

MOVING NATURES: Mobility and the Environment in Canadian History Edited by Ben Bradley, Jay Young, and Colin M. Coates

ISBN 978-1-55238-860-0

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Soils and Subways: Excavating Environments during the Building of Rapid Transit in Toronto, 1944–1968

Jay Young

Originating deep in the earth, it had travelled under the pressure of a massive glacier that ground it to a granular state. There, it rested beside millions of others. The city grew above it, sewer pipes were laid near it. But then it was dug out with a steam shovel and dumped into the back of a truck that journeyed through city streets before reaching the waterfront. There, workers dumped the soil particle on top of other material that had pushed Toronto further into Lake Ontario. In its previous location now sat a concrete tunnel, through which subway cars passed.

Building subways to move people around Toronto first required moving vast amounts of earth. Between 1949 and 1968, construction contractors excavated more than 4.3 million cubic metres of clay, sand, rock, and other materials—almost double the volume of the Great Pyramid of Giza—in order to build thirty-four kilometres of rapid transit across the city. Building subways, like other large infrastructure

projects built to enable mobility, involved a series of related decisions and possibilities. Although this excavation work is largely forgotten today, it stirred up interest among Torontonians during the postwar years. For engineers and scientists, subway excavation provided valuable opportunities to learn about the city's geology. Other Torontonians perceived subway excavation and its associated spoil materials as a problem—including residents who protested the fallen debris from haulage trucks using neighbourhood streets en route to disposal sites. To them, subway spoil imposed an unwanted nuisance and conformed to the definition of dirt as “matter out of place.”¹ The need to deposit excavated material also generated new landscapes across the city. Soil and rock from subway construction made useful material for landmaking projects, which often served other transportation modes. Construction contractors arranged with civic authorities to dump excavated material along Toronto's waterfront and further inland, thereby continuing a long process of landscape change that converted outputs of city building and urban life into inputs for landmaking.

Cities have long had complex associations with waste materials such as dirt. A key project of the modern “sanitary city” sought to rid the urban environment of all traces of dirt. Fear of disease and concern for cleanliness motivated late-nineteenth-century cities to build sewers for liquid waste removal and to establish garbage collection systems to remove solid waste.² Yet there is another, less dramatic, aspect of dirt's place within the urban environment: the essential role of soils and related materials in the building of transportation infrastructure. The field of mobility studies argues that movement is a social practice embedded with meaning and best understood by considering the ways in which its many forms interact.³ While work on the intersection of environment and mobility has stressed the ways in which completed transportation infrastructure shaped popular landscape perceptions, environmental experience during construction has received less attention.⁴ This paper connects urban environmental history and mobility studies by showing that subway building in Toronto required the movement of dirt within the city, a process that revealed hidden layers, provoked angry responses, and created new landscapes. Improving mobility necessitated short-term discomfort for some people. At the

same time, the movement of millions of cubic metres of earth created opportunities to further transform the urban environment with lasting effects on the shape of the city.

Knowing Subway Dirt

In the early 1940s, the city's transit authority, the Toronto Transportation Commission (TTC), began planning the construction of rapid transit. A north–south Yonge Street line marked the first stage of the scheme. The street was home to Toronto's busiest streetcar route, which connected growing residential areas in the north to the industrial, retail, and office jobs downtown. It was plagued by congestion. The city's topography and pattern of development presented the “underlying cause” of Yonge Street's bottlenecks, as ravines, a midtown escarpment, a cemetery, a rail line, and a general east–west street pattern prevented the construction of new north–south roads.⁵ The TTC revised its rapid transit plan with the advice of Toronto consultant Norman D. Wilson and the U.S. engineering firm DeLeuw, Cather & Company. The commission hoped to prepare detailed plans and contract specifications so construction could begin after the end of World War II, when labour and supplies became available. Rapid transit was part of larger plans during wartime to re-engineer Toronto in the postwar era—a time when municipal decision makers predicted the need for new and expanded networks of transportation infrastructure and other projects to service a growing metropolis that had suffered years of neglect during the Depression and wartime. Toronto was one of the few cities in North America that built a new rapid transit system in the first two decades after 1945, in part because of the political strength and financial independence of the TTC as well as the common perception held by many civic leaders that new roads designed for automobiles would be unable to solve all traffic congestion problems.⁶

As part of preliminary preparations for the subway, the TTC engaged Dr. Robert F. Legget to serve as consultant for subsurface investigations. Legget, an associate professor of civil engineering at the University of Toronto, had spent years working in the construction industry. His work, along with the formation of a soil studies section

within the TTC's Rapid Transit Department, illustrate the high value that the commission placed on scientific information about soil and bedrock conditions—crucial to subway design and construction.⁷ Attention to geology, for example, would allow contract tender documents to anticipate the specific volume of rock excavation, which influenced the price of contractor bids.⁸ Legget began his consultancy work by studying previous boring tests and oral descriptions from construction superintendents related to the Yonge Street corridor. In March 1944, he recommended that the TTC carry out its own boring tests along the route. The commission conducted tests in thirty-seven locations and sent collected materials to the University of Toronto's civil engineering laboratories for analysis.⁹

The results of the test boring allowed Legget to map the earth strata anticipated along the route. The southernmost section sat on shale and limestone bedrock, while the remainder of excavation proceeded through glacial till, clay, silt, sand, and gravel. Geological information allowed Legget to predict possible construction concerns; he warned, for example, that contractors might encounter undetected glacial boulders.¹⁰ The environmental knowledge gained from these studies revealed the geological processes that had laid deep layers of soil above bedrock. Along with the operational benefits of a shallow subway, this knowledge influenced the TTC's decision to build underground portions close to the surface using a cut-and-cover method rather than tunnel boring (fig. 6.1).¹¹ Soil studies, then, reduced the contingencies of subway building.¹² Legget also asserted that construction offered an additional opportunity: "Excavation for the proposed subway will reveal information of inestimable value. . . . Fossils may be found, and new light may be shed upon the correlation of the Toronto interglacial beds." Geology is a discipline rooted in place that often relies on excavations as research sites. It is also a form of environmental knowledge grounded not only in practical concerns, but also in advancing the understanding of the earth's development over past millennia. Removing soil layers in downtown Toronto provided an opportunity to contribute to geological knowledge in an urban setting.¹³

