bridging the gap to reclaiming lost space
3.1 URBAN FRAMEWORK

Using the Johannesburg SDF for 2040, 2016 as a point of departure the mining belt will be examined in a contextual sense. Its' opportunities and problems will be identified and synthesized into a final urban plan. The research intention is to directly tie into the existing SDF, building on it and altering it where need be to create a stronger proposal that effectively deals with the mining belt.

When analyzing the City's spatial framework there are 2 apparent issues. The East-West Sprawl of the mine belt (depicted in purple) and its currently fragmenting nature. Located along a main railway line there is an opportunity for substantial, well connected and beneficial development. It is clear that the mining belt can be rehabilitated to not only act as a bridge to the South of the city but also to provide a desperately needed East-West connection, from the spatially disadvantaged areas of SOWETO to that of Germiston and the Further East-Rand.

This connection Would not only provide more job opportunities and a more reliable cheap public transit system however it would serve to activate the areas along the journey, that being the sites primed for rehabilitation along the mining belt. The railway is strategically placed along the mining belt as it was originally used to transport goods and materials. Today this passenger rail system is underutilized due to the dilapidated station's lack of multi-modal connections to other forms of transport, and distance to work opportunities.

Thus on an urban scale the intervention is focused on linkages and connections. These being the reconnection of the fragmented North-South connection, which stops traveling south at Park Station, JHB CBD, and reconnecting East-West and Central Rand to form a strengthened Metropolitan core. The problem if left untreated is a huge inhibitor to socio-economic growth within the city but beyond that it has the latent potential to positively contribute to the standard of urban living by becoming a much needed green lung and providing high density housing especially closer to the metropolitan core and thus jobs.

**FIG 44:** Spatial Framework of Johannesburg (JHB SDF 2040, 2016)
3.1.1 POLYCENTRICITY MODEL AND CORRIDORS OF FREEDOM

The goal is that of a compact polycentricity. A polycentricity is an urban structure that is characterized by a dense urban core interlinked by efficient transit networks to dense complementary sub-centres such as the Corridors of freedom. (Johannesburg SDF 2040, 2016)

These work off of public transport corridors and transit orientated development nodes. They are placed around strategic movement axes such as the Turffontein and Soweto corridors. The current trend shows Johannesburg as a weak metropolitan core with weak linkages and transit corridors.

The key to achieving this polycentricity can be found in the mining belt. Which should be part of a densifying process of mixed-use typology established by strong transit networks. Because of the apparent job-housing mismatch(refer to image showing Job-housing density mismatch), whereby the spatial distribution of the city is fragmented in terms of distances people travel to find work, the creation of a polycentricity based on public transit infrastructure is paramount. The mining belt is presented as a spatial discontinuity and a transformation zone that could trigger positive city-wide change that would combat urban sprawl which is holding the city hostage. (Johannesburg SDF 2040, 2016) The effects of urban sprawl are apparent when looking at travel statistics, 83% of the population of Johannesburg live more than 2km away from their work, as opposed to London’s 13%. This fact is worsened by weak transit linkages. The Mining belt itself is viewed as a transit corridor initially to spawn development and to connect the spatially disadvantaged areas of Soweto to jobs by connecting east and west (Soweto- Germiston).

This forms part of the larger urban framework of which the proposed intervention will tie into. This is thus a larger urban analysis that was needed to establish transit linkages and connection within the city. This general overview provides a base to select an Urban Site in which to establish an intervention.
**CORRIDORS OF FREEDOM**

Johannesburg’s focus areas for development based on public transport corridors, with the potential to generate substantial economic growth and increase housing densities around strategic points and along the primary movement axes, Areas such as Turffontein, Louis Botha, Empire/Perth, and Soweto have been identified as corridors of freedom.

**UNLOCKING THE MINING BELT**

Johannesburg SDF 2040 acknowledged the mining belt as a mixed use zone but there is no proposed vision for the belt. This spatial discontinuity presents significant opportunities for: integrating the North with the South, improving cross border linkages between East and West Rand.

**COMPACT POLYCENTRICITY MODELS**

**IDEAL MODEL**

Inverted polycentric urban model, metropolitan core not strong enough and residential areas separated from economic centres.

