfar now wants to increase the technology throughput for biomass materials such as forestry residuals, agricultural residuals, yard waste and other industrial or municipal biomass materials/waste streams. The expiry date of this MoU is December 31, 2019.
- **Hawthorne Green Key Group** – a working relationship designed to undertake testing and research; write and present reports; develop data/information; and work with industry, government and academic partners on the viability of its proprietary pyrolysis technology and processes to create higher value resources from waste that would normally be sent to recycling and/or disposal facilities. Hawthorne has the Canadian rights to a proprietary pyrolysis technology that has successfully converted a range of biomass materials into energy, chemicals and/or fuels, now wants to determine the viability of this technology on solid waste materials, including mixed solid waste, commonly known as household garbage. The expiry date of this MoU is June 30, 2020.
- **Try Recycling Inc.** – a working relationship to undertake testing and research; write and present reports; develop data/information; and work with industry, government and academic partners on the viability of a range of technologies and processes to create resources from waste that would normally be sent to disposal facilities. Try has proprietary and other expertise related to the successful conversion of a range of waste materials into products with beneficial uses, in particular, the conversion of organic wastes into compost and various construction, renovation and demolition (CR&D) wastes into beneficial products. The expiry date of this MoU is December 31, 2019.
- **University of Western Ontario (Institute of Chemicals and Fuels from Alternative Resources - ICFAR)** – a working relationship covering the broad sectors of solid waste management, biomass management and related sectors that produce waste materials. ICFAR is a research facility with proprietary technologies and expertise that have contributed to the successful conversion of a range of materials into energy, chemicals and inert materials. Western has identified Environmental Sustainability and Green Energy as an area of research strength and ICFAR/Western has various research interests in the field of biomass conversion technologies and management and wishes to coordinate R&D activities, including multi-disciplinary, multi-institutional waste-to-resource initiatives, for the purpose of using the broad expertise to valorize biomass and organic wastes into marketable products at the local, regional, Canada-wide and international levels. The expiry date of this MoU is December 31, 2019.

The City has one expired MoU as follows:

- **Green Shields Energy (GSE)** – this was a working relationship designed to explore the viability of a Gas Phase Reduction (GPR) technology for managing solid waste. This technology had already been proven to manage a range of material including pesticides, soil, sediment, sludge, high-strength oils, tar, watery wastes, wood

wastes, brominated fire retardants, CFC refrigerants. It has not been thoroughly tested to handle mixed solid waste (household garbage), source separated organics (Green Bin) materials, mixed plastic waste, etc. GPR is a process for the conversion of organic material to methane rich gas also known as synthetic gas or syngas. The process comprises heating vaporized organic material in the presence of an excess amount of hydrogen gas and superheated steam to produce a methane rich fuel syngas. The syngas can be converted to various fuels or burned directly to create energy. The MoU expired on December 31, 2017. Reasons for the expiration included technology patent challenges, lack of confirmation of government grants and project financing challenges.