Legget knew that excavations conducted for transportation infrastructure had a long history of advancing the study of geology. The

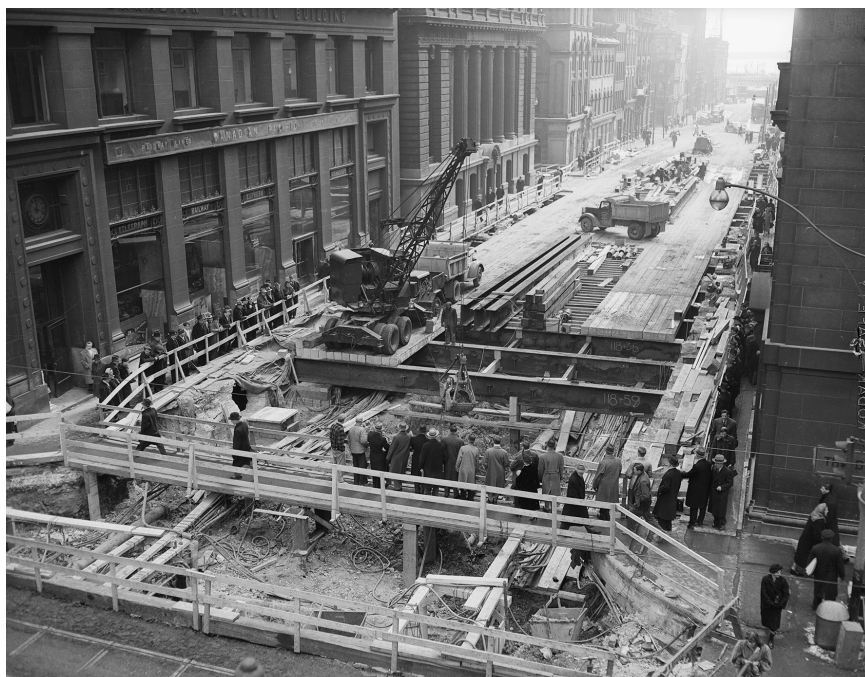


FIGURE 6.1. Cut-and-cover subway construction along Yonge Street, c. 1949. Courtesy of City of Toronto Archives.

construction of canals and railways in nineteenth-century Britain had given the young disciplines of geology and paleontology a growing number of field sites at which to study the earth's layers and prehistoric life.¹⁴ Promotion of the reciprocal relationships between engineering and geology—particularly in urban environments home to complex building projects—remained a central ambition of Legget throughout his career and was a fundamental argument in his book, *Cities and Geology* (1973).¹⁵ Legget also knew that the Toronto area had long been a prominent location for geological research. In the 1890s, A.P. Coleman began to study the fossils and earth revealed by excavations at Toronto's Don Valley Brickworks to promote the theory of interglaciation, which posits that phases of warm climate interrupted glacial periods during the Pleistocene epoch.¹⁶ Except for natural exposures, present in river valleys and lakeside cliffs, excavation sites like brickworks, road cuts,

wells, and building foundations offered geologists the best opportunities to view Toronto's stratigraphy. The significance of Toronto's interglacial beds to the understanding of the Pleistocene epoch added to the exciting potential that subway construction offered for geological research.

After the end of the war, the TTC had to wait for an opportune time to start work on the city's first subway, because of the shortage of labour and construction materials in the immediate postwar period. Meanwhile, Legget left the University of Toronto to head the National Research Council's (NRC) Division of Building Research, established in 1947 to assist the growing Canadian construction industry.¹⁷ From Ottawa, Legget continued to correspond with TTC officials about using its subway construction sites as scientific laboratories. He offered the commission an NRC research engineer to observe construction, a relationship that Legget hoped would lead to the publication of papers in engineering periodicals. This arrangement, Legget wrote, was the method by which the young NRC building division hoped "to co-operate on major construction operations in Canada."¹⁸

The TTC accepted Legget's offer. The NRC's research engineer, W.R. Schriever, made soil records and submitted weekly reports.¹⁹ Research papers studied issues such as strains on the temporary decking that covered excavation and noise levels after the Yonge line entered operation.²⁰ Legget and Schriever reflected that the experience had illustrated that "invaluable information in several different fields . . . could be obtained in no other way than on a major construction job." The "most satisfying aspect" of research, however, had been the "unexciting fact" that soil conditions conformed to Legget's earlier outline.²¹ The commission stipulated that construction contractors permit "scientific observers" to visit their excavation sites, provided that such access did not inhibit construction work.²² To coordinate such visits, Legget suggested the formation of a geological advisory committee, chaired by the University of Toronto's head of geological sciences and including Legget along with members of the Royal Ontario Museum, the Ontario Department of Mines, the Ontario Research Foundation, and the TTC. An advisory committee continued to sit during the construction of subsequent subway lines.²³

The geological research done at Toronto's subway excavations produced no major breakthroughs, but the fleeting opportunity to inspect previously hidden strata refined earlier postulations and provided local research sites for geology students. For example, master's student H.A. Gorrell examined the shale bedrock and fossils exposed during the building of the Yonge subway's southern section.²⁴ Archie Watt of the Ontario Department of Mines used his excavation inspections to challenge an earlier understanding about the geological stage of interglacial deposits found in the Don brickworks.²⁵ In the 1960s, Emory Latjai surveyed test boreholes and viewed excavations along the Bloor-Danforth subway as evidence for his Ph.D. thesis. Latjai correlated most deposits with geological analyses of other nearby areas, but he paid particular attention to peaty sediment not found in previous exposures. The discovery influenced him to hypothesize that "sediments of glacial readvance" separated the Don and Scarborough formation beds.²⁶

