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A Critical Analysis of the New Mining Company Town Kalumbila, Zambia

GEO 630 Master's Thesis

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MASTER THESIS

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ABSTRACT

Mining company towns are concrete sites where the spatial government of mining companies and its consequences can be studied. In this thesis I did a qualitative case study on the new mining company town Kalumbila based on three months of field work between June and September 2019. Kalumbila is being developed next to a copper mine owned by First Quantum Minerals Ltd. (FQM) in the Northwestern Province of Zambia. It is a particularly interesting case to study, as it is presented as a model town, open to non-miner residents and investors and designed to be sustainable and outlive the mine's lifespan. I analysed how FQM governs space and people in Kalumbila by examining the planning goals for the town, the access regime to town infrastructure and services, as well as the narratives and practices of residents. The analysis shows that there is a strong overlap between the work and private life of people in Kalumbila. This has contributed to a lack of privacy and trust among residents, which in turn has reduced their participation in the town community. Moreover, house sharing is a common practice in Kalumbila and has led to the fact that many residents see the town as a place of accommodation during work, rather than a new home. The research further demonstrates that hierarchies in the mining company are strongly influencing the social structures in Kalumbila, having resulted in the creation of spatially segregated and socially distinct groups. To which group a person belongs, determines his or her possibilities of accessing town infrastructure and services. Kalumbila presents thus a spatial imprint of the mining company hierarchies. By providing insight into the functioning of a new mining company town, this thesis contributes to an understanding of the socio-spatial transformations induced by large-scale mining operations in the Global South.

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ABBREVIATIONS

Barrick	Barrick Gold Corporation
EIA	Environmental Impact Assessment
EITA	Extractive Industries Transparency Alliance
FQM	First Quantum Minerals Ltd.
HOA	Homeowners Association
KHDC	Kabitaka Hills Development Corporation Ltd.
KML	Kalumbila Minerals Ltd.
KML HR	Kalumbila Minerals Ltd. Human Resources
KMP	Kansanshi Mining Plc.
KTDC	Kalumbila Town Development Corporation Ltd.
MBCC	Mary Begg Community Clinic
MFEZ	Multi-Facility Economic Zone
TWE	Trident Woodlands Estate
WCFCB	Workers Compensation Fund Control Board
ZCCM	Zambian Consolidated Copper Mines
ZCCM-IH	Zambian Consolidated Copper Mines Investment Housing

1. INTRODUCTION

Zambia is the world's 8th largest copper producing country with more than 80% of the country's total export earnings and 10% of its GDP being generated by the mining sector (Dobler and Kesselring, 2019, p. 225). Historically the Copperbelt Province has been the most important mining area in Zambia, but since the early 2000s a strong increase in global copper demand has led to the establishment of three large-scale mines in the Northwestern Province, a region previously largely untouched by mining (Negi, 2011, p. 27, 2014, p. 1002). This has induced important economic, infrastructural, environmental and social changes in the region (Negi, 2014, pp. 1003–1004; Kesselring, 2018, p. 237). All the three mines are owned by foreign mining companies which invested large sums of money to start operations (Kesselring, 2018, p. 238).

In social science literature the effect of foreign direct investments in the mining sector is contested. According to the modernist development discourse, these investments can enhance economic growth of resource rich countries in the Global South and at the same time also strengthen their national sovereignty by making them less dependent on loans and international aid (Negi, 2014, p. 1002; Buur and Sumich, 2019, p. 3). Other researchers however argue that these forms of capital investments in mineral extraction in practice rather lead to a "logic of governmentality[1] based on enclaving" (Buur and Sumich, 2019, p. 3).

The concept of "enclave" has in particular been shaped by the social anthropologist James Ferguson (2005, 2006). Ferguson argues that mining investments today do not bring along the same kind of social investments which benefit the local population as they did in the past (Ferguson, 2005, p. 379). Rather, they are based on "socially thin models of enclave extraction", where mining companies try to disengage from the local economy and national-level social and political realities (Ferguson, 2006, pp. 203, 205). As a result, enclosed spaces, integrated into the global mining industry but disconnected from the local context, emerge.

The "extractive enclave" idea has been taken up by many social scientists who have conducted research on the mining sector in the past years (Rubbers, 2019, p. 89). When the concept was applied to different case studies it was however shown that the enclave analysis does not capture

[1] Governmentality is a concept first developed by Michael Foucault and refers to the ensemble of institutions, mechanisms of management, administration and classification through which individuals are controlled and disciplined (Scott and Marshall, 2009, p. 294).

various processes and dynamics existing on the ground (Hönke, 2009; Appel, 2012; Côte and Korf, 2018; Buur and Sumich, 2019; Rubbers, 2019, p. 89). In order to make "extractive enclaves" work, companies must interact with different local actors and therefore a paradox emerges: the reproduction of an "extractive enclave" by a mining company is only possible through its active engagement with the local society. Taking this critique further, Rubbers (2019) states that the "extractive enclave" works as a "steam-roller" concept that "obscures the various spaces that mining companies either produce or contribute to produce" (Rubbers, 2019, p. 89). Cloete et al. (2018) agree that there is a "need for a more nuanced understanding of the places and communities that mining creates" (Cloete et al., 2018, p. 779). The enclave literature in particular tends to overlook how mining employees are accommodated nowadays (Rubbers, 2019, p. 90). In line with Rubbers (2019) I argue that housing infrastructure gives "clues" and displays "inscriptions" of the political rationalities underlying the spatial government of mining companies (Rubbers, 2019, pp. 89–90).

In this thesis, I analyse the new mining company town Kalumbila. Kalumbila is currently being constructed by First Quantum Minerals Ltd. (FQM) next to its Sentinel copper mine, which started production in the context of the mining boom in the Northwestern Province of Zambia. Today, FQM is the largest copper producer by output in Zambia (Dobler and Kesselring, 2019, p. 227). It operates two large-scale mines in Northwestern Province and holds 16.9% shares in a third copper mine located in the Copperbelt Province (First Quantum Minerals LTD, 2018a, p. 8; Dobler and Kesselring, 2019, p. 227). Kalumbila is a particularly interesting case to study, as it is presented as a model town, planned to forestall "uncontrolled" urbanization and striving to become "self-sustained" in order to outlive the mining operations. Kalumbila is open to non-miner residents and other investors and aims to be fully embedded in the local context. Therefore, it is also a good example of the mining industry's endeavour to improve the relationship between large-scale mining companies and local communities, as it is outlined in an industry developed report (Breaking New Ground: Mining, Minerals and Sustainable Development (2002)), released at the beginning of the century, which fixes a new agenda on mining and sustainable development (Louw and Marais, 2018, p. 278). The following research question will guide my analysis:

How does the mining company First Quantum Minerals Ltd. govern space and people through the new mining company town Kalumbila?

The overall aim of this thesis is to contribute to an understanding of the contemporary operating modes and consequences of the spatial government of mining companies through an analysis of

workers housing. Researching a new mining company town can shed light on the tensions which arise when mining companies try to follow a new agenda of "open" and "locally embedded" company towns and at the same time secure economic space through their spatial government. In the context of the current situation, where large-scale mining is generally accepted by policymakers to be more socially and environmentally sustainable than small-scale mining, it is fundamental to gain insight into the spatial practices of mining companies in order to better understand the socio-spatial transformations induced.

The thesis is divided into 7 chapters. Chapter 2 introduces the case study. I first provide a historical outline of copper production and urbanization processes in Zambia, then discuss the consequences of the recent mining boom on the case study area and present Kalumbila Town. Chapter 3 consists of a literature review and introduces relevant concepts for my analysis before the research questions are presented. In Chapter 4 I describe the methods used to collect and analyse empirical data. Chapter 5 starts with the presentation of the Master Plan for Kalumibla, after which I discuss the access regime to Kalumbila, as well as different conditions which led to a lack of ownership of the town by its residents and the local government. Chapter 6 looks more closely at the gated community in Kalumbila and explores the consequences of this spatial layout. In the concluding Chapter 9, the research questions are answered in a concise manner and the main findings of the thesis are reiterated.

2. THE CASE

This chapter will provide a brief summary of the historical background on copper mining and urban settlements in Zambia and discuss the effects of the recent mining boom in the Northwestern Province, after which the new mining company town Kalumbila is introduced.

2.1. Historical Outline of Copper Production and Urban Settlements in Zambia

Today Zambia is Africa's second-largest copper producer and the mining industry is the main driver of the Zambian economy (Extractive Industries Transparency Initative, 2016). Copper extraction in Zambia is a centuries long tradition, but it was the British who first started industrial production at the beginning of the last century in their former colony; Northern Rhodesia (Mususa, 2012, p. 573; Hinfelaar, 2018, pp. 119–120). At that time and up to today the mining industry in Zambia has been closely linked to urbanization processes (Nchito, 2018, p. 1). In the Copperbelt Province where most mines were located during colonial times, all towns except one were developed around mining sites (Nchito, 2018, p. 3). This is because the operation of mines was very labour intensive and therefore required the availability of a large labour force. There existed two types of communities in mining towns. On the one hand, there were the mine compounds for miners which were controlled by the mine administration and on the other hand, the "ordinary urban locations" where different people lived and which were administered by local councils (Mususa, 2012, p. 574; Nchito, 2018, p. 4).

Early mine compounds were strongly regulated and workers were separated along racial lines with very different living standards (Nchito, 2018, p. 4). Housing for natives was often located on the windward side of the mines where air pollution from the mining activities was higher, while white workers were accommodated in areas with bigger houses and more amenities. Natives were only allowed to stay in mining compounds if they were employed and their maximum duration of stay was limited (Nchito, 2018, pp. 4–5). The idea of the colonial administration was that labour settlements would never become the permanent homes of natives but only of the European settlers (Nchito, 2018, pp. 4–5). However, the realization that through a stable workforce productivity can be increased, led to a steady prolongation of the period of allowed stay for Africans in labour camps over the 20th century, from about three to six months in the 1920s to three years at the end of the 1950s (Nchito, 2018, p. 5).

Accommodation for miners initially consisted of one roomed "rondavels" built in grid format (Nchito, 2018, p. 4). Later they were replaced by communal hostels and once miners were allowed to take their families to town, stand-alone houses were built (Nchito, 2018, p. 4). Housing units were constructed by the mines, as the Europeans feared that if natives would build their own homes this would encourage the spread of diseases (Nchito, 2018, p. 4). Through the provision of housing and food the mines controlled their workers. In 1917 the first social welfare law on hygiene, cleanliness and health in mining settlements was passed (Nchito, 2018, p. 4). It was only in the 1940s when mining companies, in an attempt to stabilize the workforce in order to increase production efficiency and as a reaction to major strikes, provided the townships with infrastructure, such as schools, hospitals and recreational facilities (Mususa, 2012, p. 574; Nchito, 2018, pp. 5–6). Furthermore, the mining companies introduced a policy of Africanisation, the goal of which was to replace European workers with skilled native workers who were cheaper to hire. This improved the conditions for the African miners, as it opened up the possibility to get a skilled job (Mususa, 2012, p. 575). According to Nchito "early mine owners […] ended up creating functional cities through segregated development" with the result that at Zambia's Independence in 1964 the Copperbelt was highly urbanized (Ferguson, 1999, p. 4; Nchito, 2018, p. 5).

With the end of colonial rule, restrictions on urban settlement were lifted (Ferguson, 1999, p. 43). The government used mining revenue mainly for the development of urban areas in the Copperbelt Province and the capital Lusaka, while rural areas remained poor in infrastructure (Mususa, 2012, p. 575). During this period mine townships provided good living conditions, with good schools and health facilities, as well as different recreational facilities including for example libraries, theaters or sports clubs (Mususa, 2012, p. 575). In 1968 the state started to nationalize all major industries including the mines which were run by the state-owned Zambian Consolidated Copper Mines (ZCCM) (Hinfelaar, 2018, p. 121). The Zambianisation programme was extended by the state and the government invested in education and skills training (Mususa, 2012, p. 576). From the 1970s onwards a combination of different factors such as a strong interlinkage of politics and economics which limited the flexibility of the business sector, the government's failure to diversify the Zambian economy, as well as a global recession which caused a strong contraction of the copper price and therefore limited state revenue from copper production, led to a steady decline of urban welfare (Mususa, 2012, p. 576; Hinfelaar, 2018, p. 123). When in the 1980s basic commodities, including the traditional staple food maize meal, became scarce and difficult to obtain for many urban residents, mine workers were in a privileged

position, as they had access to these commodities through a separate distribution system (Mususa, 2012, p. 576).

Very high external dept forced the Zambian state under international pressure in the mid 1990s to gradually privatize the mining industry and an estimated two-thirds of the ZCCM workers lost their job (Mususa, 2012, p. 577; Hinfelaar, 2018, p. 123). Mine housing was sold to the (former) mine employees as part of the retrenchment benefits (Mususa, 2012, pp. 577, 580). The administration of the mine townships was transferred to local authorities in 2002 and residents had to start paying for service provision of water, electricity and garbage collection which was previously provided for free or subsidized by the mines (Mususa, 2012, p. 579, field diary,17.6.19). Today the mining companies no longer provide general maintenance of infrastructure in the old mine townships of the Copperbelt, but only selectively finance certain projects through their corporate social responsibility (CSR) programmes (Mususa, 2012, pp. 578–579). This is why infrastructure significantly deteriorated (see for example Figure 1) (Mususa, 2012, pp. 578–579). Furthermore, the cessation of the mine-policing system and increased poverty have led to a surge in the crime rate (Mususa, 2012, p. 579).

Figure 1: Mine Township Wusakili, Kitwe, Copperbelt Province (own photo, 16.6.2019)

After having discussed how mining influenced urbanization in Zambia in the past, I will now outline the more recent developments in the Northwestern Province, where a mining boom at the beginning of the century has triggered "uncontrolled" urbanization processes.

2.2. The Mining Boom in the Northwestern Province and "Uncontrolled" Urbanization

At the beginning of 2000, shortly after all the productive assets of ZCCM were sold to private companies and the privatization of the mining industry was de facto completed, demand of copper by China and other "emerging economies" sharply increased and the copper price soared (Craig, 2001, p. 407; Negi, 2014, p. 1002). This led to a mining boom in Zambia between 2002 and 2008 and in particular the Northwestern Province experienced a surge of new mining sites (Negi, 2011, p. 27, 2014, p. 1002). Since 2005 three large-scale mines (Kansanshi, Lumwana and Sentinel) have started production and have induced great social and economic changes in the region (see Figure 2) (Negi, 2014, pp. 1002–1004). Together they produced more than 575'000 tonnes of copper in 2018, which approximately constitutes 67% of Zambia's annual copper production (Chama, 2019).

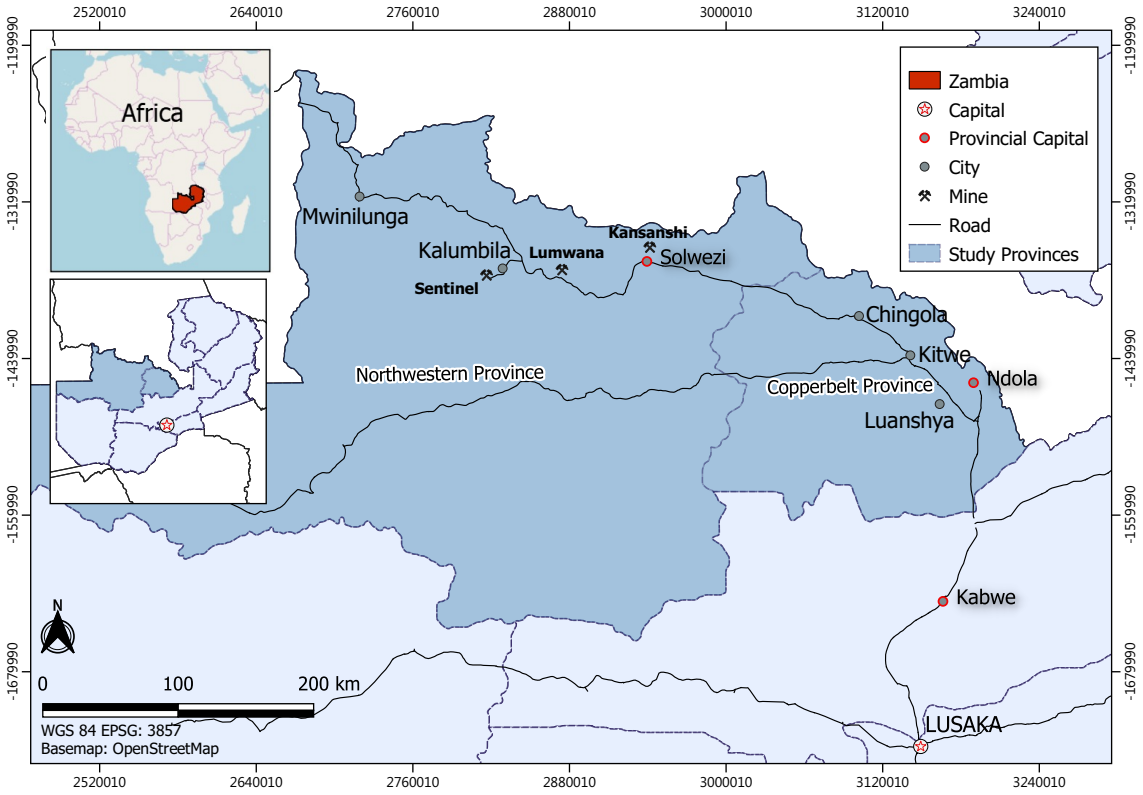

Figure 2: Locations of the Most Important Mines in Northwestern Province (own map)

In 2005 Kansanshi Mining Plc. (KMP) started operating the Kansanshi mine in Solwezi, currently in terms of output the biggest copper mine on the African continent, after making large investment to restore and technically upgrade the previously dormant mine (Kesselring, 2018, p. 238). KMP also operates a copper smelter at the Kansanshi mine site (Kesselring, 2018, p. 237).

KMP is 80% owned by FQM while the remaining 20% are owned by the Zambian Consolidated Copper Mines Investment Housing (ZCCM-IH), a mainly government-owned company (First Quantum Minerals LTD, 2018b). About 65 km west of Solwezi, along the main road T5 which leads to Mwinilunga and further to the neighbouring country Angola is the Lumwana copper mine which commenced commercial copper production in 2009 (Londono and Sanfurgo, 2014, p. 6.5; Negi, 2014, p. 1003). It was originally owned by Equinox Minerals which was acquired by Barrick Gold Corporation (Barrick) in the summer of 2011 (Londono and Sanfurgo, 2014, p. 6.1). Moreover, the Sentinel mine, which is located another 60 km west of the Lumwana mine and is part of FQM's Trident project, came into operation in 2016 (First Quantum Minerals LTD, 2018c). As this is the mine next to which the new town Kalumbila is being built, I will describe it more in detail in section 2.3.1.

