

# Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



## Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners ([Examencommissie-BK@tudelft.nl](mailto:Examencommissie-BK@tudelft.nl)), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Hui Wing Hei Joanna
Student number	4908376
Telephone number	
Private e-mail address	

Studio		
Name / Theme	Urban Architecture/Spolia	
Main mentor	Prof. Paul Vermeulen	Architectural design
Second mentor	Aurélie Hachez/ Dr. Leeke Reinders	Architectural design/ anthropology
Argumentation of choice of the studio	<p>The studio offers a comprehensive hands-on design practice for sharpening my personal sensitivity towards scale and contextual reality which the given site is subject to. That the studio is titled 'Spolia' entices me with the encouragement of reinvention and exploration of added values among the forgotten, which is imaginative but at the same time pragmatic. Moreover, the studio objective is very relevant to the improvement of living in society because it addresses the social role of programme in the public realm that the architecture being designed shall illuminate human events with high inclusiveness, flexibility and sustainability.</p>	

Graduation project	
Title of the graduation project	Recyclage –In search for nomadic application of materials from urban mining in the design of a recycle learning center
Goal	
Location:	Anderlecht, Brussels
The posed problem,	<p>The existing living and working groups are physically situated beside each other. This situation is attributed to the lack of communal space that connects the working and living spots. The plot users either live or work in the site, consuming and occupying the site at different times without encounters. The working group is hidden behind the facades and the existing shared spaces are either dominated by logistics or tediously fenced. Although the site is composed generously of public areas including parks and greenery, it is porous but neither permeable nor pedestrian-friendly. The scattered urban fabric hints the potential of re-zoning the neighbourhood with the interplay of old and new public and private spaces.</p> <p>The state of being deindustrialized founded the site with a pool of disused industrial buildings which have been or being repurposed. Through close reading of several chosen adaptive reuse buildings around the site, inhabitants are highly dependent on the refurbishing of the 'stuff' layer which means alternating the furniture layout and material in the interior. However, the fact that the stay of the users is always temporary, the bits and pieces of buildings are layered and</p>

	<p>demolished at different time intervals that fractures of intervention may not be coherent architecturally. Also, the site becomes unstable with a lack of sense of belonging amongst the 'nomads'. Despite the incoherence, materials and informal 'urban mining' are the common thread that knits the fragments of time and space. The material flow compresses the physical distance of the urban fragments and allows affordance of space at affordable cost. Rotor, a company of salvaging building components, situates at the site and reconditions the reused materials for sale. It promotes the notion of 'urban mining' in Brussels. However, the target audience is always building practitioners and professionals which make the business exclusive and non-communicative with the amateurs. In light of this, Rotor's ambition of salvage of building waste can be expanded with the aid of new facilities to provide a searching and pedagogical ground for material elites and beginners. The population should be granted the right of reinventing the city ground-up with the aid of unleashing their inherent material literacy.</p>
<p>research questions and</p>	<ol style="list-style-type: none"> <li>1. What is the relevance of urban mining in the context of the ever-changing post-industrial city?</li> <li>2. What is the feasibility of urban mining in local and regional scale? What are the potential materials to be mined from the extant specifically? What is the logistics requirement for the application of mining these materials?</li> <li>3. What are the semantic capital carried by the materials around the site?</li> <li>4. How can urban mining and new composite materials fortify social capital and identity?</li> <li>5. How can the site be reinvented ground-up with urban mining and beneficial to the nomadic users?</li> </ol>
<p>design assignment in which these result.</p>	<p>The urban planning proposal endeavors to orchestrate the process of urban mining from collection, disassembly, extraction, recovery, consumption and reinvention within the site plot, challenging the status quo of recycling industry as infrastructure. Besides industrial programmes, educational, cultural and commercial spaces can be derived from the elaborated process of urban mining. The master plan endowed contrasting characters to recycling spaces which can integrate production and consumption, infrastructure with education, and practicality with playfulness. It is significant to weave different kinds of working and living relationship within the plot to sustain the vibrancy and security of the neighbourhood. To achieve this, redrawing the boundary between private and public, providing a spectrum of spatial hierarchy for the communal space among these groups help generate the symbiosis of consumption and production activities of the neighbourhood. The site is re-zoned into a production strip, mixed commercial and production public interior strip, and a cultural strip, forming a sprawling alleyway internally that connects the urban nodes at the periphery. The organization stitches the urban fragments thematically and functionally with narrating the process of urban mining.</p> <p>The architectural assignment emphasizes the stage of realization and application of urban mining. 'Recyclage' serves as an innovative recycle learning center in which the extraction and treatment process of materials in the urban material bank can be comprehended for the development of future application. It is a hybrid that encompasses a material library, a laboratory for material preparation and testing, open workshops, exposition space for new prototypes, meeting rooms, and recycling collection spots merged with playground, providing a converge point for inhabitants, entrepreneurs, researchers and everyday makers. The center interpreted materials as interlocutor between people from all walks of life, unleashing the inherent material literacy of individuals, reinventing architectural opportunities between traces of events, time as well as memories. Thereby, it aims at offering a pedagogical environment that enables hands-on discovery, fueling of curiosity towards materials and contemplation of emotions and values attached to the materials.</p>

