PVA Consulting Engineers cc

217 Fakkel Street
Silverton, Pretoria
cc 1999/017714/23
VAT no: 4230191845
Tel.: 086 110 6256
e-mail: pva@iafrica.com

In Joint Venture

LEAD | Land Engineering And Developments Pty Ltd

217 Fakkel Street
Silverton, Pretoria
cc 2013/101367/07
Tel.: 012 804 2029
Cell: 082 933 3316
e-mail: leonard@landeng.co.za

CIVIL SERVICES REPORT

(WATER & SANITATION)

FOR

PROPOSED DEVELOPMENT

SOSHANGUVE EXT 07

FOR

PROPOSED RESEDENTIAL DEVELOPMENT

SITUATED ON

PART OF PORTION 38 OF THE FARM RIETGAT 611-JR

MARCH 2018

Prepared for the Developer:

INSTRATIN PROPERTIES (PTY) LTD

PVA Contact Person:

Mr P Venter Pr Tech Eng

Pr Tech Eng No: 8570162

083 259 9360 / 086 110 6256

pierre@pvaconsult.co.za

LEAD Contact Person:

Mr LF Dos Santos Pr Eng

Pr Eng No: 20130624

082 933 3316

leonard@landeng.co.za

Contents

1. INTRODUCTION 2
2. LOCALITY 3
3. GENERAL DISCRIPTION 4
4. EXTERNAL WATER SUPPLY 5
5. INTERNAL WATER DEMAND 6
6. EXTERNAL SEWER NETWORK 10
7. INTERNAL SEWER RETICULATION 10
8. CONSTRUCTION COST 13
9. BULK SERVICES CONTRIBUTIONS 13
10. CONCLUSION 14

1. INTRODUCTION

PVA LEAD JV was contracted by the developers, Instratin Properties (Pty) Ltd, as Civil Engineers for the proposed residential development in order to prepare a Civil Services Report for your information and approval on the proposed township to be known as Soshanguve-SS Ext 07, situated on a Part of Portion 38 of the Farm Rietgat 611-JR, in the City of Tshwane Metropolitan Municipal Area, Gauteng Province.

This report addresses the civil engineering services components as part of the statutory application process for the proposed township establishment:

- Bulk Water Services
- Bulk Sanitation Services

Electrical bulk services requirements shall not be discussed in this report, as the appointed Electrical Engineer shall be responsible for all aspects regarding the Electrical Services.

This Services Report is based on information acquired from a visual inspection of the site, information from various appointed professionals, including the appointed Town and Regional Planners, Geotechnical Engineers, Traffic Engineers, Electrical Engineer as well as from the City of Tshwane Metropolitan Municipality.

The project team comprises of the following professional individuals and companies.

Developer	Ground Floor, Building 13 The Woodlands Office Park 10 Woodlands Drive Woodmead Johannesburg, 2191	Tel: 011 534 6900 Email: info@instratin.com
Town Planner	Newtown Town Planners 103 George Storrar Drive Groenkloof Pretoria, 0181	Tel: 012 346 3204 Email: andre@ntas.co.za
Consultant Details	Mr Leonard Dos Santos LEAD (Pty) Ltd P O Box 1394, Silverton, 0127 Mr Piere Venter PVA Consulting Engineers cc P O Box 95673 Waterkloof, 0145 Address: Unit 2 Biz Afrika Park 217 Fakkel Street Pretoria, 0184	Cell: 082 933 3316 Email: leonard@landeng.co.za Cell: 083 259 9360 Email: pierre@pvaconsult.co.za

2. LOCALITY

The proposed land development area comprises of 6.1305 hectares in total, on the proposed Soshanguve-SS Ext 07 situated on a Part of Portion 38 of the Farm Rietgat 611-JR. The proposed residential development will be sub-divided into five erven. Erf 1 (6574m²) is situated on the Northern boundary.Erf 2 (7451m²) situated just below Erf 1. Erf 3 (32904m²) situated above Erf 4 on the Southern boundary of the

property. Erf 4 (8035m²) is allocated as Private Open Space situated on the Southern boundary and also bordering the proposed Soshanguve SS Ext 08. Erf 5 (2565m²) is allocated as Private Open Space situated between Salad Burnet Street and the Eastern boundary of the proposed Soshanguve Ext 07 development.

The proposed development site is located within Soshanguve Ext 07 Block SS. The Northern boundary of the proposed development borders Portion 44, 45, 46 and 47 of the farm Rietgat 611-JR, the Western boundary is bordered by (from North to South) Portions 393 to 397, 420 to 427, as well as Portions 458 to 463 of the Farm Rietgat 611-JR. The South-Eastern boundary shall be bordered by the proposed Soshanguve-SS Ext 08 situated on the more Southerly Portion of Portion 38 of the Farm Rietgat 611-JR and the Eastern boundary is formed by the remainder of Portion 38 of the Farm Rietgat 611-JR. (Refer to *Annexure A* - Locality Plan)

3. GENERAL DISCRIPTION

The proposed township development, Soshanguve-SS Ext 07, shall comprise of 3 Erven, zoned as "Residential 3", with a developable area of 6574m² for Erf 1, 7451m² for Erf 2, 32904m² for Erf 3, 8035m² for Erf 4 and 2565m² for Erf 5 of which erf 4 and 5 are allocated as Private Open Spaces, as indicated on the Township Layout. (Refer to *Annexure B* - Township Layout)

The property slopes in a North Easterly direction at 1:40 (a gradient of 2,5%).

The developer shall register an association not for gain registered in term of Section 21 of the Companies Act, 1973 (Act 61 of 1973), as amended, which shall operate as the Home Owners Association (HOA) with its main objective being the maintenance of the communal areas of the proposed Township, as well as the

internal engineering services of the Township, which maintenance responsibility shall only commence after completion of said development.

Any registered owner of a property within the Township shall automatically become a compulsory member of the HOA on date of transfer of the property onto his name.

The internal civil engineering services shall not be handed over to the City of Tshwane Metropolitan Municipality (CTMM), but in view of the fact that CTMM might at a later stage be in a position to take over said services, all designs, specifications, standards, calculations and installation of the civil engineering services shall be done in accordance with the standards and requirements of CTMM.

Once completed, all external services (those services which are considered to be Municipal when outside the boundaries of the development and to be identified by the Municipality) shall be handed over to the City of Tshwane Metropolitan Municipality.

A copy of the S.G. Plans along with a copy of the title deed can be found in *Annexure C*.

4. EXTERNAL WATER SUPPLY

Annexure D contains information regarding the existing water distribution infrastructure in the vicinity of the proposed development.

As can be seen, an existing 400mm Ø pipeline exists along the western development boundary of Soshanguve Ext 07.

A 110mm Ø pipeline extends from the 400mm Ø pipeline and runs along Salad Burnet Street between Erf 2 & 3 and along the eastern side of erf 1 & 2.

The section of 110mm Ø pipe running along the boundary of erf 1, 2 & 3 is proposed to be upgraded to a 200mm Ø pipeline to meet the combined demand of the proposed development, as shown on drawing 1763.05U01 in *Annexure E*. There are 5 proposed 200mm Ø bulk water connections for each Erven, as shown on drawing 1763.05U01 in *Annexure E*. One is located on the eastern border of erf 1 (refer to Detail 3 on drawing 1763.05U01), another is located on the southern border of erf 2 (refer to Detail 1 on drawing 1763.05U01), another is located on the northern border of erf 3 (refer to Detail 2 on drawing 1763.05U01), another on the western border of erf 4 (refer to Detail 4 on drawing 1763.05U01) and the last on the western border of erf 5 (refer to Detail 5 on drawing 1763.05U01).

5. INTERNAL WATER DEMAND

In order to link the proposed development to the Municipal water supply system, the internal water reticulation system of the proposed development will link up to the upgraded 200mmØ municipal pipelines within the Soshanguve-SS X07 development as per drawing 1763.05U01 in *Annexure E*. With that being said the internal water distribution system for the development of Soshanguve-SS X07 is proposed as 110mm diameter pipes.

WATER & SEWER SERVICES REPORT

Water demand calculated for the proposed township will be as follows:

Development Demand for Erf 1:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	46	54.2
Development Demand (Kl/day)			54.2
Flow (l/second)			0.64
Peak factor			4.6
Peak flow (l/second)			2.94
Fire Flow (l/second)			20
Total Development Demand (l/second)			22.94

Development Demand for Erf 2:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	52	62.4
Development Demand (Kl/day)			62.4
Flow (l/second)			0.73
Peak factor			4.6
Peak flow (l/second)			3.33
Fire Flow (l/second)			20
Total Development Demand (l/second)			23.33

Development Demand for Erf 3:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	230	276
Development Demand (Kl/day)			276
Flow (l/second)			3.2
Peak factor			4.6
Peak flow (l/second)			14.7
Fire Flow (l/second)			20
Total Development Demand (l/second)			34.7

Development Demand for Erf 4:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Private Open Space	15	-	12.1
Development Demand (Kl/day)			12.1
Flow (l/second)			0.14
Peak factor			4.6
Peak flow (l/second)			0.65
Fire Flow (l/second)			0
Total Development Demand (l/second)			0.65

Development Demand for Erf 5:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Private Open Space	15	-	3.85
Development Demand (Kl/day)			3.85
Flow (l/second)			0.05
Peak factor			4.6
Peak flow (l/second)			0.21
Fire Flow (l/second)			0
Total Development Demand (l/second)			0.21

Total Development Demand:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Total Development Demand	-	328	406.75
Development Demand (Kl/day)			406.75
Flow (l/second)			4.71
Peak factor			4.6
Peak flow (l/second)			21.66
Fire Flow (l/second)			20
Total Development Demand (l/second)			41.66

As can be seen in the tables above, provision for 20 ℓ/s is taken into account for the development firefighting purpose for Erven 1,2 and 3. Erf 4 and 5 requires no provision for firefighting due to the fact that the Erven is allocated private open space. There will be strategically placed fire hydrants within the proposed development at high and low points for the 3 residential Erven.

Due to the fact that Erf 4 and 5 is a private open space and therefore requires no provision for firefighting no fire hydrants will be placed within the Erven.

The pipe material to be used will be uPVC class 12. All calculations, standards and specifications will be based on to the City of Tshwane Metropolitan Municipality's requirements.

6. EXTERNAL SEWER NETWORK

Annexure F contains information regarding the existing external sewer system infrastructure in the vicinity of the proposed development.

As can be seen from this plan an existing 450mm Ø sewer exists along the eastern side of the proposed Soshanguve-SS X07 development. A 150mm Ø sewer pipe line runs along the western boundary of the development and connects to the 450mm Ø sewer pipe line as mentioned above via a 150mm Ø pipe that intersects erf 3.

7. INTERNAL SEWER RETICULATION

The proposed bulk sewer connections for the proposed development of Soshanguve-SS X07 will connect to the existing sewer reticulation network via new manholes, as can be seen on drawing 1763.06U01 in *Annexure G*. All sewer pipes are proposed to be 150mm Ø.

New servitudes will have to be registered for the existing sewer lines on the eastern border of the property due to the relocation of the development boundaries.

Internal Sewer Demand for Erf 1:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	46	55.2
Development Demand (Kl/day)			55.2
Flow (l/second)			0.64
Peak factor			2.5
Peak flow (l/second)			1.6

Internal Sewer Demand for Erf 2:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	52	62.4
Development Demand (Kl/day)			62.4
Flow (l/second)			0.73
Peak factor			2.5
Peak flow (l/second)			1.81

Internal Sewer Demand for Erf 3:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Res 3 Cluster Housing	1.2	230	276
Development Demand (Kl/day)			276
Flow (l/second)			3.2
Peak factor			2.5
Peak flow (l/second)			7.99

Total Internal Sewer Demand:

DESCRIPTION	AADD (Kl/unit/day)	Units	FLOW
Total Development Demand	1.2	328	393.6
Development Demand (Kl/day)			393.6
Flow (l/second)			4.56
Peak factor			2.5
Peak flow (l/second)			11.35

No additional external upgrades are required.

All calculation, standards and designs shall be in accordance with the specifications of the City of Tshwane Metropolitan Municipality, due to the fact that the Municipality may at a later stage take over the internal services.

The pipe material to be used will be uPVC class 400kPa – SANS 1601 (in accordance with the standards of the City of Tshwane Metropolitan Municipality).

8. CONSTRUCTION COST

The estimated water and sewer construction cost calculations can be seen in *Annexure H*, and are summarized below:

Estimated Construction Cost	**Water**	**Sewer**
External	R 402 720.00	R 110 130.00
Internal	-	-
Sub-Total	**R 402 720.00**	**R 110 130.00**
P&G's	R 64 435.20	R 17 621.00
Contingencies	R 46 715.52	R 12 776.00
Sub-Total	**R 513 870.72**	**R140 527.00**
Professional Fees	R 51 387.07	R 14 053.00
Sub-Total	**R 565 257.79**	**R 154 780.00**
VAT	R 79 136.1	R 21 642.00
Total Construction Cost	**R 644 393.88**	**R 176 422.00**

9. BULK SERVICES CONTRIBUTIONS

The bulk contribution payable for water and sanitation for the Soshanguve-SS X07 residential township development is equal to R_____.

10. CONCLUSION

In conclusion, the Developer intends to commence construction by mid-2018. The developer will submit to the City of Tshwane Metropolitan Municipality complete engineering drawings in respect of all internal services and connection points, prior to commencement of construction of the said services.

All design drawings will be submitted to the offices of the City of Tshwane Metropolitan Municipality within the next few weeks, as to expedite the process. We Trust that this report meets with your approval.

LIST OF ANNEXURES

1.	**LOCALITY PLAN**	Annexure A
2.	**APPROVED TOWNSHIP LAYOUT**	Annexure B
3.	**COPY OF SG DIAGRAM & TITLE DEED**	Annexure C
4.	**CTMM EXISTING WATER DISTRIBUTION SERVICES**	Annexure D
5.	**PROPOSED INTERNAL WATER LAYOUT**	Annexure E
6.	**CTMM EXISTING SEWER SYSTEM SERVICES**	Annexure F
7.	**PROPOSED INTERNAL SEWER LAYOUT**	Annexure G
8.	**COSTS ESTIMATES**	Annexure H
9.	**APPROVED CONDITIONS OF ESTABLISHMENT**	Annexure I

ANNEXURE A

SOSHANGUVE SS EXT.7 A PORTION OF PORTION 38 OF THE FARM RIETGAT 661-JR
INSTRATIN PROPERTIES (PTY) LTD



PVA Consulting Engineers cc

LEAD | Land Engineering And Developments Pty Ltd

ANNEXURE B

PROPOSED TOWNSHIP:

SOSHANGUVE SS EXT.7

SITUATED ON PART OF PORTION 38 OF THE FARM RIETGAT NO.611-JR

LOCAL AUTHORITY: THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY

PART OF PORTION 38
OF THE FARM RIETGAT NO.611-JR

SITE ZONES AND MATERIAL DESCRIPTION			
ZONE	MATERIAL DESCRIPTION	GEOTECHNICAL CONSIDERATIONS	NHBRC CLASSFICATION
WHOLE OF SITE	Sand (transported) overlying gravel (pebble marker) over granite rock OR Sand overlying ferricrete gravel over granophyre rock	No heave (H) No collapse (C) Moderate differential settlement (S1) Intermitent shallow rock (R)	H/C/S1/(R)

This is to certify the township layout plan in accordance with the provisions and recommendations as set out in the geotechnical investigation for the proposed township.

Ed Shedden Pr Sci Nat 402002/83

Y +89 000

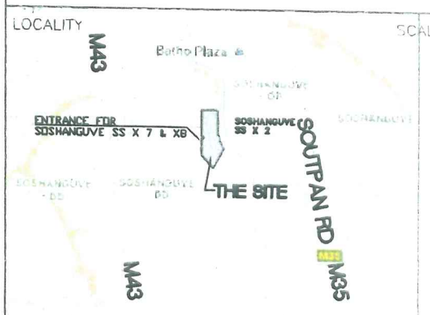
Y +88 800

X +2 820 000

X +2 820 200

X +2 820 400

LOCALITY



SCALE 1:7 500

0 180 540

COUNCIL REF. NR. :CPD 9/1/1/1 SOSH SS X 7/8

USE ZONE	NR. OF ERVEN	AREA (ha)	% OF TOWN	ERF NRS
Residential 3 (70u/ha)	3	4.6967ha	76.6%	2561 - 2563
Private Open Space	2	1,0840ha	17.7%	2564 2565
Street		0.3498ha	5.7%	
TOTAL	4	6.1305ha	100%	2561 - 2565

STREET INFORMATION		
Street length		
Gradient of streets		

AMENDMENTS	
Nov 2013	Amended erf layout and density. Rectified boundary.
Jul 2014	NHBRC Certified table included on map.
Mrt 2015	Final Erf numbers

GENERAL NOTES:

1. PROPOSED SOSHANGUVE SS EXT.7 IS DENOTED BY FIGURE "ABCDEFGHIJKLMNOPQRA" AND MEASURES 6.1305 HECTARES.
2. ALL DISTANCES AND AREAS ARE MEASURED IN SQUARE METRES OR HECTARES AND AREAPPROXIMATE PENDING FINAL SURVEY.
3. CONTOUR LINES ARE IN ACCORDANCE WITH THE STANDARDS LAID DOWN IN REGULATION18 (1) OF THE TOWN PLANNING AND TOWNSHIPS REGULATIONS FRAMED IN TERMS OF SECTIONS 69 AND 96 OF ORDINANCE 15 OF 1986 AND WERE COMPILED BY THE COUNCIL.
4. — — — — EXISTING STORM WATER PIPELINES
5. ---------- 1:50 YEAR FLOOD LINE
6. -·-·-·-·- 1:100 YEAR FLOOD LINE
7. ———— 32m FROM CENTER LINE OF RIVER

CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND DEVELOPMENT COMMITTEE

Registered owners: SIZANE AGENCIES CC

ERF 2561 "Residential 3" 70u/ha 6574m²

ERF 2562 "Residential 3" 70u/ha 7451m²

ERF 2563 "Residential 3" 70u/ha 32904m²

ERF 2564 POS 8035m²

ERF 2565 POS 2805m²

PROPOSED SOSHANGUVE SS EXT.7

PROPOSED SOSHANGUVE SS EXT.8

SOSHANGUVE SS EXTENSION

REMAINDER OF PORTION 38 RIETGAT No. 611-JR

13m STREET

STREET 15m

STREET 16m

9m wide R.O.W. Servitude

32m WIDE STORMWATER SERVITUDE

FLOODLINE 1:50 YEARS
FLOODLINE 1:100 YEARS

P.O.S 5,93Ha

MUNICIPAL 0,75Ha

MUNICIPAL 0,16Ha

"Residential 3"

0 20 40 60 80 100

COPYRIGHT RESERVED

NEWTOWN ASSOCIATES
TOWN PLANNERS
POSTAL ADDRESS: P.O BOX 95617 WATERKLOOF
STREET ADDRESS: Ashton House 61 Lois Ave Newlands

NTA

Datum: Local
System: LO29

SCALE 1:7 500

ANNEXURE C

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1: 1 000

Surveyed in May - July 1996 by me

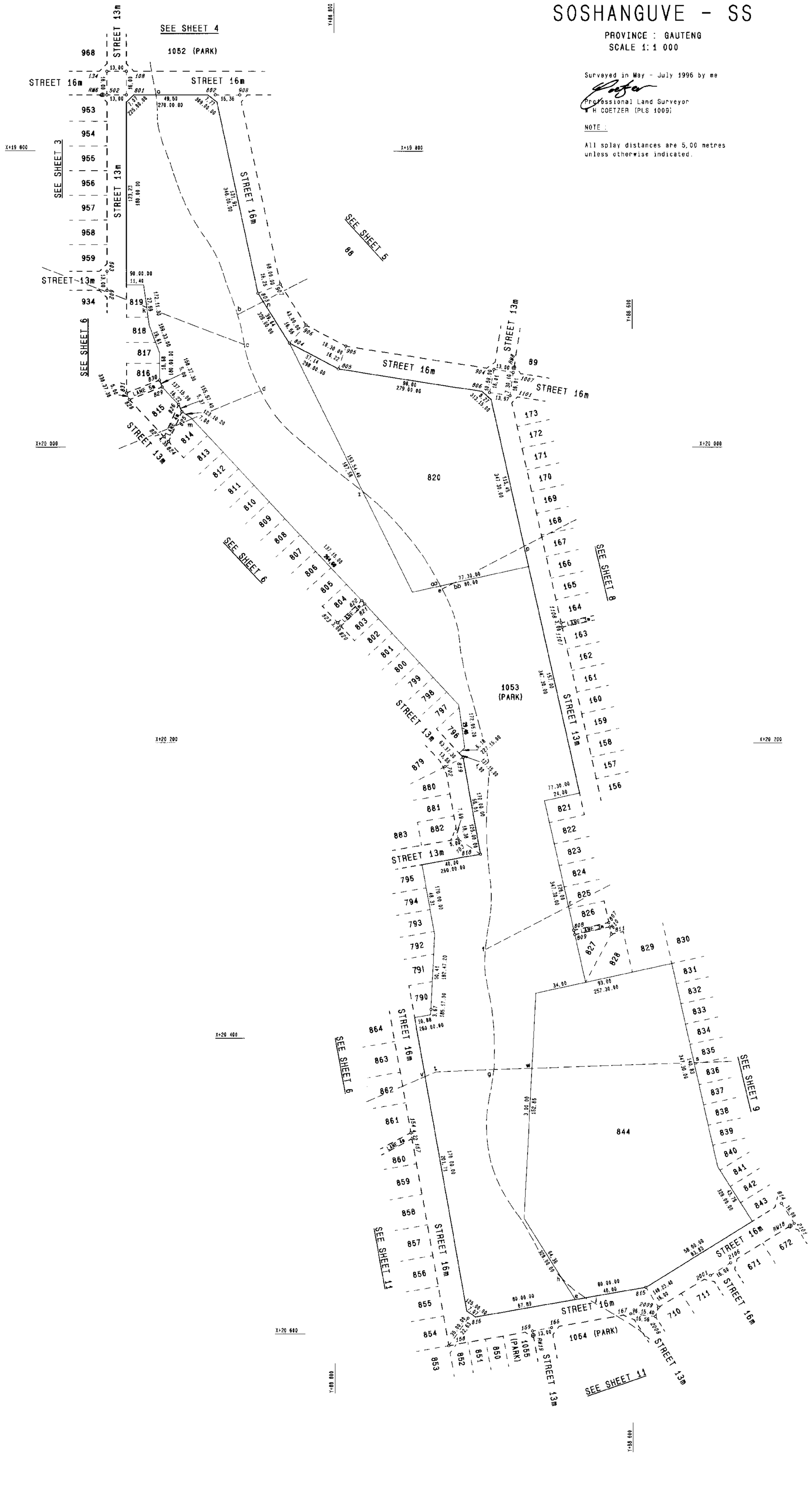
Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 7
Approved for SURVEYOR-GENERAL 1996-09-06

TN



FILE No.

SURVEY RECORDS No. 3230/1996

COMPILATION JRK

DEEDS : PRETORIA

SOS-SS.7

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

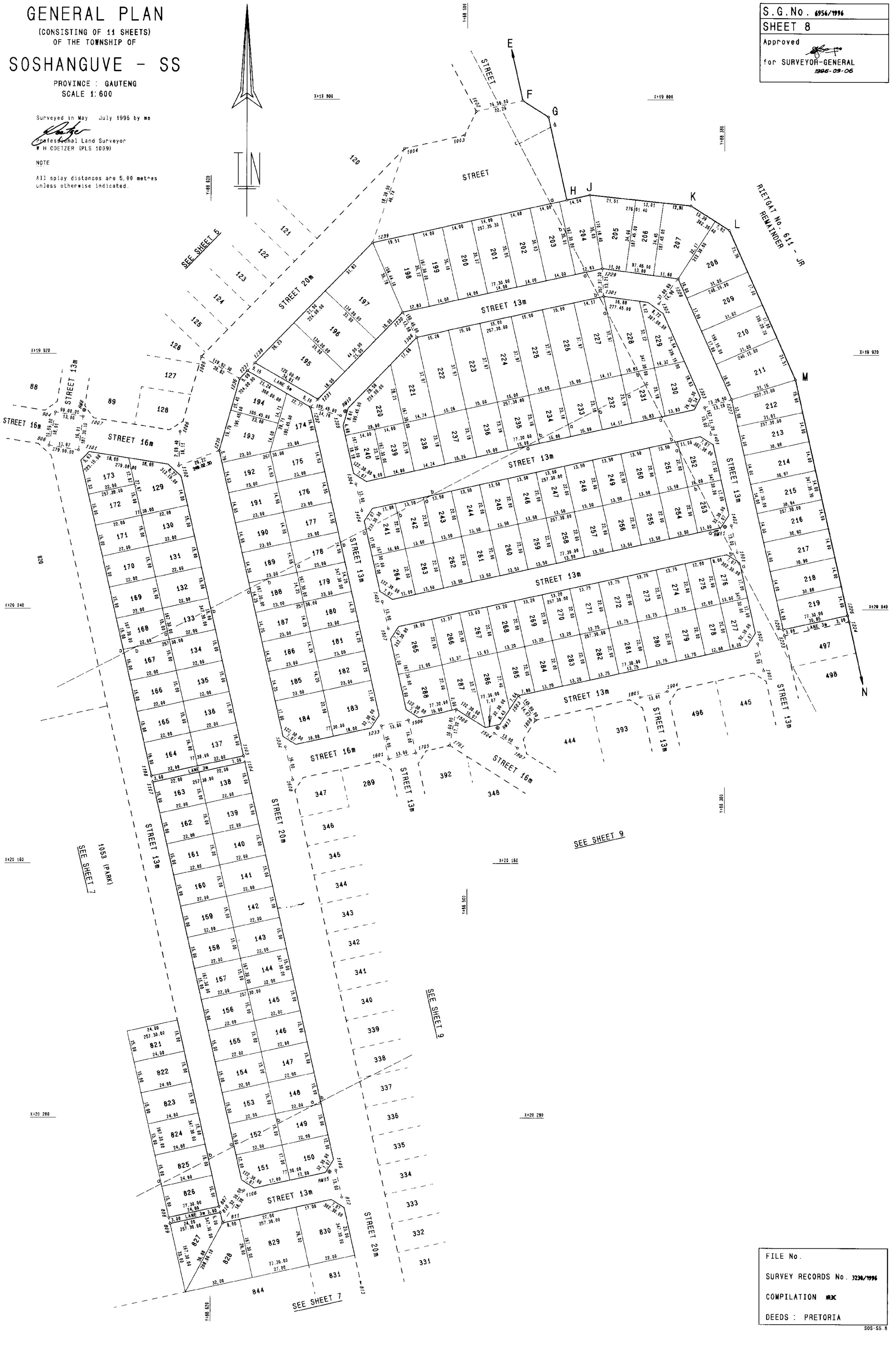
Surveyed in May July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 8
Approved for SURVEYOR-GENERAL 1996-09-06



FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION MRC
DEEDS : PRETORIA

SOS-SS.8

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

Surveyed in May July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 9
Approved for SURVEYOR-GENERAL 1996-09-06

