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**RENOVATION OF THE JUKSKEI RIVER CANAL
IN
BERTRAMS, LORENTZVILLE, JUDITH'S PAARL
TO
BEZUIDENHOUT VALLEY**



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ACKNOWLEDGEMENT AND TRIBUTE TO PAUL FAIRALL

This document is dedicated to Paul Fairall who has been a major influence on my thinking and approach to environmental conservation for the last 13 years. I first met Paul in 2005 when he offered to help the Huddle and Environs Anti-Degradation League (HEAD League) with the Environmental Impact Assessment for the development of a township on the 182 hectare Huddle Park Golf Courses. The property contains at least 60 hectares of wetland and was zoned "Agricultural" and used for three public open golf courses. Largely with Paul's input we managed to get the Johannesburg Council (the then owners of the property) to declare that at least 120 hectares would be preserved for Public Open Space to be used for golf and other sport and recreation. My association with Paul has not only been extremely influential on my thinking, but our deep friendship is something which I have come to cherish. Since then we have worked on many projects together and I feel privileged to have been invited by Paul to assist with this one.

Paul Fairall is the Chairperson of the Jukskei River Catchment Area Management Forum which facilitates and coordinates storm water resource management in the Jukskei/Upper Crocodile Catchment within the Crocodile West /Marico CMA. Its main aim is to develop and share organizational models.

In May 2014 Paul Fairall wrote the Jukskei Forum Legacy Letter which is partially reproduced in Annexure . It summarises the historic and prehistoric background to mankind's settlement on the Witwatersrand

MARIAN LASERSON

April 2018

1. PREAMBLE

Soul of the Jukskei is a project for the rejuvenation of the Jukskei River from its source to Bezuidenhout Valley.

This document is a compilation and summary of background information regarding the Jukskei River from its sources to Bezuidenhout Valley. The information is gleaned from many sources – books, documentation, university studies, records of the Johannesburg City Council and the City Engineer's Department as well as personal research. It is hoped that information in this document will supplement the work of the specialists.

The geological and pre-history are briefly discussed as well as recent history of the changing landscape. An inquiry of Johannesburg Roads Agency ascertained that most of the archives of roads and storm water engineering in Johannesburg were lost due to having been digitised and in the multiple moves from offices to offices. This necessitated finding other source information, all of which are given in the bibliography.

Where available, illustrations are included as well as maps and aerial photographs.

2. INTRODUCTION

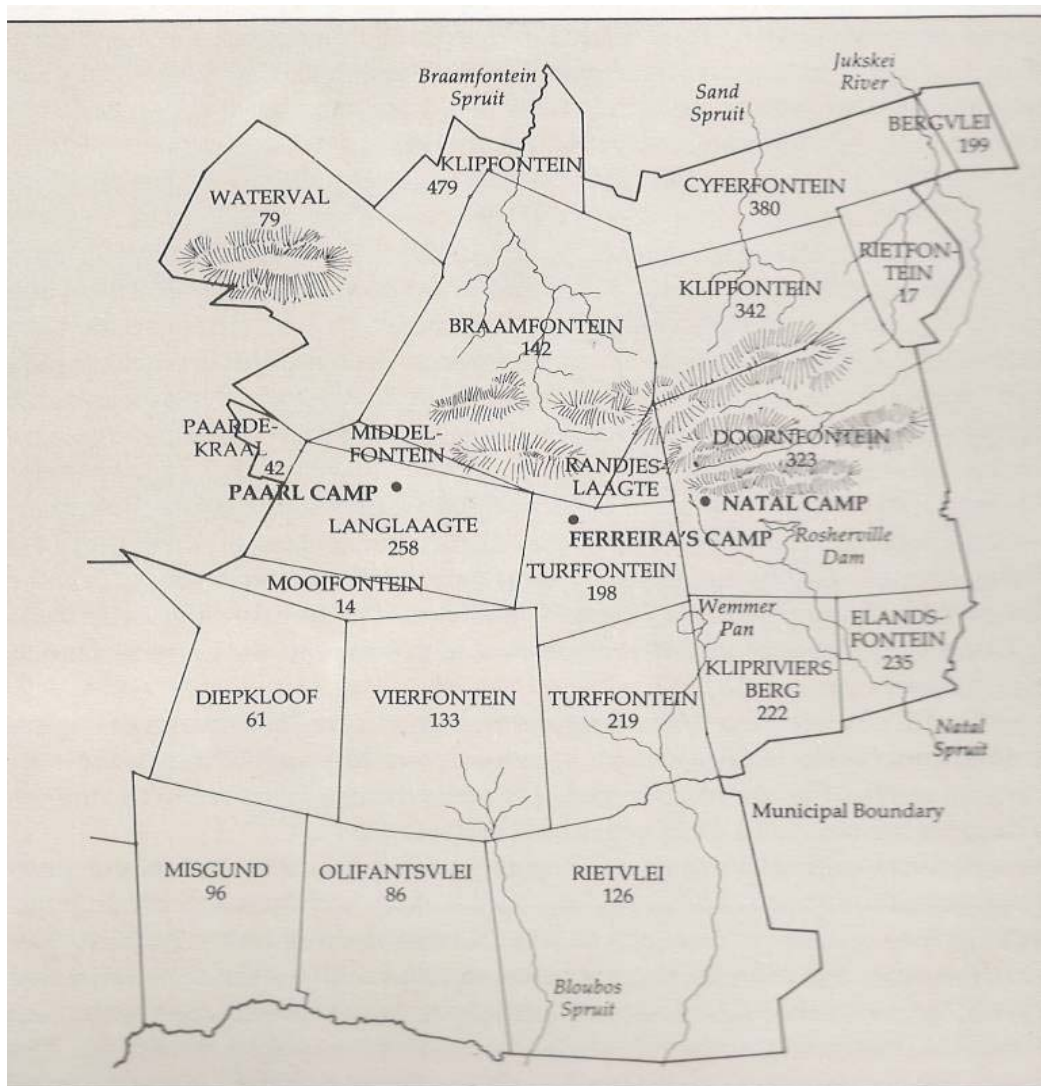
It is well known that Johannesburg differs from most other major cities in that it is not situated on the coast or on a substantial river. Johannesburg's location was dictated by the discovery of gold on the Witwatersrand in 1886 thus influencing the development of the city by farms, mines, mine dumps, and the dominating influence of the topography.

Thus the importance of Johannesburg's rivers is seldom acknowledged. They are small in comparison with other city's rivers which are navigable and rise hundreds of kilometres inland. Des Biggs, one of Johannesburg's City Engineers observed that: "If we look at the size of floods as a crude relative comparison, then we are looking at something like 1 000 cumecs for the Jukskei River, compared with 100 000 cumecs or more for a large coastal river." However there is a very short period of warning time for the Jukskei River - a few hours at most - compared with a warning period of days for coastal river floods.

There is a tendency to have more respect for larger rivers and to not build or occupy land close to these rivers. Unfortunately this is not the case with small rivers which are often considered as storm water drainage channels and are not understood in the same way. There is a tendency to build very close to the Jukskei River - often in its flood plain. This leads to loss of life and devastating damage to property.

Johannesburg has summer rainfall and very dry winters. Rainfall in Johannesburg is characterised by two main types - either short, sharp Witwatersrand thunder storms or slow drizzle which may go on for a few days. Generally it is the duration of the thunder storms and the quantity of rain which falls in a short time which causes most of the flooding and damage. For example, a storm of 30 mm in half an hour will cause the Jukskei to rise several metres, overflow its banks and cause severe damage and destruction. This subsides equally quickly leaving a trail of mud and damage and sometimes altered river beds.

Johannesburg's topography is also significant in the control of storm water. The city is built on a watershed running more or less east west, the Witwatersrand - freely translated as 'white water ridge.' Rain falling on the south of the ridge runs into the Klip River, the Vaal and Orange Rivers and into the Atlantic Ocean. Rain which falls on the north of this ridge, including the Jukskei River, eventually joins the Crocodile and the Limpopo Rivers and expels into the Indian Ocean.



Original farm boundaries, first mining camps and rivers:

Dr. G. M van der Waal from *Johannesburg – One Hundred Years*

3. GEOLOGY AND EARLY HISTORY OF THE AREA

The formation of the Witwatersrand is fascinating reading, dating back to about 4 300 million years ago when the Planet Earth settled on its path around the Sun. It was hot and radioactive elements decayed, giving off heat. The progress is described in *Geological Journeys* by Nick Norman and Gavin Whitfield. This book describes the formation of the unique geological phenomenon known as the Witwatersrand Supergroup and describes the Halfway House Granite Dome, stretching from the Orange Grove Ridge to Centurion and strongly influences the movement of ground water.

The Witwatersrand provided a suitable environment for the development of mankind, which is well documented. The grasslands provided good grazing ground for attracting game for hunting and there were caves for shelter and vantage points to see the game. Today there are remains of Middle and Late Stone Age and Iron Age settlements.

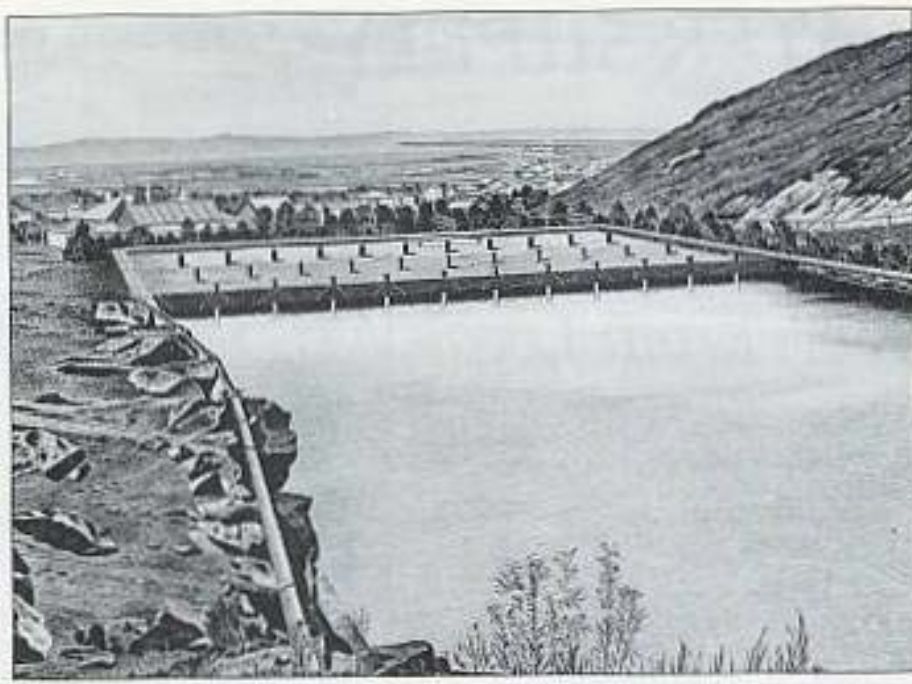
Around 1840 the Voortrekkers arrived in the Transvaal and established farms. They seem to have found sufficient water for farming. Originally this came from the Natalspruit but, as the population increased, the Jukskei became an important source of water.

