Reconstructing urban soil genesis using historical maps and archival documents: the case of Woluwe-Saint-Lambert in Brussels's 20th-century belt

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Urban soils represent a critical yet overlooked component of the urban environment. This paper addresses the lack of comprehensive urban soil data by developing a methodology based on historical documents to reconstruct soil transformations in Brussels's 20th-century urban belt, focusing on the municipality of Woluwe-Saint-Lambert. The research first identifies areas of significant soil displacement, distinguishing between excavations and backfilled zones. These spatial analyses are further contextualised through historical aerial imagery and archival records, which reveal the context and drivers behind soil movement. The findings challenge the perception of Brussels's "green belt" as build on pristine or minimally altered soil. Instead, the study demonstrates that these areas were historically sites of industrial activity, supplying raw materials for the urbanisation of central districts. Following extraction, many sites underwent backfilling or landfilling, only to be later urbanised, creating a palimpsest of soil alterations beneath contemporary neighbourhoods. The paper argues that understanding these historical trajectories is essential for interpreting present-day soil conditions and anticipating potential risks, such as contamination.

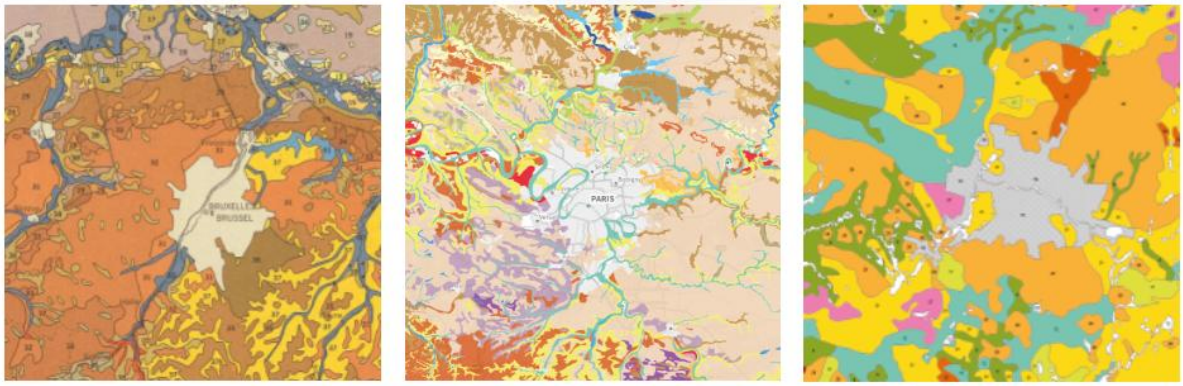
Introduction

On 21 June 2025, media articles (Belga, 2025; Bonnemé, 2025) exposed per- and polyfluoroalkyl substances (PFAS) contamination at a former industrial site in Uccle, a municipality within Brussels's second belt, in Belgium. The term 'second belt' is used to describe the urbanisation of the second half of the 20th century around Brussels. This zone is often described as closely linked to green spaces (Labo XX+I, 2021), even earning the name of "green belt" (Leloutre, 2020). The pollution, caused by a former fire extinguisher factory, adds another contaminated site located in this "green belt" to the list of soil contaminated sites in Brussels (Bruxelles Environnement, 2025). This creates a contradiction between the area's image – seen as more 'natural', built on 'clean' agricultural land – and the reality of its soil condition and the risks posed by potential contamination.

This case further highlights the limited knowledge on urban soil condition. National soil maps frequently exclude urbanised areas : for instance, Brussels is categorised as an "unmapped area" (Marechal & Tavernier, 1971), Paris appears as a "no data area" (GIS Sols & RMT Sols et Territoires, 2019), and Berlin's soil is merely labelled as a "sealed area in larger cities" (Richter, 2013) [fig. 1]. This lack of data in soil maps across European cities reveals a substantial gap in our understanding of urban soil.

Two factors explain this absence of urban soil data. First, there is a general lack of studies focused specifically on urban soils, as pedology was historically focused on agricultural productivity (Meulemans, 2020; Sojka & Upchurch, 1999). Secondly, and perhaps more significantly, urban soils are inherently heterogeneous and complex (Pouyat et al., 2010). They are predominantly composed of backfill materials (Barles, 1993), which can vary dramatically over short distances, sometimes changing from metre to metre. This heterogeneity is a result of extensive anthropogenic activities, including the construction of buildings and infrastructure, the installation of technical networks, and the development of large underground constructions such as metro, tunnels, and cellars. Urban soils also undergo

constant modification through widespread use of backfill, soil movements, earthworks, and waterproofing measures like asphalt sealing. These heavily altered soils, termed technosoils (IUSS Working Group WRB, 2022), present unique challenges for assessment and management.



[fig. 1] Comparative soil mapping of Brussels, Paris, and Berlin in national soil datasets. (Left) Brussels classified as "*zones non cartographiées*" [unmapped areas]; (Centre) Paris represented as a no-data area in the French soil map; (Right) Berlin designated as "*Versiegelte Flächen in größeren Städten*" [sealed surfaces in major cities]. Sources: (Marechal & Tavernier, 1971; GIS Sols & RMT Sols et Territoires, 2019; Richter, 2013)

