

GROENKLOOF ONTWIKKELINGS

PROPOSED DEVELOPMENT OF PORTION 3 OF KRAAIBOSCH 195: GEORGE

TECHNICAL REPORT FOR CIVIL ENGINEERING SERVICES AT KRAAIBOSCH 195/3 (Rev 3)

REF NO. 19109CG

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AVAILABILITY OF CIVIL ENGINEERING SERVICES

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PROPOSED DEVELOPMENT OF PORTION 3 OF KRAAIBOSCH 195: GEORGE AVAILABILITY OF CIVIL ENGINEERING SERVICES

1. INTRODUCTION

Groenkloof Ontwikkelings (Pty) Ltd appointed Lyners to compile a civil engineering services report for portion 3 of the farm Kraaibosch 195, George.

This report will deal with the following matters:

- The availability of civil engineering services.
- Planning of the civil engineering services.

The development will consist of the following land uses:

- Residential Zone II and III
- Group housing
- Administrative buildings
- Flats
- Business Zone
- Open spaces

2. AVAILABLE INFORMATION AND INVESTIGATIONS

The following information was made available to us:

- Sub-division plan by Formaplan (See Annexure A)
- Existing services drawings and information obtained during discussions with the local authority engineering department.
- Services report compiled previously

3. SITE TOPOGRAPHY AND DRAINAGE

The site is currently overgrown in varying densities of vegetation, tree and ground cover. The site is surrounded by different land uses including farming.



The area drains naturally towards a sharp valley and then to the Klein Swart River, a tributary to the Swart River on the northern boundary.

4. **HYDROLOGY, CLIMATE AND VEGETATION**

The Mean Annual Precipitation used for the preliminary investigation is 950 mm per annum.

5. **TRAFFIC IMPACT STUDY**

All traffic and access related issues can be discussed in a separate report if required.

6. **EXTERNAL SERVICES**

GLS Consulting Engineers was appointed by George Municipality to assist the Municipality as Water Services Authority with the master planning for water and sewer services in the George area.

The updated GLS drawings in Annexure B indicate the existing and proposed external water & sewer services reticulations as obtained from the various authorities and reports. This drawing will be updated during future planning and final design phases.

6.1 **Water**

The local authority appointed GLS as the master planning consulting engineers for the water infrastructure.

The availability of potable water will be from the South via an existing 200 mm diameter pipe along the main access road, Glenwood Avenue. New internal 160 mm diameter pipelines will connect to the existing 200 mm diameter supply pipeline. The new 160 mm diameter pipelines will also make provision for future developments to the east of this development as indicated by GLS (See Annexure B).

The water Annual Average Daily demand will be as per Guidelines (red book) standards and as discussed in the GLS correspondence:

➤ 302 High density residential units	: 0,60 Kl/d/Unit	= 181.20
➤ 256 High density Flats	: 0,60 Kl/d/Unit	= 153.60
➤ Admin, reception, eating hall	: 0,40 Kl/d/100m ² of floor area (6000m ²)	= 24.00
➤ Business Zone	: 0,40 Kl/d/100m ² of floor area (2500m ²)	= <u>10.00</u>
Total		= 368.80 Kl/day

The total annual average daily demand will therefore be 368.80 Kl/day (4,3L/s) with a peak demand of 13 l/s.



The George Municipality confirmed in writing that sufficient water resources at the treatment plants will be available (See Annexure G).

The following water saving devices will be employed:

- 2 500 litre rain water tanks at each unit;
- Low flow shower heads;
- Small capacity toilet cisterns.

6.2 Sewer

The local authority appointed GLS as the master planning consulting engineers for the sewage infrastructure of George.

The proposed sewage discharge for the development will be 277 Kl/day (3,2 L/s) which equates to 75% of the water demand with a peak flow of 9,6 L/s, calculated as per the red book principles. In addition, an allowance will be made in the outfall sewer line capacity for the sewage from a portion of erf 195/21 from the west and a portion of erf 195/62 from the east.

The George Municipality confirmed in writing that the proposed sewage discharge from a medium density development can be accommodated and that sufficient effluent treatment capacity at the treatment plant will be available (See Annexure G) and this by the end of 2021 when the current upgrades to the Outeniqua WWTW should be completed.

As per the previous services report (Annexure F) the following proposed bulk sewer is still required until an outfall sewer connection is available on the east side on erf 195/62 as per the GLS Masterplan. Due to the following reasons connecting to an outfall sewer on erf 195/62 as per GLS proposal has been discussed with George Municipality not to be practical at this time:

- The preliminary designs of the sewer system for erf 195/62 (See Annexure E) shows pump stations picking up the sewerage versus the masterplan gravity outfall sewer line (See Annexure B) that would have to be installed too high because of rock cliffs located on the south-east end of the erf making the installation of a gravity sewer impractical there;
- The time schedule for the development on erf 195/62 is too far behind that of erf 195/3 and erf 195/3 would therefore have to handle their own sewerage via an own pump station and rising main pumping to the existing outfall sewer of Groenkloof Retirement Village on erf 195/57 (See Annexure C &D).



The details of the preferred recommendation for the handling of the sewer outfall of erf 195/3 is therefore outlined below (See Annexure C &D):

- Internal outfall sewer of erf 195/3 to accumulate at the lowest point of the site which is at the north eastern corner of the site;
- A new pump station will then pump the sewage from this lowest point along the eastern site boundary across Glenwood Avenue and will connect to the existing outfall sewer of Groenkloof Retirement Village on erf 195/57;
- The capacity of this pump station will be designed to, besides the peak sewage flow from erf 195/3, also accommodate relevant portions of erf 195/21 and erf 195/62 in future and thus be able to act as a regional pump station;
- A diesel-powered generator will be provided at the proposed sewer pump station as back-up in case of power failures;
- The new pump station will pump to erf 195/57 (Groenkloof Retirement Estate) until the development on erf 195/62 to the east may install a main outfall sewer to receive this development's sewage as per the GLS masterplan (See Annexure B).
- If the development on erf 195/62 rather install a private sewer pump station (Annexure E) than the proposed GLS gravity outfall sewer (Annexure B) then the pump station on erf 195/3 will continue to permanently pump to the existing outfall sewer of Groenkloof Retirement Village on erf 195/57.

The long-term option would be for the George Municipality to take over the proposed sewer pump station on erf 195/3 as a regional pump station as soon as portions of erf 195/21 and/or erf 195/62 connects to the pump station. This would then become an alternative to the outfall sewer proposed by GLS on erf 195/62 (Annexure D) and has been accepted by George Municipality to be included in Service Agreements with the developers.

6.3 Storm Water

The overall natural drainage direction of the site is towards the Klein Swart River to the north and will be incorporated in the internal network's detail design phase where erosion protection measures are also described.

6.4 Access

Permanent access to this development will be from the newly built road, Glenwood Avenue, on the south side of the development.



During the construction phase, construction vehicles will also enter the site via the existing Glenwood Avenue Road on the southern side of the site.

7. INTERNAL SERVICES

The design of internal services will be done in accordance with the “Guidelines for the Provision of Engineering Services for Residential Townships” and the standards of George Municipality.

7.1 Roads

In general all roads are between 3,0 m and 6,8 metres wide as per requirements for the residential developments.

The following pavement structures are envisaged, but are subject to final design:

- Bituminous surfacing
 - 13,2/6,7 mm double surface treatment (or alternative).
 - 150 mm G4 crushed stone base.
 - 150 mm G5 crushed stone subbase.
 - 150 mm G7 upper selected material.
 - 150 mm G7 lower selected material.
- Brick paving
 - 80 mm Brick paving (Brick and/or cobble pavers).
 - 150 mm C4 crushed stone base.
 - 150 mm G7 upper selected material.
 - 150 mm G7 lower selected material.

The alterations and upgrading of the external and internal road infrastructure will be according to the authorities’ requirements and specifications.

7.2 Storm Water Drainage

The storm water drainage will be designed in accordance with the philosophy of providing for a minor and major system. Careful attention will be given to the layout of the road reserves to drain captured and overland storm water away from the proposed development. This storm water can then be utilised to supplement the irrigation.

The major system will consist of roads and open channels to ensure overland escape routes for the larger storm run-offs. The minor system will consist of kerb inlet catch pits and underground storm water pipes.



The minor system will be designed to accommodate the 1 in 2 year return period run-offs and the major systems for the 1 in 20 year run-offs. The minimum pipe diameters will be 450 mm for longitudinal runs and catch-pit connections as per the George Municipality's standards.

The storm water run-off from most of the area will drain towards a low point (valley) on the North side of the erf. At this point and other major outlet points, structures which will make provision for energy dissipation and erosion protection will be provided where required.

During construction, special attention will be paid to the use of silt traps at storm water inlets and at natural low points to prevent silt and rubbish to be deposited in the river.

The required bulk earthworks on the site must be planned as a total project and must incorporate the storm water management for this development.

7.3 Sewerage

Conventional gravity sewerage seems to be the viable option and it is recommended that 160 mm \varnothing uPVC (Class 34) pipes be used as sewer collectors with 110 mm diameter erf connections to the individual erven. The sewer system will consist of the necessary underground pipes, manholes and bulk erf connections to each individual property. George Municipality will take over the internal Sewer reticulation and external outfall sewer.

7.4 Water Supply

The internal water reticulation system will consist of uPVC pipes varying in size between 90 mm and 160 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants as required erf connections and water meters. George municipality will take over the water reticulation.

7.5 Bulk Earthworks

Bulk earthwork planning will be done for the individual phases and will be planned and optimised with the layout and phasing of the various areas.

8. WASTE

The development will be incorporated in the existing municipal waste infrastructure and the municipality will collect the waste at 2 approved collection points.

At a rate of 2 kg/person per day and 2 persons per unit and 4 persons per 100m² of admin/business zones the mass of waste that will be generated by the development will be 2,92 tons per day.



9. RECOMMENDATIONS

The following are recommendations to facilitate the successful development of this site:

- Detail contour survey and existing services information to be completed; and incorporated in the revised site layout.
- Cadastral boundary and required servitudes to be finalised;
- Cost estimate of required civil engineering services to be completed;
- Co-ordination is essential between the Developer, numerous new developments planned for the region and the local authority regarding the upgrade, improvement and construction of new infrastructure for the maximum benefit of all parties concerned, inclusive of a fair cost allocation.

We trust that this report meets with your approval and will gladly provide any further information that may be required.

FRANCOIS VAN ECK, Pr. Eng.
For LYNERS



ANNEXURE A:

**Subdivision - Formaplan Subdivision Plan dated
November 2019**

1. Daar word voorgestel om Ged 3 van Plaas Kraaibosch 195 ingevolge Art 15(2)(a) van die Munisipale Verordeninge op Grondgebruikbeplanning 2015 te hersoneer na onderverdelingsgebied.

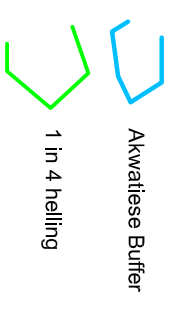
2. Daar word voorgestel om die Onderverdelingsgebied ingevolge Art 15(2)(d) van die Grondge. Beplan. Verordeninge 2015 te onderverdeel as volg en om die gebuikse soos in hakles aangedui, daaraan toe te ken:

- Gem Grootte 472 vkm
 299 ewe nrs 1 - 299 (Attree eenhede)
 2 ewe nrs 300 - 301 (Institusionele Gebruik) vir gebuikse soos aangedui op die plan.

1 erf nr 302 (Sake gebruik) om ook 'n selfoonmas te akkommodeer.

1 erf nr 303 (nutsgebruik - selfoonmas),
 2 ewe nrs 304 - 305 (Privaat oopruimte),
 1 erf nr 306 (privaatstraat),
 1 erf nr 307 (openbare straat).

3. Aansoek word ingevolge Art 15 (2) (o) van die Verordeninge gedoen vir 'n Attreoord as 'n Vergumingsgebruik op ged 3 van Kraaibosch 195.



NOTE / NOTA

Alle maters op die plan is by benadering en moet deur 'n landmeter bevestig word.
 All measurements on this plan are approximate and must be verify by a landsurveyor.

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Klient: **Groenkloof**



Projek: **Hersonering & Onderverdeling**

Titel: **Onderverdelingsplan**

Eiendom: **Ged 3 Kraaibosch 195**

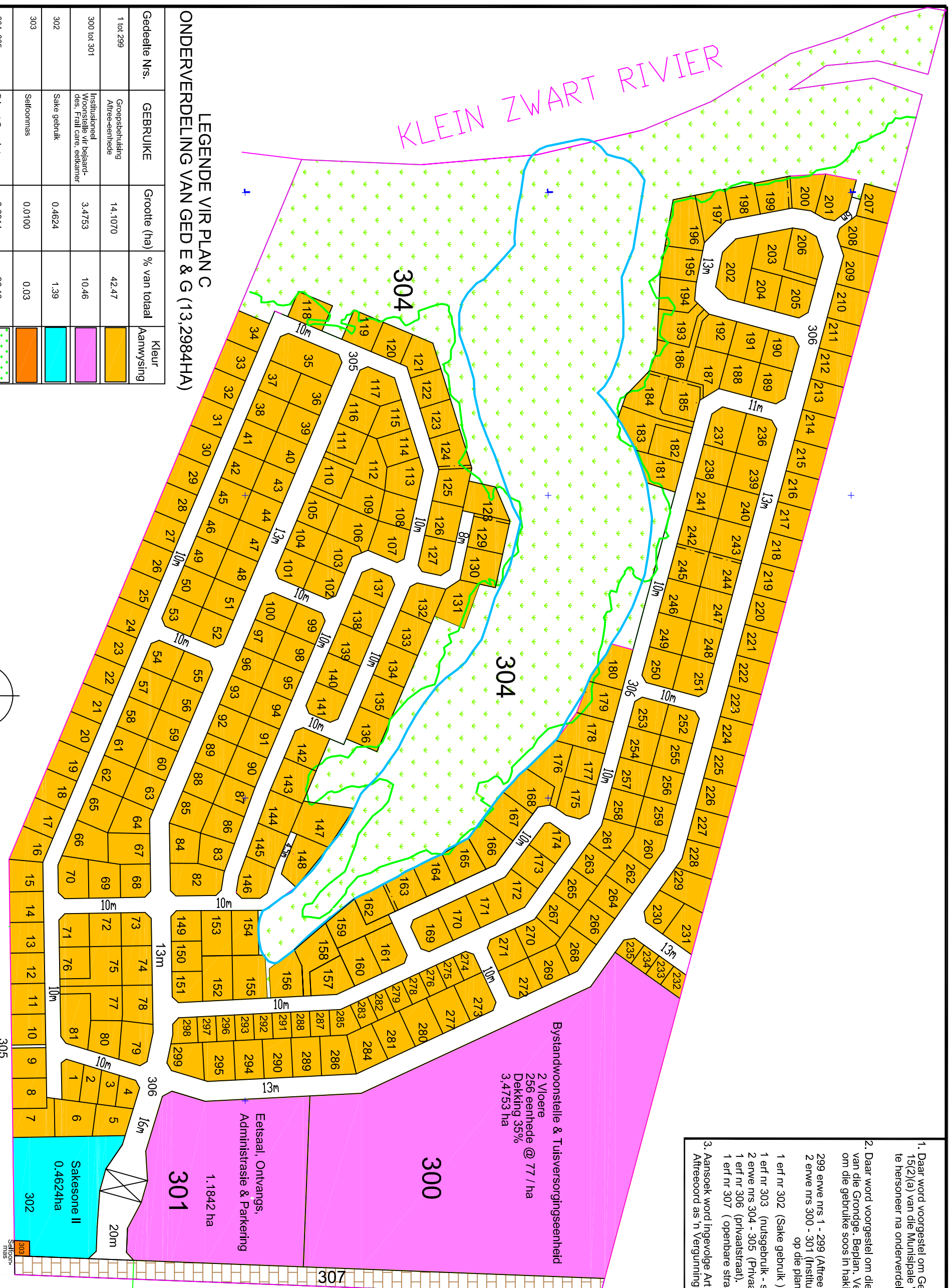
Skala: **1:2500 op A3 plot**

Datum: **Nov 2019**

Tekening Nummer: **Kraaib/3 1.1**

Gedeelte Nrs.	GEBRUIKE	Grootte (ha)	% van totaal	Kleur Aanwysing
1 tot 299	Groepsbehuiging Attree-eenhede	14,1070	42,47	[Yellow Box]
300 tot 301	Institusioneel Woonstelsel vir bejaard- des, Frail care, eekamer	3,4753	10,46	[Pink Box]
302	Sake gebruik	0,4624	1,39	[Cyan Box]
303	Selfoonmas	0,0100	0,03	[Orange Box]
304-305	Privaat Oopruimte	8,6814	26,13	[Green Box]
306	Privaat Straat	6,0007	18,07	[White Box]
307	Openbare Straat	0,4818	1,45	[White Box]
TOTAAL		33,2188	100	

