Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Nature Has No Waste

How do European landscape architecture studios approach urban sustainability through resource management?

Anne Heinkelmann

Independent Project • 30 credits
Landscape Architecture – Master's Programme
Faculty of Landscape Architecture, Horticulture and Crop Production Science
Alnarp 2020

Nature Has No Waste

How do European landscape architecture studios approach urban sustainability through resource management?

Anne Heinkelmann

Supervisor:	Thomas Randrup, SLU, Department of Landscape Architecture, Planning and Management
Assistant Supervisor:	Lisa Diedrich, SLU, Department of Landscape Architecture, Planning and Management
Examiner:	Anders Larsson, SLU, Department of Landscape Architecture, Planning and Management
Co-Examiner:	Mats Gyllin, SLU, Department of Landscape Architecture, Planning and Management

Credits:	30 hp
Project Level:	A2E
Course Title:	Independent Project in Landscape Architecture
Course Code:	EX0852

Programme:	Landscape Architecture – Master's Programme
Place of Publication:	Alnarp
Year of Publication:	2020
Cover Picture:	Filip Dujardin (2017)
Online Publication:	http://stud.epsilon.slu.se

Keywords: landscape architecture, sustainable development, sustainable resource management, urban management, resource efficiency, circular economy, nature-culture-dualism, urban metabolism

SLU, Swedish University of Agricultural Sciences
Faculty of Landscape Architecture, Horticulture and Crop Production Science
Department of Landscape Architecture, Planning and Management

Publishing and archiving

Approved students' theses at SLU are published electronically. As a student, you have the copyright to your own work and need to approve the electronic publishing. If you check the box for YES, the full text (pdf file) and metadata will be visible and searchable online. If you check the box for NO, only the metadata and the abstract will be visible and searchable online. Nevertheless, when the document is uploaded it will still be archived as a digital file.

If you are more than one author you all need to agree on a decision. Read about SLU's publishing agreement here: https://www.slu.se/en/subweb/library/publish-and-analyse/register-and-publish/agreement-for-publishing/.

☑ YES, I hereby give permission to publish the present thesis in accordance with the SLU agreement regarding the transfer of the right to publish a work.

☐ NO, I do not give permission to publish the present work. The work will still be archived and its metadata and abstract will be visible and searchable.

Abstract

In the context of the global environmental crisis, urgent steps need to be taken towards sustainable development. Within the profession of landscape architecture, efficient and far-sighted resource management plays an important role. In the theory and practice of landscape architecture, however, there is a lack of systematic reflection on this topic. This leads to the question of how landscape architecture studios approach sustainable urban design by emphasizing resource management. This thesis suggests a first conceptual framework by developing a typology of sustainable resource management (SRM). Beyond a common core, three types of SRM are differentiated: environmental type, economic type, and social type. The SRM types are illustrated in three qualitative case studies. Firstly, the project Murg-Auen-Park by Staufer&Hasler Architekten follows the environmental type. Secondly, the project De Ceuvel by DELVA Landscape Architects and Space+Matter follows the economic type. Thirdly, the project Skanderbeg Square by 51N4E follows the social type. The cases lend support to the usefulness of the SRM concept. This thesis, therefore, represents a first step towards a better theoretical understanding of SRM in urban landscape design. It also invites practitioners to reflect on how they can implement SRM.

Keywords: landscape architecture, sustainable development, sustainable resource management, urban management, resource efficiency, circular economy, nature-culture-dualism, urban metabolism

Table of Contents

List of Figures and Tables

Main Body

Case Study: Murg-Auen-Park

Figure 14: Bundesamt für Landestopografie, ThurGIS (2020). *Murg-Auen-Park Frauenfeld, historische Karte 1885* [cartographic visualization]. Available at: https://map.geo.tg.ch/apps/mf-geoadmin3/?topic=grundlagenkartenwerke&lang=de&E=2710220.14&N=1269571.66&zoom=4.0699999999999825&layers_opacity=0.9&catalogNodes=50025,50033&layers_timestamp=1945&layers=siegfriedkarte [2020-09-07]

Figure 15: Bundesamt für Landestopografie, ThurGIS (2020). *Murg-Auen-Park Frauenfeld, historische Karte 1990* [cartographic visualization]. Available at: https://map.geo.tg.ch/apps/mf-geoadmin3/?topic=grundlagenkartenwerke&lang=de&E=2709942.42&N=1269431.89&zoom=4.976666666666645&layers_opacity=0.9,0.9,0.9&catalogNodes=50025,50033,50026&layers_timestamp=1945,,2014&layers=siegfriedkarte,sulzbergerkarte,altelandeskarte&layers_visibility=false,false,true [2020-09-07]

Figure 16: Bundesamt für Landestopografie, ThurGIS (2020). *Murg-Auen-Park Frauenfeld, Gefährdung Wasser Karte* [cartographic visualization]. Available at: https://map.geo.tg.ch/apps/mf-geoadmin3/?topic=naturgefahren&lang=de&E=2709754.50&N=1269073.44&zoom=5.405972661253103&layers_opacity=0.9,0.9,0.9&catalogNodes=43002,43003&layers=gefaehrdung_wasser_ufererosion,hinweise_gefahrenkarten_wasser,gefaehrdung_wasser&layers_visibility=false,false,true [2020-09-07]

Figure 17: Bundesamt für Landestopografie, ThurGIS (2020). *Murg-Auen-Park Frauenfeld, Lärmempfindlichkeitsstufen* [cartographic visualization]. Available at: https://map.geo.tg.ch/apps/mf-geoadmin3/?topic=umweltschutz&lang=de&E=2709781.99&N=1269160.49&zoom=4.866666666666664&layers_opacity=0.9&catalogNodes=45042&layers=nutzungsplanung_les [2020-09-07]

Figure 18: Staufer&Hasler Architekten (n.d.). *Masterplan, Gemeinde Frauenfeld* [design document]. Available at: https://staufer-hasler.ch/projekt-details/masterplan-gemeinde-frauenfeld/ [2020-09-07]

Figure 19: Karrer, F. (n.d.). *Footbridge* [photography]. Available at: https://www.espazium.ch/de/aktuelles/where-have-all-flowers-gone [2020-09-07]

Figure 20: Hochparterre (2016). *Pavilion* [photography]. Available at: https://staufer-hasler.ch/content/uploads/2018/07/161208_HOCHPARTERRE_Die_Besten_2016_Murgauenpark-1.pdf [2020-09-07]

Figure 21: vetter (n.d.). *Murgauenpark Frauenfeld* [photography]. Available at: https://www.vetter.ch/bauunternehmung/tiefbau/referenzen/detail/news/murgauenpark/ [2020-09-07]

Figure 22: Architektur Forum Ostschweiz (2019). *Anthologie zur Raumkulltur* [photography]. Available at: https://staufer-hasler.ch/content/uploads/2019/01/Raum-Zeit-Kultur-Anthologie-Baukultur-Am-Anfang-stand-ein-Baum-s90-94.pdf [2020-09-07]

Figure 23: Stadt Frauenfeld (2017). *Schulthess Gartenpreis Murg-Auen-Park* [photography]. Available at: https://www.frauenfeld.ch/portraet/impressionen/bildergalerien/aktuelle-bilder.html/576/gallery/5 [2020-09-07]

Figure 24: Karrer, F. (2017). *Vom Militärareal zum städtischen Naherholungsgebiet: Der Schulthess Gartenpreis 2017 geht an den Murg-Auen-Park in Frauenfeld TG* [photography]. Available at: http://www.heimatschutz.ch/index.php?id=964&no_cache=1&tx_ttnews%5Btt_news%5D=1831&cHash=57a261ea5d4c96864ff8ba3c0cf7fb01 [2020-09-07]

Figure 25: Zimmermann, D. (2016). *Dog in water* [photography]. Available at: https://www.google.com/maps/place/Murg-Auen-Park/@47.56245,8.89593,3a,75y,90t/data=!3m8!1e2!3m6!1sAF1QipNOAT-rYHfvQKeOlyMJD7t966gSaOYGGl08jrMh!2e10!3e12!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipNOAT-rYHfvQKeOlyMJD7t966gSaOYGGl08jrMh%3Dw203-h152-k-no!7i4618!8i3464!4m5!3m4!1s0x479a91f6202a4d9f:0xcc4b0ff94217b96d!8m2!3d47.5627661!4d8.8968525 [2020-09-07]

Figure 26: Stadt Frauenfeld (2016). *Geschäftsbericht und Rechnungen der Stadtverwaltung und ihrer Betriebe für das Jahr 2016* [photography]. Available at: https://docplayer.org/147875414-Umschlagbild-der-murg-auen-park-bietet-im-sommer-vielfaeltige-moeglichkeiten-zur-erholung.html [2020-09-07]

Figure 27: Caspari, D. (n.d.). *Murg-Auenpark Frauenfeld* [photography]. Available at: https://www.tagblatt.ch/ostschweiz/frauenfeld-munchwilen/bildstrecke/ld.572370 [2020-09-07]

Figure 28: Beerli, D. (2016). *Der Murg-Auen-Park in Frauenfeld bietet Raum für alle* [photography]. Available at: https://www.tagblatt.ch/ostschweiz/frauenfeld-munchwilen/im-murg-auen-park-trifft-mensch-auf-natur-ld.772541 [2020-09-07]

Figure 29: Forte, M. (2016). *Die Murg im Murgauenpark in Frauenfeld, TG (2016)* [photography]. Available at: https://plattform-renaturierung.ch/wp-content/uploads/2018/02/Frauenfeld_TG_5.jpg [2020-09-07]

Figure 30: Caspari, D. (n.d.). *Murg-Auenpark Frauenfeld* [photography]. Available at: https://www.tagblatt.ch/ostschweiz/frauenfeld-munchwilen/bildstrecke/ld.572370 [2020-09-07]

Figure 31: bhateam (n.d.). *Referenz Murg-Auen-Park, Frauenfeld* [photography]. Available at: https://www.bhateam.ch/img/referenzen/102/Referenz_102.pdf [2020-09-07]

Figure 32: Müller, Q. (2017). *Überwucherte Brücke* [photography]. Available at: https://www.google.com/maps/place/Murg-Auen-Park/@47.56245,8.89593,3a,75y,90t/data=!3m8!1e2!3m6!1sAF1QipPluwdmJkvLPRenMpFrADQBruiGlhGb8XYbw4sN!2e10!3e12!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipPluwdmJkvLPRenMpFrADQBruiGlhGb8XYbw4sN%3Dw203-h152-k-no!7i4160!8i3120!4m5!3m4!1s0x479a91f6202a4d9f:0xcc4b0ff94217b96d!8m2!3d47.5627661!4d8.8968525 [2020-09-07]

Case Study: De Ceuvel

Figure 1: De Ceuvel (2020). *Metabolic Lab* [photography]. Available at: https://deceuvel.nl/wp-content/uploads/2020/03/metabolic-lab-1025x680.jpg [2020-09-07]

Figure 2: Space&Matter (2020). *De Ceuvel* [photography]. Available at: http://www.spaceandmatter.nl/de-ceuvel [2020-09-07]

Figure 3: DELVA Landscape Architects (2020). *De Ceuvel - Amsterdam* [photography]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 4: DELVA Landscape Architects (2020). *De Ceuvel - Amsterdam* [photography]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 5: Heinkelmann, A. (2020). *Aerial view of location* [illustration]; Background Image: Google Earth (2020). *De Ceuvel [cartographic visualization].* Available at: https://earth.google.com/web/search/De+Ceuvel,+Witbolstraat,+Amsterdam,+Niederlande/@52.39342743,4.91136012,-1.74567151a,356.81177167d,35y,51.12508842h,43.8630464t,360r/data=CpoBGnASagoIMHg0N2M2MDg0ZWY5ZmEwN2Y3OjB4MjhiZTI5MDQyYzQxNjU2MRIgLvNniTJKQCEb4aO07aITQCovRGUgQ2V1dmVsLCBXaXRib2xzdHJhYXQsIEFtc3RlcmRhbSwgTmllZGVybGFuZGUYASABIiYKJAnqdATt1RpIQBHlyNxo6H5HQBmfUUfRgfYkQCEoct1Ovu0cQA [2020-09-07]

Figure 6: Space&Matter (2020). *De Ceuvel* [photography]. Available at: https://archello.com/story/18390/attachments/photos-videos/3 [2020-09-07]

Figure 7: DELVA Landscape Architects & Space&Matter (2020). *De Ceuvel - Amsterdam* [design document]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 8: DELVA Landscape Architects & Space&Matter (2020). *De Ceuvel - Amsterdam* [design document]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 9: Space&Matter (2020). *De Ceuvel* [illustration]. Available at: https://deceuvel.nl/wp-content/uploads/2017/05/18237860_1441925212496238_2078798391809747755_o-1200x674.jpg [2020-09-07]

Figure 10: Spectral (2020). *Project Site* [photography]. Available at: https://spectral.energy/news-3/jouliette-at-deceuvel/ [2020-09-07]

Figure 11: Heinkelmann, A. (2020). *De Ceuvel Design* [Sketch].

Figure 12: Heinkelmann, A. (2020). *Site Valorization* [Sketch].

Figure 13: Metabolic, Studioninedots, & DELVA Landscape Architects (2014). *Immobile Pollution* [design document]. Transitioning Amsterdam to a Circular City — Circular Buiksloterham. Available at: https://issuu.com/DELVAlandscape/docs/circularbuiksloterham_eng_full_repo/76

Figure 14: DELVA Landscape Architects (2020). *Ruimtelijk Raamwerk Buiksloterham - Amsterdam* [design document]. Available at: https://DELVA.la/projecten/landschap/ruimtelijk-raamwerk-groenvisie-buiksloterham/ [2020-09-07]

Figure 15: DELVA Landscape Architects (2020). *Ruimtelijk Raamwerk Buiksloterham - Amsterdam* [design document]. Available at: https://DELVA.la/projecten/landschap/ruimtelijk-raamwerk-groenvisie-buiksloterham/ [2020-09-07]

Figure 16: Nature Education (2011). *Schematic model of different phytoremediation technologies involving removal and containment of contaminants* [illustration]. Available at: https://www.nature.com/scitable/knowledge/library/phytoremediation-17359669/ [2020-09-07]

Figure 17: DELVA Landscape Architects (2020). *De Ceuvel - Amsterdam* [design document]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 18: De Ceuvel (2018). *De Ceuvel* [photography]. Available at: https://deceuvel.nl/wp-content/uploads/2019/11/CEUV042-DOtk-Jaarverslag-2018_compressed.pdf [2020-09-07]

Figure 19: De Ceuvel (2018). *De Ceuvel* [photography]. Available at: https://deceuvel.nl/wp-content/uploads/2019/11/CEUV042-DOtk-Jaarverslag-2018_compressed.pdf [2020-09-07]

Figure 20: DELVA Landscape Architects (2020). *De Ceuvel* [photography]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 21: DELVA Landscape Architects (2020). *De Ceuvel - Amsterdam* [design document]. Available at: https://delva.la/projecten/de-ceuvel/ [2020-09-07]

Figure 22: Metabolic (2013). *De Ceuvel // Final Material Flows* [illustration]. Available at: https://www.metabolic.nl/publications/cleantech-playground/ [2020-09-07]

Case Study: Skanderbeg Square

Figure 1: Dujardin, F. (2017). *View of Skanderbeg Square* [photography]. Available at: https://www.miesarch.com/work/4190 [2020-09-07]

Figure 2: Dujardin, F. (2017). *Skanderbeg Square* [photography]. Available at: https://crit.cc/?work=012-Skanderbeg-square [2020-09-07]

Figure 3: Plant en Houtgoed BVB (2019). *Skanderbeg Square* [photography]. Available at: https://www.plantenhoutgoed.be/projects/Skanderbeg-square [2020-09-07]

Figure 4: Dujardin, F. (n.d.). *The openness of the square experienced from the National Theater's galleria* [photography]. Available at: https://www.miesarch.com/work/4190 [2020-09-07]

Figure 5: Heinkelmann, A. (2020). *Aerial view of location* [illustration]; Background Image: Google Earth (2020). *Skanderbeg Square [cartographic visualization].* Available at: https://earth.google.com/web/search/Tirana/@41.3296651,19.82022668,112.45436227a,1727.82810173d,35y,-0h,0t,0r/data=CnAaRhJACiQweDEzNTAzMTA0NzBmYWM1ZGI6MHg0MDA5MmFmMTA2NTM3MjAZLTgoBu2pREAhSEuKNJbRM0AqBlRpcmFuYRgBIAEiJgokCWgYQALGMkpAETpBHpAiMkpAGZifEx6GqhNAISgleFlfohNA [2020-09-07]

Figure 6: Pustina, H. (2019). *Albania Politics* [photography]. Available at: https://uk.news.yahoo.com/ap-interview-albania-pm-says-144708746.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAHDsKnS8ZLcvAosgfP0AvwVdYW-C7h22xTO89Lhli6-hpX4kOUyRssGxNstfXuSy3k0pfxt_8bCYExX1gtfiEywX60QNFR8vLEFumWwH2Et_y59kgVehCcRprBZrD4lhvQ7bY9ju7Q-ogeQdtHAY3l-UvW5NE78GYrZhpR2HCam5 [2020-09-07]

Figure 7: 51N4E (n.d.). *Concept Perspective* [video]. Available at: https://www.youtube.com/watch?v=cpg3jll5CmQ [2020-09-07]

Figure 8: 51N4E (n.d.). *Concept Perspective* [video]. Available at: https://www.youtube.com/watch?v=cpg3jll5CmQ [2020-09-07]

Figure 9: 51N4E (n.d.). *Skanderbeg Square* [design document]. Available at: https://www.archdaily.com/911980/skanderbeg-square-51n4e/5c6ebc2a284dd1b482000027-skanderbeg-square-51n4e-?next_project=no [2020-09-07]

Figure 10: 51N4E & Belzer, S. (2017). *Perspective* [design document]. Available at: ISBN-10: 9492474301

Figure 11: 51N4E & Belzer, S. (2017). *Perspective* [design document]. Available at: ISBN-10: 9492474301

Figure 12: Heinkelmann, A. (2020). *Interpretation Masterplan* [sketch]; Background: 51N4E (2020). *Master Plan* [design document]. Available at: https://www.51n4e.com/projects/skanderbeg-square [2020-09-07]

Figure 13: Heinkelmann, A. (2020). *Interpretation Context* [sketch]; Background: OpenStreetMap (2020). *Tirana*. https://www.mapz.com/map#next=%2Fexport%2Fcreate%3Fwith_layers%3Dtrue%26view%3Ddownload [2020-09-07]

Figure 14: 51N4E (2020). *Skanderbeg Square* [design document]. Available at: https://www.51n4e.com/projects/skanderbeg-square [2020-09-07]

Figure 15: 51N4E (2017). *Floorscape* [design document]. Available at: ISBN-10: 9492474301

Figure 16: Heinkelmann, A. (2020). *Green and Grey* Areas [illustration].

Figure 17: 51N4E (2017). *Urban Plan* [design document]. Available at: ISBN-10: 9492474301

Figure 18: 27.al (n.d.). *ALBANIA. Tirana. 1995* [photography]. Available at: https://27.al/per-cdo-qeveri-nje-shesh-ri-transformimet-e-sheshit-skenderbej-nder-vite-foto/albania-tirana-1995/ [2020-09-07]

Figure 19: Milligan sumo, A. (2019). *Skanderbeg Square, Tirana* [photography]. Available at: https://www.flickr.com/photos/andrewmilligansumo/49593168493/in/photostream/ [2020-09-07]

Figure 20: Donati, O. (n.d.). *Skanderbeg Square* [photography]. Available at: https://twitter.com/VisitTirana/status/881115125872287745/photo/1 [2020-09-07]

Figure 21: Offbeat Destinations (n.d.). *One day in Tirana: Taking the Kotor to Tirana bus* [photography]. Available at: https://offbeat-destinations.com/albania-kotor-tirana-bus/ [2020-09-07]

Figure 22: Tirana Times (2020). *Skanderbeg Square, Tirana* [photography]. Available at: https://www.tiranatimes.com/?p=144801 [2020-09-07]

Figure 23: imgur (2017). *Christmas tree and market in the Skanderbeg Square of Tirana, Albania* [photography]. Available at: https://imgur.com/C13QOS7 [2020-09-07]

Figure 24: Kambo, B. (2017). *Friday Prayer on the Square* [photography]. Available at: ISBN-10: 9492474301

Figure 25: Kambo, B. (2017). *Crowded summer evening* [photography]. Available at: ISBN-10: 9492474301

Abbreviations

CoE	Council of Europe
ES	Ecosystem Service
EEA	European Economic Area
EPA	Environmental Protection Agency
IFLA	International Federation of Landscape Architects Europe
IUCN	Union of Conservation Scientists
LAE	Landscape Architecture Foundation
LAE #5	Landscape Architecture Europe #5 Book
MEA	Millennium Ecosystem Assessment
SDG	Sustainability Development Goal
SRM	Sustainable Resource Management
UN	United Nations
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WWF	World Wide Fund for Nature

1 Introduction

1.1 Motivation

Nature has no waste. This statement can be traced back to the fact that nature is self-sustaining and thus manages itself (cf. Miller & Spoolman, 2011, p. 6). It has perfected a natural metabolism of a balanced circulation system (Böhm et al., 2011, p. 153). Nature's resources[1] are always reused as substance for other organisms while energy and nutrients flow continuously in closed-loop cycles of growth, decay, and rebirth (Yeler & Yeler, 2013, p. 3). Therefore, nature cannot show wasteful behavior.

Human life is dependent upon the stable and provisioning state of the earth (EEA, 2015; Prior et al., 2012, p. 577). However, the planet has changed considerably in the past two centuries due to human activity. Mankind has intervened in the natural cycles with an increasingly wasteful and impetuous behavior. This can be traced back to several aspects. The global population has been growing rapidly. This entailed a change in lifestyle, urbanization, and high economic activity. Environmental concerns were insufficiently integrated into planning. Resources were dematerialized with the only remaining value being in the price. All this led to a growing demand and exploitation of natural resources for production and consumption. The most pressing issue, thereby, lies in the subsequent change in ecosystems and the drastic loss of global biodiversity. Natural resources have been exploited in a rhythm that was faster than nature was able to counterbalance[2]. As a result, the planet is experiencing what is referred to as a global environmental/ecological crisis (McCartney et al., 2015, p. 1; Agudelo-Vera et al., 2011, p. 2295 ff.; MEA, 2005, p. 1 f.; Schott, 2004, p. 525).

These fundamental challenges lie in the core systems of society (Jackson et al., 2014, p. 2). This shows that a shift towards the sole use of renewable natural resources should occur. Simultaneously, the no longer tenable extraction and consumption of finite resources needs to be phased out. Ideally, the human-invented concept of waste is to be abandoned altogether (cf. EMF, 2017, 2013, p. 7).

Especially urbanized societies show increasingly untenable actions and structures (Batty, 2008, p. 769). Cities occupy 2% of the global land surface. However, 55% of the world's population lives in urban areas. It is assumed that this proportion will rise to 68% by 2050. As a consequence, cities use approximately 75% of the world's natural resource consumption (UN, 2020e; UNEP, 2013, p. 7). What is even more alarming is that, according to the United Nations Environment Programme (UNEP) (2013, p. 7), most of the resources that support cities are non-renewable.

---

[1] Natural resources can be seen as natural assets (raw materials) occurring in nature that can be used for economic production or consumption. A distinction between renewable and non-renewable natural resources can be made (UN, 1997, p. 51).

[2] The depletion of the world's natural resources is called environmental degradation (El-Haggar, 2007, p. 154).

This indicates that to solve the world's environmental problems one has to start in cities (cf. Brugmans & Strien, 2014, p. 2).

In the last decades, the international community has begun to counteract the man-made global crisis by focusing on the common ideal of sustainable development (cf. 2030 Agenda). Despite this realization of responsibility, creating a sustainable state remains a challenge (cf. MEA, 2005, p. 1). Thus, this thesis argues that a more strategic management of resources is needed in order to move towards sustainability.

1.2 Lacking Focus on sustainable Management of Resources

In recapitulation, it can be stated that the world needs saving. This has to be done by humans as they are responsible for the present state of the earth. Hereto, this thesis looks at the profession of landscape architecture. A multitude of the present environmental and societal challenges (e.g. climate change, environmental degradation, energy needs, urbanization) lie within the scope of landscape architects (cf. Meijering et al., 2015, p. 1; Swaffield & Deming, 2011, p. 34). They work at the interface of socio-ecological, socio-political, and socio-economic issues (cf. De Block et al., 2020, p. 3). Therefore, they mediate not only between humans and humans but also between humans and nature. For this reason, it can be argued that landscape architects have the competence to contribute to transformative change. Sustainability has become a central topic in this discipline. In this context, it is puzzling to see that neither scholarship nor practice seems to have paid particular attention to sustainability in terms of resource management (cf. Nawre, 2016).

Firstly, scholarship on sustainable planning, design, and management lacks theoretical concepts to grasp sustainable resource-use. This can be ascribed to a central limitation of the profession. It has historically focused on professional practice. There is, thus, no longstanding research tradition (Meijering et al., 2015, p. 2). In present time, scholarship regards the need to deal with these global issues. However, emphasis is put on creating sustainability through design. The steps before and after the initial project implementation are often neglected (cf. Dempsey & Burton, 2012, p. 12). In addition, the actual value of resources is not always taken into account. More research is, hence, needed on how to make better decisions in landscape planning, design, and management (cf. Swaffield & Deming, 2011, p. 35). This thesis aims to contribute to this. It lays the focus on the management of resources in the urban area. Secondly, practitioners aim to create a sustainable design. However, in reference to the problem identified in scholarship, their perspective sometimes is too narrow. It can be assumed that a variance in the level of sustainability-oriented resource management is found in landscape practice.

Therefore the question arises how current landscape architecture studios implement sustainable resource management.

1.3 Reader's Guide

To answer the research question, the thesis proceeds as follows. In a first step, **Chapter 2** provides a conceptualization of sustainable resource management (SRM). The second step suggests to differentiate between three SRM types: environmental type, economic type, and social type.

Chapter 3 introduces the research design. Distinct theoretical expectations about the characteristics of the SRM types are deduced in an analytical framework. This is a methodological tool that enables a systematic analysis of landscape architecture projects. Qualitative case studies of extreme cases are chosen for this. These are based on interviews with key actors, design documents, different forms of visuals, analytical sketches, literature, the internet, and practitioners' journals.

Chapter 4 is dedicated to the study of the three selected cases. Each of the cases lends itself to one of the three SRM types. Firstly, the project Murg-Auen-Park follows the environmental type. Secondly, the project De Ceuvel follows the economic type. Thirdly, the project Skanderbeg Square follows the social type. The chapter ends with a comparison and discussion of the findings.

Chapter 5 concludes by, firstly, summarizing the argument and key findings. Secondly, it discusses the limitations of the analysis and its generalizability beyond the studied cases. Finally, implications of this thesis for the landscape architecture practice are outlined.

