The management of brownfields in Ontario: A comprehensive review of remediation and reuse characteristics, trends, and outcomes

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Outline

- Definitions & Inventory
- Brownfields Policy Evolution
- Expanding Redevelopment Goals
- Problems and Solutions
- Ontario’s Policy and Planning Context
- Results of 4 Studies: Outcomes, Trends, Perceptions & Recommendations
- Key Takeaways

Definitions

- U.S.
  - real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant
- Ontario
  - Brownfield properties are vacant or underutilized places where past industrial or commercial activities may have left contamination (chemical pollution) behind
- Contaminated site
  - a site that exhibits, after suitable testing, soil or groundwater quality that exceeds quality criteria set by the government

Noonan, F., and C. A. Vidich, 1992. Decision analysis for utilizing hazardous waste site assessments in real estate acquisition. Risk Analysis 12(2): 245-251.

Table II. Prior Probability of Contamination Based on Land Use

Commercial and industrial land use categories	Prior probability, P
1. Former coal gas plants, fuel distributors, chemical distributors, airports, incinerators	.99
2. Auto salvage yards, plastic manufacture, electric utility, refining, hazardous waste store/transfer	.95
3. Oil and other petroleum storage	.92
4. Metal plating, landfills, chemical manufacture, metal finishing/tool and dye, laboratories	.90
5. Heavy industrial manufacturing, power plants, paper manufacturers, gas stations	.88
6. Tannery	.87
7. Urban vacant/abandoned land, furniture repair and stripping, circuit board manufacturers, tank farms, waste treatment plants	.85
8. Metal working and fabrication	.83
9. Railroad yards and right of ways, vehicle maintenance facilities	.82
10. Refuse recycling facility, machine shops, electronics assembly facility, agricultural mixers/formulators, high technology manufacturing	.80
11. Junkyards, electronics manufacture	.79
12. Industrial parks, automotive assembly facility, light industrial manufacturing	.75
13. Dry cleaning	.74
14. Auto repair	.72
15. Chemical research facility	.70
16. Trucking terminal, textile printing and finishing	.65
17. Resource recovery facilities, electrical/plumbing/HVAC service	.60
18. Photographic	.53
19. Auto dealership, fabric dyeing establishments, pharmaceutical establishments	.50
20. Highways, research facilities	.40
21. Warehouses	.35
22. Gas utilities	.35
23. Retail property	.25
24. Residential, rural vacant property, hospitals	.20
25. Offices (nonmanufacturing)	.13

Number of sites

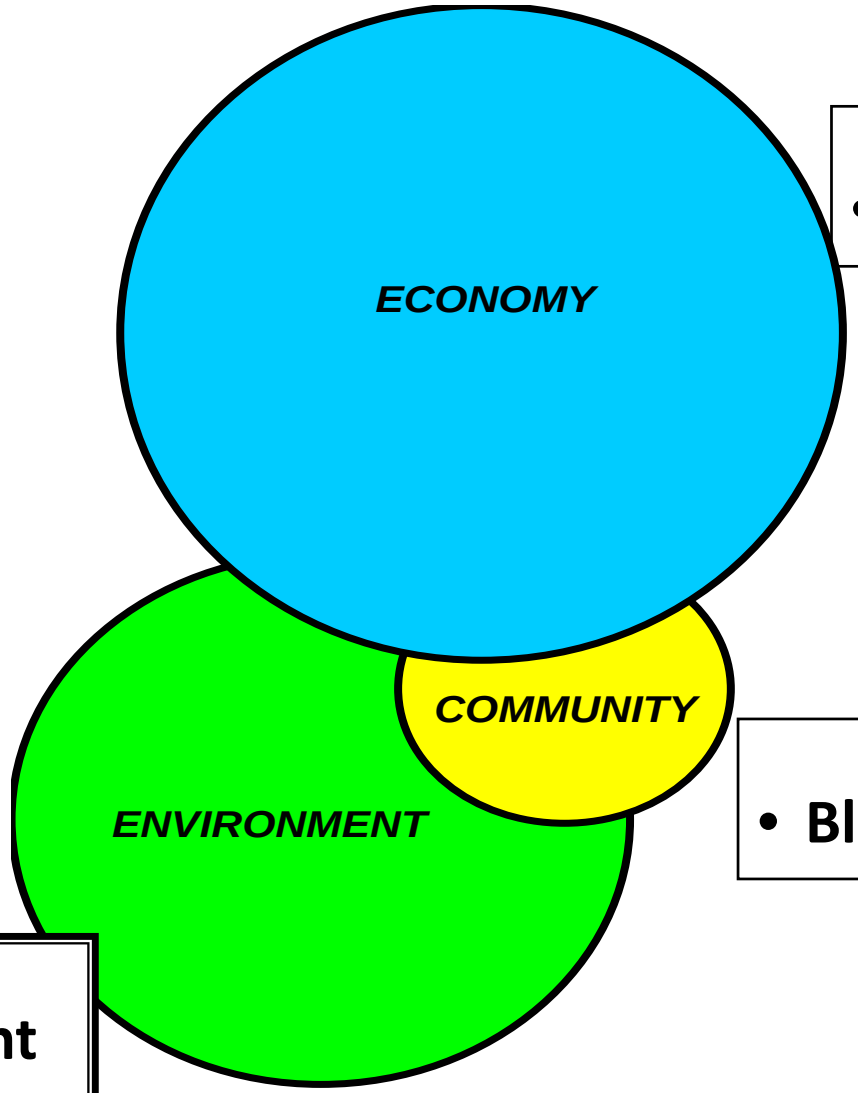
- 30,000 – 64,000 brownfields in Canada
- 25,000 brownfields in Ontario
- 22,000 brownfields identified/classified via Federal Contaminated Sites Action Plan
- 3.3% of urban land in Canadian cities is brownfield on average, up to 20%
- PSAB 3260 Liability for Contaminated Sites

ECO Canada. 2007. Who will do the cleanup? Canadian labour requirements for remediation and reclamation of contaminated sites 2006–2009. Environmental Careers Organization Canada, Calgary, AB.
De Sousa, C. (2006). Urban brownfields redevelopment in Canada: The role of local government. The Canadian Geographer, 50 (3): 392-407.

