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The second chapter concentrates on the historical influence of Magazine Hill. The heritage significance is contextualised within the Anglo Boer Wars, Fortification plans and military-industrialism realm of South African history. The proposed programme is then explained as a response to the heritage significance and main argument.

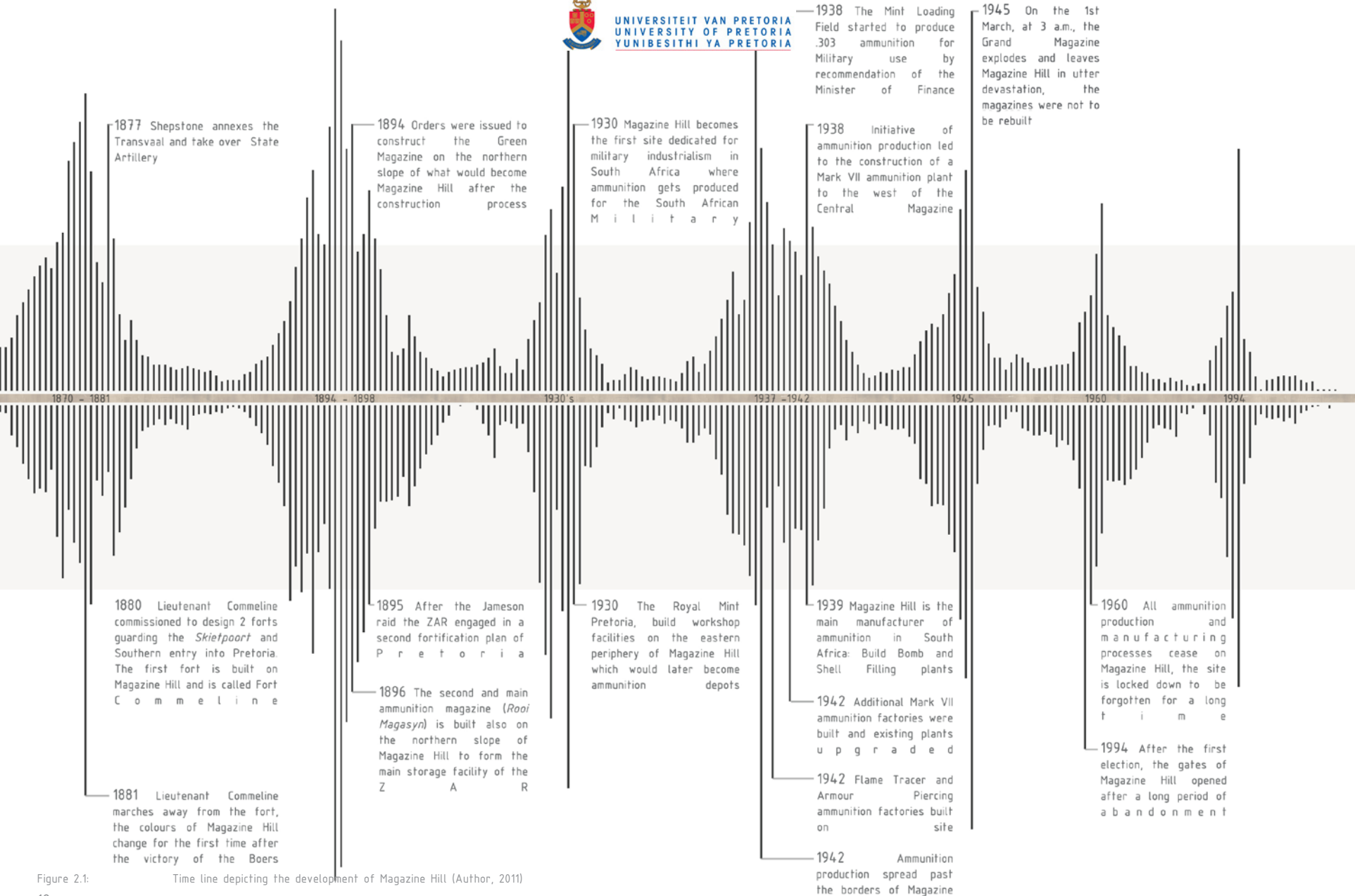


Figure 2.1: Time line depicting the development of Magazine Hill (Author, 2011)

2.1 Magazine Hill in relation to the First Anglo Boer War (1880-1881)

After the battle at Bronkhorstspuit in 1880, the British commanders initiated the first fortification plan for Pretoria. Colonel Gildea of the 21st Regiment, the Royal Highland Fusiliers, gave orders to the Royal Engineer, Lieutenant Commeline to build 2 fortifications to protect Pretoria against Boer invasions from the south. The first stronghold would be the first structure of the fortification plan and be labelled as the first building on Magazine Hill. (Du Toit Spies, 1955: 73-74)

Lieutenant Commeline named the first fort, located on Magazine Hill, after himself and the second he named Fort Tullichewan, which was situated on the present day Salvokop. These 2 strongholds would guard *Skietpoort* (the valley between Magazine and Monument Hill) and protect Pretoria against invasions from Heidelberg and the Potchefstroom area. Both forts were constructed from refined rock and fieldworks that were barricaded by packed sandbags with provided loopholes for gunfire (Panagos, 2000: 2). An additional *checaux de fries* or protective thorn bush barrier was also implemented around the whole structure to repel infantry breaching the perimeters of the hill (Panagos, 2000: 2-4).

After many unsuccessful negotiations between the Boers and Gladstone's British Government, the Boers launched an assault on the British forces and reclaimed the Transvaal in 1881, after the celebrated victories at Bronkhorstspuit and Majuba. Not one shot was fired from Fort Commeline, for the stronghold was not involved in any military activities or invasions. After the first Anglo Boer War, Lieutenant Commeline marched away from Magazine Hill, and for the first time, the colour of the reigning flag changed, which would drive Pretoria's first fort to dereliction for many years. The first structure on Magazine Hill was thus constructed to defend Pretoria against the Boer. (Panagos, 2000: 2-5)

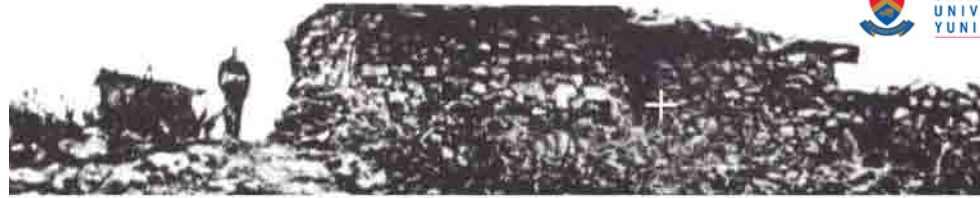


Figure 2.2: Archival Photo depicting Fort Commeline in the First Anglo Boer War (Viljoen, 2009: 43)

