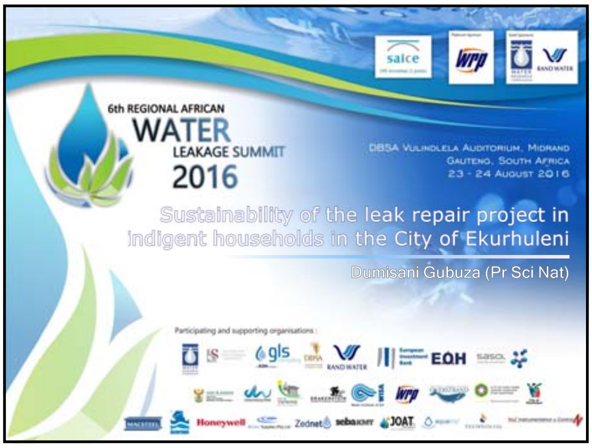


About Ekurhuleni

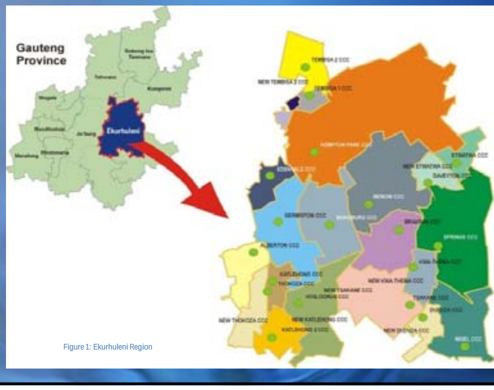
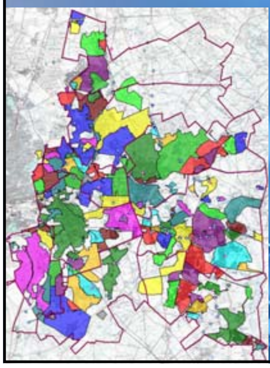


Figure 1: Ekurhuleni Region

Ekurhuleni Water Infrastructure



- Reservoirs 73
- Towers 32
- Bulk Connections 186
- Pipes (km) 11 448
- Distribution Zones 124
- Population (mill.) 3.5
- Population Growth 2.5%
- W&S Dept. Staff 1 100

Planning

Prioritisation of DMAs (highest to lowest NRW)

Prioriy	SDA	WATER DISTRICT DMA	SALES (kl/annum)	NRW (kl/annum)	NRW (% System Input)	SYSTEM INPUT VOLUME (kl/annum)	Cumulative NRW	Accumulated NRW (% of total)
1	Brakpan	TSAKANE_LANGAVILLE_LABORE_GELUKSDAL (3510)	869,821	13,810,879	94.1%	14,680,700	13,810,879	10.8%
2	[illegible]	[illegible]	12,576,835	9,224,685	42.3%	21,801,520	23,035,564	18.0%
3	[illegible]	[illegible]	9,200,085	7,965,815	[illegible]	[illegible]	[illegible]	24.3%
4	[illegible]	[illegible] ...mbined)	13,630,844	7,624,876	[illegible]	[illegible]	[illegible]	30.2%
5	[illegible]	[illegible]	10,117,981	7,267,963	[illegible]	[illegible]	[illegible]	35.9%
6	Germiston	Palm Ridge (2272)	10,265,967	4,426,633	30.1%	14,692,600	50,320,851	39.4%
7	Springs	PAM BRINK (1746, 1880) (1746_1880)	5,927,740	4,417,760	42.7%	10,345,500	54,738,611	42.8%
8	Kempton	TEMBISA (RW1744) (1744)	8,065,395	4,332,805	34.9%	12,398,200	59,071,416	46.2%
9	Germiston	CREDI RESERVOIR AND TOWER (259)	6,681,114	4,327,256	39.3%	11,008,370	63,398,672	49.6%
10	Boksburg	VOSLOORUS (RW2622) (2622)	7,552,848	4,278,152	36.2%	11,831,000	67,676,824	53.0%
11	Boksburg	DAWN PARK+ SUNWARD PARK (Bok_South)	3,926,202	3,866,643	49.6%	7,792,845	71,543,467	56.0%
12	Benoni	BENONI CENTRAL (Benoni_Central)	6,055,699	3,774,847	38.4%	9,830,546	75,318,314	58.9%
13	Nigel	NIGEL EASTERN (RW2636_RW2646) (2636_2646_5589)	2,984,070	2,997,970	50.1%	5,982,040	78,316,284	61.3%
14	[illegible]	[illegible]	4,258,751	2,974,749	41.1%	7,233,500	81,291,033	63.6%
15	[illegible]	[illegible]	4,758,935	2,852,459	37.5%	7,611,394	84,143,492	65.8%
16	Springs	KWATHEMA (RW2452) (2452)	4,472,974	2,633,226	37.1%	7,106,200	86,776,718	67.9%
17	Germiston	ZONE 110 (Windsor Road) (1389)	2,225,675	2,621,525	54.1%	4,847,200	89,398,243	69.9%
18	Germiston	BEDFORDVIEW FIRE (17)	0	2,571,090	100.0%	2,571,090	91,969,333	72.0%
19	Kempton	KEMPTON WEST RESERVOIRS (1632)	5,332,614	2,002,786	27.3%	7,335,400	93,972,119	73.5%
20	Germiston	RW2107 (2107)	1,047,036	1,879,734	64.2%	2,926,770	95,851,853	75.0%
21	Brakpan	SALLIES TOWER (Combined)	1,373,773	1,874,387	57.7%	3,248,160	97,726,240	76.5%
22	Kempton	CLAYVILLE (1900)	5,466,885	1,346,115	19.8%	6,813,000	99,072,355	77.5%
23	Kempton	UMTAMBEKA RESERVOIR (2744)	1,654,317	1,205,043	42.1%	2,859,360	100,277,398	78.5%
24	Lethabong	ISANDOVALE (RW1643) (1643)	2,742,921	1,193,379	30.3%	3,936,300	101,470,777	79.4%
25	Germiston	ZONE 150 (Roodekop Township) (1208)	1,289,416	1,155,374	47.3%	2,444,790	102,626,151	80.3%
26	Springs	PAPER FACTORIES (988)	6,048,430	1,052,180	14.8%	7,100,610	103,678,331	81.1%
27	Kempton	CHLOORKOP (3862)	1,625,715	979,172	37.6%	2,604,887	104,657,503	81.9%
28	[illegible]	[illegible]	3,851,176	972,124	20.2%	4,823,300	105,629,627	82.6%
29	[illegible]	[illegible]	1,427,749	954,277	40.1%	2,382,026	106,583,904	83.4%
30	Springs	PERSIDA (RW3774) (3774)	913,347	915,323	50.1%	1,828,670	107,499,227	84.1%
31	Benoni	ACTONVILLE(RW0031) (31)	761,437	743,223	49.4%	1,504,660	108,242,450	84.7%
32	Germiston	ZONE 160 (Elspark) (936_4313)	777,787	738,727	48.7%	1,516,514	108,981,177	85.3%

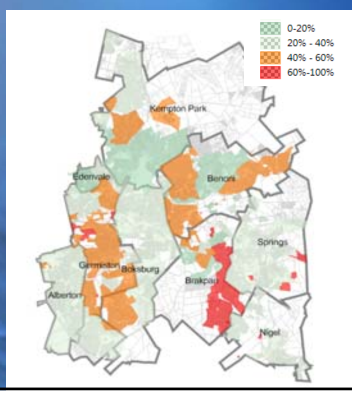
Short Term: Revised DWA Target Saving for Ekurhuleni is 25,0 Mm³/annum within 5 years "Project15%"

Sorted from highest to lowest NRW

Medium Term: 25 out of 82 DMA are responsible for 80% of water losses

Longer Term: Remainder

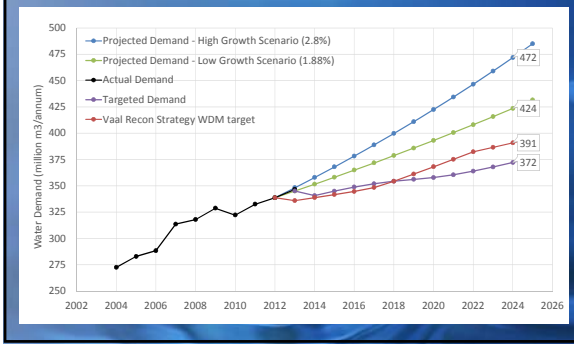
NRW Map



Business Plan for WDM

PROGRAMME CATEGORIES	PROGRAMME NUMBER	DESCRIPTION
REAL / TECHNICAL LOSSES	1	Pipeline and Valve Assessment and Replacement
	2	Replacement of Mid-Block Pipelines
	3	Pro-Active Leak Detection and Repairs
	4	Cathodic Protection of Steel Pipelines
	5	Sectorisation of Distribution Areas
	6	Telemetry System
	7	Indigent Properties Leak Fixing
	8	Leak Fixing & Meter Installation Project in Tsakane / Langaville / Geluksdal
	9	Metering of all Informal Settlements
	10	Pressure Management
APPARENT / COMMERCIAL LOSSES	11	Metering of all Unmetered Areas
	12	Replacement of all aged Domestic Water Meters
	13	Consolidation & Replacement of all Large Water Consumer Meters
	21	Installation, Replacement & Maintenance of Water Meters
SUPPORTING SYSTEMS AND OTHER INITIATIVES	14	Integration of IMQS, EMIS, Asset Management & Venus
	15	Develop and Implement a Communication, Awareness and Education Programme
	16	Water Tariffs as an Instrument to reduce Non-Revenue Water
	17	Training
	18	Document and Information Management System
	19	Risk Register: Monitoring and Mitigation Plan
	20	"War on Leaks" Rapid Responses

Water Demand Growth Scenarios

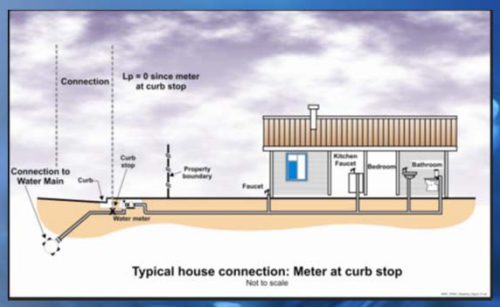


Implementation

Business Plan for WDM

PROGRAMME CATEGORIES	PROG. NO.	DESCRIPTION	2013/14	2014/15	2015/16
REAL / TECHNICAL LOSSES	1	Pipeline and Valve Assessment and Replacement	X	X	X
	2	Replacement of Mid-Block Pipelines	X	X	X
	3	Pro-Active Leak Detection and Repairs	X	X	-
	4	Cathodic Protection of Steel Pipelines	-	-	-
	5	Sectorisation of Distribution Areas	X	X	-
	6	Telemetry System	-	-	-
	7	Indigent Properties Leak Fixing	X	X	X
	8	Leak Fixing & Meter Installation Project in Tsakane	X	X	-
	9	Metering of all Informal Settlements	X	X	-
	10	Pressure Management	- X	- X	X
APPARENT / COMMERCIAL LOSSES	11	Metering of all Unmetered Areas	X	X	X
	12	Replacement of all aged Domestic Water Meters	X	X	X
	13	Consolidation & Replacement of Large Water Consumer Meters	X	X	X
	21	Installation, Replacement & Maintenance of Water Meters	-	X	X
SUPPORTING SYSTEMS AND OTHER INITIATIVES	14	Integration of IMQS, EMIS, Asset Management & Venus			X
	15	Communication, Awareness and Education Programme	X	X	X
	16	Water Tariffs as an instrument to reduce Non-Revenue Water	X	X	X
	17	Training	X	X	X
	18	Document and Information Management System	-	-	-
	19	Risk Register: Monitoring and Mitigation Plan	-	X	X
	20	"War on Leaks" Rapid Responses	-	-	X

Household Water Supply



On-site Leak Repair

- Msunduzi: 77.1% of low-income households (Smith & Green, 2005)
- Sebokeng and Evaton in Emfuleni: 80% of households (Wegelin, et al., 2009)
  - 50 000 m³/day or 18 million m³/annum.
- Johannesburg: 67% of investigated properties (Lugoma, et al., 2012)
  - 12 kl/month/household.
  - top 10% with the highest leakage would reduce the leakage rate by 63%
- Tampa, Florida: demand dropped 46.3% after retrofitting (Mayer et al., 2004)
- Toilets are the highest culprits in water leaks (Mayer et al., 1999; 2004 and Britton et al., 2013)

On-site Leak Repair

SUSTAINABILITY???

(Mckenzie & Wegelin, 2009)

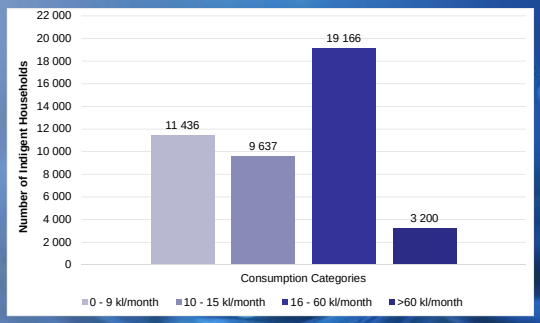
Sustainability???

- Extent of the reduction in leaks and water consumption
- Sustainability of the project benefits
- Financial efficacy: cost vs benefit

Ekurhuleni Indigent Leak Repair Project

- Targeted 2010/2011 Financial Year
- Implementation Phases:
  - Assess indigent household water consumption and prioritise
  - Auditing and investigation (pre-assessment)
  - Repair or replacement of leaking or damaged fixtures
  - Quality assurance and post assessment
  - Customer awareness

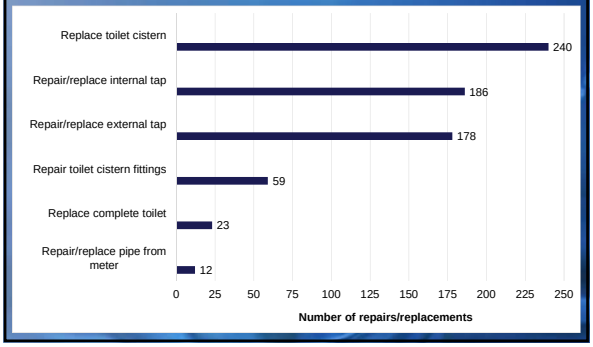
Indigent Household Water Consumption



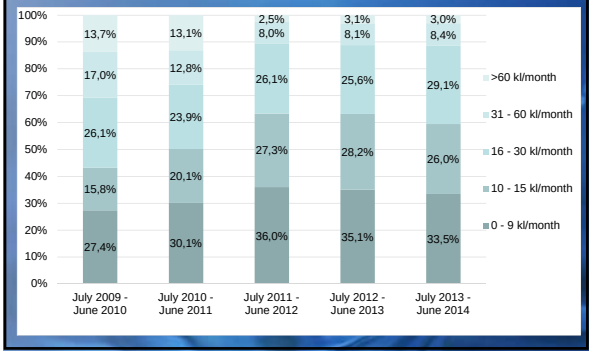
Data Handling & Analysis

- A dataset comprising 473 indigent households that were repaired was obtained
  - details of leak repair that was carried out
  - monthly water consumption over 66 months (25 January 2009 to 25 June 2014)
- Households with less than 95% of monthly water consumption data were excluded from the dataset
- The final dataset analysed below thus comprised of 257 stands.

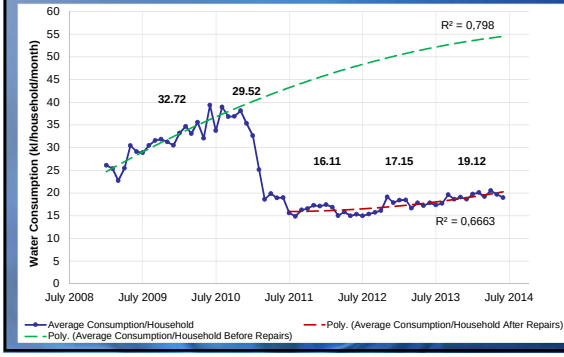
Repair or replacement of leaking or damaged fixtures



Consumption Pattern Analysis



Sustainability of Water Consumption Reduction Benefits?



Financial Efficacy of the Indigent Leak Repair Project

- Average cost per indigent household was R1 206.53 (ex. VAT)
- Benefit based on reduction in consumption x Rand Water tariff

Description	Cost (-) / Benefit (+)	Nett Cost (-) / Benefit (+)
Cost of project for 257 indigent households	-R 310 078.21	-R 310 078.21
End of Year 0	R 39 771.26	-R 270 306.95
End of Year 1	R 233 074.84	-R 37 232.11
End of Year 2	R 242 970.47	R 205 738.36
End of Year 3	R 233 199.74	R 438 938.10

Conclusion

- Extent of the reduction in leaks and water consumption
  - Consumption above 30 kl/month reduced from 30.7% to 10.5% in Year 1;
  - More than 50% reduction in average in monthly water consumption;
- Sustainability of the project benefits
  - The June 2014 average consumption was ~42% lower than in June 2010;
  - and ~65% lower than what it may have been (54 kl/month) had the project not been implemented.
- Financial efficacy: cost vs benefit
  - The net benefit amounted to R438 938.10 at the end of the 3rd financial,
  - payback was achieved early into the 2nd financial year.

Impact of WDM Business Plan Implementation

Water Balance Components

- System Input Volume

Financial Year	System Input Volume (kl/annum)	Difference from Previous Year (kl/annum)	Change (%)
2012/13	346,582,721	7,839,969	
2013/14	356,640,839	10,058,118	2.9
2014/15	364,906,484	8,265,645	2.3
2015/16	363,964,110	-942,374	-0.26

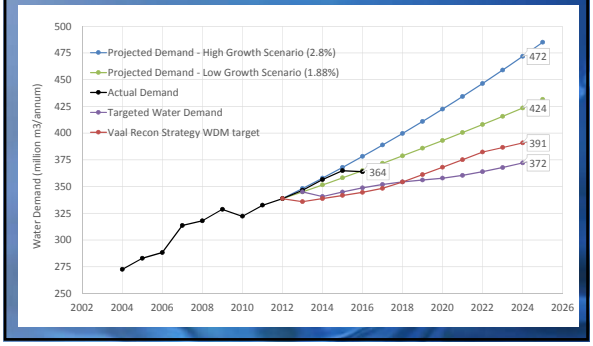
- Non-Revenue Water

Financial Year	NRW (kl/annum)	NRW (%)	Change (%)
2012/13	140 638 446	40.30%	
2013/14	134 674 900	37.80%	-2.5
2014/15	131 666 809	36.10%	-1.7
2015/16	125 859 904	34.60%	-1.5

10 Year NRW Reduction Projections

YEAR	Base Year	1	2	3	4	5	6	7	8	9	10
	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Budget Required	-	R150m	R360m	R410m	R330m	R320m	R300m	R250m	R240m	R230m	R200m
Budget Allocation		**R150m**	**R190m**	**R160m**							
Estimated % NRW Reduction	0%	1.0%	1.7%	2.2%	2.4%	2.4%	2.4%	2.4%	2.2%	1.9%	1.7%
Estimated % NRW	40.3%	39.3%	37.6%	35.4%	33.0%	30.6%	28.2%	25.8%	23.6%	21.7%	20.0%
Actual % NRW	**40.3%**	**37.8%**	**36.1%**	**34.6%**							

Water Demand Growth Scenarios



Strategy Review

Long Term WC/WDM Strategy

Aim:

- **To outline measurable objectives and action programs to ensure:**
  - **achievement of economic efficiency objectives,**
  - **reduction of non-revenue water and**
  - **deferment of the need for new water resources development**

Implementation objectives sub-divided into:

- **Institutional Arrangements,**
- **Alternative Water Resource Development,**
- **Water Resource Conservation Measures; and**
- **Water Demand Reduction Measures.**

WC/WDM initiatives over strategy period

WC/WDM Objectives	Actions	
NON-REVENUE WATER REDUCTION	Real or Physical Loss	Pipeline and Valve Assessment and Replacement
		Replacement of Mid-block Pipelines
		Pro-Active Leak Detection and Repairs
		Cathodic Protection of Steel Pipelines
		Sectorization of Distribution Areas
		Telemetry System
		Pressure Management
		"War on Leaks" Rapid Responses
	Apparent Loss	Replacement of all aged Domestic Water Meters
		Consolidation & Replacement of all Large Water Consumer Meters
		Installation, Replacement & Maintenance of Water Meters
		Updating and cleanup of the meter data and billing database
		Reduce the level of unauthorised consumption.
	Unbilled Authorized	Metering of all Informal Settlements
		Metering of all Unmetered Areas
		Metering of all Council buildings and facilities

WC/WDM initiatives over strategy period

WC/WDM Objectives	Actions
ALTERNATIVE WATER RESOURCE DEVELOPMENT	Promulgate wastewater reclamation policy and by-law.
	Conduct feasibility studies to identify feasible alternative water resource development opportunities.
	Implement feasible alternative water resource opportunities.
	Promote/advertise the use of alternative water resources.
WATER RESOURCE CONSERVATION MEASURES	Formulate and implement education and awareness campaigns to promote water conservation
	Formulate and adopt a Drought Management Plan
	Implement and enforce water restrictions as per by-laws and/or Drought Management Plan.
	Formulate and enforce regulations to reduce demand growth from new developments.
	Implement retrofitting and leak repair projects in indigent households
	Implement retrofitting and leak repair projects in areas with very high NRW and water losses.
	Encourage retrofitting in schools, industries, and the commercial sector.
	Reduce water consumption in Council buildings and facilities.
INSTITUTIONAL ARRANGEMENTS	Collaboration and co-ordination with the Finance and Corporate Legal Departments on accurate and consistent meter reading, billing, revenue collection and by-law enforcement;
	All critical positions to be filled to increase capacity to implement this strategy;
	Develop and implement a comprehensive training programme on WC/WDM for staff

Strategy Implementation Phasing

- Phase 1: Project initiation, status-quo assessment and data gathering
- Phase 2: Some field measurements, assessments, project feasibility, prioritisation, business plan preparation
- Phase 3: Secure funding for project implementation
- Phase 4: Project implementation and monitoring project impact
- Phase 5: Operational phase including capacity building, training, implementation of management systems to assist with repairs, operations and maintenance
- Phase 6: Close-out and hand-over

Conclusion

- Progress since 2013/14:
  - Reduction of the growth in water demand.
  - 5.7% reduction in non-revenue water.
  - 3.3% reduction in water losses.
- In line to meet the target of reducing NRW to 20% by 2023.
- In line to meet the Vaal Reconciliation Strategy Targets in the next three to four years if the current momentum and traction is maintained.

- Thank You -