Soil data in the Brussels-Capital Region

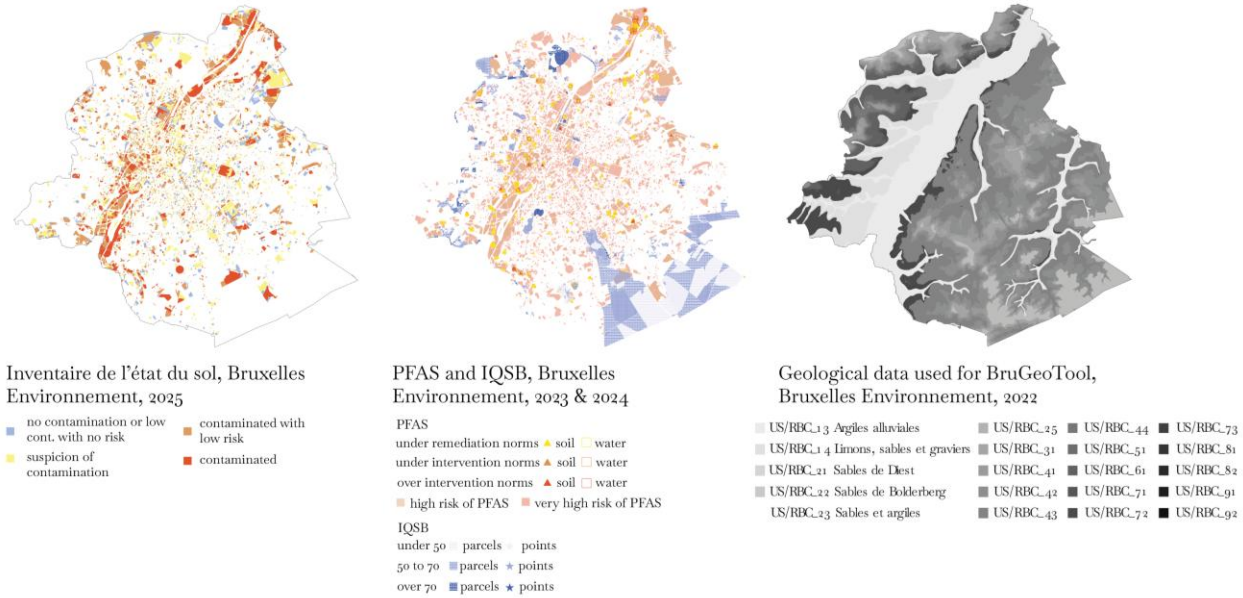
Despite the limited representation of urban soils in broad-scale maps, valuable information concerning soil does exist at finer scales for the Brussels-Capital Region. This work therefore meticulously gathered and mapped this existing data [fig. 2]. One significant component of this data collection is a legally recognised contamination map – the "*inventaire de l'état du sol*" (Bruxelles Environnement, 2025) – which delineates areas requiring further soil analysis and potential remediation [fig. 2, left]. This map categorises parcels based on suspected contamination due to past industrial or artisanal activities and includes results from soil analyses that have already been conducted. However, this method maps only studied soils or sites with known polluting activities, leaving most of the Brussels-Capital Region unmapped (Bossard & Cavalieri, 2025).

In addition to the contamination inventory map, Brussels has integrated data on PFAS contamination (Bruxelles Environnement, 2023), highlighting the risks and analysis results related to these persistent contaminants [fig. 2, centre]. This PFAS map complements the broader contamination data, providing a more nuanced understanding of soil quality and potential health risks, even if it has the same limits of providing only punctual data that covers only the studied points or parcels.

Furthermore, Brussels launched a soil strategy in 2019, known as "Good Soil", which led to the development of the Soil Quality Index for Brussels (IQSB) (Bruxelles Environnement, 2021a). This index is a monitoring tool designed to assess not only soil contamination but also the physical, biological, and chemical quality of soil [fig. 2, centre]. The IQSB offers a professional analysis method and a simplified procedure to enable citizens to conduct basic soil assessments (Bruxelles Environnement, 2021b). The results are continuously mapped and updated, with the evolving map made available online since 2024 (Bruxelles Environnement, 2024), fostering greater transparency and public engagement in soil health.

To further enhance the understanding of Brussels's soil composition, the Brussels Environmental Agency created BruGeoTool (Bruxelles Environnement, 2022). This tool is specifically designed to provide insights into the deep underground, illustrating the geological and hydrogeological strata within the Brussels-Capital Region [fig. 2, right]. However, while

BruGeoTool offers valuable information on underground geological strata, it lacks detailed data on the soil itself.



[fig. 2] Available soil data in the Brussels-Capital Region

The aims and context of this research

We observed that soil data remains limited, patchy and non-exhaustive, as evidenced by regular media reports of newly discovered contamination. To help address this gap, this paper proposes a methodology grounded in the historical analysis of soils, using historical maps and archival documents - such as operating permit requests - to identify and interpret past soil transformations, including backfilling and excavation. The underlying hypothesis is that understanding historical soil alterations and movements provides valuable insights into the "*andropedogenesis*" of urban soil (Vialle & Giampieri, 2020) – the anthropic process of urban soil formation – and, consequently, its present-day condition (Ziter & Turner, 2018).

This historical approach also serves as a new entry point for studying the history of urbanisation, complementing existing research on urbanisation processes (Leloutre, 2020; Vanneste, 2022). Through the lens of soil history, this work offers a fresh perspective on urbanisation processes, highlighting not only tensions over land use but also the tensions surrounding soil itself, as a source of raw materials and a site for waste disposal.

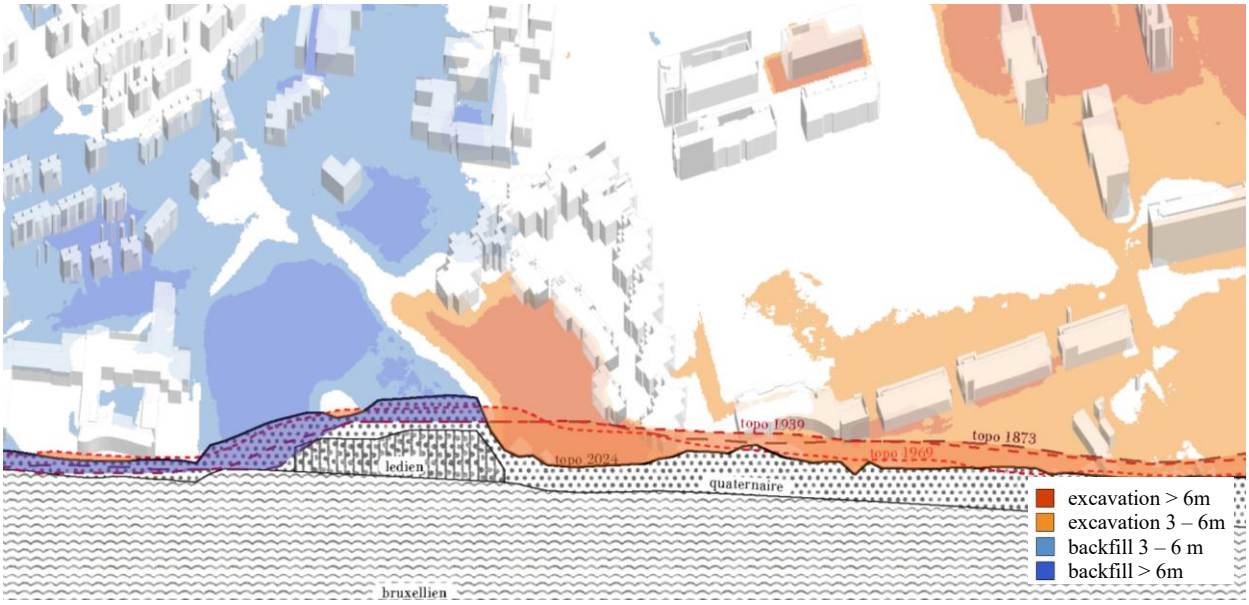
This historical perspective not only enhances our understanding of soil dynamics but also supports the development of more soil-sensitive urbanism, aligning with theories that advocate for nature-based urbanism (Barles, 1993; Corner, 1999; McHarg, 1969; Mostafavi et al., 2016; Waldheim, 2006). By integrating insights about soil history and condition, urban planners and designers can better prepare and adapt projects, for instance focusing on unsealing or greening urban areas.

