ArcelorMittal South Africa’s Vanderbijlpark Works has implemented various emission reduction projects that have resulted in an overall 89% reduction in particulate matter emissions.

The graph demonstrates the 89% overall emission reductions since 2005.
Vanderbijlpark Works background
A flat steel producer with value adding capabilities

Overview of Operations

Flat Steel Products:
- Middelburg Works: 1.7 Mtpa
- Saldanha Works: 1.1 Mtpa

Long Steel Products:
- Middelburg Works: 1.3 Mtpa
- Vereeniging Works: 0.94 Mtpa

Iron ore supply:
- 35 Mtpa from Thabazimbi

Coke & Chemicals:
- Coke: 237,000 tpa
- Tar: 113,000 tpa

*averaged

Implementing a Corporate Responsibility strategy

1. Human resources
   - Social commitments
     - Health & Safety
     - Equitable employment practices
     - World class training and skills development

2. Environment
   - Environmental commitments
     - Waste management and disposal
     - Ground and surface water management
     - Rehabilitation of legacy facilities
     - Environmental legal compliance

3. Communities
   - Community commitments
     - Local economic development
     - Social investment
     - Community engagement

4. Shareholders
   - Corporate Governance and sustainability reporting
     - Board independence
     - Equal rights among shareholders
     - Best in class disclosure and shareholder dialogue

Evolution of ArcelorMittal South Africa

1928: Iscor founded
1989: Iscor privatized and listed on the JSE
2001: Iscor and Unisa enter into joint venture to form Iscor Steel
2004/5: ArcelorMittal South Africa

Process at Vanderbijlpark Works
## Vanderbijlpark Works
### Air Emission licence

#### AEL Monitoring requirements

The Atmospheric Emission licence as contemplated in Section 43 of the National Environmental Management: Air Quality Act, 2004 (Act no. 39 of 2004)

The Atmospheric Emission licence nr AEL0003-SDM/2012

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### Additional Notes

- The Atmospheric Emission Licence issued to Vanderbijlpark Works in terms of section 44(1)(b) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) "(the Act)" in respect of Listed Activity No. 1.4, 3.1, 3.2, 3.3, 4.2, 4.5, 4.6, 4.7, 4.8, 4.10, 4.12, 4.22, 5.5, 7.2 and 11.2.
- Name of the Licensing authority – Sedibeng District municipality
- Atmospheric emission licence number – AEL0003-SDM/2012
- Atmospheric emission licence issue date – 29 February 2012
- Atmospheric emission licence type – Final
- Review date, not later than – 30 March 2016
Vanderbijlpark Works - Blast furnace

Blast Furnace air quality results - Dust

The Blast Furnace is a counter current reactor in which iron-bearing materials are reduced to molten iron. The iron (Fe) containing materials (Iron ore and Sinter, Fluxes (Dolomite, Silica stone and Limestone), Manganese ore and Coke, are added to the top of the furnace shot. Hot blast air enriched with oxygen and steam is blown from the bottom of the furnace together with Pulverised Coal (PCI), producing a counter current of reducing gases. The hot blast air reacts with carbon from the coke and PCI to form carbon monoxide, which in turn reduces iron oxide to iron. The iron is tapped into hoppers and transported to the steel plant. At Vanderbijlpark Works there are two Blast Furnaces, C and D, with a total capacity of 3.1 mt per annum molten iron.

Blast Furnace process flow diagram

The gas that is generated during the process is removed from the furnace top and cleaned from dust by the Dust Collector, Ventox and Wet scrubber systems, before being introduced into the works BF gas ring main. The gas is used for re-heating of the stoves, as well as all the boilers for energy generation. Excess Blast Furnace Gas can be flared off in Flares 1, 3 and 4.

During the iron making process slag is also generated which is either granulated or topped into an abort pit. The furnaces produce about 65 000 t of granulated slag per month and approximately 4 000 t of air cooled slag per month.

At the Pulverised Coal Injection Plant (PCI), coal is pulverised and dried to be used at both Furnaces. The coal size range is controlled to 90% less than 100 microns, and stored on site in two lime coal bins, before being injected into the furnaces along with the hot blast air. Approximately 23 000 t of cool is pulverised per month to replace coke consumption on the furnaces.
Background and reasons for implementing the project

The Blast Furnace D (BF D) Stockhouse was upgraded to reduce a source of fugitive dust emissions in Vanderbijlpark Works. This necessitated an improvement in the dust collection efficiency, and the abatement of fugitive dust emissions at both the Stock House and furnace top. The previous abatement system could therefore not exhaust all the dust generated at the Stock House.

