

CITY OF BULAWAYO



BULAWAYO LOCAL ENVIRONMENTAL ACTION PLAN

2014 - 2018

City Hall Offices

Town Clerk's Department

Cnr L. Takawira / Fife St

BULAWAYO

Table of Contents

Table of Contents	i
Acronyms	iii
Acknowledgements	iv
Background	v
Street Map For Greater Bulawayo	vi
1 Introduction and Background	1
1.1 Location.....	1
1.2 Population.....	2
1.3 Land Tenure	3
1.4 Status of Soils.....	3
1.5 Topography	4
1.6 Climate	4
1.7 Natural Resource Assessment	5
2 Existing Infrastructure	7
2.1 Infrastructure	7
2.2 Roads.....	7
2.3 Water Works	7
2.4 Sewerage Works (Waste Water Treatment Plants)	9
2.5 Water Sources	10
2.6 Industry.....	10
2.7 Traffic Flow.....	11

2.8	Schools	11
3	Assessment of Environmental Issues	13
3.1	Environmental Issues.	13
3.2	Environmental Issues in Bulawayo	13
3.3	Priority Issues for the Plan Period (2013-2018).....	14
3.4	Cause- Effect Analysis	15
3.5	Illegal dumping of waste	17
3.6	Pollution	18
3.7	Illegal Sand & Gravel Abstraction	18
3.8	Stream Bank Cultivation & Illegal Mining	19
3.9	Trenching	20
4	Leap Implementation Plan.....	21
4.1	Leap Plan.....	21
4.2	Action Plans for Priority Areas	21
5	Monitoring and Evaluation	39
5.1	Monitoring & Evaluation Plan	39
	Annex	41
	List of potential Projects	41
	References	43

Acronyms

A 21	-	Agenda 21
AEI	-	Assessment of Environmental Issues.
BCC	-	Bulawayo City Council
BPO	-	Building Preservation Order
CBD	-	Central Business District
CS	-	Chamber Secretary
CBO	-	Community Based Organization
DES	-	Director of Engineering Services
DHS	-	Director of Health Services
DH &CS		Director of Housing & Community Services
EMA	-	Environmental Management Agency
FD	-	Financial Director
LA	-	Local Authority
LA 21	-	Local Agenda 21
LEAP	-	Local Environmental Action Plan
MDC	-	Maputo Development Corridor
M&E	-	Monitoring and Evaluation
MET	-	Ministry of Environment and Tourism
MLG	-	Ministry of Local Government, Rural and Urban Development
NAST	-	Northern Areas Sewerage Treatment
NRZ	-	National Railways of Zimbabwe
SAST	-	Southern Areas Sewerage Treatment
TC	-	Town Clerks

Acknowledgements

This Local Environmental Act Plan Document for the City of Bulawayo has been produced as a result of the consented efforts of the Bulawayo Residents Associations, Local Pressure Groups, Local Councilors, the Heads of Council Departments and the Environmental Management Agency, who attended a workshop to produce coin a draft for this document. The inter-departmental committee which comprised of W.Siziba. N Ncube, S. Ncube, N.E.Mpofu, I Dube, H.N Sibanda, N.B Ndlovu, T. Mkhwananzi, P.Ncube, N.Ndlovu, D. Moyo, A. Msebele, S.Dube, P.Ngwenya and C.Moyo saw the production of the final LEAP document which is now a public document which can be accessed from the City Hall Offices.

Background

Local Environmental Action Plan is a process which addresses an area's environmental threats or problems. It also involves the relevant sectors (stakeholders) of the local community coming together, identifying their problems and concerns, and working together to solve the problem. Agenda 21 (A 21) is a Sustainable Development Action Plan for the 21st Century which urges national governments to work with their citizens to develop a local agenda. LEAP and Local Agenda 21 (LA 21) put more emphasis on public participation in the identification of key issues leading to the preparation of action plans, however LA 21 addresses all elements of sustainable development whereas LEAPS dwell more on Environmental issues. A LEAP is a document that outlines the strategies and measures for the protection, restoration, rehabilitation and for the general management of the environment. The purpose of the plan is to facilitate and co-ordinate strategies, measures, plans and activities relating to the environment. Section 95 of the EMA Act states that every local authority is expected to prepare its own environmental action plan for the area under its jurisdiction. LEAPs are actually a response to LA21. This document has been prepared as a fulfillment of the requirement of the EMA Act.

The above mentioned issues were initially identified by the participants (Bulawayo Residents Associations, Local Pressure Groups, Local Councilors, the Heads of Council Departments and the Environmental Management Agency) at the LEAP workshop which was held in June 2009 in Bulawayo. The workshop also managed to prioritize the issues in terms of their impact on the environment and their prevalence in Bulawayo. This was done using a method called **Pair Wise Ranking**. This is a simple and straight forward way of ranking issues in terms of their importance. It can be interpreted and also be easily understood by an ordinary man on the streets

STREET MAP OF GREATER BULAWAYO
Scale 1:25 000

REFERENCE

Highway	Green Office	1
Road	Green Office	2
Road (Main)	Green Office	3
Road (Main)	Green Office	4
Road (Main)	Green Office	5
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Road (Main)	Green Office	100

CITY CENTRE ENLARGEMENT

1 Introduction and Background

1.1 Location

Bulawayo's geographical position within the southern African region is very central. Its location, occupying a midway position between the powerful economy of South Africa and the potentially strong economies of the Democratic Republic of Congo and Angola may prove to be a strategic and pivotal position in the long run. Bulawayo's strong communication and cultural linkage to South Africa is becoming a major advantage in terms of regional integration. Such areas include the North-South, the Trans-Limpopo and Maputo Development Corridors (MDC). Bulawayo has long been and is still regarded as the industrial and business capital of Zimbabwe and is home to the National Railways of Zimbabwe because of its strategic position near Botswana and South Africa. It is the gateway to Hwange National Park, Matopo National Park and Victoria Falls

Bulawayo lies at the hub of a national and regional transportation network and has potentially growing air links to other major countries such as South Africa, India, Russia, China, Malaysia, Australia and the greater Europe, and to most centers in Zimbabwe, other than Harare. It is the centre of the Matabeleland region, located 439 km Southwest of Harare.

Bulawayo, as Zimbabwe's second city exerts a strong influence over the western region of the country, with no challenge to that position, but the main hinterland consists of the dry and relatively under-developed provinces of Matabeleland North and South and significant parts of the Midlands province. Bulawayo functions as an important marketing and distribution centre for the primary produce of its region. The immediate peri-urban area of Bulawayo is closely tied to the city in terms of social and economic factors but is administered by five separate Rural District Councils and the Department of National Parks and Wildlife Management.

