APA Group

APT ALLGAS ENERGY PTY LTD NETWORKS

MAINS REPLACEMENT STRATEGIC PLAN

Version 1.0

28 September 2010

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SECTION 1 - Executive Summary

Allgas operates 2926 km of gas mains, including some 400km of cast iron and unprotected steel mains (CI and UPS) within Brisbane. The CI and UPS mains are approaching the end of their useful lives with public risk, supply reliability and increasing operating costs key drivers for replacement.

Various options were examined to establish the scope and timing of replacement. A strategy based on the minimum level of replacement that will maintain the integrity of the network at an acceptable level of risk commensurate with prudent use of available funds has been recommended.

The following table summarise replacement rates and costs over the next 6 years.

	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16
Total Replacement - km	17.9	17.9	17.9	17.9	17.9	17.9
Total Replacement - $'M (Nominal)	4.0	4.15	4.34	4.47	4.66	4.83

This replacement plan focuses on optimising the use of available replacement capital expenditure funds by targeting replacement of mains that:

- Present a high risk to the public and or maintenance personnel
- Have insufficient capacity to meet current and future consumer demands
- Incur high maintenance and operating costs

This replacement strategy is considered to conform to capital expenditure rules specified in National Gas Rules, Section 79(2) on the basis that it is necessary to:

- Improve the safety to public
- Maintain integrity of natural gas supply to existing customers

There are risks associated with cast iron mains in high density inner city suburbs that will not be fully addressed until the all the CI mains are replaced. The prime safety risk concern is associated with gas mains where there is little or no open ground from which gas can vent to atmosphere. Under these conditions gas could migrate to buildings, plant rooms, etc, in sufficient volumes to create an explosive mixture. The risk is particularly acute within the inner city suburbs of Brisbane.

A prudent measure to mitigate this risk will be implemented during 2010/11 where leak survey frequency will be increased in specific locations where the combination of frequency of mains breaks, location to high occupancy building and little or no open ground between the main and building presents a relatively higher risk to the public than other mains.

SECTION 2 - Introduction

This Mains Replacement Plan provides the basis and justification for a mains replacement programme. It forms part of the Asset Management Plan for APT Allgas Energy Pty Ltd Distribution Networks. The output of the plan is forecast mains replacement capital expenditure with focus primarily on retiring old cast iron and unprotected steel mains from the network. This Mains Replacement plan covers the low and medium pressure networks of the Brisbane metropolitan area containing the remaining cast iron and unprotected steel mains in the APT Allgas Energy Networks.

The Asset Management Plan endeavours to optimise all interventions on the network by continuously monitoring the performance of the network and seeking to achieve increasing levels of safety and operational efficiency over the entire lifetime of the network assets.

This document outlines the objective of maintaining integrity of the network and capacity to meet current customer demands, reducing maintenance and operational risks and costs within the old low and medium pressure distribution networks.

Update and review cycle

The development of this Mains Replacement plan is part of the overall Asset Management Planning year round process with two parallel streams of continual nature. The first stream involves the ongoing monitoring of asset performance and the ongoing monitoring of implementation of the previous year's AMP. The second stream involves the review of asset performance, risk assessment, development of technical solutions, development of budgets and securing management approvals.

Revision and Update of the Plan

The National Manager Asset Strategy and Planning is responsible for revising and updating this plan.

SECTION 3 - Mains Replacement Overview

It has been recognised that the ageing cast iron and unprotected steel mains are overrepresented as a proportion of network maintenance activities and pose an elevated safety risk to maintenance personnel and the public. The majority of the unaccounted for gas is believed to be associated with leaks from cast iron and unprotected steel mains.

3.1 Replacement Objectives

APA's mains replacement programme objectives are to:

1. Maintain and improve safety, in particular public safety;
2. Meet regulatory obligations and requirements;
3. Maintain asset integrity and performance;
4. Realise economic value through reduction in operating costs; and,
5. Reduce environmental impact of green house gases.

The drivers and strategy for mains replacement will be reviewed annually.

Mains replacement will be undertaken in an efficient manner, including "block" based replacement and upgrading of pressure where possible.

Mains that require replacement fall into one or more of the following categories:

- Safety based mains replacement
- Condition based replacement and
- Performance based mains replacement

3.2 Safety Based Replacement

The key risk identified for mains is the possibility of gas leaks migrating to buildings where fire or explosion could result in significant consequential damage to the public and or property.

The major risk of an explosion in a property, and the possible consequential loss of life or injury related to gas escaping from a cast iron main, is at locations where the surface between the leak and a property is sealed by a road or pavement. Under these conditions gas is unable to vent to atmosphere and can travel into ducts, basements and other confined spaces creating a risk of explosion. These conditions are particularly prevalent in Brisbane's inner city suburbs where there is a high incidence of leaks, very little open ground for leaks to vent and generally high density housing.

Approximately 200 km of low and medium pressure mains in Brisbane is located in high density areas with little open ground from which leaks can vent to atmosphere.

3.3 Condition Based Replacement

All cast iron and unprotected steel mains are nearing the end of their technical and economical lives. Unless there is a broad insertion and pressure upgrade programme there will be an increasing incidence of piecemeal replacement carrying a significant premium. By comparison to average unit rates for block mains replacement, piecemeal replacement unit rates can be of the order of 3-5 times the cost.

It is expected that if no sufficient replacement were undertaken, piecemeal replacement would escalate over the next 5 to 10 years as these mains deteriorate further.

3.4 Performance Based Mains Replacement

Approximately 215 km of cast iron and unprotected steel mains have inadequate capacity to meet the requirements of instant hot water appliances. The replacement and upgrade in supply pressures is required to maintain adequate capacity to existing consumers and enable additional growth within these networks. The dispersed nature of these mains is such that a pressure upgrade of the broader network will be required.

Given that there are risk and integrity drivers for replacing the old networks this will provide and effective and efficient long term solution to capacity limitations within these networks.