The discovery of gold on the Witwatersrand is well-documented. Mostly it deals with the mines and the development of the City. However, a now out-of-print document—*The Mervyn King Ridge Trail* gives more detail about the source of the Jukskei and the surrounding developments. The study was initiated by the Planning Department of the Johannesburg City Council and sponsored by Murray and Roberts and Tradegro. It is written by Sally Argent and Nola Green, Deputy Town Planner of Johannesburg. A copy is to be found in the Johannesburg Central Library.

4. WATER SUPPLY

Water in the Natalspruit proved to be inadequate for the rapidly developing mining town. *The Mervyn King Ridge Trail* gives an account of how the Natalspruit, with the addition of wells and dams, provided sufficient water for the mining reduction works as well as for public buildings such as the hospital, gaol, police station and the diggers' camp. People who did not have direct access to a stream, spring or well were obliged to buy water from carts at anything from threepence to sixpence a small bucket, depending on how far the water had been carted. At times of drought the price rose to as much as two shillings and sixpence a bucket ... The leaders of the community then looked to Farm Doornfontein's other water source—the Jukskei River."

By 1888 the population had grown to 3 000 and the first storage reservoir was constructed over one spring of the Jukskei close to Joe Slovo Drive (then called Harrow Road) which is still in use today and has a capacity of 4,5 MI. 5.



Above: Waterworks reservoir looking south into Dourfontein (Donald Mackay Park).

From *Watershed Town-The History of the Johannesburg City Engineer's Dept*

In *The Mervyn King Ridge Trail* booklet there is a sketch of the marsh at Jukskei Springs. Unfortunately this has not been very well reproduced but, nevertheless, it is presented here for record purposes.



Early sketch of marsh at Jukskei Springs

The area was swampy and mushy and facilitated the construction of the lake at Ellis Park.



From: *A Johannesburg Album: Historical Postcards* by Oscar I Norwich

The lake at Ellis Park, complete with a landing stage and rowing boats.

In 1905 the Council named this area as Ellis Park in honour of J.D. Ellis, Chairman of the Parks and Estates Committee.

This eye of the Jukskei at Ellis Park was fitted with pipes to supply the town in June 1888. The uncovered lake had a capacity of 98 MI.

In *Watershed Town—The History of the Johannesburg City Engineer's Department* it is recorded that by the end of 1894 more reservoirs were constructed, the largest at Ellis Park on the site of the tennis courts. Despite these dams and reservoirs the demand for water exceeded the supply.

In 1901 the Town Council of Johannesburg was appointed and this facilitated the formation of the Rand Water Board which, in 1905, took over the assets of the water supply system and the water supply was then greatly improved.

By 1925 the major portion of the water supply was pumped into the reservoirs at Yeoville, Brixton and Berea. It is assumed that the water at Ellis Park is now taken by the Jukskei River and this is its main source of water, supplemented by storm water.

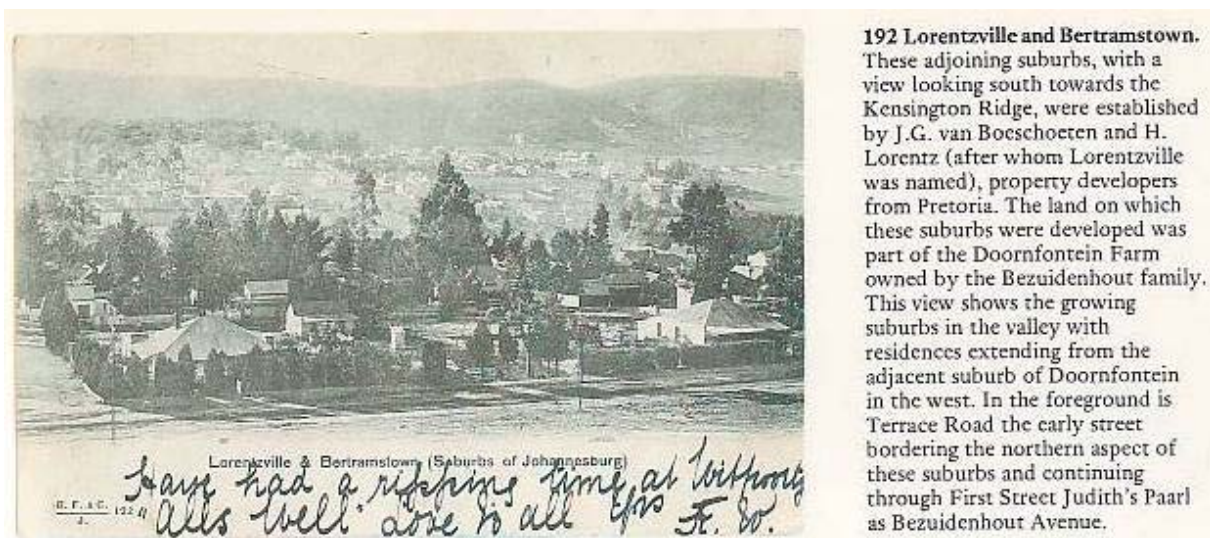
5. DEVELOPMENT OF TOWNSHIPS—DOORNFONTEIN, BERTRAMS, LORENTZVILLE AND JUDITH'S PAARL

Human settlements have a major influence on rivers. On January 1 1887 the Johannesburg Consolidated Investment Company established the township of Doornfontein. Soon Doornfontein's sparsely vegetated veld—typical of the mining town—took on a parklike quality. Thousands of trees were planted and the suburb became the select neighbourhood of mining magnates and successful businessmen. Mansions were built with beautiful garden settings.

On the East of Doornfontein, Bertrams, Lorentzville and Judith's Paarl were developed. Bertrams was established on 1 January 1889 by Robert Fuller Bertram, a successful stockbroker, and Norwich Union Life Insurance Society, the township owner. In partnership with H Lorentz, Bertram established Lorentzville on 1 January 1892. Both of these suburbs were considered to be "out in the country" and property owners bought up the groups of small stands and developed orchards, vegetable gardens and horse paddocks.

On 2 July 1909 the Bezuidenhout Family established Judith's Paarl, named after Judith. It is not known whether Judith was Fred Bezuidenhout's daughter or wife. The township owner was the United Building Society.

It is assumed that development had already taken place in Judith's Paarl because early postcards and photographs show the area quite well developed in the 1900s.



This undated postcard in *A Johannesburg Album* is probably from the 1900s

6. STORM WATER CONTROL

From *Watershed Town—The History of the Johannesburg City Engineer's Department* : George Grant and Taffy Flinn,

“Johannesburg is one of the few major world metropolises which keeps its waste-water and storm water separate—channeling the latter straight back into the streams and rivers, and treating the former by means of a sophisticated Biological Nutrient Removal Process.

“Storm water drainage has always been of prime importance. Its impact on the engineering design scene has grown steadily as the erstwhile rural environment has changed to a built environment with high percentage runoffs.

“An improvement to the quality of life can have a chain reaction on the existing situation. Suburban precast concrete walls and brick-paved driveways are examples of this phenomenon. The first experimental precast concrete wall was erected in Johannesburg in 1962. Within a short time there were so many of these walls that the direction of flow of storm water changed and caused problems where none had existed previously.

“At the same time, the greater expanse of driveways and paved areas has had the effect of increasing storm water runoff. Where previously rain water was soaked up by the grass and soft soil, it now has to be removed in drains.

“Every time another roof goes up in Johannesburg, or a carpark or a roadway is constructed, the percentage of impermeable area in the city increases. (In 1990 it was assessed as being 44%). This has serious consequences for Johannesburg's downstream neighbours, because the percentage runoff increases while the time of concentration of peak flow decreases.

“Originally responsibility for storm water design was vested in the Design Branch. In the early days it was the policy to canalize the main water courses and this was done in dressed stonework.” Example Betrams to Bezuidenhut Park. Subsequently concrete was used in the construction of storm water channels.

“Today, for aesthetic and environmental reasons canalization is no longer favoured. The idea is to retain natural looking stream beds and erosion is controlled using gabions, reno mattresses and flood retention structures.

“In 1905 when Mr GS Burt Andrews was appointed Town Engineer he set about providing streets with all-weather surfaces. Few streets had kerbs and gutters, and by 1909 these unkerbed streets presented the city with drainage problems. The Town Engineer resorted to building kerbs and gutters of minestone, with granite kerbs and concrete setts at corners. This pleased the public as it improved the look of the streets, kept the streets cleaner and the heavy loads did less damage to the macadam, all of which meant that the cost of maintaining the underground drains was reduced.

“Outside this area, even if roads had underground drains and thus would benefit from kerbing and guttering, they were excluded due to lack of funds.

“In 1911 storms caused considerable damage in the Bezuidenhout Valley Spruit. Much work had been done in the spruit using fascines of wire netting and stones, which were not altogether a success. Techniques must have improved over the years, as they are used extensively today—as gabions—with great success.

The early Design Engineers of Johannesburg were known as the Brains of the Department - “In 1895, when the first drainage scheme was designed by the Town Engineer and his staff, experts called to give opinions of the design, stated: “The general outlines of your Engineer’s scheme we have been unable to improve upon.”

Annexure C is a copy of the City Engineer’s Department minutes from 1932 dealing with the problem of storm water.

It is generally recognised in Johannesburg that all roads must be properly designed and built according to plans with suitable drainage and attention to detail.

7. SEWERS AND SEWERAGE

Johannesburg’s sewer system is thousand of kilometers long. In the upper section of the Jukskei River it runs parallel to the storm water channel. The insidious activities of the so-called Zama Zamas — illegal ‘miners’ - who deliberately block the sewer pipes with mattresses to mine for jewellery and cellphones, cause sewage ingress into the storm water system. One of these extremely bad areas is around Queen Street. The stench from the river is sometimes horrendous.

The Jukskei River also suffers considerable problems from the volume of litter and human waste emanating from hundreds of “Bad” buildings in the City Centre. In an article in the Mail and Guardian dated 2 January 2014 called *Searching for the soul of the Jukskei* Sean Christie wrote about the water emerging for the first time in the open channel at Queen Street. He described it as “blue-gray, as though someone had been washing a pair of new jeans in the water”

Wendy Bodman, in her remarkable work called *The North Flowing Rivers of the Central Witwatersrand 1975 to 1981*, mentions a phenomenon specific to the Jukskei River. She says: “On the Witwatersrand, urban streams became degraded because expediency and a need to control Highveld summer storms led to the use of water-courses as drains to carry ‘away’ storm water. In countries with a more uniform spread of annual rainfall, this storm water is first piped via sewers to sewage purification plants, where, after it is de-littered and purified, it is returned to the river system (the ‘combined system’.)”