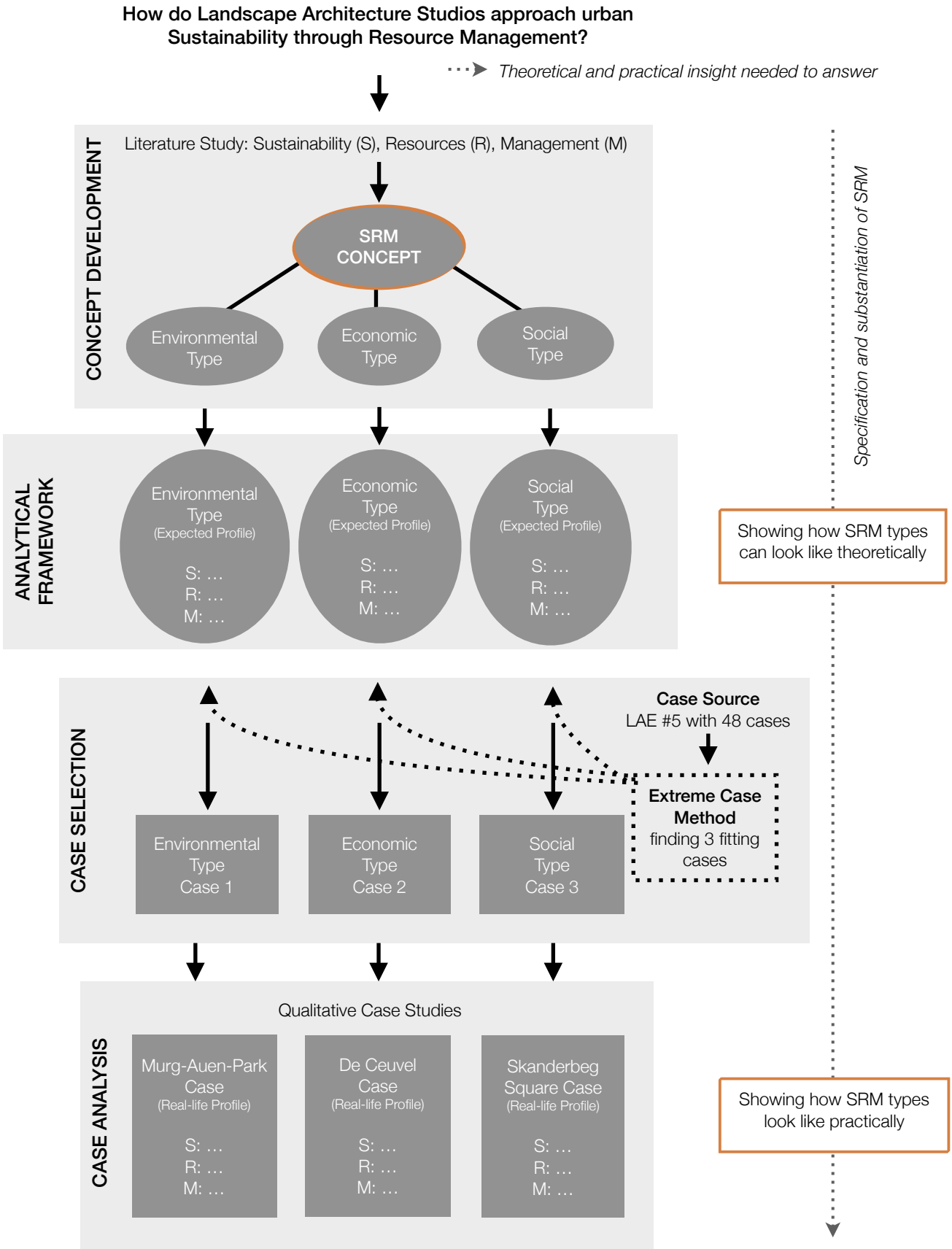

Figure 1: Overview of thesis structure (Heinkelmann, 2020)

2 Theoretical Framework

2.1 Defining Sustainable Resource Management (SRM)

SRM addresses how resources need to be managed within the course of a project to achieve sustainable landscape architecture. Until now, neither resources nor their management have been concretely defined in the profession in the context of sustainability. Hence, a conceptualization is conducted to provide a working definition of SRM for the scope of this thesis.

SRM Concept:
SRM means that the choice and utilization of resources within today's landscape architecture does not endanger the present and future functioning of nature and society. The overall aim lies in counteracting environmental degradation to stay within the earth's carrying capacity. For this, a balanced relationship between social and economic activities is needed while the integrity of nature is preserved. Resource efficiency is achieved when the project's adaptability to the future is guaranteed throughout its course. This requires a far-sighted perspective on resources and their management in view of the social and natural conditions. Three types of resources lie within the profession's field of activity: natural, human, and man-made.

2.2 Dimensions of SRM

The terms sustainability, resources, and management are identified as key comparative dimensions/ distinguishing features of SRM. A literature study elaborates how they underlie the concept.

2.2.1 Sustainability

The SRM concept draws on two understandings of sustainability. First, the World Commission on Environment and Development (WCED) (1987, p. 37), also known as Brundtland Report, describes sustainable development as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*". This definition shows the necessity to develop a long-term perspective. In addition, the Union of Conservation Scientists (IUCN), United Nations Environment Programme (UNEP) and World Wide Fund for Nature (WWF) (1991, p. 10) define sustainable development as something that improves "*the quality of human life while living within the carrying capacity of supporting ecosystems*". Here, the need to regard the environmental viability is emphasized.

The SRM concept refers to the policy of the 2030 Agenda due to its topicality and wide acceptance. The 2030 Agenda was introduced in 2015 by the United Nations (UN) as universal agreement on sustainable development. It presents the current plan of action.

A global framework of 17 sustainability development goals (SDGs) was set out to achieve a sustainable and resilient society until the year 2030 (UN, 2020c; EC, 2015). For the scope of SRM, a focus is laid on SDG 11 "*sustainable cities and communities*" and SDG 12 "*responsible consumption and production*". It has to be noted that the policy lacks sufficient elaboration on how the suggested SDGs can be translated into physical projects. This is especially problematic at local level (cf. LAE, 2018, p. 14). It is often up to the landscape architect to identify ways to implement forms of sustainability.

Over time, sustainability has been categorized in many ways in the academic world. For instance, the 2030 Agenda revolves around '*people, planet, prosperity, peace, partnership'* (UN, 2020d). However, the SRM concept builds upon the Brundtland Report's widely accepted sustainability dimensions '*environmental, economic, social*'. This is considered a solid and sufficient basis for the scope of the thesis. In retrospect, sustainable development has continued to be dictated by economic growth (Díaz et al., 2018, p. 271). To achieve SRM, it is vital to treat the three sustainability dimensions equally.

2.2.2 Resources

Landscape architecture is intended to benefit people. Therefore, initially resources are to be regarded from an anthropocentric perspective. From this viewpoint, naturally occurring materials and energy become resources when humans put value in them and see potential gain for their economic, material or spiritual well-being. Thus, a resource becomes a cultural concept and its uses and related values change from culture to culture and time to time (Miller & Spoolman, 2011, p. 6; Uzoma, n.d., p. 1). However, ecological components are an essential part of the discipline. Therefore, the intrinsic value of nature should also be considered. In order for a project to function, the specific needs of resources for flora (e.g. sunlight, nutrients, pollination) and fauna (e.g. food, water, territory) have to be met as well. This concludes that SRM is best achieved from a holistic perspective.

Hitherto, resources have been divided either according to their human or natural origin. Natural resources comprise of materials or energy constituted in nature. They can be classified according to (1) renewability (renewable, non-renewable, cyclic), (2) origin (biotic, abiotic) and (3) utility (energy: replenishable, non-replenishable; raw materials: minerals, vegetation, food). The sun is the only perpetual energy whereas renewable resources (e.g. water, vegetation) need a certain time span for replenishment. Renewable energy is generated through sunlight, wind, rain, tides, biomass, and geothermal heat. Non-renewable energy originates from fossil fuels. Natural resources are of interest to humans in terms of their use, availability, and potential for consumption and depletion (EESC, 2011, p. 100, 120, Miller & Spoolman, 2011, p. 11; Uzoma, n.d., p. 3). Until now, human resources are defined as such only in the economic sector. Here, they are either the function in an organization that deals with its people and issues related to them or the labor force themselves (Heathfield, 2020). The ecological approach to landscape architecture argues that design should mostly depend on natural resources to achieve sustainability (cf. Çelik, 2013).

The concept of SRM opposes this stance as importance is ascribed to the human as a resource. The reason for this is that a project is created by people and is principally intended for people (cf. Jansson et al., 2020, pp.11-29).

For the scope of SRM, three types of resources are defined: natural, human, and man-made. Human and man-made resources can be collectively considered as societal resources. The use of resources in the discipline can generally be answered with '*who and what does one need to create a sustainable project'.*

- **Natural resource:** the material or energy that occurs naturally as part of earth's system. It is neither dependent on nor made by humans. An intrinsic value needs to be ascribed to it.
  - e.g.: natural energy (wind, solar), flora, fauna, minerals, water, soil, climate
- **Human resource:** the immaterial characteristics of people. It shapes a person and has direct influence on the behavior.
  - e.g.: genetics, mindset, knowledge (human ingenuity, memories), skill set, emotions (sentiment), energy (willpower), cultural and societal influence (social norms, laws, values, religion, upbringing), influence of the past (attitude)
- **Man-made resource:** the activity, tangible material or system that is invented and carried out by humans. It is often the result of the interplay of natural and human resources.
  - e.g.: technological ingenuity, financing, timeframe, transportation, waste generation, built structures (architecture, infrastructure), exerted behavior and energy (manpower, labor), habitual patterns and customs, communicating documents (visualizations, plans)

Humans make use of nature's system to gain and manage resources. These indirect and direct "*benefits people obtain from ecosystems*" (MEA, 2005, p. 40) are called ecosystem services (ESs). They are commonly categorized in provisioning, regulating, cultural, and supporting[3], as stated in the Millennium Ecosystem Assessment. Supporting services are the basis of the other services while provisioning, regulating, and cultural services directly affect humans (ibid.). The anthropocentric concept of ESs is a crucial bridge between society and environment as it demonstrates the dependence of human needs and well-being on natural resources (McCartney et al., 2015, p. 1; Wu, 2013, p. 1007). Landscape architecture can be seen as a cultural profession. Hence, SRM opposes the discussion of nature first. It orientates on the six types of cultural ESs that have been introduced by De Groot et al. (2010, p. 263 f.):

- Esthetic (e.g. appreciation of natural scenery, other than through deliberate recreational activities)
- Recreational (e.g. opportunities for tourism and recreational activities)
- Inspiration for culture, art, design
- Cultural heritage and identity (e.g. sense of place and belonging)
- Spiritual and religious inspiration

3 Provisioning services (consist of food, water, timber, fiber), regulating services (affect climate, floods, disease, wastes, water quality), cultural services (provide recreational, aesthetic, spiritual benefits), supporting services (consist of soil formation, photosynthesis, nutrient cycling) (MEA, 2005, p. 40)

- Education and science (e.g. opportunities for formal and informal education and training)

It is notable that a coherent approach on how to integrate the concept of ESs in the landscape architecture practice is presently lacking (De Groot et al., 2010, p. 260).

There is a perceived nature-culture-dualism. It follows the modern assumption that humans are not an inherent part of nature as they show unique qualities. As a result, nature is seen as a separate sphere to society (Sanders, 2014, p. 1). This is among other things responsible for the increasing devaluation and indifference toward the natural environment and its resources. The dichotomy is especially present in the urban realm (Soga & Gaston, 2016, p. 94). However, there is a renewed understanding of how much the human is part of an indeterminate, non-linear system and is interwoven with nature (De Block & Vicenzotti, 2018, p. 150). In reaction, two paradigms can be seen (Jansson & Randrup, 2020, p. 8): on the one hand, the wish to protect the natural environment by reducing the production and consumption of resources and therefore the need to change the basis of human development by limiting economic growth. On the other hand, the wish to continue as before despite having an affinity towards nature. SRM has the aim to alleviate this dichotomy. It takes the position that a more robust future can only be created if people respect and work together with nature.

In the last decades, a 'post-human' discourse emerged in the profession. It regards whether resource-use and design should be apprehended from a biologistic[4] perspective to counteract the aforementioned nature-culture-dualism and catalyze a sustainability-driven mindset. In contemporary discourses, such as Landscape Urbanism and Ecological Urbanism, socio-nature is reduced to a biological/ecological perspective to enhance natural formation processes (De Block, 2015, p. 379). This suggests that landscape architects decentralize socio-political concerns to equate humans and non-humans. However, if esthetics are excluded, the profession runs the risk of further depoliticizing its very idea of design (De Block & Vicenzotti, 2018, p. 150). There is a danger that landscape architecture is trivialized as a practice of ornamentation if too much emphasis is placed on its visual form or if the landscape architect only concentrates on leaving a signature (cf. Meyer, 2008, p. 6, 8). Nevertheless, landscape architecture is primarily intended for humans. The urban landscape is composed of both bio-physical and socio-cultural structures (Wu, 2013, p. 1009). Hence, SRM opposes the position of 'nature first' and puts esthetics back on the landscape agenda. Landscape architecture must not only create a balanced socio-ecological perspective. It is also crucial to regard socio-political and socio-economic issues.

[4] Biologism stands for analyzing social situations by using biological explanations (Merriam-Webster, 2020a).

2.2.3 Management

The term resource management lacks a formal definition in the design discipline. Until now, it is only present in economics (Agudelo-Vera et al., 2011, p. 2296). There, it is seen as the process of planning, scheduling, and allocating resources in a way that maximizes their efficiency (GANTTIC, 2020). Economics estimate the monetary value of ecosystem services flows (Díaz et al., 2018, p. 271). It is possible to use the tactics of the economic sector if the scope of what is interpreted as a resource is extended to what landscape architects can now identify as societal resources. The important issue lies in finding ways on how to use ESs to facilitate socio-economic development without damaging ecosystems (cf. McCartney et al., 2015, p. 1).

Management within a landscape context can be interpreted in many ways. The existing term 'natural resource management' focusses on how major natural resources/ESs are managed by society (Epstein, 2020). SRM, however, aims at a more multifaceted perspective on resources. For this, it is drawn on the European Landscape Convention of the Council of Europe's (CE) (2020) definition of landscape management as an "*action, from a perspective of sustainable development, to ensure the regular upkeep of a landscape, so as to guide and harmonise changes which are brought about by social, economic and environmental processes*". This definition has been chosen because it puts emphasis on the endeavor to create overall sustainability instead of other landscape management definitions which focus more on user needs.

Despite differing in complexity and scale, landscape architectural project development generally follows three phases: planning, design, and management (cf. Jansson et al., 2020, p. 11). Traditionally, projects are developed in a hierarchical and chronological order. This linear logic can be traced back to basing urban spaces on administrative and economic traditions (Jansson & Randrup, 2020, p. 9). After the realization through construction and planting, management practices are implemented as the final phase. Retrospectively, local government landscape management in Europe has been mainly concentrating on essential maintenance routines and short-term gains. This often resulted in a lack of far-sighted development, adequate work methods, and proper use of the existent site (ibid., p. 6; Dempsey & Burton, 2012, p. 11).

The linearity of the development phases and the lack of attention towards management is viewed critically in regard to the SRM concept. Landscape design can never be a 'fixed image frozen in time'. It is spatial and underlies dynamics. On the one hand, these are the living components (e.g. human user, vegetation, wildlife) that are incorporated in the design. On the other hand, predictable (e.g. changing seasons, plant growth) events as well as unpredictable natural (e.g. herbivory, neophytes) or man-induced events (e.g. vandalism) influence a project. This requires landscape architects to work with nature and acquire a long-term perspective. Hence, the current fragmented and rigid organizational structure has to be counteracted. Design and management activities should not be seen as separate entities.

Continuous, strategic, and adaptive management is needed to guarantee resource-efficiency (cf. MEA, 2005, p. 52). Landscape architects have to realize that the management phase already commences at the start of a project and lasts until its end. In this context, it is referred to Jansson's et al. (2020, p. 12) definition of urban open space management as "*strategic, inclusive and far-sighted approach of continued re-planning, re-design, re-construction and maintenanc*e". Only this ensures longevity of the used resources. It can be deduced that a flexible design and the resulting possibility of adjustments is crucial for the durability, efficiency, and sustainability of a project. Since landscape architects are forced to cope with constantly changing circumstances, they should stop looking for the ultimate solution (cf. Diedrich & Kahn, 2019, p. 13). Instead, projects should be interpreted more as processes. On another note, inclusiveness and integration helps strengthen a project. Bottom-up initiatives and collaborative work methods (e.g. interdisciplinary team, public participation) that are initiated already at the beginning of a project should be encouraged.

It has been elaborated that an unapt focus and understanding of the management phase results in an ongoing waste of resources (e.g. refurbishment, new plantings, need for users to accept redesign). A strong example of how resources are currently wasted in landscape design is the tabula rasa approach. This modern strategy of 'emptiness' aims to blur all specificity off a site in order to build a new urban identity (cf. Mehan, 2017, p. 211). Such designs have led to an increasingly normative, generic style in the landscape architecture practice. In the process of urban transformation, discarding resources also often ends in gentrification. For this reason, they can be criticized as a waste of resources to a highly unsustainable extent. This can be claimed as a site is never a 'blank canvas' but the product of all three resource types. Hence, a contextual and incremental approach can be seen as more suitable urban transformation tool. By making use of existing natural (e.g. gnarled tree for climbing), man-made (e.g. murals), and human resources (e.g. attached memories), the history and identity of a site is kept alive.

The following illustration (Figure 2) conceptualizes how a project could be ideally developed. The first graphic illustrates that the past can be interpreted as certain while the future is unpredictable. The project is always situated inbetween. The second graphic shows that landscape architecture studios often regard their project as a closed entity. Regardless, the past and future always exert influence on it. This often results in complications and inefficiencies (e.g. resource waste) over the project course. The third graphic demonstrates an interpretation of how a sustainable project development could look like. It can be argued that a design is durable if it is interwoven in the past and future. It can be seen as merely a new layer that has been added to the context of the site. The resulting project should be a mixture of taking up the 'old', establishing the 'new', and leaving 'blank space' for adaptive capacity in regard to the future. The successful combination and maintenance of these components is to be achieved with strategic management.

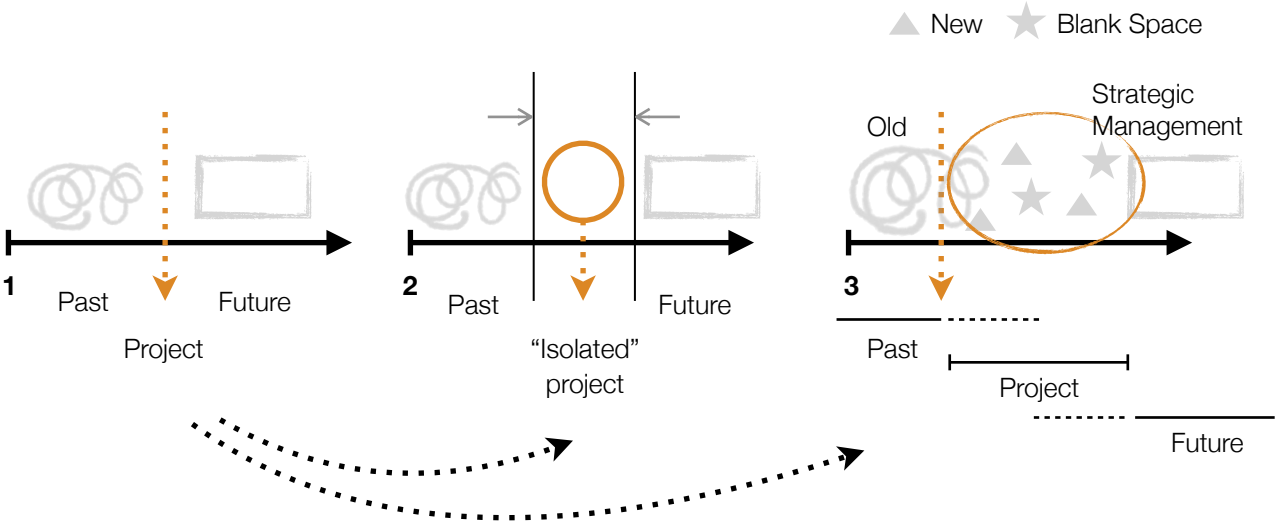

Figure 2: Forms of project development (Heinkelmann, 2020)

2.3 Three Types of SRM

All projects that encompass SRM entail — per definition — some notion of sustainability, some notion of resources, and some notion of management. However, they can work in very different ways. The main claim in this thesis is that the variations along these three dimensions (sustainability, resources, and management) cluster in three distinct types of SRM projects.

The starting point is that a landscape architect aspires to develop a sustainable design. Sustainability in the SRM concept has been defined as encompassing an environmental, ecologic, and social dimension. In theory, it is possible to maximize all dimensions within a project. However, it is argued that the sustainability dimensions cannot be fulfilled to the same extent in physical designs. In practice, factors such as existing knowledge and expertise, team constellation, site location, time, budget, natural and societal circumstances, and the uncertainty of the future hinder an equally qualitative realization. This means that a landscape architect must actively decide which dimension to mainly pursue and which will be less pronounced in the project. This claim takes shape when taking a closer look at realized designs. Here, the Danish landscape architecture studio SLA serves as an example. Its projects are marketed as future-oriented, novel, and resilient (cf. WLA, 2019). However, it is often mainly the environmental dimension that is addressed in the designs. This can be seen, for instance, in the St. Kjelds Square and Bryggervangen project (cf. Landezine International Landscape Award, 2020).

It can be concluded that various types of sustainable design occur in the physical world. This means that there are different types of SRM. Each come with other compatibilities. Depending on which aspect of sustainability a project aims to pursue, other resources and management tactics would be emphasized. That is why the SRM concept differentiates between three distinct types: environmental type, economic type, and social type.

These are certainly ideal types that do not always have to look like this in practice. There, they might blend, overlap et cetera. This division is identified as suitable pathway for providing a comprehensive and in-depth insight into how SRM takes shape in practice. In order to provide a well-founded answer to the research question, it was decided to examine each type individually and to propose appropriate ways to implement efficient resource management accordingly. In the following, the three SRM types are specified. On the basis of personal knowledge and the conducted literature study, estimates and assumptions about central aspects within the types are presented.

2.3.1 Environmental Type

The environmental type puts the focus on environmental sustainability. It is vital for humans to develop a responsible and balanced give-and-take relationship with nature. This means that the nature-culture-dualism is actively lessened within such projects. Landscape architects help keep humanity's actions within the planet's carrying capacity, for example, by promoting resource security, environmental justice, and greater environmental responsibility (cf. EPA, 2015). Projects are regarded most sustainable if the local landscape is brought (back) to its potential of being self-sufficient. If a project site already encompasses valuable ecological structures, less is often more when it comes to applying a design.

Based on the objective to safeguard and foster the local natural environment, emphasis lies on natural resources. The inherent value of nature is acknowledged. This means that all decisions within the project course are made taking into account the resulting environmental impact. For instance, the economic growth of a project has to be bound by the locations' environmental limits (cf. Morelli, 2011, p. 4; WCED, 1987, p. 38). However, since landscape architecture is intended for humans, the best possible interplay between human and natural design elements and resources is found. Landscape architects are aware that reestablishing or enhancing existing resource flows in natural systems brings benefits for both humans and non-humans. Examples of this are clean air and water. Moreover, biodiversity is not only protected but strengthened.

The management of projects aiming at environmental sustainability applies a strategic and reactive mode. Stabilizing or improving the environmental performance of the site usually creates less risks and gained benefits for the future. Landscape architects acknowledge that the more intact the natural system on the site, the less maintenance/management by humans is needed. An example for this is biological control through natural enemies instead of using pesticides. The project is held flexible thought its course to be able to adapt to nature's flux. The production of waste and pollution is minimized during the project course. This can, for instance, be done if everything is kept on-site and electric tools are used. The prevention of environmental damage might need additional implementations. Hereby, using technological systems is usually more expensive and less effective than combining them with or solely using natural processes. Environmental-friendly practices, such as only using native vegetation in the plant design, are standard in such a project.

Through generating awareness and public involvement in various project stages, site users are less likely to behave in a destructive way. On another note, climate change as a major uncertain variable and threat is adapted to and mitigated in every development stage through a collective effort. Examples for this are new strategies and policies, technologies, use of resources, and work methods.

2.3.2 Economic Type

The economic type puts focus on economic sustainability. Economics deals with how society manages the scarce resources to support human well-being (Britannica, 2020). However, economic growth and environmental degradation urgently need to be disentangled (cf. Preston, 2012, 1; p. Mason, 2011, p. 4). This is because modern industrialized economies over-produce for merely the sake of growth. As a result, mankind has continued to overshoot the global biocapacity[5] (Econation, 2020; Global Footprint Network, 2020a). A shift towards a 'circular economy' can be proposed in such projects. This model aims to reconcile the objectives of environmental stability and economic growth by relating them to contemporary and future resource scarcity. A circular economy builds upon societal as well as natural resources. For example, the circular functioning of natural ecosystems — see thesis statement 'nature has no waste' — is used as inspiration to develop regenerative and restorative economic systems (Rizos et al., 2017; Lieder & Rashid, 2016, p. 37; Preston, 2012, p. 2).

Based on the objective to create a socio-economic transformation, emphasis lies on societal resources. Existing materials on the site are viewed as resource repository. For instance, construction and demolition waste[6] (e.g. scrap metal, wood, copper) are reused or the established vegetation is not replaced with a new plant design. The more resource flows can be closed the more efficient and sustainable a project becomes in the long-term. Making use of existing natural and societal resources also entails less end-of-life costs[7]. It is clear to landscape architects that a responsible use of resources does not entail renunciation. On the contrary, it can result in financial savings (e.g. less disposal costs), greater acceptance (e.g. socially valued structures are preserved), and environmental benefits (e.g. ecosystems are left intact). Moreover, it can be claimed that the project budget does not justify unsustainable landscape development. The elements used in a design (e.g. furniture, playground, water feature) are regarded from the aspect of time and composition. At best, they are of high durable quality and designed for disassembly to ensure re-usability (e.g. modular, dismountable) (cf. EEA, 2020; Morelli, 2011, p. 6).

---

5 Biocapacity is the ecosystems' capacity to produce biological materials used by humans and to absorb waste generated by humans under current management schemes and extraction technologies (Global Footprint Network, 2020b).

6 Demolition waste is debris from the deconstruction of an architecture. Construction waste is unwanted material which is directly or incidentally produced during the construction process (EESC, 2011, p. 29, 35). Construction materials make up the largest waste stream in the EU (EEA, 2020).

7 End-of-life cost regards the disposal, termination or replacement of a material or service (EESC, 2011, p. 48).

The management of projects aiming at economic sustainability applies a strategic and active mode. This is to maximize the project's economic efficiency throughout its course. It can be made use of 'life cycle thinking'[8]. This concept regards the entire life span of a product instead of focussing on a specific part of the production and consumption chain (Singh, 2014). This is because each phase offers the potential to reduce a products' resource use and environmental impact as well as improve its performance (Life Cycle Initiative, 2020; Astrup Jensen & Remmen, 2006, p. 9). Landscape architects take up the mindset of 'return and renew' instead of the currently dominant model of 'take, make and dispose' (Ghisellini et al., 2016, p. 11; Astrup Jensen & Remmen, 2006, p. 60). An inspiration for this is the '9 Resources Framework' by Kirchherr et al. (2017, p. 224): refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, recover. The circular processes within the new economic model enable evaluations throughout the project course. Here, it is referred to Kahn and Diedrich's (2019, p. 15) claim that "L*everaging the inevitable gaps between projected change-visions and ever-changing development conditions reduces waste, saves money, produces knowledge on how to work smarter the next time*". The use of local resources is maximized. Resource-imports and the use of non-renewable resources are minimized (e.g. through take-back programs, modularity, reuse). For the duration of the project, the aim is to minimize pollution, waste generation, and transportation to and from the site. Technologies and methods that offer increased efficiency, higher productivity, less transport, and decreased pollution are applied (cf. EPA, 2015). Examples are off-grid systems (e.g. heating, cooling, sewage) and on-site management (e.g. wastewater treatment). Economic instruments (e.g. subsidies) can serve as incentives. Natural and technological approaches should be merged to combine strengths. Furthermore, by including local and regional companies and other key figures, the social and economic network is strengthened.