3.5 Mains Replacement Process

Mains are prioritised for replacement giving consideration to:

- Leak frequency identified by both leakage survey and public reported escapes
- Estimated level of operating and maintenance costs and UAFG related to gas leaks costs
- Capacity performance issues where system pressures cannot be maintained at levels consistent with efficient consumer appliance operation
- Current and potential future customer demands
- Planned local city councils and Main Roads activities on road and footpath resurfacing and upgrades
- Available capacity of existing supply mains

As part of this process:

- Critical network performance indicators are analysed on suburb levels and priorities for individual projects are determined based on set criteria
- High level concept plan for mains replacement is reviewed based on recent information available
- Long term Mains Replacement Strategic Plan is developed
- Design, cost estimate and project justification for 1 to 5 year mains replacement program is reviewed and related business case developed and submitted for approval
- Project plans and cost estimates are prepared, investment appraisal undertaken and submitted for approval.
- Project financial approval is obtained
- Tender is organised and the most suitable contractor is selected
- Project implementation is managed and coordinated with all key stakeholders
- At the completion project implementation, key performance indicators are analysed and any improvement opportunities identified and recorded

3.6 Main Renewal History

The first major renewal project was commenced in May 2001 in Hawthorne and completed in October 2001. This project was used to verify estimated costs and benefits and to confirm a business case for future rehabilitation projects. Following replacement of mains in Hawthorne, mains renewal was completed in Kangaroo Point, East Brisbane, South Brisbane, West End, Highgate Hill Stage 1 and Upper MtGravatt.

In 2007 and 2008 there was slow down in mains renewal program related to change of network owners and related transition period. Continuation of Main Renewal Program started in 2009 with renewal of old mains in Brisbane suburbs of Highgate Hill and Norman Park.

The following table summarise actual replacement expenditure since the initial major renewal commenced.

BLOCK MAIN RENEWAL PROJECTS	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
Costs ($)										
Hawthorne	895,223									
Kangaroo Point		1,014,998								
East Brisbane			2,211,828							
South Brisbane				1,591,227						
West End					3,015,032					
Toowoomba					452,174	750,169	585,101	396,016	127,746	
Highgate Hill 1						679,437				
Upper MtGravatt							302,849			
Highgate Hill 2&3 and Norman Park									3,756,023	4,472,986
Length (m)										
Hawthorne	13,173									
Kangaroo Point		12,190								
East Brisbane			19,193							
South Brisbane				10,834						
West End					18,786					
Toowoomba					4,500	7,300	4,000	2,150	750	
Highgate Hill 1						4,442				
Upper MtGravatt							1,550			
Highgate Hill 2&3 and Norman Park									13,826	17,355
Unit cost ($/m)										
Hawthorne	68									
Kangaroo Point		83								
East Brisbane			115							
South Brisbane				147						
West End					160					
Toowoomba					100	103	146	184	170	
Highgate Hill 1						153				
Upper MtGravatt							195			
Highgate Hill 2&3 and Norman Park									272	258

Mains renewal provided significant improvements in the overall condition of APT Allgas Energy Pty Ltd distribution networks and contributed to lowering of UAG levels, lowering of operation and maintenance costs and improving quality of supply to the customers by increasing available capacities and pressure and reducing loss of supplies related to water ingress in low pressure mains.

As part of the 2006 Access Submission the Queensland Competition Authority (QCA) approved a total 209 km of replacement for the current Access period. A result of constraints on capital just over 25% of the approved total has been completed. The following table compares actual replacement with the 2006 Access determination.

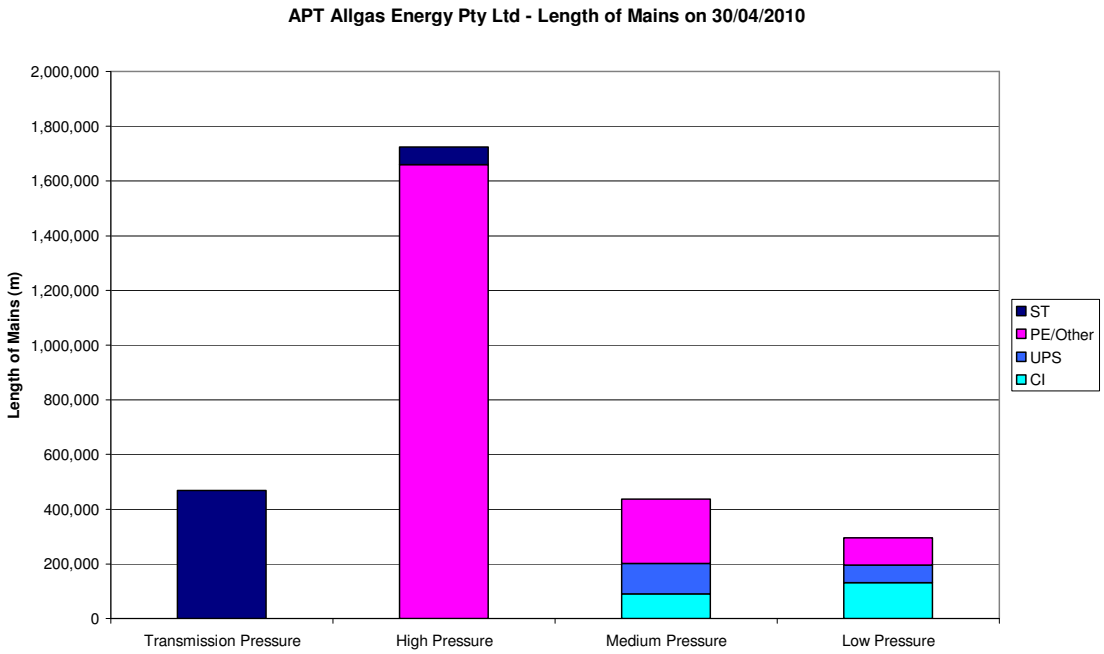
	06/07	07/08	08/09	09/10	10/11	Total
AA Approved Mains Renewal Length (m)	35,670	45,887	42,106	42,200	44,025	209,888
Actual Mains Renewal Lengths (m)	5,550	2,150	14,576	17,355	18,000	57,631

SECTION 4 Distribution Network Overview

4.1 Mains Inventory

The following tables summarises the inventory of all mains within APT Allgas Energy Pty Ltd distribution networks as of 30 April 2010.