8. EARLY DEVELOPMENT OF STORM WATER AND SEWERAGE IN JOHANNESBURG : Mr D.Leitch, M.Inst. C.E. Town Engineer

It is recorded in the Minutes of the Johannesburg Town Council on 13 May 1903 that the Medical Officer of Health and the Town Engineer recommended the abandonment of the bucket system in favour of a system of water borne sewage - called a "gravitation water-carriage system of sewerage" at that time. The Council decided to call for plans, specification and estimates for the construction of a system of drainage in which sewage and surface water could be disposed of in separate channels, and authorized an expenditure of funds on the making of preliminary surveys.

It is noted "that the lines followed in the drainage scheme are determined by the conformation of the ground." It was recognized that the ridge separated the north from the south drainage schemes. The Southern drainage scheme was divided into the east and west systems roughly divided by Hospital Hill and von Brandis Street to the municipal boundary. The Eastern rainfall drains eastwards into the Natal Spruit and the Jukskei River.

The Council resolution of 10 September 1902 resolved that surface water and sewage should be treated separately. It was recognized that "the systems must be dealt with together because it would be economical to lay both channels in the same cutting, placing the sewers on the one side of the surface water drains, but at a somewhat lower level.

The same Minutes continue with a discussion of rainfall. Although records are very scanty it is recorded that in 1898 in Doornfontein 4,6 inches (123 millimeters) fell in one hour and 0,96 inches (24 mm) in 15 minutes the previous year. However, the rainfall records were heavily dependent on the area which they covered. It was decided that because unusually heavy rain in short periods of time were not the norm the infrequency obviated the necessity to provide for them.

The Minutes also include a discussion on absorption of the rain water in the ground and the percentages of rain water which runs off due to impervious surfaces such as roofs, pavements and roads, etc. compared with different ground conditions such as gardens and ploughed farmland, etc.

Further it is suggested that "Generally speaking, except where spruities in other situations already exist, the storm water drains will be lain in the streets." "For small sized sewers, up to 15 inch (380mm) diameter, concrete or stoneware pipes will be used. For larger storm water sewers, culverts of open channels will be constructed smaller sizes of concrete and larger of rubble masonry. It was also recommended that "as the maximum flow occurs only for short periods, and at infrequent intervals, its erosive effect is not nearly so serious as it would be if the flow were constant. As these channels have to pass considerable volumes of water, it is desirable to obtain a high velocity of flow so that the section may be as much as possible reduced."

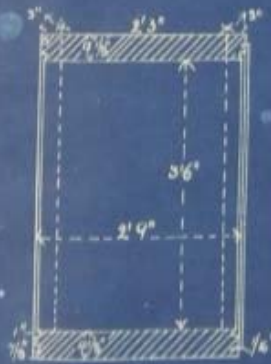
— TYPES of SEWER and CHANNELS. —

PLATE II

Storm Water Open Channel



Material
Concrete strengthened in the larger sizes by inserting steel rods or expanded metal



Material
Concrete strengthened by the insertion of steel rods or expanded metal

Scale 1/2" = 1'

Main Sewer

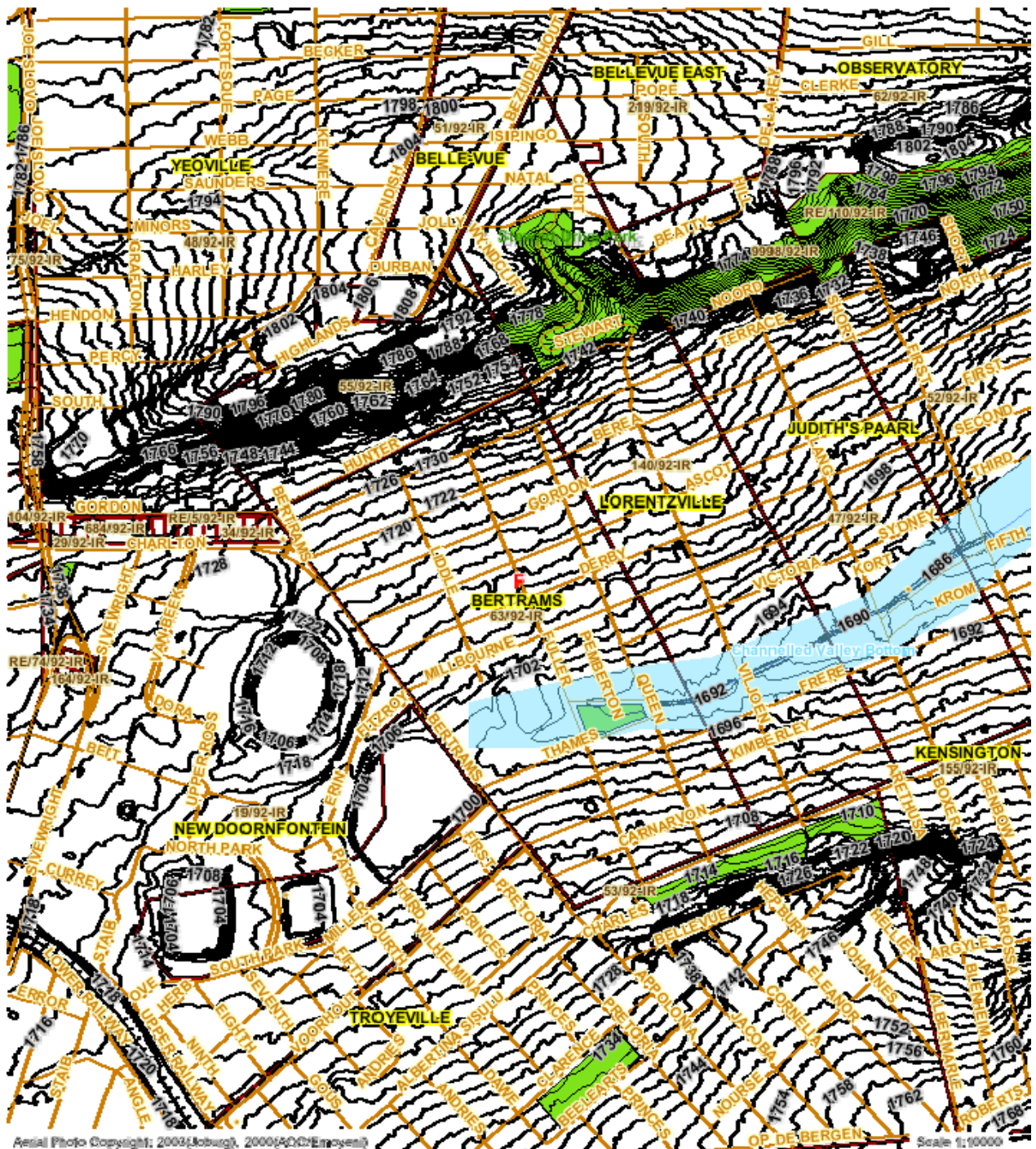
Hester
Town Engineer
16 1 03

Types of Sewer and storm water channels: City Council Minutes May 1903



The project area:

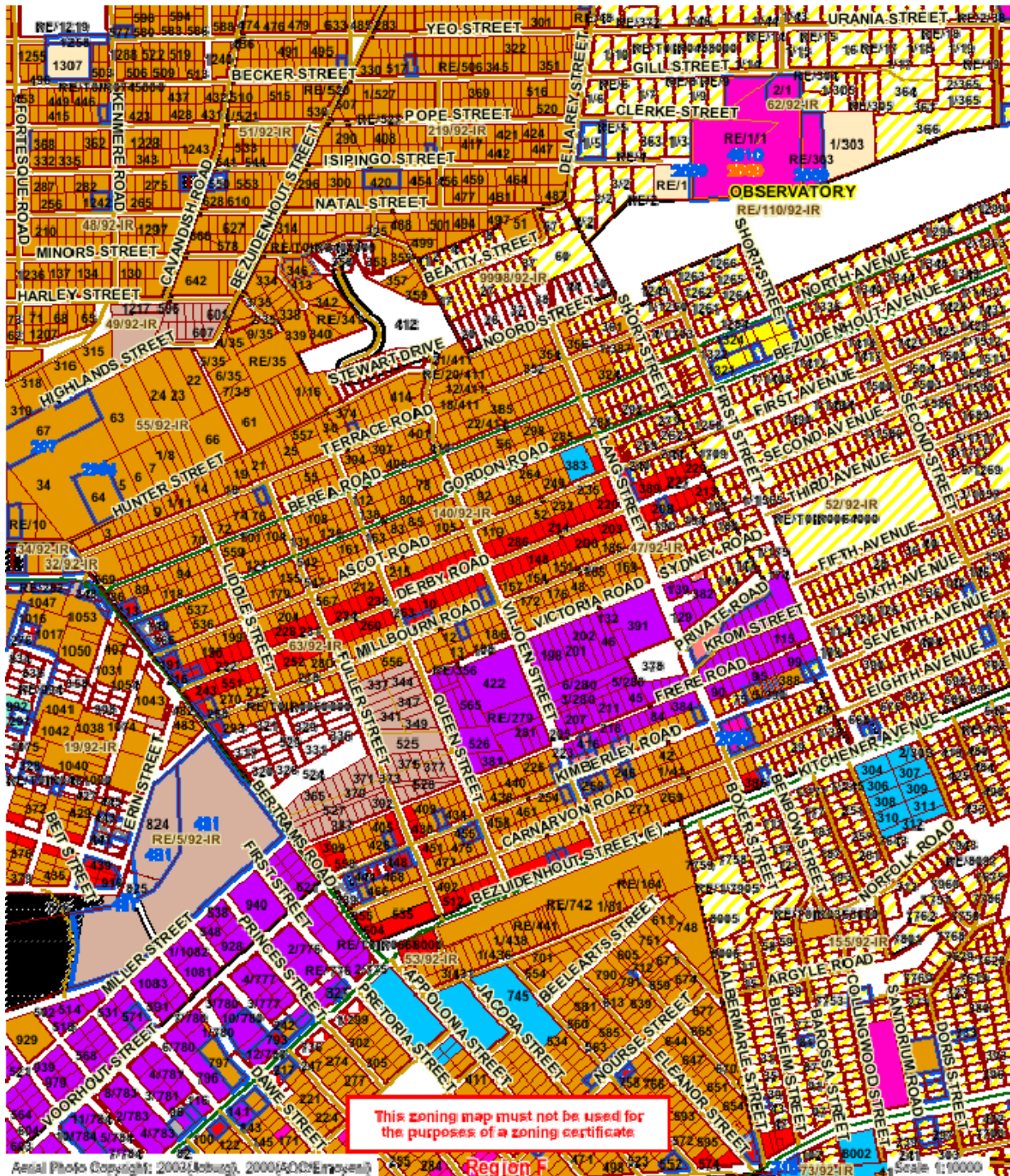
The start of the Jukskei River—Johannesburg GIS aerial 2015



The project area: Johannesburg GIS showing contours at 2 m intervals and wetlands. The green areas represent open spaces

The following maps show :

1. The Zoning of the area—for better understanding of the type of uses in the vicinity of the project
2. Ownership of properties in the project area and surrounds.



Zoning map of the area

Numbers in blue indicate Amendment Schemes.