1.2 Population

The rate of population increase in Bulawayo has declined from the high levels of the 1970s (5.9% annual average growth) to an estimated 4.5% p.a. growth rate in the period 1982-1992. According to the latest population census of 2012 (preliminary report) which was done 10 years from the previous population census of 2002, population growth for the whole of Zimbabwe has been pegged at an average annual inter – censal population growth rate of 1.1%. Currently population for Bulawayo stands at 655 675 which accounts for only 5% of the total population of Zimbabwe, though it is believed to stand at 1.5 Million. This actually shows a decrease in population of Bulawayo with a growth rate of -0.3%. Projecting the population forward to 2015 requires making a number of assumptions. The lack of good data on population migration makes such forecasts difficult, as does the rising phenomenon of the HIV/AIDS epidemic. It is assumed that over the next 15 years the impact of a declining birth rate and an increasing death rate (largely caused by HIV/AIDS), deindustrialization of Bulawayo, Discovery of Gold and Diamonds in other cities and the ongoing migration to Diaspora will progressively reduce the natural population increase in the city to beyond -0.3%, where it will remain for a number of years. Whilst the birth rate will decline the actual number of births will continue to rise due to the increasing number of fertile women in the population. This will help to offset the rising number of deaths due to AIDS. It is assumed that rural to urban migration will continue to enhance Bulawayo's population. However the provision of a new water source and other positive long-term economic factors is expected to help fuel an overall growth rate for Bulawayo.

In terms of the characteristics of the population Bulawayo has a very young population and this is likely to remain a feature for a long time. It is estimated that Bulawayo currently has 167 092 households that is families living together.

1.3 Land Tenure

The City of Bulawayo occupies land measuring approximately 660km² in extent. One interesting phenomenon about municipal owned land is that some of it lies within the neighboring Rural District Council of Umguza (URDC). There is also some state land within the municipal boundary. Predominantly, land in Bulawayo is under freehold title and leasehold. It should be noted that there are some parcels of land which are privately owned within the operative Bulawayo Master Plan boundary and these are owned by various individual and companies. They are also zoned for various uses depending on their location and size in terms of the operative master plan and other relevant town planning statutes.

1.4 Status of Soils

The plan area is covered by the Bulawayo Greenstone Belt which originated from the region's oldest rocks known as the Basement Schists. These have been classified into the Lower and Upper Greenstones. The area has got a granitic-greenstone terrain which is mainly of felsites and quartz porphyry rocks. There is also some sand cover originating from the granite rocks. The most recent cover is the alluvium unit of thin deposits of muds, clays and fine sandy loams. Overlying these muds is a discontinuous layer of red sands derived from the Karoo and small ferruginous pebbles presumably from the Kalahari ironstone (Amm 194). There is also the Maitengwe Greenstone Belt in Botswana which is located to the south of Bulawayo and shares boundaries with Plumtree town hence influencing the type of soils found in Bulawayo and the neighbouring areas. The eastern part of the city is dominated by clay and grey loam soils. The western Part of the city is also dominated by red sandy loam soils. There are also some traces of clay soils dotted around this part of the city. The western part is also characterized by scattered rock out crops and hence some isolated gravel deposits towards khami dam

1.5 Topography

The city sits on the high plains of the Lowveld of Zimbabwe and is close to the watershed between the Zambezi and Limpopo drainage basins. The land slopes gently downwards to the north and northwest. The plan area consists of vast land which shares boundaries with Matabeleland south and Matabeleland North and it is dissected by a number of streams/rivers which include, Phekiwe, Matsheumhlope, Kwelameva and Umguza. The southern side is dominated by hills especially towards the direction of the Matobo Hills (Matopo National Park) to the south.

1.6 Climate

The City of Bulawayo is located on a relatively high altitude, and hence it has a subtropical climate despite lying within the tropics. Bulawayo features a humid subtropical climate though it is a drier version of the climate with the mean annual temperatures average around 19.16°C. Bulawayo is cooled by prevailing south easterly airflow most of the year, and experiences three broad seasons:

- a) Dry, cool winter season from May to August
- b) Hot dry period in early summer from late August to early November
- c) Warm wet period for the rest of summer from early November to April.

The hottest month is October; this month marks the peak of the dry season. The average maximum temperature ranges from 21°C in July to 30°C in October.

During the rainy season, daytime maximum temperatures average around 26°C. Nights are generally cooler, ranging from 8°C in July to 16°C in January. It enjoys long hours of sunshine extending for more than 12 hours during summer.

The city's average annual rainfall is 590mm, which supports a natural vegetation of open woodland, dominated by Combretum and Terminalia trees. The City experiences showers during the December to February period, while June to August is usually dry and cold. The City's location close to the Kalahari Desert,

makes it vulnerable to droughts and rainfall tends to vary sharply from one year to another

1.7 Natural Resource Assessment

Bulawayo has a rich and unique history which is an important resource for the city. The modern city was originally developed / pegged on the instruction of Cecil John Rhodes in an open plain along the Matsheumhlophe River, south of the burnt remains of the Ndebele Capital. Scatters of stones tools and rock paintings found around Bulawayo are a great source of information as far as history and archaeology is concerned. As such there is need to retain and enhance urban features that have important historical associations that reflect the evolution and development of the city.

In terms of the built environment the city has a number of old buildings (i.e. Bulawayo Grand Hotel, Exchange Building(1920s),Cenotaph , (1920s), CBZ Bank (8th Avenue), Standard Bank, and Dolores Store Building(1894), Bulawayo Club, City Hall, Central Police Station(19050) and some of them have since been placed under the Building Preservation Order (B.P.O) for purposes of preserving the ancient architecture and general history of the city for future generations to tap into such great knowledge.

The city has a historical site where the last king of the Ndebele people (king Lobengula) used to meet with his soldiers before proceeding to the king's palace which used to be where the Bulawayo state house sits today. The site is popularly known as Inxwala Cultural site and it is along Masotsha Ndlovu Avenue between Main Street and Lobengula Street. The site has been left vacant for years and years just to owner the last King of the Ndebele People. That piece of land can only be developed into a feature which will reflect the culture of the Ndebele state and nothing other than that.

The City of Bulawayo has a number of museums of national importance, including the Natural History Museum of Zimbabwe (NHMZ), and the Bulawayo Railway Museum, with the N.H.M.Z being one of the finest museums in the whole of Zimbabwe. This is situated within the centenary park which is located on the eastern part of the city, just on the periphery of the Central Business District (CBD) along Leopold Takawira Avenue. This is the largest park within the city and it has a, water fountain, Caravan Park (lodge), variety of vegetation and birds. The museum has a lot on display which include activities which were prevalent in the city i.e. mining and hunting, flora and fauna i.e. animals, birds, rocks, trees, grasses and a lot other historical artefacts.

There is Khami Ruins on the North Western part of the city, Old Bulawayo which is located to the South, just outside the city's current master plan boundary along Old Gwanda Road. The city also hosts the Tshabalala game sanctuary which is few minutes drive from the city on wide tarred road. The city has the Chipangali Wild Life Orphanage Home located within the vicinity, thus to the South East of the City along Gwanda Road.

The city of Bulawayo has some mineral deposits dotted around the city, mainly gold deposits. The city is rich and increased with gold mineral hence it is prone to a number of illegal gold panning activities by the local communities. Illegal gold panning is affecting productive land which could be utilised for various land uses such as farming, residential, commercial, industrial and recreational. Local rivers have been heavily affected by the activities and some of the city's infrastructure has not been spared from such.

2 Existing Infrastructure

2.1 Infrastructure

Bulawayo City Council like most of the country's urban centers has sound basic infrastructure though with isolated pockets of old and limited infrastructure which cannot stand the pressure exerted by the ever growing Zimbabwean population. The LA is currently making some frantic efforts to replace and rehabilitate some of the dilapidated infrastructure (water and sewerage pipe work).