2.3.3 Social Type

The social type puts the focus on social sustainability. It regards the impact humans have on each other as well as on the natural environment. The enormous challenges society is facing require changes in the human behavior. As landscape architects design the living space of people, they hold a responsibility and active position to exert influence. Hence, sustainable landscape architecture should not only regard nature and esthetics but also social and ethical conditions. This is why maintaining and improving peoples' health, freedom, safety, equality, inclusion, and education is a core element of a project which has to be guaranteed in the long term (cf. EPA, 2015). It can be concluded that social sustainability needs to be considered within the self-perception of the discipline, in the workplace of landscape architects, and in their contact with society. As a result, the human and man-made resources at hand are improved and managed more efficiently.

[8] A life cycle constitutes from "*consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal"* (EESC, 2011, p. 24).

Based on the objective to develop strong structures for human activity, the emphasis is on societal resources. Landscape architects realize that they themselves are a resource. They have to take on several roles in order to design for sustainability (cf. LAE, 2018, p. 244 f.). They need to navigate on multiple levels regarding to political, social, ethical, environmental, and economic changes. They need to be mediators and activists who unite multiple actors to create a comprehensive project. They need to be educators and advocates towards the public and professionals. The underlying idea is to make knowledge accessible in all sectors of society to raise awareness and ultimately create behavioral change (cf. EPA, 2015). They need to raise awareness for a valorization of resources and a change in lifestyle and economy. Examples for this are encouraging pro-environment policies and general environmental consciousness. They need to be strategists who regard the present and future. An important example for this is the provision of intergenerational justice/security towards a resource (e.g. access to clean water, local recreation).

The management of projects aiming at social sustainability applies a strategic and reactive management mode. The work methods of landscape architects is altered. They collaborate across different fields to create an exchange of skills, resources, technologies, and knowledge. As knowledge mostly derives from practice, an active communication between scholarship and practitioners is striven for. A project is always surrounded by uncontrollable dynamics. So instead of looking for fixed solutions, landscape architects create flexible frameworks. If this uncertainty is accepted, future resource waste is automatically reduced (e.g. no need for replacing, replanting). SRM in practice involves interdependencies and is often complex. Hence, a multidisciplinary and skillful project team is required. This can be architects, civil engineers, nature conservationists, sociologists, and the site users themselves. On another note, social sustainability in the workplace consists of the following factors. Job availability is maintained and enforced. Decent labor standards, fair and safe working conditions, and a work-life-balance are guaranteed. Gender equality and other forms of equity are regarded. There is a no-discrimination policy. It can be concluded that diversity and contentment broaden the pool and quality of the human and man-made resources that will then be available to the studio. On another note, landscape architects cater for the range of users in order for a project to be valued and used. Engagement processes such as co-creation, public involvement et cetera are made use of. As the needs and wants of people are contextual and ever-changing, the design is adaptive to last a long time.

3 Research Design

3.1 Analytical Framework

The conceptualization is concluded by spelling out theoretical expectations/logics about the empirical manifestations of the three SRM types. They are summarized in table 1. This analytical framework is used as a methodological tool to systematize/structure the analysis of projects. Hence, already performed landscape architecture projects can now be scrutinized in regard to the SRM concept. The table demonstrates on to which degree a relationship is elaborated. Dependencies, interacting or rejecting causalities within the types and to each other become visible.

	Components	Environmental Type	Economic Type	Social Type
Sustainability	Emphasis on what SDG	SDG 11	SDG 12	SDG 11
Resources	Emphasis on what type of resource	Natural	Societal	Societal
	Emphasis on what type of ES besides supporting	Regulating	Provisioning	Regulating
	Emphasis on what categories of cultural ES	Esthetic; Recreational; Cultural heritage and identity	Inspiration for culture, art, and design; Education and science	Esthetic; Recreational; Inspiration for culture, art, and design; Cultural heritage and identity
	Emphasis on reducing the nature-culture-dualism	Yes	Yes	No
	Emphasis on esthetic-oriented or nature-oriented design	Nature	Esthetics	Esthetics
Management	Actively working with nature	Yes	Yes	No
	Project development	Dynamic	Dynamic	Linear
	Form of management	Reactive	Active	Reactive

Table 1: Theoretical expectations about the profiles of SRM types (Heinkelmann, 2020)

It is elaborated how these theoretical expectations of the SRM types come together:

- **Environmental type:** If landscape architects emphasize environmental sustainability, the nature on the site could be valuable from an ecological/biological perspective. This could be because it is sensitive (e.g. rare species), risky (e.g. prone to hazards), a heritage (e.g. historical, intergenerational importance) or otherwise structurally important (e.g. climate change mitigation, saving urban green

spaces). The orientation would then be on SDG 11, not 12. This is because the natural characteristics of the area would be safeguarded or enhanced instead of being primarily used for production and consumption. Landscape architects would need to put more emphasis on nature's self-sufficiency and inherent value. Hence, natural resources would be focal. Consequently, landscape architects would concentrate on regulating ESs to balance, strengthen or clean the project site. In this context, it is likely that nature would be preferred to man to a certain extent. It is important to lessen the nature-culture dichotomy to justify this. If the long-term functioning of nature is elemental, local natural processes would take precedence over esthetics in terms of the project design. Firstly, this would confront city dwellers to accept an unusual appearance to find recreation and esthetic. Secondly, this would reduce human maintenance activities. Instead, a dynamic management partnership of man and nature would emerge. For this, landscape architects would need to follow a reactive approach as nature transforms the site.

- **Economic type:** If landscape architects emphasize economic sustainability, a socio-economic transformation could play a central role in the project. Hence, SDG 12 would be pursued. Since the path towards a systemic economy change and sustainable society has not yet been sufficiently researched, the topics of experimentation, inspiration, and education would likely play key roles in the project. For this, landscape architects would need to interpret resources more from a holistic perspective. Natural and technological approaches would be merged to combine strengths. Hence, natural resources are made use of. Societal resources, however, would stay the driving forces within the project development. As an economically oriented project is interested in the material and energy outputs of ecosystems, landscape architects would make especially use of provisioning ESs. Ideally, the nature-culture-dualism is addressed to encourage a change in people's mindset and behavior. Accordingly, the project development would be more man-made rather than natural. Landscape architects would probably aim for an active and dynamic management to maximize the project's efficiency throughout its course.
- **Social type:** If landscape architects emphasize social sustainability, a strong framework for human activity could be aspired. The general focus is likely to lie on the needs and demands of city dwellers. Thus, SDG 11 would be pursued. To establish such a project, societal resources would be used more than natural ones. Ideally, landscape architects do not only strive for social sustainability regarding the site users but also within the overall project development. Socially oriented projects lean on regulating ESs to achieve the basis of human well-being (e.g. clean water and air, climate change adaption/mitigation). This kind of design would prioritize humans above nature. The esthetics of the site would, thus, be important. As a result, the nature-culture is not likely to be actively closed. The site would be intended for more or less intensive human use. It would, therefore, have to be managed strategically and reactively with regard to the circumstances taking place on the site. Depending on the figures that influence such a project, the project development could run the risk of being rather traditional.

3.2 Method of Case Selection

It was opted for extreme cases to illustrate the distinct logics of the three types of SRM. The necessity was seen for analyzing projects that have not been faded out by certain views and norms but strongly depict new perspectives and possibilities. This was to underline the urgency of taking big steps towards a transformative future. Hence, instead of drawing on a representative or random sample, near prefect empirical approximations of the theorized types were selected. The extreme cases allowed a rich, in-depth understanding of how different types of SRM manifest themselves empirically.

The analytical framework (See Table 1) enabled to identify suitable cases. One case per type was selected. The specific proceeding was as follows:

(1) "*Landscape Architecture Europe #5 care/create/act*" (LAE #5) from the year 2018 was used as basis. This was the current edition of a series of publications by the Landscape Architecture Europe Foundation (LAE) and supported by the International Federation of Landscape Architects Europe (IFLA). The book series distinguishes itself with theoretical and empirical topicality alongside a critical stance. The edition presented a well-recognized collection of 48 contemporary, sustainability-oriented projects. The selection criteria for these projects were the studios' stance on the concepts of nature and democracy as well as their political approaches that enabled them to interpret, and thus implement, sustainability in novel ways (LAE, 2018, p. 15).

(2) The LAE #5 cases lacked a reference to resource management. After a superficial analysis of all cases, three were identified that generally aim at either the environmental, economic or social sustainability dimension. These three showed the most promising propositions of all projects to fuel a new comprehension of resource management. This was because resource-oriented working methods and alternative forms of management were highlighted with particular strength.

Selected Cases:

- Environmental type: Murg-Auen-Park, Staufer&Hasler and Martin Klauser, Frauenfeld, Switzerland
- Economic type: De Ceuvel, DELVA Landscape Architects and Space&Matter, Amsterdam, Netherlands
- Social type: Skanderbeg Square, 51N4E, Tirana, Albania

The cases were similar in regard to their praised approach to sustainability. They were located in Europe. All of them were public areas in the city center. They were the product of an interdisciplinary project team and have been implemented within the last couple of years.

The cases differed in regard to their objectives. Murg-Auen-Park was a mixture of public park and renaturalization. De Ceuvel was an industrial and economic redevelopment. Skanderbeg Square was a redesign of a central square. They had different scopes, sizes, and amount of funding.

3.3 Method of Case Analysis and Data Collection

Qualitative case studies were conducted to assess whether the three cases corresponded to the SRM types. The proximity to reality that a qualitative case study approach entails provided the reader with concrete and practical knowledge. As argued by Flyvbjerg (2006, p. 7), it is this context-dependent knowledge and experience that builds the core of one's expertise.

The analytical framework enabled a systematic analysis. Hence, the case studies were structured according to the key dimensions sustainability, resources, and management. The aim of the analysis did not lie in 'box-ticking' or giving grades to a supposed performance on resource-efficiency. The critique of each case was produced in a human science tradition. Hence, a narrative and interpretative approach was chosen. In regard to this, it was proceeded in a critical, reflective, and transparent way. The studies also gained objectivity by including visuals.

Each case study was based on sources comprising literature, articles from practitioners' journals, the internet, original project documents (e.g. plans and brochures), visuals, and interviews with key figures. LAE #5 served as outset. It was not possible to interview the respective landscape architects of the projects. However, two other reliable figures were found. Mark Hendriks was interviewed about the projects De Ceuvel and Skanderbeg Square. Under the name Tekstlandschap, he works as a journalist, editor, and author in the field of urban and spatial planning as well as landscape architecture. He was one of the authors of LAE #5. Pierre Michel was interviewed about the project Murg-Auen-Park. He is an architect in the studio Staufer&Hasler Architekten. The interview with Mark Hendriks took place via Skype. Pierre Michel was interviewed over a telephone conversation. Both interviews lasted approximately one hour and were conducted in a non-structured way. The interviewees were asked for their personal and critical opinion. Through their expertise and personal visits on the location, they were able to provide valuable insights into the projects. Moreover, professional photographs were included in the case study to support the author's reflections on the project. This was important since a personal site visit was not possible. Interpretative illustrations based on the author's personal knowledge in the field rounded the analysis off.

In the following, the individual components of each case study are presented:

- **Murg-Auen-Park**: The main literary sources were espazium, Schweizerische Bauzeitung, Hochparterre, anthos, and Schweizer Heimatschutz. The main web source was the website of Staufer&Hasler. The design documents were drawn from Staufer&Hasler. The interview with Pierre Michel provided valuable information on the project development phases as well as on the social and ecological circumstances that have and continue to influence the project. It was amongst others made use of geodata maps. The source for this was ThurGIS. The aim was to analyze the history, the characteristics, and the interaction of the site with its surroundings.

- **De Ceuvel:** The main literary sources were the reports "*Cleantech Playground — a cleantech utility in Amsterdam North*" by Metabolic (2013) and "*Transitioning Amsterdam to a Circular City — Circular Buiksloterham*" by Metabolic, Studioninedots, and DELVA Landscape Architects (2014). The main web sources were the websites of DELVA Landscape Architects, De Ceuvel, Space&Matter, and Spectral. The design documents were mostly drawn from DELVA Landscape Architects and Metabolic. The interview with Mark Hendriks provided insight into the initial project development and its relationship to the district and rest of the city. It was amongst others made use of photographs, graphic illustrations, and maps. The aim was to illustrate the dynamic and far-sighted processes as well as the site's unique atmosphere. The project was developed in a collaborative team effort. This is why the entire project was investigated and not just the Purifying Park as main landscape component.
- **Skanderbeg Square:** The main literary source is the book "*Chapter 1 Skanderbeg Square, Tirana*" by 51N4E (2017). The main web sources were the websites of 51N4E, ArchDaily, European Union Prize for Contemporary Architecture – Mies van der Rohe Award, and European Prize for Urban Public Space. The design documents were mostly drawn from 51N4E. The interview with Mark Hendriks provided insight into the political background of the design. He also elaborated how the site caught on after its implementation. It was amongst others made use of visual material such as design plans and photographs. The thought behind this was to analyze how the project evolved over time and how it was presented by 51N4E towards the public.

4 Empirical Analysis: Case Study

4.1 Murg-Auen-Park (Environmental Type)

Figure 1-4: Impressions of finished site design (IFLA Europe)

Project Name
Murg-Auen-Park

Location
Frauenfeld, Switzerland

Contracting Authority
City of Frauenfeld and Canton of Thurgau

Area
5.5 ha

Program
Public Park

Cost
6.300.000 €

Prime Contractors
Staufer&Hasler Architekten, in collaboration with
- Martin Klauser
- Walter Bretscher
- bhateam Ingenieure AG
- Fröhlich Wasserbau AG
- Conzett Bronzini Gartmann AG

Period of Design
2010 - 2012

Period of Implementation
2013 - 2016

(Staufer&Hasler Architekten, 2020; LAE, 2018, p. 314)

Background

The site is located in western Europe in Frauenfeld, Switzerland and lies in the moderate climatic zone of the northern hemisphere. The project is not under a limited lease.

The project site is situated between the outskirts of the city and its center. When looking at the current character of the area, it could give the impression that the area grew spontaneously due to a lack of urban development. Historical maps, however, show that it has existed in its shape and greenness for centuries. It was the city of Frauenfeld that slowly grew around it (See Figure 14, 15). In 1876, the river Murg was canalized after a harsh flood. After being used as a military training area, the site became neglected and the vegetation grew unchecked. The location was not officially approved by the city but informally used and liked by its citizens. Later on, it was included in the Szenenplan of Frauenfeld as a green finger (See Figure 18). The state promoted the re-naturalization of water bodies for ecological upgrading and local recreation. The Water Protection Act intended a revitalization of the on-site watercourse (Quandt, 2017; Knüsel, 2016a, p. 30 f.; Wolf, 2016, p. 48).

Other plans were originally intended for the site. In the 1990s, an infrastructure project was initiated. Parts of the location's forest area have already been cleared until a citizens' referendum stopped the process (Salm, 2017; Hasler, 2016, p. 9). Additionally to the citizens, architect Thomas Hasler recognized the potential of the site. He spent the last two decades advocating a change of use to the authorities away from housing and infrastructure projects towards preserving the greenery (Hochparterre, 2017, p. 12). Instead of the aforementioned traditional and generic development plans, the Murg-Auen-Park was realized as mixture of park and floodplain.

Figure 5: Aerial view of location (Heinkelmann, Google Earth)

The yellow dotted line shows the edge of the city. Murg-Auen-Park lies within the white circle.

Design Task and Proposal

The task was to transform the untended land into a near-natural recreation area for the citizens. The site was to promote nature in the city. It should also be protected from being fragmented over the course of time. The river course was to be renaturalized to its state prior to the canalization (IFLA, 2018, p. 31; LAE, 2018, p. 113).

The project team referred to the task by creating a park in a forest in the middle of the city (Knüsel, 2016a, p. 31). The site was given a robust clear form and self-evident identity (Hasler, 2016, p. 9). In an attempt to treat the demands of citizens, city, and ecology equally in terms of space and design, the Murg-Auen-Park was created as a mixture of landscape architecture, infrastructure planning, architecture, as well as flood and nature conservation. It turned out to be an interwoven area of different purposes: recreational city park, English landscape garden, flood protection, renaturation, biotope, nature conservation, and urban development (IFLA, 2018, p. 31; Hasler, 2016, p. 9 ff.; Knüsel, 2016a, p. 31).

A unique aspect is that the design was determined by the existing landscape instead of being superior to it. This is because the project team made the local nature the main designer. It was allowed to continue to form the basis of the site. Thus, the river's force and sprawling vegetation continued to dynamically modify the park's character (See Figure 27-32). The man-made structures were meant to be understated to complement the natural environment (See Figure 19,20) (Knüsel, 2016b). A mostly water-bound path network with three footbridges was built and connected the park to its surroundings (Hochparterre, 2017, p. 12). Neophytes were removed while the few added plantings were of native origin (Knüsel, 2016b). The entire park had no predefined functions or regulations, such as playgrounds, prohibition signs, or fall protection. It was meant to be appropriated freely (LAE, 2018, p. 115 f.) (See Figure 23, 24). It can be concluded that the design was used to give the site a contemporary layer to make it more accessible and attractive for people. The natural environment was not over-designed. But neither was the impression given that there was no human influence.

According to Michel (2020), the park is loved and has been intensively used by a wide range of people since its initiation (See Figure 23). In regard to wildlife, it is astonishing that apart from the established populations new and partly rare species have continued to settle down (Hochparterre, 2017, p. 12). This shows that the aspired balance between offering space for human recreation and habitats for wildlife was seemingly achieved.

Sustainability

The project visualizes a contemporary struggle most cities face when it comes to urban development: urban densification versus urban greenery. The question lies in how the available space in a city can be used responsibly. Most commonly, settlement pressure causes green areas to be minimized or replaced by buildings and infrastructure. Therefore, it is important for landscape architects to secure existing open spaces that can contain both human recreation and wildlife habitats. The City of Frauenfeld has been steering in a sustainable direction. This can be claimed because the cities' structural development presently focuses on the existing settlement area. This is done in the attempt to operate inner densification and protect the surrounding nature (Helbling, 2017, p. 10). The design contributed to this in several ways: firstly, it was a precautionary investment against the degradation and fragmentation of natural habitats. Secondly, a qualitative urban open space was secured in the long term. Thirdly, the settlement pressure of the surrounding residential areas was counteracted. Fourth, it was an investment towards climate change mitigation and provision of high quality of life for citizens. Fifth, by preserving the size and characteristics of the site, positive links between urban, peri-urban, and rural areas were possible.

SDG 11 proved to be an essential component of the concept. An inclusive, public, and mostly accessible inner-city green space was provided. No thresholds could be identified during the analysis of the path system. This should enable elderly and disabled people or those with limited mobility to also make use of the area. The citizens and other site users can not only use an inner-city green space for local recreation but also an area that extends into the surrounding landscape. To sum up, the abandoned plot is now a public and democratic park. The Murg-Auen-Park is not only a compensation for the disappearing private garden. The common wish of having 'wilderness in the city' came true in this instance. People do not have to travel great distances to experience a less controlled relationship with nature. The analysis of photographs leads to the assumption that children love the naturalistic character of the site (See Figure 24). This means that they potentially grow up with a different relationship to nature; a relationship that seems more suitable to result in a functioning future.

Knüsel (2016b) stated it was important to the project team that the site would be protected both spatially and legally. This shows that they took on a far-sighted perspective. The design created conditions for increased biodiversity and ecological value. This can be claimed because the Agency for Fisheries identified that new species (e.g. beaver, kingfisher, fish Nase) have settled down (Michel, 2020). The resilience and adaptive capacity of the site to climate-related disasters (e.g. water-related) was strengthened through the river's renaturalization and the preservation of the local vegetation (see Figure 7). By keeping the rich greenness of the area, the high air quality and lack of noise pollution was maintained (see Figure 17). Regarding the multitude of long-term benefits, it can be deduced that environmental sustainability is strongly furthered in this project.

Resources

The project made use of all types of resources. However, natural resources played a dominant role. This can be deduced from the conception that the local nature is the main structure and designer. The vegetation, ground material, wildlife, and river were, thus, identified as essential resources. This can also be seen from the fact that only a few artificial and natural elements have been added. The project team was aware that some interventions would be temporary. This regarded especially the redesign of the water (Tagblatt, 2015). On another note, a skillful and persistent set of actors was needed for the realization of such a project. The project team proved to have the competence and knowledge to implement their vision. Furthermore, the analysis indicates that a lot of energy (willpower) and societal influence came from the project team. Beyond that, the voice of the public also went into the realization of the design. Michel (2020) pointed out that the project process needed to be discussed at federal, municipal as well as city level. This meant that many parties, such as environmental associations, had to be communicated with. Here, it could be seen as a benefit that the architecture studio Staufer&Hasler Architekten was from the area. More about this topic is covered in the section 'management'. Furthermore, the renaturalization of the river required technological expertise and enough financing.

A highlight of the project is the fact that accrued material stayed on the site. For example, soil and stones uncovered by the redesign of the river were reused at another location in the park, as told by Michel (2020). This shows that the project team has thought of resource flows and does not waste material. Little transportation to and from the site was, thus, not needed during the development.

The case study shows that the design offered many ESs. The following was done in regard to supporting ESs. The area was preserved in almost its entirety. This means that the established flora and fauna could remain to a large extent. Habitats were not only maintained but enhanced and diversified. This was done directly, for instance by providing breeding grounds and keeping the mature vegetation. Indirect measures were the renaturation of the floodplain. By preserving the site, it also remained part of a green corridor between landscape and city (See Figure 8). By relying on native flora, ecosystems tend to be healthier and more durable. It can be concluded that the local genetic diversity was strengthened. The following cultural ESs can be detected. The site provided opportunities for inner-city recreation. It has been intensely used by people. Hence, the following can be assumed. Mental and physical health was strengthened by being outdoor and surrounded by natural elements (e.g. sun, greenery, water, wildlife). Esthetic appreciation for the natural scenery could have been of inspiration for culture, art, and design. This is shown, for instance, by cultural events having taken place (See Figure 26) (Müller, 2015). A sense of place has been established where nature is the conjoining element. Whether the esthetic quality of the natural environment appeals to people depends on the individual. This is because the landscape is not what one is used to in a common urban green space. The Murg-Auen-Park design successfully secured what can be interpreted as cultural and natural heritage. Focus was laid on regulating ESs.

These were for example the quantity of trees that regulate the local air quality and act as carbon stores. Waste degradation and purification happened through detoxification and decomposition by microorganisms in the soil and water. Weather extremes and their impacts (e.g. erosion, flood) were moderated through the large green canopy, extensive root system, and dynamic water stream.

A strong gesture to closing the nature-culture-dualism can be detected. Hence, it is surprising that, according to Michel (2020), this was not an elemental aspect or goal within the project. He stressed that the Murg-Auen-Park is primarily intended for human use. From what has been analyzed, both humans and nature profited from the design. However, in similar vain to Knüsel (2016a, p. 30), it can be argued that the natural environment was reactivated but remained domesticated. This seems acceptable as the site is located in the city center and is not intended as a nature reserve. What can certainly be said is that the project is about rapprochement. The design offers a new perspective on the relationship of nature and human. This is done by amplifying the role of the local nature but still offer freedom to the user. Numerous effects can be associated with this free appropriation. On the one hand, the users can immerse themselves in a more naturalistic form of landscape. They are not in a controlled situation as they would normally be in a traditionally maintained park. This can encourage a different perspective to the area and nature in general. On the other hand, the freedom of motion causes people to also shape the park in negative ways. However, only minor forms of vandalism, littering, and trampling have been identified, so Michel (2020) and Knüsel (2016b).

Management

The Murg-Auen-Park did not follow the usual logic of a landscape project development. The focus was not based on a need but on a strategy. Thus, there was first a space then a client and plan (Hasler, 2016, p. 8; Wolf, 2016, p. 48). An interdisciplinary team was set up. This included the profession of architecture, landscape architecture, infrastructure planning, hydraulic and civil engineering, construction as well as nature conservation (Staufer&Hasler Architekten, 2020). Within the project development, the role of the architects and landscape architect was that of an initiator, activist, and coordinator prior to being a designer. Staufer&Hasler Architekten undertook the overall management and drafted the preliminary project plan and masterplan. The plan was then divided into areas and assigned to experts of the related fields (Hasler, 2016, p. 9). Thereby, a highly qualitative plan was achieved.

It could be claimed that the park is the result of a bottom-up development process. This is because Hasler as an individual and other citizens fought for the area to keep its form (Salm, 2017, p. 6). Moreover, public participation was included in the initial and ongoing development (Michel, 2020; LAE, 2018, p. 116).

In terms of financing, the City of Frauenfeld bought the site for comparatively little money (120,000 Swiss francs). The costs were distributed to different cost units in regard to the multitude of parties involved (Hasler, 2016, p. 10). As the design combined nature conservation and local recreation, funds were provided by the Kanton and federal government. As a result, the city ended up carrying less than half of the costs (Hochparterre, 2017, p. 12; Knüsel, 2016a).

Such an unusual and novel project would have been best communicated, planned, and organized with more than traditional architectural means. However, no such documents could be found. Staufer&Hasler Architekten presented the project with a common master plan (See Figure 6). Other supplementary documents indicated a certain dynamic, but this was not strongly expressed (See Figure 9).

Strategic and long-term management would definitely be needed in this project. In particular, a reactive mode is necessary to be able to respond to the ever-changing area. What could be deduced from Michel (2020) is that a traditional maintenance plan does not exist. Forms of management were only vaguely mentioned in the sources analyzed. The following activities could be identified (Michel, 2020; Hasler, 2016, p. 11). Everything that happens in the flood perimeter is left as it is (See Figure 28). Only if certain elements (e.g. dead wood, beaver dam) endanger the safety of visitors, interventions will be made. The only ongoing maintenance task is the removal of non-native plants (e.g. *Robinia pseudoacacia, Impatiens glandulifera*). Recurring plantings are not intended as the vegetation spreads itself. This concludes that the necessity of maintenance and management activities by man were reduced.

Synthesis

A thorough review of the project shows that there are plenty of measures that counteracted a waste of natural and societal resources:

- In order to have a comprehensive view on sustainability, such a project must not start with specialized but general knowledge. Research showed that this has been done here. An interdisciplinary team of experts was gathered. This made it possible to achieve the requirements of this multi-layered and mixed-use project. It also ensured that the entire project course was designed and managed in an efficient way.
- The concept chose a contextual over a tabula rasa approach. The project team saw its influence merely in emphasizing the existing natural character. Thus, the existing qualities and natural resources were used. By keeping most of the original layout and characteristics of the site, attached human emotions (e.g. memories, orientation, identification) and similar elements for wildlife were also automatically brought into the next stage of the area. On another note, the Mühlewiesenkanal was preserved as an industrial monument (Quandt, 2017).