**JOHANNESBURG MODEL**

**PROPOSED MODEL**

FIG 47: Multiple Spatial models of the city (JHB SDF 2040, 2016)

FIG 48: Spatial plan showing distance of residential developments and RDP developments in relation to JHB CBD, green line signifies the 20km mark (JHB SDF 2040, 2016)

FIG 49: Existing condition (top) with conceptual proposed condition (bottom) connecting north and south (Author, 2017)
3.2 URBAN SITE SELECTION

Choosing a site within the mining belt is thus a product of spatial intentions. This is in relation to proximity to transit connections, planned interventions, frameworks and upgrades as well as linkages. This also includes proximity to mine shafts, pump stations, piping networks, services and the city. To discover the “goldilocks” point Ley lines were drawn along the crucial North-South and East-West connection. These Ley lines or energy lines were centralized around nodes of activity, the mining belt and decanting points which resulted in the selection of the Robinson Deep or Village Deep Area. Consulting the other aforementioned parameters, specifically transit networks and proposed upgrades an excavated mine dump was chosen next to the Robinson Deep Landfill along Booysens Station Road.

With the selection of this Urban site the proposed Urban condition becomes strengthened by the integration of the mining belt. The mining belt which used to be toxic will be transformed incrementally, first into a green lung and then into an economic ecological hub. This site fulfills the urban intention of restitching the Urban Fabric in both the North-South and East-West directions, thus forming strong linkages.

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3.2.1 URBAN SITE

The Urban Focus Area is represented in the aerial photo to the right. This is the Urban Area chosen through the Larger Urban Framework and it is the area in which the Urban plan and intervention will be focused. The Urban Area will be analyzed according to, transit connections and routes, upgrades and future developments, key points of interest in terms of Heritage and Socio-Economic Value as well as ecologically. From there an Urban Plan will be developed and a final site will be selected.

FIG 52: Urban Site Orthophotos (Google maps, 2017)

FIG 53: Site Locality (Author, 2017)
3.2.2 URBAN SITE ANALYSIS

The ecological state of the larger area is a mix of built up city and suburban area, recreational landscapes and toxic infected mounds of mining waste. The mining networks also form a network of pumping stations and pipes which pass just north of the Urban Site. These networks can be used to contribute to the central rands AMD decanting efforts. Two mines flank the Urban Site, that being Crown and Village Deep Mine both of which have pump stations that could be tapped into. None of these sites Treat the AMD water to an ecologically safe level. The larger Ecological mapping also shows the alarming proximity of the mining sites to populated areas, an ever present threat that must be incrementally dealt with.

"Transport affordability and access are critical development concerns due to high day-to-day costs of travel, the unavailability of public transport in many peripheral areas is a major issue along with poor home-to-work connections, because of badly defined routes and weak inter-modal integration. These all impact severely on the poor, especially in a sprawling city-region where poverty and spatial dislocation are often synonymous." (Gauteng Mobility Report, 2014)

This is the major urban issue which areas along the mining belt face. When analysing the Transit networks existing such as busses and taxi routes it becomes apparent that the mining belt is a disconnected pass-through zone whereby people are either trying to get to Turffontein or the JHB city. The only population currently interacting with the mining belt are those working in the surrounding industrial belt. The mix of zones is strictly business commercial and residential. The Density of the area is mainly made up of low-rise industrial buildings broken up by mining waste sites as can be seen by the Nolly diagram.

It is important to note the position of Booysens station and its lack of connectivity to other forms of transport which ignore the rail system completely. The Johannesburg SDF 2040 has extended the BRT Rae Vaya system down and through turffontein which is shown in the transport mapping.
3.2.2.1 BOOYSENS STATION

Booysens station is a key point in this intervention not only because of its position in relation to the site but also because of its proposed upgrade scheme to a Multi-Nodal Station, including a taxi rank and BRT station. It is the perfect driver for this intervention as it deals with one of the main urban issues of connectivity. The city has proposed to do this upgrade on land which houses an informal settlement, with no indication of how the informal settlers will be accommodated. Although it would be cheaper to displace informal settlements there is a clear question of social justice and this coupled with the legacy of the mining belt is an unethical response.

An alternate proposal would be to move that station to the nearest mine dump and use it as a driver for this regeneration. By doing this it targets a central site within the mining belt, that being the mine dump adjacent to Robinson Deep Landfill. This site is just off Booysens Road and has an existing Metro Railway line bordering it which connects it to the rest of the mining landscape. This creates a point of acupuncture from which to start a regenerative intervention while activating the site. About 10000 commuters use Booysens station daily however the areas main modes of transport are cars and taxi’s while public transit systems like bus and rail systems are not utilized. This is a huge problem as these forms are public transport are cost effective and critical to a cities connectivity.