2.2 Roads

The City in general is serviced by a standard hierarchy of roads ranging from national roads to the access roads. The total length of the road network of the city averages at about 2065km, of this figure 1471.8km are of tarred road, 495.2km are of gravel roads and 98km are of earth roads. The above figures are in terms of the draft report on Road Condition Survey by CNM- YBJ Consulting Engineers (2012). The Roads Condition Survey articulates the potential areas of rehabilitation as well as upgrading requirements. The government is in the process of repairing national roads. The City Council though with limited resources is also patching some pot holes and rehabilitating selected roads and intersections.

2.3 Water Works

The City of Bulawayo is currently serviced by three water works, namely Ncema, Criterion and Nyamandlovu Aquifer. At the Nyamandlovu aquifer the water treatment process is basically chlorination since it is ground water. Criterion water works has a design capacity of 180 000m³ of water but currently it has a capacity of 120 000m³ of water. Nyamandlovu aquifer had 77 boreholes initially, only 56 boreholes were rehabilitated. Out of a total of 56 boreholes only 40 boreholes are operational. Currently there is an average of 23-40 functional boreholes per day. These had a combined design capacity of pumping 8000m³ of water. The Ncema

water works has a design capacity of 40 000m³ of water but it is currently operating at half the design capacity. The water works infrastructure is long overdue for rehabilitation and also upgrading to match the growing demand. Some maintenance work was done within the last two years at Nyamandlovu Aquifer, Ncema and Criterion water works.

A simplified flow diagram of portable water

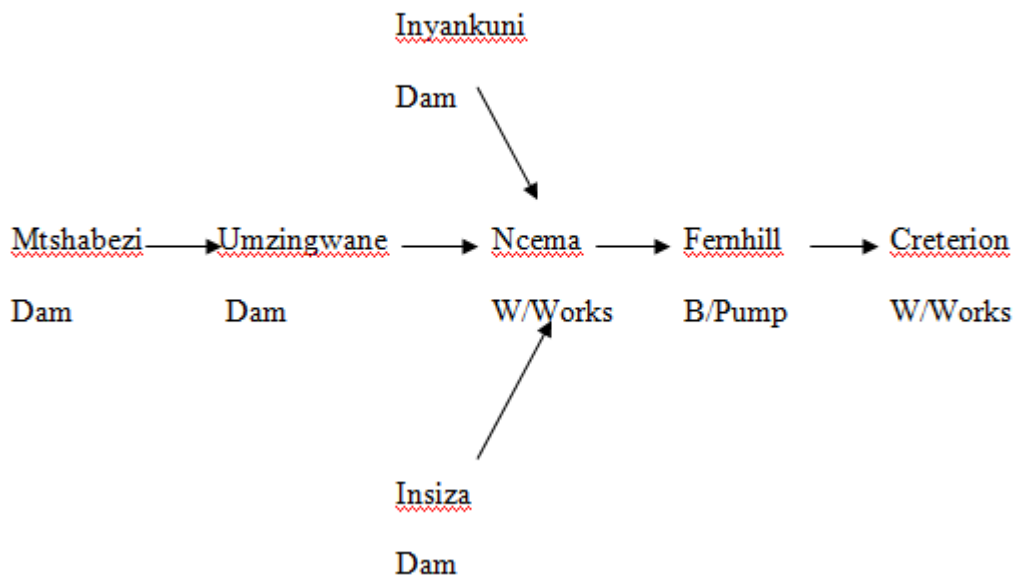


Figure 1

2.4 Sewerage Works (Waste Water Treatment Plants)

In general Bulawayo drains from South to North into Umguza River catchment with the exception of the South-west corner and part of the western side that drains into the Khami River catchment. The city has 8 main sewer catchment areas and these are Waterford, Thorngrove, Luveve, Aiselby 1, 2&3, and the Southern Areas Sewerage Treatment (SAST). SAST is located on the upstream of Khami dam. These waste water treatment plants are also supported by sewerage ponds, namely Magwegwe sewerage ponds and Cowdray Park sewerage ponds. Most of these plants are not operating at full capacity i.e. for Aiselby only 1 & 3 are functional at the moment. There is also a proposed additional prime sewer catchment area (waste water treatment facility), the Northern Areas Sewage treatment (NAST) which is to be located along old Victoria Falls road. This plant is still at design stage. The aged reticulation system feeding these sewage works is in the process of being rehabilitated. The overall length of outfall sewers is

approximately 208 km and that of the sewer reticulation is 1257 km. The city has a total length of outfall sewers and sewer reticulation network of approximately 1 465 km. the City has a proposal for the upgrading the outfall sewer pipes and it is tabulated below

Table 1 Proposed Outfall Sewer Pipeline Upgrading

Outfall Sewer Pipe Line	Length of the pipeline(km)
Aiselby 1 &2	26.8 km
Aiselby 3	11.3 km
Magwegwe	1.4 km
Thorngrove	1.2 km
SAST	15.4 km
Cowdray Park	10 km
Waterford	8 km

From the table above the Luveve Outfall Sewer Pipe Line has been left out because the hydraulic capacity analysis results for Luveve indicated that the outfall sewers are adequately sized for both present and future demands and hence minimal upgrading is required.

2.5 Water Sources

The City of Bulawayo has a perennial water challenge due to the location of the supply dams and the only perceived long term solution is the construction of the Zambezi water pipeline. The city has a total of 5 supply dams and one aquifer with a total of at least 40 functional boreholes. These are as follows; Umzingwane Dam, Inyankuni Dam, Upper & lower Ncema Dams, Insiza Dam, Mtshabezi Dam and Nyamandlovu Aquifer. These dams were all constructed before the 1980s, meaning for the past 30 years no dams were built in Bulawayo. Despite the water shortages, the city has sound water management practices.

2.6 Industry

Bulawayo is the second largest city in Zimbabwe and it has been an industrial hub of Zimbabwe over the years. This is evidenced by wide streets that can

accommodate high traffic volumes, a very sound railway network system which also influenced the location of the National Railways of Zimbabwe (NRZ) in Bulawayo. Most of the industrial areas are serviced by a railway and road to facilitate the movement of goods in bulk. Over the last decade the status quo has been taking a down turn owing to economic melt-down, and also the most recent deindustrialization of the city.

2.7 Traffic Flow

The city has wide roads with a grid iron pattern within the Central Business District (CBD) mainly which is meant to facilitates free flow of traffic within the CBD. This also promotes visibility and permeability within the CBD. Most of the intersections are controlled by traffic lights save for a few plain intersections which are meant to promote fast and free flow of traffic during off peak periods.

The city has a well developed network of ring roads which also facilitated a free flow of traffic; these include Bulawayo Drive, Circular Drive, Masiyepambili Drive, Cecil Avenue and Cowdray Park Corridor. In addition to the physical infrastructure that the city has put in place to facilitate smooth flow of traffic, the city went a step further and implemented a Public Transport Policy improve on the management of traffic within the city.

2.8 Schools

There are more than 174 registered primary schools in Bulawayo, of this 55% are government operated and managed, 24% under the Bulawayo City Council and the remainder is distributed between trust, church, Zimbabwe Republic Police, Army and Social Welfare. There is potential for more schools to be developed. The development of secondary schools also follows the same trend as the primary schools and they total to more than 40 Schools currently. There are a number crèches and pre-schools within the city.