Figure 2.3: Remains of Fort Commeline (Author, 2010)

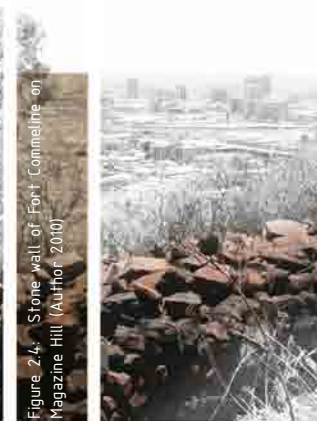
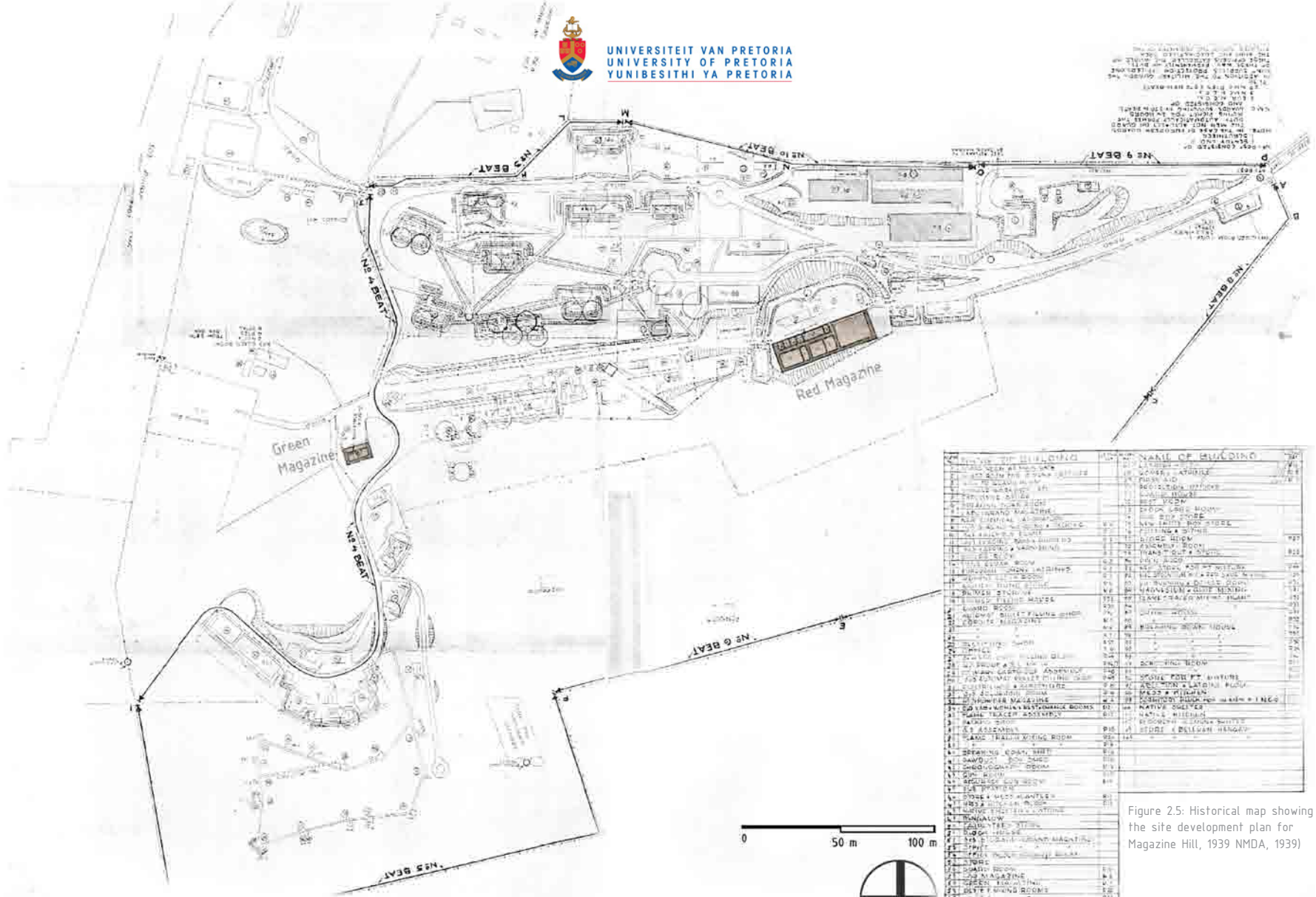


Figure 2.4: Stone wall of Fort Commeline on Magazine Hill (Author, 2010)



THE MAP SHOWS THE LAYOUT OF THE MAGAZINE HILL AND THE LOADING FIELD AREAS. THE MAP IS A HISTORICAL MAP OF THE MAGAZINE HILL AND THE LOADING FIELD AREAS. THE MAP IS A HISTORICAL MAP OF THE MAGAZINE HILL AND THE LOADING FIELD AREAS. THE MAP IS A HISTORICAL MAP OF THE MAGAZINE HILL AND THE LOADING FIELD AREAS.



NAME OF BUILDING	NO.	NAME OF BUILDING	NO.
1. GREEN MAGAZINE	1	1. GREEN MAGAZINE	1
2. RED MAGAZINE	2	2. RED MAGAZINE	2
3. LOADING FIELD	3	3. LOADING FIELD	3
4. OFFICE	4	4. OFFICE	4
5. STORE	5	5. STORE	5
6. WORKSHOP	6	6. WORKSHOP	6
7. LABORATORY	7	7. LABORATORY	7
8. RECEPTION ROOM	8	8. RECEPTION ROOM	8
9. WAITING ROOM	9	9. WAITING ROOM	9
10. REST ROOM	10	10. REST ROOM	10
11. TOILET	11	11. TOILET	11
12. SHOWER ROOM	12	12. SHOWER ROOM	12
13. KITCHEN	13	13. KITCHEN	13
14. DINING ROOM	14	14. DINING ROOM	14
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LAYOUT OF GRAND MAGAZINE & LOADING FIELD AREAS
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Figure 2.5: Historical map showing the site development plan for Magazine Hill, 1939 NMDA, 1939)