Brisbane Networks	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure				254,515	**254,515**
High Pressure			663,348	60,490	**723,837**
Medium Pressure	90,175	110,666	235,000		**435,841**
Low Pressure	130,834	64,328	99,834		**294,997**
Total	**221,009**	**174,995**	**998,182**	**315,005**	**1,709,190**
South Coast Networks	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure				157,522	**157,522**
High Pressure			492,104	2,384	**494,488**
Medium Pressure					**0**
Low Pressure			484		**484**
Total	**0**	**0**	**492,588**	**159,906**	**652,494**
Toowoomba Networks	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure				48,294	**48,294**
High Pressure			475,369	1,569	**476,938**
Medium Pressure			2,036	40	**2,075**
Low Pressure			110	1	**110**
Total	**0**	**0**	**477,515**	**49,903**	**527,418**
Oakey Networks	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure				6,998	**6,998**
High Pressure			29,046	90	**29,136**
Medium Pressure					**0**
Low Pressure					**0**
Total	**0**	**0**	**29,046**	**7,087**	**36,133**
Moura Network	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure				1,209	**1,209**
High Pressure					**0**
Medium Pressure					**0**
Low Pressure					**0**
Total	**0**	**0**	**0**	**1,209**	**1,209**
Total Networks	**CI (m)**	**UPS (m)**	**PE/Other (m)**	**ST (m)**	**Total (m)**
Transmission Pressure	0	0	0	468,537	**468,537**
High Pressure	0	0	1,659,867	64,532	**1,724,399**
Medium Pressure	90,175	110,666	237,036	40	**437,917**
Low Pressure	130,834	64,328	100,428	1	**295,592**
Total	**221,009**	**174,995**	**1,997,331**	**533,110**	**2,926,445**



At the end of April 2010 there were total of nearly 400km of cast iron and unprotected steel mains in low and medium pressure networks in Brisbane. Those mains account for the majority of leaks and water ingress issues.

The weighted average age of cast iron mains in the Brisbane networks is estimated to be around 76 years and that of the unprotected steel around 43 years. Both asset classes are nearing the end of their effective technical and economical lives.

4.2 Mains Performance, Condition and Integrity

4.2.1 Network Integrity – Key Performance Indicators

Mains replacement aims to maintain the integrity of the network as measured by:

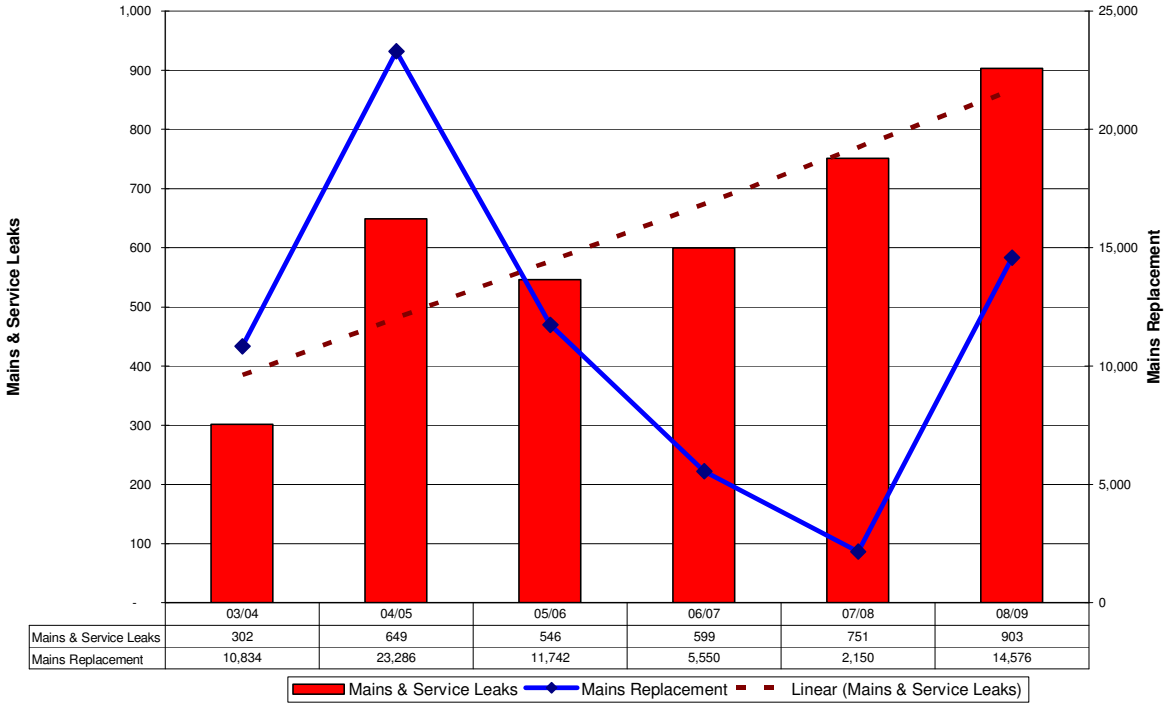
- Public and survey reported leaks
- Capacity issues in the network and
- The 12 month MAT UAFG

Increasing trends in these KPI's are indicative of deterioration in network integrity.

There are strong network safety, integrity and capacity drivers to replace the residual amount of cast iron and unprotected steel mains in the Brisbane networks.

4.2.2 REPORTED LEAKS

The following graph summarises the trends in identified leaks in old low and medium pressure networks of Brisbane over the last 6 years.



	03/04	04/05	05/06	06/07	07/08	08/09
Mains & Service Leaks	302	649	546	599	751	903
Mains Replacement	10,834	23,286	11,742	5,550	2,150	14,576

Leaks numbers shown in this graph are leaks reported by public and leak survey crews that are related to failures of the distribution network and are not directly related to third party damages.

There has been an increase in mains and service leaks in Brisbane over the last 6 years despite on average 17 km/yr of mains replaced during this period.

There appears to be an inconsistency in escalation in leaks between FY 03/04 and FY 06/07 and a corresponding 42% reduction of UAFG during this period. Changes to reporting processes and systems during this time may have influenced these trends.

Of the 395 km of cast iron and unprotected steel mains approximately 175 km (44%) is UPS. These mains are not contained within discrete networks, moreover, individual mains units are dispersed throughout the network.

Unlike CI mains the first call to a leak on UPS will reveal quite extensive pitting corrosion along the pipe length with “piecemeal” replacement rather than repair the only option.

Piecemeal renewals are typically in the order of 100 metres or less in length. This short length combined with the fact that direct burial size for size replacement is often required to maintain capacity results in a higher unit cost relative to planned “block” renewal carried out using insertion techniques.

Depending on soil conditions, UPS steel mains generally have a useful life between 45 and 65 years. With the average age of these mains approaching the end of their useful life, it is expected that

unless there is a planned replacement and pressure upgrade programme there will be an increase in UPS piecemeal replacement.

4.2.3 CI Mains Leaks – High Risk Areas

In countries like the UK, where there are still high levels (circa 80,000 km) of CI in the distribution network, it has been established that that the greatest risk is associated with large volumes of gas escaping at locations where there is little or no open ground between the break and property.

