Firstgas®

GAS DISTRIBUTION

Asset Management Plan 2023

AMP Appendices

Appendix A

Glossary

Term	Definition
AMMAT	Asset Management Maturity Assessment Tool
ALARP	As Low as Reasonably Practicable
AMP	Asset Management Plan
ARR	Asset Replacement and Renewal
CAIDI	Customer Average Interruption Duration Index
CAPEX	Capital Expenditure - the expenditure used to create new or upgrade existing physical assets in the network, as well as non-network assets e.g. IT or facilities
CMMS	Computerised Maintenance Management System
COO	Chief Operating Officer – Senior executive tasked with over-seeing the day-to-day administrative and operational functions of the business
CS	Compressor Station - station that contains a Gas Compression Plant
CP	Cathodic Protection
CPI	Consumer Price Index
DCVG	Direct Current Voltage Gradient - a survey technique used for assessing the effectiveness of corrosion protection on buried steel structures
CRM	Customer Relationship Management
DFA	Delegated Financial Authority
DP	Delivery Point
DPP	Default Price-Quality Path
EAM	Enterprise Asset Management
EHMP	Electrical Hazard Management Plan
EPR	Earth Potential Rise
FDC	Finance During Construction
FEED	Front End Engineering Design
FIK	Flange Insulation Kits
GC	Gas Chromatographs
GDB	Gas Distribution Business
GIC	Gas Industry Company - New Zealand's gas industry regulatory body
GIS	Geographical Information System
GM	General Manager
GMS	Gas Measurement System - commonly referred to as a gas meter
GNS	Institute of Geological and Nuclear Sciences
GTB	Gas Transmission Business
HDD	Horizontal Directional Drilling
HSEQ	Health, Safety, Environment and Quality
ICA	Interconnection Agreement
ICP	Installation Control Point - the connection point from a customer to the Firstgas network
ICT	Information and Communications Technology
ILI	In Line Inspection
FSP	Field Service Provided
IPS	Invensys Process Systems
IS	Information Systems
ISO 55000	International Standard for Asset Management
IT	Information Technology
KPI	Key Performance Indicator
LOS	Line of Sight

Appendix A

Glossary

Term	Definition
LPT	Low Pressure Trip
LS	Leakage Survey
MAOP	Maximum Allowable Operating Pressure
MINOP	Minimum Operating Pressure
MCS	Vendor brand of pressure safety valve
MLV	Main Line Valve - valve installed on the main transmission pipelines used to isolate sections of the pipeline for emergency or maintenance purposes
NRAMS	Non-Routine Activity Management System
NZTA	New Zealand Transport Agency
OEM	Original Equipment Manufacturer
OPEX	Operational Expenditure - the ongoing costs directly associated with running the Gas Distribution System. This includes costs both directly related to the network (e.g. routine and corrective maintenance, service interruptions/incidents, land management) and non-network related expenditure (e.g. network and business support)
OT	Off Take
PE 80	Manufactured from medium density polyethylene with a minimum required strength of 8.0 MPa.
PE 100	Manufactured from high density polyethylene with a minimum required strength of 10.0 MPa.
PIG	Pipeline Inspection Gauge Tool
PIMP	Pipeline Integrity Management Plan
PIMS	Pipeline Integrity Management System
PLC	Programmable Logic Controllers
PJ	Petajoule (unit of energy) = 1015 Joules = 1,000 TJ
PRE	Public Reported Escapes
PSV	Pressure Safety Valve - safety device to relieve excess pressure in system to protect system
RAB	Regulatory Asset Base - the measure of the net value of network and non-network assets used in price-quality regulation by the Commerce Commission
RCI	Routine and Corrective Maintenance and Inspection
ROAIMS	Rosen Asset Integrity Management System
RTE	Response Time to Emergencies
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCMH	Standard Cubic Meters per hour (unit of gas flow rate)
SIE	Service Interruptions, Incidents and Emergencies
SMS	Safety Management Study
STA	Standard Threat Assessment
TJ	Terajoule (unit of energy) = 1012 Joules
WBH	Water Bath Heater - a shell and tube heat exchanger utilising to heat gas

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30	30 Sep 31	30 Sep 32	30 Sep 33
	11a(i): Expenditure on Assets Forecast	$000 (nominal dollars)										
	Consumer connection	4,040	5,242	5,958	4,948	4,661	4,754	4,850	4,947	5,045	5,178	5,282
	System growth	3,190	2,952	3,291	2,849	2,732	2,787	2,843	2,899	2,957	3,017	3,077
	Asset replacement and renewal	3,332	4,237	3,752	3,775	3,992	3,840	3,917	4,237	4,075	4,157	4,368
	Asset relocations	546	772	793	810	826	842	859	876	894	912	930
	Reliability, safety and environment:											
	Quality of supply	-	159	164	167	170	174	177	181	184	188	192
	Legislative and regulatory		80	82	84	85	87	89	90	92	94	96
	Other reliability, safety and environment	137	345	354	362	85	87	89	90	92	94	96
	Total reliability, safety and environment	137	584	600	612	341	348	355	362	369	376	384
	Expenditure on network assets	11,245	13,788	14,393	12,994	12,552	12,571	12,823	13,320	13,341	13,640	14,040
	Non-network assets	421	523	664	584	631	616	630	644	659	673	561
	Expenditure on assets	11,666	14,311	15,057	13,578	13,183	13,188	13,453	13,965	14,000	14,313	14,601
	plus Cost of financing	44	53	56	50	49	49	50	52	52	53	54
	less Value of capital contributions	1,320	1,670	1,811	1,660	1,630	1,662	1,695	1,729	1,764	1,799	1,835
	plus Value of vested assets											
	Capital expenditure forecast	10,390	12,693	13,302	11,967	11,603	11,575	11,808	12,287	12,288	12,567	12,820
	Value of commissioned assets	8,168	9,927	10,437	9,310	9,220	9,198	9,383	9,764	9,764	9,986	10,188
		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30	30 Sep 31	30 Sep 32	30 Sep 33
		$000 (in constant prices)										
	Consumer connection	4,040	4,936	5,463	4,443	4,104	4,104	4,104	4,104	4,104	4,129	4,129
	System growth	3,190	2,780	3,017	2,558	2,405	2,405	2,405	2,405	2,405	2,405	2,405
	Asset replacement and renewal	3,332	3,990	3,440	3,390	3,515	3,315	3,315	3,515	3,315	3,315	3,415
	Asset relocations	546	727	727	727	727	727	727	727	727	727	727
	Reliability, safety and environment:											
	Quality of supply	-	150	150	150	150	150	150	150	150	150	150
	Legislative and regulatory	-	75	75	75	75	75	75	75	75	75	75
	Other reliability, safety and environment	137	325	325	325	75	75	75	75	75	75	75
	Total reliability, safety and environment	137	550	550	550	300	300	300	300	300	300	300
	Expenditure on network assets	11,245	12,983	13,197	11,669	11,051	10,851	10,851	11,051	10,851	10,876	10,976
	Non-network assets	421	492	608	524	556	532	533	534	536	537	438
	Expenditure on assets	11,666	13,475	13,805	12,193	11,606	11,383	11,384	11,585	11,387	11,413	11,415
	Subcomponents of expenditure on assets (where known)											
	Research and development											

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref												
48			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
49		for year ended	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**	**30 Sep 29**	**30 Sep 30**	**30 Sep 31**	**30 Sep 32**	**30 Sep 33**
50	**Difference between nominal and constant price forecasts**		**$000**										
51	Consumer connection		-	306	495	505	557	651	746	843	942	1,049	1,153
52	System growth		-	172	274	291	327	381	437	494	552	611	671
53	Asset replacement and renewal		-	247	312	385	477	526	602	722	761	842	953
54	Asset relocations		-	45	66	83	99	115	132	149	167	185	203
55	Reliability, safety and environment:												
56	Quality of supply		-	9	14	17	20	24	27	31	34	38	42
57	Legislative and regulatory		-	5	7	9	10	12	14	15	17	19	21
58	Other reliability, safety and environment		-	20	29	37	10	12	14	15	17	19	21
59	**Total reliability, safety and environment**		-	34	50	62	41	48	55	62	69	76	84
60	**Expenditure on network assets**		-	805	1,197	1,325	1,501	1,721	1,972	2,270	2,490	2,763	3,064
61	Non-network assets		-	31	55	60	75	84	97	110	123	136	122
62	**Expenditure on assets**		-	835	1,252	1,385	1,577	1,805	2,069	2,379	2,613	2,900	3,186

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref			Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5
72	**11a(ii): Consumer Connection**	for year ended	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
73	*Consumer types defined by GDB**		**$000 (in constant prices)**					
74	Service Connections - Residential		4,015	4,910	5,436	4,417	4,077	4,077
75	Customr Easements Costs		25	27	27	27	27	27
76								
77								
78								
79	** include additional rows if needed*							
80	**Consumer connection expenditure**		4,040	4,936	5,463	4,443	4,104	4,104
81	*less* Capital contributions funding consumer connection		863	633	685	585	551	551
82	**Consumer connection less capital contributions**		3,177	4,303	4,778	3,859	3,553	3,553
83	**11a(iii): System Growth**							
84	**Intermediate pressure**							
85	Main pipe		-	228	228	228	228	228
86	Service pipe							
87	Stations		-	342	342	342	342	342
88	Line valve							
89	Special crossings							
90	**Intermediate Pressure total**		-	570	570	570	570	570
91	**Medium pressure**							
92	Main pipe		2,381	2,210	2,447	1,988	1,835	1,835
93	Service pipe							
94	Stations		810					
95	Line valve							
96	Special crossings							
97	**Medium Pressure total**		3,190	2,210	2,447	1,988	1,835	1,835
98	**Low Pressure**							
99	Main pipe							
100	Service pipe							
101	Line valve							
102	Special crossings							
103	**Low Pressure total**		-	-	-	-	-	-
104	**Other assets**							
105	Monitoring and control systems							
106	Cathodic protection systems							
107	Other assets (other than above)							
108	**Other total**		-	-	-	-	-	-
109								
110	**System growth expenditure**		3,190	2,780	3,017	2,558	2,405	2,405
111	*less* Capital contributions funding system growth			332	367	298	275	275
112	**System growth less capital contributions**		3,190	2,449	2,650	2,260	2,130	2,130

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
	11a(iv): Asset Replacement and Renewal							
	Intermediate pressure		**$000 (in constant prices)**					
	Main pipe			80	80	30	30	30
	Service pipe							
	Stations		245	350	150	150	350	150
	Line valve							
	Special crossings							
	Intermediate Pressure total		245	430	230	180	380	180
	Medium pressure							
	Main pipe		2,109	2,287	2,287	2,287	2,287	2,287
	Service pipe							
	Station							
	Line valve							
	Special crossings		405	500	500	500	500	500
	Medium Pressure total		2,514	2,787	2,787	2,787	2,787	2,787
	Low Pressure							
	Main pipe							
	Service pipe							
	Line valve							
	Special crossings							
	Low Pressure total		-	-	-	-	-	-
	Other assets							
	Monitoring and control systems		32	500	150	150	75	75
	Cathodic protection systems		-	151	151	151	151	151
	Other assets (other than above)		540	122	122	122	122	122
	Other total		573	773	423	423	348	348
	Asset replacement and renewal expenditure		3,332	3,990	3,440	3,390	3,515	3,315
less	Capital contributions funding asset replacement and renewal							
	Asset replacement and renewal less capital contributions		3,332	3,990	3,440	3,390	3,515	3,315
	11a(v): Asset Relocations							
	*Project or programme**							
	General Allocation		546	727	727	727	727	727
	** include additional rows if needed*							
	All other asset relocations projects or programmes							
	Asset relocations expenditure		546	727	727	727	727	727
less	Capital contributions funding asset relocations		457	608	608	608	608	608
	Asset relocations less capital contributions		89	119	119	119	119	119

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref

11a(vi): Quality of Supply

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
	for year ended	**30 Sep 23**	**30 Sep 24**	**30 Sep 25**	**30 Sep 26**	**30 Sep 27**	**30 Sep 28**
	*Project or programme**	**$000 (in constant prices)**					
	General Provision	-	150	150	150	150	150
	** include additional rows if needed*						
	All other quality of supply projects or programmes						
	Quality of supply expenditure	-	150	150	150	150	150
less	Capital contributions funding quality of supply						
	Quality of supply less capital contributions	-	150	150	150	150	150

11a(vii): Legislative and Regulatory

	Project or programme						
	General Provision		75	75	75	75	75
	** include additional rows if needed*						
	All other legislative and regulatory projects or programmes						
	Legislative and regulatory expenditure	-	75	75	75	75	75
less	Capital contributions funding legislative and regulatory						
	Legislative and regulatory less capital contributions	-	75	75	75	75	75

11a(viii): Other Reliability, Safety and Environment

	*Project or programme**						
	DRS Safety valves installations	137	325	325	325	75	75
	** include additional rows if needed*						
	All other reliability, safety and environment projects or programmes						
	Other reliability, safety and environment expenditure	137	325	325	325	75	75
less	Capital contributions funding other reliability, safety and environment						
	Other Reliability, safety and environment less capital contributions	137	325	325	325	75	75

	Company Name	**Firstgas**
	AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

sch ref							
211	**11a(ix): Non-Network Assets**						
212	**Routine expenditure**						
213	*Project or programme**						
214	ICT Expenditure	206	331	405	374	403	379
215	Building Refurbishments	33	11	14	13	14	13
216	Motor Vehicles	-	-	39	38	39	40
217	Plant and equipment	182	150	150	100	100	100
218							
219	** include additional rows if needed*						
220	All other routine expenditure projects or programmes						
221	**Routine expenditure**	421	492	608	524	556	532
222	**Atypical expenditure**						
223	*Project or programme**						
224							
225							
226							
227							
228							
229	** include additional rows if needed*						
230	All other atypical expenditure projects or programmes						
231	**Atypical expenditure**	-	-	-	-	-	-
232							
233	**Non-network assets expenditure**	421	492	608	524	556	532

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033

SCHEDULE 11b: REPORT ON FORECAST OPERATIONAL EXPENDITURE

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms.
GDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).
This information is not part of audited disclosure information.

sch ref

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30	30 Sep 31	30 Sep 32	30 Sep 33
	Operational Expenditure Forecast	$000 (in nominal dollars)										
	Service interruptions, incidents and emergencies	2,039	2,809	2,885	2,946	3,004	3,065	3,126	3,188	3,252	3,317	3,384
	Routine and corrective maintenance and inspection	2,642	2,806	2,882	2,942	3,001	3,061	3,122	3,185	3,248	3,313	3,380
	Asset replacement and renewal	-	-	-	-	-	-	-	-	-	-	-
	Network opex	4,681	5,615	5,767	5,888	6,006	6,126	6,248	6,373	6,501	6,631	6,763
	System operations and network support	1,913	2,265	2,326	2,375	2,422	2,471	2,520	2,571	2,622	2,675	2,728
	Business support	3,454	3,798	3,900	3,982	4,062	4,143	4,226	4,310	4,397	4,485	4,574
	Non-network opex	5,367	6,063	6,226	6,357	6,484	6,614	6,746	6,881	7,019	7,159	7,302
	Operational expenditure	10,048	11,678	11,993	12,245	12,490	12,740	12,994	13,254	13,519	13,790	14,065

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30	30 Sep 31	30 Sep 32	30 Sep 33
		$000 (in constant prices)										
	Service interruptions, incidents and emergencies	2,039	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645
	Routine and corrective maintenance and inspection	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642
	Asset replacement and renewal											
	Network opex	4,681	5,287	5,287	5,287	5,287	5,287	5,287	5,287	5,287	5,287	5,287
	System operations and network support	1,913	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133
	Business support	3,454	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576
	Non-network opex	5,367	5,709	5,709	5,709	5,709	5,709	5,709	5,709	5,709	5,709	5,709
	Operational expenditure	10,048	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996
	Subcomponents of operational expenditure (where known)											
	Research and development											
	Insurance											

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	30 Sep 23	30 Sep 24	30 Sep 25	30 Sep 26	30 Sep 27	30 Sep 28	30 Sep 29	30 Sep 30	30 Sep 31	30 Sep 32	30 Sep 33
	Difference between nominal and real forecasts	$000										
	Service interruptions, incidents and emergencies	-	164	240	300	359	419	481	543	607	672	738
	Routine and corrective maintenance and inspection	-	164	240	300	359	419	480	543	606	671	738
	Asset replacement and renewal	-	-	-	-	-	-	-	-	-	-	-
	Network opex	-	328	479	601	718	838	961	1,086	1,213	1,343	1,476
	System operations and network support	-	132	193	242	290	338	388	438	489	542	595
	Business support	-	222	324	406	486	567	650	734	821	909	998
	Non-network opex	-	354	518	648	776	905	1,037	1,172	1,310	1,450	1,594
	Operational expenditure	-	682	997	1,249	1,494	1,744	1,998	2,258	2,523	2,794	3,070

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 12a: REPORT ON ASSET CONDITION

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a.

sch ref

					Asset condition at start of planning period (percentage of units by grade)						
8	Operating Pressure	Asset category	Asset class	Units	Grade 1	Grade 2	Grade 3	Grade 4	Grade unknown	Data accuracy (1–4)	% of asset forecast to be replaced in next 5 years
9	Intermediate Pressure	Main pipe	IP PE main pipe	km	-	-	-	-	-	N/A	-
10	Intermediate Pressure	Main pipe	IP steel main pipe	km			100.00%		-	3	-
11	Intermediate Pressure	Main pipe	IP other main pipe	km	-	-	-		-	N/A	-
12	Intermediate Pressure	Service pipe	IP PE service pipe	km	-	-	-	-	-	N/A	-
13	Intermediate Pressure	Service pipe	IP steel service pipe	km	-	-	100.00%	-	-	3	-
14	Intermediate Pressure	Service pipe	IP other service pipe	km	-	-	-	-	-	N/A	-
15	Intermediate Pressure	Stations	Intermediate pressure DRS	No.		33.30%	25.30%	41.40%	-	3	-
16	Intermediate Pressure	Line valve	IP line valves	No.	-	0.40%	89.70%	9.90%	-	3	0.01
17	Intermediate Pressure	Special crossings	IP crossings	No.	4.17%	4.17%	44.44%	47.22%	-	3	-
18	Medium Pressure	Main pipe	MP PE main pipe	km		0.78%	10.31%	88.91%	-	3	0.50
19	Medium Pressure	Main pipe	MP steel main pipe	km			100.00%		-	3	2.00
20	Medium Pressure	Main pipe	MP other main pipe	km					-	N/A	
21	Medium Pressure	Service pipe	MP PE service pipe	km		1.50%	8.33%	90.17%	-	3	2.00
22	Medium Pressure	Service pipe	MP steel service pipe	km			100.00%		-	3	
23	Medium Pressure	Service pipe	MP other service pipe	km					-	N/A	
24	Medium Pressure	Stations	Medium pressure DRS	No.	-	42.30%	15.40%	42.30%	-	4	-
25	Medium Pressure	Line valve	MP line valves	No.	0.0%	6.8%	46.2%	47.0%	-	3	8.24
26	Medium Pressure	Special crossings	MP special crossings	No.	0.84%	2.52%	63.03%	33.61%	-	3	-
27	Low Pressure	Main pipe	LP PE main pipe	km	12.61%	44.78%	42.61%		-	3	-
28	Low Pressure	Main pipe	LP steel main pipe	km	-	-	-	-	-	N/A	-
29	Low Pressure	Main pipe	LP other main pipe	km	-	-	-	-	-	N/A	-
30	Low Pressure	Service pipe	LP PE service pipe	km		10.03%	66.22%	23.75%	-	3	-
31	Low Pressure	Service pipe	LP steel service pipe	km	-	-	100.00%	-	-	3	-
32	Low Pressure	Service pipe	LP other service pipe	km	-	-	-	-	-	N/A	-
33	Low Pressure	Line valve	LP line valves	No.	-	-	73.30%	26.70%	-	3	-
34	Low Pressure	Special crossings	LP special crossings	No.	-	-	-	-	-	N/A	
35	All	Monitoring & control systems	Remote terminal units	No.	10.00%	90.00%	-	-	-	3	100.00
36	All	Cathodic protection systems	Cathodic protection	No.		6.90%	84.10%	9.00%	-	2	

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

7 **Forecast Utilisation of Heavily Utilised Pipelines**

sch ref	Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	Utilisation: *Current Year CY* y/e 30 Sep 23	*CY+1* y/e 30 Sep 24	*CY+2* y/e 30 Sep 25	*CY+3* y/e 30 Sep 26	*CY+4* y/e 30 Sep 27	*CY+5* y/e 30 Sep 28	Comment
11	Waikato	Hamilton	Hamilton IP10	1,000	500			scmh							Hamilton IP10 is no longer heavily uilised due to decreased observed and forecast flow rates.
12								kPa							
13	Waikato	Hamilton	Hamilton MP4	400	200	14,998	698	scmh	14,300	14,300	14,300	14,300	14,300	14,300	Flat growth is forecast so all years indicated have the same flow rate. For y/e 30 Sep 22, the actual total flow was less than the flow forecast however, a higher flow rate was observed within the last five years. See note 4 below
14								kPa	220	220	220	220	220	220	
15								scmh							
16								kPa							
17								scmh							
18								kPa							
19								scmh							
20								kPa							
21								scmh							
22								kPa							
23								scmh							
24								kPa							
25								scmh							
26								kPa							
27								scmh							
28								kPa							
29								scmh							
30								kPa							

31 * *Current year utilisation figures may be estimates. Year 1–5 figures show the utilisation forecast to occur given the expected system configuration for each year, including the effect of any new investment in the pressure system.*

33 **Disclaimer for supply enquiries**

34 This information in the table contains modelled estimates of utilisation and capacity. Any interested party seeking to invest in supply from First Gas distribution networks should their retailer and confirm availability of capacity.

36 **Notes and assumptions**

37 1. A "heavily utilised"pressure system is a pressure system where the modelled flow rate, at system peak during 2022is 500 scmh or greater and it's utilisation pressure drop equals or exceeds 40% from the nominal operating pressure (NOP). First Gas security standard set the MinOP at 50% of NOP.

38 2. The total capacity of a "heavily utilised" pressure system is determined by adjusting the flow rates in the model until the pressure system allowable MinOP is reached. The remaining capacity is calculated by subtracting the current year flow rate of the pressure system from the total capacity.

39 3. A forecast flow is determined for each year and this is applied to the model by proportioning the flow evenly across the system for non-time of use flows. Time of use (TOU) flows are kept at the flow observed flow rate for the time period the model was originally created.

40 4. The observed mininum pressure in the Hamilton MP4 system was 238 kPa which is slightly lower than the high utilisation pressure threshold of 240 kPa. The MP4 piping system is not undersized and the root cause of the lower than expected pressure is being investigated. Modelling studies have indicated that there is

41 restriction somewhere in the system so pressure recorders are being deployed to identify the possible location of the restriction (s).

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**

SCHEDULE 12c: REPORT ON FORECAST DEMAND

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

sch ref

12c(i) Consumer Connections

Number of ICPs connected in year by consumer type

	Current year CY **30 Sep 23**	*CY+1* **30 Sep 24**	*CY+2* **30 Sep 25**	*CY+3* **30 Sep 26**	*CY+4* **30 Sep 27**	*CY+5* **30 Sep 28**
Consumer types defined by GDB						
Residential	1,348	1,346	1,468	1,176	1,084	1,092
Commercial	90	96	129	121	113	105
Industrial	2	3	3	3	3	3
Total	1,440	1,445	1,600	1,300	1,200	1,200

12c(ii): Gas Delivered

	Current year CY **30 Sep 23**	*CY+1* **30 Sep 24**	*CY+2* **30 Sep 25**	*CY+3* **30 Sep 26**	*CY+4* **30 Sep 27**	*CY+5* **30 Sep 28**
Number of ICPs at year end	68,089	69,174	70,414	71,354	72,194	73,034
Maximum daily load (GJ/day)	37,578	37,928	38,281	38,637	38,997	39,360
Maximum monthly load (GJ/month)	1,019,197	1,028,887	1,038,670	1,048,545	1,058,515	1,068,579
Number of directly billed ICPs (at year end)	-	-	-	-	-	-
Total gas conveyed (GJ/annum)	10,044,110	10,137,626	10,232,014	10,327,280	10,423,433	10,520,481
Average daily delivery (GJ/day)	27,518	27,698	28,033	28,294	28,557	28,744
Maximum monthly amount of gas entering network (GJ/month)	27,518	27,698	28,033	28,294	28,557	28,823
Load factor	82.12%	82.11%	82.09%	82.08%	82.06%	82.04%

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY

This schedule requires information on the GDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented information
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	2	Firstgas has a published policy that is available through the document management system, The recent external AMMAT assessment highlighted the need to better communicate the policy internally.		Widely used AM practice standards require an organisation to document, authorise and communicate its asset management policy (eg, as required in PAS 55 para 4.2 i). A key pre-requisite of any robust policy is that the organisation's top management must be seen to endorse and fully support it. Also vital to the effective implementation of the policy, is to tell the appropriate people of its content and their obligations under it. Where an organisation outsources some of its asset-related activities, then these people and their organisations must equally be made aware of the policy's content. Also, there may be other stakeholders, such as regulatory authorities and shareholders who should be made aware of it.	Top management. The management team that has overall responsibility for asset management.	The organisation's asset management policy, its organisational strategic plan, documents indicating how the asset management policy was based upon the needs of the organisation and evidence of communication.
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	3	An Asset Management Strategy has been formally developed and incorporated into the AMP. Linkages are in place and evidence is available to demonstrate that, where appropriate, the organization's asset management strategy is consistent with its other organizational policies and strategies.		In setting an organisation's asset management strategy, it is important that it is consistent with any other policies and strategies that the organisation has and has taken into account the requirements of relevant stakeholders. This question examines to what extent the asset management strategy is consistent with other organisational policies and strategies (eg, as required by PAS 55 para 4.3.1 b) and has taken account of stakeholder requirements as required by PAS 55 para 4.3.1 c). Generally, this will take into account the same polices, strategies and stakeholder requirements as covered in drafting the asset management policy but at a greater level of detail.	Top management. The organisation's strategic planning team. The management team that has overall responsibility for asset management.	The organisation's asset management strategy document and other related organisational policies and strategies. Other than the organisation's strategic plan, these could include those relating to health and safety, environmental, etc. Results of stakeholder consultation.
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	3	Asset Management Strategy has been developed and incorporated into the AMP and covers nearly all asset, asset types and asset systems.		Good asset stewardship is the hallmark of an organisation compliant with widely used AM standards. A key component of this is the need to take account of the lifecycle of the assets, asset types and asset systems. (For example, this requirement is recognised in 4.3.1 d) of PAS 55). This question explores what an organisation has done to take lifecycle into account in its asset management strategy.	Top management. People in the organisation with expert knowledge of the assets, asset types, asset systems and their associated life-cycles. The management team that has overall responsibility for asset management. Those responsible for developing and adopting methods and processes used in asset management	The organisation's documented asset management strategy and supporting working documents.
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	3	Firstgas has developed an Asset Management Plan for the Transmission Network. This plan covers the transmission network holistically and includes the full asset lifecycle. Plans for critical assets are identified in the AMP. The plan meets the objectives of the Asset Management Policy as well as key performance standards such as AS2885. Firstgas has		The asset management strategy need to be translated into practical plan(s) so that all parties know how the objectives will be achieved. The development of plan(s) will need to identify the specific tasks and activities required to optimize costs, risks and performance of the assets and/or asset system(s), when they are to be carried out and the resources required.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers.	The organisation's asset management plan(s).

