Turning The Soil:
Urban Redevelopment and Soil Movement In Toronto

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Abstract

The goal of this major paper is to determine whether Toronto's soil remediation, transport and redevelopment regime is sustainable – or whether unforeseen and dispersed factors will someday combine to form a disaster for the city's urban environment. In order to address this question, the paper first examines a history of the city's brownfields: In Toronto, brownfields are broadly known as vacant or underused properties that may have been contaminated by past land use, but which show potential for redevelopment. They are also major producers of both contaminated and clean fill, and the paper examines the policies which have shaped their definition, usage, and disposal.

Following an examination of the state of the art in brownfield sciences in Ontario, Canada, and globally, the focus turns to the study of disasters. Taking cues from Barry Turner's seminal book in disaster studies Man-Made Disasters, a disaster is *"an event, concentrated in time and space, which threatens a society or a relatively self-sufficient subdivision of a society with major unwanted consequences as a result of the collapse of precautions that had hitherto been culturally accepted as adequate."* A situation in which construction-related soil stockpiles are depleted to the point that cost-effectiveness of importation comes into question, or in which rising prices cause an exodus of Toronto's building potential, can therefore be rightly termed disasters. The MP describes a generalized framework to identify disasters and the period of incubation that takes place beforehand.

The heart of the MP is a collation of Records of Site Condition taken from the Ministry Of The Environment And Climate Change database over the thirteen years of its existence. RSCs provides protection for the land owner from regulatory orders and liability, but also include data on soil imported and exported from the property, and are currently one of the only accessible means by which to track soil movement in Toronto. Gathering hundreds of records, the MP proceeds to extract trends from the data over time. To wit, soil exportation has risen dramatically, soil importation and in-situ remediation has fallen, and site risk assessment (a technique allowing buried contaminants to be written off and remain onsite) has risen to compensate.

Interviews of industry professionals from a variety of backgrounds were performed to glean their response to the information gathered above. The overall consensus from these interviews was a lack of surprise in the results displayed and a lack of concern regarding Toronto's so-called incubation period. When the results of the above sections and the interviews were slotted into the framework, that too confirmed that Toronto's soil regime is sustainable for the foreseeable future. However, it also brought to light other weaknesses in the regime, such as a lack of a soil tracking system for soils in Toronto save for a limited provision in the RSC program. The paper concludes by describing upcoming policy instruments due to be employed in the near future by the provincial government and not-for-profit actors, which will serve to further strengthen the system.

Foreword

The goal of this major paper is to determine whether Toronto's soil remediation, transport and redevelopment regime is sustainable – or whether unforeseen and dispersed factors will someday combine to form a disaster for the city's urban environment. This concern was raised due to my studies as well as my years of experience within the city working as an environmental consultant to high-rise developments, as well as an effort to determine whether the city's soil regime lay in a period of disaster incubation. To this end, the core components of my Plan of Study were the interweaving of Brownfield Science, Ontario Brownfield Policy, and National and Global perspectives on Brownfield policy.

1) Brownfield Science is a broad category that encompasses the application of scientific techniques to the Plan of Study, whether it be through field work or through the examination of peer-reviewed reports that apply to the plan. I intended soil and groundwater science to be the bedrock upon which I built the rest of the Plan.

2) Ontario Brownfield Policy incorporates studies into the root causes for environmental policies, the transitional period between older methods and requirements for remediation, and future permutations of these policies. While brownfields are an issue in any developed urban environment worldwide, the solution to them is not one-size-fits-all – even in Canada, policies dealing with brownfield remediation can vary wildly between provinces. Given that variance and my desire to continue my professional career in Ontario, the bulk of my MP focused on Ontario's policies.

3) National and Global Perspectives incorporates studies of the previous components from a global perspective, though necessarily at a wider, shallower scope. Though not a major target of my MP, global perspectives have shaped Ontario's (and Toronto's) policy history, and are currently an important factor in shoring up a key weakness in Toronto's soil regime.

In closing, I would like to thank my family, friends, employer and professors for their support throughout the learning endeavor. Thank you for your guidance and strength, and particularly for your patience. A special thanks to my loving wife, without whose support and inspiration I could surely not have made it this far.

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This Major Paper aims specifically to address the question of whether the current state of construction-related soil disposal and movement is sustainable. Soil is under constant demand for construction purposes, whether for landscaping, grading, or backfilling. While stockpiles exist, it's almost always easier to extract new, clean soil than to remediate impacted soil. In addition, demand for soil is constant as long as new constructions are ongoing, and discussion of soil use or reuse between developers is uncommon. Will Toronto run out of economically extractible soil? In-situ treatment is touted as a possibility, but is policy modification necessary to protect new soil from existing, off-site contaminants? Can current practices be sustained? If not, what can be done to render them sustainable – and if so, how can we ensure that they remain sustainable for the foreseeable future?

While information on removed soil volume and disposal is known and freely available on the MOE database, it hasn't been collated – developers across Toronto are working on separate projects, separately, and reporting their results largely without consultation with others. First, the paper will organize the data available in these databases, generating tables of relevant, cross-referenced information for later use. Taking cues from frameworks discussed in past works such as Man-made Disasters, the paper will examine whether the state of soil disposal in Toronto constitutes an incubation period for a larger problem.

Finally, the conclusions will be taken to a variety of professionals working in related fields. Through interviews, a wider range of real-world, practical experiences will be contrasted with the results of study, determining whether the research is reflective of their experiences in the industry.

1.0 BACKGROUND

Soil forms the foundation for many systems on Earth. Not all soil is created equal – the texture, hydrology and chemical composition influence its suitability for construction purposes. Soil is a living thing in more ways than one, and in a city undergoing development and redevelopment such as Toronto this life is expressed through tracking its motion. Large scale development not only requires primary excavation for foundations, but - increasingly - secondary excavations to remove contaminated material. (Lapointe, 2012) This contamination can be generated onsite through past land uses or infiltrated from nearby sources, but it must all be removed before construction can be completed. Correspondingly, proper grading of the site often requires clean fill to be imported to replace contaminated material. Soil goes out, and soil comes in – but where is it going, and where is it coming from?

1.1 A Brief History of Toronto

Before a deeper examination of soil transport and disposal in Toronto, it is important to position ourselves relative to urban development of the city's past. In the late 1990s, large amounts of redevelopment took place in the older industrial zones northwest of the city, primarily instigated by an increased demand for residential sites. (Fishlock, 2010)

Simultaneously, the Nationwide Contaminated Sites Remediation Program was discontinued and replaced by the Province of Ontario with their Guidelines for Use at Contaminated Sites. These guidelines clearly outline the accountabilities of both public and private stakeholders as well as specific procedures for assessment and remediation. With a clear understanding of the remediation process, stakeholders and specifically private sector investors more

readily opted to engage in remediation and redevelopment. However, unlike their American counterparts, Canadian private sector investors were given few incentives to enter into the remediation process. Despite this, municipal governments attempted to entice redevelopment through diminishing zoning bylaws, which unlocked new opportunities for existing buildings and lessened approval time for project proposals. (De Sousa, 2002)

The 1990s brought with it a mini redevelopment boom championed by the demand and popularity of the condo. In the late 90's, almost 70 active condo projects with more than 10,000 suites were being built, and more than half of these were built and sold in former city districts. The popularity and demand increased prices of these condos by 50%, which made the redevelopment of these brownfield sites an economically sound investment as stakeholders were likely to receive a return on investment. (MMAH, 2007) The last factor encompasses both residents' and government's desire to enhance the urban image of the city, chiefly by creating an image of a city where people want to work and live. Redevelopment and revitalization aimed to lure people back into the city and subsequently entice top industries to set up shop in Toronto. (Ontario, 2010)

The defining feature of the Toronto and GTA urban landscape is clearly the preponderance of brownfields on prime real estate. For decades, development and redevelopment of these affected sites has shifted the subsurface conditions of the city in real and tangible ways. The city has undergone many changes in land use and population dynamics, and the needs and desires of that population have changed along with it. But what, precisely, are brownfields? The answer is more complex than expected.

1.2 What are Brownfields?

Without a single, universally acceptable definition, diverse interpretations have sprung up, many of which emphasize aspects that benefit a particular stakeholder group, or at least omit important requirements. The term 'brownfield' originated initially in the UK as the opposite to greenfield (land which has not been previously developed) and in the US as an EPA definition describing brownfields as "Abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination - which implies the defining aspect of brownfields is contamination, which isn't always the case. (Alker, 2000) Other, later definitions share similar omissions or are subject to misinterpretation: for example "brownfield land is any land that has a previous use on it and is being put back for reuse (recycled land)", which does not mention contamination or pollution, and ends up being far too broad – especially in the UK, almost all land has been 'used' in one way or another.

A standardized definition was proposed by Sandra Alker and co-authors in The Definition of Brownfield. Through division and synthesis of many collected definitions, the authors proposed a universal definition as follows: "A brownfield site is any land or premises which has previously been used or developed and is not currently fully in use, although it may be partially occupied or utilized. It may also be vacant, derelict or contaminated. A brownfield site is not available for immediate use without intervention." Though unwieldy, its precision makes it ideally suited to describe the entire body of sites that could be called brownfields. (Alker, 2000)

In Toronto, Brownfields are broadly known as vacant or underused properties that may have been contaminated by past land use, but which show potential for redevelopment. (CIELAP, 2011) Contamination onsite may stem from negligence or ignorant practices, but often the facilities upon them operated before modern environmental regulations or standards – there was simply no oversight to be had. In Ontario, construction on brownfields began to become more important at the turn of the century as land use in Ontario transitioned away from manufacturing and primary resource based economies. (ASSE, 2013) As plants closed down, their land became prime real estate for residential development, and so methods for quantitatively determining the safety of a given site were required. Though often not immediately apparent, soil and water contamination can have deleterious consequences to human and ecological health, and must be considered before the soil can be remediated, removed or declared safe for use.

1.2.1 Soil Impact

Brownfield soils often contain high concentrations of trace metals, elements often adsorbed to organic matter or carbonates. High soil metal concentrations can be strongly harmful to a plant community, harming growth, reproduction and establishment. However, because of this, phytoextraction is a possibility. Phytoextraction, a process by which plants are used to remove contaminants from soil, is low-cost and effective at removing surface contamination while also increasing the aesthetic value of the remediated site. (Gallagher, 2008) However, contaminants removed in such a way don't just vanish – they're incorporated into the plant's structure in some fashion, and their position in the structure can have effects on human health.

A study undertaken at a former railroad yard in New Jersey determined that the most dominant species on the site was able to translocate soil metals at high rates towards leaf tissue, leading them to postulate that higher rates conveyed some sort of selective advantage. They also determined that differential tolerances and methods of assimilation can increase the risk of contamination impacting humans. (Gallagher, 2015) For instance, in some situations although soil Zinc content was lower than New Jersey's soil screening criteria, the risk associated with Zinc human impact was elevated because the plants concentrated the metal in their leaves. This bioaccumulation both raised the concentrations above thresholds and put them in a position where they caused a greater threat to humans as opposed to if they had been sequestered in the roots. (James, 2012)

1.2.2 Groundwater Impact

When considering site contamination or impact, soil impacts are readily quantifiable, but contaminants that affect the soil have a chance of infiltrating into the groundwater, as well. Sustainable management of groundwater resources is challenging: urban development brings with it a host of contaminating activities that can easily harm the fragile and limited resource. The Waterloo Moraine provides an illustration – in addition to supporting a number of streams and wetlands, it also supplies water to over half a million Canadians. Urban intensification in the area is expected to bring even larger populations and industry to Waterloo, increasing the demand for water and almost certainly decreasing water quality. (Sousa, 2014) Without sustainable use, sooner or later water content and access will become a problem.

Threats to drinking water can be divided into threats to water *quality* (intrusion from wastewater, fertilizer, fuels, salt, and the like) and threats to water *quantity* (droughts, irrigation, overexploitation of aquifers). In urban areas, loss of permeable surface area – from urban intensification and construction - restructures the groundwater recharge sinks and potentially channels suspended particulate into aquifers. In that respect, brownfield construction is beneficial – by turning over already-impacted sites, further loss of permeable surface area can be avoided. However, caution is required: due to aforementioned potential for soil contamination, brownfield sites are at a heightened risk for causing water contamination through contact alone. (Murray and Rogers, 1999) Any disturbance of the soil on-site can lead to increased infiltration of rainwater as compacted material is agitated. Depending on soil structure, this can even lead to contaminants spreading through groundwater along the water table.

1.2.3 Human Health Impact

Human health impact from brownfield contamination is as varied as the contamination itself. Elevated pH and lead levels in soil can contribute to asthma, childhood cancer and autism spectrum disorder. In an example from the United Kingdoms, thirty-two brownfield sites were studied in total over two years - on each site, a composite sample was taken across the entire area and tested for metal (Pb, Cu, Zn, Ni) and pH contamination. Unsurprisingly, the four sites with the highest concentrations were formerly (or currently) sites of industrial activity, and one of them was currently a nature reserve. The UK's Contaminated Land Exposure Assessment (CLEA) model has defined limits for direct and indirect ingestion and inhalation of soil-bound metals – and eleven of the thirty-two sites exceeded them, with

three exceeding for lead. Exceedance indicated that hand-to-mouth ingestion of the soil by children would exceed the blood lead concentration threshold laid out by CLEA, exposing children to health impacts outlined above. The study strongly recommended that bioavailability tests (and particularly tests for lead) ought to be carried out before brownfield sites are redeveloped for residential purposes.

1.3 Urban Redevelopment and Soil Disposal in Canada

Canada is an enormous landmass with a relatively low population density. Historically, the population has collected near the southern border, resulting in cities containing large percentages of our total population. Consequently, while our cities are spreading outwards, there is also call for them to intensify and redevelop vacant, disused, and even contaminated land in order to cope with the demands of increased urbanization. In response to this, in 2001 the Government of Canada mandated the generation of a National Brownfield Redevelopment Strategy. Gathering multiple stakeholders, the national task force consulted representatives from all levels of government, the private sector and the environmental consulting community in order to generate a unified theory and knowledge base of Canadian Brownfields.

1.3.1 NRTEE National Brownfield Strategy

In 2003, the National Round Table on the Environment and the Economy sought to create a national strategy for dealing with Canada's brownfields. At the time, there were estimated to be as many as 30,000 brownfields in the country – left unmanaged, they represent a loss of economic opportunity, pose a threat to human health and the environment, and negatively

impact a neighbourhood's image. Drawing lessons from brownfield remediation in Canada, the US, and Europe, the NRTEE proposed several benefits for a national brownfield strategy: creation and retention of employment opportunities, increased tax revenues (experiences in the geologically and culturally similar United States have demonstrated that property values within two kilometres of the brownfield development may rise by an average 10 percent), revitalized neighbourhoods and communities (particularly in scenarios where large tracts of brownfields blight central business districts or industrialized suburbs), reduced urban sprawl (for instance, each hectare of brownfield developed for residential purposes saves approximately $70,000 yearly in transportation costs, and prevents over four hectares of greenfield land from being developed in outlying areas), increased competitiveness for cities (compact land use, reduced tax burden for infrastructure, and improved business climate combine to improve attraction to foreign investment), and enhanced environmental quality, health and safety. (NRTEE, 2003)

Why, then, is redevelopment of these properties not of higher priority? For one thing, brownfields cannot be considered as a homogeneous mass. Each site comes with a specific set of problems and properties, shaped by the site's history and the municipality's bylaws and liability. Brownfields can however be grouped into three tiers: in the top tier are sites whose value in the market exceeds the cost of remediation, accounting for approximately 15-20% of brownfields in Canada. Naturally, these do not remain abandoned for long, and market forces tend to drive redevelopment on these sites into profitability. The bottom tier accounts for a similar percentage and describes sites in which the cost of cleanup exceeds the market value, and are unlikely to see redevelopment in the near future due to high

cleanup costs and uncertainty. The largest tier lies somewhere in the middle – cleanup costs are high, but so is the potential market value for the redeveloped site. Without a brownfield redevelopment strategy in place, these sites lie fallow, losing out on the potential social, environmental and economic benefits. (NRTEE, 2003)

Even so, a single redevelopment strategy cannot target all of Canada, nor all of these tiers. The top tier requires no intervention – market forces will inevitably see them redeveloped – and the bottom tier is beyond the scope of the strategy. The middle tier is ripe for intervention, as a number of market failures prevent brownfield redevelopment even when the final outcome will more than repay the initial cost. Property owners are leery of converting their lands to other uses due to civil liability concerns (and consequently many choose to keep sites vacant); developers are reluctant to develop and lenders to finance redevelopment for similar reasons; municipalities for their part are likely to impose environmental requirements to relieve their own liability concerns.

The NRTEE recognized that these concerns must be addressed head on, tailoring solutions to specific failures, if fallow brownfields are to be brought back into the marketplace. Both public and private sector actors must participate if the strategies are to succeed, but public sector initiatives in particular are central to overcoming market barricades. Luckily, successful initiatives on the provincial and municipality level exist to serve as guidelines for more widespread implementation.

- In 2000, the federal government established the Green Municipal Enabling Fund, which provides grants for community brownfield inventories and assessments. In recent

years, GMF approved almost 60 million dollars worth of loans and grants to municipal sustainability initiatives – not to mention the intangible improvements to its selection of knowledge services, peer learning programs and enhanced client services and resources.

- Ontario and Quebec have introduced legislation to promote brownfield redevelopment by addressing key barriers. Quebec in particular has established a successful incentive program, Revi-Sols, which provides grants to fund the cost of studies leading to rehabilitation work, as well as the cost of that work. Implemented in 1998 (and renewed in 2002), Revi-Sols has subsidized the clean-up of over a hundred and thirty development projects in Montreal. One notable brownfield site developed under the Revi-Sols initiative is the Angus Shops, a CRP railyard used until the early 90's for maintenance and construction of railway equipment – leading to heavy contamination with heavy metals, petroleum hydrocarbons and polycyclic aromatic hydrocarbons. Following decontamination, hundreds of residential units were created in the prime real estate cleared by the process.
- Municipalities such as Hamilton, Ontario have demonstrated leadership in creating community partnerships, development initiatives, and engaging governments and the private sector with their Environmental Remediation and Site Enhancement (ERASE) Plan. ERASE aims to replace underutilized or contamination properties with productive land uses, reduce urban sprawl, promote energy efficiency through construction to LEED standards and to stimulate private investment activity within Hamilton. Through the combined efforts of many sub-programs such as study and redevelopment grants, tax assistance, marketing and harbourfront loans, ERASE has seen successful implementation in Hamilton – and served as a template for several other Canadian municipalities' redevelopment and incentive plans.

Based on the above (and others like them), the NRTEE developed three crucial strategic directions for their national brownfield redevelopment: applying strategic public investments to address upfront costs (for instance, by establishing an effective mechanism through which provincial and municipal governments can provide incentives); establishing an effective public policy regime for environmental liability and risk management (by providing participants through all levels of the development process with clear and consistent public policy); and building capacity for and community awareness of brownfield redevelopment (by building shared objectives around a common vision of rejuvenated post-brownfield sites as active community centres).

1.3.2 State of Canada's Brownfield Redevelopment Industry

Five years later, the Ontario Centre for Environmental Technology Advancement (OCETA) collaborated with NRTEE to conduct a market research study to determine the effectiveness of their national redevelopment plan. OCETA carried out a review of the public and private sector literature to compile a list of actions and surveyed key stakeholders to identify progress made in relation to the national strategy to provide an update on the state of the Canadian brownfield redevelopment industry.

The first question on the survey related to the definition of brownfields: the NRTEE strategy defined brownfields as "abandoned, idle or underutilized commercial or industrial properties where past actions have caused known or suspected environmental contamination, but where there is an active potential for redevelopment". Respondents determined that while the definition is nationally recognized by the public and private

sectors, few organizations use that precise wording – individual stakeholders vary the definition according to their own needs or desires: private sector interests often add "where there is potential for value creation" to the definition, selecting for remediated properties with greater value than the cost of remediation; municipalities emphasize "small urban and rural sites" in their definition to encourage development of under-utilized sites in areas that do not have the same market forces driving redevelopment as large urban centres; large urban centres, for their part, are disinclined to label sites as brownfields due to the associated stigma, instead terming them "community improvement sites". The lack of a consistently applied definition was found to make it difficult to develop an accurate inventory of Canadian brownfields overall. (OCETA, 2008)

The respondents were broadly unaware of a formal effort to develop an National Brownfield Redevelopment Strategy, but had noted significant improvement in recent years in the form of stakeholder engagement mechanisms and intersectional initiatives. In some cases such as the Ontario Brownfields Stakeholder Group, resulting in increased effectiveness in developing policies and strategies to deal with brownfields. The federal coordinating office recommended by NRTEE did not materialize – but then, respondents from the private sector disagreed that another layer of bureaucracy would improve matters. Finally, the Canadian Brownfields Network (CBN) and the National Brownfields Association (NBA) were commonly raised by respondents as examples of national organizations focusing on brownfield redevelopment – though both were described as being insufficient in scope to truly be called "national", and neither filled the recognized need for a central, unified organization.

The survey further expanded to query about individual recommendations made in the NRTEE's plan.