Purple: Industrial 1

Blue: Educational

Red: Business 1

Tan: Municipal

Amber: Residential 4

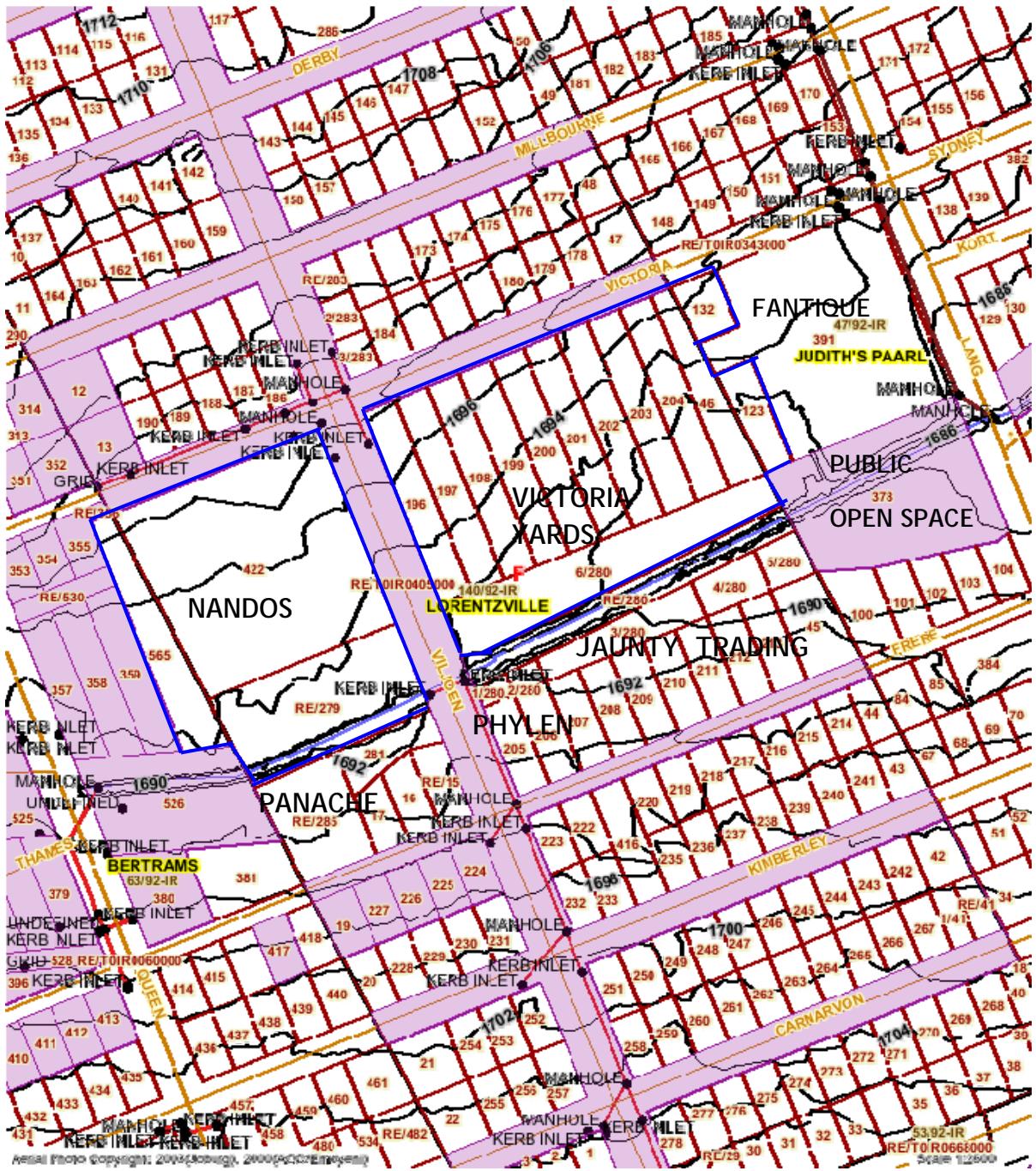
Cerise: Institutional

Orange: Commercial

Yellow: Residential 1

No colour: Roads, Parks, etc.

Surrounding uses in the vicinity of the project.



OWNERSHIP OF PROPERTY

- City of Johannesburg
- Storm water nodes and pipes

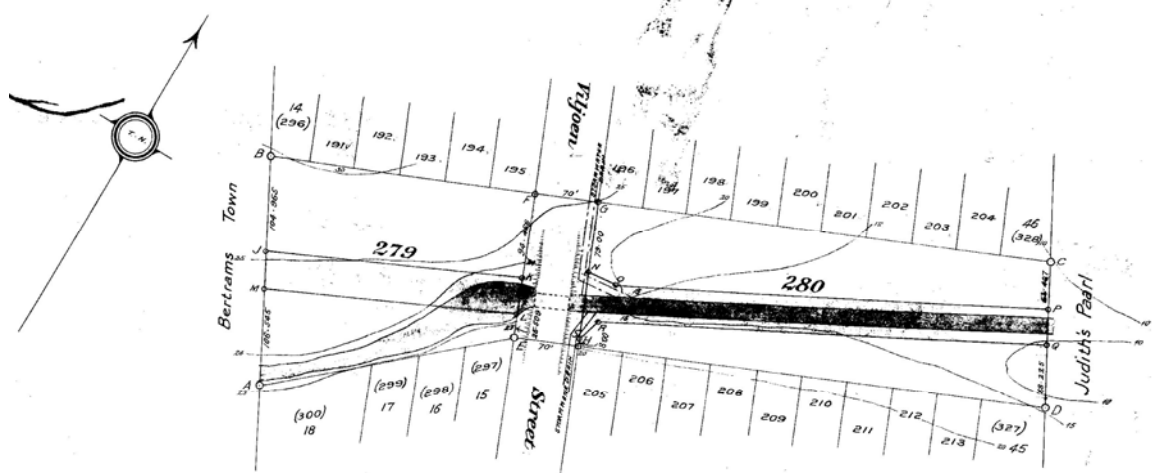
NOTES:

Nandos owns Erf 279RE, Lorentzville, which contains the river channel
 Jaunty Trading owns Erf 280RE Lorentzville which contains the river channel
 Erf 378 Judith's Paarl is owned by City of Johannesburg
 Erf 526 Bertrams is owned by City of Johannesburg – and Nandos encroaches on north-east corner

Erf No.	Township	Owner	Area m2	Municipal Value	Zoning
17, 18, RE/285	Lorentzville	Panache	4301	2 380 000	Industrial 1
281		Panache	773	1 660 000	Industrial 1
46, 196-204, 6/280	Lorentzville	Mazal Props Victoria Yards	19525	2 800 000	Industrial 1
123, 132	Judith's Paarl	Mazel Props Victoria Yards	With above	With above	Industrial 1
RE/15	Lorentzville	Hlobo Nicholas Batanda	591	840 000	Industrial 1
16	Lorentzville	Utility Elevators	568	2 000 000	Industrial 1
1/280,2/280,205, 206	Lorentzville	Phylen	10179	2 600 000	Industrial 1
280/3/4/5/RE, 207-213, 45	Lorentzville	Jaunty Trading	586	5 764 000	Industrial 1
355	Bertrams	Johannesburg	446	0	Industrial 1
357	Bertrams	Johannesburg	1088	300 000	Industrial 1
358	Bertrams	Johannesburg	1163	310 000	Industrial 1
359	Bertrams	Johannesburg	1239	0	Industrial 1
526	Bertrams	Johannesburg	3333	92 000	Industrial 1
RE/530	Bertrams	Johannesburg	446	0	Industrial 1
378	Judith's Paarl	Johannesburg	5455	1 530 000	Public Open Space
391	Judith's Paarl	Fantique	7734	2 950 000	Industrial 1

Properties surrounding Nando's by size, municipal value 2017, zoning

NOTE :- Stand N° 279 is subject to the Storm-water Servitude lettered J, K, L, M, N, O, P, Q, R.



STAND N°280

SIDES		ANGLES	
HG	160.00	H	90.00.0
GC	506.43	G	90.00.0
CD	160.73	C	95.28.0
DH	521.75	D	84.32.0

Area 571 sq Rds. 30 sq Ft.

Storm-water Servitude

SN	73.00	S	39.14.30
NO	33.372	N	73.3.40
OP	480.893	O	201.17.20
PO	40.008	P	91.7.0
QR	498.63	Q	38.53.0
RS	28.531	R	228.24.30

Area 145 sq Rds. 28 sq Ft.

WHOLE FIGURE

SIDES		ANGLES	
AB	251.581	A	76.52.40
BC	869.56	B	84.33.20
CD	160.73	C	95.28.0
DE	591.75	D	84.32.0
EA	284.043	E	198.34.0

Area 1 Mor. 453 sq. Rds. 69 sq Ft.

STAND N°279

SIDES		ANGLES	
AB	251.581	A	76.52.40
BF	293.13	B	84.33.20
FE	160.0	F	90.00.0
EA	284.043	E	108.34.0

Area 404 sq. Rds. 71 sq Ft.

Storm-water Servitude

JK	283.348	J	96.35.0
KL	40.025	K	87.58.20
LM	279.544	L	92.1.40
MJ	40.071	M	93.25.0

Area 78 sq Rds. 26 sq Ft.



GENERAL PLAN of a portion of the Township of **LORENTZVILLE**

comprising two stands numbered 279 & 280, and a portion of Viljoen Street being an amendment of that portion of the Township marked "JOHANNESBURG WATERWORKS ESTATE & EXPLORATION CO LTD" as appears on General Plan S.G. N°A 10/02, framed by Surveyor W.H.A. Pritchard in May 1902.

Situate on the farm DOORNFONTEIN N°24, District Johannesburg, Province of Transvaal & bounded as indicated above

The angular points of each stand have been properly defined on the ground

<p>N°A 458 Examined. The numerical data of this General Plan are sufficiently consistent</p> <p><i>J. Maxwell</i></p> <p>Surveyor General's Office Pretoria 18</p>	<p>Approved</p> <p><i>W. Wood</i></p> <p>Surveyor General's Office Pretoria 18</p>
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Surveyed in December 1920 by me

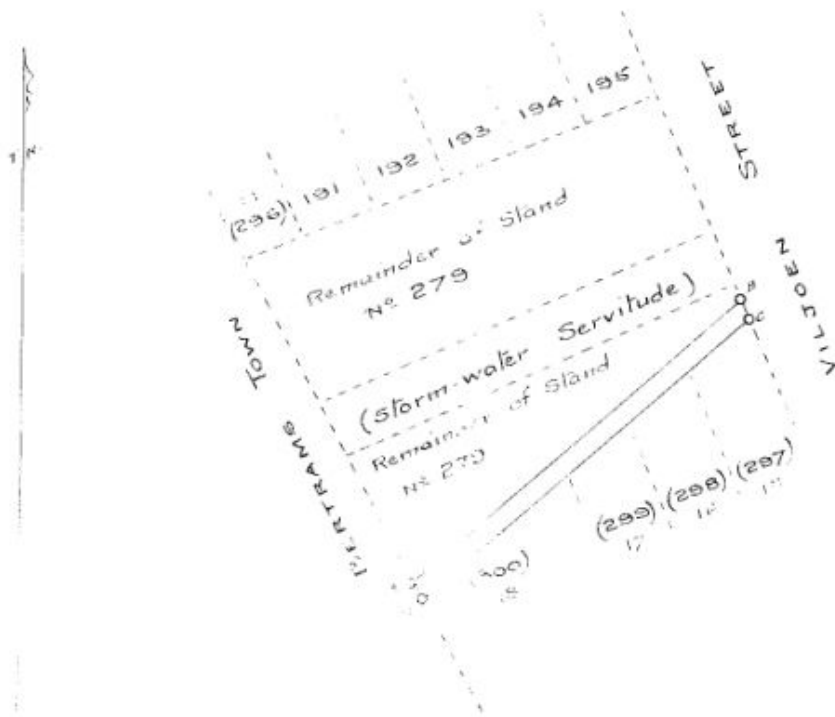
W. H. Pritchard

Land Surveyor

TT T.P. 1226

Form G.—Diagram Form for a portion of an Erf or Lot in a Township.

Sides.	Angles.
AB 285.277	A 103 7.20
BC 12.658	B 71 26 0
CD 284.043	C 108 34 0
DA 12.322	D 76 52.40



The above figure lettered **A B C D** represents
23 square roods **104** square feet of land, being portion of
STAND No. 279 in the Township of **LORENTZVILLE**
 situate on the farm **DOORNFONTEIN No. 24 District Johannesburg**
 Province of the Transvaal, as appears on ^{the General Plan} ~~Diagram~~ S.G. No. A. 458/22 framed by Surveyor
W. H. Pritchard in Dec. 1920 relating to Deed of Transfer
 No. _____ made in favour of _____
 and dated _____ . Bounded as indicated above.
 The angular points have been properly defined on the ground according to law.
 Surveyed in **May 1922** by me *P. Keaton*
 Land Surveyor.

FRAMED FOR THE PURPOSE OF A SERVITUDE

No. **A 1551** Examined. The numerical
 data of this Diagram are sufficiently consistent.
W. H. Pritchard Approved
 Surveyor-General.

This Diagram belongs to Deed of Transfer
 No. _____ made this day in favour of _____

 Registrar of Deeds.

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13. Various maps from the Johannesburg Geographical Information Services
14. Ian Barkhuizen: *The Oldest House in Johannesburg* - Unpublished article

1. DECLARATION

- I, Marian Phyllis Laserson, declare that:
- I act as an independent specialist in this report
- All the material has relevance to this project concerned with renovation and upgrading of a section of the Jukskei River and adjoining properties
- This research has been conducted using available information gleaned from various books, documents and reports, not necessarily published, as well as my own observation and photographs.
- All details are true and accurate to the best of my knowledge. I have only quoted from others when I have good reason to believe that their assertions are true and not conjecture or rumour
- I have expertise in conducting this specialist report including knowledge of the Johannesburg Town Planning Scheme, the National Building Regulations, the relevant aspects of the National Environmental Management Act and the South African Heritage Resources Act
- I undertake to disclose to the applicant and competent authorities relevant information which I have researched which may influence any decisions in the project
- I recognise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

A handwritten signature in black ink, appearing to read 'M. Laserson', is written over a light blue rectangular background.

Marian P Laserson

CURRICULUM VITAE OF MARIAN PHYLLIS LASERSON

- Education:** B. Arch (Wits) 1975,
3 year major in Sociology (Wits) 1972,
Diploma in Advanced Property Practice
- Current Employment:** Small town planning practice - applications rezoning,
consent, etc., some architectural consulting
- Previous Employment:** 1985 - 2005: Lecturer Department of Architecture and
Dept.of Construction Management and Quantity Surveying
Technikon Witwatersrand - now University of Johannesburg
- mostly in construction technology of buildings
(full-time Dept of Architecture 1985 - 1992 and part-time
thereafter)
- 1992 - 1996: Part-time lecturer at Technikon Witwatersrand -
Construction Technology I, II and III in Fire Brigade
Technology.
- 1975 - 1982: Development Control Officer and Social
Research, Department of Town Planning, Johannesburg City
Council
- 1973 - 1974: Lecturer Department of Building Science,
University of the Witwatersrand
- 1954 - to date: Architectural practice - occasional small
buildings and consulting
- Community Service:** A Rotarian of 26 years - a self-starter in projects which serve
communities from all walks of life.
- Active on various ratepayers organisations
Ward Committee member and assists several Ward
Councillors on matters of Development Planning and Urban
Management.
- Assists (and on the boards of) several NGO's and non-profit
organisations which deal with community development, skills
development and the environment.
The Gauteng Wetland Forum and the Jukskei Forum, for the
protection of our environment and rivers
- Personal:** Widowed—3 sons and 4 grand children

Stormwater.

Topographically the area occupied by the city is of very undulating character, there being numerous valleys and ridges. A unique feature is that valleys running due south eventually drain to the Atlantic Ocean, whereas those leaving the city in a northerly direction eventually discharge their waters into the Indian Ocean.

The Johannesburg Railway Station is situated 5,735 feet above the sea level, the highest point in the Municipal area being 5,970 feet and the lowest approximately 5,085 feet above the sea level respectively.

Statistics show the rainfall to average about 30 inches per annum, the rainy season being generally regarded as from October to April. Short torrential downpours are frequent.

The configuration of the Municipal area, together with the incidence of rainfall, have necessitated large expenditure in stormwater schemes and on bridges spanning natural watercourses. The capital expenditure on stormwater drainage is approximately £800,000.

The stormwater works carried out in the twelve months under review may be divided into three main classes:—

- (a) Enlargement of, alteration, or addition to the reticulation system in the Central Area.
- (b) Canalisation of natural watercourses.
- (c) Replacement of open drains by covered ones, and construction of pipe drains and minor drainage work.

Central Area.

The following drainage schemes in the Central Area were completed during the period under review:—

1. Quinn Street stormwater drain, which affords relief to the drains in the north-western portion of the Central Area.
2. Marshalls and City and Suburban stormwater drain, designed to cope with additional run-off from the Salisbury Claims Township area and south-eastern portion of the city.
3. Jeppe subsidiary stormwater drain, which will relieve the Natal Spruit of some of the stormwater from the north-eastern portion of the outer central area.

The drainage scheme to relieve the overcharged stormwater drain in Market Street West and to prevent flooding in the south-western section of the central portion of the city was well advanced at the end of June and will become operative at the commencement of the 1932-33 rainy season. The relief drain commences in Simmonds Street south of Frederick Street and traverses Marshalls and Ferreirstown to discharge into the Robinson Spruit canal just below the Robinson Bridge.

General.

Owing to the presence of numerous Municipal services in the streets in the central stormwater reticulated area, additional relief drains have, where the level of the outlet permitted, been located below all existing works so as to obviate costly alterations to these. The depth of cover thus available has permitted of the excavations being made in tunnel instead of in open cut. The excavated material is removed through shafts which at the same time form excavations for manholes. This method of construction has been found economical, and causes considerably less obstructions in busy thoroughfares and inconvenience to vehicular traffic than excavation in open cut would.

Latterly the use of precast concrete blocks has been adopted in place of concrete in situ or brickwork in the construction of the box culvert type of drain. The roof of the drain consists of precast reinforced concrete beams, placed and grouted in position after the walling has been completed. This method of construction permits of the work being done more expeditiously and economically than in concrete in situ or brick, and has generally been adopted in the case of covered drains.

Canalisation of Stormwater Dongas.

Progress was made in the canalisation of some of the many stormwater dongas in the Municipal area.

2007 5 7

A decked masonry drain now takes the place of the unsightly donga which formerly ran parallel to the Houghton Drive between St. John Road and the southern entrance to the Automobile Club. This work has made possible the widening and general improvement of the above Drive and its surroundings.

The spruit between the Zoo and the Zoo Lake has disappeared by the construction of a covered masonry drain and levelling off of surrounding ground. In order to prevent siltation in the Zoo Lake, a silt trap in the form of a lakelet has been constructed at the lower end of the drain mentioned and adjacent to the Zoo Lake.

A commencement has been made of canalising the donga traversing Lower Houghton, Orange Grove, Victoria, Farm Klipfontein, Norwood and Orchards. Portion of this drain is open masonry, and that through the Old Johannians sports ground is of the decked type.

Good progress has been made in connection with the construction, using precast concrete blocks, of a decked drain in the Observatory Spruit.

The work of canalising the donga between the tramway culvert in La Rochelle Road and the western end of the Wemmer Pan was well in hand at the end of June. In order to facilitate the lay-out of the proposed sports ground adjoining Pioneer Park, portion of the drain is to be decked, the remainder to be open channel.

The whole drain is to be constructed with precast concrete blocks.

The cutting of an earth drain and construction of headworks to augment the water supply in the Wemmer Pan was completed by contract.

Reconstruction of Existing Drains, Pipe Drains and Minor Drainage Works.

Several open drains in suburbs, such as those in Delarey Street, Observatory, Argyle, Barossa and Benbow Streets, and Leda Street, Kensington, were reconstructed and decked to provide additional road facilities.

Small masonry culverts were completed in Emmarentia and Orchards.

Malvern East stormwater drainage scheme south of Jules Street was completed, as well as a concrete drain under the east pavement in Marathon Street, and numerous pipe and concrete drains necessitated by township development within the Municipal Area.

Water Supply.

The city derives its water supply from the Rand Water Board, which delivers water in bulk to various high and low level service reservoirs having a total capacity of 16.69 million gallons. An extensive water reticulation scheme has been laid down by the Council comprising 535.56 miles of mains varying in diameter between 3 inches and 24 inches and serving 39,700 consumers. The daily consumption varied between 10,080,000 and 4,584,000 gallons, the average being 7,101,000 gallons.

Increased Water Supply: Rand Water Board.

In considering the future water requirements of the Municipalities and Mines as submitted to the Rand Water Board early in the year, it was realised that an additional supply would be required in the near future. The estimated maximum daily requirements under drought conditions of the Board's consumers were 22.1 million gallons in 1931, 24.3 million gallons in 1934, 25.6 million gallons in 1937, and 26.1 million gallons in 1940, against 20 million gallons per day then available. It was therefore evident that in the event of a protracted drought, which is a frequent occurrence, there would be a serious shortage of water.

A scheme to increase the supply from the Vaal River, delivered at Zwartkoppies, from 10 million to 15 million gallons per day, at an estimated cost of £179,500, was ultimately agreed upon, the standing charges incidental thereto to be borne by the Board's consumers in proportion to the quantity of water supplied by the Board to each such consumer.

The works were well in hand at the 30th June, and the extra water is expected to be available before the next heavy draw-off period commences.

Growths in Yeoville Reservoir and Dosage with Copper Sulphate.

Early in 1932 complaints were received from consumers of deposits of dark particles in the water supply.

Microscopic examination showed that diatoms were the chief constituent of the deposit, but there was much unorganised mineral matter, and a noteworthy constituent was 3.36 per cent. manganese dioxide.

Towards the end of March extensive growths of the green algae oedogonium rapidly developed, and on 1st April copper sulphate to the extent of 0.5 parts per million was added for 72 hours.

The growth was killed and the dose of copper sulphate was reduced to 0.25 parts per million.

The treatment of the water with copper sulphate was discontinued from 11th April to 13th April. On 19th April the dose was reduced to 0.2 parts per million and continued till 30th April, when it was stopped altogether.

Fresh growth occurred on 28th May, and this was arrested and killed by copper sulphate of 0.33 parts per million applied for 48 hours, after which it was again reduced to 0.2 parts per million.

Although this treatment was continued, a fresh growth of the unicellular algae cosmaria was observed on 21st June. Copper sulphate of 0.4 parts per million did not affect this growth, which, however, did not develop to any serious extent.

The dose of 0.25 parts per million was continued until the end of June in order to prevent development of oedogonium.

Sewerage.

Johannesburg till 1927 possessed one sewage treatment works in the Klipspruit Sewage Farm, which was constructed in 1905. At these works was treated the sewage from the whole Municipal area, although only the inner portion of the Municipality was provided with the amenities of water-borne sewerage. In all outlying suburbs and portions the night soil system of collection was in vogue until 1927, the sewage collected being introduced at various specially constructed sanitary intakes along the sewers, and thence conveyed to Klipspruit for purification.

In 1926 the City Council decided on the extension of water-borne sewerage to the suburbs, portions of which had rapidly become populated after the termination of the late war. The configuration and contours of the Municipal area presented difficulties regarding future sewage disposal and influenced the final decision.

Was the one treatment works at Klipspruit to deal with the sewage from the whole Municipal area as before, and necessitating pumping into existing sewers, possible enlargement or duplication of these, erection of pumping stations, etc., or would the construction of several modern biological sewage disposal works to suit natural drainage conditions, thus obviating pumping, be a better solution to the problem? These were the questions that presented themselves.

After carefully considering the whole position, it was decided to establish separate sewage disposal works in the various natural drainage basins within the Municipality in addition to the Klipspruit Sewage Farm, which would continue to deal with the sewage from the Central Area and that collected under the night soil system.

The natural drainage basins have been termed Central, Western, Eastern, North-Eastern and North-Western Basins draining to the Klipspruit Sewage Farm, Antea, Bruma, Cydna and Delta Sewage Disposal Works respectively.

The following is a short *resume* of the activities during the twelve months under review in the drainage basins detailed above:—

CENTRAL BASIN: DRAINING TO KLIPSPRUIT SEWAGE FARM.

Klipspruit Sewage Farm.

The average daily flow of sewage treated at these works was 4,147,200 gallons, the lowest volume recorded being 2,876,100 gallons and the highest 6,167,500.

The average daily flow produced about 25 tons of screenings and sediment from the detritus tanks, and 207 tons of sludge. The former was removed, as in previous years, by parties owning adjoining farms. Sludge, which is run into trenches and covered in, was likewise taken away after digestion had taken place. No charge is made in either case. The sewage after screening and sedimentation is disposed of by broad irrigation on land which is planted with Italian rye grass. Cattle is permitted to graze on pasture lands at a uniform rate of 4d. per head per day, and the revenue realised from this source amounted during the period under review to £3,607 19s.

***4. PAUL NEL STREET, HILLBROW.**

This street is the lowest lying street within the township, being situate at the foot of two hills, with the result that it has to carry off all stormwater. No work has been done to the street, consequently it has been considerably damaged by stormwater. We propose that minestone kerb and gutter should be laid, and that the street should be formed.

We recommend:

That an expenditure of £575 be sanctioned for the work mentioned in the foregoing report.

Adopted.

(Vote—Kerbs, Gutters and Crossings.)

***5. OPEN STORMWATER DRAIN—SOUTH SIDE OF ELLIS PARK.**

The Town Engineer has submitted to this Committee the following report:—

“ Pursuant to the Committee’s instructions, the condition of the drain along the South boundary of Ellis Park has been carefully examined, and an estimate prepared for putting it in a satisfactory state.

“ The length of the drain from the end of the recently completed permanent work to the culvert at Bertrams Road is 694 yards. Of this only 400 yards have been lined with rough masonry, the joints of which have been washed out badly in places, and the remainder is an earth channel with what appears to be a breezed concrete invert, the greater part of which has been worn away. The section area varies from 44 to 24 square feet, and in consequence of the increased rate of flow caused by permanent work, both above and under ground, the area of the drain is insufficient to carry off the water from moderately heavy falls of rain.

“ The work included in the estimate is: 1,865 cubic yards of lining (minestone set in lime mortar and pointed in cement); 240 square yards making good masonry invert; 800 lineal yards widening existing channel and raising walls; 125 lineal yards inlets from side streets; estimated cost, £3,724.

“ This amount does not include any work in Herb Street, between the North side of Miller Street and the South side of Upper Railway Road.

“ At the present time the stormwater is conveyed from the trench along the railway embankment in open channels across Upper Railway Road through the centre of Herb Street and across Miller Street. It would effect a great improvement if a covered drain were constructed between the points mentioned. This would cost approximately £4,000.

“ It was intended, in the permanent scheme, to lay an underground drain in Miller Street to connect up with the junction which has been left in Bertrams Road, but this would be a much more expensive undertaking than the one

“ now put forward. If the open drain is to be constructed, it will, of course, obviate the necessity of putting a covered drain in Miller Street.

“ I recommend that the open drain be lined with minestone masonry where there is no lining at present; that the existing lining be made good where necessary, and that the drain be enlarged where required, to take the increased rate of flow, also that a covered drain be constructed from the South side of Upper Railway Road along Herb Street to the drain on the North side of Miller Street. This latter proposal should be referred to the Sewerage Committee if the suggestions with regard to the open drain are approved.”

We have carefully considered the Town Engineer’s proposals, and while we agree that it is desirable that these should be carried out, we consider that for the present it would suffice if £1,000 were spent on carrying out permanent work; and that any repairs which are absolutely necessary should be done under ordinary maintenance.

We recommend:

That a sum of £1,000 be voted for the purpose of carrying out permanent work on the drain situate within the southern boundary of Ellis Park.

Adopted.

(Excess Vote—Drain, Ellis Park.)

SPECIAL REPORT OF FINANCE COMMITTEE.

We have considered the recommendation of the Works Committee and approve of the expenditure involved, subject to the money being provided out of the Maintenance Votes allocated to the Works Committee.

Adopted.

H. GRAUMANN,
Chairman.

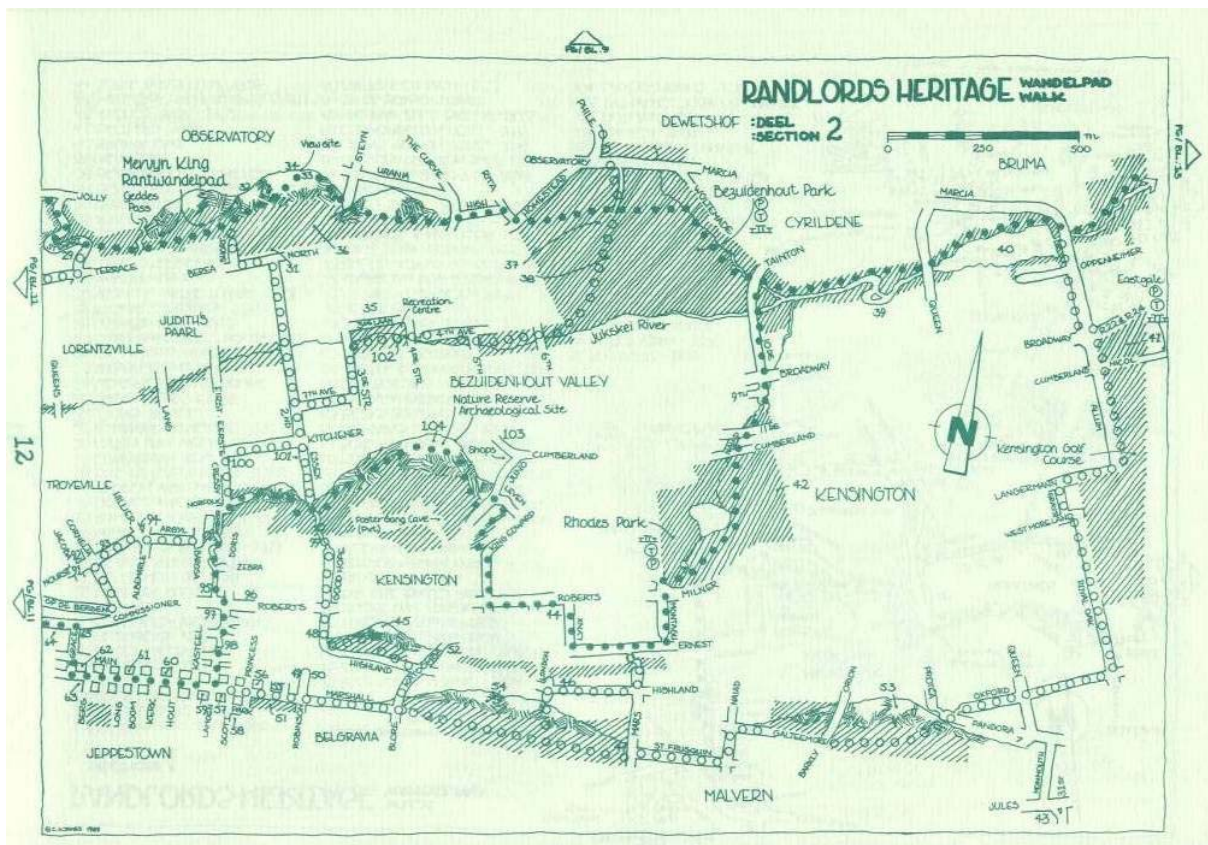
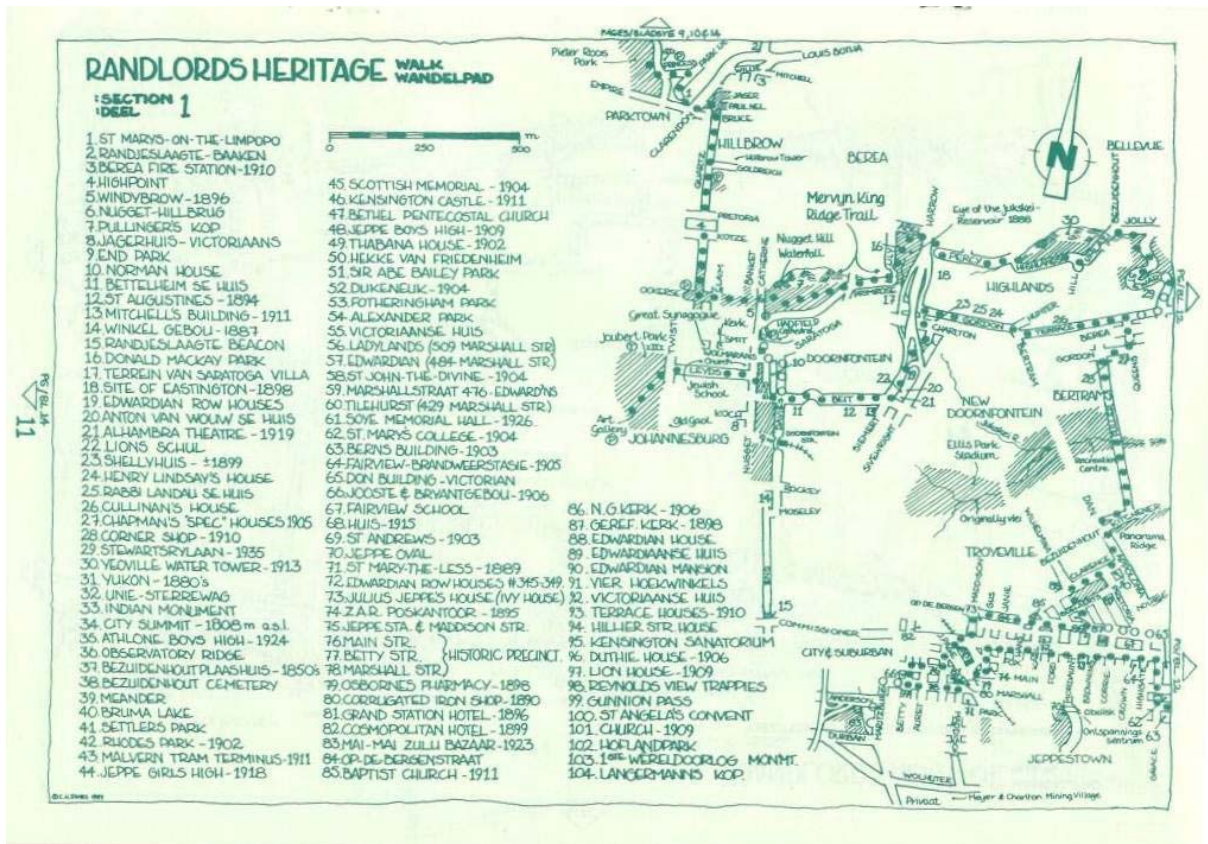
10th August, 1909.

***6. STORMWATER DRAINAGE, ROSETTENVILLE.**

The Town Engineer has submitted to this Committee a scheme for dealing with the stormwater from Lawn Street. The scheme involves the laying of an open masonry channel through Stand 212a, Rosettenville, owned by Mr. John Ward, and Stand 213, Rosettenville, owned by Mr. H. Gullett, in order to convey the water to the Spruit. Messrs. Ward and Gullett have agreed to the channel being laid across their properties, and to grant a servitude holding the Council harmless for any damage that may be caused to them owing to the existence of the channel. The estimated cost of the channel, including a dished crossing in the street, and fencing, is £185.

ANNEXURE E

From *Johannesburg Trails*—Public Relations Department, City of Johannesburg 1992



The Oldest House in Johannesburg: Ian Barkhuizen

After passing eastwards through Lorentzville and Judith's Paarl the Jukskei River continues from First Street to Third Street, Bezuidenhout Valley in a closed stone-lined channel. The channel is then open from 3rd Street to De Wetshof, passing through the litter trap at Bezuidenhout Park and expels into a natural river bed through De Wetshof Park to Bruma.

Johannesburg's oldest house the original Viljoen/F.J. Bezuidenhout farm house is *circa* 1852



The second house on the same site, situated in the Bezuidenhout Park, Bez Valley, was built much later *circa* 1863 and was F.J. Bezuidenhout's house. It is much larger. It has



been declared a National Monument and is currently occupied and well-maintained by Rotary International District 9400

Following Frederick Bezuidenhouts' death a new section was added to the house and the original homestead is now an outhouse (cottage). These houses were built well before the discovery of gold on the Witwatersrand.



The original house, considering its age and the recent years of neglect, it is not beyond repair and full restoration, if an early intervention by the custodians can be motivated, will ensure that it is not lost to our city

The houses are not on the heritage or history trails, no plaque or information board. The history attached to these houses and their link to the discovery of gold and the formation of Johannesburg needs to be preserved. **(Johannesburg stands on their farms)**

In March 1949 one of Fredrick Bezuidenhout's grandsons sold the 133 hectares to the Johannesburg city council, stipulating that it was to be a park named Bezuidenhout Park, and that the farmhouse was to be maintained by the council and that the acacia trees needed to be protected

General History Synopsis

The original Viljoen – F.J.Bezuidenhout farm House was built around 1852, thirty four years before the discovery of Gold on the Rand. Viljoen and his daughter Judith (after whom Judith Paarl is named) together with 25 year old Frederick Jacobus Bezuidenhout (born 1825) of Beaufort West, left Potchefstroom in search of land to farm sheep. In 1850 Viljoen exercised his right as a burgher and took possession of 10 000 acres of vacant land and called it Doornfontein after its strong fountain, an artesian spring surrounded by thorns. (He received title in 1858). On Viljoens death Frederick Bezuidenhout inherited the farm Doornfontein.

FJ Bezuidenhout also owned the farm Braamfontein; he took title from his brother Gerrit Bezuidenhout (born 1822) in 1858. Gerrit transferred the farm to his brother Frederick the day after he received title to the farm. These are the main properties on which Johannesburg now stands.

The Ridge and Northwards

In 1862 Fredrick Bezuidenhout subdivided Braamfontein into 3 portions of around 500 Morgan each.

The southern portion title, was once again held by Gerrit Bezuidenhout and he resold it in 1871. The farm changed hands a number of times and in 1887 was bought by the Zuid Afrikaansche Republiek Government for 4 000 Pounds. The Fort, Hospital, Tram sheds, brickworks and cemeteries etc were built on this portion.

The North Eastern portion Parktown etc was bought by Dirk Geldenhuis who leased part of it to Edward Lippert who planted the property to trees for pit-props in what is now Saxonwald. Other portions were leased by the Braamfontien Estates Company who together with Lippert eventually purchased this property and donated the Zoo and Zoo Lake to Johannesburg.

The North Western section was transferred to C.W. Bezuidenhout and was bought by Frans and Louw Geldenhuis of Swellendam, in 1887. Suburbs such as Emmerentia (after Louws wife Emmerentia Botha) Greenside etc were formed.

The Ridge South and East

Doornfontein and Turffontein covered sections of current day Johannesburg which include Marshallstown, Doornfontein, Ferreiras, Troyeville, Jeppestown, Bellevue etc. as well as the suburbs of Judith's Paarl, Cyrildene, Gillooly's Farm, Kensington, Bezuidenhout Park, Homestead Park, and Dewetshof etc.

Proclamation of the Diggings

On the 27th September 1886 Krugers Zuid Afrikaansche Republiek Government proclaimed the Bezuidenhout farms Doornfontein and Turffontein together with seven other farms as goldfields. The proclamation reserved for the farmer Bezuidenhout the usual “werf” with his homestead where he and his wife continued to farm until his death in October 1900. He was remembered as “A very wealthy, simple-minded and unassuming gentleman.” His wife died three years later in October 1903. The remainder of the farm was divided between his three sons and two daughters.

A Few points of History relating to the Farms

Hunting of Wild Animals

Before the discovery of gold on the Rand it was a wild area with an abundance of game. Old man Fredrick Bezuidenhout shot a lion where Observatory now stands. (He showed me the spot according to Sir Percy Fitzpatrick)

The Name Johannesburg

In June 1886 F.J.Bezuidenhout and his son appointed Veldcornet Johannes Petrus Meyer in his private capacity to carry out business transactions on their behalf on the southern part of the farm Doornfontein and the farm Turffontein which belonged to them. Meyer conducted his affairs from a tent in what is now City and Suburban on a southern portion of Doornfontein. The area was called Meyers Camp but with the influx of diggers from Natal the name soon changed to Natalspruit. There is speculation that Johan Meyer could also be part of the mystery to the naming of Johannesburg due to his efforts in the establishment of Johannesburg.

Letters and Postal Services

Although there were postal services between larger towns, postal services to the reef were primitive. Large portions of the Witwatersrand were isolated with no postal communication.

A.B.Edgson, who was the postal agent at Mulders Drift, moved to Ferreira's Camp as a canteen keeper and carried out the task of postal agent. On the 11th August 1886 a note appeared in “The Transvaal Advertiser” that arrangements had been made, that post marked “Edgson's Bezuidenhout's farm” would be delivered to the Rand. Letters were placed in a box and these were sorted and distributed by the residents themselves.

Water Supplies to Johannesburg

The Goldfields on the rand were continually short of water not only for the stamp mills but potable water for the thousands of miners, prospectors and workers. Legend has it that some Rand Lords and their wives bathed in soda water during water shortages. (Not too dissimilar to our current political aristocracy who consume bottled water while the poverty stricken who depend on water from rivers and streams, drink water with E-Coli and Pathogen levels that are toxic to humans.)

Edward Jones reports from an engineering point of view that the existing supply was via wells and a small stream which passed through a sluit full of decomposing matter. In addition a number of brick makers were concentrated on the banks of the stream and were responsible for further pollution. Another source of contamination was due to the filth from the streets and cesspools being washed into the stream after a rain fall. (So what's new - refer the Bruma Lake and Jukskei river problem)

The necessity for the fair distribution of water among claim holders caused many disputes. The first effort to supply water to Johannesburg is the formation of the "Johannesburg Waterworks' Estate and Exploration Company Ltd" in July 1887. They leased a portion of Doornfontein with the water rights, with the intention to supply Johannesburg with water via pipes.

The source of the supply of the water for the waterworks was from a spring situated on the northern boundary of the farm Doornfontein with a flow rate of 18 000 liters per hour. With the reservoir elevation approximately 17 meters above Market Square, no major engineering problems were expected.

A report on the water quality was given by Dr.Hans Sauer, District Surgeon of Johannesburg. The water was found to be pure, with insignificant vegetable matter, and with lime, salts and carbonates present in small quantities

The water from Doornfontein was turned on about 12 months later and the first house to be supplied belonged to the Strubens. The road to the reservoir became Sievewright Avenue and was the only street to have trees planted down the center as well as the verges.

The fountains and springs from Doornfontein and Braamfontein still supply our rivers and streams with water - a prime example is the Jukskei River, which has as its source the artesian spring under the centre court of the tennis section of the Johannesburg Sports stadium. Mr.Kieth Brebner the project manager during the construction of the sports facility tells how a permanent pumping station needed to be installed as they could not control the flow of water under the centre court.

Unfortunately this pure spring water, the source of the Jukskei river,is polluted with sewage and other debris from our roads and streets much in the same way as happened in early

Johannesburg and the pollution problem is being exacerbated by a council who lack the will and ability to deal with the problem

The Future

Will the Johannesburg City Council take charge of this project as custodians or will they wait for it to be destroyed like the Drill Hall, Post Office and Laundry et al.