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	The organisation does not have a documented asset management policy.	The organisation has an asset management policy, but it has not been authorised by top management, or it is not influencing the management of the assets.	The organisation has an asset management policy, which has been authorised by top management, but it has had limited circulation. It may be in use to influence development of strategy and planning but its effect is limited.	The asset management policy is authorised by top management, is widely and effectively communicated to all relevant employees and stakeholders, and used to make these persons aware of their asset related obligations.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	The organisation has not considered the need to ensure that its asset management strategy is appropriately aligned with the organisation's other organisational policies and strategies or with stakeholder requirements. OR The organisation does not have an asset management strategy.	The need to align the asset management strategy with other organisational policies and strategies as well as stakeholder requirements is understood and work has started to identify the linkages or to incorporate them in the drafting of asset management strategy.	Some of the linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements are defined but the work is fairly well advanced but still incomplete.	All linkages are in place and evidence is available to demonstrate that, where appropriate, the organisation's asset management strategy is consistent with its other organisational policies and strategies. The organisation has also identified and considered the requirements of relevant stakeholders.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	The organisation has not considered the need to ensure that its asset management strategy is produced with due regard to the lifecycle of the assets, asset types or asset systems that it manages. OR The organisation does not have an asset management strategy.	The need is understood, and the organisation is drafting its asset management strategy to address the lifecycle of its assets, asset types and asset systems.	The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.	The asset management strategy takes account of the lifecycle of all of its assets, asset types and asset systems.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	The organisation does not have an identifiable asset management plan(s) covering asset systems and critical assets.	The organisation has asset management plan(s) but they are not aligned with the asset management strategy and objectives and do not take into consideration the full asset life cycle (including asset creation, acquisition, enhancement, utilisation, maintenance decommissioning and disposal).	The organisation is in the process of putting in place comprehensive, documented asset management plan(s) that cover all life cycle activities, clearly aligned to asset management objectives and the asset management strategy.	Asset management plan(s) are established, documented, implemented and maintained for asset systems and critical assets to achieve the asset management strategy and asset management objectives across all life cycle phases.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented information
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	2	A recent gap assessment has highlighted the need to better communicate internally the Asset Management Plan		Plans will be ineffective unless they are communicated to all those, including contracted suppliers and those who undertake enabling function(s). The plan(s) need to be communicated in a way that is relevant to those who need to use them.	The management team with overall responsibility for the asset management system. Delivery functions and suppliers.	Distribution lists for plan(s). Documents derived from plan(s) which detail the receivers role in plan delivery. Evidence of communication.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	3	Firstgas AMP places responsibility for delivery of the AMP with the Chief Operating Officer (Section 2). The Chief Operating Officer delegates the responsibility of the sections of the AMP through the organisation. These responsibilities and documented in Firstgas position descriptions as		The implementation of asset management plan(s) relies on (1) actions being clearly identified, (2) an owner allocated and (3) that owner having sufficient delegated responsibility and authority to carry out the work required. It also requires alignment of actions across the organisation. This question explores how well the plan(s) set out responsibility for delivery of asset plan actions.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team.	The organisation's asset management plan(s). Documentation defining roles and responsibilities of individuals and organisational departments.
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	3	Firstgas has arrangements in place to cover the requirements of the delivery, execution and maintenance of the Asset Management Plan. Particulary the project management manual for creation or replacement of assts and maintenance manuals for maintaining existing assets.		It is essential that the plan(s) are realistic and can be implemented, which requires appropriate resources to be available and enabling mechanisms in place. This question explores how well this is achieved. The plan(s) not only need to consider the resources directly required and timescales, but also the enabling activities, including for example, training requirements, supply chain capability and procurement timescales.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team. If appropriate, the performance management team. Where appropriate the procurement team and service providers working on the organisation's asset related activities.	The organisation's asset management plan(s). Documented processes and procedures for the delivery of the asset management plan.
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	3	Firstgas has comprehensive Emergency response Frameworks and crisis Managment framework to respond to incidents and emergencies. The plans are aligned to the New Zealand Coordinated Incident Management System.		Widely used AM practice standards require that an organisation has plan(s) to identify and respond to emergency situations. Emergency plan(s) should outline the actions to be taken to respond to specified emergency situations and ensure continuity of critical asset management activities including the communication to, and involvement of, external agencies. This question assesses if, and how well, these plan(s) triggered, implemented and resolved in the event of an incident. The plan(s) should be appropriate to the level of risk as determined by the organisation's risk assessment methodology. It is also a requirement that relevant personnel are competent and trained.	The manager with responsibility for developing emergency plan(s). The organisation's risk assessment team. People with designated duties within the plan(s) and procedure(s) for dealing with incidents and emergency situations.	The organisation's plan(s) and procedure(s) for dealing with emergencies. The organisation's risk assessments and risk registers.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	The organisation does not have plan(s) or their distribution is limited to the authors.	The plan(s) are communicated to some of those responsible for delivery of the plan(s). OR Communicated to those responsible for delivery is either irregular or ad-hoc.	The plan(s) are communicated to most of those responsible for delivery but there are weaknesses in identifying relevant parties resulting in incomplete or inappropriate communication. The organisation recognises improvement is needed as is working towards resolution.	The plan(s) are communicated to all relevant employees, stakeholders and contracted service providers to a level of detail appropriate to their participation or business interests in the delivery of the plan(s) and there is confirmation that they are being used effectively.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	The organisation has not documented responsibilities for delivery of asset plan actions.	Asset management plan(s) inconsistently document responsibilities for delivery of plan actions and activities and/or responsibilities and authorities for implementation inadequate and/or delegation level inadequate to ensure effective delivery and/or contain misalignments with organisational accountability.	Asset management plan(s) consistently document responsibilities for the delivery of actions but responsibility/authority levels are inappropriate/ inadequate, and/or there are misalignments within the organisation.	Asset management plan(s) consistently document responsibilities for the delivery actions and there is adequate detail to enable delivery of actions. Designated responsibility and authority for achievement of asset plan actions is appropriate.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	The organisation has not considered the arrangements needed for the effective implementation of plan(s).	The organisation recognises the need to ensure appropriate arrangements are in place for implementation of asset management plan(s) and is in the process of determining an appropriate approach for achieving this.	The organisation has arrangements in place for the implementation of asset management plan(s) but the arrangements are not yet adequately efficient and/or effective. The organisation is working to resolve existing weaknesses.	The organisation's arrangements fully cover all the requirements for the efficient and cost effective implementation of asset management plan(s) and realistically address the resources and timescales required, and any changes needed to functional policies, standards, processes and the asset management information system.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	The organisation has not considered the need to establish plan(s) and procedure(s) to identify and respond to incidents and emergency situations.	The organisation has some ad-hoc arrangements to deal with incidents and emergency situations, but these have been developed on a reactive basis in response to specific events that have occurred in the past.	Most credible incidents and emergency situations are identified. Either appropriate plan(s) and procedure(s) are incomplete for critical activities or they are inadequate. Training/ external alignment may be incomplete.	Appropriate emergency plan(s) and procedure(s) are in place to respond to credible incidents and manage continuity of critical asset management activities consistent with policies and asset management objectives. Training and external agency alignment is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	3	Firstgas has appointed staff who has responsibility for ensuring that the organization's assets deliver the requirements of the asset management strategy, objectives and plan(s). They have been given the necessary authority to achieve this.		In order to ensure that the organisation's assets and asset systems deliver the requirements of the asset management policy, strategy and objectives responsibilities need to be allocated to appropriate people who have the necessary authority to fulfil their responsibilities. (This question, relates to the organisation's assets eg, para b), s 4.4.1 of PAS 55, making it therefore distinct from the requirement contained in para a), s 4.4.1 of PAS 55).	Top management. People with management responsibility for the delivery of asset management policy, strategy, objectives and plan(s). People working on asset-related activities.	Evidence that managers with responsibility for the delivery of asset management policy, strategy, objectives and plan(s) have been appointed and have assumed their responsibilities. Evidence may include the organisation's documents relating to its asset management system, organisational charts, job descriptions of post-holders, annual targets/objectives and personal development plan(s) of post-holders as appropriate.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	3	Firstgas has a process for determining what resources are required for asset management activities and in most cases these are available but in some instances resources remain insufficient.		Optimal asset management requires top management to ensure sufficient resources are available. In this context the term 'resources' includes manpower, materials, funding and service provider support.	Top management. The management team that has overall responsibility for asset management. Risk management team. The organisation's managers involved in day-to-day supervision of asset-related activities, such as frontline managers, engineers, foremen and chargehands as appropriate.	Evidence demonstrating that asset management plan(s) and/or the process(es) for asset management plan implementation consider the provision of adequate resources in both the short and long term. Resources include funding, materials, equipment, services provided by third parties and personnel (internal and service providers) with appropriate skills competencies and knowledge.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	3	Firstgas communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.		Widely used AM practice standards require an organisation to communicate the importance of meeting its asset management requirements such that personnel fully understand, take ownership of, and are fully engaged in the delivery of the asset management requirements (eg, PAS 55 s 4.4.1 g).	Top management. The management team that has overall responsibility for asset management. People involved in the delivery of the asset management requirements.	Evidence of such activities as road shows, written bulletins, workshops, team talks and management walk-abouts would assist an organisation to demonstrate it is meeting this requirement of PAS 55.
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	2	The external consultants identified that this area requires improvement. Key areas that requrie improvement are. Better procedures that govern and or control outsources maintenance practices and processes. The other area that requries improvement is understading withing the wider business of hte outsourced model.		Where an organisation chooses to outsource some of its asset management activities, the organisation must ensure that these outsourced process(es) are under appropriate control to ensure that all the requirements of widely used AM standards (eg, PAS 55) are in place, and the asset management policy, strategy objectives and plan(s) are delivered. This includes ensuring capabilities and resources across a time span aligned to life cycle management. The organisation must put arrangements in place to control the outsourced activities, whether it be to external providers or to other in-house departments. This question explores what the organisation does in this regard.	Top management. The management team that has overall responsibility for asset management. The manager(s) responsible for the monitoring and management of the outsourced activities. People involved with the procurement of outsourced activities. The people within the organisations that are performing the outsourced activities. The people impacted by the outsourced activity.	The organisation's arrangements that detail the compliance required of the outsourced activities. For example, this this could form part of a contract or service level agreement between the organisation and the suppliers of its outsourced activities. Evidence that the organisation has demonstrated to itself that it has assurance of compliance of outsourced activities.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	Top management has not considered the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management understands the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management has appointed an appropriate people to ensure the assets deliver the requirements of the asset management strategy, objectives and plan(s) but their areas of responsibility are not fully defined and/or they have insufficient delegated authority to fully execute their responsibilities.	The appointed person or persons have full responsibility for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s). They have been given the necessary authority to achieve this.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	The organisation's top management has not considered the resources required to deliver asset management.	The organisations top management understands the need for sufficient resources but there are no effective mechanisms in place to ensure this is the case.	A process exists for determining what resources are required for its asset management activities and in most cases these are available but in some instances resources remain insufficient.	An effective process exists for determining the resources needed for asset management and sufficient resources are available. It can be demonstrated that resources are matched to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	The organisation's top management has not considered the need to communicate the importance of meeting asset management requirements.	The organisations top management understands the need to communicate the importance of meeting its asset management requirements but does not do so.	Top management communicates the importance of meeting its asset management requirements but only to parts of the organisation.	Top management communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	The organisation has not considered the need to put controls in place.	The organisation controls its outsourced activities on an ad-hoc basis, with little regard for ensuring for the compliant delivery of the organisational strategic plan and/or its asset management policy and strategy.	Controls systematically considered but currently only provide for the compliant delivery of some, but not all, aspects of the organisational strategic plan and/or its asset management policy and strategy. Gaps exist.	Evidence exists to demonstrate that outsourced activities are appropriately controlled to provide for the compliant delivery of the organisational strategic plan, asset management policy and strategy, and that these controls are integrated into the asset management system	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented information
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	2.5	Firstgas has comprehensive training requirements matrix for operational teams. The external gap analysis recommends that these be extended to include asset management competencies and reflected in the position descriptions		There is a need for an organisation to demonstrate that it has considered what resources are required to develop and implement its asset management system. There is also a need for the organisation to demonstrate that it has assessed what development plan(s) are required to provide its human resources with the skills and competencies to develop and implement its asset management systems. The timescales over which the plan(s) are relevant should be commensurate with the planning horizons within the asset management strategy considers e.g. if the asset management strategy considers 5, 10 and 15 year time scales then the human resources development plan(s) should align with these. Resources include both 'in house' and external resources who undertake asset management activities.	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of analysis of future work load plan(s) in terms of human resources. Document(s) containing analysis of the organisation's own direct resources and contractors resource capability over suitable timescales. Evidence, such as minutes of meetings, that suitable management forums are monitoring human resource development plan(s). Training plan(s), personal development plan(s), contract and service level agreements.
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	3	Firstgas has a training competency training matrix for opertational teams. In addition to Firstgas has a learning Management system for all employess and internal contractors To have visibility of training courses and certificates		Widely used AM standards require that organisations to undertake a systematic identification of the asset management awareness and competencies required at each level and function within the organisation. Once identified the training required to provide the necessary competencies should be planned for delivery in a timely and systematic way. Any training provided must be recorded and maintained in a suitable format. Where an organisation has contracted service providers in place then it should have a means to demonstrate that this requirement is being met for their employees. (eg, PAS 55 refers to frameworks suitable for identifying competency requirements).	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of an established and applied competency requirements assessment process and plan(s) in place to deliver the required training. Evidence that the training programme is part of a wider, co-ordinated asset management activities training and competency programme. Evidence that training activities are recorded and that records are readily available (for both direct and contracted service provider staff) e.g. via organisation wide information system or local records database.
50	Training, awareness and competence	How does the organization ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	2.5	Firstgas aligns training requirements with established competencies in pipline technical operation and maintenance. A training and development plan exists to ensure that pipeline personnel involved with the operation and maintenance of the asset are appropriately trained. The validation of competency forms part of hte Pipeline Cetificate of Fitness provided by Lloyds Register. The external AMMAT assessment highlights the need to include asset management competencies for staff involved in Asset management and		A critical success factor for the effective development and implementation of an asset management system is the competence of persons undertaking these activities. organisations should have effective means in place for ensuring the competence of employees to carry out their designated asset management function(s). Where an organisation has contracted service providers undertaking elements of its asset management system then the organisation shall assure itself that the outsourced service provider also has suitable arrangements in place to manage the competencies of its employees. The organisation should ensure that the individual and corporate competencies it requires are in place and actively monitor, develop and maintain an appropriate balance of these competencies.	Managers, supervisors, persons responsible for developing training programmes. Staff responsible for procurement and service agreements. HR staff and those responsible for recruitment.	Evidence of a competency assessment framework that aligns with established frameworks such as the asset management Competencies Requirements Framework (Version 2.0); National Occupational Standards for Management and Leadership; UK Standard for Professional Engineering Competence, Engineering Council, 2005.
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	2	Firstgas communication plans are primarily focused in external stakeholder. Following the Assetivity gap assessment, the score has been reduced from 3 to 2 to reflect the need for better internal communications internally around the importance of Asset Management and the Asset Management systems.		Widely used AM practice standards require that pertinent asset management information is effectively communicated to and from employees and other stakeholders including contracted service providers. Pertinent information refers to information required in order to effectively and efficiently comply with and deliver asset management strategy, plan(s) and objectives. This will include for example the communication of the asset management policy, asset performance information, and planning information as appropriate to contractors.	Top management and senior management representative(s), employee's representative(s), employee's trade union representative(s); contracted service provider management and employee representative(s); representative(s) from the organisation's Health, Safety and Environmental team. Key stakeholder representative(s).	Asset management policy statement prominently displayed on notice boards, intranet and internet; use of organisation's website for displaying asset performance data; evidence of formal briefings to employees, stakeholders and contracted service providers; evidence of inclusion of asset management issues in team meetings and contracted service provider contract meetings; newsletters, etc.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	The organisation has not recognised the need for assessing human resources requirements to develop and implement its asset management system.	The organisation has recognised the need to assess its human resources requirements and to develop a plan(s). There is limited recognition of the need to align these with the development and implementation of its asset management system.	The organisation has developed a strategic approach to aligning competencies and human resources to the asset management system including the asset management plan but the work is incomplete or has not been consistently implemented.	The organisation can demonstrate that plan(s) are in place and effective in matching competencies and capabilities to the asset management system including the plan for both internal and contracted activities. Plans are reviewed integral to asset management system process(es).	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	The organisation does not have any means in place to identify competency requirements.	The organisation has recognised the need to identify competency requirements and then plan, provide and record the training necessary to achieve the competencies.	The organisation is the process of identifying competency requirements aligned to the asset management plan(s) and then plan, provide and record appropriate training. It is incomplete or inconsistently applied.	Competency requirements are in place and aligned with asset management plan(s). Plans are in place and effective in providing the training necessary to achieve the competencies. A structured means of recording the competencies achieved is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
50	Training, awareness and competence	How does the organization ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	The organization has not recognised the need to assess the competence of person(s) undertaking asset management related activities.	Competency of staff undertaking asset management related activities is not managed or assessed in a structured way, other than formal requirements for legal compliance and safety management.	The organization is in the process of putting in place a means for assessing the competence of person(s) involved in asset management activities including contractors. There are gaps and inconsistencies.	Competency requirements are identified and assessed for all persons carrying out asset management related activities - internal and contracted. Requirements are reviewed and staff reassessed at appropriate intervals aligned to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	The organisation has not recognised the need to formally communicate any asset management information.	There is evidence that the pertinent asset management information to be shared along with those to share it with is being determined.	The organisation has determined pertinent information and relevant parties. Some effective two way communication is in place but as yet not all relevant parties are clear on their roles and responsibilities with respect to asset management information.	Two way communication is in place between all relevant parties, ensuring that information is effectively communicated to match the requirements of asset management strategy, plan(s) and process(es). Pertinent asset information requirements are regularly reviewed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented information
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	2	The Firstgas AMP references the main elements of the asset management system.		Widely used AM practice standards require an organisation maintain up to date documentation that ensures that its asset management systems (ie, the systems the organisation has in place to meet the standards) can be understood, communicated and operated. (eg, s 4.5 of PAS 55 requires the maintenance of up to date documentation of the asset management system requirements specified throughout s 4 of PAS 55).	The management team that has overall responsibility for asset management. Managers engaged in asset management activities.	The documented information describing the main elements of the asset management system (process(es)) and their interaction.
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	3	Firstgsas uses Maximo, Meridian, a technical engineering document vault, GIS and Nucleas document control system as primary asset information systems. These systems contain data to be able to support the whole life cycle.		Effective asset management requires appropriate information to be available. Widely used AM standards therefore require the organisation to identify the asset management information it requires in order to support its asset management system. Some of the information required may be held by suppliers. The maintenance and development of asset management information systems is a poorly understood specialist activity that is akin to IT management but different from IT management. This group of questions provides some indications as to whether the capability is available and applied. Note: To be effective, an asset information management system requires the mobilisation of technology, people and process(es) that create, secure, make available and destroy the information required to support the asset management system.	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Operations, maintenance and engineering managers	Details of the process the organisation has employed to determine what its asset information system should contain in order to support its asset management system. Evidence that this has been effectively implemented.
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	2	The external AMMAT assesment has highlighted that this area requires improvement. The current processes rely on individual to manually manage data. The score has been reduced to reflect the assessment.		The response to the questions is progressive. A higher scale cannot be awarded without achieving the requirements of the lower scale. This question explores how the organisation ensures that information management meets widely used AM practice requirements (eg, s 4.4.6 (a), (c) and (d) of PAS 55).	The management team that has overall responsibility for asset management. Users of the organisational information systems.	The asset management information system, together with the policies, procedure(s), improvement initiatives and audits regarding information controls.
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	3	Firstgas has engaged external consultant to review Maximo functionality and its configuration as one of the primary asset management information system. This concluded that the current configuration and application was appropriate for the businesses needs. In a		Widely used AM standards need not be prescriptive about the form of the asset management information system, but simply require that the asset management information system is appropriate to the organisations needs, can be effectively used and can supply information which is consistent and of the requisite quality and accuracy.	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Users of the organisational information systems.	The documented process the organisation employs to ensure its asset management information system aligns with its asset management requirements. Minutes of information systems review meetings involving users.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	The organisation has not established documentation that describes the main elements of the asset management system.	The organisation is aware of the need to put documentation in place and is in the process of determining how to document the main elements of its asset management system.	The organisation in the process of documenting its asset management system and has documentation in place that describes some, but not all, of the main elements of its asset management system and their interaction.	The organisation has established documentation that comprehensively describes all the main elements of its asset management system and the interactions between them. The documentation is kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	The organisation has not considered what asset management information is required.	The organisation is aware of the need to determine in a structured manner what its asset information system should contain in order to support its asset management system and is in the process of deciding how to do this.	The organisation has developed a structured process to determine what its asset information system should contain in order to support its asset management system and has commenced implementation of the process.	The organisation has determined what its asset information system should contain in order to support its asset management system. The requirements relate to the whole life cycle and cover information originating from both internal and external sources.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	There are no formal controls in place or controls are extremely limited in scope and/or effectiveness.	The organisation is aware of the need for effective controls and is in the process of developing an appropriate control process(es).	The organisation has developed a controls that will ensure the data held is of the requisite quality and accuracy and is consistent and is in the process of implementing them.	The organisation has effective controls in place that ensure the data held is of the requisite quality and accuracy and is consistent. The controls are regularly reviewed and improved where necessary.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	The organisation has not considered the need to determine the relevance of its management information system. At present there are major gaps between what the information system provides and the organisations needs.	The organisation understands the need to ensure its asset management information system is relevant to its needs and is determining an appropriate means by which it will achieve this. At present there are significant gaps between what the information system provides and the organisations needs.	The organisation has developed and is implementing a process to ensure its asset management information system is relevant to its needs. Gaps between what the information system provides and the organisations needs have been identified and action is being taken to close them.	The organisation's asset management information system aligns with its asset management requirements. Users can confirm that it is relevant to their needs.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
69	Risk management process(es)	How has the organisation documented process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	3	Firstgas has a risk management procedure that is implemented across the business. As a requirement of AS2885 and the certificate of fitness, the assets are risk assessedon a five yearly basis the a Formal safety management study. New assets and modifications to assets are assessed of operational risk through a formalised HAZOP process. Individual risks are managed through a risk item register.		Risk management is an important foundation for proactive asset management. Its overall purpose is to understand the cause, effect and likelihood of adverse events occurring, to optimally manage such risks to an acceptable level, and to provide an audit trail for the management of risks. Widely used standards require the organisation to have process(es) and/or procedure(s) in place that set out how the organisation identifies and assesses asset and asset management related risks. The risks have to be considered across the four phases of the asset lifecycle (eg, para 4.3.3 of PAS 55).	The top management team in conjunction with the organisation's senior risk management representatives. There may also be input from the organisation's Safety, Health and Environment team. Staff who carry out risk identification and assessment.	The organisation's risk management framework and/or evidence of specific process(es) and/ or procedure(s) that deal with risk control mechanisms. Evidence that the process(es) and/or procedure(s) are implemented across the business and maintained. Evidence of agendas and minutes from risk management meetings. Evidence of feedback in to process(es) and/or procedure(s) as a result of incident investigation(s). Risk registers and assessments.
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	3	Where risk assessments identify actions, these are incorporated into the asset information system with an action owner and timeframe for close out. This is monitored by management and audited to enusre proper close out. Where training needs are identified these are updated in the training matrix		Widely used AM standards require that the output from risk assessments are considered and that adequate resource (including staff) and training is identified to match the requirements. It is a further requirement that the effects of the control measures are considered, as there may be implications in resources and training required to achieve other objectives.	Staff responsible for risk assessment and those responsible for developing and approving resource and training plan(s). There may also be input from the organisation's Safety, Health and Environment team.	The organisations risk management framework. The organisation's resourcing plan(s) and training and competency plan(s). The organisation should be able to demonstrate appropriate linkages between the content of resource plan(s) and training and competency plan(s) to the risk assessments and risk control measures that have been developed.
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	3	Firstgas works closely with Worksafe, commerce commission and industry bodies to maintain awreness of its changes in legislation. Regulatory and statutory requirements. The managers for these areas are responsible for communicating the changes to the revelant areas. The appropriate systems will be then used to log and manage any required changes.		In order for an organisation to comply with its legal, regulatory, statutory and other asset management requirements, the organisation first needs to ensure that it knows what they are (eg, PAS 55 specifies this in s 4.4.8). It is necessary to have systematic and auditable mechanisms in place to identify new and changing requirements. Widely used AM standards also require that requirements are incorporated into the asset management system (e.g. procedure(s) and process(es))	Top management. The organisations regulatory team. The organisation's legal team or advisors. The management team with overall responsibility for the asset management system. The organisation's health and safety team or advisors. The organisation's policy making team.	The organisational processes and procedures for ensuring information of this type is identified, made accessible to those requiring the information and is incorporated into asset management strategy and objectives
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	3	Processes and procedures are in place to manage ans control implementation of asset management plans. The Project management Mannaul provides the process for design, modification,procurement, construction and commission of assets. Design standards manage the design standards provide control when designs, whilst asset maintenance standards provide		Life cycle activities are about the implementation of asset management plan(s) i.e. they are the "doing" phase. They need to be done effectively and well in order for asset management to have any practical meaning. As a consequence, widely used standards (eg, PAS 55 s 4.5.1) require organisations to have in place appropriate process(es) and procedure(s) for the implementation of asset management plan(s) and control of lifecycle activities. This question explores those aspects relevant to asset creation.	Asset managers, design staff, construction staff and project managers from other impacted areas of the business, e.g. Procurement	Documented process(es) and procedure(s) which are relevant to demonstrating the effective management and control of life cycle activities during asset creation, acquisition, enhancement including design, modification, procurement, construction and commissioning.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
69	Risk management process(es)	How has the organisation documented process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	The organisation has not considered the need to document process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle.	The organisation is aware of the need to document the management of asset related risk across the asset lifecycle. The organisation has plan(s) to formally document all relevant process(es) and procedure(s) or has already commenced this activity.	The organisation is in the process of documenting the identification and assessment of asset related risk across the asset lifecycle but it is incomplete or there are inconsistencies between approaches and a lack of integration.	Identification and assessment of asset related risk across the asset lifecycle is fully documented. The organisation can demonstrate that appropriate documented mechanisms are integrated across life cycle phases and are being consistently applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	The organisation has not considered the need to conduct risk assessments.	The organisation is aware of the need to consider the results of risk assessments and effects of risk control measures to provide input into reviews of resources, training and competency needs. Current input is typically ad-hoc and reactive.	The organisation is in the process ensuring that outputs of risk assessment are included in developing requirements for resources and training. The implementation is incomplete and there are gaps and inconsistencies.	Outputs from risk assessments are consistently and systematically used as inputs to develop resources, training and competency requirements. Examples and evidence is available.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	The organisation has not considered the need to identify its legal, regulatory, statutory and other asset management requirements.	The organisation identifies some its legal, regulatory, statutory and other asset management requirements, but this is done in an ad-hoc manner in the absence of a procedure.	The organisation has procedure(s) to identify its legal, regulatory, statutory and other asset management requirements, but the information is not kept up to date, inadequate or inconsistently managed.	Evidence exists to demonstrate that the organisation's legal, regulatory, statutory and other asset management requirements are identified and kept up to date. Systematic mechanisms for identifying relevant legal and statutory requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	The organisation does not have process(es) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning but currently do not have these in place (note: procedure(s) may exist but they are inconsistent/incomplete).	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning. Gaps and inconsistencies are being addressed.	Effective process(es) and procedure(s) are in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Firstgas**
AMP Planning Period	**1 October 2023 – 30 September 2033**
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented information
91	Life Cycle Activities	How does the organisation ensure that process(es) and/or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	3	Firstgas has a document management system to manage controlled documents. This includes processes for review and auditing of documents and processes by interanl auditor to ensure that the processes are maintained.		Having documented process(es) which ensure the asset management plan(s) are implemented in accordance with any specified conditions, in a manner consistent with the asset management policy, strategy and objectives and in such a way that cost, risk and asset system performance are appropriately controlled is critical. They are an essential part of turning intention into action (eg, as required by PAS 55 s 4.5.1).	Asset managers, operations managers, maintenance managers and project managers from other impacted areas of the business	Documented procedure for review. Documented procedure for audit of process delivery. Records of previous audits, improvement actions and documented confirmation that actions have been carried out.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	3	The external review noted that Firstgas has a set of performance indicators, which are a mix of leading and lagging indicators. These are monitored weekly. The KPIs are primarily targeted at risk and meet the requriements of ISO55001:2014		Widely used AM standards require that organisations establish implement and maintain procedure(s) to monitor and measure the performance and/or condition of assets and asset systems. They further set out requirements in some detail for reactive and proactive monitoring, and leading/lagging performance indicators together with the monitoring or results to provide input to corrective actions and continual improvement. There is an expectation that performance and condition monitoring will provide input to improving asset management strategy, objectives and plan(s).	A broad cross-section of the people involved in the organisation's asset-related activities from data input to decision-makers, i.e. an end-to end assessment. This should include contactors and other relevant third parties as appropriate.	Functional policy and/or strategy documents for performance or condition monitoring and measurement. The organisation's performance monitoring frameworks, balanced scorecards etc. Evidence of the reviews of any appropriate performance indicators and the action lists resulting from these reviews. Reports and trend analysis using performance and condition information. Evidence of the use of performance and condition information shaping improvements and supporting asset management strategy, objectives and plan(s).
99	Investigation of asset-related failures, incidents and nonconformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	3	Firstgas has a document management system to manage controlled documents. This includes processes for review and auditing of documents and processes by interanl auditor to ensure that the processes are maintained.		Widely used AM standards require that the organisation establishes implements and maintains process(es) for the handling and investigation of failures incidents and non-conformities for assets and sets down a number of expectations. Specifically this question examines the requirement to define clearly responsibilities and authorities for these activities, and communicate these unambiguously to relevant people including external stakeholders if appropriate.	The organisation's safety and environment management team. The team with overall responsibility for the management of the assets. People who have appointed roles within the asset-related investigation procedure, from those who carry out the investigations to senior management who review the recommendations. Operational controllers responsible for managing the asset base under fault conditions and maintaining services to consumers. Contractors and other third parties as appropriate.	Process(es) and procedure(s) for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances. Documentation of assigned responsibilities and authority to employees. Job Descriptions, Audit reports. Common communication systems i.e. all Job Descriptions on Internet etc.
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	3	Firstgas have an established audit procedure and assurance plan to ensure complinace against external and internal requirements. Firstgas engaged Assetivity an external body to it against the requirements under ISO55001:2014.		This question seeks to explore what the organisation has done to comply with the standard practice AM audit requirements (eg, the associated requirements of PAS 55 s 4.6.4 and its linkages to s 4.7).	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit teams, together with key staff responsible for asset management. For example, Asset Management Director, Engineering Director. People with responsibility for carrying out risk assessments	The organisation's asset-related audit procedure(s). The organisation's methodology(s) by which it determined the scope and frequency of the audits and the criteria by which it identified the appropriate audit personnel. Audit schedules, reports etc. Evidence of the procedure(s) by which the audit results are presented, together with any subsequent communications. The risk assessment schedule or risk registers.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
S1	Life Cycle Activities	How does the organisation ensure that process(es) and/or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	The organisation does not have process(es)/procedure(s) in place to control or manage the implementation of asset management plan(s) during this life cycle phase.	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during this life cycle phase but currently do not have these in place and/or there is no mechanism for confirming they are effective and where needed modifying them.	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process for confirming the process(es)/procedure(s) are effective and if necessary carrying out modifications.	The organisation has in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process, which is itself regularly reviewed to ensure it is effective, for confirming the process(es)/ procedure(s) are effective and if necessary carrying out modifications.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
S5	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	The organisation has not considered how to monitor the performance and condition of its assets.	The organisation recognises the need for monitoring asset performance but has not developed a coherent approach. Measures are incomplete, predominantly reactive and lagging. There is no linkage to asset management objectives.	The organisation is developing coherent asset performance monitoring linked to asset management objectives. Reactive and proactive measures are in place. Use is being made of leading indicators and analysis. Gaps and inconsistencies remain.	Consistent asset performance monitoring linked to asset management objectives is in place and universally used including reactive and proactive measures. Data quality management and review process are appropriate. Evidence of leading indicators and analysis.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
S9	Investigation of asset-related failures, incidents and nonconformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	The organisation has not considered the need to define the appropriate responsibilities and the authorities.	The organisation understands the requirements and is in the process of determining how to define them.	The organisation are in the process of defining the responsibilities and authorities with evidence. Alternatively there are some gaps or inconsistencies in the identified responsibilities/authorities.	The organisation have defined the appropriate responsibilities and authorities and evidence is available to show that these are applied across the business and kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
10S	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	The organisation has not recognised the need to establish procedure(s) for the audit of its asset management system.	The organisation understands the need for audit procedure(s) and is determining the appropriate scope, frequency and methodology(s).	The organisation is establishing its audit procedure(s) but they do not yet cover all the appropriate asset-related activities.	The organisation can demonstrate that its audit procedure(s) cover all the appropriate asset-related activities and the associated reporting of audit results. Audits are to an appropriate level of detail and consistently managed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	3	Where poor performance or non conformance is identified, an investigator is assigned to perfrom an investigation of the issue. The aim of the investigation is to determine the root cause and develop actions to remediate the poor performance. The issue is assigned an owner who is repsonsbile to ensure the actions are implemented. An audit is carreid out on completed investigations by the internal auditor to ensure actions have been completed.		Having investigated asset related failures, incidents and non-conformances, and taken action to mitigate their consequences, an organisation is required to implement preventative and corrective actions to address root causes. Incident and failure investigations are only useful if appropriate actions are taken as a result to assess changes to a businesses risk profile and ensure that appropriate arrangements are in place should a recurrence of the incident happen. Widely used AM standards also require that necessary changes arising from preventive or corrective action are made to the asset management system.	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit and incident investigation teams. Staff responsible for planning and managing corrective and preventive actions.	Analysis records, meeting notes and minutes, modification records. Asset management plan(s), investigation reports, audit reports, improvement programmes and projects. Recorded changes to asset management procedure(s) and process(es). Condition and performance reviews. Maintenance reviews
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	3	AMMAT external review noted" We believe that the culture within Firstgas is very much one that pursues continuous improvement. This was evident from the many procedures and documents that were reviewed in addition to the discussion with the interviews. Collectively these are in pursuit of improving processes that constitute the Asset Management system"		Widely used AM standards have requirements to establish, implement and maintain process(es)/procedure(s) for identifying, assessing, prioritising and implementing actions to achieve continual improvement. Specifically there is a requirement to demonstrate continual improvement in optimisation of cost risk and performance/condition of assets across the life cycle. This question explores an organisation's capabilities in this area—looking for systematic improvement mechanisms rather that reviews and audit (which are separately examined).	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. Managers responsible for policy development and implementation.	Records showing systematic exploration of improvement. Evidence of new techniques being explored and implemented. Changes in procedure(s) and process(es) reflecting improved use of optimisation tools/techniques and available information. Evidence of working parties and research.
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	2	The external Assetivity gap assessement noted " there is an opportunity for improvement to review the performance of the asset management system as a whole and pursue continuous improvement around asset management objectives aligned to perfromance KPI's		One important aspect of continual improvement is where an organisation looks beyond its existing boundaries and knowledge base to look at what 'new things are on the market'. These new things can include equipment, process(es), tools, etc. An organisation which does this (eg, by the PAS 55 s 4.6 standards) will be able to demonstrate that it continually seeks to expand its knowledge of all things affecting its asset management approach and capabilities. The organisation will be able to demonstrate that it identifies any such opportunities to improve, evaluates them for suitability to its own organisation and implements them as appropriate. This question explores an organisation's approach to this activity.	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. People who monitor the various items that require monitoring for 'change'. People that implement changes to the organisation's policy, strategy, etc. People within an organisation with responsibility for investigating, evaluating, recommending and implementing new tools and techniques, etc.	Research and development projects and records, benchmarking and participation knowledge exchange professional forums. Evidence of correspondence relating to knowledge acquisition. Examples of change implementation and evaluation of new tools, and techniques linked to asset management strategy and objectives.