ArcelorMittal South Africa, Vanderbijlpark Works aims to reduce the Work’s total emissions and impact on the receiving environment.

Post implementation:
- The visible dust emissions from the Stock house has been eliminated.
- The fugitive dust is captured by the new extraction system.
- The bag house will cater for future environmental legislation and be able to comply with an emission limit of 30mg/m3 from the bag house stack.
- The total emissions of Vanderbijlpark Works has been reduced.

Total Cost:
- Total cost of the bag house calculates to $12.6 m/R127.6m.
Vanderbijlpark Works - Coke Making

Coke is used in the Blast Furnaces to chemically reduce iron ore to iron metal. It is also however a fuel. Coke is converted to coke by heating coal charged into a battery oven to about 1000°C in an oxygen-free environment for 15-21 hours. Subsequent to the heating process, coke is pushed from the ovens and divided with water to prevent further combustion. Vanderbijlpark Works operates five batteries, which supply coke to the blast furnaces on site.

Hot coke oven gas, which forms as a result of heating coke in the coke ovens, is cooled down from ~800°C to ~80°C by spraying it with flushing liquor.

When the crude coke oven gas cools down, a mixture of olefin compounds, compounds out of the gas.

The gas fraction is routed to the gas plant where it is cooled down further to remove more condensates in the primary coolers, cleaned of fine dust droplets in the electrostatic precipitators and H2S and NH3 removed by water scrubbing. The scrubbing liquor used for the H2S and NH3 removal is stripped and the gas cleaned of the Elemental Sulphur plant.

The final products from this plant are elemental sulphur that is sold, steam and coal gas that is mixed with the crude coke oven gas before the gas plant. Between 3% and 4% of the crude coke oven gas is returned to the coke oven batteries, while a significant portion of the compound is used in other operations within the integrated steel works.

All condensates emanating from the crude gas and the gas plant are captured in a tor separator. Here, the condensates are separated into: (a) light gas is pumped to ArcelorMittal Coke and Chemicals for further processing and (b) A heavy fraction that is either recycled back into the coke batteries or disposed on a certified waste site.

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**Emission reduction initiatives**

In any coke making process, a certain amount of emissions (both fugitive and point source) are inevitable. In order to reduce the magnitude of emissions from the batteries at ArcelorMittal South Africa, Vanderbijlpark Works, various actions have been implemented, including those mentioned below. During 2013/2014 approximately R200 ml was committed to projects aimed at reducing emissions from the coke ovens.

**Ceramic Welding**

Due to the extreme temperatures within the ovens of a battery, considerable heat stress is endured by the refractories which line the individual ovens. As a result, fine cracks form in the walls over time, which may have a negative effect on the emissions from the battery stack. To minimize emissions arising from this cause, extensive ceramic welding is performed on ovens in the different batteries on site. Ceramic welding is the process that is used to repair the coke oven refractories at operating temperature with minimal disruption to production. The repair material is ceramic bonded to the damaged refractory, utilizing a fusion process that generates an exothermic reaction in excess of 2000°C. Ceramic welding allows for a superior repair that restores structural integrity to the original brickwork.

**Battery tightening project**

Due to the great heat stress which exists within a battery, over time the sealing interfaces begin to shift in alignment. Consequently, the amount of fugitive emissions arising from the oven doors may increase. To curb such emissions, ArcelorMittal implemented a battery tightening project which focused on the brazing of ovens to realign door seal interfaces.

**Exhauster Control**

Another means of managing fugitive emissions emanating from the batteries is by means of exhauster control. The primary function of the exhauster is to suck the gas formed during the coke making process from the ovens for cleaning at downstream facilities. Slight pressure changes resulting from inefficient operation of the exhauster may cause elevated levels of fugitive emissions. ArcelorMittal has indicated upgrades to its exhausters to improve their control and thereby mitigate fugitive emissions.
Vanderbijlpark Works - Sinter Plant

Sinter plant air quality results - Dust

Sinter Plant - BG ESP - Monthly performance

Sinter Plant - CG ESP - Monthly performance

Sinter Plant - AG ESP - Monthly performance

Sinter Plant - Baghouse A & B - Monthly performance

Sinter Plant clean gas project

The Sinter bag house is one of various projects that were commissioned as part of our emission reduction strategy. The particulate (dust) emissions from the Sinter Main stack were the biggest single point source on site. The installation of abatement equipment to capture the emissions currently emitted from the stack was finalised and commissioned in October 2012. This project reduced the dust load from the Sinter plant by 52%. Construction of the Sinter dry scrubbing plant amounted to a total cost of R 250 million.