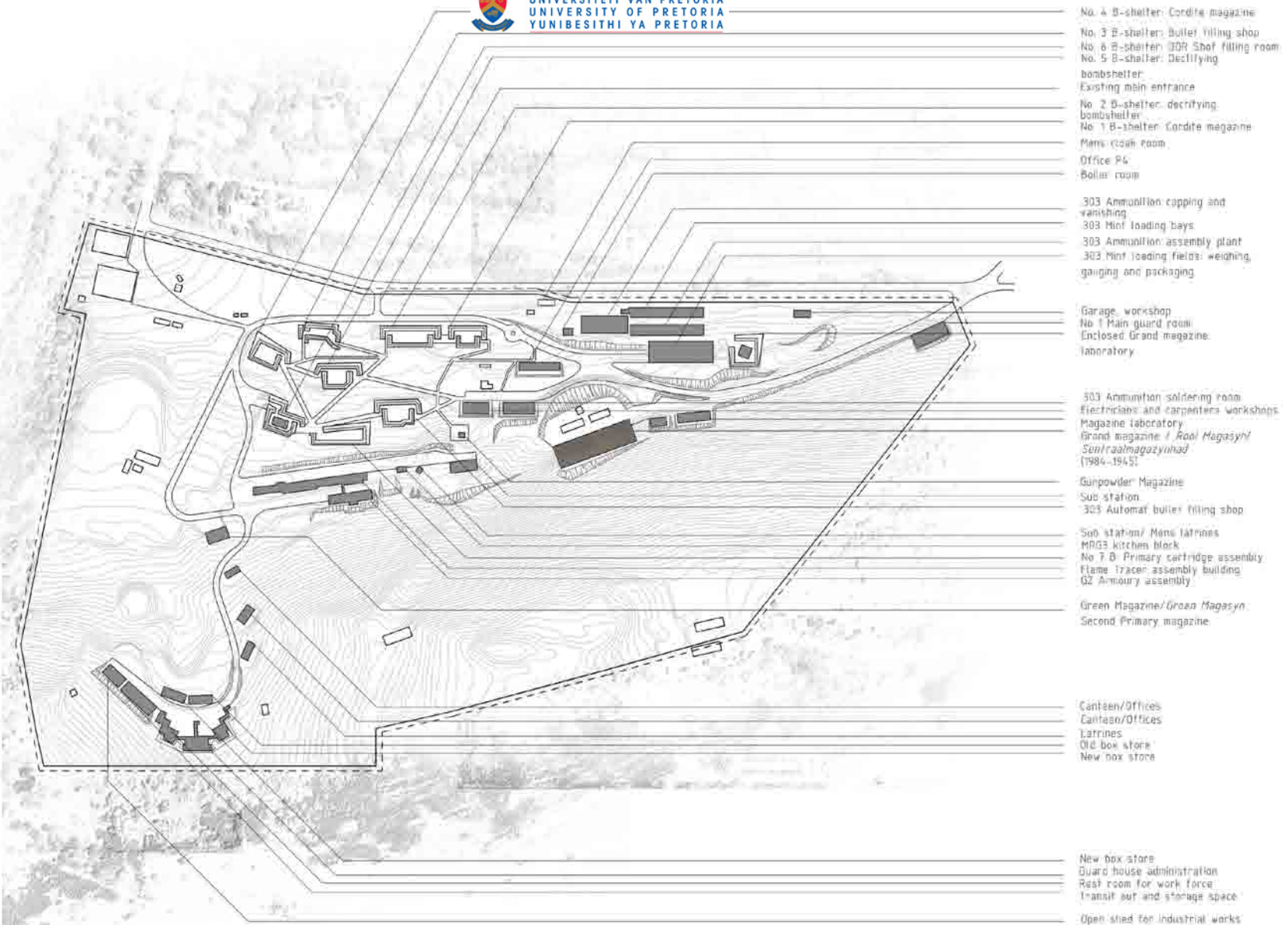


Figure 2.6: Map of Magazine Hill depicting the different buildings and functions on site, 1939 (Author, 2011)

2.2 Magazine Hill in relation to the Second Anglo Boer War (1898-1898)

Two years prior to the Second Anglo Boer War (1896-1898), the Government of the ZAR, under leadership of President Paul Kruger, commanded that more ammunition and armaments should be acquired for the defensive force of Pretoria (Swart, 2000: 5). In 1894 orders were issued to build an ammunition magazine on the northern slopes of what would become *Magasynheuwel* (Magazine Hill) after the construction (Panagos, 2000: 3). This ammunition magazine was called the *Groen Magasyn* (Green Magazine) and is still in very good condition today. The construction of the Green magazine was very similar to that of the forts which would be constructed in the next 2 years as a second fortification plan of Pretoria (NMDA, 1945: 7). It was after the Jameson raid in 1895 that the ZAR Government engaged in a second fortification plan, which included the construction of Fort Schanskop, Fort Klapperkop, Fort Wonderboompoort and Fort Daspoortrand, also known as West Fort.

The second fortification plan also affected the development of Magazine Hill, for a second ammunition magazine was built 1896, also on the northern slopes of Magazine Hill. This larger magazine was named *Sentraalmagazynhad* (Central Magazine) or where referred to as the *Rooi Magasyn* (Red Magazine), which was used for the storage of gunpowder, cordite and dry gun cotton primers, but mainly for the storage of small and large artillery ammunition shells (NMDA, 1945: 9). The new magazine would become the primary storage facility and was therefore referred to as Central Magazine. This new partly underground ammunition magazine was constructed some distance to the west of the Green Magazine, to avoid damage of both structures if a sabotage attempt was launched (Panagos, 2000: 5).

Figure 2.7: Plan of Magazine, 1894 (NMDA, 1894)

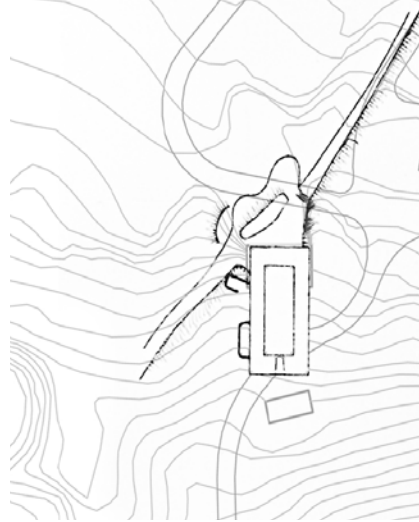


Figure 2.9: Green Magazine with 7 state artillery cannons in front (Author, 2010)



Figure 2.8: Central magazine during construction, 1984 (SANMMH)



Although a lack of construction drawings of both the Green and Central Magazines halted the investigation of the structures, a clear description of the of buildings was provided through an investigative report by the Chief Inspector of Explosions on the 17th of September, 1945.