The arrival of these three large-scale mines has created a new mining frontier in the Northwestern Province and has given the region the popular name "New Copperbelt" (Van Alstine and Afionis, 2013, p. 362; Negi, 2014, pp. 999, 1002). Furthermore, the increase in mining activities has triggered a steady influx of employment seekers in the region (Kesselring, 2018, p. 237). Most of the work migrants originate from the Copperbelt, where, as described above, the privatization of the mines has strongly reduced the number of jobs in the mining sector. They are often better educated and skilled for mining jobs than locals, which in turn makes it difficult for locals to compete with them and therefore to find employment in the mines. This has increasingly led to tensions between the different social groups (Negi, 2013, pp. 245–246; Kapesa, Mwitwa and Chikumbi, 2015, p. 54). The strong in-migration has led to the expansion of the provincial capital Solwezi as well as the emergence of newly urbanized spaces in other parts of the province. Solwezi has grown from 50'000 inhabitants in the early 2000s to about 250'000 in 2016 (Kesselring, 2018, p. 239).

Historically, the region was not the focus of government interventions and infrastructure development was limited (Kesselring, 2018, p. 239). The mostly under-resourced government institutions were not prepared to face the fast increase of population and the urbanization processes therefore lacked adequate planning. Infrastructure development has not kept pace and housing units have popped up in a rather chaotic manner (Kesselring, 2018, p. 239). Negi, who conducted in-depth ethnographic research in Solwezi in 2007/2008 described the situation as follows: "[…] thousands of new migrants in Solwezi have moved into newly constructed, often unfinished, structures before utilities have been provided or even planned. Entire compounds consequently existed without any state-provided basic services. […] Only three roads in Solwezi

were tarred by 2008, two of which had been tarred only in the previous two years. Other 'roadways' were concocted out of drainage channels, unusable during rains. Minibuses served a few compounds, negotiating these poor roads, but residents of all other areas walked kilometres to reach the town centre." (Negi, 2014, pp. 1003–1004).

In Manyama, which is located next to Barrick's Lumwana mine gate, the situation is similar. Even though Barrick provides a housing estate located inside the fenced mining license area for its employees, employment seekers and employees of mining contractors have settled in the village of Manyama (Londono and Sanfurgo, 2014, p. 20.6). The rapid population growth in Manyama has transformed the village into an informal urban settlement (Namutoka, 2016, p. v). The settlement is located on customary lands and has been rapidly expanding without any spatial planning (Namutoka, 2016, p. v). Formerly agricultural land in the immediate surrounding of Manyama is now occupied with all sorts of housing structures, mostly made from cheap building materials, such as mud bricks and iron sheets (Namutoka, 2016, p. 21). The majority of households neither have electricity nor running water and there are no officially designated streets (Namutoka, 2016, p. 70).

It is in particular the unplanned, informal and messy character of the recent urbanization processes in the region that are pointed out by the planners of Kalumbila as being at the source of the various challenges Solwezi and other smaller towns are currently facing (Zambia Chamber of Mines, 2018, p. 13). Kalumbila in turn is presented as an example of "proper urban planning" in order to avoid any negative consequences of rapid and uncontrolled urbanization (Kalumbila Town Development Corporation, 2013a, p. 45).

After having discussed how in the early 2000 a mining boom in the Northwestern Province has fuelled the arrival of migrants from other regions in Zambia and has led to underserviced urban settlements, I will now present the specific context of my case study.

2.3. The Trident Project and Kalumbila

2.3.1. The Trident Project: The Mine(s) of Kalumbila Town

FQM is a Canadian-based mining company which was founded more than 20 years ago and began business in 1996 with the purchase of a mining license in Zambia (First Quantum Minerals LTD, 2018a). It has been constantly growing since and currently operates 7 mines on various continents (First Quantum Minerals LTD, 2018a, p. 8). FQM is currently the biggest taxpayer in Zambia and has a market capitalization of 7.4 billion USD (Kesselring, 2018, p. 237; Chan, Nair

and Deveau, 2019). FQM operates in Kalumbila through the daughter company Kalumbila Minerals Ltd. (KML) of which it has 100% ownership. Figure 3 presents an overview of the different subsidiary entities of FQM operating in Kalumibla.

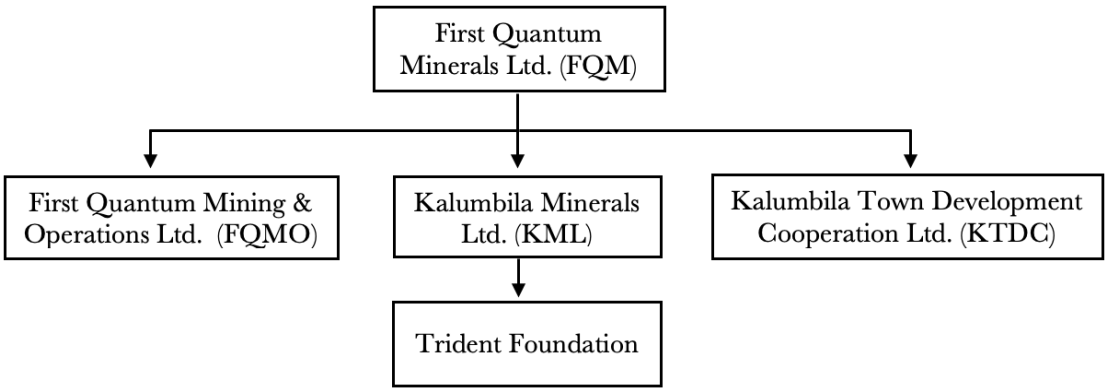

Figure 3: FQM Subsidiary Companies Operating in Kalumbila (own representation)

In 2010 FQM acquired Kiwara PLC, which had been doing mineral exploration work and has had a controlling interest in the Trident Prospecting License Area (Gray, Lawlor and Briggs, 2015, p. 40). After the acquisition the planning of the Trident Project started. The Trident Project is located in Kalumbila District, Northwestern Province, approximately 150 km west of Solwezi and 160 km east of Mwinilunga and 16 km off the main road T5. It includes the Sentinel copper mine, as well as the Enterprise deposit, a nickel orebody, and regional exploration targets including the Intrepid deposit (Gray, Lawlor and Briggs, 2015, p. 12). To date only the Sentinel copper mine is operational, while the other two mining projects are still in the planning phase. The Sentinel mine is an open pit mine which in 2018 produced 224'000 tons of copper (First Quantum Minerals LTD, 2018a, p. 8). It is currently forecast that the mine will be operational until 2033 (First Quantum Minerals LTD, 2018c).

The establishment of the Sentinel mine has strongly altered the physical environment of the area and has also induced massive changes in infrastructure (Kesselring, 2018, p. 237). New roads have been built by FQM, such as the access road from the main road T5 to the mine, and already existing ones have been improved, such as the T5 connecting the mine to Solwezi, which has been tarred (interview KR16, 10.8.19). Furthermore, FQM built an airport runway which allows people to fly in directly from the capital Lusaka. The flight from Lusaka takes about an hour whereas by road it takes 12 hours. Two dams were constructed (see Figure 4). The Kisola dam was built in order to store raw water for mining purposes and the Musangezhi dam to divert Musangezhi River which was flowing on top of the copper ore deposit (Gray, Lawlor and Briggs,

2015, p. 17; Kapesa, 2019, p. 152). Additionally, the power lines which formerly terminated at Lumwana Mine, about 60 km away, have been extended up to the mine site and an additional new 600 km long power line connecting directly to a power station in the capital Lusaka has been constructed (Gray, Lawlor and Briggs, 2015, p. 164; Kesselring, 2017b, p. 98). Above all, next to the Sentinel mine FQM developed the new company mining town Kalumbila.

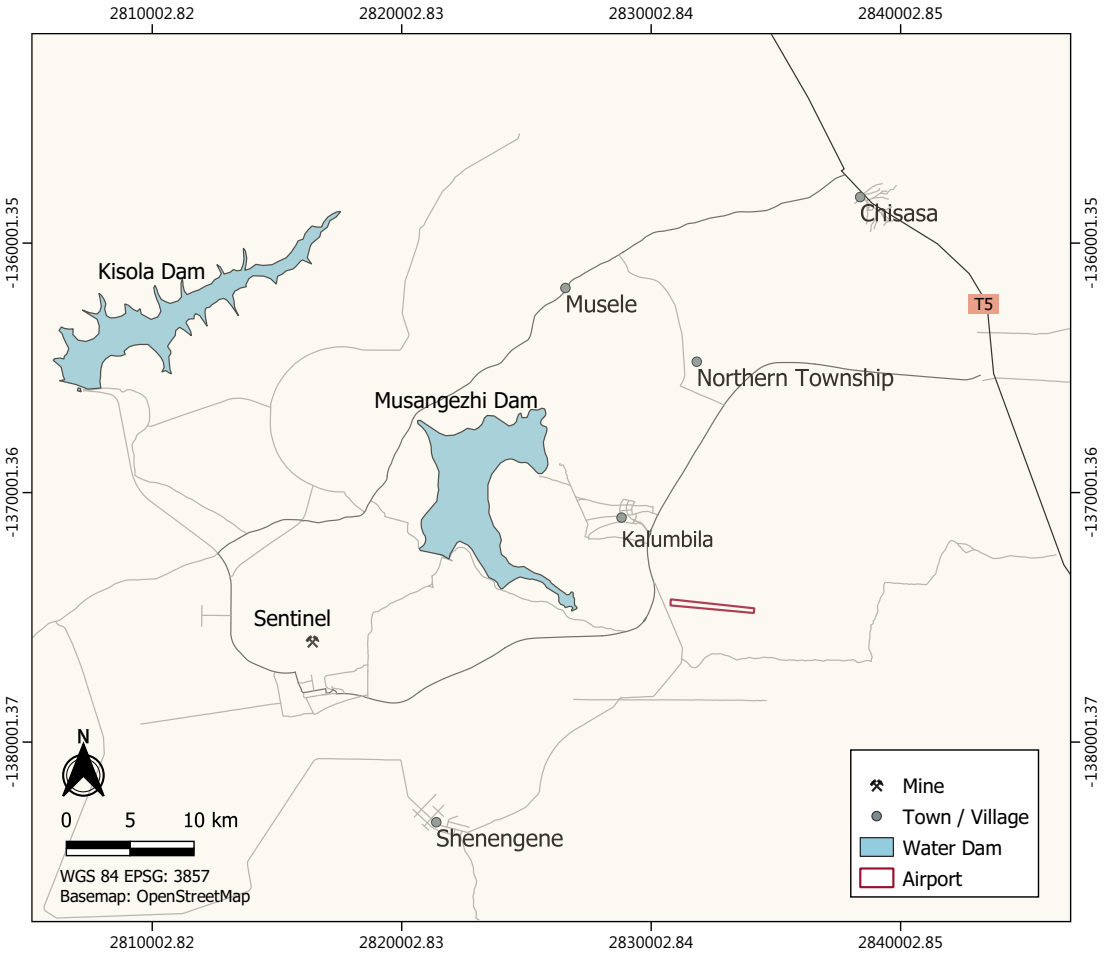

Figure 4: Kalumbila and Surrounding Settlements (own map)

In the following I will first describe the context of Kalumbila Town by briefly discussing the land attribution and resettlement process after which I will outline the greenfield town project in more detail.

2.3.2. Land Attribution and Resettlement in Kalumbila

In Zambia a mining license confers the right to mine but is independent from the surface rights. The Trident Project is located on customary lands held in trust by Senior Chief Musele of the Lunda people. In 2010 the Lunda Traditional Authority in Kalumbila allocated 518 square kilometres of land to FQM for the Trident Project (Kapesa, 2019, p. 158). However, FQM did

not get the presidential consent which according to the Zambian Lands Act of 1995 is necessary for areas beyond 2.5 square kilometres and a dispute arose on how much land FQM was allowed to use (Kapesa, 2019, p. 158). In 2012 FQM commenced with the construction of the Sentinel mine (First Quantum Minerals LTD, 2018c). In 2013, however, the Zambian government ordered an immediate stop of construction works at the mine until all the contested issues were solved and a ministerial taskforce was allocated to the case (Kapesa, 2019, p. 160). Consequently the mining company threatened to dismiss the 1'400 workers already employed at the project, which lead the local community to rise against the government, and construction was allowed to continue (Kapesa, 2019, p. 160). After several hearings in the Zambian parliament and negotiations between the different stakeholders, the land was finally reduced to 383 square kilometres for the mining operations and infrastructure, and 51 square kilometres for Kalumbila Town, the industrial zone and the airport[2] (Gray, Lawlor and Briggs, 2015, p. 33).

The allocated land encompassed several communities including Wanyinwa, Mukilawantambo, Kawelanga and part of Kankonzhi which had to be resettled (Kapesa, 2019, p. 158). As a result, after consultations with the to be resettled communities, the two new settlements Shenengene and Northern Township were constructed (see Figure 4) (interview TF1, 9.7.19). Shenengene is located further from the main road and housing plots have bigger land attributed, which allows the residents to continue farming. As a consequence, today there is a majority of resettled farmers living in this zone (Sjöberg, 2019, p. 19). However, road conditions to Shenengene are poor, which constitutes a major challenge for the residents (Sjöberg, 2019, p. 15; interview KR9, 31.7.19). Northern Township on the other hand is located closer to the main road and has a more mixed population as job-seeking in-migrants often choose this place as an alternative to live in Kalumbila town (Sjöberg, 2019, p. 27).

According to the mine, a total of 589 households were resettled (First Quantum Minerals LTD, 2019). In the resettlement areas the mining company constructed new infrastructure, such as schools, boreholes and health facilities but there is currently no electricity, running water or sewage system (interview TF1, 9.7.19). Furthermore, the arrangement of houses differs strongly from the original villages, as the houses were constructed closer to each other (Kesselring, 2017b, p. 98). Population is steadily increasing due to a constant influx of migrant work seekers which constitutes a considerable pressure on the existing infrastructure (interview TF1, 9.7.19). Government's regulation of the resettlement area is very limited, and they are slowly turning into

[2] The exact area size still warries according to different resources.

informal settlements (interview TF1, 9.7.19). Additionally, due to the fact that large parts of the mining area are fenced off, local populations' access to natural resources such as forest and rivers has been limited (Action Aid Zambia, 2015, p. 23).

In order to understand the context where Kalumbila is developing, the land attribution and resettlement process was shortly outlined above. It is however important to note that for the town itself no resettlement was necessary, as the town land was not occupied by settlements before.

2.3.3. Kalumbila Town

To run operations at Sentinel mine about 5'500 workers are needed (First Quantum Minerals LTD, 2019). The majority of positions require skilled labour, which was not available in the local area, and FQM forecasted that employees would come from other regions in Zambia and would need housing (ARUP Zimbabwe LTD, 2012, p. 8). Due to the very limited infrastructure present in Trident Project area FQM decided to build a new town to provide housing and infrastructure for the employees of the large-scale mines. Historically, the strong dependency of mining company towns on the mining company has resulted in the deterioration of many of those towns or even in the generation of "ghost towns" after the mining operations ended. (Littlewood, 2014, p. 39).

Kalumbila however is presented as a new sustainable model which targets the socio-economic problems commonly associated with mining company towns and aims to outlive the mining operations (Saasa and Kamwanga, 2014, p. 59; Collet, 2016). The town is developed and run by the private company Kalumbila Town Development Corporation Ltd. (KTDC), which is entirely owned by FQM. The vision of the planners is to create a thriving, modern African town with good quality housing and infrastructure in a clean and natural environment (Collet, 2016; interview KRDC1, 8.7.19). Therefore, the town is also open to the public, including private individuals and investors who want to build or buy a home or start a commercial business (ARUP Zimbabwe LTD, 2012, p. 7). Additionally, an industrial park was planned with the idea that companies independent of FQM would come and install themselves in Kalumbila and push-start industrial activities in the region (interview KTDC2, 10.7.19). At its completion the town should consist of 10'000 housing units as well as commercial and retail areas (ARUP Zimbabwe LTD, 2012, p. 1). KTDC does not keep records of the number of residents in town and there are therefore no official numbers of residents of Kalumbila. Estimates currently range from about 7'000 to 8'000 inhabitants (interview KTDC1, 8.7.19; interview KTDC5, 7.8. 19).

Figure 5: Kalumbila Park with Sports Ground (own photo, 2.8.19)

All the houses in Kalumbila are connected to electricity, sewerage and a water supply system. Furthermore, there are schools, a clinic, a pharmacy, an apartment hotel, a fuel station, ATMs, three small take-away restaurants, a bar and a park with sport grounds in town (see Figure 5). Residents can do their food shopping in a supermarket or a local market, where farmers from the area offer their products. To get other goods such as clothes, furniture or electrical devices, residents have to leave Kalumbila. Additionally, some residents have installed small informal businesses, such as barber shops or printing shops, in their private homes, as there is currently a lack of available business space in town. Many residents also have a small vegetable garden next to their houses, where they grow tomatoes, onions, rape, Chinese cabbage or kalembula (sweet potato leaves), and some of those with a bigger garden also have a pigeon or chicken house (see Figure 6). The town has a bus station where intercity buses pass a few times a day to connect either to Solwezi, the Copperbelt and further on to the capital Lusaka or to Mwinilunga.

Figure 6: Houses and Vegetable Garden in Kalumbila (own photo, 26.8.19)

Apart from the above described part of Kalumbila which is freely accessible to everybody, there is also Trident Woodlands Estate (TWE) which is a gated community that has been built for the mines' management and expatriate workers next to Musangezhi dam. Houses in TWE are more spread out and bigger in size. Additionally, there are different recreational facilities, like sports infrastructure and a club house with a bar and restaurant. In this thesis for reasons of simplicity and in accordance with common practice of Kalumbila residents, I will refer to the "open-access" part of Kalumbila as "town" and the gated community as "TWE". I will describe TWE in more detail in Chapter 6.

The closest urban settlement to Kalumbila is Chisasa, which is situated at a distance of about 20 km at the main road T5. Apart from the two resettlements, Northern Township and Shenengene, there is also the village of Musele, where Senior Chief Musele resides, which is located at a driving distance of about 14 km from Kalumbila (see Figure 4). FQM implements different corporate social responsibility projects in all of these settlements through the Trident Foundation. The Trident Foundation projects are related to healthcare, business development, education, farming, infrastructure provision, as well as forest and wildlife conservation (First Quantum Minerals LTD, 2019). There are company buses which connect the surrounding settlements to Kalumbila and to the mine: however, only KML employees are allowed to use these buses. Local public transport is scarce and to move to the surrounding villages or to Chisasa, Kalumbila residents have to take a shared taxi or hike.