Sinter Plant process flow diagram

Sinter is produced through blending fine-sized iron ore, fluxes (limestone and dolomite) and other metallurgical by-products. These raw materials are agglomerated and fired using coke and air/air as a fuel until they fuse into a solid stable mass known as sinter, which is an important feedstock for the blast furnace. This heating and fusing process takes place on a conveyor-belt type structure known as the sinter strand. Currently Vanderbijlpark Works operates two such strands, Strand A and B.
Vanderbijlpark Works
Direct Reduction

Direct Reduction process flow diagram

The Direct Reduction route is an alternative iron making route, which utilises coal to reduce the iron ore.

At Vanderbijlpark Works, six rotary kilns are used to heat iron ore, coal and additives to produce sponge iron, which is then utilised in the blast furnaces and basic oxygen furnaces.

The waste gases from the process are drawn off and sent through a waste heat boiler to generate process steam. Dust particles are removed from the waste gas stream in the Electrostatic Precipitator (ESP), before the waste gas is emitted into the atmosphere through the main stack.

There is an emergency stack situated between the kiln and the boiler. This serves as a safety device for the boiler, should there be an unplanned boiler outage. There are presently 6 kilns per boiler trains in operation.

Direct Reduction air quality results
Dust

Direct Reduction - Klin 1 - Monthly performance

Direct Reduction - Klin 2 - Monthly performance

Direct Reduction - Klin 3 - Monthly performance

Direct Reduction - Klin 4 - Monthly performance

Direct Reduction - Klin 5 - Monthly performance

Direct Reduction - Klin 6 - Monthly performance

Direct Reduction - Raw material ESP Monthly performance

Direct Reduction - Product separation ESP Monthly performance

Direct Reduction - Tailings - Monthly performance
Vanderbijlpark Works - Foundry

Foundry emission reduction project

In terms of the AEL, the Foundry Cyclone’s new emission limit is 30 mg/m³. To ensure compliance to the AEL limit, a mobile bag house was connected to the cyclone and readings are averaging at 1mg/Nm³.

Foundry process

Foundry > 9 tons and Foundry < 9 tons

Foundry operations involve production of near shape castings in moulds made from sand bonded silica and sand. Molten steel or iron is poured into the moulds built in either pits or weld-fabricated steel boxes. After solidification and cooling of the metal, the sand is removed from the castings through a process called striping. Fettling operation involves cleaning of castings through arc-air and grinding.

The Ferrous Foundry is made up of two main production sections: >9ton Section and <9ton section.

The >9 ton section is situated in the Basic Oxygen steel plant area from where its liquid steel supply is sourced. The <9ton section is situated close to the blast furnaces D plant and has a small induction furnace to smelt scrap metal.

Moulding in this section is done in steel boxes utilizing sand recycled from the blast furnaces. Casting of cast iron jobs is made from torpedo pig iron from Blast Furnaces C or D.

Foundry air quality results - Dust

Furnaces - Cyclone - Monthly performance

Furnaces - Sand reclamation - Baghouse Monthly performance
Vanderbijlpark Works
Pickle line 3 & 4 and Lurgi 1-3

Air quality results - HCI Units

**Pickle line #3 - Monthly performance**

**Continuous Pickling Line #4**

The pickling line prepares strip coming from the hot strip mill for the cold rolling process by removing surface rust and dirt. This is achieved through a process of acid pickling and water rinsing. The line also aids the cleaned strip and side-trims it to the correct width in preparation for the 5 Stand tandem mills.

**Lurgi 1 - Monthly performance**

**Lurgi 2 - Monthly performance**

**Lurgi 3 - Monthly performance**
Vanderbijlpark Works
Open area rehabilitation

Fugitive dust reduction

Open areas that are not covered by natural vegetation such as grass or artificial covering such as paving contribute towards the generation of fugitive dust emissions on site. In order to reduce the amount of fugitive emissions generated, ArcelorMittal South Africa Vanderbijlpark Works has embarked on a drive to cover these open areas.

