

Presentation on Water Loss Management

Presented by Lourens Lotter

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CoT STATISTICS (before merger)



- 9525 km of bulk and distribution mains
- 137 storage reservoirs with 1 690 MI storage
- 28 water towers with 10,4 MI storage
- 360 Control Valves (PRV's, Flow control etc)
- 240 Bulk Management Meters
- 400 000 Consumer connections

NRW CALCULATION 2010 2011



Month June 2011

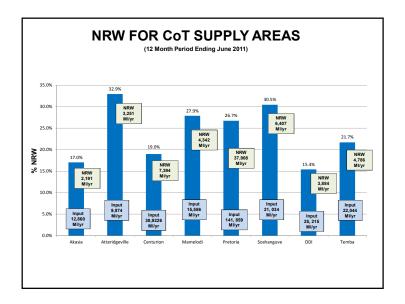
Total Bulk input = 287 397 001 kl/year Formal Water Sales = 186 179 767 kl/year "Sales" to Informal Areas = 31 049 962 kl/year

NRW = Total Bulk input - (Formal Water Sales + "Sales" to Informal Areas)

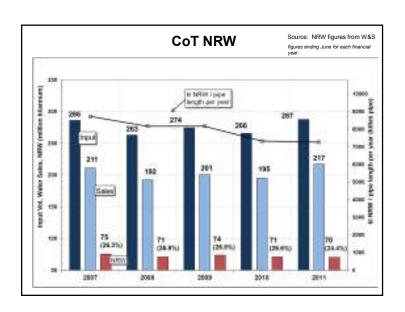
Total Bulk input

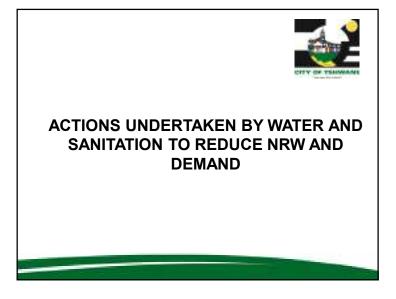
= <u>70 167 272</u> X 100 287 397 001

= 24,4%



			NR	VV	ГО	, n	50 I	3	UF	ГL		4I/L	.AC	,			
									Authorised	Consumption							
	Bulk Input					Billed Authorised Unbilled Authorised				NRW		Physical Losses					
Month ending	Rand Water Bulk Input	WTP Bulk Input	Boreholes/F ountains Bulk Input	Magalies Water Bulk Input	r within City	Total Bulk	k Billed Metered Formal Water Sales	Billed Un- Metered (Flat Rate)		Estimated Consumption for authorised areas	Unbilled Metered	Unbilled Unmetered	Total Loss: Net input Billed Authorised (formal water sales)- Un Billed Metered (informal sales)		Unavoidable Hosses (UAFL)	Avoidable Losses (Total Loss - UARL	
	kl/y	kl/y	H/y	kl/y	kl/y	kl/y	И/у	И/у	ki/y	kl/y	И/у	kl/y	kl/y	%	kl/y	kl/y	% tr
m2008-07	196947489	29612762	23353161	11628187		261541599	186622398	0	_	4615425	0	0	70903776	26.9%	9595000	60708776	23.
m2008-08	197056802	31190461	23352489	12253535	0	263349891	188329504	0		4615425	0	0	70404962	26.7%	9595000	60809962	23.
m2008-09	196387299	30862458	23034844	12029851	0	262314477	188978012	0	_	4615425	0	0	68723040	26.2%	9595000	59126040	22
m2008-10 m2008-11	200805751	31415053	22958975 22971285	11556037	0	266580812	193364228 195146613	0	_	4615425 4615425	0	0	68601159 67901330	25.7%	9595000 9595000	59006159 58306330	22
m2008-11	201712641	31488450	22971285	1200088	0	26/00/05/50	195240613	0	_	4615425	0	0	69959216	25.9%	9595000	60364136	22
m2009-01	206343694	32003773	23271277	1300722	0	274177652	196591658	0		4615425	0	0	72970569	26.6%	9595000	63375569	23
m2009-02	204060960	31801497	23446703	13089162	0	271931429	194301408	0		4615425	0	0	73014586	26.9%	9595000	63419586	23.
m2009-03	203431849	31603492	23767734	13393287	0	271898067	192583430	0	6.5	4615425	0	0	74699212	27.5%	9595000	65104212	23.
m2009-04	203351486	31714188	23789451	13544625	0	272399748	192815174	0	↓ —	4615425	0	0	74969149	27.5%	9595000	65374149	24