LEGENDE VIR PLAN C
 ONDERVERDELING VAN GED E & G (13,2984HA)

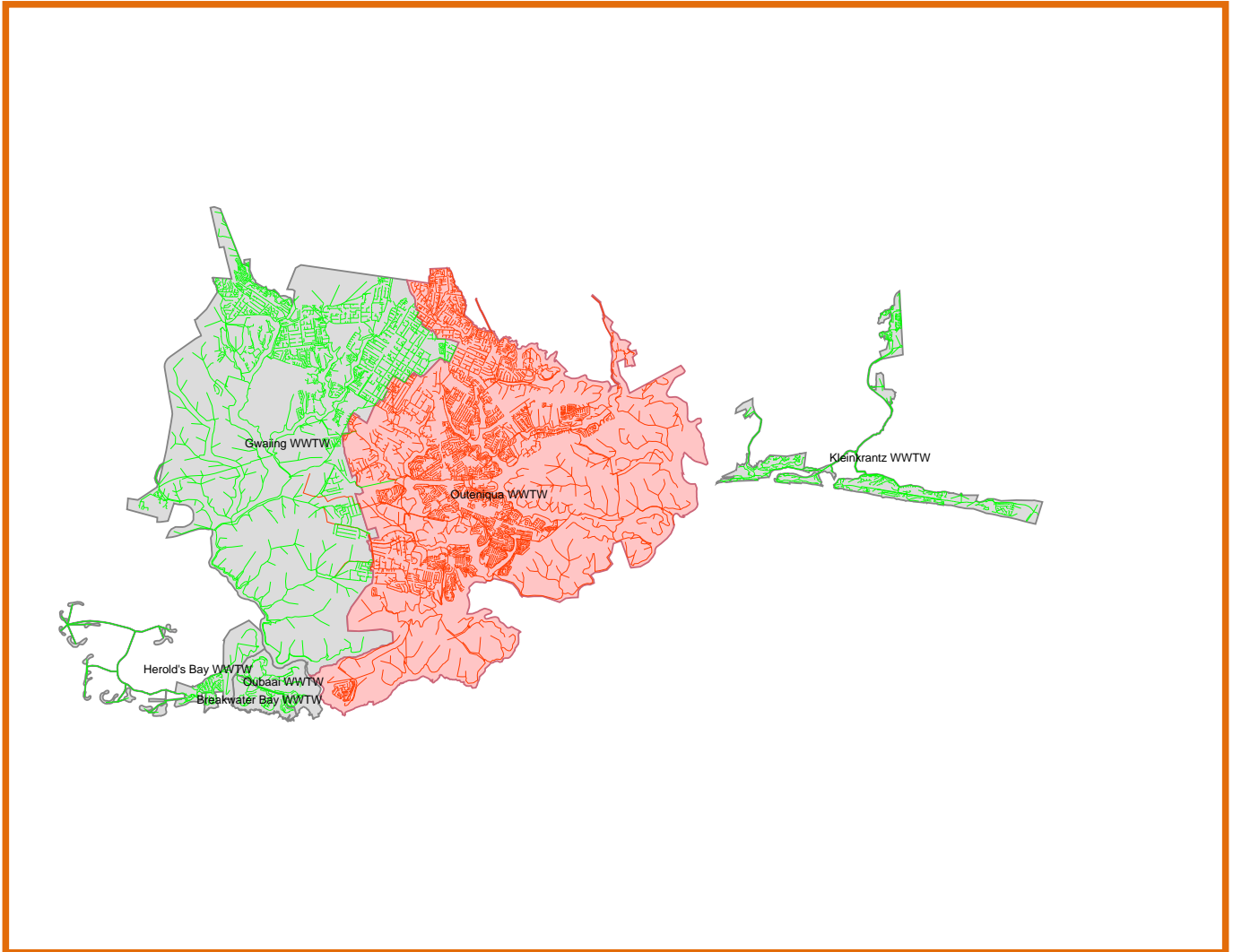


Gedeelte 21



ANNEXURE B:

GLS - Updated Services (Sewer & Water) Plans

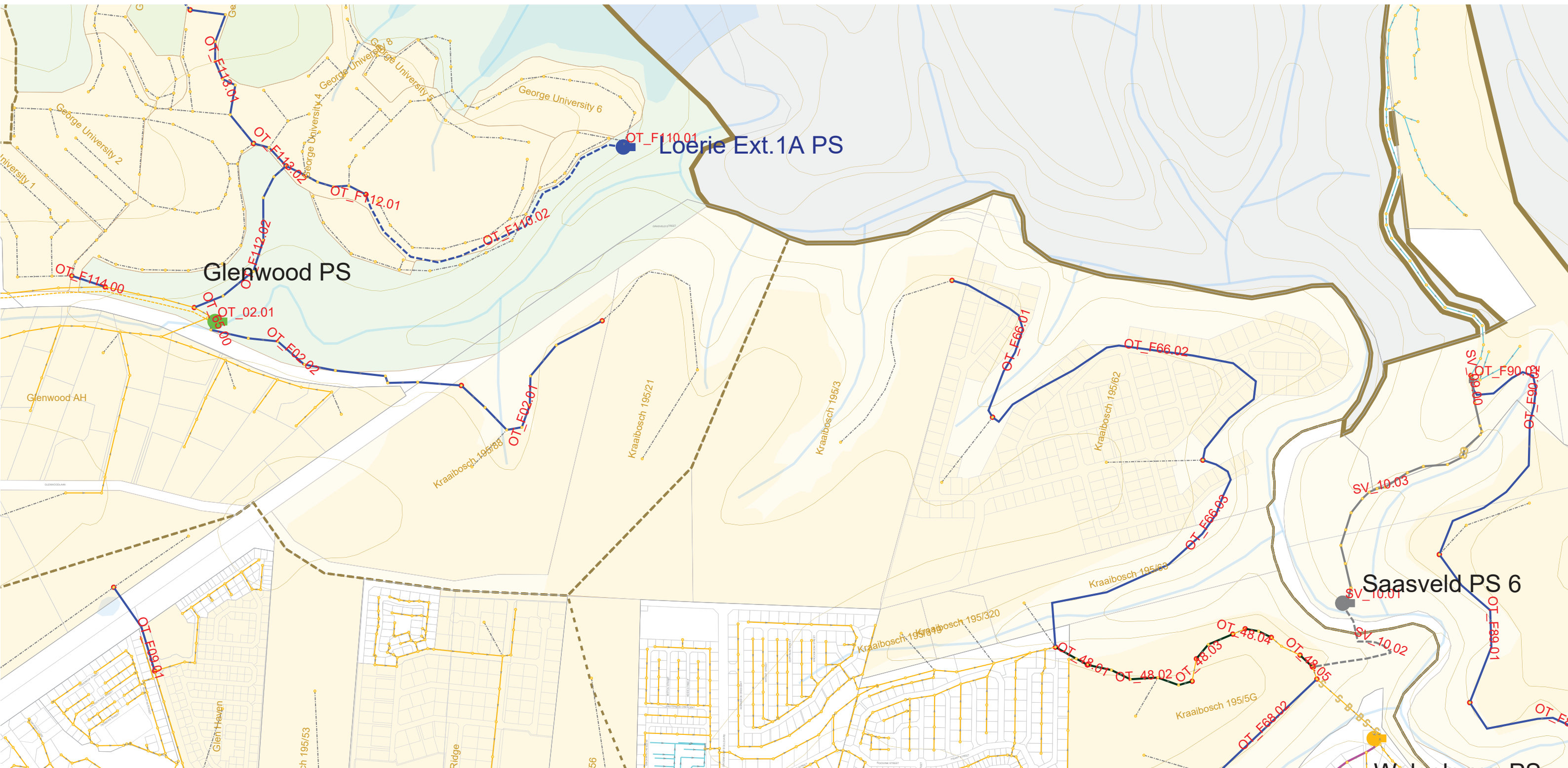


A 5GH9F 'D@5B
G9K 9F 5; 9'GMGH9A

; Ycf[Y

Ci hYb]ei U'XfU]bU[Y'UfYU

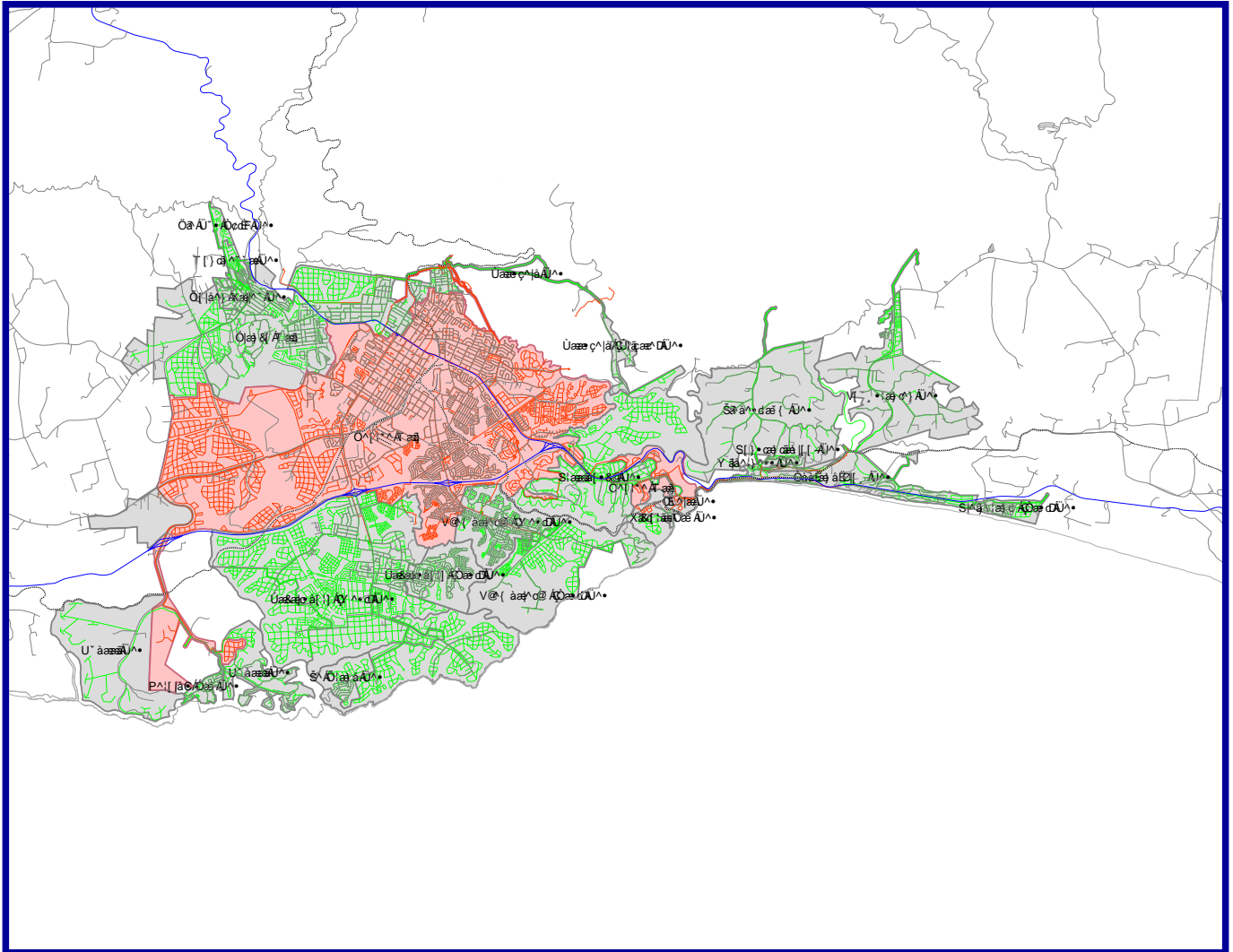
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Master Plan Drainage Areas