The advantage of covering open areas is that it contributes towards reducing fugitive dust emissions, improves storm water runoff quality and also looks aesthetically pleasing. To date approximately 400 hectares, including hydroseeding as part of remediation activities on site, of previous open areas have been vegetated.
Vanderbijlpark Works
Waste Management

Background:
The Vanderbijlpark Works old waste site was commissioned in the 1960’s where the disposal of metallurgical waste on approximately 170 ha of land took place.

The old waste site was decommissioned on the 31 December 2010 and closed off for disposal as per the Water Use License requirement. The Department of Water Affairs was satisfied with the measures ArcelorMittal had put in place to reduce the possible impact from the waste site, and the Department of Environmental Affairs was content with the overall protection of the environment. To date approximately R100 million has been spent on the remediation of the old site.

Disposal on the new Glüh waste disposal site commenced in January 2011. The new waste disposal site and associated leachate collection system was designed and constructed according to approved designs at a cost of R32 million.

Remediation of old waste site

A phased approach has been adopted for the rehabilitation of the old waste disposal site due to its size. There has been great success in the achievement and completion of project milestones, namely:

- Phase 1 of the remediation that entailed capping of the old waste disposal facility. This was successfully completed in 2010 and vegetation was established in 2011.
- Phase 2 of the remediation of the former waste disposal facility commenced in 2011 and was completed by March 2012.
- Full rehabilitation of the site will be achieved with the completion of Phase 3 which commenced in 2012 and is expected to be completed in 2015.
Vanderbijlpark Works - Rehabilitation of Dam 10
Transformation of a Legacy Dam

History
Commissioned in 1960 as a number of earth dams for the purpose of waste water storage and evaporation. The Dam 10 area is roughly 40 ha.

Two of the 10 dams were used for the storage of organically contaminated waste water. The remaining dams were used for inorganic waste water storage and evaporation.

Use of the facility ceased in 2000. Since then the site was dried and remediated.

Organic soil remediation
Innovative breakdown of organic contaminated soil through Enhanced Archeaa Treatment. Curtain wall windrows were sourced for application to soil.

Material breakdown of material to pre-determined clean-up levels. Required results obtained and organic breakdown extremely successful.

Treated soil and material spread on Dam 10 surface to serve as topsoil for in-organic soil stabilization to follow.

In-organic soil stabilisation
The remaining inorganic soil compounds were stabilised as per pre-determined soil requirements. The area of the dam was sampled and analysed in order to determine the correct portions of material required to achieve optimal stabilisation of the soil.

Chemical stabilization of the soil profile with the addition of gypsum, limestone, organic compost and fertiliser N,P,K in ratios pre-determined.

Benefits:
- Improved quality of seepage into ground water as well as surface water runoff quality.
- Reduced dust generation and transformed appearance.
- Cost: R16.5 million

Project history
2000 - 2001
Site prepared
2005 - 2007
Preparation and implementation of remediation plans and methods
2011
Complete decommissioning, final organic remediation and opening national final clean-up windrows and vegetation
Vanderbijlpark Works

Zero Effluent Discharge

Vanderbijlpark Works became a Zero Effluent Discharge (ZED) Facility in 2006. The Main Treatment Plant (MTP) was officially opened on 5 April 2006 by the Hon. Rejoice Mogosodi, Deputy Minister of Environmental Affairs and Tourism at the time.

ZED and the MTP Project resulted in:
- Termination of effluent discharge
- 50% Reduction in raw water abstraction
- ArcelorMittal South Africa received an environmental sector reward from the Department of Water Affairs
- MTP upgrade (2012 - R20 million)

Over the past year significant challenges, concerning the overall water balance of the Works, have been experienced. Approximately R90 million has been made available to restore the Works’ ZED status, which is anticipated to be achieved by July 2016.

Fresh water abstraction ML/month

![Graph showing water abstraction over time]
CETP sludge originated from the CETP as an underrun of the trickling filters. With the construction of the Main Treatment Plant (MTP) in 2005, certain infrastructure at the CETP were also upgraded including new fiber processes that press the sludge into dry, fine cake that is authorised to be disposed of at the internal disposal site.