By also proposing an N17-M70 linkage through this site, from Soweto to Boksburg (explored in the transport mapping), that artery can support an effective BRT and Taxi system. This can be coupled with an additional North-South Gautrain line, which forms a gateway to the south, thus bridging the gap between North-South and Park Station-The mining belt. This begins the process of re-stitching the urban fabric together and can create a strengthened Multi-nodal station which activates the area effectively. This deals not only with the major issues of Booysens Station, that being a single entry, mono-modal station that is far removed from movement routes, but it also deals with the linkages issues of the mining belt.
3.2.2.2 MAPPING

There is a varied mix of land-uses within the study area, moving from a residential South (Turffontein); to a low rise industrial belt sprinkled with mine tailings and recreational activities; to the high rise silhouette of Johannesburg CBD. As can be seen in the 3D representation The Turffontein Corridor of Freedom looks at densifying that area into an active city node.

The Urban Area is surrounded by a myriad of informants that being recreational zones like Turffontein Racecourse, Wemmer Pan Dam and Rand Stadium as well as Heritage Sites like The James Hall Transport Museum, however only the informants relative to the lenses of Heritage, Ecology and Socio-Economic Value will be considered. Notable influences are aspects such as the Markets surrounding the area including the Fresh produce and night markets, The Network of mining sites and the network of subsequent pipes, The Turffontein Corridor of Freedom, The Braamfontein Arts precinct of which this site will feed off of in terms of its momentum within art facilitation. The South portion of the site houses a large landfill which was a re-purposed mine dump. This will be converted into a park after the landfill has closed. There are many industrial activities taking place directly around the site such as the Telkom training Centre and City power. Most of the activities are warehouses, wholesalers and car service yards. The North of the site is flanked by a rail network that has an informal settlement which has developed around what is now Booysens Station.

The ecological mapping of the site brought attention to some key features, such as the isolation of the site apart from Zama’s Zama’s and squatters. There are some clear zones where the vegetation is thriving and encroaching onto the harmed soil. The landscape is an infected yellowish colour, typical of mine tailings. The soil itself covers most of the site however only one significant mound of waste remains, the rest has been re-mined for gold. There are large deposits of natural stone on site as well as formations of stagnant water on site, infected by the soil. These catchments of water fall to the south of the site and form in large pools. The trees on site are indigenous however the reeds will have to be removed as they can cause respiratory problems. Around the stagnant pools of water dead birds can be found, as a direct result of the toxic water. The varied contours are typical of a re-mined site and form an interesting series of levels.

The Urban site is a blank canvas in terms of transit points with roads flanking the edges of the site. There is one clear travel route which is marked by a dirt road and footpaths. This cuts through the site from Booysens Station to the M70. The site is an isolated island of toxic waste at the moment but is surrounded by bustling activities and busy roads such as Booysens road, which the proposed BRT extension passes through. All the elements are there to create a strong transit node. The North-East of the site is the main point of entry with a dirt road being located there. The North-East corner also hosts a cement factory, the rest of the site forms barriers in the form of low mound walls.

**POINTS OF INTEREST**

*FIG 67: Points of interest in heritage and socio-economic value (Author, 2017)*
FIG 68: Ecological mapping of harmed, industrial, vegetated and stone landscapes with water masses (Author, 2017)

3.2.2.3 TROLLEY PUSHERS

The Informal Settlement is a typical result of necessity where the impoverished and under-skilled have situated themselves next to employment opportunities, although this intervention does not specifically deal with informal housing, it rather seeks to empower in the form of skills development and other means to support and enable a contextual response.

One key feature of not only this informal settlement but Johannesburg South are the Trolley Pushers, who collect valuable trash for recycling and processing in exchange for money. They are readily employed by the landfill and pikitup (waste services company) as they do not have many other potential buyers or privatized clients. This is a monopolized situation in which there is no growth opportunities or accountability.

The trolley pushers face harsh conditions from having to sort through large amounts of trash to carting that trash around the city on roads that do not accommodate their movement or business. They are not enabled in any way by government or police often times inhibiting their business. Although they avoid taxes in their informal businesses they also avoid protection and consideration. (Zack, Chalton, Kotzen, 2012)

The trolley pushers offer a sensitive alternative to trash trucks. They provide this recycled waste to the formal economy. It is important to know trolley pushers are also a victim of pendulum migration having to travel far distances. Paul the trolley pusher, travels almost 120kms every week pushing his trolley through Johannesburg’s suburbs to collect enough waste to feed his family. He earns about R1100 on a good work week, but he is a success story (Zack, Chalton, Kotzen, 2012)

The business of informal recycling depends on the prices paid by buy-back centres for particular categories of waste. On a good week Paul can earn up to R1,100. Typically he makes R800–900 per week. To earn R1,100, Paul must pull almost 600 kg over five days. He sells his reclaimed materials every two weeks, when he has accumulated enough quantity of each item to make the transaction worthwhile.