TN

M

N

X+20 040 Y+88 560

X+20 040 Y+88 320

X+20 160 Y+88 440

X+20 280

X+20 400

X+20 520 Y+88 560

X+20 520 Y+88 320

SEE SHEET 8

SEE SHEET 7

SEE SHEET 10

SEE SHEET 11

STREET 13m

STREET 16m

STREET 20m

LANE 3m

RW15

RW16

RW17

RIETGAT No. 611 - JR
REMAINDER

FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JRX
DEEDS : PRETORIA

SOS-SS.9

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

Surveyed in May - July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 10
Approved for SURVEYOR-GENERAL 1996-09-06

TN

X+20 440 Y+88 320 Y+88 440 X+20 520 X+20 640 X+20 760 X+20 880 Y+88 200

SEE SHEET 9 SEE SHEET 11

STREET 13m STREET 16m STREET 20m LANE 3m LANE 4m

RIETGAT No. 611 - JR REMAINDER

FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JR3C
DEEDS : PRETORIA

SOS-SS.10

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

Surveyed in May - July 1996 by me

Professional Land Surveyor
H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 11
Approved for SURVEYOR-GENERAL 1996-09-06

TN

SEE SHEET 6

SEE SHEET 7

SEE SHEET 9

SEE SHEET 10

SEE SHEET 10

STREET 16m

STREET 20m

STREET 13m

STREET 40m

1053 (PARK)

1054 (PARK)

1055 (PARK)

ERF 932

ERF 933

ERF 934

ERF 935

ERF 936

ERF 937

ERF 938

ERF 975

ERF 976

ERF 977

ERF 978

ERF 979

ERF 980

ERF 981

ERF 982

ERF 983

ERF 984

SOSHANGUVE - DD TOWNSHIP

RIETGAT No. 611 - JR
REMAINDER

FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JRK
DEEDS : PRETORIA

SOS-SS.11

AREAS		AREAS		AREAS		AREAS	
Erf Number	Square Metres	Erf Number	Square Metres	Erf Number	Square Metres	Erf Number	Square Metres
1- 4	350	230	373	607	327	852	261
5- 8	375	231	367	608	386	853	475
9	367	232	328	609	452	854- 855	452
10	356	233- 236	348	610	559	856- 858	463
11	3,1998 hectares	237	354	611	366	859	462
12	7 376	238	342	612- 620	322	860	299
13	2,3306 hectares	239	325	621	591	861	533
14	2,6263 hectares	240	312	622- 624	345	862- 869	462
15	852	241	340	625	357	870	572
16	340	242- 251	297	626- 627	334	871	772
17	391	252- 253	339	628	369	872	405
18- 38	388	254- 263	297	629	431	873- 878	338
39	406	264	340	630	367	879	397
40	363	265	450	631	397	880	372
41	357	266	294	632- 633	477	881	375
42	382	267	287	634	812	882	381
43	375	268- 270	290	635	587	883	388
44	474	271- 272	303	636- 638	477	884	375
45	477	273	302	639	525	885	409
46	353	274	303	640	420	886- 891	338
47	384	275	264	641- 643	345	892	405
48- 57	403	276	273	644	407	893- 896	579
58- 59	418	277	274	645	365	897- 898	626
60- 62	404	278	264	646- 654	322	899	576
63 65	405	279 282	303	655	356	900	735
66- 68	406	283- 284	290	656	388	901	869
69	407	285	305	657- 662	375	902- 903	589
70	420	286	417	663	500	904- 905	375
71	422	287	359	664	552	906	574
72	509	288	450	665- 670	375	907	537
73	556	289	403	671- 672	388	908- 922	388
74	687	290- 310	322	673- 678	375	923	558
75	364	311	276	679	516	924	466
76- 77	375	312	329	680- 687	375	925- 927	375
78	340	313	459	688	388	928	636
79	762	314- 315	425	689	425	929	449
80	463	316- 317	487	690	389	930	374
81- 86	450	318- 319	425	691	377	931- 932	550
87	430	320	576	692	493	933	704
88	4,3664 hectares	321	350	693- 694	306	934	363
89	428	322	345	695	308	935- 937	350
90	372	323	442	696- 703	345	938	663
91	385	324	322	704	510	939	456
92	384	325	276	705- 709	345	940- 944	350
93- 100	390	326- 346	322	710	357	945	363
101	583	347	403	711	356	946	438
102	473	348	343	712- 716	345	947- 951	415
103- 109	604	349- 368	311	717	325	952- 953	438
110- 111	436	369	332	718	366	954- 958	415
112- 114	505	370	333	719- 725	345	959	438
115- 116	506	371- 391	311	726	337	960- 961	660
117- 118	507	392	415	727	643	962- 964	550
119	508	393	586	728	531	965	650
120	3 158	394- 417	322	729	432	966- 967	463
121- 125	390	418	617	730	593	968- 969	613
126	360	419	495	731	646	970- 971	463
127	359	420- 443	322	732	789	972	650
128	390	444	800	733	781	973	550
129	502	445	586	734- 737	757	974	462
130- 136	330	446- 469	322	738	787	975	542
137	352	470- 471	495	739	516	976	538
138- 149	330	472- 495	322	740- 751	345	977	525
150- 151	362	496	586	752	337	978	450
152- 163	330	497	463	753- 755	371	979	475
164	352	498- 500	462	756	425	980- 983	407
165- 172	330	501- 502	461	757	513	984- 985	531
173	362	503- 505	460	758- 764	518	986	988
174	369	506- 508	459	765	672	987- 989	407
175	334	509- 511	458	766	340	990	332
176- 178	335	512- 513	457	767- 776	330	991	413
179- 182	328	514- 516	456	777- 778	340	992	419
183- 184	494	517- 519	455	779- 788	330	993	897
185- 188	328	520- 522	454	789	340	994	907
189- 191	335	523	453	790	298	995	910
192	334	524	957	791	325	996	918
193	455	525- 526	420	792	327	997	1 015
194	399	527	810	793- 794	345	998	327
195	730	528	688	795	356	999	300
196	693	529- 530	420	796	297	1000- 1003	305
197	822	531	956	797	296	1004	418
198	568	532	450	798- 803	297	1005- 1012	408
199	492	533- 534	430	804- 813	334	1013	375
200- 202	491	535- 537	429	814	424	1014- 1018	350
203	490	538- 540	428	815	555	1019	362
204	479	541- 543	427	816	345	1020	341
205	550	544- 547	426	817	300	1021- 1024	405
206	445	548	422	818	281	1025	420
207	640	549	1,1850 hectares	819	284	1026	404
208	613	550	4 225	820	1,4131 hectares	1027- 1029	390
209- 210	527	551	4 467	821- 826	360	1030	434
211	613	552	369	827	456	1031	475
212	444	553- 565	322	828	560	1032- 1035	350
213- 214	434	566	356	829	756	1036	375
215- 217	433	567	483	830	604	1037- 1044	408
218- 219	432	568	318	831- 839	308	1045	418
220	520	569- 580	322	840	309	1046- 1049	305
221	488	581	369	841- 842	299	1050	300
222	579	582	327	843	328	1051	567
223- 226	569	583- 594	310	844	2,3967 hectares	1052 (PARK)	4,0427 hectares
227	538	595	464	845	475	1053 (PARK)	6,1960 hectares
228	555	596	417	846	261	1054 (PARK)	3,0523 hectares
229	334	597- 606	318	847- 851	252	1055 (PARK)	800

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG

Surveyed in May - July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres
unless otherwise indicated.

S.G.No. 6956/1996
SHEET 2
Approved for SURVEYOR-GENERAL 1996-09-06

FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JR3C
DEEDS : PRETORIA

SOS-SS.2

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

Surveyed in May - July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 3
Approved for SURVEYOR-GENERAL 1996-09-06

RIETGAT No. 611 - JR
REMAINDER

STREET 13m

SEE SHEET 4

1052 (PARK)

ERF 174
ERF 175
ERF 176
ERF 177
ERF 178
ERF 191
ERF 370
ERF 371
ERF 372
ERF 373
ERF 386
ERF 387
ERF 388
ERF 389
ERF 390
ERF 391
ERF 392
ERF 393
ERF 394
ERF 395
ERF 396
ERF 397
ERF 420
ERF 421

SOSHANGUVE - DD TOWNSHIP

STREET 16m

SERVITUDE 5,00 m

LANE 3m

SEE SHEET 6

SEE SHEET 7

1053 (PARK)

FILE No.

SURVEY RECORDS No. 3230/1996

COMPILATION JR3C

DEEDS : PRETORIA

SOS-SS 3

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:750

Surveyed in May - July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 4
Approved
for SURVEYOR-GENERAL
1996-09-06

TN

RIETGAT No. 611 - JR
REMAINDER

STREET 13m

STREET 16m

LANE 5m

RIGHT OF WAY SERVITUDE

1052 (PARK)

1053 (PARK)

SEE SHEET 3

SEE SHEET 5

SEE SHEET 7

FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JR3C
DEEDS : PRETORIA

SOS-SS.2

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

Surveyed in May - July 1996 by me

Professional Land Surveyor
T H COETZER (PLS 1009)

NOTE :

All splay distances are 5.00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 5
Approved for SURVEYOR-GENERAL 1998-09-06

SEE SHEET 4
13

STREET 16m

RIGHT OF WAY SERVITUDE

LANE 5m

STREET 13m

STREET

RIETGAT No. 611 - JR
REMAINDER

SEE SHEET 4
14

15

1052
(PARK)

STREET 16m

1053 (PARK)
SEE SHEET 7

820
SEE SHEET 7

88

SEE SHEET 8

STREET 20m

STREET

197
196
195
194
193
192

SEE SHEET 8

X+19 440
X+19 560
X+19 680
X+19 800
X+19 920
Y+88 800
Y+88 680
Y+88 560

FILE No.
SURVEY RECORDS No. 3238/1996
COMPILATION JRJC
DEEDS : PRETORIA

SOS-SS 5

GENERAL PLAN

(CONSISTING OF 11 SHEETS)
OF THE TOWNSHIP OF

SOSHANGUVE - SS

PROVINCE : GAUTENG
SCALE 1:600

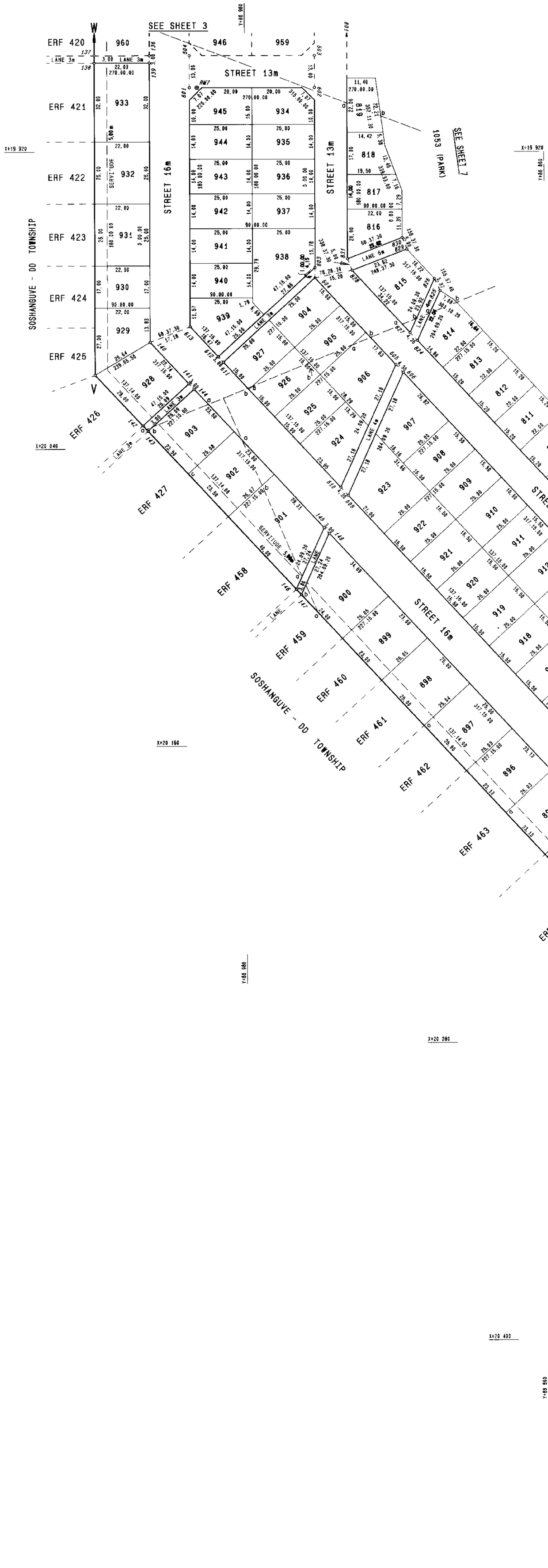
Surveyed in May - July 1996 by me

Professional Land Surveyor
W H COETZER (PLS 1009)

NOTE :

All splay distances are 5,00 metres unless otherwise indicated.

S.G.No. 6956/1996
SHEET 6
Approved for SURVEYOR-GENERAL 1996-09-06



FILE No.
SURVEY RECORDS No. 3230/1996
COMPILATION JR3C
DEEDS : PRETORIA

SOS-SS.6

TM 11522(1)

| MAIN FIGURE DATA | | |

SEËLREG
STAMP DUTY.....
FOOI
FEES..... R165,00

Opgestel deur my,

TRANSPORTBESORGER
P J J VAN RENSBURG

BC 59657/98

SECTION 46 (3) ACT 47 OF 1937
ARTIKEL 46 (3) WET 47 VAN 1937

The land herein described has been laid out into
Die grond hierin beskryf is in..... ERWE 1 - 1051

In accordance with General Plan SG No. A
uitgelê ooreenkomstig die Algemene Plan SG-no. A..... 6956/96

approved/compiled by the Surveyor-General on the
goedgekeur/opgestel deur die Landmeter-generaal op die..... 06/09/96

and booked in a separate register under the name of
en te boek gestel in 'n aparte register onder die naam van.....

SOSHANGUVE - SS

Deeds Office,
Aktekantoor,
PRETORIA

Registrar of Deeds.
Registrateur van Aktes.

VIR VERDERE ENDOSSEMENTE SIEN BLADSY

FOR FURTHER ENDORSEMENTS SEE PAGE

T 75415/98

AKTE VAN TRANSPORT

HIERBY WORD BEKEND GEMAAK

DAT:- PETRUS JOHANNES JANSE VAN RENSBURG

verskyn het voor my, REGISTRATEUR VAN AKTES vir Gauteng te PRETORIA, en dat hy die genoemde Komparant synde behoorlik daartoe gemagtig kragtens 'n Volmag aan hom verleen deur:-

Die PROVINSIE GAUTENG

gedateer te PRETORIA op 2 APRIL 1998.

For Information Only

Welke Volmag aan my getoon is en die genoemde Komparant het verklaar dat nademaal sy Prinsipaal op 2 JUNIE 1995 ooreengekom het om die hiernagenoemde eiendom te transporteer aan die hiernagenoemde transportontvanger in ruil vir die eiendom bekend as:-

GEDEELTE 23 van die plaas RIETGAT 611,
Registrasie Afdeling J.R., Provinsie Gauteng;

GROOT: 122,2775 (EENHONDERD TWEE EN TWINTIG komma TWEE SEWE SEWE VYF) Hektaar;

EN NADEMAAL die transportnemer ook addisioneel 'n bedrag van R23 924,37 (DRIE EN TWINGTIGDUISEND NEGEHONDERD VIER EN TWINTIG RAND EN SEWE EN DERTIG SENT) aan die transportgewer betaal ten einde die waardes van die eiendomme wat verruil word, gelyk te stel.

En dat hy in sy voornoemde hoedanigheid, hiermee in volle en vrye eiendom sedeer en transporteer aan en ten gunste van:-

SIZANE AGENCIES CC
CK 92/23202/23
diese Opvolgers in Titel en Regsverkrygendes:-

GEDEELTE 38 van die plaas RIETGAT 611,
Registrasie Afdeling J.R., Provinsie Gauteng;

GROOT: 93,3535 (DRIE EN NEGENTIG komma DRIE VYF DRIE VYF) Hektaar;

SOOS AANGEDUI op die aangehegte Kaart L.G. No. 6955/1996 EN GEHOU kragtens Sertifikaat van Verenigde Titel T.76794/1989;

For Information Only

ONDERHEWIG AAN DIE VOLGENDE VOORWAARDE:

Die restant van Minerale Gebied 3 geleë op die Resterende Gedeelte van Gedeelte 8 van die plaas Rietgat 105, Registrasie Afdeling J.R., Transvaal, Groot 1132,5223 (EEN EEN DRIE TWEE komma VYF TWEE TWEE DRIE) hektaar, 'n gedeelte waarvan aangedui word deur die figuur y x middel van spruit hh jj kk U aa op Kaart S G No 6955/1966 hierby aangeheg is onderhewig aan 'n voorbehoud van alle regte tot minerale soos gesedeer aan die Suid-Afrikaanse Ontwikkelingstrust kragtens Akte van Sessie van Regte op Minerale K 4120/89 RM.

EN verder onderhewig aan al sodanige voorwaardes as wat in genoemde Akte vermeld staan of na verwys word.

WESHALWE die Komparant afstand doen van al die reg en titel wat sy Prinsipaal voorheen tot genoemde eiendom gehad het en gevolglik ook erken dat hy geheel en al uit die besit daarvan onthef is en nie meer daartoe geregtig is nie en dat kragtens hierdie Akte, die genoemde

SIZANE AGENCIES CC

diese Opvolgers in Titel of Regverkrygendes, tans en voortaan daartoe geregtig is, ooreenkomstig plaaslike gebruik, behoudens die regte van die Staat, en ten slotte erken dat hereregte betaal is op die bedrag van R503 924,37 (VYFHONDERD EN DRIEDUISEND NEGEHONDERD VIER EN TWINTIG RAND EN SEWE EN DERTIG SENT), synde die billike waarde van die eiendom.

For Information Only

TEN BEWYSE WAARVAN ek, die genoemde Registrateur van Aktes, tesame met die Komparant hierdie Akte onderteken en my die ampseël bekragtig het.

ALDUS GEDOEN EN VERLY op die kantoor van die Registrateur van Aktes te PRETORIA op 9-7-98

In my teenwoordigheid:-

q.q.

REGISTRATEUR VAN AKTES

For Information Only

BLADSY/PAGE 5

T 75415/98

W.O.P. B 28596/06

B 028596/06

VERBIND
MORTGAGED

vir
for R 6180 00

Akteskantoor
Deeds Office

27/02/06
Registrateur
Registrar

27/02/06

BC 181562/2007

GEKANSELLEER
CANCELLED

(2)

REGISTRATEUR/REGISTRAR

24/10/2007

(1)

ENDOSSEMENT KRAGTENS ARTIKEL 27D VAN WET 61 VAN 1973	ENDORSEMENT BY VIRTUE OF SECTION 27D OF ACT 61 OF 1973
BINNEGEMELDE BESLOTE KORPORASIE IS OMSKEP IN 'N MAATSKAPPY EN STAAN NOU BEKEND AS	WITHIN-MENTIONED CLOSE CORPORATION HAS BEEN CONVERTED INTO A COMPANY AND IS NOW KNOWN AS
Sizane Agencies (Pty) Ltd	
NO. 2006/014134/07	
BC 59529 07	
17 09 /07	REGISTRATEUR/REGISTRAR

(2)

SERTIFIKAAT VAN GEREGISTREERDE TITEL UITGEREIK
CERTIFICATE OF REGISTERED TITLE ISSUED

TEN OPSIGTE VAN Ged 46 (Ged v Ged 38) Plaas Rietpan
IN RESPECT OF

611 JR = 22,5521 ha RESTANT 70,8014 ha
REMAINDER

T 127667/07

17 09 707

REGISTRATEUR/REGISTRAR

dkf 24/10/07

For further endorsement see page 6

For Information Only

BLADSY/PAGE 6

AKTE No./DEED No. T. 75415/98

ONTEIENING DEUR EXPROPRIATION BY

City of Tshwane Metropolitan Municipality

VAN/OF Act/Ord No: Sec 79(24) of Ord 1939 read with Sec 5 of the expropriation Act 63/1975

GROOT ONGEVEER/MEASURING APPROXIMATELY ± 57,29 ha.

EX 77/2007

REGISTRATEUR/REGISTRAR

For Information Only

ANNEXURE D

(0223) SOSH-SSX01

(0223) SOSH-SSX02

(0217) SOSH-P

SOSH-DD

X: +2 820 100

Y: +88 600

Y: +88 100

Y: +88 800

Southern

LEGEND

- Network pipes (Ø, material & class) — e.g. 75Ø uPVC '12'
- Private Internal Network
- Bulk Water Pipes
- RW Pipes
- Zones
- Other Pipes
- Townships
- Pipe Offset — 4.45m
- RW Connection — 3312
- Reservoir / Tower
- Pump Station
- Zone Valve — Closed
- Valve
- Hydrant
- PRV
- CV
- Air Valve
- Scour Valve
- End Cap
- Flow Meter — M
- House Connection

CITY OF TSHWANE
"we are the same"

Tshwane System

INDEX

Q23	R23	S23
Q24	R24	S24
Q25	R25	S25

Water Distribution System

TSHWANE

DATE: May 2007

REV: 11

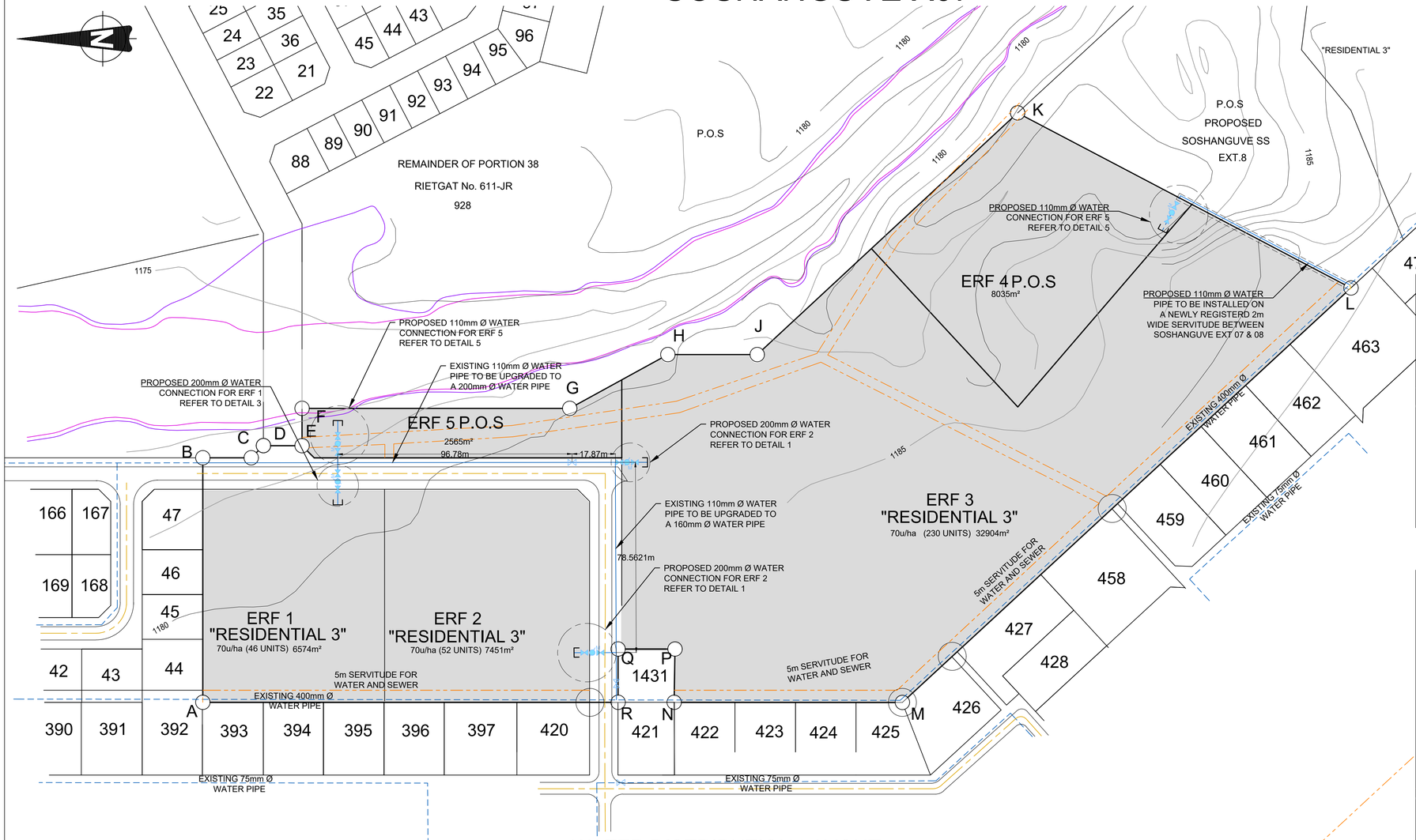
SCALE: 1 : 5 000 — WGS 29°

0m 20m 40m 60m 80m 100m

No: **R24**

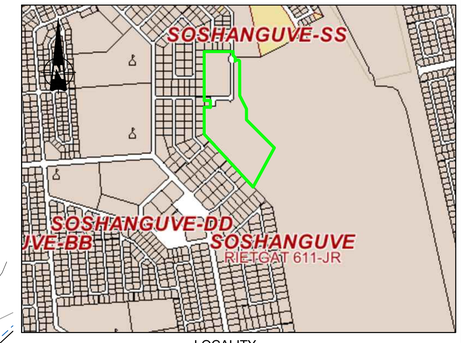
ANNEXURE E

SOSHANGUVE X07

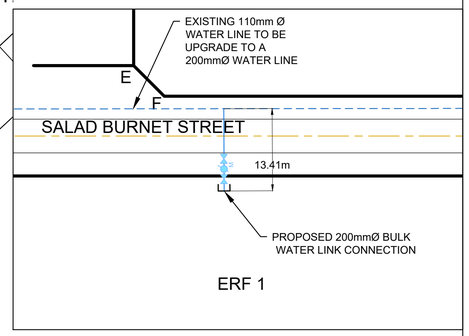


WATER DISTRIBUTION LAYOUT

SCALE 1:1000

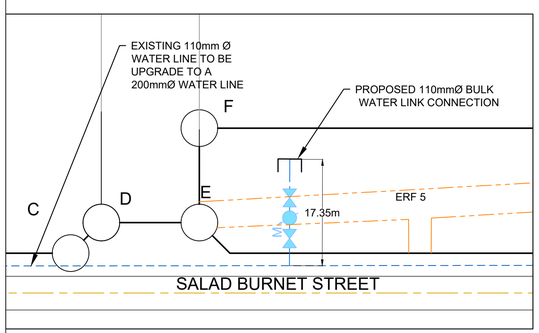


LOCALITY

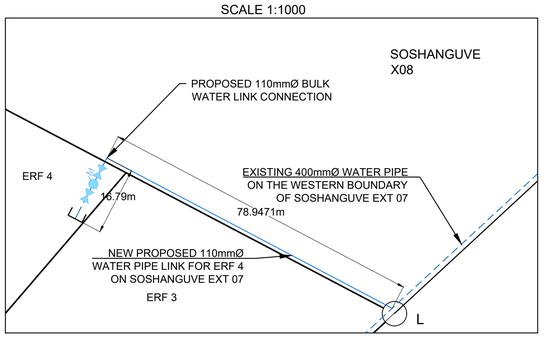


DETAIL 1: BULK WATER CONNECTION FOR ERF 1
SCALE: 1:500

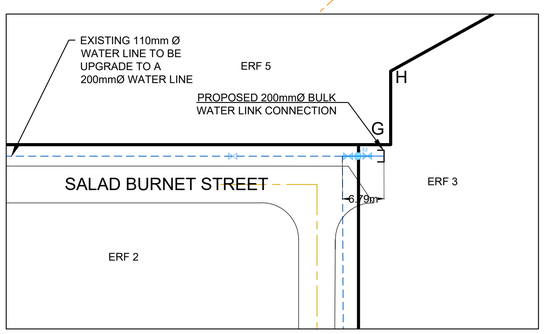
DETAIL 2: BULK WATER CONNECTION FOR ERF 2
SCALE: 1:500



DETAIL 5: BULK WATER CONNECTION FOR ERF 5
SCALE: 1:500



DETAIL 4: BULK WATER CONNECTION FOR ERF 4
SCALE: 1:750



DETAIL 3: BULK WATER CONNECTION FOR ERF 3
SCALE: 1:500

NOTES AND SPECIFICATIONS

GENERAL

1. ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT ISABS REQUIREMENTS.
2. ALL DIMENSIONS ARE IN MILLIMETRES. (UNLESS SO OTHERWISE SPECIFIED).
3. DO NOT SCALE FROM THESE DRAWINGS.
4. ALL DIMENSIONS MUST BE CHECKED AND APPROVED ON SITE.
5. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, THIRD EDITION 2005 AND THE STANDARD DETAIL DRAWINGS.
6. THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, SERIES 4.
7. THE SIGNATURE ON THIS DRAWING OF ANY DIRECTOR OF THE PUBLIC WORKS AND INFRASTRUCTURE DEVELOPMENT DEPARTMENT, IN NO WAY RELIEVES ANY RESPONSIBILITY WHATSOEVER FROM THE CONSULTANT.
8. THE CONSULTANT REMAINS RESPONSIBLE TO ENSURE THAT ALL THE GUIDELINES, STANDARD DRAWINGS, STANDARDS AND SPECIFICATIONS OF THE PUBLIC WORKS AND INFRASTRUCTURE DEVELOPMENT DEPARTMENT HAVE BEEN MET AND ARE COMPLIED WITH.
9. FINAL POSITION OF SERVICES TO BE DETERMINED ON SITE.