The TTC's contractors did not move earth for the purpose of producing geological knowledge, and so the use of a construction site for scientific research presented some challenges. Most obvious, researchers could observe only those layers required for construction. Except for the southerly sections of the Yonge and University subways, excavation took place within soil, not bedrock. Construction conditions also influenced the accuracy of researchers' observations. For instance, Gorrell noted that fossils were collected "under adverse lighting conditions, and continual construction work made systematic collecting impossible." Therefore, he confessed, the fossil listing used for analysis was "adequate" but not "exhaustive."²⁷ Watt also remarked on the challenges of research. When contractors covered sections before he had made observations, opportunities to examine exposures were lost and attempts to correlate the geological formations with other locations were weakened. Watt also admitted to ambiguity in the number of glacial till layers found in one site. "This apparent uncertainty," he disclosed, "is attributed to the fact that most of the examination of the section was done by flashlight below a street covering."²⁸

The Royal Ontario Museum (ROM) preserved NRC soil samples at the suggestion of the advisory committee.²⁹ In 1955, a year after the Yonge subway had begun service, the museum mounted a small

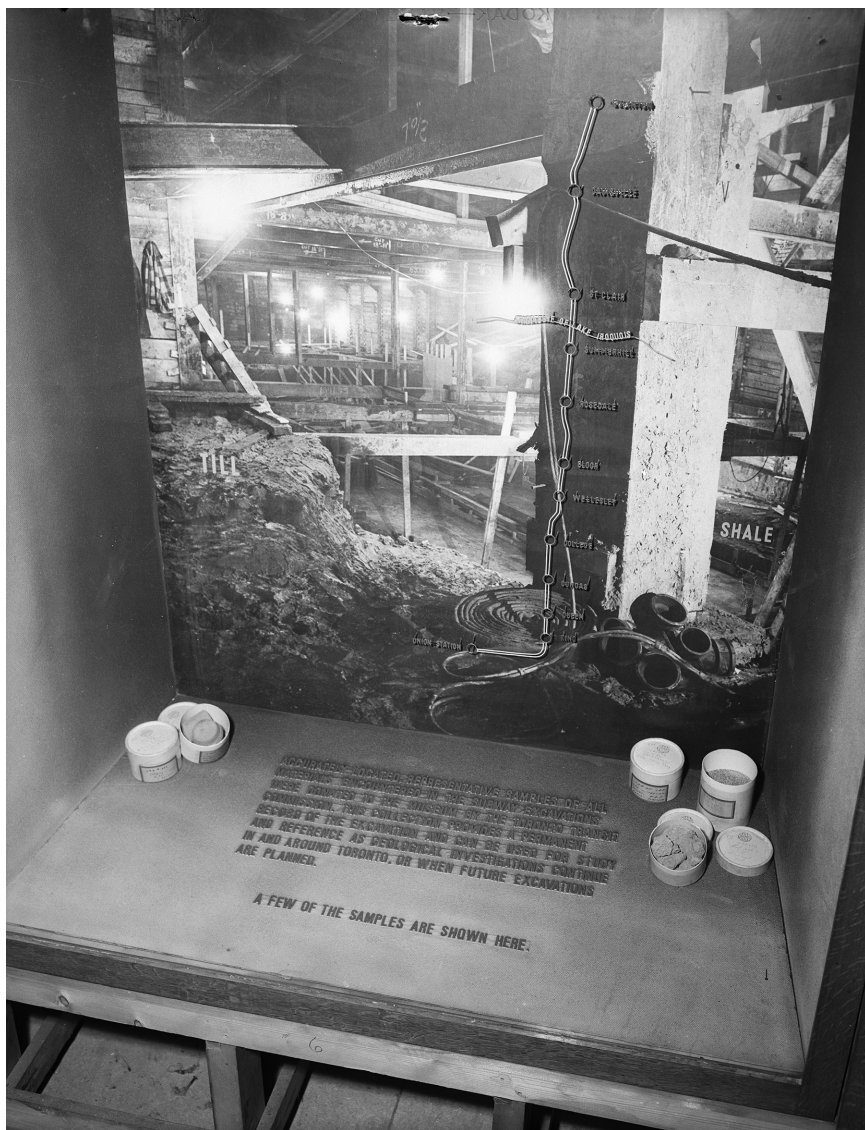


FIGURE 6.2. One of three panels from the Royal Ontario Museum's display about Yonge Street subway geology, c. 1955. Courtesy of City of Toronto Archives.

exhibit about the geology along the route (fig. 6.2). TTC general manager W.E.P. Duncan recommended that the commission contribute more than eight hundred dollars towards display costs in the belief that it should “prove most valuable for future guidance to our engineers and others as it provides a permanent record of soil conditions along the route of the subway.”³⁰ The display included geological cross-section representations of downtown, with skyscrapers above the underground subway structure and layers of soil and bedrock. It became a prominent attraction for the museum’s revamped geological section, which, according to the ROM’s 1955 annual report, used “modern methods of display . . . to depict geological processes and the change from cases full of . . . regimented species is very marked. Visitors, both scientists and laymen, have been quick to voice their appreciation.”³¹ Long after construction of the Yonge subway had ceased, its excavated material continued to educate people about Toronto’s geology. At a time when postwar growth had led to transformations within the city’s built environment aboveground, digging into the earth to build subways facilitated greater knowledge of what lay underneath.

Moving Subway Dirt

While subway excavation stirred the interest of geologists and engineers, others had negative impressions of construction and its spoil material. The building of highways and other transportation routes has caused pollution, imposed spatial division, and had other environmental impacts on urban neighbourhoods, and opposition to such negative consequences increased during the 1960s across Canada and the United States.³² These kinds of urban infrastructure projects involved moving large quantities of construction and waste materials, often with negative outcomes for local populations. In Toronto, the convoys of dump trucks that hauled earth away from subway construction locations through local streets to reach disposal sites stirred complaints and even protests from residents. The most prominent campaign emerged in Rosedale, an affluent neighbourhood and home to residents who took offence to subway spoil being hauled along their streets and dumped in Chorley Park, a local amenity (see figure 6.3 for known subway spoil disposal