Brownfields Policy Evolution

- Phase 1 (late 1970s to early 1990s)
  - focus on public health and environmental risk
- Phase 2 (early 1990s to present)
  - focus on addressing the real and perceived barriers to property redevelopment
- Phase 3 (early 2000 to present)
  - focus on achieving a broader range of economic, social, and environmental outcomes associated with sustainability

Redevelopment Goals (Public) - Past



- **Profit, taxes & jobs**
- **Blight removal**
- **Contamination management**

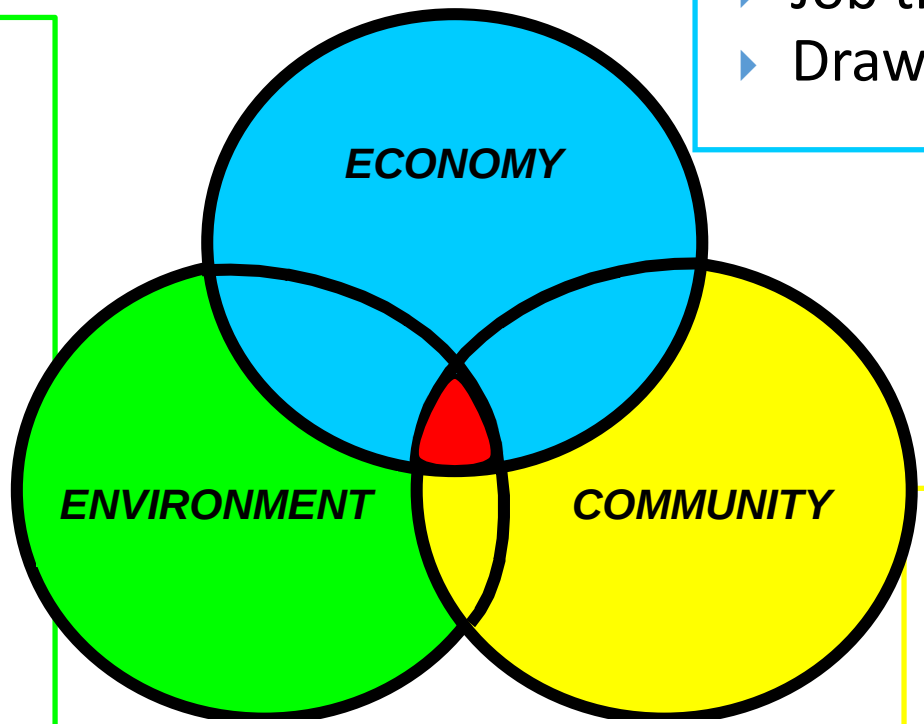
Redevelopment Goals (Public) - Present

- **Contamination & Blight management**
- **Profit, taxes & jobs**

+

- Influences local property values (catalytic effect)
- Influences local economic activity & income
- Job training
- Draws on local enterprises

- Innovative cleanup
- Green space and habitat
- Green infrastructure
- Resource recovery
- Multi-transport options
- Energy efficiency & generation
- Green building & design
- Water efficiency
- Urban Agriculture



- Public amenities
- Public health
- Affordable housing
- Historical preservation

The Problem

- Public funds are limited and most remediation and redevelopment is done by private sector developers
- Development motivations are increasingly focused on real estate market fundamentals (profit, market, location) and less on socio-economic and environmental goals
- Brownfield obstacles and goals impose real costs & risks on a Developer's Pro Forma
  - Assessment & Cleanup costs
  - Liability costs
  - Stigma costs
  - Time costs

Table 6. Pro forma analysis of hypothetical industrial scenarios

Factor	Brownfield		Greenfield	
Property information				
Lot size (acres/hectares)	1.5/0.6			
Coverage (%)	40			
Building area	26 136 square feet/242 m²			
Development cost information	*Cost ($)*	*Percentage of total*	*Cost ($)*	*Percentage of total*
Land acquisition cost				
Land purchase price	102 000	5.8	360 000	21.8
Site costs				
Demolition	60 000	3.4	0	0.0
Site assessment	63 000	3.6	0	0.0
Remediation	225 000	12.9	0	0.0
Land levies	0	0.0	77 820	4.7
Construction costs				
Building hard costs ($40 PSF)	1 063 894	60.8	1 061 587	64.2
Arch./eng./consulting fees	21 693	1.2	21 693	1.3
Soft costs				
Leasing fees	35 284	2.0	35 284	2.1
Legal fees	13 000	0.7	6 500	0.4
Realty taxes	21 479	1.2	6 499	0.4
Insurance and bonding	2 500	0.1	2 500	0.2
Contingency	60 000	3.4	20 000	1.2
Development financing cost (9%)	82 630	4.7	62 515	3.8
Total development costs	1 764 476	100.0	1 654 398	100.0
Development lease information				
Market rent (average spring 2000)	5.35		6.45	
Net operating income (NOI)				
Project returns	139 828		168 577	
Levered yield				
Capitalized value (NOI/0.1)	1 398 276		1 685 772	
Loan amount (loan-to-value)	978 793		1 180 040	
Debt service (20 years at 9%)	104 440		125 914	
Cash flow before tax	139 828		168 577	
Equity requirement	978 793		474 357	
Return on equity (ROE) (%)	*4.6*		*9.0*	
Unlevered yield				
Capitalized cost	1 749 927		1 654 398	
Cash flow before tax	139 828		168 577	
Yield (%)	8.0		10.2	
Rent required for 8% ROE ($ PSF net)	6.60		6.25	
Rent required for 12% ROE ($ PSF net)	7.35		6.95	
Site preparation time (months)	7		12	