- **Implement Tax System Changes to Promote Brownfield Redevelopment –** Not seen to have been implemented on a federal level, but provinces and municipalities have made strides towards tax-based incentive programs. Ontario made changes to the *Planning Act* allowing municipalities to create Community Improvement Plans (much like Hamilton's ERASE plan). BC also announced the development of a provincial Brownfield Renewal Strategy including tax measures targeting brownfields.
- **Remove Liens and Tax Arrears against Qualifying Brownfield Sites** – While the surveyed agreed on the value of the removal of liens and arrears, little progress has been made federally or provincially, with removal only seen on a case-by-case basis.
- **Provide Mortgage Guarantees, Revolving Loans and Grants for Qualifying Brownfield Sites** – The lack of access to capital is traditionally a stumbling block for the redevelopment of potentially-risky brownfield sites, and one that could be alleviated by the Canada Mortgage and Housing Corporation. CMHC has made progress with offering mortgage loan insurance to brownfield sites on a case-by-case basis, first in Ontario then expanding to other provinces. Additionally, increased awareness and regulatory specificity has generated a level of comfort such that RBC and CIBC have begun to offer lending and financing to brownfield developments.
- **Allowing Binding Contractual Allocation of Liability** – Though the NRTEE recommended the formation of a framework to permit contractual allocations of regulatory and civil liability among parties, there does not appear to have been much progress across

Canada. Attempts to do so in Ontario were seen by survey respondents to have limited flexibility in liability management rather than the opposite.

- **Provide for Termination of Regulatory Liability –** Several provinces (British Columbia, Manitoba, Quebec, New Brunswick and Ontario) have taken steps to clarify regulatory liability since the release of the brownfield strategy. Quebec, for instance, amended the Environment Quality Act to prevent the province from issuing orders against properties remediated to appropriate standards.
- **Create an Insurance Fund for Post-Liability Termination Claims –** The majority of respondents felt this recommendation unnecessary and inappropriately benefited polluters and redevelopment companies that perform inadequate work. In opposition to this recommendation, Ontario retained the "polluter pays" principle rather than create a fund.
- **Apply Site-Specific Assessment and Approvals Regime** – British Columbia and the Atlantic Provinces have been using risk-based approaches for over a decade, and only recently have Ontario and Alberta begun to follow suit. While risk-based assessment has come to be viewed as the leading approach in site assessment, additional work is required to ensure that approval frameworks operate efficiently and in a timely manner.
- **Provide for Regulatory Approvals of Remediation –** Increasingly, provinces are relying on the use of Qualified Professionals to execute consistent contaminated site work and to vet acceptability of remediation efforts. While the specifics of the QP programs vary between provinces, all have implemented regulations that allow the professionals to approve work including site assessment and remediation rather than the government. Ontario introduced the Record of Site Conditions, which provides protection the land owner and developers from regulatory orders and liability.

- **Increase Capacity to Undertake Brownfield Redevelopment Projects** – Respondents described the significant effort that has gone into building capacity of all levels of government and the public and private sector. Workshops, handbooks and conferences were offered as examples of means to instruct and inform the public and professionals about brownfields. Even so, respondents emphasized the need to continue to expand Canadian expertise to handle future challenges.
- **Facilitate the Demonstration of Innovative Environmental Technologies and Remediation Processes** – The recommendation targeted a reduction of regulatory barriers delaying technological innovation in brownfield remediation. Respondents described ongoing difficulties in the field, but incremental improvements handed down by the federal government has provided funding for the demonstration of soil technologies that "prevent, treat or contain contamination or which facilitate an increase in land use or land value through brownfield remediation."

The NRTEE report described several market failures (lack of access to capital, liability risk, etc.) that slow the redevelopment of brownfields in Canada. The surveyed respondents determined that while some progress has been made to mitigate these failures, they remain present in the current state of Canadian affairs. Regulatory delays and liability risk were found to remain as significant impediments to development – and new barriers had come to light over the course of the national strategy's implementation. Inter-governmental relations between federal, provincial and municipal bodies cause delays in uptake and regulatory confusion due to a lack of harmony between policies and programs at different levels of government. A surprising lack of supply in the labour market for contaminated sites has also held up development – a lack of workers with appropriate expertise to become Qualified

Professionals was found to have a retarding effect on the industry. Overall, the NRTEE strategy seems to have played a significant role in motivating brownfield redevelopment in Canada.

1.4 Urban Redevelopment and Soil Disposal in Ontario

Ontario's path to the current guidelines in place for site remediation overlaps with the NRTEE strategy, but its genesis began far earlier. Ontario first introduced the Environmental Protection Act in 1971 as a means of prohibiting the discharge of contaminants into the environment - though chiefly to limit property damage – and empowered the Ministry Of The Environment And Climate Change with legal power to control, stop, and repair unlawful discharge. Over a decade later the act was amended to require the cleanup of spills and compensation of those who suffered personal or economic harm as a result of the spill – though the delay meant that the worst of the contamination had already occurred, and law enforcement was sporadic at best. By the late 80's, Ministry Of The Environment And Climate Change recognized that landowners and municipalities required guidelines, which it provided in the form of the first published standards in the 1989 *Guidelines for the Decommissioning and Cleanup of Site in Ontario*. Throughout the 90's, Ontario continued to update these guidelines, increasing from 22 chemical and soil condition parameters in its inception to over a hundred by 1996.

Cleanup of contaminated sites was thereafter governed under the EPA and General Waste Management Regulation 347 and overseen by Ministry of Environment directors until June of 1996. That month, the Ministry Of The Environment And Climate Change issued a

Guideline for Use at Contaminated Sites in Ontario, which became standard for clean-ups until 2004. Unfortunately, it lacked legislative force except under a narrow set of situations, proving itself insufficient for the task. (ESEM, 2014) The Brownfield Statute Law Amendment Act codified the cleanup guideline into law, providing a list of standards for soil, groundwater and sediment testing. By 2004 the Record of Site Condition remained the central documentation of site remedial work, but began to be publicly available through and on-line electronic registry of RSCs.

However, the standards laid out by the Amendment Act were based on scientific studies done between 1985-1996 and did not take into account contemporary advances in testing equipment. In addition, site based risk assessment under the current guidelines were costly and complicated due to a lack of clear regulations guiding their application. These issues combined to force the MOE's hand – if sites could not be counted on to be properly assessed with current standards and if hundreds of thousands of dollars were being wasted on improper excavation, their stakeholders would suffer. A streamlined RSC process incorporating changes to standards, both Phase I and II ESAs and regulations on excavations would improve confidence in Brownfield development.

In 2007, the Standards Development Branch of the Ministry Of The Environment And Climate Change released a rationale for an update to soil and groundwater standards, which eventually found their way into an amendment to the Environmental Protection Act in 2010. (APGO, 2011) Along with updated standards, the amendment improved guidelines for Phase One and Phase Two Environmental Site Assessments (the former being a series of site visits

and historical data checks site to determine the potential contaminants for a given site, and the latter being the suite of soil and groundwater tests required to determine the presence of any actual contamination). (EBR, 2010) For Phase I ESAs, it specifies which records ought to be reviewed, who is appropriate to interview, which questions to ask, the precise nature of the site reconnaissance required and the distance from the site within which the records must be consulted (changed to 250m from 'whatever seems appropriate'). It also lays out specified Potentially Contaminating Activities – any property containing a PCA (in the present time or in the past) automatically becomes an enhanced investigation property, subject to more stringent questioning. (Government of Ontario, 2011)

The triggers for the requirement of a Phase II ESA were made explicit – if a property within the zone of study was tagged as containing a PCA, a Phase II ESA must be completed. In addition, detailed instructions were laid out as to determining ideal sampling locations, as well as proper methods for collecting, handling and analyzing samples, preparing them for shipment to a testing laboratory, measuring groundwater samples, etc. Afterwards, a Conceptual Site Model in the form of overhead and cross-sectional drawings displaying the three-dimensional extent of each contaminant of concern must be produced from the data. (Government of Ontario, 2011) Finally, the Ministry Of The Environment And Climate Change provided an exhaustive update to their online Brownfields Environmental Site Registry system, allowing a QP to submit both parts of their ESA (if applicable), their CSM, and any associated lawyer's letters, property owner's information, or geographical data.

1.5 Urban Redevelopment and Soil Disposal Across the Globe

Sustainable development was famously defined at the 1987 Brundtland Commission as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs', but many argue that it remains ambiguous. Even so, sustainable development has become a mainstream policy issue in the UK and worldwide. Many models have been developed to attempt to balance the tensions between economic growth, social impacts and environmental impacts, with varying degrees of success. (Dixon, 2006) Brownfield regeneration provides solutions in the form of socio-economic regeneration of the area, environmental improvements of the same, and reduction in pressure on greenfields.

However, there is significant variation in regards to the acceptable levels of contamination allowed to remain after the remediation process has been completed across different countries. The primary difference between the American and UK policy lies within the Small Business and Liability Relief and Brownfield Revitalization Act: while policies in the United States differ between individual states federal laws can be enforced if state laws prove to be inadequate; the EU, on the other hand, has no all- encompassing regulation or policy between the different states. (Erdem and Nassauer, 2013). Other important differences include the United States' higher focus on reducing the risk to human health while many of the EU states focus on greater protection for humans as well as wildlife and ecosystems. An example of this is America's lack of remediation standards for leaching contaminants into groundwater even if the site is not a public water source.

Post-socialist cities such as Brno in the Czech Republic face their own challenges in the form of transition from heavy, engineering and textile industry, to trade, retail and associated business activities. Intensive industrialization throughout the 19th and most of 20th century has been the leading factor of urbanization in the area. In 2015, Brno listed 187 brownfields of which 63 were successfully regenerated, while 124 sites are derelict or underused. Brownfields do not exist by themselves, independently or in a vacuum, but they are products of the interrelationships between places and social and ecological processes. (Frantal, 2015)

Environmental forensics describes both the significance and distribution of pollution of a site and the processes that led the site to being polluted. It involves a search for telltale compounds or molecular markers to locate site-specific contamination (in opposition to conventional characterization which determines only the contaminant's concentration and not its source). Forensics are especially important on megasites, where traditional characterization can hinder the true sourcing and remediation of contamination. Langreo, Spain is one such megasite: spanning nearly 20 hectares, with an additional 20 hectare buffer under consideration, it has been the historical host of metallurgies, power plants, chemical industries and coal plants. Environmental forensics was used here to identify the types of waste found on the site and link them to their sources, assess the composition of these wastes and to establish an accurate conceptual site model. (Gallego, 2016)

First, a historical study was performed to find waste sources on or near the site, followed by an extensive series of soil samples and subsamples taken from areas of suspected concern. Analysis performed on the samples included solid waste analysis, mineralogical

characterization, leachate testing and hydrocarbon content analysis. Testing revealed elevated arsenic and lead content in the soil – which would have been uncovered by traditional characterization. However, the study then went a step beyond to track the contamination to its source, the dispersal of pyrite ashes across the site. Pyrite ashes, a by-product of sulphuric acid production, were found to account for the majority of the environmental threats at Langreo, with other sources such as slag piles and coal waste were comparatively minor in scope. This information provides crucial background for future risk assessments, and would potentially save a good deal of time and money. The study provided the above as proof for their recommendation of the application of environmental forensics in parallel with traditional characterization as prologue to in-depth risk assessment and site remediation.

2.0 MAN-MADE DISASTERS

Having now described the state of the art in brownfield remediation, we now shift focus to the consequences of our current regime. Site remediation is clearly in high demand in Ontario and in Toronto in particular, and the flow of contaminated and excess soil has risen along with it. To a certain point of view, this is beneficial, and representative of a success in the uptake of brownfield remediation awareness and thriving market forces buoying up a growing industry. The concern raised in this major paper, however, is whether we can sustain such growth, or whether the disparate parts of our development and remediation machinery will lead to an untenable scenario in the future. In order to come to grips with such a daunting experiment, we look to the study of disasters, and in particular a concept known as disaster incubation.

To be clear: a lack of clean construction soil, or an excess of it, or a system in which soil movement cannot be accurately tracked, is not something that would typically be categorized as a disaster. In the eventuality that a lack of clean fill became a limiting factor in construction, developers would simply ship in soil from more distant aggregate sources, the distance from urban centres improving the quality of the material. However, that solution in itself raises more problems: longer distances travelled means a larger impact on greenhouse gas emissions, which only grows the further the sites become from the city; the cost, too, would rise, and untrammeled increase in distance would inevitably cause issues in cost-benefit ratios – which would either pass the cost along to consumers or drive industry from the area. Given that developers already dislike Toronto's strict soil regulations, further

headaches could prove too much to be worth their time and money. Viewed through that lens, it truly starts to seem disastrous.

2.1 Disaster Incubation Theory – Lessons from Walkerton

To put it simply, disaster incubation theory is the study of applying foresight to hindsight. The Walkerton water crisis of 2000 was a disaster and a tragedy, though one which *in hindsight* had some eminently preventable sources: The contaminants entered the Walkerton water system through stormwater and manure infiltration into a well bored too shallow into fractured bedrock; although water contamination by fecal coliforms was indicated as early as the late 70's, water extraction continued; though the water system was chlorinated to mitigate this, operators routinely used insufficient dosage; and a lack of chlorine and turbidity monitoring on the well prevented the automated shutoff of pumping. Beyond the physical factors leading to the disaster, human error contributed to the continued operation of the system long past the point of usability: a lack of training and technical know-how in Walkerton's Public Utilities Commission operators prevented early identification of the vulnerability of the well to contamination – and the need for continuous monitoring of these vulnerabilities; improper operating practices including false reports and misidentification of microbiological samples – contrary to Ministry Of The Environment And Climate Change guidelines and directives – persisted for many years prior to the incident; and notably the PUC's general manager concealed inconvenient test results from local health officials, preventing a solution as simple as a boil water advisory that would have cut off the outbreak at its source. (Lindgren, 2003)

Even the provincial government's hands weren't clean in the matter: Ministry Of The Environment And Climate Change inspection should have flagged improper procedures by PUC operators, but budget restrictions led to the cessation of government lab testing services for municipalities. Despite finger pointing by both the PUC and the government, it is clear – and reflected in the judge's decision – that both parties shared the blame.

> *…Given that the Ministry Of The Environment And Climate Change was responsible for overseeing the construction and operation of the Walkerton water facility, its activities must also be considered in order to determine if it adequately fulfilled its role and, if not, whether a proper exercise of its responsibility would have prevented the outbreak, reduced its scope, or reduced the risk that the outbreak would occur. At the Inquiry, the government argued that I should find that Stan Koebel was the sole cause of the tragedy in Walkerton, and that I should find that government failures, if any, played no role – the suggestion being that if it were not for Stan Koebel's failures, the tragedy would not have occurred. I reject that argument completely. It totally misconceives the role of the Ministry Of The Environment And Climate Change as overseer of communal water systems, a role that is intended to include ensuring that water operators and facilities operate satisfactorily…* -- *The Hon. Mr. Justice O'Connor (Lindgren, 2003)*

Looking at Walkerton from the present – that is to say, future – vantage point allows such egregious errors to stand out like beacons, but who can say whether we're not watching the new disaster happening around us today? Studying past disasters such as this one allow for the generalization of a framework which can be used to forecast future ones. Ergonomics science recognizes that disasters do not spring out of the ether, but rather are preceded by periods of progressively accumulating risk – though these risks are themselves not easily

described until after the fact. This period of increase, termed the "incubation period" by Barry Turner in his seminal book Man-Made Disasters, is the period in which Toronto may well lie with regards to its soil disposal and transport regime.

The book analyses several case studies including the 1966 Aberfan rubbish tip slide (in which water was allowed to collect and saturate a pile of shale overburden and rush downhill to bury the nearby village of Aberfan – and in which a subsequent investigation revealed ignorance, ineptitude and communications failure in both management and contractors), the 1968 Hixon level crossing accident (in which a passenger train collided with a heavy flatbed truck bearing a hundred ton transformer – and in which several failures of the transporter crew, signalmen and police escort allowed the incident to occur), and the 1973 Isle of Man Summerland leisure centre fire (in which fifty people were consumed by flames and the centre gutted almost entirely – and in which a subsequent investigation determined was exacerbated by poor fire-resistance of building materials, an open-plan design that allowed easy airflow, management-delayed evacuation attempts and locked fire doors!) (Turner, 1976) Though each case is different in scope, causation and impact, the similarities are such that he was able to create a generalized framework to describe disasters.

2.2 Analyzing Disasters

First, a discussion of the commonalities between disasters. Though the pattern of events and components differ in each case – and indeed on the surface the four events (Aberfan, Hixon, Summerland and Walkerton) appear to be very different incidents – by looking past the surface differences a striking number of similarities can be seen.

- **Failure to Comply with Existing Regulations –** At Aberfan, few formal regulations had been drafted regarding tip placement safety, but the other two case studies are prime examples of what ignorance or hand-waving of regulations can create. If regulations are ignored, improperly applied or followed to the letter of the ruling but not its spirit, disasters can occur. Summerland, for instance, was a multiactivity leisure centre, including cinemas, bars and entertainment on multiple levels, and yet it applied regulations intended for use in traditional theaters. While the application was technically correct, it was wholly unsuited for the scale of the site, and moreover management knew – or *ought* to have known – that this was the case. Returning to the case of Walkerton, this can be seen in the half-hearted attempts to chlorinate the water system as required; without adequate chlorination, these attempts at lip service were less than nothing, because they gave a false impression of due diligence. (Turner, 1977)
- **Rigidities in Perception and Beliefs in Organisational Settings** - The possibility of disaster can be obfuscated by elements of culture and institutions. Any organization, as part of its formation, will develop a innate culture related to its tasks and environment. This can be a benefit to the organization during its normal lifespan, but can also foster a sort of collective blindness. When pervasive and long-established beliefs exist within an organization, they begin to affect decision-making and organizational arrangement. The Aberfan tip slide, for instance, was dominated by the pervasive set of attitudes and perceptions seen in the National Coal Board in particular and the coal industry in general. (Weick, 1998) Despite – or perhaps *because of* - a historic precedent in neglect of tip safety, the Coal Board in Aberfan sited a spoil tip above a stream, which partially led to the disaster. The perception of potential dangers associated with tip siting was muted in the corporate

culture of the coal industry, and literature and organizational practices on tip safety were neglected. Only after the disaster were the blinders removed and the true cost of negligence seen. (Turner, 1976)

- **Decoy Phenomena –** Decoys are essentially distractions that divert resources and attention away from what turn out to be the major problems. Often, these secondary problems are dealt with and managed, leading to a false sense of security in other areas. A unifying factor of these decoys is that they are well-defined problems or sources of danger, particularly those that are in tune with the beliefs and perceptions of the organization in question. Prior to the Hixon train disaster, representatives from the haulage company who owned the flatbed truck and the company who owned the transformer were concerned that a surge would cause arcing from overhead wires as the truck crossed. Their lingering on this issue caused blindness to the real issue of the oncoming passenger train.
- **Organisational Exclusivity –** A lack of regard for individuals outside of the organisation, characterized by the implication that outsiders are ignorant of the hazards compared to members. Prior to the Aberfan disaster, the local council warned the NCB about their anxiety regarding the tip's location. Prior to the Hixon disaster, the road haulers association had contacted British Rail regarding concerns over the new railway crossings that played a part in the accident. In both cases, the overtures were met with scorn or dismissal, and not taken seriously in any sort of regulatory capacity. (Turner, 1976)
- **Information Difficulties –** Information difficulties alone do not imply an inevitable disaster – communication difficulties are present at some level in all organizations. All actors within the framework of a disaster are all, after all, individuals, with differing viewpoints and conclusions drawn even with access to the same information. Some viewpoints that end up

being crucial retroactively are often ignored at the time, and not always through negligence. Regardless, ambiguous transferal of information plagued all three of the disasters indicated in the book. At Summerland, ambiguity surrounded the fire-resistance of plastic panels used in the façade: chief executives assumed that departments in control of their installation had effectively performed safety precautions, while those departments assumed that the executives has signed off on the reliability on the panels before submitting them for installation. (Turner, 1977) At Hixon, a warning notice for the rail crossing was recommended to be installed "facing traffic": the intent was to install it perpendicular to the flow of traffic to target approaching vehicles, but the ambiguous wording led to its installation parallel to the flow of traffic, targeting halted vehicles already at the crossing. A lack of adequate communication can therefore lead to disaster in unexpected ways. (Turner, 1976)

- **Involvement of Strangers –** When sites are open to the public or at least unrestricted to personnel, the variety of possible incidents increases dramatically. Whether through maliciousness, ignorance or mere carelessness, the introduction of strangers can throw a wrench into even the best managed of sites – and in a site already primed for disaster this can be the spark that sets it all in motion. Strangers are, as a group, difficult to brief on proper operations and difficult to define, so that in order to maintain order onsite information must be disseminated to a large and diverse group. To compound this difficulty, administrators run the risk of homogenizing this diverse group into a single stereotype and assuming their behaviour based on this oversimplification. (Weick, 1998) At Summerland, for instance, the expected behaviour in the case of fire in an affected cinema was an orderly escape down the multi-level staircase and out of the building – but by not considering the sub-group of

concerned parents trying to head against the flow of traffic to find their children on upper levels, the congestion on the sole staircase increased to dangerous levels. In Walkerton, the farm near the impacted well applied manure prior to a massive rainfall event; while the tribunal determined him not to be at fault, his lack of training and integration into the PUC organization meant that he was an outside and unexpected influence on their system. (Lindgren, 2003)

- **Minimizing Emergent Danger –** Where possible hazards *were* recognized, they were underestimated or undervalued. The looming danger of the Aberfan tip slide was not recognized, or else the scale of the disaster was minimized in the minds of those who had. The fire at Summerland was considered of minimal concern – not ever worth calling the fire service – until the building itself was ablaze. (Turner, 1977) In Walkerton, PUC commissioners failed to respond to an Ministry Of The Environment And Climate Change inspection report that expressed concern over water quality and operating techniques. (Lindgren, 2003) In situations where the full scale of the potential disaster was known, shifting the blame and stalling for time took place rather than the expected intensification of precautions. When this denial became ingrained in the organizational culture, the actors became blind to the potential dangers these hazards posed. (Dekker, 2013)
- **Post-Disaster Recommendations –** The final step of disasters is the aftermath, and how they are dealt with in light of the preceding incident. The one commonality between all of the tribunals of inquiry carried out after their respective disasters is that they attempted to deal with the problems as they appeared *now*, rather than how they would have appeared to the actors before the disaster. This technique may well solve the problems that generated

this particular disaster, but fails to address the pre-existing structural problems that may still be present and serve to generate future problems. (Turner, 1977)

2.3 Sequence of Disaster Development

Having determined common factors in different disasters, we can then apply that knowledge towards creating a generalized development sequence that disasters pass through before finally erupting. As part of this process, Turner puts forth a limited definition of disaster that can be used to describe this particular category of events: *"An event, concentrated in time and space, which threatens a society or a relatively self-sufficient subdivision of a society with major unwanted consequences as a result of the collapse of precautions that had hitherto been culturally accepted as adequate."* (Turner, 1977) Important for the purposes of this major paper is the wording of this definition: "unwanted consequences" is a far cry from the death and harm implied by a normal reading of the word. A situation in which construction-related soil stockpiles are depleted to the point that cost-effectiveness of importation comes into question, or in which rising prices cause an exodus of Toronto's building potential, can therefore be rightly termed disasters.