Company Name	Firstgas
AMP Planning Period	1 October 2023 – 30 September 2033
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	The organisation does not recognise the need to have systematic approaches to instigating corrective or preventive actions.	The organisation recognises the need to have systematic approaches to instigating corrective or preventive actions. There is ad-hoc implementation for corrective actions to address failures of assets but not the asset management system.	The need is recognized for systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit. It is only partially or inconsistently in place.	Mechanisms are consistently in place and effective for the systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	The organisation does not consider continual improvement of these factors to be a requirement, or has not considered the issue.	A Continual Improvement ethos is recognised as beneficial, however it has just been started, and or covers partially the asset drivers.	Continuous improvement process(es) are set out and include consideration of cost risk, performance and condition for assets managed across the whole life cycle but it is not yet being systematically applied.	There is evidence to show that continuous improvement process(es) which include consideration of cost risk, performance and condition for assets managed across the whole life cycle are being systematically applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	The organisation makes no attempt to seek knowledge about new asset management related technology or practices.	The organisation is inward looking, however it recognises that asset management is not sector specific and other sectors have developed good practice and new ideas that could apply. Ad-hoc approach.	The organisation has initiated asset management communication within sector to share and, or identify 'new' to sector asset management practices and seeks to evaluate them.	The organisation actively engages internally and externally with other asset management practitioners, professional bodies and relevant conferences. Actively investigates and evaluates new practices and evolves its asset management activities using appropriate developments.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Appendix C

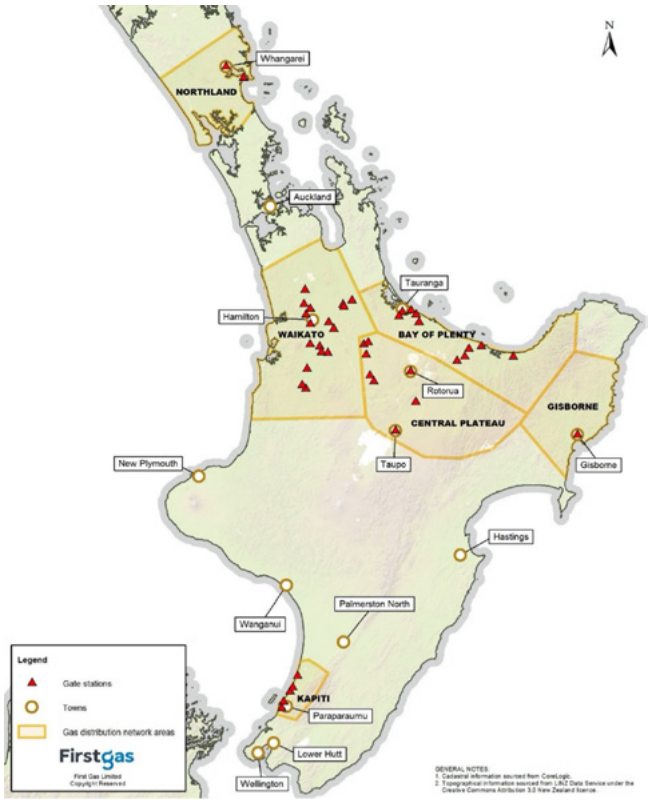
Network Overview

This appendix provides an overview of the gas distribution network, including its load characteristics and configuration. It also includes descriptions of the main asset types on the network.

C.1 Firstgas Group Limited's Gas Distribution Areas

Figure 19 shows the areas of the North Island where the gas distribution assets are located.

Figure 19: Firstgas Gas Distribution Areas



C.1.1 Network Overview

The Firstgas network provides gas distribution services to retailers who sell gas to over 64,000 residential, commercial and industrial customers throughout the North Island. Firstgas are the third largest gas distributor in New Zealand and supply one in five of the country's gas customers.

The distribution network covers the regions of Northland, Waikato, Central Plateau, Bay of Plenty, Gisborne and Kapiti. Each of these regions has its own unique capacity and demand requirements, and are connected to the Firstgas transmission network.

Some key characteristics of these regions and their consumers are:

- **Northland** predominantly services Whangarei residential consumers, with around 16% commercial/industrial consumers (e.g. hospitals, bakeries). One major industrial consumer is located at Marsden Point.
- **Waikato** the majority of the Waikato network services the residential population within Hamilton, servicing approximately 29,612 consumers. Also, within the region are several large commercial/industrial consumers, including dairy and poultry farms, along with several smaller residential settlements.
- **Central Plateau** predominantly services consumers in Rotorua with 4,060 connection points (ICP), Taupo (2,474 ICPs) and Tokoroa (1,034 ICPs). The network also services multiple rural centres and many medium to large industrial consumers.
- **Bay of Plenty** predominantly serves residential customers in Tauranga (4,933 ICPs) and Mt Maunganui (5,080 ICPs), along with other smaller centres and medium to large industrial users. Mt Maunganui has been identified as a potential growth area with major industrial, commercial and urban development expected in the area.
- **Gisborne** serving the greater Gisborne area, connecting 3,221 consumers. Approximately 10% of these are commercial/industrial gas users.
- **Kapiti** services approximately 5,205 consumers in the Paraparaumu and Waikanae regions, as well as multiple smaller centres further north along the Kapiti Coast.

C.2 Key Statistics

Table 9 below sets out key statistics for the gas distribution network (as at 1 October 2022).

Table 9: Key statistics for the distribution network

Statistic	Value
Consumers connected	65,027
System length (km)	4,843
Consumer density (consumer/km)	13.4
District Regulating stations (DRS)	128
DRS density (system km/DRS)	37.8
DRS utilisation (consumers/DRS)	508
Peak load[2] (scmh)	52,275
Gas conveyed (PJ pa)	9.3

C.3 Demand on the Network

The capacity of the network is determined by the operating pressure, the size of the pipe and the allowable pressure loss between inlet and outlet. Meshed distribution networks are sized on the same principle, the difference being, that pipes are interconnected at several points and can be fed to multiple points, rather than running from point to point.

As the distribution network expands and demand grows, the pressure in downstream parts of the network can drop significantly. This has the potential to limit network capacity, and consequently the delivery of gas to downstream consumers.

Under normal network operating conditions, the standard 00074 Gas Distribution quality of supply criteria stipulates that the pressure at any point on the network shall be no less than 50% of its nominal pressure. Further details of these standards can be found in Appendix F – System Development.

In order to prevent any departure from these standards, Firstgas undertakes pressure monitoring surveys and carry out network analysis to identify any areas that are at risk of not meeting supply standards. This allows proactive reinforcing networks and ensures operating pressures do not become insufficient.

The distribution network is broken down into discrete pressure systems. Regulator stations are positioned strategically around the network to control the pressure of gas entering each discrete pressure system (i.e. intermediate pressure, medium pressure, low pressure systems).

The demand, and subsequent pressure drops, on each of these systems needs to be considered independently. This is due to the meshed nature of the network, and the mix of residential, commercial and industrial consumers.

Demand on the network comes from a combination of consumer types, each with their own requirements and demand profiles:

- **Residential:** consumers typically have peak demand in the morning and evening, bookending the standard work day where consumption is low. Residential consumers typically use gas for hot water, heating or cooking, and use around 20 - 30 GJ of gas per year.
- **Commercial and industrial:** loads are typically consistent for the whole day. These users can range from small restaurants and office buildings, to large scale industries, such as dairy processing. These users can consume anywhere from 30GJ to over 50TJ per year.

With commercial and industrial customers providing a consistent load demand in between the residential peaks, the network is capable of achieving a measure of load-levelling. The pressure data collected as part of the monitoring programme is used to identify the load characteristics of the networks. This provides the ability to model the load profile for different consumer types.

C.3.1 Peak Demand and Gas Conveyed

Historical trends show long-term gas demand is mainly influenced by local economic activity, the price and availability of substitute fuels (e.g. electricity, fuel oil etc.), population and household growth, and investment decisions made by large industrial and commercial consumers.

In the short-term, demand is very sensitive to climate. A cold snap, for example, can drive up the demand for gas significantly. Conversely, a warm winter can result in a considerably lower demand.

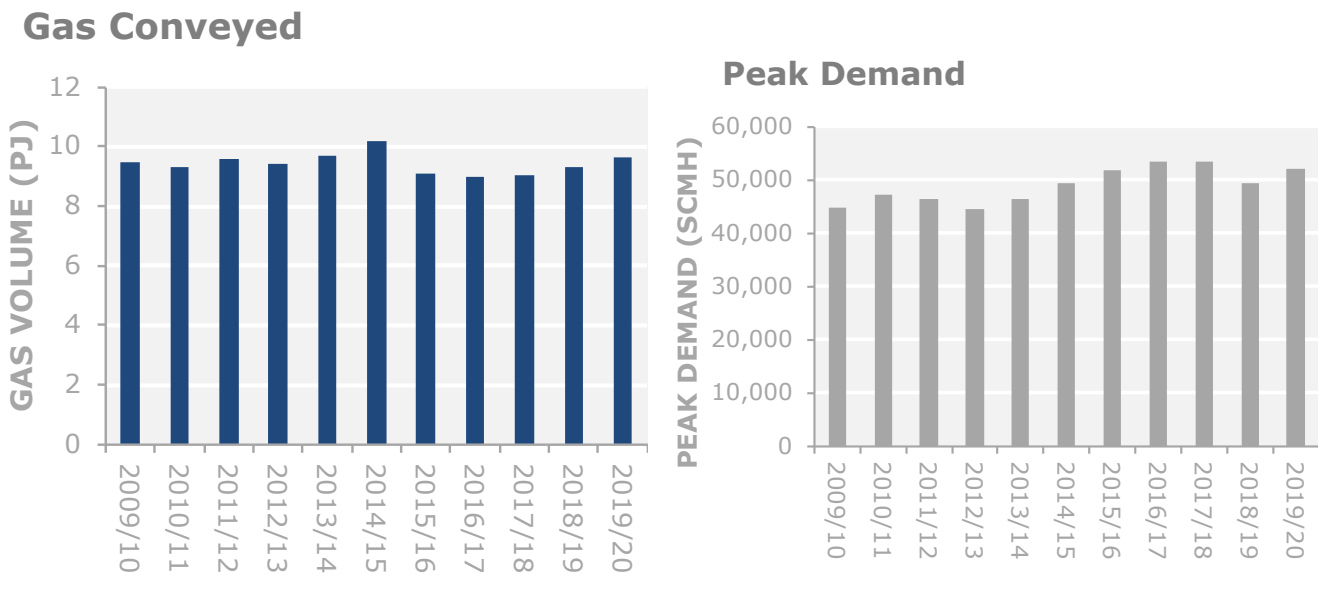
After normalising for year-on-year variances, historical data shows a steady demand trend. Any unusually high peak demands that occur due to extreme weather conditions ordinarily represent only a small percentage of hours in a year.

The peak demand on the gas distribution network, and the quantity of gas conveyed for the past six years is shown below. This data shows the coincidental peak demands of all gate stations delivering supply to gas distribution networks. Individual demand forecasts for each of the gate stations on the network are detailed in Appendix I – Load Forecasts.

The reasons for the variability between the gas conveyed and the peak hour demand trends are complex. Changes in weather patterns or the timing of gas usage of large industrial consumers has a considerable influence on overall peak gas demand. This partially explains the inconsistent relationship between the annual energy delivered and the total peak hour demand.

The distribution network supplies gas to a number of high demand commercial and industrial consumers that have a significant impact on network operations and asset management. The locations of consumers with a significant individual energy demand (above 20TJ) are provided in Appendix D – Network Maps.

Figure 20: Peak Demand and Gas Conveyed



C.4 Distribution System Design

In general, the gas distribution network assets are relatively young, with the majority of assets being built from the late 1980s onwards, and predominantly constructed of steel and polyethylene materials.

The distribution network is made up of a number of legacy systems developed independently by various network developers that is now owned and operated by Firstgas. Each of these networks was designed and operated to the standards applied by each of the developers. As a result, the defined standard operating pressures of similar sections of the network are not always consistent.

Any such design and operating conditions that do not conform to Firstgas standards are defined in the quality of supply standard. Over time, the intention is to rationalise and standardise the design and operating pressure ranges in order to simplify network operations.

C.5 Network Configuration

The gas distribution network begins from the outlet valve of the gas transmission system and terminates at the inlet valve on a consumers' gas measurement system, or gas meter. The gas distribution networks broadly contain the following six main categories of assets:

- Distribution pipes
- Pressure stations
- Valves
- Corrosion protection equipment
- Monitoring systems
- Special crossings

The distribution network operates at pressures up to 2,000 kPa, and is categorised into low, medium and intermediate pressure systems, as defined by NZS 5258:2003. These operating pressures are further categorised into seven discrete pressure levels as shown in Figure 21 below.

The distribution network receives bulk gas supply from the Firstgas high-pressure transmission system operating across the North Island. The transmission system delivers gas, typically to the intermediate pressure (IP) and medium pressure (MP) distribution networks, via gate stations.

These IP and higher-pressure MP systems tend to be radial in design, whereas the design of the majority of MP and low pressure (LP) systems tends to be mesh-based, providing back feed security to a large number of residential and commercial loads. MP and LP systems are often supplied from multiple District Regulating Stations (DRS), thereby further increasing the security of supply.

A simplified depiction of the distribution network (Figure 22) is presented on the next page showing the interconnection between various pressure levels.

Figure 21: Distribution Pressure Systems

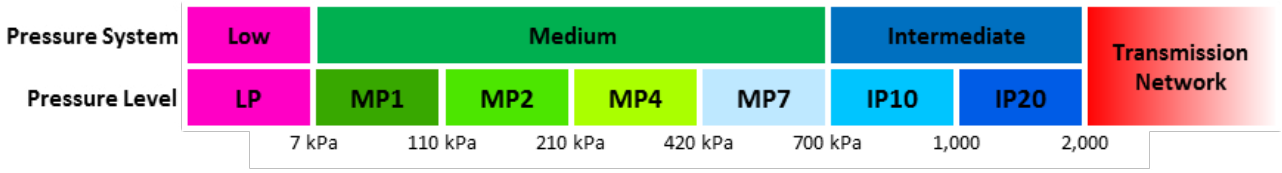
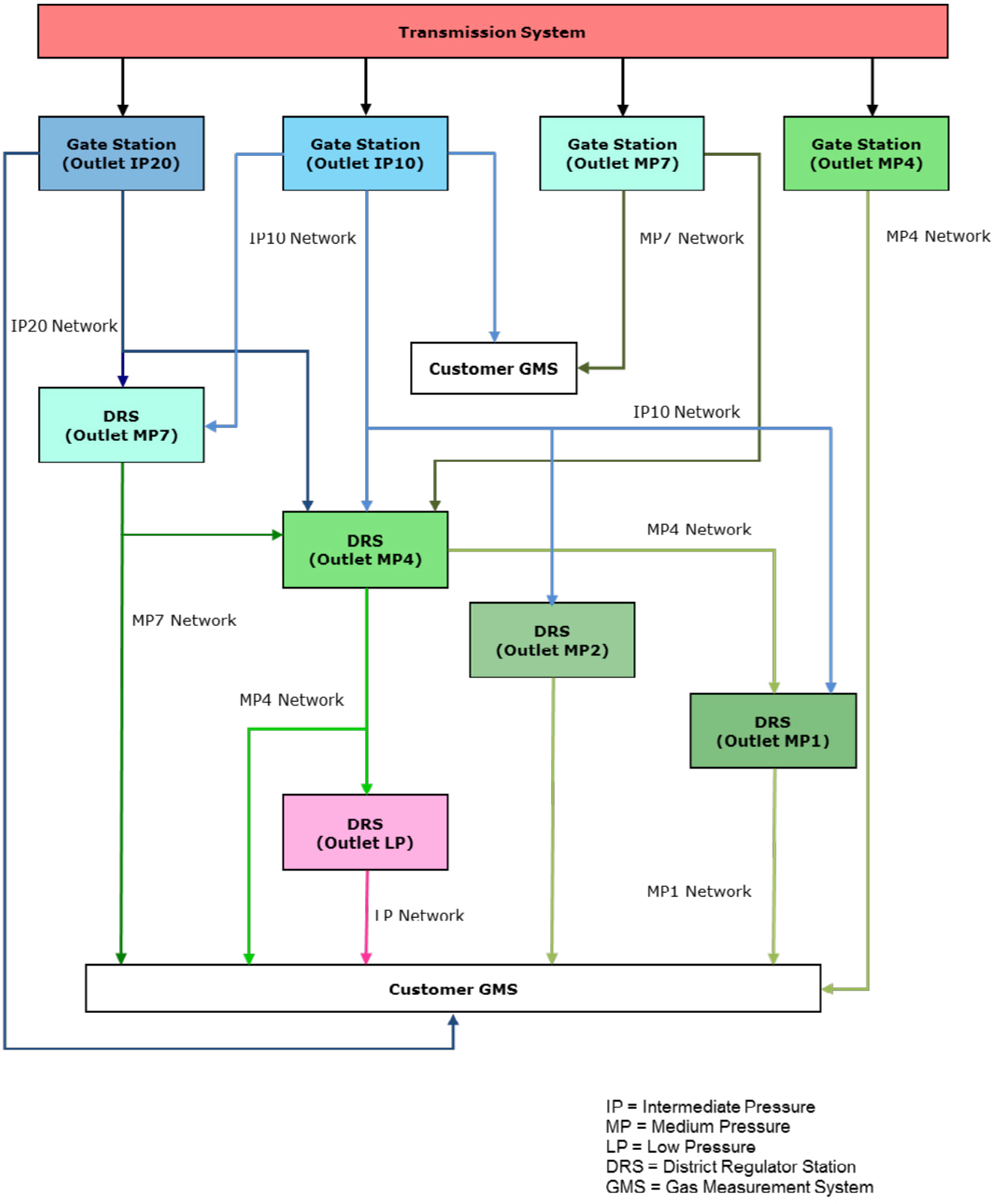


Figure 22: Schematic of the Distribution Network



C.5.1 Mains and Service Pipes

Gas distribution pipes are categorised into the two asset types:

1. Mains

Generally larger and higher-pressure pipe used to transport gas through the network for further distribution and use.

The IP systems generally form the 'backbone' of the distribution networks with laterals diverging from pipes to supply adjacent areas. These pipes are operated in the IP range of 700 to 2,000kPa. The selection of these pressures has, in the majority of cases, been based on balancing gas volumes, transmission distances, and delivery pressures. The IP systems are all constructed to a high technical standard of welded steel. They are also all protected against corrosion by CP, using either a system of sacrificial anodes or an impressed current installation to aid in the prevention of corrosion.

The MP system makes up the majority of Firstgas distribution assets. The pipes in the MP system generally form the greater mesh network and are used to directly supply gas consumers. These mains are constructed mostly of polyethylene (PE) and as such require no corrosion protection.