In these circumstances gas escaping may not escape to atmosphere via open ground and instead can potentially enter a building in sufficient volume to cause the creation of an explosive mixture. Historical data from the UK indicates there are around 1.3 million gas escapes per year of which 12,000 emanate from breaks. Of these 12,000 breaks, 600 cause gas in buildings and on average, 3 results in a serious incident.

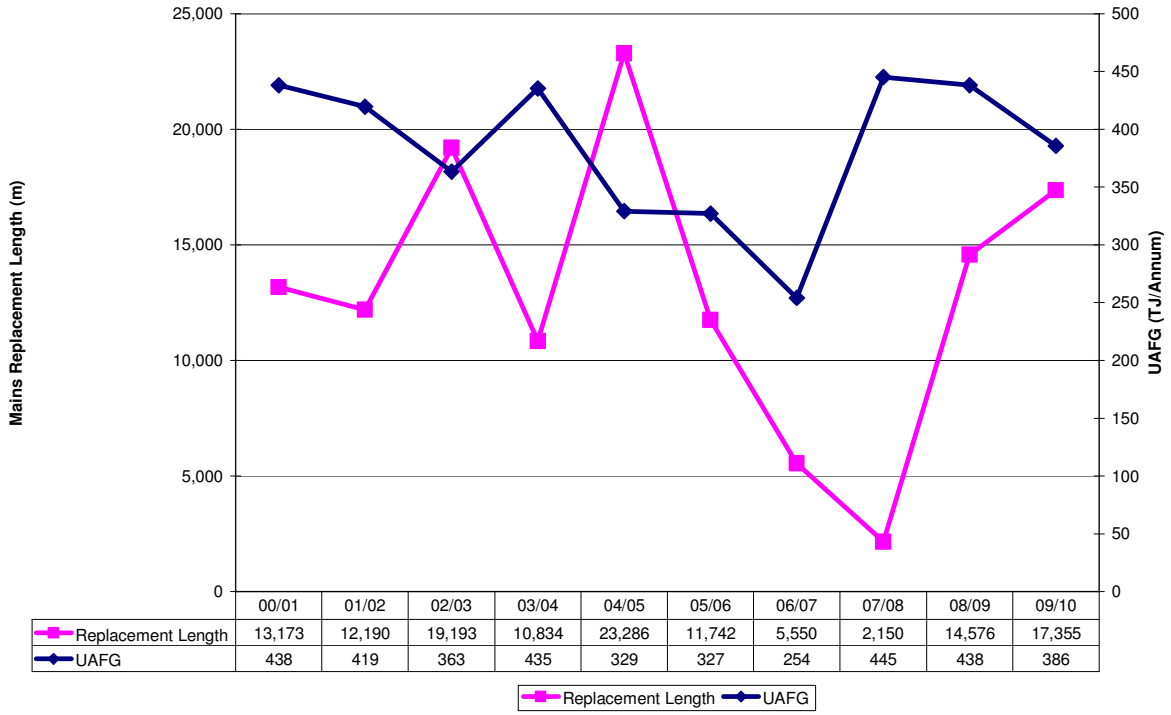
Consequently the UK has developed a risk model to prioritise replacing all its CI within 30 metres of a property (which is nearly all the CI). The risk model focuses replacement on areas where there is a high risk of breakage and little or no open ground for the gas to escape.

A risk model based on probability of breakage and consequence, developed by external consultants, is being used by the 3 Victorian and South Australian distribution businesses. Mains that are considered most likely to break based on historical data are prioritised for replacement. At this stage there is insufficient data of the type and quality to develop a similar risk model for the Brisbane network.

Based on a qualitative assessment, approximately 50% (200km) of the remaining cast iron and unprotected steel mains in Brisbane are located in the inner city high density occupancy locations with little or no open ground in the vicinity of buildings. Leaks from these mains are considered to pose a higher risk than those in other less populated areas.

4.2.4 UNACCOUNTED FOR GAS

The graph below details MAT UAG for the Brisbane Region from July 2000.



	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Replacement Length	13,173	12,190	19,193	10,834	23,286	11,742	5,550	2,150	14,576	17,355
UAFG	438	419	363	435	329	327	254	445	438	386

It is considered that about 75-80 % of the reported UAFG is associated with leaks from CI & UPS.

It is estimated that the CI & UPS mains are contributing about 700 GJ/km/yr to the total UAFG.

During the 6 year period from 2000 the replacement strategy focussed on replacing mains with the highest incidence of leaks and UAFG. During this period, on average, 15 km/yr of CI & UPS was replaced with a commensurate reduction in UAFG of about 180 TJ's.

During the 4 year period from 2006 the increase in UAFG correlates to the reduction in mains replacement with, on average 9.9 km/yr replaced. The reduction in replacement was associated with capital constraints during this period.

4.2.5 CAPACITY ISSUES

Urban redevelopment throughout the suburbs of Brisbane is posing capacity issues in the old low and medium pressure networks. Additional peak hour demand from either higher density housing or use of high instantaneous demand appliances has seen an increase in the number of identified supply problems. There has been an increase in the number of complaints regarding poor supply pressures. These have generally been traced to either water ingress, the use of high demand appliances or "organic growth" in areas where housing density has been increased because of urban consolidation developments.

The old low pressure CI & UPS networks are typically supplied with gas at 1.6 kPa. To maintain adequate supply to instantaneous demand appliances a minimum pressure of 1.35 kPa is required.

It is estimated that approximately 50% or 150 km of low pressure mains in Brisbane networks have insufficient mains capacity to service modern high demand appliances.

4.2.6 MAINS PERFORMANCE, CONDITION & INTEGRITY – CONCLUSIONS

1. A minimum replacement rate of about 15 km/yr is required to improve network integrity, in particular the reduction of UAFG.

2. On average the CI & UPS mains contribute about 700GJ/Km/yr to UAFG in Brisbane

3. The residual CI mains in high density areas and increasing incidence of leaks in these areas are considered to pose a higher risk to the community than main in less dense areas.

4. Approximately 150 km of the LP CI & UPS network is considered capacity constrained given the requirements of modern day gas appliances. Urban consolidation within older inner city suburbs is further exacerbating the problem. These mains are generally located at the "tail" end on LP networks, not necessarily close to alternative supply sources. The only effective way to meet customer demands is block main replacement, including pressure upgrade of the broader LP network.

5. Unlike CI mains where the majority of leaks area associated with leaking joints that can be repaired, the first response to a leak on UPS could require piecemeal replacement due to extensive external pitting corrosion. The 175 km of UPS are approaching an age where increasing levels of piecemeal replacement are expected in response to reported leaks.