- The design allowed for uses that overlapped but did not hinder each other. This benefited the health of the ecosystem and showed people a less instrumentalized landscape. It also turned the site into a learning ground. Humans have to accept certain dangers when being in the park.
- The adaptation of the design to the natural characteristics was often done to a great extent. A flood in 2015 intervened in the initial implementation phase of the project (Tagblatt, 2015). This is where reactive management had to come into effect. The changes this event created were incorporated in the design. The network of paths and bridges was laid out where the natural environment allowed it. For instance, valuable tree groups were circumvented (Michel, 2020).
- The efficiency of the design was strengthened as it did not aim to create 'finite images'. This is because it was apparently understood that the atmosphere-producing elements are dynamic processes. By giving nature as much space as was done here, people can constantly immerse themselves in the ever-changing optics of the landscape. The dynamic and diverse structure also benefits flora and fauna (See Figure 11).
- The man-made material input was done wisely. For example, the footbridges were made of larch, a native natural resource for the region. As nature was to be made use of, no artificial playgrounds were provided.
- Securing nature's self-sufficiency had numerous advantages. Recurring plantings are unnecessary. The renaturalized waterscape now acts as a spillway, enables a safer access for humans, and is a more diverse habitat for wildlife.

However, the case study revealed some inefficiencies:

- It could be argued that Murg-Auen-Park is very successful in the social sense but poses complications in regard to the natural environment. The question lies to what degree nature is allowed to completely take over the site and be completely self-sufficient in the course of the project. This development is to be followed-up in the future. In general, the distribution of man and nature on an urban site is a heated discussion in landscape architecture.
- It can be concluded that the relationship between nature and culture is both the weakest and strongest aspect of the design. On the one hand, the project serves as excellent inspiration of how nature and man can not only be harmonious but also potentially thriving in an urban setting. On the other hand, the level of the project teams' interference in the area is worth a discussion. Some sources refer to a high implementation effort (See Figure 21, 22). Dozens of trees were cleared, tons of ground material had to be moved, and the flooding had to be helped with an underground pressure pipe (Knüsel, 2016b). Therefore, the construction period was disruptive. It could ultimately be considered worthwhile as it helps the landscape to re-establish itself. Another aspect to reflect and follow up on is the intensive use of the site by humans.

Design Documents

Figure 6: Masterplan (Staufer&Hasler Architekten)

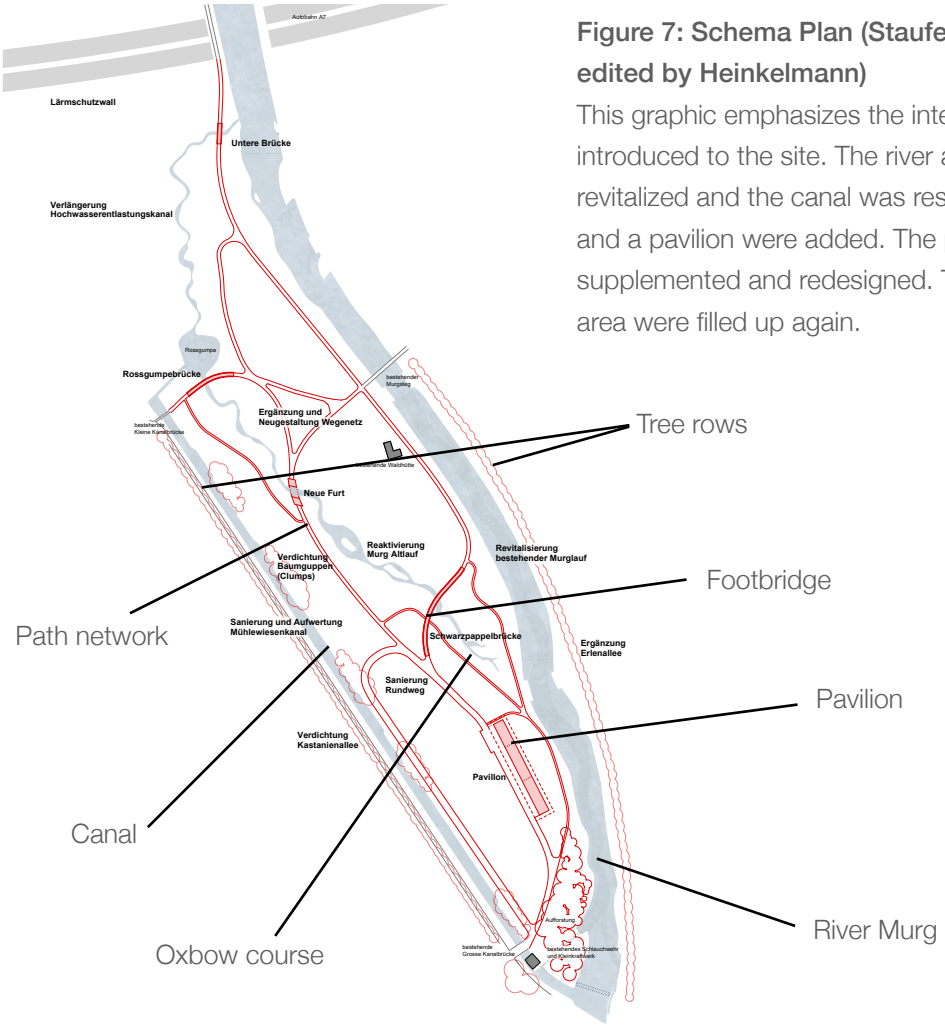

Figure 7: Schema Plan (Staufer&Hasler Architekten, edited by Heinkelmann)

This graphic emphasizes the interventions which were introduced to the site. The river and oxbow course were revitalized and the canal was restored. Three foot bridges and a pavilion were added. The path network was supplemented and redesigned. The two tree rows along the area were filled up again.

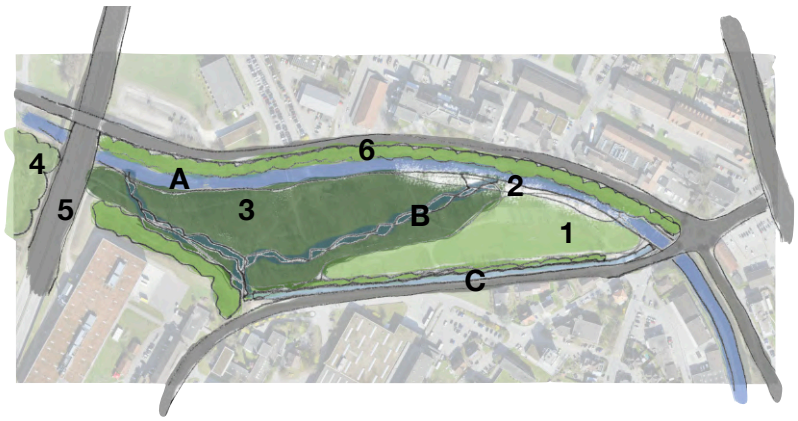

Figure 8: Spatial zones (Heinkelmann, Google Maps)

This sketch shows that the design is made of a few but strong components. The river has three elements: a broad (A), a meandering (B), and a canalized (C) section. The park constitutes of a lawn area (1), a shallow river bank (2), and a forest (3). The wooden area is connected to an exurban forest (4). The big road (5) inbetween is elevated and thus enables a continuation of the greenery. Tree rows surround the entire site. They continue parallel to the river into the city (6).

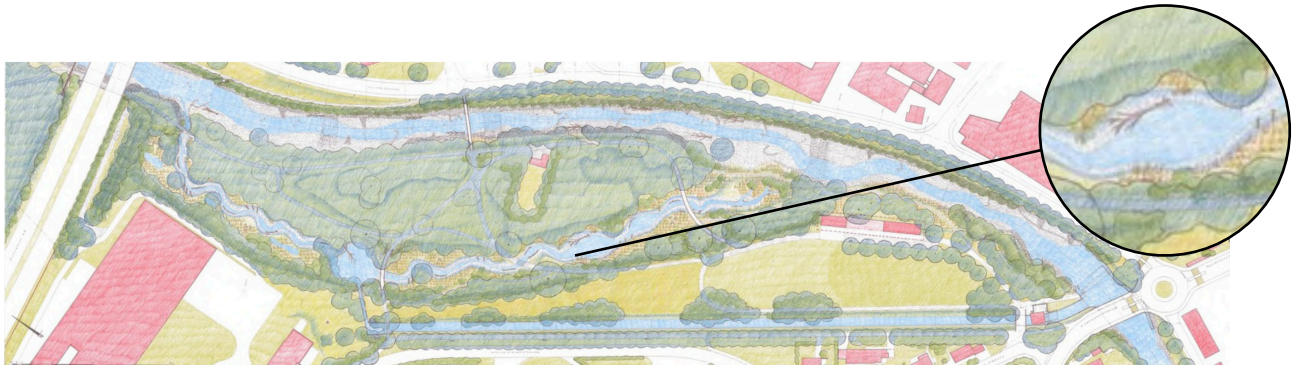

Figure 9: Landscape Plan (Klauser, edited by Heinkelmann)

The plan is hand drawn and abstract. It emphasizes the large green body of the forest and the tree rows that frame the site. The only detail lies in the depiction of dead wood and fallen trees. This shows the importance given to a natural and spontaneous development.

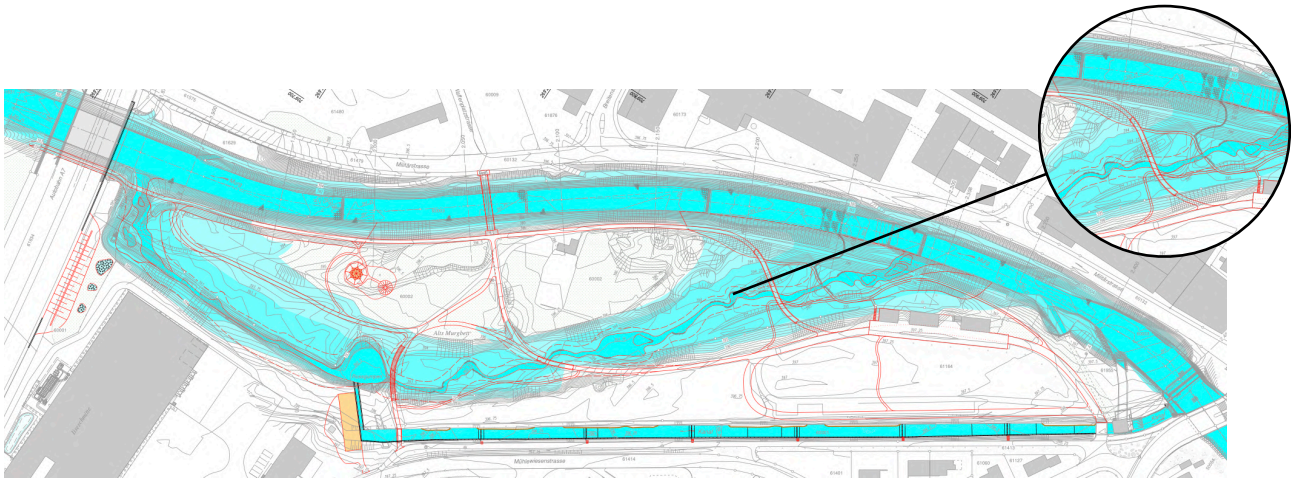

Figure 10: Flood Plan (bhateam, edited by Heinkelmann)

This plan illustrates the potential flooding of the oxbow course in the forest. The river and canal are expected to be relatively unaffected by extreme nature events.

Analytical Sketches

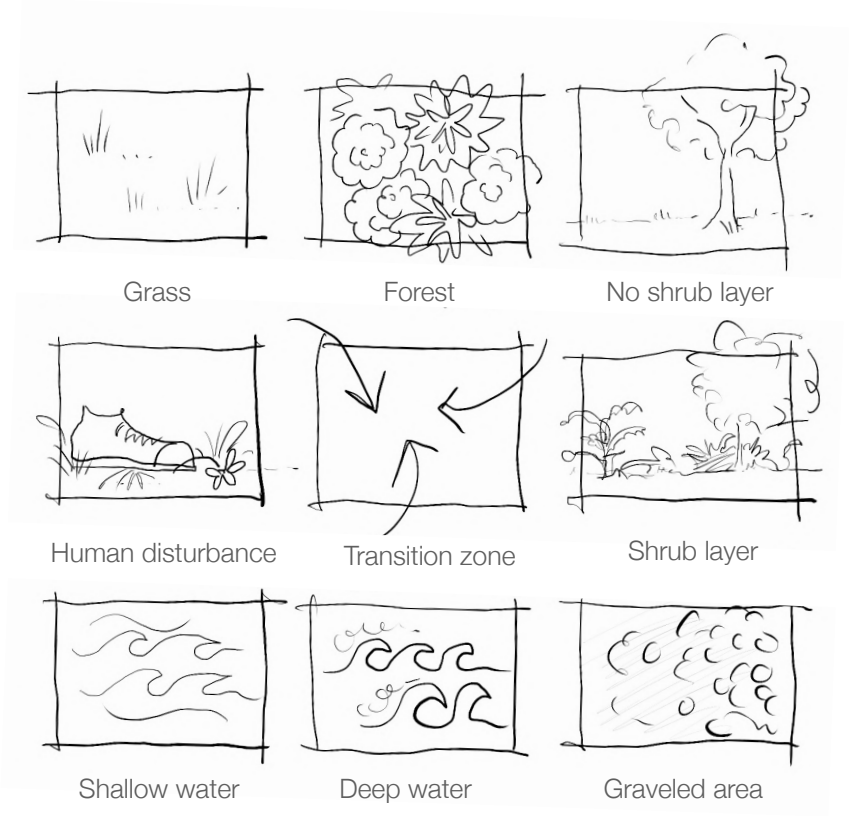

Figure 11: Structural diversity (Heinkelmann)
The diverse environment is appealing to both people and wildlife.

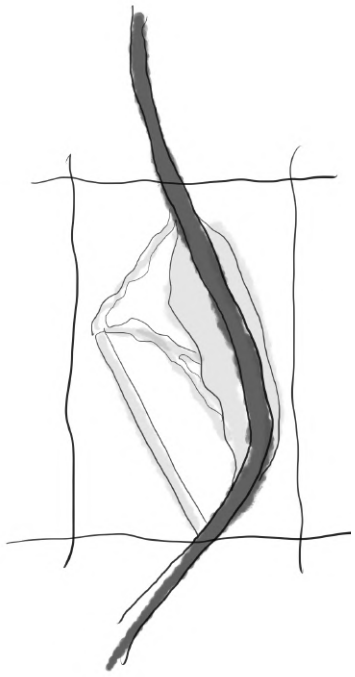

Figure 12: Riverscape (Heinkelmann)
The priorly canalized Murg is renaturalized within the park. It is now dynamic, more broad, and partially shallow. A small canal and an oxbow course add to the diversity of the waterscape.

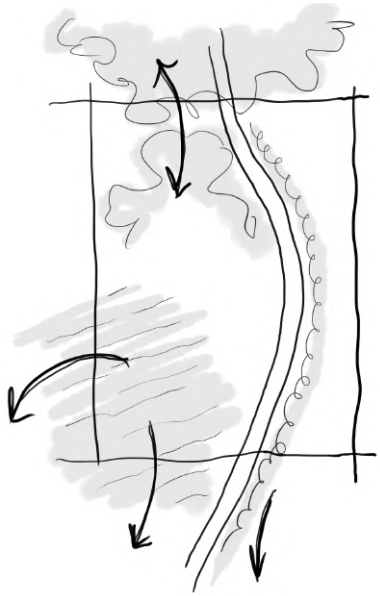

Figure 13: Crossovers (Heinkelmann)
The forest at the outskirts of the city remains connected to the parks' wooden area. The tree row alongside the river continues south. The lawn in the West is adjacent to further grass areas.

Site Characteristics

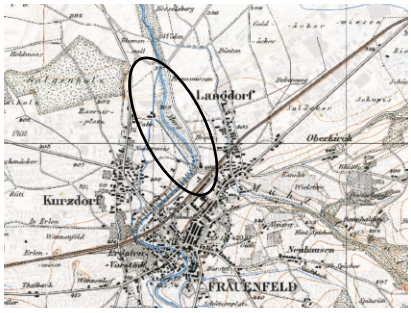

Figure 14: Frauenfeld 1885 (ThurGIS)

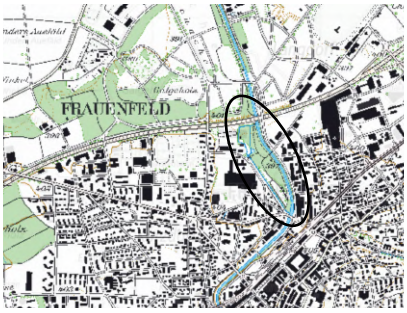

Figure 15: Frauenfeld 1990 (ThurGIS)

The historical maps show that the City of Frauenfeld grew around the site which has always been a floodplain forest next to the river Murg.

Figure 16: Hazard map for erosion and flooding (ThurGIS)

Legend: Red = High, Blue = Medium, Yellow = Low

The map shows a high risk (red) that the oxbow course floods and erodes. However, it is its purpose to temporarily store excess water. Interestingly, the canal and main river are still highly prone to hazards.

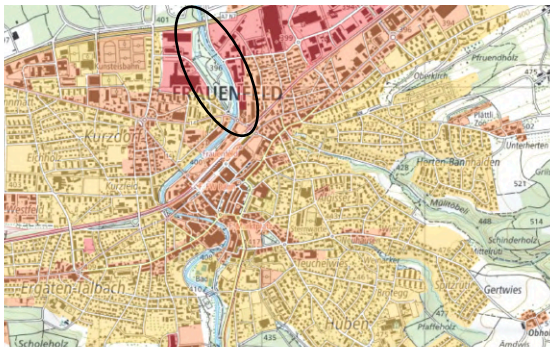

Figure 17: Noise Sensitivity (ThurGIS)

Legend: Yellow = Step 1, Light orange = Step 2, Dark orange = Step 3, Red = Step 4

All green fingers, including the Murg-Auen-Park, are free of noise pollution. This is beneficial for recreation and habitats. The contrast between the park and its seemingly noisy surrounding (red) is noteworthy in this regard.

Figure 18: Scene Plan (Staufer&Hasler Architekten)

This masterplan divides the city in scenes, not zones. The Murg-Auen-Park is one of the green fingers which reach from the landscape into the city.

Interventions

Figure 19: (Karrer)

Figure 20: (Hochparterre)

The man-made structures give the appearance of fitting perfectly into the existing nature. The choice of design is understated. It takes up the color scheme, material, and form of the environment.

Figure 21: (vetter)

Figure 22: (Architektur Forum Ostschweiz)

The photographs show the considerable implementation effort that the renaturation of the river and installation of the footbridges entailed. The interference was grave but the entailed benefits may justify it.

Appropriation

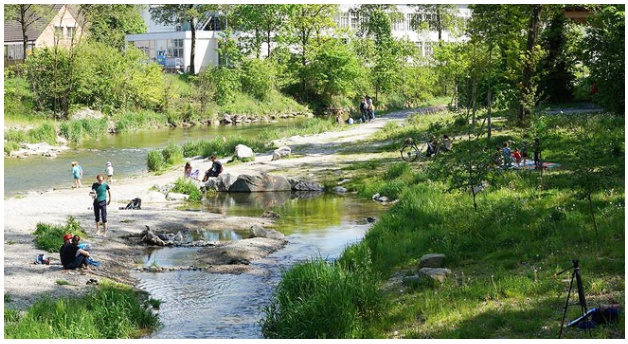

Figure 23: (Stadt Frauenfeld)
The water, river bank, and lawn are used freely, informally, and intensively by people.

Figure 24: (Karrer)
City children assumably grow up with a different relationship to nature.

Figure 25: (Zimmermann)
The presence of dogs without a leash could be disturbing for the wildlife.

Figure 26: (Stadt Frauenfeld)
Cultural events are beneficial for people. But for the local flora and fauna, this could be disruptive and stressful.

Natural Character

Figure 27: (Caspari)
The naturalized river is flowing dynamically.

Figure 28: (Beerli)
The water carves its way. Dead wood is scattered across the area.

Figure 29: (Forte)
When looking at this photograph, one would not guess to be in a city center.

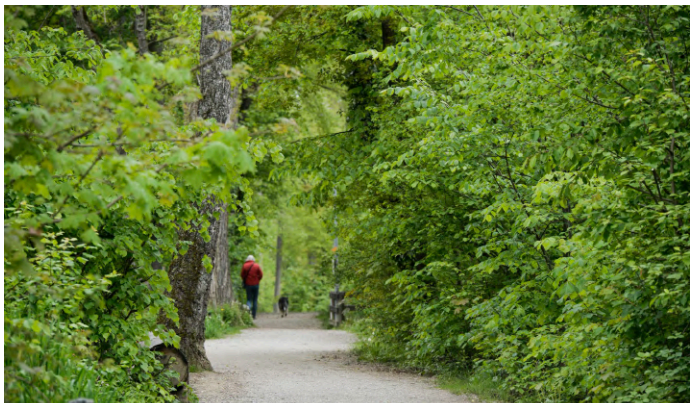

Figure 30: (Caspari)
The unrestricted vegetation growth creates a green jungle in the city.

Figure 31: (bhateam)
Nature dominates culture. This photograph depicts an area in the forest that has been flooded. It is now impassable for people. An alternative route is purposefully not offered.

Figure 32: (Müller)
Nature is altering the park's appearance. And it is allowed to do so. This photograph shows that the otherwise commonly fought plant *Convolvulus arvensis* is eventually going to "take over" the entire footbridge.

4.2 De Ceuvel (Economic Type)

Figure 1-4: Impressions of finished site design (De Ceuvel, DELVA Landscape Architects, Space&Matter)

Project Name
De Ceuvel

Location
Amsterdam, Netherlands

Contracting Authority
City of Amsterdam

Period of Design
2012 - 2014

Area
0.4 ha

Program
Industrial redevelopment

Cost
450.000 €

Period of Implementation
2014 - 2016

Prime Contractors
DELVA Landscape Architects and Space&Matter in collaboration with

- smeelearchitecture
- Metabolic
- Transsolar
- Bas van Schelven
- Witteveen en Bos
- Huib Koel
- Woodies at Berlin

(Space&Matter, 2020; LAE, 2018, p. 306)

Background

The site is located in western Europe in Amsterdam, Netherlands and lies in the moderate climatic zone of the northern hemisphere. The project underlies a ten year lease (De Ceuvel, 2020a).

The site is situated on the former 'De Ceuvel-Volharding' shipyard in Buiksloterham. This is a neighborhood in the post-industrial north of Amsterdam that was created from deposited dredge material. The district was designated to follow a gradual and organic transformation process and is thus being redeveloped to be a smart, bio-based and circular working and housing area. In addition, the demands for a more inclusive governance and management structure (e.g. bottom-up) were pursued. The urban development of the district has the status of a tangible living lab and prototype for innovation and a green economy. However, the economic crisis in 2007 and 2008 slowed the development plans for the neighborhood down (DELVA Landscape Architects, 2020a; Metabolic et al., 2014, p. 25).

Other plans were originally intended for the site. Before the financial crisis, a boulevard with residential towers and expensive shops was to be built. Instead of the aforementioned traditional and generic development plans, the De Ceuvel site was transformed into a temporary eco-hub for creative and social enterprises (DELVA Landscape Architects, 2020a; Space&Matter, 2020; Make the world great again, 2017).

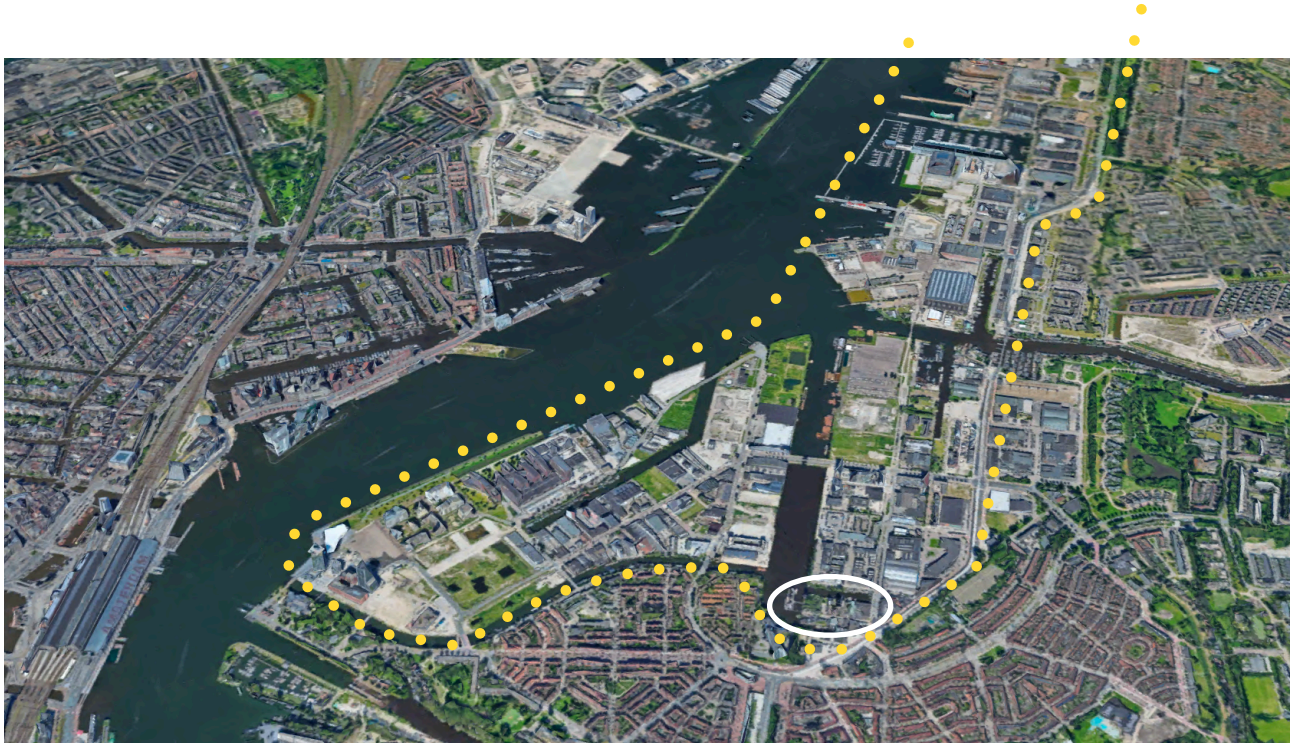

Figure 5: Aerial view of location (Heinkelmann, Google Earth)

The yellow dotted line shows the localization of the district. De Ceuvel lies within the white circle.

Design Task and Proposal

The task was to regenerate the site through inexpensive, temporary, self-built, and creative appropriation. The municipality incentivized this as a countermeasure to the financial crisis. De Ceuvel was intended to strengthen Buiksloterham's identity, be a place of experimentation, offer a public program, and provide inspiration (See Figure 14) (DELVA Landscape Architects, 2020b; Metabolic et al., 2014, p. 25).