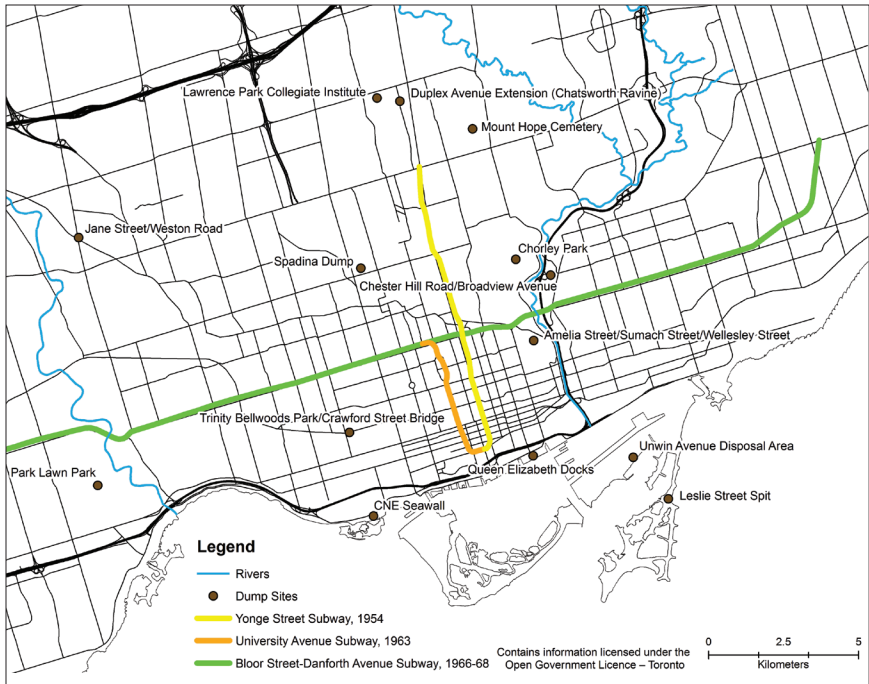


FIGURE 6.3. Subway spoil disposal locations, 1949–1968. Map by Steven Langlois and University of Saskatchewan HGIS Laboratory.

locations). Rayner Construction, a subway contractor, had begun to dump excavation material in the park in 1950 and hoped to deposit more fill there. Rayner had been searching for disposal sites following the decision of East York, a suburban municipality on the northeast fringe of the city, and the Don Valley Conservation Authority, established in 1948, to ban subway spoil dumping on the east side of the Don Valley. A construction company had purchased the valley site with the intention of eventually using the new land for development, but the conservation authority claimed that the dumping of clay and rubble threatened animal and plant life.³³ Toronto’s mayor, H.E. McCallum—at Rayner’s request—convinced the federal government to continue to permit filling operations at the park. “While providing the contractor

with a location to dump,” the mayor wrote, “the arrangement at the same time greatly improves the value of Chorley Park.”³⁴

Disposing of spoil at Chorley Park relieved the contractor and “improve[d]” the property, but it also aggravated local residents. Complaints about dumping in Chorley Park started in January 1951, when a Rosedale resident protested that “no effort” had been made to relieve the “disgraceful state and condition” of the sidewalks on a street used to transport “hundreds of truck loads of clay brought from the subway work.” In the course of hauling material from the excavation site to Chorley Park and back, dirt inevitably fell from the trucks’ open-box beds and mud-caked wheels. During the past week, the resident observed, a winter mild spell had mixed melting snow with the soil, turning the sidewalk into “a sea of soft mucky clay.” More dramatically, the homes “in this otherwise clean section are becoming a never-ending track of mud.” In just one day, he claimed, mud had splashed hundreds of pedestrians, their clothing dirtied and shoes damaged. The city’s street-cleaning commissioner instructed his department to contact the contractor, but complaints continued. The commissioner reported that his department had devoted special attention to subway construction sites and haulage routes, but admitted the existence of an “abnormal situation” at Chorley Park.³⁵

Grievances about the movement of soil through the neighbourhood soon made newspaper headlines. The *Toronto Star* published photographs of residents who were “vigorously protesting [the] mud and dust nuisance” that plagued the neighbourhood. In the article’s dramatic description, the “ceaseless parade of trucks match[ed] the din of a factory area,” as if the haulage path had temporarily converted the residential area into an industrial environment. Locals claimed that the dirt had prompted a decline in property values, and they demanded lower taxes as compensation. Those living along Douglas Drive, the road with the worst conditions, even “threatened to barricade the street and guard it against truck traffic until something is done to remedy conditions.” The article also framed the situation as an environmental health issue by linking the dirt to reports that eight homes on one street were stricken with the flu. “No wonder,” one woman concluded; “this street’s so dusty it’s a breeding place for disease.”³⁶ She was not the only individual

to connect fallen dirt from haulage—an unintended consequence of subway construction—to health concerns. A resident living north of Rosedale believed “the dirt and muck caused by the trucks carrying away the dirt from the new Subway diggings must be causing a lot of disease . . . [because] these streets are absolutely filthy.”³⁷ According to the rhetoric of some residents, then, the movement of subway dirt caused not only unsightly streets, but also physical illness.

The city’s Board of Control decided that dumping at Chorley Park could continue for another six weeks and promised residents that civic departments and Rayner would work to improve the situation.³⁸ Press coverage continued a month later with reports on the rescue of a teenage boy who had become trapped in the site’s sinking soils, which had originated as subway spoil.³⁹ Complaints about excavated dirt were also made during construction of the Bloor-Danforth line in the early 1960s, including one alderman’s criticism of “debris” found north of Danforth Avenue between Broadview and Pape avenues.⁴⁰ Residents living near the future Greenwood subway yards protested the stink as contractors excavated more than 57,300 cubic metres of refuse from the site, a former garbage dump.⁴¹ Yet the limited evidence of such objections suggests that these protests never reached the intensity of those by Rosedale residents in the early 1950s. Possibly contractors for the Bloor-University-Danforth subways did a better job of ensuring a minimal impact by subway spoil on residential areas, but a more convincing explanation is that most subway construction and spoil movement in the first half of the 1960s occurred near less well-heeled neighbourhoods, whose residents had less access to the resources required for directed opposition. Subway building led to long-term benefits for many Torontonians, but some residents felt the consequences of its materiality more than most.