3 Assessment of Environmental Issues

3.1 Environmental Issues.

According to the Government of Zimbabwe (2002) environment means “ the natural and manmade resources, physical resources both biotic and abiotic occurring in the atmosphere, lithosphere, water, soil, minerals and living organisms whether indigenous or exotic and the interaction between them”. The environment fulfills a number of functions in our lives i.e. agriculture, extraction of minerals, settlements, atmosphere, ozone layer, carbon dioxide, soils, rocks forests and it is also productive and protective in nature.

Most of the environmental issues arise due to unsustainable use and consumption of resources, inappropriate economic frame works, increasing poverty and HIV & AIDs and general inequality. Bulawayo as a city is not exceptional to environmental challenges; as such the City working with the EMA and other Stakeholders has sought to address some of its environmental issues through the adoption of LEAPs.

3.2 Environmental Issues in Bulawayo

The most prevalent environmental issues in Bulawayo are; Pollution(P) Stream Bank Cultivation (SBC), Illegal Mining (IM), Poaching (P) of wood, Veld Fires (VF), Illegal Abstraction of Sand and Gravel (ASG), Illegal Dumping of Waste (illegal release of toxic waste into the environment by industries and public littering) (IDW), , Collapsed Sewerage Reticulation Systems over flowing into water bodies (CSR), Deforestation (D), and Trenching (T). The above mentioned issues were initially identified by the participants (Bulawayo Residents Associations, Local Pressure Groups, Local Councilors, the Heads of Council Departments and the Environmental Management Agency) at the LEAP workshop which was held in June 2009 in Bulawayo. The workshop also managed to prioritize the issues in terms of their impact on the environment and

their prevalence in Bulawayo. This was done using a method called **Pair Wise Ranking**. This is a simple and straight forward way of ranking issues in terms of their importance. It can be interpreted and also be easily understood by an ordinary man on the streets

Table 2 Pair Wise Ranking

	IDW	CSRS	T	SB C	D	P	IM	ASG	VF	SCO RE	RAN K
VF	IDW	CSR	T	SB C	D	P	IM	ASG	X	0	9
ASG	IDW	CSR	IAS G	AS G	IA SG	P	AS G	X		5	4
IM	IDW	CSR	T	SB C	D	P	X			1	8
P	IDW	CSR	P	P	P	X				6	3
D	IDW	CSR	D	D	X					4	5
SBC	IDW	CSR	SBC	X						3	6
T	IDW	CSR	X							2	7
CSR	IDW	X								7	2
IDW	X									8	1

From the pair wise ranking above it is clear that all the environmental issues that were identified in Bulawayo illegal dumping of waste followed by collapsed sewerage reticulation system, pollution, abstraction of sand and gravel are the most severe challenges facing the city. These are of high impact and very detrimental to the environment as a whole (biotic and abiotic), hence the urgent need for the city of Bulawayo to craft this document which will clearly state how and when the LA intends to address these issues.

3.3 Priority Issues for the Plan Period (2013-2018)

These are environmental issues which Council deem to be very critical hence calling for urgent attention. Such issues cannot be shelved for some other time because their situation is very detrimental to the environment and life in general. These issues have been tabulated below in their order of importance

Table 3

Issue	Department Responsible
Illegal dumping of waste	Health Services Department
Collapsed sewerage reticulation system	Engineering Services Department
Pollution	All Departments
Illegal abstraction of sand & gravel	Housing & Community Services Department
Deforestation	Housing & Community Services Department
Stream Bank Cultivation	Engineering Services Department/ Housing & Community Services Department
Trenching	Engineering Services Department
Illegal mining	Housing & Community Services Department
Veld fire	Chamber Secretary and Housing & Community Services Department

3.4 Cause- Effect Analysis

They are a structured and visual brainstorming tool designed to help to identify all the possible causes of the problem at hand and when completed, they provide a Map of the problems and are particularly useful when a team embarking on a diagnostic journey of issues affecting the environment.

Cause and Effect Analysis was devised by Professor Kaoru Ishikawa, a pioneer of quality management, in the 1960s. The technique was then published in his 1990 book, "Introduction to Quality Control". The analysis was originally developed as a quality control tool; however the technique can be used in other instances i.e. to:

- Discover the root cause of a problem.

- Uncover bottlenecks in a process.

The diagrams that are created with Cause and Effect Analysis are known as Ishikawa Diagrams or Fishbone Diagrams (because a completed diagram can look like the skeleton of a fish). Identify where and why a process is not working.