WATER LEGEND:

WATER LEGEND:

- EXISTING MUNICIPAL WATER MAIN
- EXISTING MUNICIPAL VALVE
- VALVE
- WATER METER
- END CAP
- NEW LINK WATER LINE

GENERAL LEGEND:

- PROPOSED DEVELOPMENT
- 1:50 YEAR FLOOD LINE
- 1:100 YEAR FLOOD LINE
- ROAD CENTER LINE
- SERVITUDE LINE

CITY OF TSHWANE
PO BOX 1022
PRETORIA
0001

CITY OF TSHWANE
SERVICES INFRASTRUCTURE DEPARTMENT
WATER AND SANITATION DIVISION

AMENDMENTS

NR	DATE	APPROVED	DESCRIPTION	PAR
-	-	-	-	-

WATER AND SANITATION

FOR INTERNAL APPROVAL - RECEIVED SIGN WHEN APPLICABLE

	NAME	Prof. Reg. No	SIGNATURE	DATE
DIRECTOR:INFRASTRUCTURE PROVISION				
DIRECTOR: WATER DISTRIBUTION				
DIRECTOR: BULK WATER SERVICES				
DIRECTOR: WATER & SANITATION: PLANNING & REGULATION				
DIRECTOR: WASTE WATER COLLECTION				
DIRECTOR: WASTE WATER TREATMENT				

CONSULTANT DETAIL

PVA CONSULTING ENGINEERS cc
CONSULTING ENGINEERS & PROJECT MANAGERS

LEAD | Land Engineering And Development Pty Ltd

CIVIL & STRUCTURAL CONSULTING ENGINEERS

UNIT 2 BIZ AFRIKA PARK, 217 FAKKEL STREET, SILVERTON, 0184, PO BOX 95673, WATERKLOOF, PRETORIA, 0181
TEL:086 1106 256
e-mail : pva@iafrica.com

UNIT 2 BIZ AFRIKA PARK, 217 FAKKEL STREET, SILVERTON, 0184, PO BOX 1394, MOOIVALLEI PARK, PRETORIA, 0181
TEL:082 933 3316
e-mail : info@landeng.co.za

I, ... Prof Reg Nr. .....
HEREBY CERTIFY THAT THE SERVICES WILL\ HAVE BEEN INSTALLED ACCORDING TO CLAUSE A OF THE ABOVE NOTES AND TO THE DRAWING

CONSULTANT DRAWING NUMBER: 1763.05U01
SIGNATURE: _____
REVISION: A

DESIGNED
NAME: PJ VENTER Prof Reg No: 8570162
SIGNATURE: ..... DATE: .....

DRAWN
NAME: - DATE: -
SIGNATURE: ..... DATE: -

CHECKED
NAME: PJ VENTER Prof Reg No: 8570162
SIGNATURE: ..... DATE: -

INFORMATION OFFICE CHECKED
NAME: .....
SIGNATURE: ..... DATE: .....

DESIGN OFFICE APPROVAL
NAME: ..... Prof Reg No: .....
SIGNATURE: ..... DATE: .....

CONTRACT No. 1763
PROJECT No. 1763
SHEET No. 1 OF 1
PAPER SIZE A1
SCALE AS SHOWN
DATE: FEB-2018

LOCATION OF PROJECT
SOSHANGVE X07

DESCRIPTION OF PROJECT:
PROPOSED BULK WATER LINK CONNECTION

WBS No. __-_____-__-_____-__-__

COT DRAWING NUMBER __-_____-_____-__-____-__-__
REVISION: A

PROJECT STATUS

CONCEPT DRAWING | TENDER DRAWING | APPROVED CONSTRUCTION DRAWING | AS BUILT DRAWING

PROJECT ENGINEER of COT:
NAME _____ SIGNATURE _____
Prof Reg No. _____ DATE _____

INSPECTOR OF WORKS of COT:
NAME _____ SIGNATURE _____
DATE _____

ANNEXURE F

(0223) SOSH-SSX01

(0223) SOSH-SSX02

(0217) SOSH-P

SOSH-DD

Rietgat-NPMSS

y: +88 600

y: +88 100

X: +2 820 000

X: +2 820 100

Saltspan

Southpan

CITY OF TSHWANE
"we are the same"

Tshwane System

LEGEND

PIPE DIAMETER LEGEND

- ≤ 175 mmØ
- > 175 ≤ 325 mmØ
- > 325 mmØ
- 680127 / 350Ø HDPE / (101) — Pipe Number, Direction, Diameter and Material/Class, Slope (1 in Xm)
- Private Internal Network
- Rising Mains
- Drainage Areas
- Townships

- 1,5 Manhole (Depth in meter)
- Rodding Eye
- T Top End
- Diversion
- Pump Station
- Special Structures
- M Flow Meter
- House connections

- B B Pipe Bridge
- S S Syphon
- T T Tunnel
- E E Encased

INDEX

Q23	R23	S23
Q24	R24	S24
Q25	R25	S25

Sewer System TSHWANE

DATE: May 2007

REV: 11

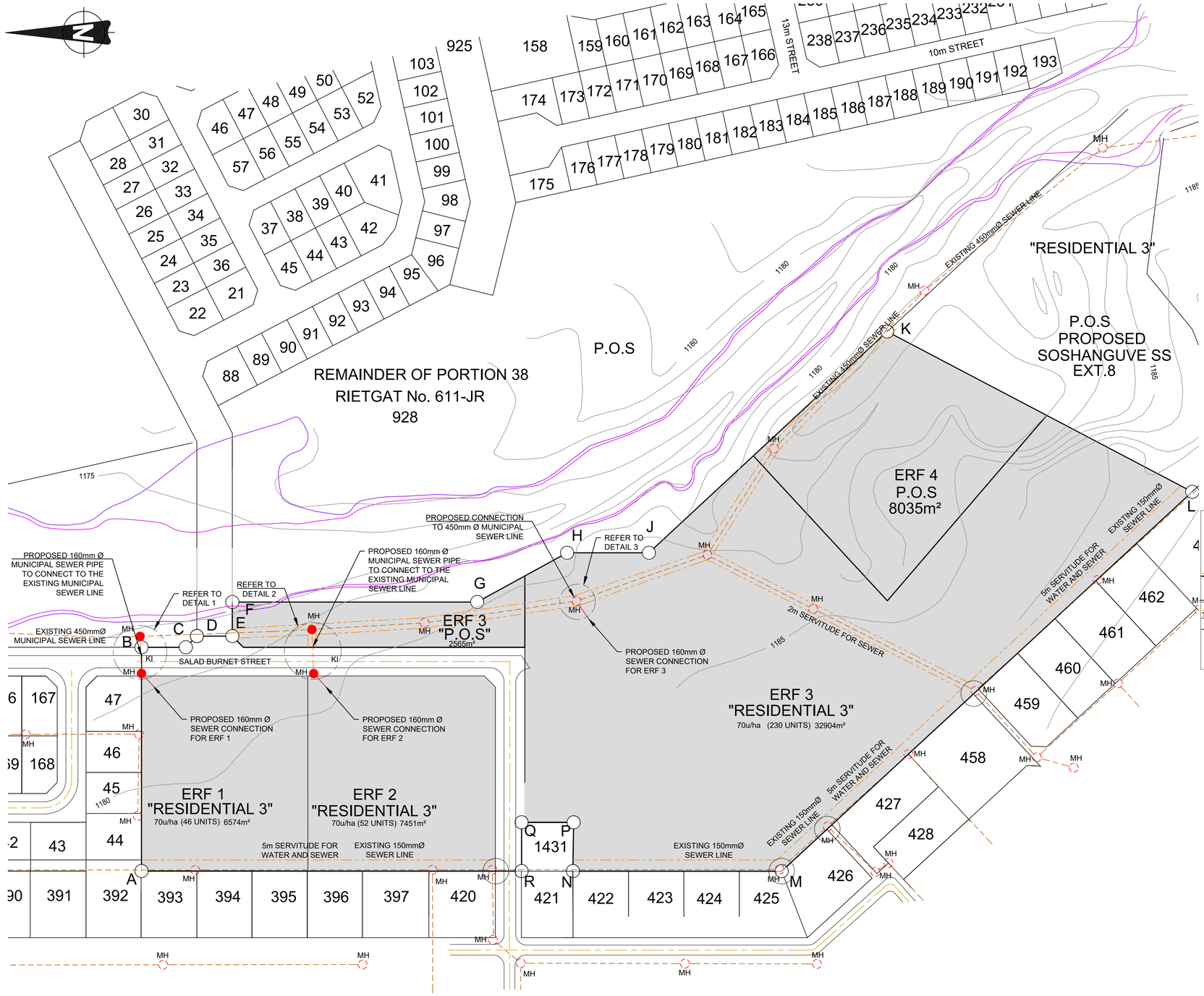
SCALE: 1 : 5 000 — WGS 29°

0m 20m 40m 60m 80m 100m

No: **R24**

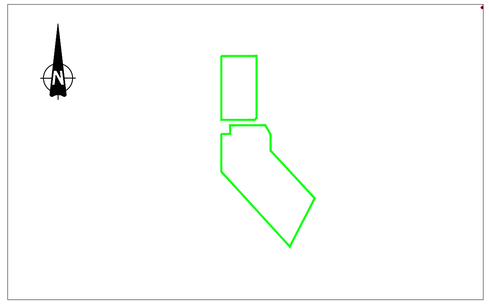
ANNEXURE G

SOSHANGUVE X07

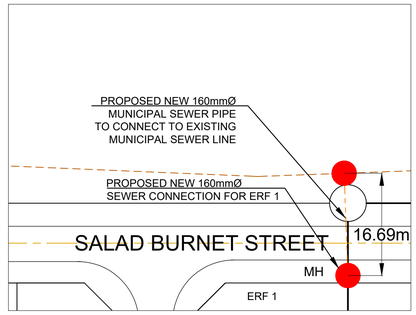


SEWER CONNECTION LAYOUT

SCALE: 1:1000

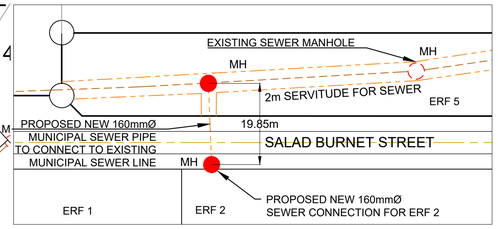


LOCALITY



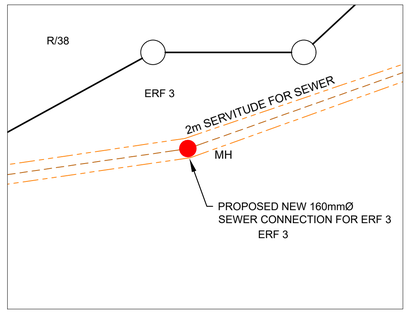
DETAIL 1: BULK SEWER CONNECTION FOR ERF 1

SCALE: 1:500



DETAIL 2: BULK SEWER CONNECTION FOR ERF 2

SCALE: 1:750



DETAIL 3: BULK SEWER CONNECTION FOR ERF 3

SCALE: 1:750

NOTES AND SPECIFICATIONS

1. ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT SABS REQUIREMENTS.
2. ALL DIMENSIONS ARE IN MILLIMETRES. (UNLESS OTHERWISE SPECIFIED).
3. DO NOT SCALE FROM THESE DRAWINGS.
4. ALL DIMENSIONS MUST BE CHECKED AND APPROVED ON SITE.
5. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, THIRD EDITION 2005 AND THE STANDARD COT DETAIL DRAWINGS.
6. THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, SERIES 4.
7. THE SIGNATURE OR INITIALS ON THIS DRAWING, OF ANY DIRECTOR OF THE PUBLIC WORKS AND INFRASTRUCTURE DEVELOPMENT DEPARTMENT, IN NO WAY REMOVES ANY RESPONSIBILITY WHATSOEVER FROM THE CONSULTANT.
8. THE CONSULTANT REMAINS RESPONSIBLE TO ENSURE THAT ALL THE GUIDELINES, STANDARD DRAWINGS, STANDARDS AND SPECIFICATIONS OF THE PUBLIC WORKS AND INFRASTRUCTURE DEVELOPMENT DEPARTMENT HAVE BEEN MET AND ARE COMPLIED WITH.
9. FINAL POSITION OF SERVICES TO BE DETERMINED ON SITE.

LEGEND

SANITATION

- NEW MANHOLE
- EXISTING MANHOLE
- NEW CCTV INSPECTION
- EXIST. LINE INSPECTED BY CCTV
- NEW SEWER LINE
- EXISTING SEWER LINE
- HOUSE CONNECTION

GENERAL LEGEND:

- PROPOSED DEVELOPMENT
- 1:50 YEAR FLOOD LINE
- 1:100 YEAR FLOOD LINE
- ROAD CENTER LINE
- SERVITUDE LINE

CITY OF TSHWANE
PO BOX 1022
PRETORIA
0001

CITY OF TSHWANE
SERVICES INFRASTRUCTURE DEPARTMENT
WATER AND SANITATION DIVISION

AMENDMENTS

NR	DATE	APPROVED	DESCRIPTION	PAR
-	-	-	-	-

WATER AND SANITATION

FOR INTERNAL APPROVAL - RECEIVED SIGN WHEN APPLICABLE

	NAME	Prof. Reg. No	SIGNATURE	DATE
DIRECTOR:INFRASTRUCTURE PROVISION				
DIRECTOR: WATER DISTRIBUTION				
DIRECTOR: BULK WATER SERVICES				
DIRECTOR: WATER & SANITATION: PLANNING & REGULATION				
DIRECTOR: WASTE WATER COLLECTION				
DIRECTOR: WASTE WATER TREATMENT				

CONSULTANT DETAIL

PVA CONSULTING ENGINEERS cc
CONSULTING ENGINEERS & PROJECT MANAGERS
LEAD Land Engineering And Development Pty Ltd

CIVIL & STRUCTURAL CONSULTING ENGINEERS

UNIT 2 BIZ AFRIKA PARK
217 FAKKEL STREET
SILVERTON
0184
PO BOX 49023
WONDERBOOM
PRETORIA
0184
TEL:086 1106 256
e-mail : pva@iafrica.com

UNIT 2 BIZ AFRIKA PARK
217 FAKKEL STREET
SILVERTON
0184
PO BOX 1094
WONDERBOOM
PRETORIA
0184
TEL:082 933 3316
e-mail : info@landeng.co.za

I ..... Prof Reg Nr. .....
HEREBY CERTIFY THAT THE SERVICES WILL\ HAVE BEEN INSTALLED ACCORDING TO CLAUSE A OF THE ABOVE NOTES AND TO THE DRAWING

CONSULTANT DRAWING NUMBER: 1763.06U01 SIGNATURE: ..... REVISION: A

DESIGNED
NAME: PJ VENTER Prof Reg No: 8570162
SIGNATURE: ..... DATE: .....

DRAWN
NAME: - .....
SIGNATURE: ..... DATE: -

CHECKED
NAME: PJ VENTER Prof Reg No: 8570162
SIGNATURE: ..... DATE: -

INFORMATION OFFICE CHECKED
NAME: .....
SIGNATURE: ..... DATE: .....

DESIGN OFFICE APPROVAL
NAME: ..... Prof Reg No: .....
SIGNATURE: ..... DATE: .....

CONTRACT No. 1763
PROJECT No. 1763
SHEET No. 1 OF 1
PAPER SIZE A1
SCALE AS SHOWN
DATE: FEB-2018

LOCATION OF PROJECT
SOSHANGVE X07

DESCRIPTION OF PROJECT:
PROPOSED SEWER LINK CONNECTION

WBS No. __-_____-__-_____-__-__

COT DRAWING NUMBER __-_____-_____-__-__-_____-__-__ REVISION: A

PROJECT STATUS

CONCEPT DRAWING | TENDER DRAWING | APPROVED CONSTRUCTION DRAWING | AS BUILT DRAWING

PROJECT ENGINEER of COT:
NAME SIGNATURE
Prof Reg No. DATE

INSPECTOR OF WORKS of COT:
SIGNATURE
NAME DATE

ANNEXURE H

PVA Consulting Engineers cc
Unit 2 Biz Afrika Park, 217 Fakkel Street Pretoria, 0184
PO Box 95673 Waterkloof 0145
e-mail: pva@iafrica.com
Tel: 086 110 6256

LEAD | Land Engineering And Developments Pty Ltd
Unit 2 Biz Afrika Park, 217 Fakkel Street Pretoria, 0184
PO Box 1349 Silverton, 0127
e-mail: info@landeng.co.za
Tel: 082 933 3316

Estimates For Civil Services

Project: Soshanguve Ext 07
Water & Sanitation

Date: February 2018
Project Nr. 1763
No of Units: 328

Done By:	**PVA-LEAD**
Approved:	**-**
-	

	DESCRIPTION	UNIT	Price p. unit	SUB TOTAL	TOTAL	
1,1	**Internal ROADS**					
	60mm Grey interlocking paving incl sand	m²	R 0	R 0		R 0 PER UNIT
	C4 Sub-base with Stabilisation 3% cement 150mm Thick	m²	R 0	R 0		
	G6 Layer beneath Road Sub-base	m²	R 0	R 0		
	G9 Layer beneath Streets and Parking	m²	R 0	R 0		
	Kerb figure 3	m	R 0	R 0		
	Pinting of Parking Bays and Lanes	m	R 0	R 0		
	Painting Arrows and Stop Lines	0	R 0	R 0		
	Road Signs	0	R 0	R 0		
	Site Clearence	m²	R 0	R 0		
					R 0	
1,2	**SEWER**					
	200Ø Pipes (Mainlite) All in	m	R 290	R 0		R 336 PER UNIT
	160Ø Pipes (Mainlite) All in	37 m	R 240	R 8 880		
	Manholes >2m	0	R 14 000	R 0		
	Manholes <2m	5	R 11 000	R 55 000		
	Lamp Holes	0	R 1 500	R 0		
	Extra over Rock Exc	4 m³	R 500	R 1 850		
	Connections	3	R 2 800	R 8 400		
	Road Crossing	2	R 18 000	R 36 000		
	Camera Inspection	m	R 70	R 0		
	Reinstate Existing Sidewalks / Landscaping	m	R 350	R 0		
					R 110 130	
1,3	**WATER**					
	200∅ Pipes	317 m	R 450	R 142 650		R 1 182 PER UNIT
	160∅ Pipes	m	R 320	R 0		
	110∅ Pipes	72 m	R 260	R 18 720		
	75∅ Pipes	m	R 180	R 0		
	40∅ Pipes	m	R 165	R 0		
	Connections (±12%)	2	R 2 500	R 5 000		
	Saddles	0	R 650	R 0		
	Extra over Rock Exc	39 m³	R 500	R 19 450		
	Fire Hydrants Complete	0	R 8 500	R 0		
	Valve Complete	2	R 6 000	R 12 000		
	Road Crossing	2	R 18 000	R 36 000		
	200Ø Main Meters Connection + Dep	3	R 38 000	R 114 000		
	110Ø Main Meters Connection + Dep	2	R 20 000	R 40 000		
	Connections (short)	0	R 2 800	R 0		
	Double Connections (Road Crossing)	0	R 3 500	R 0		
	Reinstate Existing Sidewalks / Landscaping	m	R 350	R 0		
					R 387 820	
1,4	**STORM WATER**					
	1050∅ Pipes	m	R 2 300	R 0		R 0 PER UNIT
	600∅ Pipes	m	R 1 050	R 0		
	450Ø Pipes	m	R 750	R 0		
	300Ø Pipes	m	R 650	R 0		
	SW Inlets (2.5m) Grid	0	R 15 000	R 0		
	Junction Box	0	R 12 000	R 0		
	Extra over Rock Exc	m³	R 500	R 0		
	Road Crossing	0	R 18 000	R 0		
	Stormwater Outlet structure	0	R 8 000	R 0		
					R 0	
	SUB TOTAL 1				**R 497 950**	
	Ps + Gs ±16%				R 79 672	
	Sub-Total				R 577 622	
	CONTINGENCIES ±10% sum				R 57 762	
	Sub-Total				R 635 384	
	Professional Fees 10%				R 63 538	
	Sub-Total				R 698 923	
	VAT 14%				R 97 849	
	TOTAL 1				**R 796 772**	
	Total Price per Unit – ? Units				R 2 429	

ANNEXURE I

City Planning and Development Department

Room 12007 | 12th Floor | Isivuno | 143 Lilian Ngoyi Street (Van der Walt) | Pretoria | 0002
PO Box 3242 | Pretoria | 0001
Tel: 012 358 0975 | Fax: 086 214 4411
Email: makgorometiem@tshwane.gov.za I www.tshwane.gov.za I www.facebook.com/CityOfTshwane

My ref:	CPD 9/1/1/1- SOSH-SS X 7 223	Tel:	012 358 9092
Your ref:		Fax:	012 358 9115
Contact person:	Mariëtte Theron	Email:	mariettet@tshwane.gov.za
Section/Unit:	Regional Spatial Planning		

New Town Associates

P.O.BOX 95617

WATERKLOOF

0145

Sir/Madam

AMENDMENT OF CONDITIONS OF ESTABLISHMENT IN TERMS OF SECTION 98(5) OF THE TOWN PLANNING AND TOWNSHIPS ORDINANCE, 15 OF 1986: SOSHANGUVE - SS EXTENSION 7

Attached please find a copy of the approved amended conditions of establishment for the above-mentioned township for your attention.

CITY OF TSHWANE
APPROVED
2015 -01- 17
CITY PLANNING AND
DEVELOPMENT COMMITTEE

Yours Faithfully

f STRATEGIC EXECUTIVE DIRECTOR: CITY PLANNING AND DEVELOPMENT

Date.....

On request, this document can be provided in another official language.

STATEMENT OF CONDITIONS UNDER WHICH THE APPLICATION MADE BY SIZANE AGENCIES CC REGISTRATION NUMBER 92/23202.23 (HEREINAFTER REFERRED TO AS THE APPLICANT/ TOWNSHIP OWNER) IN TERMS OF THE PROVISIONS OF CHAPTER III: PART C (or CHAPTER IV) OF THE TOWN-PLANNING AND TOWNSHIPS ORDINANCE, 1986 (ORDINANCE 15 OF 1986), FOR PERMISSION TO ESTABLISH A TOWNSHIP ON A PART OF PORTION 38 OF THE FARM RIETGAT 611 REGISTRATION DIVISION JR PROVINCE OF GAUTENG, HAS BEEN GRANTED

1. **CONDITIONS TO BE COMPLIED WITH PRIOR TO THE TOWNSHIP BEING DECLARED AN APPROVED TOWNSHIP IN TERMS OF THE PROVISIONS OF SECTION 103 OFTHE TOWN-PLANNING AND TOWNSHIPS ORDINANCE, 1986 (ORDINANCE 15 OF 1986)**

1.1 INSTALLATION AND PROVISION OF SERVICES

The applicant shall make the necessary arrangements for the finalization of the services agreements with the local authority for the provision and installation of water, electricity and sanitation as well as the construction of roads and storm water drainage in the township.

If external services are not available or the existing external services are not sufficient to accommodate the township, special arrangements will have to be made after consultation with the applicable departments in the Municipality.

1.2 MINERAL RIGHT PERMITS

The consent shall be obtained from the Department of Mineral and Energy regarding the mineral rights in respect of the land on which the township is being established.

1.3 GENERAL

(a) The applicant shall satisfy the City of Tshwane Metropolitan Municipality (hereafter referred to as the Municipality) that:

(i) the relevant amendment scheme (in terms of section 125 of Ordinance 15 of 1986) is in order and may be published simultaneously with the declaration of the township an approved township;

(ii) a detailed Public Transport Assessment must be submitted in compliance with the provisions of the National Land Transport Act, 2009 (Act 5 of 2009), Section 38. The assessment must comply with the requirements of the Municipality (Transport and Roads Department: Transport Development Division) and must indicate how such facilities will be provided and how public transport and non motorised transport facilities will be integrated with the development;

(iii) the portions of the road reserves adjoining the proposed township, and which are required for the proper installation and maintenance of the Municipality's electrical services must be acquired by the township owner to the satisfaction of the Public Works and Infrastructure Development Department (Energy and Electricity Division);

(iv) the name of the township as well as the street names have been approved by the Council and it is indicated on the layout plan or General Plan in accordance with regulation 18.(1)(a)(iv) of the Town-Planning and Townships Ordinance 15 of 1986.

(b) The applicant shall comply with the provisions of Sections 72, 75 and 101(2) of Ordinance 15 of 1986.

2. CONDITIONS OF ESTABLISHMENT (CONDITIONS WHICH WILL BE APPLICABLE TO THE APPROVED TOWNSHIP IN TERMS OF SECTION 103 OF ORDINANCE 15 OF 1986)

2.1 NAME

The name of the township shall be Soshanguve SS Extension 7.