With the definition out of the way, he moves onto the developmental stages of disasters.

- **Stage I –** The normal state of affairs, prior to an incident. Precautions and codes of practice are in place based on prior expectations, and the assumption is in place that these precautions are being followed. **Failure to Comply with Existing Regulations** occurs during this stage.
- **Stage II –** Incubation period. Accumulation of instances of events which contravene the normal state of affairs and expectations thereof. Events go unnoticed or are disregarded

due to false assumptions, poor communication or reluctance to face the reality of things beginning to go awry. **Rigidities of Belief and Perception, Decoy Phenomena, Organizational Exclusivity, Informational Difficulties, Involvement of Strangers,** and **Minimizing of Emergent Danger** occur during this stage.

- **Stage III –** Precipitating event. What the public would recognize as the precise instant of the disaster. The looming crash occurs, the inevitable fire bursts into life, or unbalanced factors otherwise reach a tipping point. In addition to the more immediate elements of the disaster, the precipitating event immediately recontextualizes the chain of events that marked the incubation period.
- **Stage IV –** Onset. Immediately afterwards, the consequences of the disaster come to light, both direct and unanticipated. The collapse of cultural precautions becomes apparent
- **Stage V –** Rescue and salvage. Damage control occurs here, in which the responsible organization makes emergency changes to halt further occurrences of the disaster and to give them breathing room to consider their future steps.
- **Stage VI –** Full cultural readjustment. Once a full assessment takes place, more permanent solutions can be drafted and put into place. A full paradigm shift of expectations, and a desire to prevent similar disasters from ever reoccurring.

2.4 Conclusions

Theoretically, any disaster fitting the description listed above ought to fit into these developmental stages. Again, however, this is much easier to do retroactively. The incubation period is the key point in this discussion – once the disaster has moved onto Stage III and beyond, it's already far too late to investigate, and Stage I is indistinguishable from the

normal state of affairs in a system that is not heading towards disaster. The question is then whether Toronto's soil transport and disposal system is within an incubation period – and if so whether we can skip past the disaster and onto Stage VI, in which a shift can be made to maintain sustainability and accountability within the system.

This report has already described Ontario and Canada's soil and brownfield backgrounds and touched upon the concerns with excess construction soil, but Toronto is its own special case. To determine whether Toronto is operating within an incubation, this report will first collate reports from the Ministry Of The Environment And Climate Change Record of Site Condition database over the thirteen years of its existence and determine trends in soil movement. Next, the results of this technique will be presented to professionals within the industry along with a brief on disaster incubation in order to determine whether their experience has led them to the same conclusions (and if they differ, the reasons in which that might be the case). Finally, the results will be applied to the same disaster development sequence as the Aberfan, Hixon, Summerland and Walkerton case studies.

3.0 RSC DATABASE

While information on removed soil volume and disposal is known and freely available on the Ministry Of The Environment And Climate Change database, it largely hasn't been collated. Communication flows from property owners, developers, and Qualified Persons towards the Ministry with a minimum of discussion between the actors involved. In an effort to draw some salient information from the database, three hundred Records of Site Condition were analysed and cross-referenced, gaining a more complete view of soil disposal and transport in Toronto redevelopment across space and time. One hundred were conducted between 2004-2005, a further hundred between 2011-2013 and the rest between 2015 to the present. 2011 was an important year in Toronto's environmental policy, and the changes made that year (and the years immediately prior) account for the state of soil disposal in Toronto today.

3.1 Toronto Soils

3.1.1 Toronto Soils Prior to 2011

Brownfields make up a large portion of the urban landscape – any past commercial or industrial use can potentially mark a site as a brownfield. Former gas stations, factories, garages, dry cleaners and disposal sites each carry with them an associated cocktail of contaminants that can infiltrate and contaminate soil or groundwater. (CIELAP, 2011) When a property owner decides to change the land use of their property from industrial to residential – a common occurrence in urban landscapes – it automatically provokes an RSC. Environmental consultants or engineers are called upon as a QP to assess the land with a Phase I ESA, an exhaustive search of the property and surrounding areas in both

contemporary and historical settings. (MMAH, 2007) Every potential source of contamination is tagged as a potential concern and assigned to a broad category; for instance, a nearby or on-site dry cleaner could be a potential source for perchloroethylene or trichloroethene, and as such would be tagged for VOCs. (CIELAP, 2011) If the site is deemed to be clean enough after all that research, it goes through as a limited-scope RSC – there's simply unlikely to be anything severe enough to warrant a concern, so no further work is needed. (MMAH, 2007)

However, in many cases, further research *is* warranted, and it is then that sampling and analysis must be conducted. Following up with clues from the Phase I, a Phase II ESA takes an educated guess at where contaminants might be, and the QP begins boring monitoring wells across the site. (MMAH, 2007) Soil samples are taken at regular intervals along the excavation, and water samples are taken from the completed well. Soil and water samples are then tested for the parameters of concern called out in the Phase I, and results are cross-referenced with their position on site – this generates a three-dimensional plume that helps to indicate the magnitude of contamination. Additional monitoring wells or test pits may be required to increase the resolution of the data. (ESEM, 2014)

On-site remediation of the contamination is often not an option due to cost or associated difficulties, so the vast majority of it needs to be shipped to disposal landfills. (ESEM, 2014) Nor can it be easily reused: excavated soil is divided into Tables that describe its suitability for reuse, and the most common soil found in Brownfield areas in Ontario is filed under Table 3: "Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition".

(MOE, 2009) On the other hand, leaving contamination in the ground where it could potentially harm soil or water quality or even living beings is equally unacceptable. Prior to 2011, soil and groundwater samples taken as part of a Phase II were compared to chemical standards dating back to 1986 at the earliest, completely ignoring the wealth of scientific that had taken place in the intermittent years. Without a set of updated standards, property owners ran the risk of going in the other direction – excavating too little, not completely excising the contamination, and potentially submitting an RSC without really solving the problems present on-site. (EBR, 2010)

3.1.2 Proposal for Amending Ontario Regulation 153/04, Brownfields RSC

The large volumes of soil sent to land fills were inconsistent with the MOE's waste diversion policies, and needed to be curtailed. As for soil and groundwater chemistry, current standards were simply insufficient to keep the public and the environment safe from exposure to harmful chemicals. Additionally, while groundwork was already laid for RSCs they were handled on a case-by-case basis or at least lacked a consistent framework. (ESEM, 2014)

In response, in January 2010, the Ministry Of The Environment And Climate Change added the "Proposal for Amending Ontario Regulation 153/04, Brownfields Records of Site Condition" to the Environmental Bill Registry. It proposed amendments to the EPA addressing RSC integrity, streamlined RA, strengthened standards, and assorted technical improvements, and left the amendments open to commentary from the public. Objections were made to the stringency of the updated standards, the lack of flexibility in the

streamlined RA, the increased cost for the updated Phase I and II ESAs, and the lack of transitional rules for projects currently underway. (EBR, 2010) The Ministry Of The Environment And Climate Change addressed these comments in turn, but the tone of the responses effectively left no room for argument – despite misgivings from contractors, property owners and consultants, the proposal went through.

3.2 Collated RSC Database

3.2.1 Data Selection

Data was gathered from the Ministry Of The Environment And Climate Change RSC databases based on several criteria. Data was chosen based on relevance, timeliness and location in order to produce the most precise possible view of the demographics of Toronto's Records of Site Condition.

- First, the target studies had to encompass at least a Phase II ESA – while Phase I ESAs may have taken place in relevant areas, Phase I alone precludes the likelihood of soil contamination, and therefore contamination related soil removal. Therefore, even though construction taking place on Phase I properties could require soil transportation, it would not be reported as part of an RSC. For this reason, their exclusion was deemed acceptable. The specification of *at least* a Phase II ESA accounts for the presence of Phase II + RA properties, which include Risk Assessment measures within the RSC.
- Second, target studies needed to be located within Toronto. The RSC form allows for self-report of the location of the site in question, so only sites listed as Toronto would be allowed. This paper is focused on Toronto specifically rather than the environs due to its history and specific policies, so sites located in other cities were deemed inapplicable.

- Third, the site must have a municipal address. The RSC form does not require a property's municipal address to be inputted, and indeed in some cases that's not an option for the QP submitting it, but for the purposes of this paper an address allowed the sites to be displayed on a map of Toronto (seen in Figures 1-3 in Appendix A). The omission of sites without a municipal address is not expected to bias the results of this study.
- Finally, the sites are ordered by date within the constraints listed above. The 2004-2005 Database contains selections between November 2004 to December 2005. The 2011-2013 Database contains selections between November 2011 and August 2013. The 2015-2017 Database contains selections between October 2015 to April 2017. These selections were performed in order to provide the greatest distance between the old and new ESAs, and thus the greatest contrast, while still maintaining a traceable flow through time.

3.2.2 Criteria

The collated database was generated using criteria selected to be most representative of the sites in question and of the thesis of this paper. Instead, the collated database lists only the property's municipal address, the date on which the RSC was submitted, the Table to which the contaminants were compared, the current and intended property uses, the process (if any) used for on-site soil remediation as well the quantity of soil remediated, the volume of soil removed and deposited on-site, whether groundwater remediation was conducted, and whether the site was risk assessed as part of the Phase II ESA. These criteria, when collated and cross-referenced between the past and present databases, were expected to provide a snapshot of the changes in soil transport as a result of changing policies in Toronto.

3.3 Expectations

Prior to creating the database, based on my experience in the industry and the literature surrounding it, I would expect to see an overall increase in soil removed from sites due to a greater percentage of material failing the more stringent contaminant concentration tables. In addition, I would expect an uptick in Risk Assessments (in an attempt to write off soil contamination to reduce the volume of soil that needed to be excavated) and in-situ remediation (in an attempt to reduce contaminants to a level below exceedance of a given table). In terms of land use change, I would expect most of the sites to be heading from commercial usage to residential, a reflection of Toronto's production (or overproduction) of condominium units.

3.4 Results

Collated RSC Database – Summary of Data			
	2004 – 2005	**2011 - 2013**	**2015 - 2017**
Current Property Use	Commercial (60%)	Commercial (66%)	Commercial (66%)
Proposed Property Use	Residential (85%)	Residential (79%)	Residential (80%)
Contaminant Standard Table	Table 3 RPI (85%)	Table 3 RPI (68%)	Table 3 RPI (70%)
Total Quantity of Soil Remediated	88,680.00 m^3	5,000.00 m^3	0.00 m^3
Total Soil Exported	551,910.00 m^3	1,331,070.58 m^3	1,169,248.70 m^3
Average Soil Exported	7,884.43 m^3	18,747.47 m^3	20,513.14 m^3
Maximum Soil Exported	115,000 m^3	182,000.00 m^3	344,000.00 m^3
Total Soil Imported	368,800.50 m^3	143,960.20 m^3	86,106.30 m^3
Average Soil Imported	14,184.63 m^3	6,855.25 m^3	5,381.64 m^3
Maximum Soil Imported	274,362 m^3	62,140.00 m^3	49,370.00 m^3
Percent Risk Assessed	2%	15%	18%
Sourced from RSC Registry – July 1, 2011 – Present (www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/searchFiledRsc_search?request_locale=en) And RSC Registry October 1, 2004 – July 1, 2011. (www.lrcsde.lrc.gov.on.ca/besrWebPublic/generalSearch)			

3.4.1 Property Use and Standards

As expected, the majority of the RSCs submitted throughout the three periods of study reflected a shift from Commercial to Residential land uses. The contaminant standards table describes the condition of the soil and groundwater according to parameters established on site, including water potability and soil stratification. Table 3 RPI describes sites that fall Residential, Parkland, and Institutional land uses but do not require potable water access, which encompasses many sites in urban areas. The decrease in Table 3 RPI sites between the 2004-2005 and 2011-2013 intervals could be representative of the increased trouble in assessing a site as RPI (exceeding those standards could require the site to be assessed

according to the Community, Commercial or Industrial tables, which have laxer standards) but with a limited sample size it's difficult to confirm that as the cause.

3.4.2 Soil Remediated

For the purposes of this database (and within the Ministry Of The Environment And Climate Change database itself), soil remediation is counted to mean in-situ remediation. A site stripped of contaminated material and backfilled with clean material can be said to be remediated, but soil undergoing that treatment is categorized for RSC purposes as soil exported or removed. The difference in quantity of soil remediated is immediately noticeable, charting a clear downward trend in in-situ soil remediation over the thirteen years studied. That significant a drop is indicative of a shift in priorities in the treatment of contaminated soil; over the time studied, it became either no longer possible to remediate the soil in-situ, or else no longer economical to do so.

3.4.3 Soil Exported

Moving on to soil exported, a complementary trend can be seen over the years. After the implementation of the 2011 amendment, the next few years see a near-doubling of previous removed volume, which continues on into the 2015-2017 period. An averaging of soil removed (including only sites which had soil removal performed) aims to correct for the extreme variability in the size of the individual sites across Toronto, and reflects the trends seen in the total: the volume of soil removed is increasing over time. The maximum soil

removed (per single site within a year range) also increases, though its value as an indicator is limited due to differing site sizes.

3.4.4 Soil Imported

The other half of the equation, total soil imported trends downwards over the thirteen years studied. It decreases by over half between the 2004-2005 period and the 2011-2013 period, almost halving again by the present. It is important to note that the increased stringency of the 2011 contaminant standards applies as much to importation as exportation – imported soil must meet the table applicable to the site in question, which makes the location of appropriate backfill more difficult. Instead of material excavated from nearby sites in Toronto, it is often more expedient, cheaper, and more reliable to import granular material or crusher run stones from aggregate pits. An averaging of soil importation (including only sites which had soil importation performed) reflects the trends seen in the total: the volume of soil imported is decreasing over time. The maximum soil removed (per single site within a year range) also decreases, though its value as an indicator is limited due to differing site sizes.

3.4.5 Risk Assessment

If a Brownfield project cannot meet Ministry Of The Environment And Climate Change regulated soil or groundwater remediation standards, the property owners must obtain approval from the Ministry for property-specific standards. This process is known as Risk Assessment, and requires the property owner and QP to do a thorough analysis of the ways that contaminants could come in contact with a person, animal, plant or water source – and

more importantly reasons that specific types of exposure are unlikely to occur. (FCM, 2009) RA is one option on a site for contaminated soil – there are many extenuating circumstances and loopholes than can be leveraged to write off contaminants on a site-specific basis. Prior to the 2011 amendment, it was both costly and time-consuming to generate an acceptable RA. (MMAH, 2007) On the other hand, on-site remediation of contamination is often not an option due to cost or associated difficulties even after that point. Risk assessment was tracked in the database in the form of percent risk assessed, informing merely on the presence of RA rather than the specific details of each individual site. Over the years studied, the popularity of RA has increased, increasing sharply after the implementation of the amendment and steadily increasing thereafter.

3.5 Conclusions

Over the thirteen years of publicly-available RSC records, there is a visible trend towards a diminishment of in-situ soil remediation and volume of soil imported, and an increase of soil removed and sites undergoing risk assessment. Through cross-referencing with contemporary literature and currents of thought, several conclusions can be suggested from this data.

3.5.1 Property Use and Standards

The constancy of the land use changes across the period reflect the literature – the majority of development in Toronto since the early 00's has been in the direction of residential properties converted from commercial uses. Table 3 RPI Full Depth Generic Site Condition

Standards in a Non-Potable Ground Water Condition likewise corresponds to a large percentage of the properties available.

3.5.2 Soil Remediated

Remediation drops sharply after 2011 due to changes made in the amendment released in that year – increased stringency of contaminant concentration standards introduced with the amendment rendered successful remediation more difficult to achieve. Faced with the possibility of in-situ remediation being attempted, subsequently failing, and excavation being required *anyway*, developers (and the consultants who advise them) have opted for 'scrape and dump' instead. The drop to *zero* remediation in 2015-2017 conforms with the trend, though with a larger sample size it is likely that some remediation is still ongoing.

3.5.3 Soil Exported

Soil exportation increasing so sharply is due to the strict standards included in the amendment requiring more soil to be removed and sent to soil disposal sites – particularly in the years shortly after the amendment, when means to write off common and low-risk contaminants were unknown to consultants.

- Road salt contamination, for instance, would cause a nearly-automatic failure of any site with asphalt cover, due to the concentrating effects of repeated winter de-icing. This contamination can be written off using a proviso within the O. Reg 153/04 RSC document stating that electrical conductivity, sodium adsorption ratio, sodium and chloride content in sites "adjacent to roadways" can be assumed to be false positives.

- *"If, having regard to any phase one and phase two environmental site assessments for a property, a qualified person determines that an applicable site condition standard is exceeded at the property solely because a substance has been used on a highway for the purpose of keeping the highway safe for traffic under conditions of snow or ice or both, as provided for under section 2 of Regulation 339 of the Revised Regulations of Ontario, 1990 (Classes of Contaminants — Exemptions), the applicable site condition standard is deemed not to be exceeded for the purpose of Part XV.1 of the Act. O. Reg. 153/04, s. 48 (3)."*

This particular loophole was present in the amendment but not well-known until several months after the implementation of the new standards, leading to an elevated level of salt-impacted soil extraction during that period. Lack of familiarity with the new standards thus contributed to an elevation in excess soil exportation .

o Improved technology and construction techniques also contribute to the surge in exported soil. Increasingly, large constructions – accounting for large portions of the total soil, as can be seen by a single site in the 2015-2017 category accounting for nearly a third of all soil exported during the period - are excavating from lot line to lot line rather than a specific cut-out within the property line. Much of the large construction in Toronto is condominium developments, which require underground parking to service the residents. Underground parking garages require large volumes of soil to be extracted and shipped off-site, and advances such as interlocked caissons, bathtub foundations and advanced dewatering techniques allow the foundations to be excavated ever-deeper.

3.5.4 Soil Imported

Soil importation dropping off over the years has a similar root cause – with the adoption of lot line to lot line excavation and the subsequent filling of the void with building foundations or garages, less soil is required for backfilling. The only soil required in that situation is whatever is required for landscaping or grading onsite.

o Soil importation also has very precise allowances according to the O. Reg. 153/04 document. Paragraph 55(1) of Part XII of O.Reg 153/04 specifies the conditions under which soil can be brought to an RSC property where the RSC is being submitted for fil15/15ing based on a Phase One and Phase Two ESA

- *Soil that did not originate at a RSC property may be brought from another property to a RSC property to remain there following the filing of a record of site condition only where the RSC property,*
    a) *is being used or has been used, in whole or in part, for one of the uses described in clause 32 (1) (b); [e.g.: garage, bulk liquid dispensing facility or dry cleaning equipment operation]*
    b) *is a property with respect to which a potentially contaminating activity on, in or under the property has been identified as occurring or having occurred;*
    c) *is not a property described in subsection 32 (2); [e.g.: currently used for an agricultural or other use, or a community use, an institutional use, a parkland use or a residential use]*
    d) *is a property with respect to which one or more contaminants of concern have been identified as present. O. Reg. 511/09, s. 27.*

- *If any of the above conditions do not apply, soil brought to the RSC property must meet Table 1 Standards*

o If these conditions are met, further requirements are found in Schedule E of O.Reg 153/04, summarized as follows: contaminant concentrations must be equal or lower to the applicable site condition standard (as confirmed by sampling and analysis prior to transportation); analysis must be performed for all contaminants that can reasonably assumed to be present, as confirmed in Phase I investigation; and analysis must be performed according to volume of material imported (i.e.: one sample per first 5000 m3)

The specifics of these regulations were introduced in the 2011 amendment, accounting for part of the drop in imported soils. Together with the diminished need for imported soil, it is unsurprising that soil importation has decreased over time. This also means that Toronto's RSC sites are producing soil rather than consuming it when considered as a whole.