According to the Chief Inspector (1945: 7), the same construction methods were used for the Green and Central Magazines. Both structures were built into the rocky hill which left only the north facade exposed. The outer stone walls of the Central Magazine had a thickness of 1 metre and acted as retaining walls, backing the compacted solid ground on the other side of the walls. The 1,2 metre thick northern stone facade contained several steel doors that were framed in brick and led into the storage compartments. Ventilation and circulation passages were also introduced into the Grand Magazine. Within the structure, cement and stone walls divided the interior of the magazine into 11 different compartments for storage, with a floor to ceiling height of 3.6 metre (NMDA, 1945: 7).

According to the Chief Inspector (1945: 8) the composite roof of the Central Magazine consisted of a series of different structural elements. Steel stanchions built into the solid walls carried steel girders which again carried cross girders. The voids between the latter supported corrugated iron sheets at the base and was filled with breeze concrete, where the roof proper was a concrete slab topped with a few feet of compacted soil. This construction method veiled the magazines and through using the hill as a protective barrier, maximum security could be obtained (NMDA, 1945: 7-9).

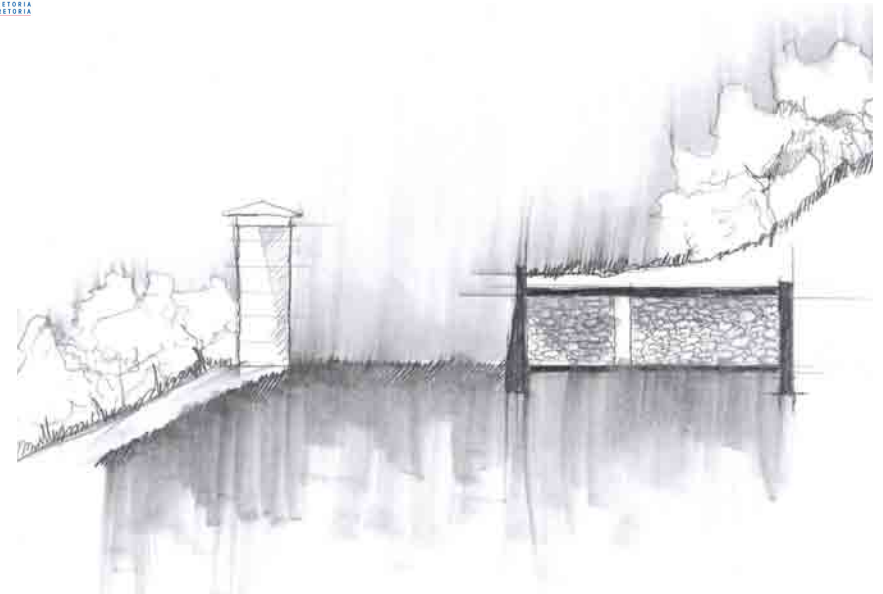


Figure 2.10: Conceptual sketch of Red Magazine section (Author, 2011)

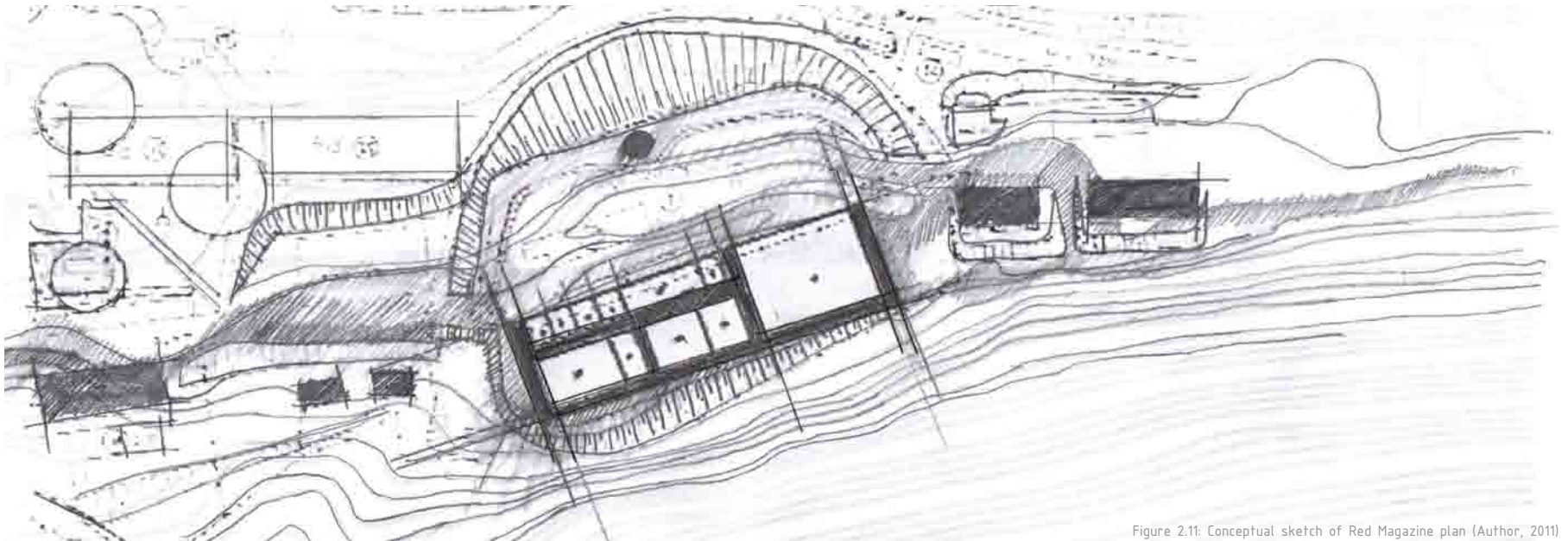


Figure 2.11: Conceptual sketch of Red Magazine plan (Author, 2011)

2.3 Magazine Hill in relation to the history of ammunition production in South Africa (1930–2011)

The South African arms industry originated in the late 1930's with the appointment of an Advisory Committee on Defence Force Requirements to explore the potential of military-industrialism in the country (Gutteridge, 1994: 50). Magazine Hill was appointed as the first site in South Africa where military-industrialism would be formalised. In the early 1930's the Royal Mint Pretoria built workshop facilities on the eastern periphery of Magazine Hill, and it was not long before the Royal Mint approached the Minister of Finance with a recommendation that ammunition could be produced in the Mint facilities on the site. In 1938 the Mint Loading Fields on Magazine Hill started to produce .303 ammunition for military use (SAMint, 2011). This event played a considerable role in the development of Magazine Hill as a site for production.