3.5 Illegal dumping of waste

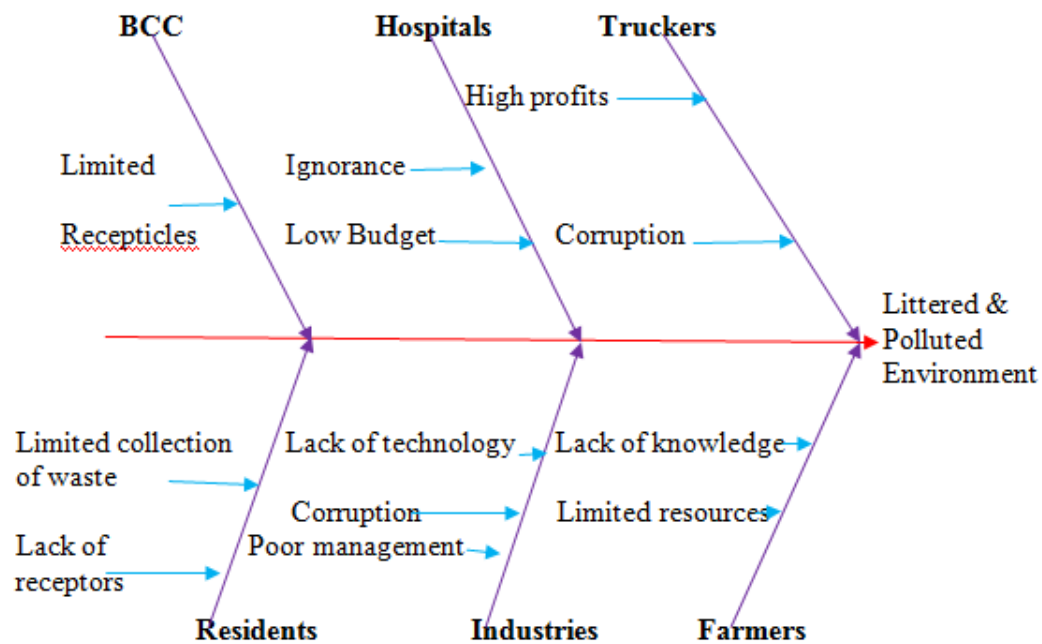


Figure 2

3.6 Pollution

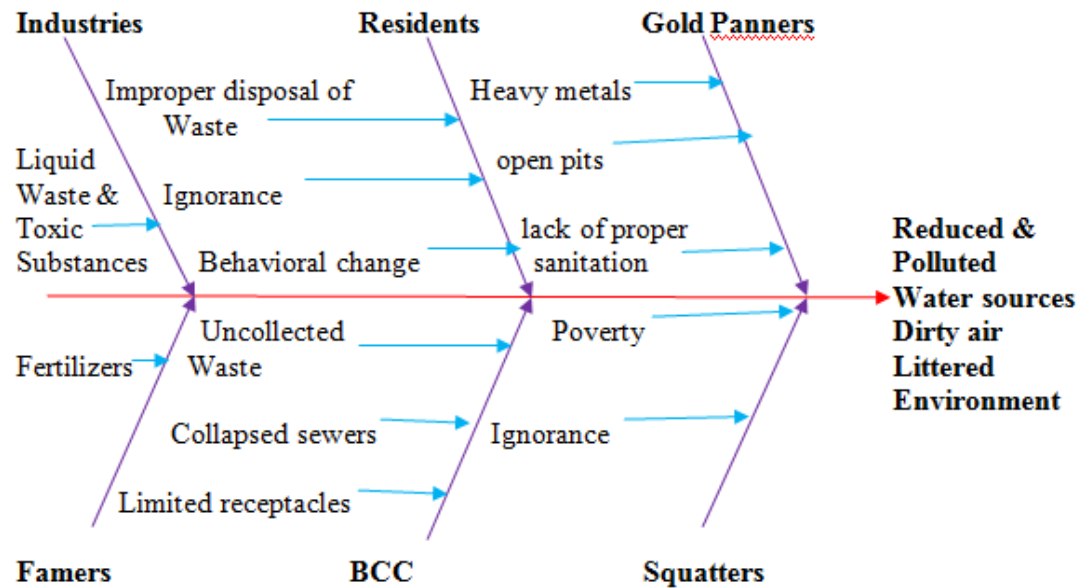


Figure 3

3.7 Illegal Sand & Gravel Abstraction

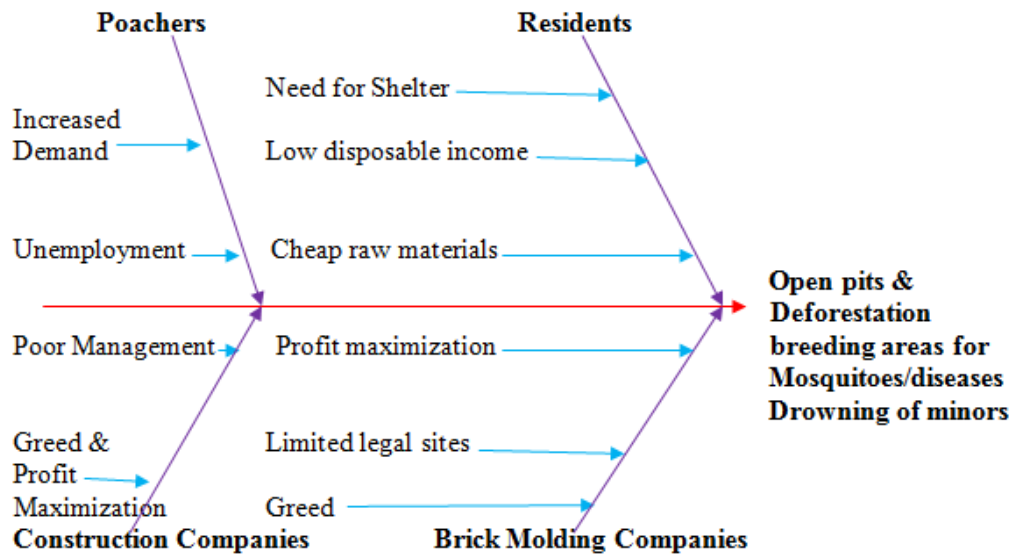


Figure 4

3.8 Stream Bank Cultivation & Illegal Mining

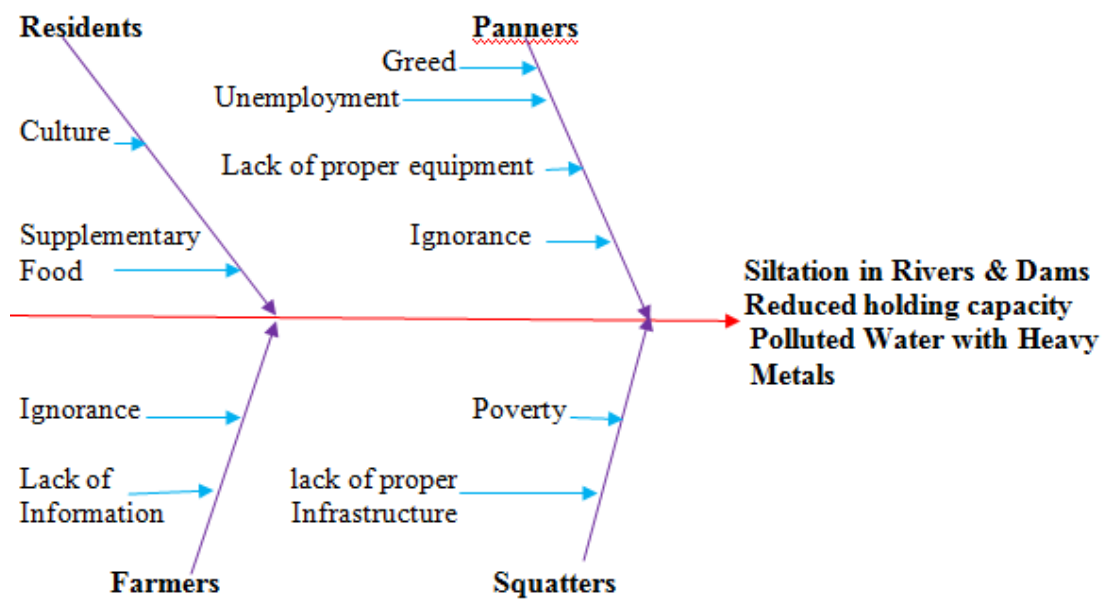


Figure 5

3.9 Trenching

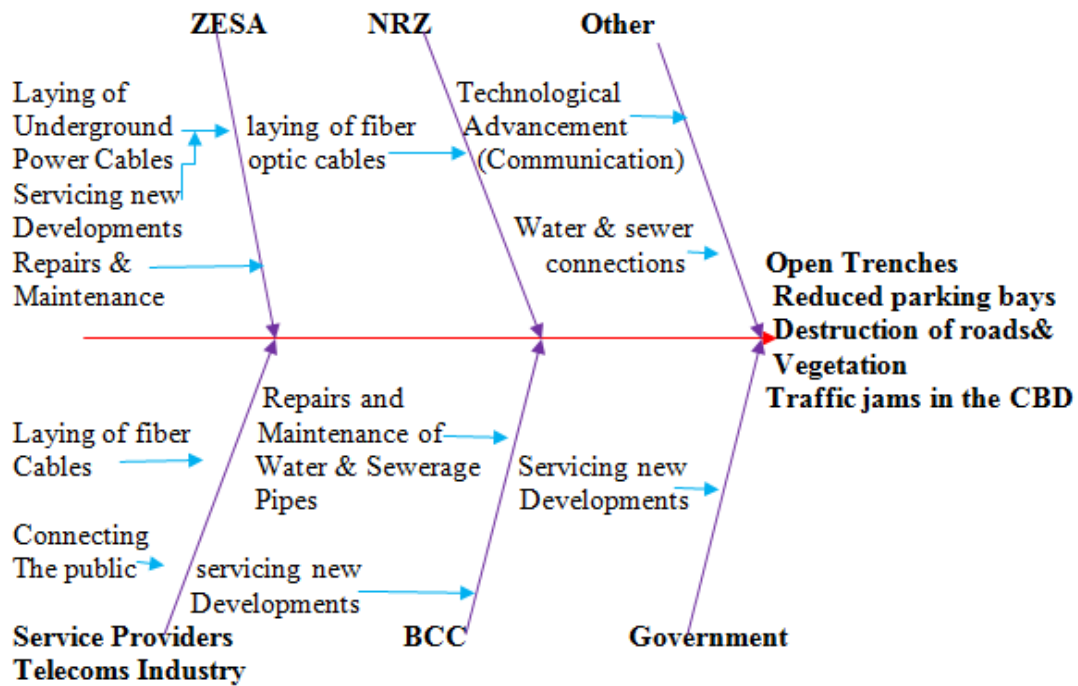


Figure 6

4 Leap Implementation Plan

4.1 Leap Plan

This is the plan of action for addressing the local environmental issues. These strategies have been specifically coined for the City of Bulawayo with most of the activities tabled for implementation by specific departments. These strategies have been designed to tally with the respective budgets and thus why some of the issues have been left out because of limited funds. Only issues that have funding have been considered since this is a functional document which shall be implemented within a given time frame.

