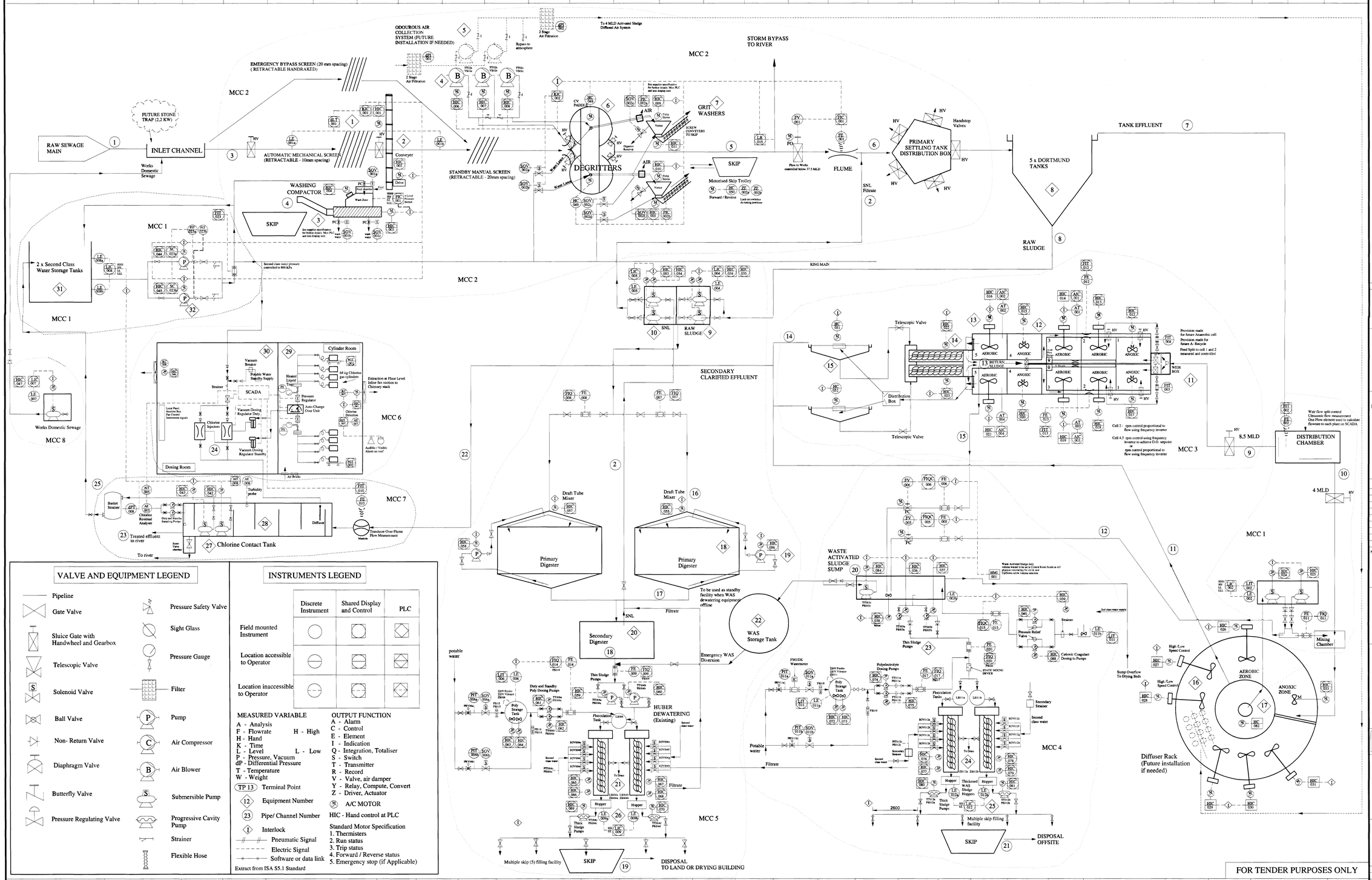
PIPE / CHANNEL NUMBER		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	27	m
STREAM DESCRIPTION		Raw Sewage	HOW Return SNL /Filtrate	Raw Sewage	Screenings	Grit	Raw Sewage	Tank Effluent	Raw Sludge	Tank Effluent New	Tank Effluent Old	Secondary Effluent Old	Waste Activated Sludge Old	Return Sludge New	Secondary Effluent New	Waste Activated Sludge New	Primary Digester Feed	Primary Digester Sludge	Secondary Digested Sludge	Dewatered Digested Sludge	Combined Waste Activated Sludge	Dewatered Waste Activated Sludge	Combined Secondary Effluent	Effluent to River	Chlorinator Water	2nd Class Water	S.N.L.	WAS dewatering Filtrate	2nd Digested dewatering filtrate	Works Sewage	
ADWF	(m3/day)	12.2 MLD	408 m3/day	12.2 MLD	2 m3/day	0.5 m3/day	12.6 MLD	12.5 MLD	105 m3/day @ 3%	8.5 MLD	4 MLD	3.91 MLD	89 m3/day @ 1.0%	8.5 MLD	8.255 MLD	245 m3/day @ 0.7%	105 m3/day @ 3%	105 m3/day @ 1.8 %	63 m3/day @ 3%	9 m3/day @ 22%	334 m3/day @ 0.8%	18 m3/day @ 15%	12.165 MLD	11.5 MLD		6 - 22 liters/second	42 m3/day	312 m3/day	54 m3/day	50 m3/day	
PWWF	(m3/day)	37.2 MLD		37.2 MLD			37.6 MLD	37.5 MLD	160 m3/day																						
DIAMETER / SIZE		600 dia inlet sewer 600 w x 1600 ht	150 ID rising main	600 w x 1600 ht			600 w x 1600 ht	600 ID pipe	200 ID pipe & 150 ID pipe	600 ID pipe	450 ID pipe	450 ID pipe	150 ID pipe	250 ID pipe	600 ID pipe	150 ID pipe	150 ID pipe	150 ID pipe	150 ID pipe	150 ID pipe	150 ID pipe	200 ID pipe	700 ID pipe	700 ID pipe	75 ID pipe	126 ID pipe	150 ID pipe	100 ID pipe	100 ID pipe	110 sewer pipe	
MATERIAL		Concrete Launder	PE-HD pipe	Concrete Launder			Concrete Launder	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	HDGMS	HDGMS	HDGMS	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	PE-HD pipe	uPVC class 6.3	