De Sousa, C. 2000. "Brownfield Redevelopment versus Greenfield Development: A Private Sector Perspective on the Costs and Risks Associated with Brownfield Redevelopment in the Greater Toronto Area." Journal of Environmental Planning and Management, 43(6): 831-853.

De Sousa, C. (2015) Overcoming barriers and facilitating brownfields redevelopment in the GTHA: A review of results from interviews with private sector stakeholders. Report prepared for the Center for Urban Research and Land Development, Faculty of Community Services, Ryerson University. Pg. 1-25

The Solutions

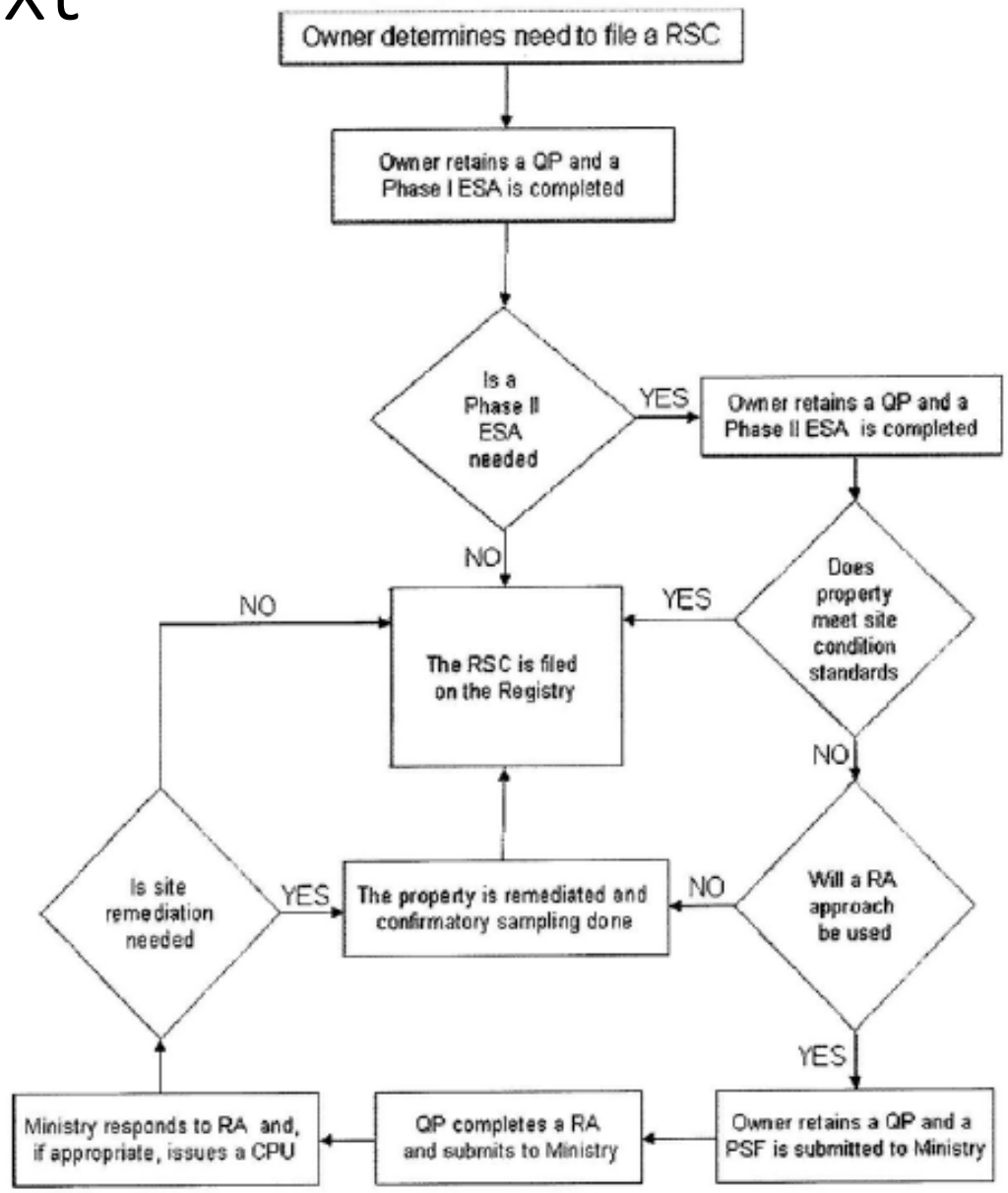
- Publicly-driven cleanups & redevelopment projects
- Sticks: Publicly-mandated cleanups
- Carrots: Public programs and incentives that make the Developer's pro forma work
  - Policy clarity
  - Offsets (e.g., technical assistance, process facilitation)
  - Rezoning & density
  - Direct financing (e.g., grants, loans)
  - Tax incentives (e.g., tax credits, deferral)