2.3.4. Existing Research on Kalumbila

The planning of Kalumbila started in 2011 and construction is still continuing today, so there is only little research on the town and further analysis is necessary in order to fully understand the ongoing dynamics. This section will briefly present the main conclusions of the research conducted on Kalumbila.

Kesselring (2017b) in her paper on the electricity crisis and new mining towns in Zambia states that the building of the town has contributed to an increased social stratification of the population. She suggests that people can be categorized into four different social groups according to their place of residence, which is either TWE, Kalumbila town, the two resettlement areas or Chisasa (Kesselring, 2017b, p. 98). Social stratification has happened mainly because these four places differ strongly in terms of infrastructure provision and access to services (Kesselring, 2017b, p. 98).

Furthermore, Francisca Hamilton (2017) in her Bachelor thesis in architecture with the title "Importing 'Cities for People': Kalumbila, Mining Town" analysed in particular the Master Plan for Kalumbila Town, which was designed by the Danish company Gehl Architects according to universal principles and international best practices in urban planning (Hamilton, 2017, p. 46). According to Hamilton the plan for Kalumbila was mainly derived from the analysis of foreign models, such as old American company towns (Hamilton, 2017, pp. 36, 37). She finds that the planners lacked a sufficient understanding of the "specific complexities of the Zambian context" and the "difficulties of building mining settlements", which has led to a framework plan that fails to appropriately take into account the "patterns of domestic growth, the importance of social aspiration and the impact of fluctuations in economic stability" (Hamilton, 2017, pp. 45–46). This is why some ideas of Gehl architects, such as the creation of vibrant streets full of pedestrians and cyclists, do not catch on very well in the town (Hamilton, 2017, p. 55). Hamilton further states that Kalumbila in the way it was planned represents "a contemporary example of 'airplane architecture'" which "reflects a pervasive form of colonialism" (Hamilton, 2017, p. 46). Moreover, according to Hamilton the existence of TWE as a gated community separated from the rest of the town is starkly problematic, as it "retains certain stereotypical social divisions" and "is akin to colonial urban plans" (Hamilton, 2017, p. 46).

A third interesting study is the Master thesis in Sustainable Development of Josefine Sjöberg (2019). Sjöberg did an in-depth study on the two resettlement areas Shenengene and Northern Township in order to explore their social sustainability by applying an analytical framework for strategic social sustainability (Sjöberg, 2019, p. iv). The study found that FQM is strongly present in the resettlement areas and exercises influence in particular through the Trident Foundation (Sjöberg, 2019, p. iv). This presence has positive and negative aspects for the residents. On the one hand, the company has provided certain infrastructure and services to the communities, while government service provision has remained very limited (Sjöberg, 2019, p. 57). On the other hand, new social issues have arisen, such as increased competition for jobs or conflicts with local leaders (Sjöberg, 2019, p. 57). The results of this research are important to understand the local setting in which Kalumbila is embedded.

Finally, Kapesa, Mwitwa and Chikumbi (2015) in their analysis on the impact of new mining concessions on Kalumbila area do not examine the company town as such but provide a good overview of the changes that mineral extraction has induced on local livelihoods. They found that these changes, such as restricted access to natural resources or an increased influx of migrants seeking jobs in the mine, have resulted in increased social conflicts.

3. LITERATURE REVIEW AND RESEARCH QUESTIONS

In my literature review I will first explore the tensions that are characteristic of mining frontiers. I will then present the essential properties and common dynamics in mining company towns before outlining how the development of infrastructure and the built environment constitutes a form of exercise of political power and control. In the last section of this chapter I will elucidate the research gap and present the research questions of this thesis.

3.1. The Mining Frontier

As described in section 2.2, Kalumbila is located in the Northwestern Province, where formerly subsistence agriculture constituted the main source of income and where since the early 2000s mining activities have strongly increased and a new frontier of mineral extraction was opened up (Negi, 2014, p. 999).

The frontier concept describes spaces where state control or the dominant economic system is not (fully) established yet. Frontiers are imagined as spaces of wilderness which are not made use of, but bear great possibilities for the future (Tsing, 2003, p. 5100). Accordingly, "resource frontiers are driven by a particular dynamic of 'empty, but full' […] : they emerge when sites are imagined as 'empty' (of proper governance), but 'full' of potential resources for extraction" (Côte and Korf, 2018, p. 467). Frontiers are made possible through certain mapping and regulating devices which allow the measurement and recording of still to be "conquered" resources. Furthermore, the concept of frontiers is tied to a certain idea of modernisation which envisions the constant expansion of modernisation as the universal pathway to contentment (Korf and Raeymaekers, 2013, p. 10).

However, this framing of frontiers disregards the violence which is inherent to processes of frontier expansion. It presents the frontier as an empty space and neglects what has actually been there already. The framing of frontiers as places of "not yet" constitutes a political argumentation that does not correspond to reality and creates the basis for a free pass to intrusion (Korf and Raeymaekers, 2013, p. 10). It violently denies previously existing livelihoods and ecologies to which the frontier is a disruption. Therefore, as Tsing (2003) points out, the production of

resources for the capitalistic system can lead to what she calls a "trauma of transformation" for the actors of the system already in place. More specifically, when an area experiences a sudden increase in capital investment in the mining sector, the changes that this brings might trigger what Negi calls "wish images of development" by the local population. These are new ideas and imaginations of how the region will profit from the mineral investments and what kind of positive transformations they will cause (Negi, 2014, p. 1004). However, people living in resource frontiers often also have fears and anxieties about the "disruption of social-spatial 'order'" (Negi, 2014, p. 1000). These tensions which are constitutive of a frontier, also play out in new mining company towns, which will be discussed in the next section.

3.2. Mining Company Towns

Kalumbila displays characteristics of both "mining towns" and "company towns", which is why I will frame it as a "mining company town". A "mining town" is a town in which the main economic activities consist of mineral resource extraction and processing (Littlewood, 2014, p. 41; Davies and Oliver, 2017, p. 25). This dependency on one industry makes mining towns particularly vulnerable to the booms and bust cycles of the mineral commodity prices and limits their capacity to adapt and generate income from other sectors (Davies and Oliver, 2017, p. 25). A "company town" on the other hand, is a community which is "owned and administered by an industrial employer" (Littlewood, 2014, p. 41). I therefore define a "mining company town" as a company town which is owned and administered by a mining company. Depending on the focus of the study and the geographical location, other denominations, such as "mine township" or "mine worker camp", are also used to describe the same phenomena (Mususa, 2012; Larmer and Laterza, 2017; Nchito, 2018; Rubbers, 2019).

Mining company towns are constructed by mining companies, in some cases in collaboration with the local government, close to the extraction sites in order to provide accommodation for their employees (Littlewood, 2014, p. 41). In these towns the mining company usually owns the (majority of) land and housing, provides infrastructure, such as health and educational facilities, renders municipal services to the residents, and is the main focus of local economic and social life (Louw and Marais, 2018, p. 279). Infrastructure provision and services are often free of charge or subsidized (Littlewood, 2014, p. 41). The majority of residents of a mining company town are employees of the mining company or work for a contractor or supplier of the mining company. In some mining company towns home ownership among workers is encouraged in order to strengthen feelings of belonging and loyalty to the town and the company (Borges and Torres,

2012, p. 12). These towns may be "closed" and only accessible to workers and their families or they can also be "open" if access to housing in the town is not restricted (Littlewood, 2014, p. 41). Mining company towns often function autonomously from the municipal authorities and mining companies act as the de facto local governor and enforcer of community rules (Borges and Torres, 2012, p. 5). As a consequence town politics are practically non-existent (Porteous, 1970, p. 131).

The main body of scientific literature consists of historical analyses of mining company towns (Borges and Torres, 2012; Rubbers, 2019). This literature mentions different reasons as to why mining companies have constructed these towns.

Firstly, various authors found that companies provided housing primarily out of necessity if the site of production was located in isolated, sparsely settled regions. According to this argument, it was not profitable for independent investors to invest in housing at these locations, as housing investments were strongly interlinked with the success of the business of the mining company. The mining companies, however, needed a significant number of workers to run the operation and hence they were obliged to build the housing themselves (Fishback, 1992, pp. 353–354). Mining company towns are therefore described as "devices to secure labor though housing" to assure a constant labour supply (Borges and Torres, 2012, p. 10).

Secondly, some researchers also pointed out that housing provision for employees was economically beneficial to a mining company. According to this analysis companies owned housing in order to shape and produce a strong workforce and increase its productivity by ensuring access to good medical assistance, attracting better-quality workers to remote areas, reducing turnover and enhancing company loyalty and work attitudes of employees (Fishback, 1992, p. 353). However, this "enhanced-productivity explanation" only fits well in situations where company housing was in effect superior to alternative worker accommodation (Fishback, 1992, p. 353). The quality of housing in company towns varied significantly from town to town and often also within the same town (Fishback, 1992, p. 353). According to Fishback (1992), it is in particular in towns where "welfare capitalism" was practiced, which included inter alia the building of recreational facilities, enhanced schooling and the hiring of welfare workers, that productivity improvement was successful (Fishback, 1992, p. 353).

In addition to these two explanations which focus on economic aspects of mining company towns, more critical political analyses show that company towns were also used as "sites primarily designed to control and discipline" the labour force (Larmer and Laterza, 2017, p. 702). Mining companies determined rules and regulations in the town to control the behaviour of workers and

their families. Family policies were for example frequently implemented to create "modern" families which were imagined as nuclear families with a clear division of roles: the husband would work in the mine while the wife would be responsible for all the domestic work (Rubbers, 2019, p. 92). Health programs to produce strong, healthy and disciplined workers often contained eugenic elements (Rubbers, 2019, pp. 90–91). Other means to control labour in company towns included managing access to resources, such as water or electricity (Borges and Torres, 2012, p. 10). Living in a company town therefore strongly influenced the way of life of the workers and their families. The company had "control over both working space and residential space" of its employees through "the combination of places of work and worker's housing" (Borges and Torres, 2012, p. 9). Housing of workers could thus be used by companies as an "instrument of power" (Borges and Torres, 2012, p. 10).

Moreover, according to Larmer and Laterza (2017), company towns were "inherently exclusionary places that sowed or reinforced divisions" between different social groups in and outside of town, such as company town residents and workers who did service jobs in the company town or people living next to the company town (Larmer and Laterza, 2017, p. 702). Inside the company town not all residents were provided with the same benefits of company paternalism (Borges and Torres, 2012, p. 17). In particular in colonial contexts, racial categorization and spatial segregation were common practices in mining company towns (Borges and Torres, 2012, pp. 18, 142). Company town quarters for white workers were provided with better infrastructure and services than the parts of the town for black workers (Borges and Torres, 2012, p. 18). Most company towns were also residentially segregated in terms of the workers position in the company hierarchy. Employees in managing positions lived in larger, standalone houses, while the quality and comfort of housing structures would decrease in accordance with the workers hierarchy level, with the unskilled workers living in the most simple structures (Porteous, 1970, pp. 135–136; Acosta, 2015, p. 232). This spatial layout according to institutional hierarchies strongly influenced the power relations between residents (Acosta, 2015, p. 232).

Today, when new mining company towns are constructed, they on the one hand build on the legacy of historical models of company towns and on the other hand distinguish themselves from these models, as they try to integrate contemporary best practices of urban planning, such as sustainability principles. However, there is only little literature that analyses newer forms of mining company towns (Littlewood, 2014, pp. 40, 42). I will in the following present the findings of Appel and Hendriks, and outline their relevance for understanding mining company towns. Apart from their analyses, most contemporary research on mining company towns focuses on

what happens to these towns once a mine closes down or on how former company towns are "normalized" and converted into open towns administered by the local authorities (Littlewood, 2014; Cloete *et al.*, 2018; Louw and Marais, 2018).

Hannah Appel (2012) conducted research on private oil compounds in Equatorial Guinea. These compounds, where expatriate workers live and work, are maintained and regulated by the oil company and not the local government, and are zoned according to the workers position in the company hierarchy (Appel, 2012, p. 441). This results in "an elevated level of employee/inhabitant control" (Appel, 2012, p. 441). However, local workers are not permitted to live in the compounds (Appel, 2012, p. 441). According to Appel, "companies […] exercise a tremendous amount of infrastructural power in these sites" (Appel, 2012, p. 441). Although Appel's research does not examine a greenfield company town project, but rather residential areas which were built by oil companies in an already existing town, her conclusions also help us to better understand company towns.

Appel explores the different strategies and narratives that an oil company uses in order to disentangle and separate a compound from its location in Malabo, the capital of Equatorial Guinea (Appel, 2012, p. 443). Firstly, the spatial layout and architecture of the residential compound differs strongly from the local urban housing pattern and construction methods; the area rather resembles an North American suburb (Appel, 2012, p. 446). Secondly, the compounds separation from its surroundings is further enhanced through very strict access rules to the compound, as well as curfews for its residents (Appel, 2012, p. 447). Appel also describes how "local histories of use, ownership and dispossession" of the land of the compound area are neglected and replaced by narratives of wilderness and discovery, which feed the compounds "origin story" (Appel, 2012, pp. 448–449). Furthermore, the compound disposes of infrastructure, such as hot water, electricity and waste systems, which is exceptional in the local context (Appel, 2012, p. 449). This infrastructure is seen by the oil company as a way to function "self-sufficiently" without having to rely on a local services, which are perceived as "highly inefficient" (Appel, 2012, p. 450). Appel states that while the compound space is presented by the company as a well-organized place where global standards and norms are being followed, the surrounding local town is associated with images of arbitrariness and incomprehensibility (Appel, 2012, p. 451). In sum, she argues that despite all the efforts made by the company to isolate the compound and its functioning from its geographical location, the separation always remains "partial, strategic and performative" (Appel, 2012, p. 450).

The anthropologist Thomas Hendriks (2013, 2015) conducted research on a logging camp of a multinational timer company in the Democratic Republic of Congo. The logging camp differs significantly from a mining company town. Firstly, there are significant differences in the operation modes of mining and logging activities. Secondly, the logging camp was designed for a much shorter period of existence and therefore does not include any social infrastructure provided by the company, such as schools or hospitals (Hendriks, 2015, p. 163). Nevertheless, some of Hendriks' conclusions are also relevant for the analysis of contemporary mining company towns, as they relate to the camp as a place which differs from the surrounding locations through its greater integration into the global economy.

Hendriks argues that because the logging camp is connected by roads and other infrastructure to trade networks, it is on the one hand a "site of temporary acceleration of opportunities" for its residents, in particular in comparison with the villages surrounding the camp (Hendriks, 2013, p. 2). On the other hand though, Hendriks outlines that the increased sense of connectivity and mobility that residents of the camp experience, causes feelings of isolation because every person's understanding of mobility is always relative to others (Hendriks, 2013, p. 6). As workers that live in the camp do not compare themselves to the local population living in the surrounding area, but "to the imagined mobility of big cities and the western world", the logging camp is seen by its residents as a place of immobility where people lack the opportunity to leave (Hendriks, 2013, p. 6). This paradox of simultaneous feelings of connectivity and isolation might also arise in mining company towns.

Overall, the literature on mining company towns and related phenomena suggests that mining company towns entail questions of productivity, labour force control, socio-economic segregation, and spatial connectivity and isolation.

3.3. Infrastructure and the Built Environment

When studying mining company towns, the towns' housing and service infrastructure constitute an essential part of the analysis, as it produces a specific urban social and built environment. In particular, anthropologists have conceptualized infrastructure as a frame to rethink the political (Anand, Gupta and Appel, 2018, p. 4). According to McFarland and Rutherford (2008) infrastructure development is fundamentally a political process as it can connect and fragmentize communities at the same time (McFarlane and Rutherford, 2008, p. 364). Moreover, differentiated access to infrastructure can (re)produce or consolidate social categories like class, gender or race (Anand, Gupta and Appel, 2018, p. 6). Infrastructure and the built environment

can therefore strongly shape social life and become a visible expression of socio-economic status differences (Lawrence and Low, 1990, pp. 457, 463; Anand, Gupta and Appel, 2018, p. 6).

People adapt their conduct to the built environment they live in (Lawrence and Low, 1990, p. 460). The construction and development of infrastructure and the built environment can thus be seen as a way of exercising political power and control. Urban planners and architects determine with their plans "a certain allocation of people in space, a *canalization* of their circulation" (Foucault, 1984, in Lawrence and Low, 1990, p. 485). Furthermore, infrastructure enables capital and labour flows to and away from specific locations (Anand, Gupta and Appel, 2018, p. 5). Infrastructural projects are thus often related to ideas of modernity and progress (Anand, Gupta and Appel, 2018, p. 3). Infrastructure can produce sentiments of hope and inclusion but also violence and abandonment (Anand, Gupta and Appel, 2018, p. 11). Material infrastructures, such as roads or power lines, "are critical both to differentiated experiences of everyday life and to expectations of the future" (Anand, Gupta and Appel, 2018, p. 3). While governments and private corporations often present infrastructural investment as an opportunity for economic benefit, (lack of) service delivery and infrastructure is also used by communities to make political claims (Anand, Gupta and Appel, 2018, p. 3).

3.4. Research Gap and Research Questions

As discussed above, research on new forms of mining company towns is limited. This might be due to the fact that in accordance with the extractive enclave thesis outlined in the Introduction, the construction of whole new towns by mining companies when opening a new operation is no longer seen as the standard case. Rubbers, in his analysis of mine worker camps, however suggests that "a new cycle in the history of workers' camps seems about to start" and in particular when new mining projects are located far away from major urban centres, mining companies are building mining company towns in order to attract employees and provide them with the necessary infrastructure (Rubbers, 2019, pp. 94–95). However, the construction of mining company towns is contested, as research has shown that the dominance of a town by one company and the resulting concentration of economic activity in one sector generate socio-political and institutional relationships, which negatively affect a town's sustainable and inclusive development (Littlewood, 2014; Kapesa, Mwitwa and Chikumbi, 2015; Louw and Marais, 2018).

In this thesis I therefore analyse the new mining company town Kalumbila in order to explore the contemporary operating modes and consequences of the spatial government of mining companies. This will lead to an understanding of mining company towns beyond the enclave

theory, enabling to take into account the opposite and ambiguous tendencies on the ground. According to Rubbers (2019), an in-depth analysis of a mining company town's infrastructure provides "'clues' or 'inscriptions' of broader power strategies" of the mining company (Rubbers, 2019, p. 89). Analysing the way how a mining company plans and builds a town and what kind of housing it provides for its employees, can therefore help us to "unravel the dynamics of corporate governance and place-making at sites of extraction" (Kesselring, 2017a). This allows us to better understand the spatiality of large capital investments in the extractive industry.