Historically, CETP sludge was disposed of in two dams, namely CETP Dam 1 and CETP Dam 2. New CETP dams both located in the Consolidated Residue Management Facility (CRMF) area. These dams were constructed with soil and without any liners or concrete walls:

- CETP sludge Dam 1 was commissioned in 1963 and consisted of 13 dams combined in one system.
- CETP sludge Dam 2 was commissioned in 1975 and consisted of 6 dams combined in one system.
- Sludge disposal into Dam 1 was terminated in 1997.
- Sludge disposal into Dam 2 was terminated in 2005.

The combined volume of CETP Dam 1 and Dam 2 was 700,000 m³. The major constituent of the sludge was biomass and partially spent lime sludge auger dust used in the rolling plants and derived from animal feed.

After different trials and investigations were completed, it was concluded that the best remediation option will be the following:

- Enhanced microbial treatment of the organic contaminated sludge. This includes the addition of microbes, fertilizer and windrow application.
- Soil stabilisation of the remaining soil in the dams and finally revegetation with indigenous grass species.

Remediation of CETP Dam 1 is already completed.

Remediation of CETP Dam 2 is currently in the preparation phase, with residue stockpiled in windrows for biooxidation.
Metal Recovery Crushing and Screening Plant (MRCS)

The purpose of the Metal Recovery Crushing and Screening Plant is to minimise the amount of waste disposed of on the Vanderbijlpark Works site and to optimise the recycling of by-products back into the process.

During the steel making process, slag is generated when impurities are removed from the liquid steel to arrive at the desired chemical composition. The slag contains a measurable amount of metal that can be recovered. The slag, instead of being directly disposed of onto the internal waste site, is diverted to the MRCS plant to recover the usable metallic material that can be utilised in the steel making process.

The MRCS plant plays a vital role in avoiding the disposal of usable by-products.

MRCS Plant process flow diagram

Liquid Steel is produced at the Oxygen Steel Making plant. A by-product of this process is slag. Slag is transported to the MRCS plant where the slag is crushed and screened.

The high Fe (metallic) content slag is separated from the low Fe slag and is re-used in the steel making process.

The remainder of the material is disposed of at the internal waste disposal site.
Vanderbijlpark Works
Ambient air monitoring

Introduction
ArcelorMittal South Africa monitors ambient air as an indicative tool to measure the efficiency of environmental emissions reduction plans. This also serves as an indicator tool to develop emissions reduction strategies.

ArcelorMittal South Africa utilizes ambient air monitoring stations which are located in the four directional outskirts of the works to monitor ambient air quality. Dust buckets are also utilized to monitor dust fallout according to ASTM D739.

ArcelorMittal South Africa are not legislated to monitor ambient air.

Equipment and methods
An ambient station comprises of multiple measuring instruments to measure ambient air quality and meteorological data.

Quality Assurance and Quality Check
- Quarterly SANAS calibration of gas emissions measurement instruments.
- Yearly SANAS calibration of meteorological measurement instruments.
- Quality control manuals.

Equipment and methods

Parameters measured in ambient stations

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Vanderbijlpark Works Waste Site

The new Dry Metallurgical waste disposal site

Operations of the new waste disposal site are currently being conducted according to the site operational plan. As of December 2011 approximately 65% of the total estimated airspace at the site had been filled up. The waste management licence for this activity was issued and received.

Leachate collection dam

The H-H leachate collection system and associated dam was constructed with the new waste site to collect and contain contaminated run off and leachate produced from the new dry metallurgical waste disposal site and the new general waste disposal site. The leachate dam was constructed in line with H-H logon design.

The leachate dam is currently functioning well and there have been no leaks detected or any structural or wall failure to the dam. The water from the dam can be pumped to the Main Treatment Plant (MTP) for treatment and re-used in the Works as and when required.

New domestic waste site

- Site clearing and area preparation at the new domestic waste disposal site commenced in September 2011, and construction commenced in October 2011.
- The liner system (consisting of a 150mm in situ base preparation, 100mm sacrificial layer, 15mm HDPE liner, 64 kdbbms, a composite coping layer consisting of 450mm compacted clay layer (Rx 150mm layers) and a 100mm stiff leachate collection layer) has been completed, and the drainage systems are currently being completed.
- The construction of the new general domestic waste site was completed at the end of February 2012 at a cost of R7 million.
Vanderbijlpark Works
Tipping station upgrade

Project background

Forming part of ArcelorMittal South Africa Vanderbijlpark Works drive to reduce fugitive emissions, a new R 2.5 million steel frame overhead sprayer system was recently installed at Brig on the waste disposal site.