Disposing of Subway Dirt

Excavated soil from subway construction altered the physical shape of Toronto. Subway contractors saw spoil as a waste, something to dispose of as cheaply as possible. Pitts, Johnson, Drake, and Perini, the Canadian-American consortium that built two downtown sections of

the Yonge subway, broke down its successful tender bid by noting the estimated cost per cubic yard of excavation, including its subcontracted haulage costs.⁴² Contract specifications for the Yonge subway stipulated the contractor's duty to dispose of spoil, but the TTC reserved the right to designate dumping sites and would compensate the contractor if disposal cost more in other locations than in previously agreed sites.⁴³ From a different perspective, municipal authorities conceived of excavated soil as a potentially useful building material. The TTC had thought about subway excavation material as early as 1944, realizing a window of opportunity for municipal projects that required fill. "The disposal of this material is a considerable item of expense," wrote consultant Wilson. "If other civic works can be furthered by the use of this waste material, such uses should be favoured."⁴⁴ The TTC identified twenty-six possible dumping locations, ranging from ravines to the waterfront to an east-end brickyard.⁴⁵

In February 1949, as construction loomed closer, the TTC inquired whether government departments and commissions desired any of the estimated 765,000 cubic metres of Yonge subway spoil. Determining suitable disposal sites before contract tendering, the commission felt, would assist the TTC, the city, and contractors.⁴⁶ By May, the TTC's chief engineer had planned for material from the Yonge subway's southerly contracts to be disposed of at Toronto Harbour Commission (THC) sites, and he hoped to arrange agreements between contractors and city authorities regarding the northerly sections.⁴⁷ Similar practice preceded construction of the Bloor-Danforth subway, when the TTC informed the city, Metro Toronto (the higher-level metropolitan municipality), the THC, and the Ontario Department of Highways that approximately 1.1 million cubic metres of "sand, clay, silt and other types of soil" would be made available by excavation between Keele Street and Woodbine Avenue. Once again, contractors were responsible for the disposal of excavation material, but if other government bodies expressed interest, the TTC would make arrangements, but bear none of the cost. The TTC became, in effect, a supplier of landmaking materials, mediating between its contractors and other government bodies.⁴⁸

A dispute between the THC and the contractor for the Yonge subway's southerly section illustrates the TTC's role in balancing

government demand for subway spoil and contractor concern about haulage costs. Since its creation in the early 1910s, the THC had infilled portions of the city's harbour to make land and generate revenue.⁴⁹ THC landmaking projects were often tied to transportation infrastructure. Starting in the 1910s, it used spoil from construction of the Union Station railway terminal, along with municipal waste and dredged silt, to convert the marshes of Ashbridges Bay into industrial lands.⁵⁰ The THC's first harbour priority after World War II was the completion of docks in order to increase shipping capacity, in anticipation of higher demand for docking space from the St. Lawrence Seaway Project.⁵¹ In April 1949, the THC's general manager informed the TTC of two locations where it had use for subway spoil: the docks being constructed between Jarvis and Parliament streets required 230,000 cubic metres of fill, while a site at Unwin Avenue needed around 765,000 cubic metres.⁵² The THC had recently sold land to the Ontario Hydro-Electric Power Commission and Consumer's Gas.⁵³ These land deals required fill to move Unwin Avenue south towards the lake, so it soon became the THC's preferred location for subway spoil.⁵⁴

In late 1949, only months after subway construction had begun, the THC refused to accept excavated material at its Jarvis-Parliament docks. It now wanted the material to be deposited at its Unwin Avenue location. However, the TTC's construction contractor estimated that using the Unwin site added six kilometres to each dump truck trip—and thus more than ninety thousand dollars to contract costs. A TTC official warned the THC that the contractor “might conceivably purchase a ravine lot and fill it up” to ensure lower haulage costs, resulting in less material for harbour projects.⁵⁵ Following months of discussion, all sides reached an agreement. The contractor promised to deliver 115,000 cubic metres of subway spoil to the Jarvis-Parliament docks and an equal amount to Unwin Avenue, with no charge to the THC for additional haulage costs.⁵⁶

Subway spoil continued to serve THC ends as rapid transit expanded throughout the metropolitan area. Today, one of Toronto's most distinctive landscape features is the Leslie Street Spit, which was built as the Outer Harbour East Headwater and intended in the 1960s as the breakwater for a new harbour that was planned for the area east of the

city's downtown. Rather than build a traditional concrete breakwater, THC engineers began to experiment with fill.⁵⁷ In October 1961, the TTC informed the THC's chief engineer about spoil anticipated from the Bloor-Danforth subway. The engineer subsequently recommended a study to determine whether a new headland could be built from "very large quantities of fill [that] will be available next year from such sources as Subway construction."⁵⁸ Subway spoil along with dredged silt and rubble from downtown construction projects was used to build the spit.⁵⁹ Subway construction continued to provide fill into the 1970s, as the THC gladly received spoil from the building of subsequent subway lines.⁶⁰ Since that time, the spit has become a dramatic addition to the urban landscape, particularly as a prized location for birdwatching.⁶¹

Ironically, municipal authorities also used subway spoil to facilitate automobility. In 1948, City Council authorized construction of a bridge to extend Duplex Avenue north across the Chatsworth Ravine. Two years later, the City of Toronto's works commissioner observed that construction of northerly sections of the Yonge subway promised to make "a larger quantity of free fill available. This could be placed on the Duplex Avenue Extension and also on the bottom of the ravine . . . which would greatly improve its use for park purposes." His words illustrate not only popular thinking that saw ravine infilling as a means to create improved park spaces, but also the ways in which spoil saved capital expenditures for the municipal corporation. The commissioner estimated that the use of excavation material eliminated the need for a bridge, saving the city almost two hundred thousand dollars, or half of the extension project costs.⁶²

Infilling the Canadian National Exhibition (CNE) seawall with subway spoil from the University line also saved municipal funds. Metro Toronto Council agreed in June 1958 to develop a park area of approximately fifteen to twenty hectares by filling the area between the lakeshore and its breakwater. The city subtracted the new land against the three hectares of CNE parklands that Metro Toronto had taken in order to build the Gardiner Expressway north of the exhibition grounds. The decision fell in line with the city's policy requiring that new parklands be created to replace those taken for infrastructure projects. Establishing new parkland from existing land, according to Metro