The initiative of ammunition production on the site led to the construction of a .303 Mark VII ammunition plant in 1938. This plant was the first structure built to the west of the Grand Magazine on the site. By the beginning of 1939 Magazine Hill was the main manufacturer of ammunition in South Africa (NMDA, 1945: 2). In the same year, bomb and shell filling plants were also built on Magazine Hill and was put into operation one year later. With the outbreak of the Second World War, howitzer shells, 18 and 25 pounder shell cases, primers and detonators were also produced on the site (DENEL, 2010). To accommodate the new production lines and products, the activities of ammunition production spread past the borders of Magazine Hill. Numerous factories were built including ammunition depots in Kimberley, Ladysmith, Johannesburg and Pretoria West, which later became the Armscore industry (Gutteridge, 1994: 55). In 1942 the main bomb and shell filling plant moved to Lenz, and with additions and alterations to the existing empty plant, the building was converted into an additional .303 Mark VII ammunition factory. The original .303 ammunition depot that was constructed in 1938, converted to a flame tracer and armour piercing ammunition factory at the end of 1942 (NMDA, 1945: 7).

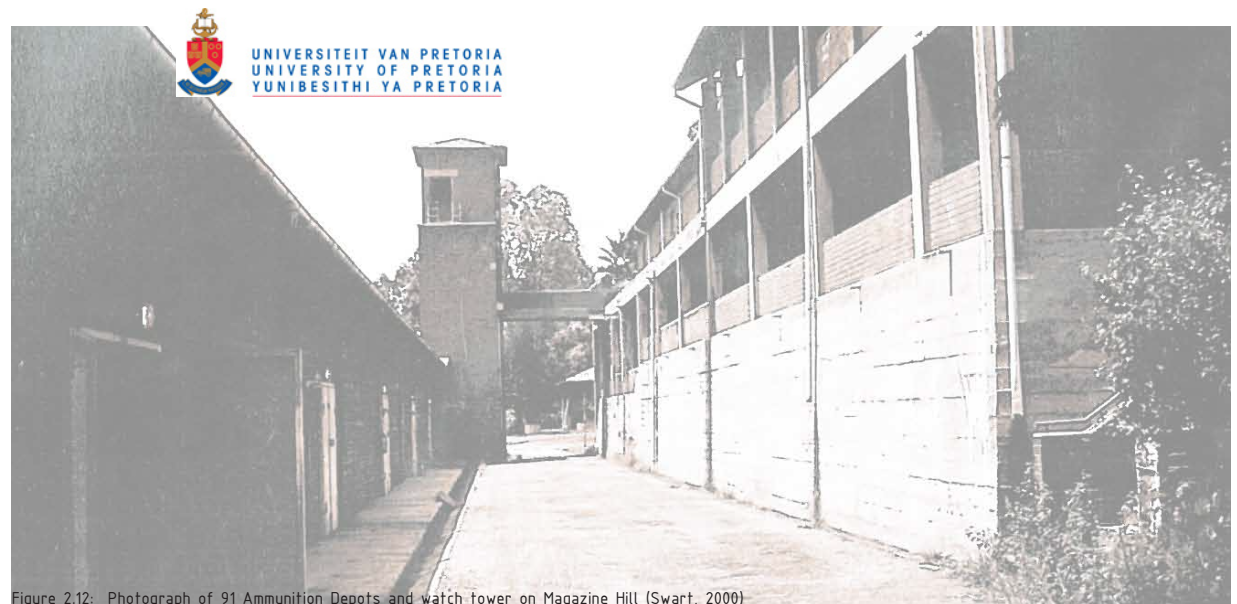


Figure 2.12: Photograph of 91 Ammunition Depots and watch tower on Magazine Hill (Swart, 2000)

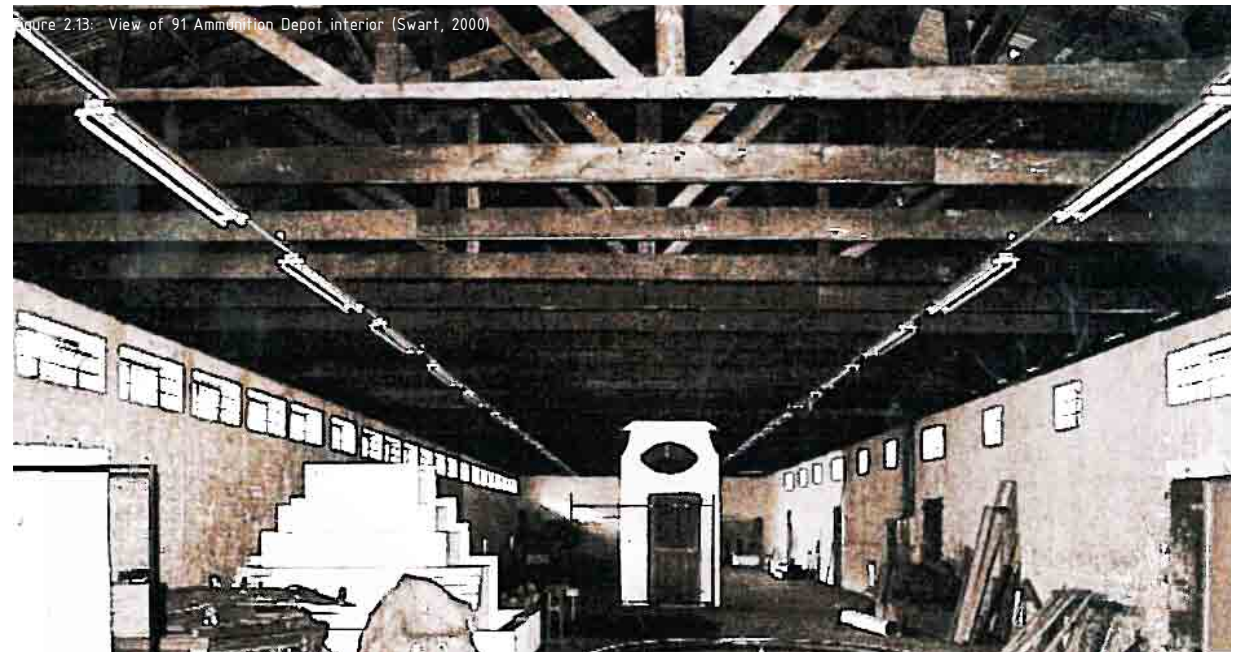


Figure 2.13: View of 91 Ammunition Depot interior (Swart, 2000)

Just as Magazine Hill achieved its highest rate of ammunition production, the Explosive Division of the Department of Commerce and Industries started to question the safety, standards and regulations of the manufacturing process on site. In 1943 it was concluded that site had been developed outside the regulations of the Explosion Act of 1937, for the distance between structures that was dedicated for production fell outside of the regulations, as well as the amount of explosives that was handled in each building. This posed a threat to the production tempo and at the end of 1943 the Mint loading ammunition depots, which at this stage had been operated by military personnel, had to be de-militarised. It was concluded that the production would be limited in order to get Magazine Hill back into the Explosives regulations, therefore ammunition production continued, only this time supervised by the Explosives Division (NMDA, 1945: 2-4).