Table 8. Pro forma estimates of potential brownfield policies and programmes

Policies and programmes	New cost ($)	Return (%)	New cost ($)	Return on Equity (ROE) (%)
Base project cost and return	20 132 198	15.2	1 749 927	4.6
Site assessment costs subsidized	20 143 054	15.1	1 753 296	4.6
Increase in land value	90 000		63 000	
No increase in land value	20 085 429	15.7	1 684 442	5.0
Demolition site assessment and remediation costs subsidized	19 671 759	17.9	1 726 498	4.7
Land cost required to achieve 8% ROE	—	—	170 000	8.0
Industrial tax abatement (net rent + 50 cents)	—	—	—	5.7
Industrial tax abatement (net rent + $1)	—	—	—	7.1
Low development finance rate (4.5%)	19 334 707	19.9	1 715 774	4.8
Liability protection (25% reduction in legal costs)	20 070 014	15.9	1 746 375	4.6
Shortened development period (= greenfield time lines)	19 873 560	16.7	1 717 240	4.8
Clean-up cost reduced by 30% (site-specific risk assessment)	20 011 237	15.9	1 679 765	5.0
Combination (subsidized site assessment and shortened development)	19 880 861	16.7	1 718 898	4.8
Combination (subsidized site preparation and tax abatement + $1)	—	—	1 726 498	7.4
Land cost required to achieve 8% ROE	—	—	415 000	8.0
Combination (subsidized site preparation, tax abatement + $1, shortened development)	—	—	1 590 368	9.8

Ontario Remediation Policy Context

- Ontario **Record of Site Condition** Regulation (RSC 2004) –**Qualified Persons** are responsible for conducting site assessment/remediation to standards then filing a completed RSC to the Environmental Ministry for administrative and technical review.
- RSC mandatory for change in land use (Industrial/Commercial to Residential/Park)
- Approaches to site remediation leading to RSC filing
  - Generic standards
  - Site-specific Risk Assessment (streamlined & full), QP required to prepare a Pre-Submission Form for review by Ministry prior to taking action.



Ontario Planning Policy Context

- Places to Grow Act (2005) allows for the identification/designation of growth plan areas & development of strategic growth plans for communities throughout Ontario
- Growth Plan for the Greater Golden Horseshoe (2006, 2017) envisages increasing intensification of the existing built-up area, with a focus on urban growth centres, intensification corridors, major transit station areas, brownfield sites and greyfields."
- New Targets (2017):
  - Urban growth centres 150-400 residents-jobs/ha
  - Major transit stations 150-200 res-jobs/ha
  - 50-60% of new residential in delineated built-up areas

Ontario Planning Policy Context

- Planning Act (2006) allows municipalities to create Community Improvement Plans (CIP) in order to help developers in CIP areas remediate sites by offering financial incentives, including Tax Increment Equivalent Grants.

Type of Financial Incentive	# of Municipalities	% of Municipalities with "Brownfields CIPs" (44)
Tax Increment Equivalent Grant	41	93%
Tax Assistance	34	77%
Study Grant Program	26	59%
Development Charges Reductions/Exemptions	24	55%
Fees Grant Program	21	48%
Façade Grant or Loan Program	15	34%
Rehabilitation and Redevelopment Grants/Loans	4	9%

Number of Ontario municipalities offering various brownfield financial incentive programs within the context of Community Improvement Plans as of October, 2010.

Research Questions – Highlights from 4 Studies

1. What has been the scale, character, and value of cleanup activity throughout the province since the implementation of RSC legislation in 2004?
   - De Sousa, C. & Speiss, T. (2018). The Management of Brownfields in Ontario: A Comprehensive Review of Remediation and Reuse Characteristics, Trends, and Outcomes, 2004-2015. Environmental Practice, 20(1), 4-15. https://www.tandfonline.com/doi/full/10.1080/14660466.2018.1407615
2. What has been the nature of property development that has taken place on brownfields in a handful of Ontario cities (Toronto, Waterloo, and Kingston)?
   - De Sousa, C. (2017). Trying to Smart-In-Up and Cleanup Our Act by Linking Regional Growth Planning, Brownfields Remediation, and Urban Infill in Southern Ontario Cities. Urban Planning, 2(3), 5-17. https://www.cogitatiopress.com/urbanplanning/article/view/1026/1026
3. What are the current motivations for, and barriers to, private sector redevelopment of brownfields in the Greater Toronto and Hamilton Area, as well as the perceived effectiveness of policies, programs, and tools that aim to foster redevelopment?
   - De Sousa, C. (2015) Overcoming barriers and facilitating brownfields redevelopment in the GTHA: A review of results from interviews with private sector stakeholders. Report prepared for the Center for Urban Research and Land Development, Faculty of Community Services, Ryerson University. Pg. 1-25. http://www.ryerson.ca/content/dam/cur/pdfs/WorkingPapers/CUR%20Working%20Paper_Brownfields_Redevelopment_November%2023%2C%202015.pdf
4. What is the perception regarding the state of brownfields practice in Canada and progress made with implementing the recommendations made in the National Round Table on the Environment and the Economy's National Brownfield Strategy (2003)?
   - The State of Brownfields in Canada: Renewing Canada's National Redevelopment Strategy, 2018, https://www.canadianbrownfieldsnetwork.ca/sites/default/uploads/files/The_State_of_Brownfields_in_Canada_final.pdf