4.2 Action Plans for Priority Areas

Since Council has various departments with different responsibilities, the implementation plans have been structured in such a way that those that fall under the same department are grouped together for easy budgeting, implementation and monitoring purposes. The plans are as follows:

E 1: SAFEGUARD THE ENVIRONMENT

ENVIRONMENTAL CHALLENGE	TASKS	BY WHOM	WHEN	DURATION	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET	COMMENTS
Industrial Liquid Waste Management	<ul style="list-style-type: none"> - Revised By-Laws to ensure and strengthen effluent quality monitoring programmes by - Levying industries with materials that overload treatment plants and also destroy sewer infrastructure - Trade Effluent - Tariffs/Polluter pays principle - Prosecuting/fining abusers of the 	<ul style="list-style-type: none"> 1. B.C.C 2. Captains of industry 3. EMA 4. NSSA 5. NUST and other Institutions of Higher Learning 	2014	<ul style="list-style-type: none"> December 2014 	<ul style="list-style-type: none"> - Spot fining system in place - Industrial waste management system in place - Compliant waste-water from WTPs 	<ul style="list-style-type: none"> - Improved compliance to sewer discharge standards - Fewer incidences of discharges to water courses - Improved quality performance of municipal wastewater plants - Improved quality of reclaimed water from WTPs 		<ul style="list-style-type: none"> 1. Auto Samplers 2. Trade Waste Insp. Chemist, Technician, Sampler 3. Instruments (potable pH, DO, conductivity etc) 4. Testing Reagents 5. Protective Gear 	<ul style="list-style-type: none"> \$20 000.00 \$80 000.0 \$13 000.00 \$5 000.00 \$2 000.00 	

	sewer system									
	<ul style="list-style-type: none"> - Enforce regulations governing pre-treatment and proper disposal of industrial waster - Commence/Strengthen education programmes on abuse of sewer system by industry to promote sound and effective industrial waste management practices 	<ol style="list-style-type: none"> 1. B.C.C 2. EMA 3. Captains of industry 4. Z.R.P. 1. B.C.C 2. NGOs/Donors 3. NUST 4. NSSA 5. EMA 6. Representatives of industry 	<p>On-going</p> <p>On-going</p> <p>On-going</p>	<p>On-going</p>	<ul style="list-style-type: none"> - Draft plans for new industries incorporating pre-treatment plants - Increase in number of functional ETPs put up - Increase in number of draft ETP plans submitted 	<ul style="list-style-type: none"> - Improved effluent quality discharged to sewers - Sound and effective industrial waste management practices 		<ol style="list-style-type: none"> 1. Vehicle 2. Stationery 1. Resource material e.g. fliers 2. Resource persons for conducting workshops 	<p>See above</p>	
	<ul style="list-style-type: none"> - Negotiate and enter into agreements with those industries that require special/alternative methods of liquid waste disposal 	<ol style="list-style-type: none"> 1. B.C.C 2. NGOs/Donors 3. NUST 4. NSSA 5. EMA 6. Representatives of industry 		<p>On an as and when required</p>	<ul style="list-style-type: none"> - Negotiated effluent disposal sites in place - High cost and 	<ul style="list-style-type: none"> - Sound and effective industrial waste management practices - Cleaner production practices 		<ol style="list-style-type: none"> 1. Vehicles 2. Computers and printers 		

	- Research into cleaner waste production technologies	7. Independent consultants 1. B.C.C 2. Independent Consultants 3. NUST and other institutions of Higher Learning 4. NGOs			energy savings obtained - Less amount of waste produced - Inter-company re-use of the waste produced	- Cleaner and healthier operating environment - Better economic returns				
Cross City canal/ stream and river pollution	- Repair collapsed sewers to prevent raw sewage flowing into streams	1. B.C.C 2. Donors/NGOs 3. Contractors			- Minimal flow in streams/canals during dry weather	- Reduced mosquito menace for residents living along these streams - Reduced stench problems		1. Field instruments (portable Laboratory) 2. Vehicle 3. Stationery		Share the above budget
	- Rehabilitate treatment works to improve	1. B.C.C 2. Donors/NGOs			- Reclaimed water meets E.M.A.	- Reduced discharge licence costs to				

	quality of reclaimed sewage	3. Contractors			standards	regulating authorities e.g. EMA.				
	- Revise By-Laws for effective policing of industry	B.C.C	December 2014		- Spot fining system for stream polluters - Less illegal dumping in streams	- Cleaner and healthier streams				
	- Clean streams to allow free flow of water	B.C.C	On-going			- Reduced mosquitoes menace - Less stench problems				
	- Educate industry and residents on dangers of discharging effluent and dumping waste into streams	1. B.C.C 2. NUST 3. Captain of Industry 4. Residents	On-going		- Environmental Protection Task Force for clean streams	- Restoration of Loch-Lion and Umguza Yacht Club - Restoration of Khami Dam as source of potable water				
	- Rehabilitate sewage pump stations to ensure that sewage is conveyed into treatment works	1. B.C.C 2. Donors/NGOs 3. Contractors			- Minimal flow in streams during dry weather					

	- Attend sewer chokes and bursts to minimise raw sewage inflows into streams	B.C.C.	On-going		- Minimal flow in streams during dry weather					
Total recurrent									120 000	

C1: PROVIDE ADEQUATE CIVIL PROTECTION SERVICES

LEAP IMPLEMENTATION PLAN FOR ENVIRONMENTAL PROTECTION AND ENFORCEMENT OF BY-LAWS

GOAL 8

ACTIONS ENVIRONMENTAL CHALLENGE	TOOLS	BY WHOM	WHEN	DURATION	OUTPUT	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Gold Panning	Daily patrols reduce illegal gold panning by 60%	BCC Rangers and Esigodini ZRP and other private Rangers affected	Daily Inclusive of week-ends and holidays	January to December 2014	- Arrest of gold panners - Confiscation of items/tools used in panning	Reduction in mine shafts and increase in prosecution of illegal panners	Number of items/ tools confiscated and arrests done	13 Rangers plus (Uniforms and salaries) 1 Vehicle (T 35)	118,248.00 50,500.00	
Vagrants and Squatters	Remove squatters and vagrants on Council land	BCC Rangers BCC Security and URDC Rangers	Daily inclusive of week-ends and holidays	January to December 2014	- Dumped rubbish - Muggings	- Reduction of illegal settlers - Reduced dumping and muggings	- Clean and safe areas - Reduction in muggings - Less complaints from residents	9 Rangers plus (Uniforms and salaries) 1 Vehicle (Van)	81,864.00 24,700.00	
Poachers for: -	Daily patrols to reduce poaching	BCC Rangers ZRP	Daily patrols in and around the Greater	January to December	- Firewood and sand sold in the	- Less unregistered vehicles and	- Increase in number of	31 Rangers plus (Uniforms and	281,976.00	