2.2 DESIGN

The township shall consist of erven, parks and streets as indicated on Plan CPD Sosh SSX7/8.

2.3 REMOVAL OR REPLACEMENT OF MUNICIPAL SERVICES

Should it become necessary to move or replace any existing municipal services as a result of the establishment of the township, the cost thereof shall be borne by the township owner.

2.4 DEMOLITION OF BUILDINGS AND STRUCTURES

When required by the City of Tshwane Metropolitan Municipality to do so, the township owner shall at his own expense cause to be demolished to the satisfaction of the Municipality all existing buildings and structures situated within building line reserves and side spaces or over common boundaries, or dilapidated structures.

2.5 REMOVAL OF LITTER

The township owner shall at his own expense have all litter within the township area removed to the satisfaction of the City of Tshwane Metropolitan Municipality, when required to do so by the Municipality.

2.6 REMOVAL AND/OR REPLACEMENT OF TELKOM SERVICES

Should it become necessary to remove and/or replace any existing TELKOM services as a result of the establishment of the township, the cost thereof shall be borne by the township owner.

2.7 COMPLIANCE WITH CONDITIONS IMPOSED BY GDARD

The township owner shall at his own expense comply with all the conditions imposed, by which the Gauteng Department of Agriculture and Rural Development including if applicable those by which exemption has been granted from compliance with Regulations No 1182 and 1183 promulgated in terms of Sections 21, 22 and 26 of the Environmental Conservation Act, (Act 73 of 1989) or the National Environmental

Management Act, 1998 (Act 107 of 1998) and Regulations thereto, as the case may be, for the development of this township.

2.8 OBLIGATIONS WITH REGARD TO SERVICES AND RESTRICTIONS

REGARDING THE ALIENATION OF ERVEN

The township owner shall within such period as the Local Authority may determine fulfil its obligations in respect of the provision of water, electricity and sanitary services as well as the construction of roads and stormwater drainage and the installation of systems thereof, as previously agreed upon between the township owner and the local authority. Erven may not be alienated or transferred into the name of a purchaser prior to the Local Authority certifying that sufficient guarantees/cash contributions in respect of the supply of services by the township owner have been submitted or paid to the said Local Authority.

3. CONDITIONS TO BE COMPLIED WITH BEFORE THE ERVEN IN THE TOWNSHIP BECOME REGISTERABLE

INSTALLATION OF INTERNAL AND EXTERNAL SERVICES

A certificate issued in terms of section 82 of the town-planning and Townships Ordinance (Ordinance 15 of 1986) must be lodged with the first transfer or with any other act of registration such as the issuing of a Certificate of Title.

The township applicant shall install and provide internal engineering services in the township as provided for in the services agreement.

The Local Authority shall install and provide external engineering services for the township as provided for in the services agreement.

4. DISPOSAL OF EXISTING CONDITIONS OF TITLE

All erven shall be made subject to existing conditions and servitudes, if any, including the reservation of the rights to minerals.

5. CONDITIONS OF TITLE

THE ERVEN MENTIONED BELOW SHALL BE SUBJECT TO THE CONDITIONS AS INDICATED, LAID DOWN BY THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY IN TERMS OF THE PROVISIONS OF THE TOWN-PLANNING AND TOWNSHIPS ORDINANCE, 1986 (ORDINANCE 15 OF 1986)

5.1 ALL ERVEN

(a) The erf shall be subject to a servitude, 3 m wide, for municipal services (water, sewer, electricity and stormwater) (hereinafter referred to as "the services"), in favour of the local authority, along any two boundaries, excepting a street boundary and, in the case of a panhandle erf, an additional servitude for municipal purposes, 3 m wide, over the entrance portion of the erf, if and when required by the local authority: Provided that the local authority may waive any such servitude.

(b) No buildings or other structures may be erected within the aforesaid servitude area and no trees with large roots may be planted within the area of such servitude or within a distance of 2 m thereof.

(c) The Municipality shall be entitled to temporarily deposit on the land adjoining the aforesaid servitude, any material it excavates during the laying, maintenance or removal of such services and other works which in its discretion it regards necessary, and furthermore the Municipality shall be entitled to reasonable access to the said property for the aforesaid purpose, subject to the provision that the Municipality shall make good any damage caused during the laying, maintenance or removal of such services and other works.

5.2 ERVEN SUBJECT TO SPECIAL CONDITIONS

In addition to the relevant conditions set out in paragraph 5.1.1 above, the undermentioned erven shall be subject to the conditions as indicated:

5.2.1 ERF 2563

(a) The erf shall be subject to a servitude 3m wide for municipal services (stormwater) in favour of the City of Tshwane Metropolitan Municipality, as indicated on the general plan.

(b) No buildings or other structures may be erected within the aforesaid servitude area and no trees with large roots may be planted within the area of such servitude or within a distance of 2 m therefrom.

(c) The City of Tshwane Metropolitan Municipality shall be entitled to temporarily deposit on the land adjoining the aforesaid servitude, any material it excavates during the laying, maintenance or removal of such services and other works which in its discretion it regards essential, and furthermore the City of Tshwane Metropolitan Municipality shall be entitled to reasonable access to the said property for the aforesaid purpose, subject to the provision that the City of Tshwane Metropolitan Municipality shall make good any damage caused during the laying, maintenance or removal of such main sewer pipelines and other works.

5.2.2 ERF 2563

The erf shall be subject to a servitude for road purposes in favour of the City of Tshwane Metropolitan Municipality, as indicated on the general plan. Upon submission of a certificate by the City of Tshwane Metropolitan Municipality to the Registrar of Deeds in which it is mentioned that such servitude is no longer needed, the condition shall lapse.

6. CONDITIONS WHICH, IN ADDITION TO THE EXISTING PROVISIONS OF THE RULING TOWN-PLANNING SCHEME, HAVE TO BE INCORPORATED IN THE TSHWANE TOWN-PLANNING SCHEME, 2008, IN TERMS OF SECTION 125 OF ORDINANCE 15 OF 1986.

6.1 ERVEN 2561, 2562 AND 2563 SOSHANGUVE SS EXTENSION7

1	Use Zone	**3: Residential 3**
2	Uses permitted	Duplex Dwellings and Dwelling-units
3	Uses with consent	Table B, Column 4.
4	Uses not permitted	Table B, Column 5.
5	Definitions	Clause 5
6	Density	70 dwelling units per hectare
7	Coverage	As per SDP
8	Height	2 Storeys
9	Floor space ratio	As per SDP
10	Site development plan and landscape development plan	(1) A site development plan and a landscape development plan, unless otherwise determined by the City of Tshwane Metropolitan Municipality, compiled by a person suitably qualified to the satisfaction of the Municipality, shall be submitted to the Municipality for approval prior to the submission of building plans. (2) The landscaping, in terms of the landscape development plan, shall be completed by completion of the development or any phase thereof. The continued maintenance of the landscape development shall be to the satisfaction of the Municipality. (3) $4m^2$ per dwelling unit must be provided on site and developed as a children's play area with play equipment.
11	Building lines	In terms of Clause 9 and clause 12.
12	Parking requirements	Demarcated parking spaces, together with the necessary paved manoeuvring space, shall be provided on the erf in the following ratios to the satisfaction of the Municipality: (1) One covered and paved parking space for each dwelling-unit with two habitable

		rooms or less. (2) One covered and paved and one paved parking spaces for each dwelling-unit with three habitable rooms or more. (3) One paved parking space per three dwelling-units for visitors.
13	Paving of traffic areas	All parts of the erf upon which motor vehicles are allowed to move or park, shall be provided with a permanent dust-free surface, which surface shall be paved, drained and maintained to the satisfaction of the Municipality.
14	Access to the erf	Entrances to and exits from the erf shall be sited, constructed and maintained to the satisfaction of the Municipality.
15	Loading and off-loading facilities	The loading and off-loading of goods shall only take place within the boundaries of the erf.
16	Turning facilities	In accordance with the Site Development plan.
17	Physical barriers	In accordance with the Site Development Plan.
18	Health measures	(1) Any requirements for air pollution-, noise abatement- or health measures set by the Municipality shall be complied with to the satisfaction of the Municipality without any costs to the Municipality. (2) No air-conditioning units or compressors may be mounted to the exterior walls of buildings without the prior consent of the City of Tshwane Metropolitan Municipality.
19	Outdoor advertising	Advertisements and/or signboards shall not be erected or displayed on the erf without the written consent of the Municipality first being obtained in terms of municipal by-laws for outdoor advertising.
20	General: (1) An engineer must be appointed before building plans are submitted, who must submit, together with the building plans, a certificate which states that he has studied the relevant geological report and that he has established the necessary measures with regard to building work, drainage of the buildings and the site and the installation of wet services so that the whole development is safe as far as possible from a geological point of view. On completion he must certify that all his specifications have been met. (2) Before approval of the Site Development Plan, the engineering	

CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND
DEVELOPMENT COMMITTEE

geologist and the Council for Geoscience must certify that the final lay-out of structures and wet services are in accordance with the geological findings and recommendations.

(3) In addition to the above conditions the erf and buildings thereon are further subject to the general provisions of the Tshwane Town-planning Scheme, 2008.

6.2 ERVEN 2564 AND 2565, SOSHANGUVE SS EXTENSION7

1	Use Zone	21: Private Open Space
2	Uses permitted	Table B, Column 3.
3	Uses with consent	Table B, Column 4.
4	Uses not permitted	Table B, Column 5.
5	Definitions	According to the scheme
6	Density	Not applicable
7	Coverage	As per Site Development Plan
8	Height	As per Site Development Plan
9	Floor space ratio	As per Site Development Plan
10	Site development plan and landscape development plan.	A site development plan and a landscape development plan, unless otherwise determined by the City of Tshwane Metropolitan Municipality, compiled by a person suitably qualified to the satisfaction of the Municipality, shall be submitted to the Municipality for approval prior to the submission of building plans
11	Building lines	In accordance to the scheme
12	Parking requirements	As per Site Development Plan
13	Paving of traffic areas	All parts of the erf upon which motor vehicles may move or park shall be provided with a permanent dust-free surface, which surface shall be paved, drained and maintained to the satisfaction of the Municipality.
14	Access to the erf	Entrance to and exits from the erf shall be located, constructed and maintained to the satisfaction of the Municipality.
15	Loading and off-loading facilities	Not Applicable

CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND
DEVELOPMENT COMMITTEE

16	Turning facilities	Not Applicable
17	Physical barriers	In accordance to the scheme
18	Health measures	Any requirements for air pollution-, noise abatement- or health measures set by Municipality shall be complied with to the satisfaction of the Municipality without any costs to the Municipality.
19	Outdoor advertising	Advertisements and/or sign boards shall not be erected or displayed on the erf without the written consent of the Municipality first being obtained in terms of municipal by-laws for outdoor advertising.
20	General: 1. In addition to the above conditions the erf and buildings thereon are further subject to the general provisions of the Tshwane Town Planning Scheme, 2008.	

CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND
DEVELOPMENT COMMITTEE

PROPOSED TOWNSHIP:

SOSHANGUVE SS EXT.7

SITUATED ON PART OF PORTION 38 OF THE FARM RIETGAT NO.611-JR

LOCAL AUTHORITY: THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY

PART OF PORTION 38
OF THE FARM RIETGAT NO.611-JR

SITE ZONES AND MATERIAL DESCRIPTION			
ZONE	MATERIAL DESCRIPTION	GEOTECHNICAL CONSIDERATIONS	NHBRC CLASSFICATION
WHOLE OF SITE	Sand (transported) overlying gravel (pebble marker) over granite rock OR Sand overlying ferricrete gravel over granophyre rock	No heave (H) No collapse (C) Moderate differential settlement (S1) Intermitent shallow rock (R)	H/C/S1/(R)

This is to certify the township layout plan in accordance with the provisions and recommendations as set out in the geotechnical investigation for the proposed township.

Ed Shedden Pr Sci Nat 402002/83

Y +89 000

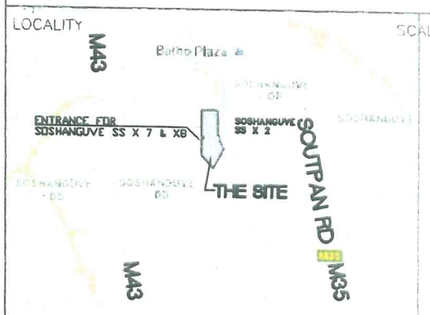
Y +88 800

X +2 820 000

X +2 820 200

X +2 820 400

LOCALITY



SCALE 1:7 500

0 180 540

COUNCIL REF. NR. :CPD 9/1/1/1 SOSH SS X 7/8

USE ZONE	NR. OF ERVEN	AREA (ha)	% OF TOWN	ERF NRS
Residential 3 (70u/ha)	3	4.6967ha	76.6%	2561 - 2563
Private Open Space	2	1,0840ha	17.7%	2564 2565
Street		0.3498ha	5.7%	
TOTAL	4	6.1305ha	100%	2561 - 2565

STREET INFORMATION		
Street length		
Gradient of streets		

AMENDMENTS	
Nov 2013	Amended erf layout and density. Rectified boundary.
Jul 2014	NHBRC Certified table included on map.
Mrt 2015	Final Erf numbers

GENERAL NOTES:

1. PROPOSED SOSHANGUVE SS EXT.7 IS DENOTED BY FIGURE "ABCDEFGHIJKLMNOPQRA" AND MEASURES 6.1305 HECTARES.
2. ALL DISTANCES AND AREAS ARE MEASURED IN SQUARE METRES OR HECTARES AND AREAPPROXIMATE PENDING FINAL SURVEY.
3. CONTOUR LINES ARE IN ACCORDANCE WITH THE STANDARDS LAID DOWN IN REGULATION18 (1) OF THE TOWN PLANNING AND TOWNSHIPS REGULATIONS FRAMED IN TERMS OF SECTIONS 69 AND 96 OF ORDINANCE 15 OF 1986 AND WERE COMPILED BY THE COUNCIL.
4. — — — — EXISTING STORM WATER PIPELINES
5. ---------- 1:50 YEAR FLOOD LINE
6. -·-·-·-·- 1:100 YEAR FLOOD LINE
7. ———— 32m FROM CENTER LINE OF RIVER

CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND DEVELOPMENT COMMITTEE

Registered owners: SIZANE AGENCIES CC

ERF 2561 "Residential 3" 70u/ha 6574m²

ERF 2562 "Residential 3" 70u/ha 7451m²

ERF 2563 "Residential 3" 70u/ha 32904m²

ERF 2564 POS 8035m²

ERF 2565 POS 2805m²

PROPOSED SOSHANGUVE SS EXT.7

PROPOSED SOSHANGUVE SS EXT.8

SOSHANGUVE SS EXTENSION

REMAINDER OF PORTION 38 RIETGAT No. 611-JR

13m STREET

STREET 15m

STREET 16m

9m wide R.O.W. Servitude

32m WIDE STORMWATER SERVITUDE

FLOODLINE 1:50 YEARS
FLOODLINE 1:100 YEARS

P.O.S 5,93Ha

MUNICIPAL 0,75Ha

MUNICIPAL 0,16Ha

"Residential 3"

0 20 40 60 80 100

COPYRIGHT RESERVED

NEWTOWN ASSOCIATES
TOWN PLANNERS
POSTAL ADDRESS: P.O BOX 95617 WATERKLOOF
STREET ADDRESS: Ashton House 61 Lois Ave Newlands

NTA

Datum: Local
System: LO29

SCALE 1:7 500

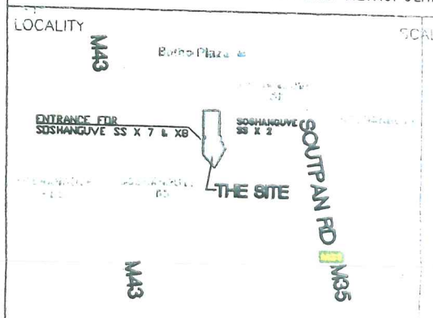
PROPOSED TOWNSHIP:

SOSHANGUVE SS EXT.7

SITUATED ON PART OF PORTION 38 OF THE FARM RIETGAT NO.611-JR

LOCAL AUTHORITY: THE CITY OF TSHWANE METROPOLITAN

LOCALITY



SCALE

COUNCIL REF. NR. :CPD 9/1/1/1 SOSH

USE ZONE	NR. OF ERVEN	AREA (ha)	% TOWN
Residential 3 (70u/ha)	3	4.6967ha	
Private Open Space	2	1,0840ha	
Street		0.3498ha	
TOTAL	4	6.1305ha	

STREET INFORMATION		
Street length		
Gradient of streets		

AMENDMENTS	
Nov 2013	Amended erf layout and density. Rectif
Jul 2014	NHBRC Certified table included on ma
Mrt 2015	Final Erf numbers

GENERAL NOTES:

1. PROPOSED SOSHANGUVE SS EXT.7 IS DENOTED "ABCDEFGHIJKLMNOPQRA" AND MEASURES 6.130
2. ALL DISTANCES AND AREAS ARE MEASURED IN METRES OR HECTARES AND AREAPPROXIMATE PENDING FINAL SURVEY.
3. CONTOUR LINES ARE IN ACCORDANCE WITH THE LAID DOWN IN REGULATION18 (1) OF THE TOWN AND TOWNSHIPS REGULATIONS FRAMED IN TERMS SECTIONS 69 AND 96 OF ORDINANCE 15 OF WERE COMPILED BY THE COUNCIL.
4. — — — — EXISTING STORM WATER PIPELINE
5. ····· 1:50 YEAR FLOOD LINE
6. -·-·- 1:100 YEAR FLOOD LINE
7. ——— 32m FROM CENTER LINE OF

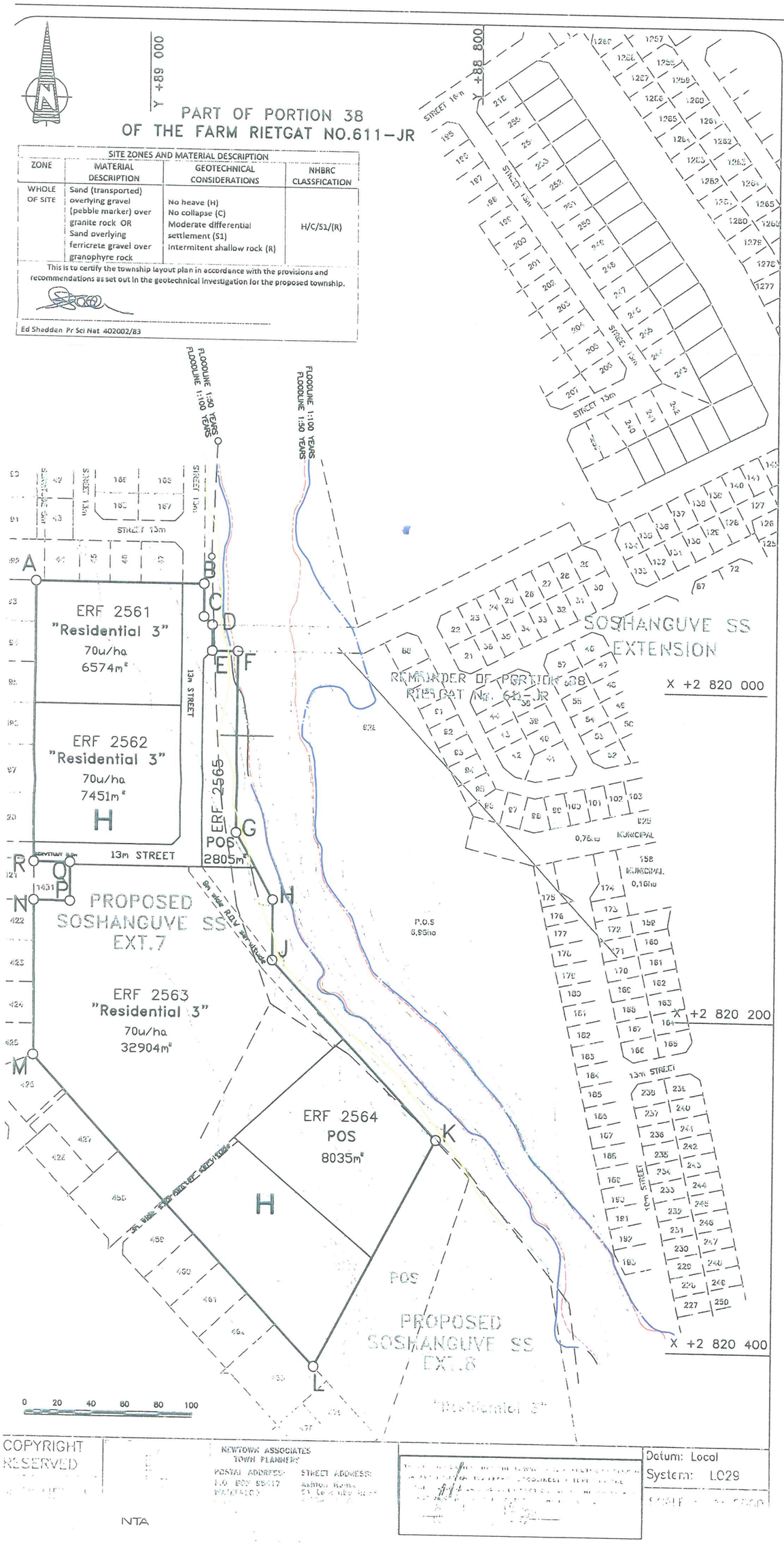
CITY OF TSHWANE
APPROVED
2015 -04- 17
CITY PLANNING AND DEVELOPMENT COMMITTEE

Registered owner: SIZANE AGENCIES CC

SITE ZONES AND MATERIAL DESCRIPTION			
ZONE	MATERIAL DESCRIPTION	GEOTECHNICAL CONSIDERATIONS	NHBRC CLASSFICATION
WHOLE OF SITE	Sand (transported) overlying gravel (pebble marker) over granite rock OR Sand overlying ferricrete gravel over granophyre rock	No heave (H) No collapse (C) Moderate differential settlement (S1) Intermitent shallow rock (R)	H/C/S1/(R)

This is to certify the township layout plan in accordance with the provisions and recommendations as set out in the geotechnical investigation for the proposed township.

Ed Shedden Pr Sci Nat 402002/83



COPYRIGHT RESERVED

NEWTOWN ASSOCIATES
TOWN PLANNERS
POSTAL ADDRESS: P.O. BOX 95617 WATERKLOOF
STREET ADDRESS: ASHTON HOUSE

Datum: Local
System: LO29

NTA

ANNEXURE J

CITY OF TSHWANE
"We are the same"

SERVICE DELIVERY DEPARTMENT
ROADS AND STORMWATER DIVISION

Tel: (012) 358-3797
Fax: (012) 358-3361

Address: PO Box 14013 C/o Basden & Rable Streets,
LYTTELTON LYTTELTON AGRICULTURAL HOLDINGS
0140 0157

SECTION: INFRASTRUCTURE PLANNING AND MANAGEMENT

MEMO

Your ref.:
My ref.: V10/1/2/1-S24/SS
Date: 29 June 2007

Enquiries: Hannes Claassen
Tel: 012-358 3287

The Manager: Land Use Legislation and Application
City Planning
AKASIA OFFICES
Attention: Mariette Theron

TOWNSHIP ESTABLISHMENT: GEOLOGICAL REPORT: SOSHANGUVE BLOCK SS

1. The report compiled by Geostrata CC dated January 1997 is in order. The investigation indicates the presence of soil that exhibits in medium collapsible conditions (C2) within the depths normally excavated for strip footings/foundations that would require additional special measures to overcome the detrimental foundation conditions.

2. The following condition must be included in the conditions of establishment:

2.1.1 No structures shall be erected prior to the appointment of a professional structural or geotechnical engineer who must design, specify and supervise structural measures for foundations of all structures according to the soil classification for each specific zone as described in the report. On completion of the structures he must certify that all his specifications have been met.

3. This report is accepted for proclamation purposes.

Yours faithfully

GENERAL MANAGER : ROADS AND STORMWATER
Le-TE-Soshanguve BLOCK SS

TABLE OF CONTENTS

		Page:
1.	INTRODUCTION	1
2.	SITE DESCRIPTION	1
3.	SITE INVESTIGATION	3
4.	LABORATORY TESTING	3
5.	GEOLOGY	4
6.	SOILS	4
7.	BEDROCK	6
8.	GEOHYDROLOGY	7
9.	GEOTECHNICAL DISCUSSION	8
10.	CONCLUSIONS AND RECOMMENDATIONS	14
11.	GENERAL	20

APPENDICES

SOIL PROFILES	A
SUMMARY OF TECHNICAL INFORMATION ON MATERIALS... ...	B
DETAILS OF POTENTIAL EXPANSIVENESS OF MATERIALS ...	C
CBR RESULTS	D
CHEMICAL TEST RESULTS	E
GEOTECHNICAL MAP	F
GEOLOGY MAP	G

1. INTRODUCTION

This report presents the results of a soils investigation carried out for the proposed township of Block SS Soshanguve, on portion of the farm Rietgat 105 JR, in the Akasia metropolitan area.

The purpose of the investigation was to provide information on the nature and geotechnical properties of the shallow soils encountered on the site. This information has been obtained so that areas may be delineated where similar geotechnical problems occur. Prospective developers may assess the suitability of certain types of development within specific areas.

This report has been prepared in accordance with the Provincial Administration: Gauteng (previously the Transvaal Provincial Administration) requirements regarding the establishment of a township as well as the National Home Builders Registration Council's (Reference 8) guidelines regarding geotechnical problems. The contents of this report are intended for use by town planners and Local Authorities and not for use by individual stand owners. It is not the purpose of this report to provide information necessary for detailed foundation design.

The project was commissioned at the verbal request of Mr P Shelley of the firm Protown cc.

The field work was initiated and completed in January 1997.

2. SITE DESCRIPTION

The site is an approximately rectangular area of about 95ha located some 18km north of the Onderstepoort Research Institute, north of Pretoria.

The area is bounded by the suburb of Soshanguve Block DD along the west, Block R along the east, Block CC in the south and Block KK in the north. The eastern boundary is coincident with an existing surfaced road known as "Soutpan Road" for a distance of about 800m in the north. A well-defined stream, Soutpan, flows in a shallow valley from south to north and divides the site into a western third and an eastern two-thirds.

The main access to the site is via Soutpan Road. Another route, via the south, is proposed but is at present a rocky track. Vehicular access is also possible from the surfaced road forming the northern boundary of the property.

The site comprises undeveloped areas in the south and along the boundary of Block DD. An informal settlement has developed along the eastern two-thirds of the site. The southern limit of the settlement is indicated on the edge of the map in Appendix F.

Structural development consists of a few single storey buildings (shops) in the north eastern corner and numerous informal structures of corrugated iron along the eastern boundary. A fairly large area representing an abandoned borrow source is located in the middle of the undeveloped western bank. The approximate location of this area is indicated on the map in Appendix F.

Vegetation over the undeveloped areas consists of a variety of indigenous trees along the stream. Scattered thorn trees and smaller shrubs are typical of the vegetation away from the stream. Veld grasses are found throughout the site.