2. Service

Smaller pipes used to transport gas from a main to a GMS typically installed on the consumer's property.

Service connections provide the link between the gas mains in the street and the customer's gas meter. They comprise of a service pipe, riser and a riser valve. The outlet connection of the riser valve designates the end of the distribution system. A service regulator is normally fitted downstream of the riser valve to regulate the gas pressure to the consumer meter-set and to downstream appliances. In these cases, the regulator is owned by retailers or GMS owners.

Figure 23: Typical PE mains pipe installation

C.5.2 Pressure Reduction

Pressure reduction stations are those parts of a gas network that link two pressure levels through pressure regulators. They are the points where gas enters a lower pressure network and are used to maintain a consistent inlet pressure to each system. There are three categories of pressure stations on the distribution network:

- **Gate stations:** where the pressure station is the link between the gas transmission system and a gas distribution network, it is known as a gate station. In these locations, high pressure gas equipment (i.e. pressure regulating equipment and custody transfer metering) within the gate station is operated by the transmission business and is not considered part of the distribution network. Equipment downstream of the pressure regulation (i.e. associated valves and pipework) within the gate station is operated as part of the gas distribution network.
- **District Regulating Stations:** where the pressure station is the link between two differing pressure level systems, it is known as a district regulating station (DRS). DRS are used to reduce and regulate the operating pressure from higher operating pressure systems to systems with lower operating pressures.

DRS are strategically located within the distribution network so that a continuous and safe gas supply is delivered to the maximum number of customers. They are primarily used to reduce the higher pressures associated with high-volume mains, (i.e. MP7 and above), down to more economical distribution pressure levels between 200kPa and 420kPa on the MP2 and MP4 systems.

The lower operating pressures provided by the DRS assets allow modern technology and materials, such as polyethylene pipes, to be used to provide a safe, assured and cost-effective gas supply to customers.

As these are the source of supply to a significant number of consumers, they are critical components in the gas distribution network. Because of this importance, DRS installations are often duplicated in order to ensure a reasonable level of security of supply. This redundancy also enables maintenance to take place without a loss of supply to customers.

Service regulators: service regulators are used to normalise the flow and pressure of gas supplied to individual premises, based on the consumer's supply requirements. For practical reasons where a regulator is unable to be installed immediately adjacent to the consumers gas meter (i.e. as part of the GMS), it is installed at a location upstream from the GMS and may be owned and maintained by Firstgas.

Figure 24: A standard DRS installation

C.5.3 Line Valves

Line valves are manually operated valves used in the distribution system that fall into two categories:

- In line mains and service valves: strategically located to isolate the flow of gas within the system when required.
- Blow down valves: designed to vent/depressurise sections of the system in the event of an emergency.

The majority of manually operated valves used in the distribution system are ball valves, plug valves or gate valves.

C.5.4 Corrosion Protection Systems

Steel or metallic pipes and equipment installed in the distribution system (either above or below ground) are susceptible to corrosion. Various measures are employed to ensure the integrity of the assets are maintained.

Above ground pipe and equipment is protected against corrosion by the provision of paint or other suitable protective coatings e.g. wrapping. Periodic inspections are carried out to monitor the condition of these coatings.

Below ground steel pipes and equipment is protected against corrosion by the provision of protective coatings (e.g. high-density polyethylene or epoxy coating) and the application of impressed current or sacrificial anode CP systems. Protective coatings are inspected whenever underground pipe or equipment is exposed. CP test points are provided at regular intervals on the system. They are monitored on a periodic basis and maintained to ensure that the levels of protection being provided to the underground plant are kept within prescribed maximum and minimum levels.

C.5.5 Monitoring Systems

At various strategic locations throughout the distribution network, monitoring systems are installed to observe and record network data. Generally located at gate stations and DRS, these systems provide monitoring and alarming of critical inlet/outlet pressures, temperatures and flow rates, and corrected and uncorrected metering data.

The systems used to monitor the gas distribution networks are a combination of Cello and VDS3000 data loggers and correctors. The data gathered by the monitoring systems is accessed through an archiving histogram called Wonderware. This information is then used in network modelling and forecasting to inform future network design and to ensure gas security standards are met. The existing Cello units currently rely on 2/3G cellular communications networks that are being retired so these units will be replaced with more modern equivalents.

C.5.6 Special Crossings

Special crossings are locations where a section of pipe is installed either above or below ground in order to cross over a roadway, river, railway or any area of interest with a differing risk profile from a standard installation.

In certain instances, an above ground crossing (e.g. over a bridge) enables the gas distribution pipe route to negotiate obstacles, where a below ground crossing is not practical.

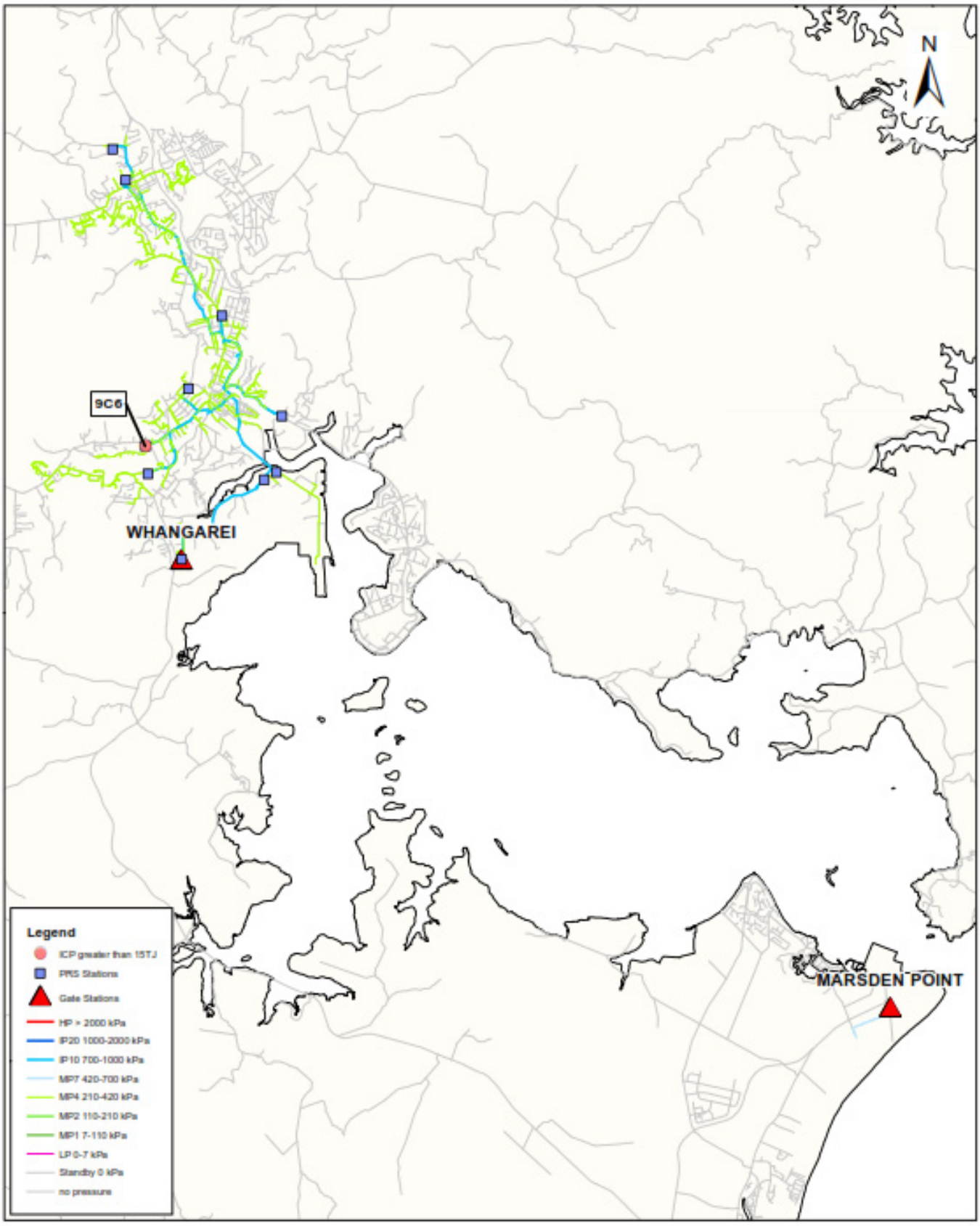
C.5.7 Critical Spares and Equipment

An appropriate stock of critical spares and equipment ensures any maintenance or repairs to the network are not hindered by the lack of equipment or parts availability. The critical spares and equipment holdings include spare pipe and pipe fittings, repair equipment, spare DRS, and other items that have been determined critical based on lead time, turnover, risk, or other drivers. These items are held at various locations throughout the network to allow for fast repairs.

Appendix D

Network Maps

This appendix provides outlines of the Firstgas distribution network, including location of mains pipes, gate and pressure regulation stations. The maps also show ICPs with an individual energy demand above 20TJ, and hence have a significant impact on network operations and asset management.

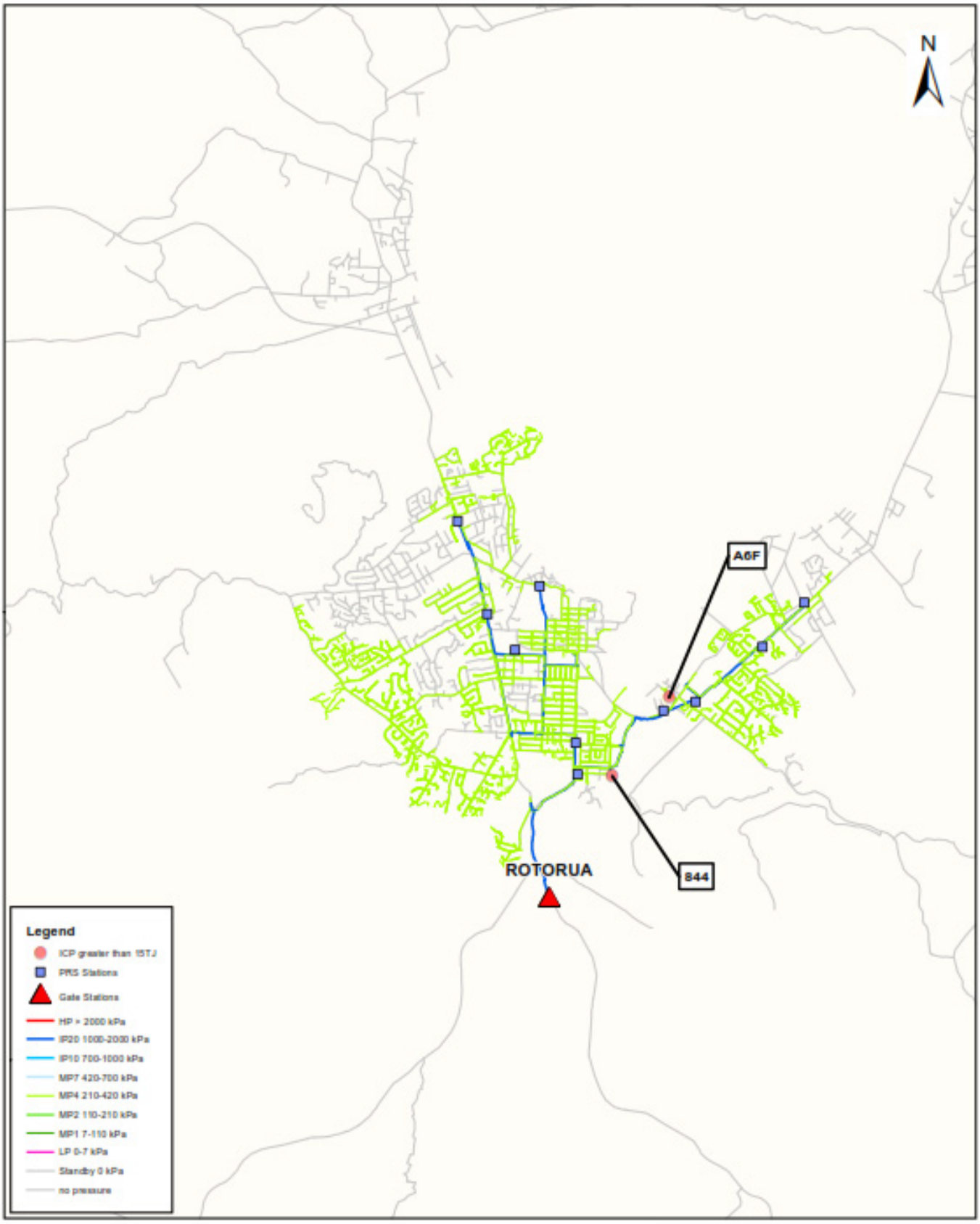


GAS DISTRIBUTION MAPS
NORTHLAND REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-002-01-F

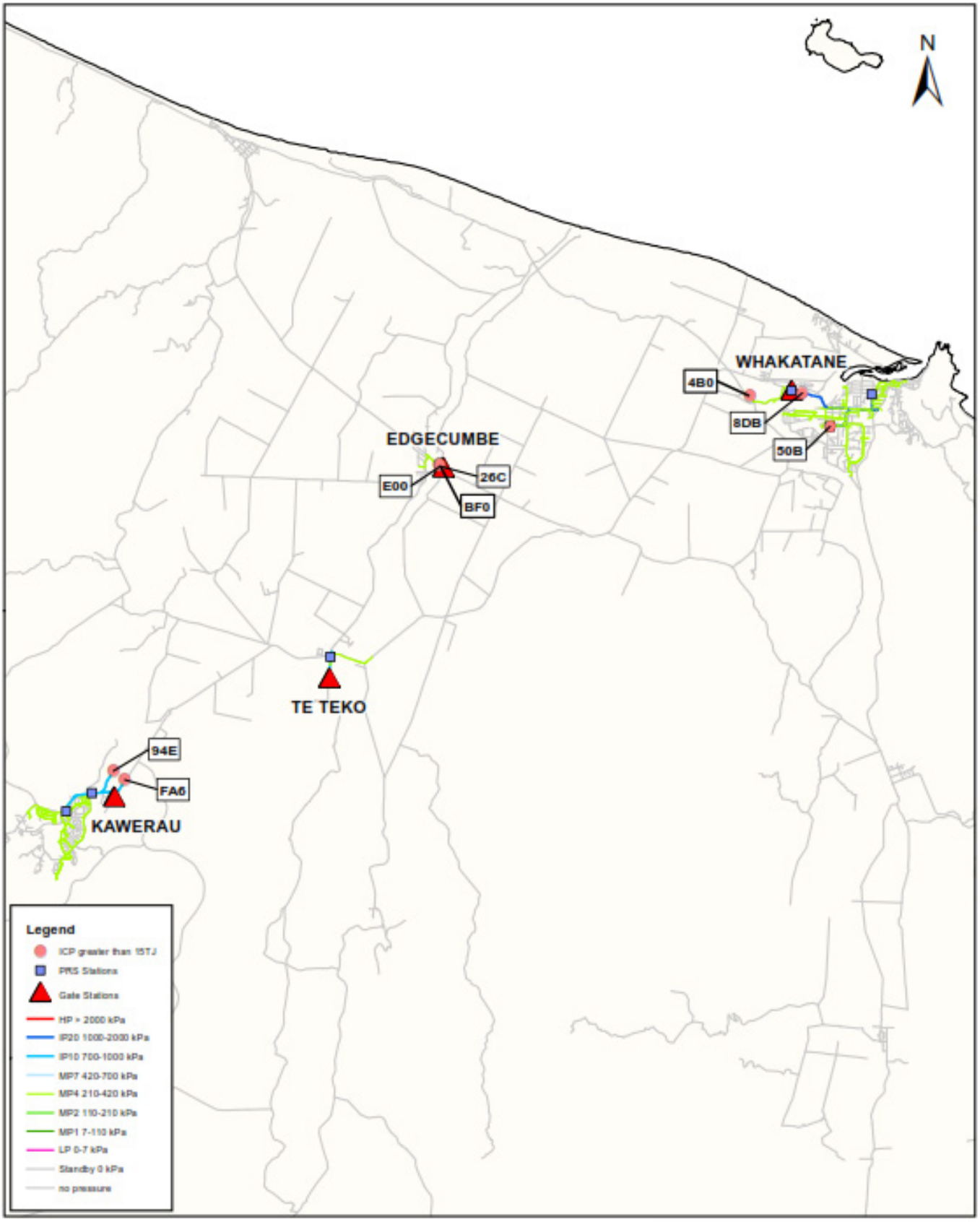


GAS DISTRIBUTION MAPS
CENTRAL PLATEAU REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-004-04-A

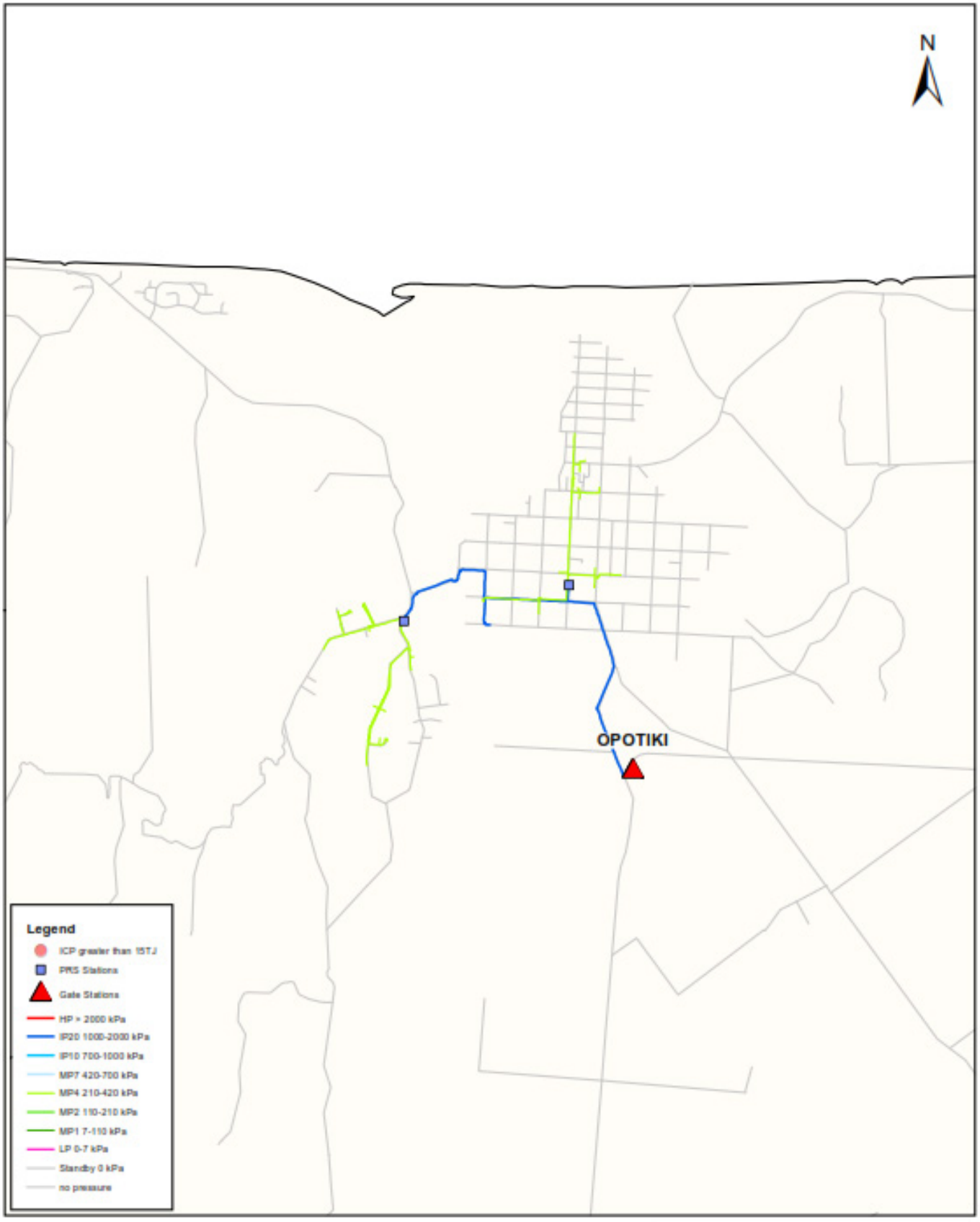


GAS DISTRIBUTION MAPS
BAY OF PLENTY REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of issue: 19/04/2023.