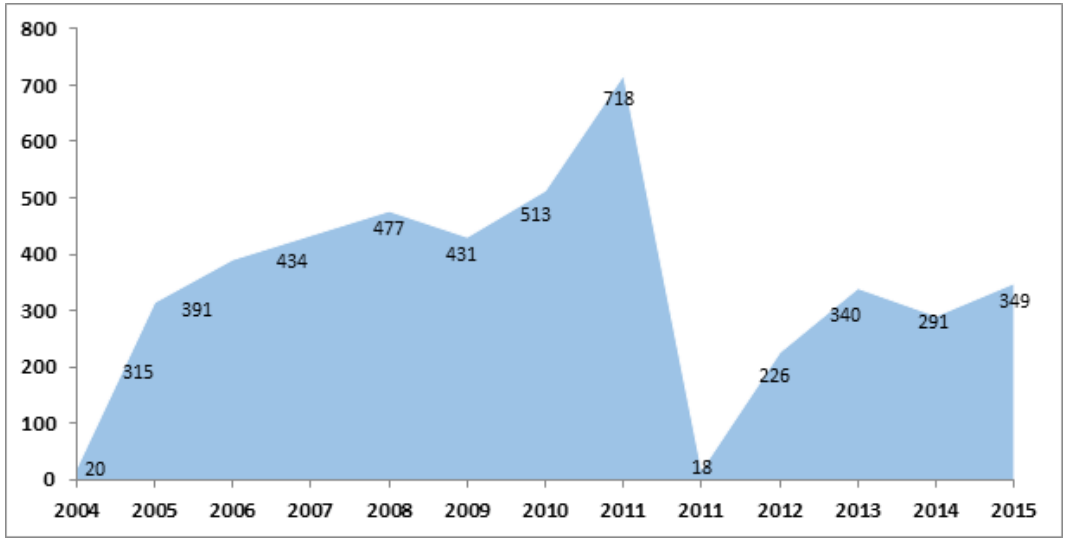
Methods

1. RSC review for all of Ontario
   - Information gathered from all RSCs filed by property owners to Ontario's Environmental Site Registry between:
     - October 1, 2004 and June 30, 2011
     - July 1, 2011 to December 31, 2015
2. Link RSCs to 2013 Property Assessment/Tax info for 3 cities (Toronto, Waterloo, Kingston)
   - In-depth analysis (for Toronto only) of residential development & pre-post analysis comparing 2013 and 2003 property tax assessment information
3. Personal interviews with 20 private sector stakeholders working on brownfields in the Greater Toronto and Hamilton Area (2015)
4. Online survey completed by 80 of 264 participants across Canada in spring 2018 and CBN National Summit breakout groups in June 2018

1. Cleanup & Blight Removal: Ontario Records of Site Condition

(Oct. 2004 to 2015)

	Ontario
RSCs filed	4,524
Hectares	23,689
Acres	58,512



Municipality	Number of RSCs	Average Area per RSC (ha)	Total Area (ha)
Toronto	1,405	0.80	1,124
Brampton	370	11.76	4,351
Vaughan	186	9.27	1,724
Hamilton	151	4.49	673
Markham	143	6.52	939
Ottawa	143	1.82	261
Mississauga	129	2.31	294
Burlington	117	2.26	270
Oakville	94	7.80	745
Kitchener	83	3.33	300
Oshawa	72	7.93	553
Milton	52	17.98	935
Ajax	50	6.02	301
Clarington	44	11.51	506
Caledon	19	21.62	411

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1. Cleanup & Blight Removal: Ontario Records of Site Condition

- Assessment & Remediation (2004-15)
  - Phase I ESA = 24% of RSCs
  - Phase I and II ESA (generic) = 69%
  - Phase I and II ESA risk assessment 7%
- Most common contaminants (2011-15)
  - PHCs (476 RSCs)
  - Metals (415)
  - Volatile organic compounds (365)
- Soil movement (2004-11):
  - 96% had soil removed, 57% had soil deposited, and/or 18% had soil remediated.
- Ownership (2011-14):
  - Private (78%), Individual (6%), Government (6%), No Info (10%), Other (0.5%)

- Land Use Change (2004-2015)