VALVE AND EQUIPMENT LEGEND

- Pipeline
- Gate Valve
- Sluice Gate with Handwheel and Gearbox
- Telescopic Valve
- Solenoid Valve
- Ball Valve
- Non- Return Valve
- Diaphragm Valve
- Butterfly Valve
- Pressure Regulating Valve
- Pressure Safety Valve
- Sight Glass
- Pressure Gauge
- Filter
- Pump
- Air Compressor
- Air Blower
- Submersible Pump
- Progressive Cavity Pump
- Strainer
- Flexible Hose

INSTRUMENTS LEGEND

	Discrete Instrument	Shared Display and Control	PLC
Field mounted Instrument			
Location accessible to Operator			
Location inaccessible to Operator			

MEASURED VARIABLE
A - Analysis
F - Flowrate
H - High
H - Hand
K - Time
L - Level
L - Low
P - Pressure, Vacuum
dP - Differential Pressure
T - Temperature
W - Weight

OUTPUT FUNCTION
A - Alarm
C - Control
E - Element
I - Indication
Q - Integration, Totaliser
S - Switch
T - Transmitter
R - Record
V - Valve, air damper
Y - Relay, Compute, Convert
Z - Driver, Actuator

TP 13 Terminal Point
12 Equipment Number
23 Pipe/ Channel Number
1 Interlock
A/C MOTOR
HIC - Hand control at PLC

Pneumatic Signal
Electric Signal
Software or data link

Standard Motor Specification
1. Thermisters
2. Run status
3. Trip status
4. Forward / Reverse status
5. Emergency stop (if Applicable)