The project team approached this by redeveloping and valorizing the plot to become an experimental ground for regenerative, circular, and innovative urban development. The mission was to inspire a more sustainable economy and lifestyle (Ceuvel, 2020a; Space&Matter, 2020). The design needed to be flexible, inexpensive, and off-grid as the location brought many challenges with it. The project was a 10-year lease and only a small budget was made available. The local soil and water was highly contaminated with industrial wastes and other pollutants (See Figure 13). The existing area did not offer any buildings or a gas and sewage connection. As it was prohibited to dig deeper than 50 centimeters, no foundations, gas and sewer pipes could be laid (Brändlin & Krause, 2015; DELVA Landscape Architects, 2014; Schuetze, 2014).

The site and its surroundings held many remnants of the industrial past, such as houseboats. These were retrofitted as offices and arranged on the plot. An elevated closed-loop boardwalk was built to connect them. These implementations made it possible for the site's polluted ground not to be covered and accessible to people. The constructions were conducted together with the future tenants as well as volunteers. The so-called Purifying Park was then established on the open ground by DELVA Landscape Architects in collaboration with the University of Ghent (See Figure 9). Traditional purification techniques (e.g. soil removal or mixing) are expensive and often limited to moving the pollution, and therefore the problem, to another location. This had to be why the phytoremediation technology was chosen as organic and more sustainable alternative. Phytoregenerative plants as hyperaccumulators are able to absorb, stabilize, and take up contamination through their roots (See Figure 16). The plant plan, thus, entailed phytoregenerative vegetation (See Figure 17). The landscape design was composed of an undulated area of perennials, grasses, mature trees, and short rotation coppice (See Figure 18-21) (Space&Matter, 2019; LAE, 2018, p. 228 f.; Brändlin & Krause, 2015; DELVA Landscape Architects, 2014; Metabolic, 2013, p. 16, 33). Hence, this 'working' landscape enabled the soil and water to recover from the industrial past.

The houseboats offered cheap rental space for start-ups. A commercial and public function was accommodated by providing a café and hosting a multitude of public events. This turned the area into a venue for a creative community and tourism. The demand for conducting experiments was met by interpreting the entire area as a living laboratory. Hence, all processes on site contributed to knowledge generation (See Figure 22) (De Ceuvel, 2020a; LAE, 2018, p. 228 f.). All this created a multi-layered and mixed-use project.

Sustainability

Multiple sources state Buiksloterham is to become the most sustainable neighborhood in Europe (cf. De Ceuvel, 2020a; Spectral, 2020b; Amsterdam Smart City, 2016). As the financial crisis halted common capital-intensive project developments, projects such as De Ceuvel had the possibility to demonstrate an attractive alternative. In terms of economic sustainability, such designs urgently need to be realized and studied.

As part of Buiksloterham, the project has set itself ambitious sustainability targets. SDG 12 proved to be an essential component of the concept and almost all of its targets were successfully dealt with. A transition towards a circular economy and society requires a technical and cultural shift. Hence, people need to change their behavior and acquire new techniques. It can be seen that this turnaround was actively promoted through hosting a multitude of programs — from workshops, guided tours, and lectures to annual festivals and art exhibitions. The case study indicates that research, education, biology, and culture was successfully merged in a joyous, creative, and accessible way. Information about economic sustainability was provided locally was well as online. One can hope that these various pathways raise awareness of the need for sustainable thinking and practice.

De Ceuvel was a small and temporary project but it was also visionary and contributed to the long-term goal of Buiksloterham. It showed a comprehensive, progressive, and imaginative approach towards economic sustainability. Waste minimization and resource maximization through creative reuse was targeted. It was striven to close and as many resource flows locally as possible within the given time frame. For this purpose, the sun as renewable energy up to the urine of the site users/ visitors was used (See Figure 22) (LAE, 2018, p. 228 f.). Hence, the project not only showed what opportunities lie within transforming post-industrial landscapes. It also offered an alternative view on public services, urban metabolism, and resource production and consumption in the city (See Figure 11, 12). Here, houseboats were used because they were part of the site's repository. They can also serve as a good symbol for a sustainable system: a small, closed-looped, independent organism that can be installed and removed anywhere, and has an optimized area per capita.

Resources

De Ceuvel challenged the conventional status of natural and societal resources when it comes to urbanism. Hereby, man-made resources played a dominant role. This is because the project depended on people as resources, not only as designers and constructors but also as managers. A skillful and persistent set of actors was needed to create this project. The team proved to have the competence and knowledge to implement this concept. It demonstrated the skills to understand the political and institutional context of the area. By encouraging others to adopt a sustainability perspective, it was possible to establish and keep partnerships with various key figures in the city (Hendriks, 2020). In doing so, the traditional silo thinking could be broken down. It could have been a benefit that a part of the project team was from the area. The analysis indicates that a lot of energy

(willpower), time, and societal influence was needed to fight administrative bureaucracy and establish networks. Metabolic founder, Eva Gladek, stated that several laws had to be broken to implement De Ceuvel (Schuetze, 2014). This shows that such a project cannot be realized easily. In addition, the team had to show creativity in dealing with the complex task. The implementation required not only human but also technical ingenuity. A lot of manpower went into the construction and upkeep of the site. The inclusion of the tenants was smart. Hereby, their emotions, knowledge, and attitude towards De Ceuvel and the dealt topics was influenced.

The project demonstrates an imaginary alternative to the ongoing processes of disposal and dissolution. The way in which the resources circulated and were coordinated proved to be more important than their materiality. Every step of the development process was done at the highest possible level of sustainability and resource-efficiency, according to DELVA Landscape Architects (2014). To achieve this, it was smart to view the plot and its surrounding as resource repository. Many local and regional materials were reused and upcycled instead of being wasted. The project aimed to close the local resource cycles. Thus, all waste materials produced on site were minimized and reused. No toxic chemicals or materials that may pose a threat to the heath of humans or ecosystems were used. An efficient use of natural resources was done, for instance in regard to using solar energy (See Figure 22) (De Ceuvel, 2020a, 2020b; Space&Matter, 2019; LAE, 2018, p. 228). All this indicates that only little transportation and small distances to and from the site was needed. Within its experimental character, De Ceuvel looked into different clean and green technologies, and combined rudimentary and mainstream technical solutions (cf. Space&Matter, 2020). The result can be interpreted as a template for creative reuse and resource efficiency. The project can be seen as an archival space as knowledge is continuously generated. It would be interesting to see — especially after the end of the project — to what extent this information will be spread publicly.

The analysis showed that the design offered many ESs. The following was done in regard to supporting ESs. As part of the vegetation was preserved, it can be assumed that some habitats were maintained. De Ceuvel's design also added and diversified habitats. This was done directly by keeping mature trees, introducing living and breading grounds, and providing a multitude of plant species. Indirect measures were the purification of soil and water. Whether all introduced plants were native was not found out. It can still be expected that the local biodiversity was strengthened. The following cultural ESs could be detected. The site provides opportunities for inner-city recreation. According to the research and interview, the site has been intensely used by people. Hence, the following can be assumed. The mental and physical health was strengthened by being outdoor and surrounded by natural elements (e.g. sun, greenery, water, wildlife). The scientific and educational category was strongly pursued. De Ceuvel provided inspiration culture, art and design. Tourism could also be detected. The focus was laid on provisioning ESs. This was in regard to the material and energy outputs from the local ecosystems. For example, urban agriculture based on local food production was operated, and the sun and rainwater was made use of (makesense, 2018).

On another note, weather extremes and their impacts (e.g. flood) could potentially be moderated through the largely overgrown and unsealed ground.

In the following, the project's reaction to the nature-culture dualism is analyzed. A form of symbiosis was aimed at. By preserving mature trees, an inherent respect for nature was shown. It could not be determined whether the local green was completely replaced by the phytoregenerative vegetation. However, nature is cultivated for human benefit. The esthetic quality of the site is rather unusual. The appearance does not follow a 'fixed image' and can be changed by the tenants. Research indicates that the Purifying Park served for decontamination and research, not for ornamentation. However, in view of the desired atmosphere on the site and the intention to attract visitors, it can be assumed that the park should maintain a certain esthetic level. It can be said that De Ceuvel is not a place where one goes to find recreation close to nature as it was obviously created by man. The design is meant to have a light footprint as the temporary installations and infrastructure are built without foundations. This was apparently done in order not to damage the natural components of the plot (Metabolic, 2013, p. 17, 33). It can be argued that this can also be attributed to the prohibition to dig. Ideally, the nature-culture-dualism would have been targeted more strongly to underline the needed behavioral change in industry and lifestyle.

Management

De Ceuvel did not follow the usual logic of a landscape project development. In reaction to the financial crisis, the site was to be transformed with limited and alternative means. An interdisciplinary team was gathered that included the profession of landscape architecture, architecture, sustainability company, climate engineering, civil and hydraulic engineering as well as construction companies (Space&Matter, 2020).

The community governance and bottom-up initiative was highly pronounced. A community and stakeholder engagement path was chosen (Metabolic, 2013, p. 22). The project design and course of the project was conducted in a joint effort with the tenants and civic volunteers. This is why do-it-yourself (DIY) approaches were used. A framework of rules and regulations was provided to guide the tenants. However, it is said that the framework still offered room for individual initiative (DELVA Landscape Architects, 2014). It can be assumed that the tenants continuously altered the site design as they were free to transform their houseboats. The exact management tasks that the tenants and other laymen had to fulfill were not to be found. After having scrutinized the project course, it was interesting to see that the collaborative dimension and improvised character did not pose as hindrance but accounted as a driver of the site's realization. The transparent approach chosen for the project must have favored this.

In regard to financing, the budget was low. This was despite having received a funding from the City of Amsterdam (Metabolic, 2013, p. 33). Nevertheless, the project demonstrated that reactivating such a complex area can be both inexpensive and valuable. By making use of the existing elements on the plot, there were no high discarding costs. In addition, free or cheap materials were collected (ibid., p. 16). The active closing of resource cycles must have also lowered the running costs. A high level of financing easily allows a good standard, but this is a low-cost, bottom-up project. The success of De Ceuvel highlights the need for cities to start allowing more space for experimentation, especially in the public realm.

It can be argued that such a highly processual, unusual, and novel project requires to be communicated, planned, and organized with more than traditional architectural means. A master plan could indeed not be found. Instead, plans and illustrations that show expected/possible stages were created (See Figure 7-9).

It could be deduced from Hendriks (2020) that a traditional maintenance plan did not exist. Every component of the site underwent continuous transformation processes. Here, LAE (2018, p. 228) stated that ongoing monitoring was conducted. Hence, a strategic management was needed. An active management mode would be required as the project aimed at the highest level of research within its rental period. Research shows this was achieved. The project team and tenants continued to managed the site. Besides a technical design process, nature's systematics were also used to manage the green and blue spaces (DELVA Landscape Architects, 2020a). Due to the storage of pollutants, the phytoregenerative plants need to be removed and replanted annually. However, as by 2015, it was not yet clear how to dispose them (Brändlin & Krause, 2015). According to Hendriks (2020), the benefit of involving scientific organizations (e.g. energy and water companies) made it possible to demonstrate whether the planned local systems worked.

Synthesis

The analysis shows that there were plenty of measures that counteracted a waste of natural and societal resources:

- In order to have a comprehensive view on sustainability, such a project must not start with specialized but general knowledge. Research shows this has been done here. An interdisciplinary team of experts was gathered. It worked together with an engaged community. This made it possible to achieve the requirements of this multi-layered and mixed-use project. It also ensured that the entire project course was designed in an efficient way.
- The concept chose a contextual and incremental over a tabula rasa approach. The place thus held many remnants of its industrial past. The esthetics and atmosphere built on this. The method of incrementalism was particularly well suited for the experimental character of the project. The scavenged materials predominantly came from ship construction. Through this, the industrial heritage of the site was preserved.

- The design allowed for uses that overlapped but did not hinder each other. The site included both private and public functions. It was of commercial and scientific character but equally evoked informal play and creative action. Design and science were seen as complementary ways to generate knowledge. This setting allowed for a circulation of heterogeneous ideas and materials. According to DELVA Landscape Architects (2014), it was achieved to unite education, art, and culture with ecology and research.
- The design transformed all local challenges into positive sensations by shifting from a mainstream to an interpretative logic. 'Waste' land and 'waste' materials were brought together as something attractive, innovative, and valuable. The challenges were solved and presented as one joint answer. Instead of hiding the past, the design picked up on the location's qualities for a sustainable turnaround. For instance, the soil and water contamination no longer represented the main problem but acted as catalysts for innovative concepts.
- Keeping most of the material (e.g. houseboats, soil) on site allowed to circumvent an expensive discarding process and loss of resources.
- De Ceuvel's temporary and experimental character allowed less conventional forms of assembling and narrating the urban to be practiced.
- The project was designed in a tangible way. First of all, it is remarkable that such a project has made it to realization. De Ceuvel demonstrated a fast implementation of sustainability and resource measures using low-cost, simple technologies, ecosystem services, and community power. The transparent composition (e.g. live digital displays of material flows) is praiseworthy, especially in an experimental area. Thereby, it is easy to build on experience and spread knowledge. Its values of a circular economy and sustainable lifestyle are perceptible in a direct, physical, and joyous way. Hence, De Ceuvel's tactic successfully spoke to people as it picks them up at a level they themselves can experience, understand, and implement.
- Instead of solely focusing on technical progress, a community was established. This added to the spread of awareness towards sustainable practices and lifestyles.
- The project is remarkable as it has not only left the plot more clean due to its regenerative design but also created a community and conducted intensive research. According to DELVA Landscape Architects (2014) and Metabolic (2013, p. 33), De Ceuvel raised the social profile, health, and property value of the site.

However, the case study revealed some inefficiencies:

- According to the research and the interview, De Ceuvel is an enclave. The physical site developed into a venue for a rather small audience. These are mainly young people and many from the hipster culture. This created a gap to especially the working class of Buiksloterham. Nevertheless, De Ceuvel's conducted research does reach a larger audience. This is evident from the fact that the knowledge gained through the project is being embedded in the current urban framework for Buiksloterham, and used in the University of Ghent (Hendriks, 2020). It can also be assumed that Buiksloterham's high profile enables the results of the project to travel far.

- The redevelopment of Buiksloterham should be discussed in regard to gentrification. Building on technical and natural principles, the neighborhood can become sustainable in the economic and ecologic sense. But whether it will be sustainable from a social point of view is debatable. As of now, the district — as many similar projects — runs the risk of becoming a place for only a unilateral group (cf. Hendriks, 2020). This would oppose the democratic public value of city renewal.
- De Ceuvel could also be interpreted as a product of government-led austerity measures. Such intermediate, small-scale, bottom-up designs can be used to conceal or normalize a city's vulnerable state. This project would not have been realized in an economically prosperous period. Would it have been possible to implement such a project outside of Buiksloterham? Would the design have this degree of flexibility if it was not an interim project? It is encouraged that Buiksloterham uses the contextual knowledge gained. Other general standards for creating a circular district should be given less attention.
- A central question to ask oneself is what will happen after the site's lease expires. Sustainability is a main ambition in Buiksloterham but a concrete plan or directive is not existent, as stated by Metabolic et al. (2014, p. 13). This entails the risk that sustainability objectives — in regard to all three dimensions — are subordinated within the project development process. Not taking advantage of De Ceuvel's flexibility and established network would be a missed opportunity. The future of the project is not specifically addressed in any examined sources. Will the established community, systems, and materials on site move together with the boats? Is this the end-of-life phase for most man-made and natural resources? It could not be determined whether the ground is fully decontaminated after the ten years. Current development plans of the district aim to preserve places for experimentation as well as greenery (See Figure15) (DELVA Landscape Architects, 2020b).
- The reliability to the laymen means that the project could have stood or fallen depending on the commitment of the tenants/volunteers.
- The knowledge generation is intense. However, the site is of a small scale. This means that the processes and systems shown may not be easily transferred.

Design Documents

Figure 6: Plot before the project (Space+Matter)

Figure 7-8: Perspectives of Concept (DELVA Landscape Architects & Space+Matter)

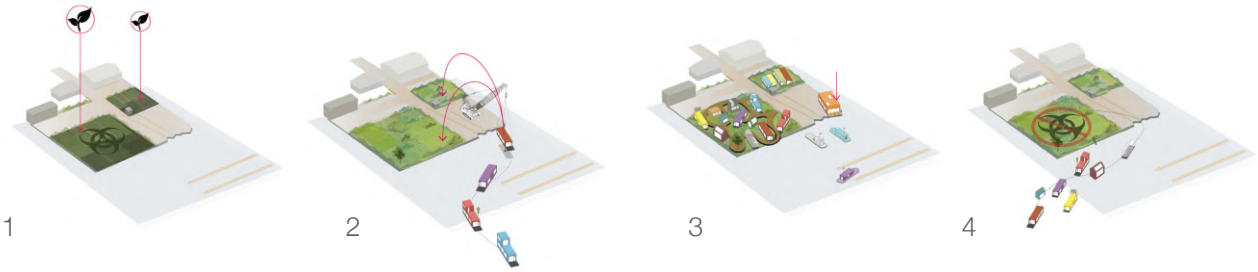

Figure 9: Concept (Space+Matter)

(1) The Purifying Park is established on the polluted area to clean the soil.
(2) The refurbished houseboats are put on the plot.
(3) The boardwalk connects all houseboats. An active system is initiated on site.
(4) After 10 years, the houseboats leave the site. The plot is returned to the municipality more clean.

Figure 10: Design result (Spectral, edited by Heinkelmann)

Analytical Sketches

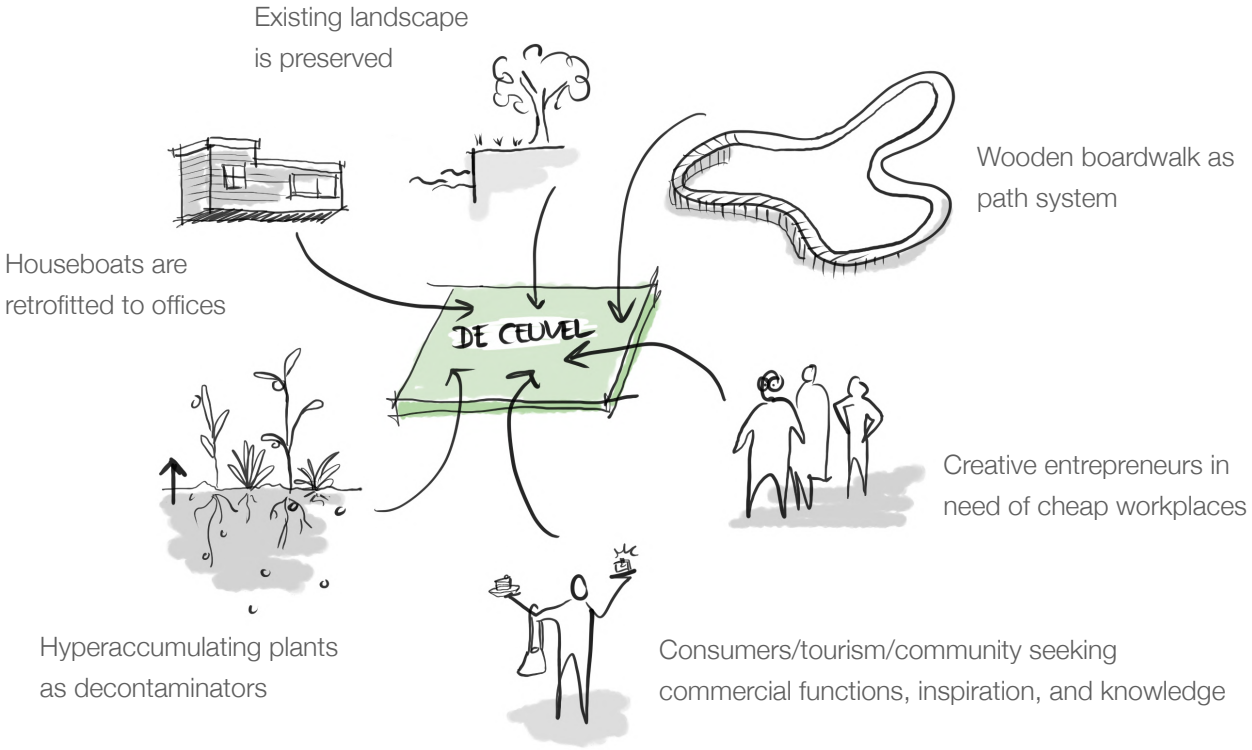

Figure 11: De Ceuvel Design (Heinkelmann)
This sketch emphasizes the dynamic components that came together to form the De Ceuvel project.

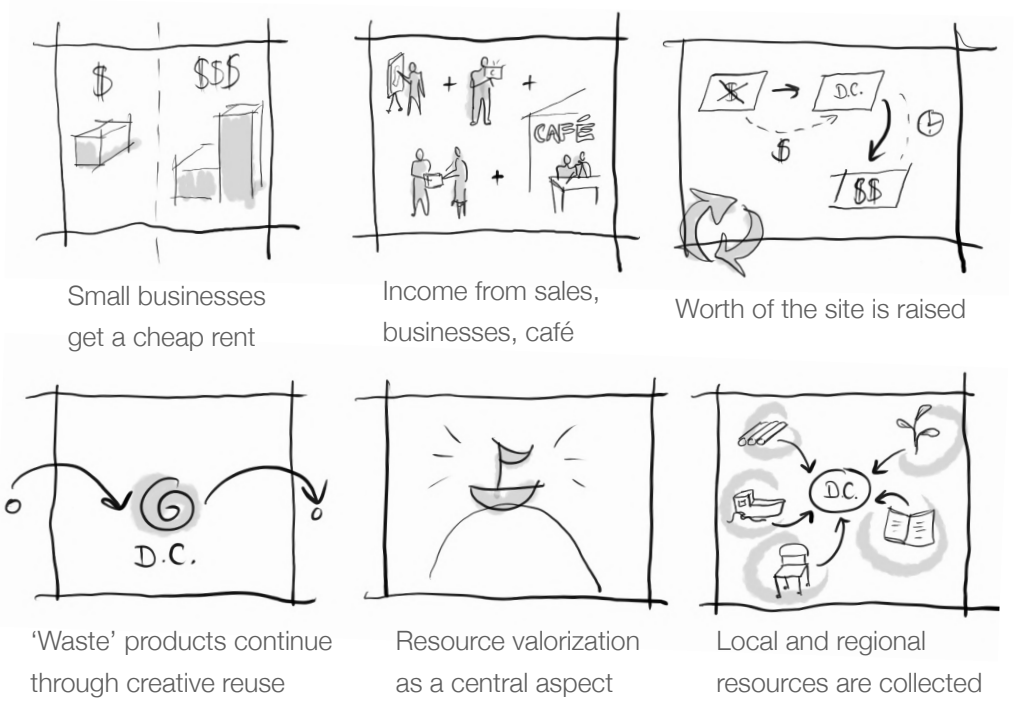

Figure 12: Site Valorization (Heinkelmann)
These sketches show the multi-level benefits that the project has created.

Site Characteristics

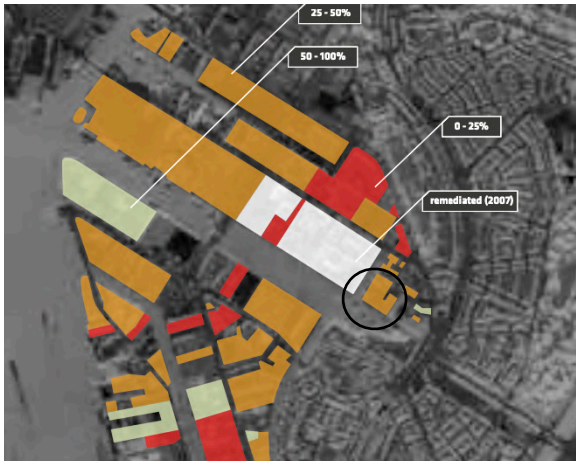

Figure 13: Pollution Map Buiksloterham (Metabolic)

The map shows the immobile pollution (1-2 m below surface) in the district. De Ceuvel is part of the polluted areas. It is stated that the remediation was to 25-50% complete in 2014.

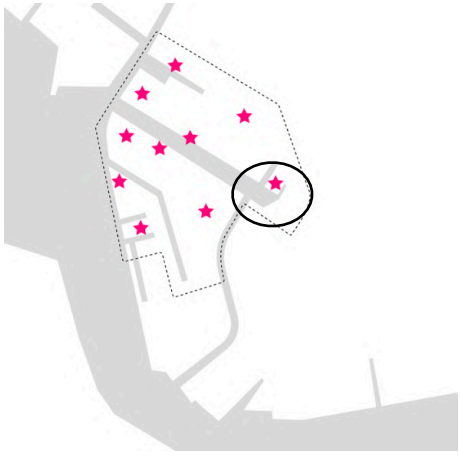

Figure 14: Experimentation Places in Buiksloterham (DELVA Landscape Architects)

De Ceuvel is one of the areas that is meant to be an experimentation driver for Buiksloterham.

Figure 15: Buiksloterham 2040 (DELVA Landscape Architects, edited by Heinkelmann)

This map shows an urban plan for the district in 2040. The current De Ceuvel project is replaced with another design. The site still entails a green area that, however, seems rather small. The greenery is meant to be part of a green infrastructure (yellow).

Purifying Park

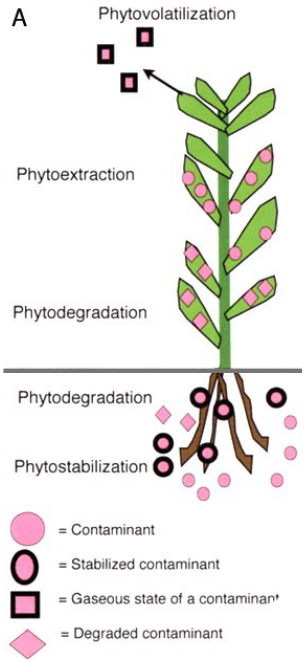

Figure 16: Phytoremediation schema (Nature Education)
This schematic model shows different phytoremediation technologies involving the removal and the containment of pollutants.

Figure 17: Plant plan (DELVA Landscape Architects)
This shows a selection of the plants that were used on-site for the phytoremediation.

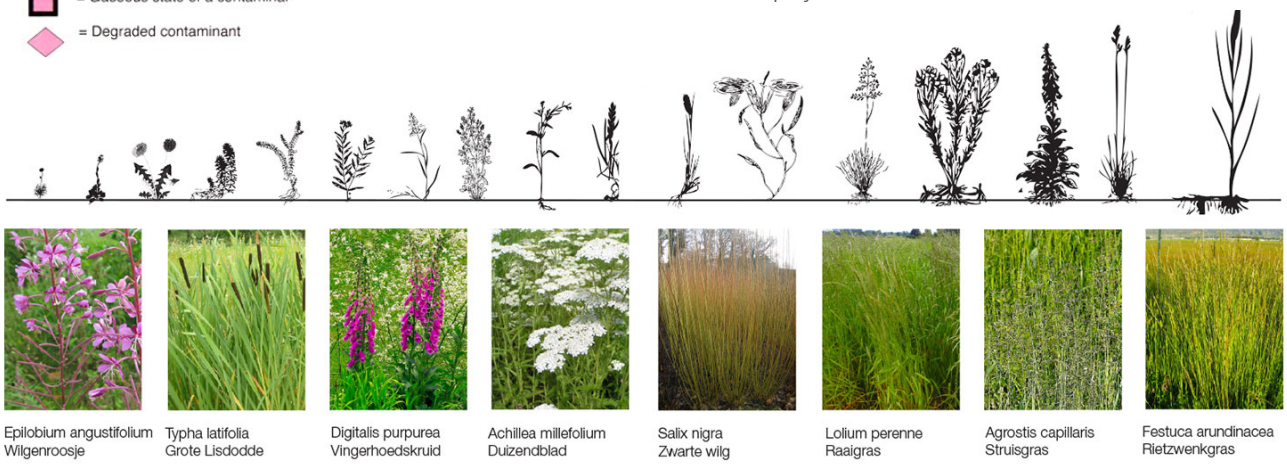

Figure 18: (De Ceuvel)
Some mature trees are kept.