This work unfolds within a context of renewed interest in soil questions, as soil is now seen as a key element at the centre of the critical zone (Ashley, 1998; Latour & Weibel, 2020). It plays therefore a crucial role in supporting life and maintaining ecological balance, as it is an interface between the atmosphere, the biosphere and the geosphere (European Commission & European Soil Bureau, 2005). The renewed interest translates into European initiatives such as the European Union's Soil Strategy for 2030 (European Commission, 2021) that aims to reduce land degradation, supported by the 2023 "Soil Monitoring Law" (Soil Monitoring

Law, 2023), which focuses on soil protection and restoration. These initiatives are an answer to the threats on urban soils, including sealing, contamination, and compaction (European Commission, 2006; Stolte et al., 2016). They are completed by national and local initiatives, like "*Stop Béton*" and "*Bouwshift*" (Labo XX+I, 2021) in Belgium or France's 2021 Climate and Resilience Law (Loi Climat et Résilience, 2021).
The research presented in this paper is part of an ongoing PhD project co-directed by Géry Leloutre (ULB, LoUIsE) and by Chiara Cavalieri (UCLouvain, Super-Position). This doctoral research builds upon the foundations laid by two key research projects: the completed 3Dcit-is project and the ongoing Archisols project, both funded by Innoviris (Join R&D projects and Co-create). The Archisols project, in particular, has provided critical insights and methodologies that inform the current study.

Modelling soil displacement

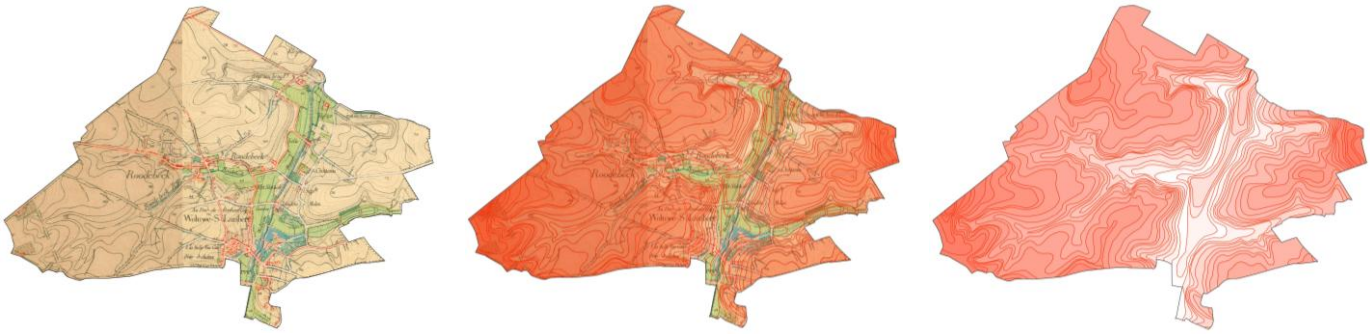
This section presents a methodology to identify areas where substantial anthropogenic soil alterations - such as backfilling or excavation - has occurred over the past 150 years. To address this, this research proposes a model that not only locates these alterations spatially but also estimates the time periods during which they took place. The presented methodology aims therefore to contribute to addressing the gap of the lack of data about urban soils, provides insights into soil history and urbanisation processes.
The methodology was applied to the municipality of Woluwe-Saint-Lambert. This municipality share with Uccle – the municipality where the PFAS contamination was discovered, discussed at the begging of this paper – its location in the "green belt" mainly built during the second half of the 20th century. This municipality is therefore also associated with the image of urbanisation on 'clean' land, previously only slightly impacted by humans.
The application of this methodology resulted in the creation of a detailed map [fig. 3], which highlights areas of excavation and backfill. Excavations are depicted in orange, indicating locations where the current altitude is lower than in previous records. Conversely, backfilled areas are shown in blue, where the current altitude is higher, indicating the addition of backfill material. The map distinguishes between smaller-scale modifications (3 to 6 metres) and more significant changes (greater than 6 metres). Accompanying this map is a sectional view that illustrates the backfills and excavations alongside various topographical profiles from different time periods (1873, 1939, 1969, and 2024), providing a temporal understanding of these modifications.
The methodology draws inspiration from the Geotechnical Maps of Brussels (Dam et al., 1990), which include detailed sheets on backfills, or *'remblais*.' These were calculated by comparing the first topographical survey conducted around 1860 with the topography at the time of the study in 1990. The Belgian National Geographic Institute's efforts to digitise and georeference historical maps have provided an invaluable data source [fig. 4, left]. This advancement allows for the extension of the geotechnical mapping methodology by incorporating topographical data from multiple time points – 1873, 1939, and 1969 – and comparing it with contemporary high-resolution topographical data in a GIS software. This expanded methodology not only identifies backfilled areas but also highlights excavations, potentially offering cues into the sources of backfill materials.



[fig. 3] Map and section of the backfills and excavations in Woluwe-Saint-Lambert.