Drainage Area	Present AADD (kL/d)	Present PDDWF (kL/d)	Present PDDWF (%)	Theoret. AADD (kL/d)	Theoret. PDDWF (kL/d)	Theoret. PDDWF (%)	Fully Occ. AADD (kL/d)	Fully Occ. PDDWF (kL/d)	Fully Occ. PDDWF (%)	Future AADD (kL/d)	Future PDDWF (kL/d)	Future PDDWF (%)	Future Increase PDDWF (kL/d)	Area (ha)	Present PDDWF/ha (kL/ha/d)	Future PDDWF/ha (kL/ha/d)
Outeniqua WWTW				17 124	16 654	97%	21 585	20 662	96%	49 123	40 070	82%	23 417	7 944	2	5
Saasveld PS 6				0	7	0%	0	7	0%	0	7	0%	0	1	5	5
Welgelegen PS				210	288	137%	743	624	84%	1 505	1 196	79%	909	210	1	6
Kraaibosch PS				725	839	116%	1 781	1 504	84%	4 059	3 187	79%	2 348	459	2	7
George Erf 464 PS F1				0	0	0%	0	29	0%	1 426	841	59%	841	54	0	16
George Erf 464 PS F2				0	0	0%	0	25	0%	679	448	66%	448	44	0	10
Glenwood PS				297	268	90%	331	414	125%	3 902	2 610	67%	2 342	322	1	8
Blue Mountain PS 1				29	44	155%	81	83	103%	646	442	68%	398	32	1	14
Blue Mountain PS 2				0	3	0%	4	6	124%	4	6	124%	3	34	0	0
George WTP Sludge				0	1 260	0%	0	1 260	0%	0	1 260	0%	0	0	0	0
Eden George PS				2 071	3 067	148%	2 573	3 353	130%	2 628	3 388	129%	322	403	8	8
Meul PS				6 251	7 059	113%	8 425	8 504	101%	14 982	12 835	86%	5 776	1 816	4	7
Schaapkop PS				8 836	9 353	106%	11 741	11 225	96%	18 893	16 040	85%	6 687	2 422	4	7
Woodifields PS F1				0	0	0%	0	12	0%	128	104	81%	104	33	0	3
Woodifields PS F2				0	0	0%	0	40	0%	384	318	83%	318	157	0	2
Saasveld PS 1				1	1	92%	1	1	92%	1	1	92%	0	0	3	3
Saasveld PS 2				12	10	81%	12	10	81%	12	10	81%	0	5	2	2
Saasveld PS 3				4	3	80%	4	3	80%	4	3	80%	0	5	1	1
Saasveld PS 4				8	6	76%	8	6	76%	8	6	76%	0	8	1	1
Woodifields PS F3				117	114	97%	117	134	114%	325	278	85%	164	143	1	2
Woodifields PS F4				117	114	97%	117	230	197%	1 179	992	84%	878	576	0	2
Kraaibosch5 PS				117	114	97%	117	275	235%	1 573	1 320	84%	1 206	785	0	2
Victoria Bay Injector PS				10	6	58%	10	6	58%	10	6	58%	0	0	15	15
Victoria Bay PS				25	17	66%	28	18	66%	28	18	66%	1	10	2	2
Victoria Bay PS 2				34	23	68%	36	101	281%	352	346	98%	323	298	0	1
Parkdene PS 2				0	0	0%	0	0	0%	0	0	0%	0	0	2	2
Parkdene PS 3				0	0	0%	0	0	0%	0	0	0%	0	0	2	2
Thembaletu PS 2				0	0	0%	0	0	0%	0	0	0%	0	0	2	2
Thembaletu PS B				0	0	0%	0	0	0%	0	0	0%	0	0	1	1
Thembaletu PS A				0	0	0%	0	0	0%	0	0	0%	0	0	1	1
Thembaletu PS 1				0	0	0%	0	0	0%	0	0	0%	0	0	3	3
Thembaletu PS 7				0	2	0%	0	2	0%	0	2	0%	0	0	30	30
Destiny Africa PS				1 661	1 443	87%	1 879	2 214	118%	11 781	8 571	73%	7 128	2 290	1	4
Thembaletu Ext.12A PS				0	0	0%	0	96	0%	1 667	1 470	88%	1 470	365	0	4
Thembaletu Ext.11B PS				0	0	0%	0	111	0%	1 762	1 563	89%	1 563	421	0	4
Thembaletu PS 4				0	0	0%	0	0	0%	0	0	0%	0	0	2	2
Thembaletu PS 3				0	1	0%	0	1	0%	0	1	0%	0	0	5	5
Thembaletu PS 6				3 868	3 326	86%	4 300	4 386	102%	16 365	12 516	76%	9 191	2 994	1	4
Le Grand PS 1				14	38	264%	182	138	76%	182	138	76%	100	21	2	7
Le Grand PS 2				20	56	275%	244	190	78%	244	190	78%	133	31	2	6
Le Grand1 PS				0	0	0%	0	11	0%	151	128	85%	128	79	0	2
Le Grand2 PS F1				0	0	0%	0	2	0%	35	29	83%	29	55	0	1

MPs	OT_V18.01	RET_OT_077	2018	Investigate existing Gravity	160	0.0	31.8	0.0	Investigate (full flow velocity)		0	0	250	0	Investigate	0	3 000	3 000
MPI	SV_01.01	RET_OT_078	2018	Upgrade existing Gravity (Investigate first)	110	0.0	46.4	5.2	Investigate (full flow velocity)		160	94 000	160	94 000	Investigate	0	111 000	204 000
MPs	SV_V01.01	RET_OT_078	2018	Investigate existing Gravity	110	0.0	53.0	0.1	Investigate (full flow velocity)		0	0	160	0	Investigate	0	3 000	3 000
MPs	SV_V01.02	RET_OT_078	2018	Investigate existing Gravity	160	0.0	36.2	5.8	Investigate (full flow velocity)		0	0	400	0	Investigate	0	3 000	3 000
FM	OT_F02.01	RET_OT_082	2028	New Gravity	0	0.0	460.0	10.3			0	0	160	748 000		0	54 000	802 000
FM	OT_F02.02	RET_OT_082	2028	New Gravity	0	0.0	572.5	10.4			0	0	160	931 000		0	54 000	985 000
FM	OT_F86.00	RET_OT_083	2033	New Gravity	0	0.0	77.2	1.5			0	0	160	126 000		0	54 000	180 000
FM	OT_F09.01	RET_OT_084	2028	New Gravity	0	0.0	194.0	5.2			0	0	160	316 000		0	54 000	370 000
FM	OT_F66.01	RET_OT_085	2033	New Gravity	0	0.0	383.8	7.6			0	0	160	624 000		0	54 000	678 000
FM	OT_F66.02	RET_OT_085	2033	New Gravity	0	0.0	815.3	11.2			0	0	160	1 325 000		0	54 000	1 379 000
FM	OT_F66.03	RET_OT_085	2033	New Gravity	0	0.0	639.8	14.7			0	0	200	1 180 000		0	56 000	1 235 000
FM	OT_F68.01	RET_OT_086	2028	New Gravity	0	0.1	345.7	1.0			0	0	160	562 000		0	54 000	616 000
FM	OT_F68.02	RET_OT_086	2018	New Gravity	0	0.1	290.1	1.9			0	0	160	472 000		0	54 000	526 000
FM	OT_F04.01	RET_OT_087	2028	New Gravity	0	0.1	172.6	8.0			0	0	160	281 000		0	54 000	335 000
FM	OT_F04.02	RET_OT_087	2028	New Gravity	0	0.0	238.9	8.4			0	0	160	389 000		0	54 000	443 000
FM	OT_F04.03	RET_OT_087	2028	New Gravity	0	0.0	431.1	11.7			0	0	160	701 000		0	54 000	755 000
FM	OT_F04.04	RET_OT_087	2028	New Gravity	0	0.0	39.2	20.8			0	0	160	64 000		0	54 000	118 000
FM	OT_F07.01	RET_OT_088	2028	New Gravity	0	0.0	866.3	3.9			0	0	160	1 408 000		0	54 000	1 462 000
FM	OT_F07.02	RET_OT_088	2028	New Gravity	0	0.0	234.2	4.1			0	0	160	381 000		0	54 000	435 000
FM	OT_F08.00	RET_OT_089	2028	New Gravity	0	0.1	195.7	3.7			0	0	160	318 000		0	54 000	372 000
FM	OT_F05.01	RET_OT_090	2028	New Gravity	0	0.0	314.3	0.8			0	0	160	511 000		0	54 000	565 000
FM	OT_F05.02	RET_OT_090	2028	New Gravity	0	0.0	337.5	1.3			0	0	160	549 000		0	54 000	603 000
FM	OT_F06.01	RET_OT_091	2028	New Pump Station				20.8	New pump station	Kraaibosch3 PS		0		0	Pump Station	3 022 000	0	3 022 000
FM	OT_F06.02a	RET_OT_091	2028	New Rising	0		654.6	25.8		Kraaibosch3 PS	0	0	160	815 000		0	18 000	833 000
FM	OT_F06.02b	RET_OT_091	2028	New Rising	0		38.3	25.8	Road crossing	Kraaibosch3 PS	0	0	160	96 000		0	18 000	114 000
FM	OT_F06.02c	RET_OT_091	2028	New Rising	0		308.5	25.8		Kraaibosch3 PS	0	0	160	385 000		0	18 000	403 000
FA	OT_F06.02d	RET_OT_092	2028	Alternative Rising	0		1 696.0	0.0	Interim (Design Flow = 12 L/s)	Kraaibosch3 PS	0	0	110	0	No Standard Cost	0	0	0
FM	OT_F33.01	RET_OT_093	2023	New Gravity	0	0.0	452.7	21.9			0	0	160	736 000		0	54 000	790 000
FM	OT_F33.02	RET_OT_093	2023	New Gravity	0	0.0	278.6	29.3			0	0	200	514 000		0	56 000	570 000
FM	OT_F33.03	RET_OT_093	2023	New Gravity	0	0.0	366.6	60.9			0	0	250	786 000		0	59 000	845 000
FM	OT_F33.04	RET_OT_093	2023	New Gravity	0	0.0	207.4	65.8			0	0	250	445 000		0	59 000	504 000
FM	OT_F33.05	RET_OT_093	2023	New Gravity	0	0.0	558.6	67.1			0	0	250	1 198 000		0	59 000	1 256 000
FM	OT_F33.06	RET_OT_093	2023	New Gravity	0	0.0	476.5	69.1			0	0	250	1 022 000		0	59 000	1 080 000
FM	OT_F33.07	RET_OT_093	2023	New Gravity	0	0.0	363.5	72.9			0	0	250	780 000		0	59 000	838 000
FM	OT_F116.01	RET_OT_093	2023	New Gravity	0	0.0	361.5	8.5			0	0	160	588 000		0	54 000	642 000
FM	OT_F116.02	RET_OT_093	2023	New Gravity	0	0.0	244.9	17.9			0	0	160	398 000		0	54 000	452 000
FM	OT_F116.03	RET_OT_093	2023	New Gravity	0	0.0	425.0	24.7			0	0	200	784 000		0	56 000	840 000
FM	OT_F70.02	RET_OT_094	2053	New Gravity	0	0.0	1 777.5	10.9			0	0	160	2 888 000		0	54 000	2 942 000
FM	OT_F70.03	RET_OT_094	2028	New Gravity	0	0.9	37.7	15.9			0	0	160	62 000		0	54 000	116 000
FM	OT_F31.01	RET_OT_095	2028	New Pump Station				15.9	New pump station, else siphon	Thembaletu Ext.10 PS		0		0	Pump Station	2 466 000	0	2 466 000
FM	OT_F31.02	RET_OT_095	2028	New Rising	0		199.4	15.9	River Rail road crossing	Thembaletu Ext.10 PS	0	0	125	599 000		0	15 000	614 000



A 5GH9F 'D@5B
K 5H9F 'GMGH9A

; Ycf[Y

6i ` _ / 'F Yh]W! ; Ycf[Y'a U]b'ncbY

&\$%- ! \$*

Master Plan Item Table

BchY. 7cgrg]bWV XY'D' ; fūz7cbh]b[YbVYg/ : YyYI W XY'9-5'gh X]Yz'fY[]ghU]cb'cZgYfj]h XYgUbX#cf''UbX'UWēi]g]hcbzdfchV]cbzā cb]hcf]b[UbX'J 5H''

System Type	System	Item Type	Item	Project	Year	Detail	Comment	Name	Total Cost Inc. (R)
F5K	?U]Ja UbGF]] Yf ffuk 'k UHYfL	AD]	; FK S\$' "\$\$	6@S; FK S\$&	&\$&'	&\$ \$ @fg 4 ' - \$' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	?U]Ja UbGF]] YFDG	\$
F5K	Ci H'v]jei Uffuk 'k UHYfL	AD]	; FK S\$(' "\$%	6@S; FK S\$'	&\$&'	&\$ \$ @fg 4 ' ' \$' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	Ci H'v]jei Uffuk 'k UHYf DG	\$
F5K	Ci H'v]jei Uffuk 'k UHYfL	AD]	; FK S\$("\$&	6@S; FK S\$'	&\$&'	&\$ \$ @fg 4 ' ' \$' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	Ci H'v]jei Uffuk 'k UHYf DG	\$
F5K	Ci H'v]jei Uffuk 'k UHYfL	AD]	; FK S\$("\$'	6@S; FK S\$'	&\$&'	&\$ \$ @fg 4 ' ' \$' a 'Di a d GHU]cb'hc Vēbgfri Vh		Ci H'v]jei Uffuk 'k UHYf DG) '++* '\$\$\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$) "\$%	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' + a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug@ck '@zhDG	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$) "\$&	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' + a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug@ck '@zhDG	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$) "\$'	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' + a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug@ck '@zhDG	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$*"\$%	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' ;) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug<][\ '@zhDG	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$*"\$&	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' ;) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug<][\ '@zhDG	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S\$*"\$'	6@S; FK S\$)	&\$&'	%&\$ @fg 4 ' ;) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	A U[Ug<][\ '@zhDG	\$
F5K	6cfY\c'Yg	AD]	; FK S6\$&' "\$%	6@S; FK S\$(	&\$&'	, @fg 4 '%q) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	6cfY\c'Y; 6<9%)	\$
F5K	6cfY\c'Yg	AD]	; FK S6\$&' "\$&	6@S; FK S\$(	&\$&'	, @fg 4 ' -) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	6cfY\c'Y; 6<9\$'	\$
F5K	6cfY\c'Yg	AD]	; FK S6\$&' "\$'	6@S; FK S\$(	&\$&'	, @fg 4 ' -) ' a 'Di a d GHU]cb'hc Vēbgfri Vh	-bj Ygh[UHY WdUW]fm	6cfY\c'Y; 6<9%'	\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	AD]	; FK S6\$' "\$%	6@S; FK S\$*	&\$&'	- \$' a 'l) '\$\$ a a 'ē 'DjdY'hc]bgfU''			, ' '\$\$\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	ADU]	; FK S6\$' "\$& U	6@S; FK S\$*	&\$&'	' ' a 'l) '\$\$ a a 'ē 'DjdY'hc UVUbXcb	FY'cW]hY'djdY		\$
F5K	A U[UgF]] Yf ffuk 'k UHYfL	ADU]	; FK S6\$' "\$& V	6@S; FK S\$*	&\$&'	* + a 'l) '\$\$ a a 'ē 'DjdY'hc UVUbXcb	FY'cW]hY'djdY		\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$%	6@S6A FS\$%	&\$&'	&' (@fg 4 '%\$' a 'Di a d GHU]cb'hc Vēbgfri Vh		<][\ '@j Y' FYg6ccghYf 4 C'X'K HD	\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$& U	6@S6A FS\$%	&\$&'	%a 'l ' ('\$\$ a a 'ē 'DjdY'hc]bgfU''			%* - '\$\$\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$& V	6@S6A FS\$%	&\$&'	% (, a 'l ' ('\$\$ a a 'ē 'DjdY'hc]bgfU''			%\$% '\$\$\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$' V	6@S6A FS\$%	&\$&'	%l '&- (a a 'ē '7\YU'JUj Y'hc]bgfU''			\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$' U	6@S6A FS\$%	&\$&'	%a 'l ' '\$\$ a a 'ē 'DjdY'hc]bgfU''			\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' (\$	6@S6A FS\$%	&\$&'	%l ' '\$\$ a a 'ē 'JUj Y'hc]bgfU'fhUbX'Wcgy			%) '\$\$\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$%	6@S6A FS\$%	&\$&'	%l '&)& a a 'ē 'JUj Y'hc]bgfU'fhUbX'Wcgy			% + '\$\$\$
6@?	C'X'K HD fWUf'k UHYfL	AD]	6A FS6\$%' "\$&	6@S6A FS\$%	&\$&'	% ' @fg &\$ \$ a a 'ē ' : 'ck 7cbhfc'JUj Y'hc]bgfU''		6'UbVē'AU]b'4 C'X'K HD: 7J	&* - '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$%	6@S; K A S\$%	&\$%	%%\$\$\$ a #X 4 '&) (a '9; @K UHYf HFYUha Ybh: UW]j]mhc]bgfU''		BYk 'K HD	9% -) '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$&	6@S; K A S\$&	&\$&'	%%\$\$\$ a #X 4 '&) (a '9; @K UHYf HFYUha Ybh: UW]j]mhc]bgfU''		BYk 'K HD	9% -) '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$'	6@S; K A S\$'	&\$&'	& (\$\$\$ a #X 4 '&) (a '9; @K UHYf HFYUha Ybh: UW]j]mhc]bgfU''		BYk 'K HD &	&) \$ (, , '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' (\$	6@S; K A S\$(	&\$ ( ,	& ( \$\$\$ a #X 4 '&) (a '9; @K UHYf HFYUha Ybh: UW]j]mhc]bgfU''		BYk 'K HD &	&) \$ (, , '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' (\$)	6@S; K A S\$)	&\$*'	& (\$\$\$ a #X 4 '&) (a '9; @K UHYf HFYUha Ybh: UW]j]mhc]bgfU''		BYk 'K HD &	&) \$ (, , '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$*	6@S; K A S\$%	&\$%	*** a 'l) '\$\$ a a 'ē 'DjdY'hc]bgfU''			&\$%\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$+	6@S; K A S\$%	&\$%	% \$ @fg 4 ') \$' a 'Di a d Cb'mhc]bgfU''	: i h fy'di a d	BYk 'K HD DG	%% % \$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$,	6@S; K A S\$&	&\$%	*** a 'l) '\$\$ a a 'ē 'DjdY'hc]bgfU''			&\$%\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$% V	6@S; K A S\$(	&\$&'	% \$ a 'l '%\$\$\$ a a 'ē 'DjdY'hc]bgfU''			%* + '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$% U	6@S; K A S\$'	&\$&'	% \$ a 'l '%\$\$\$ a a 'ē 'DjdY'hc]bgfU''			%* + '\$\$\$
6@?	BYk 'K HD fWUf'k UHYfL	AD]	; A FS6\$%' "\$% W	6@S; K A S\$)	&\$&'	% \$ a 'l '%\$\$\$ a a 'ē 'DjdY'hc]bgfU''			%* + '\$\$\$