6. In summary there are safety/risk, performance and condition/integrity drivers to replace the residual amount of CI & UPS in Brisbane

SECTION 5 - Replacement Strategy

5.1 General

The replacement of mains will be prioritised based on a combination of risk, performance and economics. The following sections summarise the individual drivers for replacement.

5.2 Risk Based Replacement

The prime safety concern associated with CI & UPS is gas entering buildings, especially from a circumferential break in the CI network where a sudden large release of gas has sufficient volume to create an explosive mixture in a nearby building. In locations where there is little open ground for the gas to escape to atmosphere, such as the inner Brisbane city suburbs, then the risk is increased.

Based on a qualitative assessment, approximately 50% (200km) of the remaining cast iron and unprotected steel mains in Brisbane located in the inner city high density occupancy locations. At this stage a quantitative risk analysis, similar to that used by the Victorian and SA DB's has not been undertaken to asses the extent of high risk areas.

As a principle, mains with a relatively high incidence of mains breakage, in high density areas with little or no open ground for mains gas leaks vent will be given priority for replacement.

5.3 Performance Based Mains Replacement

Approximately 150 km of LP CI & UPS steel mains is unlikely to meet the requirements of modern day appliances. The replacement and upgrade in supply pressures is required to maintain adequate capacity to existing consumers and enable additional growth within these networks.

The dispersed nature of these mains is such that a pressure upgrade of the broader network will be required. The majority of these mains are located within high density areas where urban renewal/consolidation is exacerbating capacity issues.

The replacement and pressure upgrade of these mains provides an effective and efficient long term solution to capacity limitations within these networks.

5.4 Economic Based Replacement

The 175 km of UPS mains within the Queensland network are over 40 years old and nearing the end of their useful life.

Unlike CI mains where the majority of leak repairs are associated with joints that could be repaired, the first response to a leak on a UPS main is likely to find it riddled with corrosion with piecemeal replacement the only option.

Unless there is a broad insertion and pressure upgrade programme there will be an increasing incidence of piecemeal replacement carrying a significant premium. By comparison to average unit rates for "block" replacement, piecemeal replacement unit rates can be of the order of 3-5 times the cost.

A NPV analysis of replacement based on reducing operating costs is detailed in Section 5.7. The most significant economic driver for replacement is the cost avoidance of future piecemeal replacement of UPS mains. It is expected that if no replacement were undertaken, piecemeal replacement would escalate over the next 20 years as these mains deteriorate further.

5.5 Risk Assessment

Key risks associated with leaks from existing CI & UPS mains are:

- Public safety – Potential for gas in buildings from leaking gas mains
- Network Integrity/Reliability – Water in LP main issues
- Supply - Capacity to meet future demand on the LP and MP networks
- Revenue – Reduced revenue from constrained capacity of LP and MP networks.
- Operating expenditure – Increasing costs associated with deterioration of the network
- Environmental – Increasing UAFG contributing to greenhouse gas emissions.
- Reputation - APT Allgas Energy Pty Ltd reputation as a prudent network owner/operator

The risks related to current condition of old low and medium pressure networks in Brisbane have been assessed using the APA Risk Matrix, taking into account existing risk mitigation strategies. The following table summarises the risk assessment.

		Health & Safety	Financial Impact	Customer & Business Interruption	Environment	Compliance & Legal	Reputation	Total
Risk Untreated	Likelihood	Unlikely	Likely	Almost Certain	Almost Certain	Unlikely	Unlikely	
	Consequence	Major	Moderate	Moderate	Minor	Minor	Major	
	Risk Level	High 14	Moderate 07	High 16	Moderate 11	Moderate 07	High 14	69
Treated Risk	Likelihood	Rare	Rare	Rare	Rare	Rare	Rare	
	Consequence	Major	Moderate	Minor	Minor	Minor	Major	
	Risk Level	Moderate 10	Low 03	Low 01	Low 01	Low 01	Moderate 10	26

Priority		Priority Description
Priority 1		Any project, where Risk Level of at least one risk area falls into Extreme must be included in Priority 1. These projects should be regarded as non-discretionary, as their justification is to mitigate the risk level that is not acceptable to APA.
Priority 2		Any project, where Risk Level of at least one risk area falls into High must be included in Priority 2. The non inclusion of these projects may expose APA, or third party asset owner to potential short and long-term business damage.
Priority 3		Any project, where Risk Level of at least one risk area falls into Moderate must be included in Priority 3. The non inclusion of these projects may affect reliability of assets; as well it may affect operating efficiency and compliance.
Priority 4		Any project, where Risk Level of at least one risk area falls into Low must be included in Priority 4. The non inclusion of these projects may affect opportunity for overall company risk reduction and operating efficiencies.

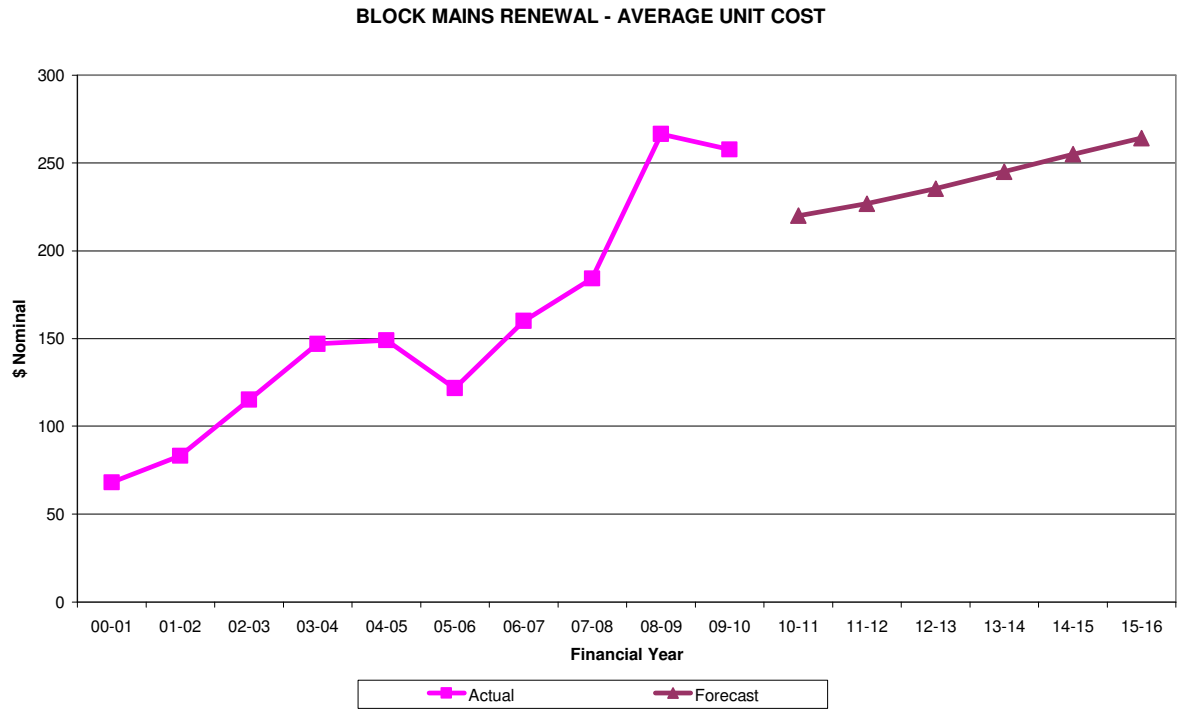
The replacement of mains has been assessed as a Priority 2.

5.6 Replacement Costs and Benefits

5.6.1 Costs

APT Allgas Energy Pty Ltd has outsourced its capital works program (material and labour) through a public tender process, thereby obtaining a market price with respect to the provision of these services.

Historical data related to average unit costs for block mains renewal are shown on diagram below together with forecast unit cost increase based on expected escalation rates.



The forecast unit rate for FY 10/11 is $220 nominal (including overhead). This rate has been based on a "moderated" actual average FY 09/10 unit rate of $258/m. Replacement during 2009/10 included projects in difficult locations which contributed to a higher unit rate.

The following table summarises the total inflation escalation rates used to calculate nominal unit rates over the period 20011/12 to 2015/16.

Description	11/12	12/13	13/14	14/15	15/16
TOTAL INFLATION AND ESCALATION RATES (%)	3.11	3.73	4.14	4.04	3.63
Inflation Rates (%)	2.50	2.50	2.50	2.50	2.50
Escalation Rates (%)	0.60	1.20	1.60	1.50	1.10

The forecast real cost escalation unit rates are based on Australian Energy Regulator's report on labour cost escalation "Forecast growth in labour costs" produced by Access Economics published on 16th September 2009.

5.6.2 FINANCIAL BENEFITS

5.6.2.1 Reduction of annual operating and maintenance costs

The estimated potential reduction of annual operating and maintenance costs assuming the total completion of mains renewal programme for old low and medium pressure networks in Brisbane based on actual costs for 2008/09 Financial Year are summarised in the following table.

	Total O&M 08/09	CI & UPS O&M	Total O&M Reduction
Activity	**$'000**	**%**	**$/Yr**
Inspection	722	10%	72
Planned Maintenance	1,562	10%	156
Corrective Maintenance	3,212	80%	2,570
Operation Support	3,726	10%	373
TOTAL	**9,222**	**34%**	**3,171**

5.6.2.2 Reduction of annual unaccounted for gas costs

The estimated potential reduction of annual UAFG as result of completing replacement of CI & UPS in Brisbane is about 250TJ/Annum or approximately $1.4M/yr.

This based on the following assumptions:

1. 75% of the total Queensland report UAFG is associated with leaks.
2. 90% of the Queensland UAFG is associated with the leaks from Brisbane network.
3. 95% of the UAFG associated with leaks in Brisbane is associated with the CI & UPS mains

5.6.2.3 Piecemeal mains replacement avoidance

As discussed in Section 3.3 UPS mains are close to the end of their useful lives. It is expected that over the next 20 years these mains will require replacement. If a broad scale "block" replacement programme of all CI & UPS is not undertaken these mains will need to be replaced on a piecemeal basis in response to mains leaks with an associated premium over replacement by insertion and pressure upgrade.

The piecemeal replacement scenario for the residual 175 km of UPS has been based on exponentially increasing rates over 20 year during which time all the UPS is expected to need replacement. It is expected that piecemeal replacement would commence to escalate in an exponential manner over the next few years. The cost of this piecemeal replacement has been included as cost avoidance in the economic modelling of the total "block" replacement programme.

5.6.2.4 Other Benefits

Other benefits associated with total replacement of CI & UPS mains that are difficult to quantify include:

- Ability to serve new customers on line of main as urban regeneration continues. The LP and MP networks are capacity constrained restricting incremental revenue from the network.

- Refocussing limited maintenance resources on optimising preventative maintenance programmes, rather than dealing with unplanned capacity and network control issues.

- Accurate records of mains locations, valves, I&C meter sets etc. The records of the old LP cast iron networks have been transcribed from wall maps (maintained by supervisors) to hardcopy cadastre maps to electronic maps. Details of depth and boundary dimensions are only as good as the original data. Replacement of the network will assist in reducing the risk of out of date information. (Note – in the UK Transco was fined 13 million UK pounds in 2005 for not keeping accurate records of the reticulation pipeline in Scotland (Larkhall) which led to an explosion and 3 deaths).

- Reduction in workers compensation claims and safety issues arising from leak repairs, excavations and maintenance on old mains.

5.7 Economic Analysis

An NPV analysis of total of CI & UPS replacement has been carried out using the following key assumptions/criteria:

1. Total costs of replacement incurred in Yr 0.
2. Block replacement rate of $220/m ($ Real 2010/11)
3. NPV over 20 years
4. Inflation of 2.5%
5. A discount rate of 10% (real)
6. Exponential replacement of UPS over 20 years as detailed in Section 5.6.2.3
7. A total 440 km of main replacement(400 km CI & UPS + 40 km of old poly and PVC) Analysis

The following table summarises the NPV analysis for the total replacement of CI & UPS mains in the Brisbane network.

BRISBANE REPLACEMENT - ECONOMIC ANALYSIS						
Leak Escalation	1%	2%	3%	1%	2%	3%
UPS Replacement Cost Premium	200%			300%		
NPV Base Cost -$'M	-12.5	-10.1	-7.5	-0.2	2.2	4.8
IRR Base Cost - %	8.4	8.8	9.1	9.9	10.2	10.5

Piecemeal costs are typically between 2 and 3 times the “block” insertion replacement unit rates.

A leak escalation rate of 2% is considered conservative given: the trends in leak escalation noted over the last 5 years; and deterioration expected over the next 20 years given the age of CI & UPS mains.

Based on a 20 year lifecycle cost the replacement of the total Brisbane CI & UPS mains can be considered “marginally” economically prudent.

SECTION 6 - Replacement Options

6.1 General

The following section considers various replacement options for the total replacement of CI & UPS mains within the Brisbane network. The options considered were:

- Option 1 – Maximum Accelerated Replacement (85 km/yr)
- Option 2 – Minimum Replacement (18 km/yr)
- Option 3 – Moderate Replacement (28 km/yr)

6.2 Option 1 – Maximum Accelerated Replacement

As discussed in Section 5 a level of risk and economic justification could support replacement of the old CI & UPS mains on an "as soon as possible" basis.

Assuming availability of funds and a satisfactory tariff outcome then the shortest practical completion would be during the Access Period 2011/12 to 2015/16.

Based on 17.9 km replacement currently budgeted the FY10/11 a balance of 422 km or almost 85 km/yr and $18.6M/yr ($ Real 2010/11) would be require over the next Access Period. This compares to the current annual budget of approximately $4M/yr.

APA would need to source an additional $14.6M/yr to fund this programme with a significant increase in Duos tariff required at the next Access Arrangement reset. It is considered that the tariff price shock this would incur could place customer connection economics at risk potentially stranding existing assets.

Given competition for limited funds and other projects with higher priorities within the APA Group, a significant increase in mains replacement CAPEX is not considered prudent. Given network growth and operational expenditure APA considers a replacement budget of about $4M would be a prudent level of replacement CAPEX given forecast revenue, growth CAPEX and operating costs.

This option is not recommended on the basis that:

- The increase in Tariff required to sustain such a programme would put the economic viability of new connections at risk potentially stranding network assets.
- The additional replacement CAPEX is not considered the optimal use of funds.

6.3 Option 2 – Minimum Replacement

This option continues the current rate of replacement of about 18 km/yr at an annual cost of about $4 M/yr.

As detailed in Section 4.2.4 an average replacement rate of 15 km/yr over the 6 year period from 2000 saw UAFG gradually reduce.

Option 2 at 17.9 km/yr replacement is considered the lowest rate commensurate with reducing UAFG over time.

This scenario does increase the risk of operating costs escalating, in particular increase in piecemeal replacement of UPS main. While it is difficult to quantify how quickly the existing UPS will deteriorate the moderate levels (about 0.4 km/yr) are forecast over the next 6 years with rates increasing to 5 km/yr, 12 km/yr and 17 km/yr in subsequent Access periods.

With this rate of replacement there are some risks with respect to ongoing leaks and maintaining capacity within the LP and MP networks. The following additional risk mitigation measures would be recommended with this Option:

- To mitigate risks of CI mains leaks in higher density areas it would be prudent to increase planned leak surveys to a 12 month frequency in areas where there is little or no open ground from which leaks can vent.

- To mitigate supply risks on the LP and MP networks careful scrutiny of new connections is required. Areas where capacity is constrained, and cannot be provided on a cost effective basis, then prospective new connections may need to be foregone.

- Development of improved risk, performance and condition assessment tools to better quantify drivers for any acceleration of future replacement.

This option is recommended on the basis that:

- An acceptable level of network integrity is maintained.
- It balances risk with the availability of funds.

6.4 Option 3 – Replacement over 15 years

This option considers a “moderate” rate of replacement between the maximum and minimum scenarios. Replacement over the next 15 years has been considered.

Based on 17.9 km replacement currently budgeted the FY10/11 a balance of 422 km or about 28 km/yr at $6.2M/yr ($ Real 2010/11). This compares to the current annual budget of approximately $4M/yr for a 17.9 km/yr replacement programme.

Increasing replacement to 28 km/yr over the next Access Period would still carry some residual risk to integrity and supply to the extent the same mitigation measures would be required.

This option would accelerate replacement and reduce potential risks to integrity and supply at a marginally faster rate than Option 2. However, in absence of more rigorous assessment of mains failures, capacity limitations and associated risk in high density areas it is difficult to quantify the benefits of an additional $2.2M/yr in mains replacement.

This option is not recommended on the basis that:

- There is not a compelling justification for the additional $2.2M/yr over Option 2.
- Additional replacement CAPEX in excess of $4M is not considered the best use of existing funds.

6.5 Recommendation

Option 2 is recommended on the basis that risks to network integrity and supply will be maintained at an acceptable level. This Option is commensurate with availability of funds given forecast revenue, growth and operating costs.

This replacement strategy is considered to conform to capital expenditure rules specified in National Gas Rules, Section 79(2) on the basis that the expenditure is justified on the grounds that is necessary to:

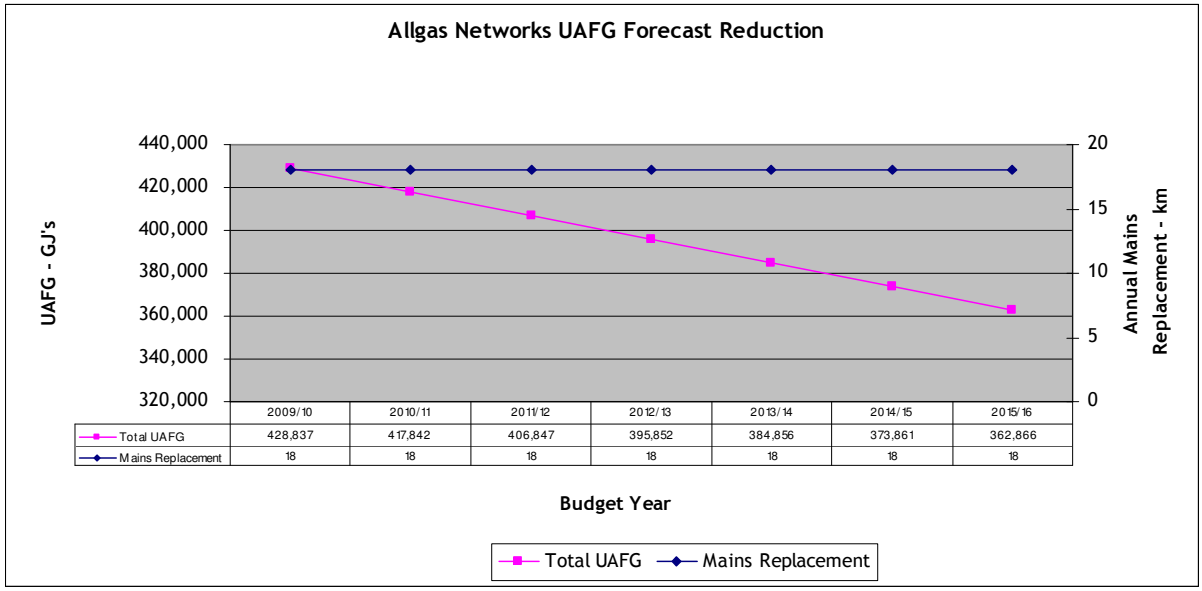
- Improve the safety to public
- Maintain integrity of natural gas supply to existing customers