m2009-05	205146090	31911142 32124362	23624508	13285919	0	273967666	194641957	0	8	4615425 4615425	0	0	74730284 73649662	27.3%	9595000 9595000	65115284 64054662	23
m2009-06 m2009-07	206118466	32124762	223993324	13315108	0	279870342	196282598	0	+ - 3	4615425	0	0	73649682	25.8%	9595000	64094662	23
m2009-07	205821308	30036341	22003191	13894722	0	271866053	196077153	0		4615425	0	0	71178475	26.2%	9595000	61583475	22.
m2009-09	205157638	31060955	21927065	13719814	0	271029030	195646819	0	I □ §:	2038525	0	0	73343666	27.1%	9595000	63748666	23.
m2009-10	202922490	30485565	21080975	13570010	0	266534044	194086051	0	- it	2038525	0	0	70409469	26.4%	9595000	60814469	22
m2009-11	202847542	30349203	20713260	13400325	0	266497640	193854111	0	- ŧ	2038525	0	0	70605005	26.5%	9595000	61010005	22.1
m2009-12 m2000-01	201060815	30622926	20623381	12824808	0	264310336	192990728	0	- 8	2038525	0	0	69283084 68430003	26.2%	9595000	59686084 58875008	22.
m2000-01 m2000-02	202007833	30496800	20014560 19308130	13105230	0	264351629	193553755	0	+ ₫·	2038525	0	0	68571768	25.9%	9595000	58976768	22.1
m2000-03	203582068	30423777	18423847	12159554	0	263936546	196154497	0	1 - 5.	2038525	0	0	65793524	24.9%	9595000	56198524	21.
m2000-04	203132953	29870060	17470900	11652190	0	260834050	195802927	0	1 🗆 🖟 1	1964430	0	0	63066693	24.2%	9595000	53471693	20.5
m2000-05	201728117	29585310	16624367	13634297	0	266439655	193484064	0	P rew	4188269	0	0	70767323	26.6%	9595000	61172323	23.0
m2000-06	205428278	29363895	16201776	13637024	0	265758667	190864302	0		4200108	0	0	70694257	26.6%	9595000	61099257	23.
m2000-07 m2000-08	206103397	29065315	22619632 22629879	21900034	0	279688639	182046844 182465615	0	23576252 24388718	4202344 4190928	0	0	69863199 69254074	25.0%	10963693	58230506 58231064	20.1
m2000-08	203000503	29040780	22575938	21792700	0	280318715	182973360	0	24555988	4200928	0	0	68588392	24.7%	10923010	57624512	20.
m2000-10	209960805	29234800	22716613	21768316	0	283680545	185142797	0	25039146	4219068	0	0	69279534	24.4%	10970230	58309304	20.
m2000-11	118513552	29112310	23241264	21957320	93698000	286522234	185851672	0	25371149	4227428	0	0	71071985	24.8%	9813001	61258984	21.
m2000-12	118808599	29082610	1392268	22043398	115889000	287215764	186712440	0	25401712	4096790	0	0	73004822	24.7%	9813001	61191821	21
m2011-01 m2011-02	212868990	28663500	23814339 24293883	21139050	0	286485886	186019254	0	25260994	4553784 4628252	0	0	70651854 69843548	24.7%	11038581 11125882	59613273	20.
m2011-02 m2011-03	212389478	28564250	24273883	21062974	0	285910500	186956959	0	25377743	4628252	0	0	69315291	24.2%	11125882	58321766	20.
m2011-03	211776493	28583590	24930776	21110000	0	286400346	186236080	0	25325594	4721754	0	0	70017418	24.5%	11254230	58952828	20.
m2011-05	No-data																_