The relief of the site is low except at the southern end where a small knoll occurs. There is an overall crossfall of some 58m from south east to north west. The gradient of the side slopes of the shallow valley varies from about 3% in the

flatter eastern half to about 6% on the slopes of the knoll at the southern end.

3. SITE INVESTIGATION

The subsoil conditions were investigated by means of 12 shallow test pits excavated to depths ranging from 0,9m to 2,8m below existing ground level. The pits were excavated by means of a JCB 3CX TLB machine and were terminated when excavation conditions became difficult in the ferruginised residual granite/granophyre, at maximum excavation depth of the machine or at machine refusal on soft rock or hardpan ferricrete.

Detailed soil profiles were drawn up from a visual examination of the in situ material observed in the test pits by an engineering geologist according to recommended standard procedures (Reference 5).

Detailed individual soil profile descriptions are given in the Soil Profiles in Appendix A and the positions of the test pits are shown on the maps in Appendices F and G.

4. LABORATORY TESTING

Sieve analyses and Atterberg limits were determined for a number of disturbed soil samples obtained from representative horizons during the investigation. The soils were classified according to Unified Soil and T R B classification systems and the results are tabulated in Appendix B.

Chemical tests were carried out on a disturbed sample to determine the pH and electrical conductivity of the ferruginous soils.

5. GEOLOGY

According to the 1:250 000 Geological Series, Sheet No. 2528 Pretoria, the area is underlain by granophyre (fine grained granite) of the Rashoop Granophyre Suite and younger Nebo granite of the Lebowa Granite Suite. These Suites form the top of the Bushveld Complex.

The hard rock geology is mantled by colluvial and residual soils in the flatter lying areas. Outcrops of granophyre and granite are common in the southern half of the site. Scattered intermittent outcrops do occur further north on the western side of the stream.

6. SOILS

The site is characterised by four typical soil profiles depending on the underlying parent rock and topography.

i) **Alluvium:** Alluvial sand was intersected in test pit (TP) 8 from surface to a depth of 1,9m. Hard rock granite underlies the alluvium. Scattered boulders of granophyre and granite occur within the alluvial sand. Alluvial sand is presumed to be present along Noga Street to the north.

ii) **Ferricrete:** Hardpan ferricrete was encountered below 0,7m of colluvial sand in TP 10 while similar hardpan ferricrete occurred below 0,6m of ferruginous gravel in TP 7. Machine refusal occurred in both test pits at a depth of about 1m.

Numerous exposures of hardpan ferricrete were observed in southern half of the eastern portion of the site.

iii) **Bushveld Complex:** Nebo Granite: The presence of a coarse-grained igneous rock is assumed to indicate granite on this site.

The largest portion of the site is underlain by Nebo granite, described as grey to pink, coarse-grained granite. This rock type gives rise to two distinct soil profiles. The most common soil profile developed on the granite may be described as

0,0-0,2m slightly moist light brown to reddish brown loose silty sand (colluvium) overlying

0,2-1,0m medium and fine quartz gravel in minor matrix of silty sand (pebble marker) OR orange mottled black and brown dense to very dense gravel of ferruginous concretions in a minor matrix of silty sand with pockets of hardpan ferricrete in places overlying

1,0-2,0m medium and fine gravel of hard and soft ferruginous concretions in sandy matrix varying in consistency from loose to dense (ferruginised residual granite) grading into

>2m slightly moist orange mottled pink gravelly sand/sandy gravel (residual granite).

The nature of residual granite intersected below the layer of ferricrete gravel varies from a gravelly sand where ferruginisation is limited to a gravel of ferruginised concretions with pockets of honeycomb ferricrete in places where the process of ferruginisation is more advanced.

In the central portion of the western side a generalised profile soil may be described as

0,0-0,3m fine and scattered medium gravel of quartz and granite in an abundant matrix of light brown silty sand (colluvium) overlying

0,3-0,7m medium and fine friable gravel of quartz and granite in a minor matrix of orange brown silty sand (residual granite) overlying

0,7-1,0m pink speckled brown and white highly weathered to weathered soft rock granite grading into

>1,0m hard rock granite.

Rashoop Granophyre: A typical profile in this area may be described as

0,0-0,3m medium and fine with scattered coarse gravel of quartz, granophyre and granite in a brown sandy matrix overlying

0,3-0,9m medium and fine gravel of ferruginised granophyre and granite in a light brown speckled black sandy matrix overlying

0,9-1,8m slightly moist orange yellow mottled brown dense slightly ferruginised silty sand grading into granophyre with depth.

Granophyre was positively confirmed in only one test pit (TP 4). The distinction between granophyre and granite is not always easy since granophyre is basically a fine grained granite. In some instances, the two rock types may tend to each other.

7. BEDROCK

The weathering pattern of granite and granophyre is generally very irregular with deeply weathered soil adjacent to outcrop such as observed in the vicinity of TP 11 where hard rock granite outcrops within 2m or 3m of a 2,4m deep test pit.

The probability of encountering shallow, hard rock granite (or granophyre) is moderate throughout the site although limited field mapping indicates a higher probability in the south.

Nebo Granite: Scattered outcrops of pink to "red" coarse-grained granite were observed in an "old" borrow pit in the central western area as well as in the south eastern portion of the property.

Rashoop Granophyre: At the time of the investigation, a trench about 1,5m deep had been excavated along the southern and part way along the south western boundaries of the site. The southern trench was almost entirely in hard rock granophyre from a depth of about 200mm to 400mm below the surface while the western trench encountered pockets of hard rock between soft rock to dense residual granophyre. Scattered and intermittent outcrops of granophyre occur in the southern half of the site, particularly in the vicinity of the knoll.

8. GEOHYDROLOGY

The main drainage feature of the site is the northerly flowing Soutpan stream. A moderate flow of water was observed in the stream at the time of the investigation.

A large volume of storm water run off finds its way into the stream via numerous large culverts that drain Block DD in the west. A smaller volume of run off is generated in the informal settlement where no storm water culverts are present and run off flows along unsurfaced roads and paths, often resulting in significant soil erosion.

A 1:50 year floodline has not been indicated on the map supplied. Any proposed development along the river must take the floodline into account.

Ground water was encountered in TP's 8 and 12. The seepage in TP 8 occurs below the alluvium, at the contact with the hard rock granite, while the seepage in TP 12 flows from small discontinuities in the residual granite. Although the volumes of water were small in both instances, problems due to ground

water seepage should be expected. It is probable that perched water tables may arise in localised areas during the wet season as run off percolates through the sandy topsoil until relatively impermeable ferricrete layers or residual granite are encountered.

9. GEOTECHNICAL DISCUSSION

The following observations are based upon our interpretation of the conditions on the site, of the soil material sampled and of the tests performed in the laboratory.

9.1 Potentially Expansive Soil: Observations made during the field work suggested that the soils blanketing the site were unlikely to exhibit any expansiveness.

Laboratory test results confirm the field observations and indicate low expansiveness for all soil types tested. The site has been classified as Class H according to Reference 8 as detailed in Table 3.

TABLE 3

NHBRC CLASSIFICATION OF EXPANSIVE SOILS

CLASS	ESTIMATED TOTAL HEAVE (mm)
H	<7,5
H 1	7,5 - 15
H 2	15 - 30
H 3	>30

Differential movement = 50% total heave.

The absence of heave problems does not imply the absence of other geotechnical problems.

9.2 Collapsible Soil: No undisturbed samples were cut from the sidewalls of test pits for consolidation tests since the only significant layer of sand was confined to an area along the stream in the vicinity of TP 8. Although no collapse tests were undertaken, it is almost certain that

the alluvial sand is potentially collapsible and the appropriate design and construction modifications should be implemented in the vicinity of Noga Street.

According to Reference 8, a site should be classified into three classes depending on the amount of expected settlement (collapse and normal). The classification is given in Table 4.

TABLE 4

NHBRC CLASSIFICATION OF COLLAPSIBLE SOILS

CLASS	ESTIMATED TOTAL SETTLEMENT (mm)
C	<5
C 1	5 - 10
C 2	>10

Differential movement = 75% total settlement.

Most of the site has been classified as Class C except for the area in the vicinity of TP 8 extending north along Noga Street which has been conservatively classified as Class C 2.

9.3 Settlement (Differential Movement): The irregular and sporadic occurrence of rock or hardpan ferricrete near the surface is likely to lead to numerous structures being founded partly on "incompressible" rock and partly on "compressible" soil. The probability of excessive differential movement due to these founding conditions is unacceptably high. Appropriate design and construction modifications should be incorporated into structures to overcome this problem.

The entire site, except where alluvium occurs, has been conservatively classified as Class S 1 as a consequence of the irregular occurrence of rock or hardpan. The likelihood that extensive areas, particularly in the

north, will require little or no foundation modifications is favourable and normal founding methods are liable to be adequate.

TABLE 5

NHBRC CLASSIFICATION OF CONSOLIDATION SETTLEMENT

CLASS	ESTIMATED TOTAL SETTLEMENT (mm)
S	<7,5
S 1	7,5 - 15
S 2	>15

Differential movement = 50% total settlement.

9.3 Excavation Properties: Machine refusal (JCB 3CX TLB) occurred in seven of the 12 test pits excavated for this investigation. Excavation problems were experienced below a depth of about 1m, particularly in the southern half of the site. Intermittent rock outcrop and areas of hardpan ferricrete are the causes of shallow refusal. The use of heavier machinery in areas underlain by hardpan ferricrete may allow greater depths to be achieved without too much difficulty but this will not be the case where hard rock granite or granophyre outcrops.

Excavations in excess of 3m will be possible over large areas in the north east.

An indication of the variable nature of the bedrock topography may be gained from the irregular floor of the abandoned borrow area on the west bank. Colluvial and residual soils have been stripped to expose bedrock over most of the borrow area.

An excavation classification (SABS 1200) would see the most of the site classified as soft excavation (very loose/soft through to stiff or dense) for the top 0,75m to 1m (top 2,5m in the north east). An intermediate classification (very stiff or dense through to soft rock)

would be appropriate below a depth of about 1m for the southern half of the site although scattered areas would be classified as hard excavation where soft to hard rock granite/granophyre or hardpan ferricrete occurs close to surface.

The use of pneumatic equipment and/or limited blasting may be necessary for the installation of services, particularly where unweathered hard rock granite outcrops. Construction waste, in the form of large granite boulders, may also prove to be a problem along the western bank. The boulders are believed to have originated from Block DD.

9.5 Sidewall Stability: No problems were encountered with the stability of the sidewalls in any of the test pits. Any excavations below a depth of 1,5m should be treated with care, particularly if undertaken in the wet season and if left open for a lengthy period.

The stability of a sidewall is a function of the soil moisture content and if this increases through poor surface drainage unstable conditions may occur.

9.6 Construction Material: Fair quality construction material is likely to be available over large portions of the site, particularly where thick layers of ferruginised granite have developed. Two CBR tests indicate the material to range in quality between G5 and G6 (Reference 3). An average specification is likely to be G6.

Unfortunately, the extensive borrowing of construction material on this site will have a negative impact of township development because of drainage problems and rehabilitation costs. At present, portion of the west bank is unsuitable for development because of the existence of the "old" borrow area.

9.7 Septic Tanks: The use of septic tanks and associated French drains or soakaways is unlikely to meet with success over the site because of impermeable hardpan ferricrete and hard rock granite at shallow depths. If on-site sanitation methods are to be considered, care must be exercised to ensure adequately sized French drains as well as the prevention of ground water contamination.

9.8 Chemical tests: A chemical test was carried out to obtain an indication of the aggressiveness (corrosiveness) of the soil with respect to galvanised pipes. Laboratory test results indicate the soil layer between surface and 1,2 in the TP 11 to be slightly acidic with a pH of 5,87.

The Electrical Conductivity (EC) of this soil layer is 6mS/m (16 600ohm/cm). A table in Appendix D indicates that soil with an EC value of <10mS/m is non-corrosive for galvanised pipes.

The corrosion of buried galvanised pipes is a complex problem influenced by a number of factors such as EC, acidic soils (pH < 7,0), corrosive bacteria and stray electrical currents. No attempt has been made to analyse all the factors but indications are that the ferruginous soil is a fairly non-aggressive environment even though slightly acidic.

9.9 Drainage: The sandy nature of the topsoil facilitates fairly rapid topsoil erosion, particularly along paths and on the sides of unsurfaced roads. Storm water drains should be designed to minimise flow velocities where unlined drains are to be located.

Seepage as a result of perched water tables may create drainage problems if and when construction occurs during a wet season. The problem is most severe where an impermeable layer "daylights" at the bottom of a slope.

Problems relating to the drainage of the abandoned borrow area on the west bank may be expected, particularly in the wet season. At the time of the investigation, a fair volume of standing water in the form of numerous separate ponds was evident in the borrow area.

9.10 Cemetery Site: The suitability of an area for use as a cemetery is based on various factors such as the excavatability, the depth to solid rock, stability of sidewalls, permeability of soil and depth to water table. An evaluation of this site in terms of these factors indicates a portion of the site in the north east, underlain by ferruginous residual gravel, may be suitable although hand excavation may be difficult below a depth of about 1,5m. Hardpan ferricrete may occur locally.

9.11 Solid Waste Disposal: No area was immediately evident as suitable for use as a solid waste disposal site within the area investigated. Certain requirements have to be met before an area may be licensed for use as a disposal site. The proximity of the stream, the relatively porous nature of the soil profile and the likelihood of intermittent shallow rock are factors against the use of any portion of this site for waste disposal.

9.12 Road Subgrade: Road construction should not pose a serious problem over most of the site since the shallow soils are invariably of reasonable quality (average G6). Areas where some problems may occur are in the south where intermittent hard rock and hardpan ferricrete are present. The presence of potentially collapsible alluvium in the vicinity of Noga Street may require additional design considerations.

10. CONCLUSIONS AND RECOMMENDATIONS

A guideline prepared by a committee of Local Authorities involved in township establishment recommends that a site be classified into three zones according to the prevailing geological conditions.

Zone I - No special precautions necessary for development.

Zone II - Suitable for development but subject to standard precautions such as the compaction of collapsible soils or removal of expansive clays.

Zone III- Conditions require a detailed investigation for each structure or stand before construction is initiated. Specialised foundation designs may be necessary.

In order to determine the classification, the site is evaluated in terms of three parameters, namely: founding conditions (expansive clay, collapsible sand and shallow rock); slope stability (rock or soil) and drainage conditions. Each parameter is assessed on a scale of 1 (good) to 3 (bad) and the designation of zones determined according to the highest scale.

The National Home Builders Registration Council (Reference 8) has proposed a similar classification in which a site is subdivided according to the type and severity of a geotechnical problem present and the founding solution required to solve the problem. The NHBRC classification has been adopted for this report because of its relevance to residential development.

The various precautions and solutions recommended to overcome the geotechnical problems, using the latter classification, are given in the following paragraphs. All of the solutions are made with respect to the erection of lightly loaded, single storey structures.

10.1 Expansive Soils: Expansive soils are absent on this site and as a consequence no design or construction modifications, with respect to heave, need to be adopted for the erection of single storey structures.

10.2 Collapsible Soils: Foundations for structures and roads located within the area along Noga Street should be suitably modified to accommodate the solutions recommended for a Class C 2. The various solutions are given below:

i) **Stiffened Strip Footings, Stiffened or Cellular Raft:** Stiffened strip footings or stiffened or cellular raft with mesh reinforcement in floor slabs and articulation joints or solid, lightly reinforced masonry. Bearing pressures should not exceed 50kPa. Sites should be properly drained and appropriate service and plumbing precautions implemented.

ii) **Deep Strip Footings:** Founding on a competent horizon below the collapsible layer. Fabric reinforcement should be included in the floor slabs.

iii) **Soil Compaction below Footings:** Remove in situ soil to a depth and width of 1,5 times the foundation width or a competent horizon. Replace with suitable material compacted to 93% MOD. AASHTO density at ± 2% of OMC. Removed material is often suitable for replacement. Normal construction methods with lightly reinforced strip foundations and masonry may then be utilised.

vi) **Soil Raft:** Remove in situ soil to a metre beyond the perimeter of a building and replace with suitable material compacted at 93% MOD> AASHTO at ±2% of OMC. The use of normal construction methods with lightly

reinforced strip foundations and masonry may then be considered.

v) **Piled or Pier Foundations:** Reinforced concrete ground beams or solid slabs on piled or pier foundations with fabric reinforcement in ground slabs. Sites should be properly drained.

Normally constructed foundations may be used for light structures in the areas delineated as Class C provided foundations are placed on the gravelly material below the blanket of sandy colluvium. Cognisance must also be taken of other geotechnical problems which may negate the blanket use of normal founding methods within a Class C area.

10.3 Settlement (Differential Movement): Design modifications to accommodate excessive differential movement should be incorporated in those structures built partly on rock and partly on soil. Since the exact location of all occurrences of rock outcrop or hardpan ferricrete is beyond the scope of this investigation, the entire site must be regarded as suspect. The possible foundation solutions are detailed below.

i) **Modified Normal:** Reinforced strip footings with articulation joints at some internal and all external doors. The masonry should be lightly reinforced. Foundation pressures should not exceed 50kPa.

ii) **Soil Compaction below Footings:** Remove in situ soil to a depth and width of 1,5 times the foundation width or a competent horizon. Replace with suitable material compacted to 93% MOD. AASHTO density at ± 2% of OMC. Removed material is often suitable for replacement. Normal construction with lightly

reinforced strip foundations and masonry may then be utilised.

iii) **Deep Strip Footings:** Found structures on a uniform, competent horizon below the layer of compressible soil. Foundations should be suitably reinforced where single structures straddle different material types such as rock and soil.

iv) **Soil Raft:** Remove in situ soil to a metre beyond the perimeter of a building to a depth of 1,5 times the widest foundation or to a competent horizon and replace with suitable material compacted at 93% MOD. AASHTO at -1% to +2% of OMC. The use of normal construction methods with lightly reinforced strip foundations and masonry may then be considered.

Normal construction methods using shallow strip footings may be used where shallow rock or hardpan is absent provided the foundations are placed on a competent layer below the sandy topsoil. The inspection of foundation excavations by competent persons may avoid the excessive use of modified construction methods.

10.4 Excavation Properties: A TLB should be capable of excavating service trenches to a depth of about 2m over most of the northern half of the site without too much difficulty. The presence hardpan ferricrete in places may pose a small problem in some places.

A more powerful machine, such as a Komatsu PC 200, should experience few problems at depths of <3m in the same area and may be capable of excavating a large portion of the service trenches in the south but problems with shallow hard rock granite/granophyre and hardpan are liable to be encountered.

The use of pneumatic tools and/or limited blasting may be necessary where rock outcrop occurs, particularly in the southern half.

10.5 Sidewall Stability: Unstable sidewalls are not expected in excavations less than 1,5m deep. Where excavations exceed 1,5m in depth, adequate care should be exercised to ensure workers safety but instability is not regarded as a serious problem.

Poor surface drainage around excavations may increase the probability of unstable conditions. The presence of ground water along fissures and fractures should be regarded a warning sign and particular care must be exercised. Conditions are likely to be more unstable during a wet season.

10.6 Construction Material: Construction material meeting a G5 to G6 specification is present on this site in the form of ferricrete gravel, ferruginised residual granite and weathered, very soft rock granite. However, the extensive borrowing of construction material must be weighed up against the rehabilitation costs and loss of ground for township development. An example is the existing "old" borrow area on the western side of the site which is unsuitable for development at present. Fairly large areas of open, undeveloped land in the vicinity of the site, underlain by similar geology, may provide more favourable sources of construction material.

10.7 Septic Tanks: On-site sanitation disposal is not recommended for this site because of the likelihood of ground water contamination due to the presence of shallow impermeable layers of rock or hardpan ferricrete. The proximity of the stream is another negative factor with respect to on-site sanitation disposal.

If septic tanks are regarded as essential then adequately sized soakaways must be constructed. Previous experience of on-site sanitation in other granitic areas with under-sized soakaways has been most unfavourable.

10.8 Chemical Tests: The chemical test results indicate slightly corrosive conditions towards galvanised pipes in terms of acidity (pH=5,87) but not conductivity (EC<10mS/m). If galvanised piping is to be used on a large scale, more detailed investigations should be undertaken to assess the corrosion potential of the topsoil throughout the site. The use of PVC pipes (or similar) should overcome the problems associated with corrosion.

10.10Drainage: Cognisance of the erosive powers of storm water run off must be considered in the design of township services, particularly where unsurfaced streets are to be built.

The perched water tables may hamper construction because of constant seepage and in some areas excavation trenches may fill with water for prolonged periods. Seepage may also lead to the rapid deterioration of surfaced roads. The natural slope of the site should facilitate the drainage of storm water run off towards the stream.

The draining of the borrow area in the centre of the west bank should be considered.

10.11Cemetery: Portion of the northern half of the site would be suitable for the location of a cemetery although difficult hand excavation and scattered pockets of hardpan ferricrete may pose problems. In the south, shallow hard rock and hardpan may pose serious problems for cemetery development.

10.12 Solid Waste Disposal: No area is suitable for the large scale disposal of domestic waste on this site.

18.12 Road Subgrade: The site is underlain by good subgrade conditions. Ferruginised gravel and/or residual granite occurs within the top 300mm to 500mm of the soil profile and generally meets a G 6 specification.

The layer of potentially collapsible alluvium along Noga Street may require some form of remedial treatment before construction takes place.

11. GENERAL

It must be borne in mind that an investigation of this nature is aimed at delineating broad areas in which problems may occur. Consequently, certain generalisations have to be made to avoid the necessity of a costly investigation at each building location. It may be found that soil conditions at variance with those discussed in this report do occur locally. The variant conditions should be inspected by competent personnel to ensure that these conditions do not pose a problem for a specific development. The potential for problems due to under-design must also be considered.

It is recommended that consideration be given to mapping any service trenches that are excavated on the site. This exercise will allow for a refinement of the soil boundaries and the magnitude of the geotechnical problems within those areas. The information in this report is not sufficient for detailed foundation design.

REFERENCES

1. BRINK, A.B.A. - Engineering Geology of Southern Africa (Vol. 1) Building Publications, Pretoria. 1979

2. BRINK, A.B.A. PARTRIDGE, T.C. AND WILLIAMS, A.A.B., Soil Survey for Engineering - Monographs on Soil Survey, Oxford Press. 1982

3. COMMITTEE OF STATE ROAD AUTHORITIES. - Guidelines for Road Construction Materials. - Department of Transport, TRH 14, 1989

4. DE VILLIERS, D.C., - Septic Tank Systems. - BOU 93, National Building Research Institute, CSIR, Pretoria. 1987

5. JENNINGS, J.E. BRINK, A.B.A., AND WILLIAMS, A.A.B., - Revised Guide to Soil Profiling for Civil Engineering Purposes in South Africa. The Civil Engineer in S.A., Vol. 15 No. 1 Jan, 1973.

6. JENNINGS, J.E., AND EVANS, G. - Practical Procedures for Building in Expansive Soil areas. - S.A. Builder, October, 1962.

7. JENNINGS, J.E., AND KNIGHT, K. - A Guide to Construction on or with Materials Exhibiting Additional Settlement due to "Collapse" of Grain Structure. - 6th Reg. Conf. for Africa on Soil Mech. and Found. Eng. Durban, South Africa, Vol. 1, pp 99 - 105. 1975

8. NATIONAL HOME BUILDERS REGISTRATION COUNCIL. - Standards and Guidelines - 1st Issue, May 1995.

9. SAVAGE, P.E., - Simplified Assessment of Settlement of Uniform Soil under Dwelling House Foundations. - Unpublished paper - 1974.

10. SCHWARTZ, K., - Collapsible Soils. - The Civil Engineer in S.A., Vol. 27 No. 7, July 1985.

11. SOUTH AFRICA COMMITTEE FOR STRATIGRAPHY (S.A.C.S.). Stratigraphy of South Africa. Part 1 (Comp. L.E. Kant): Handb. Geol. Survey of S. Africa. 8. 1980

12. VAN DER MERWE, D.H., (MODIFIED BY P.E. SAVAGE) - The Prediction of Heave from Plasticity Index and the Percentage Clay Fraction. 1970

13. WILLIAMS, A.A.B, PIDGEON, J.T, DAY, P, - Expansive Soils. - The Civil Engineer in S.A., Vol. 27 No. 7, July, 1985.

APPENDIX A

SOIL PROFILES

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 1*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *08/01/97*

UNIFIED/ TRH CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,6	Slightly moist, light brown, loose, intact, silty SAND with abundant, fine gravel of quartz and scattered granite; colluvium.	
			1,8	Medium and fine, angular, slightly ferruginised, closely packed GRAVEL of quartz and hard and soft, ferruginous concretions in a minor matrix of moist, reddish brown blotched yellow, silty sand; overall consistency is medium dense with loose and dense pockets; residual granite (slightly ferruginised). Tends locally to pockets of hardpan ferricrete.	(LOW)
			2,8	Medium and fine, angular, tightly packed GRAVEL of quartz, pink feldspar and scattered, hard and soft, ferruginous concretions in a trace matrix of moist, brown, silty sand; overall consitency is dense to very dense locally; residual granite. EOH NOTES: 1) Hole stopped at 2,8m in residual granite. No refusal. 2) Ground water not encountered during excavation but water at base after 24hrs due to rain overnight. 3) Fine roots in top 400mm. 4) Excavated at end of culvert discharge.	

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 2*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *07/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,3	Fine and scattered medium, subrounded, closely packed, friable GRAVEL of quartz and granite in an abundant matrix of slightly moist, light brown, silty sand; overall consistency is loose; colluvium.	
			0,7	Medium and fine, subangular, tightly packed, friable GRAVEL of granite and quartz in a minor matrix of dry, orange brown sand; overall consistency is medium dense becoming dense with depth; residual granite.	(LOW)
			1,0	Pink speckled brown and white, weathered, soft rock to hard rock GRANITE. EOH	

NOTES:

1) Machine refusal at 1,0m on hard rock granite.
2) Ground water not encountered during excavation.
3) Fine roots in top 300mm.

Prepared By: **GEOSTRATA cc P O Box 74573 LYNNWOOD RIDGE 0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 3*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *07/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,4	Medium and fine, subrounded, closely packed, friable GRAVEL of quartz and granite in a minor matrix of slightly moist, brown, silty sand; overall consistency is loose with medium dense pockets; colluvium.	
			0,9	Medium and fine, subangular, tightly packed, friable GRAVEL of granite in a minor matrix of slightly moist, yellowish brown, silty sand; overall consistency is medium dense to dense; residual granite.	(LOW)
			1,5	Pinkish orange speckled white, highly weathered, very closely fractured, soft rock to hard rock GRANITE. Becoming hard rock below 1,5m. EOH	

NOTES:

1) Machine refusal at 1,5m on hard rock granite.
2) Ground water not encountered during excavation.
3) Fine roots in top 500mm.