3.5.5 Risk Assessment

Prior to 2011, The RA process was traditionally arduous and expensive, requiring the QP to prove that all parts of the model used in the RA meet human health and environmental standards, and involved multiple meetings between the QP and the Ministry. The 2011 amendment aimed to expedite the process.

o Through the online Brownfields Environmental Site Registry system, a QP can now generate site-specific standards through controlled modification of the generic standards. With this, the model can be tweaked to match site-specific conditions such as soil type, fraction of organic carbon, distance to closest water body, and minimum depth below grade to highest water table. (Government of Ontario, 2011) Rather than the lengthy meetings and

highly specific reports required for each component, this new method gives a standardized template to work off of. This was expected to greatly increase the speed at which RA could be approved and reduce overhead for QPs and property owners. (AIMS, 2011)

- Based on the data available from the Ministry Of The Environment And Climate Change RSC database, the success of the changes to the RA process can be clearly seen. The percentage of risk assessed sites septupled between the 2004-2005 period and the 2011-2013 period, continuing to increase into the present. Risk Assessment has proven itself as a means of clearing a site for construction, and its increasing uptake is expected to reduce excess contaminated soil exportation by allowing it to remain buried.
- However, the numbers alone do not fully describe the reality of the RA approval process. Long wait periods for Ministry Of The Environment And Climate Change review of the assessment and frequent requests for additional testing frustrate consultants and make long-term financial planning difficult for developers and land owners. Additionally, while the cost of risk assessment is manageable compared to large-scale construction projects such as subdivision development or condominiums, smaller sites run the risk of going over budget simply chasing ministry approval for the assessment. In situations in which the cost of the assessment is greater than the value of the site on the market, the land is effectively worthless and will likely remain a brownfield.

3.6 Limitations

3.6.1 Limited Scope of Study

While the results of the collated database are certainly indicative of a change in the demographics of soil transport and storage in Toronto over the past thirteen years, they are

yet far from a complete picture. Three hundred RSCs over the entire period of the RSC Registry only scratches the surface of the data available. Further study is required to fill in gaps in data, particularly between the very earliest records and the records taking place after the amendment to determine whether there was a ramp-up period prior to the amendment's release, or whether the changes really were that immediate. Periodic updates of this database over the next ten years – or longer - would also be useful to determine whether these trends will persist into the future.

3.6.2 Non-RSC Excess Soil Generation

Sites generating RSCs are by no means the only generators of excess soil. Recall that RSCs are only mandatory in situations in which the land use changes from a less sensitive use to a more sensitive use. Broadly, a change from industrial, commercial or community use will trigger an RSC. But many sites do not require a change of land use, nor do they provoke other provisional triggers for RSC requirement. Greenfield sites, for instance, do not require an RSC, and are strongly preferred for this and the many other reasons clean, uncontaminated sites are prized. (Government of Ontario, 2016) When taking these sites into consideration, the volume of excess construction soil skyrockets. In 2015 alone, the volume of excess construction fill generated across Ontario – a large percentage of which was extracted from the GTA – was estimated at over 25 million cubic metres, the majority of which was sourced from industrial, commercial and institutional sources. To put that in perspective, that volume of soil would fill the Rogers Centre in Toronto sixteen times over. Clearly merely

examining RSCs alone is insufficient to capture the soil generation of the GTA. (RCCAO, 2012)

On the other hand, it is a means to gauge trends in soil transport where such means are few and far between. A 2017 study of excess construction soil by the Residential and Civil Construction Alliance of Ontario (RCCAO), a committee of management and labour groups representing the many facets of construction in Ontario, was forced to gather information individually from budget data from the Ministry of Transportation's highway construction programs - as well as budgets for natural gas pipelines and sewers – and estimate the volume displaced in their installation. No statistics or records are otherwise readily available for a more accurate count of soil volume, and so they drew their conclusions based on these estimations. Given this, even the limited sampling size of the RSC database counts for a valuable source of data on industry trends. (RCCAO, 2017)

3.6.3 Exported Soil Destinations

The lack of a tracking system for soil movement in Ontario (and Canada, for that matter) raises several concerns. Non-RSC sites have no central database like the RSC Registry, and as mentioned above that leads to second-hand volume estimation. Even within the RSC database, only the volume of soil exported is listed, not its destination – the Ministry Of The Environment And Climate Change does not require that to be present in the RSC form itself, and only copies of truck slips are required to be submitted in the full report (which is not available to the public, only the Ministry). Consequently, while volumes of exported soil are known, the final resting places of the soil flowing from Toronto are not. (RCCAO, 2017)

This extends through all levels of the industry, from governments to contractors. Contractors and developers in particular do not communicate with each other regarding the destination of their fill. Soil movement is big – and competitive – business: subcontractors and soil disposal companies are secretive about their disposal sites and practices. If a company finds a site willing to pay for dirt, under the current policy climate it's in their best interest to keep that location to themselves so their competitors don't snap them up. (Novakovic, 2016)., A National Post report in 2013 attempted to track the soil excavated for the Line 1 Subway Extension and the Crosstown LRT (together accounting for approximately 3 million cubic metres); TTC and Metrolink were unwilling to provide the Post with precise locations for the disposal, listing several possible sites in Peel. A subsequent investigation revealed the soil would in fact be heading to East Gwillimbury – only when that lead was examined it turned out the final destination was likely several sites in Erin, Ontario. A representative from the aggregate pit at that location was reluctant to give details of how or where the excavate would be treated. (Kuitenbrouwer, 2013) This lack of accountability and tracking makes it very difficult to gain a proper picture of the state of Toronto's soil stockpiles, and must be remedied.

4.0 PROFESSIONAL INTERVIEWS

In order to put the results of the collated database and the preceding sections to the test, professional interviews were conducted with eight individuals from within different aspects of the industry, with years of expertise ranging from five years to fifty. Through the interviews, a wider range of real-world, practical experiences could be contrasted with the results of study, determining whether the research is reflective of their experiences in Toronto's soil transport, disposal, and remediation industry.

4.1 Interview Structure

Each of the interviewees was presented with the background of the major paper and the research. In the document given to the subjects, it was described so: *"The purpose of the research is to examine the current policies underlying brownfield development and soil disposal in Toronto, and to determine whether the lack of crosstalk between developers, the city, and contractors is leading to unexpected consequences. A component of the major research paper is to interview representatives from each of the affected parties to determine whether the research is reflective of their experience in the industry, and in doing so gain a deeper perspective of the real world consequences of the current regime."* (Turner, 1976) The full text of the Interview Questions and the Consent Information Form are available in Appendix C and D respectively. The interviews were conducted chiefly in person, with the responses recorded and transcribed or – in one case – handwritten during the interview to maintain privacy. Two interviews were conducted over the phone, with another over e-mail. In each case, the interviewee was provided with a copy of the Consent Information Form and informed of their right to anonymity – which all of them chose to assert.

4.2 Interview Questions

Interview questions relate to the regime of soil disposal and brownfield remediation in Toronto, including practices and techniques used, the interaction between developers, government organizations and consultants, and the potential for long-term sustainability concerns. Due to the varied nature of the interviewees and the depth of their experiences with particular facets of the study, follow-up questions were supplied as required to target the knowledge each individual could supply.

Question 1: Could you briefly describe your experiences with urban development and brownfields in Toronto?

The respondents varied in their backgrounds: several worked for environmental consulting groups, two worked for soil analysis laboratories, several worked at Toronto's City Hall. Their experiences ranged from those who had just begun in the industry to those who had been working within Toronto for several decades. Among those who had the greatest experience, the chief comment was the increase in regulatory policies over the years, as well as the nature of the development work ongoing in Toronto. The trend, particularly with regards to excavation, has been about densification – working with brownfields, among the pre-existing landscape of the city, developers have opted to excavate deeper foundations over time and made buildings taller. The increasing depth of these foundations have produced large volumes of soil – most of which is clean past the first several meters. Curiously, many of those surveyed did not consider the sites they worked with brownfields (although they met the definition as presented by the Ministry Of The Environment And Climate Change and within this major paper) because despite their location and past uses

many of them did not require Phase II assessment due to a lack of Potentially Contaminating Activities. (MMAH, 2004)

Question 2: In your assessment, is the current state of soil disposal and transport in Toronto sustainable? Why or why not?

Responses were mixed, with a slant towards an affirmative. Broadly, the consensus was that excavation and disposal was sustainable as long as the property value of the developed site was sufficiently above the redevelopment cost, and that except in the very worst of edge cases that would be what would happen the majority of the time. Most sites, even badly contaminated ones, bore 3-5 meters of surficial soil contamination, but when one considers that the full excavation could be ten times that depth the true scale of the situation becomes apparent. Toronto is unlikely to run out of clean construction fill because ultimately more of it is produced by excavation than is required for backfill.

Whether the respondant agreed or disagreed on the sustainability of current practices, it was clear from their answers that they interpreted sustainability to mean *economic* sustainability – as in, whether or not it would remain cost-effective in the near or distant future. Little concern appeared to be given to the environmental impact of potentially increasing the distance trucks would have to cover to find clean soil, or the risks inherent with overloading contaminated soil facilities. However, even within the economic framework, they described the benefits of upcoming MOE guidelines advocating reuse rather than landfilling of soil – which would decrease the risk in both of those concerns. Risk Assessment was also called

out as a far more sustainable approach in the long run – leaving contaminants in place reduces the amount of soil removed, which has benefits both economically and ecologically.

Question 3: Consider the following table, summarizing data from the Ministry Of The Environment And Climate Change RSC database. Each range describes 100 RSCs collated within that period.

a) Do any of the conclusions surprise you? Why or why not?

b) Briefly explain why you think these trends are present.

Collated RSC Database – Summary of Data				
	2004 – 2005	**2011 - 2013**	**2015 - 2017**	**Trend**
Current Property Use	Commercial (60%)	Commercial (66%)	Commercial (66%)	-
Proposed Property Use	Residential (85%)	Residential (79%)	Residential (80%)	
Contaminant Standard Table	Table 3 RPI (85%)	Table 3 RPI (68%)	Table 3 RPI (70%)	
Total Quantity of Soil Remediated	88,680.00 m^3	5,000.00 m^3	0.00 m^3	↓
Total Soil Exported	551,910.00 m^3	1,331,070.58 m^3	1,169,248.70 m^3	↑
Average Soil Exported	7,884.43 m^3	18,747.47 m^3	20,513.14 m^3	
Maximum Soil Exported	115,000 m^3	182,000.00 m^3	344,000.00 m^3	
Total Soil Imported	368,800.50 m^3	143,960.20 m^3	86,106.30 m^3	↓
Average Soil Imported	14,184.63 m^3	6,855.25 m^3	5,381.64 m^3	
Maximum Soil Imported	274,362 m^3	62,140.00 m^3	49,370.00 m^3	
Percent Risk Assessed	2%	15%	18%	↑
Sourced from RSC Registry – July 1, 2011 – Present (www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/searchFiledRsc_search?request_locale=en) And RSC Registry October 1, 2004 – July 1, 2011. (www.lrcsde.lrc.gov.on.ca/besrWebPublic/generalSearch)				

Property use over time was not considered unusual at all by any of the respondents – that's where the work is, and that's where it always has been in Toronto. The nature of RSCs also biases the results somewhat: RSCs are triggered by the change from a less stringent land use

to a more stringent land use, and residential is among the most stringent. The fluctuation of percentages over the years was not considered particularly relevant, and was assumed to be due to the sample size.

The decline of total quantity of soil remediated in-situ was not a surprise – the response was near-universally "yeah, because in-situ remediation doesn't work!" – though the drop to zero was considered unusual. Again, the assumption there was limitations of sample size. When pressed about their disdain for in-situ remediation, anecdotal evidence was given to show experiences in which property owners felt that to be the case.

> *"In-situ remediation no longer performed due to timing: in-situ remediation has been around decades, and technology for performing the remediation has gotten better. Problem is, the timeframe for achieving the results has not get any better. You ask the guys at Vertex and Intrinsic… they'll tell you they can do it, and they'll meet your timelines, but the reality of it is that we know that if you're not dealing with source abatement first off, it's like putting a Band-Aid on a broken leg: it'll serve your purpose for a short timeframe, and then concentrations rebound… when dealing with [high-rise development in Toronto], where there is a lot of soil being removed for parking, so [soil removal] is already a cost they have to incur, so what's the point of another year of [in-situ remediation] to meet concentrations when it's going to be removed anyway?"*

The magnitude of the jump in total soil exported was unexpected, but the trend was not – anecdotally, they confirmed that over time the soil volumes extracted from their sites had been increasing. The more than doubling post-2011 was acknowledged as a response to the

amendment released that year, both due to the increase in difficulty in clearing a site through contamination removal verification and to early misunderstandings in the expected implementation of the new ruling. Road salt was called out as an example, where it seemed like every site tested after the amendment would fail for exceedances and electrical conductivity and sodium adsorption ratio (indicators for soil salinity) until exceptions in place within the amendment were located and written off in subsequent reports.

Soil imports dropping was deemed to be unrelated to the increase in exportation except tangentially – with more sites opting for larger building footprints, foundations and underground parking lots, the only soil being imported was being used for grading and minor backfilling. Little landscaping is required in modern downtown structures (except for parkland conversion) and therefore little soil is being imported. Some consideration was given to the temporary nature of soil importation in high-rise development:

> *"Soil is often imported for only temporary purposes, for grading and for ramps… they bring in shale for ramps, and that all comes out – and if it's not there on a permanent basis, it doesn't need to be disclosed as part of the RSC… the agreement is that the excavating contractor – anything they bring in for temporary use – it's on their own their accord to bring it in and remove it."*

The increased rate of Risk Assessment was met with both surprise and an impatient sense of approval. Many reasons were given for the increase over time. The near octupling of the rate between 2004-2005 and 2011-2013 was expected to be due to the amendment's introduction of formal legislation of how and when to apply RA, but part of that is also the decreasing availability of properties able to be traditionally remediated. Heritage buildings

are fragile, particularly belowground, and legally protected besides, so sites abutting against them are often subject to RA in order to decrease liability and improve confidence. RA is considered a very convenient vehicle to the RSC – relatively painless, more sustainable than digging and dumping, and while the contaminants remain on site part of the RA is measures taken to bar pathways to the contaminants from human and ecological access. The question was even posed as to why RA rate hadn't increased *more*, with the supplied hypothesis that a lack of individuals certified as QPRA in Toronto was proving a limiting factor.

Question 4: What policy decisions could be implemented that could improve the situation in Toronto?

Many respondents spoke of the balancing act consultants and property owners must perform between what they are legislated and required to do under the regulations laid down by the ministry – the provincial standards that they have to adhere to as professionals – and the agendas held by the individual municipalities within Ontario. Municipalities such as Halton, Markham and Whitby, for instance, were called out as more difficult to operate within than Toronto. Whitby in particular has set a Table 2 Standards policy across the entire city – even without potable well users in the areas surrounding a given site, the municipality has chosen to enforce a stricter standard. There is a disconnect, therefore, between what is required by law and what is enforced by smaller communities. Toronto, in that respect, is actually less difficult to work within – concessions are made to expedite the construction process, while still remaining within the law.

Question 5: Describe the state of communication between different sectors of the industry. For instance, is information regarding soil transportation readily accessible to different actors?

Simply put, there isn't any. Construction and development in Toronto is extremely insular, with discussion limited between contractors, subcontractors and developers from different sites or organizations. Any sort of collusion between actors if performed on an ad hoc basis only, with no centralized method of communicating. The only communication that happens between sites is a common excavator being used on multiple sites: the developer hires excavators to do a job and doesn't care where the material goes. The only requirement under current regulations is tracking contaminated material, but once the new regulations are in play, they will also need to track clean fill.

No soil registry exists, allowing soil to pass through Toronto without any outsider's knowledge – only the Ministry Of The Environment And Climate Change and the QP and/or property owner would be privy to that information. Instead, in cases of urgent need of soil disposal or delivery it is common to depend on soil brokers, who perform exactly the task their name implies – though again, only with their limited clientele. In rare (but not *too* rare) cases, these soil brokers fail to perform due diligence on the materials they work with, such as an infamous 2015 incident in which "clean" material was shipped to a farmer's field by Earthworx for landscaping, only for the farmer to discover debris like glass, bricks and plastic. Subsequent testing discovered heavy metal contamination. (Welsh, 2015) Even when brokered soil performs its function correctly and without incident, it is clear that the practice has liability and limitations associated with it that a open-market soil registry would not.

However, in a sort of prisoner's dilemma twist, it is beneficial for individual excavators to keep their soil disposal sites hidden from the competition. They are disincentivized to participate in a public soil registry for fear that their normal sites will stop accepting their material.

Question 6: In Barry Turner's book, Man-made Disasters, he puts forth a term known as 'disaster incubation' describing that prior to an incident there is an incubation period in which "causal factors that contribute to, or precipitate, a disaster accumulate and interact in an unnoticed manner." Do you think that Toronto's current regime of soil transport and disposal constitutes an incubation period for a catastrophic lack of construction soil?

After a brief description of the salient points of disaster incubation theory and the sequence of disaster development, the consensus among those interviewed is that no, there is no looming disaster. Good soil is not difficult to find, only to track. There's more excess than required for reuse – we're generating so much in excavation that is outstrips soil needed for onsite, permanent basis.

> *"The amount of contaminated soil we're removing from [contaminated brownfield] sites – more than is really contaminated, due to the conservative nature of high-volume extraction – is so miniscule, a drop in the bucket. If you look at the geology of the geological formations [underlying the city], you're still looking at millions of tons of available soil."*

If an incubation period is characterized by an “accumulation of instances of events which contravene the normal state of affairs and expectations thereof” and “events which go unnoticed or are disregarded due to false assumptions, poor communication or reluctance to face the reality of things beginning to go awry”, the respondents the state of Toronto’s current regime likely fits portions of those descriptions, but cannot be realistically stated to fit all of them – especially given the upcoming amendment to the regulations.

5.0 ASSEMBLING THE COMPONENTS

Given the response to the interviews, the likelihood that Toronto's soil transport and disposal system is under a crisis appears to be rather slim, but in order to confirm this the next step is to turn to the framework laid out in Section 2. Let us examine again the definition of disaster laid out earlier: *"An event, concentrated in time and space, which threatens a society or a relatively self-sufficient subdivision of a society with major unwanted consequences as a result of the collapse of precautions that had hitherto been culturally accepted as adequate."* For the reasons laid out earlier, a catastrophic failure of Toronto's soil transport and disposal system would constitute a disaster under this definition, and therefore the components of disasters ought to be applicable to it as well. By comparing what has been learned to the framework, a definitive answer can be drawn.

- **Failure to Comply with Existing Regulations – FALSE**

Some amount of this certainly (occurs according to the respondents), but contractors tend to err on the side of caution rather risk trouble with the Ministry Of The Environment And Climate Change. For instance, it was reported that contaminated sites are often *over-*excavated in an effort to thoroughly rid a contaminated site of exceedances and meet the soils standards table. Such practices go above and beyond what the regulations require but reduce the likelihood that subsequent verification testing will turn up unexpected contamination, halting or slowing planned construction down the line. Some of this also occurs in rare cases such as the Earthworx contaminated soil disposal scandal, but such egregious occurrences are punished harshly. (Welsh, 2015)

- **Rigidities in Perception and Beliefs in Organisational Settings – TRUE**

This is chiefly seen in this context in the form of pushback against any sort of amendment to existing rules – when the 2011 amendment came through, there was opposition from a variety of stakeholders. For an individual or firm wishing to purchase or sell a property, getting a clean report (that is, a Phase II Environmental Site Assessment, or Phase II ESA) became significantly more difficult – properties with contaminant concentrations that would have passed muster with prior regulations stood a chance of failing under new ones. Remediation of such a site would also became more difficult and potentially cost-prohibitive (APGO, 2011). In the absence of remediation, the last recourse would be RA – also difficult due to rigorous standards and liability imposed upon lenders. Financial institutions face issues themselves under the new regulations – in the situation that a previously compliant property with an existing mortgage needed updating, it wouldn't necessarily meet the new standards. The site would then need to be brought up to code, requiring additional demands of the Borrower – an awkward situation. Finally, aggregate quarries, sources of sand and gravel used in construction, would face pressure to provide only material that would meet the new and stricter standards for Table 1 (inert fill). (AIMS, 2011) Of course, years after the amendment passed, these same stakeholders have adapted to the new system and have come to accept these ruling as part of the dominant culture – but an amendment upcoming later in 2017 is facing the same sorts of opposition.