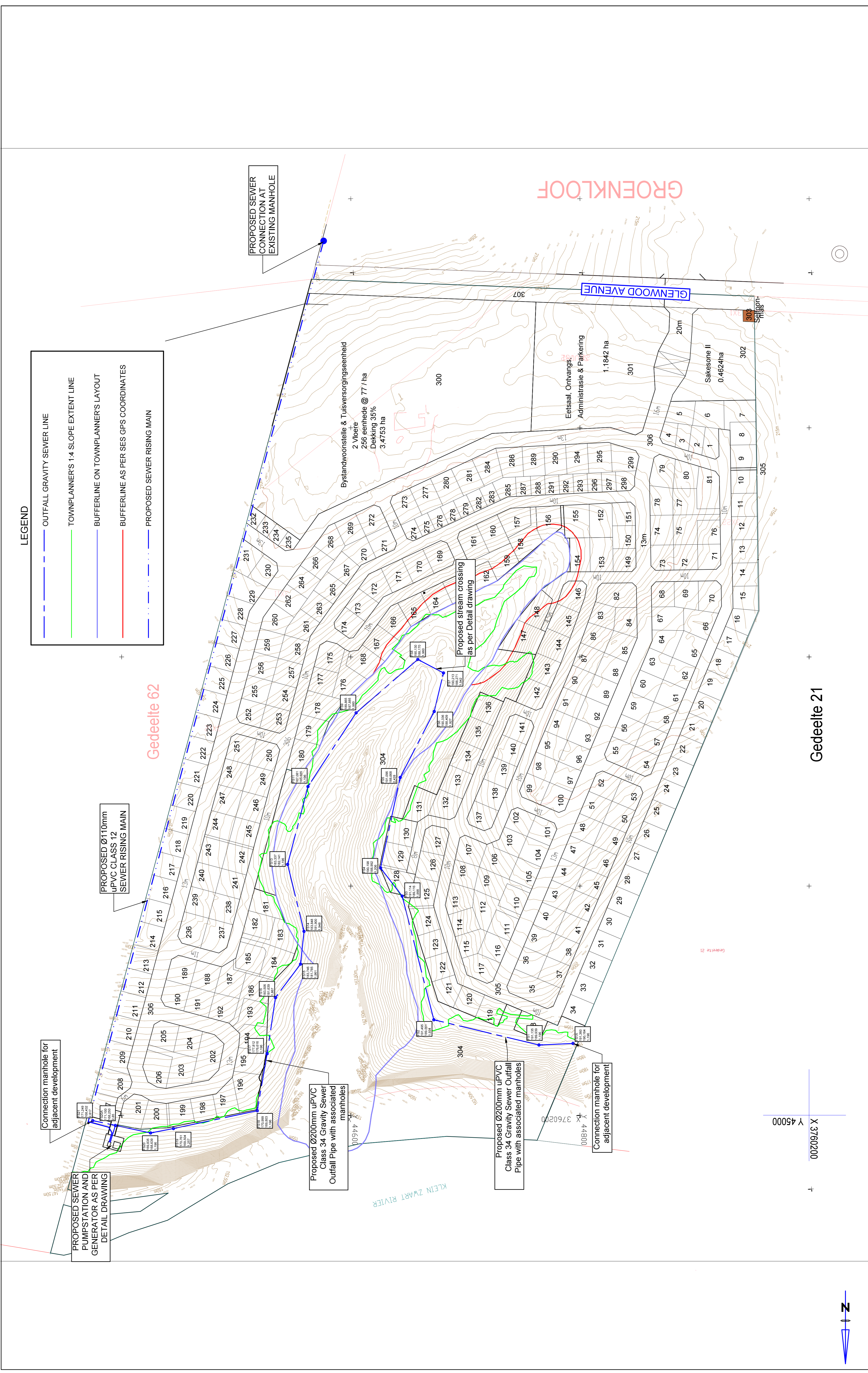
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ycf[YA U]b DFJ '5_Y UI'5_Y UFYg	: A	5K FS: \$&"\$\$	F 9HS5K FSS)	&\$*'	+)' a l '% \$ a a '« D]dY hc]bgtU"		% * '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ycf[YA U]b DFJ	A D	: A FS%) "&	6@S: A FS&)	&\$,	%l '% \$ a a '« J U] Y hc]bgtU" fYhc Wcgy	-bgtU" bYk 'ncbYj Uj Y	%&' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YF 76@DI DUF_XYbY	A D	: A FS% "\$	F 9HS: A FS\$(	&\$&'	& a l '% \$ a a '« D]dY hc]bgtU"	CdYb Yl]ghj b['ncbYj Uj Y	' * '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D	: A FS% (" %	F 9HS: A FS\$)	&\$&'	&& a l '% \$ a a '« D]dY hc]bgtU"		, ' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YF 76@DI 6cFWYFXgl 6cFWYFXgDFJ	A D	: A FS% (" &	F 9HS: A FS\$)	&\$&'	% a l '% \$ a a '« D]dY hc]bgtU"		, '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A DU	: A FS%+ "%	F 9HS: A FS)	&\$%	-+ a l '% \$ a a '« D]dY hc]bgtU" UVUbXcb	8YVé a]ggjcb d]dY fWdE	\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A DU	: A FS%+ "&	F 9HS: A FS)	&\$%	)"- a l '% \$ a a '« D]dY hc]bgtU" UVUbXcb	8YVé a]ggjcb d]dY	\$
F 9H	: Ycf[Yl; Ycf[YA U]b! DUMfhgXcfd	A DU	: A FS%+ "\$	F 9HS: A FS)	&\$%	% (+ a l '% \$ a a '« D]dY hc]bgtU" UVUbXcb	8YVé a]ggjcb d]dY	DUMfhgXcfd %
F 9H	: Ycf[Yl; Ycf[YA U]b! DUMfhgXcfd	A DU	: A FS%+ "\$	F 9HS: A FS)	&\$%	&% a l '% \$ a a '« D]dY hc]bgtU" UVUbXcb	8YVé a]ggjcb d]dY	\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D	: A FS% "\$	F 9HS: A FS\$%	&\$&'	%+ a l '% \$ a a '« D]dY hc]bgtU"		+ ' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; ?]b[gk ccXDFJ &	A D	: A FS% (" %	F 9HS: A FS) \$	&\$&'	&) \$ a '9; @% \$ a a '« DFYggi fYFYXi V]b[J U] Y hc]bgtU"		?]b[gk ccXDFJ'
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D	: A FS% * "%	F 9HS: A FS\$,	&\$&'	(, ' a l '% \$ a a '« D]dY hc]bgtU"		% ' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YF 76@DI @k UU_La d	A D	: A FS% * "&	F 9HS: A FS\$,	&\$&'	' % a l '% \$ a a '« D]dY hc]bgtU"		%&' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; GH]b\cZZ-bX DUF_DFJ	A D]	: A FS' % "\$	F 9HS: A FS-\$	&\$&'	&* \$ a '9; @% \$ a a '« DFYggi fYFYXi V]b[J U] Y hc]bgtU"	-b] Yghj[UHY	GH]b\cZZ-bX DUF_DFJ
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D]	: A FS' & "\$	F 9HS: A FS\$'	&\$%	+ (a l '% \$ a a '« D]dY hc]bgtU"	9l]ghj b['gnghYa fbc]bZt	GWYa UH]W]dY hc]b_Yl]ghj b['gnghYa
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D]	: A FS' ' "%	F 9HS: A FS\$&	&\$&'	%& (a l '% \$ a a '« D]dY hc]bgtU"	9l]ghj b['gnghYa fbc]bZt	\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	A D]	: A FS' ' "&	F 9HS: A FS\$&	&\$&'	% a l '% \$ a a '« D]dY hc]bgtU"	9l]ghj b['gnghYa fbc]bZt	\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; ?]b[gk ccXDFJ &	A D]	: A FS' ("\$	F 9HS: A FS%&	&\$%	+- a l '% \$ a a '« D]dY hc]bgtU"	9l]ghj b['gnghYa fbc]bZt	\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: % % %	F 9HS: A FS% %	&\$&'	+ ' a l '% \$ a a '« D]dY hc]bgtU"		% ' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: % % &	F 9HS: A FS% %	&\$&'	& * a l '% \$ a a '« D]dY hc]bgtU"		(&& '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: % % \$	F 9HS: A FS% %	&\$&'	() a l '% \$ a a '« D]dY hc]bgtU"		-) '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ ("%	F 9HS: A FS&	&\$&'	** a l '% \$ a a '« D]dY hc]bgtU"		%&' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ ("\$	F 9HS: A FS%+	&\$&'	' &\$ a l '% \$ a a '« D]dY hc]bgtU"		(* , '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ ("\$	F 9HS: A FS%	&\$&'	** (a l '% \$ a a '« D]dY hc]bgtU"		% % , '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$) "%	F 9HS: A FS%&	&\$,	+ , ' a l '% \$ a a '« D]dY hc]bgtU"		% \$ - + '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$) "&	F 9HS: A FS%&	&\$,	%&& (a l '% \$ a a '« D]dY hc]bgtU"		%) ('\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$) "\$	F 9HS: A FS%&	&\$,	&\$* a l '% \$ a a '« D]dY hc]bgtU"		' % '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ * "%	F 9HS: A FS%&	&\$,	& (% a l '% \$ a a '« D]dY hc]bgtU"		' * % '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ * "&	F 9HS: A FS%&	&\$,	% (a l '% \$ a a '« D]dY hc]bgtU"		& (& '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; 6i YA ci bHU]b	: A	: A FS: \$ + "%	F 9HS: A FS' &	&\$%	), ' a l '% \$ a a '« D]dY hc]bgtU"		% (+ '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; 6i YA ci bHU]b	: A	: A FS: \$ + "&	F 9HS: A FS' &	&\$%	) - a l '% \$ a a '« D]dY hc]bgtU"		%& ('\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$, "%	F 9HS: A FS%	&\$&'	' (+ a l '% \$ a a '« D]dY hc]bgtU") \$) '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$, "&	F 9HS: A FS%	&\$&'	)+ + a l '% \$ a a '« D]dY hc]bgtU"		, % - '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$, "\$	F 9HS: A FS% (	&\$'	+ - * a l '% \$ a a '« D]dY hc]bgtU"		% %& ('\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V	: A	: A FS: \$ - "%	F 9HS: A FS%*	&\$'	' ' & a l '% \$ a a '« D]dY hc]bgtU"		(, ('\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ybk ccX9l hDFJ	: A	: A FS: \$ - "&	F 9HS: A FS%*	&\$'	& (\$ a '9; @% \$ a a '« DFYggi fYFYXi V]b[J U] Y hc]bgtU"	: Ybk ccX9l hDFJ V	&' '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ybk ccX9l hDFJ	: A	: A FS: \$ - "\$	F 9HS: A FS%*	&\$'	' &- a l '% \$ a a '« D]dY hc]bgtU"		(, \$ '\$\$\$
F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ybk ccX9l hDFJ	: A	: A FS: \$ - ("	F 9HS: A FS%*	&\$'	' , ' a l '% \$ a a '« D]dY hc]bgtU")) ' '\$\$\$
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F 9H	: Ycf[Yl; Ycf[YA U]b!; Ycf[YG V!; Ybk ccX9l hDFJ	: A	: A FS: \$ - "\$ +	F 9HS: A FS%	&\$'	& (\$ a '9; @% \$ a a '« DFYggi fYFYXi V]b[J U] Y hc]bgtU"	: Ybk ccX9l hDFJ U	&' '\$\$\$
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F 9H	; Ycf[YI; Ycf[YA U]b!; Ycf[YGI V!; Ycf[YA U]b DFJ	: A	: A FS: ' & " % \$	F 9HS: AFS* +	&\$ (' '	& + * a l % \$ a a ' « DjdY hc]bgtU"			(\$, \$\$\$
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ANNEXURE C:

Kraaibosch Erf 195, Portion 3 - Proposed Outfall Sewer Layout Plan



LEGEND

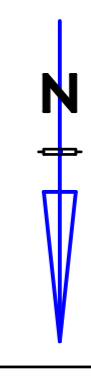
- OUTFALL GRAVITY SEWER LINE
- TOWNPLANNER'S 1:4 SLOPE EXTENT LINE
- BUFFERLINE ON TOWNPLANNER'S LAYOUT
- BUFFERLINE AS PER SES GPS COORDINATES
- PROPOSED SEWER RISING MAIN