Prepared By: **GEOSTRATA cc P O Box 74573 LYNNWOOD RIDGE 0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSILANGUVE.*

TEST PIT No.: *TP 4*

MACHINE: *JCB 3CX TLB.*

PROFILED By: cs

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *07/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,3	Medium and fine with scattered coarse, subrounded, closely packed, friable GRAVEL of quartz, granophyre and granite in a minor matrix of slightly moist, brown, silty sand; overall consistency is loose; colluvium.	
			0,6	Medium and fine, subangular, closely packed, friable GRAVEL of ferruginised granophyre in a minor matrix of slightly moist, light brown speckled black in places, silty sand; overall consistency is loose with medium dense pockets; residual granophyre.	(LOW)
			0,9	Medium and fine, angular to subangular, tightly packed GRAVEL of slightly ferruginised granophyre in a trace matrix of slightly moist, orange brown, speckled black, silty sand; overall consistency is dense; residual granophyre.	
SMC A-4(1)	4/1			Slightly moist, orange yellow mottled brown speckled black, dense to very dense, intact, slightly ferruginsed, silty SAND; residual granophyre.	LOW
			1,8	EOH	

NOTES:

1) Difficult excavation at 1,8m in ferruginised granophyre. Almost refusal.
2) Ground water not encountered during excavation.
3) Fine roots in top 400mm.

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 5*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *07/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,2	Slightly moist, brown, medium dense, intact, silty, coarse SAND; colluvium.	
				Fine, subangular, tightly packed, friable GRAVEL of quartz and granite in a trace matrix of slightly moist, brown, silty sand; overall consistency is medium dense; residual granite.	
TRH 14 = G6	M36 SL3828 SC A-2-6(0)		0,9	Medium and fine, angular, tightly packed GRAVEL of soft rock granite in a trace matrix of grey, silty sand; overall consistency is dense becoming medium dense in places below 1,5m; residual granite.	LOW
				Tends to highly weathered, very soft rock granite in places.	
			2,1	EOH	
				NOTES: 1) Hole stopped at 2,1m in highly weathered granite. No refusal. 2) Ground water not encountered during excavation but moist at base of pit. 3) Fine roots in top 100mm. 4) CBR test undertaken on bulk sample over entire depth.	

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 6*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,2	Slightly moist, reddish brown, loose, intact, silty, coarse SAND with minor, quartz gravel; colluvium.	(LOW)
SMC A1-b(0)	6/1		0,9	Medium and fine, subrounded to subangular, closely packed, friable GRAVEL of quartz in a minor matrix of slightly moist, light brown, silty sand; overall consistency is medium dense to loose; pebble marker.	LOW
			1,8	Fine, subangular, tightly packed, ferruginised GRAVEL of quartz and hard and soft, ferruginous concretions in a minor matrix of slightly moist, yellowish orange mottled black, silty sand; overall consistency is dense; residual granite (ferruginised). Tends to hardpan ferricrete in places.	(LOW)
			2,2	Fine, angular, tightly packed GRAVEL of quartz and pink feldspar in a trace matrix of slightly moist to moist, pinkish orange, sandy silt; overall consistency is dense to medium dense; residual granite (coarse grained). EOH NOTES: 1) Hole stopped at 2,2m in residual granite. No refusal. 2) Ground water not encountered during excavation. 3) Fine roots in top 300mm. 4) Termite tunnel at 0,5m below the surface.	

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 7*

MACHINE: *JCB 3CX TLB.*

PROFILED By: cs

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
				Coarse, medium and fine, angular, closely packed, GRAVEL of hard ferricrete concretions in an abundant matrix of moist, brown, silty sand; overall consistency is loose; nodular ferricrete.	(LOW)
			0,6	Orange mottled black and brown, very dense, hardpan FERRICRETE.	
			1,0	EOH	

NOTES:

1) Machine refusal at 1,0m on hardpan ferricrete.
2) Ground water not encountered during excavation.
3) Fine roots in top 600mm.
4) Excavated in drainage channel amongst informal houses.

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.*

TEST PIT No.: *TP 8*

MACHINE: *JCB 3CX TLB.*

PROFILED By: es

CONTRACTOR: *ROUNDUP PLANT RENTALS.*

DATE: *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
SC A2-4(0)	S/1			Moist, light brown becoming beige with depth, loose, intact, slightly silty SAND with scattered granite and granophyre boulders; allivium (potentially collapsible).	LOW
			1,9	Pink stained light brown (weathering), slightly weathered, very closely fractued, hard rock GRANITE.	(LOW)
			2,1	EOH	

NOTES:

1) Machine refusal at 2,1m on hard rock granite.
2) Seepage of ground water from fractured granite at base of pit.
3) Fine roots in top 600mm.

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block Ss, SOSHANGUVE.* **TEST PIT No.:** *TP 9*

MACHINE: *JCB 3CX TLB.* **PROFILED By:** es

CONTRACTOR: *ROUNDUP PLANT RENTALS.* **DATE:** *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,3	Slightly moist, brown, loose, intact, silty SAND with minor quartz gravel; colluvium.	
			0,8	Medium and fine, angular, tightly packed, friable GRAVEL of ferruginised, granite fragments and quartz in a minor matrix of dry, brown, silty sand; overall consistency is medium dense to dense; residual granite(?).	(LOW)
			1,0	Slightly moist, orange mottled pink, black and yellow, dense, fractured, silty SAND with pockets of very soft rock granite; residual granite(?). EOH Grades into pink, weathered, very closely fractured, hard rock GRANITE(?) at base of pit.	

NOTES:

1) Refusal 1,0m on hard rock granite(?).
2) Ground water not encountered during excavation.
3) Fine roots in top 400mm.
4) Contact between residual gravel and underlying sand is very irregular.

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: ***Block Ss, SOSHANGUVE.*** **TEST PIT No.:** *TP 10*

MACHINE: *JCB 3CX TLB.* **PROFILED By:** es

CONTRACTOR: *ROUNDUP PLANT RENTALS.* **DATE:** *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
			0,7	Moist to slightly moist, light brown becoming beige with depth, loose, intact, silty SAND with traces of gravel; colluvium.	(LOW)
			1,0	Slightly moist, beige, medium dense, intact, silty SAND with minor quartz gravel; colluvium. Becoming orange brown speckled black, very dense FERRICRETE; hardpan ferricrete.	

NOTES:

1) Refusal 1,0m on hardpan ferricrete.
2) Ground water not encountered during excavation.
3) Fine roots in top 300mm.

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.* **TEST PIT No.:** *TP 11*

MACHINE: *JCB 3CX TLB.* **PROFILED By:** es

CONTRACTOR: *ROUNDUP PLANT RENTALS.* **DATE:** *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
TRH 14 = G5	2000 TJ53 SMC A-1-b(0)		0,2	Slightly moist, light brown, loose, intact, silty SAND with minor fine, quartz gravel; colluvium.	LOW
			0,6	Orange mottled black and brown, dense to very dense FERRICRETE with numerous pockets of nodular ferricrete; hardpan ferricrete.	
			1,2	Coarse, medium and fine, angular, closely packed, friable GRAVEL of hard, ferruginous concretions in a minor matrix of slightly moist, light brown, silty sand; overall consistency is dense with loose pockets; residual granite (ferruginised). Pockets of loose sand occur in places.	
			1,8	Slightly moist, light brown blotched and mottled orange and black, dense, intact, silty SAND with abundant, hard and soft, ferruginous concretions; residual granite. Tends to sandy gravel in places.	(LOW)
			2,2	Slightly moist to moist, orange mottled grey blotched black in places, dense, slightly ferruginised, silty SAND with scattered, ferruginous concretions; residual granite. EOH NOTES: 1) Hole stopped at 2,2m in residual granite. No refusal. 2) Ground water not encountered during excavation. 3) Fine roots in top 300mm. 4) CBR test undertaken on bulk sample taken 0m to 1,2m.	

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 98 2049 FAX 012 998 6890 CELL 082 551 6034

SOIL PROFILE

PROJECT: *Block SS, SOSHANGUVE.* **TEST PIT No.:** *TP 12*

MACHINE: *JCB 3CX TLB.* **PROFILED By:** es

CONTRACTOR: *ROUNDUP PLANT RENTALS.* **DATE:** *08/01/97*

UNIFIED/ TRB CLASS.	SAMPLE No.	LEGEND	DEPTH (m)	DESCRIPTION	POTENTIAL EXPANSIVENESS
				Slightly moist, light brown, loose, intact, silty SAND with minor fine, quartz gravel; colluvium.	
			0,4	Medium and fine, subangular to subrounded, closely packed GRAVEL of ferruginous concretions and quartz in a minor matrix of moist, yellow brown, silty sand; overall consistency is medium dense; residual granite (ferruginised in places with scattered hardpan ferricrete).	(LOW)
			1,0		
SC A2-6(0)	12/1			Fine, angular, tightly packed GRAVEL of quartz, pink feldspar and scattered, ferruginous concretions in a minor matrix of moist, orange, silty sand; overall consistency is medium dense to dense; residual granite (ferruginised in places with scattered hardpan ferricrete).	LOW
				Pockets of dense to very dense, ferruginised, residual granite in places.	
			1,9	Some slight seepage below 1,9m.	
			2,4	EOH	
				NOTES:	
				1) Hole stopped at 2,4m in residual granite. No refusal. 2) Slight ground water seepage below 2,3m. 3) Fine roots in top 300mm. 4) Termite tunnel at 0,95m.	

Prepared By: **GEOSTRATA cc** **P O Box 74573** **LYNNWOOD RIDGE** **0040**

TEL 012 998 2049 FAX 012 998 6890 CELL 082 551 6034

APPENDIX B

SUMMARY OF TECHNICAL INFORMATION ON MATERIALS

SUMMARY OF TECHNICAL INFORMATION ON MATERIALS

PROJECT: *BLOCK SS Soils*

SITE: *SOSHANGUVE*

HOLE No.	SAMPLE No.	DEPTH (m)	MATERIAL DESCRIPTION	SIEVE ANALYSIS (%PASSING)									SOIL MORTAR ANALYSIS					CONSTANTS				CLASSIFICATION	
				37,5 mm	26,5 mm	19,0 mm	13,2 mm	4,75 mm	2,0 mm	0,425 mm	0,075 mm	0,002 mm	C Sand	CF Sand	MF Sand	FF Sand	<0,75 mm	LL	PI	LS	GM	T.R.B.	UNIF
TP 4	4/1	0,9-1,8	silty SAND			100	98	90	79	59	41	-	26	9	7	7	51	20	5	2,5	1,21	A-4(1)	SMC
TP 5	CBR	0,0-2,1	gravelly SAND				100	86	62	37	24	-	41	7	6	8	38	28	13	6,5	1,77	A-2-6(0)	SC
TP 6	6/1	0,2-0,9	sandy GRAVEL				100	78	45	30	19	-	32	10	8	7	43	21	6	2,5	2,06	A-1-b(0)	SMC
TP 8	8/1	0,0-1,9	SAND					100	97	72	20	-	26	20	19	15	20	NP		0,0	1,11	A-2-4(0)	SC
TP 11	CBR	0,0-1,2	GRAVEL	99	97	92	87	62	50	38	19	-	24	15	12	11	38	20	6	3,0	1,93	A-1-b(0)	SMC
TP 12	12/1	1,0-2,4	gravelly SAND				100	89	64	38	27	-	41	7	5	6	41	26	12	6,0	1,71	A-2-6(0)	SC

GEOSTRATA cc P O Box 74753 LYNNWOOD RIDGE 0040 Tel: 012 982049 Fax: 012 998 6890 Cellular: 082 551 6034

APPENDIX C

DETAILS OF EXPANSIVENESS OF MATERIALS

DETAILS OF POTENTIAL EXPANSIVENESS OF MATERIALS					PROJECT: *Block SS Soils* LOCATION: *Soshanguve*	
PROFILE No.	SAMPLE No.	DEPTH OF SAMPLE (m)	THICKNESS OF LAYER (m)	POTENTIAL EXPANSIVENESS	PREDICTED HEAVE (mm)	TOTAL PREDICTED HEAVE (mm)
NOTE: No expansive soils were encountered in any of the twelve test pits excavated for this proposed development.						

GEOSTRATA cc P O Box 74753 LYNNWOOD RIDGE 0040 Tel: 012 982049 Fax: 012 998 6890 Cellular: 082 551 6034

APPENDIX D

CBR RESULTS

CBR Values of Bulk Samples at TP 5 and TP 11

Locality: Block SS	Residual Granite TP 5 0,0-2,1	Ferricrete Gravel TP 11 0,0-1,2
Screen Analysis (%PASS)		
53,0mm	100	100
37,5mm	100	99
26.5mm	100	97
19.0mm	100	92
13.20mm	98	87
4,75mm	86	62
2,00mm	75	50
0,425mm	59	33
0,075mm	41	18
Soil Mortar		
Coarse Sd 2-0.425	41	24
C Fine Sd 0.425-0.25	7	15
Medium F Sd 0.25-0.15	6	12
Fine Fine Sd 0.15-0.075	8	11
Material <0.075	38	38
Constants		
Grading Modulus	1.77	1.83
Liquid Limit	28	29
Plasticity Index	13	6
Linear Shrinkage (%)	6.6	3.0
Classification - TRB	A-2-6(0)	A-1-b-(0)
Classification - TRH14	GS	GS
TYPE OF TEST (CBR/UCS)	**CBR**	**CBR**
MOD. AASHTO		
Max Dry Density (kg/m3)	2103	2068
Optimum Moisture Cont(%)	7.1	7.6
Moulding Moisture Cont(%)	6.8	7.7
Dry Density (kg/m3)	2118	2081
% of Max Dry Density	101	101
100% Mod CBR/UCS	68	143
% Swell	0.0	0.0
NRB		
Dry Density (kg/m3)	2048	2008
% of Max Dry Density	97	97
100% NRB CBR/UCS	44	82
% Swell	0.1	0.1
PROCTOR		
Dry Density (kg/m3)	1919	1906
% of Max Dry Density	91	92
100% NRB CBR/UCS	23	61
% Swell	0.1	0.0
CBR/UCS Values		
100% Mod AASHTO	63	133
98% Mod AASHTO	48	104
97% Mod AASHTO	42	91
95% Mod AASHTO	34	72
93% Mod AASHTO	28	57
90% Mod AASHTO	20	40

APPENDIX E

CHEMICAL TEST RESULTS

CHEMISTRY RESULTS

TEST PIT	SAMPLE No	DEPTH (m)	pH	CONDUCTIVITY mS/m	RESISTIVITY ohm/cm
TP 11	CBR	0,0-1,2	5.87	6.01	16638

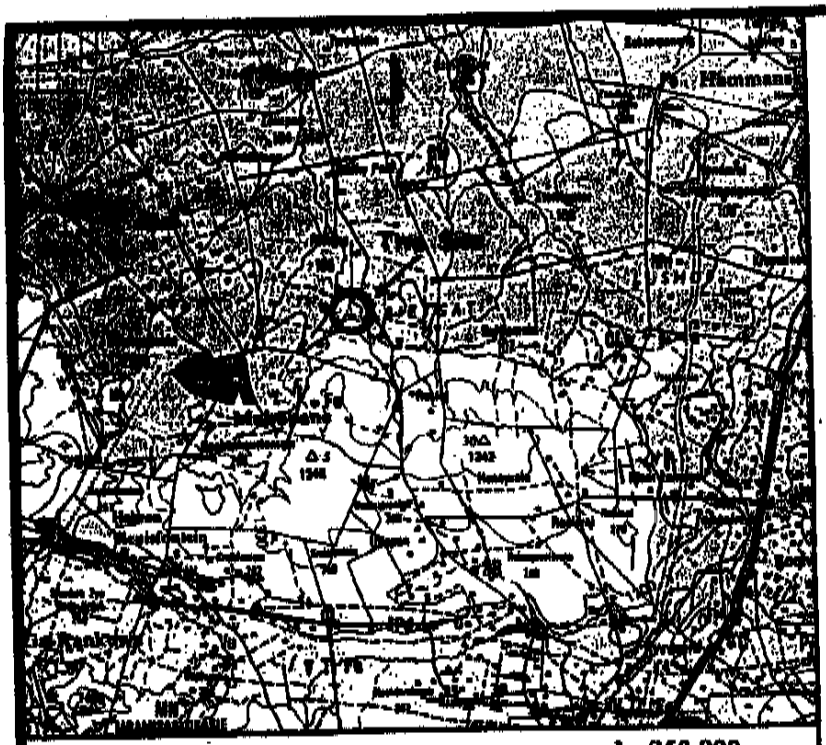
TABLE OF CORROSIVENESS

Conductivity	Resistivity	Corrosiveness
>110mS/m	0 - 900ohms/cm	Very Highly corrosive
110 - 45mS/m	900 - 2300ohms/cm	Highly corrosive
45 - 20mS/m	2300 - 5000ohms/cm	Medium corrosive
20 - 10mS/m	5000 - 10000ohms/cm	Slightly corrosive
<10mS/m	>10000ohms/cm	Non-corrosive

According to the above table the ferruginised residual granite is unlikely to be corrosive.

APPENDIX F

GEOTECHNICAL MAP



LOCALITY PLAN 1 : 250 000

LEGI

TP 4 Test Pit Position and Nu

Total Estimated Heave

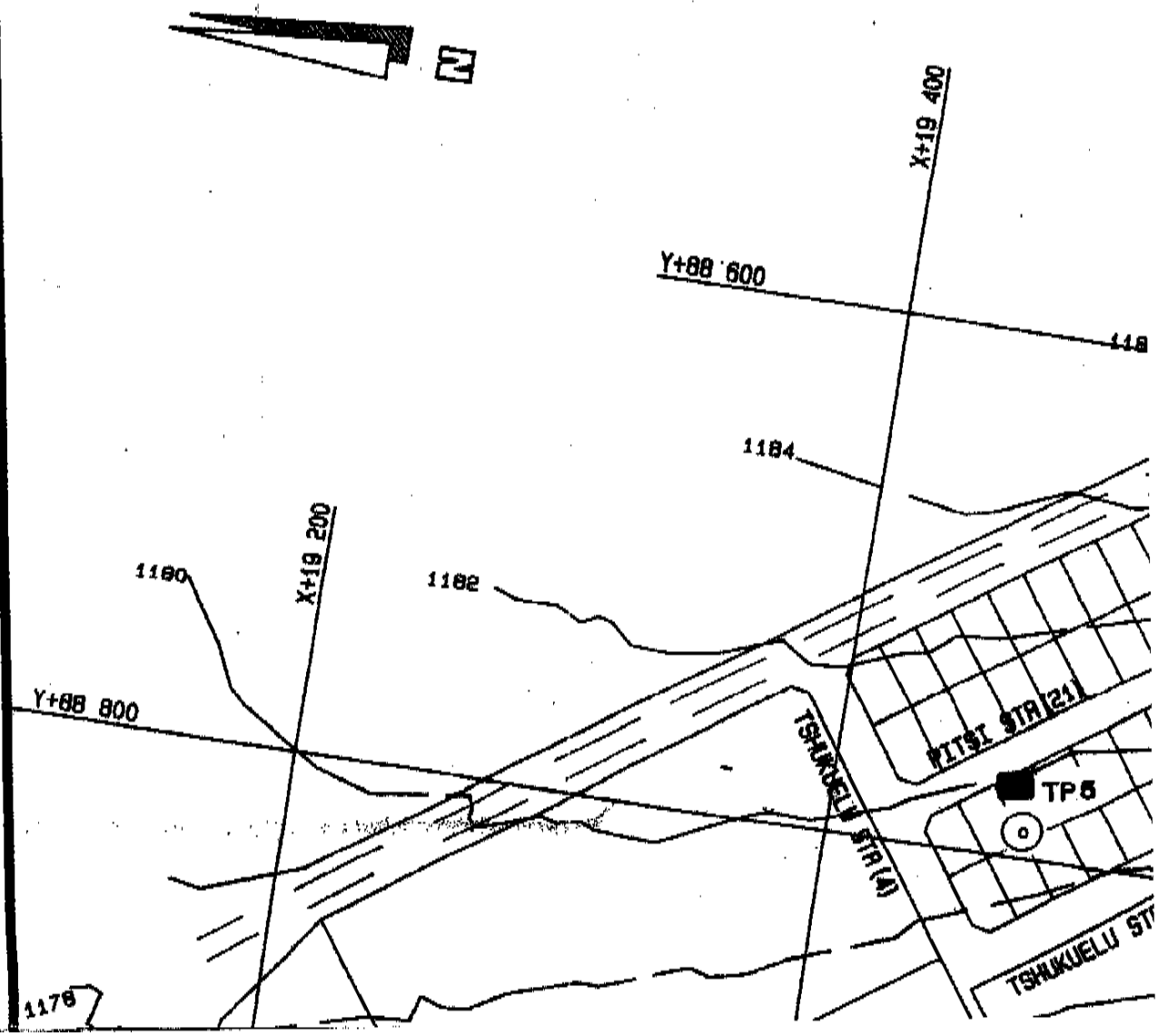
Intermittent Rock Outc

Intermittent Hardpan F

Scattered Large Hard R

Approximate Extent of

Approximate Soil Unit I



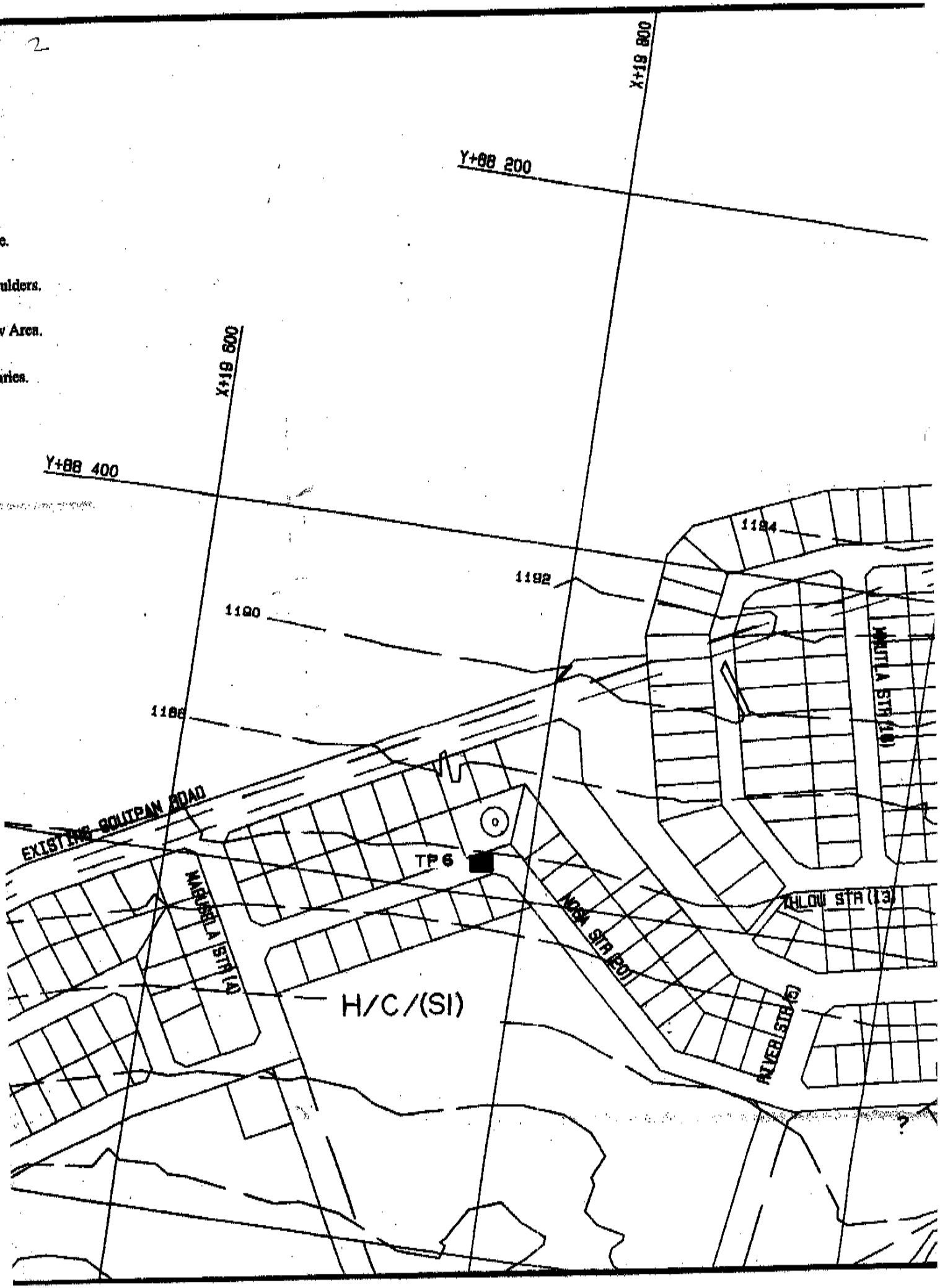
2

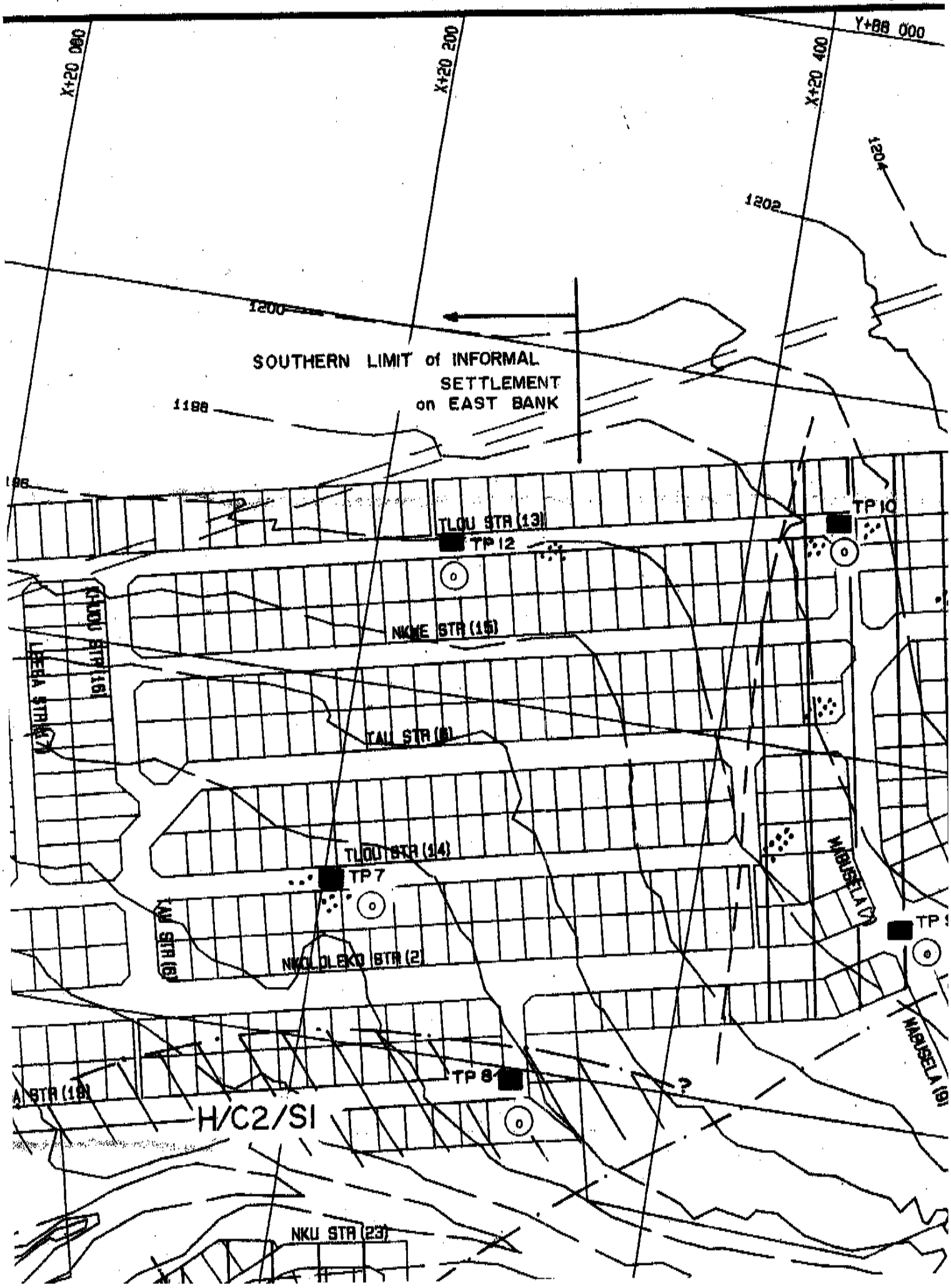
te.

oulders.