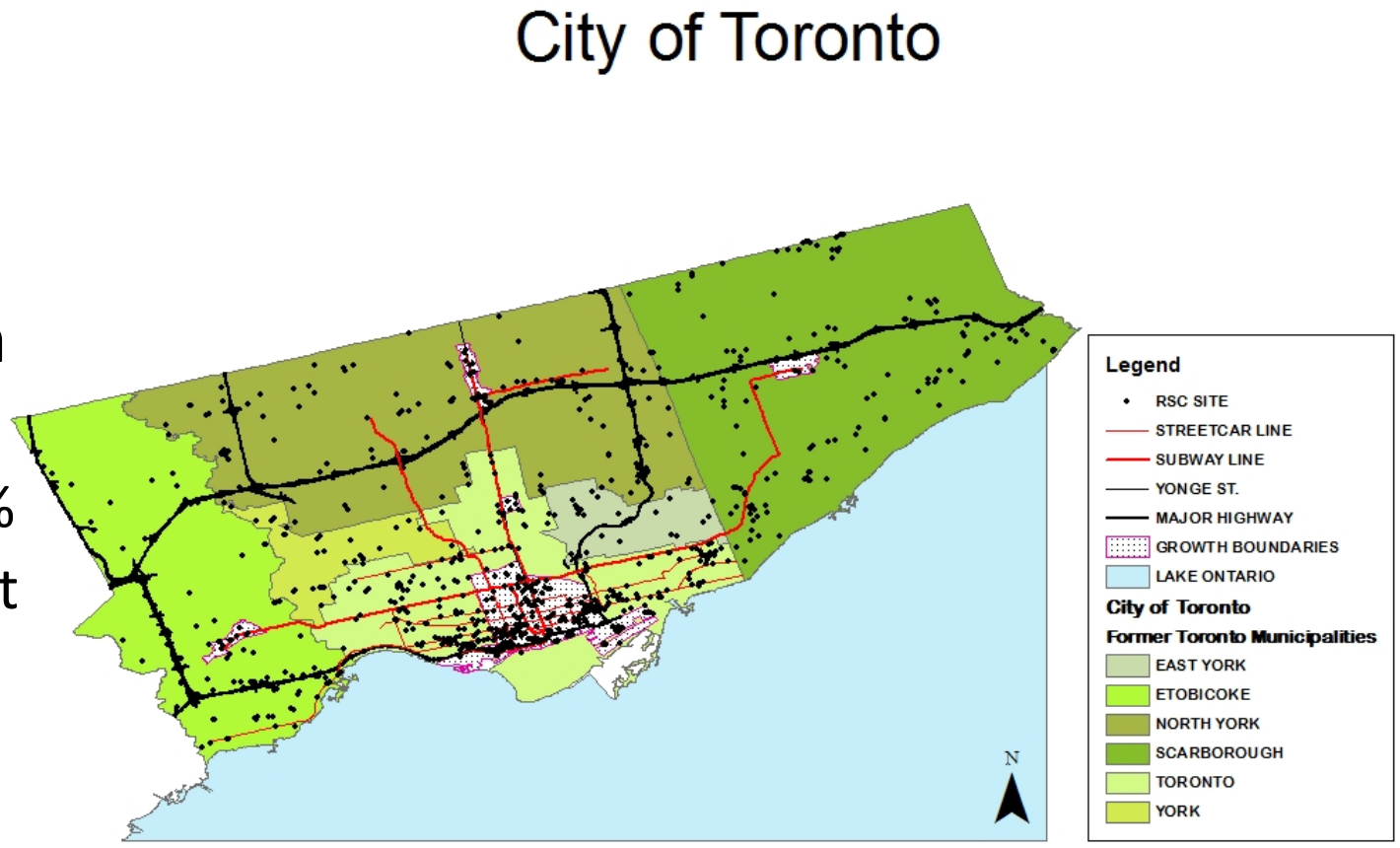
Previous Land Use	RSCs (n)	RSCs (% of total)
Commercial	1,663	36.8%
Industrial	1,011	22.3%
Agriculture/Other	844	18.7%
Residential	656	14.5%
Community	141	3.1%
Institutional	128	2.8%
Parkland	46	1.0%
n/a	35	0.8%
TOTAL	4,524	100.0%

Intended Land Use	RSCs (n)	RSCs (% of total)
Residential	3,052	67.5%
Commercial	676	14.9%
Industrial	276	6.1%
Community	168	3.7%
Parkland	146	3.2%
Institutional	144	3.2%
Agricultural/Other	31	0.7%
n/a	31	0.7%
TOTAL	4,524	100%

- Value (2011-15)
  - RSCs transacted (80%) had "total consideration" value of $6.7 billion ($1.5 billion/year)
  - Total land transfer taxes paid = $142 million dollars