- **Decoy Phenomena – UNCERTAIN**

Due to the widespread nature of Toronto's soil regime, decoy phenomena can be said to be either non-existent or omnipresent, and in either case cannot be confirmed satisfactorily. There are many outside elements involved in site remediation, and amendments on the provincial and city level are constantly being performed to address issues being raised with

particular individual factors. Any one of the outside factors being amended could turn out to be a decoy phenomena, though by their very nature decoys can only be confirmed retroactively. For instance, the focus on in-situ soil remediation in literature is seen an optimal solution to low levels of soil contamination, but both interviews and the database paint a different picture. This could be an instance of decoy phenomena, particularly if in-situ remediation continues to be pushed as a possible solution.

- **Organisational Exclusivity – TRUE**

Organisational exclusivity certainly applies to many levels of Toronto's soil system. The process of remediating a site and developing it for future use entails many levels of bureaucracy, from provincial to municipal governments to landowners and developers down to consultants and contractors. Each level of the process is insular not only from tiers above and below them, but also from other agencies on the same tier level. (De Sousa, 2000) Construction is a highly competitive business in Toronto, and any communication with competitors must be weighed with caution to avoid any appearance of weakness. Data like soil and water contaminant concentrations, fill sources and sinks, aggregate volumes, and certainly design specifications are guarded jealously. By preventing access to outside actors they protect themselves from liability concerns and poaching, but they render themselves vulnerable to blind spots. (Turner, 1977)

- **Information Difficulties – TRUE**

Information difficulties apply for much the same reason that organisational exclusivity does; different actors within the industry do not communicate. In fact, actors are disincentivized to share information like soil disposal sites or soil sources in order to maximize their own profit, and to prevent them from being in a situation where they are unable to source or

unload soil. No legislation is in place to force communication, and judging by the interviews the sentiment is that the system works best *without* another level of bureaucratic involvement. (McKitrick, 2017) Nevertheless, this has led to scenarios in which sites a handful of blocks from one another have transported soil in and out of town without the ability to consult with one another on their needs. (Kuitenbrouwer, 2013)

- **Involvement of Strangers – FALSE**

Due to the widespread nature of soil remediation and transport and the variety of actors working within the industry, as well as the barricaded and protected nature of open construction sites, the influence of the stranger factor is limited. Only vetted individuals can enter sites for the most part, and their individual influences must be considered part of the system rather than an outside factor. (APGO, 2015) The public can of course influence these sites and generate contamination in the years prior to the work, but this is so diffuse and nebulous as to be a non-factor; there are simply so many ways that unknown outsiders can affect sites prior to work that their influence cannot be accurately gauged or estimated – and if they distant an interaction could be considered it would have been considered in prior case studies.

- **Minimizing Emergent Danger – UNCERTAIN**

If the danger in this hypothetical disaster is a lack of construction soil, it is difficult to say that that the danger is likely to exist in an emergent capacity in the foreseeable future. Interviews, literature and the collated RSC database agree that Toronto is a net exporter of construction fill, and upcoming legislation is more concerned about the excess than the lack of it. (Kuitenbrouwer , 2013) Consequently the emergent danger is not only minimized, it is null – no one is concerned about the situation because experience has taught them there isn't

one. The secondary danger is the lack of a soil registry, and in this respect minimization does occur: contractors have grown used to using soil brokers and word of mouth and are leery to consider using something that puts them on a level playing field. (SOiiL, 2017)

While some of these apply to the current regime in Toronto, only in the most overly-conservative of situations could they be said to apply to all of them. Due to this – and the collected opinions of those interviewed – the answer is yes, the current regime is sustainable, barring some significant paradigm shift in our construction techniques or storage. However, if that's the case, what can be done about the weaknesses that were flagged as part of the study?

6.0 LOOKING TO THE FUTURE

Though it is apparent that Toronto's regime of soil disposal is not going to lead to a catastrophic lack of soil (far from it, as it would turn out!), that result simply shifts the focus onto the weaknesses in Toronto's soil system. Even without an impending disaster, the issues raised in the previous sections remain, and being proactive is a sure means to prevent a hypothetical disaster from occurring.

6.1 Soil Exchange Registry

While most of the surveyed agreed with the trends drawn from the collated database that Toronto's soil exports were increasing faster than its imports, all of them agreed that no formalized system was in place to handle this soil. In their experience, there existed little to no crosstalk between developers and contractors working on different projects, which meant that a site with excess soil and a site requiring soil importation could be mere blocks away without knowing – unless a soil broker or intermediary happened to be in place to make the exchange. Even if the situation isn't a disastrous one, it's certainly poorly managed, and the lack of communication may in time turn from an inconvenience to a more serious problem.

One potential solution to this is a sort of open-sourced soil database. A successful and contemporary soil matching registry exists in the UK through an organization called Contaminated Land: Applications in Real Environments. CL:AIRE was created as an independent, not-for-profit organization in 1999 to raise awareness for practical and sustainable remediation techniques, but in the years since it's grown into a variety of fields

in the environmental consulting industry, becoming a leader in sustainable land reuse, regulation initiatives, and the aforementioned soil matching registry. The register operates precisely like an open internet forum – there are subsections for donor sites and receiver sites (which list the property's reference number, location, volume available/needed, data range in which the soil is available, the physical description of the soil available, and the specified and appropriate use for the material) as well as soil disposal sites (which list the property's reference number, location, allowed yearly intake, timescale for delivery and treatable material/contaminants). Both requesting information and posting it are free, allowing developers and contractors the ability to exchange data in a neutral area. Though the registry is relatively new, it is already touted as a successful tool, and one which has served as a guideline by other nations. (CL:AIRE, 2017)

During an Ministry Of The Environment And Climate Change stakeholder engagement activity carried out as part of a best management practices draft, it was determined that though RSCs went a long way towards codifying the inventory of soils on brownfield sites, BMPS for non-RSC construction were lacking. In response, Supporting Ontario Infrastructure Investments and Lands (SOiiL) was created with the help of the Residential and Civil Construction Alliance of Ontario (RCCAO), along with government and industry partners in order to bring lessons learned from CL:AIRE to Canada. The registry operates similarly to the UK's: potential generators and receiving sites first register with SOiiL to confirm participation. Generators then submit soil information, and when a potential match is found the registry will arrange a Project Partnership between the two. SOiiL's only role in this is coordination, leaving both groups to perform their own due diligence and contractual

fulfilment on their own. SOiiL's goal is a construction and development industry that promotes sustainable use of excess construction soil by connecting to soil owners to those who require it. In order to do this, they have strived to establish Ontario's first soil registry system and worked to spread awareness of this registry to stakeholders in Ontario and internationally such that it sees as much use as possible. It is their view that collaboration and an open forum for information between stakeholders will lead to the same sort of advances seen in the UK. (SOiiL, 2017)

Unfortunately for our purposes, SOiiL's registry currently applies only to "clean" soils, defined by them as soils generated in the course of development and infrastructure projects and excludes impacted or contaminated soils found at brownfields. This definition is awkward and ambiguous, and doesn't reflect the nature of soil generated at brownfield sites – that is to say, that only the upper few metres of the site tend to contain contamination, with the remaining depth clean native soil. Given the trends seen in the collated RSC database, the narrowness of this focus seems to be short-sighted, and reduces the usefulness of SOiiL's registry in heavily urbanized areas such as Toronto, where a large percentage of generated soil comes from – and heads to – brownfield construction. Though their reluctance is not discussed in the literature, it most likely stems from liability concerns. In addition, in order for sites to be able to verify the cleanliness of their soil and the standards tables it meets, they would need to exchange soil chemical analysis reports (which would entail communication between the site owner, the consultant and the developers for permitting) and accept a certain amount of liability of their own. The addition of RSC soil to the registry would greatly increase the difficulty of soil matching, but that alone should not be a reason

to exclude it. Partnering with the Ministry Of The Environment And Climate Change in order to link RSC registry access to SOiiL registry access would expedite the process greatly, though policy and privacy roadblocks would have to be overcome.

6.2 Proposed Amendment to O. Reg. 153/04

Coincidentally, during the course of this major paper, the MOE released an Excess Soil Management Policy Framework to the Ontario Environmental Registry. The framework includes proposed amendments to O. Reg. 153/04 include enhancements to the RSC and RA service, though is not intended to fundamentally change its nature. The framework's key goals are to protect human health and the environment from inappropriate relocation of excess soil, and to enhance opportunities for the beneficial reuse of excess soil and to reduce GHG emissions associated with its movement. Part of the proposal is the suggestion that the proponent of a project prepare an excess soil management plan if more than a thousand cubic metres of soil is being removed, or if any part of the site area had (or had) a potentially contaminating activity. Once confirmed by a QP, key information would be registered on an online excess soil reuse registry prior to soil transportation from the site. Excess soil will be treated as a resource rather than a waste, and its appropriateness for reuse will depend on site standards from the source and destination sites. Incidentally, site-specific standard tables will be modified to account for advances in technology – much like in the 2011 amendment – as well as expanded to account for scenarios in which large volumes of soil are being transported for reuse. (EBR, 2016)

Though at the time of writing the comment period on the EBR had only recently closed (end of June) and therefore the results of the public consultation had not been released, some sense of the public's reaction can be gleaned by examining the earlier proposal for the framework. Of the 100 comments received on the proposal, the majority spoke in favour of the proposed Excess Soil Management Policy Framework: some comments emphasized the need for a link to climate change and greenhouse gas emissions, which ended up being reflected in the final document; several concerns were raised regarding where precisely responsibility and liability would fall, and while this was deemed to be out of scope for the policy framework, they were taken into consideration; finally, much support was given to the market-based approach to soil tracking and the soil registry. (EBR, 2017)

Though it is early yet to be able to forecast the effectiveness at which the amendment will be able to handle the issue facing Ontario's (and Toronto's) soil transport and tracking issues, it remains a clear sign that the ministry is aware of them and is making the attempt to address them. It is not indicated within the proposal or the framework itself whether SOiiL was consulted or tapped for the creation of the registry, nor is the structure of the registry itself described at the current time. Nevertheless, it remains an exciting – and conveniently-timed! – policy decision that will change the face of Ontario's brownfields and soil transport game.

6.3 Conclusion

If the question posed by this major paper is summed up as **"Is the current state of construction-related soil disposal and movement sustainable?"**, the answer appears to be yes. Even though there are apparent problems with soil transportation, disposal and the communication between different actors in the industry, they do not appear to have come together to form an unsustainable whole. While the elements of the whole match some of the indicators for an incubation period, too many do not, particularly after the 2011 amendment – and even moreso after appearance of the 2017 amendment. The interviews with the industry professionals further support the sustainability of the system: though they disagreed on some points of the literature and the precise mechanisms by which the system was sustainable, none of them foresaw a situation in which Toronto could reasonably run out of soil, or even really a situation in which soil transportation would become cost-inefficient. Even with the various failures seen in aspects of the system, the system as a whole appears to be relatively stable.

It must be noted that in the interviews 'sustainability' was considered to refer to economic sustainability, rather than ecological. This was partially due to the phrasing of the questions asked, and partially due to views held within the industry. Certainly the costs of doing business are more easily quantifiable than long-term environmental interactions. Regardless, the exercise served as a means to take a contemporary pulse of individual and systemic elements of the regime within Toronto, and generated the collated RSC database and the trends drawn from it. Future additions to this data, particularly in the years following

the complete implementation of the new amendment, will strengthen the reliability of these trends, and serve as an early warning system for an incubation period in the future.