CoT WATER DEMAND STRATEGY

Item No.	Description	Max Points	Score
1	Development of Standard Water Balance	4	3
2	Pressurised Supply to all consumers 100% of time	4	4
3	Commercial and Industrial Metering System	4	3
4	Residential Metering System	4	3
5	Effective Billing System including Informative Billing	4	3
6	Network (Leakage) Complaints System	4	3
7	Billing and Metering Complaints System	4	2
8	Asset Register for Water Reticulation System	4	3
9	Asset Management - Capital Works	4	3
10	Asset Management - Operations and Maintenance	4	2
11	Dedicated WDM support	4	3
12	Active Leakage Control	4	2
13	Effective Sectorisation	4	3
14	Effective Bulk Meter Management	4	3
15	Credit Control Policy and Implementation	4	3
16	Pressure Management and Maintenance of Pressure Reducing Valves	4	2
17	As-Built Drawings of Bulk and Reticulation Infrastructure	4	3
18	Schematic Layout of Water Infrastructure	4	4
19	Regulation of Water Fittings	4	1
20	Implementation of By-Laws and National Standards or better	4	3
21	Technical Support to Customers	4	2
22	Removal of Illegal Connections	4	2
23	Community Awareness and Education Programmes	4	2
24	Schools Awareness and Education Programmes	4	2
25	Newspaper & radio articles plus posters and leaflets for distribution	4	1
	Totals	100	65

INFORMAL AREAS



Calculation of estimated consumption:

- Base consumption figures obtained from actual metered consumption values in similar developments (kl/day/Ha)
- Area of informal development determined from 2009 aerial photos, site inspections etc (Ha)
- Base consumption value applied to informal development to obtain estimated consumption volume
- Volume applied in NRW calculation for zone

METER AUDITS IN CoT INDUSTRIAL AREAS



- Audit of all connections in industrial areas (large users)
- · Locate un-metered connections
- · Identify and replace all old, broken, illegible meters
- Ensure all meters are on billing system
- Impact already determined for some areas

METER AUDITS IN INDUSTRIAL AREAS Impact of audits and meter replacements

Area	No. of Conn	Increase in Metered Consumption (kl/yr)		,	Water Tariff: Increase in Revenue (R/yr)	Increase in Revenue	Total Increase in revenue (R/yr)	Return Period (Months)
Rosslyn North	138	60 000	R	338 541	R 595 200	R 138 600	R 733 800	6
Rosslyn South	236	36 000	R	438 238	R 357 120	R 83 160	R 440 280	12
Pretoria Indus	144	108 000	R	455 897	R 1 071 360	R 249 480	R 1 320 840	4
Waltloo , Silverton-dale	550	43 368	R	800 000	R 430 211	R 100 180	R 530 391	18
Pretoria West Light Industrial	355	83 460			R 827 923	R 192 793	R 1 020 716	
Koedoespoort	93	68 028			R 674 838	R 157 145	R 831 982	
Hermanstad	189	100 272			R 994 698	R 231 628	R 1 226 327	
Rooihuiskaal	90			(Currently Being D	etermined		
Hennopspark	168	63 768			R 632 579	R 147 304	R 779 883	
Sunderland Ridge	169	25 644			R 254 388	R 59 238	R 313 626	
Lyttelton Manor	52	4 080			R 40 474	R 9 425	R 49 898	
Pretoria North	253	3 936			R 39 045	R 9 092	R 48 137	
Pretoria Street (Silverton)	159	19 836			R 196 773	R 45 821	R 242 594	
Gezina	217	32 160			R 319 027	R 74 290	R 393 317	
Kirkney	60	4 464			R 44 283	R 10 312	R 54 595	
Total	2 873	653 016			6 477 919	1 508 467	7 986 386	

Water Tariff Used: R9.92/kl

Sanitation Tariff Used: 60% of increase in metered consumption @ R3.85/kl

PRESSURE MANAGEMENT (e.g. NELMAPIUS EXT 8)



- No consumer meters installed in Nelmapius X8 (high leakage)
- Special pressure reducing valve (PRV) fitted to handle high pressure reduction ratio
- Electronic Time Modulated Controller fitted onto PRV to reduce pressure further during night