Drawing Reference: GIS-G0215-005-01-E

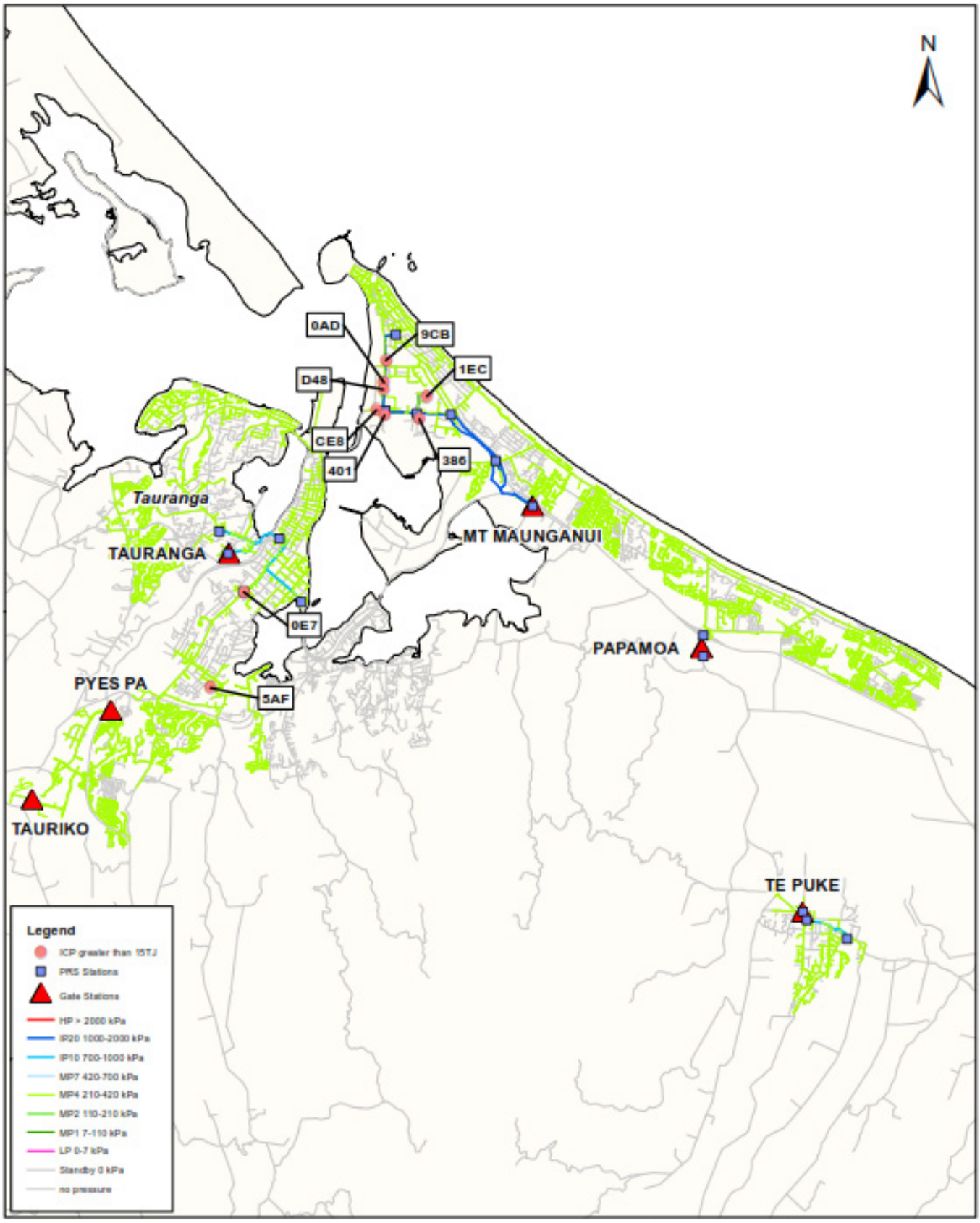


GAS DISTRIBUTION MAPS
BAY OF PLENTY REGION

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Firstgas

Drawing Reference: GIS-G0215-005-02-E

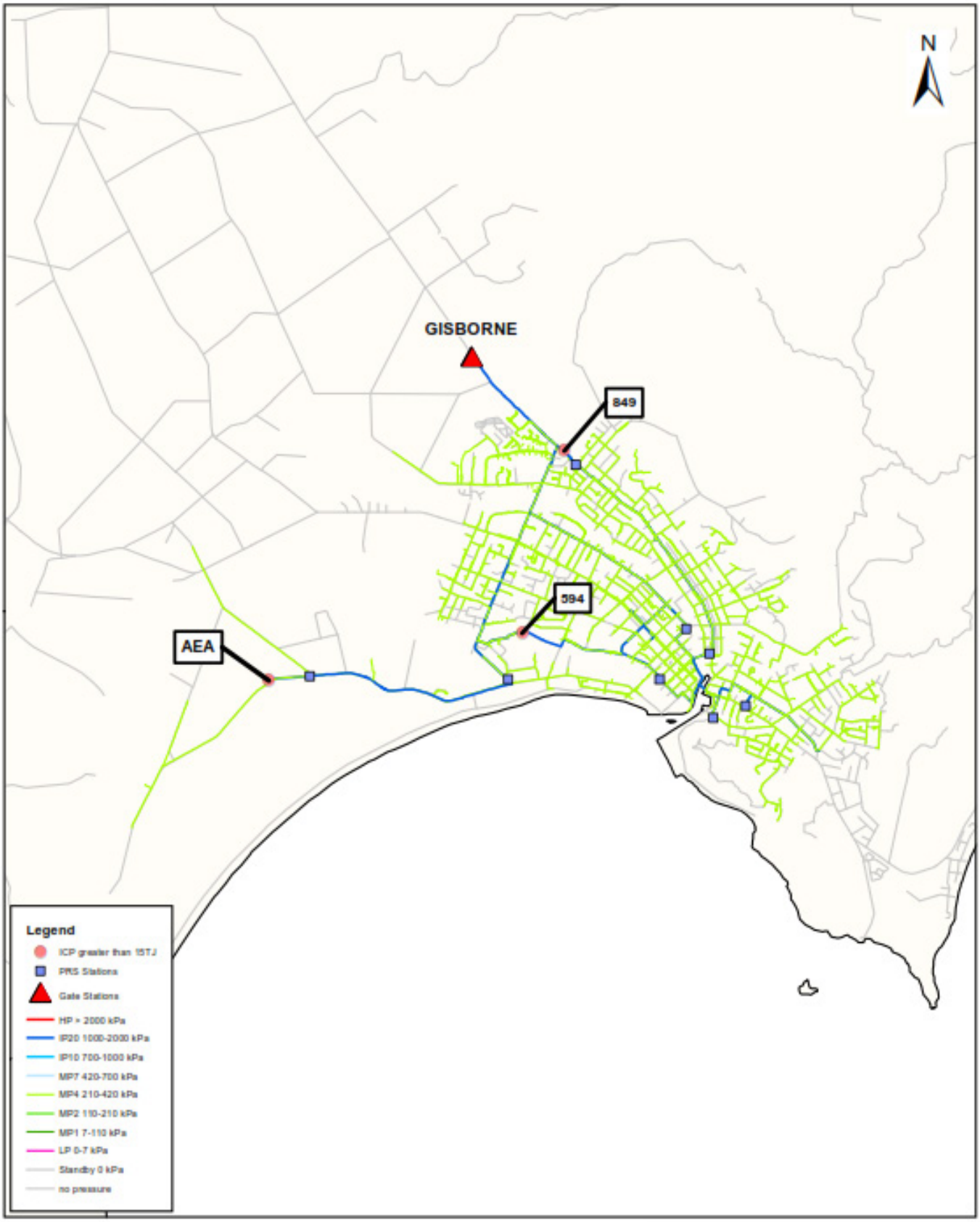


GAS DISTRIBUTION MAPS
BAY OF PLENTY REGION

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Firstgas

Drawing Reference: GIS-G0215-005-03-E

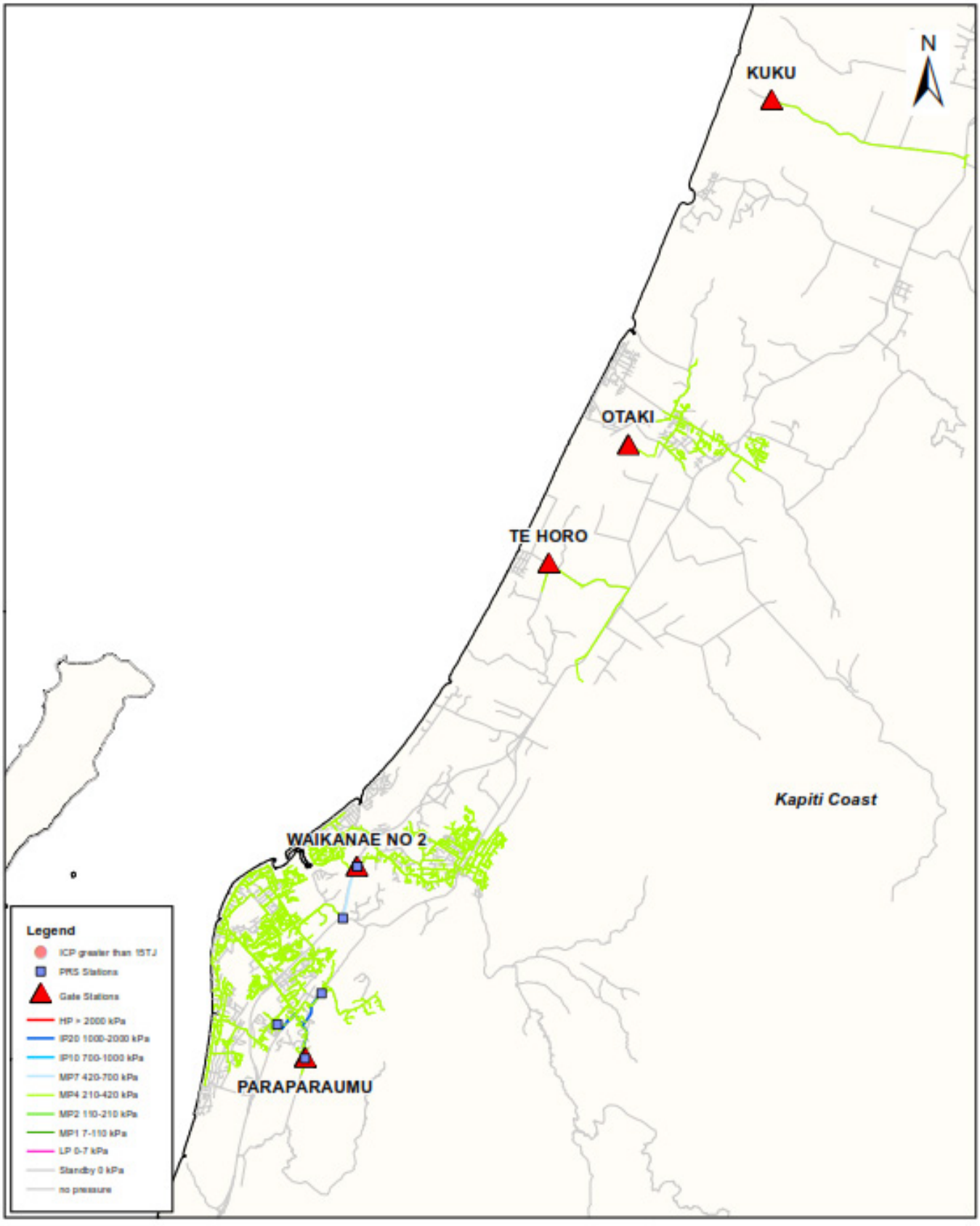


GAS DISTRIBUTION MAPS
GISBORNE REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-006-01-E

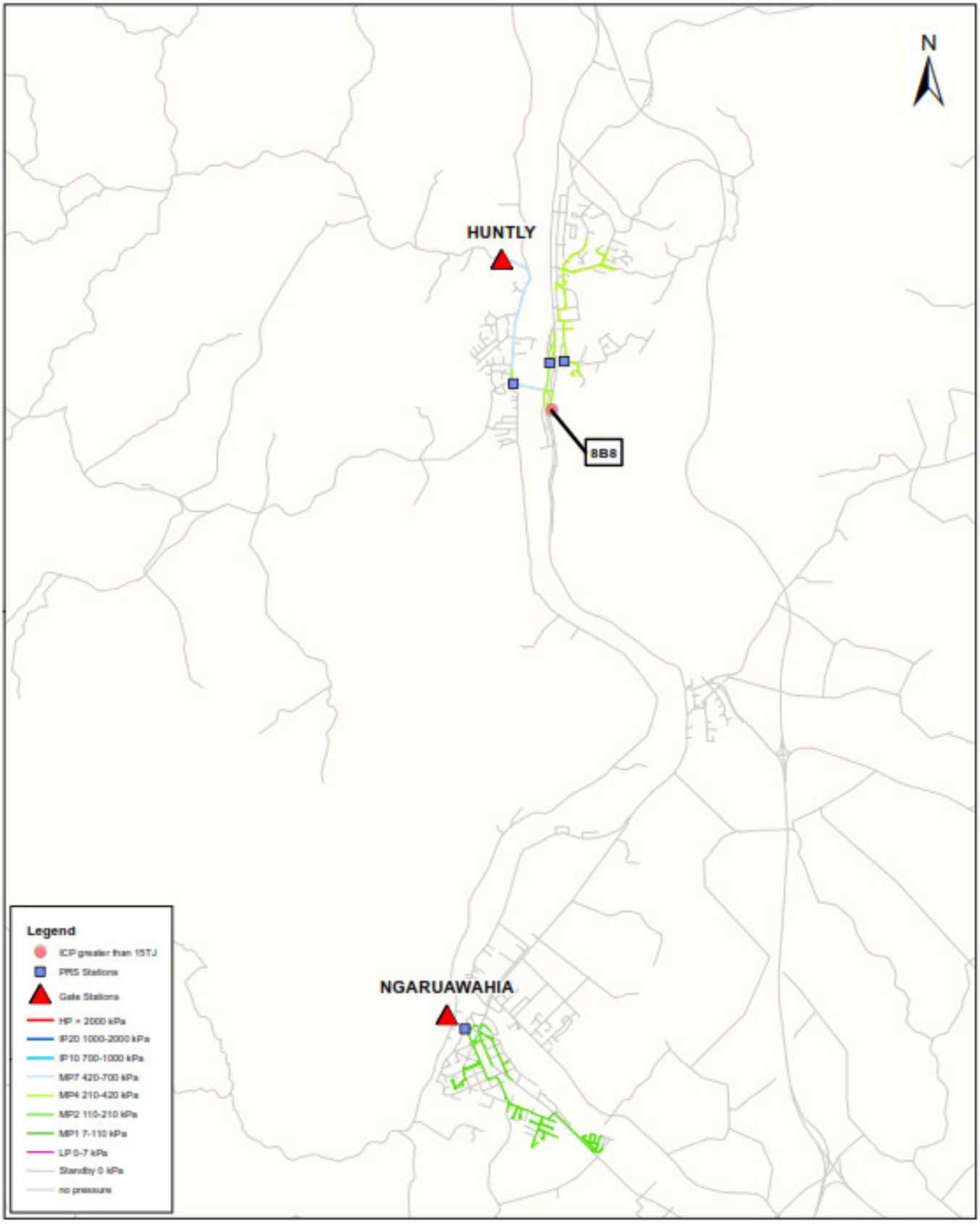


GAS DISTRIBUTION MAPS
KAPITI REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-007-01-E

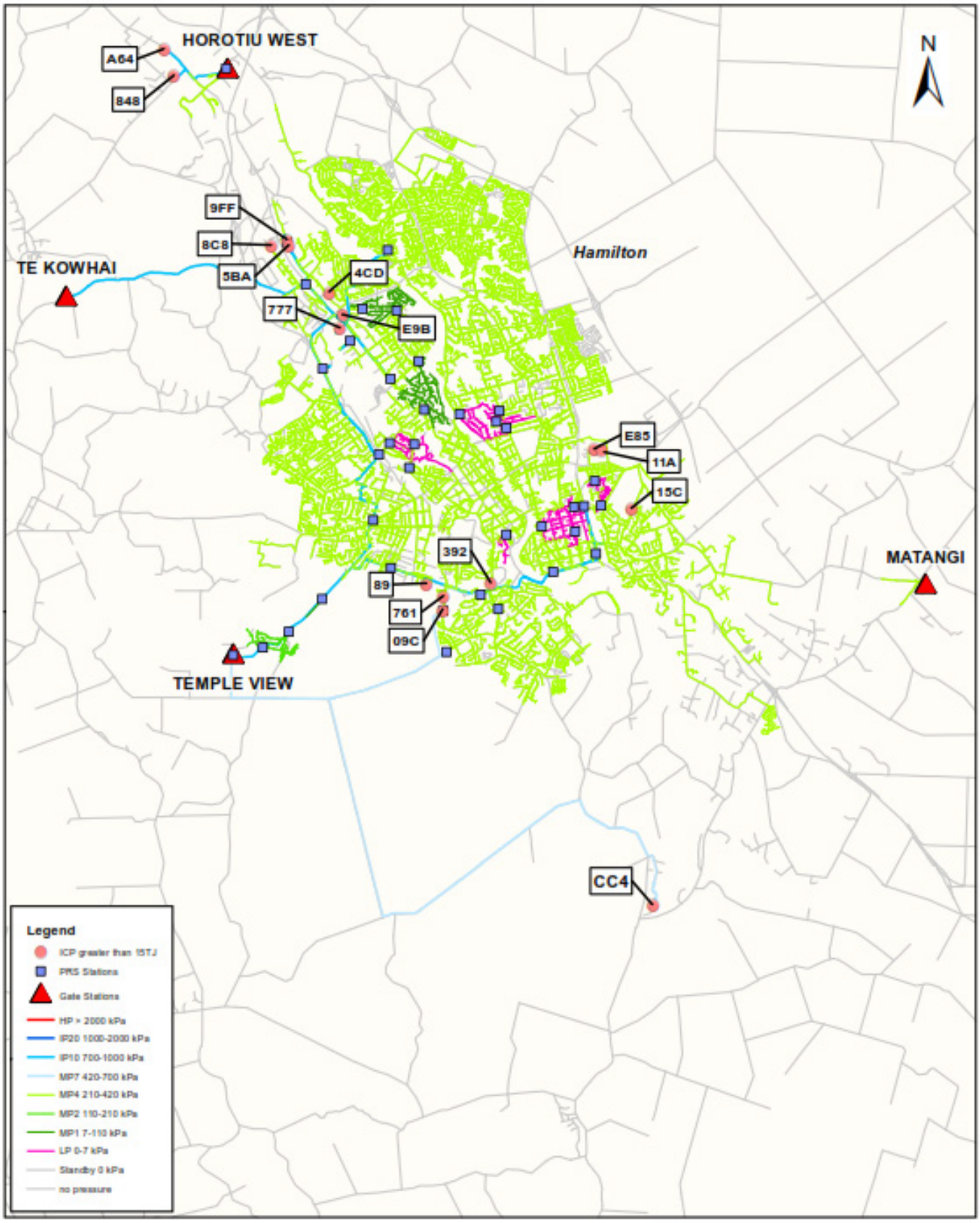


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-01-E

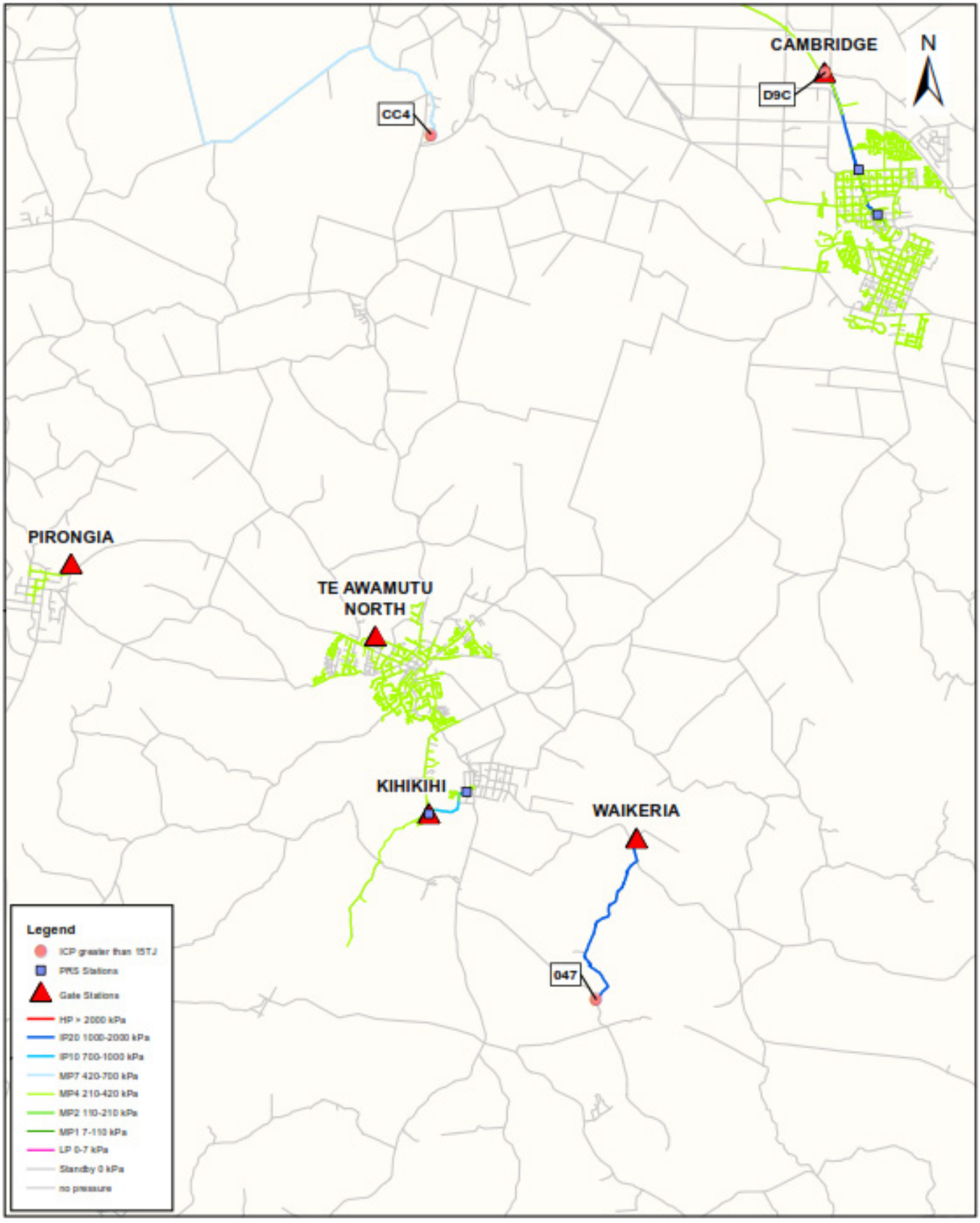


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-02-E

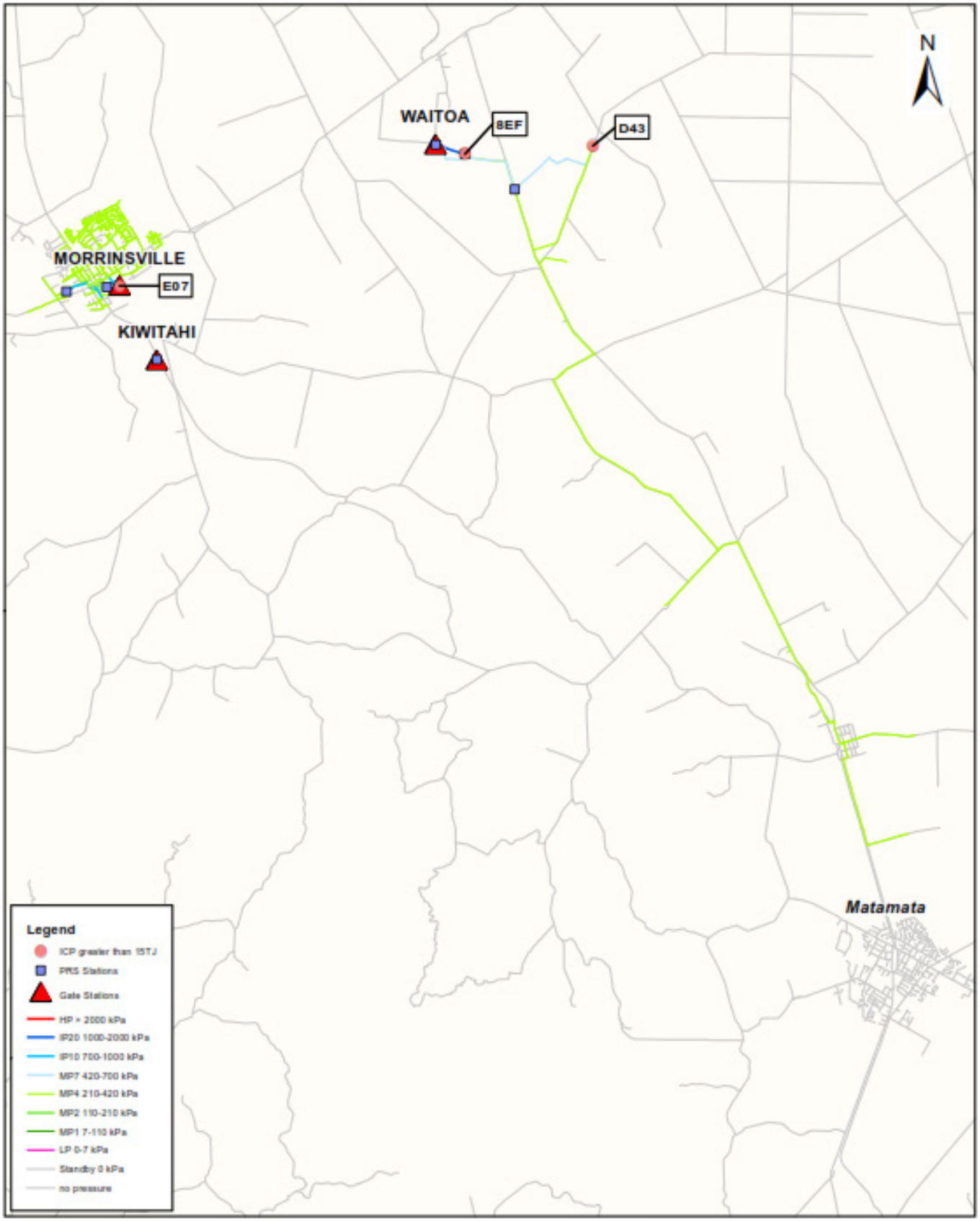


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-03-E

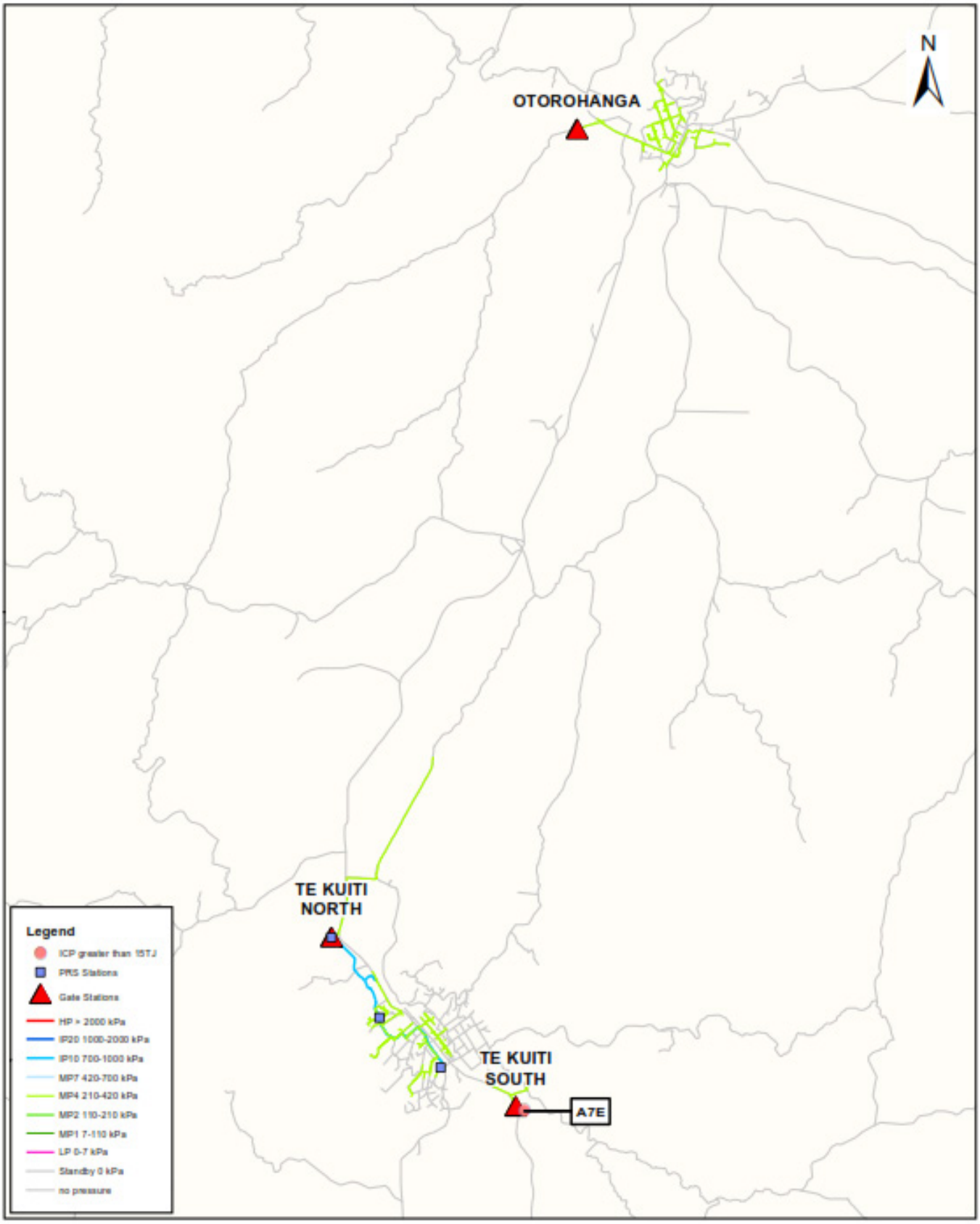


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-04-E

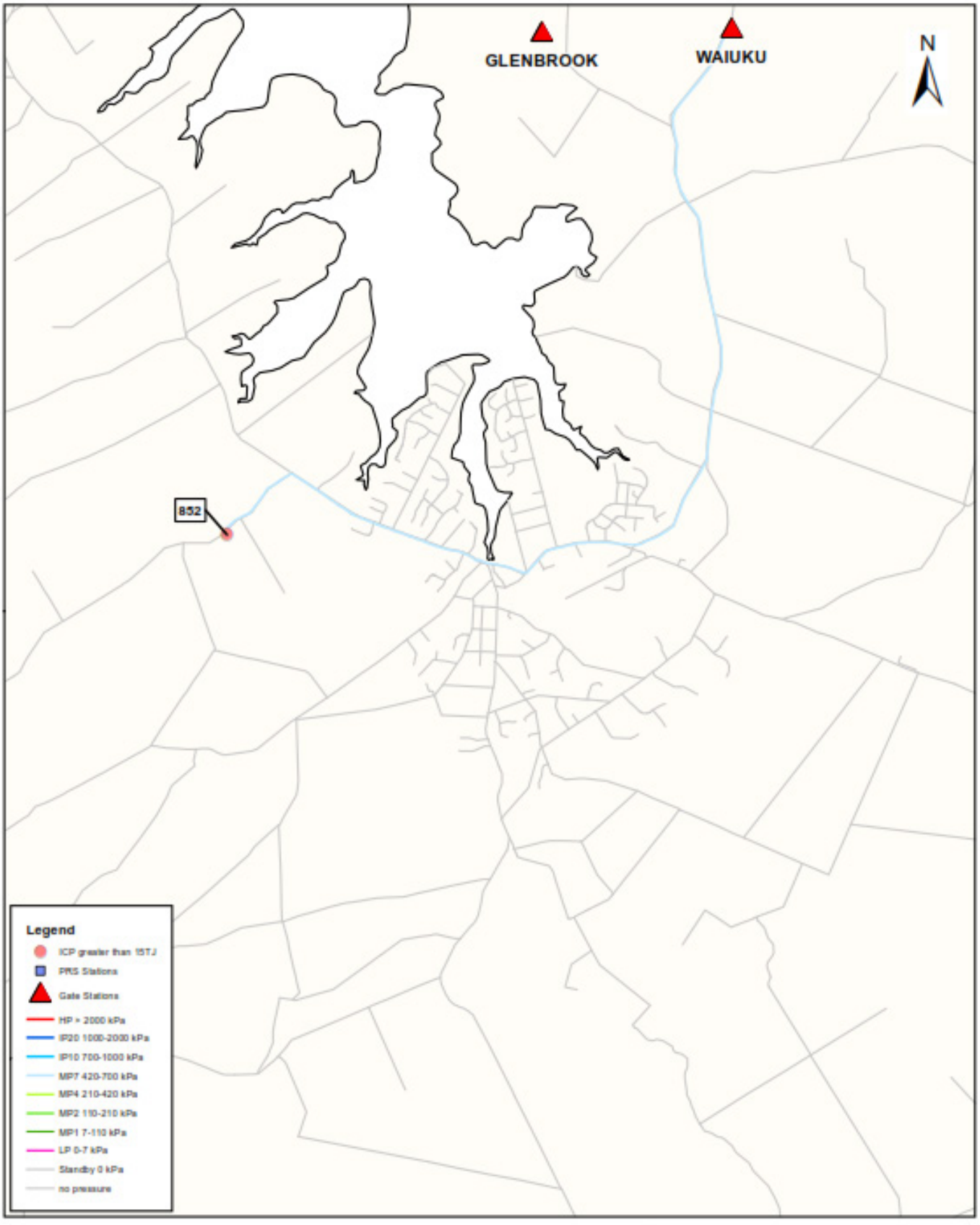


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-05-E

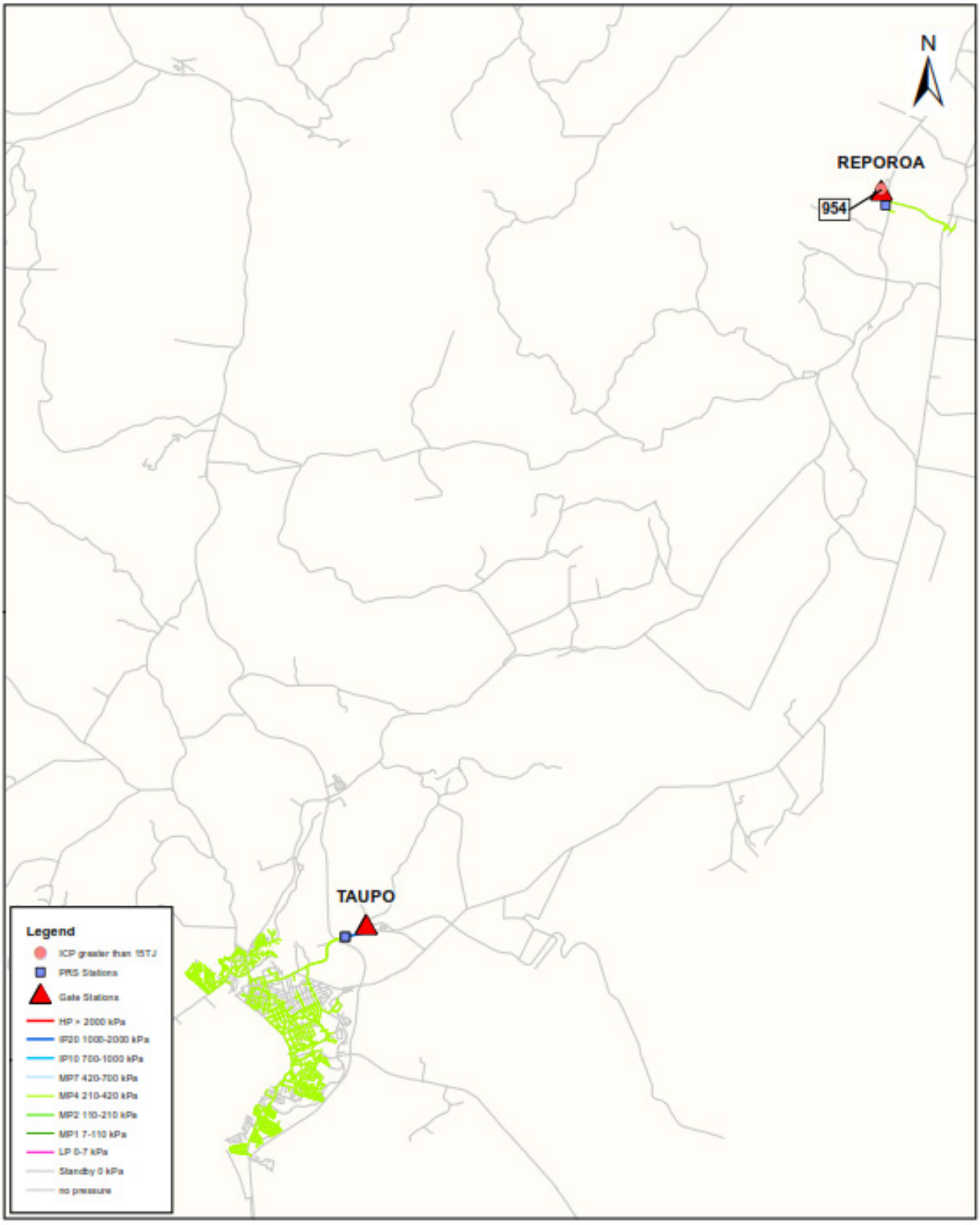


GAS DISTRIBUTION MAPS
WAIKATO REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of issue: 19/04/2023.