Toronto chair Fred Gardiner, could cost over twenty million dollars. Using fill from subway construction and other anticipated projects was a cheaper proposition.⁶³ Subway spoil provided much of the fill for the project. Although recreational boating clubs—which objected to the loss of the protected channel between the shore and the breakwater—succeeded in reducing the size of the project, filling operations had created eight hectares of new land by early 1962. That summer, the land served as a parking lot for CNE attendees.⁶⁴

Another site transformed by subway fill was Trinity-Bellwoods Park, located in a working-class neighbourhood on the city's west side. The park featured a neoclassical bridge built in 1915 that spanned Crawford Street across remnants of the Garrison Creek ravine. In 1963, the city parks commissioner decided to fill the ditch and bury the bridge. Official memory, in the form of a Heritage Toronto plaque that commemorates the Crawford Street Bridge, notes that "portions of the ravine were then filled in, here with earth from subway excavation in the 1960s."⁶⁵ Although no documentation connects the filling operation to subway spoil, Bloor-Danforth subway excavation was likely the source; it took place about a kilometre from the park site.⁶⁶ More recently, some Torontonians have viewed the filling operation with regret. Burying the Crawford Street Bridge, they feel, was an architectural and environmental loss in an immigrant neighbourhood lacking the resources to be heard at city hall. They believe that the city needed somewhere to dispose of the dirt, and the park valley was an easy option.⁶⁷ Indeed, structural considerations fail to explain why the bridge was buried. The works commissioner observed at the time that "there is no immediate necessity to abandon the existing Crawford Street Bridge as there is considerable life remaining in this structure."⁶⁸ However, as seen at the Chatsworth Ravine and the CNE, Toronto's officials saw infilling as a way to create or improve parkland in both affluent and modest neighbourhoods. Neighbourhood residents may have even perceived the filling operation as a positive measure. With the disposal of excavated soil, the subway's impact on the urban fabric extended far beyond its tracks and tunnels.

Conclusion

Toronto's subways illustrate how the construction of mobility pathways prompted people to come face to face with the earth below the surface of a city. Environmental historians emphasize the need to consider the materiality of nature's past; they seek to answer this question: "Where is the dirt?"⁶⁹ Although dirt here is a metaphor for wider biological and ecological processes, this chapter has shown that the understanding of dirt, its movement and role in reshaping urban landscapes, and the human responses it provoked tie together the desire for mobility within the physical realities of the urban environment. Whether geologists viewing excavated chasms in search of previously hidden soil strata, or Rosedale residents protesting against the mud that temporarily threatened their prestigious neighbourhood, people came in contact with some of the material flows necessitated by the creation of mobility corridors. Likewise, contractors and municipal authorities also thought about dirt when they considered what to do with the millions of cubic metres of spoil generated by excavation. Paying attention to dirt broadens our understandings not only of the effects of mobility infrastructure on everyday landscapes, but also of the essential influence of the earth's materiality on mobility.

Subway construction in Toronto carried on after 1968, with the TTC continuing to extend rapid transit into suburban areas. System expansion meant that contractors continued to excavate, move, and dispose of millions more cubic metres of material in the name of urban mobility. In some cases, environmental conditions posed distinct challenges for subsequent subway construction, particularly the difficulty contractors faced in 1970 when they encountered highly permeable soils during tunnelling operations to extend the Yonge subway north into suburban North York. The environmental movement of the late 1960s and 1970s also influenced subway building, as city dwellers protested the impact of the Spadina line's cut-and-cover construction on the Cedarvale-Nordheimer ravine system. Although the residents' campaign drew from the increasingly popular language of ecology, it also echoed earlier complaints, by East York politicians and members

of the Don Valley Conservation Authority, about spoil dumping in ravines in the early 1950s.

Enhancing mobility in the twentieth-century city was dirty work. New networks of movement could only be developed by moving massive amounts of dirt, scraped from the bowels of the earth. The challenge for engineers and politicians was to find a purpose and a place for this material—it had to go somewhere. Today, such excavated material is integrated within the landscape and largely forgotten, but there is an underground history of environment and mobility within urban networks. Construction of a subway system in Toronto changed the shape of the city, and not only below the surface.