SCALEBAR		SCALE 1:1250	SHEET		PROJECT C:19109G Kraalbosch 195-3 - Groenkloof Ontwikkeling										
<small>Copyright of this drawing is the property of Lyners. No part of this drawing may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Lyners.</small>		CONTRACTING ENGINEERS: SIGNATURE: _____ DATE: _____ APPROVED: CLIENT REPRESENTATIVE: _____ DATE: _____ SIGNATURE: _____		PROJECT C:19109G Kraalbosch 195-3 - Groenkloof Ontwikkeling CLIENT Groenkloof Ontwikkelings (PTY) LTD TITLE OUTFALL SEWER LAYOUT PLAN											
DESIGNED DRAWN CHECKED		WO VO F+E		DATE 17/08/2019 17/08/2019 08/2019											
REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> <th>CHKD</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>PRELIMINARY DESIGN</td> <td>17/08/2019</td> <td>WVO</td> <td>F+E</td> </tr> </tbody> </table>		REV	DESCRIPTION	DATE	BY	CHKD	A	PRELIMINARY DESIGN	17/08/2019	WVO	F+E	SCALE 1:1250 CONTRACT No. C19109G PROJECT No. C19109G DRAWING No. C19109G - 01 DATE OF FIRST ISSUE: 2017-04-03 REV		DATE OF FIRST ISSUE: 2017-04-03 REV	
REV	DESCRIPTION	DATE	BY	CHKD											
A	PRELIMINARY DESIGN	17/08/2019	WVO	F+E											

Gedeelte 21

Gedeelte 62

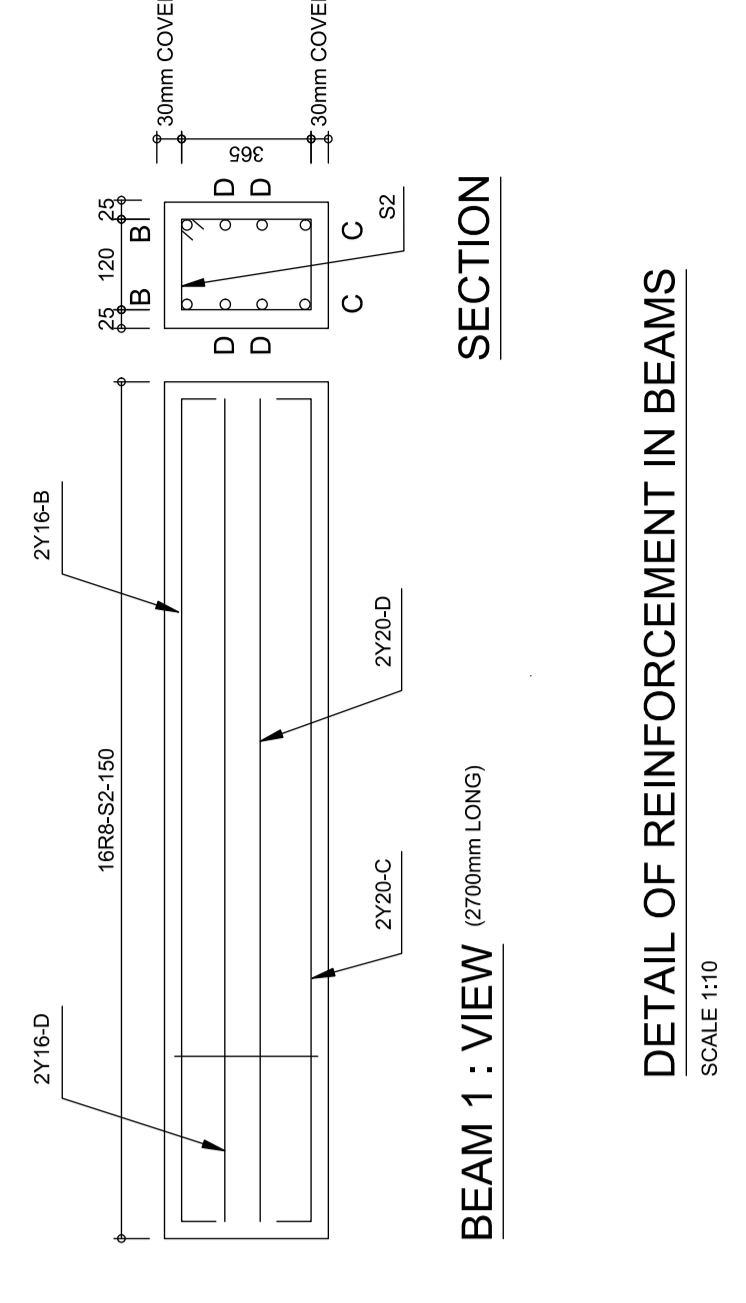
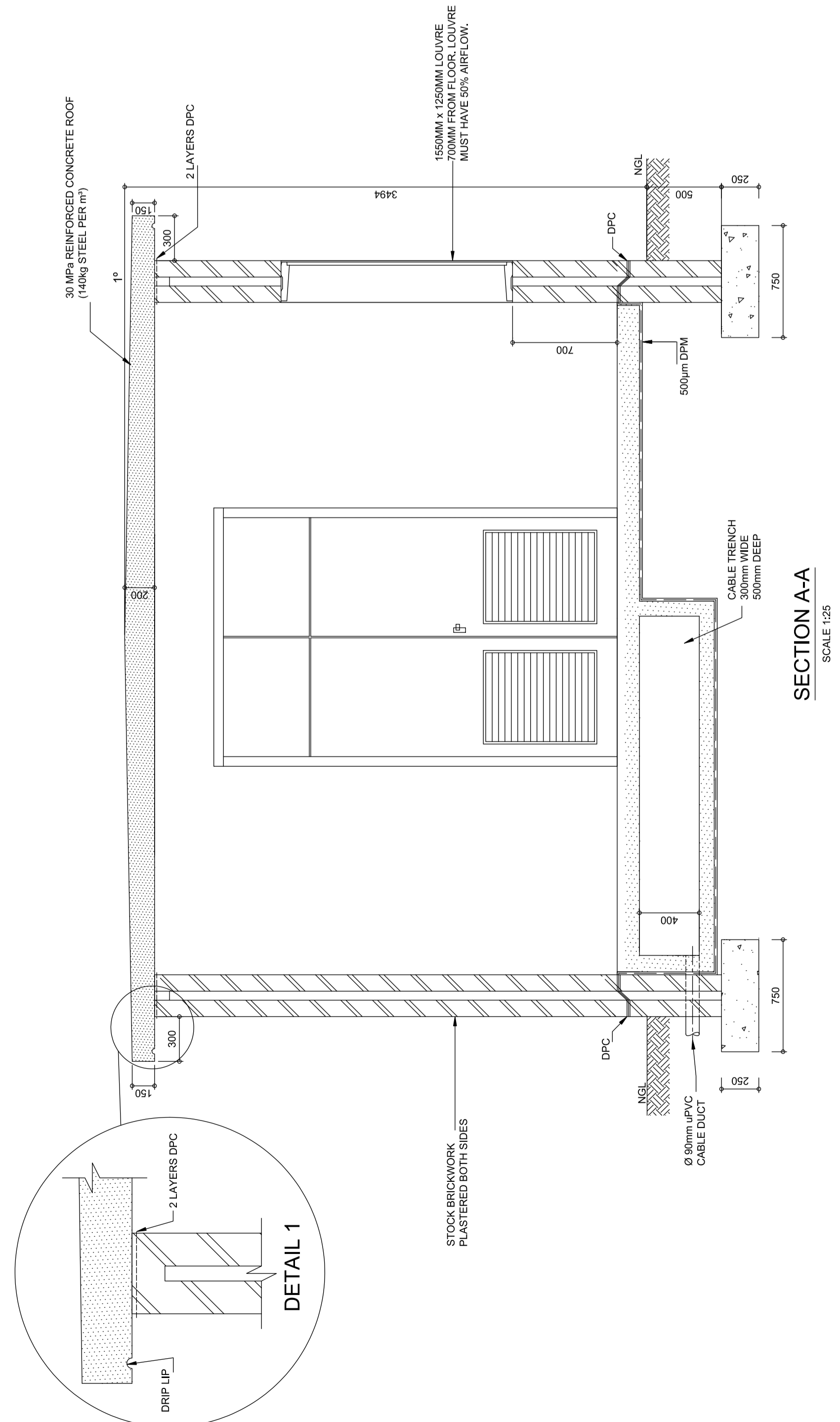
X 3760200
Y 45000





ANNEXURE D:

Kraaibosch Erf 195, Portion 3 - Proposed Sewer stream crossing & Pumpstation details



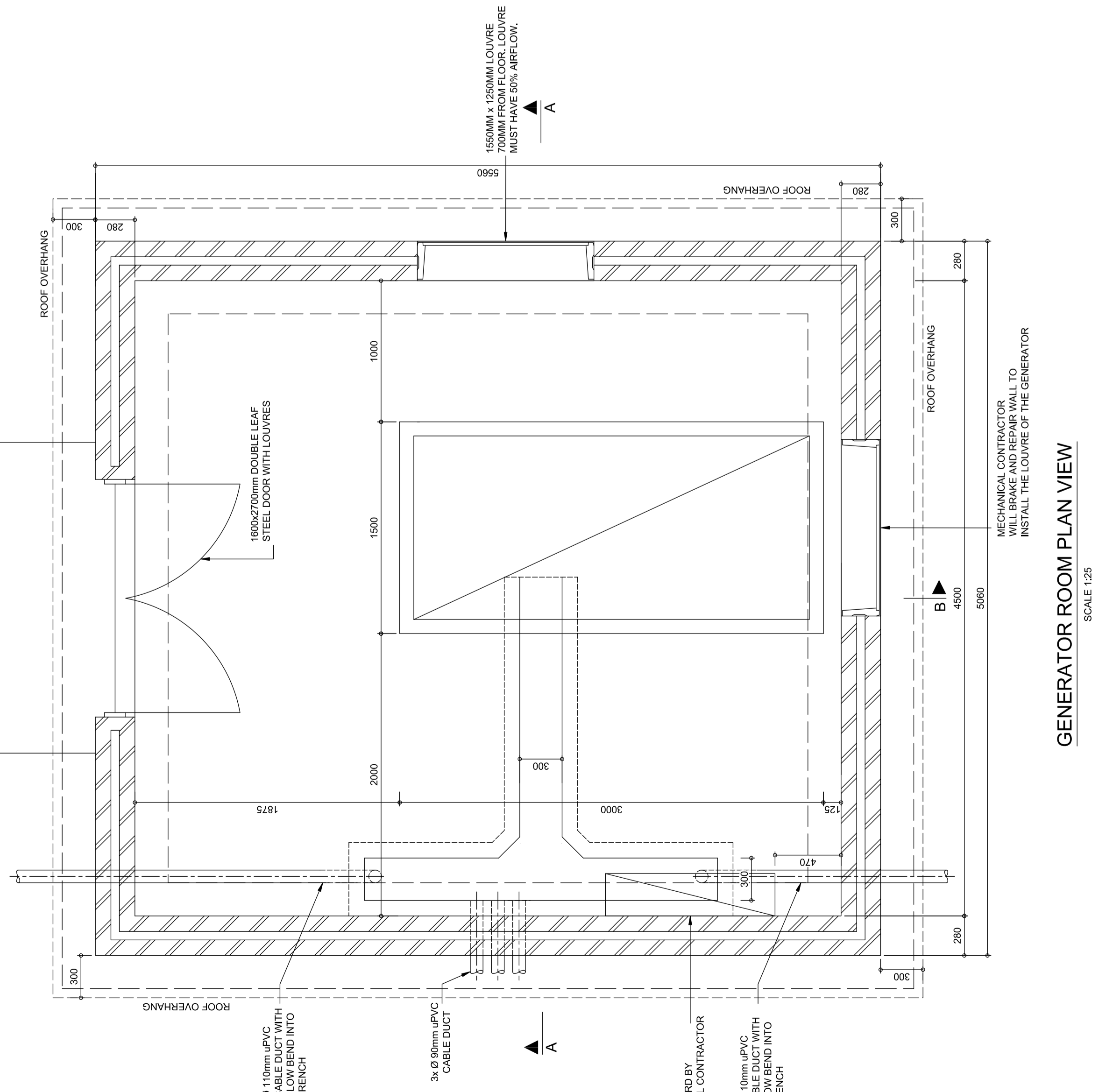
DETAIL OF REINFORCEMENT IN BEAMS
SCALE 1:10

PART	MARK	TYPE	NUMBER IN EACH	TOTAL NUMBER	LENGTH CODE	A	B
BEAM 1	B	18	2	2	1500	1500	1500
	C	18	2	2	1500	1500	1500
	D	18	2	2	1500	1500	1500
	E	18	2	2	1500	1500	1500
BEAM 1	C	18	2	2	2000	2000	2000
	D	18	2	2	2000	2000	2000
	E	18	2	2	2000	2000	2000
	F	18	2	2	2000	2000	2000