Drawing Reference: GIS-G0215-003-06-B

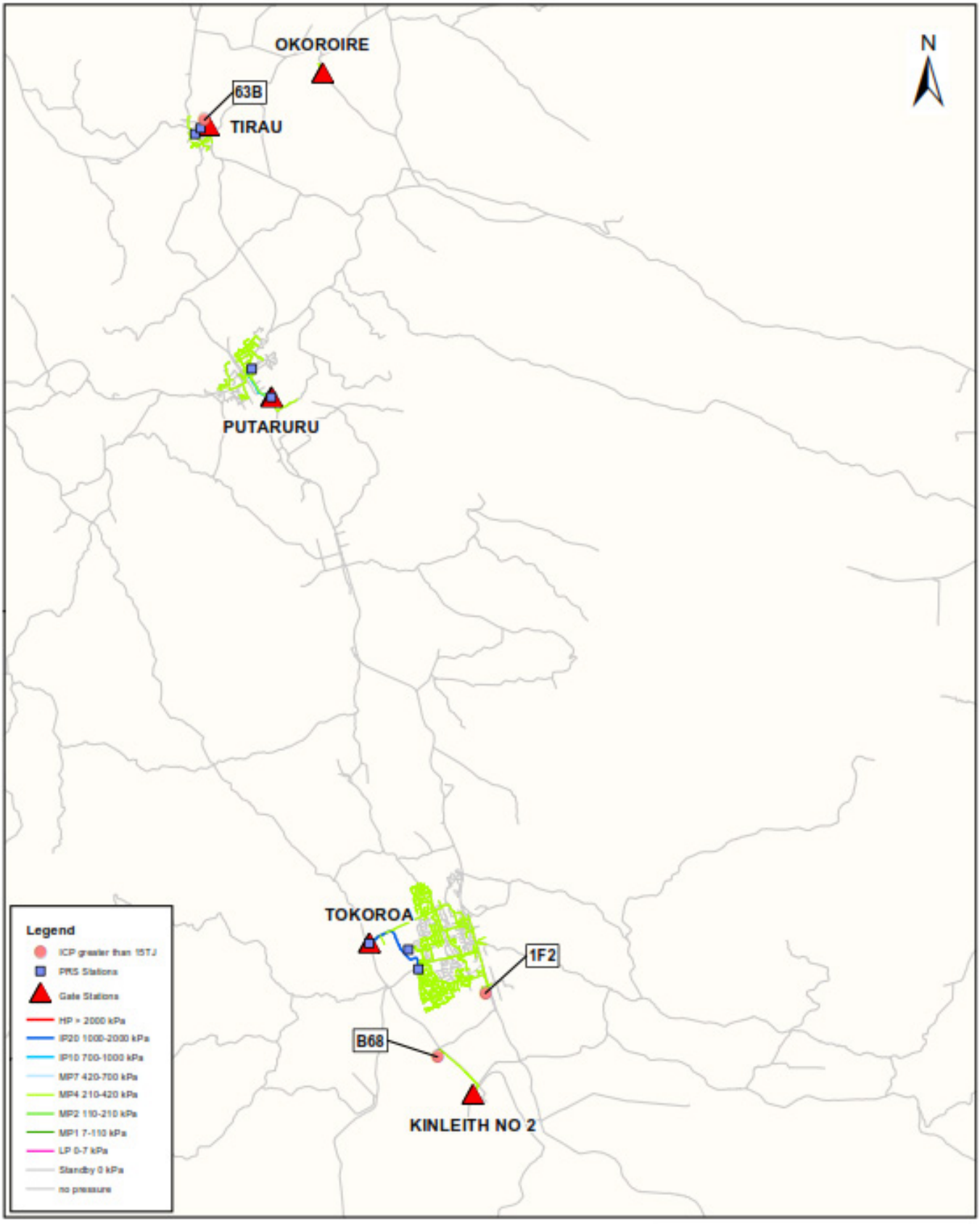


GAS DISTRIBUTION MAPS
CENTRAL PLATEAU REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-004-02-E



GAS DISTRIBUTION MAPS
CENTRAL PLATEAU REGION

Firstgas

GENERAL NOTES:
1. Cadastral and Topographical information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator 2000 projection.
3. Date of Issue: 19/04/2023.

Drawing Reference: GIS-G0215-004-03-A

Appendix E

Asset Fleets

The following sections provide more detail on the individual asset fleets that make up the Firstgas distribution network. This section describes their characteristics, discusses conditions and risks issues, and provides background information on key investments over the planning period. It covers the following asset types:

- Mains and service pipes
- Pressure reducing stations
- Line valves
- Cathodic protection
- Monitoring systems
- Special crossings
- Critical spares and equipment

The definition of asset categories and asset classes used in the AMP are aligned with those defined by Information Disclosure and those reported in Schedule 12a - Report on Asset Condition, disclosed in Appendix B – Information Disclosure Schedules. However, some categories don't map directly (e.g. sub components) and as such, some of the asset grades recorded in Schedule 12a reflect the overall condition of the asset class or asset category and not the asset grade of the sub-components.

E.1 Mains and Service Pipes

Gas distribution pipes are categorised into the two asset types:

- **Mains:** generally larger and higher-pressure pipe used to transport gas through the network for further distribution and use.
- **Services:** smaller pipes used to transport gas from a main to a GMS typically installed on the consumer's property.

E.1.1 Fleet Overview

The composition of the gas distribution network is set out in Table 11 below.

The majority of mains and service pipes, both steel and PE, have been installed from the late 1980s onwards, as the network experienced further growth and the availability of gas increased. The PE network predominantly consists of PE80 material, with PE100 pipes being installed from the late 1990s onwards.

The age profiles for mains and service pipes are shown in Figures 25 and 26 below.

Table 11: Fleet Overview (September 2022)

ASSET CATEGORY	ASSET MATERIAL	LENGTH (KM)	% BY CATEGORY
Mains	PE	3232	64.9%
Mains	Steel	323	6.5%
Service	PE	1412	28.4%
Service	Steel	13	0.3%

Figure 25: Mains Pipes Age Profile

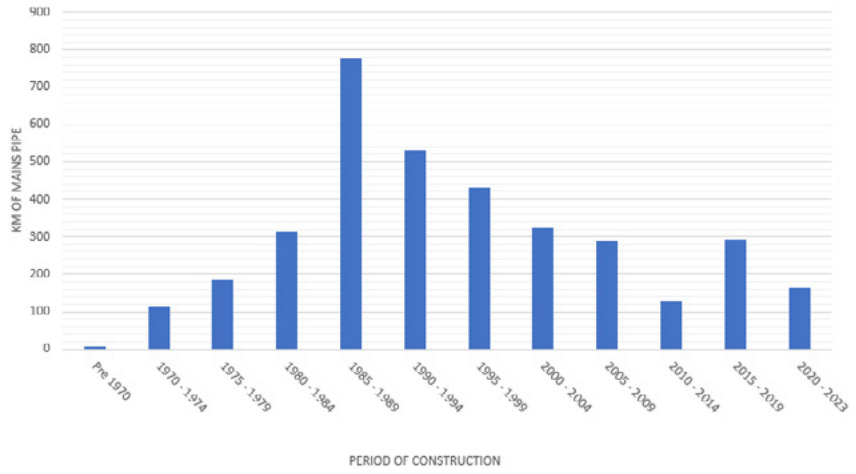
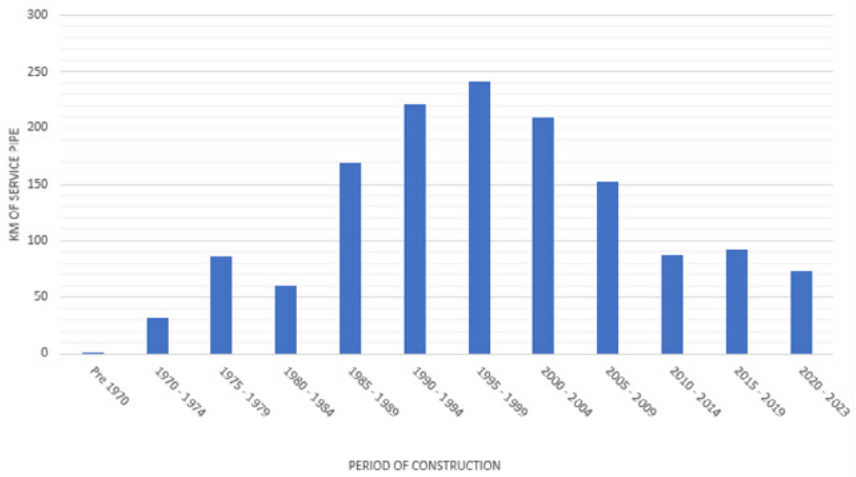


Figure 26: Service Pipes Age Profile



E.1.2 Condition

Steel Pipes

During recent years, the network has undergone a programme to ensure steel pipe systems have adequate CP in accordance with the requirements of NZS 5258 and AS/NZS 4645.

The standard design life for steel pipes operating on a MP network is 60 years, and for those on an IP network 70 years. Based on condition monitoring, the overall condition of the pipes is good. No programmed replacement of these pipes is envisaged within the standard life of the asset.

The replacement of underground steel pipes is expected to continue to be of a corrective nature, targeting specific locations and addressing localised issues rather than a large-scale replacement programme.

PE Pipes

The average age of PE pipe assets is approximately 22 years. The standard design life of PE pipes manufactured prior to 1985 is 40 years, and the standard design life for modern PE (post 1985) is 50 years.

PE pipes were first used in the distribution network in the 1970s. Early PE materials (i.e. pre 1985) have been known to exhibit premature brittle-like issues. Based on this, a heightened monitoring programme and risk assessment process was commenced. Further information on this issue, and the attitude to the mitigation of this risk, can be found below. However, this issue was resolved in PE materials manufactured post 1985, and pipes produced from this material have been found to be very durable.

Isolated problems have been found with certain PE butt and saddle tee joints, due to poor quality control and jointing techniques used in earlier PE systems. This is part of the pre-1985 replacement programme.

E.1.3 Risks and Issues

Steel Pipes - Mechanical coupling joints on Hamilton MP4 Steel Network

Mechanical coupler joints (e.g. gibault joints) have been encountered on a regular basis on some parts of the Hamilton MP4 steel network. The use of this type of joint (i.e. instead of welded connections) was prevalent on the Hamilton network in the 1970s and early 1980s when the majority of the MP4 steel pipes were installed, but the practice has long since been discontinued. Couplers are a potential cause of leakage due to corrosion (i.e. of the fitting and/or pipe) or movement of the pipe within the coupler. In addition, the presence of couplers can inhibit the level of CP protection available to adjacent sections of steel pipe.

As built records do not indicate the mechanical coupling joints, so it is very difficult to locate where they are in the network; therefore these joints will be replaced on a reactive basis.

Steel Pipes - Small diameter steel pipes

The Hamilton MP4 distribution system includes approximately 11 kilometres of steel mains pipe with a nominal diameter of 25 mm or less.

The small diameter steel mains pipe in Hamilton is comprised of pipe sections that range in length from a few metres, supplying a handful of customers, to several hundred metres in length, supplying 20 to 30 customers. As many of the small diameter mains sections do not have isolation valves fitted, in the event that a section needed to be isolated, it is likely the isolation could only be achieved by:

- Operating isolation valves on the larger diameter upstream system and/or
- Carrying out a stopple operation on the system.

This situation inevitably increases the risk of delays in isolating the supply in emergency situations and could significantly increase the number of service connections affected by an outage. In order to mitigate this risk, an ongoing pipe replacement programme has been running on an annual basis to replace Hamilton MP4 small diameter steel mains with PE.

Steel Pipes - Electrical hazards on metallic pipes

The close proximity of high voltage power networks and buried pipes can result in hazardous voltages on the pipe. The primary mechanisms involved in the transfer of electrical energy to a buried pipe include earth potential rise and low frequency induction. AS/NZS 4853 (Electrical hazards on metallic pipes) requires pipe owners/operators to reduce the risk to personnel and equipment from identified electrical hazards (including lightning) to an acceptable or tolerable level. AS/NZS 4853 also requires the electrical hazards and their controls be documented in an Electrical Hazard Management Plan (EHMP).

AS/NZS 4853 requires the assessment of electrical hazards and associated risks to be carried out over three levels:

- Level 1 is a conservative assessment and determines if an electrical hazard exists and, if so, whether the risk level is negligible.
- Levels 2/3 are a detailed risk assessment of locations that are not accepted as low risk by the level 1 assessment. Due to the nature of the analysis required, it is typically carried out by external consultants who are specialists in this field.

The plan is to develop an EHMP for the gas distribution network. This was planned to be completed by within FY2023. The work has not been completed, experience from the EHMP studies undertaken on the Transmission system has meant that the scope of work will be redefined.

Pre-1985 PE pipes

PE pipe manufactured before 1985 was made with a polymer structure that over time is susceptible to crack growth and significant deformation. This typically follows:

- A squeeze off, or a stress concentration i.e. rock in trench base.
- Where the pipe has been squeezed off, this type of material develops microcracks over time and the pipe loses integrity and leaks.

In addition, accelerated life tests show that this PE type has an expected total life of approximately 50-60 years. This means some older pipes manufactured before 1985 are fast approaching its end of life and needs replacing.

The distribution network includes approximately 396 kilometres of pre-1985 PE mains, of which 352 kilometres (89%) operate at MP4 and the balance at LP and MP1. The majority of these mains are located in the Waikato region in the Hamilton distribution system. Additionally, the network contains approximately 116 kilometres of pre-1985 service pipe, with the majority located within Hamilton.

In February 2019, Energy Pipelines CRC (Australian Governments' Cooperative Centres Programme) published a report compiled by Deakin University (in collaboration with APA) "An investigation into the mechanisms and property changes that lead to wall failure in ageing polyethylene pipes Phase I and Phase II".

This report highlighted that the oxidation induction time (OIT) can be used to indicate the remaining life of the polyethylene pipe. Essentially an OIT greater than 10 minutes indicates that material properties are relatively unchanged. An OIT between 10 and 5 minutes indicates that the material properties are starting to decline at a more rapid rate and an OIT of less than 5 minutes indicates that all antioxidant is depleted and that material properties are compromised as evidenced by a rapid deterioration in material properties. It appears that this criteria applies to all PE resins i.e. pre-1985 as well as post 1985 polyethylene pipe.

The report also suggested pipe longevity is affected by ground temperature, squeeze off duration, rate of squeeze off and release. Discussions with counterparts in Australia suggest the older the pipe is when squeezed off the higher likelihood that it will fail due to cracking within the next 2–3 years.The US National Transportation Safety Board published a Special Investigation Report (SIR-98/01) in 1998 titled 'Brittle-like cracking in plastic pipe for gas service'. The report was produced following the investigation of a number of pipe accidents involving plastic piping cracking in a brittle-like manner.

The US report is recognised internationally. It concluded that much of the plastic pipe manufactured and used from the 1960s through to the early 1980s may be susceptible to premature brittle-like incidents when subjected to stress intensification. Key factors behind stress intensification within PE pipes are:

- Occluded particles contacting the pipes surface (e.g. rock impingement)
- Pipe squeeze off
- Connections to PE or steel fittings (including butt welding)
- Severe pipe bending

One of the key recommendations made in the US report was for gas operators to closely monitor the performance of older plastic piping and to identify and replace in a timely manner any of the piping that indicates poor performance. In the USA, the risks associated with pre-1985 PE failure have been covered off by a 2009 amendment to the US Federal Pipe Safety Regulations which requires all US gas distribution pipe operators to develop and implement integrity management programmes.

Fault analysis of pre-1985 pipes

The most recent analysis of faults relating to pre-1985 PE pipes on the distribution network was completed in 2019, after three years of testing and analysis. The results of the analysis highlighted the following key points:

- The Public Reported Escapes (PRE) and Leakage Survey (LS) rate for pre-1975 pipes is approximately 7 – 9 times greater than that of the 1975-85 PE pipes, and 8 – 12 times greater than that of the whole network.
- Comparison of the Public Reported Escapes (PRE) and Leakage Survey (LS) for 1975-85 PE pipes and Pre-85 PE pipes, by pressure category, showed that MP4 pipe had the highest Public Reported Escapes (PRE) and Leakage Survey (LS) for every reporting period, and that the rate for pre-1975 PE pipe was significantly greater than that of 1975-85 PE pipe.
- A rise in the Public Reported Escapes (PRE) and Leakage Survey (LS) rate was recognised in Waikato, which follows a similar trend to the Public Reported Escapes (PRE) and Leakage Survey (LS) rate for MP4 pipe. Approximately 78% of all pre-1985 PE pipe in the whole network is in Waikato and some of the oldest pipe in the network is in Hamilton. This makes it a prime location to focus a replacement programme.
- Squeeze off failures in 1975-85 PE pipe and pre-1975 PE accounted for almost all of the squeeze off failures in the whole network. This concludes that pre-1985 PE is more affected by past squeeze offs than newer pipe, and that reinforcement clamps should be installed on all future squeeze offs to help maintain the integrity of the PE system as it ages.
- PE fitting failures represent the largest quantity of failures and an increasing trend can be recognised for 1975-85 PE pipes, pre-75 PE pipes and the whole network. PE fitting failure rates are highest for pre-1975 PE pipes, specifically with saddle tees. Failure of the saddle tee caps appears to be the primary failure mechanism, which suggest that they will be a focus in future replacement works.

Remaining life testing

- Firstgas adopted an Oxidation Induction Time (OIT) testing strategy to determine the life expectancy of all pre-1985 PE pipes. A total of 260 PE pipe samples (e.g. pre-1985, post 1985) were collected from replacement projects and reactive work from the Waikato region. These samples were tested in New Zealand by Waters and Farr.
- The oldest pipe in the network was installed in 1973 and is approximately 46 years old. The overall life estimate result from OIT for pre-1975 pipes is 45.3 years. If this result is accurate, then pre-1975 PE pipe in the Firstgas distribution network could be at the end of its useful life. This would explain the high failure rates from this era of pipe.
- Pre-1975 to 1985 PE pipe samples came back with overall life estimate of 57.3 years. Unfortunately, due to highly varied OIT results with post 1985 samples, the estimated life expectancy was not able to be confirmed.

- Firstgas is continuing to capture more data points for the 1975-85 PE samples, which will enable us to better refine the overall life estimate to achieve a more accurate picture. A statistically significant sample size has been achieved, a key observation is that there is a significant difference between the overall life estimate for the pre-1975 PE and 1975-85 PE. This difference aligns with the results from the fault analysis reporting, that indicates that failure rates of pre 1975 PE is approximately 7–9 times greater than that of 1975-85 PE pipe.
- There was a heavy need to data-mine to identify all the pipes and prioritise the risk to help understand the actual risk better and establish the most likely scenarios and likelihood of it happening so that appropriate controls and mitigations can be applied. The output from the analysis suggests that there are two types of risk levels:
  - One is the fracture risk where pre-1975 PE pipe is most susceptible to cracking with time
  - The second is an age-related risk for PE pipes manufactured from 1975-1985.
  - Pre-85 PE remains a risk to Firstgas. However, priority and additional focus has been given to the existing pre-1975 PE pipe when developing a strategy and completing a replacement programme to address the fracture risk issue on the pipe as soon as practical.

PE Pipes - Hot plate welding

Hot plate welding was the standard method of jointing PE pipe when PE pipe was first introduced on the network in the early 1970s. This jointing technique continued until the introduction of electrofusion (EF) jointing in the early 1980s. The electrofusion system is used for socket and saddle fusion. Hot plate welding is still used for butt fusion joints but is now made using electronic controlled processes.

The hot plate welding was a manual process and the quality of each weld was highly dependent on the skill of the welder. Also the impact of cleanliness and weather conditions (wind etc.) were not fully understood. This has resulted in some weld issues for pipes laid in the 1970's and early 1980's.

It is estimated that the network includes approximately 364 kilometres of MP4 and 42 kilometres of MP2/MP1/LP polyethylene mains that utilise hot plate welds. The latest fault analysis indicates that butt joints have seen the most significant increase in failure rate. The rate of these failures has tripled in the last two years. Almost all butt joint failures in the whole network were on 1975-85 PE and pre-1975 PE pipe for all reporting periods, which is the same trend that was recognised for squeeze off failures. This aligns with the change to the use of electrofusion fittings.

The trend for these failures should be closely monitored going forward to determine whether the rate continues, which may lead to butt joint failures exceeding squeeze off or PE fitting failures.

E.1.4 Key Projects

Pre-1985 PE replacement programme

As discussed above, risk assessment has been carried out to identify the risk ranking of pre- PE pipes on the network, and to help prioritise and build the replacement programme targeting the affected pipes in high and intermediate risks.

The locations identified as high risk have been completed, with the shift now moving to intermediate risks. An ongoing replacement programme for the next 10 to 15 years is planned to address the remaining 73 kilometres of intermediate risk pre1975-85 PE pipe. Firstgas has procured an inline camera to conduct condition assessment of suspected Pre-85 locations and to pinpoint locations that need to be replaced. Adoption of the next camera technology will allow Firstgas to maintain it programme to reduce risk exposure.

MP4 steel (Hamilton)

Legacy mechanical coupling joints on the Hamilton MP4 network are a potential cause of leakage due to corrosion (i.e. of the fitting and/or pipe) or movement of the pipe within the coupling. In addition, the presence of couplings can inhibit the level of CP protection available to adjacent sections of steel pipe. There is no planned mechanical coupling joints replacement programme. Mechanical coupling joints will be replaced on a reactive basis.

Replacement of small diameter Steel Mains (Hamilton)

The Hamilton distribution system includes approximately 11 kilometre of MP steel mains pipe with a nominal diameter of 25mm or less which is difficult to analyse in the event of an emergency where supply needs to be isolated. An ongoing pipe replacement programme to replace all Hamilton MP small-diameter steel mains with PE is being conducted. To date, approximately 1 kilometre of small-diameter steel mains with PE pipelines has been replaced.

Inspection of small sections of stranded steel pipe (Hamilton)

Each section needs to be investigated and tested for electrical continuity. If electrical continuity is confirmed then CP should be applied. However, if electrical continuity is not confirmed, then replacement programme should be considered.

Unspecified works

Periodically, sections of mains and service pipe may be identified that need to be replaced (on an as-required basis) due to safety or compliance issues. Examples include pipes located under buildings or pipes of non-compliant material specification. The expenditure forecast for this work is based on historical expenditure.

E.2 Pressure Reduction

Pressure reducing stations link two pressure levels in gas networks, through pressure regulators. They are the points of input to a pressure level and comprise the following three types:

- Gate stations
- District regulator stations
- Service regulators

Pressure stations linking the gas transmission system and a gas distribution network are known as gate stations. High pressure regulating equipment, custody transfer and metering within the gate station is operated and maintained by Firstgas' transmission business. Distribution system equipment such as check-metering where installed, and associated valves and pipework within the gate station is operated and maintained as part of the distribution network.

Where a pressure station links two gas distribution pressure networks, it is known as a district regulating station (DRS). These are operated and maintained as part of the distribution network.

The purpose of DRS and gate stations are to automatically control the pressure in the downstream mains, and meet the following service and performance standards:

- Have the capacity to supply the forecast load, based on minimum design inlet pressure and design outlet pressure and current load projections.
- Be twin stream, with each stream meeting the forecast load capacity.
- Have adequate over-pressure protection, preferably two safety protection devices, including an automatic shut off (ASO) device.
- Be accessible at all times and able to be isolated external to the enclosure.
- Have a 35-year minimum life.
- Pilot loaded regulator DRS should maintain delivery pressure at ±5% of set point.
- Spring loaded 'direct acting' regulator DRS should maintain delivery pressure at ±10% of set point.
- Normal operation shall maintain delivery pressure at or below Maximum Allowable Operating Pressure (MAOP) at all times.
- Under fault conditions, delivery pressure should be maintained at or below 8 kPa for Hamilton LP systems, and at or below 110% MAOP for MP and IP systems.
- Each DRS is to have an inlet and outlet isolation valve located at least 5 metres away from the enclosure.
- DRS must comply with Firstgas standards and legislative requirements.