	<p>The material library does not only serves as a conventional archive of materials, it also forges a learning environment and open access research platform that stimulates sensory experience between visitors and objects. It promotes proclivity of people to foreshadow new scenarios with different materials that blur the distinction between research, socialization, knowledge-seeking and play. The open workshops address that the practice of craft becomes the acquisition of knowledge about materials. The workshops allow the learning of delicate techniques and appropriate uses of tools with provision of an array of specialist skills, machines, tools, salvaged and recycled materials, and software. Thereby, visitors can reflect on the material qualities and expand the senses with new inspiration and syntheses. On the other hand, the laboratories and meeting rooms respond to the diverse realms of know-hows required throughout the process of urban mining. They create an intersection hub for designers, bioengineers, architects, lawyers and other related professionals to discuss, consult and engage in the study of materials which is now barely possible in Rotor due to the lack of space and resources. Last but not least, the new recycle learning center is interfaced with classrooms, a communal kitchen and rows of schools that programmes for recreational-participatory practices among children are included in the new design. Therefore, stepped playgrounds with collection bins are introduced to encourage recycling as a daily habit and culture.</p>
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## Process

### Method description

A mixed methodology of phenomenology and material flow analysis is used to investigate topics of material culture and urban mining. While phenomenology constitutes the qualitative data, material flow analysis makes up the quantitative part. Phenomenology is particularly used to depict the nature and underlying meaning of the particular phenomenon. In the beginning, semi-structured interviews with plot users and in-situ observation were harnessed to get hands-on understanding of how the site users make sense of their living environment. The phenomenon of informal urban mining around the site is identified and it becomes the investigating topic. Phenomenological methodology is further applied on the study of material culture encrypted in the materials being mined from the existing buildings: a dialectic study between subject and object. Through writing autobiographies of each material, the everyday interaction with humans that mold their identities can be documented. The human affective and emotional perception towards materials are captured by photography and sensory characterization mapping. As for the material flow analysis, the processing steps of materials from extraction to recycling are studied with the aid of GIS and official document from recycling plants. The feasibility of urban mining of different materials is analysed by locating and estimating the hibernating and existing stock of materials in and around the site.

### Literature and general practical preference

#### Literature (theory)

Brand, S. (2012). *How buildings learn: what happens after they are built*. London: Penguin Books.

Brunner, P. H., & Rechberger, H. (2004). *Practical handbook of material flow analysis*. Boca Raton, FL: Lewis Publishers.

Camera, S., & Karana, E. (2018). *Experiential Characterization of Materials: toward a toolkit*. DRS2018: Catalyst. doi: 10.21606/drs.2018.508

Creswell, J. W., & Creswell, J. W. (2013). *Qualitative inquiry and research design: choosing among five approaches*. Los Angeles: SAGE Publications.

Hegel, G. W. F. (1977). *Phenomenology of spirit*. Oxford: Clarendon Press.

Hicks, D., & Beaudry, M. C. (2018). *The Oxford handbook of material culture studies*. Oxford: Oxford University Press.