In 1945 the Government established the Council for Scientific and Industrial Research (CSIR), which focused on the industrial potential in South Africa. Shortly afterwards the Board of Defence Resources and the Munitions Production Office was founded in 1949 and 1951 respectively.

After the United Nations (UN) restricted the sales of ammunitions and arms to South Africa, the National Party (NP) established Armscore under the Armaments Development and Production Act (no 57). By the end of 1960 all ammunition production on Magazine Hill had ceased. By 1980, Armscore was considered to be the central manufacturer of arms and ammunition in South Africa. By April, 1992, a restructuring of Armscore gave birth to Denel Pretoria Metal Pressings (Denel PMP) that functions as an independent weapon and ammunition manufacturing company. Today Denel PMP is considered as the leader of ammunition production in South Africa, and forms part of a global exporting industry (Gutteridge, 1994: 50-64).



Figure 2.14: Mortar shells exhibited on Magazine Hill. (Author, 2011)



Figure 2.15: Munition Defects stored at Magazine Hill. (Author, 2011)



Figure 2.16: Magazine Hill after the explosion, 1 March 1945 (NMDA, 1945: 781003142)

2.4 The mysterious Explosion of the Central magazine

At about 6.20 a.m. on the 1st of March, I received a telephone message from Mr. Zeppenfeld, Director-Manager of the South African Mint, Munitions Section, to the effect that there had been a serious explosion in the vicinity of the Mint Loading Field and Grand Magazine, but as explosions were still occurring, the seat of the original explosion and the extent of the damage could not be determined at that time.

*I arrived at the Loading Field at about 9.30 a.m. and found a scene of devastation.
(NMDA, 1945: 1).*



Figure 2.17: Devastation at the Mint Loading field on Magazine Hill after the explosion. (NMDA, 1945: 781003169)

At 3 a.m. on the 1st of March, 1945, the legacy of Magazine Hill changed forever. A mysterious explosion of the Grand Magazine led the entire site in total desolation. According to the Chief Director of Explosives (1945: 1), the site was unrecognisable directly after the tragic event. Buildings were found burnt out, other still burning and some structures were completely flattened by the tremendous force of the blast. The concrete roof with several feet of compacted soil on top was blown into the sky together with all live ammunition shells and cartridges that were stored in the magazine (Panagos, 2000: 5). Damages were reported as far as Church Street, where small remnants of the magazine were found throughout the southern part of the city (Du Toit Spies, 1955: 78).

Several buildings outside the borders of Magazine Hill were affected and damaged by the massive explosion. Photographs taken during the examination of the explosion show a steel beam, weighing 600 kg, that crashed into the Second World War medical stores, located more than 750 metres away from the explosion site. A roof girder was found next to Fort Commeline on top of the hill, a vast distance from the point of detonation (Panagos, 2000: 6). The detonator magazine to the west of the explosion was wrecked and covered with a thick layer of debris and pieces of rock, some boulders weighing up to 8 tons. Offices and stores to the east of the magazine had disappeared completely, so too a block house on the northern mound and a building at the western gate (NMDA, 1945: 1–20).

Sadly, 34 people died on Magazine Hill that night, while 231 persons suffered injuries as a result of the explosion. The Mint loading Field suffered the greatest damage because of its close proximity to the Central Magazine. 11 Females lost their lives in these buildings while working shifts, filling .303 rifle cartridges with cordite (Panagos, 2000: 7). The cause of the explosion still remains a mystery till this day, while a sabotage strategy executed by the Ossewa Brandwag forms the Chief Director's personal conclusion.

A labour force of 200 people was appointed to clear the site after the explosion, where manual labour continued for 1 week before a vehicular team could also join the clearing team. The Chief Director stated that the task at hand proved to be very dangerous, for the whole site was strewn with unexploded ordnance. For a period of 40 hours after the accident, explosions and fires still combusted among the scattered debris, seriously injuring 2 more people (NMDA, 1945: 6). Magazine Hill was cleared in 7 months. Today the site stands in isolation, severe dereliction and weathering accompanies the ammunition factories. The Grand Magazine has been reduced to a scar in the landscape, a 60 by 70 foot crater in the hill.



Figure 2.23: Universal beam found 750 metre away from the explosion site, 1945 (NMDA, 1945: 781003172)



Figure 2.24: Bent structural member of the Grand Magazine found on site, 1945 (NMDA, 1945: 781003166)

2.5 An architectural response – proposed programme

The proposed programme does not only form part of the practical intervention on the site, but also the theoretical premise. The injection of the most suitable building programme on the historical layers of Magazine Hill will become a crucial factor in the future development of the site. Another aspect that also needs to be considered is the future projections of the military precinct and the proposed strategies of the SANDF. In response to the historical influence of Magazine Hill as a productive site, a Brass Foundry that recycles spent ammunition shells produced by the SANDF, the South African Police Force (SAPD) and the general public is proposed.

2.6 Programme background

Denel Pretoria Metal Pressings, the masters of ammunition art, originated from the ammunition manufacturing industry on Magazine Hill. This company is located in Pretoria West, not far from its origin, and functions as an independent branch of Armscore. Denel PMP is considered the leading ammunition manufacturer in the country and produces over a 100 million rounds of ammunition per year, of which 95% is utilised by the SANDF in military and police training (Denel, 2010: 40–43). In the South African context the average household expenditure on ammunition is R4.86, while the total expenditure on ammunition and arms production exceeded R47 billion between 1999 and 2000 (Statistics SA, 2000). These statistics clearly illustrate the amount of spent brass shells being produced by the defence institutions and private sector in South Africa each year.

The future projections of the South African Military is considered as a guideline for development. The SANDF increased their request for ammunition to a R 160 million over the last year (Denel, 2010: 43). Large financial sums have also been set aside for new military indoor shooting facilities in Pretoria, and the upgrading of existing shooting facilities in the military precinct (Engelbrecht, 2010: 1). The Department of Defence has recently assigned the Military Integrated Environmental Management or “Operation Green Soldier” programme to the SANDF, which involves new sustainable management strategies for military activities and recycling in South Africa (Godschalk & Ferreira, 2010: 2)

Up to 1995 The Department of Defence (DoD) engaged in deep sea dumping of obsolete ammunition. The sites included 2 main dumping areas from the coast of Natal and Cape Town, at 4000 metre depth. According to the DoD, the term obsolete ammunition includes remnants of used ammunition (empty bullet shells), unserviceable ammunition, unexploded ordnance and unused ammunition. After the Environmental Framework had been implemented in 1995, all deep sea dumping activities ceased at once (Godschalk & Ferreira, 2010: 2).