A service regulator is used to control the supply pressure to large industrial/commercial consumers. A service regulator is typically comprised of a small-capacity pressure regulator along with upstream and downstream isolation valves. These units are installed upstream of the customer GMS and may be owned and maintained by Firstgas.

E.2.1 Fleet Overview

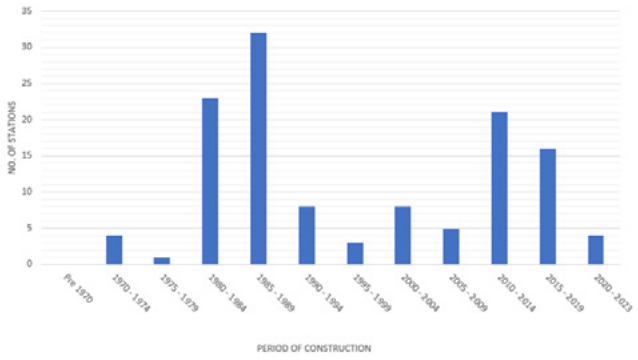
DRS installations comprise the following elements:

- Remote (fire stop) inlet and outlet isolation valves (in most sites)
- Inlet and outlet valves
- Filters
- Regulators
- Over-protection control - monitor regulators and/or slam-shut mechanism and/or relief valves
- Metering (in some sites)
- Enclosure - varies from wire mesh to solid timber/concrete block building

The standard life for DRS is 35 years and are generally installed above ground, but a growing number of factory-built underground DRS are being installed.

The age profile for all stations on the network is shown in Figure 27 below. The majority of the pressure reduction facilities were installed in the 1980's aligning with the growth in the network observed in the pipeline network age. Many of these facilities have been renewed or upgraded with newer sub-components that are not represented in the below data.

Figure 27: Stations age profile



E.2.2 Condition

A risk-based approach has been adopted to replace DRS in the distribution networks Each individual element of DRS will be risk evaluated and accordingly, risk score will be assigned to the relevant element. At the end of risk evaluation process, highest risk score will be assigned to DRS for planning purpose, which may lead to replacement of one or more elements. Overpressure protection elements will be rated against an extreme consequence during risk assessment.

The FGL in-house risk assessment is regularly updated and reviewed as further data is collected (e.g., repair/refurbish work, maintenance/inspection report, compliance data, system growth upgrade) to ensure an accurate risk profile is maintained. The key characteristics that are considered are:

- Code Compliance
- Fire valves
- Proximity to Building, high density community use
- Load Growth
- Stream (single or twin stream, code compliant)
- Regulator (obsolete or current)
- Filters (single filter or two filters)
- Overpressure protection (compliance)
- Vehicle impact
- Condition assessment (based on annual Omexom Survey report)

E.2.3 Risks and Issues

The updating of the strategy for the ongoing management of the DRS has reduced the need to undertake significant DRS replacement programmes however the assessment and evaluation process identified above, has highlighted two main issues with DRS.

- Lack of isolation valves that can be used to isolate the DRS in the event of an emergency or fire.
- Limited vehicle impact protection to the DRS.

Both of these issues are identified as a requirement in the standard NZ4645.

A programme has been developed to address these issues and will be carried out within the DPP period.

E.2.4 Key Projects

Currently there is no requirement to replace existing DRS. Work planned for the remainder of the DPP period for the DRS is to retrofit the existing DRS with additional safety isolation valves and install appropriate vehicle impact protection where required.

Table 12. DRS Safety Valve and Protection programme

DRS Description	Location	Programme
DR-80132	Hamilton	Safety Isolation valves
DR-80043	Gisborne	Safety Isolation valves
DR-80039	Gisborne	Safety Isolation valves
DR-80045	Gisborne	Safety Isolation valves
DR-80010	Rotorua	Safety Isolation valves
DR-80153	Temple View	Safety Isolation valves
DR-80078	Tokoroa	Safety Isolation valves
DR-80170	Rotorua	Safety Isolation valves
DR-80124	Hamilton	Safety valves and Vehicle impact protection
DR-80137	Hamilton	Vehicle impact protection
DR-80147	Hamilton	Vehicle impact protection
DR-80150	Hamilton	Vehicle impact protection
DR-80254	Hamilton	Vehicle impact protection
DR-80255	Hamilton	Vehicle impact protection
DR-80257	Hamilton	Vehicle impact protection
DR-80259	Hamilton	Vehicle impact protection
DR-80260	Hamilton	Vehicle impact protection
DR-80272	Gisborne	Vehicle impact protection
DR-80120	Hamilton	Vehicle impact protection

There is no planned service regulator replacement programme. Service regulators will be replaced on a reactive basis.

E.3 Line Valves

Distribution system valves are comprised of inline mains and service valves (to control the flow of gas within the system) and blowdown valves (to depressurise sections of the system in the event of an emergency).

Valve types currently in use include ball valves, plug valves and gate valves. Due to their design, ball valves are relatively maintenance-free, whereas the other types require some measure of periodic maintenance to prevent issues and to ensure they remain operable.

Valves are expected to achieve the following level of service and performance standards:

- Mains are to have sufficient valves to isolate consumers in blocks of 500 to 1,000.
- Installation at every 2,000 metres in PE systems with MAOP greater than 420 kPa.
- All IP services are to be fitted with an isolation valve.
- All services that enter a building at other than the GMS location, pass through a space where gas could accumulate, e.g cross private property to supply another property, or is one of several extending to different floors of a building, are to be fitted with isolation valves.
- Each service shall end with an isolation valve(s) and shall be upstream of the GMS.
- Valves are to be installed to isolate high-risk areas, such as CBD areas, bridges and rail crossings (note that these valves may be automatic shut-off valves).
- Valves are easily accessible, operable and leak-free.
- Valves comply with standards and legislative requirements.

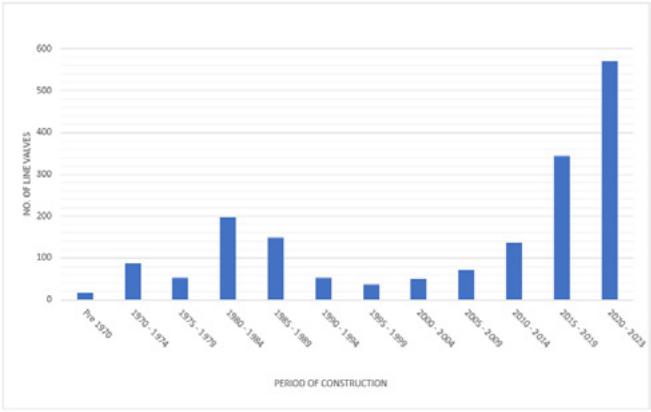
E.3.1 Fleet Overview

Information on valve types (i.e. ball, plug etc.) installed on the networks is not currently available, as it was not historically held in either the GIS or asset management systems. The quantity of plug valves installed on the network is unknown. The use of plug valves ceased around the mid 1980s. Plug valves require a higher level of maintenance, because of their design, which includes regular greasing to prevent the valve seizing and/or leaking.

The age profile for line valves on the network is shown below. Ball valves have been used since the mid-1980s and are considered to be reliable and relatively maintenance-free.

Mains and service valves are typically installed below ground. The majority are direct-buried and access to the valve is provided via a valve sleeve. In some cases, (e.g. on larger diameter mains) valves are installed in pits or above ground. Below ground valves are generally operated by a purpose-made valve key, whereas above-ground valves are typically operated by a hand wheel and gearbox mechanism. Note references to mains valves exclude valves that are installed above ground at gate stations and DRS; these are operated and maintained as part of station equipment.

Figure 28: Line valve age profile



E.3.2 CONDITION

Ball valves are typically in good condition and operate adequately. Plug valves represent a significant operational and maintenance problem due to:

- The need for continual greasing to overcome seizing problems
- The grease drying out
- Wads of grease contaminating downstream facilities

Some valve sites are susceptible to the access sleeve filling up with debris. This has to be cleaned out before the valve can be maintained.

In some cases, older valves are no longer able to be located. This is typically due to road alterations or re-sealing, which result in obscured valve locations.

E.3.3 RISKS AND ISSUES

Under pressure shut-off valves

In the past, road controlling authorities have sometimes stipulated (as part of their consent to attach a gas main to a bridge) that an under-pressure shut-off (UPSO) valve be installed in the pipe on the upstream side (i.e. the supply side) of the bridge. Where UPSO valves were fitted, in some cases they were installed without an appropriate means of periodic testing/tripping of the valve. All known UPSO valves without testing/tripping facilities have now been removed and replaced with ball valves.

Two remaining UPSO valves are known to be in service on the network, one in Taupo and the other in Whakatane. The driver for relocating these valves was that the valves were located in a confined space, which made the ongoing maintenance a safety issue. A review on the need to maintain these valves has been completed with the outcome that valve maintenance is not required and they will not be replaced.

Valve Activation

The maintenance programme for ball valves requires valves to be partially operated to confirm that the valve is operable, whereas the maintenance programme for plug valves requires only valves that are "designated emergency valves" to be partially operated.

The reason for different maintenance practices for ball and plug valves is that plug valves can be prone to seizing and by limiting the partial movement operation to critical valves only, the risk of a plug valve seizing in a partially closed position is reduced. However, this approach does increase the risk of a plug valve that is not subject to a periodic partial movement operation seizing during an emergency operation. International practice is being researched to determine an appropriate maintenance strategy for plug valves.

Riser plug valves

Prior to the introduction of ball valves in the early 1990s, a plug type riser valve was used for residential and small commercial connections. Due to its mechanical design, this type of valve is prone to seizing and gas escapes.

In order to mitigate the risks associated with riser plug valves, annual audits of approximately 1,000 riser valves are undertaken. The audits target areas known to have relatively high populations of plug type riser valves and are carried out in accordance with the technical standard 00013 Valve maintenance.

Unknown valve types

Information on valve types has historically not been captured in the GIS or SAP-PM systems. This impacts on preventive maintenance scheduling as different valve types (e.g. ball or plug etc.) require different types of maintenance activity. The quantity of plug valves installed on the network is unknown. A review of available valve data will be undertaken and uploaded into Maximo-PM where possible. This will be carried out as part of a larger programme to upload asset data into Maximo-PM.

E.3.4 KEY PROJECTS

Valve replacement

In general, valves are expected to last the lifetime of the network system to which they are connected but will be replaced on an as required basis where:

- The valve cannot be practically actuated.
- Excessive gas escapes are evident.
- In the case of plug valves, the amount of lubricant being installed is compromising the operation of the downstream network.
- The cost of maintenance outweighs the cost of replacing/relocating the valve.

Riser valve replacement

A programme was in place to change approximately 1000 to 2000 riser valves annually. This program has been superseded by the meter replacement programme, where meters are being replaced and if required the riser valves will be change out at the same time on a reactive basis.

E.4 Corrosion Protection Systems

Apart from certain sections of the Hamilton MP4 systems that require CP restoration or installation, the age profiles for the mains and service pipes are shown in the charts below.

All steel pipes on the network now have functional CP systems by the provision of a protective coating (e.g. high-density polythene) and the application of either an impressed current or sacrificial anode CP system. CP systems are intended to meet the following level of service and performance standards:

- Provide an instant off potential of more negative than 850 mV.
- Provide an instant off potential less negative than 1,200 mV when measured with a copper/copper sulphate reference electrode.
- Comply with Firstgas standards and legislative requirements.

E.4.1 Fleet Overview

The CP systems in the network comprise of the following:

- 6 Impressed Current CP (IC) systems.
- A further 2 IC systems that are operated and maintained by Firstgas Transmission, but which also provide CP protection to the distribution network.
- Approximately 28 sacrificial anode CP systems.
- A number of other small sacrificial anode systems protecting pockets of steel pipe and bridge crossings.

As can be seen in the following age profile, the majority of these systems were installed in the 1980s along with the IP and MP steel mains networks.

E.4.2 Condition

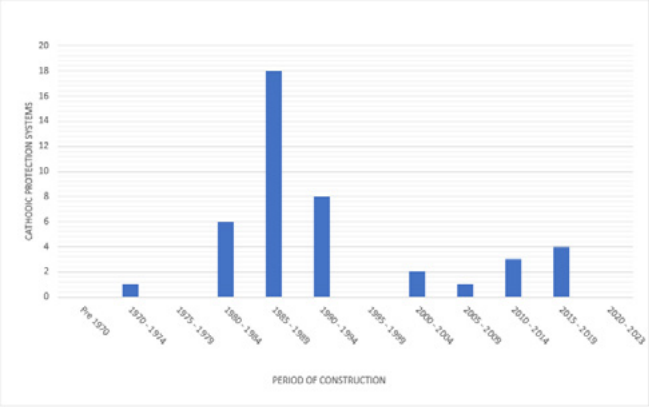
Apart from the exceptions noted below, the condition of the overall CP system is considered adequate.

Some CP systems still have inadequate test points to meet the test point spacing requirements of AS2832.1. Further upgrade work is planned to install additional test points on these CP systems to meet the requirements of AS2832.1.

Firstgas have identified sections of steel mains and services without CP systems. A programme to apply CP to these sections of steel mains has been initiated. Alternatively, if installing a CP system is not cost-effective, then they will be replaced with PE pipe. Once the steel mains CP is completed, then addressing the pipe steel services can be addressed.

Following the completion of the Hamilton MP4 CP system upgrade programme, a problem with the electrical continuity of some steel service connections was identified within the upgraded areas. Subsequent investigations confirmed that not all MP4 steel service lines within the upgraded areas are electrically connected to the steel mains that they are supplied from and therefore have limited or no CP.

Figure 29: Cathodic protection age profile



E.4.3 Risks and Issues

Third party issues

Short circuits are an ongoing problem in a number of areas in Hamilton, particularly the CBD. They are generally caused by faulty insulation joints or from the steel pipes touching other utility assets. Due to the nature of the problem and their location, they can be difficult and time consuming to identify and expensive to remedy. These short circuits can take months/years to locate and can cause excessive current drain, which may contribute to early failure of the CP systems.

When GMS are replaced on steel services, the insulation joints are occasionally reinstated incorrectly. These can cause excessive current drain and contribute to early failure of the CP systems. To address this risk a CP insulating joint tag has been developed. The tag is designed to be installed on GMS risers to warn anyone working on the GMS or the riser that an insulating joint is required on the outlet of the riser valve. The requirement to use the tag will be included in the next revision of the Firstgas Technical Standard 00059 Construction of below ground corrosion protection systems.

Incomplete inspection

The configuration of a small number of sacrificial anode CP systems within the network has prevented instant-off measurements being taken due to the inability to synchronously interrupt the CP system. Although “on” readings are being taken and these give an indication of CP protection, they do not meet the requirements of AS/NZS 4645. The majority of these sacrificial anode systems have now been upgraded by means of installing CP coupons which allow instant-off testing to be carried out.

Cased crossings

There are several cased crossings of steel pipes on the network. Cased crossings are typically installed on steel pipes which cross under railway lines or major roads etc. and consist of a larger diameter steel duct through which the steel carrier pipe has been installed. Rail and road operators sometimes insist on the installation of cased crossings on the basis that the casing will vent gas away from the rail or road crossing in the event of a fault on the steel carrier pipe.

Cased crossings are generally avoided as the casing can shield the pipe from its CP. If water, or another electrically conducting medium, enters the casing, the steel pipe may be exposed to the risk of corrosion. In some cases, the actual casings do not have CP, thus over time, they will corrode which may lead to problems with the water or other liquids entering the casing.

The current checks made to cased crossings are to confirm that the CP voltage readings are different from the pipe readings and that their readings do not alter while an instant on/off potential survey is carried out. This confirms that the casing and the steel pipe are not touching. A review has confirmed that all known cased sites are being monitored, however further research is being carried out to identify any unrecorded cased sites.

E.4.4 Key Projects

Ongoing maintenance

CP maintenance is carried out in accordance with the technical standard 00015 Maintenance of Below Ground Corrosion Protection Systems.

- All impressed current installations are inspected every two months. The output current and voltage are recorded.
- All drainage bonds are inspected every two months. Electrical connections are inspected to ensure satisfactory operation.
- All galvanic installations are inspected to ensure satisfactory operation: three-monthly, six-monthly and annually in major urban, urban and rural areas respectively.
- All test points are tested three-monthly, six-monthly and annually in major urban, urban and rural areas respectively. The on and instant off pipe to soil potential measurements with respect to a copper/copper sulphate reference electrode is recorded.
- All test points are tested three-monthly and six-monthly in urban and rural areas respectively. The on pipe to soil potential measurements with respect to a copper/copper sulphate reference electrode is recorded.
- Electrical isolation points are tested three-monthly, six-monthly and annually in major urban, urban and rural areas respectively. Any electrical isolation between buried or submerged pipes and other underground metallic structure are tested to ensure they are electrically isolated from each other.
- Interference test points are tested every five years. The on and instant-off pipe to soil potential measurements with respect to a copper/copper sulphate reference electrode is recorded. The testing is carried out in conjunction with the foreign-structure owner with each system being interrupted in turn.

Replacement programme

In general, impressed current systems are expected to last the lifetime of the network system that they are attached to. However, they will be replaced where the cost of maintenance outweighs the cost of replacing them.

Sacrificial anode systems will be replaced when the anodes have been consumed, or when the CP current requirement exceeds the capacity of the anode system. This may be due to coating deterioration (it is usually more cost-effective to increase current to protect coating defects than repair coating defects) or an increase in network size that is beyond the capacity of a sacrificial anode system.

The replacement programmes for the network include an annual provision for the replacement of CP assets as required e.g. installation of surge diverters, installation of new ground beds, upgrade of existing ground beds, replacement of expired sacrificial anodes, relocation of at-risk test points.

The increase in cost connection to the Hamilton MP4 network steel plus compliance requirements from AS/NZS 2885 suggests that there could be areas of the network which are not cost-effective to install or restore CP systems. Therefore, a proposal to investigate replacing some of the MP4 steel networks with PE pipe. This approach could be done in conjunction with the pre-1985 pipe replacement programme.

E.5 Monitoring Systems

The primary system used to monitor the gas distribution networks is the Cello system. Cello systems are deployed at permanent monitoring sites around the network and install temporary Cello units for winter gauging, or to obtain customer load profile. The Cello telemetry system monitors pressure data at DRS sites and locations where low pressures are anticipated through modelling.

The Cello system has the capability to provide additional functionality that is not currently used for monitoring the network. An investigation is being carried out on areas of expanded functionality where net benefits may be gained. Examples of areas where this functionality could be expanded include:

- Monitoring of a DRS slam-shut sensor.
- Monitoring of unauthorised entry to DRS station.
- Detection of gas escapes at DRS stations.
- Remote monitoring of CP sites

E.5.1 FLEET OVERVIEW

Permanently installed Cello data loggers currently provide monitoring at 28 DRS and 46 sites.

The Cello system is comprised of GSM remote data loggers that use SMS messages for communication, and a receiving PC located at the New Plymouth Bell Block office. The Cello unit itself is an intrinsically safe unit that can monitor flow and pressure and initiate alarms. Data collected from Cello sites are accessible via a Wonderware data historian.

In addition to the permanent Cello units, approximately 39 further units are used as portable data loggers for winter gauging or performance analysis purposes.

E.5.2 CONDITION

The average age of Cello units installed at permanent monitoring locations throughout the network is approximately four years. The standard life for the batteries within these units is five years. The Cello system communicates utilising 2/3G cellular technologies that are in the process of being retired, prompting the need to upgrade the fleet. In addition to the Cello units the server and platform to support the Cello units is obsolete and no longer supported.

E.5.3 RISKS AND ISSUES

Currently, the Cello units communicate via the 2G network. The 2G network is scheduled to be decommissioned no later than 2025. The organisation is actively exploring options to update the data acquisition and analysis system for the Cello units promptly. The goal is to eliminate the need for purchasing the same type of Cellos and the associated monitoring and analysis systems in the future. The focus is on finding a more sustainable and modernised solution encompassing improved hardware and software design.

E.6 Special Crossings

Special crossings are locations where a section of pipe is installed either above or below ground in order to cross over a roadway, river, railway or any area of interest with a differing risk profile from a standard installation.

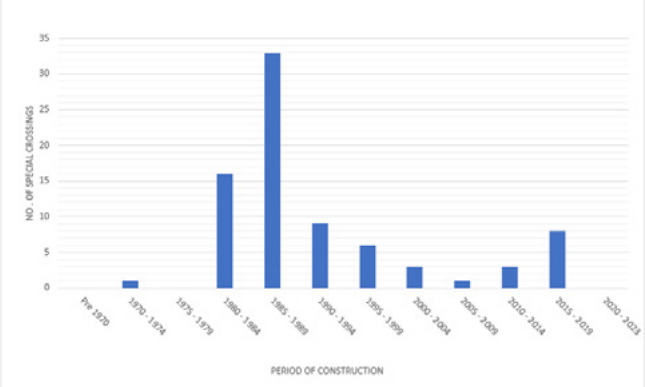
E.6.1 Fleet Overview

Special crossings are typically attached to road or rail bridge structures, although in a few cases they are attached to dedicated pipe bridge structures. These crossings are comprised of either a PE or a steel carrier pipe. Where the carrier pipe is PE, it is encased in a steel or PVC duct in order to provide physical and ultraviolet protection to the carrier pipe. The duct is typically attached to the bridge structure by means of galvanised or stainless-steel fittings. Where the carrier pipe is steel, it is typically either painted or wrapped (to provide corrosion protection) and attached directly to the bridge structure by means of galvanised or stainless-steel fittings and rollers.

Ensuring adequate access to the special crossing to carry out maintenance inspections is an ongoing challenge at some special crossing sites. This can be due to the physical design of the bridge structure (e.g. the carrier pipe is encased within the structure), or the need to obtain approval (i.e. from the structure owner or operator) to gain access to the bridge structure.

The distribution network currently has 92 special crossings, the majority of which were installed from the late 1980s onwards. Figure 30 below shows the age profile of the special crossings in the distribution network.

Figure 30: Special Crossings Age Profile



E.6.2 Condition

On review of the maintenance reports it has been determined that condition of the fleet has deteriorated or in worse condition than anticipated. The special crossing sites requires various levels of upgrade work over the coming planning period. Budget allowances have therefore been included in the capital and operating expenditure forecasts. This will cover a range of upgrade work including the replacement of damaged or loose bracket fixings and damaged or poorly designed pipe support brackets, and corrective maintenance work to repair pipe coating damage and ground to air interfaces.

E.6.3 Risks and Issues

Environmental Exposure

Special crossings installed over waterways (particularly estuaries) and high-volume roads (e.g. motorways) are exposed to a harsh physical environment which can compromise the integrity of pipe coatings and support brackets. Where above-ground crossings are attached to bridges, additional risks are present due to the potential impact on the general public in the event of a pipe incident or due to corrective maintenance activities. Targeted maintenance inspections are carried out to mitigate the risks associated with these crossings.

E.6.4 Key Projects

The following special crossing projects are planned for the forecast period:

Provision has been made to address identified corrosion, recoat the pipeline and supports in FY 2024. The initial sites have been identified however a more robust plan will be developed over the course of FY2024.

Crossing Location	Area
Gladstone Rd	Gisborne
Peel Road	Gisborne
Huntly Bridge Crossing	Huntly

E.7 Critical Spares and Equpment

A stock of critical spares and equipment is maintained so the repair of a network fault is not hindered by the lack of availability of required parts or equipment. Critical spares and equipment items for the networks are owned and held by Firstgas. When new equipment is introduced to the network an evaluation is made of the necessary critical spares and equipment items required to be retained to support the repair of any equipment.

When new critical spares and equipment items are required, they are typically purchased by Firstgas which enables the control of the quantities and condition of the critical spares to remain in-house.

E.7.1 Fleet Overview

The critical spares and equipment lists include items that are low volume (turnover) or high cost, or have long lead times for purchase, or are no longer produced (obsolete) or where the level of risk associated with not holding a spare is considered high.

The list includes fittings and equipment related to steel pipes (e.g. TD Williamson drilling and stoppling equipment, repair clamps, valves), DRS spares (e.g. Cocon cartridges, regulators), regulator overhaul kits and PE fittings. The need for the wide range of items is due to the relatively long lead times to obtain replacement parts from key suppliers and the geographic spread of the network.

E.7.2 Condition

The most recent review of critical spares and equipment standard, process and implementation, suggests that there were clear gaps in the condition of these critical items that were not adequately maintained and monitored. This is being addressed through maintenance plans introduced to close this gap and ensure that the spares are maintained in an appropriate condition.

E.7.4 Key Projects

Development of all maintenance plans associated with critical spares.

Purchase of additional emergency clamps for steel pipes.

Appendix F

System Developement

This appendix introduces the approach to developing the gas distribution network. It explains what is meant by system development and approach to planning investments. It describes the capacity modelling and demand forecasting approaches and sets out development plans for each system.

1.1. System Development Planning

The term 'system development' is used to describe capital investments that increase the capacity, functionality, or size of the network. These include the following main types of investments.

- **Growth** investments that change the capacity and/or configuration of the network to ensure demand can be met at appropriate supply security levels. Typically, these investments extend the network to developing areas, or increase capacity or supply levels to cater for general demand growth.
- **Customer connections** expenditure to facilitate the connection of new customers to the network that may be, at least partly, funded by the connecting third party (customer contributions).

1.1.1. Planning Objectives

The primary objectives in system development planning are to identify and prevent foreseeable network related security, capacity and quality (system pressure) problems in a safe, prudent and cost-effective manner. The planning process involves the consideration of:

- The design and operation of the network and any potential safety risks to staff, contractors or the public.
- Supply quality, security or capacity issues that may prevent delivering to target service levels.
- Adequacy of supply to new developments or areas requiring gas connections.
- Reasonable gas supply requirements to customers, inclusive of a prudent capacity margin to cater for foreseeable medium-term load growth.
- Statutory requirements imposed on the network design, including acceptable pressure levels.
- Potential supply quality problems identified from sources such as network measurement and monitoring (system pressure), gas flow modelling and customer complaint databases.

1.1.2. Investment Drivers

- System development planning is concerned with delivering performance based on the availability of reserve capacity in the network to a level acceptable to the business, or as agreed with customers. Key policies, standards and guidelines underpin the system development planning approach:
- Quality of supply: the quality of supply standard specifies the minimum levels of network pressure (including levels of redundancy) to ensure an appropriate level of supply service.
- Network parameters: including acceptable operating pressure levels, pipe sizes, flow rates providing an appropriate operating framework for the network. These will generally be aligned with industry norms.
- Service levels: established as part of the use of network agreements with retailers and customers.
- Technical standards: ensure optimum asset life and performance is achieved. These ensure that capital cost, asset ratings, maintenance costs and expected life are optimised to achieve lowest overall cost. Standardisation also reduces design costs and minimises spare equipment holding costs, leading to lower overall project costs.

Quality of Supply

The importance of supply quality to all customers is acknowledged and the networks are designed to a quality level that ensures most modern gas-driven equipment operates effectively. Strategies have been adopted to monitor and manage the impact of quality on the network. These include installation of pressure and flow monitoring equipment at gate stations, district pressure stations and customer sites, and the application of modelling software and tools to predict the impact of supply quality on customers.

The capacity of an individual pipeline is determined by the operating pressure, the diameter of the pipe and the allowable pressure difference between inlet and outlet. Meshed distribution systems work under the same basic principle. As the network expands and demand grows, certain parts can become constrained resulting in lower downstream pressures. Regular system pressure monitoring surveys and modelling to identify constraints and implemented upgrades are carried out before pressures become insufficient.

Several factors are considered in determining the quality of supply applicable to the gas distribution network. These include the degree of redundancy under different circumstances and supply pressure criteria which, when combined, build the overarching quality of supply criteria.