The main research question of this thesis is thus:

How does the mining company First Quantum Minerals Ltd. govern space and people through the new mining company town Kalumbila?

Subquestions concern the town planning, inclusiveness of the mining company town and residents' everyday practices:

- What are the main planning goals of Kalumbila and how are they put into practice?
- How is access to town infrastructure and to services in Kalumbila organized?
- How do the residents' narratives and practices correspond to or differ from the goals and imaginations of the town planners?

In the following chapter, the methodological approach used to answer these research questions is presented.

4. METHODOLOGY

In this chapter I will first explain how I accessed the research field and reflect on my positionality in the field, before discussing my data collection and analysis methods.

4.1. Qualitative Research Methods & Process

To answer my research questions I did a qualitative case study. Qualitative research aims to better understand social realities (Flick, Von Kardorff and Steinke, 2009, p. 14). Qualitative methods allow the researcher to examine single cases and their specificities and obtain a detailed account of the perspective of the actors, their ideas, attitudes and opinions (Mattissek, Pfaffenbach and Reuber, 2013, p. 35). Furthermore, I used an inductive approach, which led to a circular research process, where the hereafter described steps of data collection and data analysis were not carried out in a strictly chronological way but sometimes overlapped (Flick, 2016, pp. 124–128). For example, during fieldwork I already reviewed and analysed part of the collected data and subsequently included the gained insights which resulted in the adaption of my interview guides. In addition, even after fieldwork I still collected more data from documents and discussions with other researchers. This helped to clarify questions unanswered questions. Taking this iterative approach, rather than following a predetermined line of thought, allowed me to remain open to unexpected insights, which constitutes an important feature of qualitative research, and adopt a more creative way of studying the new town Kalumbila (Flick, Von Kardorff and Steinke, 2009, p. 14).

4.1.1. Ethnographic Research

In this study I followed an ethnographic approach. Ethnographic research entails a reflexive approach embedded in context and dialogue with the research field (Burawoy, 1998, pp. 14–15). According to Lüders (2009), ethnographic research has three essential characteristics: longer participation, a flexible research strategy and ethnographic writing (Lüders, 2009, pp. 391–399). Firstly, longer participation means that the researcher takes part in activities and daily life of the social group studied, observing and interacting with its members for an extended period of time (Herbert, 2000, p. 551). This allows the researcher to establish trustful relationships and capture situational and local knowledge (Lüders, 2009, p. 391). It is therefore crucial to gain good access to the field and take on an accepted role in the local context. I will explain how I did this in section 4.2.1. Secondly, an ethnographic approach requires the ability of the researcher to adapt her

research methods to a particular field and research context (Lüders, 2009, p. 393). Thirdly, ethnographic writing involves the retrospective protocolling of observations, which implies a first "processing" of the events by the researcher and therefore differs from other forms of qualitative research collection, such as interviews, which are recorded and transcribed word by word (Lüders, 2009, p. 396). Thus, it is important to take into account and reflect on one's positionality when doing ethnographic research (on positionality see section 4.2.3).

4.2. Field Research

One remarkable aspect of a Master thesis in Human Geography is the requirement to go into the field and collect one's own data. Field research is different from working quietly in your office in front of a computer. In my case it involved travelling to another place and adapting to the local circumstances and practices. This was challenging in some situations, but it also allowed me to immerse myself into different realities and further broaden my horizon. To minimize the risk of putting myself or any of my research participants into an unpleasant situation, planning ahead and carefully preparing the field work was crucial. In the following sections I will therefore outline how I accessed my research field.

4.2.1. Access to the Field

Before fieldwork, I did exploratory research which included phone calls, email exchange and meetings with various people in Switzerland who conducted or are currently conducting research related to copper mining in Zambia. More concretely, I contacted three anthropology Master students from Swiss universities who did research for their theses in Zambia, two of them in the Northwestern Province (6 weeks, 5 months and 6 months of research stay respectively). I also had an email exchange with Dr. Rita Kesselring, Senior Lecturer at the Institute for Social Anthropology, University of Basel, who did 18 months of field work on the social and economic impact of copper mining in Zambia, including 5 months of field work in Kalumbila. Furthermore, I met with Dr. Mirko Winkler, Head of the Health Impact Assessment (HIA) Research Group at the Swiss Tropical and Public Health Institute Basel. His research group conducted the health impact assessment for the Trident Project; a baseline study in 2011 and a follow-up study in 2015 (Knoblauch *et al.*, 2017, p. 1). At the time they were also planning to do a second follow-up health impact study in the Kalumbila area in June 2019. These exchanges helped me to become more familiar with the field and to better prepare myself for some of the challenges I may have encountered.

Moreover, I also received the contact details of several people in Zambia prior to my departure. These contacts proved to be very valuable once I had arrived in the field. In particular, through one of the Master students I was connected to Gerald Mutelo, the national coordinator of the local NGO Democratic Governance and Human Rights Advocates (DEGHA), who offered to be my guide and take me to see different old mine townships in the Copperbelt. With him I visited different mine townships in Kitwe, Chingola and Chambishi. To experience these places, see how space is organized and what kind of different housing types and infrastructure are present, allowed me to have a point of reference in order to better situate Kalumbila in the historical and local context. In addition, through one of the contacts I also found a place to stay in Kalumbila, as it turned out that this contact has a family member who works for KML and has lived in a small house in Kalumbila since 2017. This lady offered to host me during the entirety of my stay in Kalumbila. My host in Kalumbila also helped me to organize my stays outside of Kalumbila in Ntambu and Chisasa. In general, my field work and access to different places and people was very much facilitated through the generous hospitality which I encountered everywhere I went, and which is deeply rooted in the local culture.

4.2.2. Collaboration with the Dag Hammarskjöld Institute for Peace and Conflict Studies, Copperbelt University, Zambia

For my research visa in Zambia an affiliation to a local research institution was required. I was very excited about this, as an affiliation would also allow me to gain insight into the Zambian academic environment and connect to other local students and researchers. However, at the start, this affiliation proved rather difficult to organise. A senior lecturer at the Department of Geography and Environmental Studies at the University of Zambia, whose contact details I had received from one of my supervisors, did not respond to my emails. The second option, which would have been an affiliation to the Southern African Institute for Policy and Research (SAIPAR), a renowned private research centre located in Lusaka, was found to be too expensive, as my funding was limited. Luckily, I then found out that the Center for Comparative and International Studies (CIS) at the ETH Zurich, where I am currently working as a research assistant, was collaborating with the Dag Hammarskjöld Institute for Peace and Conflict Studies of the Copperbelt University on an international research project called "Ethnic Power Relations and Conflict in Fragile States". Thanks to this connection I was accepted as a research affiliate at the Dag Hammarskjöld Institute for Peace and Conflict Studies which is located in Kitwe in the Copperbelt Province.

After arriving in Zambia and before travelling to Kalumbila I spent two weeks at the Institute, where I was welcomed warmly. This helped me to quickly adapt to the Zambian way of life and to further expand my network. Robby Kapesa in particular, who had just finished his PhD on "Local Perceptions of Horizontal Inequalities, Collective Grievances, and Ethnic Mobilization in Emerging Mining Areas of North-Western Zambia" at the Dag Hammarskjöld Institute for Peace and Conflict Studies proved to be a very valuable contact. Although thematically Mr. Kapesa's research focus is quite different from mine, geographically our research field overlaps. Due to his PhD, which inter alia involved conducting over 50 interviews to collect qualitative data, Robby Kapesa has acquired in-depth knowledge of Kalumbila and the surrounding areas. He gave me advice on how to approach different actors in the field and refine my sampling strategy. Furthermore, he helped me to connect to another PhD student of the Institute who is also an employee of the Trident Foundation, the local corporate social responsibility program of FQM. Once I was in Kalumbila this person introduced me to other Trident Foundation employees as well as to Michael Kabungo, the superintendent of the town management company KTDC. After I received the approval of the KTDC superintendent the rest of his team showed to be very helpful and open to contributing towards my study.

4.2.3. Positionality

To reflect on one's positionality is particularly important when doing qualitative research, as in this research tradition we recognize that the researcher is never "outside" of the research process, but that she actively takes part in it and that she might have gained certain data and not other because of who she is. In particular, when doing interviews, interviewees might present a situation in different ways depending on who is asking the questions (Mattissek, Pfaffenbach and Reuber, 2013, pp. 138–139). On the one hand, to fully understand a geographically and culturally situated statement a certain degree of familiarity with the local context and culture is necessary. On the other hand, some things might be easier to expose for a "non-local" observer because an "insider" would lack the necessary distance as it would just seem normal to her.

I found that my positionality and how I was perceived by my informants was shaped mainly by the following three attributes: being Swiss, a student and white. Many Zambians perceive Switzerland as a developed, wealthy country full of opportunities. Coming from Switzerland thus led to high expectations regarding my abilities and influence, which is shown for example by the fact that I was sometimes asked if I wanted to invest money. However, presenting myself as a student, affiliated to the Copperbelt University which is very well known in Zambia, helped significantly to lower those expectations and make my position as a researcher with no

decision-making power concerning any projects in town clear. Additionally, my physical appearance and in particular my white skin colour not only made me stick out wherever I went, but also made my position as a foreigner very clear from the start. Due to my skin colour I was often associated with the expats working for the mine and people were at first surprised about my behaviour. For example when they saw me cycling through town or if they learnt that I was not staying in the gated community, they were astonished because this was very unusual for expats. This kind of experiences therefore taught me about different expectations and perceptions of my research participants.

Furthermore, it was important to make clear that my research is fully independent from the mining company. As mentioned above I did this by explaining that I was a student and that this research was part of the requirements to complete my Master level studies. In particular, for the cases where I was connected to the resident interviewees through a KTDC employee, I made sure to clearly state my autonomy from FQM. In addition, I always asked at the start of the interview if the interviewee would like to be anonymized and I felt that the knowledge to have their identity protected reassured my informants and made them open up more and also state critical opinions. I think that anonymization was especially important in the specific context of my research because I asked people to share information about something that was planned and implemented by their own employer.

4.3. Data Collection

In total I conducted three months of fieldwork in Zambia between June and September 2019. When I first arrived in Zambia, I spent a few days in the capital Lusaka, where I had the opportunity to participate in the 8th Zambia Alternative Mining Indaba (see section 4.3.4), as well as meeting different researchers and NGO representatives who had been working on mining and its social and economic impacts in Zambia. As mentioned above I then travelled to Kitwe, where I spent two weeks at the Dag Hammarskjöld Institute for Peace and Conflict Studies before arriving in Kalumbila, where I stayed for a total of two months. During this period, I also spent a week each in the village of Ntambu and in Chisasa. In Ntambu, which is located about 55 km southwest of Kalumbila, I was accommodated by a young couple that operates a small honey company which collaborates with the Trident Foundation. In Chisasa I stayed with the family of someone who works as a gardener for KML. By sharing time with people outside of the town, I could learn about their living conditions and the opportunities and challenges the construction of Kalumbila has brought to the surrounding communities.

After having given this short overview of my fieldwork stay, I will now outline my sampling strategy before presenting the data collection methods.

4.3.1. Sampling

Qualitative research does not gain its main insights through the accumulation of data from a high number of different cases but from selecting a relatively small number of cases purposefully according to the aim of the research (Patton, 1990, p. 169). I mainly concentrated on two different research populations.

Firstly, I conducted interviews with town planners; these included staff of KTDC as well as urban planning officers working on the district level at Kalumbila Town Council[3] and on the provincial level in the Department of Physical Planning of the Northwestern Province. Due to the limited number of people in these positions I did not need to sample my interview partners, but rather conducted interviews with all the planners and architects working for KTDC as well as the Physical Planner of the Kalumbila Town Council and the Provincial Planner and Senior Physical Planner of the Northwestern Province.

Secondly, I interviewed different residents of Kalumbila who were willing to share their personal experiences and perspectives of living in Kalumbila with me. For selecting the resident interviewees I did purposeful sampling by using a "maximum variation sampling", which aims to capture "the core experiences and central, shared aspects or impacts of a program", or in the case of this research, of living in the new mining company town Kalumbila, by selecting heterogenous cases (Patton, 1990, p. 172). I used the following criteria for the variation in the sample of this study: gender, "migrant status"[4], "employment status"[5] and type of housing. Common patterns which are present across the resulting sample enable us to expose shared aspects of a situation (Patton, 1990, p. 172). Furthermore, I also used "snowball sampling" to trace information-rich cases, meaning residents that were recommended to me because of their particular broad knowledge about the development and functioning of Kalumbila due to either their particular interest in the subject or because they already lived in town since several years.

[3] Kalumbila Town Council is the local governmental authority which governs the whole of Kalumbila District and not, as the name might imply, a governmental agency specifically for the mining company town Kalumbila.

[4] For the criteria "migrant status" I structured people into three categories: resident in the local area before 2011 (which is the start year of the Trident Project), resident in Zambia but not in the local area before 2011 and expatriate.

[5] For the criteria "employment status" I structured people into the following categories: out of employment, self-employed, employed by KML, employed by a contractor of Sentinel mine.

As a result, my purposeful sample includes a total of 40 interviews (including follow-up interviews), discussions and meetings:

- 18 interviews with Kalumbila residents
- 8 interviews with 6 different KTDC employees
- 2 interviews with 3 different state urban planning officers
- 6 interviews with residents of Chisasa and Ntambu
- 3 interviews with 2 different Trident Foundation employees
- 1 interview with the local chief
- 1 interview with the manager of Kabitaka Hills Development Corporation Ltd. (KHDC)[6]
- 1 stakeholder engagement meeting organized by the Extractive Industries Transparency Alliance (EITA) (see section 4.3.4)

A more detailed list of all the interviews can be found in the Appendix A.

When conducting interviews, I always informed participants about the purpose of my research and how the information they shared during the interview would be used, in order to obtain their "informed consent" (Peters, 2017, p. 84). Participants agreed to take part in the research either orally or by signing an interview consent form. The consent form can be found in the Appendix B. I also asked the interviewees if they wished to be anonymized in my thesis.

4.3.2. Triangulation

Triangulation generally refers to the combination of different research approaches with the aim to increase the validity of the results and thus the quality of the study. This might include triangulation of theories, data, investigators or methods (Flick, 2009, p. 310). For my thesis I did a "data triangulation" by combining data obtained from different sources including interviews, observations, reports, maps and promotional material (Flick, 2009, pp. 311–312). I also did a "between-methods triangulation" by using different data collection methods including qualitative interviews, participant observation and the compilation of various documents and photographs (Flick, 2009, p. 313). This allowed me to have points of comparison and check the consistency of my data.

[6] KHDC is implementing a housing project called Kabitaka in Solwezi for employees of the Kansanshi mine. KTDC is trying to implement the lessons learned in Kabitaka.

4.3.3. Semi-Structured Interviews and Discussions

Semi-structured in-depth interviews constitute the core data collection method of this study. Semi-structured interviews are conducted on the basis of an interview guide. The interview guide predefines the key topics of the interview but leaves flexibility to the interviewer in terms of the exact formulation and order of the questions, as well as openness to take up new aspects and topics the interviewee might bring up (Hopf, 2009, p. 351). I prepared two main interview guides, one for the in-depth interviews with Kalumbila residents and one for the expert interviews with town planners. The questions were organized around the following topics: planning and implementation, housing, town infrastructure and services, social life, development, access and exclusion. I also included biographical questions in my interviews with residents in order to understand which other places and spaces have influenced the participants' imaginations of and narratives about Kalumbila. By doing so I wanted to avoid casting Kalumbila as a geographically bound unit which is not interconnected with the global sphere. According to Massey (1994, 2002), in order to understand the character of any place it needs to be set in the context of its relations with the world, because "the social relations which constitute a locality increasingly stretch beyond its borders: less and less of these relations are contained within place itself" (Massey, 1994, p. 162, 2002, p. 294). I adapted the interview guides during fieldwork because my knowledge about the case increased over time and therefore some questions became redundant and new ones arose.

All of the interviews were conducted in English. English is very commonly used by Kalumbila residents. This turned out to be a major advantage, as I was not only able to conduct the interviews myself without being reliant on a translator, but could also easily follow everyday conversations between residents. In addition, informal discussions were part of my daily life in Kalumbila. Sometimes they were not directly related to my study but still contained some interesting points. At other times people would inquire about the progress of the study and an informal discussion on my research topics would naturally arise. These conversations helped me to better set into context the information gained from more formal interviews and understand which themes were most important to my interlocutors.

Expert Interviews

For the interviews with town planners, which as mentioned above included KTDC employees as well as state urban planning officers, I used a specific form of semi-structured interviews called "expert interview". Experts are defined by Meuser and Nagel (2009) as persons who, often as

professionals, bear in some ways responsibility for certain societal issues and who therefore have privileged access to specific knowledge about those issues (Meuser and Nagel, 2009, p. 470).

There exists different types of expert interviews (Bogner and Menz, 2009, pp. 46–47). For this thesis I used a mix of the systematizing expert interview and the theory-generating expert interview (Bogner and Menz, 2009, pp. 46–47). While the goal of the systematizing expert interview is to retrieve the expert's knowledge and obtain practical and experience-based information, the theory-generating expert interview takes into account the subjective dimension of the expert knowledge and thus focuses on disclosing the expert's assumptions, conceptions and theoretical background (Bogner and Menz, 2009, pp. 47–48). For my interviews with different town planners in Kalumbila I did not only want to learn about the town's planning goals and their implementation, but also about the political rationalities underlying these and thus the inherent assumptions about how a good city should be built. I had follow-up interviews with several town planners which served to clarify uncertainties and allowed for further discussion on interesting issues that related to my research questions. In addition to these more structured interviews I also had meetings with key informants, such as employees of the Trident Foundation who implement the corporate social responsibility projects of the mine, where I did not follow an interview guide, but inquired about their work duties and field of expertise.

4.3.4. Participatory Observation

Observations are important in qualitative research. Participatory observation involves the immersion of the researcher in the research field. The researcher is making observations not only as an outsider, but also from the perspective of a participant. When doing participant observation, the researcher thus interferes in the events and creates distortion (Flick, 2016, p. 287). It is therefore crucial to be aware of one's positionality in the field.