This gives some idea as to the size and impact that the Bezuidenhout farms had on the formation of Johannesburg, can we not use these historical houses as one of the legs to tell the story of Johannesburg.

Payable Gold JAS.Grey.F.I.C

Reefs of Fortune H.Filmer and C.Parry

The Barnett Collection

South African Memories Sir J. Percy Fitzpatrick

Other Men's Millions Eric Rosenthal

Melville Koppies: Trekkers, Farmers and Miners

Property24

OLDEST HOUSE/ BUILDING IN JHB CIRCA 1853



Attached a picture of the oldest house/ building in Johannesburg circa 1853. First home of Frederick and Judith (nee Viljoen) situated in Bezuidenhout Park, in very bad state of disrepair, would make an ideal museum for the Jukskei catchment area management Forum.

Alteration of the original name of the Uri to the Jukskei. "according to T.V . Bulpin in 'Lost Trails of the Transvaal' the Jukskei was name from an old broken wagon 'yoke- key' found abandoned her. 'The Friend of the Sovereignty' of 3 February 1851, states that the 'Jeuk skei river (which is) from a broken yoke's key having been found on its banks, possesses an historical interest from the probability of its having been the hunting ground of Captain Harris and the key possibly a memento of some of the mishaps occasioned by his clumsy and mutinous wagon driver.' It was in the Jukskei River that the first gold was found in South Africa. in 1853 alluvial gold-seeker Pieter Jacob Marais (who had been one of the famous 'fortey niners' in California a few years earlier) found a few nuggets in the river just north of where Johannesburg is now. He never realized that they had washed down from the ridge of White Waters, and it was not for another 30 years that the fabulous reef was discovered. In the early days of gold mining, water was a serious problem. During the 1890's boreholes were sunk , and dams built at Klip Spruit and Natal Spruit, but some miners preferred to take wagon loads of ore across Johannesburg to stamp mills on the Jukskei. Sometimes after a long drought there was no water and crushing had to stop. The wealth of history in the Jukskei catchment area includes buildings dating to the early gold-rush days, some pre-1886 farmhouses, archaeological sites, places of interest such a s the Foster Gang cave, National monuments, buildings of architectural merit and places associated with personalities such as Cullinans, Herman Charles Bosman, Herbert Baker, Pieter Boos and Julius Jeppe. The Randlords Heritage Walk covers the historical areas in detail.

Some brief but highly necessary background information of where our area is situated in the landscape. The excavations at the boulders in Midrand, the research by Wits University into the heritage caves of Glenferness on the banks of the Jukskei River, in the late 1940's, and remnants of fire kilns on Linksfield Ridge, Melville Koppies and the Lonehill Tor have shown that the Jukskei/Crocodile Rivers were both stone and iron age highways. Research and excavations have shown that humans lived here 14,000 years ago when and why they left is unknown.

When humans, the fore-fathers of the Batswana and the Bapedi people settled here again 2,000 years ago on the profusion of Wetlands with an abundance of food stretching from the Ridge they called "Dinokeng", a Nguni word meaning "The Place of Waters" over Northern Johannesburg through what is Midrand and Fourways today, down the gorges with their seeps and hillside slope Wetlands into the fertile "Moot" - an area between the Magalies (Cashane Mountains) and Johannesburg mountain ranges. They lived an idyllic life for nearly 1,864 years, with food security, until four cataclysmic events took place. The first three almost simultaneously during the second and third decades of the 19th Century, the fourth in 1886.

Mfecane, (Zulu: "The Crushing") (Sotho: Difuqane), a series of Zulu and other Nguni wars, and forced migrations during the second and third decades of the 19th Century changed the demographics, social, and political configuration of Southern Africa. The Mfecane was set in motion by the rise of the Zulu Military Kingdom under Shaka (c 1787-1828) who revolutionised Nguni warfare. The rise of Shaka's Kingdom, which took place during a time of drought and social unrest, was itself part of a wider process of state formation in South-Eastern Africa. During this time Mzilikazi Khumalo, Shaka's top General, fled Zululand after a dispute over cattle numbers looted in battle and meant as a tribute to the King. Assimilating young maidens and boys as he crisscrossed the Highveld and settled at Hartbeespoort Dam. The remnants of his settlement are still visible today around the base of the cable car station. Between 1827 and 1832 Mzilikazi built three military strongholds along the Magaliesberg the largest Kungwini, at Wonderboom, north of the present day Pretoria; Diananeni just north of present day Hartbeespoort Dam and Hlahlandela, near Rustenburg. One can safely assume that Mzilikazi, a proven brilliant general, had not met nor heard of Napoleon Bonaparte's military doctrines but he clearly knew that holding the high ground (The Magaliesberg Range) and having an ample food supply (The Moot) "An army marches on its stomach" (Napoleon Bonaparte) were clear tactical advantages. He knew he had food security.

At the same time the warrior queen Manthatisi gathered all the nomadic tribes on the central, western and northern areas of the Highveld together in a huge mass of people and animals that was not sustainable and imploded on itself. She was doomed to fail because there was no food security.

The third event was the arrival of the Voortrekkers from Natal over the Drakensberg and on to the Highveld from 1838 onwards. It was their guns and horse mounts that unseated Mzilikazi.

The fourth event was the discovery of the main conglomerate of gold on the farm Langlaagte in 1886. During the last year of the second Anglo/Boer 1899-1901; 8,500 of the remaining 14,500 "Bittereinders" (unwilling to admit defeat) found sustenance in this fertile valley. Where commando's under Generals De La Rey, Smuts and Kemp repeatedly rode out on successful raids against British columns. General De Wet rode in several times from the Free State to replenish his food stocks. [This is] An area steeped in Heritage, History, Legacy and Culture for all the peoples of this Country. Since the time of the San Bushman on the Highveld food security brought man here.

The earliest black settlers moved into the Magalies Valley from the present day Mpumalanga. They probably were the ancestors of the present Tswana speakers who presumably left Northern Tanzania about two thousand years ago. About 600 AD they were probably compelled to leave the valley because of rising temperatures and decreasing rainfall. They went back to Mpumalanga before returning 800 years later. In that period the Bushman were the only inhabitants of this fertile valley. The Bushman were eventually forced out to Botswana and the Northern Cape.

The Magaliesberg is one of the oldest mountain ranges in the world, as is the upper catchment of the Jukskei and Crocodile Rivers one of the oldest in the world.

Ramsar International Theme : WETLANDS AND AGRICULTURE.

The time has come that we apply international proven remedial intervention measures. One amongst so very many that comes to mind is the success achieved on the Yarra River that runs through the City of Melbourne, Victoria, Australia. This formerly highly polluted River earned itself the nickname of the muddy river. The City built 99 artificial Wetlands ran the river water through them with great success to the extent that the Platypus (*Ornithorhynchus anatinus*), the only egg laying mammal in the World, has returned to the inner city where it has resumed breeding. This is but one of hundreds of successful references we can quote.

The success of biomass remediation through floating Wetlands has been adequately proven by the eight years of research by the DWA. And *Mets a Me* project at Hartbeespoort Dam. This technology is being successfully transferred to the mining sector by us (Emifula Riverine and Wetland Remedial Consultants) and suitably qualified associated scientists for passive treatment of mine water. Given the observations gleaned at Bruma Lake on their floating Wetlands over the last six years with constant advice from Petrus Venter and DWA we have now offered Cape Town City a number of floating Wetlands to test, and transfer the technology as wide as possible country wide.

Given the great success of water quality improvement by the establishment of oyster beds in the estuary of the Potomac River in North America, we could re-establish copious mussel beds at the decant areas of existing and artificial Wetlands and other suitable calm and appropriate water bodies, with the necessary hydrokinetics, with stock from existing fresh water mussels (*Afroniaia framesi*) still to be found in large quantities in the irrigation canals in the upper reaches of the Groot Marico River, notably on the Ronsdawelskraal irrigation scheme above the Hamlet of Groot Marico part of the same CMA. Their large shells can still be found in the heritage caves in Glenferness, Northern Johannesburg.

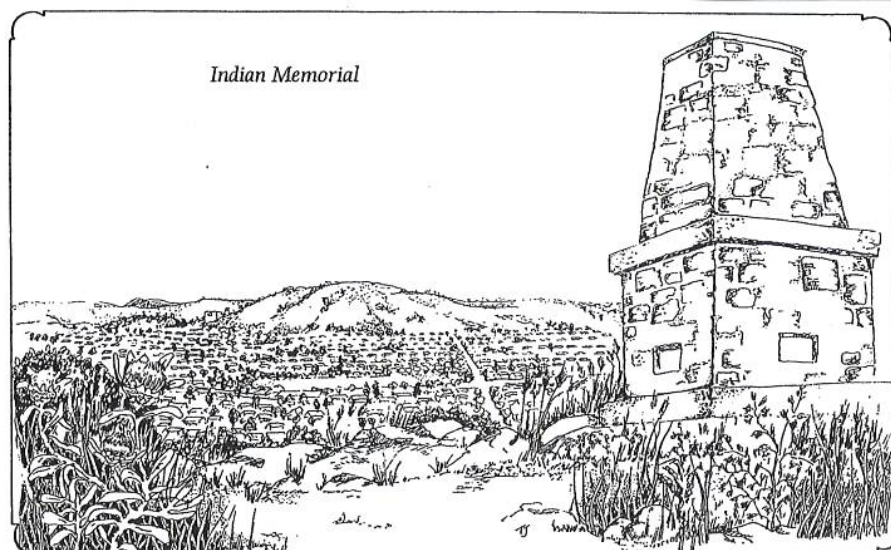
Is this not the first chance for various Scientific Professions, to jointly tackle a major problem? Wetland Science, Aquatic Science, Aqua Culture, Agriculture, Soil Science, Land Remediation, WRC, ARC, etc.

This research could be funded from the Waste Management Stream estimated to generate R22 Million in this catchment per annum (The National Environmental Management: Waste Act (Act 59 of 2008) under the auspices of the Jukskei River Catchment Area Management Forum and the South African Wetland Society and possibly implemented by the Agricultural Research Council (ARC) and/or The Water Research Council (WRC)

There remains lots of work for the forum to engage in.

Paul Fairall.

ANNEXURE I



THE INDIAN MEMORIAL

Perched on the summit of the Observatory Ridge is a memorial built to commemorate the members of the Indian Army who lost their lives in the Anglo-Boer War. The monument was built in 1902 and consists of an obelisk of stone cut from the koppie on which it stands.

The inscription reads:

*To the memory of British Officers
Natives
NCOs and Men
Veterinary Assistants
Halbands
and followers of the Indian Army
who died in South Africa 1899-1902.*

Three names are inscribed on plates set into the other three sides; Musselman, Christian Zoroastrian and Hindu-sikh. Very little is known about the history of the memorial or who was responsible for its erection. It is not clear from the inscription whether it also commemorates the South African Indian Ambulance Corps (all of whom were British citizens) who were sent by Gandhi to serve on the side of the British.

The origins and use of the small stone enclosure built just below the memorial are unknown.