Lehmann, A-S. (2017). *Material Literacy*. In C. Perren (Ed.), *Substance* (pp. 20-27). (Bauhaus; Vol. 9). Leipzig: Spector Books.

Sirowy, B. (2010). *Phenomenological concepts in architecture towards a user-oriented practice*. Oslo: AHO.

Tilley, C. Y. (2000). *Metaphor and material culture*. Oxford, UK: Blackwell.  
Tilley, C., Spyer, P., Keane, W., Küchler, S., & Rowlands, M. (2017). *Handbook of material culture*. London: SAGE Publications.  
Wallsten, B. (2015). *Toward Social Material Flow Analysis: On the Usefulness of Boundary Objects in Urban Mining Research*. *Journal of Industrial Ecology*, 19(5), 742–752. doi: 10.1111/jiec.12361  
Zhu, X. (2014). *GIS and Urban Mining*. *Resources*, 3(1), 235–247. doi: 10.3390/resources3010235

#### Literature (research data/design)

Baiche, B., Neufert, E., & Neufert, P. (2011). *Architects data*. New York, NY: Wiley-Blackwell.  
Glassman, P., Dyki, J., & Phillipot, C. (2017). *The handbook of art and design librarianship*. London: Facet Publishing.  
Nakamura, T., & Halada, K. (2015). *Urban mining systems*. Tokyo: Springer.

#### Precedent (Material library/recycle learning center/community center)

1. The Urban Mining & Recycling (UMAR) Experimental Unit, Werner Sobek, 2013, Dübendorf, Switzerland
2. Brunner Innovation Factory, HENN Architekten, 2018, Rheinau, Germany
3. YingLiang Stone Archive, Atelier Alter, 2016, Beijing, China
4. Classroom Makeover for the Blind, Creative Crews, 2018, Pattaya, Thailand
5. Smart Innovation Learning Center, NEILI LAB, 2017, Putuo, China
6. The Pinch Library And Community Center, John Lin + Olivier Ottevaere, 2014, Yunnan, China
7. Danish Recycling Center, Bjarke Ingels, Copenhagen, Denmark

### Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The master programme and studio topic, Spolia, underscores the importance of contextual design that deals with technical, social and spatial challenges in the extant. My project topic was inspired by examining the site as an unstable city fragment from social, economic, cultural, morphological and typological aspects. Immaterial and material spolia which carry the values and memories are recognized. They become the fragments because the pattern of language between the bits and pieces are yet to be discovered. Regarding materials and materiality as a common ground that connect time and people in spite of their backgrounds, the design proposal condensates the existing human-object relationship as spolia and expands it with introducing a new function on site: a recycle learning center where people can contemplate the past and envisage the future living scenarios in a sustainable way. The design is interweaved with urban mining initiative and the care of material culture, bringing in the engineering and humanistic dimension to the architecture. On the other hand, the chair of architecture advocates the rippling impact of architectural design on urban context which means the design vision of the smaller scale (i.e. materials) which then impacts on the larger scale (i.e. architectural form and tectonics). Therefore, the design project is chosen to be situated between the existing fragments and minimizes the demolition, rather it crafts the public space from the interior and the interior space from the materiality and construction details.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The proposed thesis is a genuine reflection on the role of architecture in terms of material use and the flexibility it offers for bottom-up design decision. It acknowledges the global trend of

participatory design and the altering role of architects being the mediators amongst design opportunities instead of top-down creators. The sensitivity of collective design approach is further elevated with urban mining initiatives that the design outcome takes circular design processes and material literacy into consideration. The design exercise sheds light on the importance of properties, semantic values and afterlife of materials in the very beginning that materiality can always be regarded as a compromise in design phase. Investigating the life cycle and biographies of materials brings more thorough understanding of the intelligent use, recyclability and circular construction methods of materials that are secondarily produced. Being able to explore inventive ways of recycling and maintain a humble attitude towards every material is essential to enhance the practicality, environmental awareness and economic efficiency in my future design proposals. The notion of urban mining also aligns with the technologies developed in the field such as BIM system and building passports. These tools provide an information base for better application of urban mining in cities towards which the thesis is proactively oriented: digging into the possibilities arose from the creation and recreation, use and reuse.