Figure 2.25: Conceptual drawing of the brass furnaces and artist studios (Author, 2011)

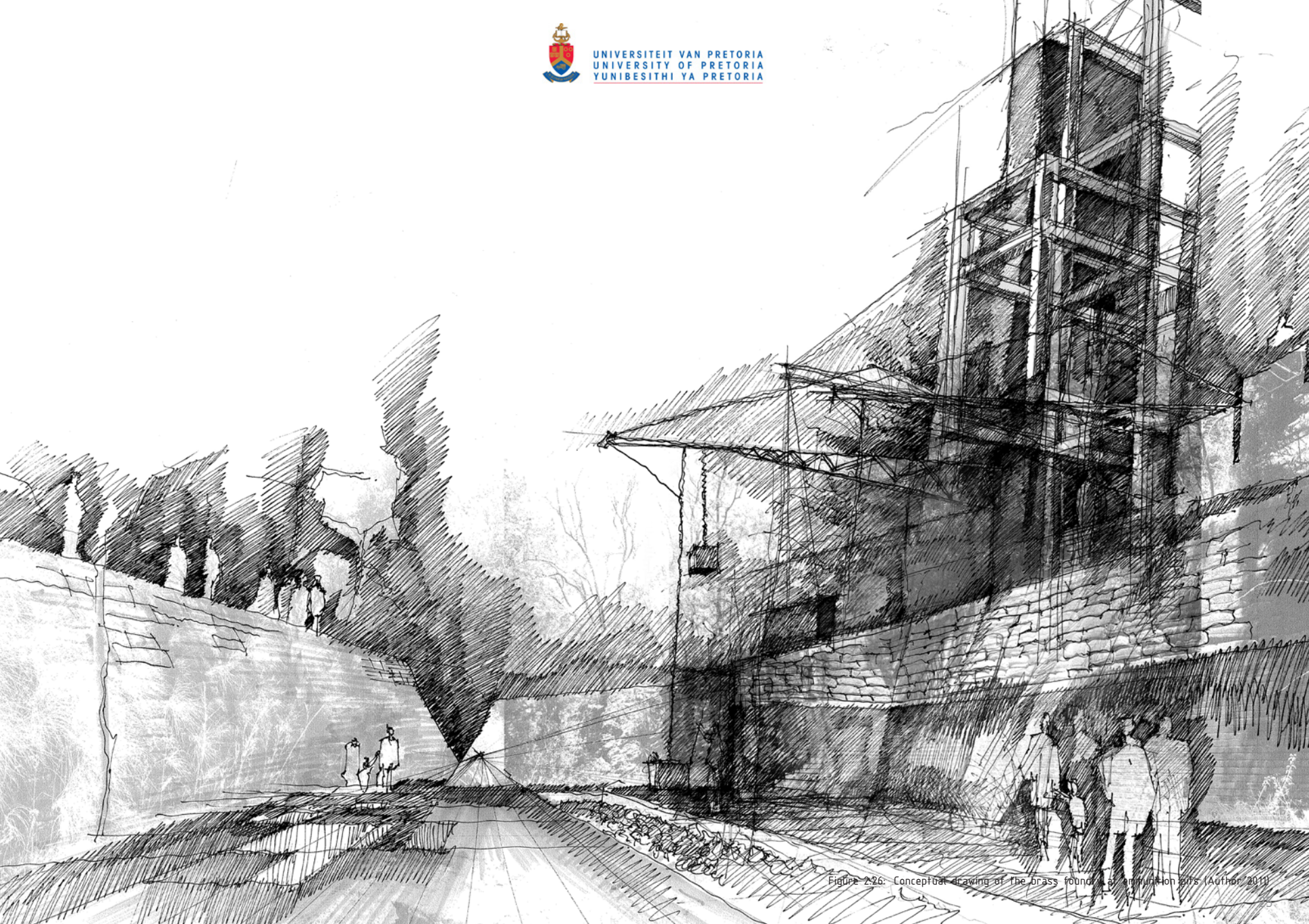


Figure 2.26: Conceptual drawing of the brass foundry and ammunition pits (Author, 2011)

2.7 Programme process

The process would start at the training facilities and the shooting ranges of the SAPD and SANDF. The site of Magazine Hill is ideally located on the edge of the 2 precincts, therefore the foundry would cater directly for the 2 institutions, depending on their waste as the primary resource. Shooting ranges in close proximity to Magazine Hill include SAAA Shooting Range, SAHARA Shooting Facility, S.W.A.T National Firearms and Shooting Facilities, and Proshot Indoor Shooting Range. Not all spent brass shells are recycled directly after use, for this depends on the condition of the shell after it has been fired. Empty brass shells are also reloaded, but after 2-3 rounds of use, the shell enters the recycling/smelting process (Denel, 2010: 37). The public would also be considered as a secondary resource, where empty brass shells could be handed in at the foundry for a financial incentive.

The proposed brass foundry would consist of a primary and a series of smaller scale furnaces that melt the spent shells to produce brass billets. These billets are the raw format of brass that could be distributed to Denel PMP for the production of ammunition shells, but will also be reused on site by local brass artists. The programme would also involve a series of smaller scale artist foundries that produce brass sculpture, instruments, installation and urban art. The public realm would then be able to experience the whole process of ammunition reduction within the historical context of ammunition production.

2.8 Practical implementation of program

1. The foundry would form part of the environmental framework of the SANDF.
2. The derelict and unutilised site of Magazine Hill would be re-appropriated in its historical context of ammunition production.
3. The act of recycling would re-establish the Military into the environmental realm.
4. To promote skill transfer among local artists and encourage interaction between artists and the public.

2.9 Conceptual implementation of program

1. The programme can set up mediation between the public and the Military.
2. The programme can also mediate between old and new ways of thought, ammunition production versus ammunition reduction
3. The mysterious and secretive history of Magazine Hill would be presented through a new programme, where commemoration would occur through everyday use, not encapsulated in a monument or museum, frozen in time.
4. The new programme would be a direct link to the previous function of the site, responding to the historical function and heritage of Magazine Hill.