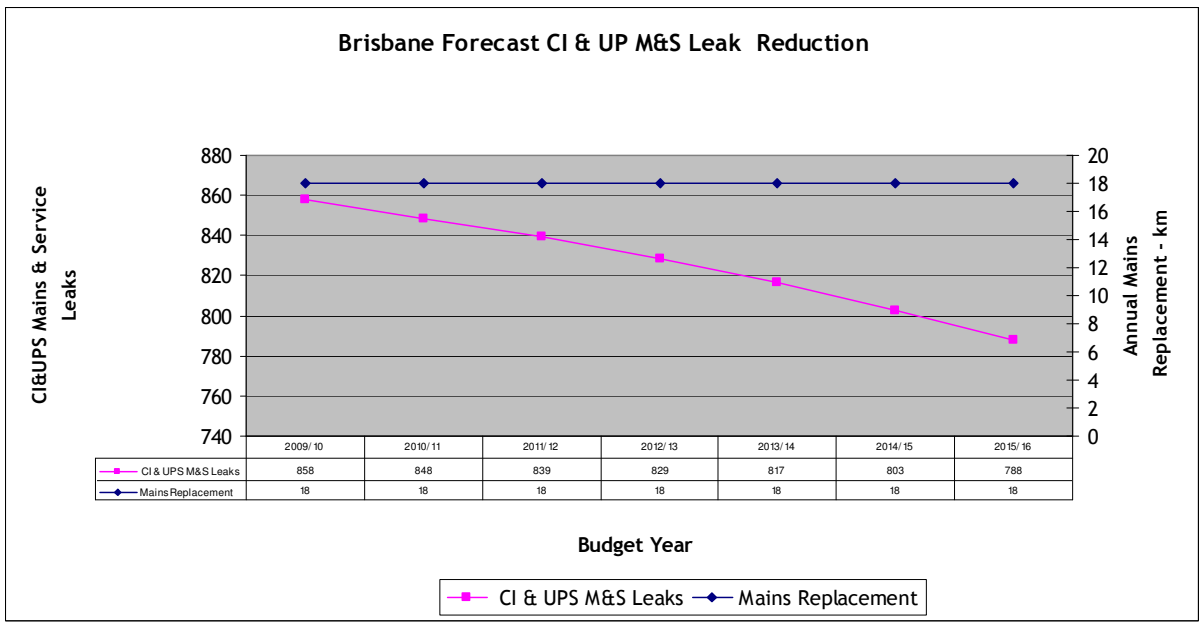
6.6 Opex/Capex Trade Off

The following graphs detail the year on year forecast of UAFG and CI & UPS leaks based replacement programme of 17.9km/yr.

As mains are replaced incremental benefits are realised in the following year. The full benefits of the replacement programme will not be realised until the total inventory of CI & UPS mains is replaced.

The forecasts are based on a 3%. leak escalation and an average 680 GJ/km UAFG from CI & UPS mains.





SECTION 7 - Programme of Work Priorities

The following table summarises the priority for replacement work. Block mains renewal projects in suburbs of Highgate Hill and Norman Park are currently in implementation stage. Work in suburb of Woolloongabba is planned to start in 2010/11 Financial Year.

The priority factor has been based on addressing areas with the worst combination of leaks, UAFG and supply problems.

The total mains length in this table includes approximately 160 km of mains previously inserted or direct buried. This main is considered suitable to be upgraded to medium pressure.

Priority	Suburb	Total Leaks 03/09	Total Main (km)	Lks/km/yr	Total Cost ($/km/yr)	Add. Customer Demand	Add. Demand Factor	Supply Mains Availability	Supply Factor	Priority Factor
1	Highgate Hill	139	14,431	1.61	12,783	High	1.20	High	1.20	**18,407**
2	Norman Park	198	21,767	1.52	12,199	Medium	1.10	High	1.20	**16,103**
3	Woolloongabba	179	30,860	0.97	8,609	High	1.20	High	1.20	**12,397**
4	Tarragindi	242	29,521	1.36	11,202	Low	1.00	Medium	1.10	**12,322**
5	Moorooka	282	38,909	1.21	10,171	Medium	1.10	Medium	1.10	**12,307**
6	Manly	133	14,740	1.50	11,547	Low	1.00	Low	1.00	**11,547**
7	Annerley	294	40,857	1.20	10,129	Medium	1.10	Low	1.00	**11,142**
8	Mt Gravatt	172	27,087	1.06	9,207	Medium	1.10	Medium	1.10	**11,141**
9	Mansfield	67	9,357	1.19	10,090	Low	1.00	Medium	1.10	**11,099**
10	Graceville	130	18,457	1.17	11,079	Low	1.00	Low	1.00	**11,079**
11	Sherwood	138	19,932	1.15	10,950	Low	1.00	Low	1.00	**10,950**
12	Morningside	145	24,721	0.98	8,680	Medium	1.10	Medium	1.10	**10,502**
13	Balmoral	68	11,709	0.97	8,617	Medium	1.10	Medium	1.10	**10,426**
14	Camp Hill	217	38,902	0.93	8,353	Medium	1.10	Medium	1.10	**10,107**
15	Coorparoo	277	52,844	0.87	7,990	Medium	1.10	Medium	1.10	**9,668**
16	Holland Park	366	54,296	1.12	9,633	Low	1.00	Low	1.00	**9,633**
17	Bulimba	83	16,691	0.83	7,707	Medium	1.10	Medium	1.10	**9,326**
18	Greenslopes	200	31,604	1.05	9,184	Low	1.00	Low	1.00	**9,184**
19	Fairfield	64	12,992	0.82	7,657	Medium	1.10	Low	1.00	**8,422**
20	Yeronga	98	20,490	0.79	7,474	Medium	1.10	Low	1.00	**8,221**
21	Corinda	60	17,210	0.58	7,234	Low	1.00	Low	1.00	**7,234**
22	Wynnum	202	57,403	0.59	5,542	Low	1.00	Low	1.00	**5,542**
	Total	**3750**	**604,780**	**1.03**	**9,365**		**1.07**		**1.07**	**10,762**