2. Toronto Cleanup & Land Use Change (2004-2011)

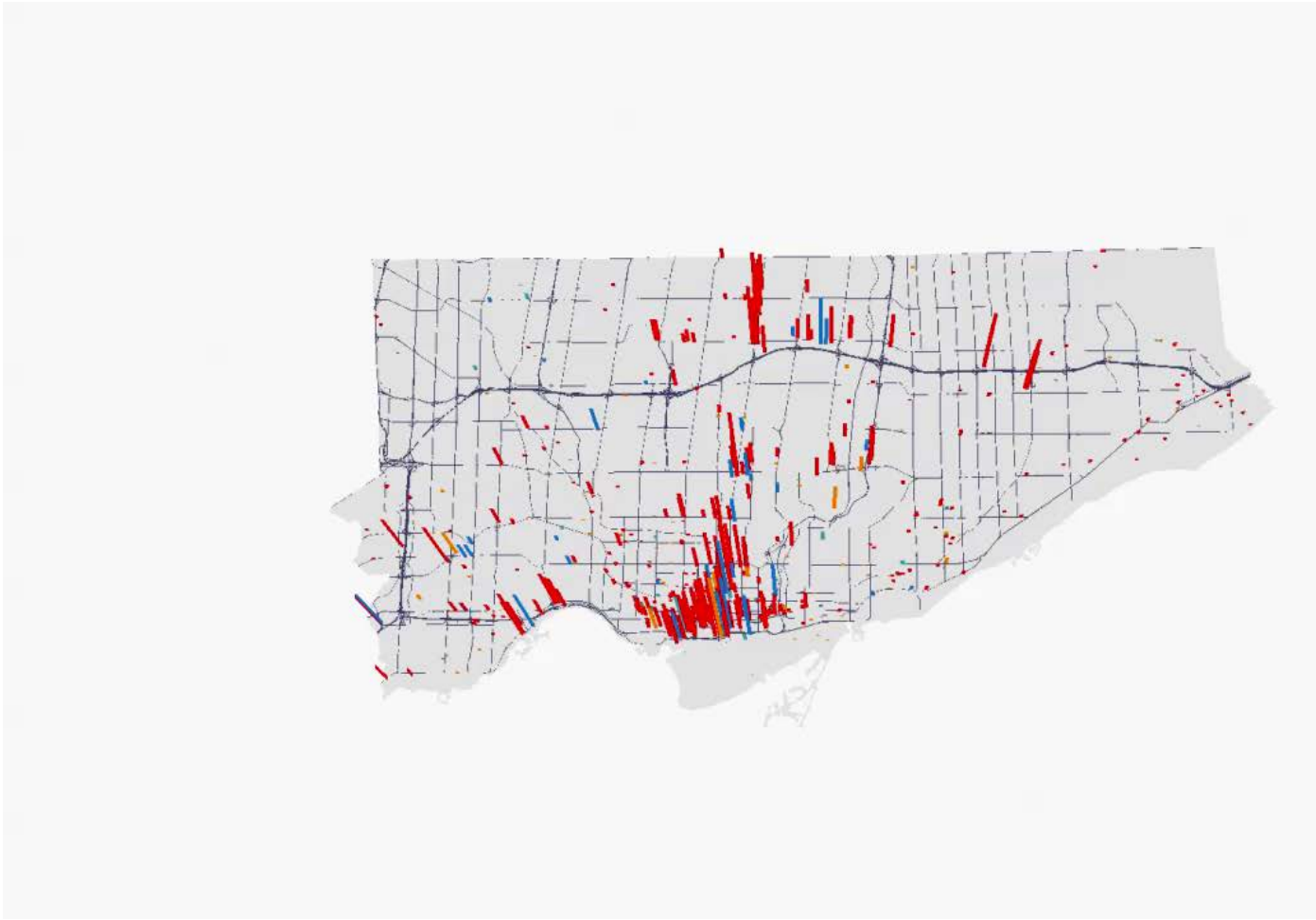
- 1000 RSCs filed (995), 2,868 acres, (2.3 mean)
- Site Assessment & Remediation
  - Phase I ESA = 16% of RSCs
  - Phase I and II ESA (generic) = 77%
  - Phase I and II ESA risk assessment 7%
- High propensity toward “dig-and-dump” (>63%)



De Sousa, C. (2017). Trying to Smart-In-Up and Cleanup Our Act by Linking Regional Growth Planning, Brownfields Remediation, and Urban Infill in Southern Ontario Cities. Urban Planning, 2(3), 5-17.

2. Toronto: Redevelopment Highlights (2004-2011)

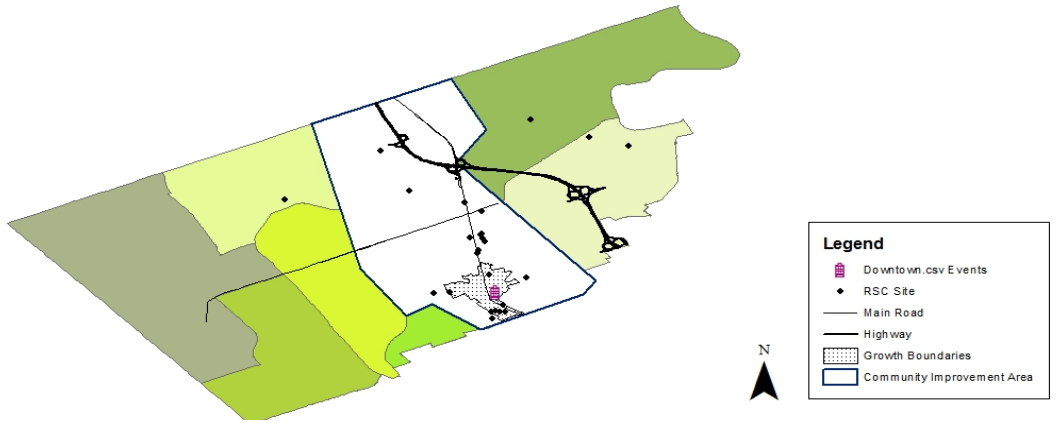
- ≈ 87,000 units total
- ≈ 83,000 Residential units
  - Condo (71,079 units)
  - Apartment (4,109 units)
  - Townhouse (6,820 units)
  - Singles (772 units)
  - Semis (240 units)
- ≈ 148,551 to 222,152 residents
- $37.1 billion total assessed property value (2013), with $22.7 billion downtown.
- Redevelopment added almost $15 billion to assessed value (409 RSCs pre/post analysis)