Figure 19: (De Ceuvel)
Some of the plants offer an estheticbloom aspect.

Figure 20-21: (DELVA Landscape Architects)
A variety of atmospheres is given, from ‘neat’ to ‚wild’ greenery. These photograph makes it seem as if function is more important than esthetics.

Resource Flows

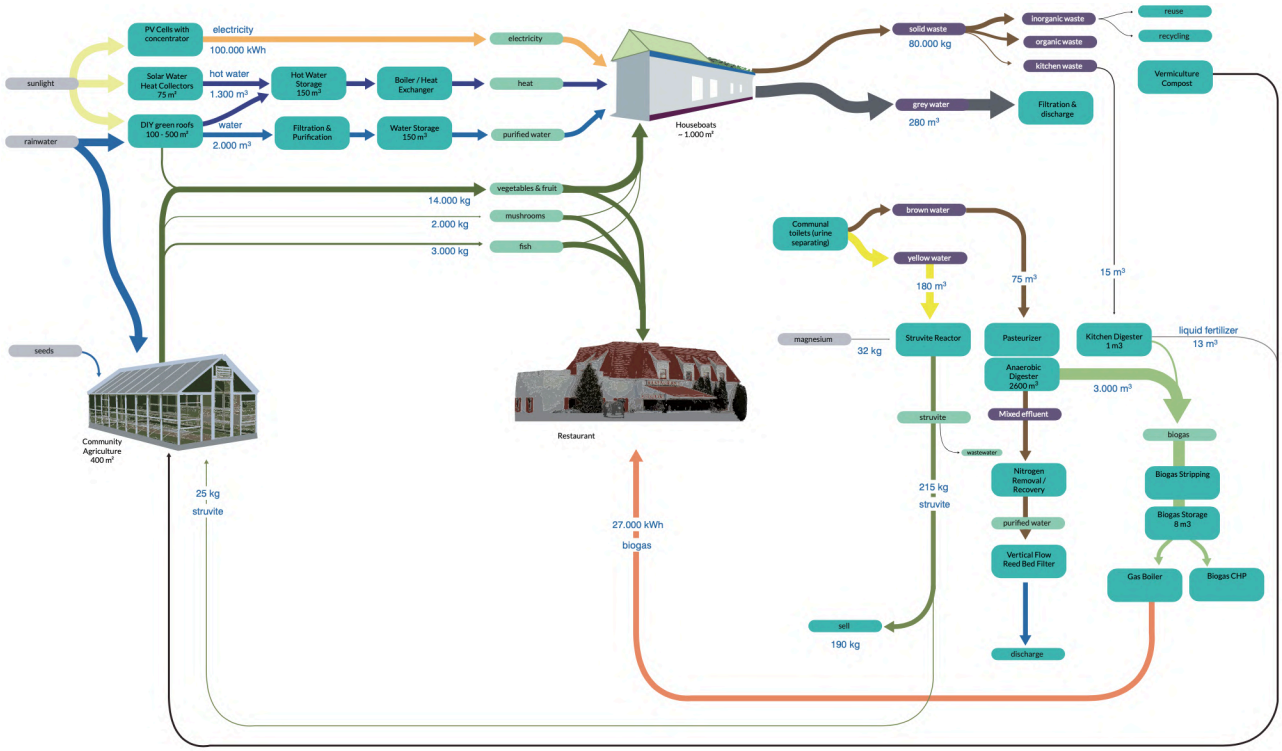

Figure 22: On-site installations (Metabolic)

- Wastewater system: DIY digester and biofiltration system, organic waste gets turned into plant fertilizer
- Heating system: Solar collector, heating control system, electric boiler, heat exchanger
- Electricity Demand: Using solar photovoltaic panels for the generation of renewable electricity
- Water system: Rainwater and drinking water storage and purification
- IT system: Online web platform displays real-time live feeds documenting the on-site resource use
- Food and ecosystems: Community food production (Greenhouse with Aquaponics system), floating ecological platforms, DIY green roofs, phytoremediation garden, animal habitat infrastructure
- Sanitation system: Compost toilets, off-grid sewage system, plants as sewage treatment
- Energy system: The Jouliette

(De Ceuvel, 2020b; Space&Matter, 2019; Metabolic, 2013, p. 40, 48)

4.3 Skanderbeg Square (Social Type)

Figure 1-4: Impressions of finished site design (Plant en Houtgoed, Dujardin)

Project Name
Skanderbeg Square

Location
Tirana, Albania

Contracting Authority
Municipality of Tirana

Period of Design
2008 - 2015

Area
9.7 ha

Program
Redesign of the central square

Cost
15.000.000 €

Period of Implementation
2015 - 2019

Prime Contractors
51N4E, in collaboration with
- Plant En Houtgoed
- Anri Sala
- iRI
- Fusha
- Atelier Jeol
- Gentian Lipe
- Chevalier Masson
- Aquafontal
- Gatic

(51N4E, 2020; ArchDaily, 2019, LAE, 2018, p. 325)

Background

The site is located in southern Europe in Tirana, Albania, and lies in the moderate climatic zone of the northern hemisphere. It is noteworthy that 25% of the country's population live in a 2,5 kilometer radius of the square (Persyn, 2019). The project is not under a limited lease.

The site was established in the early 1920s. When Albania was occupied by fascist Italy in 1939, the square and surrounding areas were reconstructed in a neo-renaissance style and utilized to glorify dictator Mussolini. Under communist regime, Albania became one of the most isolated countries in the world. From 1945 up, Skanderbeg Square was the core space for military parades and party meetings. This was despite the densely populated city growing around it. The communist austerity led to the disappearance of public venues in Tirana. As a substitute, the cultural leisure activity of promenading emerged. This resulted in a multitude of inhabitants spending hours strolling on the square and adjacent boulevard (See Figure 20). With the communism's end and capitalist transformation of the economy, the square was transformed into a place of transit for motorized vehicles. In 2010, then mayor now prime minister Edi Rama initiated the government program "Rilindja Urbane" (urban renaissance). The aim was to give the capital and country new relations between the government, administration, institutions, and the public. Skanderbeg Square is seen as not only the heart of the capitol but the country. Hence, a redesign of the square was an essential part of the program. A change in administration halted the redevelopment of the square until, in 2015, the new mayor Erion Veliaj realized the design proposal (51N4E, 2019; LAE, 2018, p. 236; Shehu, 2018).

Other plans were originally intended for the site. In 2004, a foreign studio drew up a proposal of several free-standing tall towers as modernization and densification of the city center. This plan was dropped as it was seen as an undeniable attempt to erase Tirana's complex history (51N4E, 2019). Instead of the aforementioned traditional and generic development plans, the site was transformed into a democratic public space intended primarily for citizens.

Figure 5: Aerial view of location (Heinkelmann, Google Earth)

The yellow dotted line shows the edge of the city. Skanderbeg Square lies within the white circle.

Design Task and Proposal

The task was to give the square back to the citizens (Shehu, 2018). The redesign should symbolize a new era of planning and governance (Nientied & Aliaj, 2019, p. 211). While showing respect to the controversial past, strong steps towards the future were to be made (51N4E, 2017, p. 18). Rama's main ambition was the following: "*(…) a city without a square, such as Tirana, is in fact a city without a community, a city whose identity has been hit right at its heart (…) Therefore, this justifies the start of project precisely with the logic to (…) democratize the vision which is there, and transform the space inherited, in a space where past, present and future coexist with each other (…)*" (Nientied & Aliaj, 2019, p. 212).

Belgian office 51N4E referred to the task by creating an open framework instead of a fixed design. The square was designed to enhance public empowerment. Hence, emphasis was laid on free civic appropriation, ownership, meeting, and inclusion. Furthermore, the square was meant to be a catalyst for multiple systems. These were to be taken up to help change the metabolism of the city (51N4E, 2020, 2019b; Persyn, 2019).

The initial site was vast and open. Both the project team and Rama interpreted this emptiness as most important condition for democratic and public life to take place. Hence, 51N4E kept and enhanced the structure. This ensured that the square continued to be the largest open space in Tirana (public space, 2020). The redesign provided an overall pavement while rendering the square more attractive to various popular uses such as seating, bathing, and holding events. The design aimed to counteract the monumentality of the totalitarian architecture that framed the site. This was done by installing a low pyramid shape as ground. The intention was that, when standing at the pyramid's tip, the user is at par with the authoritarian past (EUmiesaward, 2020; ArchDaily, 2019). It can be concluded that the citizen was, hereby, meant to be put on a pedestal to create a new equal perspective on the past. A large public garage was build under the square. This enabled the establishment and enhancement of bicycle and pedestrian connections (ArchDaily, 2019). The paving of the square consisted of a mosaic. The stones for this were collected from multiple regions of the country (51N4E, 2019). Fountains amplified the stones' coloration and meant to provide a cooling micro-climate (51N4E, 2017, p. 47). Research shows that the water also initiated a joyous and interactive experience for young and old (See Figure 19).

Twelve gardens were created to surround the square. Both the green areas on site and the adjacent green spaces were included. The gardens were meant to soften the austere architecture and buffer the congested city (See Figure 9, 12, 14) (51N4E, 2019a). It is laudable that the gardens were intended to be more than ornamentation. They meant to be urban biotopes and start of a green infrastructure that could potentially intertwine the city and landscape (See Figure 17) (51N4E, 2017, p. 28, 37). Local mature trees were kept and the added vegetation was solely native (ibid., p. 34). The gardens probably provided an alternative to the seemingly monotonous green spaces of Tirana.

Sustainability

In the last decades, Albania's rapid population growth combined with a lack of urban strategies and policies resulted in an uncontrolled urbanization on the basis of economic growth. The country still does not have a systematic approach regarding public space and only few large public areas exist. These are, however, widely popular (Sustainable Cities Platform, 2020; 51N4E, 2019). This can be traced back to the Mediterranean culture of actively appropriating the urban realm. Hence, the redesign can be seen as a good starting point for social sustainability. The project also illustrates a current task within the discipline — creating healthy and democratic spaces. This democratic design motif was implemented in a tangible and exemplary manner. The redesign seems to help Tirana and Albania take a step towards sustainable development, civic appropriation, and integration (cf. LAE, 2018, p. 236). It can, thus, be concluded that the project had or is going to have a large socio-cultural impact.

It was deduced that the project team actively promoted a sustainable perspective as SDG 11 seems to have been essential to the concept. The project intended to have an influential reach on a local up to national scale. It aimed to influence the economy, society, and political course of the country. This has been achieved to a certain extent as the following examples show. For gaining the stones, local quarries were reactivated and professionalized. Tree nurseries were opened that were meant to supply the site for the future. The square has been used for local markets (51N4E, 2019a; 51N4E, 2017, p. 56). The redesign successfully secured the site as cultural heritage. It invested in climate change mitigation and the provision of high quality of life for citizens. Access to a safe, inclusive, green, and public space was provided. But 51N4E did not only focus on the plot. Positive economic, social, and environmental links between the urban, peri-urban, and rural areas were strengthened. The redesign of Skanderbeg Square could potentially lead to the adoption of integrated policies and plans towards inclusion, resource efficiency as well climate change measures. No thresholds could be identified in regard to the sites' paving. This should enable elderly and disabled people or those with limited mobility to also use the location. All classes are represented on site, have equal access, and individual liberty. The motif 'see and be seen' is strong. Through all this, prejudice is assumably minimized and inclusion is encouraged. The design actively counteracts modernism with its dominance of motorized traffic, and loss of individuality, identity, and familiarity that is typical for the public urban realm. Moreover, sustainable modes of transport were provided. Whether the environmental impact of the city was largely reduced can be debated.

This case also demonstrated that the role landscape architects can play in society should not be underestimated. Here, the designers were also activists, directors, organizers, and mediators. Skanderbeg Square highlights the need for landscape architects to engage not only in social and ethical, but also political, and economic development.

Resources

The project made use of all types of resources. However, the human resource played a central role. Skanderbeg Square could be described as ‘a project by people with people for people’. The project team demonstrated the skills to deal with the complex historical, political, and social circumstances of the site. It could have been a benefit that 51N4E was not from the country. In this way, the office may have brought in more expertise and objectivity. Potential disadvantages could have been counteracted by including local actors and the public in the project development. The project team used the context and history as a rich resource. The design, hereby, shows consideration to the citizens’ emotions (e.g. sentiment, memories) and behavior. Through this, the countries’ identity and culture is respected as the past is not erased but dealt with. It cannot be forgotten but it can be met on — in this case literally — another level. A recreational and self-paced outdoor use was made possible to a large extent. Hence, room was given to the Mediterranean habits and customs (e.g. strolling, being outside, to see and be seen) to be performed. A three month long public participation process with residents, business people, and actors around the site was included. This was an hitherto unknown process for Albania (51N4E, 2019b; LAE, 2018, p. 241). This dialogue design must have had numerous benefits: firstly, subsequent conflicts could have been circumvented. Secondly, the landscape architects could have learned more about the local culture and public needs and wants. Thirdly, the projects’ reach was broadened as its boundaries to the surroundings got blurred. Ultimately, the design can be described as user-oriented, locally grounded, and appropriable for everyday use. One could assume that the use of Albanian resources (pavement stones, vegetation) resulted in less need of transportation. However, thousands of tonnes of soil had to be shifted in the construction phase. The stones were sourced from the entire country. As Albania did not have plant nurseries that hosted native species, the project team collected the intended plants from all over Europe (51N4E, 2017, p. 34). It is positive that the outdoor furniture was locally fabricated (Kucharek, 2019).

The analysis showed that the design offered many ESs. The following was done in regard to supporting ESs. The design added and diversified the existing habitats of the green areas on and around the site. The diverse plant plan enhanced the urban biodiversity. In this regard, 51N4E (2017, p. 28) mentioned an increase in insects. By relying on native flora, ecosystems tend to be healthier and more durable. The following cultural ESs could be detected. The site provided opportunities for inner-city recreation. According to the research and interview, the site has been intensely used by citizens/tourists. Hence, the following can be assumed. The mental and physical health was strengthened by being outdoor and surrounded by natural elements (e.g. sun, greenery, water, wildlife). The human need for movement and socialization was satisfied. Tourism was also increased. Esthetic appreciation, culture, art, and design could also have been triggered. All this enhances a sense of place, belonging, and identity. The project laid its focus on regulating ESs. 51N4E (2017, p. 32) said that hope was placed in natural processes.

The gardens with the native species were intended to moderate the effects of climate change (ArchDaily, 2019). They also acted as carbon storage. How much influence the gardens have on the local climate and air quality could not be determined. The fountains provided water. The multitude of blossoming plants provided opportunities for pollination. Pesticide use was avoided (Persyn, 2019), probably in favor of biological control.

In the following, the project's reaction to the nature-culture dualism is analyzed. At first glance, one could claim that the design did not touch upon the relationship. However, the design encouraged the viewer to develop an emotional connection to the natural materials on site. The native plants and stones were proudly presented as symbolic cultural and national heritage. The plant combination in the gardens was meant to be both esthetically pleasing and ecologically valuable. If the user is able to grasp the ecological worth can be debated. It can be deduced that functionality was to some extent prioritized to esthetics. This is, for instance, visible in the effort to establish biotopes instead of a traditional flower bed. Within the case study, it is, however, claimed that the physical appearance still played a major role. The esthetic components of the design can be debated. However, an advantage is seen in the design concentrating on grand gestures and not getting lost in details. This clarified and strengthened the underlying message. The choice of elements, that are either reinforced or left open as canvas for continuous transformation, has been wisely made. This provides a long-lasting common ground that can be embodied in various ways.

Management

Skanderbeg Square did not follow the usual logic of a landscape project development. The site was first and foremost meant to be a statement and initiator of a certain vision. An interdisciplinary team was set up. Architecture office 51N4E as main designer collaborated with Albanian artist Anri Sala for the competition and dutch horticulture company Plant en Houtgoed for the urban ecosystem. The new Albanian company iRI was responsible for the project implementation (EUmiesaward, 2020). Inside 51N4E, the team responsible for the competition proposal comprised seven men and three women. The team executing the final design were five men and four women (51N4E, 2020). This can be considered promising from the perspective of gender equality.

The project cannot be interpreted as a bottom-up development. The planning system and implementation of the Urban Renaissance developments have been centralized (Nientied & Aliaj, 2019, p. 211). Skanderbeg Square, thus, remains to be the product of a political course steered by the government (cf. LAE, 2018, p. 236). It is notable that the project team handed over some of their power to the users. As a result, they were less likely to be able to predict the future course of the project.

The financing of 15 million euros was considerable. This budget can be considered a large amount in terms of the country's economic and social instability. Some sources claimed that 10 million euros of

the financing were state funds from Kuwait (cf. Yalli, 2011). All of this raises questions, especially in regard to the multitude of allegations of corruption that circle around the project (cf. Nientied & Aliaj, 2019, p. 215).

Such a charged project seems to require to be communicated, planned, and organized with more than traditional architectural means. However, no such documents could be found within the research. 51N4E presented the project with a common master plan (See Figure 9). 51N4E relied on traditional design documents to present their work. It could be argued that, since the project team was already 'thinking out of the box' by expanding its initial scope, it should have also communicated the design in a novel way. The perspectives of the design did not convey the valuable social components of the concept (see Figure 10, 11).

As the design is meant to be an open-ended process, a strategic management approach would be deemed necessary. 51N4E (2017, p. 37) explicitly said that management instead of solely maintenance activities were intended. However, the case study did not find much information about this. It was said that the plantings were intended to become increasingly self-reliant. This was partly due to the aspired climate resistance and partly to the fact that Albania had no experience or tradition in landscaping. Overall, a reactive form of management would be needed because the users are allowed to modify the site.

Synthesis

The case study deduced that there are plenty of measures that counteracted a waste of natural and societal resources:

- In order to have a comprehensive view on sustainability such a project must not start with specialized but general knowledge. Research showed that this has been done here. An interdisciplinary team of experts was gathered. In the quest for designing for empowerment, it was laudable to include public participation in the initial project development phase. This must have intensified the public appreciation and use of space for the present and made it more durable for the future.
- Skanderbeg Square is the most important square of the country (LAE, 2018, p. 236) and embodies its history. Therefore, the site is laden with political and cultural symbolism. It, thus, can play an important role in the democratization of Albania. This is why it can be seen as pivotal that the project team went against a tabula rasa approach. It can be deduced from the historical development of the site that whoever has the power in Albania has the square and vice versa. Hence, it was a good concept to actively give the space to the citizens.
- The project team specifically procured local materials and presented them as symbolic resources rather than products. In addition, the gardens were meant to be also experimentation labs (ArchDaily, 2019; 51N4E, 2017, p. 37, 40).

- The design was not created for its own sake but served as a stage and common ground for civic usage. It is referred to what can be seen as a key statement by 51N4E (2017, p. 82): "*Architecture not as a spectacle, but as a stage, creating conditions to perform public life*".
- The design entailed socio-economic benefits and strengthened the Albanian economy and culture. The project invested in local up to national partnerships. According to 51N4E (2017, p. 56), a platform of knowledge, networks, and technical know-how was established.
- The 'emptiness' of the design was understood and valued by the public. This can be stated because the square has been intensely used (Hendriks, 2020). Hence, the message that the project sought to convey was understood. It can, therefore, be praised that the project team did not succumb to adding more features. Over-designing is a common phenomenon in design disciplines.
- The project had a reach beyond the limited perimeter of the site. The square was thus not treated as an island but was strongly interwoven in its surroundings. This made it more interconnected, influential, and durable. The project team created starting points that were meant to grow beyond the initial design and develop into a system (51N4E, 2019b). Like-minded projects are already following (e.g. International Competition for the object "New Municipality Building").
- It has to be noted that the design choices (e.g. linking the site to its surroundings, connecting city and landscape, urban ecosystems, green infrastructure) might be common in Western Europe. It can be assumed that they are innovative for Albania.

However, the case study revealed some inefficiencies:

- Only little information about closing resource flows and minimizing on-site waste could be found out. These are that the fountain water formed a closed circuit and pesticides were avoided (Persyn, 2019; 51N4E, 2017, p. 44). The research could not determine whether the initial resources on the site were used, except from preserving mature trees. The materials used in the design were not reused from local or regional sources, but newly created.
- The project aim was that the citizens enliven the design through appropriation. 51N4E admitted that this vision is something that cannot really be planned but only hoped for (Persyn, 2019). It can be claimed that laying such importance on the users to ultimately fulfill the purpose of the square makes the concept fragile.
- It must be reflected whether the execution of the concept lives up to the considerable budget that was available. For one, this refers to creating a space that is not considered complete unless people interact in it. Another aspect is that it is questionable whether 15 million euros should have been mobilized for this redesign when Albania continuous to be in a cultural and economical struggle.
- 51N4E (2019) claimed that the place is now a civic design and does not serve a commercial purpose. However, it can be argued that the square is a political model. There is a possibility that the next government alters the site again. The design is based on Edi Rama's personal perception and 'Urban Renaissance' plan. He has a vision of how Tirana and Albania should be in the future. It could not be established In the case study whether this vision is also supported by the general public or other key figures.

- To what certain extent the citizens can appropriate the site is not concretely mentioned in the sources analyzed. It can be assumed that they are not allowed to interfere with the gardens.
- The design is socially oriented and has a very poetic angle. This, however, seemed to have reduced the resource-efficiency and long-sightedness in regard to other aspects. It can be argued that the design brought social and economic but not necessarily environmental benefits. A large percentage of the paving is non-permeable and only few green areas exist (See Figure 14, 15). This is despite rain runoff and flood risk being issues, as stated by 51N4E (2017, p. 46). Tirana is dense, has a warm climate, and lacks green space. The size of the square could have been used to mitigate the heat island effect and to provide a larger habitat for urban fauna and flora. Surely, it would have been possible to upkeep the vast character of the square and still offer more green and permeable surfaces. The wet square was intended to remind of the lake landscape in Albania (ibid., p. 40). Against the background that the design reduced green and blue areas, one can wonder why a 'real' water landscape was not installed. The competition illustrations (See Figure 8, 10, 11) and tree plan (See Figure 14) depicted the square as a green surface that is embedded in abundant vegetation. The realized design (See Figure 9), however, shows that the square is fully paved and surrounded by sparse and scattered vegetation. Hence, the choice of visual presentation could have also been a way to conceal a lack of greenery.
- The role Edi Rama played in this project must be scrutinized. On the one hand, he was the initiator of urban renewal projects that the country does need. On the other hand, he continues to be accused of corruption and fraud. This is particularly interesting in view of the extensive Kuwaiti financing of Skanderbeg Square.
- Albania's future remains unforeseeable. What value will the design have if Albania goes bankrupt or another civil war breaks out? It would be a pity if Skanderbeg Square ends up being a democratic symbol in a country without democracy. In 2019, Albania has faced numerous struggles, riots, and demonstrations. Some of these took place on Skanderbeg Square (See Figure 6). From this, it can be detected that the project was successful in the social sense. It can be used in a democratic way. Overall, it can be concluded that the project is laden with inspiring aspirations. But it is unsure how it will develop as Albania continues to show periods of instability in the economic, political, and social sense.

Figure 6: (Pustina)
This photograph proves that the square can be used by the citizens in a democratic way. It shows antigovernment protesters holding a main opposition democratic party flag (left) and an Albanian (right) flag during a rally on Skanderbeg Square in 2019.

Design Documents

Figure 7: (51N4E)

Figure 8: (51N4E)

When comparing the ‘before’ and ‘after’ pictures, the drastic change becomes apparent. The previously heterogenous, chaotic, and grey cityscape comes together as a calm, green, and unified area. This is due to large-scale and reduced design elements. The green color of the square gives the appearance of it being grass or, at least, permeable material. This could have been a way to circumvent the amount of sealed surface that was realized. The plantings of the gardens did not turn out to be as dense as depicted here.