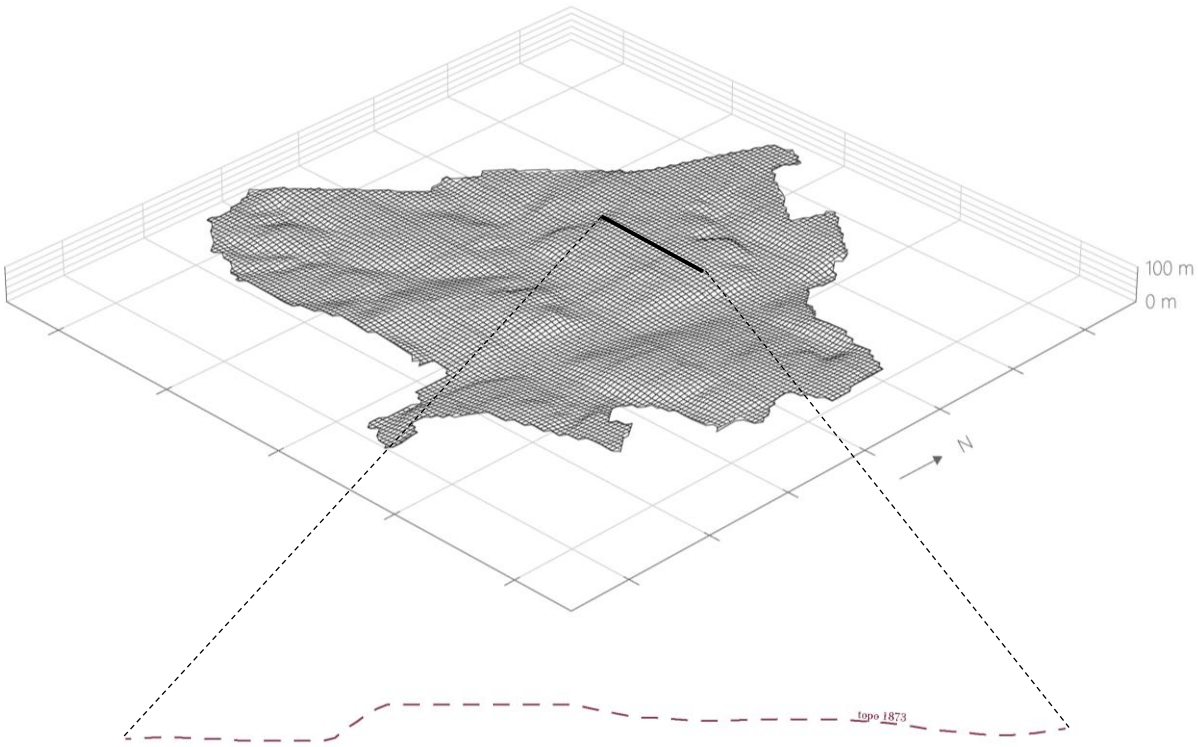
Vectorisation and generation of historical digital elevation models

The initial step in the developed methodology involves the vectorisation of contour lines from the historical maps provided by the Belgian National Geographic Institute. These contour lines were vectorised at 5-metre intervals, with additional lines for the maximum and minimum elevations of hills and valleys to enhance precision [fig. 4, centre and right]. This operation was carried out for the years 1873, 1939, and 1969 with vectorisation performed using QGIS software.



[fig. 4] On the left, Woluwe-Saint-Lambert municipality on the IGN map of 1873. On the centre and on the right, vectorisation process of the contour lines for this same municipality.

Using these vectorised contour lines, we generated a digital elevation model (DEM) to create 3D representations of past topographies. Figure 5 shows the DEM of Woluwe-Saint-Lambert in 1873. The same process was repeated for 1939 and 1969. The DEM was computed in QGIS software using TIN interpolation, while visualisation was produced in Python with matplotlib, rasterio, and numpy. These models enable the calculation of topographical sections and facilitate various topographical analyses.



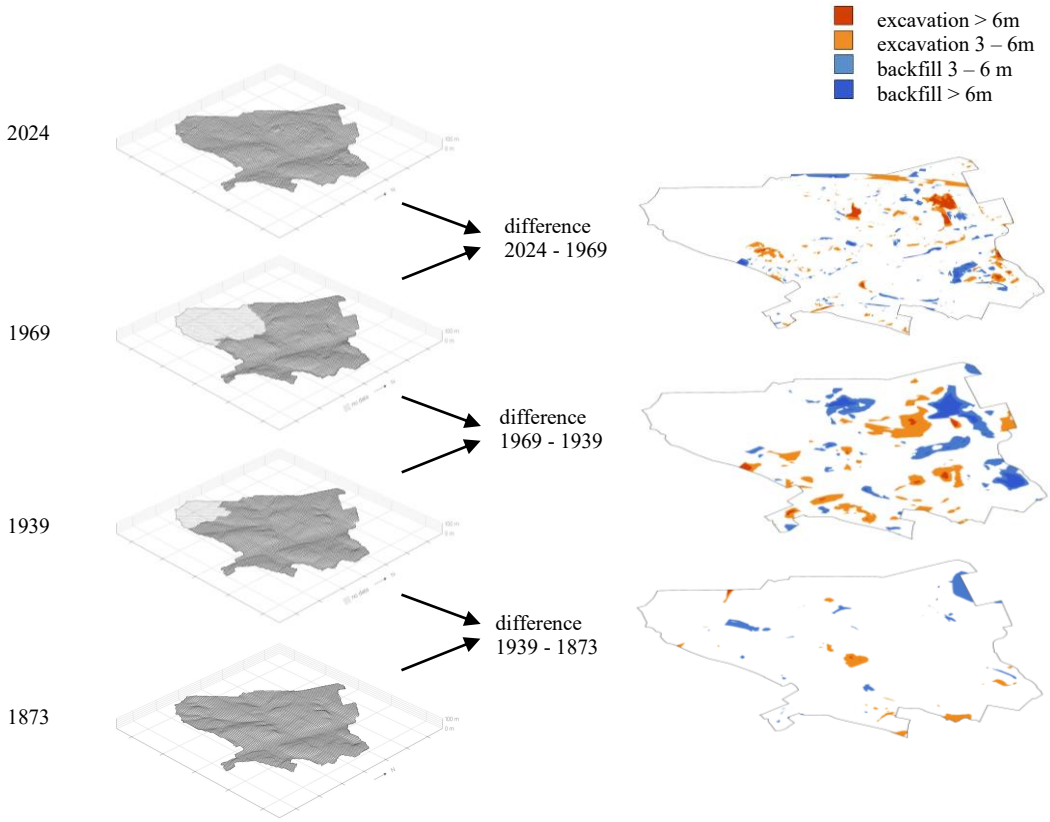
[fig. 5] Digital elevation model and section of Woluwe-Saint-Lambert in 1873.