2. Waterloo & Kingston Redevelopment Highlights

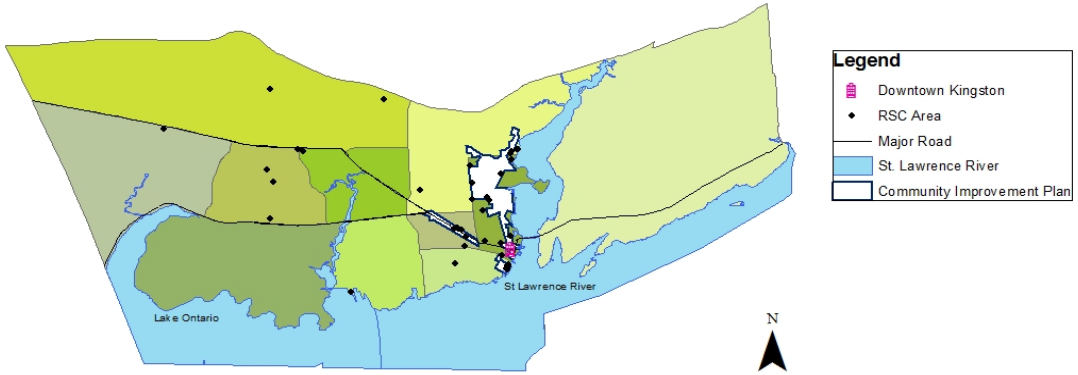
- Waterloo
  - 24 RSCs, 38 acres (1.59 mean)
  - Redevelopment of 29 properties (143 acres): Residential 31%, Retail 24%, Office 14%, Industrial 14%, Other 10%
  - $148 million total assessed value (2013)

City of Waterloo



- Kingston
  - 45 RSCs, 172 acres (3.8 acre mean)
  - Redevelopment of 38 properties (254 acres): Residential 58%, Vacant 18%, Retail 8%, Office 5%, General Commercial 5%, Industrial 3%, Institutional 3%
  - $316 million total assessed value (2015)

City of Kingston



3. Private Sector Perspective

- Motivations
  - Private sector motivations are focused more sharply on real estate market fundamentals (profit, market, location) and less on broader socio-economic and environmental objectives.
- Barriers
  - Cost, liability, and time continue to be main barriers, although “Institutional” barriers persist.
- Facilitation Strategies
  - Financial, regulatory (provincial and municipal), and legal mechanisms are highly noted and ranked.
  - The preference is for relatively indirect intervention from government wherein provincial and municipal agencies just make the existing processes & tools more efficient and effective, with more enhanced and accessible interventions needed in secondary/weaker markets

4. Canadian Brownfield Stakeholder Perspective

- Motivations
  - Most important = to protect public health and safety, reduce contamination and protect soil & groundwater, and conform to environmental regulations.

- Government Barriers
  1. Slow timelines for Ministry responses to BF submissions
  2. Lack of political will & awareness of BF issues
  3. Lack of regulatory liability closure mechanism
  4. Limited provincial budget to address brownfields
  5. Limited government administrative resources

- Development Barriers
  1. "Upside down" remediation Costs
  2. High Remediation Costs
  3. More contamination than expected/surprise costs
  4. Potential impacts to adjacent properties
  5. Slow regulatory review, uncertain timelines & delay

4. Stakeholder Perspective on Implementation of 2003 NRTEE Recommendations

D

Image: Dreamtime

NRTEE Recommendations & Actions		Federal	Provincial	Municipal
1. Applying strategic public investments to address upfront costs	1.1 Implement tax system changes to promote brownfield redevelopment	F	D	D+
	1.2 Remove liens and tax arrears against qualifying brownfield sites	F	D	D
	1.3 Provide mortgage guarantees for qualifying brownfield sites	F	-	-
	1.4 Provide revolving loans for qualifying brownfield sites	D	F	D-
	1.5 Provide grants for qualifying brownfield sites	D	D-	D+
NRTEE Recommendations & Actions		Federal	Provincial	Municipal
2. Establishing an effective public policy regime for environmental liability and risk management	2.1 Allow binding contractual allocation of liability		D	
	2.2 Provide for termination of regulatory liability		D+	
	2.3 Provide for termination of civil liability after a limitation period	F	F	
	2.4 Create an insurance fund for post-liability termination claims	F	F	
	2.5 Apply site-specific assessment and approvals regime	D	C+	D+
	2.6 Provide for regulatory approvals of remediation		C+	D+
NRTEE Recommendations & Actions		Federal	Provincial	Municipal
3. Building capacity for and community awareness of brownfield redevelopment	3.1 Increase capacity to undertake brownfield	D-	D	D+
	3.2 Facilitate the demonstration of innovative environmental technologies and remediation processes	D	D	D-
	3.3 Raise awareness of the benefits of brownfield redevelopment	D	D+	

4. Canadian Brownfield Stakeholder Perspective

- Recommendations for the Environmental Consulting Sector
  - Encouraging the use of risk management approaches for site assessment and corrective action, particularly in an effort to deal with pollution issues on-site as opposed to exporting those issues elsewhere;
  - Lobbying for the development and application of new technology;
  - Requiring a formalized process to ensure better education and appropriate skillsets for those overseeing assessment and remediation (i.e., Qualified Professionals); and
  - Embracing a deeper and more holistic understanding of the brownfield issue that considers broader socio-economic and environmental objectives beyond just pollution issues at the site.

Key Takeaways

- Growing comfort with regulatory approach to assessment and cleanup in Ontario and in other provinces, which is driven largely by development activity and implemented by professional consultants
- Support from municipal tax base to fund assessment, remediation, and redevelopment is a key tool in Ontario and throughout North America
- Redevelopment activity has been rather extensive in scale, character, and value, which has added to the tax base, particularly in the GTA's strong market
- Dense redevelopment is occurring in locations identified by Ontario's provincial growth plan and CIPs, but this could be even more proactive versus reactive
- Changing land use and increasing density seem to be key municipal tools for promoting redevelopment, but there is room for financial tools and streamlining approvals
- A more interventionist approach identifying brownfields/districts suitable for redevelopment plus stricter controls on greenfield sprawl might be better suited for all cities, especially smaller ones

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