As I was living in Kalumbila, which was at the same time my research focus, participating in daily town life allowed me to collect a lot of complementary information to the data obtained through interviews. I repeatedly took walks or cycled through town in the morning or evening to get familiar with the town's set up and also observe the daily life of the residents. Furthermore, as a resident in Kalumbila I encountered the same experiences which some of my interviewees recounted, such as coping with the limited choice in the only supermarket in town or rushing to buy take-away dinner in the event of a power cut and later on eating together with my host in an almost dark house, while absurdly outside the streets were strongly lit by solar powered street lights.

Often, finding my way to places where I was going to meet an interviewee turned out to be good opportunities to do participatory observation. In particular, if I was meeting my informant outside of Kalumbila, I found myself confronted with the same difficulties that other residents who did not own a car also encountered. If I was lucky, I could catch one of the few buses that left town, more often though I had to squeeze into a shared taxi or even hike, while at the same time half-empty company buses would pass by, which non-KML employees were not allowed to use. These instances offered good opportunities for conversations with town residents about their personal relation to the town, the town's opportunities and challenges as well as local rules and cultural traditions. This helped me to learn more about the mental maps of different Kalumbila residents.

I also took part in different meetings and conferences. In Lusaka I participated in the 8th Zambia Alternative Mining Indaba. The Zambia Alternative Mining Indaba is a multi-stakeholder conference which is organized each year by Zambian civil society organizations working on mineral resource extraction to discuss different issues in relation to good governance, transparency and accountability of the extractive industry. At this conference I could learn about the most pressing social issues in Kalumbila and also establish contact with the Extractive Industries Transparency Alliance (EITA), an NGO which is currently implementing different projects in the settlements around Kalumbila. EITA would then inform me whenever they had a workshop or meeting in Kalumbila area and invite me to participate. I attended a stakeholder engagement meeting which EITA organized and where different public officials of Kalumbila District and representatives of FQM and Barrick came together to discuss how to better tailor corporate social responsibility programs to the needs of the local communities in order to increase their effectiveness. Taking part in meetings like this allowed me to gain more information about the bigger economic, political and social realities Kalumbila is embedded in.

I made field notes about all these lived experiences in a field diary. Field notes included practical and descriptive information, for example the description of an event or a discussion, as well as more reflective and analytical information consisting of my ideas, thoughts and reflections.

4.3.5. Documents and Photographs

In addition to the interviews and participatory observation, I collected documents and online publications about Kalumbila. These included documents published by FQM, KTDC and Gehl architects, such as company reports or promotional materials and reports on the town project. It also comprised the Environmental Impact Assessments (EIAs) for the town and the airport, NGO reports on the Sentinel mine and the resettlement, maps of the town and data gained from other

online resources, like the KTDC Facebook page or the "Mining for Zambia" webpage, which is an industry representatives webpage. A compilation of these documents can be found in the bibliography in section 8.1.

Moreover, I took photographs of the town's infrastructure, different housing types, residents and the environment in order to visualize life in Kalumbila. However, as I felt it is important to respect resident's privacy, in certain situations I deliberately decided not to take pictures. Even though photographs seemingly reproduce reality objectively, when using them as data for research it is important to be aware about the fact that pictures are socially and technically constructed (Harper, 2009, pp. 406–412). The choice of subject, frame and brightness for example can change how reality is represented in a photograph (Harper, 2009, pp. 406–4012).

4.4. Data Analysis

Data analysis includes the application of a certain analytical lens through which reality is understood. Original text material has to be reduced in its complexity and condensed so that it only contains the information relevant to answer the research questions and at the same time it is enriched with explanatory and conceptual statements. The aim is to present a coherent story to the reader, from which conclusions can be drawn that are useful to understand the broader phenomena in which the case is embedded (Lund, 2014). In this process prioritization is important. According to Lund "a case is an edited chunk of empirical reality where certain features are marked out, emphasized, and privileged while others recede into the background" (Lund, 2014, p. 224). "A case is not 'natural' but […] [an] analytical construct aimed at organizing knowledge about reality in a manageable way" (Lund, 2014, p. 224). Furthermore, when doing data analysis it is important to acknowledge that social science produces historical and not unequivocal knowledge (Lund, 2014, p. 225).

In order to be able to analyse the collected data, the data had to be made available in a written form. I used two different methods to retain the information gained through interviews. Either I took notes of the interviewee's statements during the interview or I audio recorded the interview and later transcribed it. When I took notes during the interview, I was not able to capture the exact wording, as it was difficult to make very detailed notes and at the same keep the conversation flowing and concentrate on the interviewee. However, in some circumstances it seemed more appropriate to not record the interview and I also felt that interviewees were more comfortable to open up and state critical opinions when I did not audio record the interview. On the other hand, interview transcripts allowed an analysis of the exact wording of the statements of the interviewee.

I therefore found that the combination of both techniques was useful and resulted in a more comprehensive data collection.

4.4.1. Coding

After data collection I was confronted with the challenge of getting an overview of all the text material including my interview notes and transcriptions, field diary notes and documentations on Kalumbila as outlined in section 4.3.5. Coding is not only a useful strategy to structure and categorize data, but also to identify relationships and patterns and is therefore already part of the analytical process. First of all, I read and re-read the texts, doing what Gibbs (2012) calls "intensive reading" (Gibbs, 2012, p. 143). This helped me to become extremely familiar with the texts. By always asking new questions about the texts, I looked at them from different perspectives and could develop first interpretations (see Gibbs, 2012, p. 143).

I then used the *Grounded Theory* approach as a guideline to code and analyse my data. This data analysis method was devised and refined by Strauss, Glaser and Corbin (Glaser and Strauss, 1967; Strauss and Corbin, 1996). My goal was not to develop a new theory, as this is clearly too ambitious in the frame of a Master thesis. However, I used the analytical instruments of the *Grounded Theory* to "inductively generat[e] novel theoretical ideas of hypotheses from the data as opposed to testing theories specified beforehand" (Gibbs, 2012, p. 49). "Theoretical coding" as described in the *Grounded Theory* method can be divided into three coding procedures: "open coding", "axial coding" and "selective coding" (Flick, 2016, p. 387). During "intensive reading" I started with "open coding" and inductively developed codes from the texts. "Open coding" aims to relate data and phenomena to specific terms (Flick, 2016, p. 388). I used the software MaxQda for coding. In the next step I compared and contrasted the different passages already coded and grouped and categorized the codes by developing new summarizing categories (Flick, 2005, p. 263; Gibbs, 2012, p. 50). During the coding process I wrote memos as a form of record-keeping of my thoughts and to support the creative process (Gibbs, 2012, p. 30).

After coding my interviews this way, I had a list of codes and categories. With MaxQda I visualized all the codes and categories in a code map and began to look for relationships and patterns. "Axial coding" helped to further refine the categories and detect relations between them (Flick, 2005, p. 265). Strauss and Corbin (1996) propose to use a "coding paradigm" (see Figure 7) to relate codes to a category. One category, the phenomenon, is located at the centre and the researcher maps out a network of relations around it, consisting of causal conditions, context and intervening conditions, action strategies and consequences (Böhm, 2004, pp. 271–272).

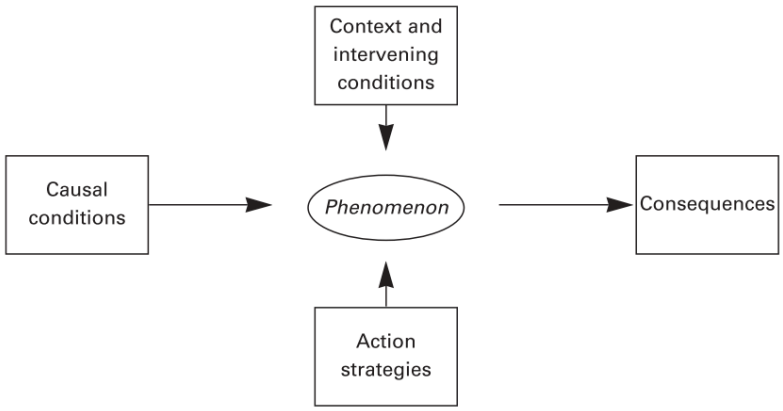

Figure 7: Coding Paradigm (Böhm, 2004, p. 272)

I chose a few categories of particular relevance with regard to the research questions and tried to build different coding paradigms. Figure 8 shows an example where I chose the category "housing shortage" as the phenomenon.

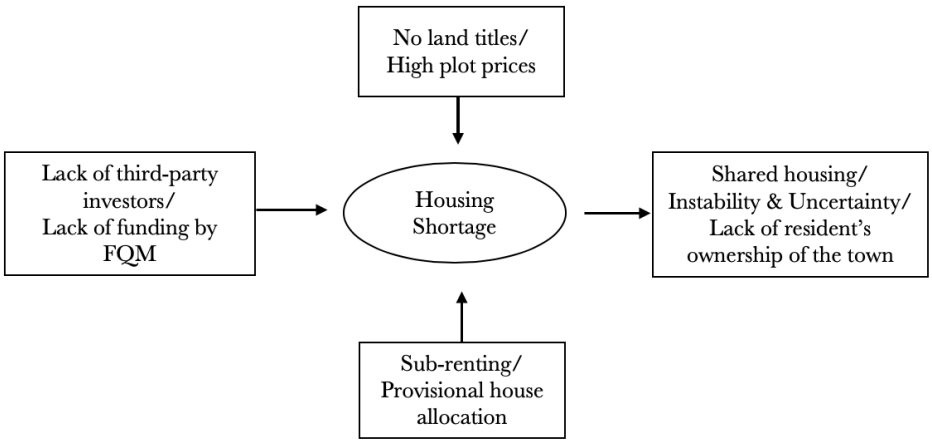

Figure 8: Coding Paradigm for "Housing Shortage"
(own representation, adapted from Böhm, 2004, p. 272)

I used "axial coding" to think about how different parts of my data were connected and detect the phenomena for which I had the richest data. "Selective coding" is about choosing one main phenomenon which will constitute the core of the analysis and the basis of the new theory (Strauss and Corbin, 1996, p. 94). As outlined above the aim of this thesis was not to develop a grounded theory and I therefore did not make use of this coding method.

The analytical process did not stop after coding but continued during the writing process. I experienced writing as an essential part of thinking about my data. Drafting and re-drafting helped me to become clearer about my ideas and formulate them in a more coherent and clear-cut way.

5. KALUMBILA HOUSING

In this chapter I will first present the main planning goals of Kalumbila. I will then discuss the access regime to housing in town before exploring the main causes and consequences of the current housing shortage. This will lead me to examine the phenomenon of house sharing and the effects of the close interrelation of the work and living environment in Kalumbila. Finally, I will analyse the possibilities of access to education and healthcare services in town for different groups of residents.

5.1. Planners Ideas on Housing: Core Principles of the Town Design

Kalumbila is currently developed and run by Kalumbila Town Development Corporation (KTDC), which is owned by FQM, but functions as an independent entity. KTDC's town planning and management team consists of two town planners, of whom one is also responsible for town maintenance and services, two architects who design the houses and other buildings in town, as well as employees at the sales office who are in direct contact with the tenants and handle the leases and other requests by Kalumbila residents (interview KTDC 2, 10.7.19). The Master Plan of the town was designed by Gehl architects, a renowned urban designing company from Denmark, in collaboration with Arup Zimbabwe and Zulu-Barrow Development Consultants, a Zambian engineering company (ARUP Zimbabwe LTD, 2012, p. 13; Collet, 2016). The planning process started in 2011 (interview KTDC6, 19.9.19). The framework plan establishes the following main principles for the planning of the town.

Firstly, nature should be protected and the town should thus be built in harmony with the natural environment (interview KTDC2, 10.7.19). Kalumbila is located in a Miombo Woodland area with many big, shady trees (ARUP Zimbabwe LTD, 2012, p. 97). The KTDC planners try to adapt to the environment rather than impose themselves on the natural surroundings (interview KTDC2, 10.7.19). Two of the planners also stated that the town should somehow compensate for the "brown zone" that the mine is creating (interview KTDC2, 10.7.19; interview KTDC3, 12.7.19). Moreover, KTDC lays great importance on the cleanliness of the town.

Secondly, with regards to the mobility of people the main goal is to create closeness and accessibility (interview KTDC2, 10.7.19). The town's layout is structured around a central spine, which is the main road along which shops and offices are planned to be developed (interview

KTDC2, 10.7.19). From this central spine shorter dead-end roads, called Bananas, spread out, with smaller plots being located closer to the main road, while the bigger plots are situated towards the road end (see Figure 9) (interview KTDC1, 8.7.19). This layout has two principle targets. On the one hand, it should enable easy access to business and other services for all residents by placing lower cost housing closer to the main road and therefore make it a walkable distance. On the other hand, it should in general discourage the use of cars in town by giving priority to pedestrians and cyclists and therefore contribute to lessening the traffic and increasing the quality of the living environment (interview KTDC1, 8.7.19; interview KTDC2 10.7.19; interview KTDC3, 12.7.19).

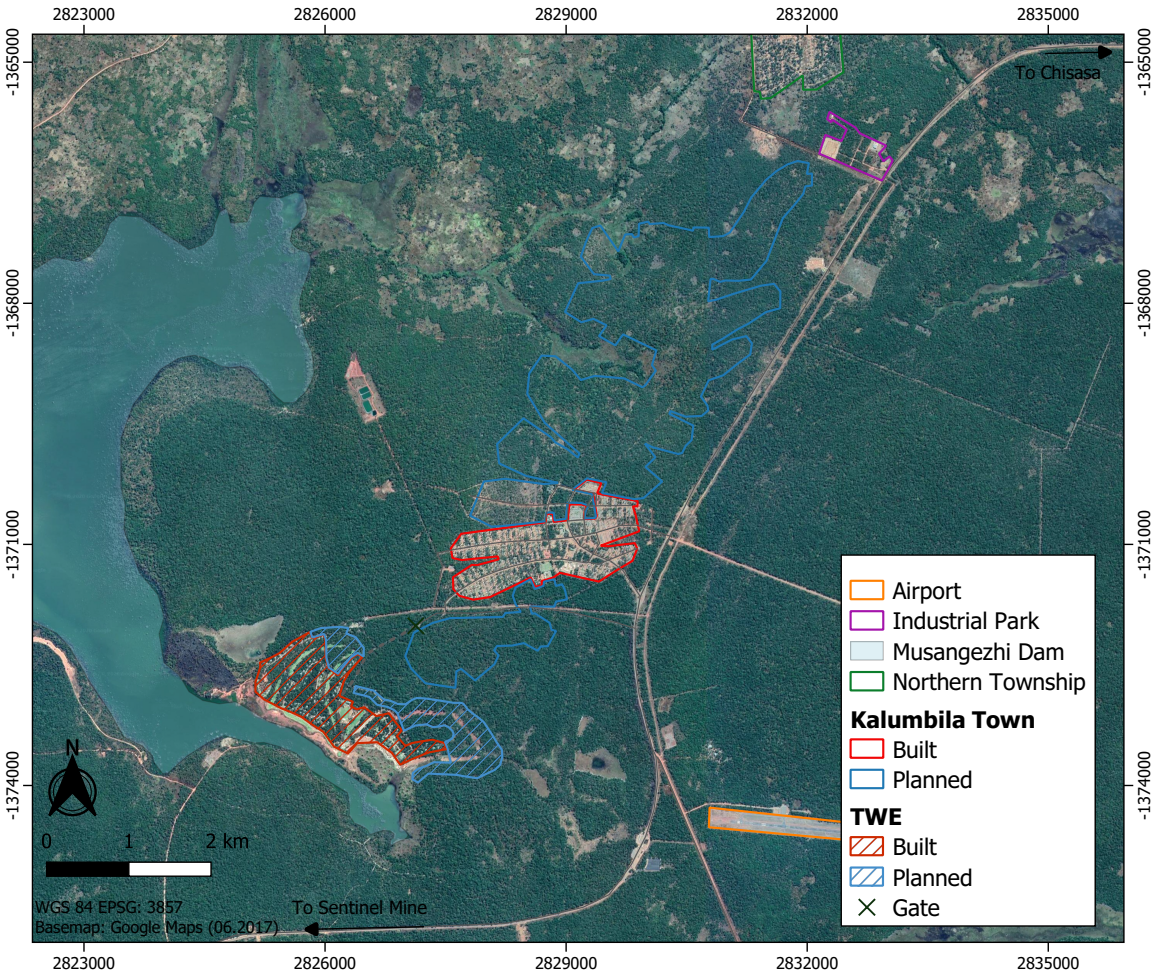

Figure 9: Kalumbila Town and Trident Woodlands Estate (TWE) Layout Plan (own map)

Thirdly, in order to prevent the spreading of informal settlements, the town is planned in such a way as to allow for urban growth (Gehl Architects, 2011, p. 16). The idea is that the CBD replicates itself over time along the main road alongside with the housing units (interview KTDC2, 10.7.19). Furthermore, the building designs are such that expansions are easily possible (Gehl Architects, 2011; interview KTDC1, 8.7.19).

Fourthly, the aim of the planners is to create an open and inclusive town. For KTDC this mainly means that they also build "low-cost" housing units, which are smaller and simpler and should cater for example to gardeners, domestic workers or employees of the supermarket (see Figure 10) (interview KTDC3, 12.7.19). Furthermore, plots in town are for sale and interested people have the possibility of buying land and building their own house, even without being employed at the mine.

Figure 10: Low-Cost Housing Units in Kalumbila (own photo, 26.8.19)

Fifthly, economic diversification away from mining should be achieved in order to strengthen the town's resilience and ensure a continuously thriving town economy even after the end of the mine's lifespan. The plan envisages the creation of an industrial park at the northern end of the town (see Figure 9) (interview KTDC2, 10.7.19). At the moment the industrial park consists of two bigger companies: BIA Zambia Ltd., which sells and provides after-sales services for mining equipment, and ME Long Ten Grinding Media, a mill ball plant. To attract industries and investment a multi-facility economic zone (MFEZ) should be established in Kalumbila. MFEZ are special industrial zones with tax incentives for private investments (Zambia Development Agency, 2015). The Zambian Development Agency has approved the MFEZ in Kalumbila under the condition that a land title is granted (Gray, Lawlor and Briggs, 2015, pp. 33, 34). The issuing of land titles is currently in process but the MFEZ has not been installed yet. Moreover, to generate a vibrant commercial life in town the development of small businesses is supported, for example with the establishment of a local farmers' market (see Figure 11) (Gehl Architects, 2011, p. 14).