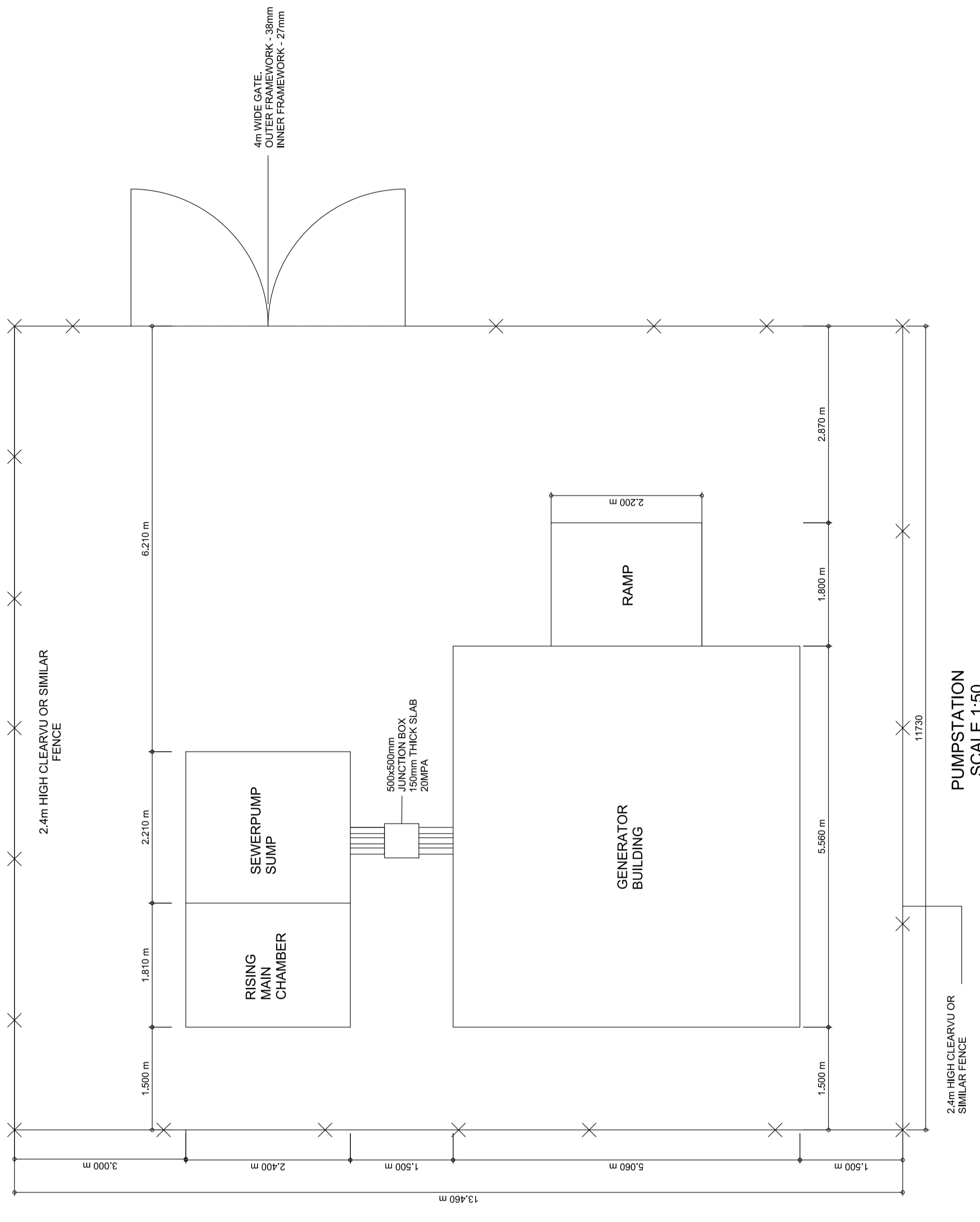
BENDING SCHEDULE



SECTION B-B
SCALE 1:25



GENERATOR ROOM PLAN VIEW
SCALE 1:50

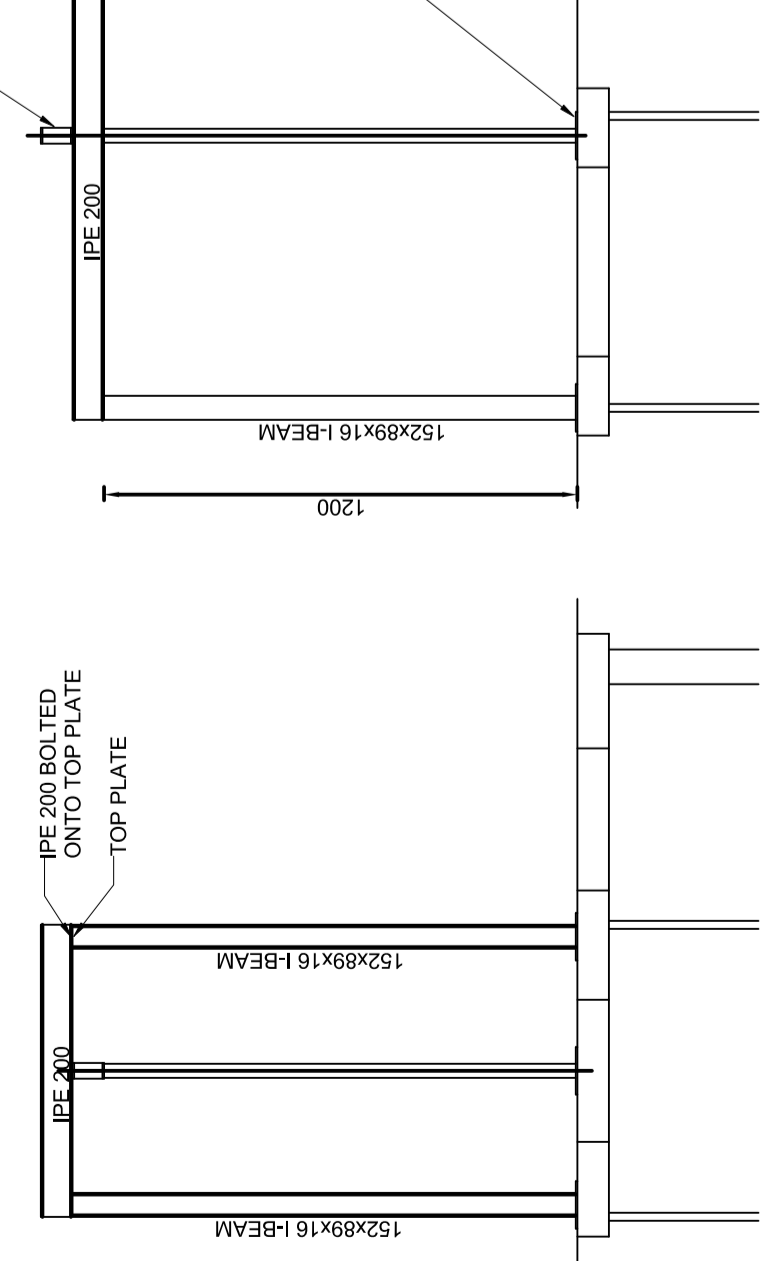
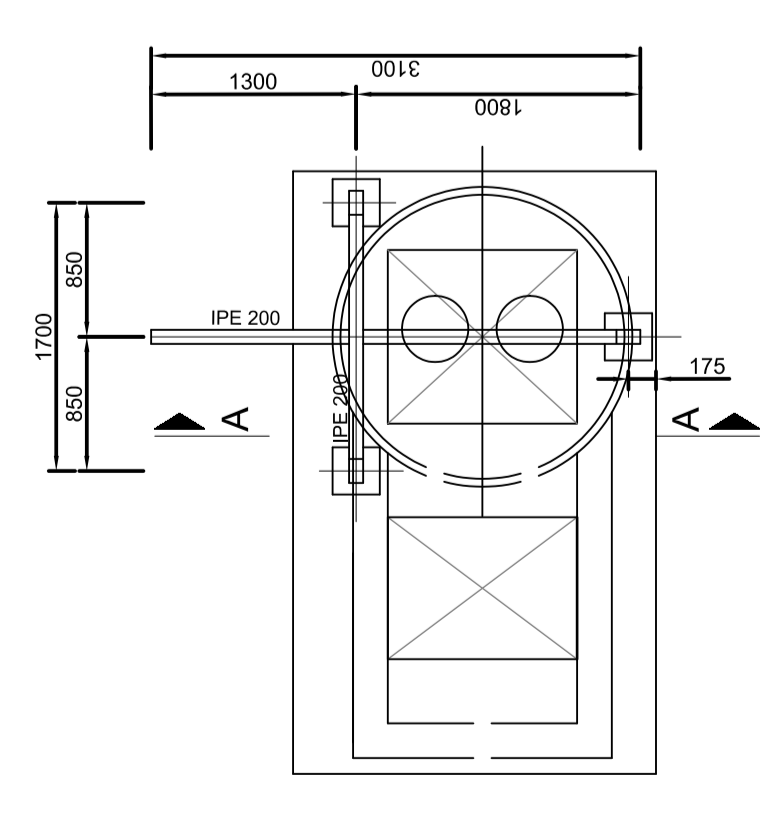


PUMPSTATION
SCALE 1:50

The reference made to Engineer will also refer to Employer's Agent for GCC 2015 Contracts

<p>APPROVED</p> <p>ENGINEERS:</p> <p>DATE:</p>		<p>CLIENT</p>		<p>PROJECT</p> <p>C19109G Kraaibosch 195-3 - Groenloof Ontwikkeling</p>		<p>SCALE on A1 SHEET</p>									
<p>APPROVED</p> <p>CLIENT:</p> <p>DATE:</p>		<p>DESIGNED</p>		<p>CONTRACT No.</p>		<p>PROJECT No.</p>									
<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>DATE</th> <th>REV BY/CHKD</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REV	DESCRIPTION	DATE	REV BY/CHKD					<p>CONSULTING ENGINEERS</p> <p>LYNERS</p> <p>PO Box 757 GEORGE 6530</p> <p>Tel: 044 887 0223 / Fax: 044 887 0741 email: george@lyniers.co.za</p>		<p>TITLE</p> <p>SWITCH AND GENERATOR ROOM BUILDING</p>		<p>DRAWING No.</p> <p>C19109G-02</p>	
REV	DESCRIPTION	DATE	REV BY/CHKD												
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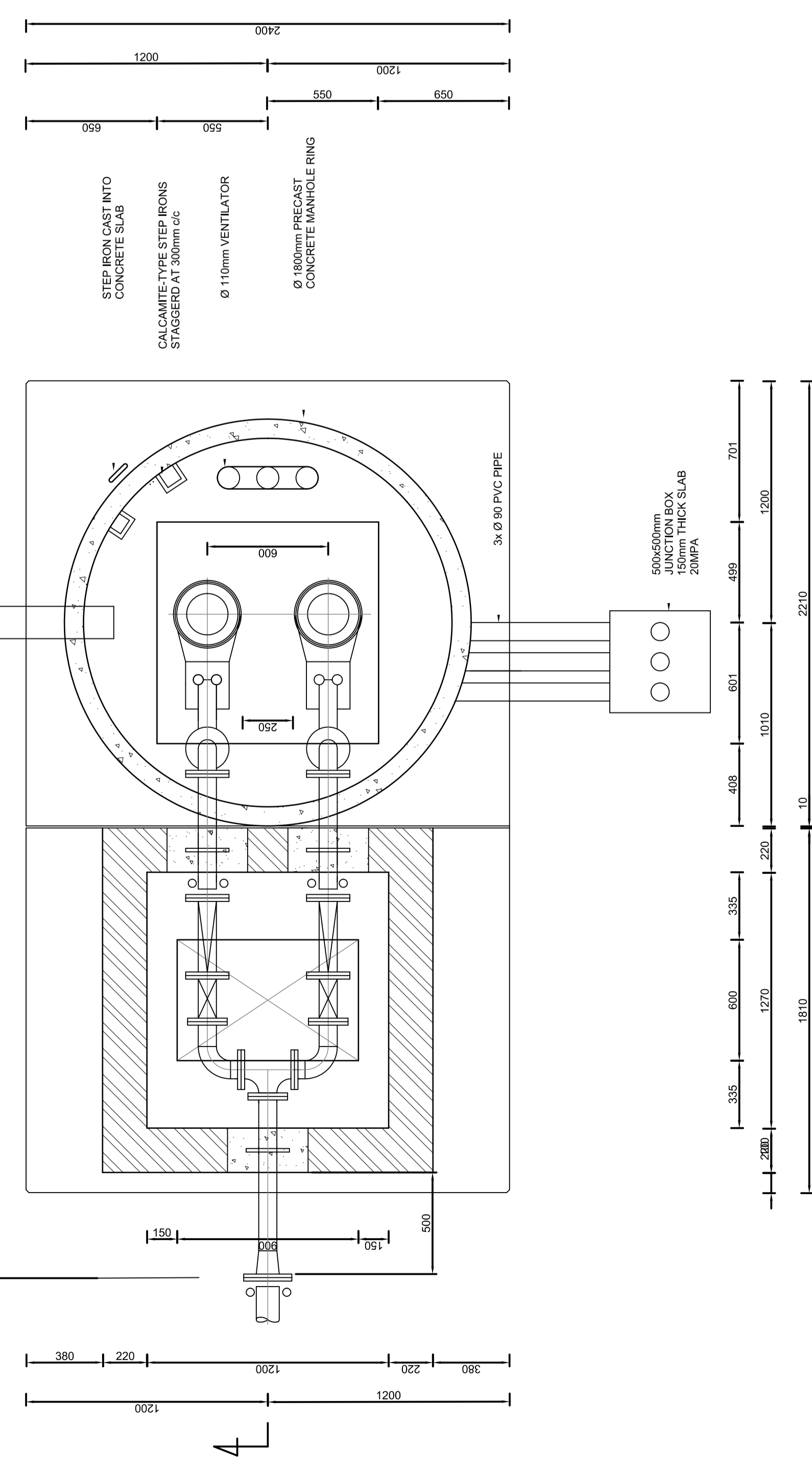
PLAN
HOIST BEAM
STRUCTURE
SCALE 1:50