Notes

- 1 Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (London: Routledge/Kegan Paul, 1966), 35.
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- Commission,” n.d., fonds 16, series 274, file 21, CTA.
- 9 “Soil Studies for Toronto Subway,” *Roads and Bridges* 83, no. 2 (1945): 49, 52, 136.
 - 10 Ibid., 142.
 - 11 R.F. Legget and W.R. Schriever, “Site Investigations for Canada’s First Underground Railway” (National Research Council of Canada, Division of Building Research, Research Paper No. 93, 1960), 2. This report was originally published in *Civil Engineering* 55, no. 642 (1960): 73–79. Escalator costs, a desire to keep the subway structure close to the surface in order to integrate rapid transit with surface transit routes, and other operational factors also influenced the use of cut-and-cover.
 - 12 Dale H. Porter discusses the concept of contingency in engineering projects, in *The Thames Embankment: Environment, Technology, and Society in Victorian London* (Akron, OH: University of Akron Press, 1998), 191–92, 213–17.
 - 13 “Soil Studies,” 51–52.
 - 14 Michael Freeman, *Victorians and the Prehistoric: Tracks to a Lost World* (New Haven: Yale University Press, 2004), 9–51. Suzanne Zeller examines the growth of geological study in nineteenth-century Canada and its impact on conceptions of a transcontinental Canadian nation-state, in *Inventing Canada: Early Victorian Science and the Idea of a Transcontinental Nation* (Toronto: University of Toronto Press, 1987).
 - 15 *Canadian Encyclopedia*, s.v. “Robert Ferguson Legget,” accessed 7 January 2011, <http://www.thecanadianencyclopedia.com/en/article/robert-ferguson-legget>; Robert F. Legget, *Cities and Geology* (New York: McGraw-Hill, 1973); P.F. Karrow and John J. Clague, “Geology in the Urban Environment in Canada,” *Geoscience Canada* 37, no. 2 (2010): 66.
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- 24 H.A. Gorrell, "Geologic Studies of Formations Exposed in the Toronto Transportation Commission Subway Excavations" (MA thesis, University of Toronto, 1952); H.A. Gorrell, "The Dundas Formation as Exposed in the Excavations for the Toronto Transportation Commission Subways," *Proceedings of the Geological Association of Canada*, vol. 5 (1952): 83–93.
- 25 Archie K. Watt, "Correlation of the Pleistocene Geology as Seen in the Subway, with That of the Toronto Region," *Proceedings of the Geological Association of Canada*, vol. 6, part 2 (1954), 70. TTC soil consultants used Watt's subway geology paper, along with A.P. Coleman's 1932 study, "The Pleistocene of the Toronto Region," as background information in order to determine the feasibility of tunnel construction for the University and Bloor-Danforth subway lines (TTC, "Feasibility Study Subway Extensions Tunnel Sections, Report and Analysis of University Avenue and Bloor Street Tunnel Sections," December 1956, pp. 3–4, Norman Douglas Wilson fonds, vol. 38, file 27, LAC).
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- 27 H.A. Gorrell, "Geologic Studies," 6–7.
- 28 Watt, "Correlation of the Pleistocene Geology," 69, 74
- 29 Legget, *Cities and Geology*, 508.
- 30 TTC, "Exhibit at Royal Ontario Museum of Subway Soil Excavations," Minutes, Meeting No. 61, 6 January 1955, pp. 11–12, fonds 16, series 203, file 2, CTA.
- 31 Unnamed photo binder of past exhibits, Royal Ontario Museum Geology and Mineralogy Section, Royal Ontario Museum Archives and Library, Toronto (hereafter ROM Archives); "Report of the Director of the Royal Ontario Museum of Geology and Mineralogy," Royal Ontario Museum, *Annual Report*, 1955, pp. 2–3, ROM Archives.
- 32 On the consequences of expressways and the freeway revolt in the United States and Canada, see Raymond Mohl, "Planned Destruction: The Interstates and Central City Housing" in *From Tenements to Taylor Homes: In Search of an Urban Housing Policy in Twentieth-Century America*, eds. John F. Bauman, Roger Biles, and Kristin M. Szylyvian (University Park: Pennsylvania State University Press, 2000), 226–45; William Issel, "'Land Values, Human Values, and the Preservation of the City's Treasured Appearance': Environmentalism, Politics, and the San Francisco Freeway Revolt," *Pacific Historical Review* 68, no. 4 (1999): 611–46; and Danielle Robinson, "Modernism at a Crossroad: The Spadina Expressway Controversy in Toronto, Ontario ca. 1960–1971,"

- Canadian Historical Review* 92, no. 2 (2011): 295–322.
- 33 “Can’t Tell Where Subway ‘Will Dump Its Clay Next,’” *Toronto Star*, 24 August 1950; “No Subway Clay Dumping in Don Valley—East York,” *Toronto Star*, 29 August 1950.
 - 34 George Rayner to H.E. McCallum, 24 October 1950, and [H.E. McCallum] to E.P. Murphy, 5 October 1950, both at fonds 200, series 361, subseries 1, file 245, CTA.
 - 35 Toronto resident to H.D. Bradley, 19 January 1951, [H.D. Bradley] to Toronto resident, 25 January 1951, and [H.D. Bradley] to H.E. McCallum and the Board of Control, 1 March 1951, p. 2, all at fonds 200, series 1234, file 457, CTA; City of Toronto Board of Control Minutes, Minute 686, 27 February 1951, fonds 200, series 779, file 103, CTA. Names of private individuals in restricted files are listed as “Toronto resident.” The city’s traffic engineer informed the Board of Control that trucks were prohibited (“not supposed to”) from using the residential streets in question, but asked, “But what else can they do?” “Order Bradley Explain Why Rosedale Mud Not Cleaned,” *Toronto Star*, 8 March 1951.
 - 36 “3 to 4 Inches of Mud on Roads, Block Sewer Cause Illness, Is Claim,” *Toronto Star*, 8 March 1951.
 - 37 Toronto resident to Mayor Allan A. Lamport, 8 April 1952, fonds 200, series 361, subseries 1, file 246, CTA.
 - 38 “Can Dump Subway Mud in Chorley Park,” *Toronto Star*, 9 March 1951.
 - 39 “Floating Landslide of Clay From Subway Traps Boy, 13,” *Toronto Star*, 2 April 1951.
 - 40 City of Toronto Committee on Public Works Minutes (hereafter CTCPWM), Minute 165, 20 February 1963, fonds 200, series 579, file 88, CTA.
 - 41 Paul Hunt, “It’s Metro’s Ditch in Time,” *Toronto Telegram*, 28 August 1965.
 - 42 Tender in folder “Yonge Street Subway, C.A. Pitts.”
 - 43 TTC, “General Conditions and General Specifications For Subway Construction,” February 1949, p. 50, fonds 16, series 274, file 1, CTA. In one instance, the TTC—having requested a contractor to dispose of fill in the basements of excavated buildings off Yonge Street, on Summerhill and Woodlawn Avenue—agreed to reimburse the contractor because the haulage rate was higher than the agreed base rate. E.R. Tryhorn to A.W. Salmon, “James Walker Invoices,” 5 October 1950, fonds 16, series 274, file 21, CTA.
 - 44 N.D.W[ilson]., “Disposal of Excess Excavation,” n.d. [in folder dated 1944], pp. 4–5, Norman Douglas Wilson fonds, vol. 36, file 19, LAC. Toronto was not alone in realizing the usefulness of dirt from subway construction; Montreal expanded Île Sainte-Hélène and created Île Notre-Dame for Expo 67 using excavated materials from the construction of its metro (along with over six million tons of dredging from the St. Lawrence). Jeffrey Stanton, “Building Expo 67,” 9 March 1997, accessed 6 November 2010, <http://www>.