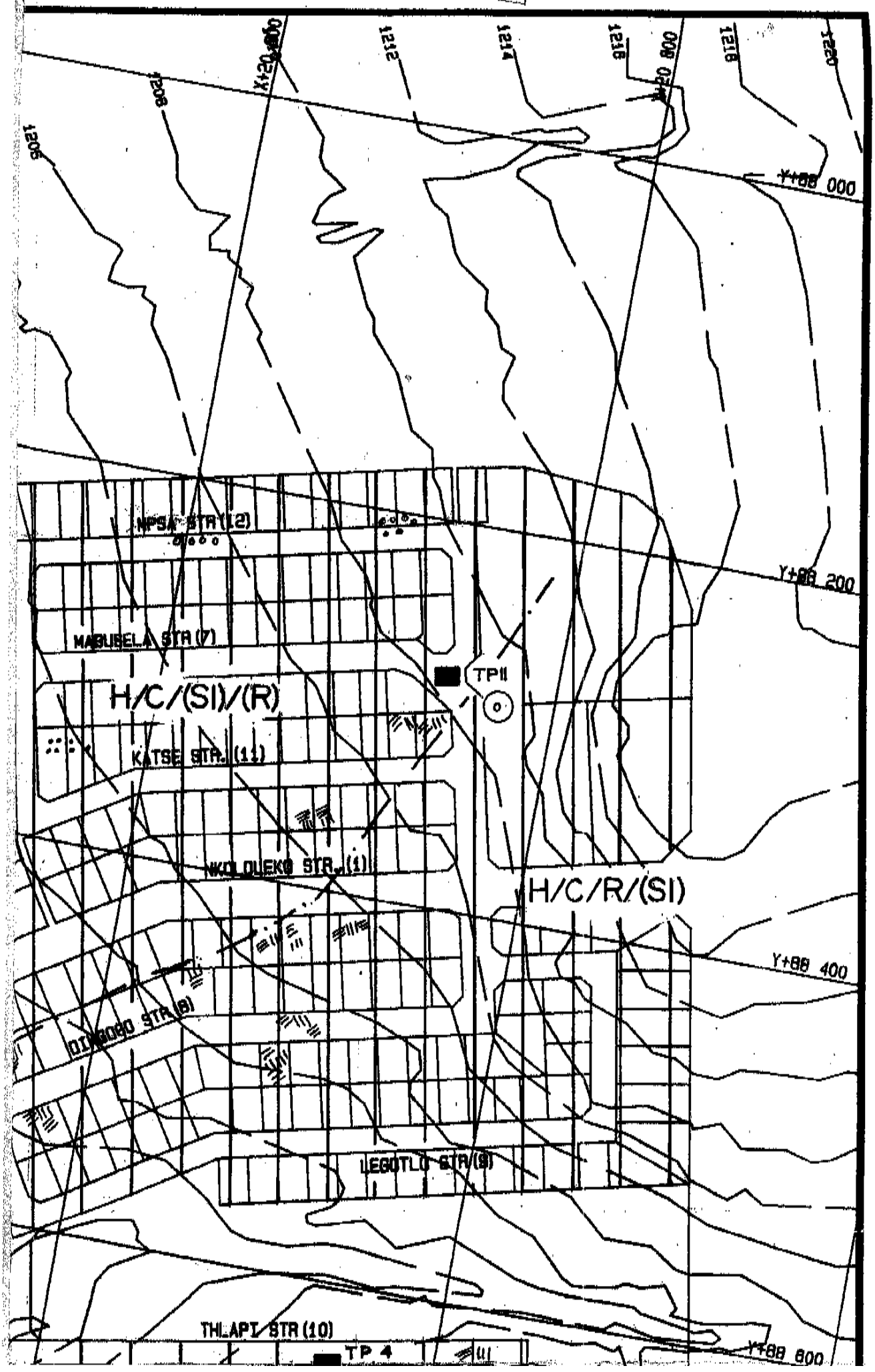
w Area.

aries.

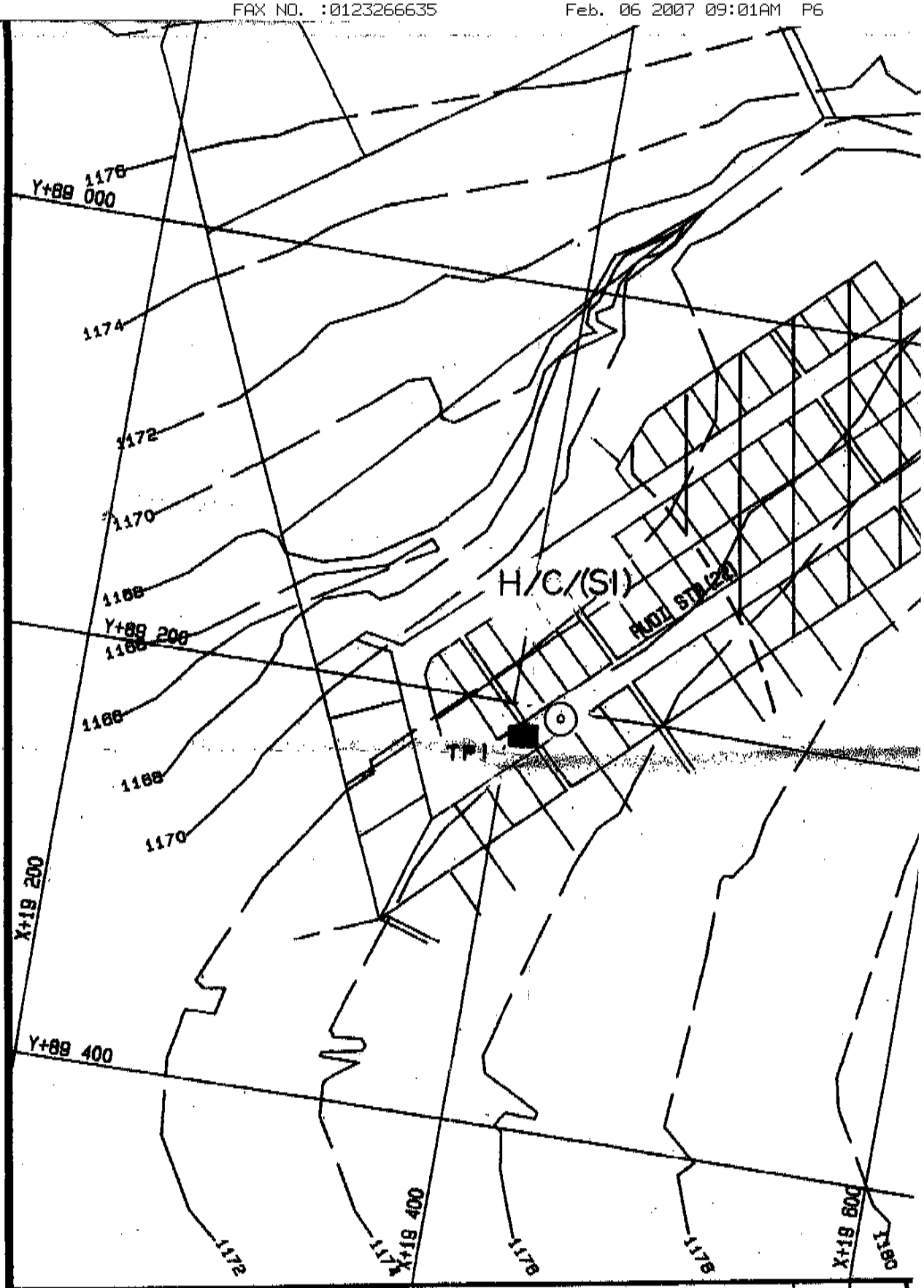



X+20 000
X+20 200
X+20 400
Y+88 000
1204
1202
1200
1198
SOUTHERN LIMIT of INFORMAL SETTLEMENT on EAST BANK
TP 10
TLOU STR (13)
TP 12
NKWE STR (15)
TAU STR (8)
TLOU STR (14)
TP 7
NKOLOLEKO STR (2)
TP 8
H/C2/SI
NKU STR (23)
MABUSELA (9)

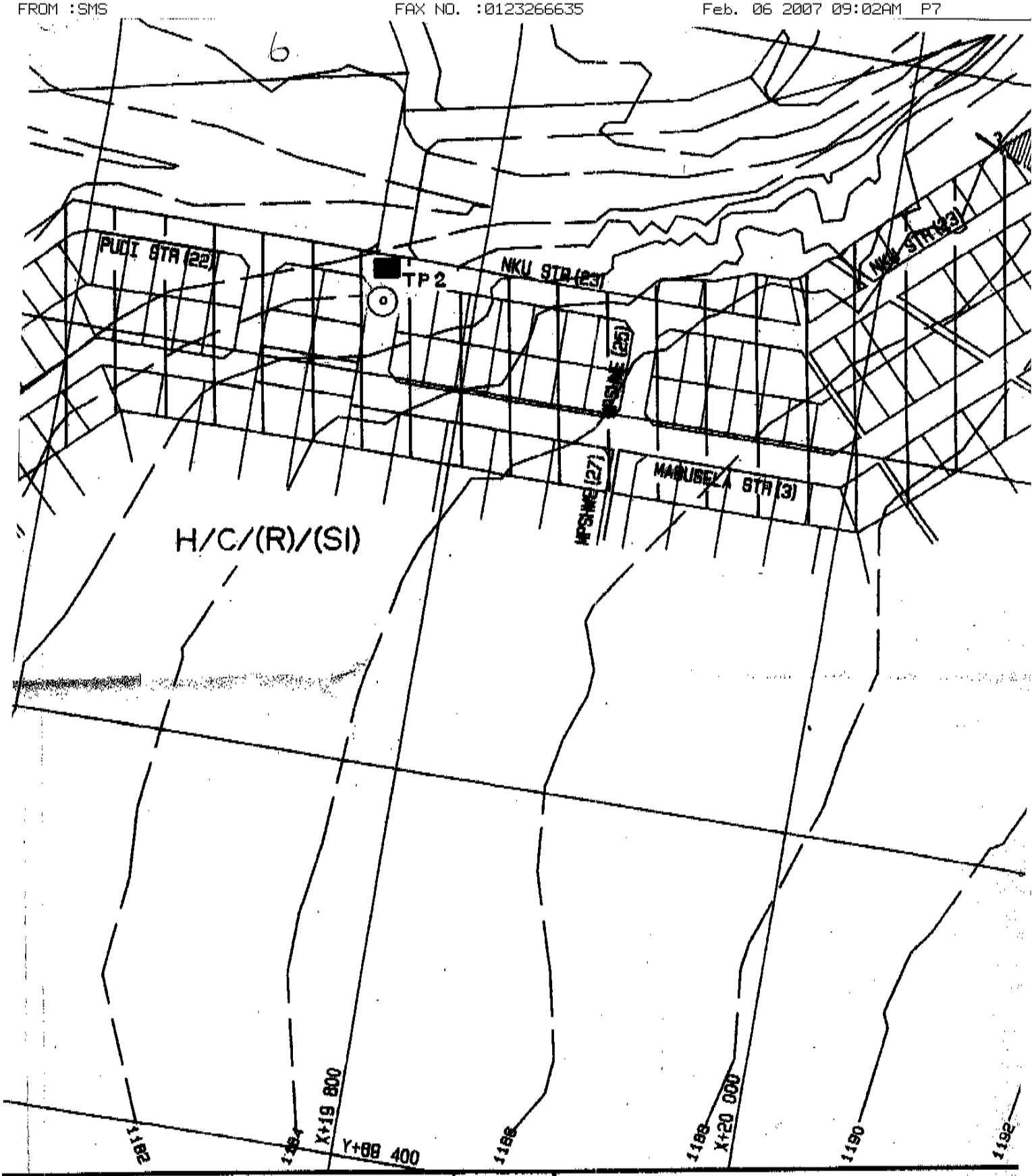
4


Y+88 000
Y+88 200
Y+88 400
Y+88 600
NPSA STR (12)
MABUSELA STR (7)
H/C/(SI)/(R)
TP11
KATSE STR. (11)
NKOLOLEKO STR. (1)
H/C/R/(SI)
LEGOTLO STR (9)
THLAPI STR (10)
TP 4

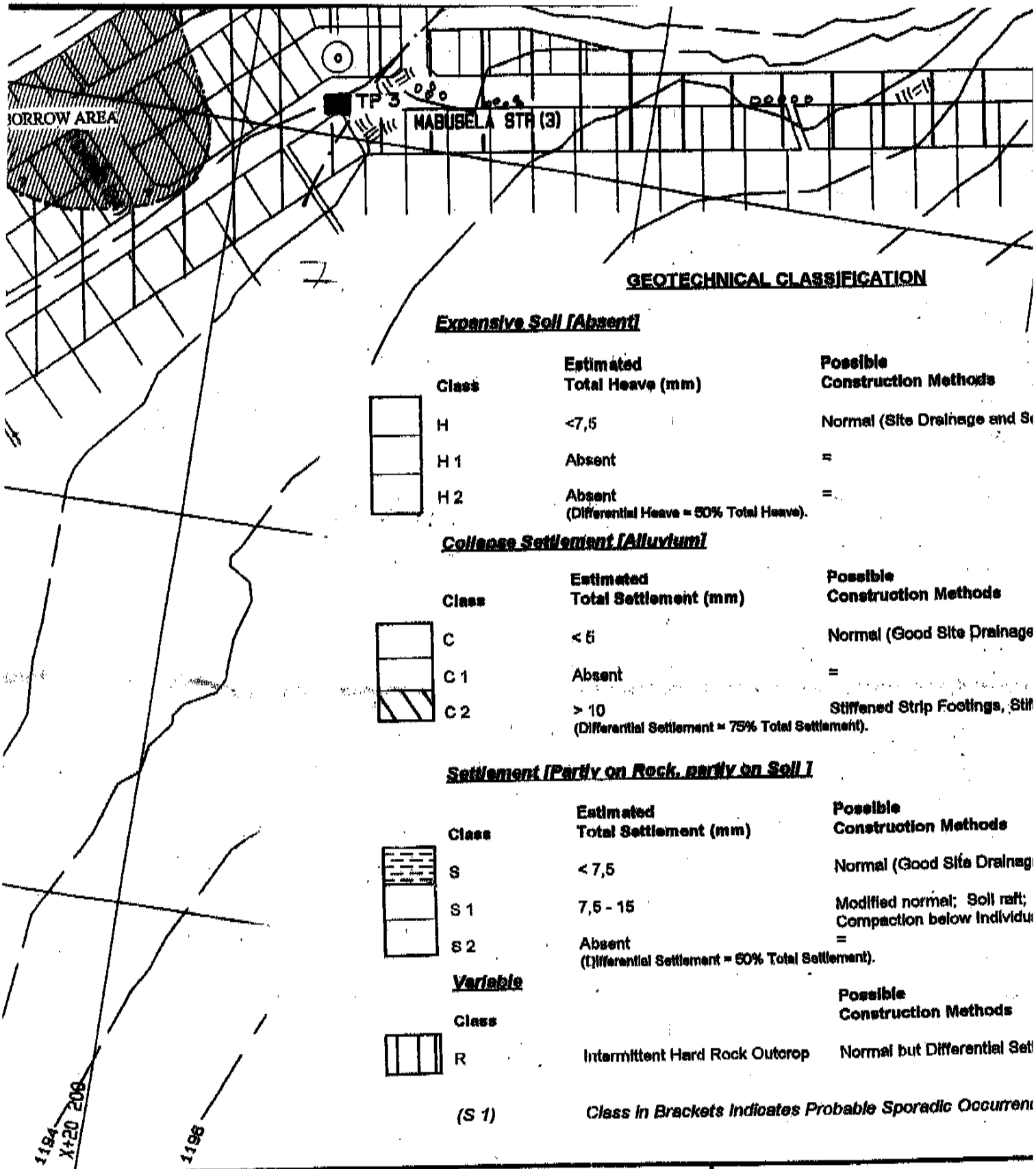
S



1	11/86	PHASES ADDED		
NO	DATUM DATE	DESCRIPTION	CHKD CHK	STARTING FROM CHK
		WYSIGINGS / AMENDMENTS		



BEMEET DEUR SURVEYED BY		DATUM/ DATE	STADSRAAD VAN AKASIA
NTWERP DEUR DESIGN BY		MAY '98 DATUM/ DATE	
AGESIEN DEUR CHECKED BY		DATUM/ DATE	DEPARTEMENT VAN DIE STADSINGENIEUR
TEKEN DEUR RAWN BY		MAY '98 DATUM/ DATE	
AGESIEN DEUR CHECKED BY		DATUM/ DATE	



GEOTECHNICAL CLASSIFICATION

Expansive Soil [Absent]

Class	Estimated Total Heave (mm)	Possible Construction Methods
H	<7,5	Normal (Site Drainage and S
H 1	Absent	=
H 2	Absent (Differential Heave = 50% Total Heave).	=

Collapse Settlement [Alluvium]

Class	Estimated Total Settlement (mm)	Possible Construction Methods
C	< 5	Normal (Good Site Drainage
C 1	Absent	=
C 2	> 10 (Differential Settlement = 75% Total Settlement).	Stiffened Strip Footings, Stif

Settlement [Partly on Rock, partly on Soil]

Class	Estimated Total Settlement (mm)	Possible Construction Methods
S	< 7,5	Normal (Good Site Drainag
S 1	7,5 - 15	Modified normal; Soil raft; Compaction below Individu
S 2	Absent (Differential Settlement = 50% Total Settlement).	=

Variable

Class		Possible Construction Methods
R	Intermittent Hard Rock Outcrop	Normal but Differential Set

(S 1) *Class in Brackets Indicates Probable Sporadic Occurren*

WN COUNCIL

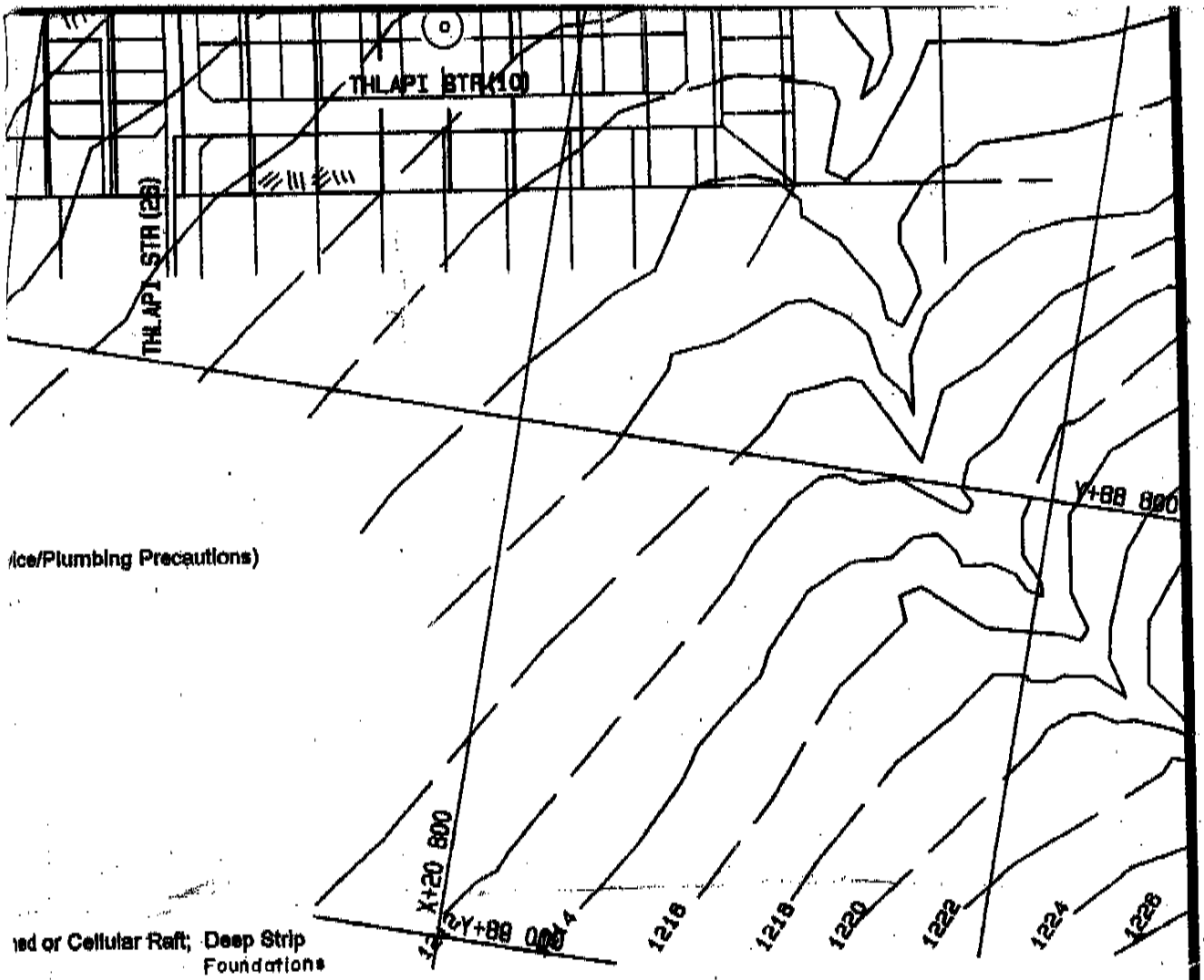
TOWN ENGINEER'S DEPARTMENT

STADSINGENIEUR
TOWN ENGINEER

RAADGEWENDE ING.
CONSULTING ENG.

SOSHAN

8



lice/Plumbing Precautions)

ad or Cellular Raft; Deep Strip Foundations

ep Strip Foundations; Footings.

nent Possibly a Problem.

BLOCK SS, SOSHANGUVE.

SOILS INVESTIGATION.

GEOTECHNICAL MAP

Prepared By: GEOSTRATA cc
P O Box 74753
LYNNWOOD RIDGE 0040
Tel: 012 98 2049 / 4202023
Fax: 012 996 6880

SCALE:	DATE:
1 : 2 500	January 1997
JOB No.: 833soos/96	FIGURE No.:

UVE UNIT SS

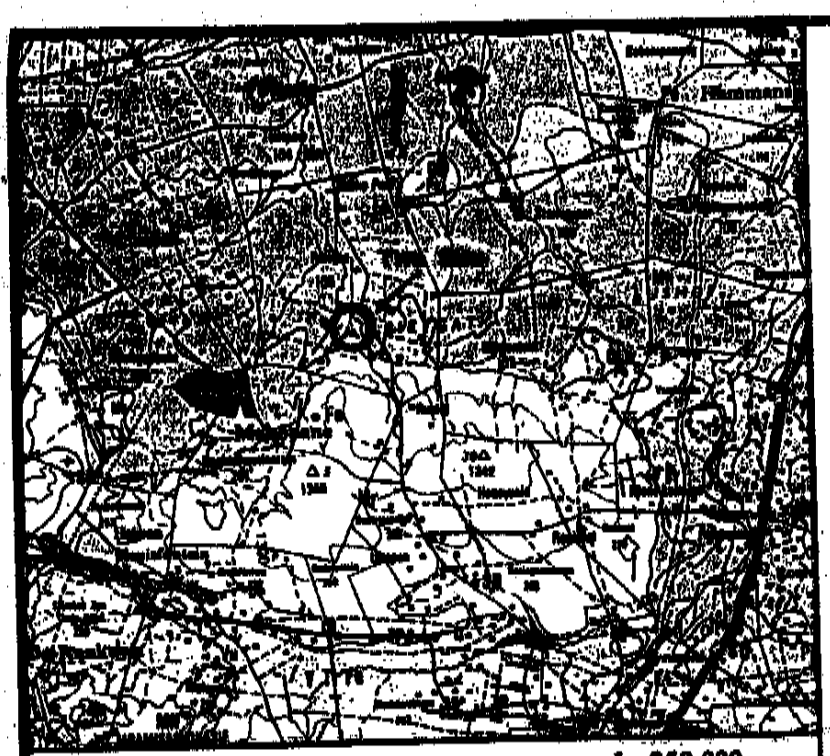
SKAAL : VERT
SCALE : HOR. 1 : 2500

SKAAL OP OORSPRONKLIKE
SCALE ON ORIGINAL

PLAN NR.
PLAN NO.