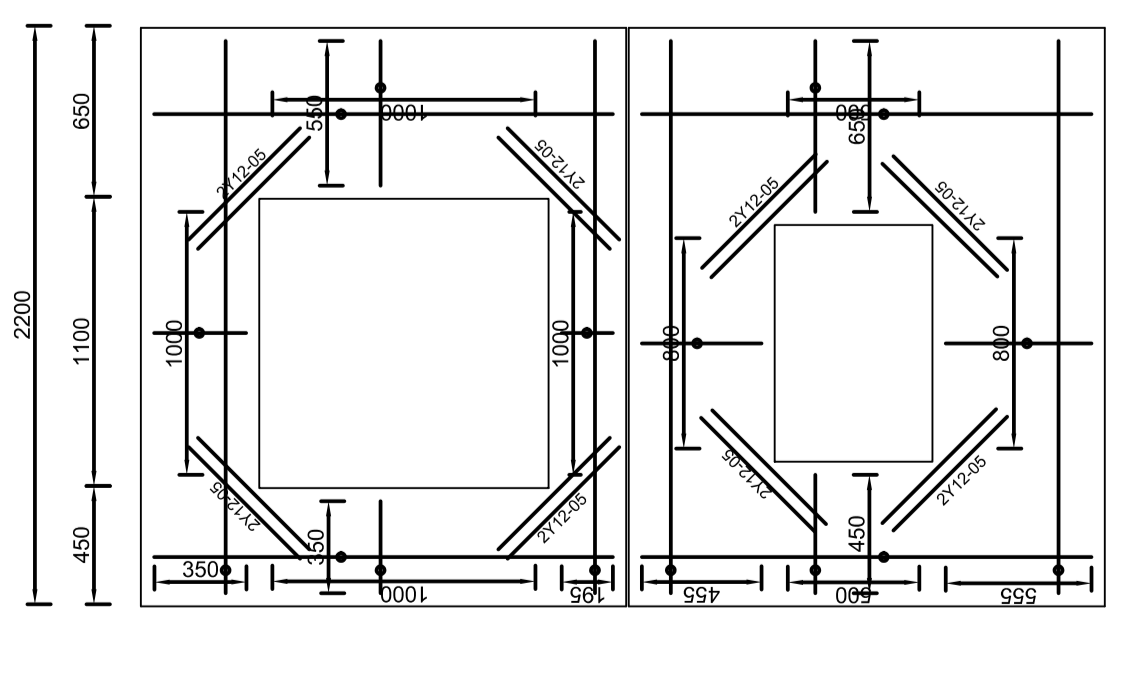
SECTION A-A
SCALE 1:50

FRONT ELEVATION
SCALE 1:50

CIVIL CONTRACT
MECHANICAL CONTRACT



PUMP STATION PLAN
SCALE 1:25



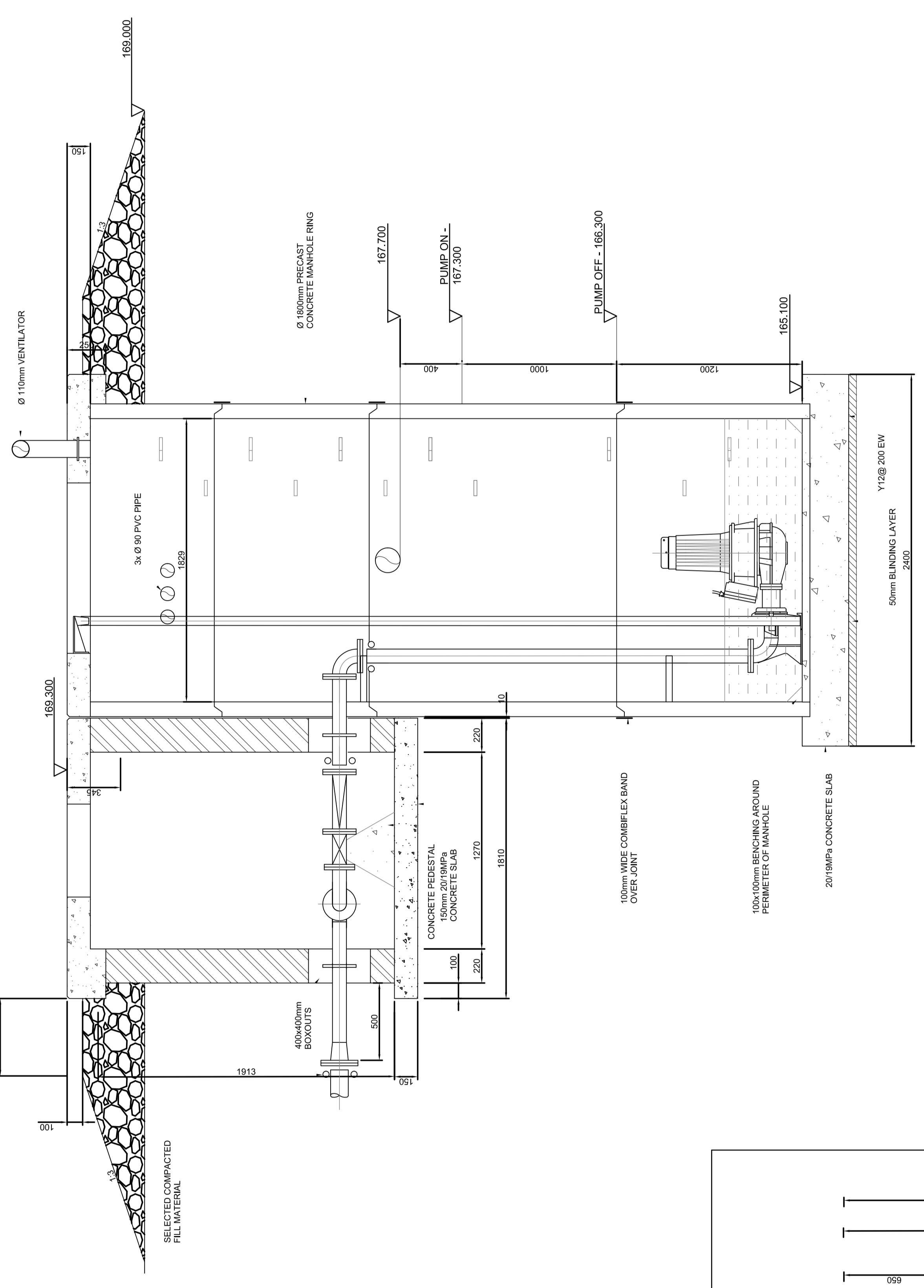
PLAN OF PUMP MANHOLE SLAB
(STEEL REINFORCEMENT)
SCALE 1:25

* Areas marked with hatching are to be approved by the client (e.g. for the use of a different material or for the use of a different finish).

STEELWORK TO BE NOT DIPPED GALVANISED

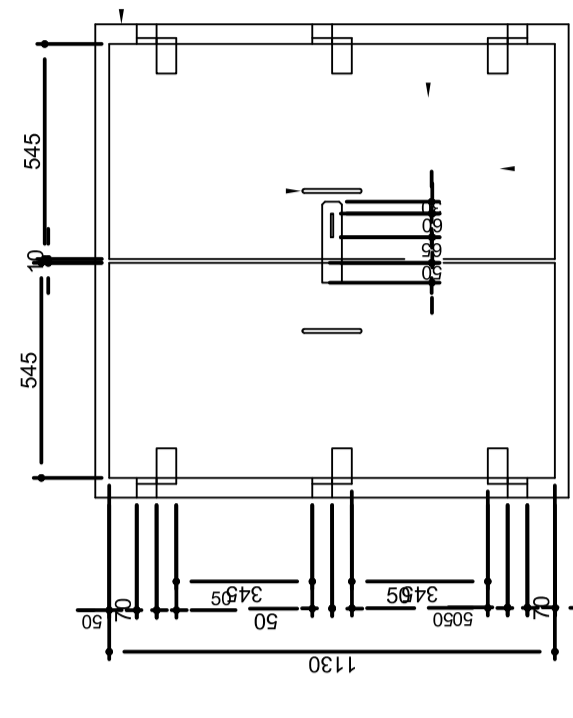
MARK	TYPE	TOTAL UNITS	TOTAL PER UNIT	BEND					
				A	B	C	D	E	
01	Y16	1	16	16	2100	20			
02	Y16	1	16	16	550	20			
03	Y16	1	8	8	200	20			
04	Y16	1	10	10	1750	20			
05	Y16	1	16	16	600	20			
06	Y16	1	12	12	1700	20			
07	Y16	1	5	5	650	20			
08	Y16	1	5	5	350	20			
09	Y16	1	16	16	350	20			

SECTION A-A
SCALE 1:25



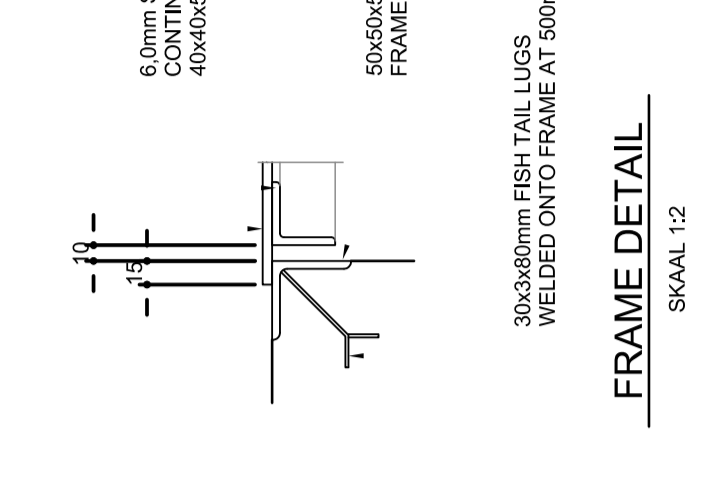
CIVIL CONTRACT

MECHANICAL CONTRACT

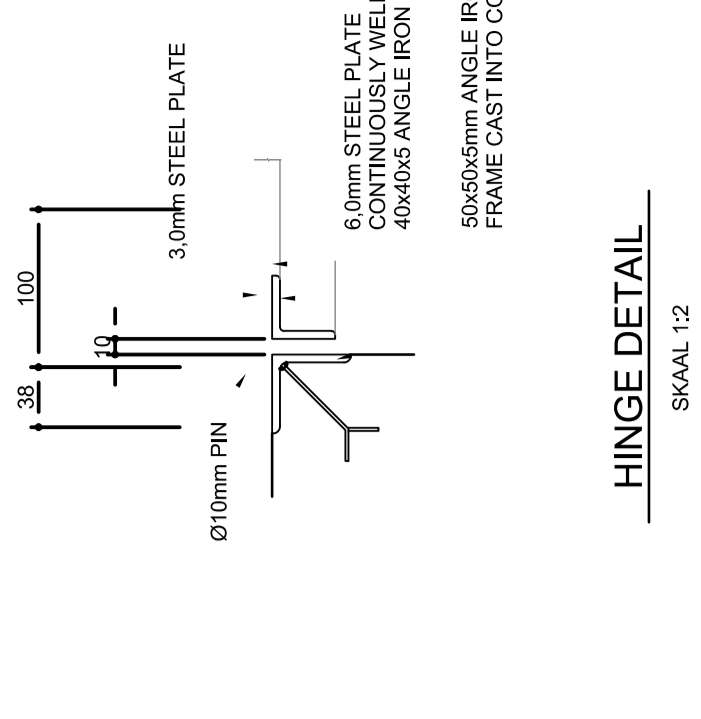


SUMP COVER DETAIL
SCALE 1:2

VALVE CHAMBER COVER DETAIL
SCALE 1:2



FRAME DETAIL
SCALE 1:2



HINGE DETAIL
SCALE 1:2

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REV	DESCRIPTION	DATE	REV BY/CHKD

DESIGNED
DRAWN
CHECKED

CONSULTING ENGINEERS

LYNERS
PO Box 757
GEORGE
6550
Tel: 044-887 0223 / Fax: 044-887 0741
email: george@lyners.co.za

APPROVED
ENGINEERS:
DATE:
APPROVED
CLIENT:
DATE:

CLIENT

PROJECT
C19109G Kraabosch 195-3 - Groenloof Ontwikkeling

TITLE
SEWER PUMPSTATION LAYOUT AND DETAIL

SCALE
01 A1 SHEET

CONTRACT No.
PROJECT No.

DRAWING No.
C19109G-03

REV
△



ANNEXURE E:

Kraaibosch Erf 195, Portion 62 Proposed Outfall Sewer Layout Plan



COPYRIGHT: This drawing is the copyright of DELplan Urban & Regional Planning. Do not scale from it but refer to figured dimensions. All measurements must be checked and confirmed by a Professional Land Surveyor. Any discrepancies should please be reported to DELPlan immediately.

KOPIEREG: Die kopiereg van hierdie tekening behoort aan DELplan Stads & Streekbeplanning. Moenie daarvan afskaal nie, maar verwys na afstande soos aangedui. Alle afmetings moet deur 'n Professionele Landmeter nagegaan en bevestig word. Enige teenstrydighede moet asseblief dadelik aan DELplan rapporteer word.

PROJECT: Proposed development for Keith Lewer Allen Trust

PROJEK:

DESCRIPTION: Kraaibosch 195/62, George

BESKRYWING:

TITLE: Site development plan Alternative 4

TITEL:

NOTES: **NOTAS:**

PROPOSED ZONINGS			
ZONING	ERVEN	AREA (m ²)	%
Single Residential Zone II (± 1000m ²)	43	44,404.65	9.57
Single Residential Zone II (± 500m ²)	54	27,203.02	5.86
General Residential Zone III	5	51,648.90	11.13
Open Space Zone II	8	294,028.86	63.36
Transport Zone III	1	42,271.22	9.11
Transport Zone II	1	2,084.09	0.45
Utility Zone	2	2,400.00	0.52
TOTAL	114	464,040.74	100.00

Proposed sewer line
 Proposed sewer rising main

A1 Scale: 1:2000

Tel: 044 873 4566 • Email: planning@delplan.co.za
www.delplan.co.za

DELPLAN
CONSULTING

URBAN & REGIONAL PLANNERS

DESIGNED: DV

DRAWN: MV 592/GEO/11/Tek/SKF/SDP10_5
GETEKEN:

DATE: OCTOBER 2019
DATUM:

PLAN NO: ANNEXURE
PLAN NR:

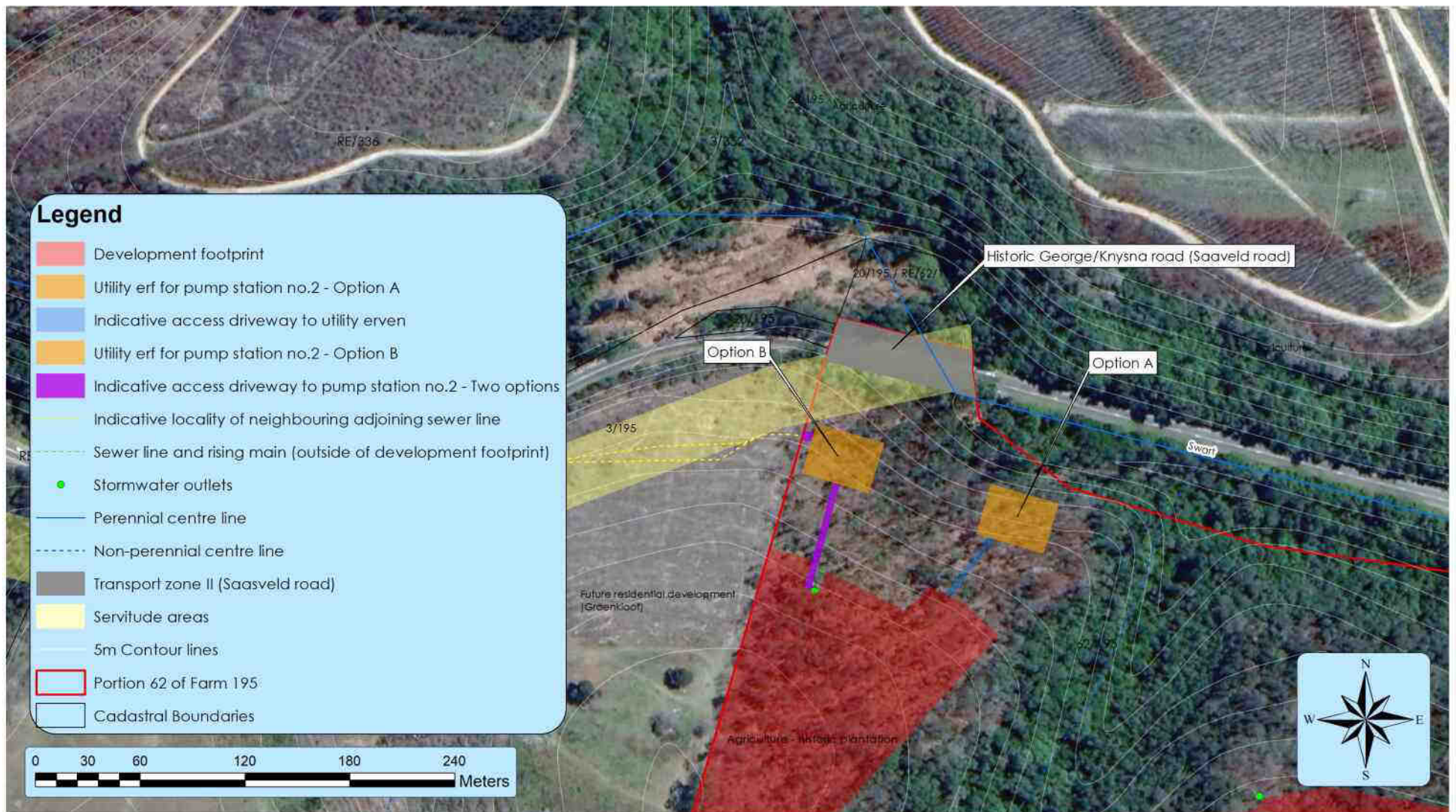


Figure 1b: Draft Site Development Plan for Pump Station No.2 on Portion 62 of Farm 195, George

Date: 30 October 2019
 Project No: 761
 Drawn By: I. Delpont

Cadastral & servitude data - Surveyor General 2019
 Aerial image - Surveyor General 2010; NFEPA data SANBI 2011
 DELPlan SDP 10.5 Oct 2019; V3 Sewer Site Plan Oct 2019

Projected Coordinate System: GS_1984_UTM_Zone_34S



HilLand Environmental
 Environmental Assessment Practitioners

184 Mount View, Victoria Height
 P.O. Box 890, GEORGE, 6530
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ANNEXURE F:

Previous Services Report from previous Subdivision Plan

Datum: 19 Junie 2006

Ons verw: TG305/B1

KRAAIBOSCH 195/3 : VOORLOPIGE SIVIELE DIENSTEVERSLAG

Hierdie voorlopige verslag is gebaseer op 256 residensiële erwe

1. WATER

Die beraamde gemiddelde daaglikse aanvraag van die ontwikkeling is 256 kl met 'n piekaanvraag van 22 l/s. Die waternetwerk sal aansluit by die nuwe 700mm hooftoevoerpyp na die Tuinroete streekswinkelsentrum. Hierdie pyplyn is tans onder konstruksie. Die aansluitingspyp tussen die ontwikkeling en bogenoemde 700mm hooftoevoerpyp sal ook voorsiening moet maak vir ander naasliggende toekomstige ontwikkelings.