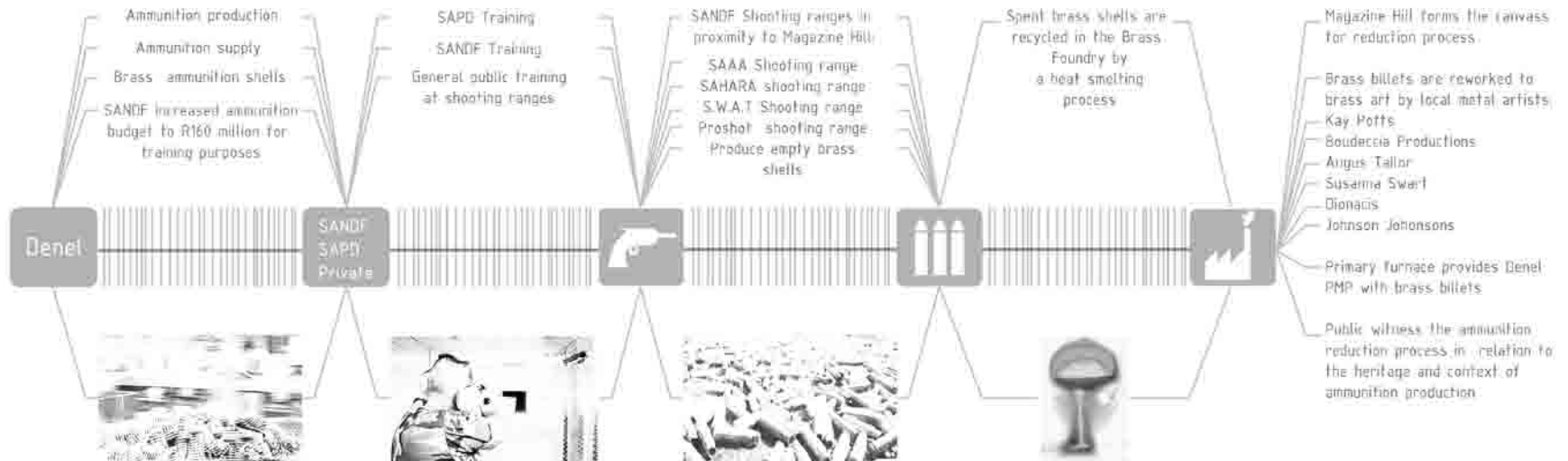


Figure 2.27: Program process diagram (Author, 2011)

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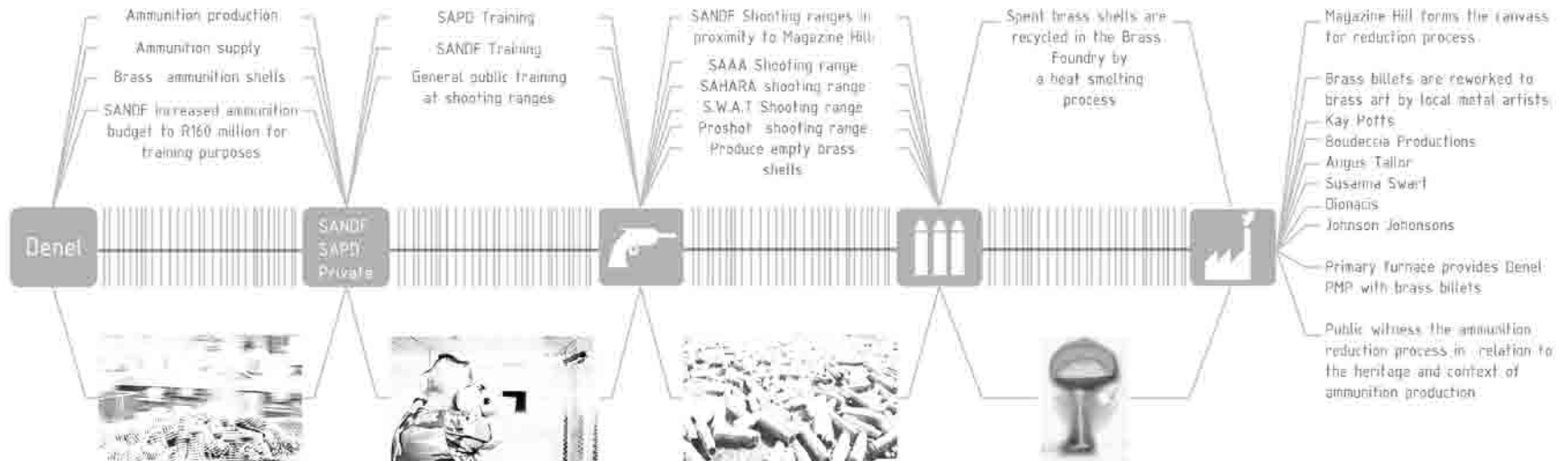


Figure 2.27: Program process diagram (Author, 2011)

2.10 Client

Two major clients are identified in terms of project feasibility. The first client is Denel Pretoria Metal Pressings in association with Armscore that initiates a brass foundry on Magazine Hill to form a secondary ammunition reduction unit. This programme would provide them with raw material and initiate an interface between the company and the public, through incorporating local artists and public activity. The second potential client could be the SANDF that starts a brass foundry for both institutional and public use as part of an interactive programme that strengthens the public-military interaction. This project could also form part of the new environmental framework, Operation Green Soldier.



Figure 2.28: Military, Client and Public interrelationship in proposed design scheme (Author, 2011)

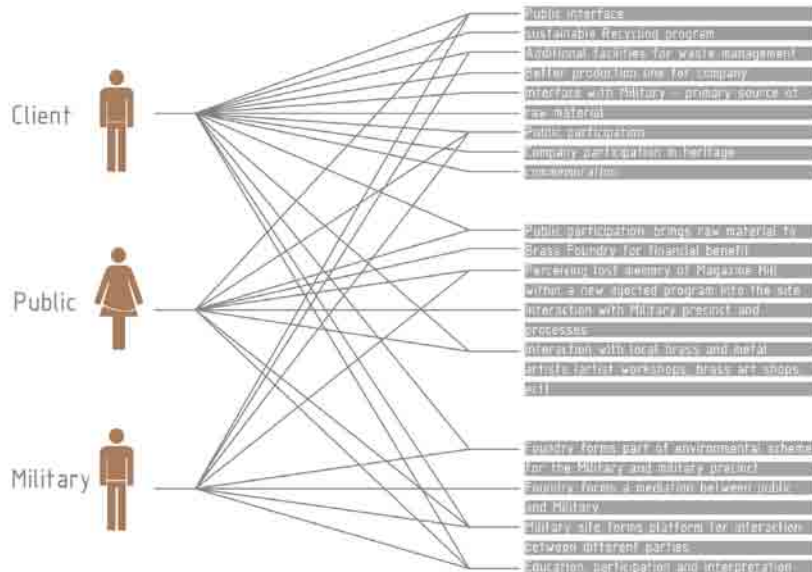


Figure 2.29: Interaction diagram of proposed brass foundry (Author, 2011)