Extract from ISA S5.1 Standard

PLANT / EQUIPMENT ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
DESCRIPTION	Mechanical Screen	Screenings Conveyer	Screenings Washer Compactor	Grit Air lift Blowers 2 x Duty 1 x Standby	Odour Blowers 1 x Duty 1 x Standby	Vortex Degritters	Grit Separators / Washers	5 x Dortmund Primary Settling Tanks (Existing)	Raw Sludge Submersible Pumps (Existing)	SNL Submersible Pump (Existing)	8.5 MLD Bardenpho Activated Sludge Plant	8.5 MLD A/S Anoxic Cells Mixers	8.5 MLD A/S 2 speed Aerators	8.5 MLD A/S Return Sludge Screw Pumps	8.5 MLD A/S Clarifiers x 2	4 MLD A/S Activated Sludge Plant (Existing)	4 MLD A/S Clarifier (existing)	Primary Digesters (Existing)	Primary Digester Mixing Pumps	Secondary Digester (Existing)	Digested /WAS Sludge Dewatering Equipment	WAS Digester (Existing)	WAS Pumps	WAS Sludge Dewatering	WAS Thick Sludge Pumps	Secondary Digester Thick Sludge Pumps (Existing)	Chlorination Tank Submersible Pumps	Chlorine Contact Tank	Chlorination Cylinder Room	Chlorination Dosing Room	2nd Class Water Storage tanks	2nd Class Water Booster Pumps
EQUIPMENT DETAIL	10mm spacing Automatic Retractable					c.v.Paddles 2 x 1.1 KW	rabbiters 2 x 0.55 KW conveyers 2 x 1.1 KW	10.3m dia 8.5m depth 970 m3 volume	1 x Duty 1 x Standby	1 x Duty 1 x Standby	2 Lanes of 884 m3 5 Cells per lane 14m x 14m x 4.5m	In cells 1 and 4	In cells 2,3 and 5	1 x Duty 1 x Standby		4850 m3 7 Aerators 37/22 KW 4 KW mixer	24m dia clarifier, 3m depth	Two x 1800 m3 No Heating No Gas collection	Gorman Rupp 2 x Duty	20m x 10m x 5m 800 m3	2 x Huber RoS 3/2 Rotamat Screw Presses	Volume 600 m3 storage for feed to Press 21	1 x Duty ; 1 x S/B Screw Press Feed 1 x WAS DIG Feed	2 x Screw Press	2 x Netzch 1 x Duty 1 x Standby		1 x duty 1 x standby	1,38m x 9.8m x 3m ht = 1.58m Volume = 64 m3					
DUTY			Washer 3.5 KW Compactor 4 KW				Motorised Skip Trolley 7.5 KW					2 x 6 KW mixers (future additional)			Sized for 2xAWDF 21m dia, 3m depth		1 KW bridge drive	Ultimate 3,225 Ton/d Volume 104 .3 m3/d	380 m3/hr		63 m3/d @ 3% 2 TonDS/day		42 m3/hour 2 x 7.5m head 1 x 12m head	334 m3/d @ 0.8% 2.7 TonDS/day	3.5 m3/hour 12 - 15% TS		11 KW					
KW	2.2 KW	1.1 KW	7.5 KW	2 x 5.5 KW	15 KW	2 x 1.1 KW	10.8 KW		2 x 15 KW	2 x 15 KW	6.4 Ton COD/day	4 x 6 KW	6 x 49 KW	1 x 8 KW	2 x 1 KW	3 x 37 KW 1 x 4 KW	1 KW		30 KW		30 KW			30 KW	3 KW						2 x 15 KW	

FOR TENDER PURPOSES ONLY

REVISIONS

Revision	Date	Description
B	Oct 2009	As Built
A	August 2007	Modifications to the following: 1. Dewatering Plant: Various 2. Chlorination Plant: Ejector added 3. Second Class Water Pumps: Valve added

AS BUILT

DATE : 03/02/2012 SIGN :

REDUCED PLAN USE SCALE BELOW

0 10 20 30 40 50 60 70

70mm ON ORIGINAL PLAN

LEGEND OF EXISTING UNDERGROUND SERVICES

- SEWERS AND M.H.'S
- STORM WATER DRAIN AND M.H.'S
- WATER MAINS AND VALVES
- ELECTRICITY CABLES
- TELKOM CABLES

UNDERGROUND SERVICES CHECKED

SERVICE	DATE	SIGNATURE
S.W DRAINS		
SEWERS		
WATER MAINS		
TELKOM CABLES		
ELECTRIC CABLES		
SPOORNET CABLES		
E.S.C. CABLES		
OIL PIPE LINE		

NOTE: Only underground services affected by new construction work are shown.
Care must be taken during excavations for road foundations, trenches etc. to avoid damage to underground services such as sewers, drains, cables, water mains and connections. Wherever possible these must be located before work proceeds.

NOTE: No construction work to commence until land and servitude acquisitions have been completed
Acquisitions completed:
Date Engineer

DEPARTMENT OF WASTEWATER MANAGEMENT

ETHEKWINI MUNICIPALITY

ETHEKWINI WATER & SANITATION

Contract No. WS. 5735

Project Title
VERULAM WASTEWATER TREATMENT WORKS UPGRADE : REPLACEMENT OF BIOFILTERS WITH 8.5 MLD ACTIVATED SLUDGE PLANT

Project No. Y 6065

Drawing Title
PROCESS AND INSTRUMENTATION DIAGRAM

Reference Drgs.
Scales :
Surveyed : Date :
Drawn : M.Graham Date : 3 September 2006
Designed : M.G./B.B./A.P./K.B. Date : 3 September 2006
Works Project Engineer:
Manager : (Design)
Deputy Head: Technical Services:

Drawing No. 60463-10 Sheet 1 Rev. B