The purpose of this system is to aid in suppressing fugitive emissions arising from off-loading activities, involving both rail- and road- transported waste to the waste site. High pressure water is sprayed from the roof sprayer system upon commencement of the off-loading activities.
Vanderbijlpark Works - Open area rehabilitation: Fugitive dust reduction

Dust suppression trials

ArcelorMittal South Africa, Vanderbijlpark Works, is committed to reducing fugitive emissions and therefore has invited companies specialising in dust suppression to conduct trials on open roads within the works. The purpose behind the trials was to evaluate the performance of the applied products and to arrive at conclusions regarding the best possible dust suppression product and impacts that these products can have on the surrounding environment.

For dust suppression on unpaved roads suppressant products used include: lignin sulphate and calcium and magnesium chloride types. Four different companies have conducted dust suppression trials on the site. All of the trials were conducted on gravel roads.

Trial 1: Conducted on a section of the M4 weighbridge road located in the south-east section of the works. The product used was a formula of blended emulsified co-polymer and anti-modifiers. An emulsion is usually a mixture of two products that do not readily mix together.

The advantage of this product is that it binds finer soil particles of the unpaved road, thereby reducing the load of vehiclederived entrained dust. The disadvantage of using this product is the cost associated with road preparation prior to application.

Trial 2: Conducted on a section of the road passing the pool pits in the eastern side of the works. The product used for this trial was a Lignosulphonate. Lignosulphonates are derived from lignin, a naturally occurring polymer found in wood that acts like glue holding the cellulose fibers of pulp together.

Advantages of using this product is that it is non-toxic and non-toxic and lignin. Lignosulphonates tend to be more effective than Chlorides on gravel roads containing higher levels of sand. Laboratory leachate test results found high electrical conductivity (EC), Calcium (Ca) and Sodium (Na) concentrations which is the product’s disadvantage.

Trial 3: Conducted on a section of the west bank road leading to the waste tip stations. The product used to suppress the dust contained Calcium Chloride. The advantage of using a CaCl2 based product, is that it attracts moisture from the air, keeping the road damp even under hot, dry conditions. The negative of utilising a CaCl2 is that the leachate generated by adding these products to the soil road results in runoff that has a very high conductivity.

Trial 4: Basic Oxygen Furnace (BOF) slag was mixed with an additive to create a cement-like compound that can be used as a road building mixture. The advantage of this trial was that BOF slag, previously a co-product without value, is utilised as an aggregate to create the mixture resulting in the material being reused instead of being disposed. Pending further investigation, this could contribute towards less waste being disposed of internally, extending the life span of the waste disposal facility and reducing the burden of waste on the natural environment.

Currently laboratory tests are underway to determine the effectiveness of this product and to identify any possible impacts that may occur as a direct result of using the product.

Recently, pot hole repair trials were conducted to determine the feasibility of using the product for road applications.
Vanderbijlpark Works - Salt Cell

Introduction

ArcelorMittal South Africa Vanderbijlpark Works was issued with a Waste Management License (E2/9/11/1318/3) for the construction of a Salt Cell from the Department of Environmental Affairs (DEA).

Construction of the salt cell commenced in September 2013 according to approved design drawings. The inner liner system used for the salt cell consisted of 2 x cupulate geosynthetic drainage layers followed by 3 x 1.5 mm HDPE (High Density Polyethylene) layers. Filling of the salt cell took place during July and August 2014, the dry season, in order to keep the salts as dry as possible before capping took place.

The filled salt cell was sealed according to the design drawing requirements, after which it was covered with 2 x 150 mm compacted clay layers, 1.5 mm HDPE liner and 200 mm of topsoil that was hydro seeded with indigenous grass in March 2015. The salt originates from the evaporator crystallizer at the Main Treatment Plant (MTP) and from the Desalination Plant. The salts are generated when brine water from the Reverse Osmosis (RO) plant is evaporated and salt is crystallized.
Vanderbijlpark Works - Ecological diversity