Figure 11: Local Farmers' Market in Kalumbila (own photo, 2.8.19)

Based on these principles the aim of KTDC is to create a town with a healthy, natural environment, where people like to live. They also promote the town accordingly: the slogan of Kalumbila is "the happiest town in Africa" (Collet, 2016). Good quality and affordable houses in combination with good infrastructure and services in town should attract and retain mine workers and encourage them to take their families to Kalumbila (interview KTDC6, 19.9.19). Families add to the vibrance of the town (interview, KTDC1, 9.8.19). People with families also tend to stay longer in town, which should help to stabilize the workforce in Kalumbila, as a stable workforce increases work efficiency. Furthermore, the design based on short streets, which encourages social interaction between neighbours and favours pedestrians and cyclists, should contribute to a good social network among residents and to create a strong community fabric. Additionally, for KML employees a rent-to-own scheme is implemented to stimulate home ownership in Kalumbila (Kalumbila Town Development Corporation, 2013b, pp. 16–17).

State urban planners on the district or provincial level were not actively involved in the planning of Kalumbila (interview UP2, 9.8.19). The local council and provincial planning authority only approved the town plan once it was already finished (interview UP2, 9.8.19). Up to date the collaboration between the governmental planning authority and KTDC remains very limited. As one of the state urban planners said:

> "We don't really know what is going on there in Kalumbila. They manage everything on their own." (interview UP2, 9.8.19).

He further explained that unfortunately the Zambian government treats Kalumbila as private property where a private investor is doing an infrastructure project and not as a new town where Zambian citizens are living and whom the state has certain responsibilities for (interview UP2, 9.8.19).

According to the KTDC manager the ultimate aim is that the town is governed by a town management board which is constituted of representatives of the mining company, the local government and the private sector (interview KTDC1, 9.8.19). Although this option was discussed in 2015 and 2016 with the different actors to be involved, it has not yet been implemented. According to the KTDC manager, the reasons for this are a combination of lack of resources and interest (interview KTDC1, 9.8.19). The mining company fears firstly that the collaboration will be too one-sided due to the expectations of the government that the mine will provide all the financial resources, and secondly that the involvement of government departments will reduce efficiency in planning (interview KTDC1, 9.8.19). The establishment of a town management board would lessen the authority of FQM over Kalumbila, which would be an important step to guarantee the sustainability of the town, as aimed for by the planners. However, as the example of the town management board shows, even though the town is planned by a separate entity from the mining company, the mining company's interests strongly influence the development of the town and its institutions.

5.2. Access to Housing in Kalumbila

In this section I will discuss how one can become a resident of the town and I will show how in practice, due to a specific housing allocation and subsidy system, the town primarily provides accommodation to KML employees. Although this number varies over time, KML employees constitute about 50% of the workforce at the Sentinel mine, while the other 50% are outsourced. In August 2018, 2'825 direct employees and 2'693 contractor employees worked at the Sentinel mine (First Quantum Minerals LTD, 2019). Furthermore, there are only very few locals that live in town due to the massive difference in land price and construction cost in and outside of Kalumbila.

At the moment the majority of the houses in town are owned by KTDC. KTDC has constructed 12 different house types, from simple one bedroomed houses up to three and four bedroomed houses with gardens (see for example Figure 12), as well as a section with two-storey terraced houses (see Figure 13). In addition, some individuals bought plots in Kalumbila and either commissioned KTDC to build a house or constructed their house themselves according to KTDC

design requirements. Furthermore, the first big external investor in housing in town, Workers Compensation Fund Control Board (WCFCB), a Zambian social security institution, financed the construction of 50 houses. A further 15 houses owned by the WCFCB are currently being built and another investor is also starting with the construction of an additional 30 houses (interview KTDC1, 9.8.19).

Figure 12: Medium-Sized Houses with Gardens in Kalumbila (own photo, 28.7.19)

There are basically three different ways to become a resident in Kalumbila. Firstly, you can buy your own plot and build a house, secondly as a company or KML employee you can rent houses from KTDC, or thirdly you can sub-rent a house or room from a KML employee who in turn rents his house from KTDC. I will now explain each of these three options in more detail before analysing the consequences of these regulations.

As a Zambian citizen or Zambian registered company you can buy a fully serviced plot of land in Kalumbila from KTDC (Kalumbila Town Development Corporation, 2016). Prices vary according to plot size and are subsidized for KML employees. For a 300 m^2 plot the price on a three-year payment plan is 39'139 ZMW (= 2'825 USD) for KML employees and 49'203 ZMW (= 3'553 USD) for non-KML employees (Kalumbila Town Development Corporation, 2016).[7] FQM's local workers earn on average 1'800 USD per month including bonuses (Kalumbila Town Development Corporation, 2013b, p. 16). This number is however to be regarded with caution because the range of salaries is wide. Up to date there are only about 30 plots which have been sold (interview KTDC1, 8.7.19). An interviewee explained that most miners do not buy land in

[7] Prices based on sales document of 2016. Exchange rate of 1 ZMW = 0.0722 USD on 12.11.19.

Kalumbila due to the (perceived) high prices of plots as well as the comprehensive construction and design requirements of KTDC (Kalumbila Town Development Corporation, 2016; interview KR4, 16.7.19). KTDC regulates the allowed construction material and most of this material is only available in Solwezi, which in turn implies rather high transport costs and makes building your own house even more expensive (interview KR4, 16.7.19). Moreover, building plans have to be pre-approved not only by the local Council, but also by KTDC and people may fear that they cannot construct their house according to their own preferences (Kalumbila Town Development Corporation, 2016). Additionally, most mine workers are on fixed-term contracts. KML employees usually have contracts of either one or two years and this insecurity as to how long they will have a job in the mine makes them reluctant to buy land and build a house (interview KR1, 5.6.19).

Figure 13: Two-Storey Terraced Houses in Kalumbila (own photo, 16.7.19)

The second option is to rent a house in Kalumbila. Currently KTDC rents the biggest portion of its houses to KML. KTDC also rents 76 houses to mining contractor companies which work at Sentinel mine and use these houses to provide accommodation to some of their employees (interview KTDC5, 7.8.19). For KML employees the following procedure applies. KML employees receive a housing allowance as part of their salaries (field diary, 5.7.19). KML Human Resources (KML HR) then allocates housing according to the following criteria: seniority in KML, job importance, duration of employment and family size (interview KTDC5, 16.7.19). If you are assigned a house by KML HR you can either accept it or reject it and wait for another option. KML employees receive subsidized housing which means rents are significantly lower for them (interview, KTDC5, 7.8.19). Furthermore, for KML employees there is the option of a "rent-to-own" scheme, where tenants pay towards a mortgage guaranteed by FQM and after

about 15 years they will own the house (Kalumbila Town Development Corporation, 2013b, pp. 16–17). This scheme was put in place by FQM to promote home ownership in Kalumbila.

The last option available to access housing in Kalumbila is through sub-renting. KML employees who got allocated a house with several bedrooms and live there alone, for example because their family has not joined them, often sub-rent rooms in order to earn some additional income. Mine workers who work for mining contractors often are not provided with accommodation by their employer and have to organize a place to stay themselves. Renting a room in town is one of the most comfortable options, even if it is rather expensive. Rooms are currently sub-rented at rates of 800 to 900 ZMW (= 58 to 65 USD)[8] (interview KR17, 24.8.19). A majority of employees of mining contractors therefore rent single rooms and stay in shared housing. Sub-renting even though not officially allowed, is currently tolerated by KTDC because of the housing shortage, which will be discuss in the next section.

This section has shown how access to housing is strongly regulated and that the town primarily provides accommodation for KML workers. This is in contrast with the town planners' idea of an open and inclusive town where not only mine workers live. The outlined access regime guarantees a controlled and ordered growth of the town. However, all the mine workers and work seekers that do not find accommodation in town install themselves in the surrounding settlements (interview TF1, 9.7.19). In particular in Chisasa and in the Northern Resettlement, the strong increase of population due to the steady in-migration has led to an overuse of infrastructure and a rapid and uncontrolled urbanization process. In Chisasa there is no formal street grid, many houses are provisional and unstable, and basic public services such as electricity or running water are missing. The area is under traditional authority and there are no planning agreements with the Kalumbila Town Council, which means that town planning is basically non-existent (SM1, 17.7.19).

There is a lack of cooperation between KTDC, the traditional authority and the state urban planners to counteract the tendency of formation of informal settlements around the mining company town. The clear delimitation of town land and an access regime by which KTDC can regulate the town's population growth rate, allows KTDC to effectively manage Kalumbila and offer a nice living environment for the KML workforce. However, outside Kalumbila, settlements

[8] Exchange rate of 1 ZMW = 0.0722 USD on 12.11.19.

are growing in a chaotic and unplanned manner and are missing basic infrastructure. There is also a risk that once KTDC loosens its control on Kalumbila the informality will spill over.

5.3. Lack of Ownership of the Town

5.3.1. Housing Shortage

The town plan of Kalumbila is laid out for 10'000 housing units, of which ¼ are planned to be funded by FQM while the remaining ¾ should be financed by third parties (either individuals, real estate investors or other entities) (ARUP Zimbabwe LTD, 2012, p. 1). Up to date around 1'100 to 1'200 housing units have been constructed (see Figure 9) and around 7'000 to 8'000 people live in Kalumbila (interview KTDC1, 8.7.19; interview KTDC5, 7.8. 19). Demand for accommodation in Kalumbila remains high and even though KTDC is constantly constructing more houses the town currently faces a significant housing shortage. This is mainly due to two reasons.

Firstly, according to KTDC it has proven more difficult to attract investors than initially expected during the planning phase (interview, KTDC1, 9.8.19). As mentioned above, WCFCB has up to date been the only external investor that financed a bigger number of houses. The KTDC town manager thinks it is in particular the missing land title deeds which have discouraged investors from coming to town (interview KTDC1, 9.8.19). As stated in section 2.3.2, the land on which Kalumbila sits was originally customary land controlled by Senior Chief Musele. To convert it to state land a 16-step process is necessary according to Zambian law and only then land title deeds which secure private property can be issued (interview KTDC1, 9.8.19; Hamilton, 2017, p. 38). The first few land title deeds have recently been issued but the majority of plots in town are still without land titles (interview KTDC1, 9.8.19). This insecurity has had a negative impact on housing investments in town.

Secondly, KTDC cannot plan the construction of houses independently and according to their current needs analysis but is dependent on FQM as a funder in order to be able to construct houses (interview, KTDC5, 7.8.19). FQM however has not agreed upfront on the exact numbers of houses to be built each year (interview KTDC5, 7.8.19). FQM's willingness to invest in the town depends on the financial performance of the Sentinel mine. When the copper price dropped in 2015, FQM cut down a lot on their investment in housing (interview KTDC1, 9.8.19). Between late 2015 and mid-2017 housing construction by KTDC was therefore advancing at a slower pace (interview KR4, 16.7.19; interview KTDC1, 9.8.19). As at the same time the number of

workers at the Sentinel mine was increasing, a gap was created between available houses and the demand for houses (interview KR4, 16.7.19). After the copper price picked up again, KTDC's pace of building also increased (interview KTDC1, 9.8.19). This situation shows the strong interrelation between KTDC and FQM. Although KTDC has consciously been established as an independent entity of FQM, in practice it strongly depends on the decisions taken by the mining company in order to function.

The housing shortage in town has had several consequences. Due to the housing shortage, when KML employees first arrive in town, they are normally either allocated a provisional home in town or placed in the mining camp. The mining camp is located on the mining license area close to the mine pit and access is strictly limited. While the camp was initially planned for as an interim period until accommodation in town had been found for the employee, it has now become a more permanent option because there are not enough houses available in town (interview KTDC1, 9.8.19). Junior employees are normally accommodated in the camp while senior employees are directly placed in town either in a shared hotel apartment or in a shared house. Due to the housing shortage the time periods in these transitional housing arrangements are ranging from a few months to years. As one of the resident interviewees who currently stays at the apartment hotel explained, it is a challenge to adapt to a new place and feel at home in such a setting:

> "Right now, I'm living at the hotel because of the housing shortage here. So in a way it's a bit unstable because […] you know when you arrive but you don't know when you leave. So it's a bit of that insecurity. Trying to make a place comfortable to call it home has been a challenge. But I've tried by all means to try and have it. […] [I]t's a small temporal space and I think it has been going on for too long. Not that I'm complaining but sometimes you just need to have that surety." (interview KR6, 24.7.19).

The housing shortage has thus contributed to an uncertain and unstable accommodation situation for many residents, which in turn prevents them from being able to properly install themselves. They are stuck in the "wait loop" and live in anonymous homes which they have not properly furnished and decorated yet, as they are always expecting to move out soon. The housing shortage has also fuelled the phenomenon of house sharing, which I outline in more detail in the following section.

5.3.2. House Sharing

In section 5.2 we have seen that whilst the town was planned as an open town where theoretically anybody could become a resident, in practice access to housing in town strongly depends on one's position in the workforce of the mine. This access regime, high rental prices and a significant shortage of housing available in Kalumbila have led to a constant increase in the number of residents who live in shared housing.

Today many residents live in different types of shared accommodation (interview KR4, 16.7.19). Firstly, KTDC directly rents out some individual rooms in shared houses. Secondly, some contractors at the Sentinel mine rent houses from KTDC and provide rooms in those houses for their employees (interview KR17, 24.8.19). Mostly these rooms are just intended for a short-term stay so that employees that are new in Kalumbila can find their own accommodation (interview KR17, 24.8.19). Thirdly, KML employees who got allocated a two or three bedroomed house and live there alone, often decide to sub-rent rooms to make some extra money. In this case the main tenant might rent out all the bedrooms of the house and stay in the living room (interview KR17, 24. 8.19). As a result, four or more (in the case of two people sharing one bedroom) mine workers are staying in a three bedroomed house of either about 80 or 100 m^2 (ARUP Zimbabwe LTD, 2012; interview KR17, 24.8.19).

Living in a shared house with mostly strangers can lead to difficulties, such as excessive noise or overuse of the sanitary and cooking infrastructure. The mining context can further enhance the challenges of living in a shared household. The big majority of the workforce at the Sentinel mine is male, so in most of the shared houses all the inhabitants are men. Furthermore, the daily routines of the house inhabitants might differ significantly because of the different work schedules of shift workers. A resident interviewee told me that after working on a night shift he often did not get enough sleep because the other house mates would play loud music or invite friends over (interview KR5, 24.7.19). In addition, if the main tenant of the house is leaving Kalumbila or wants to bring his family to Kalumbila and thus needs more space, sub-tenants have to move out and look for other accommodation. In combination with the housing shortage, this has led to the fact that many Kalumbila residents have been frequently moving in and out of different houses. Several resident interviewees stated that they had already lived in three to four different places since they arrived in Kalumbila a few years ago (interview KR15, 5.8.19; interview KR5, 24.7.19; interview KR17, 24.8.19). Due to this unstable situation, it is more difficult for Kalumbila residents to properly settle down and develop feelings of belonging and responsibility towards the community.

Furthermore, house sharing makes it impossible for the mining employees to stay with their families. Therefore, only an estimated 45% of KML employees who stay in Kalumbila live with their family and the majority of contracting employees who are Kalumbila residents, have not taken their families to Kalumbila (interview, KTDC5, 16.7.19; interview KTDC5, 7.8.19). Firstly, the fact that workers live alone in Kalumbila rather than with their families, prevents them from actually feeling at home in Kalumbila and seeing it as a place to live and not just a work place. They mostly spend all their days off in another place than Kalumbila. Secondly, it also affects the composition of the population of Kalumbila resulting in a very male dominated community. This is particularly problematic as the creation of a vibrant urban economy, such as stipulated in the town's Master Plan, is dependent on a varied and balanced town population. Thirdly, mine employees that have left their family in another town need to finance two homes, one in Kalumbila and one in the town where their family lives. This constitutes a significant financial burden.

A resident interviewee even stated that he would prefer to live in the mining camp (interview KR17, 24.8.19). There he would not need to pay rent and basic domestic duties such as cooking or doing the laundry are taken care of. In Kalumbila however he has to do these tasks himself, while he is not taking part in town life either, because on his days off he always travels to his hometown (interview KR17, 24.8.19). Furthermore, mine workers who stay in the mining camp rather than in town still get their housing allowance as part of the salary even though they do not have to pay rent. To stay in the camp is thus significantly cheaper for mine workers (interview KR15, 24.8.19).

In conclusion, house sharing prevents employees from considering Kalumbila as their home and start building up a social network and taking ownership of the town. Rather than a situation of a normal town where people live with their families, a form of an uncontrolled and uncoordinated mining camp inside „normal" housing structures has emerged.

5.3.3. Lack of Privacy and Trust

Kalumbila today is a place where people know their neighbours and feel safe (interview KR1, 5.6.19; interview KR5, 24.7.19). Several of my resident informants stated that they have a good relationship with their neighbours (interview KR5, 24.7.19; interview KR1, 5.6.19; interview KR8, 29.7.19). Furthermore, Kalumbila is often described by its residents as a calm, friendly and peaceful place (interview KR10, 2.8.19; interview KR8, 29.7.19; interview KR1, 5.6.19). However, in Kalumbila the work and living environments of people is strongly interrelated. The

vast majority of residents all work for the same employer. It is therefore hard to separate private and work relationships (interview KTDC5, 16.7.19). As a resident stated:

> "Yes, I think it becomes very difficult […] and it sometimes can complicate even work relationships and what happens with who in the workplace based on that kind of smallness of the community. [What happens in town] can affect the workplace and vice versa." (interview KR16, 10.8.19).

Due to the fact that you live next to your work colleagues, you do not only know what they are doing at work, but also what they are doing at home (interview KTDC5, 16.7.19). According to one of the KTDC town planners this has influenced the residents' conduct and limits their personal involvement in the town (interview KTDC5, 16.7.19).

The Homeowners Association (HOA) is an example of how the strong overlap between work and personal life influences the behaviour of residents in Kalumbila. The initial idea by the town planners was to set up a HOA, of which every tenant or owner of a house in Kalumbila is a member in order to encourage the residents' engagement in town affairs (interview KTDC5, 16.7.19). HOA representatives should then have been chosen amongst the residents and be the first point of contact for residents in case of any issues in their neighbourhood (interview KTDC5, 16.7.19). Members of the HOA were also envisaged to jointly determine the rules in town, for example whether it is allowed to keep chickens in the garden (interview KTDC5, 16.7.19). KTDC tried to set up a HOA from 2013 up to 2015. However, residents did not show any interest in participating in the HOA and up to today there is no HOA in place in Kalumbila (interview KTDC5, 16.7.19). The KTDC town planner stated that people do not want to get involved in the HOA, as they are afraid to be victimized at work for the actions they take in town. If for example a resident acts as a HOA representative and there are complaints against her boss by her neighbours, this can put her in a tricky situation (interview KTDC5, 16.7.19). Situations like this have already occurred, where the things that happened in town had severe consequences for residents at work (interview KTDC5, 16.7.19). The strong connection between the two spheres of action makes it difficult to separate company hierarchies in the mine from private life in your neighbourhood. Hierarchies in the mine are therefore strongly influencing the social structures in town.