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APPENDIX A

RSC Locations

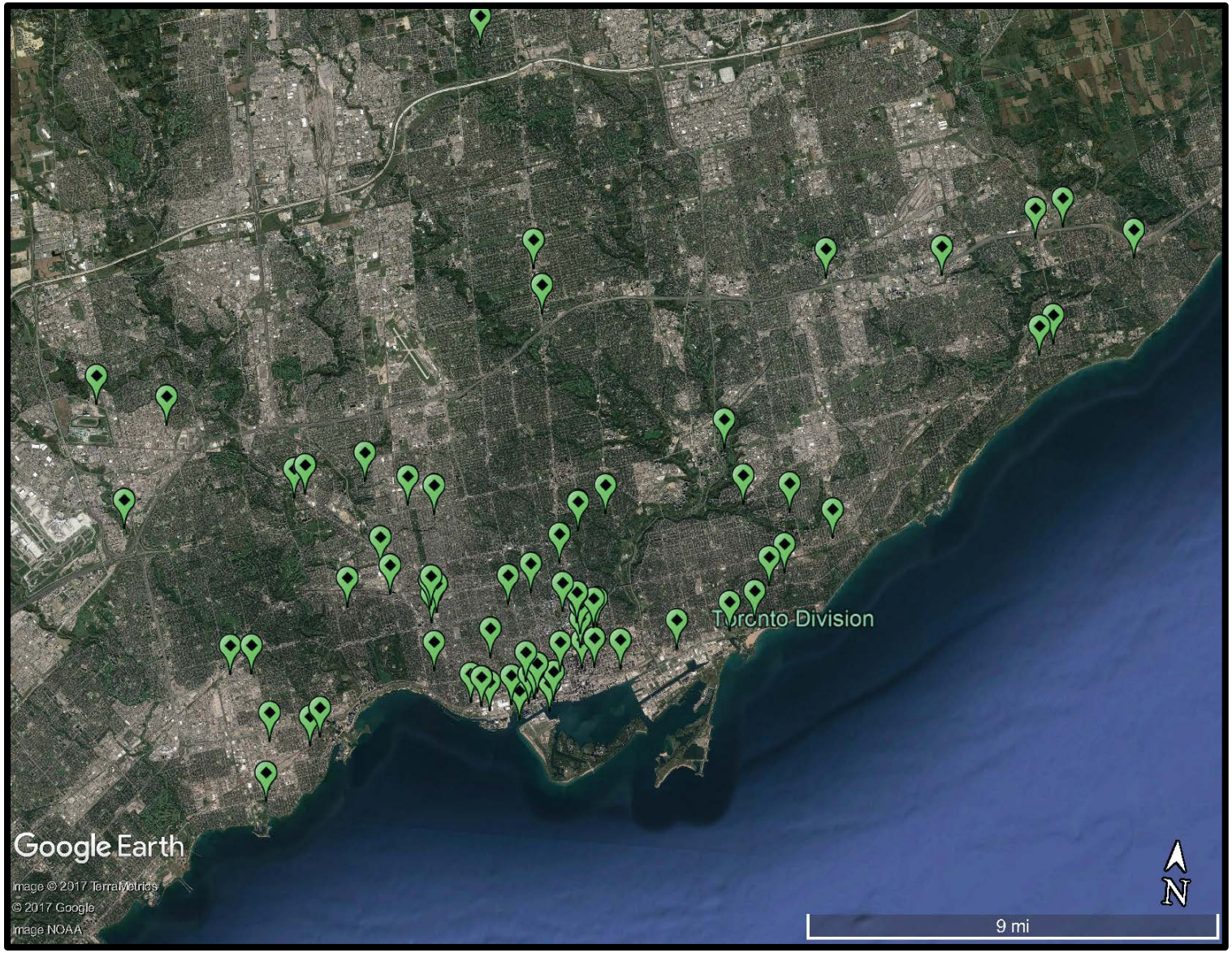

Figure 1. RSC Locations Period 11/12/2004 - 12/21/2005

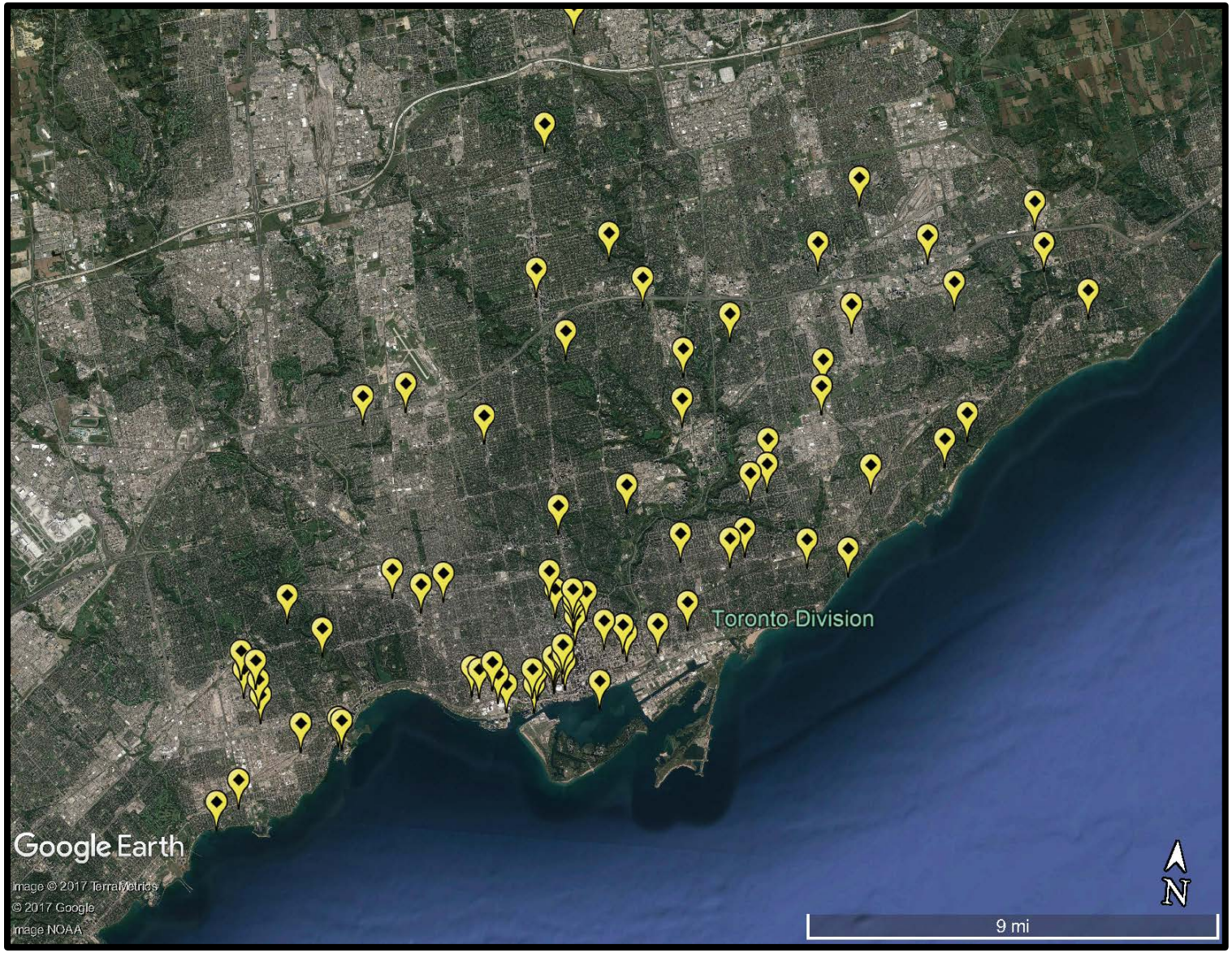

Figure 2. RSC Locations Period 11/23/2011 - 8/8/2013

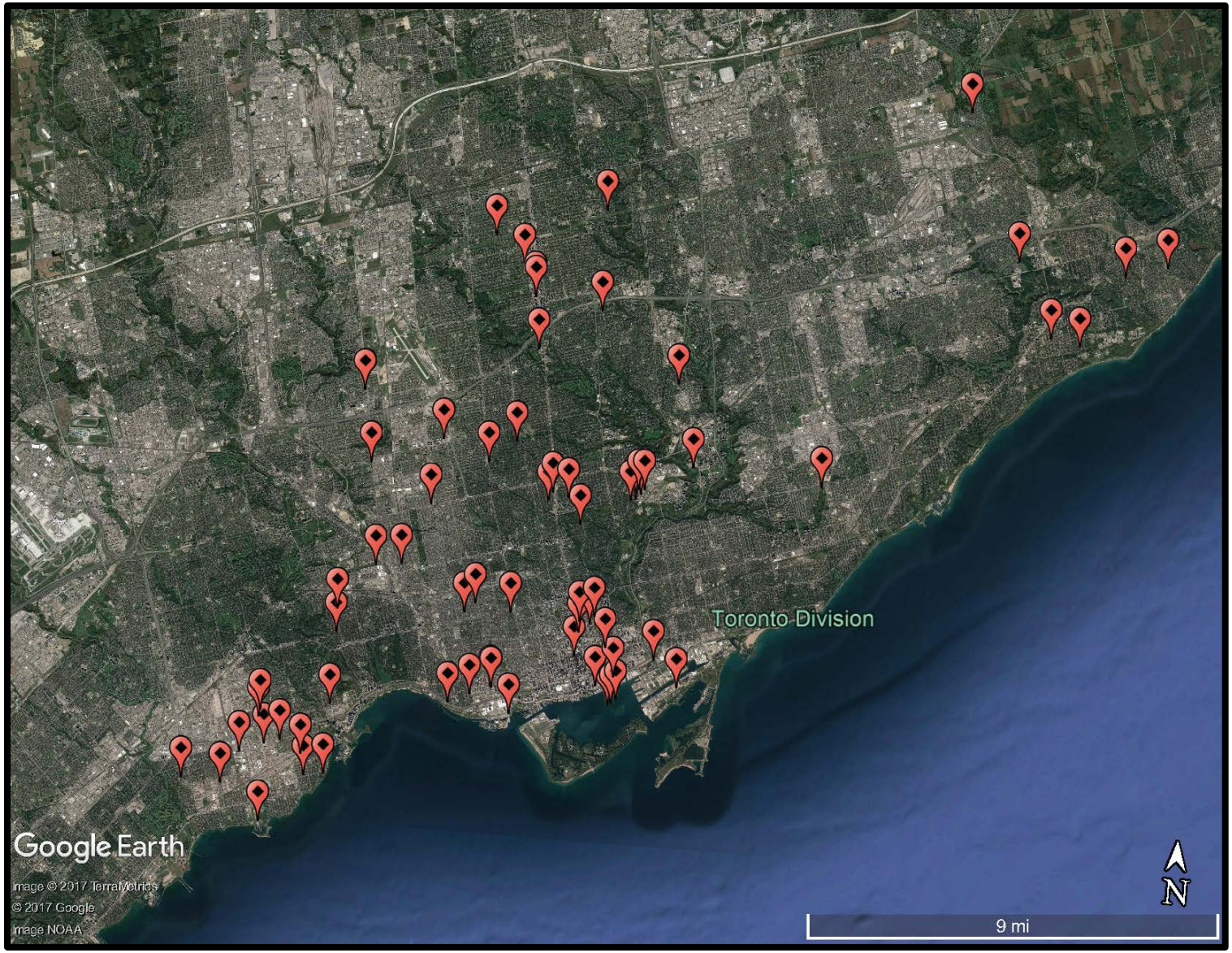

Figure 3. RSC Locations Period 10/28/2015 - 4/24/2017

APPENDIX B

Collated RSC Results

RSCs
11/12/2004 – 12/21/2005

	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
1	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1094	1912 St. Clair Ave. W. Toronto, Ontario	11/12/2004	3 Residential	Commercial	Residential	Detailed in RSC	5000	5000	5000	N/A	NO
2	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1120	8800 SHEPPARD AVE E TORONTO, ON, M1B 5R4	11/17/2004	3 Residential	Residential	Residential	Detailed in RSC	500	25000	25000	N/A	NO
3	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1124	150 WYNFORD DR NORTH YORK, ON, M3C 1K6	11/30/2004	3 Commercial	Commercial	Commercial	N/A	0	600	600	N/A	NO
4	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1139	2525 St. Clair Avenue West	12/16/2004	3 Commercial	Commercial	Commercial	N/A	0	2000	0	N/A	NO
5	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1137	1100 KING ST W TORONTO, ON, M6K 1E6	12/20/2004	3 Residential	Commercial	Residential	Detailed in RSC	66000	10200	30000	Detailed in RSC	NO
6	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1319	20 Curity Avenue	12/22/2004	3 Industrial	Industrial	Industrial	Detailed in RSC	9000	50	500	Detailed in RSC	YES
7	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1062	24 BIRCH AVE TORONTO, ON, M4V 1C8	12/24/2004	3 Residential	Community	Residential	N/A	0	0	0	N/A	NO
8	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1153	980 Lansdowne Avenue, Toronto, Ontario	1/14/2005	3 Residential	Commercial	Residential	N/A	0	45	40	N/A	NO
9	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1326	Part of lot 61 on plan 287 (York) Parts 5, 6, 11, 12, 18, & 19 plan 66R-21414 Toronto, Ontario	1/18/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
10	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1378	552, 554, & 556 Adelaide Street West Toronto, Ontario M5V 1T5	1/27/2005	3 Residential	Commercial	Residential	N/A	0	482	0	N/A	NO
11	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1410	764 Yonge Street / 35 Balmuto Street Toronto, Ontario	2/2/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
12	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1322	351 Queen Street East & 167 Parliament Street Toronto, Ontario	2/15/2005	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	NO
13	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1535	150 WYNFORD DR NORTH YORK, ON, M3C 1K6	3/14/2005	3 Commercial	Commercial	Commercial	N/A	0	630	630	N/A	NO
14	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1389	2276, 2280, 2284 Gerrard Street East, Toronto, ON, M4E 2E1	3/14/2005	3 Residential	Residential	Residential	N/A	0	200	200	N/A	NO
15	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1495	65 SKYWAY AVE, TORONTO, ON, M9W 6C7	3/23/2005	3 Industrial	Industrial	Industrial	N/A	0	0	0	N/A	NO
16	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1508	131 COXWELL AVE, TORONTO, ON, M4L 3B4	3/23/2005	3 Residential	Residential	Residential	N/A	0	1006	1006	N/A	NO
17	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1751	18 Yonge Street, Toronto, Ontario	4/18/2005	3 Residential	Commercial	Residential	N/A	0	30000	0	N/A	NO
18	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1785	33 Charles Street East, and 26, 32 and 34 Isabella Street, Toronto, Ontario	4/19/2005	3 Institutional	Institutional	Institutional	N/A	0	2700	0	N/A	NO
19	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1510	550 HOPEWELL AVE, TORONTO, ON, M6E 2S6	4/21/2005	3 Residential	Industrial	Residential	N/A	0	190	0	N/A	NO
20	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1497	1600 Keele Street, Toronto, Ontario M6N 5J1	4/26/2005	3 Residential	Residential	Residential	N/A	0	850	0	N/A	NO
21	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1783	Toronto Eaton Centre Toronto, Ontario	4/26/2005	3 Institutional	Commercial	Institutional	N/A	0	141	0	N/A	NO
22	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1874	2013 Lawrence Avenue West TORONTO, ON, M4X 1P7	5/13/2005	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	NO
23	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1831	241 Bathurst Street	5/25/2005	3 Residential	Commercial	Residential	N/A	0	4450	0	N/A	NO
24	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1862	1 to 47 Algarve Crescent, Toronto, Ontario	5/30/2005	3 Residential	Commercial	Residential	N/A	0	18000	9000	N/A	NO
25	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1927	1151 Victoria Park Avenue Toronto, Ontario	6/6/2005	3 Residential	Commercial	Residential	N/A	0	500	500	N/A	NO
26	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1552	231 Fort York Boulevard, Toronto, Ontario (Building 1C)	6/7/2005	3 Residential	Commercial	Residential	N/A	0	20000	0	N/A	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
27	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1735	231 Fort York Boulevard, Toronto, Ontario (Building 1D)	6/7/2005	3 Residential	Commercial	Residential	N/A	0	13000	0	N/A	NO
28	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1879	1100 Lansdowne Avenue, Toronto	6/15/2005	3 Residential	Industrial	Residential	N/A	0	0	0	Detailed in RSC	NO
29	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1987	2A Spadina Avenue	6/16/2005	3 Residential	Industrial	Residential	N/A	0	115000	14150	N/A	NO
30	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1962	1945 Lawrence Avenue West Toronto, Ontario	6/22/2005	3 Residential	Commercial	Residential	N/A	0	300	0	N/A	NO
31	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2022	8800 Sheppard Avenue East, Toronto, On. M1B 5R4 Phase 3 - Part 2- 66R-21444	6/27/2005	3 Residential	Residential	Residential	Detailed in RSC	1000	25130	0	N/A	NO
32	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1513	1145 MORNINGSIDE AVE TORONTO, ON, M1B 5J3	7/4/2005	3 Commercial	Industrial	Commercial	Well Detailed in RSC	4000	1000	0	N/A	NO
33	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2040	66 PORTLAND ST, TORONTO, ON, M5V 2M8	7/19/2005	3 Residential	Commercial	Residential	N/A	0	10000	0	N/A	NO
34	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1920	812 Lansdowne Avenue, Toronto, Ontario	7/29/2005	3 Residential	Industrial	Residential	N/A	0	12259	0	N/A	NO
35	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2149	345 DUFFERIN ST, TORONTO, ON, M6K 3G1	8/12/2005	3 Residential	Commercial	Residential	Well Detailed in RSC	1050	372.5	125	N/A	NO
36	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2210	2013 Lawrence Avenue West	9/9/2005	3 Commercial	Industrial	Commercial	N/A	0	0	0	N/A	YES
37	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2165	1100 KING ST W TORONTO, ON, M6K 1E6	9/9/2005	3 Residential	Commercial	Residential	Detailed in RSC	2130	0	260	N/A	NO
38	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1997	651 Warden Avenue, Toronto, Ontario	9/12/2005	3 Residential	Industrial	Residential	Detailed in RSC	0	658	577	N/A	NO
39	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2240	4 TIDESWELL BLVD, SCARBOROUGH, ON, M1B 4X9	9/19/2005	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
40	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1958	4314 KINGSTON RD, SCARBOROUGH, ON, M1E 2M8	9/29/2005	3 Residential	Commercial	Residential	N/A	0	450	0	N/A	NO
41	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2062	813 St. Clarens Avenue, Toronto, Ontario M6H 3X4, 815 St. Clarens Avenue, Toronto, Ontario M6H 3X4 , 817 St. Clarens Avenue, Toronto, Ontario M6H 3X4	9/29/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
42	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2140	85 EXECUTIVE CRT, TORONTO, ON, M1S 5W9	9/29/2005	3 Residential	Agriculture	Residential	N/A	0	0	0	N/A	NO
43	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1960	460 SHAW ST, TORONTO, ON, M6G 3L3	10/7/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
44	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2275	293 KINGSTON RD TORONTO, ON, M4L 1T6	10/12/2005	3 Residential	Commercial	Residential	N/A	0	439	0	N/A	NO
45	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2289	825 CALEDONIA RD, TORONTO, ON, M6B 3X8	10/13/2005	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	NO
46	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2178	2548 WESTON RD TORONTO, ON, M9N 2A6	10/21/2005	3 Residential	Commercial	Residential	N/A	0	43	96	N/A	NO
47	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2295	60 BATHURST ST, TORONTO, ON, M5V 2P4	10/21/2005	3 Residential	Commercial	Residential	N/A	0	3400	0	N/A	NO
48	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2462	2181 and 2191 Yonge Street, Toronto, Ontario, M4S 3H7 & M4S 3H8	11/7/2005	3 Residential	Institutional	Residential	N/A	0	13500	0	N/A	NO
49	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2236	700 Huron Street, Toronto, Ontario	11/7/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
50	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2402	79 Scollard Street, 1290 Bay Street and 1280 Bay Street, Toronto	11/7/2005	3 Residential	Commercial	Residential	N/A	0	40000	0	N/A	NO

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51	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2305	5566 Yonge Street, Toronto, Ontario	11/7/2005	3 Residential	Commercial	Residential	N/A	0	10	0	N/A	NO
52	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2270	1900 LAKESHORE BLVD. WEST, TORONTO	11/7/2005	3 Residential	Commercial	Residential	N/A	0	200	100	N/A	NO
53	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2311	77 JANDA CRT TORONTO, ON, M9W 6V2	11/7/2005	3 Residential	Parkland	Residential	N/A	0	0	0	N/A	NO
54	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2358	2802 Danforth Avenue, Toronto, Ontario	11/7/2005	3 Residential	Commercial	Residential	N/A	0	27.5	27.5	N/A	NO
55	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2352	115,117,119,121,123,125,127,129,131,133,135 FLORENCE STREET, TORONTO, ONTARIO , M6K 1P4	11/8/2005	3 Residential	Industrial	Residential	N/A	0	101	0	N/A	NO
56	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2232	46 Wellesley Street East, Toronto, Ontario , M4Y1G3	11/8/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
57	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2427	455 ADELAIDE ST W, TORONTO, ON, M5V 1T1	11/8/2005	3 Residential	Commercial	Residential	N/A	0	162	162	N/A	NO
58	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2502	975 The Queensway, Toronto, Ontario	11/8/2005	3 Residential	Commercial	Residential	N/A	0	80	0	N/A	NO
59	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2411	15 Stafford Street, formerly 720 Wellington Street West and 17, 19, 21 Stafford Streets , Toronto, Ontario	11/8/2005	3 Residential	Commercial	Residential	N/A	0	22000	0	N/A	NO
60	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2324	266 DALESFORD RD, TORONTO, ON, M8Y 1G5	11/10/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
61	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2415	898, 900 and 924-938 Mount Pleasant Road, Toronto, Ontario	11/14/2005	3 Residential	Commercial	Residential	N/A	0	5000	700	N/A	NO
62	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2451	118 ENDERBY RD, TORONTO, ON, M4E 2S7	11/15/2005	3 Institutional	Community	Institutional	N/A	0	1900	0	N/A	NO
63	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2268	14 SNARESBROOK DR, ETOBICOKE, ON, M9W 2N4	11/15/2005	3 Residential	Residential	Residential	N/A	0	85	85	N/A	NO
64	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2385	169 JOHN ST, TORONTO, ON, M5T 1X3	11/15/2005	3 Residential	Residential	Residential	N/A	0	500	0	N/A	NO
65	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2406	20 STEWART ST, TORONTO, ON, M5V 1H6	11/15/2005	3 Residential	Commercial	Residential	N/A	0	1350	0	N/A	NO
66	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2429	4177 LAWRENCE AVE E, TORONTO, ON, M1E 2S3	11/15/2005	3 Residential	Commercial	Residential	N/A	0	20	20	N/A	NO
67	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2399	22 and 24 Wellesley Street East, Toronto, Ontario , M4Y 1G2	11/17/2005	3 Residential	Commercial	Residential	N/A	0	15000	0	N/A	NO
68	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2536	577 OXFORD ST, ETOBICOKE, ON, M8Y 1E6	11/17/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
69	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2526	1430 YONGE ST, TORONTO, ON, M4T 1Y6	11/18/2005	3 Residential	Commercial	Residential	N/A	0	13673	0	N/A	NO
70	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2537	83 and 87 Erskine Avenue, Toronto, Ontario	11/22/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
71	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2455	36 Whitewood Road, Toronto, Ontario, M4S 2X7	11/22/2005	3 Residential	Institutional	Residential	N/A	0	0	0	N/A	NO
72	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2346	58 and 60 Tecumseth Street, Toronto	11/22/2005	3 Residential	Commercial	Residential	N/A	0	526	0	N/A	NO
73	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2479	21 CARLTON ST, TORONTO, ON, M5B 1L2	11/22/2005	3 Residential	Commercial	Residential	N/A	0	27000	0	N/A	NO
74	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2483	38 Charles Street East, Toronto	11/25/2005	3 Residential	Commercial	Residential	N/A	0	112	0	N/A	NO
75	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1993	1465 LAWRENCE AVE W TORONTO, ON, M6L 1B2	11/25/2005	3 Residential	Residential	Residential	N/A	0	5000	5000	N/A	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
76	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2330	18 SPRING GARDEN AVE, TORONTO, ON, M2N 3G2	11/25/2005	3 Residential	Residential	Residential	N/A	0	5500	0	N/A	NO
77	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2417	433 and 437 Roncesvalles Avenue, Toronto, Ontario	11/25/2005	3 Residential	Commercial	Residential	N/A	0	17000	0	N/A	NO
78	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2362	Northwest corner of Sheppard Avenue East and Kennedy Road, Toronto	11/25/2005	3 Commercial	Commercial	Commercial	N/A	0	0		N/A	NO
79	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2487	10 Wellesley Place, Toronto, Ontario , M4Y 1B1	11/25/2005	3 Residential	Institutional	Residential	N/A	0	66	60	N/A	NO
80	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2621	319 MERTON ST, TORONTO, ON, M4S 1A7	11/25/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
81	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=1773	20 Blue Jay Way, Toronto, Ontario , M5V 3W7	11/29/2005	3 Residential	Commercial	Residential	N/A	0	600	600	N/A	NO
82	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2531	212 Eglinton Avenue East and Part of 196 Eglinton Avenue East, Toronto	12/1/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
83	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2531	212 Eglinton Avenue East and Part of 196 Eglinton Avenue East, Toronto	12/1/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
84	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2626	473 DUPONT ST, TORONTO, ON, M6G 1Y6	12/2/2005	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
85	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2639	185 Bremner Boulevard, Toronto, Ontario	12/2/2005	3 Residential	Residential	Residential	N/A	0	17540	0	N/A	NO
86	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2556	76 SHUTER ST, TORONTO, ON, M5B 1B1	12/5/2005	3 Residential	Commercial	Residential	N/A	0	1760	0	N/A	NO
87	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2559	303 KINGSTON RD, TORONTO, ON, M4L 1T6	12/5/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
88	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2472	363 Sorauren Avenue, Toronto, Ontario , M6R 2G5	12/6/2005	3 Residential	Commercial	Residential	N/A	0	16000	0	N/A	NO
89	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2424	10, 24, 26, 28 St Albans Road, Toronto, Ontario	12/6/2005	3 Residential	Industrial	Residential	N/A	0	350	0	N/A	NO
90	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2534	43 Hanna Avenue, Toronto, Ontario , M6K 1X1	12/8/2005	3 Residential	Industrial	Residential	N/A	0	1530	0	N/A	NO
91	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2583	5145 DUNDAS ST W TORONTO, ON, M9A 1C1	12/8/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
92	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2648	6 , 16 Plymouth Avenue, Toronto, Ontario	12/13/2005	3 Residential	Industrial	Residential	N/A	0	1500	0	N/A	NO
93	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2493	732 - 740 Spadina Avenue, Toronto, ON, M5S 2J2	12/13/2005	3 Residential	Commercial	Residential	N/A	0	1000	0	N/A	NO
94	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2685	96 SAINT PATRICK ST, TORONTO, ON, M5T 1V1	12/13/2005	3 Residential	Commercial	Residential	N/A	0	4700	0	N/A	NO
95	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2700	3391 Bloor Street West, Toronto, Ontario	12/15/2005	3 Residential	Commercial	Residential	N/A	0	21000	0	N/A	NO
96	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2692	292 Merton Street, Toronto, Ontario M4S 1A9	12/19/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
97	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2608	205 New Toronto Street, Toronto, ON, M8V 0A1	12/19/2005	3 Commercial	Industrial	Commercial	N/A	0	11432	274362	Detailed in RSC	NO
98	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2696	500 Sherbourne St, Toronto	12/19/2005	3 Residential	Institutional	Residential	N/A	0	90	0	N/A	NO
99	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2218	233 CARLAW AVE, TORONTO, ON, M4M 3N6	12/19/2005	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
100	https://www.lrcsde.lrc.gov.on.ca/besrWebPublic/viewRsc?searchId=gen&rscId=2715	4135, 4143 and 4159 Dundas Street West, Toronto, Ontario	12/21/2005	3 Residential	Commercial	Residential	N/A	0	1500	0	N/A	NO

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	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
1	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=200947	1919 WESTON ROAD, TORONTO, ONTARIO M9N 1W7	11/23/2011	2 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
2	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=201566	169 EASTERN AVENUE, TORONTO, ON M5A 1J1, 185 EASTERN AVENUE, TORONTO, ON M5A 1J1, 171 EASTERN AVENUE, TORONTO, ON M5A 1J1	1/16/2012	1 Residential	Commercial	Residential	N/A	0	300	220	N/A	YES
3	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=201607	170 FORT YORK BOULEVARD, TORONTO, ONTARIO M5V 0E6	1/20/2012	3 Residential	Industrial	Residential	N/A	0	9900	0	N/A	NO
4	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=201967	1151 MARKHAM ROAD, TORONTO, ONTARIO M1H 2G1	2/13/2012	3 Commercial	Commercial	Commericial	N/A	0	1520	0	Described in RSC	NO
5	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202206	10 GLADSTONE AVENUE, TORONTO, ONTARIO M6J 1J6, 8 GLADSTONE AVENUE, TORONTO, ONTARIO M6J 1J6	3/7/2012	3 Residential	Commercial	Residential	N/A	0	2985	0	N/A	NO
6	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202247	6 CHURCH STREET, TORONTO, ONTARIO M5E 1M1, 55 FRONT STREET EAST, TORONTO, ONTARIO M5E 0A7	3/12/2012	3 Residential	Commercial	Residential	N/A	0	13000	0	N/A	NO
7	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202486	716 SAMMON AVENUE, TORONTO, ONTARIO M4C 3S9	4/11/2012	3 Residential	Commercial	Residential	N/A	0	22.93	0	N/A	NO
8	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202807	1049 GERRARD ST EAST, TORONTO, ONT. M2M 4J1, 1057 GERRARD ST, TORONTO, ONT. M2M 4J1, 1055 GERRARD ST, TORONTO, ONT. M2M 4J1	4/17/2012	2 Institutional	Commercial	Institutional	N/A	0	0	0	N/A	NO
9	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202787	4691 KINGSTON ROAD, TORONTO, ONTARIO M2R 1A2, 4695 KINGSTON ROAD, TORONTO, ONTARIO M2R 1A2	4/18/2012	3 Residential	Commercial	Residential	N/A	0	133	133	N/A	NO
10	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202989	3087 DANFORTH AVENUE, TORONTO, ONTARIO M1L 1A9	4/24/2012	3 Residential	Commercial	Residential	N/A	0	12.2	12.2	N/A	NO
11	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202954	26 FIELDWAY ROAD, TORONTO, ONTARIO M8Z 3L2	4/26/2012	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
12	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=202956	30 FIELDWAY ROAD, TORONTO, ONTARIO M8Z 3L2	4/26/2012	3 Residential	Commercial	Residential	N/A	0	28	28	N/A	NO
13	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=203086	1815 YONGE STREET, TORONTO, ONTARIO M4T 2A4	5/11/2012	3 Residential	Commercial	Residential	N/A	0	15000	0	N/A	NO
14	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=203188	100 JOHN STREET, TORONTO, ONTARIO M5V 2E1, 295 ADELAIDE STREET WEST, TORONTO, ONTARIO M5V 1P7, 104 JOHN STREET, TORONTO, ONTARIO M5V 2E1	5/15/2012	3 Residential	Commercial	Residential	N/A	0	52800	0	N/A	NO
15	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=203287	3178 BATHURST STREET, TORONTO, ONTARIO M6A 2A9, 35 SARANAC BOULEVARD, TORONTO	5/28/2012	3 Residential	Community	Residential	N/A	0	78795	0	N/A	NO
16	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204006	1201 DUNDAS STREET EAST, TORONTO, ONTARIO M4M 1S2	7/11/2012	3 Residential	Industrial	Residential	N/A	0	18000	0	N/A	NO
17	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204107	5 ST. JOSEPH STREET, TORONTO, ONTARIO M4Y 1J6, 618 YONGE STREET, TORONTO, ONTARIO	7/26/2012	3 Residential	Commercial	Residential	N/A	0	28000	0	N/A	NO
18	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204166	14 GLADSTONE AVENUE, TORONTO, ONTARIO M6J 1J6, 12 GLADSTONE AVENUE, TORONTO, ONTARIO M6J 1J6	8/2/2012	3 Residential	Commercial	Residential	N/A	0	7315	0	Described in RSC	NO
19	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204426	24 MASSIE STREET, TORONTO, ONTARIO M1S 3Z6	8/15/2012	1 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
20	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204307	50 PAGE AVENUE, TORONTO, ONTARIO M2K 2B4	8/22/2012	3 Residential	Institutional	Residential	N/A	0	0	0	N/A	NO
21	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204348	692 YONGE STREET, TORONTO, ONTARIO M4Y 2A6, 67 ST. NICHOLAS STREET	8/28/2012	3 Residential	Commercial	Residential	N/A	0	22500	0	N/A	NO
22	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204706	2B MINTO STREET, TORONTO, ONTARIO M4L 1B6	9/13/2012	3 Residential	Residential	Residential	N/A	0	180	165	N/A	NO
23	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204907	2150 LAWRENCE AVENUE EAST, TORONTO, ONTARIO M1R 3A7	9/17/2012	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
24	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204909	6 LLOYD AVENUE, TORONTO, ON M6N 1H1	9/24/2012	3 Residential	Industrial	Residential	Described in RSC	5000	2500	2300	N/A	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
25	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205172	282 UPPER HIGHLAND CRESCENT, TORONTO, ONTARIO M2P 1Y1	10/3/2012	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
26	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204908	210 SIMCOE STREET, TORONTO, ONTARIO M5T 1T4	10/5/2012	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
27	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204746	2200 LAKE SHORE BOULEVARD WEST, TORONTO, ONTARIO M8V 1A4	10/10/2012	3 Residential	Commercial	Residential	N/A	0	675	675	N/A	NO
28	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205288	274 DONLANDS AVENUE, TORONTO, ONTARIO M4J 3R4, 280 DONLANDS AVENUE, TORONTO, ONTARIO M4J 3R4	10/11/2012	3 Residential	Commercial	Residential	N/A	0	182000	0	N/A	NO
29	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205207	621 KING STREET WEST, TORONTO, ONTARIO M5V 1M5	10/12/2012	3 Residential	Commercial	Residential	N/A	0	27900	0	N/A	NO
30	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205228	5170 YONGE STREET, TORONTO, ONTARIO M2N 5P6	7/31/2012	3 Residential	Commercial	Residential	N/A	0	5000	0	N/A	NO
31	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=204986	103 CHARLES STREET EAST, TORONTO, ONTARIO M4Y 0A9, 99 CHARLES STREET EAST, TORONTO, ONTARIO M4Y 1V2, 568 JARVIS STREET, TORONTO	10/15/2012	3 Residential	Commercial	Residential	N/A	0	51000	0	N/A	NO
32	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205146	112 JUTLAND ROAD, TORONTO, ONTARIO M8Z 2H1	10/17/2012	3 Institutional	Industrial	Institutional	N/A	0	0	0	N/A	NO
33	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205351	120 TWENTY FOURTH STREET, TORONTO, ONTARIO M8V 3P1	10/25/2012	3 Residential	Industrial	Residential	N/A	0	9531.5	0	N/A	NO
34	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205587	328 ADELAIDE STREET WEST, TORONTO, ONTARIO M5V 1P8, 340 ADELAIDE STREET WEST, TORONTO, ONTARIO M5V 1P9	10/30/2012	3 Residential	Commercial	Residential	N/A	0	11000	0	N/A	NO
35	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205289	55 HOWIE AVENUE, TORONTO, ONTARIO M4M 2H1	11/2/2012	3 Residential	Institutional	Residential	N/A	0	3531	5797	N/A	NO
36	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205849	5 HANNA AVENUE, TORONTO, ONTARIO M5K 1W8	11/14/2012	3 Residential	Commercial	Residential	N/A	0	32000	0	N/A	YES
37	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205626	224 KING STREET WEST, TORONTO, ONTARIO M5V 1H9	11/16/2012	3 Residential	Commercial	Residential	N/A	0	5100	0	N/A	NO
38	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205686	1 BLOOR STREET EAST, TORONTO, ONTARIO M4W 1A9	11/20/2012	3 Residential	Commercial	Residential	N/A	0	90000	0	N/A	NO
39	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205933	25R QUEENS QUAY EAST, TORONTO, ONTARIO M5E 0A5	11/28/2012	1 Parkland	Commercial	Parkland	N/A	0	0	0	N/A	YES
40	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206088	6 UNDERWRITERS ROAD, TORONTO, ONTARIO M1R 3A9, 10 UNDERWRITERS ROAD, TORONTO, ONTARIO M1R 3A9	11/29/2012	3 Industrial	Industrial	Industrial	N/A	0	14700	12551	Described in RSC	YES
41	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206029	3560 ST. CLAIR AVENUE EAST, SCARBOROUGH, ONTARIO M1K 1G3	11/30/2012	3 Residential	Commercial	Residential	N/A	0	1150	0	Described in RSC	YES
42	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205951	39 QUEENS QUAY EAST, TORONTO, ONTARIO M5E 0A5	11/30/2012	1 Community	Commercial	Community	N/A	0	0	0	N/A	NO
43	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205866	327 CEDARVALE AVENUE, TORONTO, ONTARIO M4C 4K5	12/3/2012	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
44	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206090	2R OLD MILL DRIVE, TORONTO, ONTARIO M6S 0A2	12/10/2012	3 Parkland	Commercial	Parkland	N/A	0	0	0	N/A	NO
45	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206151	287 RICHMOND STREET WEST, TORONTO, ONTARIO M5V 1X1, 117 PETER STREET, TORONTO, ONTARIO M5V 2G9	12/11/2012	3 Residential	Commercial	Residential	N/A	0	14000	0	N/A	NO
46	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=205386	30 OLD MILL ROAD, TORONTO, ONTARIO M8X 0A5	12/11/2012	3 Residential	Commercial	Residential	N/A	0	34800	750	N/A	NO
47	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206286	14 ALGOMA STREET, TORONTO, ONTARIO M8Y 1C3	12/12/2012	3 Parkland	Industrial	Parkland	N/A	0	0	19144	N/A	YES
48	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206166	1030 KING STREET WEST, TORONTO, ONTARIO M6K 1E6	12/12/2012	3 Residential	Commercial	Residential	N/A	0	75000	0	N/A	NO
49	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206327	19 WATERMAN AVENUE, TORONTO, ONTARIO M4B 1Y2	12/12/2012	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	YES
50	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206347	78 TISDALE AVENUE, TORONTO, ONTARIO M4A 1J8	12/13/2012	5 Residential	Industrial	Residential	N/A	0	0	0	Described in RSC	YES

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51	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206147	1144 ISLINGTON AVENUE, TORONTO, ONTARIO M8Z 4S5	12/27/2012	2 Residential	Commercial	Residential	N/A	0	60	0	N/A	NO
52	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206152	1255 YORK MILLS ROAD, TORONTO, ONTARIO M3A 2V3	12/27/2012	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
53	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206451	105 GEORGE STREET, TORONTO, ONTARIO M5N 2N4	1/4/2013	3 Residential	Commercial	Residential	N/A	0	13600	0	N/A	NO
54	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206528	103 LIGHTBOURN AVENUE, TORONTO, ONTARIO M6H 2H6	1/4/2013	3 Residential	Industrial	Residential	N/A	0	285	0	N/A	NO
55	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206535	1275 MORNINGSIDE AVENUE, TORONTO, ONTARIO M1B 3W1	1/9/2013	3 Commercial	Commercial	Commercial	N/A	0	45	45	N/A	YES
56	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206366	199 RICHMOND STREET WEST, TORONTO, ON M5V 0H4, 10 NELSON STREET, TORONTO, ON M5V 3Y8, 203 RICHMOND STREET WEST, TORONTO, ON M5V 1V3, 181 RICHMOND STREET WEST, TORONTO, ON M5V 1V3	1/10/2013	1 Residential	Commercial	Residential	N/A	0	54954	0	N/A	NO
57	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206326	99 ONTARIO STREET REAR, TORONTO, ONTARIO M5A 2V2, 132 BERKELEY STREET, TORONTO, ONTARIO M5J 2H7	1/17/2013	3 Residential	Commercial	Residential	N/A	0	4470	0	N/A	NO
58	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206466	104A HOLLIS AVENUE, TORONTO, ONTARIO M1N 3J2	1/21/2013	3 Residential	Industrial	Residential	N/A	0	112.5	0	N/A	NO
59	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206840	0 Don Jail Roadway, Ontario	1/22/2013	3 Parkland	Residential	Parkland	N/A	0	0	0	N/A	NO
60	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206730	4186 DUNDAS STREET WEST, TORONTO, ONTARIO M8X 1X3, 4180 DUNDAS STREET WEST, TORONTO, ONTARIO M8X 1X3	1/23/2013	9 Residential	Commercial	Residential	N/A	0	852	0	N/A	NO
61	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206848	3077 KINGSTON ROAD, TORONTO, ONTARIO M1M 1P1	1/29/2013	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
62	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206833	185 BONIS AVENUE, TORONTO, ONTARIO M1T 3W6	1/29/2013	3 Residential	Commercial	Residential	N/A	0	3160	0	N/A	NO
63	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206490	335 COLLEGE STREET, TORONTO, ONTARIO M5T 1S2	2/1/2013	2 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
64	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206588	1051 ELLESMERE ROAD, TORONTO, ONTARIO M1P 2X1	2/12/2013	3 Residential	Industrial	Residential	N/A	0	475	475	Described in RSC	YES
65	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207088	75 THE DONWAY WEST, TORONTO, ONTARIO M3C 2E9	2/21/2013	3 Residential	Commercial	Residential	N/A	0	311	0	N/A	NO
66	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206749	2756 OLD LESLIE STREET, TORONTO, ONTARIO M2K 1J2	2/26/2013	3 Residential	Commercial	Residential	N/A	0	42000	0	N/A	NO
67	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207390	1051 ELLESMERE ROAD, TORONTO, ONTARIO M1P 2X1	3/5/2013	7 Residential	Industrial	Residential	N/A	0	482	475	Described in RSC	YES
68	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=206566	36 PARK LAWN ROAD, TORONTO, ONTARIO M8Y 3H8	3/14/2013	3 Residential	Industrial	Residential	N/A	0	21000	0	N/A	NO
69	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207367	877 WILSON AVENUE, TORONTO, ONTARIO M3K 1E6	3/15/2013	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
70	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207311	1390 DON MILLS ROAD, TORONTO, ONTARIO M3B 3P9	3/19/2013	3 Commercial	Industrial	Commercial	N/A	0	0	0	N/A	NO
71	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207248	508 WELLINGTON STREET WEST, TORONTO, ONTARIO M5V 1E3, 512 WELLINGTON STREET WEST, TORONTO	3/19/2013	3 Residential	Commercial	Residential	N/A	0	142	0	N/A	NO
72	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207247	508 WELLINGTON STREET WEST, TORONTO, ONTARIO M5V 1E3	3/19/2013	3 Residential	Commercial	Residential	N/A	0	209	0	N/A	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
73	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207368	12 MERCER STREET, TORONTO, ONTARIO M5V 1H3, 60 JOHN STREET, TORONTO, ONTARIO M9N 1J7	3/27/2013	3 Residential	Commercial	Residential	N/A	0	1800	0	N/A	NO
74	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207866	1048 ISLINGTON AVENUE, TORONTO, ONTARIO M8Z 6A4	4/4/2013	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	NO
75	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207871	41 OSSINGTON AVENUE, TORONTO, ON M6J 2Z1	4/4/2013	3 Residential	Commercial	Residential	N/A	0	245	0	N/A	NO
76	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207870	875 MORNINGSIDE AVENUE, TORONTO, ONTARIO M1C 0C7	4/5/2013	3 Community	Industrial	Community	N/A	0	6350	21470	Described in RSC	YES
77	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207987	620 DUNDAS STREET EAST, TORONTO, ONTARIO M5A 2B4	4/22/2013	3 Parkland	Residential	Parkland	N/A	0	0	0	N/A	NO
78	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207890	1201 WILSON AVENUE, TORONTO, ONTARIO M3M 3G8	4/23/2013	3 Parkland	Industrial	Parkland	N/A	0	0	0	N/A	NO
79	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208166	875 MORNINGSIDE AVENUE, TORONTO, ONTARIO M1C 0C7	4/26/2013	3 Community	Industrial	Community	N/A	0	37290	62140	N/A	YES
80	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207449	394 SYMINGTON AVENUE, TORONTO, ONTARIO M6N 2W3	4/29/2013	3 Residential	Industrial	Residential	N/A	0	110	0	N/A	NO
81	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208128	1550 O'CONNOR DRIVE, TORONTO, ONTARIO M4B 2V3	5/8/2013	3 Institutional	Industrial	Institutional	N/A	0	0	0	N/A	NO
82	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208126	3563 LAKE SHORE BOULEVARD WEST, TORONTO, ONTARIO M8W 1P4	5/9/2013	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	YES
83	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208006	51 EAST LIBERTY STREET, TORONTO, ONTARIO M6K 3P8	5/10/2013	3 Residential	Industrial	Residential	N/A	0	11500	0	N/A	NO
84	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=207766	170 AVENUE ROAD, TORONTO, ONTARIO M5R 2H8	5/14/2013	3 Residential	Commercial	Residential	N/A	0	22940	0	N/A	NO
85	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208293	307 SHERBOURNE STREET, TORONTO, ONTARIO M5A 2R9	5/16/2013	3 Residential	Commercial	Residential	N/A	0	4370	4127	Detailed in RSC	NO
86	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208407	408 SHUTER STREET, TORONTO, ONTARIO M5A 2B4, 402 SHUTER STREET, TORONTO, ONTARIO M5A 2B4	5/17/2013	3 Community	Residential	Community	N/A	0	850	0	N/A	NO
87	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208309	48 ABELL STREET, TORONTO, ONTARIO M6J 3H2	5/21/2013	3 Residential	Commercial	Residential	N/A	0	44800	0	N/A	NO
88	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208450	21 AVENUE ROAD, TORONTO, ONTARIO M5R 2G1	5/21/2013	3 Residential	Commercial	Residential	N/A	0	70	0	N/A	NO
89	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208426	55 CHAUNCEY AVENUE, TORONTO, ONTARIO M8Z 2Z2	5/23/2013	3 Institutional	Commercial	Institutional	N/A	0	0	0	N/A	NO
90	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208689	4620 FINCH AVENUE EAST, TORONTO, ONTARIO M1S 4G2	6/7/2013	3 Institutional	Institutional	Institutional	N/A	0	0.45	0	N/A	YES
91	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208691	851 MILLWOOD ROAD, TORONTO, ONTARIO M4G 1W7	6/12/2013	3 Residential	Commercial	Residential	N/A	0	12165	12000	N/A	NO
92	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208813	10 PARK LAWN ROAD, TORONTO, ONTARIO M8Y 3H8	6/28/2013	9 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
93	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208809	17 BEVERLEY STREET REAR, TORONTO, ONTARIO M5T 1X8, 19 BEVERLEY STREET, TORONTO, ONTARIO M5T 1X8	7/2/2013	3 Residential	Residential	Residential	N/A	0	1500	0	N/A	NO
94	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208487	355 KING STREET WEST (PART OF), TORONTO, ONTARIO M5V 1J6	7/3/2013	3 Residential	Commercial	Residential	N/A	0	1350	1350	N/A	NO
95	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=209128	3360 KINGSTON ROAD, TORONTO, ONTARIO M1M 1R2	7/4/2013	3 Residential	Commercial	Residential	N/A	0	43	43	N/A	NO
96	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208926	131 HAZELTON AVENUE, TORONTO, ONTARIO M5R 1J1, 195 DAVENPORT ROAD, TORONTO, ONTARIO M5R 1J1	7/9/2013	3 Residential	Commercial	Residential	N/A	0	12700	0	Detailed in RSC	NO
97	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=208811	2200 LAKE SHORE BOULEVARD WEST, TORONTO, ONTARIO M8V 1A4	7/17/2013	9 Residential	Commercial	Residential	N/A	0	150000	0	N/A	NO
98	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=209328	1548 KINGSTON ROAD, TORONTO, ON M1N 1R7	7/22/2013	3 Residential	Commercial	Residential	N/A	0	85	60	N/A	NO
99	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=209108	199 RICHMOND STREET WEST, TORONTO, ON M5V 0H4, 203 RICHMOND STREET WEST, TORONTO, ON M5V 1V3	7/26/2013	3 Residential	Commercial	Residential	N/A	0	61079	0	N/A	NO
100	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=209107	21 GRENVILLE STREET, TORONTO, ONTARIO M4Y 1A1, 9 GRENVILLE STREET, TORONTO, ONTARIO M4Y 1A1	8/8/2013	3 Residential	Commercial	Residential	N/A	0	9287	0	N/A	NO

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1	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223267	247 COLLEGE STREET, TORONTO, ON M5T 1R5, 39 GLASGOW STREET, TORONTO, ON M5T 1R5	4/24/2017	3 Residential	Commercial	Residential	N/A	0	8800	0	N/A	NO
2	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223234	38 GLASGOW STREET, TORONTO, ON M5T 1R5, 255 COLLEGE STREET, TORONTO, ON M5T 1R5, 40 GLASGOW STREET, TORONTO	4/24/2017	3 Residential	Commercial	Residential	N/A	0	11000	0	N/A	No
3	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223122	178 VICTORIA STREET, TORONTO, ON M5B 1T7	4/19/2017	3 Community	Commercial	Community	N/A	0	3200	0	N/A	NO
4	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223118	33-49 NIAGARA STREET, TORONTO, ON M5V 1C2, 576-580 FRONT STREET WEST, TORONTO, ON M5V 1C1	4/18/2017	3 Residential	Commercial	Residential	N/A	0	116400	0	N/A	NO
5	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223103	1185 EGLINTON AVENUE EAST, TORONTO, ON M3C 3V2, 18 FERRAND DRIVE, TORONTO, ON M3C 3V2	4/13/2017	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	YES
6	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223239	927A EGLINTON AVENUE WEST, TORONTO, ON M6C 2C3, 935 EGLINTON AVENUE WEST	3/31/2017	3 Residential	Commercial	Residential	N/A	0	13000	0	N/A	NO
7	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223248	150 BERRY ROAD, TORONTO, ON M8Y 1W3	3/30/2017	3 Residential	Industrial	Residential	N/A	0	2950	2200	Detailed in RSC	NO
8	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223156	109 VANDERHOOF AVENUE, TORONTO, ON M4G 2H7	3/29/2017	3 Community	Industrial	Community	N/A	0	0	0	N/A	YES
9	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223155	99 VANDERHOOF AVENUE, TORONTO, ON M4G 4H9, 70 WICKSTEED AVENUE, TORONTO, ON M4G 4H9	3/29/2017	3 Community	Industrial	Community	Detailed in RSC	0	1349	1349	N/A	YES
10	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223084	57 LINELLE STREET, TORONTO, ON M2N 2J4	3/28/2017	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
11	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223093	2 HOLIDAY DRIVE, TORONTO, ON, M9C 1G5	3/27/2017	5 Residential	Commercial	Residential	N/A	0	25000	0	N/A	NO
12	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223092	6441 KINGSTON ROAD, TORONTO, ON M1C 1L2, 6435 KINGSTON ROAD, TORONTO, ON M1C 1L2	3/21/2017	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
13	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	25 BALLYCONNOR COURT, TORONTO, ON M2M 4B3	3/20/2017	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
14	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223147	2522 KEELE STREET, TORONTO, ON M6L 2N8	3/16/2017	2 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
15	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223088	62 CHARLES STREET EAST, TORONTO, ON M4Y 1T1, 61 HAYDEN STREET, TORONTO, ON M4Y 2P2	3/15/2017	3 Residential	Commercial	Residential	N/A	0	10000	0	N/A	NO
16	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	109 OSSINGTON AVENUE, TORONTO, ON M6J 2Z2	3/10/2017	3 Residential	Commercial	Residential	N/A	0	7000	0	N/A	NO
17	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	40 WELLESLEY STREET EAST, TORONTO, ON M4Y 1G4	3/10/2017	3 Residential	Commercial	Residential	N/A	0	14000	0	N/A	NO
18	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223035	845 THE QUEENSWAY, TORONTO, ON M8Z 1N6	3/9/2017	3 Residential	Commercial	Community	N/A	0	0	0	N/A	NO
19	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=223023	300 VALERMO DRIVE, TORONTO, ON M8W 2L1	3/3/2017	3 Residential	Institutional	Residential	N/A	0	6204	0	N/A	NO
20	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222995	161 EGLINTON AVENUE EAST, TORONTO, ON M4P 1J5, 173 EGLINTON AVENUE EAST, TORONTO, ON M4P 1J4	2/28/2017	3 Residential	Commercial	Residential	N/A	0	23000	0	N/A	NO
21	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	3142 LAKE SHORE BLVD. W., TORONTO, ON, M8V 1L4	1/27/2017	3 Residential	Commercial	Residential	N/A	0	305	300	N/A	NO
22	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	95 PIDGEON STREET, TORONTO, ON M1L 0C7	1/25/2017	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	NO
23	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	2114R BLOOR STREET WEST, TORONTO, ON M4W 3E2	1/24/2017	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
24	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222905	438 ADELAIDE STREET EAST, TORONTO, ON M5A 1N4, 460 ADELAIDE STREET EAST, TORONTO, ON M5A 1N4	1/23/2017	3 Residential	Commercial	Residential	N/A	0	11000	0	N/A	NO
25	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222978	186 - 188 JARVIS STREET, TORONTO, ON M5B 0B3	1/17/2017	3 Residential	Commercial	Residential	N/A	0	9000	2000	Detailed in RSC	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
26	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222954	220 MCRAE DRIVE, TORONTO, ON M4G 1T5	1/6/2017	3 Residential	Industrial	Residential	N/A	0	253	343	N/A	NO
27	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	17 DUNDONALD STREET, TORONTO, ON M4Y 1K3	12/16/2016	3 Residential	Commercial	Residential	N/A	0	12400	0	N/A	NO
28	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	10 YORK STREET, TORONTO, ON M5J 2L9	12/16/2016	3 Residential	Commercial	Residential	N/A	0	22906	0	N/A	NO
29	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	1025 DUPONT STREET, TORONTO, ON M6C 1C2	12/8/2016	3 Residential	Industrial	Residential	Detailed in RSC	0	385	35	N/A	NO
30	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222606	475 COMMISSIONERS STREET, TORONTO, ON M4M 1A9	12/1/2016	7 Residential	Industrial	Residential	N/A	0	185	0	N/A	YES
31	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222702	55 MAC FROST WAY, TORONTO, ON M1X 1N6	11/29/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
32	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222737	630 KIPLING AVENUE, ETOBICOKE, ON M8Z 5G1	11/17/2016	3 Commercial	Industrial	Commercial	N/A	0	65	0	N/A	NO
33	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222694	2221 YONGE STREET (PART OF), TORONTO, ON M4S 2B4	11/9/2016	3 Community	Commercial	Community	N/A	0	0	0	N/A	NO
34	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222692	592 SHERBOURNE STREET, TORONTO, ON M4X 1L4	11/8/2016	3 Residential	Commercial	Residential	N/A	0	400	0	N/A	NO
35	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222655	70 WICKSTEED AVENUE, TORONTO, ON M4G 4H9, 99 VANDERHOOF AVENUE, TORONTO	11/2/2016	3 Commercial	Industrial	Commercial	Detailed in RSC	0	54357	1140	N/A	NO
36	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222584	5250 YONGE STREET, TORONTO, ON M2N 5P6	10/28/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
37	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222486	743 WARDEN AVENUE, TORONTO, ON M1L 4A8	10/19/2016	3 Residential	Industrial	Residential	Detailed in RSC	0	27336	0	N/A	YES
38	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222585	130 BOND AVENUE, TORONTO, ON M3B 3P3	10/19/2016	3 Parkland	Industrial	Parkland	N/A	0	124.6	157.2	N/A	NO
39	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222598	373 CHURCH STREET, TORONTO, ON M2N 7E4, 365 CHURCH STREET, TORONTO, ON M2N 7E4	10/6/2016	3 Residential	Commercial	Residential	N/A	0	21000	0	N/A	NO
40	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222537	190 QUEENS QUAY EAST, TORONTO, ON M5A 1B6	10/5/2016	3 Community	Commercial	Community	N/A	0	0	0	N/A	YES
41	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222497	1011 THE QUEENSWAY, TORONTO, ON M8Z 6C7	9/28/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
42	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222546	274 CHURCH STREET, TORONTO, ON M5B 1Z5, 270 CHURCH STREET, TORONTO, ON M5B 1Z5	9/28/2016	3 Residential	Commercial	Residential	N/A	0	65	0	N/A	YES
43	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222538	355 CHURCH STREET, TORONTO, ON M5B 1Z8	9/26/2016	3 Residential	Commercial	Residential	N/A	0	11000	0	N/A	NO
44	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissio	1020 ISLINGTON AVENUE, TORONTO, ON M8Z 6A4	9/19/2016	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	YES
45	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222472	17 PEEL AVENUE, TORONTO, ON M6J 1M3, 21 PEEL AVENUE, TORONTO, ON M6J 1M3, 19 PEEL AVENUE, TORONTO, ON M6J 1M3	9/19/2016	3 Parkland	Residential	Parkland	N/A	0	800	0	N/A	NO
46	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222391	4700 KEELE STREET, TORONTO, ON M3J 1P3	9/15/2016	3 Parkland	Institutional	Parkland	N/A	0	0	0	N/A	NO
47	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222443	31 POWERHOUSE STREET, TORONTO, ON M6H 4K7	9/8/2016	3 Residential	Industrial	Residential	N/A	0	55	0	N/A	NO
48	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222362	1116-1118 KINGSTON ROAD, TORONTO, ON M1N 1N4, 1102 KINGSTON ROAD, TORONTO, ON M1N 1N4	9/7/2016	3 Residential	Commercial	Residential	Detailed in RSC	0	11753	0	N/A	NO
49	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222403	2388 YONGE STREET, TORONTO, ON M4P 3J5, 31 MONTGOMERY AVENUE, TORONTO, ON M4R 1C9	9/6/2016	3 Residential	Commercial	Residential	N/A	0	6100	0	N/A	NO
50	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222365	85 KEELER BOULEVARD, TORONTO, ON M1E 4K6	8/30/2016	2 Residential	Institutional	Residential	N/A	0	9914	11709	N/A	NO

	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
51	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222367	1580 AVENUE ROAD, TORONTO, ON M5M 3X6	8/26/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
52	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222447	1145 OSSINGTON AVENUE, TORONTO, ON M6G 3W3	8/19/2016	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	YES
53	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222405	202 PARKHURST BOULEVARD, TORONTO, ON M4G 2G3	8/19/2016	3 Residential	Commercial	Community	N/A	0	0	0	N/A	NO
54	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222404	2575 ST. CLAIR AVENUE WEST, TORONTO, ON M6N 4Z5	8/16/2016	3 Commercial	Industrial	Commercial	Detailed in RSC	0	0	0	Detailed in RSC	YES
55	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222402	2522 KEELE STREET, TORONTO, ON M6L 2N8	8/10/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
56	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222343	33 SHORE BREEZE DRIVE, ETOBICOKE, ON M8V 1A1	8/5/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
57	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222347	1040 ISLINGTON AVENUE, TORONTO, ON M8Z 6A4	7/28/2016	1 Residential	Industrial	Residential	Detailed in RSC	0	14055	49370	Detailed in RSC	YES
58	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222346	1040 ISLINGTON AVENUE, TORONTO, ON M8Z 4R3	7/28/2016	1 Industrial	Industrial	Industrial	Detailed in RSC	0	2730	0	Detailed in RSC	YES
59	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222340	4700 KEELE STREET, TORONTO, ON M3J 1P3	7/27/2016	3 Community	Commercial	Community	N/A	0	0	0	N/A	NO
60	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222282	1346 AND 1364 KINGSTON ROAD, TORONTO, ON M1N 4E4	7/26/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	YES
61	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222310	11 SUPERIOR AVENUE, TORONTO, ON M8V 0A7, 2398 LAKE SHORE BOULEVARD WEST, TORONTO, ON M8V 1C3	7/26/2016	3 Residential	Commercial	Residential	N/A	0	6800	0	N/A	NO
62	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222322	67 KIRKDENE DRIVE, TORONTO, ON M1C 2N7	7/22/2016	1 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
63	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222320	50 REGENT PARK BOULEVARD, TORONTO, ON M5A 3H6	7/22/2016	3 Residential	Commercial	Residential	N/A	0	10000	0	N/A	NO
64	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222226	2 BICKNELL AVENUE, TORONTO, ON M6M 4G3	7/19/2016	3 Residential	Industrial	Residential	N/A	0	0	0	N/A	YES
65	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222251	441 JANE STREET, TORONTO, ON M6S 3Z9	7/18/2016	2 Residential	Commercial	Residential	N/A	0	4500	0	N/A	NO
66	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222187	3415 WESTON ROAD, TORONTO, ON M9M 2X3	7/12/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
67	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222099	636 EVANS AVENUE, TORONTO, ON M8W 2W6	6/28/2016	5 Residential	Industrial	Residential	N/A	0	28000	2000	N/A	NO
68	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222222	2183 LAKESHORE BOULEVARD WEST, TORONTO, ON M8V 1A1	6/23/2016	3 Residential	Commercial	Residential	N/A	0	16000	0	N/A	NO
69	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222223	1496 QUEEN STREET WEST, TORONTO, ON M6K 1L4	6/13/2016	2 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
70	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222224	2183 LAKESHORE BOULEVARD WEST, TORONTO, ON M8V 1A1	6/9/2016	3 Residential	Commercial	Residential	N/A	0	71000	0	N/A	NO
71	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222225	169 GOULDING AVENUE, TORONTO, ON M2M 1L5	6/7/2016	3 Residential	Industrial	Residential	N/A	0	566	700.1	N/A	NO
72	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222014	66 QUEENS WHARF ROAD, TORONTO, ON M5V 0J5, 60 QUEENS WHARF ROAD, TORONTO, ON M5V 0J5, 139 FORT YORK BOULEVARD, TORONTO, ON M5V 0J7	6/2/2016	3 Residential	Industrial	Residential	N/A	0	27000	0	N/A	NO
73	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222043	591 SHEPPARD AVENUE EAST, TORONTO, ON M2K 1B4, 593 SHEPPARD AVENUE EAST, TORONTO, ON M2K 1B4	5/25/2016	2 Residential	Community	Residential	N/A	0	0	0	N/A	NO
74	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222044	1100 BRIAR HILL AVENUE, TORONTO, ON M6B 1M7	5/25/2016	2 Residential	Institutional	Residential	N/A	0	0	150	N/A	NO
75	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222045	431 ROYAL YORK ROAD, TORONTO, ON M8Y 2R8	5/6/2016	3 Residential	Commercial	Residential	N/A	0	2900.6	0	N/A	NO
	URL	Property Municipal Address	Date	Table	Current Property Use	Intended Property Use	Soil Remediation Process	Estimated Quantity of Soil Remediated (in-situ m^3)	Removed Soils (in-situ m3)	Deposited Soils (in-situ m3)	Groundwater Remediation	Risk Assessed
76	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221976	411 ROGERS ROAD, TORONTO, ON M6M 1A1	5/3/2016	3 Residential	Commercial	Residential	N/A	0	5080	4053	N/A	NO
77	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222282	254 ROYAL YORK ROAD, TORONTO, ON M8V 2V9, 256 ROYAL YORK ROAD, TORONTO, ON M8V 2V9	4/25/2016	3 Residential	Commercial	Residential	N/A	0	637.5	100	N/A	NO
78	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222310	155 QUEENS QUAY EAST, TORONTO, ON M5A 1B6	4/19/2016	3 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	YES
79	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222322	125 QUEENS QUAY EAST, TORONTO, ON M5A 1B6	4/19/2016	9 Commercial	Commercial	Commercial	N/A	0	0	0	N/A	YES
80	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=222320	208 GERRARD STREET EAST, TORONTO, ON M5A 2E6	4/19/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	YES
81	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221673	1000 BATHURST STREET, TORONTO, ON M5R 3G7, 1002 BATHURST STREET, TORONTO, ON M5R 3G7	4/15/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
82	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221472	70 COLBORNE STREET, TORONTO, ON M5C 1G4, 60 COLBORNE STREET, TORONTO, ON M5C 1G4	4/7/2016	3 Residential	Commercial	Residential	N/A	0	12500	0	N/A	NO
83	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221671	5200 YONGE STREET, TORONTO, ON M2N 5P6	3/29/2016	3 Residential	Commercial	Residential	N/A	0	24950	0	N/A	NO
84	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221671	146 LAIRD DRIVE, EAST YORK,, ON M4G 3V7, 150 LAIRD DRIVE, EAST YORK, ON M4G 3V7	3/29/2016	3 Residential	Commercial	Residential	N/A	0	16	0	N/A	NO
85	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221671	43 GERRARD STREET WEST, TORONTO, ON M5G 1Z4	3/17/2016	3 Residential	Commercial	Residential	N/A	0	344000	0	N/A	NO
86	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221131	4470 KINGSTON ROAD, TORONTO, ON M1E 2N6, 4434 KINGSTON ROAD, TORONTO, ON M1E 2N6	3/11/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
87	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=221506	90 EGLINTON AVENUE WEST, TORONTO, ON M4R 2E4	3/7/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
88	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220986	431 MOUNT PLEASANT ROAD, TORONTO, ON M4S 2L8, 358 BALLIOL STREET, TORONTO, ON M4S 1E2, 423 MOUNT PLEASANT ROAD, TORONTO, ON M4S	3/3/2016	3 Institutional	Community	Institutional	N/A	0	718	0	N/A	NO
89	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220347	280 MANSE ROAD, TORONTO, ON M1E 3V4	2/5/2016	3 Residential	Institutional	Residential	N/A	0	0	0	N/A	NO
90	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220318	270-272 POPLAR PLAINS, TORONTO, ON M4V 1R3, 213-223 ST. CLAIR AVENUE WEST, TORONTO, ON M4V 1R3	1/26/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
91	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220567	296 COLLEGE STREET, TORONTO, ON M5T 1R9, 294 COLLEGE STREET, TORONTO, ON M5T 1R9	1/19/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
92	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=219886	114 OSSINGTON AVENUE, TORONTO, ON M6J 2Z4	1/12/2016	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO
93	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220209	106-108 LILLIAN STREET, TORONTO, ON M4S 2H7, 98 LILLIAN STREET, TORONTO, ON M4S 2H7	12/21/2015	3 Residential	Commercial	Residential	Detailed in RSC	0	85524	0	N/A	YES
94	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=219808	23 ELDORA AVENUE, TORONTO, ON M2M 1R3, 21 ELDORA AVENUE, TORONTO, ON M2M 1R3	12/8/2015	3 Residential	Residential	Residential	N/A	0	0	0	N/A	NO
95	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220098	255 RANEE AVENUE, TORONTO, ON M6A 2P4	11/25/2015	3 Residential	Industrial	Residential	N/A	0	350	0	N/A	NO
96	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=219569	112 FRONTENAC AVENUE, TORONTO, ON M5N 1Z9, 110 FRONTENAC AVENUE, TORONTO, ON M5N 1Z9	11/19/2015	2 Residential	Community	Residential	N/A	0	0	0	N/A	NO
97	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220168	3415 WESTON ROAD, TORONTO, ON M9M 2V9	11/5/2015	3 Residential	Commercial	Residential	N/A	0	55000	0	N/A	NO
98	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=219546	571 JARVIS STREET, TORONTO, ON M4Y 2J1, 119 ISABELLA STREET, TORONTO, ON M4Y 1P2	11/5/2015	3 Residential	Commercial	Residential	N/A	0	5115	0	N/A	NO
99	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=220168	14 STRACHAN AVENUE, TORONTO, ON M6K 3R2	11/3/2015	3 Parkland	Industrial	Parkland	Detailed in RSC	0	10500	10500	N/A	NO
100	https://www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/viewDetail?submissionId=219546	704 QUEEN STREET EAST, TORONTO, ON M4M 1G9	10/28/2015	3 Residential	Commercial	Residential	N/A	0	0	0	N/A	NO

APPENDIX C

Interview Questions

Interview Questions

1. **Could you briefly describe your position and experiences with urban development in Toronto?**
2. **In your assessment, is the current state of soil disposal and transport in Toronto sustainable? Why or why not?**
3. **Consider the following table, summarizing data from the MOECC RSC database. Each range describes 100 RSCs collated within that period.**

Collated RSC Database – Summary of Data				
	2004 – 2005	**2011 - 2013**	**2015 - 2017**	**Trend**
Current Property Use	Commercial (60%)	Commercial (66%)	Commercial (66%)	-
Proposed Property Use	Residential (85%)	Residential (79%)	Residential (80%)	
Contaminant Standard Table	Table 3 RPI (85%)	Table 3 RPI (68%)	Table 3 RPI (70%)	
Total Quantity of Soil Remediated	88,680.00 m^3	5,000.00 m^3	0.00 m^3	↓
Total Soil Exported	551,910.00 m^3	1,331,070.58 m^3	1,169,248.70 m^3	↑
Average Soil Exported	7,884.43 m^3	18,747.47 m^3	20,513.14 m^3	
Maximum Soil Exported	115,000 m^3	182,000.00 m^3	344,000.00 m^3	
Total Soil Imported	368,800.50 m^3	143,960.20 m^3	86,106.30 m^3	↓
Average Soil Imported	14,184.63 m^3	6,855.25 m^3	5,381.64 m^3	
Maximum Soil Imported	274,362 m^3	62,140.00 m^3	49,370.00 m^3	
Percent Risk Assessed	2%	15%	18%	↑
Sourced from RSC Registry – July 1, 2011 – Present (www.lrcsde.lrc.gov.on.ca/BFISWebPublic/pub/searchFiledRsc_search?request_locale=en) And RSC Registry October 1, 2004 – July 1, 2011. (www.lrcsde.lrc.gov.on.ca/besrWebPublic/generalSearch)				

   a) **Do any of the conclusions surprise you? Why or why not?**
   b) **Briefly explain why you think these trends are present.**
4. **What policy decisions could be implemented that could improve the situation in Toronto?**
5. **In Barry Turner's book, Man-made Disasters, he puts forth a term known as 'disaster incubation' describing that prior to an incident there is an incubation period in which "causal factors that contribute to, or precipitate, a disaster accumulate and interact in an unnoticed manner." Do you think that Toronto's current regime of soil transport and disposal constitutes an incubation period for a catastrophic lack of construction soil?**

APPENDIX D

Informed Consent Form

Consent Information Form

1. Research Background

The purpose of the research is to examine the current policies underlying brownfield development and soil disposal in Toronto, and to determine whether the lack of crosstalk between developers, the city, and contractors is leading to unexpected consequences. A component of the major research paper is to interview representatives from each of the affected parties to determine whether the research is reflective of their experience in the industry, and in doing so gain a deeper perspective of the real world consequences of the current regime.

2. Interview Information

Interview questions relate to the regime of soil disposal and brownfield remediation in Toronto, including practices and techniques used, the interaction between developers, government organizations and consultants, and the potential for long-term sustainability concerns.

The information collected in the interviews will only be used in the research with the consent of the interview participant, and they shall be named and identified only with their consent. Each interview will take approximately one hour. A copy of the consent form will be given to each interviewee.

3. Consent Information

Risks and Discomforts: We do not foresee any risks or discomfort from your participation in the research and you have the right to not answer any questions.

Voluntary Participation: Your participation in this research project is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you decide. Your decision to stop participating, or to refuse to answer any questions will not affect your relationship with the researcher or York University. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible.

Confidentiality: The interviews will be recorded by the researcher for documentation purposes but recordings may be stopped at your request. Unless you agree otherwise, all information you supply during the interview will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Your data will be collected through an audio recording of the interview combined with handwritten notes by the researcher. Your data will be safely stored in a locked facility and only the researcher will have access to this information. Data will be destroyed at the end of the research project and confidentiality will be provided to the fullest extent possible by law.

If you have any questions about the research in general or about your role in the project, please feel free to contact my Supervisors Dr. Peter Mulvihill (prm@yorku.ca) and Dr. Anders Sandberg (sandberg@yorku.ca). This research has been reviewed and approved by the FES Research Committee, on behalf of York University, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about the process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Research Tower, York University (telephone 416-736-5914 or email ore@yorku.ca).

Legal Rights and Signatures:

I, _____, consent to participate in the Brownfield Soil Disposal and Disaster Incubation Research Project conducted by Nicolas Sabo. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____ **Date** _____
Participant

Signature _____ **Date** _____
Principal Investigator

Thank You,

Nicolas Sabo
Researcher & Master in Environmental Studies Candidate 2017
nsabo@yorku.ca