Wood, sand and game animals	of any kind	BCC Security and URDC Rangers	Bulawayo	2014	city - Unsafe meat sold in the open market	increased movement of rangers and other security personnel - Impounding of vehicles	vehicles in council installations - Complaints of deterrent fee by offenders - Payment done in revenue offices by the culprits - Open pits in and around Greater Bulawayo	salaries) 1 Vehicle (Van)	24,700.00	
Total Recurrent									201,369.00	
Total Capital									99,900.00	

E 1: SAFEGUARD THE ENVIRONMENT

SECTION A: SOLID WASTE MANAGEMENT

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Solid Waste Management	1. Remove domestic waste weekly	1. BCC - Cleansing Section	By end of December 2014	1. Compliant landfill	1. Clean residential area	1 & 2 Frequency of waste removal	1. 150 Loaders (salaries)	734,400.00	
1. Domestic waste	2. Remove waste in the CBD daily			2. Bins in public places	2. Litter free CBD	3. Existence of a lined and compliant	2. 130 Sweepers (salaries)	636,714.00	
	3. Proper disposal of				3. Improved knowledge on	sanitary landfill	3. 27 H/O (salaries)	449,686.08	
							4. 3 Plant Operators	59,129.28	

waste				proper solid waste		(salaries)	
Construction of Lined Sanitary Landfill				management	4. Number of areas where clean up campaigns were held	5. 18 Workshop staff (salaries)	176,514.12
4. Clean-up Campaigns						6. 10 Cleansing Supervisors (salaries)	233,754.00
5. Awareness Campaigns					5. Number of areas where awareness campaigns held	7. 4* Refuse Removal Vehicles	1 000 000
- give target							
6. Mobilisation of communities and formulation of Community Based Organisations (CBO's)					6. Number of functional CBO's in place	8. 2 Skip Haulers	300,000.00
7. Recycling						9. 20 Skip Bins	16,000.00
8. Provision of bins in public places- 2 bins on every intersection					7. Number of recycling units/ firms in place	10. 1000 Histreet litter bins	100,000.00
9. Provision of bins in all households					8. Number of bins in place	11. 2 Tipper Trucks	232,000.00
						12. 12 Vannetes	180,000.00
							9,368,197.48
							1,271,883.06

E 1: SAFEGUARD THE ENVIRONMENT

SECTION B: LIQUID WASTE

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Domestic Liquid Waste - Raw sewage that poses public health hazards	1. Examination of building plans to ensure all buildings have sanitary facilities 2. Sewage waste complaints follow-up	Environmental Health Practitioners	1. Ongoing 2. Ongoing 3. Ongoing	1. Buildings complying with approved plans 2. Complaints followed up	Healthy environment	1. Number of plans examined 2. Number of residential premise inspected 3. Number of complaints followed up	1. Human resources 2. Transport 3. Stationery	No direct	
Commercial and Industrial Liquid Waste - Liquid waste poses a public health	1. Examination of building plans to ensure compliance with building by-laws 2. Inspections of trading	Environmental Health Practitioners	1. Ongoing 2. Ongoing	1. Buildings complying with approved plans	1. Water bodies that pose no threat to human health and the environment	1. Number of plans examined 2. Number of trading premise inspected	Sampling equipment (Dipper, HDPE, 1 Piece12' Handle, 32oz, Coliwasa Liquid Waste Sampler,	25,000.00	

hazard	premises			2. Identification of buildings		3. Number and types of sampling equipment procured	15oz)		
	3. Follow-up to liquid waste complaints		3. Ongoing	with liquid waste problems					
	4. Procure sampling equipment for liquid waste monitoring		4. Ongoing	3. Complaints followed up		4. Number of Stakeholder meetings held			
	5. Liaison with relevant stakeholders e.g. trade waste inspector, S.H.E.Q Officers		5. Quarterly			5. Educational sessions held			
	6. Enforce Public Health Act		6. Ongoing			6. Deposit fine tickets issued and number of prosecutions			

SECTION C: HAZARDOUS WASTE

E 1: SAFEGUARD THE ENVIRONMENT

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Health Care Waste Management	1. Construct an incinerator	1. Cleansing	By Dec 2014	1. Functional incinerator	Healthy environment characterised by low risk of medical waste contamination	1. Medical Wastes Removal Completed Tasks Schedule	1. Waste bins 2. Vehicle for waste collection	1,800.00 25,000.00	
	2. Provide colour coded receptacles for			2. Colour coded bins in all					

	immediate waste collection at clinics 3. Incinerate all medical waste			health institutions		2. Number of illegal dumping episodes 3. Number of colour coded bins	3. Finances constructing incinerator 4. Labour	16,000.00	
Electronic Waste - Batteries - Other electronic gadgets	1. Set up database of major handlers of these 2. Education of residents on reuse and proper disposal 3. Provide specialised site for disposal of such material	1. E.H.Ps 2. Trade Waste Inspector	December 2014	Fewer batteries disposed of in domestic waste		1. Electronic waste generators database 2. Number of education sessions held 3. Functional specialised site	1. Manpower 2. 5 GPS gadgets 3. GIS system	5,000.00 20,000.00	

E 1: SAFEGUARD THE ENVIRONMENT

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Radioactive Waste	1. Creation of database of radioactive material users in the city	EHPs	Monthly				1. 3 Handheld detectors 2. Stationery	13,000.00	

	2. Detection of presence of radioactive waste in waste 3. Procurement of detectors 4. Education of industrialists and workers (awareness campaigns)						3. Manpower 4. Computers 5. Transport 6. IEC		
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SECTION D: AIR POLLUTION CONTROL

E 1: SAFEGUARD THE ENVIRONMENT

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENTS
Air Pollution Control	1. Identification, Measurement and Control of major pollutants such as:	1. Air pollution control Technician	Ongoing	Compliance to legislation	Clean and healthy environment	1. No. of inspections/ reports	1. 6* Environmental 5 gas analyser	60,000.00	
	NOx, SOx, COx, Ozone, Particulate matter	2. Environmental health Practitioners		e.g. Public Health Act, Factories and Works Act, EMA		2. Air quality analysis reports	2. 3* Portable air samplers	2,400.00	
						3. Air pollution complaints responded/			
							4. Nissan NP 200	16,000.00	

						attended to	5. Stationery	400.00	
Total Recurrent								1,271,883.06	
Total Capital								1,105,800.00	