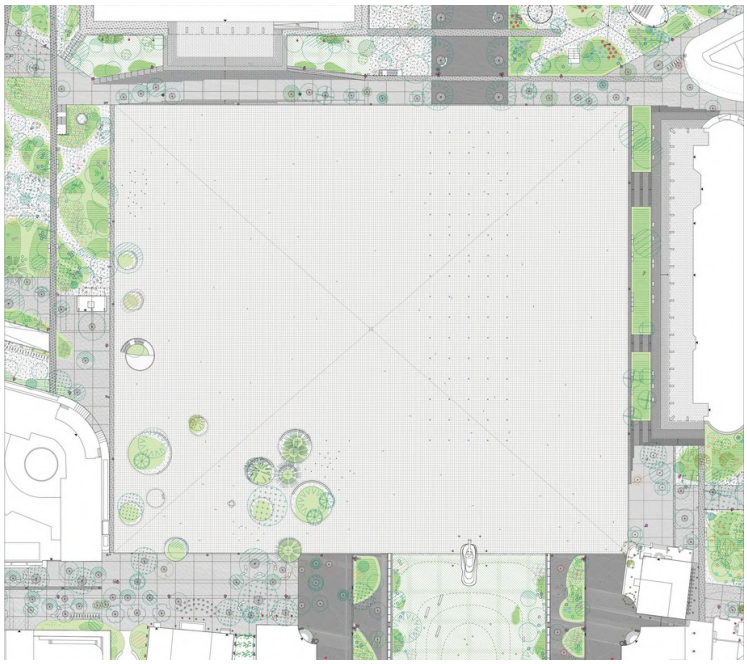

Figure 9: Master Plan (51N4E)

Figure 10-11: Perspectives (51N4E & Belzer)

Analytical Sketches

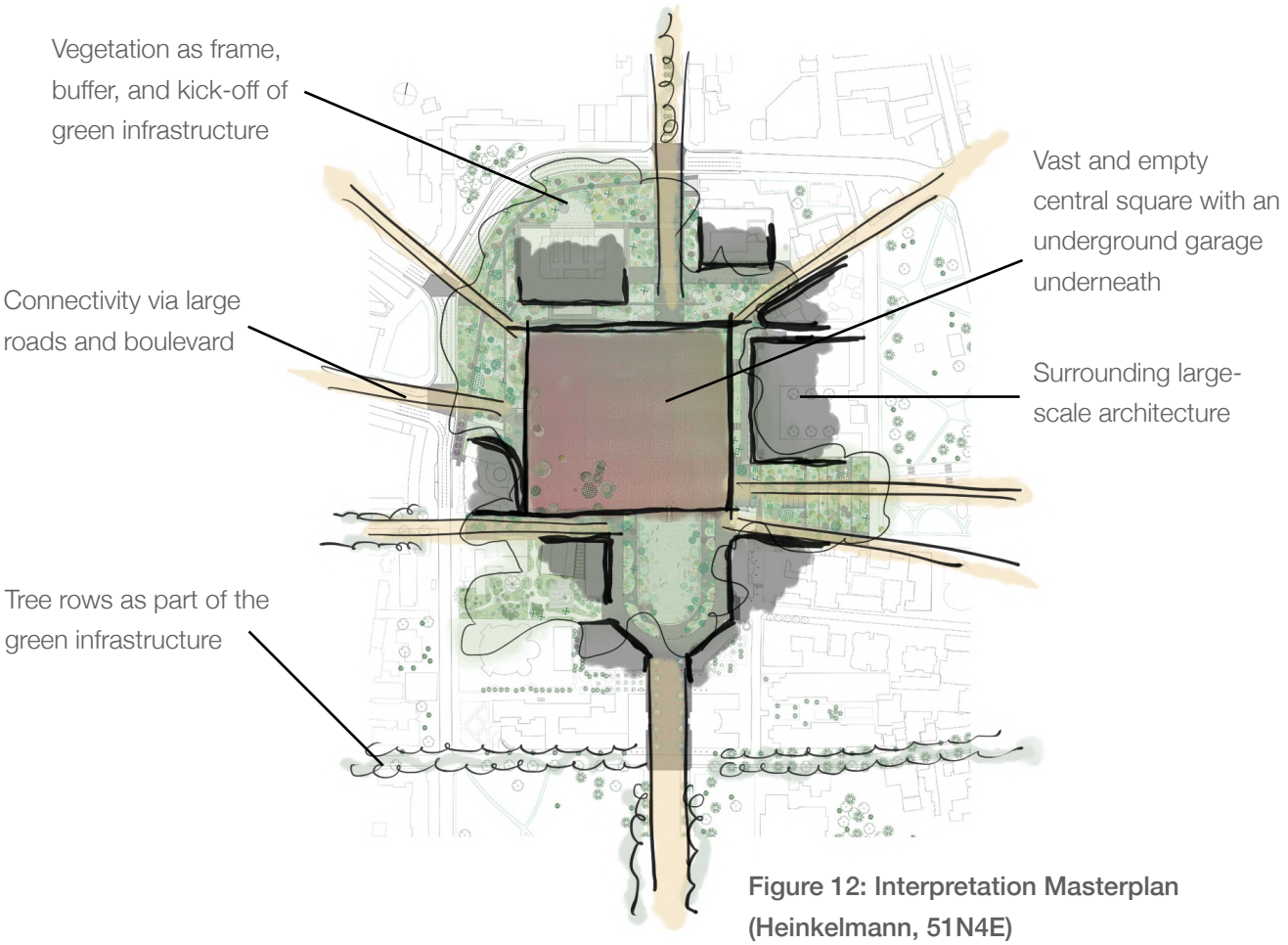

Figure 12: Interpretation Masterplan (Heinkelmann, 51N4E)

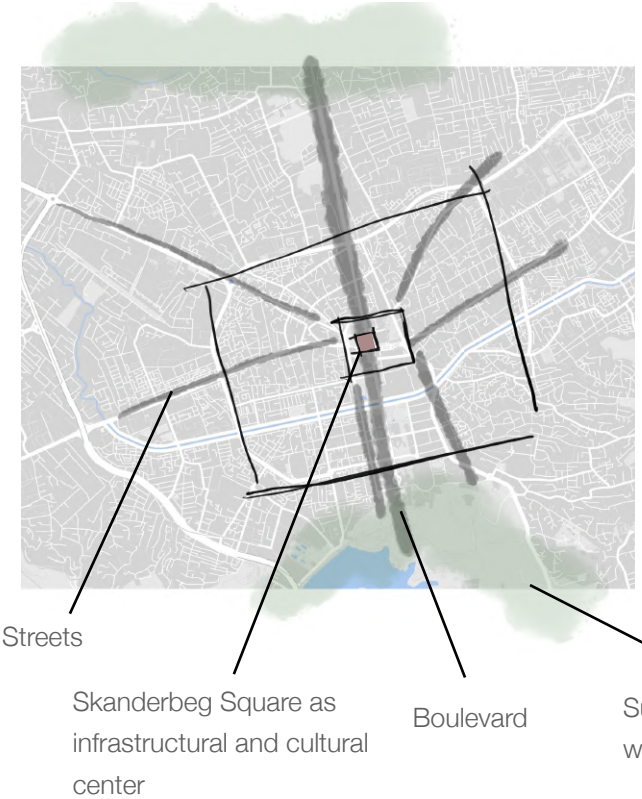

Figure 13: Interpretation Context (Heinkelmann, OpenStreetMap)

The most noticeable aspect is that Skanderbeg Square is by far the largest public space in Tirana. The project site lies central in the city. Many large roads pass by. The boulevard provides an axis that connects the city and the landscape.

Figure 14: Tree Plan (51N4E)
The plan shows the green frame around the square as well as the corridors that reach into the surroundings. The color scheme of the square in relation to the other elements of the plan gives the impression of it being green and airy. This is, however, not the case.

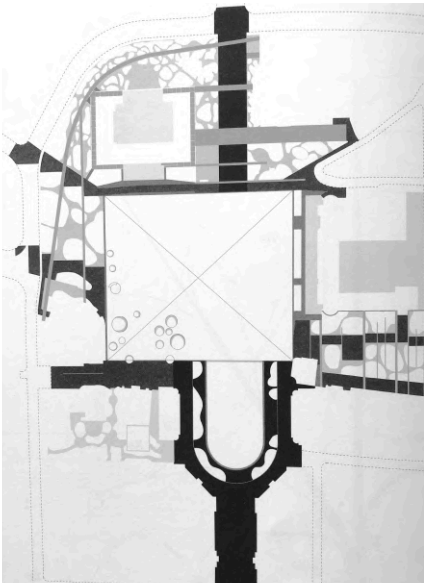

Figure 15: Floorscape (51N4E)
The site is influenced by heat as well as heavy rain events. The chosen ground materials, however, do not offer much permeability. This, in combination with the prioritization of grey over green, opens up the question if the design is that resource-efficient.

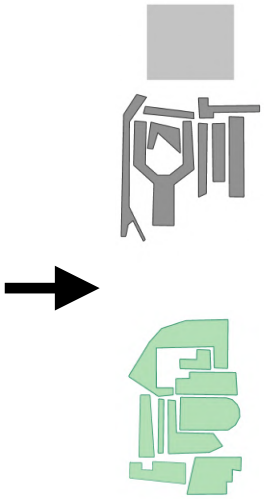

Figure 16: Green and Grey Areas (Heinkelmann)
The green areas are spatially distributed and could therefore appear as large as the gray areas. However, this surface-illustration shows an uneven distribution. This raises the question whether the square necessarily had to be an entirely covered area.

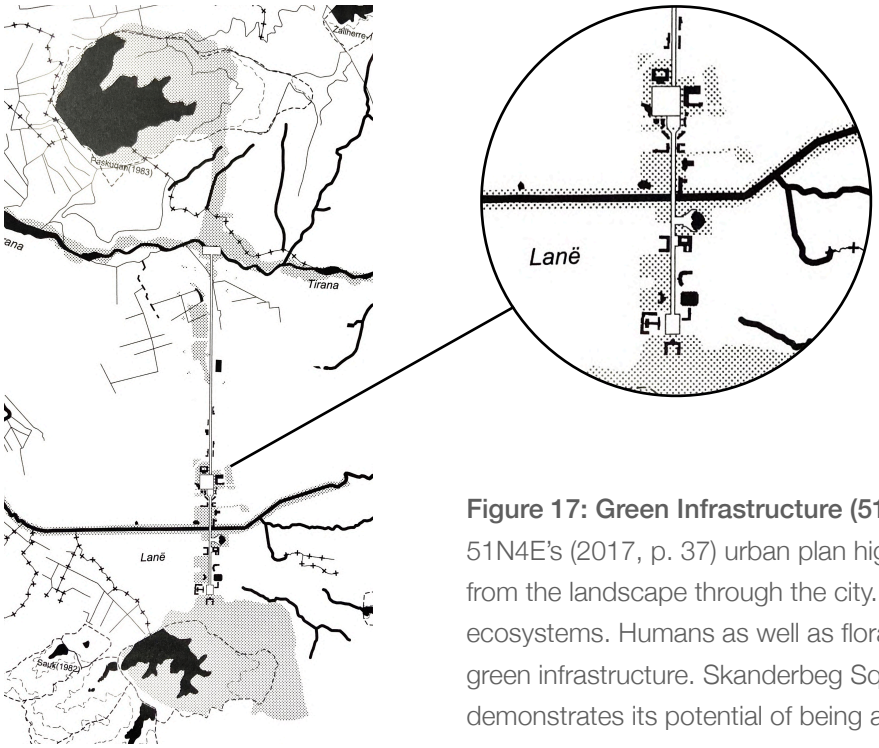

Figure 17: Green Infrastructure (51N4E, edited by Heinkelmann)
51N4E's (2017, p. 37) urban plan highlights patches of green areas from the landscape through the city. This could form a corridor of ecosystems. Humans as well as flora and fauna would benefit from this green infrastructure. Skanderbeg Square's central position, hereby, demonstrates its potential of being a catalyst for transformation.

Appropriation

Figure 18: (27.al)

Figure 19: (Milligan sumo)

Skanderbeg Square and water

Both photographs show a water feature on the square. Assumably due to the Mediterranean climate, it seems to be gladly used, especially by children. Instead of the previously strict fountain design, a multitude of water jets now create an interactive and accessible setting. It is to be remembered that a water feature is always also a social feature.

Figure 20: (Donati)

Figure 21: (Offbeat Destinations)

Skanderbeg Square and strolling

The citizens have always been fond of strolling on the square and adjacent boulevard. This activity is still possible in the new design.

Figure 22: (Tirana Times)

Skanderbeg Square and people

The square is very well visited. Many one-time or recurring events happen here. It is noteworthy that also religious events take place. This is a democratic right that was not always possible to exert in Tirana. In the summer, life happens more during the evenings and nights. However, the square can also be completely empty at times.

Figure 23: (imgur)

Figure 24: (Kambo)

Figure 25: (Kambo)

Figure 26: (Kambo)

Figure 27: (51N4E)

Figure 28: (Ghinitoiu)

Figure 29: (Kambo)

Skanderbeg Square and dwelling

The photographs depict how the users are able to linger on the site in numerous ways. They use the stairs of adjacent buildings or arrange the loose furniture according to their needs. This adds a convivial and autonomous component to the public space. The processes as they can be observed today support the envisioned concept.

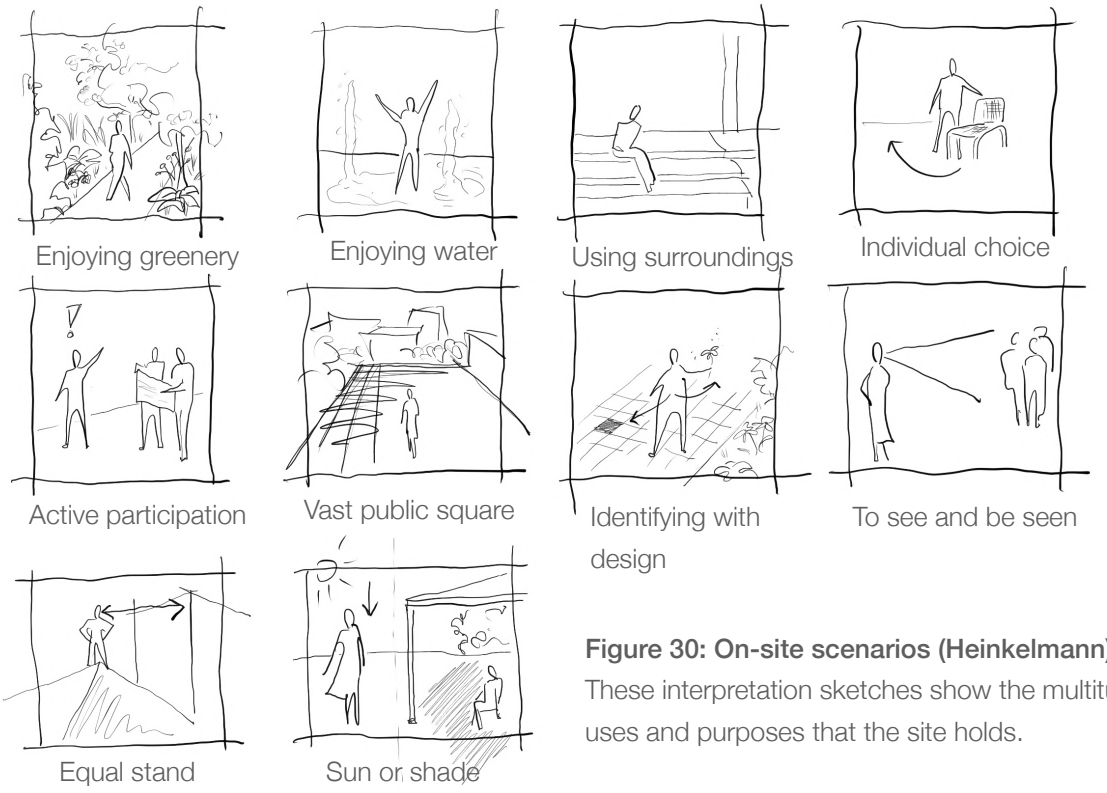

Figure 30: On-site scenarios (Heinkelmann)

These interpretation sketches show the multitude of uses and purposes that the site holds.

4.4 Case Comparison

To conclude the case study analysis, all three projects are evaluated. In a first step, they are regarded individually. The findings are summarized in table 2. This builds upon the analytical framework (Section 3.1). In a second step, the cases are compared with one another.

It is elucidated to which degree Murg-Auen-Park is in line with the environmental type of SRM. As expected, emphasis was laid on SDG 11. The role natural resources played was indeed great as they formed the basis of the design. Supporting ESs were maintained and enhanced. The project encompassed the expected categories of cultural ESs. A focus on regulating ESs was clearly identifiable. The Murg-Auen-Park showed an exceptionally strong relationship between nature and human. What is interesting is that the nature-culture-dualism was not a specific aspect of the concept. As assumed, a natural atmosphere and development was prioritized to a certain form of esthetics. Hence, the project team did actively work with nature in a reactive mode. The project development turned out to be dynamic and novel.

It is elucidated to which degree De Ceuvel is in line with the economic type of SRM. As expected, emphasis was laid on SDG 12. The project heavily relied on societal, particularly man-made, resources. Supporting ESs were maintained and enhanced. The case encompassed the expected categories of cultural ESs. Hereby, the scientific and educational category was strongly pursued. A focus on provisioning ESs was clearly identifiable. However, the Purifying Park was based upon the regulating service of wastewater treatment. The project fit the expected stance to the nature-culture-dualism. The focus, though, was not pursued as strongly as initially assumed. Esthetics was prioritized to a natural atmosphere and development. The project development turned out to be dynamic and novel. It required an active mode.

It is elucidated to which degree Skanderbeg Square is in line with the social type of SRM. As expected, emphasis was laid on SDG 11. The project heavily relied on societal, particularly human, resources. Supporting ESs were maintained and enhanced. The case encompassed the expected categories of cultural ESs. A focus on regulating ESs was clearly identifiable. The case fit the expected stance to the nature-culture-dualism. Even tough the project team lessened the role of esthetics, it can still be argued that it was prioritized to a natural atmosphere and development. Whether the team successfully worked with nature to an exceptional degree can be discussed. It is still assumably still the human that carries the design and management. The project development included a level of flexibility. Overall it can be said that the project course was still rather linear and traditional. It needed to have a reactive mode.

	Components	Murg-Auen-Park	De Ceuvel	Skanderbeg Square
Sustainability	Emphasis on what sustainability dimension	Environmental	Economic	Social
	Emphasis on what SDG	SDG 11	SDG 12	SDG 11
Resources	Emphasis on what type of resource	Natural	Societal (Man-made)	Societal (Human)
	Emphasis on what type of ES besides supporting	Regulating	Provisioning	Regulating
	Emphasis on what categories of cultural ES	Esthetic; Recreational; Cultural heritage and identity	Inspiration for culture, art, and design; Education and science (Strongly)	Esthetic; Recreational; Inspiration for culture, art, and design; Cultural heritage and identity (Strongly)
	Emphasis on reducing the nature-culture-dualism	Yes (Strongly)	Yes (Not as strongly)	No
	Emphasis on esthetic-oriented or nature-oriented design	Nature	Esthetics	Esthetics
Management	Actively working with nature	Yes (Strongly)	Yes (Not as strongly)	No
	Project development	Dynamic	Dynamic	Linear
	Form of management	Reactive	Active	Reactive

Table 2: Findings within the three cases (Heinkelmann, 2020)

Concluding from the individual case comparison, all projects are almost ideal-typical representations of the SRM types. This shows that they can be seen as trailblazers to promote SRM in landscape architecture. In the following, the cases are compared with each other.

Firstly, the similarities between the cases are presented. All can be used as learning ground: the Murg-Auen-Park in regard to bringing nature and human closer together, De Ceuvel in regard to establishing a circular economy from the bottom-up, and Skanderbeg Square in regard to democratizing a place in an inclusive manner. Each project teams have committed themselves to a cooperative way of working and to involve the public. It was observed that there have always been certain individuals that have fought persistently for the project's realization. In every project, part of the project team was from the area. They were, therefore, able to draw on local knowledge and simplified network building. The cases share a great level of site specificity and contextuality. Hence, they did not follow standard development answers. Moreover, they can be described as process-oriented.

The project teams were aware of the flux of their design, but instead of trying to precisely predict the project's course, they left room for leeway.

On another note, the cases demonstrated a connection, necessity, and transfer between 'finding' and 'creating'. This refers to the use of local/regional resources, the reinterpretation of superfluous material, and the use of the available societal resources. All projects showed strong approaches to the creative act of selection, reuse, and appreciation. De Ceuvel used the available labor, local materials, and titled waste products. This was done in an experimental way. Skanderbeg Square used the historical layers, native resources, and potential of the citizens. This was done in a poetic way. The Murg-Auen-Park used the established nature. This was done in a restrained way. No team focused exclusively on the form and esthetics of the project or on leaving a signature. As already suspected, the cases did not just follow the one sustainability dimension assigned to them in this thesis. However, it can still be deduced that this was the dimension on which the greatest emphasis was laid. The cases show overlaps in regard to the work methods and objectives. However, this was anticipated.

Secondly, the differences between the cases are presented. All variances can be traced back to the established typology. The landscape architects identified and thus approached resources and their management differently. This underlines the claim of this thesis to be aware that there a more logics to SRM. The Murg-Auen-Park made nature the main designer and manager. In De Ceuvel, the human was the main designer and manager. The same can be said for Skanderbeg Square. The Murg-Auen-Park had a valuable landscape at its hands. The project team, thus, did not see — and have — the necessity for plenty additional man-made components. The design choices were made in favor of nature, less so for the human's esthetic understanding. In contrast, the economically and socially oriented cases laid more emphasis on esthetic and design. In Murg-Auen-Park, nature acts for its own sake. In De Ceuvel, nature is used for its ESs. Skanderbeg Square has installed an ecosystem that should ultimately be self-sufficient. However, it can be claimed that the landscape is still primarily intended for humans. De Ceuvel and Skanderbeg Square introduced many new natural resources to the site except from keeping mature trees. Murg-Auen-Park did only introduce a small amount of new natural resources. Skanderbeg Square made heavy use of human resources. This was to adapt the design to the users' needs. The design counted on the site users to give it purpose. De Ceuvel made extensive use of man-made resources. This was to implement the project. The design counted on the tenants and professionals to manage the place and conduct research. In the Murg-Auen-Park, societal resources were mainly needed to enable the implementation of the project. The design did not count on human use. It can be concluded that, in regard to the SRM concept, Murg-Auen-Park and De Ceuvel showed strong and tangible approaches. Skanderbeg Square, as can be expected from the social sustainability dimension, showed strong intangible approaches.

Thirdly, the following indications can be drawn from the cases in regard to the thesis statement 'nature has no waste'. The Murg-Auen-Park showed multiple benefits that arise when local nature is allowed to be self-sufficient. For one, less human intervention is necessary in the project course.

A more wild and dynamic nature is highly appreciated, especially by the youth. If nature in a more original form can be accepted, less materials and products are necessary to be introduced to the site (e.g. dead tree as benches, waterfront as playground). The better the relationship between user and location, the fewer negative human-induced effects (e.g. littering) can be expected. This is because nature is respected and its value is understood. De Ceuvel showed that if the human taps into nature's processes with enough understanding of its working, it does not have to end in resource depletion. In contrast to traditional forms of ES use, attention is laid on a balanced give and take. Both can benefit if man and nature work together. This can be seen here, as the local soil and water were cleaned directly and efficiently in a joint effort without the human contributing to the waste of more resources (e.g. soil disposal). Skanderbeg Square showed that nature can be used to amplify culture. The material and immaterial gap humans have drawn between themselves and the natural environment does not have to be. The landscape architects used the vegetation to create traditional pleasures such as taking a walk in the green and having shade in the hot country. But what was special was that the natural elements were selected to promote a more intimate dialogue. They demonstrated that nature is an essential part of peoples' identity. This can lead to humans developing a more understanding connection.

Fourthly, unexpected aspects and shortcomings are presented. All cases claimed to regard forms of strategic management. However, no explicit strategies or documents could be found in any case study. In comparison with the other cases, Skanderbeg Square did not show the same level of efficiency in the installation and management of resources. This is regrettable considering the large budget that was at hand.

5 Discussion and Conclusion

5.1 Summary of Findings

The thesis started with the observation that, in view of attaining sustainability, a more efficient resource management is needed in the field of landscape architecture. Since there was a lack of systematic reflection on this topic in the profession, literature on sustainability, resources, and management was compiled. This enabled the conceptualization of a working definition for sustainable resource management (SRM). SRM means that the choice and utilization of resources within today's landscape architecture do not endanger the present and future functioning of nature and society. Since practitioners focus on different aspects when it comes to sustainable design, it was suggested to distinguish between three types within the SRM concept: environmental type, economic type, and social type. The value of this typology was demonstrated by qualitative case studies. It can, thus, be concluded that the SRM concept helps to understand how can landscape architects can address urban sustainability.

5.2 Limitations and Generalizability

All cases are located in Europe in the urban space. The projects have been established within the last years. Future evaluations are needed to see how they develop in the long-term. A visit on site was not possible for any project. Nor was it within the scope of this thesis to conduct more interviews. As the thesis laid emphasis on the theoretical conceptualization of SRM, it was not within the time frame to conduct a quantitative analysis. In practice, it is not aspirational to create a project with an 'either or' approach. It could be questioned if such a 'constricted' analytical framework was the right choice as basis for an interpretive analysis. However, this did not turn out to be limiting. Through the systemized proceeding, it was possible to gain a deep insight into the cases within the given time. The most apparent limitation within the thesis is that only three landscape architecture projects were analyzed. Hence, the inferential value from the extreme cases to other projects is limited.

Against this backdrop, the thesis has a limited generalizability. There is, consequently, more work to do in line with SRM. Future research has to probe whether the concept is applicable beyond the analyzed cases and particularly beyond Europe. This could be done through systematic empirical assessments such as follow-up case studies, in-depth research, and structured interviews with more key figures.

Nevertheless, the theoretical expectations about the profiles of the SRM types proved capable as analytical tool. They revealed forms of SRM that can be conducted in practice in a nuanced way. The three analyzed cases demonstrate the validity of the typology in their context. This is why the analytical framework can be used as orientation/inspiration in the future. It should, however, not be considered a manual or 'box-ticking-list' for SRM. It should rather be interpreted as a first tool and structure to build upon.

In general, the scope of the thesis did not allow for the establishment of a new theory as well as solid testing on multiple cases. This is why theoretical innovation was prioritized to empirical elaboration. The main purpose/contribution of this thesis was to develop a first conceptual framework/typology for analyzing SRM and illustrate its value empirically. The findings show that this has been accomplished. For this reason, the concept can be seen as a first step towards a better understanding of SRM within urban landscape design.

5.3 Practical Implications

The following scenarios illustrate different aspects of and perspectives on SRM in practice:

- If a project site is located in the city center and already consists of a mature and large nature area, it is important that this is largely preserved. City dwellers can find esthetic and recreation also in less designed landscapes. Therefore, a project site that already has a wealth of natural resources does not need a multitude of additional design elements. A major, potentially costly, one-time intervention on site may be necessary to restore the structures of a landscape to a more natural state. However, if this is done correctly, less care-taking by man will be needed in the future. Nature will manage itself and rebalance its systems. Through this, many long-term benefits for nature and humans are achieved. A good example for this is how the project Murg-Auen-Park dealt with such an issue.
- A change in industry and lifestyle can be made tangible and inspirational. This does not only have to be aimed at through a specific landscape design. A confluence of public and private and of professionals and laymen is possible. Further tactics are urban agriculture or combining educational with cultural events. When aiming to achieve resilient systems, one should work in partnership with nature and aim to close the local resource flows. If a project site is interpreted as living laboratory and held flexible, plenty of knowledge can be generated. However, this requires continuous and strategic management. The project De Ceuvel can serve as excellent example for such an endeavor.
- A project does not have to limit its scope to the perimeters of the physical site. It can be interwoven with its surroundings. This enables the spread as well as gain of immaterial and material benefits. The choice of resources in a design holds many opportunities. Besides the primary purpose, resources can trigger an emotional response and strengthen the culture and economy. A design should aim at bettering the human life. Sometimes, this means that the physical form of a landscape project should play less of a role. Importance would have to be placed on preserving, creating, and continuously managing the societal conditions. In that case, projects would have to become a forum for discussions on topics such as appropriation, empowerment, and integration. The project Skanderbeg Square showed these issues at length.

Based on the findings obtained in this thesis, it can be argued that the likelihood of implementing SRM depends on numerous aspects:

- Landscape architects must be aware of the urgency to develop sustainable projects.
- Landscape architects have to know which resources exist and are — or could be — at their disposal. In this context, the value that is ascribed to resources is essential.
- Landscape architects have to realize that to create a resource-efficient design, strategic and adaptive management is required throughout the entire project course. A far-sighted approach is necessary when dealing with nature and striving towards sustainability.
- The user must ultimately accept the site. Otherwise the design has not fulfilled its purpose.

- How aware and willing are people to move away from ‘business as usual’ towards projects that promise to contribute to a sustainable society but include novel and often less controllable perspectives and working methods? Landscape architects are likely to need to convince others to follow an SRM approach. Commissioners, governments, and other decision makers can still pose as hindrance here.

Ultimately, the topic of this thesis proved to be a worthwhile undertaking. It has been demonstrated that more attention needs to be directed to resource management in the context of sustainability. This issue must be approached head-on considering the critical state of the earth. It is, therefore, hoped that this thesis provides a frame of reference, awareness, and inspiration for landscape architecture professionals as well as people associated with or interested in urban planning and the environment. The SRM concept is to be built on since it is intended as a resource itself. Landscape architects can now make use of the gained knowledge and help save the world.

Acknowledgements

A big thank you to my supervisors Prof. Thomas Randrup and Prof. Lisa Diedrich for their engaged and continuous support. I would also like to thank Mark Hendriks and Pierre Michel for their helpful and enthusiastic contribution to this thesis.

I dedicate the thesis to my brother.