Paul lives with his partner and baby in an illegally occupied warehouse in the eastern end of the Johannesburg CBD. They occupy a makeshift room 2m x 2m, in a building with no formal electricity or water services. Paul pays rent to a building committee who manage security and cleaning for the residents. Living cheaply enables him to support his family in Joburg whilst at the same time sending R1000 a month to relatives Lesotho, where his home is. He also deposits R1000 a month into his savings account.

Living centrally means Paul walks far to source material before it is claimed by other recyclers. Closer in suburbs such as Yeoville and Kensington have too many recyclers already working these areas. Increasing competition requires him to set off earlier and earlier in the morning to get ahead. But he lives conveniently close to the three recycling centres he sells his stock to.

Before taking the materials to be weighed at the recycling stations, Paul separates items according to category. Being able to accumulate, store and sort material near to the buy-back centres is a key part of his business. It is important to note that while Paul is an example of a success story of the informal recycling industry, many recyclers in Johannesburg are not in the same position. For many it is simply a means “just to make enough money to eat” as twenty year old Njabulo who lives under the M1 highway bridge explains. Nevertheless, recycling remains a viable and accessible industry in Johannesburg.

Paul the Trolley Pusher

RECYCLABLES

**PET**

**HDPE**

**HL-1**

**GLASS**

[FIG 70: Trolley pusher city condition (Author, 2017)]

[FIG 71: Info graphics depicting price of recyclables (Zack, Chalton, Kotzen, 2012)]

[FIG 72: Informal settlement condition (Zack, Chalton, Kotzen, 2012)]
3.2.3 PICTORIAL URBAN CONTEXT EXPLORATION
(ALL IMAGES TAKEN BY AUTHOR, 2017)

FIG 73: Urban Exploration through pictures depicting industrial condition amongst the toxic waste mounds (Author, 2017)
3.3 URBAN VISION

An urban strategy was formulated, by our urban group which comprises of 2 landscape students and thus 2 landscape interventionist as well, in which these issues are dealt with. As the site needs rehabilitation, a 35-year plan will be implemented as follows:

- 5 years: The toxic land will be re-formed into mounds and processed to remove the uranium and then will be made into bricks by the cement factory on site. This will happen while the remaining land is vegetated to rehabilitate the soil. A wetland system will process the water on site in conjunction with an AMD treatment centre and a transport node will form the first intervention to activate the area.
- 5-35 years: All road facing edges will be developed into mixed-use facilities. By this point the toxic land will have been processed and the brick facility can start processing other sites toxic material.
- 35+ The inner potions of the site will be built up with high density mixed-use buildings and varying typologies, establishing a firm economic presence within the city. This effort can then trickle out from this central site into the remaining mining sites. The processing of the site is a long process but it also gives it time to establish itself in an incremental manner which allows for a sustainable and resilient intervention.

<table>
<thead>
<tr>
<th>RESILIENT-CITY</th>
<th>INCLUSIVE-CITY</th>
<th>CONNECTED-CITY</th>
<th>GENERATIVE-CITY</th>
<th>COMPACT-CITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protecting biodiversity and energy as well as high value agricultural land</td>
<td>Balanced service provision and diversified land use, bridging social, spatial and economic barriers</td>
<td>Enhancing public transport on provincial and urban scales to reconnect the city starting from the corridors of freedom</td>
<td>Spurring economic growth and opportunities</td>
<td>Density and diversity, accessibility and travel</td>
</tr>
</tbody>
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![FIG 74: Urban Vision large Walkable streets with mixed uses that open to the street (Urban Group, 2017)](image1)

![FIG 75: Urban Plan depicting regenerated precinct (Urban Group, 2017)](image2)
The Urban Plan developed is an aim to synthesize the projects intention with existing Johannesburg Frameworks such as the 2040 SDF.

It focuses on creating an incremental development that will eventually bring new economic activity to the area and kickstart development along the mining belt reclaiming the landscape for the city.

The site itself has been imagined as a economic, ecological zone in order to provide a much needed green lung to the precinct and city.