



DOLOMITE RISK MANAGEMENT PLAN

**MERA FONG CITY LOCAL
MUNICIPALITY**

WHO SHOULD COMPLAINTS BE REPORTED TO?

During normal working hours : Office Civil Engineering: 018 788 9602
During week-ends/holidays : Standby Personnel
During an emergency (urgent) disaster : Manager Civil Engineering: S. Manganyi: 018 788 9780/

083

637 0803

E. LIST OF KEY PERSONNEL

NAME	DESIGNATION	TELEPHONE
N Moyo	Manager Civil Eng	018 788 9780/
G.Dirker	Manager: Water Services	018 788 9784 / 082 467 3854
A. Phephetheni	Roads & Stormwater	018 788 9771 / 082 857 9976
	Chief B. Inspector	018 788 9691

DOLOMITE RISK MANAGEMENT STRATEGY

DOLOMITE RISK MANAGEMENT

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SECTION A:

Background:

GEOLOGY OF GAUTENG

General info:

Dolomite occurs in various parts of the country
25% Of Gauteng Province Is Dolomitic
5% to 10% of S.A.
Commercial, Industrial Mining And Economic Centre Of S.A.
3-4 million people live on dolomite in region
Distribution of dolomite Merafong
50% of Merafong is underlain by dolomite.
Problems are occurring elsewhere in dolomite areas, but not on the scale of Merafong's problems.
What is dolomite?
Dolomite is a rock.
Calcium carbonate
Dissolves in water over millions of years.
Caves form in the dolomite.
Soil overlying the rock can collapse into the caves.

Caves ----->

SECTION B:

The problem!

What are sinkholes and dolines?

Sinkholes are:

Are catastrophic

Are typically circular

May be 1m to 100m in diameter

May be 1m to 100m deep.

May cause loss of life/damage to property

38 deaths, 32 in this area.

Dolines are:

Less sharply defined

Occur slowly

Tens of metres to kilometres

Typically 0,5 to 1m deep

Causes of sinkholes and dolines

Water infiltration into the ground e.g. from leaking water pipelines, sewers, storm water canals and pipes, ponding against houses, etc.

Artificial lowering of groundwater by mining activity, farming activity.

96% of sinkholes are man-induced.

Sinkholes on wet services routes

Ingress water triggers sinkhole

Ground water level draw down

Dolomitic profile showing soil filled fracture zones

Sinkhole formation due to leaking wet services

Sinkhole formation due to dewatering

SECTION C:

How do we deal with the problem?

To prevent or manage the situation, we need to understand that:

Sinkholes and dolines are rarely 'acts of God'.

Human activities cause sinkhole and doline formation.

Negligence often results in sinkholes/dolines.

Actions taken:

Sites are investigated and classified.

Sites are classified into risk classes.

Use three broad categories: Low, medium and high risk.

Precautionary measures are applied in relation to the risk.

Develop appropriately in relation to risk.

Do not develop high-risk areas.

SITE INVESTIGATIONS INVOLVE:

Field mapping
Gravity surveys
Drilling boreholes
Digging test pits
Laboratory tests
Analysis
Risk Zoning

INHERENT RISK CHARACTERISATION AND ANTICIPATED NUMBER OF GROUND-MOVEMENT EVENTS

Risk & land use
Development on dolomite is feasible:
it must be appropriate in relation to the risk

MERAFONG: DOLOMITE AREAS

Merafong
In excess of 400 sinkholes and dolines have developed in the Merafong Region caused by both infiltrating water and dewatering

SECTION D:

Legal considerations
Merafong City Council could face potential claims.
Current knowledge of the problem makes the Council, Councillors and officials liable if positive action is not taken.
Failure to take appropriate and urgent action may impose a legal liability in terms of:
The Occupational Health and Safety Act (Act 85 of 1993)
Dereliction of duty
Section 12 of Act 95 of 1998 (NHBRC)
Act 103 (1977) National Building Regulations
SANS 10400-B
Disaster Management Act
Municipal Systems Act 2000.
Section 152 of the Constitution of South Africa Act 108 of 1996, states "object of local government ...
Section 1(d)to promote safe and healthy environment."
Section 24 of the Constitution states: " Everyone has the right to (a) an environment that is not harmful to their health or well-being."
Section 4 of the Local government: Municipal Systems Act, No32 of 2000, Section 4(2) (i) states:
The Council of a municipalityhas the duty to ...(i) promote a safe and healthy environment in the municipality."
Council has knowledge of a problem and must act positively and be seen to act.
Council now possess knowledge ...i.e. 'harm is foreseeable'
Steps must be taken to mitigate the risk in problem areas.

Section 12, Act 95 of 1998 requires:

That all new Greenfields sites are investigated, Peer Reviewed and enrolled.

Council for Geoscience, STC and NHBRC must approve.

Includes all housing, including owner-builder.

Individual erven must now be approved and enrolled.

Merafong must have a DRMS.

Act is strictly applied.

Section 2.8.1 of Part 1 of the NHBRC Manual:

The risk of sinkhole and doline formation shall be establishedin townships or parts thereof (including individual erven) where dolomite is directly at surface or dolomite is covered by surficial rocks of thickness less than:

60m in non-dewatered areas with controls.

100m in dewatered areas or areas with no controls

NHBRC REQUIRES:

Geotechnical report

B4 certificate

Township services certificate

Township layout

Water, sewer and storm water design

Precautionary/foundation designs for D3 areas.

Dolomite Risk Management Strategy

Construction monitoring

Construction report

EF003 certificates for each stand.

A1 form if changing in Soil Site Class Designation

Water Precautionary Measures

Minimum standards for water precautionary measures are outlined in Section 2.8.3, Part 1 and 2, Home Building Manual, Revision 1, February 1999.

SECTION E:

Critical issues:

Safety matters

Legal considerations.

Administrative matters.

CRITICAL ISSUES:

Situation in Khutsong deteriorating.

Informal areas at risk

Council for Geosciences 1989 and Intraconsult 1997: "Freeze old Khutsong."

This did not occur.

Zone 3 and 4 areas –disaster area.

Poor storm water management, services of inappropriate design and depth due to poor slope

Any new areas (private or state funded) require a DRMS.

Blybank and Khutsong South developments require DRMS for approval.

Inadequate capacity to monitor and ensure quality control w.r.t.

infrastructure

Issue of individual stands in Khutsong, WELVERDIEND AND in Carletonville must be dealt with.

Future safe development requires a DRMS.

Fruitless expenditure on sinkholes

Targeted EXPENDITURE IS essential, avoid fruitless expenditure on capital projects in high risk (IHRC 6) areas

Must prevent loss of confidence in Merafong

NHBRC will require proof of a DRMS.

Need to ensure safety of Community.

Need to protect Municipal assets.

Need to protect private residential property.

Need to protect commercial property

Need to legally protect Council and officials.

SECTION F:

The Solution!

The way forward

Council has reacted positively

Council has already reacted positively to the threat.

Merafong is currently implementing a comprehensive, Integrated Dolomite Risk Management Strategy.

BASIC PRINCIPLE OF A DRMS

(DOLOMITE RISK MANAGEMENT STRATEGY)

HAZARD

+

RISK MANAGEMENT

=

ACCEPTABLE RISK

HAZARD

+

NO OR POOR RISK MANAGEMENT

=

UNACCEPTABLE RISK

Risk Management Strategy involves setting in place policies and procedures (by-laws) to reduce likelihood of sinkholes and dolines forming in dolomite areas of Merafong

Section 12 of Act 95 of 1998 requires a Dolomite Risk Management Policy signed by the Municipal Manager

(Typically 5 to 10 pages)

ESSENTIAL ELEMENTS OF DRMS:

Risk assessment of Merafong: Use existing data plus strategic new data where required.

Assemble data on sinkholes/dolines.

Formulation of planning development policy for township establishment in terms of risk.

Control development: Ensure appropriate development in relation to risk .

Prioritise Medium and Low Risk areas for development.

High risk areas for agricultural use or special commercial uses .

Check list for Building Plans and inspection of sites and services.

Appropriate infrastructure design in relation to risk. Formulate policy.

Appropriate and proactive maintenance in relation to risk.

Assess integrity of existing water bearing services (Initially samples to establish status quo followed by medium-long term programme).

Systematically budget for and upgrade inappropriate and old services.

Civil engineers to sign NHBRC Compliance Certificate for Services.

Design a maintenance policy/guidelines in compliance with National Standards.

Monitor GWL's and abstraction in sensitive areas.

Cover residential, municipal and commercial areas.

Strive towards compliance with GFSH-2 and new SANS 10400.

Need check list of submissions to Council for new developments e.g. Storm water plan, monitoring plan, etc.

Databank: Create an interactive Geographical Information System.

Determines budgeting for upgrading of civil engineering infrastructure.

Guidelines on reacting to and rehabilitating sinkhole.

Emergency Reaction Plan.

Dolomite Risk Management Committee.

Need education and awareness programme.

Need Vigilance.

DRM System involves:

Layer 1: Base geology

Layer 2: Gravity and borehole data.

Layer 3: Geohydrology

Layer 4: Sinkhole database

Layer 5: Dolomite risk zoning

Layer 6: Municipal buildings and private properties.

Layer 7: Water bearing services

Layer 8: Damaged property, buildings, evacuated areas.

Layer 9: Monitoring work.

Layer 10: Safe development priority areas

LAYER 2

To succeed,

The strategy must permeate every level and every aspect of Merafong Council's decision making in dolomite areas.

All maintenance and land use decisions within Merafong should be made in the context of the structured, holistic, risk management strategy

DRMS will assist in solving problems identified:

Individual stands.

Remove impediment to development.

Improve safety.

Assist in motivating further funding.

Reduce water wastage, saving money (e.g. PWD & RWB).

SECTION G:

Specific recommendations on way forward

RECOMMENDATION 1: FOCUS OF SAFE DEVELOPMENT

Khutsong South region should be focus of land policy.
Approximately 2000 ha currently under investigation between Carletonville and Welverdiend
Only area not on dolomite with be potential for safe development.
First 600ha investigated proven to yield safe land.
Blybank is developable but no additional land is available beyond the current approved area.
Small pockets of land within Carletonville can be considered for development. However, costs dictate more affordable forms of housing.
People wishing to live off the dolomite at Wedela, Fochville should be encouraged to do so.

RECOMMENDATION 2: INFORMAL SETTLEMENTS

Informal settlements are on high risk i.e. Risk Class 5 and 6 land.
People are daily at risk.
Upgrading institutions will not be approved due to unsafe land and high densities.
Council for Geoscience and NHBRC will not be able to approve and state will not spend funds in these areas.
All informal settlements should be relocated to Khutsong South and Extensions.

RECOMMENDATION 3: OLD KHUTSONG

Area is Zone 3 and 4.
Freeze Khutsong.
Storm water and sewers are a problem in Khutsong Proper.
Cost of replacing sewers is prohibitive and stability problems will re-occur.
De-densify sub-areas (Risk Class 5 and 6 areas) of old Khutsong to Khutsong South.
Assess costs and motivate to National treasury and Dept. Local Government and Land Affairs (Est. 1500 homes).
Communicate need to Community.
Present problem and seek financial assistance from Provincial and Central Government to finance.

RECOMMENDATION 4: Khutsong Extensions 2 and 3

Predominately Zone 3 Khutsong Extensions 2 and 3. Zone 4 sub-areas.
Freeze Khutsong Extensions 2 and 3.
Upgrade sewers and storm water in Khutsong Extension 2 and 3.

RECOMMENDATION 5: Residential stands sold in Khutsong Extensions 2 and 3

Predominately Zone 3 Khutsong Extensions 2 and 3. Zone 4 sub-areas.
Individual certification of each stand will be required. (NHBRC EF0003 certificate)
Due to poor stability conditions, Council for Geoscience and NHBRC unlikely to approve.
Council should provide alternative safe stands in Khutsong South to owners.

RECOMMENDATION 6: Community facilities, churches

It is recommended that new investments in Community Facilities, churches, etc. take place in Khutsong South and new Extensions.

Council should provide stands to replace those sold to Churches.

RECOMMENDATION 7: High risk land in Khutsong South.

Portions of high-risk land have been removed from the proposed Khutsong South development.

Must prevent re-occurrence of the current crises i.e. informal settlements on dangerous ground.
Must develop agricultural and commercial programmes. Seek agricultural subsidies.

RECOMMENDATION 8: UPGRADING OF SERVICES IN KHUTSONG.

Khutsong Proper, Khutsong Extensions 1, 5 and 6 is problematic. No further fruitless expenditure.
Relocate.

Khutsong Extensions 2 and 3: Upgrade storm water, sewer and water systems. No further development.
De-densify (backyard dwellings).

RECOMMENDATION 9: Stands within Carletonville sold by council to individuals.

All stands now require NHBRC approval and certification (Section 12, Act 95 of 1998).

For the issuing of certificate an investigation is required.

Expenditure on investigations improves safety and confidence in the area.

Empower potential purchasers. All potential buyers of stands in Carletonville from Council should be handed an information leaflet on the NHBRC requirements.

Recommend that investigation of new residential stands collectively undertaken by Council and sold with costs of investigation included.

RECOMMENDATION 10: EDUCATION CAMPAIGN.

Sinkholes in Khutsong and temporary closure of Carletonville Police Station following a sinkhole generated concern.

Create an awareness campaign.

Use leaflets with rates and taxes accounts

Use local media.

RECOMMENDATION 11: BOREHOLE CENSUS IN BOSKOP-TURFFONTEIN COMPARTMENT.

Boskop-Turffontein Compartment requires monitoring.

All borehole data should gathered.

All new borehole data in Khutsong South

RECOMMENDATION 12: SPECIFIC INCLUSION IN DRMS FOR KHUTSONG SOUTH.

Merafong City should pass a resolution committing itself to groundwater level monitoring in Khutsong South.

Keep Council for Geoscience and NHBRC informed.

Seek authority through by-laws to control abstraction (e.g. Centurion).

Require that all boreholes are registered.

RECOMMENDATION 13: Dolomite stability of Welverdiend.

Wolverdiend has not been assessed.

The area should be investigated and risk zoned.

Risk zoning is required for the DRMS.

RECOMMENDATION 14: DRMS for townhouse developments and complexes.

Body Corporates and inhabitants of Complexes should be made aware of the need for Risk Management on their properties.

An information sheet and checklist should be sent out or made available at Council to provide guidance.
By-laws.

RECOMMENDATION 15: All REPAIR WORK TO CURRENT INDUSTRY STANDARDS.

All repair work; maintenance work etc should meet the minimum standards of the SABS 400, the new SANS 10400 and Council for Geoscience and NHBRC requirements.

RECOMMENDATION 16: Dolomite Risk Management Committee

Establish a Dolomite Risk Management Committee
Include Municipal Engineer, Council Members, Planning Representative, Municipal Manager, Specialist Consultant, etc.

RECOMMENDATION 17: Rooipoort School?

Area of high-risk dolomite.
School specially built on mattress on rock, etc
Control situation?

CONTINGENCY PLANS AND EMERGENCY PROCEDURES

COMMUNITY SERVICES	SUPPORT SERVICES	INFRASTRUCTURE DEVELOPMENT	LOCAL ECONOMIC DEVELOPMENT	FINANCE
Public Safety and Security	Human Resources	Civil Engineering	Marketing	Income
Sports, Libraries, Arts, Recreation & Culture	Secretariat Legal Services	Electrical Engineering	Housing	Expenditure
Health & Environment	Administration	Fleet Management	Town Planning	Procurement

EXTERNAL SUPPORT SERVICES		
1.1.1.1.1 NAME	1.1.1.1.2 CONTACT PERSON	1.1.1.1.3 TELEPHONE NUMBER
West Rand District Municipality	E Koloji	011-9513000 / 083 267 6601
South African Police Services	Fochville –Lt Col I.Matamela Carletonville – Col Morebudi	018-7711106 / 0824924030 018-7881332 / 082 463 7046
South African National Defense Force	Petrus Groenewald	018-7874244 / 0827555015***
Mine Security	Goldfields – Billy Krugel Anglogold – Boet van den Heever Durban Roodepoort – Japie Storm	018-7818079 018-7003821 018-7899030
Hospital	Acting Matron Ms Fondo Acting CEO – Dr D Moloi	018 788 1813 018 788 1702/01
Mortuaries	Carletonville AVBOB – Mr M Meyer	018-7862216/6786/ 0829231893
General Suppliers of food and essential goods	President Supermarket (F/ville) – Mr B Synodonis Pick 'n Pay (C/ville) Pick 'n Pay (Jurie van Aswegen) Friendly Grocer – Manny Catelo SPAR – Tasos Athanasiatis SPAR – Johny Athanafiadis Shoprite – Jaap Appelman	018-7716300 018-7862040 018-7862040 018-7874761 018-7886233 018-7886233 018-7874845
Emergency Medical Services	J.Bence	011-2787901/0832865495

SECTION	NAME	ADDRESS	TEL. NO. (W)	TEL. NO. (H)
Strategic Executive Support Services	H Bredenkamp		0187889500	

SUPPORT SERVICES

Move to the disaster management centre
Report incident to office of the Executive Mayor and the Municipal Manager
Obtain all possible information relating to the situation
Co-ordinate action pertaining to administration, warnings and communication
Instruct relevant officials to go to scene if necessary
Communicate with relevant support services e.g. SANDF and SAPS

5.5.6 FINANCE

DESIGNATION	NAME	ADDRESS	TEL. NO. (W)
CFO	M Chauke		018-7889552
Manager: Finance			018-7889553
Manager: Income	D Schmidt		018-7889554
Manager: Internal Audit			018-7889621

Purchasing of foodstuffs and essential goods
Receiving of food, goods and equipment
Record keeping of purchased items.

5.5.7 LOCAL ECONOMIC DEVELOPMENT

DESIGNATION	NAME	ADDRESS	TEL. NO. (W)
Executive Director Economic Development & Planning	L.Peu		018-7889528 082 864 8996
Manager: Housing	N M Jofile		083 648 7595
Manager: Marketing			018-7889692
Manager: Town Planning	J E Smit		018-7889688

Liaise with media regarding disaster to ensure proper coverage
Co-ordination and provision of transitional areas and alternative re-location areas if necessary
Communication regarding emergency housing and evacuation

5.5.8 INFRASTRUCTURE DEVELOPMENT

DESIGNATION	NAME	ADDRESS	TEL. NO. (W)	TEL. NO. (H)
Executive Director Infrastructure Development			018-7889651	
Manager: Electrical Engineering	E Shange	42 Andries Street	018-7889655	083 6487611
Manager: Civil Engineering	N Moyo		018-788-9780	074 076 5480

5.5.9 COMMUNITY SERVICES

DESIGNATION	NAME	ADDRESS	TEL. NO. (W)	TEL. NO. (H)
Executive Director Community Services	SE Mantjane		018-7889642	083 509 7096
Act Manager: Public Safety & Security	P.Olivier		018-7889739	083 642 7379
Manager: Sport, Libraries, Arts, Recreation & Culture	F Seatlholo		018 788 9500	

After receiving a message regarding a disaster, mobilise the Disaster Management Centre (control room)

Move to disaster area with EMS personnel to evaluate

Mobilise personnel according to situations

Liaise with external support services for preparedness

Record keeping of injured

Emergency water provision including the purification and treatment

Mobilise clinic personnel

Provide emergency food, goods and equipment

Assist with transportation of the above to disaster and transitional areas

Medical doctors to assist with treatment and issuing of death certificates if necessary

Provision of protective clothing when handling corpses

Provision of emergency accommodation and/or temporary (transitional) camps

Establish and manage a pest control team if necessary

Constant communication between EMS – Disaster Management team and Executive Mayor's office

Assist with mass burials of corpses and clean-up actions.