References

Main Body

Agudelo-Vera, C.M., Mels, A.R., Keesman, K.J. & Rijnaarts, H.H.M (2011). Resource management as a key factor for sustainable urban planning. *Journal of Environmental Management,* vol. 92 (10), pp. 2295-2303. Available at: https://www.researchgate.net/publication/51192002_Resource_management_as_a_key_factor_for_sustainable_urban_planning [2020-09-08]

Astrup Jensen, A. & Remmen, A. (eds) (2006). *Background Report for a UNEP Guide to LIFE CYCLE MANAGEMENT - A bridge to sustainable products*. Available at: https://www.lifecycleinitiative.org/wp-content/uploads/2013/09/UNEP_Background_document_LCM_2006_Febr.pdf [2020-05-29]

Batty, M. (2008). The Size, Scale, and Shape of Cities. *Science*, vol. 319 (5864), pp. 769-771. Available at: https://www.researchgate.net/publication/5593135_The_Size_Scale_and_Shape_of_Cities [2020-09-08]

Blaug, M. (2020). *Economics*. Available at: https://www.britannica.com/topic/economics [2020-09-01]

Brugmans, G. & Strien, J. (eds) (2014). *IABR–2014–Urban by Nature.* Available at: https://iabr.nl/media/document/original/iabr_2014_introduction.pdf [2020-09-01]

Böhm, K., Tintner, J. & Smidt, E. (2011). Modelled on Nature - Biological Processes in Waste Management. In: Kumar, S. (ed) *Integrated Waste Management - Volume I*. pp. 153-178. Available at: https://www.researchgate.net/publication/221914782_Modelled_on_Nature_Biological_Processes_in_Waste_Management [2020-03-26]

Council of Europe (CE) (2020). *European Landscape Convention.* Available at: https://www.coe.int/en/web/conventions/full-list/-/conventions/rms/0900001680080621 [2020-09-08]

Çelik, F. (2013). Ecological Landscape Design. In: Ozyavuz, M. (ed) *Advances in Landscape Architecture. pp. 10689-2414.* Available at: https://www.intechopen.com/books/advances-in-landscape-architecture/ecological-landscape-design [2020-09-08]

De Block, G., Vicenzotti, V., Diedrich, L. & Notteboom, B. (2020). For whom? Exploring landscape design as a political project. *Journal of Landscape Architecture,* vol. 14 (3), pp. 4-7. Available at: https://www.tandfonline.com/doi/full/10.1080/18626033.2019.1705568 [2020-03-24]

De Block, G. & Vicenzotti, V. (2018). The nature of post-human landscape design. In: Landscape Architecture Europe (2018). *Landscape Architecture Europe #5 care/create/act.* 5. ed. Wageningen: Blauwdruk Publishers. pp.149-155. ISBN-10: 9492474301

De Block, G. (2015). Ecological infrastructure in a critical-historical perspective: From engineering 'social' territory to encoding 'natural' topography. *Environment and Planning A,* vol. 48 (2), pp. 367-390. Available at: https://www.researchgate.net/publication/283935296_Ecological_infrastructure_in_a_critical-historical_perspective_From_engineering_%27social%27_territory_to_encoding_%27natural%27_topography [2020-09-08]

Dempsey, N. & Burton, M. (2012). Defining place-keeping: The long-term management of public spaces. *Urban Forestry & Urban Greening*, vol. 11 (1), pp. 11-20. Available at: https://www.sciencedirect.com/science/article/pii/S1618866711000732?via%3Dihub [2020-05-15]

De Groot, R.S., Alkemade, R., Braat, L., Hein, L. & Willemen, L. (2010). Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity,* vol. 7 (3), pp. 260-272. Available at: https://www.sciencedirect.com/science/article/pii/S1476945X09000968?via%3Dihub [2020-05-05]

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R.T., Molnár, Z., Hill, R., Chan, K.M. A., Baste, I.A., Brauman, K.A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P.W., van Oudenhoven, A.P.E., van der Plaat, F., Schröter, M., Lavorel, S., … Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, vol. 359 (6373), pp. 270-272. Available at: https://science.sciencemag.org/content/359/6373/270.full?ijkey=/vA6P5O/b2eSM&keytype=ref&siteid=sci [2020-09-08]

Econation (2020). *Sustainable economy*. Available at: https://econation.co.nz/sustainable-economy/ [2020-06-20]

El-Haggar, S.M. (2007). *Sustainable Industrial Design and Waste Management. Cradle-to-cradle for Sustainable Development.* Elsevier Science & Technology. Available at: http://www.gcpcenvis.nic.in/PDF/Sustainable_Industrial_Design_and_Waste_Management.pdf [2020-03-28]

Ellen MacArthur Foundation (EMF) (2017). *Concept*. *What is a circular economy? A framework for an economy that is restorative and regenerative by design.* Available at: https://www.ellenmacarthurfoundation.org/circular-economy/concept [2020-05-05]

Ellen MacArthur Foundation (EMF) (2013). *Towards the circular economy. Economic and business rationale for an accelerated transition*. Available at: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf [2020-05-05]

Environmental Protection Agency (EPA) (2015). *Sustainability Primer.* Available at: https://www.epa.gov/sites/production/files/2015-05/documents/sustainability_primer_v9.pdf [2020-06-20]

Epstein, C. (2020). *Natural resource management*. Available at: https://www.britannica.com/topic/natural-resource-management [2020-08-24]

European Commission (EC) (2015). *Sustainable Development Goals and the Agenda2030.* Available at: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_15_5709 [2020-04-02]

European Economic and Social Committee (EESC) (2011). *Let's speak sustainable construction - Multilingual Glossary.* Available at: https://www.eesc.europa.eu/resources/docs/eesc-2011-01-en-fr-de-es.pdf [2020-04-02]

European Environment Agency (EEA) (2020). *Improving circular economy practices in the construction sector key to increasing material reuse, high quality recycling*. Available at: https://www.eea.europa.eu/highlights/improving-circular-economy-practices-in [2020-09-08]

European Environment Agency (EEA) (2015). *Natural capital and ecosystem services*. Available at: https://www.eea.europa.eu/soer/2015/europe/natural-capital-and-ecosystem-services [2020-09-08]

Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, vol. 12 (2), pp. 219-245. Available at: https://www.researchgate.net/publication/221931884_Five_Misunderstandings_About_Case-Study_Research [2020-06-21]

GANTTIC (2020). *5 Reasons Why Resource Management Is Important*. Available at: https://www.ganttic.com/blog/why-is-resource-management-important [2020-08-24]

Ghisellini, P., Cialani, C. & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, vol. 114 (7), pp. 11-32. Available at: https://www.sciencedirect.com/science/article/pii/S0959652615012287?via%3Dihub [2020-09-08]

Global Footprint Network (2020a). *Past Earth Overshoot Days.* Available at: https://www.overshootday.org/newsroom/past-earth-overshoot-days/ [2020-04-02]

Global Footprint Network (2020b). *Glossary*. Available at: https://www.footprintnetwork.org/resources/glossary/ [2020-04-02]

Heathfield, S.M. (2020). *What Is a Human Resource?.* Available at: https://www.thebalancecareers.com/what-is-a-human-resource-1918144#what-is-a-human-resource [2020-03-10]

International Union for Conservation of Nature (IUCN) (2020). *Services.* Available at: https://www.iucn.org/commissions/commission-ecosystem-management/our-work/cems-thematic-groups/ecosystem-services [2020-03-11]

International Union for Conservation of Nature (IUCN) / United Nations Environment Programme (UNEP) / World Wildlife Fund (WWF) (1991). *Caring for the Earth. A Strategy for sustainable Living*. Gland, Sitzerland. Available at: https://portals.iucn.org/library/efiles/documents/cfe-003.pdf [2020-09-08]

Jansson, M. & Randrup, T. B. (2020). Urban open space governance and management – the long-term perspective. In: Jansson, M. & Randrup, T.B. (eds) *Urban Open Space Governance and Management.* Routledge, London & New York, pp. 2-10. ISBN-10: 0367173026.

Jansson, M., Vogel, N., Fors, N., Dempsey, N., Buijs, A. & Randrup, T.B. (2020). Defining urban open space governance and management. In: Jansson, M. & Randrup T.B. (eds) *Urban Open Space Governance and Management*. Routledge, London & New York, pp. 11-29. ISBN-10: 0367173026.

Jansson, M., Vogel, N., Fors, H. & Randrup, T.B. (2019.) The governance of landscape management: new approaches to urban open space development. *Landscape Research*, vol. 44 (8), pp. 952-965. Available at: https://www.tandfonline.com/doi/full/10.1080/01426397.2018.1536199 [2020-09-08]

Jansson, M., & Lindgren, T. (2012). A review of the concept 'management' in relation to urban landscapes and green spaces: Toward a holistic understanding. *Urban Forestry & Urban Greening*, vol. 11 (2), pp. 139-145. Available at: https://www.sciencedirect.com/science/article/abs/pii/S1618866712000246?via%3Dihub [2020-04-10]

Kahn, A. & Diedrich, L. (2019). Cross the line to make the most of uncertainty. *'scape magazine*, vol. 16, pp. 12-17, Wageningen: Blauwdruk.

Kirchherr, J., Reike, D. & Hekkert, M.P. (2017). Conceptualizing the Circular Economy: An Analysis of 114 Definitions. *Resources, Conservation & Recycling*, vol. 127, pp. 221–232. Available at: https://www.researchgate.net/publication/320074659_Conceptualizing_the_Circular_Economy_An_Analysis_of_114_Definitions [2020-04-03]

Landezine International Landscape Award (2020). *Sankt Kjelds Square and Bryggervangen.* Available at: https://landezine-award.com/sankt-kjelds-square-and-bryggervangen/ [2020-09-08]

Landscape Architecture Europe (LAE) (2018). *Landscape Architecture Europe #5 care/create/act.* 5. ed. Wageningen: Blauwdruk Publishers. ISBN-10: 9492474301

Lieder, M. & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, vol. 115 (1), pp. 36-51. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0959652615018661?via%3Dihub [2020-05-05]

Life Cycle Initiative (2020). *What is Life Cycle Thinking?.* Available at: https://www.lifecycleinitiative.org/starting-life-cycle-thinking/what-is-life-cycle-thinking/ [2020-05-29]

Mason, M. (2011). The sustainability challenge. In: Brady, J., Ebbage, A. & Lunn, R. (eds) *Environmental Management in Organizations*. 2. ed. London, UK: Earthscan Publications, pp. 525-532. Available at: https://www.researchgate.net/publication/30528091_The_sustainability_challenge [2020-09-08]

McCartney, M., Finlayson, M. & de Silva, S. (2015). *Brief for GSDR 2015 - Sustainable development and ecosystem services*. Available at: https://sustainabledevelopment.un.org/content/documents/629475-McCartney-Sustainable%20development%20and%20ecosystem%20services.pdf [2020-09-08]

Mehan, A. (2017). "Tabula Rasa" planning: creative destruction and building a new urban identity in Tehran. *Journal of Architecture and Urbanism*, vol. 41 (3), pp. 210-220. Available at: https://www.researchgate.net/publication/319905204_Tabula_Rasa_planning_creative_destruction_and_building_a_new_urban_identity_in_Tehran [2020-06-21]

Merriam-Webster (2020a). *Biologism*. Available at: https://www.merriam-webster.com/dictionary/biologism [2020-05-05]

Meyer, E.K. (2008). Sustaining Beauty. The Performance of appearance. A Manifesto in three parts. *Journal of Landscape Architecture*, vol. 3 (1), pp. 6-23. Available at: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.467.8163&rep=rep1&type=pdf [2020-09-08]

Millennium Ecosystem Assessment (MEA) (2005). *Ecosystems and Human Well-being: Synthesis.* Washington, DC: Island Press. Available at: https://www.millenniumassessment.org/documents/document.356.aspx.pdf [2020-03-10]

Miller, G.T. & Spoolman, S.E. (2011). *Living in the Environment: Principles, Connections, and Solutions.* 17th ed. Belmont, CA: Brooks-Cole. ISBN-10: 0538735341

Morelli, J. (2011). Environmental Sustainability: A Definition for Environmental Professionals. *Journal of Environmental Sustainability*, vol. 1 (1), pp. 1-9. Available at: https://pdfs.semanticscholar.org/d6bb/dad853a1ce8762f9ba569a7f279d5062408c.pdf?_ga=2.141084466.1605441645.1599599409-153164394.1599483440 [2020-06-20]

Nawre, A. (2016). Developing Landscapes of Resource Management. *Landscape Architecture Magazine.* May Issue. Available at: https://landscapearchitecturemagazine.org/2016/05/26/developing-landscapes-of/ [2020-03-07]

Preston, F. (2012). *A Global Redesign? Shaping the Circular Economy.* London: Chatham House. Available at: https://pdfs.semanticscholar.org/25a2/445d773e16a37bcb9f69dc34065aa8604a88.pdf?_ga=2.207184659.1605441645.1599599409-153164394.1599483440 [2020-09-08]

Prior, T., Giurco, D., Mudd, G., Mason, L. & Behrisch, J. (2012). Resource depletion, peak minerals and the implications for sustainable resource management. *Global Environmental Change*, vol. 22 (3), pp. 577–587. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0959378011001361?via%3Dihub [2020-03-12]

Rizos, V., Tuokko, K. & Behrens, A. (2017). *The Circular Economy. A review of definitions, processes and impacts*. Available at: https://circulareconomy.europa.eu/platform/sites/default/files/rr2017-08_circulareconomy_0.pdf [2020-05-05]

Sanders, C.M. (2014). *The Nature-Culture-Dualism in Western Societies and its Relevance for Mental Infrastructures - A critical glance from Buen Vivir and Theravāda-Buddhism*. Available at: https://co-munity.net/system/files/biblio/3462_0.pdf [2020-09-08]

Schott, D. (2004). Urban environmental history: what lessons are there to be learnt?. *Boreal Environment Research*, vol. 9 (6), pp. 519-528. Available at: http://www.borenv.net/BER/archive/pdfs/ber9/ber9-519.pdf [2020-09-08]

Singh, J. (2014). *Towards a Sustainable Resource Management: A Broader Systems Approach to Product Design and Waste Management*. Diss. Stockholm: KTH Royal Institute of Technology Stockholm. Available at: https://www.researchgate.net/publication/263176690_Towards_a_Sustainable_Resource_Management_A_Broader_Systems_Approach_to_Product_Design_and_Waste_Management [2020-04-05]

Soga, M. & Gaston, M.J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment*, vol. 14 (2), pp. 94-101. Available at: https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/fee.1225 [2020-04-02]

Swaffield, S. & Deming, E. (2011). Research strategies in landscape architecture: Mapping the terrain. *Journal on Landscape Architecture*, vol. 6 (1), pp. 34-45. Available at: https://www.researchgate.net/publication/233233427_Research_strategies_in_landscape_architecture_Mapping_the_terrain [2020-09-08]

United Nations (UN) (2020a). *Sustainable Development Goal 11.* Available at: https://sustainabledevelopment.un.org/sdg11 [2020-06-30]

United Nations (UN) (2020b). *Sustainable Development Goal 12.* Available at: https://sustainabledevelopment.un.org/sdg12 [2020-06-30]

United Nations (UN) (2020c). *The Sustainable Development Agenda*. Available at: https://www.un.org/sustainabledevelopment/development-agenda/ [2020-04-07]

United Nations (UN) (2020d). *Transforming our world: the 2030 Agenda for Sustainable Development.* Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld [2020-04-07]

United Nations (UN) (2020e). *Cities and Pollution contribute to climate change.* Available at: https://www.un.org/en/climatechange/cities-pollution.shtml [2020-09-08]

United Nations (UN) (1997). Glossary of Environment Statistics. *Studies in Methods,* Series F, Nr. 67, New York, US: United Nations publication, p. 51. Available at: https://unstats.un.org/unsd/publication/SeriesF/SeriesF_67E.pdf [2020-09-08]

United Nations Environment Programme (UNEP) (2013). *City-Level Decoupling. Urban resource flows and the governance of Infrastructure transitions*. Available at: http://wedocs.unep.org/bitstream/handle/20.500.11822/8488/City-Level_FReport_EN.pdf?sequence=1&isAllowed=y [2020-09-08]

Uzoma, I. (n.d.). *The concept of resources*. Available at: https://www.academia.edu/38018268/CONCEPT_OF_RESOURCES [2020-03-31]

Meijering, J.V., Tobi, H., van den Brink, A., Morris, F. & Bruns, D. (2015). Exploring research priorities in landscape architecture: An international Delphi study. *Landscape and Urban Planning*, vol. 137, pp. 85-94. Available at: https://www.sciencedirect.com/science/article/pii/S0169204615000043 [2020-03-31]

World Commission on Environment and Development (WCED) (1987). *Our Common Future*. Oxford: Oxford University Press. Available at: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf [2020-02-05]

Wu, J. (2013). Landscape sustainability science: ecosystem services and human well-being in changing landscapes. *Landscape Ecology*, vol. 28, pp. 999-1023. Available at: https://www.academia.edu/6373505/Landscape_sustainability_science_ecosystem_services_and_human_well_being_in_changing_landscapes [2020-04-05]

Yeler, G. M. & Yeler, S. (2013). *No Waste in Nature: Using Nature as a Model for Construction Industry*. Available at: https://pdfs.semanticscholar.org/6edb/3a8f8c9cd24d82a58e93b2eb62eccf56a648.pdf [2020-03-26]

World Landscape Architecture (WLA) (2019). *SUND Nature Park | Copenhagen, Denmark | SLA.* Available at: https://pdfs.semanticscholar.org/6edb/3a8f8c9cd24d82a58e93b2eb62eccf56a648.pdf [2020-09-08]

Case Study: Murg-Auen-Park

Hasler, T. (2016). Murgauenpark Frauenfeld. *anthos*, Nr. 4, pp. 8-11. Available at: https://staufer-hasler.ch/content/uploads/2018/07/anthos_Murgauenpark-Frauenfeld.pdf [2020-02-17]

Helbling, C. (2017). Unsere Stadtentwicklung beginnt beim Freiraum. *Schweizer Heimatschutz*, pp. 10-11. Available at: https://staufer-hasler.ch/content/uploads/2018/07/2017_Schulthess-Gartenpreis_Murgauenpark.pdf

Hochparterre (ed) (2017). Frauenfeld. *Hochparterre Themenheft,* vol. Juni - Juli 2017, p. 12. Available at: https://issuu.com/hochparterre/docs/hochparterre_frauenfeld_2017 [2020-09-08]

International Federation of Landscape Architects (IFLA) (ed) (2018). Murg-Auen-Park. In: International Federation of Landscape Architects (IFLA) (ed.) *Landscape architecture as a common ground,* p. 31. Available at: https://sak.org.pl/wp-content/uploads/2019/03/IFLA_ExhibitionCatalogue_preview_small.pdf [2020-05-23]

Knüsel, P. (2016a). Trittstein von Stadt zu Land. *Tec21 Schweizerische Bauzeitung*, Nr. 14, pp. 30-32. Available at: https://staufer-hasler.ch/content/uploads/2018/07/160401_Tec21_Trittstein-von-Stadt-zu-Land_s30.pdf [2020-02-16]

Knüsel, P. (2016b). Trittstein von Stadt zu Land Murgauenpark. *espazium*. Available at: https://www.espazium.ch/de/aktuelles/trittstein-von-stadt-zu-land [2020-05-23]

Landscape Architecture Europe (LAE) (2018). *Landscape Architecture Europe #5 care/create/act.* 5. ed. Wageningen: Blauwdruk Publishers. ISBN-10: 9492474301

Müller, R. (2015). *Openair zieht an die Murg*. Available at: https://www.thurgaukultur.ch/magazin/1704 [2020-05-25]

Quandt, F. (2017). Where have all the flowers gone? Schulthess-Gartenpreis des Schweizer Heimatschutzes. *espazium*. Available at: https://www.espazium.ch/de/aktuelles/where-have-all-flowers-gone [2020-05-23]

Salm, K. (2017). *Murg-Auen-Park: Vom Militärareal zum preisgekrönten Familienpark.* Available at: https://www.srf.ch/kultur/gesellschaft-religion/murg-auen-park-vom-militaerareal-zum-preisgekroenten-familienpark [2020-02-16]

Staufer&Hasler Architekten (2020). *Murg-Auen-Park, Frauenfeld*. Available at: https://staufer-hasler.ch/projekt-details/murg-auen-park-frauenfeld/ [2020-02-16]

Tagblatt (2015). *Der Park ist trotz Hochwasser im Zeitplan*. Available at: https://www.tagblatt.ch/ostschweiz/frauenfeld-munchwilen/der-park-ist-trotz-hochwasser-im-zeitplan-ld.575952 [2020-05-25]

Wolf, S. (2016). Für Auge und Nase. *Hochparterre,* Nr. 16, pp. 48-53. Available at: https://staufer-hasler.ch/content/uploads/2018/07/161208_HOCHPARTERRE_Die_Besten_2016_Murgauenpark-1.pdf [2020-02-16]

Case Study: De Ceuvel

Amsterdam Smart City (2016). *A circular workplace for creative and social enterprises.* Available at: https://amsterdamsmartcity.com/projects/the-ceuvel [2020-06-30]

Brändlin, A.S. & Krause, R. (2015). *Eine grüne Oase an den Amsterdamer Grachten*. Available at: https://www.dw.com/de/global-ideas-amsterdam-de-cheuvel-technologie/a-18655323 [2020-06-30]

De Ceuvel (2020a). *What is De Ceuvel?.* Available at: http://deceuvel.nl/en/about/general-information/ [2020-02-05]

De Ceuvel (2020b). *Sustainability.* Available at: http://deceuvel.nl/en/about/sustainable-technology/ [2020-02-06]

DELVA Landscape Architects (2020a). *De Ceuvel - Amsterdam.* Available at: https://delva.la/projecten/de-ceuvel/ [2020-02-05]

DELVA Landscape Architects (2020b). *Ruimtelijk Raamwerk Buiksloterham - Amsterdam.* Available at: https://DELVA.la/projecten/landschap/ruimtelijk-raamwerk-groenvisie-buiksloterham/ [2020-08-29]

DELVA Landscape Architects (2014). *Purifying Park de Ceuvel | Amsterdam Netherlands | DELVA Landscape Architects.* Available at: https://worldlandscapearchitect.com/purifying-park-de-ceuvel-amsterdam-netherlands-DELVA-landscape-architects/#.XkO-qi2brOR [2020-02-10]

Gemeente Amsterdam (2019). *Investeringsnota Buiksloterham 2019 Van organische ontwikkeling naar versnelde transformatie*. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjnwMH5s9_rAhUnxosKHUnRD-YQFjABegQIAhAB&url=https%3A%2F%2Fassets.amsterdam.nl%2Fpublish%2Fpages%2F794806%2Finvesteringsnota_buiksloterham_2020.pdf&usg=AOvVaw1CxPv4pfXGGfL0i2ROwXHo [2020-09-08]

Landscape Architecture Europe (LAE) (2018). *Landscape Architecture Europe #5 care/create/act.* 5. ed. Wageningen: Blauwdruk Publishers. ISBN-10: 9492474301

Make the world great again (2017). *Make the world great again — NTR Documentaire over Café de Ceuvel* [video]. Available at: https://www.youtube.com/watch?v=hsLEnSpDhe8 [2020-06-30]

makesense (2018). *WATT IF EP 05 - Netherlands (Buiksloterham)* [video]. Available at: https://www.youtube.com/watch?v=2I2SOUbbeAU [2020-02-05]

Metabolic, Studioninedots, & DELVA Landscape Architects (2014). *Transitioning Amsterdam to a Circular City — Circular Buiksloterham*. Available at: https://issuu.com/DELVAlandscape/docs/circularbuiksloterham_eng_full_repo/76 [2020-09-08]

Metabolic (2013). *Cleantech Playground - a cleantech utility in Amsterdam North*. Available at: https://www.metabolic.nl/publications/cleantech-playground/ [2020-02-10]

Schuetze, C. F. (2014). *Building a Community on Polluted Land*. Available at: https://www.nytimes.com/2014/11/20/business/energy-environment/ex-shipyard-in-amsterdam-houses-shops-and-offices.html?ref=europe&_r=2 [2020-04-30]

Space&Matter (2020). *De Ceuvel.* Available at: http://www.spaceandmatter.nl/de-ceuvel [2020-02-05]

Space&Matter (2019). *Circular Living Lab Amsterdam* [video]. Available at: https://vimeo.com/337527892 [2020-02-05]

Spectral (2020). *Jouliette at De Ceuvel.* Available at: https://spectral.energy/news-3/jouliette-at-deceuvel/ [2020-02-10]

Case Study: Skanderbeg Square

ArchDaily (2019). *Skanderbeg Square / 51N4E.* Available at: https://www.archdaily.com/911980/skanderbeg-square-51n4e [2020-06-21]

EUmiesaward (2020). *Skanderbeg Square.* Available at: https://www.miesarch.com/work/4190 [2020-06-20]

Kucharek, J-C. (2019). Tirana's Skanderbeg Square restored to the people. *The RIBA Journal.* Available at: https://www.ribaj.com/buildings/skanderbeg-square-tirana-albania-restoration-by-51n4e-jan-carlos-kucharek [2020-06-22]

Landscape Architecture Europe (LAE) (2018). *Landscape Architecture Europe #5 care/create/act.* 5. ed. Wageningen: Blauwdruk Publishers. ISBN-10: 9492474301

Nientied, P. & Aliaj, B. (2019). The Public in Search of Identity: New Symbolism in Urban Spaces. A Study of Central Squares of Balkan Capitals: Innovation in Central, Eastern and South Eastern Europe. In: Maros, F., Jaššo, M. & Husar, M. (eds.) *The Role of Public Sector in Local Economic and Territorial Development*. Switzerland: Springer International Publishing, pp. 203-237. ISBN-10: 303006686X

Persyn, F. (2019). *Framework for participation.* Available at: https://www.toposmagazine.com/skanderbeg-square-tirana/ [2020-06-20]

public space (2020). *“It is important to understand that the square is also a political statement”* [video]. Available at: https://www.publicspace.org/multimedia/-/post/-it-is-important-to-understand-that-the-square-is-also-a-political-statement- [2020-06-21]

Shehu, B. (2018). *The square, the power, the citizenship.* Available at: https://www.publicspace.org/multimedia/-/post/the-square-the-power-the-citizenship [2020-06-20]

Sustainable Cities Platform (2020). *Public Space - City Grace City/Region: City of Tirana, Albania.* Available at: https://sustainablecities.eu/transformative-actions-database/?c=search&action_id=uvk6uvod [2020-06-25]

Yalli, J. (2011). *Albanian leader lauds Kuwait Amir’s 10 man euro to Tirana.* Available at: https://www.kuna.net.kw/ArticleDetails.aspx?id=2195004&language=en [2020-06-26]

51N4E (2020). *Skanderbeg Square*. Available at: https://www.51n4e.com/projects/skanderbeg-square [2020-06-22]

51N4E (2019). *Renovation of Skanderbeg Square*. Available at: https://www.publicspace.org/works/-/project/k056-skanderbeg-square [2020-06-21]

51N4E (2017). *Chapter 1 Skanderbeg Square, Tirana*. Ruby Press: Berlin. ISBN-10 : 3944074211

Unpublished Materials

Hendriks, M. (2020). Interviewed by Anne Heinkelmann, Skype, 2020-08-12.

Michel, P. (2020). Interviewed by Anne Heinkelmann, Telephone, 2020-08-19.

Statutory Declaration

I herewith declare that I have composed the present master thesis myself and without use of any other than the cited sources and aids. Sentences or parts of sentences quoted literally are marked as such; other references with regard to the statement and scope are indicated by full details of the publications concerned. The thesis in the same or similar form has not been submitted to any examination body and has not been published. This thesis was not yet, even in part, used in another examination or as a course performance.

Place, Date: Malmö, 2020-09-11 Signature: