



## WC/WDM at Johannesburg Water


23<sup>rd</sup> June 2015  
N Moul



### BACKGROUND & OBJECTIVES



- GLS currently contracted to assist Johannesburg Water with Water Reticulation Masterplanning:
  - Maintaining hydraulic models of supply network
  - Detailed treasury analysis on stand-by-stand basis
- Possible to identify many new WDM projects on an ad-hoc basis
- However decision was made to analyse all available data in a structured manner, with the aim of providing a WC/WDM masterplan to supplement WDM initiatives already being carried out by JW.



## BACKGROUND & OBJECTIVES (cont..)

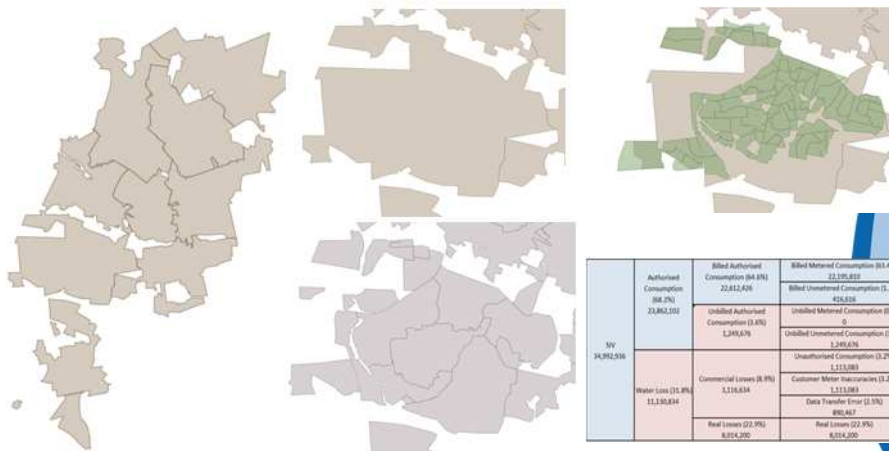


- Proposed Methodology:
  - Develop Water Balance Management System
  - Review Bulk Meter Requirements
  - Minimum Night Flow Analysis
  - Pressure Reduction/Control
  - Meter Replacement
  - Large Users, Schools & General treasury analysis
  - Analysis of Pipe Burst Incident Data
  - Consolidate/Prioritise Projects & Estimate potential Savings

## WATER BALANCE



- Zonal Water Balance, carried out on multiple levels

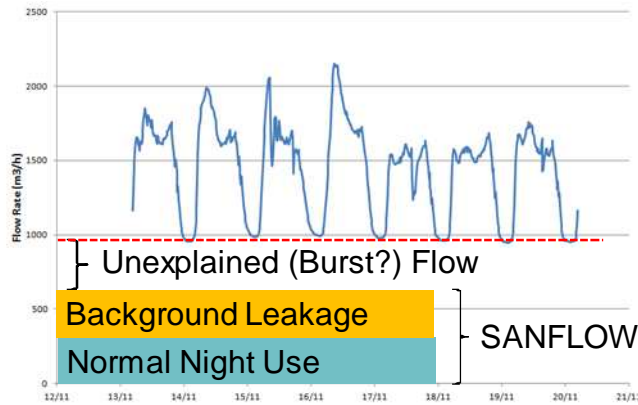


JW	Authorized Consumption (84.2%)	Billed Authorized Consumption (84.4%)	Billed Metered Consumption (83.4%)	Revenue Water (84.4%)
	23,862,502	22,822,498	22,227,812	22,812,426
Water Loss (15.8%)	Unbilled Authorized Consumption (1.4%)	Unbilled Metered Consumption (8%)	Billed Unmetered Consumption (1.2%)	Non-Revenue Water (15.4%)
	1,340,679	1,849,676	426,516	
Real Losses (22.3%)	Commercial Losses (8.8%)	Unauthorized Consumption (1.2%)	Customer Meter Inaccuracies (1.2%)	Real Losses (22.3%)
	1,118,834	1,113,088	1,113,088	
		Data Transfer Error (1.5%)		
		892,847		
		Real Losses (22.3%)	Real Losses (22.3%)	
		8,374,292	8,374,292	

## MINIMUM NIGHT FLOW ANALYSIS



Analysis carried out for 28 supply zones



## PRESSURE MANAGEMENT





- 177 New PRV zones already defined for city
- Prioritisation exercise carried out, projects ranked on estimated savings/Rand spent



Lehae Res PRV1  
 Current Static: 81m  
 Future Static: 45m  
 1,764 Connections,  
 15km Pipework  
 Est Cost: R125,720

## METER REPLACEMENT

- Existing JW Practices:
  - Driven by meter faults (reactive) and Pipe replacements
  
- Review of meter replacement best practice & JW's Aspirations:
  - "Small/Domestic" meters (15mm-25mm) - replaced in bulk on suburb basis. Driven primarily by age, but also consumption levels and pipe bursts.
  - Large Meters (40mm and greater) – replaced on individual basis. Driven primarily by site audits and meter inspections.

## METER REPLACEMENTS – SMALL




- Model developed to prioritise small meter replacements on a suburb basis

Age: 70%

Reading: 10%

Consumption: 10%

Burst Exposure: 10%

→

Prioritised Suburb List



## METER REPLACEMENTS – LARGE



- ◆ 40mm-150mm Meters in JHB
  - 11,838 Meters: 3.6% of total
  - 203M/day: 30.5% of total
- ◆ Large ICI meters to be replaced through Large Meter Audits
  - Prioritised list generated based primarily on prevalence of Billing anomalies and meter age
- ◆ Supplementary list of residential large meters for replacement identified based on age and consumption levels.

## LARGE USERS & TREASURY ANALYSIS



- ◆ List of 100 Largest Consumers reviewed:
  - Reconciled with JW's current list of largest consumers
  - Ad-hoc recommendations made, eg: meters that are read infrequently, old meters to be replaced
- ◆ 200 Large Meter records with Lowest Consumption

Avg_Day_Demand	Meter_Size	Meter_Insta	Measuremen	Me	Consumer	Address
0	100	2009-10-16	6,109	KL	UNITED ASSOCIATION OF SA	GOLDMAN STREET...
0	50	2010-05-06	36	KL		GORDON ROAD   2
0	100	2009-08-14	137,496	KL	PALMS BODY CORPORATE   RUIMSIG	CABERNET STREET...
0	50	2010-05-06	873	KL	BODY CORPORATE FLORA VIEW	FLORIDA NORTH E...
0	50	2013-02-03	6	KL	GUNRIC VALVE MANUFACTURING (P...	DOMKRAG STREET...
0	50	2010-03-04	111,981	KL	CONTROLLING BODY EAST LAKE	SIXTH AVENUE   47
0	50	2009-10-20	838	KL	HI - TECH TECHNICAL SERVICES CC	SPYKER CRESCENT...
0	80	2014-03-18	14	KL	THE VILLAGE DON 345 CC	RADIOKOP EXTAS...
0	50	2009-10-17	29	KL	T C I INVESTMENTS (PTY) LTD	RICHARD ROAD   41
0	50	2009-10-17	90	KL	PRIMA TILES CC	WINZE DRIVE   218
0	50	2009-09-11	39	KL	CITY   CITY OF JOHANNESBURG	FLEURHOF TS   44...
0	50	2010-05-04	8	KL	LOUGILL BODY CORPORATE	THE HIGHWAY ST...
0	50	2010-04-02	135,914	KL		NADINE STREET   ...
0	50	2010-05-07	138	KL	BARBARA MANSIONS BODY CORPO...	PENNY STREET   19
0	80	2009-06-12	8	KL	SUITE CONCEPTS (PTY) LTD	WINZE DRIVE   204

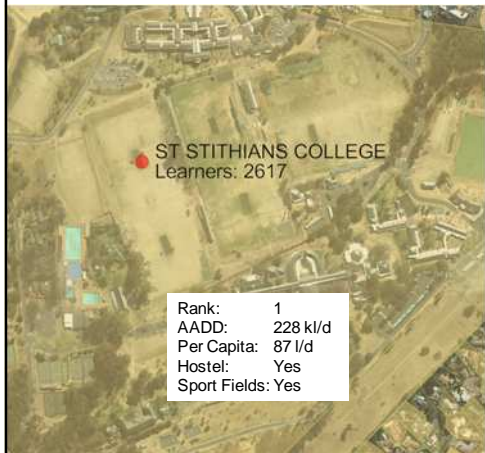
Billing Error?  
Meter Stopped?  
Oversized?



## SCHOOLS ANALYSIS



- Schools database provided by Dept of Education
- Per capita consumption analysed for top 50 school consumers, compared to benchmark values (20 l/cap/d)



## PIPE BURST ANALYSIS



- Pipe burst database provided by JW, burst incidents captured on suburb basis
- Database analysed and suburbs ranked on bursts/km
- Results used to inform Pipe replacement and Identify potential new PRV zones:

Rank	Township/Suburb Name	Burst Frequency (/km)	Average Pressure (m)	Average Pipe Age (yrs)	Current Remedial Actions	Remedial Actions Identified from Burst Analysis
1	LERATONG VILLAGE	71.9	83.5	11.5	Masterplan PRV Zone to be implemented	
24	ALEXANDRA	21	71.3	19.6		Establish new PRV
39	MORNINGSIDE	18.1	64	34.2	Pipe Replacement being implemented	
45	WILLOWILD	17.6	78.2	46.5		Pipe replacement recommended

## OVERVIEW



- Desktop exercise, now moving into implementation phase - Outcomes need to be quantified!
- Potential for significant reduction in NRW:
  - Meter replacement strategy
  - Large User & Large Meter Analysis
- Potential for significant reduction in Real Losses:
  - Pressure Reduction
  - Schools Analysis
  - Water Auditing – Leak Detection

## THANKS



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