- westland.net/expo67/map-docs/
buildingexpo.htm.
- 45 TTC, Rapid Transit Department,
“Location of Dumps for Excess
Excavation Materials” (map),
14 February 1949, drawing no.
G-1442, RG 3/3, box 260, file 16,
Toronto Port Authority Archives
(hereafter TPAA).
- 46 TTC, “Yonge Street Subway
Disposal of Excavated Soil,”
February 1949, RG 3/3, box 260, file
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- 47 C.P. VanNorman, “Meeting at
City Hall—Rapid Transit Subway,”
6 May 1949, p. 3, fonds 16, series
1533, file 82, CTA.
- 48 TTC Minutes, Report No. S10,
Meeting No. 465, 11 October 1961,
fonds 16, series 203, file 36, CTA.,.
- 49 Roy Merrens, “Port Authorities
as Urban Land Developers: The
Case of the Toronto Harbour
Commissioners and Their Outer
Harbour Project, 1912–68,” *Urban
History Review* 17, no. 2 (1988):
92–93.
- 50 James O’Mara, “Shaping Urban
Waterfronts: The Role of Toronto’s
Harbour Commissioners,
1911–1960” (Discussion Paper No.
13, York University, Department of
Geography, March 1976), 51.
- 51 Merrens, “Port Authorities,” 98.
- 52 F.R. Scandrett to [W.E.P.] Duncan,
“Yonge Street Subway—Disposal of
Excavated Soil,” 6 April 1949, pp.
1–2, fonds 16, series 1533, file 22,
CTA.
- 53 Merrens, “Port Authorities,”
98; O’Mara, “Shaping Urban
Waterfronts,” 50.
- 54 Scandrett to Duncan, “Yonge Street
Subway.”
- 55 W.E.P. Duncan, “Yonge Street
Subway—Disposal of Excavated
Soil,” 19 December 1949, p. 3, fonds
16, series 1533, file 22, CTA.
- 56 Untitled Draft Agreement, 31
January 1950, p. 1, RG 3/3, box 260,
file 16, TPAA; THC, Minute Book,
Minute 16210, 21 February 1950, p.
196, RG 1/1, TPAA.
- 57 Merrens, “Port Authorities,” 101.
- 58 J. Jones to E.B. Griffith, “Outer
Harbour Studies—McNamara
Engineering Limited,” 26 October
1961, RG 3/3, box 238, file 20,
TPAA; TTC Minutes, Report No.
S10, 1961. The THC wanted any
quantities of clean fill from the
Bloor-Danforth subway (except
spoil) excavated to create the
Greenwood subway yard, which
had previously served as a waste
disposal site.
- 59 In 1962, subway excavation
generated 153,000 cubic metres
of fill for the spit, growing the
following year to 291,000 cubic
metres, or 55 percent of the total
clean fill received by the THC in
1963. In 1964, subway fill made up
306,000 cubic metres of received
fill—part of the record 994,000
cubic metres that reclaimed sixteen
hectares for the outer harbour
that year. On the days of June 11
and 12, 1964, 42 percent of fill
came from subway construction,
but on November 18, the largest
single source of fill that day was the
Toronto-Dominion Centre, which
had broken ground on November
12, 1964. See THC, *Annual Report
for the Port of Toronto*, 1962, p.
9, RG 1/2, TPAA; W. Colvin,
“Disposal Area No. 2 Materials
Received 1964,” 12 January 1965,
RG 3/3, box 238, file 20, TPAA;

- THC, *Annual Report for the Port of Toronto*, 1963, RG 1/2, TPAA; THC, *Annual Report for the Port of Toronto*, 1964, p. 8, RG 1/2, TPAA; THC, "Source of Fill Material Survey Leslie St. Disposal Area June 11th & 12th 1964" (map), 18 June 1964, RG 3/3, box 238, file 20, TPAA; THC, "Source and Type of Fill Material Leslie St. Disposal Area Survey Taken Nov. 18. 64" (map), 2 March 1965, RG 3/3, box 238, file 20, TPAA.
- 60 J.H. Jones, "Memo to Be Brought Forward May 10, 1967," 27 February 1967, RG 3/3, box 238, file 22, TPAA.
- 61 Jennifer Foster and Gail Fraser, "Predators, Prey and the Dynamics of Change at the Leslie Street Spit," in *Urban Explorations: Environmental Histories of the Toronto Region*, eds. L. Anders Sandberg, Stephen Bocking, Colin Coates, and Ken Cruikshank (Hamilton, ON: L.R. Wilson Institute for Canadian History, 2013), 211–24.
- 62 CTCPWM, Minute 341, 22 March 1950, fonds 200, series 579, file 75, CTA. The city also considered in 1950 the use of subway spoil to fill Rosedale Valley, in order to avoid rebuilding Sherbourne Street and Glen Road bridges over the ravine. This suggestion quickly led to protests from Rosedale residents, who believed that infilling would eradicate a place of beauty and recreation. Mayor McCallum insisted the ravine infilling idea was not his idea, but rather a suggestion he had forwarded to the Board of Control. "Mayor Hastens to Stress Ravine-Fill Idea Not His," *Toronto Star*, 25 August 1950.
- 63 City of Toronto Council Minutes, 1958, Committee on Parks and Exhibitions Report No. 13, Appendix A, 12 June 1958, adopted as amended 23 June 1958; "Lakefront Park Seen Etobicoke to Islands," *Toronto Star*, 9 May 1955.
- 64 TTC Minutes, Report No. 21, Meeting No. 334, 15 October 1959, fonds 16, series 203, file 15, CTA; "What's Going On along the Waterfront," *Toronto Star* 22 January 1962; City of Toronto Council Minutes, 1959, Committee on Parks and Exhibitions Report No. 15, Appendix A, 1 October 1959, adopted as amended 13 October 1959, p. 2188; George Bryan, "Introducing Your New Subway," *Toronto Star*, 13 October 1962.
- 65 Heritage Toronto, "Crawford Street Bridge," commemorative plaque in Trinity-Bellwoods Park, 2008.
- 66 One local resident remarked that a conversation at a meeting with an elderly man—who stated that fill had come from the Bloor subway—was the only "evidence" he had found that the fill came from subway construction. Bernd Baldus, email communication to author, 19 July 2010.
- 67 Sarah Meehan, "Burying Your Bridges," *Spacing*, accessed 6 June 2010, <http://spacing.ca/hidden-gems03.htm>.
- 68 CTCPWM, Minute 533, 18 September 1963, fonds 200, series 579, file 88, CTA.
- 69 Ellen Shroud, "Does Nature Always Matter? Following Dirt through History," *History and Theory* 42, no. 2 (2003): 75–81.