PRESSURE MANAGEMENT INTERVENTIONS BY COT OVER LAST FEW YEARS



Pressure Management initiatives (excluding annual servicing of all pressure reducing valves)

Pressure management Area	Savings kl/yr	Savings in R/yr (Based on R4.39/kl)				
Mamelodi Ext 11	20 000	87 000				
Nelmapius Ext 3,4	365 000	1 602 000				
Nelmapius Ext 8	230 000	1 009 000				
Valhalla	52 000	228 000				
Lotus Garden	100 000	439 000				

ODI - PRV Installations - Summary of Savings

Meter#	Average Flow before PM (kl/h)	Average Flow after PM (kl/h)	Savings in Average Flow (kl/h)	Savings / Year (kl)
Meter 53	2.2	1.8	0.4	3 504
Meter52	15.2	6.1	9.1	79 716
Meter 51	1.9	1.4	0.5	4 380
Meter 62	3.4	0.7	2.7	23 652
Meter 50	3.8	2.4	1.4	12 264
Meter 55	29.6	24	5.6	49 056
Meter 56	33.5	24.6	8.9	77 964
Erasmus	1.2	0.9	0.3	2 628
Hebron	240	195	45	394 200
Hebron E	23.5	12.4	11.1	97 236
TOTAL	354.3 kl/h	269.3 kl/h	85 kl/h	744 600 kl

SUMMARY OF WDM INTERVENTIONS BY COT OVER LAST FIVE YEARS



- Preparing detailed monthly water balance (very few municipalities in RSA prepare regular water balances)
- Meter Audits in 15 Industrial Areas (2427 connections audited) 126 unmetered connections located, 240 existing meters required replacement. Results determined for 4 of 15 areas to date. Increase in Revenue for CoT for 4 areas = R3mil/yr.
- Meter Audits for all irrigated road islands (293 connections):
 7 unmetered connections located, 66 meters require replacement.
 Impact to be determined by mid 2011.

SUMMARY OF WDM INTERVENTIONS BY CoT OVER LAST FEW YEARS

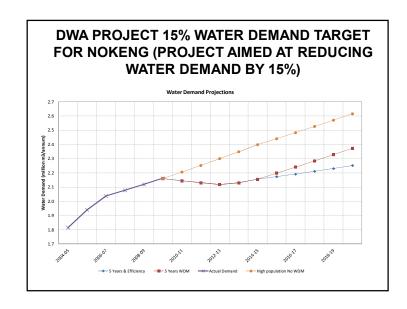


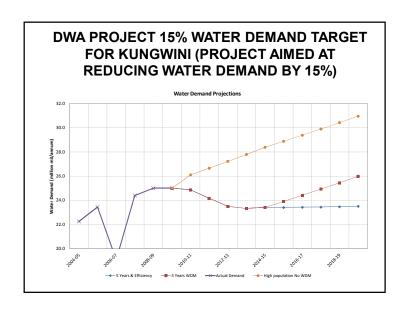
- 2179 domestic meters installed for unmetered houses in Mamelodi and Soshanguve in 2009. If a low consumption of 15kl per property per month assumed then additional metered consumption of 292 220kl/yr @ R6.71 = additional income of R2.6 mil/yr.
- · 32760 bursts/leaks repaired per year
- · 50927 water meters replaced per year
- · 282,2 km length of mains replaced from 2005 to August 2011

SUMMARY OF WDM INTERVENTIONS BY CoT OVER LAST FEW YEARS



- 582 illegal connections found and removed/legalised in 2009/10 (this excludes un-metered connections located in industrial areas)
- 30 School's workshops held in 2010/11 to promote water conservation
- 90 Community workshops held in 2010/11 to promote water conservation reaching 2881 community members





ACHIEVEMENTS OF CoT REGARDING WATER LOSS REDUCTION



- First prize in DWA national Water Demand Management Sector Awards in 2009.
- Over the last three years CoT has managed to reduce the water demand and water losses consistently
- The CoT has one of the lowest percentages NRW of all Metros in the RSA
- CoT is one of the few Municipalities/Metros that is currently succeeding in achieving the required water demand targets set by DWA for project 15%



Thank You