The currently still rather small number of residents further enhances this issue (interview KR16, 10.8.19). People are very aware of what other members of the community are doing. For some residents this has had the effect that they feel observed and very consciously think about their

behaviour and how it might be perceived by others (field diary, 8.8.19). It can also lead to a withdrawal from social activities by some residents, as they fear negative comments by other members of the community. One resident interviewee outlined how lack of trust can influence people's wellbeing:

> "I feel like at the moment most people are unhappy. […] I think the closeness of the community can create issues of trust. And those issues of trust make a place not enjoyable. […] [It] definitely doesn't help in having good, healthy relationships with people around you." (interview KR16, 10.8.19)

Another resident described her personal experience as follows:

> "And the fact that Kalumbila is small, so it's that very close. Everything is happening at the same time. I need to breath, there is nowhere to breath because you're going to find the same people, same corner." (interview KR6, 24.7.19).

The town planners wanted to promote social interaction between residents to strengthen the community feeling and they designed the town accordingly. For example, short streets and low fences between the different plots should have facilitated contact between neighbours. However, the town planners did not take into account the particular dynamics of a mining company town as described above, where residents are specifically looking for some personal space and privacy.

To sum up, the strong connection between the work and living environment enhanced by the smallness of the community has influenced the level of trust between residents. The lack of trust in turn affects the residents' behaviour in town and reduces their commitment towards the community. This has a negative influence on the resident's ownership of the town.

5.3.4. Absence of Governmental School and Health Facilities

In the last sections we have discussed different issues which have contributed to the lack of ownership of the town by its inhabitants. Furthermore, there is also an outstanding lack of governmental presence. There are no government services provided in town with the exception of a police station, which is responsible for security and law enforcement. Healthcare and education services in Kalumbila are privatized.

There are currently three different schools and a clinic in Kalumbila. The schools are run by Educore Services, a private education company which also runs schools in Solwezi, where FQM

is operating the Kansanshi mine (Educore Services, 2019). Educore Services works in partnership with FQM and according to their webpage "this partnership has seen a huge investment in the construction, commissioning and operating of these schools to support their growth and development" (Educore Services, 2019). How exactly Educore Services is linked to FQM is not clear from my data, but the education company was evidently established with the primary goal of providing education services at locations of FQM mines. Two of the schools are located in town, while the third one is in TWE. The Trident Preparatory Kalumbila in TWE has an international focus and follows the Cambridge Curriculum. It should primarily cater for the needs of expatriate employees' children in TWE, but is open to anyone who can afford the high school fees. Of the two schools in town, the Sentinel Kalumbila School follows a mixture of the Cambridge and Zambian curriculum, while the Frontier Nkisu School is teaching according to the Zambian curriculum. The latter is praised by Educore Services as a low-cost model that should "enable children from lower socio-economic backgrounds to access educational opportunities their parents did not have" (Educore Services, 2015, p. 2).

Schools fees for up to four children of KML employees are strongly subsidized, which results in the majority of pupils at the three schools being children of FQM employees (interview KTDC5, 16.7.19). The schools offer quality education, but school fees for all of the three schools are very high when compared to the other schools in the region, particularly because in Zambia public schools are generally free up to grade 9. Therefore, only few non-KML employees can afford to send their children to one of the schools in town (interview KTDC5, 16.7.19). Schools outside of the town are facing great difficulties due to the stark in-migration of job seekers in the region. They are not only hard to reach from town, but also under-resourced and have a very high number of pupils per class. NGO reports talk of over 100 children per class (Scott Jakobsson, 2019, p. 42). As a result, most of the residents who are not directly employed by KML are very reluctant to take their family to stay in Kalumbila (interview KTDC5, 16.7.19).

The Trident Town Clinic is part of the Mary Begg Community Clinic (MBCC), a non-profit health organization which is a Zambian registered entity (Mary Begg Community Clinic, 2019). MBCC also operates private clinics at other sites in Zambia where FQM is present, such as in Solwezi and Ndola (where FQM's international staff is based) (Mary Begg Community Clinic, 2019). KML employees and their immediate families, which means spouse and up to four children under 18 years, get free health care at the clinic. This rule has been described by interviewees as a great challenge for families in Kalumbila. As one of the residents outlined, this concept of a nuclear family does not correspond to the local culture where people with a stable income often

take in other family members, for example younger siblings or cousins, in order to support them (interview KR8, 29.7.19). Those persons however do not qualify to be on the health scheme of the company and consequently need to pay high fees for treatments. This common form of family life is therefore inhibited in Kalumbila, even though the presence of these young people would contribute to a thriving and dynamic community as aimed for in the town's Master Plan.

Some contractor companies at the Sentinel mine also provide access to the town clinic for their employees, while others send them to clinics outside the town. The closest public hospital is the Lumwana District Hospital, which is located about an hour's drive away in Manyama and was built by Barrick as part of their corporate social responsibility (CSR).[9] Public health care is free in Zambia and the fact that there is only an expensive private clinic in town poses a challenge to all the residents that do not get access through a company health scheme.

Figure 14: Trident Town Clinic, Kalumbila (own photo, 27.7.19)

In conclusion, access to health and educational services in Kalumbila is in practice mostly limited to KML employees and employees of some other contracting companies. For people who do not work for the mine the lack of governmental school and health facilities constitutes an often insurmountable challenge and discourages them from moving to Kalumbila. The privatization of these important services in town therefore leads to a new categorization of residents based on a person's position in the mine workforce. These dynamics challenge the planners' vision to establish an inclusive town.

[9] There are other smaller community clinics in Chisasa and other settlements around which however do not have a medical doctor on site.

In this chapter we have seen that KTDC aims to develop Kalumbila into an environmentally and economically sustainable town with good quality and affordable accommodation in order to attract and stabilize an efficient workforce for the mine. I have further shown that even though the town is theoretically open to everybody, in practice, as a result of the specific housing allocation and subsidy system in place, it is predominantly KML employees who have access to a house in Kalumbila. The strict access regime and clear boundaries of the town space guarantees an effective management of the town by KTDC. Furthermore, I have argued that house sharing, a phenomenon consolidated due to the current housing shortage, has led to a situation where Kalumbila is considered as a place to make a living rather than a new home and residents are thus not taking ownership of the town. The reduced commitment of residents towards the community is further reinforced because of the close interrelation of work and living environments in Kalumbila. Finally, a person's position in the mine workforce, that is to say if someone works for KML, for a contracting company or not at all for the mine, does not only determine if and to what kind of housing he has access, but also if he and his family have access to healthcare and education services in town.

6. GATED COMMUNITY FOR THE MINE MANAGEMENT

In this chapter I will first describe TWE before exploring the different narratives in place in relation to why a gated community exists in Kalumbila. I will then outline how access to TWE is regulated and illustrate the strong presence of the mining company in TWE. Furthermore, I will show how housing and recreational infrastructure in TWE differs strongly from the towns' infrastructure and argue that this has led to the emergence of two disconnected communities which have only limited interaction.

6.1. Trident Woodlands Estate: The Other Part of the Town

As already stated in section 2.3.3, Kalumbila is divided into two zones: the "open" town, to which everybody has access and the "closed" Trident Woodlands Estate (TWE), where expatriate workers and the senior and junior management of the company reside and to which access is restricted (Kesselring, 2017b, p. 98). Expatriate workers, a majority of whom are South Africans, Zimbabweans or Australians, constitute about 4% of the Sentinel mine's total workforce (Trident Foundation, 2019). TWE does not appear in most of the promotional materials on Kalumbila and when planners of KTDC talk about Kalumbila they normally do not include TWE. It is not part of the town's Master Plan created by Gehl architects either. It was planned as a separate entity by the South African golf course designer Peter Matkovich and developed by another team than KTDC (interview KTDC1, 8.7.19).

TWE is located at the southern end of the open town (see Figure 9). To get to TWE you leave behind the last houses of the open town and pass through a stretch of forest before the access gate appears. There is however also a road that turns off from the mine access road and allows TWE residents to get to the gated community without passing through town. In TWE, houses are arranged around a golf course. The ultimate goal is to construct approximately 250 housing units of which currently about 90 already exist (ARUP Zimbabwe LTD, 2012, p. 36). The golf course is located next to the Musangezhi dam, which was constructed in order to drain land for the operation of the mine. Some houses are facing the dam and the dam is also used for recreational activities like fishing and boating. Thanks to the location next to the dam and an extensive irrigation system, TWE consists of a very green and lush environment all year long. In addition

to the golf course, other recreational facilities such as a swimming pool, a gym, tennis courts and a cricket field, are also located in TWE and are freely accessible for its residents. Furthermore, the Club House, which consists of two bars, a lounge area and a fine dining restaurant, is the core piece of social gatherings in TWE. As already mentioned in section 5.3.4, there is also a high quality private school with an internationally oriented curriculum that should primarily cater for the needs of expatriate employees' children.

Figure 15: House in TWE (own photo, 10.8.19)

The houses in the gated community are either three or four bedroomed, single storied and of a size of approximately 300 m^2 (see Figure 15) (ARUP Zimbabwe LTD, 2012, p. 37). Their design is similar to houses one would expect to find in an American upper-class suburb with an open kitchen, a big living room and a covered terrace. The houses are rented out to FQM expatriates and management employees fully furnished. Unlike in the open town, the houses are owned by FQM and it is not intended that employees will become homeowners. Apart from the houses, there is also a singles' quarter for employees who are staying in TWE on their own. Accommodation in the singles' quarter consist of one-bed room apartments with an ensuite bathroom but lack a kitchen. There is a canteen where residents can choose between international and local cuisine (field diary, 11.7.19).

6.2. Contested Reasoning for a Gated Community

There are two main narratives for the existence of a gated community in Kalumbila, which were put forward by the town planners and some of the resident interviewees. While the first one is related to safety concerns, the second one constitutes a more technical explanation which is based

on the fact that TWE is located on the mining license and not on town land. The underlying reasons for the existence of TWE are however to be found in the needs and requirements of the mining company. This highlights that there is a contradiction between the mining company town's imperatives to on the one hand cater for a productive workforce of the mine and on the other hand promote inclusiveness.

6.2.1. The Security Discourse

One of the discourses about the existence of the gate community is based on the issue of security. The development of TWE as a separate and access restricted area is according to this discourse necessary to protect the properties from burglars and to ensure the full safety of its residents. One of the TWE residents stated for example that she thinks that the gated community is necessary to provide an adequate level of security (interview KR10, 2.8.19). Other interviewees said that it is in particular the specific context of a mining company town that requires these kind of security arrangements. As one of the town residents explained:

> "Just imagine if the Golf [TWE] is not restricted there would be chaos there. Everyone would want to speak to the general manager, everyone would want to be seeing who's the boss. Everyone would be following, wanting to have anything to do with the bigger bosses. You understand we're in a situation where everyone is job hunting and the like." (interview KR15, 5.8.19).

In accordance with this line of thought, another reason put forward was the importance for the mine management to be protected and have a safe place of retreat in the event of a strike (field diary, 8.7.19). Moreover, the former KTDC manager explained that there seems to be the perception amongst expatriate workers, in particular from outside the African continent, that in general Africa is not a safe place, even though according to his opinion this is not true for Zambia (interview KTDC6, 19.9.19).

My data showed that the perception of security levels in Kalumbila varies strongly amongst resident interviewees. A majority of residents described Kalumbila as a very safe place. Some residents therefore think that security concerns are rather a pretext to obscure other reasons:

> "I wouldn't be worried about threat of violence or anything of that nature so for it to be so restrictive to me is lesser the safety concern than more of a cultural norm for a certain type of people that are making those kinds of decisions." (interview KR16, 10.8.19)

This statement points to the fact that it might not be the threat of violence which led to the construction of a gated community, but the perceptions and preferences of the decision makers at mine management level. I will now first discuss the technical explanation for the existence of TWE, before examining the ideas of the mine management in more detail.

6.2.2. The Technical Explanation

Technically, part of TWE is located on the town land, while the majority of TWE is located on the mining license. This means that currently KTDC manages only 15 houses on TWE. The rest of TWE is managed by a different entity of FQM which is also responsible for the miners' camps inside the mine site. The location of TWE on the mining license provides for a very technical explanation for the access rules to TWE. According to this explanation, brought forward by different KTDC employees as well as by some TWE residents, as the majority of TWE is located on the mining license FQM has according to Zambian law particular responsibilities there which are different from the ones on town land (interview KTDC2, 10.7.19; interview KTDC3, 12.7.19; interview KR10, 2.8.19). These responsibilities concern the safety and health of people who are on the mining license. For security and liability reasons the company is therefore obliged to fence TWE off and control access. This argumentation is valid. However, it does not touch the core of the question as to why one part of the town was built as a closed-off part. Building TWE partly on the mining license was a conscious decision; it could have also been built on town land. The reason for the existence of a separate, closed-off part of the town has thus to be found somewhere else.

6.2.3. A Top-Level Decision

The town planners present the openness and inclusiveness of the town as a core principle of the town's sustainability. The existence of TWE can therefore be interpreted as an indication for the mining company's high levels of leverage on the spatial layout of Kalumbila.

According to the former KTDC manager, the set-up of TWE as a gated community has led to many lengthy and intensive internal discussions between the town planners and the mine management (interview KTDC6, 19.9.19). The mine management had determined from the very beginning that there must be a separate part of the town where high-quality living standards are guaranteed in order to attract skilled expatriate workers that were needed to run the mining operation (interview KTDC6, 19.9.19). As the former KTDC manager explained:

„It was clear from the start [that TWE is built as a separate area]. We tried to argue that from the town planning side it should be more integrated and everything else. And they said no. I think it was a decision made all the way at the top of the mining company. Because they said this is really important for us to be able to attract this high-quality staff. Secured houses, safe own area, big golf course, you know all the bells and whistles." (interview KTDC6, 19.9.19).

FQM had thus a strong influence on the way Kalumbila is spatially laid out. Even though the town was planned by town planners independent of the mining company, FQM prescribed that the mine's management and expatriate workers housing is spatially separated from the other residents in town. The mining company has therefore from the very start promoted a town model which reinforces social classification along company hierarchy lines. In practice this has produced a bipartite community rather than an inclusive town such as aspired for in the town's Master Plan. In the following I will describe the access regime to TWE in more detail, before further exploring the effects of this spatial arrangement.

6.3. Access to and Control in Trident Woodlands Estate

As stated above, TWE is primarily intended to provide housing for expatriate workers and employees with management positions. Furthermore, private people can also buy homes in the golf estate. Currently, there are about five houses on TWE which are rented out to FQM's contracting companies by KTDC and three houses which are owned by the management of the mill ball plant, which is located in the industrial park of the town (interview KTDC1, 9.8.19). Non-TWE-residents have restricted access and have to pass through a 24h-guarded access gate and sign themselves in and out. The access gate consists of two barriers and a control room for the security guards which has a mirrored front wall (see Figure 16). Even though the guards at the gate are employed by a local security contractor, it is the mining security which monitors everything that happens at the gate through video surveillance and has the ultimate authority to decide who enters and leaves TWE (interview KTDC5, 16.7.19). For visitors of TWE residents, their host needs to announce their visit in advance in order for them to be able to pass through the gate.

If residents of the town want to go to the Club House or use any of the recreational facilities in TWE they need to become a club member. Fees for club membership are 100 ZMW monthly for KML employees and 300 ZMW monthly plus a one-time initial fee of 1'200 Kwacha for non-KML employees who live in Kalumbila or in one of the surrounding settlements. To put this fee

into perspective, the monthly rent for a one bedroomed studio or the rent of a room in a shared house in Kalumbila costs about 800 ZMW, which means that access to the Club House is comparatively expensive (interview KTDC, 7.8.19; interview KR17, 24.8.19). Furthermore, each club member has the right four times a month to take an invitee to the Club House. Residents told me that the restriction on the number of invitees was only introduced early last year (interview KR4, 16.7.19). Other than that, special arrangements might provide access to TWE for certain people for a limited time. These special arrangements however then depend on the right kind of connections.

Figure 16: Access Gate to TWE (own photo, 26.7.19)

Through the strict access rules, the mining company takes a regulatory role in TWE. Its strong presence is also made visible through symbolic aspects. Firstly, for KML workers Club membership is registered on the company's employee identity card and the same card is also used to pay in the Club House. Furthermore, the company logo is encountered often in TWE; emblazoning the entry door to the swimming pool, printed on the fabric of the chairs in the Club House restaurant, or on T-shirts worn by other Club House guests (field diary, 1.7.19). So, even though KML employees mainly go to the Club House on their days off to have a rest from work, they are still constantly made aware of their employer's presence. When I was at the Club House with some friends from town, they would constantly check who was around and adapt their conduct accordingly (field diary, 8.7.19). Additionally, inside TWE there are cameras to monitor the roads, as well as the Club House and the recreational facilities (field diary, 8.7.19). All these

factors have led to a situation where mining employees do not feel free to do what they want and are cautious to display behaviour in line with the company's expectations. As one of the town residents stated:

> "I don't like the cameras. I don't feel like my privacy is respected. […] In TWE you're watched by the company." (interview KTDC5, 7.8.19)

Next to the mining security, the TWE residents themselves also seem to have a good overview of who is in their neighbourhood. Sometimes when I was moving around in TWE, people would tell me later that they saw me and inquire about what I was doing (field diary, 1.7.19; 8.7.19). This might be due to the fact that there is currently a rather small number of residents in TWE. Moreover, the spouses of the expatriate employees are usually not allowed to work, as it is very difficult for them to get a working permit, which leaves them with a lot of time for town gossip (interview KR16, 10.8.19). This suggests that in addition to the mining company's control, there seems to be a high level of social control among TWE residents.

Some of the resident interviewees did not seem to care much about the gated community, as access is possible through membership. One town resident for example pointed out that if he would be using a swimming pool or a gym in another town, he would also need to pay for those services (interview KR1, 5.7.19). A majority of residents however, from both sides of the fence, clearly stated their discontent with the situation, as this spatial layout has various consequences, which I will analyse in the following.

6.4. Differences in Infrastructure

TWE is not only spatially separated, but also manifests separation, or contrast to the town, in several other aspects. In particular, in dry season the visual contrast between the red dust present everywhere in town and the perfectly mowed, bright green golf course lawn in TWE is striking. In addition, all of the houses in TWE have big gardens and as the houses are quite spread out you sometimes almost feel like driving through a light forest rather than a residential area. A TWE resident when describing her house pointed out the advantages of its big size:

> "I mean I love our house. It's a great home. My daughters can have their own rooms which is a real privilege. We each can have a bit of our own space, even if we're all at home we can have space. But there is also nice space to be together. And if we have friends over, we've got enough space to be able to host our friends." (interview KR10, 2.8.19)

In direct opposition to this statement many town residents pointed out that the smallness of the houses in town constitutes a challenge as it leads to a lack of personal space and makes it impossible to host visitors (interview KR4, 16.7.19; interview KR6, 24.7.19). In the Zambian culture however, hospitality plays a very important role.

While the design of the houses in TWE is spacious and luxurious with the goal to please the inhabitants and make them stay in Kalumbila, the house designs in town are mainly aimed to be as cost-effective as possible. The design of the houses in town is thus primarily economically driven, rather than based on local cultural and social norms. I argue that the difference in house designs reflects the mining company's labour requirements. The mining company is willing and feels it is necessary to invest more into the housing of its management and highly skilled expatriate workers to attract them to Kalumbila, as they might leave behind similar kinds of luxurious environments. At the same time the pool of the Zambian mining workforce is large enough, and the main aim is to accommodate these employees in order to have a strong and stable workforce, but no special amenities are needed to attract them to and keep them in Kalumbila.

Figure 17: Swimming Pool in TWE (own photo, 28.7.19)

Apart from the difference in housing design, TWE also differs significantly in infrastructure. Whereas in TWE there are generators that supply the households with electricity in case of power cuts, the houses in town remain dark in those instances (interview KR10, 2.8.19). Furthermore, in TWE there is a variety of recreational infrastructure, while in town the main sports facilities

consist of a volleyball and basketball field in the park[10] and the sports ground of one of the schools, which is also used by the local football club or for sport events. Especially the fact that there is a gym and a nice swimming pool in TWE but none in town was pointed out by many resident interviewees (see Figure 17). Through these differences in infrastructure inequalities are created among Kalumbila residents, which I will discuss in more detail in the next section.

6.5. Creation of Spaces of Otherness

Most of the TWE residents spend their time inside the gated community and mainly use the town to access services, such as the shop, market or fuel station. They have their own small community in TWE and are rather disconnected from daily life in the town. As one of the TWE residents stated:

> "I don't know too much of what actually happens, like social things that happen in town to be honest. I mean on the Estate we do quite a lot. But I'm not always aware of what's happening in town necessarily." (interview KR10, 2.8.19)

The spatial separation thus has practically led to the creation of two different, parallel existing communities. Several of my resident interviewees rhetorically differentiated in their statements between their own neighbourhood and its residents, to which they would refer in first person plural, and the residents living on the other side of the TWE gate. In addition, my data revealed a lot of frustration and dissatisfaction with this situation among residents, highlighted by the following comment of a TWE resident:

> "I hate that it's restricted. I feel like it sets up the culture of automatic, not just segregation, but I feel like it also sets up a culture of false senses of superiority. Because it's almost like you feel like we live in this really fancy, nice place and in order to access it you need to jump through all these hoops and all this yadeeyadeeyada whereas for us (heightens voice) 'we just drive on in because this is our home'. And I think it can definitely create a sense of 'us' and 'them'. And for me and for my personality I hate that. I hate the idea of there being a discrimination between me and another human being, you know it's like a whole 'us' and 'them' issue, for me it's very, very difficult." (interview KR16, 10.8.19).

[10] Currently the park is extended to include further sport facilities, for example a beach soccer field.

The statement by this resident shows how the restriction of access to TWE contributes to the creation of different groups within Kalumbila which have different privileges according to their place of residence. Social classifications inside Kalumbila are thus created and made visible through the material barrier of the entry gate to TWE. Where one lives and therefore with which group one is associated, in turn, depends on the job position in the mine. Mining hierarchies are thus strongly influencing the socio-spatial arrangement of the town.

6.6. De Facto Racial Separation

Most of the expatriate employees are white, while most of the Zambian employees who stay in town are black. The existence of TWE therefore practically also leads to a situation of racial separation. Whereas in town the majority of residents are black, almost all the white residents of Kalumbila stay in TWE. This is also shown by the assumption by most of my interviewees that I would be staying in TWE and their surprise when they learnt that this was not the case. Furthermore, the disconnection between the expatriate community and the Zambian town residents was exposed in other occasions, for example when an expatriate employee celebrated his farewell party at the Club House and there was only one black Zambian among a group of 30 to 40 invitees (field diary, 3.8.19). The spatial separation of residents of different skin colours can lead to a situation where colonial discourses on racial differences are reiterated. As one of my resident interviewees stated:

> "Because in a way it gives a message like we're different people, so we're going to live in these different places you know. So in a way it's creating a natural imbalance amongst us." (interview KR6, 24.7.19)

Historically, mining towns have been racially segregated for a long time and the divide in Kalumbila thus resonates with colonial urban plans (see Borges and Torres, 2012, p. 18).

The situation is also being perceived as racial discrimination by town residents:

> "I worry sometimes because let me say the truth. I've come to understand, it's one of the things that I hate here in Kalumbila. It's part of racism, ok. Yeah racism. You know whereby people they don't want to mingle around. We are all people ok. But we need to interact, we need to associate. But if something has been done like that, then you can tell, ok, people we're not associating in a good manner. But that shouldn't be the case." (interview KR5, 24.7.19).

According to town residents the spatial set-up makes it difficult to interact and create relationships with TWE residents (interview KR2, 11.7.19; interview KR6, 24.7.19; interview KR8, 29.7.19). Social boundaries that separate people become physical and permanent through the existence of a gated community and opportunities for shared experiences are reduced (see Vesselinov, Cazessus and Falk, 2007, p. 112). This might negatively impact the level of tolerance among people (see Vesselinov, Cazessus and Falk, 2007, p. 112).

In this chapter I have shown that specific labour requirement needs of FQM are at the origin of the existence of a gated community in Kalumbila. To run the Sentinel mine efficiently, FQM has to be able to attract expatriate mining experts, which is why TWE was constructed. TWE stands in contrast with the town planners' endeavours to inclusiveness and can be seen as an example for the mining company's strong leverage on the spatial layout of Kalumbila. I have further argued that people are allocated to clearly bounded distinct spaces, between which infrastructure and service provision strongly differ, depending on their position in the mining company hierarchy. Through the material manifestation of social boundaries, inequalities between Kalumbila residents are reinforced.

7. CONCLUSION

Mining company towns are concrete sites where the spatial government practices of mining companies, as well as their influence on the people living and working there, can be studied.

In this thesis I did a qualitative case study on the new mining company town Kalumbila. Kalumbila was created as a new model which would be different from an ordinary mining town. It was planned by a renowned urban planning company with the main aims of firstly being an inclusive town open to all kind of people including non-miners, secondly creating a town where residents have a strong sense of community, thirdly preventing an unplanned urbanization process and the spreading of informal settlements and fourthly attracting other businesses and industries to town in order to diversify the town's economy. The objective is therefore not only to provide good housing for mine workers and their families in order to secure a constant supply of skilled labour for the mine but also to create a town which will continue to thrive after the mine's closure. Kalumbila, which has currently a population of about 7'000 to 8'000 people, is administered by the private company KTDC which is owned by FQM. State urban planners are not involved in the ongoing planning and development of the town.

This thesis shows that hierarchies in the mining company are strongly influencing the social structures in the mining company town Kalumbila, having resulted in the creation of spatially segregated and socially distinct groups. To which of the following groups a person belongs, determines his or her possibilities of accessing town infrastructure and services in Kalumbila. Firstly, local people who have been living in the area before the mine's arrival and who are not employed in the mine are practically excluded from the town due to the high cost of rents and services in town. The only way they may take part in town life is through commercial activities, such as selling or buying goods. Secondly, employees of contracting companies, which constitute around 50% of the Sentinel mine's workforce, mostly sub-rent a room from KML workers. They stay in a shared house, where every room is occupied by a different worker. Therefore, they cannot take their family to Kalumbila and most of them see Kalumbila as a place of accommodation during work, rather than a home, as their private life takes place somewhere else. The majority of them do not use the hospital or schools in town because they are privatized and the costs of these services are too high. Thirdly, KML employees constitute the majority of residents in Kalumbila because they benefit from subsidized housing in town. The mining company also subsidizes healthcare and education services in town for KML employees and their

immediate family members. This has caused almost 50% of KML employee residents to take their family to Kalumbila. Fourthly, the mine employees at management level and expatriate workers live in the gated TWE in big houses, where they have access to different sports and recreational facilities and a Club House with an elegant restaurant and bars. Overall, Kalumbila presents thus a spatial imprint of the mining company hierarchies. This is in opposition to the planners' vision to make Kalumbila an inclusive town.

It is further argued that FQM governs space and people in Kalumbila not just through classification as outlined above, but also through a clear delimitation of town land. KTDC only implements the planning goals in a clearly bounded space, to which access is strongly regulated. This allows KTDC to manage Kalumbila efficiently and leads to a controlled and well-organized growth of the town. However, all the mine workers and work seekers who the Sentinel mine has attracted and who do not have access to housing in the town install themselves in the nearby settlements where rapid population growth has resulted in an unplanned and chaotic urbanization process. The mining company town therefore has not solved the problem of spontaneous, ungoverned urbanization, but has only redirected the migration flux to places which are not under the mining company's direct control.

Additionally, this research demonstrates that in Kalumbila residents' narratives and practices differ from the goals and imaginations of the town planners in several aspects. First of all, house sharing has become a very common practice in Kalumbila due to the current housing shortage in combination with the housing allocation system in place. On the one hand, KML employees when they first arrive in Kalumbila are often allocated to a shared home and on the other hand the phenomenon of sub-renting has led to the existence of many shared households. People who live in shared houses often perceive this as a provisional accommodation situation. Most of them have left behind families in other towns where they return whenever they are off work. They therefore do not settle down properly in Kalumbila nor develop feelings of belonging and responsibility towards the community. This does not correspond with the planners' vision for Kalumbila to be a place where people want to build up a new life and where a strong connection and interaction between different residents leads to a dynamic town community. Furthermore, the strong connection between the work and living environment in Kalumbila makes it hard to separate private and work relationships. This has contributed to a lack of privacy and trust among Kalumbila residents and reduced the involvement of residents in town affairs. In contrast to the planners' ideas of an open and sustainable town, the mining company structures daily life of Kalumbila residents in such a way that it has inhibited the town so far to develop its own

character, drive and attraction, which is necessary to guarantee its existence beyond the lifespan of the mine. More examples would exist but due to the limited scope of a Master thesis none of them were further analysed in detail.

By the end of the field work in September 2019 the state urban planners where working on a town plan to develop state land next to the company mining town and offer plots for sale. Once this project has been implemented it would be interesting to study how the presence of a mine township administered by state authorities changes the current functioning of Kalumbila. Moreover, it would also be of interest to do a long-term study in order to examine the development of Kalumbila over time and see if economic sustainability of the town and greater independence from the mining company can be achieved.

To sum up, the thesis shows that geographers studying the spatial implications of foreign direct investments in the mining sector should pay attention to how mines can influence social structures by becoming a new reference point for social hierarchies and how this is reflected in the spatial arrangements present at sites of extraction. The "enclave" concept does not capture these kinds of dynamics and I therefore argue that the idea of the "enclave" must be complexified.

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9. APPEDICES

9.1. Appendix A: List of Interviews

Abbreviation	What	Date	Time	Place	Who
KR1	interview	05.07.19	14.40 - 15.30	Kalumbila	Kalumbila resident 1 (town); KML employee
KR2	interview	11.07.19	15.30 - 15.50	Kalumbila	Kalumbila resident 2 (town); student
KR3	interview	16.07.19	11.15 - 12.15	Kalumbila	Kalumbila resident 3,4,5 (town); three women
KR4	interview	16.07.19	18.30 - 21.00	Kalumbila	Kalumbila resident 6 (town); KML employee
KR5	interview	24.07.19	16.00 - 16.40	Kalumbila	Kalumbila resident 7 (town); KML employee
KR6	interview	24.07.19	18.15 - 18.40	Kalumbila	Kalumbila resident 8 (town); Trident Foundation employee
KR7	interview	29.07.19	14.05 - 14.30	Kalumbila	Kalumbila resident 9 (town); KML employee
KR8	interview	29.07.19	16.20 - 17.05	Kalumbila	Kalumbila resident 10 (town); KML employee
KR9	interview	31.07.19	16.30 - 17.15	Kalumbila	Kalumbila resident 11 (town); KML employee
KR10	interview	02.08.19	8.30 - 9.00	Kalumbila	Kalumbila resident 12 (TWE); FQM employee, expatriate
KR11	interview	02.08.19	10.00 - 10.30	Kalumbila	Kalumbila resident 13 (town); KML employee
KR12	interview	02.08.19	16.00 - 16.20	Kalumbila	Kalumbila resident 14 (town); KML employee
KR13	informal interview, house viewing	03.08.19	8.45 - 9.15	Kalumbila	Kalumbila resident 15 (town); KML employee
KR14	interview	05.08.19	14.00 - 14.35	Kalumbila	Kalumbila resident 16 (town); KML employee
KR15	interview	05.08.19	16.15 - 16.50	Kalumbila	Kalumbila resident 17 (town); KML employee

KR15	follow-up interview	24.08.19	9.30 - 10.15	Kalumbila	Kalumbila resident 17 (town); KML employee
KR16	interview	10.08.19	16.00 - 16.40	Kalumbila	Kalumbila resident 18 (TWE); FQM employee
KR17	interview	24.08.19	11.00 - 11.40	Kalumbila	Kalumbila resident 19 (town); contractor employee
KTDC1	Interview and town tour	08.07.19	12.20 - 13.00, 14.30 - 15.30	Kalumbila	KTDC 1; manager, town planner
KTDC1	follow-up interview	09.08.19	16.45 - 17.45	Kalumbila	KTDC 1; manager, town planner
KTDC2	interview	10.07.19	10.20 - 11.10	Kalumbila	KTDC 2; architect
KTDC3	interview	12.07.19	10.10 - 10.55	Kalumbila	KTDC 3; architect
KTDC4	interview	16.07.19	14.40 - 15.40	Kalumbila	KTDC 4; town planner
KTDC5	interview	16.07.19	15.45 - 16.55	Kalumbila	KTDC 5; employee sales office
KTDC5	follow-up interview	07.08.19	13.30 - 14.00, 16.30 - 17.30	Kalumbila	KTDC 5; employee sales office
KTDC6	interview	19.09.19	13.00 - 14.00	Lusaka	KTDC 6; former manager
TF1	interview	09.07.19	14.30 - 16.30	Kalumbila	Trident Foundation employee 1
TF1	Follow-up interview and tour to Chisasa and Musele	24.07.19	9.00 - 11.30	Chisasa, Musele	Trident Foundation employee 1
TF2	interview	08.08.19	10.00 - 11.30	Kalumbila	Trident Foundation employee 2
UP1	interview	31.07.19	9.10 - 10.00	Manyama	Physical Planner of Kalumbila Town Council

UP2	interview	09.08.19	9.00 - 10.30	Solwezi	Provincial Planner and Senior Physical Planner, Department of Physical Planning, Northwestern Province
KB1	interview and tour of Kabitaka	25.07.19	10.00 - 11.45	Kabitaka, Solwezi	Kabitaka Hills Development Corporation (KHDC); manager
CHI1	informal interview	23.07.19	13.00 - 14.00	Kalumbila	Chisasa resident 1; KML employee
CHI2	interview	14.08.19	14.10 - 15.00	Chisasa	Chisasa resident 2; member of the NGO "Musele Taskforce"
CHI3	interview	15.08.19	16.30 - 17.00	Chisasa	Chisasa resident 3
CHI4	interview	18.08.19	15.55 - 16.15	Chisasa	Chisasa resident 4
Chief1	interview	06.08.19	10.00 - 11.40	Musele	Chief
NT1	interview	19.07.19	11.00 - 11.30	Ntambu	Ntambu resident 1, 2
NT2	interview	21.07.19	15.00 - 15.45	Ntambu	Ntambu resident 3; Trident Foundation Field Officer
SM1	stakeholder engagement meeting EITA	17.07.19	9.30 - 12.45	Lumwana	stakeholder engagement meeting, organized by the NGO EITA

9.2. Appendix B: Interview Consent Form

University of Zurich[UZH]

Department of Geography
Political Geography

University of Zurich
Department of Geography
Winterthurerstrasse 190
CH-8057 Zurich
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Interview Consent Form

Research Project Title: Qualitative Case Study on Kalumbila Town
Research Investigator: Andrea Graber
Research Participants Name:

I am Andrea Graber, a postgraduate student at the University of Zurich in Switzerland. My master research project focuses on Kalumbila, as a newly emerging mining town. I am inviting you to participate in this research based on your knowledge on the subject. Thank you for agreeing to participate in this research as an interviewee. Ethical procedures for academic research require that interviewees explicitly agree to being interviewed, and that they know how the information they share during interviews will be used. Using this form, therefore, I seek to obtain your prior consent to participate in this research. Read carefully each of the statements given below, and ensure that you fully understand them before you sign the form.

By signing this form I agree that;

- I am voluntarily accepting to take part in this research project through interviews. I understand that I can decline to be interviewed or if I accept, I can stop the interview at any time without prior notice, whenever I feel like doing so.
- I don't expect to receive any material or monitory payment for my participation in this project
- The information that I will share during the interview will be recorded and later be used solely for academic purposes.
- if I wish so, the recording of my interview will be played to me at the end of the interview, in order for me to correct any factual errors that might be there, so that I provide authentic information.
- access to the interview transcript will be limited to Andrea Graber and academic colleagues and researchers with whom she might collaborate with during the research process.
- the actual recording will be kept by Andrea Graber.
- I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.
- any variation to the conditions listed above will only occur with my prior consent.

☐ I request that any summary of the interview (or interview transcripts), or direct quotations thereof, that would be made available through academic publication or other academic outlets will be anonymized in order to protect my identity. Care will also be taken to ensure that any other information in the recorded interviews that could identify me remains confidential.

☐ I agree that my name may appear with any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets.

Participants Printed Name	**Participants Signature & Date**
Researchers Signature	**Date**

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You can also contact Andrea Graber's supervisor:
Dr. Muriel Côte
Group leader
Political Geography
Tel.: +41 44 63 55209
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9.3. Appendix C: Personal Declaration

I hereby declare that the submitted thesis is the result of my own, independent work. All external sources are explicitly acknowledged in the thesis.

Name: Andrea Graber Date: 26.1.2019