Computing topography changes

With the digital elevation models representing topographies at different historical periods, it becomes possible to identify and highlight changes in topography over time. By comparing these models, areas of excavation and backfill can be pinpointed, revealing where the topography has been altered – either lowered through excavation or raised through backfilling.

As illustrated in figure 6, topographical differences between the digital models have been calculated for several key time intervals: from 1873 to 1939, from 1939 to 1969, and from 1969 to 2024, the year of the most recent topographical data available. In these comparisons, backfilled areas are highlighted in blue, while excavated areas are marked in red. This detailed analysis offers a comprehensive understanding of the spatial and temporal dynamics of soil transformations in the case study of Woluwe-Saint-Lambert.

Given that the base maps from the National Geographic Institute are available for all of Belgium, this methodology has the potential to be expanded to the entire Brussels-Capital Region and even to other municipalities across Belgium. However, a significant limitation is the lack of historical topographical data in urbanised areas. A notable observation from these models is the increasing presence of "no data" areas, which correspond to urbanised regions that lack contour lines in historical maps. As cities expanded and developed, these "no data" zones also grow [fig. 6].



[fig.6] Computation of topographical differences across various time intervals. On the left, digital elevation models for different years are displayed, highlighting the noticeable expansion of the 'no data' areas, which reflects the lack of topographical data in historical maps for urbanised areas. The right panel presents the results of the topographical difference computations for different time intervals, illustrating areas that have undergone backfilling and excavation.

Understanding urban soil genesis through historical documents

The method outlined in the preceding sections effectively identifies locations where anthropogenic modifications – such as backfilling or excavation – have occurred, providing a broad temporal framework for these interventions. However, critical questions remain unanswered: What motivated these alterations? What were the origins or destinations of the displaced soil? Do these processes offer insights into soil quality? When precisely did these events happen? To address these uncertainties, this section adopts a case study methodology, leveraging a range of historical documents to reconstruct the processes and contexts of urban soil genesis.

Clues from historical aerial imagery

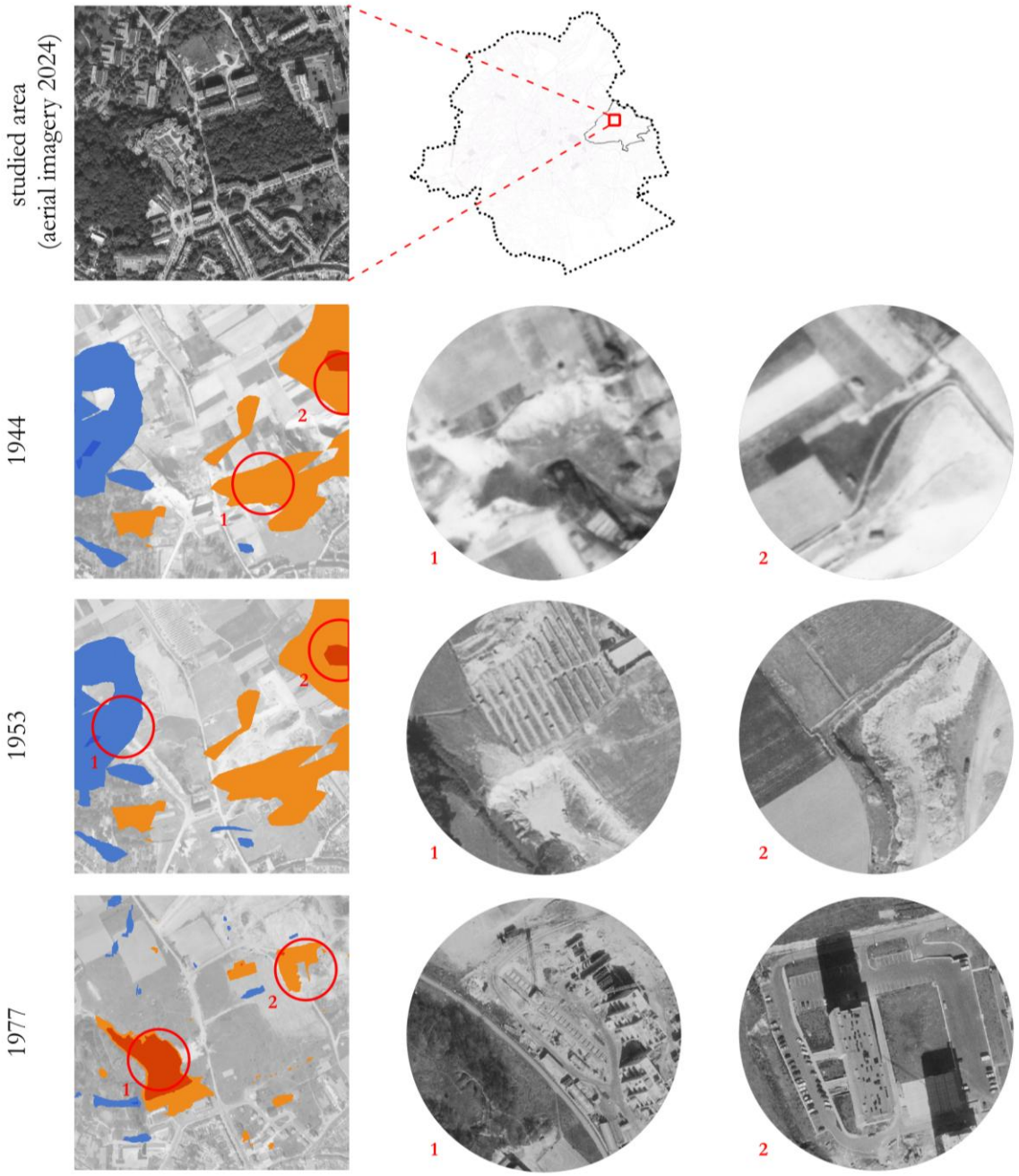
A particularly valuable resource in this investigation is the historical aerial imagery archive of the Brussels-Capital Region. This archive offers near-decadal coverage, with available datasets spanning from the early 20th century (1930–35, albeit with partial coverage of the Woluwe-Saint-Lambert municipality) through subsequent decades (1944, 1953, 1961, 1971, etc.). The temporal depth and spatial resolution of these images render them an invaluable asset for deciphering the urban evolution of Brussels.

By superimposing the previously generated backfill and excavation maps onto these historical aerial images, it becomes possible to correlate spatial patterns of soil disturbance. Figure 7 illustrates this methodology: the first column presents the backfill and excavation map superposed with the corresponding aerial imagery, while the subsequent columns provide detailed zooms on selected areas of interest.

Figure 7 reveals compelling evidence of extractive industries in the 1944 imagery. Notably, several zones of backfill and excavation coincide with features resembling quarries. This observation is further substantiated in the 1953 imagery, where a quarry is clearly visible in the second image, and brickworks – identifiable by the characteristic linear arrangements of drying bricks – are present in the first image. These findings suggest that extractive activities, such as sand quarrying and brick production, were primary drivers of soil displacement during this period. The presence of these industries not only elucidates the reason for soil movement but also underscores the extensive extractive history of the municipality.

By contrast, the 1977 aerial imagery presents a marked shift in land-use dynamics. Extractive activities, such as sand quarries and brickworks, have largely ceased, replaced by the encroachment of urbanisation. New roads and construction sites dominate the landscape, indicating that urban expansion had become the principal agent of soil displacement by this time.

The systematic examination of historical aerial imagery, when combined with spatial mapping, enables the reconstruction of urban soil transformation. This approach not only clarifies the when and where of soil modifications but also illuminates the why – thereby enriching our comprehension of the anthropogenic forces shaping urban soils.



[fig. 7] Superposing aerial imagery to backfill and excavation map to understand soil transformation. Aerial imagery: bruciel, urban.brussels.

Confirmation from historical plans and maps

In addition to aerial imagery, historical maps from the National Geographic Institute provide further insight into the spatial and temporal dynamics of soil exploitation. While these maps were previously employed to delineate backfill and excavation zones, certain editions – specifically those from 1939 and 1969 – explicitly depict brickworks and sand quarries. These features were systematically vectorised to enhance their visibility [fig.8, left], offering a clear spatial representation of extractive activities during these periods.

Another particularly illuminating document is a 1953 plan of Woluwe-Saint-Lambert, which details the locations of sand quarries and brickworks [fig.8, centre]. This plan reveals that extractive activities were concentrated in the northern sector of the municipality, while the southern areas were already undergoing urbanisation. The plan likely served as a foundational reference for the municipality's draft of *plan général* – a zonning plan guiding land-use from the same period. The draft of this *plan général* [fig. 8, right] introduces zones designated as '*zones rurales'* (rural areas), marked in dark red, which were explicitly reserved for rural exploitation to meet the resource needs of local industries. This zoning strategy appears to have been deliberately implemented to protect extractive industries – such as brickworks and sand quarries – from urban expansion. Although the *plan général* was never formally adopted, it reveals the spatial logic of mid-20th-century planning and an intent to mitigate conflicts between urban growth and resource extraction, ensuring the continued operation of industries reliant on extracting materials.

When considered alongside aerial imagery, these historical plans provide a multidimensional perspective on soil exploitation. The 1953 plan, for instance, corroborates the aerial observations of extractive activities in the northern municipality while clarifying the regulatory impacts of their spatial distribution. The combination of NGI maps and historical plans enriches our understanding of the institutional and economic contexts underpinning soil displacement. These documents not only map the where and when of extractive activities but also reveal the strategic decisions linked to these activities.



[fig. 8] Spatial distribution of brickworks and sand quarries in Woluwe-Saint-Lambert. (Left) National Geographic Institute (NGI) map of 1939, with vectorised brickworks and sand quarries; (Centre) 1953 municipal plan detailing brickworks and quarries; (Right) Draft of the *plan général* of Woluwe-Saint-Lambert, illustrating zoning allocations. Sources: National Geographic Institute; Municipal Archives of Woluwe-Saint-Lambert.

Further explanation from archives documents

Delving deeper into archival documents reveals stories that illuminate the nuanced contexts of soil transformation in Brussels. While these case-specific narratives resist broad generalisations, they offer invaluable insights into the processes and tensions surrounding urban soil transformation, providing a granular understanding of how soil was moved, contested, and repurposed over time.

For instance, archival records [fig.9] document palpable tensions between urban infrastructure development and extractive activities. Two adjacent sand quarry compagnies, *Bevilaqua-Taminiaux* and *van Pachtenbeke et fils*, found themselves at the centre of such disputes during the 1950s. Correspondence and plans reveal tensions surrounding the extension of the Chaussée de Louvain, as a planned street directly threatened their operations. A letter addressed to *Bevilaqua-Taminiaux* explicitly prohibited any soil modification on her parcels, effectively halting quarry exploitation due to the impending road project. A similar refusal was initially issued to *van Pachtenbeke et fils*.