2. RIOLERING

Die beraamde gemiddelde daaglikse vloei is 205 kl met 'n piekvloei van 7 l/s. Die rioolafloop van die ontwikkeling sal graviteer na 'n nuwe pompstasie op die noord-oostelike hoek van gedeelte 195/3. Hiervandaan sal die riool gepomp word tot op die suid-oostelike hoek, vanwaar dit deur middel van gravitasie- en styglyne na die beoogde pompstasie naby die streekswinkelsentrum vervoer sal word. Hierdie pompstasie is ook tans in aanbou en is ontwerp om die addisionele rioolafloop te kan hanteer.

3. STORMWATER

Alle stormwater afloop van die beoogde ontwikkeling sal deur middel van ondergrondse pype of bogrondse kanale weggevoer word na die bestaande stroompie in die middel van gedeelte 195/3.

4. PAAIE

Alle interne paaie sal van 'n permanente verharde padoppervlak voorsien word. Die toeganspaaie na die ontwikkeling sal aansluit by die toekomstige padnetwerk in die Kraaibosch gedeelte ten suide van die beoogde ontwikkeling.

P H Goedhart Pr Ing

Tuiniqua Raadgewende Ingenieurs (Edms) Bpk. Reg nr 2001/011886/07

Direkteure: Alie Killian (Pr Tegn. NHDT. LSAISI)
Paul Goedhart (Pr Ing. M Ing(Siv))

Serett Maree (Pr Ing. B Ing (Siv). LSAISI)
Francois Scholtz (Pr Ing. B Ing (Siv))

GEREGISTREERDE FIRMA – SUID-AFRIKAANSE VERENIGING VAN RAADGEWENDE INGENIEUR



NOTES

1. This drawing is the property of Tuiniqua (Pty) Ltd and all design features are covered by copyright. The drawing and information herein may not be reproduced or used for any purpose other than that for which it was originally intended.
2. Water and sewer masterplanning is done by GUS Consultants in Stellenbosch.
3. Roads masterplanning is done by Vekivice in Cape Town.

DATE	DESCRIPTION
A	2008/08/27 FOR INFORMATION

TUINQUA CONSULTING ENGINEERS
 122, GARDENS STREET, WINDHAM, GEORGE
 P.O. BOX 989, GEORGE
 TEL: 044-8744098
 FAX: 044-8744092

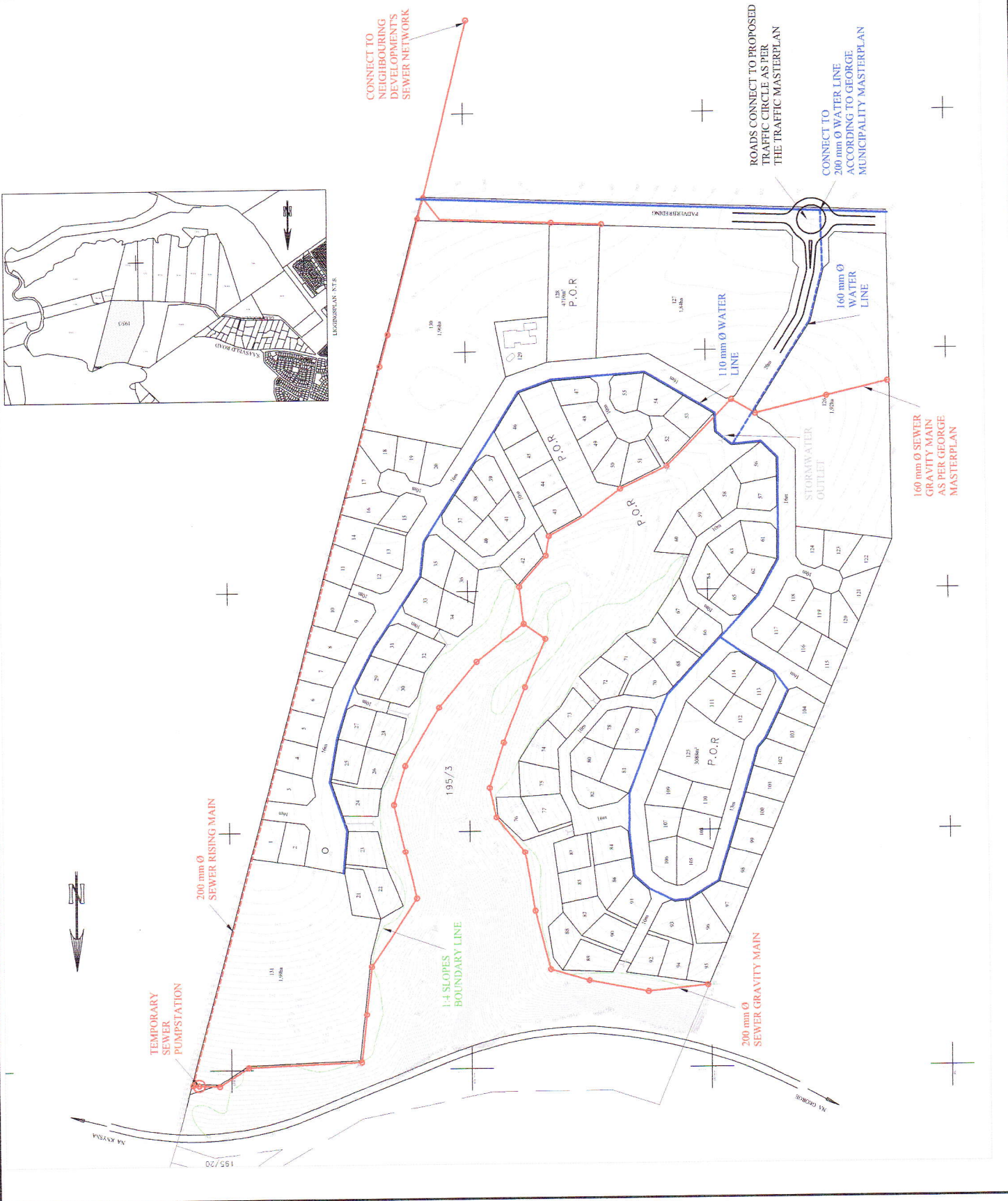
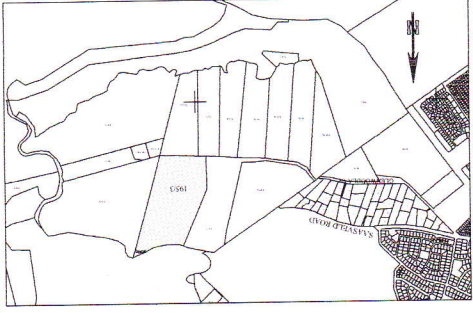
QUINTUS HOUGAARD
 082 326 8061

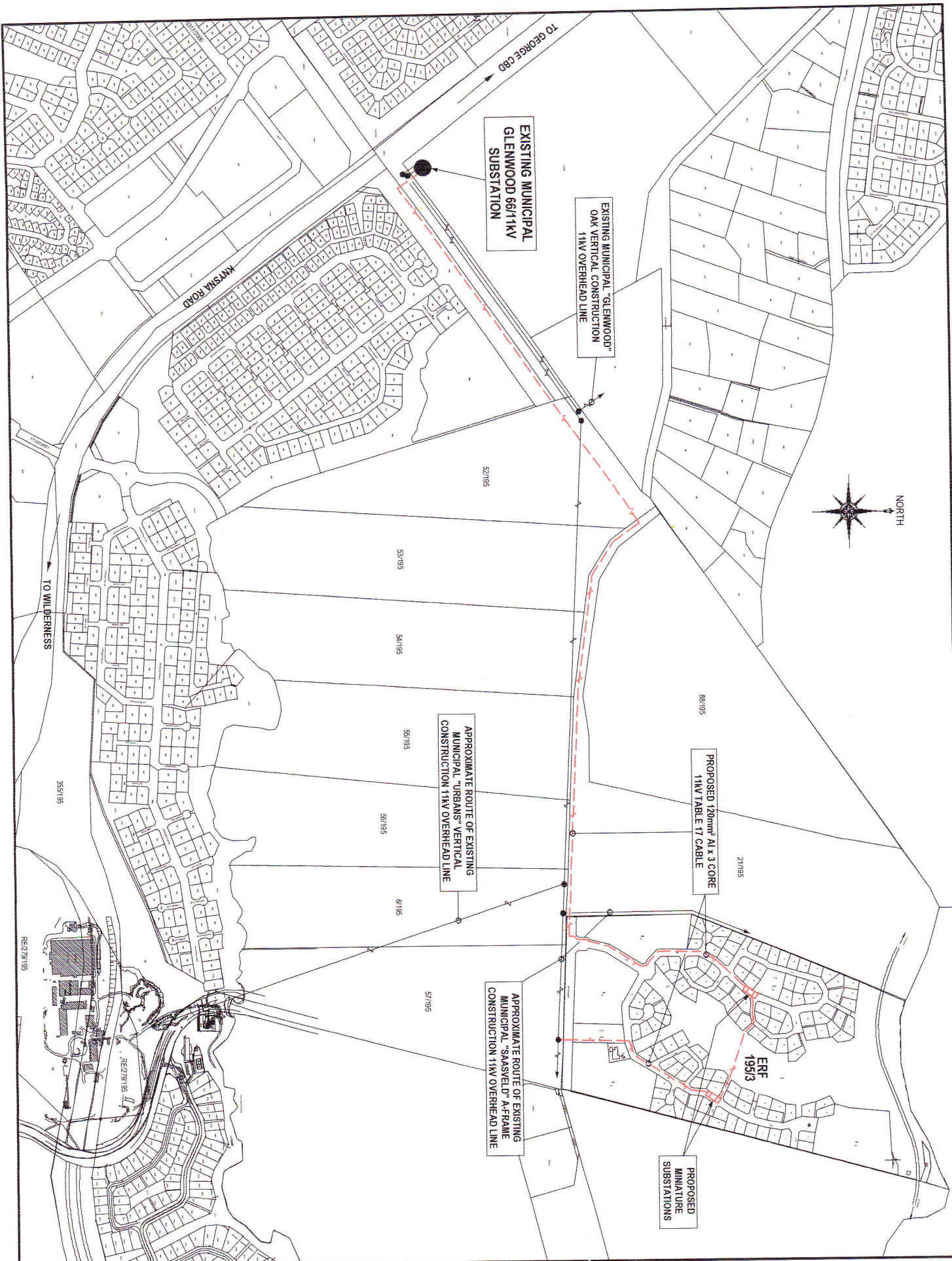
KRAAIBOSCH ERF 195/3

PROPOSED BULK SERVICES ERF 195/3 KRAAIBOSCH GEORGE

FOR INFORMATION

Project No	13005 (AS)	Date	27 August 2008
Designed	GF	Drawing Number	TG305-C000
Drawn	GF	Revision	A
Checked	PG		





No	DATE	DRAWN	DESCRIPTION
REVISIONS			



CLINKSCALES MAUGHAN-BROWN

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 George 6520
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1987 EDGEMOUTH GEORGE CAPE TOWN
 EAST COAST BRANCH BRANCH



 C.E.S.A.

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CLIENT
ADONNAI SHAMMAHA TRUST

PROJECT
**PROPOSED DEVELOPMENT
 ON ERF 195/3,
 KRAAIBOSCH, GEORGE**

DRAWING TITLE
**PROPOSED BULK ELECTRICAL
 LAYOUT**

DRAWN FB	DESIGNED MG	CHECKED	APPROVED
SCALE 1:7500	DATE 27-08-09	CAD REF No. 3010-497- E-SK1	DWG SIZE A3
DRAWING NO. 3010-497/E/SK01			REVISION



ANNEXURE G:

George Municipality – Approval letter for Water and Sewerage

Faks 044-874454



G E O R G E

MUNISIPALITEIT
Wes Kaap

UMASIPALA WASE
Ishona - Koloni

MUNICIPALITY
Western Cape

Posbus / P.O. Box 19 George 6630 Tel: 044 8019111 Fax: 044 8733776

VERW/REF

21/116

NAVRAE:
ENQUIRIES:

H L Basson

TEL:

801 9260

Setplan
Posbus 1566
GEORGE
6530

2 Februarie 2007

Meneer

VOORGESTELDE VERANDERING VAN GRONDGEBRUIK VIR GEDEELTES 52 - 57, 88, 21, 3, 62, 63 en 5 VAN DIE PLAAS KRAAIBOSCH 195 : GEORGE

Die skrywe gedateer 4/04/2006 vanaf die Departement Waterwese en Bosbou aan u, waarvan 'n afskrif aan ons oorhandig is vir kommentaar, het betrekking.

Hiermee word bevestig dat bogenoemde gedeeltes geïdentifiseer is vir medium digtheid ontwikkeling in die water- en rioolmeesterplanne van George. Die ontwikkelings kan aansluit by die bestaande stelsels van die munisipaliteit. Water wat deur die ontwikkelings gebruik sal word, kan voorsien word uit die bestaande geregistreerde gebruik.

Die uwe

**H L BASSON
ADJUNK DIREKTEUR: SIVIELE EN TEGNIESE DIENSTE**

Setplan

0448019459

#1051 P.001 / 001

GEORGE MUNISIPALITEIT

N.13.2027 11:16 0448019459



Reference number: **Kraaibosch**
Date: **03/04/2020**

Enquiries: **L Mooiman**
044 801 9353

NEIL LYNERS AND ASSOCIATES
PO BOX 757
GEORGE
6530

(via email: francois@lynerns.co.za)

ATTENTION: Mr. Francois van Eck

**PROPOSED REZONING AND SUBDIVISION: PORTIO 3 OF 195 OF THE FARM KRAAIBOSCH,
DIVISION GEORGE**

Your enquiry regarding the progress on the project to upgrade the capacity of the Outeniqua Waste Water Treatment Works refers.

The civil works has been completed and the contract for the Mechanical and Electrical components of the works has been awarded. It is anticipated that the works will be completed in 2022/23 although the final completion date and the commissioning of the works depends on the project progress and any potential contractual delays and /or extensions.

Please do not hesitate to contact the Department Civil Engineering Services if any additional information is required.

Yours sincerely,



RR WESSO
DIRECTOR: CIVIL ENGINEERING SERVICES