APPENDIX G

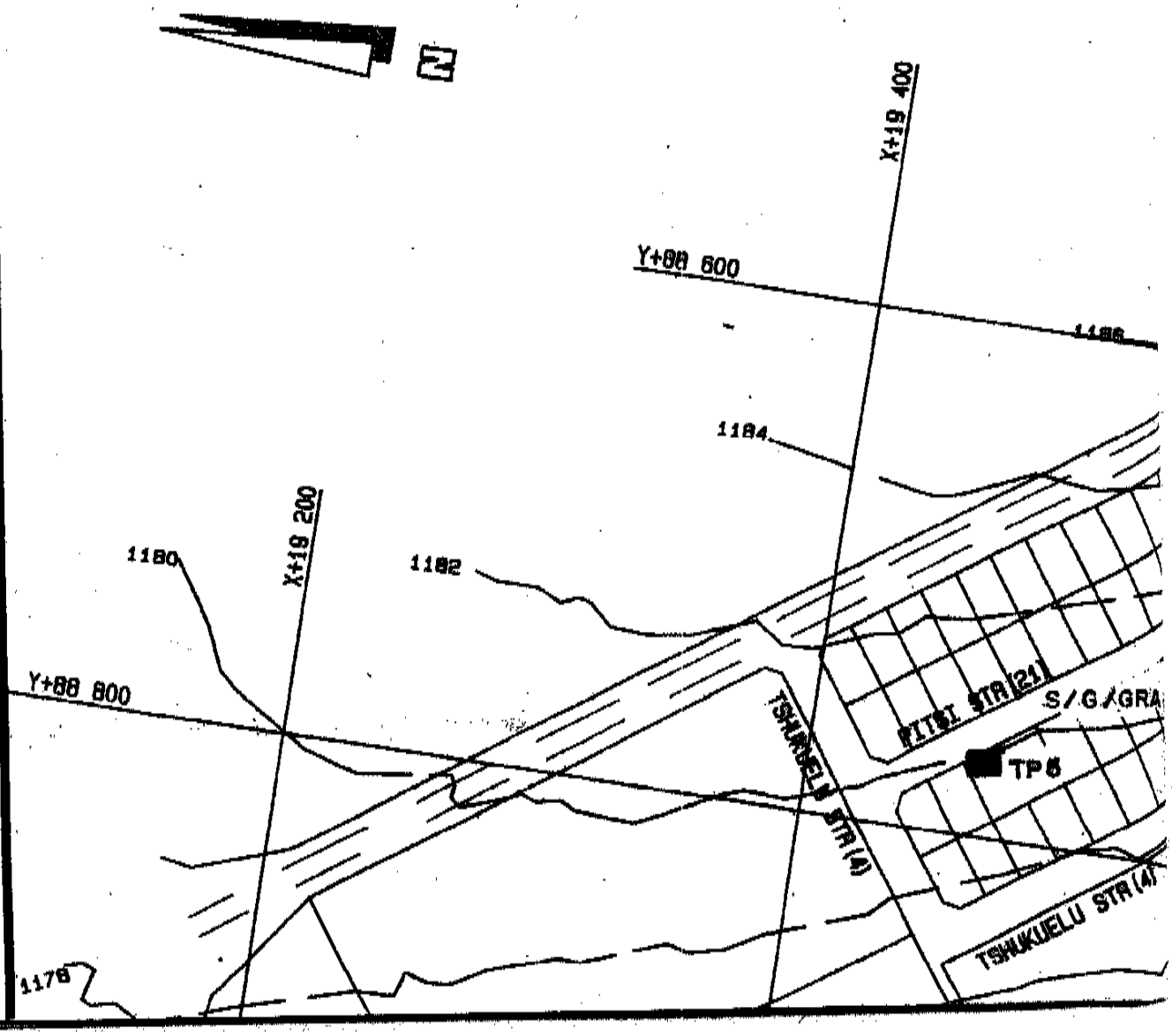
GEOLOGY MAP



LOCALITY PLAN 1 : 250 000

GENERALIS

S/ Fer G/ Fer GRA/ GRA	San
S/ Fer G/ GRA	San
S/ G/ GRA	San
S/ GRA	San
S/ Fer G/ GRN	San



2.

SOIL PROFILES

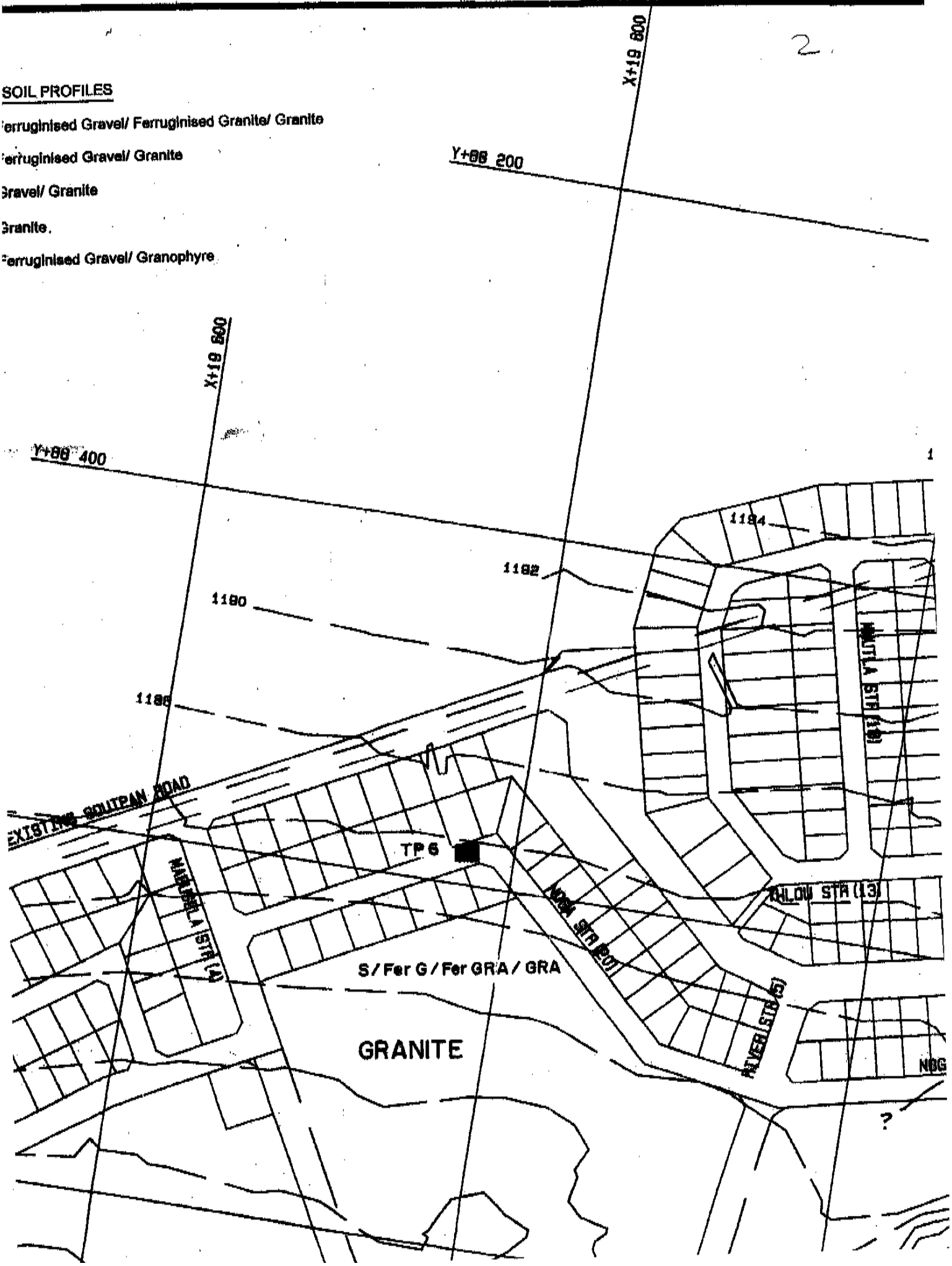
Ferruginised Gravel/ Ferruginised Granite/ Granite

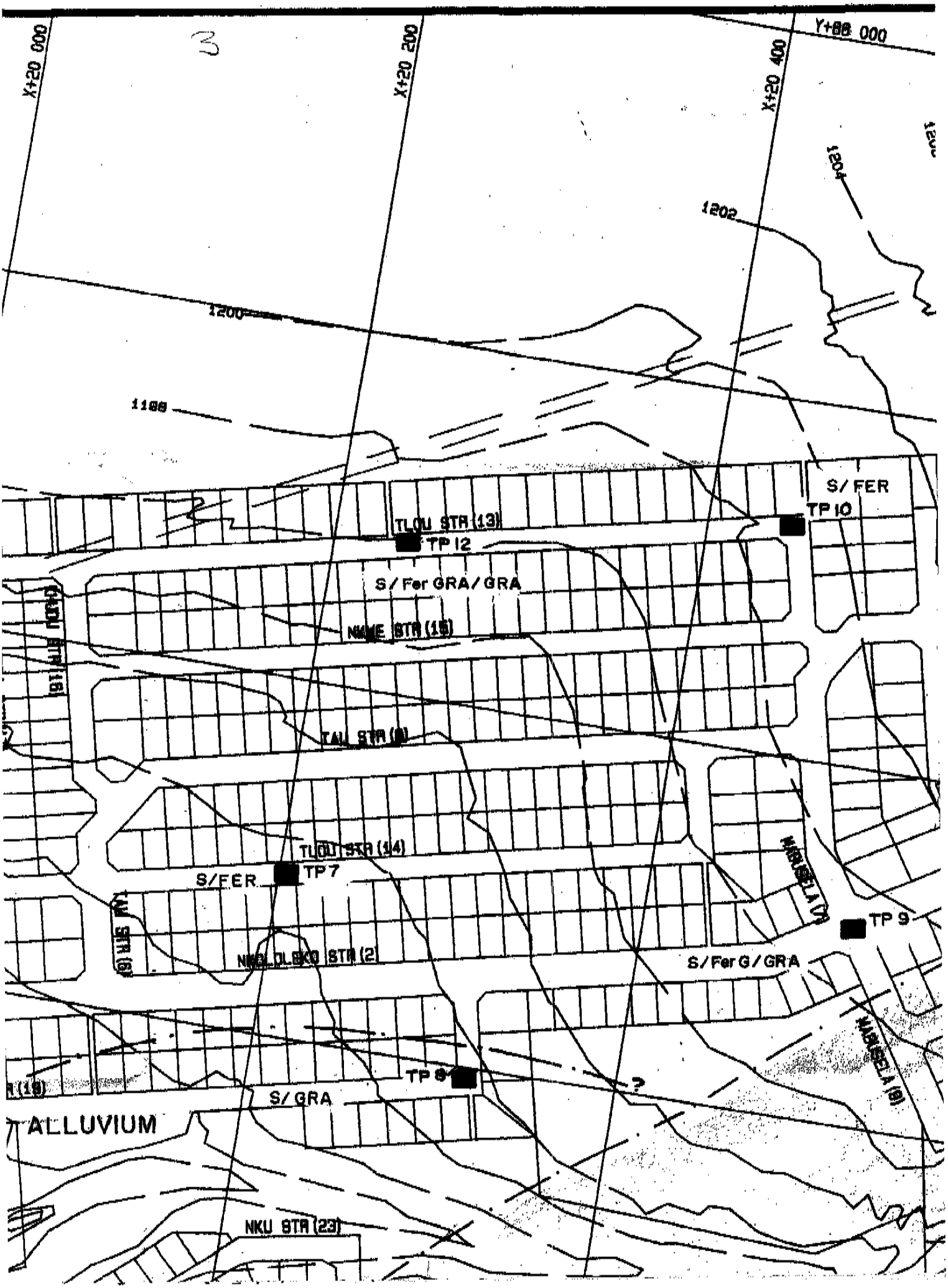
Ferruginised Gravel/ Granite

Gravel/ Granite

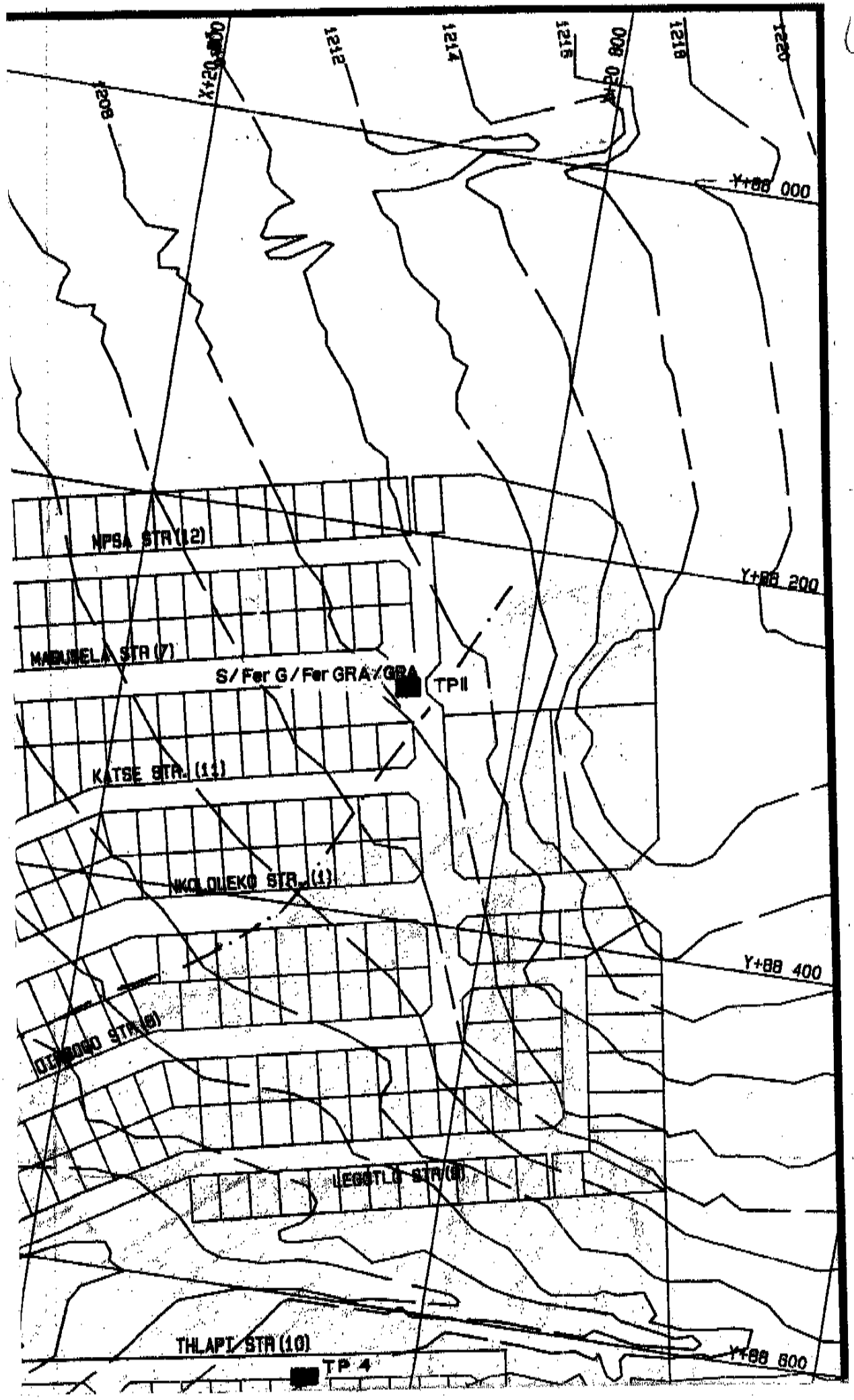
Granite.

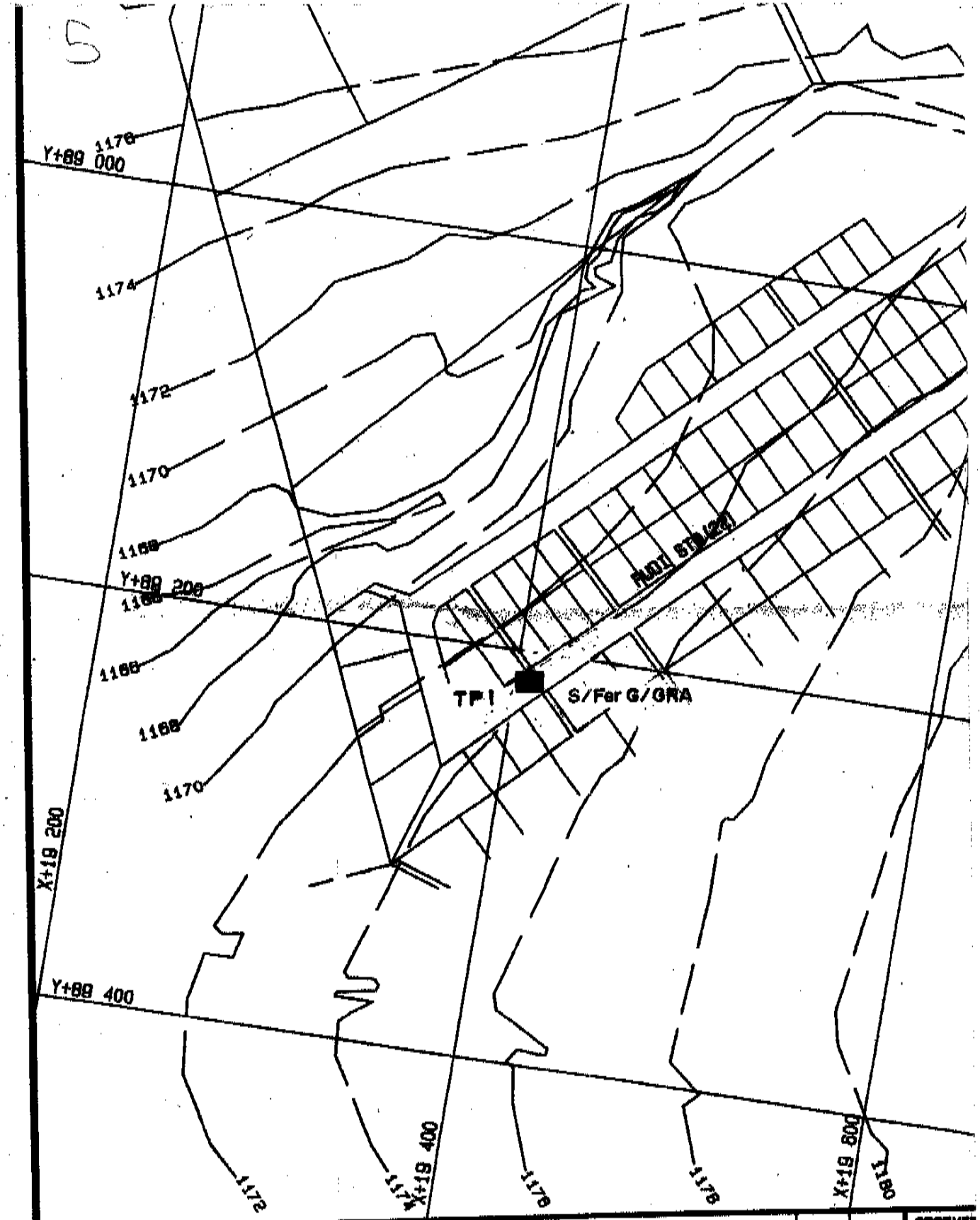
Ferruginised Gravel/ Granophyre




3
X+20 000
X+20 200
X+20 400
Y+00 000
1204
1202
1200
1198
S/FER
TP 10
TLOU STR (13)
TP 12
S/Fer GRA/GRA
NAME STR (15)
TAU STR (8)
TLOU STR (14)
S/FER
TP 7
NKOLOKO STR (2)
S/Fer G/GRA
TP 9
TP 6
S/GRA
ALLUVIUM
NKU STR (23)

4


Y+88 000
Y+88 200
Y+88 400
Y+88 600
NPSA STR(12)
MABUBELA STR (7)
S/Fer G/Fer GRA/GRA
TP11
KATSE STR. (11)
LEGOTLO STR(8)
THLAPI STR (10)
TP 4

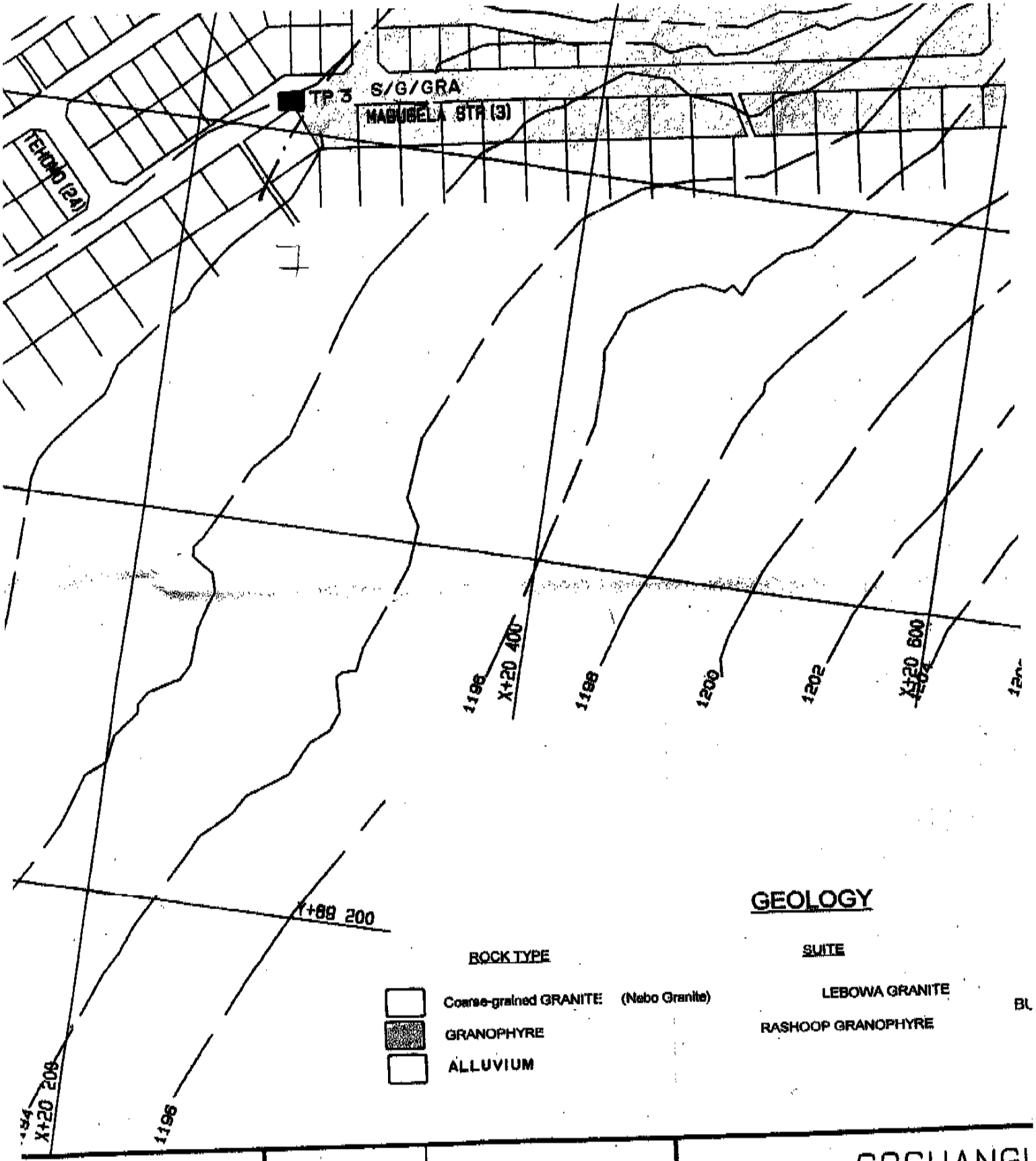


					OPSEMEE SURVEYE
					ONTWERP DESIGN
					NABEBIE CHECKED
1	11/06	PHASES ADDED			GETEKEN DRAWN
NB	DATUM DATE				NABEBIE CHECKED

WYSIGINGS / AMENDMENTS



T DEUR D BY		DATUM/ DATE	STADSRAAD VAN AKASIA TO
DEUR BY		MAY '98 DATUM/ DATE	
N DEUR BY		DATUM/ DATE	DEPARTEMENT VAN DIE STADSINGENIEUR
DEUR Y		MAY '98 DATUM/ DATE	
N DEUR BY		DATUM/ DATE	



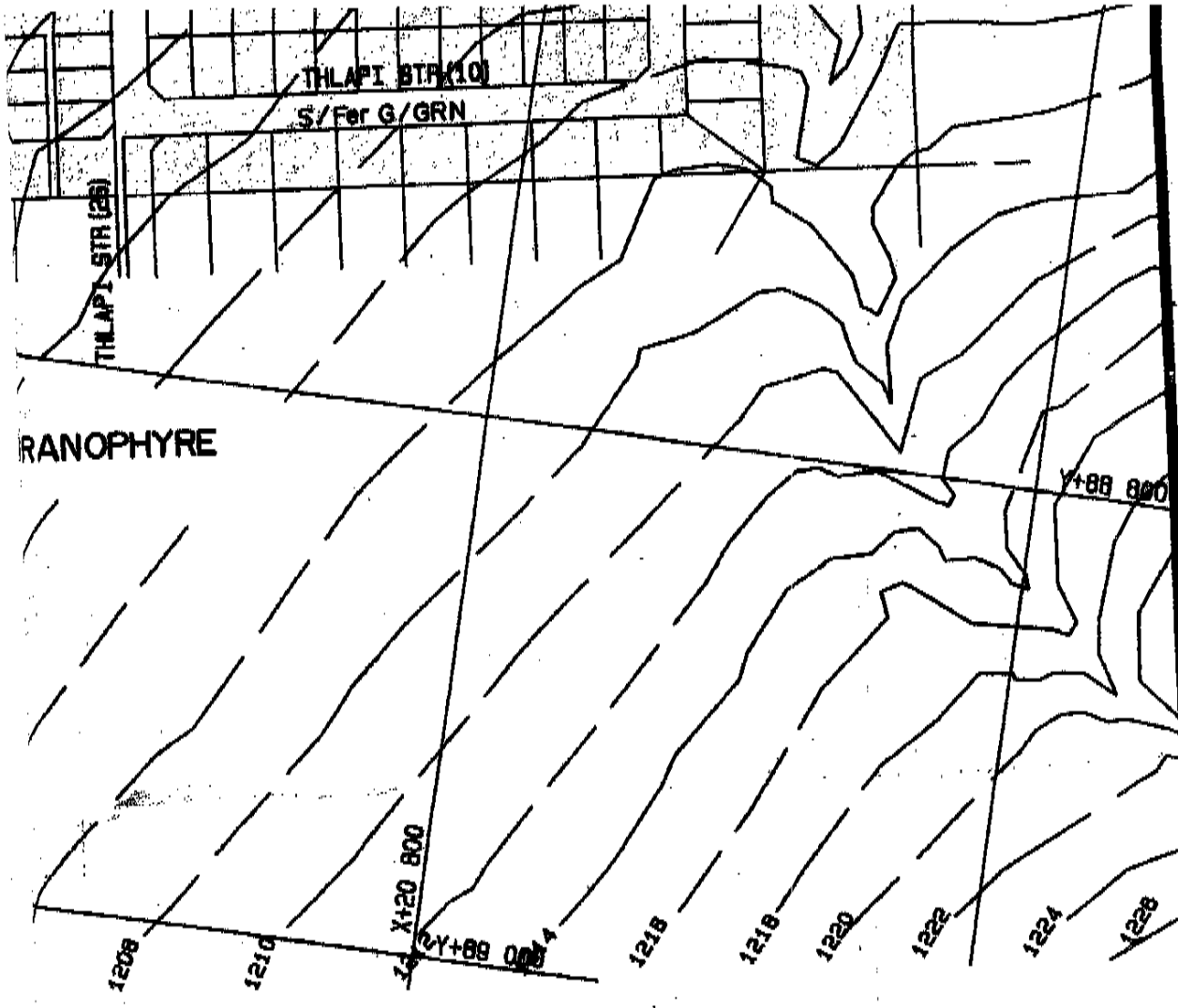
COUNCIL

SOSHANGU

N ENGINEER'S
EPARTMENT

STADSINGENIEUR
TOWN ENGINEER

RAADGEWENDE ING.
CONSULTING ENG.



BLOCK SS, SOSHANGUVE.

SOILS INVESTIGATION.

GEOLOGY

VELD COMPLEX

RECENT

Prepared By: GEOSTRATA cc
P O Box 74753
LYNNWOOD RIDGE 0040
Tel: 012 98 2049 / 4202023
Fax: 012 998 6890

SCALE: 1 : 2 500

DATE: January 1997

JOB No.: 533eos/96

FIGURE No.:

E UNIT SS

SKAAL : VERT
SCALE : HOR. 1 : 2500

SKAAL OP ORSPRONKLIKE
SCALE ON ORIGINAL

PLAN NR.

PLAN NO.