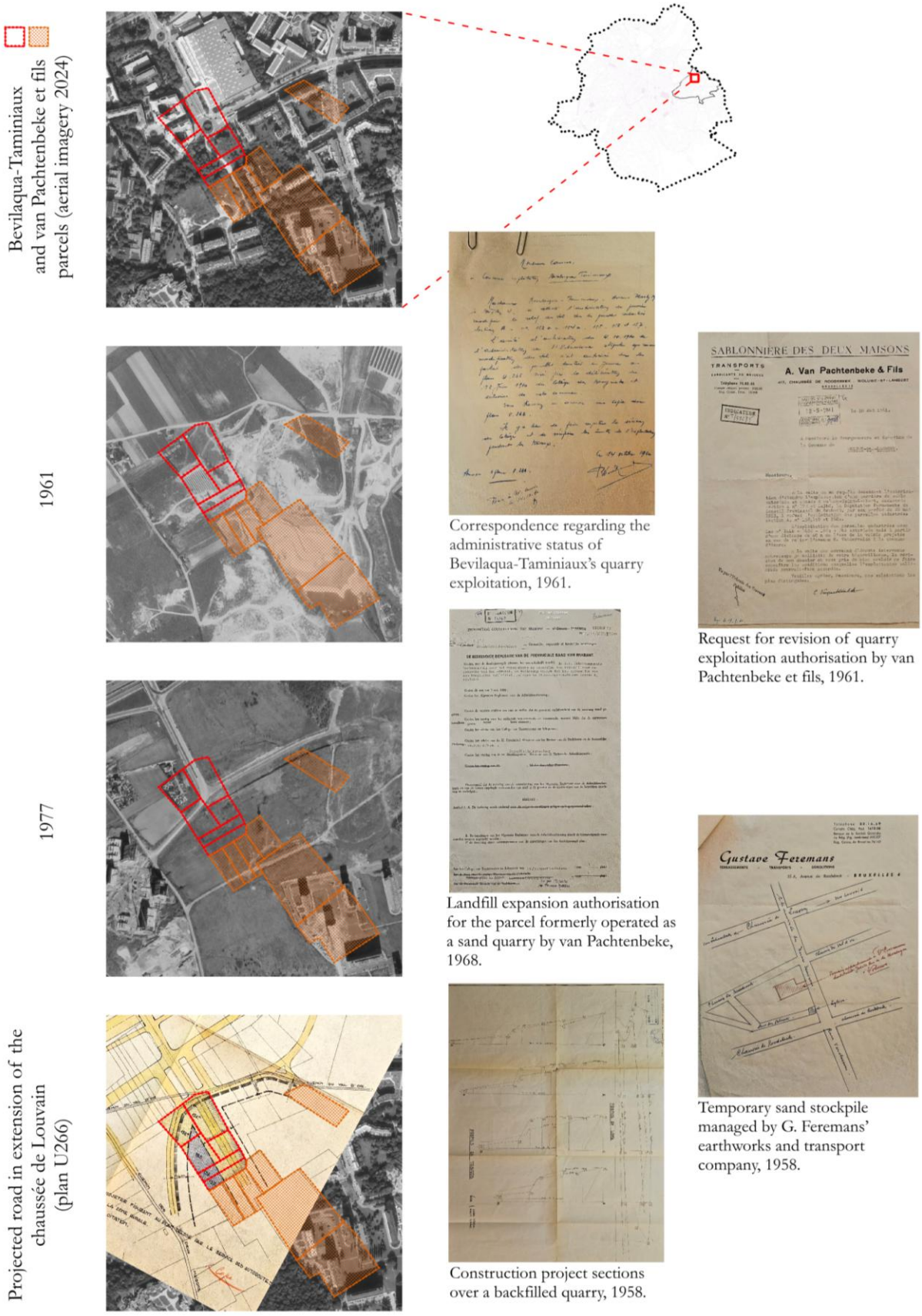
However, the administrative process took an unexpected turn. In 1960, a subsequent letter revoked the refusal granted to *van Pachtenbeke*, citing procedural irregularities: the urbanism administration has failed to respect the deadline for responding to *Bevilaqua-Taminiaux*'s exploitation request, thereby resulting in its tacit approval. Denying *van Pachtenbeke*'s application under these circumstances was deemed inequitable. This reversal underscores tensions around soil use and raises questions about the actual implementation of these plans. The discrepancy between the projected road and its realisation suggests that outcomes may have been influenced by such conflicts.

A 1968 document [fig. 9] requesting authorisation to expand a landfill provides further evidence of changes in soil uses. Cross-referencing parcel numbers with historical plans confirms that the site in question was none other than *van Pachtenbeke*'s former sand quarry. This transformation – from extraction to waste disposal – highlights a trajectory of soil exploitation, where voids created by quarrying were later repurposed for waste deposition. Notably, the landfill's operational conditions mandated the daily application of insecticides, a practice with potential implications for soil quality and environmental health. Today, this area is urbanised, its industrial past obscured by residential development.

In the same district, municipal archives from Woluwe-Saint-Lambert document proposals for construction over backfilled quarries [fig. 9], such as the area between Rue Théodore De Cuyper and Clos des Peupliers. The projected developments appear to differ from what was ultimately built, suggesting that plans were abandoned. However, this example documents the phase of the urban extension where former quarries were built upon.

It would be extremely valuable to track the movements of soil, determining both its origins and destinations. Archives from *G. Feremans* company, which specialised in earthworks, demolition, and transport, offer insights into the complexity of soil transport. These documents reveal the movement of sand from Avenue de Cortenberg to Chemin des Deux Maisons. However, the material was only temporarily stockpiled before being sold onward, with no indication of its final destination. This intermediary step complicates efforts to retrace soil flows, as materials could be stored, mixed, or redistributed before reaching their ultimate destination.

These stories collectively demonstrate that soil movement was rarely a linear or predictable process. Instead, it was shaped by legal disputes, administrative oversights, economic opportunism, and environmental externalities, each contributing to the dynamic and often contested nature of urban soil transformation.



Correspondence regarding the administrative status of Bevilaqua-Taminiaux's quarry exploitation, 1961.

Request for revision of quarry exploitation authorisation by van Pachtenbeke et fils, 1961.

Landfill expansion authorisation for the parcel formerly operated as a sand quarry by van Pachtenbeke, 1968.

Temporary sand stockpile managed by G. Feremans' earthworks and transport company, 1958.

Construction project sections over a backfilled quarry, 1958.

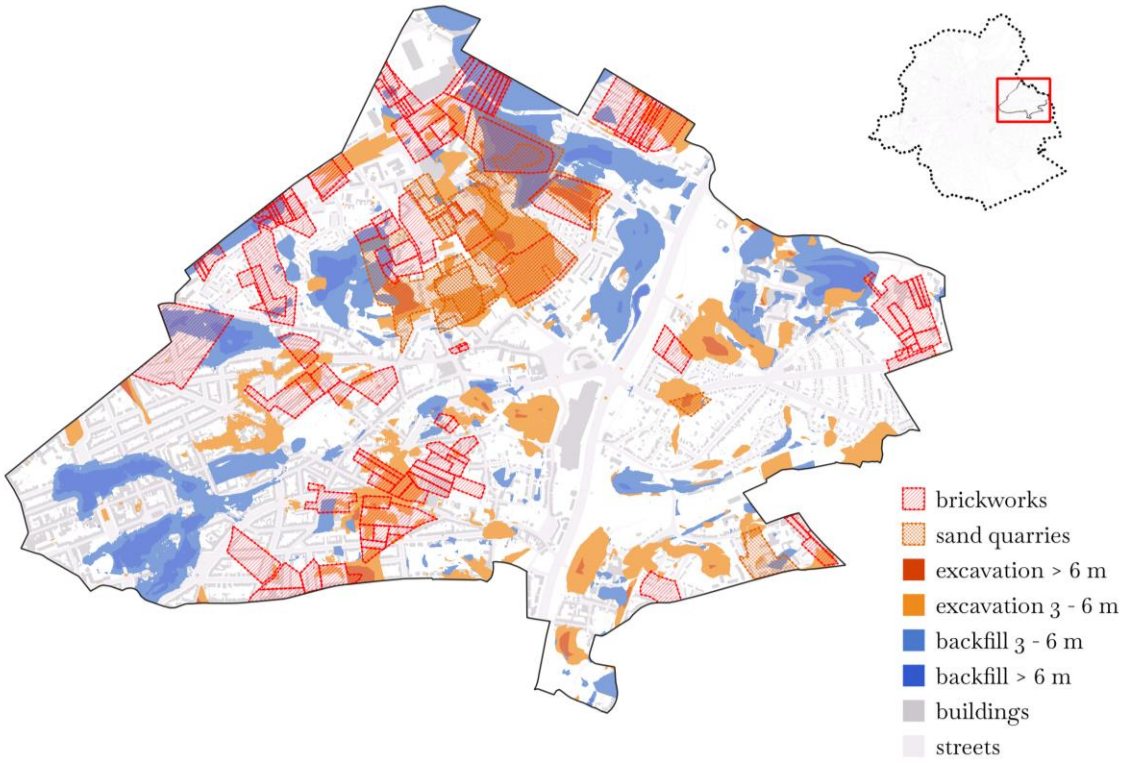
[fig. 9] Archival documents tracing the history of parcels exploited by *Bevilaqua-Taminiaux* and *van Pachtenbeke et fils*: sand quarries, urbanisation, and landfill conversion. Sources: Municipal Archives of Woluwe-Saint-Lambert; Aerial imagery: bruciel, urban.brussels.

A new gaze on urban soils

The integration of the various insights presented in this paper - including backfill and excavation maps, inputs of aerial imagery and old maps, historical records of brickworks and sand quarries - into a single spatial representation [fig. 10] reveals patterns of soil alteration, intertwined with the trajectory of urbanisation. By overlaying these layers, the map highlights areas where intensive extractive and landfill activities have reshaped the soil, in ways that challenge contemporary perceptions of urban peripheries.

The analysis presented in this paper uncovers a sequence in soil transformation. At first, soil served as a resource as sand quarries and brickworks extracted materials essential for construction. These extractive activities concentrate in the still only slightly urbanised 20th-century belt and were feeding the urbanisation of the more central districts. Far from being pristine or "natural", these areas were, in fact, places of industrial activities where the raw materials for urban development were sourced. Following extraction, backfilling and landfilling repurposed these excavated spaces, effectively recycling them as disposal sites for the byproducts of urban life. Finally, as Brussels continued to expand, many of these landfilled areas were themselves urbanised, completing a cycle of soil alteration. New neighbourhoods, infrastructure, and green spaces emerged atop layers of highly altered soil, letting the soil history of these places reemerge only when soil contamination studies are done, or other soil remaniment are made.

Delving into archival documents provides more than just spatial data; it offers a narrative lens through which to interpret soil and urbanisation history. These records reveal the motivations, regulations, and socio-economic contexts that drove soil alteration. By reconstructing these processes, we gain insight into the feedback loops between urbanisation and soil modification. The historical perspective also highlights the cumulative nature of these changes, where each phase of alteration – extraction, landfilling, and urbanisation – built upon the previous, leaving a palimpsest of human activity beneath the surface.



[fig. 10] Superposition of historical soil excavations and backfill sites with former brickworks and sand quarries, derived from archival documents (maps, plans, permits). Current buildings and streets form the background layer.

Conclusion

This study demonstrates how the integration of historical data can illuminate the complex interplay between soil history and urbanisation in Brussels' 20th-century belt and therefore inform us about today's soil condition. Acknowledging the impossibility of exhaustive, metre-by-metre soil analysis, this study leverages historical evidence to strategically direct investigative efforts. The proposed methodology operates as a scalable analytical framework: it begins by identifying broad patterns of soil displacement before progressively zooming in on critical zones. The first level of analysis pinpoint areas of significant topographic alteration; the second examines the reasons and sequences of these transformations; the last level delves into the underlying drivers and tensions around soil alteration. By structuring inquiry in this way, the approach aims to guide targeted fieldwork and soil sampling, to ensure that limited resources for soil investigation are deployed where they are most needed, informed by a robust historical foundation.

However, the findings also highlight several limitations and avenues for further research. While the methodology provides valuable insights into Brussels's soil history, its generalisability remains constrained by local context. The availability of detailed digitalised historical maps, permit requests records, and other archives make Brussels a data-rich case study. Other cities, with different industrial histories, building materials, or archival practices, may not yield the same patterns or levels of detail, and could present alternative narratives of soil alteration. Testing this approach in diverse urban settings would refine its applicability. Moreover, the focus on soil movement, extraction, landfilling, and urbanisation captures only one facet of soil transformation. Industrial and artisanal activities have directly contaminated soils through pollutants, while large-scale infrastructure projects have induced massive soil displacement. These processes, though not the primary focus here, are equally critical in shaping soil conditions. Thus, this analysis represents a single layer in a broader stratigraphy of urban soil histories, each requiring distinct methodological approach.

The historical trajectories highlighted in this work, by their nature, are also partial. They reflect the biases of available sources and the specific questions posed by researchers. To build a more comprehensive understanding, these insights must be superimposed with other forms of knowledge. Oral testimonies, local expertise, and interdisciplinary collaborations – such as those pursued by the other research groups of the Archisols research project – can participate to fill these gaps.

Beyond its immediate findings, this work contributes to the recognition of soil as a critical lens for understanding urbanisation and calls for better consideration of the stories beneath our feet to inform the cities we build above.

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