LEAP IMPLEMENTATION PLANS – TRENCHING

E 1: SAFEGUARD THE ENVIRONMENT

ACTIONS ENVIRONMENTAL CHALLENGE	TASKS	BY WHOM	WHEN	DURATION	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET	COMMENT
Trenching	1. Law Enforcement - Municipal Police	1. BCC 2. ZRP 3. EMA	Immediate	Ongoing	1. Deterrent Prosecution System 2. Trenching permit management and supervision system improved	1. Improved compliance to road trenching standards 2. Reduced road pavement break-down		1. Vehicle		
	2. Use of common conduits by all service providers	1. BCC 2. Service Providers	Immediate	Ongoing	1. Reduced trenching frequency by service providers 2. Common area for ease of maintenance	1. Increased life span of road network 2. Improve rideability of roads 3. Eradication of dust		1. Recent road network data base 2. Stationery	100,000.00	

						in aesthetic areas caused by trenching				
	3. Monitoring to prevent dumping of waste into the drainage systems e.g. gravel	1. BCC 2. ZRP 3. EMA	Immediate	Ongoing	1. Deterrent prosecution/fine for those found dumping in drainage systems	1. Well defined storm drainage network 2. Reduced pothole formation caused by poor storm drainage roads		2. Monitoring staff		
	4. Enforcement of the time limit during which the trenches are left open	1. BCC 2. Service Providers	2014	Ongoing	1. Increase in work supervision planning 2. Minimal disturbance to traffic flow	1. Reduction in traffic congestion around trenching areas				
Total Recurrent									100,000.00	
Total Capital										

E 1: SAFEGUARD THE ENVIRONMENT

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	DURATION	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET	COMMENT
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CHALLENGE										
Liquid Waste (Sewage)	1. Pipe replacement due to age and condition 2. Pipe upgrade due to hydraulic capacity 3. CCTV inspection program 4. Rehabilitation and upgrading of WTW's	1. CoB Sewer distribution section 2. CoB ² Waste Water supplies section	March 2014	5 year plan, split into yearly programs	% decrease in sewer spillages by catchment	Improved waste water management	Reduction in sewer blockages and spillages	CoB sewer maintenance team	\$ 110,000.00	
			to						\$ 85,000.00	
			December 2015						\$ 20,000.00	
			January to December 2014						300,00.00	
			2014 - 2015		Improved inflows into WWTWs	Cleaner environment	Less EMA penalties			
					Improved treatment capacity of WWTWs	Amount of reclaimed water produced (ML)				
Sewage- Sewer Chokes and Bursts	- Upgrade sewer reticulation system by - Building more sand traps and de-sanding old ones - Repairing collapsed sewers	1. B.C.C 2. Donors/NGOs 3. Contractors			- Reduced sewer blockages - Increased volumes of sewage inflows into WTPs	- Restoration of aesthetic and recreational attributes of water courses and dams - Increased volumes of good quality reclaimed water from the WTPs		Pipes,tools and equipment	110,000.00	
	- Acquire new plant to help choke clearing	1. B.C.C 2. Donors/NGOs 3. Contractors			- Timeous attendance /reduced blockages	- Cleaner and healthier streams				
	- Enter into partnerships with private companies where necessary to help	1. BCC 2. NGOs 3. Private			- Timeous reaction/ reduced sewer blockages	- Cleaner and healthier streams				

	de-choke and de-sand clogged sewers	Companies			- Dry streams during dry weather					
	- Commence/strengthen education programmes on abuse of sewer systems	1. BCC 2. NGOs 3. Private Companies 4. Churches 5. Schools 6. Residents' Associations 7. EMA	On-going		- Early reporting of chokes and bursts - Reduced number of chokes	- Greater awareness of environmental problems				
	- Establish more gangs to allow timeous attendance to sewer chokes	1. B.C.C			- Timeous reaction and reduced sewer blockages					
Total Recurrent									615,000.00	
Total Capital										

C1:PROVIDE ADEQUATE CIVIL PROTECTION SERVICES

ACTIONS ENVIRONMENTAL	TASKS	BY WHOM	WHEN	DURATION	OUTPUTS	OUTCOMES	INDICATORS	RESOURCES	BUDGET (\$)	COMMENT
Out break of fires Veld fires	Conduct 65 fire safety awareness	1. Fire Brigade 2. EMA	Ongoing	1 year	Decrease in	Mitigate destruction of	Decrease in preventable	2 x Fire prevention		
Property fires	campaigns and	3. Forestry			incidents of	environment,	fire outbreaks	officers(T.B.E)	41,000,00	
Rubbish fires	community	Commission			fire breaks	loss of lives and property.	incidences	1 x utility vans	17,000,00	
Vehicle fires	education									

					Informed and supportive community		Well informed and educated community	1x laptop 2 x rims of bond	600 42,00	
							Decrease in false alarms Decrease in fire safety violations			
REGULARISATION OF GAS REFILLING / SELLING OUTLETS	Embark on fire safety inspections for gas refilling and selling outlets	Fire Brigade EMA Town Planning	Ongoing	1 year	Increase in public safety	Mitigate destruction of environment, loss of lives and property.	Decrease in fire out breaks and illegal gas outlets			
Total Reccurent									41 642.00	
Total Capital									17 000,00	

The action plans as indicated above have got different time frames depending on the activities involved. These are to be implemented by the respective departments and the inter-departmental committee will continue to monitor and evaluate the implementation of the LEAPs.

5 Monitoring and Evaluation

5.1 Monitoring & Evaluation Plan

Monitoring- Refers to a continuous process of measuring physical progress and financial expenditure in project implementation.

Evaluation-refers to an appraisal of project performance, which is done at periodic intervals during or after implementation stage.

This will be done by all departments with the interdepartmental committee taking the regulatory role with the help of EMA where necessary. Monitoring will be done at intervals depending on the nature of the activity and the given time frame.

There shall be some quarterly reviews for the LEAPs

All the departments shall be expected to complete and submit monitoring and evaluation forms. This shall be done on quarterly basis. Sample forms for M & E have been provided below. These forms have been designed as to give a summary of activities undertaken at any given time.

Table 4 A sample of a Monitoring template

Task /Activity	Baseline	Data Source	Budget	Duration	Target	Comments	Recommendations

Table 5 A Sample of an Evaluation template

Objective /Activity	Baseline	Data Source	Progress made	Quantitative output	Outcome	Impact	Recommendations

Annex

List of potential Projects

Council has a number of proposed projects which are waiting funding. These include residential areas, commercial areas, industrial areas, and sewerage ponds, duplication of both water and sewerage pipe lines, gravel and pit sand sites, cemetery sites. There are also some other projects which have a private initiative i.e. lodges, hotels, schools, recreational centers, travel centers, service stations and many others. These cannot be planned for in advance as their implementation is not certain and it cannot be confirmed well in advance. However some guide lines on their implementation can be set in advance as to guide their implementation whenever the need arises.

Council has a number of projects which are due for implementation and they are listed below:

- a)** Emhlangeni Medium Density Residential
- b)** R/E of Umganini Medium Residential
- c)** Emganwini High Density Residential
- d)** Magwegwe West High Density Residential
- e)** Luveve 5 High Density Residential
- f)** Magwegwe North High Density Residential
- g)** Cowdray Park High Density Residential
- h)** Egodini modernization Bach Street widening and realignment.
- i)** Cowdray Park Sewerage Ponds
- j)** Aiselby 1 & 2 Outfall Sewer Pipe upgrading (6. 8 km).
- k)** Aiselby 3 Outfall Sewer Pipe upgrading (11.8 km).
- l)** Magwegwe Outfall Sewer Pipe upgrading (1.4 km).
- m)** Thorngrove Outfall Sewer Pipe upgrading (1.2 km).
- n)** SAST Outfall Sewer Pipe upgrading (15,4 km)

- o)** Cowdray Park Outfall Sewer Pipe upgrading (10 km)
- p)** Waterford Outfall Sewer Pipe upgrading (8 km)
- q)** Landfill site
- r)** Waste transfer stations
- s)** Mining
- t)** Cemetery

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