- Under normal network operating conditions, the standard stipulates that the pressure at any point on the network shall be no less than 50% of its nominal pressure (NOP), and no higher than its maximum allowable operating pressure.
- In some cases, non-standard minimum network pressures (MinOP) are used as a result of network configuration or special agreements with customers.

The standard also defines the minimum network pressures to be maintained using contingency provisions upon loss of a critical element in the supply chain.

- Intermediate pressure (IP) networks shall be operating at no less than 40% of NOP.
- Medium pressure (MP) networks shall be operating at no less than 30% of NOP.
- Low pressure (LP) networks shall be operating at no less than 2kPa.

During contingency conditions, network pressures may drop below those experienced during standard and non-standard operating conditions. In these situations, maintaining network pressure depends on the type of fault and the network configuration. Contingency provisions such as customer load shedding are used to maintain network pressure to the end users.

1.1.3. Managing Uncertainty

Several precautions are taken to mitigate the risks of making long-term investments in an uncertain environment. Apart from normal risk avoidance measures, specific actions taken to mitigate the risks associated with network investments include:

- Act prudently: prioritise small incremental investments and defer large investments for as long as reasonably practicable. The small investments must, however, conform to the long-term investment plan for a region and not lead to future asset stranding.
- Optimise with replacement projects: for large network assets, rather than replace existing end-of-life assets with the modern equivalent, a review is carried out to confirm the continued need for the assets, as well as the optimal size and network configuration that will meet the needs for the next asset lifecycle.

Planning Timeframes

Plans are produced based on near, medium and long-term views. This helps to address the differing levels of uncertainty that apply over different time periods.

- Near-term plan: is the most accurate and generally captures load growth for the next three years. This timeframe identifies short-term growth patterns, mainly leveraging off historical trends. It generally allows sufficient time for planning, approval and network construction to be implemented ahead of changing network demand.
- Medium-term plan: covers the next 10 years, and anticipates regional development trends such as land re-zoning, new transport routes and larger infrastructure projects. The medium-term plan also captures behavioural changes such as the adoption of new technologies or global trends (e.g. impact of climate change on consumer behaviour).
- Long-term plan looks at growth patterns within the region at the end of the current asset lifecycle, around 40 years out. A top-down approach is used to predict probable network loads within the region, from which the requirement for pressure system upgrades or new gate stations and DRS are identified. The objective of this is less about developing accurate load forecasts and more about providing a long term development plan, identifying likely future network requirements.

1.1.4. Planning Methodology

Planning for growth investments requires anticipated shortfalls in capacity under forecast demand conditions. Firstgas plan for efficient and timely investment in additional capacity and security before reliability is adversely affected.

Demand forecasts and network modelling provide an accurate picture of future demand growth (or decline), so investment decisions can be made with confidence. When used in conjunction with equipment ratings, it is possible to plan for the required quality of supply margins within the network relative to the quality of supply standard and required service levels.

These developments need to fit within the context of the wider asset management activities (e.g. renewal plans), such that investments are optimised across all business objectives and constraints. Assets are managed using an asset lifecycle approach, which helps ensure these activities are integrated.

The development planning process involves the following steps:

1. Needs identification
2. Options analysis
3. Solution definition
4. Project prioritisation

Needs Identification

The need for a growth investment may arise following the identification of any of the following:

- Upcoming supply quality, security or capacity issues that may prevent us from delivering target service levels.
- Adequacy of supply to new developments or areas requiring gas connections.

In all cases, effective design requires consideration of the forecast planning demand, the capacity of network and the impact of the environment in which the equipment will operate.

Using this information, ensures monitoring the network capacity relative to the quality of supply standards, and thus identify any potential shortfalls between available capacity and expected demand. If these capacity breaches are deemed to require an investment solution or modification to the network, a project will be initiated.

Options Analysis

Once a modification to the network has been identified as necessary, a project is scoped, and a number of possible options are developed that meet the modification objectives.

These options may be asset or non-asset based, and the optimal solution may not necessarily result in system augmentation. Additionally, there are significant efficiencies that can result from a solution that allows conventional network investment to be deferred without compromising capacity or supply pressure.

In developing options, consideration is given to the following factors to ensure the investment decision is prudent and efficient.

- Currency and accuracy of network capacity rating.
- Validation of models by collecting actual system pressure data through pressure data loggers.
- Load diversity opportunities (e.g. transfer to alternative pipelines or DRS).
- Leverage of other projects to gain synergies, e.g. asset replacement, road re alignment or new construction activities.
- Use of risk assessment criteria to ascertain risk tolerance, and to test that:
  - The solution cost is not disproportionate to the benefits obtained.
  - That recommended solutions are commercially sustainable.
  - Loss of supply to customers is minimised.

The options considered are summarised in a business case that is submitted for project solution evaluation.

Solution Evaluation

Once developed, the project options are evaluated (both financially and on a risk basis) to identify the optimum investment decision that meets both the project requirements and maintains the current service level to existing consumers.

System development improvements, or non-asset solutions, are preferred over deferring system expenditures. If asset solutions are inevitable, smaller projects are prioritised over larger projects to reduce the risk of stranded assets. Early investment is avoided unless there are good reasons to do otherwise (for example, to take advantage of the synergy of implementing in conjunction with other projects).

Project Prioritisation

Once preferred project solutions are identified, a list of development projects is compiled, including other areas of network investment (e.g. asset replacement), along with their proposed schedule and initial budgets, and commence project prioritisation. Projects are prioritised based on corporate investment drivers, as per the investment prioritisation procedure outlined in Appendix H – Asset Management Approach.

1.2. Network and Asset Capacity

To enable the capacity of the delivery points (and subsequent pressure systems) to be assessed, it is necessary to have a reliable assessment of the capacities of the major components within the network. The major components within the distribution network include:

- Pipelines
- Gate stations
- District regulating stations (DRS)

Determining the capacities of these network components requires a detailed assessment of each sub-component. For example, in assessing the capacity of a DRS, we need to assess the performance ratings of the filter, meter, regulator and other accessories to ensure the sub component with the lowest rating is identified. Therefore, the minimum rated sub component determines the overall asset rating.

The following subsections describe how the capacities of the major network components are assessed. In all cases, maximum operating capabilities are used to determine the asset capacities.

1.2.1. Pipelines

Due to the various pipeline types, network configurations, and varying consumer loads the analysis of pipeline capacity is quite complex. Pipeline capacity is determined by examining the relationship between system pressures, pipe diameter and the allowable minimum operating pressure (MinOP). This is achieved using a network modelling tool called 'Synergi Gas' , that is capable of determining minimum pressures a pipeline system can sustain under load condition.

Synergi Gas is also utilised for the distribution network modelling.

1.2.2. Gate Stations

The gas distribution network takes supply from the transmission system via gate stations, which are also operated and maintained by Firstgas.

The capacity of these gate stations is designed to meet the 10-year forecast load requirements at that point in the network. This load is based on minimum design inlet and outlet pressures, and current load projections on the overall network.

From a gas distribution perspective, it is necessary to obtain an ongoing understanding of the design capacity of many of the gate stations upstream of the network. Any capacity constraints imposed at a gate station may impact on distribution investment decisions. By obtaining an improved knowledge of these gate station capacities and constraints, improved development decision are possible by offering a wider range of investment options.

1.2.3. District Regulating Stations

The purpose of a DRS is to control the pressure in the downstream mains pipeline to which it is connected. Similar to gate stations, a DRS is designed with sufficient capacity to supply the 10-year forecast load.

The system is designed based on minimum design inlet and outlet pressures, and current load projections for heavy utilised pipelines in the network region. Networks such as Kapiti and Waikato, the pressure system is ranging between MP4 to IP20.

These design pressures are based on the quality of supply Standards to ensure adequate supply pressure and capacity across the network.

1.3. Demand Forecasting

This section describes the approach to forecasting gas demand on the distribution network.

1.3.1. Demand Forecast Methodology

Specially developed model is used to forecast gas demand on the distribution network. Using this model, the winter (annual peak) forecasts can be projected at each gate station for the next 10 years based on historical trends by taking the followings steps.

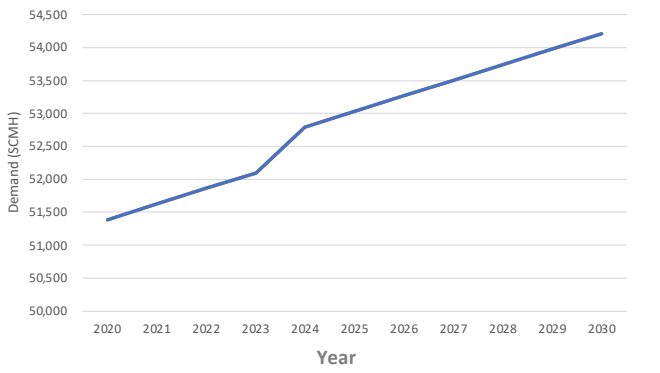
- Using historical monthly flow data to determine a maximum flow for each quarter. Where multiple meters are present at a gate station, the readings are either summed or averaged based on the station configuration. Zero, anomalous and incomplete data is excluded from analysis. In some cases, where meter data is not available, the system pressure monitoring programmes are utilised to assess the network demand. Where a gas network is supplied from two (or more) gate stations, the timing of the network peak gas flow may not coincide with either of the gate stations' peak flows.
- The quarterly maximum flow values are then analysed for several factors: long-term trend, business cycle effects, seasonality and any unexplainable, random variation. As it is usually very difficult to isolate the business cycle effects in networks with a mix of consumers, the trend component comprises both long-term average and cyclical effects. The process of analysing this data comprises two stages.
  - Decomposition: applies moving averages to eliminate the irregular and seasonal variation in the data to identify the long-run growth trend within the time-series.
  - Adjustment: historical flow data is seasonally adjusted, and the trend is then extrapolated and multiplied by an appropriate seasonal index to obtain the baseline long-term demand at each gate station.
- Any confirmed future connections that are anticipated to have a significant impact on demand are manually added to the demand forecast. The resultant data provides the long-term demand at each gate station and ultimately drives the expected future network configuration.

1.3.2. Demand Forecast

The load forecast demonstrates a consistent growth on the network of approximately 1% over 10 years, consistent with expected connection forecast.

This growth is not expected to be uniform across the entire network, with certain regions identified as having a high growth potential, and others with little or no expected growth. The growth for individual gate stations within the network are further detailed in Appendix E – Asset Fleets.

Figure 32: Demand forecast for the next 10 years



The increase in demand in 2024 is due to the growth predicted at Waikeria network from the Department of Correction's future expansion.

1.4. Network Monitoring

Pressures throughout the network are monitored as part of ongoing surveys routinely undertaken on the network. These programmes are designed to provide the necessary system performance data that facilitates network modelling.

Multiple methods are employed to collect the required network performance data, including:

- Manually downloaded or remotely downloaded portable electronic data loggers (e.g. Cello).
- Gas consumer time-of-use data obtained directly or indirectly from retailer measurement systems or meters.
- Gas transmission Supervisory Control and Data Acquisition (SCADA) system data.
- Isolated readings obtained during peak loading conditions.

Appendix H provides functional and physical descriptions of these systems.

1.5. Network Modelling

To model the distribution network, a computer modelling tool called Synergi Gas is used. Synergi Gas is designed to model gas network flow, pressure profiles and capacity margins. This software is used for the following functions.

- To determine the minimum pressure a pipe system can sustain under load conditions.
- For scenario analysis when considering development options and assessing forecast demand.
- To assess the impact of changes to network operating parameters (such as increasing or reducing operating pressure in parts of the network) and to assess network risk.

The majority of the network planning models have been developed from data extracted from GIS and billing systems and adapted for using with the network modelling software.

These network models are validated by comparing the model performance to the actual performance of the gas distribution network that is recorded as part of network monitoring. Where the model and actual network performance differ, the model is updated to reflect actual conditions.

The total system flow for each network model is then scaled to align with the actual peak flow. This alignment is applied evenly across the network by adjusting the existing loads in the model. This becomes the base load model for the network or pressure system.

The network models on high growth areas are updated on a 3-yearly cycle.

1.6. Customer Connections

Firstgas views increased gas availability as good for consumers, providing the prerogative to choose their ideal energy mix at home and at work. Having more gas users, with more diverse needs, will ensure the business is more resilient that will ultimately lead to more competitive prices for customers. In order to achieve this, gas must be delivered to the consumer cost effectively, securely and connection to the network is as simple as possible.

Working closely, and openly with consumers of all sizes in order to ensure confidence in the quality of supply and viability as a supplier of alternative energy, is paramount.

1.6.1. Connecting to the Network

Residential

Gas delivers a clean, efficient, and economical source of energy. Providing endless hot water, precise cooking control, heating or to enhance outdoor entertaining, gas is the ideal energy choice.

Consumers interested in making a connection to the network or wishing to check the network coverage should:

- call the Firstgas connections number 0800 NEW GAS (0800 639 427), or
- visit the Firstgas website (www.firstgas.co.nz) to make an online enquiry, or
- email connections@firstgas.co.nz.

The connection process takes around four to six weeks from an acceptance letter from the customer to connection. All the necessary plans and approvals are obtained from council and utility companies and liaised with the chosen retailer and metering company to deliver the connection. Once these are in place, a connection time dependent on customers' demand is scheduled, as well as weather and schedule restrictions.

All connection fees are fully disclosed and depend on the distance from the meter position to the property boundary, as well as the load being installed. Free connections are available for those who meet the free connection criteria, where less than 20 metres of service is required, gas hot water or central heating is being installed, and the connection is straightforward - not requiring traffic management or specialised reinstatement. A quote is sent - whether the connection is free or has a charge - before committing to completing the connection.

Figure 33 Contractors laying a new service residential connection

Business and Commercial

Most enquiries received for subdivision reticulation come via a consultant. Developers wishing to enquire directly about inclusion of gas reticulation into their developments, or to check the distribution coverage can:

- call us on 0800 NEW GAS (0800 639 427)
- email connections@firstgas.co.nz, or
- visit the Firstgas website (www.firstgas.co.nz) to make an online enquiry.

Firstgas works with developers to find the most cost-effective way to get natural gas reticulated into their subdivision, and to promote natural gas to end consumers.

Industrial and commercial customers appreciate the ability to offer a gas supply that meets all their needs. Firstgas are proud to provide a reliable, economic, clean energy source to some of New Zealand's most significant commercial and industrial operations that form the lifeblood of this country's economy.

Larger customers that are considering switching or including gas in their energy needs can contact the Commercial Team on 0800 NEW GAS (0800 639 427), by emailing connections@firstgas.co.nz, or by applying online. Energy retailers and consultants are also a great source of information on the benefits of natural gas, and can facilitate with the connections process, and are worth engaging with early in the process.

Check Before you Dig!

Parties planning an excavation or renovations on land where underground services may be present (e.g. gas pipes, electricity or other services), need to ensure safety is maintained while work is being carried out.

They should contact BeforeUDig by phoning 0800 248 344 or submit an enquiry form at www.beforeudig.co.nz before carrying out any activities that may disturb underground services. Here they will also find network maps, close approach consents and permits to work.

1.6.2. Forecasting Customer Connections

The ICP connections forecast, combined with known and forecast subdivision, commercial and industrial connections, informs the forecast Capex spend on customer connections.

Larger commercial and industrial consumer connection rates are more difficult to predict than residential and subdivisions. As such, a more reactive approach is used to forecast these loads, incorporating significant connections into the forecast models as requests arise.

Appendix G

Network Developement Programme

This appendix sets out the Firstgas long-term development plans for the larger gas distribution systems.

G.1. WHANGAREI NETWORK SYSTEM

The Whangarei system is supplied from the gas transmission system at one gate station, located in South Whangarei. The Whangarei network system consists of one IP pressure system, five MP4 pressure system and 10 DRS.

System	Planned Development
Whangarei IP10	Nil
Union East Street MP4	Nil
Pipiwai Road MP4	Nil
Whangarei MP4	Nil
Dyer Street MP4	Nil
Port Whangarei MP4	Nil

G.2. MARSDEN POINT NETWORK SYSTEM

The Marsden Point network system is supplied from the transmission system at one gate station, located in Mair Road. This network system consists of one MP7 pressure system and is supplying gas to one industrial consumer. No DRS are installed in the Marsden Point network system.

System	Planned Development
Marsden Point MP7	Nil

G.3. HUNTLY NETWORK SYSTEM

The Huntly network system is supplied from the transmission system at one gate station located in Hetherington Road. This network system comprises one MP7 pressure system, three MP4 pressure systems and three DRS.

System	Planned Development
Huntly MP7	Nil
Huntly East MP4	Nil
Huntly Central MP4	Nil
Harris St MP4	Nil

G.4. NGARUAWAHIA NETWORK SYSTEM

The Ngaruawahia network system is supplied from the transmission system from one gate station located in Brownlee Avenue. This network system comprises one MP7 pressure system, one MP2 pressure system and one DRS.

The Ngaruawahia MP7 pressure system is designed to operate at IP20 (MAOP 1,820kPa) but is currently operating at a lower pressure of 450kPa. The purpose of the lower operating pressure is to improve the accuracy of the transmission gate station meter and to minimise the effects of odorant fade in this network system.

System	Planned Development
Ngaruawahia MP7	Nil
Ngaruawahia MP2	Nil

G.5. HOROTIU NETWORK SYSTEM

The Horotiu network system is supplied from the transmission system at one gate station located in Horotiu Bridge Road. This network system comprises one IP10 pressure system, one MP4 pressure system and one DRS.

System	Planned Development
Horotiu IP10	Nil
Horotiu MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.

G.6. HAMILTON NETWORK SYSTEM

The Hamilton network system is supplied from the transmission system at two gate stations, located at Te Kowhai in the North West and Temple View in the South West of Hamilton. The Hamilton network system comprises one IP10 pressure system, one MP7 pressure system, three MP4 pressure systems, one MP2 pressure system, three MP1 pressure systems, five LP pressure systems and 37 DRS.

System	Planned Development
Hamilton IP10	The pressure drops below MinOp in the section of 100NB IP10 located on the southeastern side of Hamilton. Therefore, there is no remaining capacity. System reinforcement is planned by addition of IP10 piping. The following options are being considered to resolve the constraints in the network: • Construct about 7 kilometres of 225mm OD SDR9 PE pipe between DR-80139-HM and DR-80277-HM. This would loop the IP10 network. Note that the PE pipe would have an MAOP of 1,000 kPa and thus the IP10 operating pressure would reduce from its current 1,050 kPa to 900 or 950 kPa. • Construct about 7 kilometres of 100/150 NB CS pipe between DR-80139-HM and DR-80277-HM. This would loop the IP10 network. To further improve the network capacity, the reinforcement is planned and under current investigation: Upgrading the existing IP pipeline from Te Kowhai gate station to intersection of Te Rapa Road and Wairere Drive from 1,160kPa to 1,960kPa is under investigation. This would require an installation of a new IP20/IP10 DRS at the corner of Te Rapa Road and Wairere Drive. Planned to be completed in FY2023
Hamilton MP7	Nil
Hamilton West MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Hamilton MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Temple View MP2	Nil
Tuhikaramea Road MP1	Nil
Hamilton North MP1	Nil
Hamilton South MP1	Nil
Fairfield LP	Nil
Frankton LP	Nil
Hamilton West LP	Nil
Hamilton East LP	Nil
Cameron Rd LP	Nil

G.7. MATANGI NETWORK SYSTEM

The Matangi network system is supplied from the transmission system from one gate station located in Tauwhare Road. This network system comprises one MP4 pressure system.

Flow data for the Matangi gate station is not currently available. As the system is considered low risk of breaching quality of supply, it is not intended to collect this information at this point in time. No DRS is installed in the Matangi network system.

System	Planned Development
Matangi MP4	Nil

G.8. MORRINSVILLE NETWORK SYSTEM

The Morrinsville network system is supplied from the transmission system from one gate station located in the south of Morrinsville. This network system consists of one IP10 pressure system, one MP4 pressure system and two DRS.

System	Planned Development
Morrinsville IP10	Nil
Morrinsville MP4	Nil

G.9. KIWITAHI NETWORK SYSTEM

The Kiwitahi network system is supplied from the transmission system from one gate station located in Morrinsville-Walton Road. This network system comprises one MP4 pressure system. The Kiwitahi network system supplies one large commercial consumer and one large industrial gas user.

System	Planned Development
Kiwitahi MP4	Nil

G.10. WAITOA NETWORK SYSTEM

The Waitoa network system is supplied from the transmission system from one gate station located in Wood Road. This network system consists of one IP20 pressure system, one MP7 pressure system, one MP4 pressure system and two DRS.

System	Planned Development
Waitoa IP20	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Waitoa MP7	Nil
Waitoa MP4	Nil

G.11. CAMBRIDGE NETWORK SYSTEM

The Cambridge network is supplied from the transmission system from one gate station and consists of one IP20 pressure system, two MP4 pressure systems and three DRS.

System	Planned Development
Cambridge IP20	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Cambridge MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Bruntwood MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.

G.12. TE AWAMUTU NETWORK SYSTEM

The Te Awamutu network system is supplied from the transmission system from two gate stations, located at Te Awamutu and Kihikihi. The Te Awamutu network system consists of one IP10 pressure system, two MP4 pressure systems and two DRS.

System	Planned Development
Kihikihi IP10	Nil
Te Awamutu MP4	Nil
Kihikihi MP4	Nil

G.13. WAIKERIA NETWORK SYSTEM

The Waikeria network system is supplied from the transmission system from one gate station located in Higham Road. This network system comprises one IP20 pressure system currently supplying gas to one large customer at the end of the system.

System	Planned Development
Waikeria IP20	Nil

G.14. PIRONGIA NETWORK SYSTEM

The Pirongia network system is supplied from the transmission system from one gate station located in Pirongia Road. This network system comprises one MP4 pressure system.

System	Planned Development
Pirongia MP4	Nil

G.15. OTOROHANGA NETWORK SYSTEM

The Otorohanga network system is supplied from the transmission system from one gate station located in Waitomo Valley Road. This network system comprises one MP4 pressure system.

System	Planned Development
Otorohanga MP4	Nil

G.16. TE KUITI NORTH NETWORK SYSTEM

The Te Kuiti North network system is supplied from the transmission system from one gate station located in the northwest of Te Kuiti. This network system consists of one IP10 pressure system, three MP4 pressure systems and five DRS.

System	Planned Development
Te Kuiti North IP10	Nil
Hangatiki East Road MP4	Nil
Te Kuiti MP4	Nil

G.17. TE KUITI SOUTH NETWORK SYSTEM

The Te Kuiti South network system is supplied from the transmission system from one gate station located in SH30 near Beros Road. This network system consists of one MP4 pressure system.

There is an industrial consumer located adjacent to the Te Kuiti South gate station from which gas is directly fed to this factory. The gas flow into Te Kuiti South pressure system is the difference between the flows recorded at the gate station meter and the industrial consumer's GMS.

System	Planned Development
Te Kuiti South MP4	Nil

G.18. OKOROIRE NETWORK SYSTEM

The Okoroire network system is supplied from the transmission system from one gate station located in Somerville Road. This network system comprises one MP4 pressure system. Flow data for the Okoroire gate station is not currently available. As the system is considered low risk of breaching quality of supply, it is not intended to collect this information at this point in time.

System	Planned Development
Okoroire MP4	Nil

G.19. TIRAU NETWORK SYSTEM

The Tirau network system is supplied from the transmission system from one gate station located in Okoroire Road. This network system consists of one IP10 pressure system, one MP4 pressure system and two DRS.

System	Planned Development
Tirau IP10	Nil
Tirau MP4	Nil

G.20. PUTARURU NETWORK SYSTEM

The Putaruru network system is supplied from the transmission system from one gate station located in Bridge Street. This network system consists of one IP10 pressure system, one MP4 pressure system and two DRS.

System	Planned Development
Putaruru IP10	Nil
Putaruru MP4	Nil

G.21. KINLEITH NETWORK SYSTEM

The Kinleith network system is supplied from the transmission system from one gate station located near the junction of Old Taupo Road and Kinleith Road. The gate station supplying the Kinleith MP4 is located in the same site as the supply to Kinleith Mills. This network system consists of one MP4 pressure system.

System	Planned Development
Kinleith MP4	Nil

G.22. TOKOROA NETWORK SYSTEM

The Tokoroa network system is supplied from the transmission system from one gate station located in Baird Road near Old Taupo Road. This network system consists of one IP20 pressure system, one MP4 pressure system and three DRS.

System	Planned Development
Tokoroa IP20	Nil
Tokoroa MP4	Nil

G.23. ROTORUA NETWORK SYSTEM

The Rotorua network system is supplied from the transmission system from one gate station located in the south of Rotorua in SH5. This network system consists of one IP20 pressure system, four MP4 pressure systems and 14 DRS.

System	Planned Development
Rotorua IP20	Nil
Rotorua East MP4	Nil
Rotorua MP4	Nil
Waipa MP4	Nil

G.24. REPOROA NETWORK SYSTEM

The Reporoa network system is supplied from the transmission system from one gate station located in Parekarangi. This network system consists of one IP20 pressure system, one MP4 pressure system and one DRS.

The major industrial consumer is supplied directly from the Reporoa gate station, i.e. not connected to the IP20 network. For modelling accuracy, the load from the industrial user is deducted from the total gate station flow when modelling the Reporoa network system.

System	Planned Development
Reporoa IP20	Nil
Reporoa MP4	Nil

G.25. TAUPO NETWORK SYSTEM

The Taupo network system is supplied from the transmission system from one gate station located in Rakaunui Road. This network system consists of one IP20 pressure system, one MP4 pressure system and two DRS.

The Taupo network system has two DRS which supply gas to the Taupo MP4 pressure systems. As part of the reinforcement options, one of the DRS will be set to provide an MP7 outlet for the proposed Taupo MP7 pressure system.

System	Planned Development
Taupo IP20	Nil
Taupo MP4	Nil

G.26. TAURANGA NETWORK SYSTEM

The Tauranga network system is supplied from the transmission system from two gate stations, located at Te Reti in the central Tauranga and Pyes Pa in the South West. The Tauranga network system consists of one IP20 pressure system, currently operating as an IP10 pressure system, one MP4 pressure system and five DRS. The gas distribution system takes an IP10 supply from Tauranga gate station at a NOP of 1,000kPa and an MP4 supply from Pyes Pa gate station at a NOP of 400kPa.

System	Planned Development
Tauranga IP10	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Tauranga MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.

G.27. MT MAUNGANUI NETWORK SYSTEM

The Mt Maunganui network system is supplied from the transmission system from two gate stations, Mt Maunganui gate station and Papamoa gate station. The Maunganui network system consists of two IP20 pressure systems, two MP4 pressure systems and seven DRS.

Major industrial and commercial activities are expected in the northern part of Mt Maunganui. Growth and change in gas demand will be very much dependent on the business development in this area.

The Papamoa East area provides an important opportunity for Tauranga City Council to provide green field urban development. The estimated population for Papamoa East is around 25,000, should development potential be fully realised. Urban development would occur over a period of 20-30 years, with initial stages catering for a population of around 9,200.

Tauranga City Council have developed an urban design structure plan for the Te Tumu/Wairakei area. Wairakei (Part 1), sets out how low and medium density residential land, business land and open space land will be laid out. Services structure planning provides the main roading network for the Wairakei area and locations of necessary bulk infrastructure. Progress of the development will depend on landowner responses, influencing the ultimate resident population.

System	Planned Development
Mt Maunganui IP20	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Papamoa IP20	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Papamoa Beach IP20	Firstgas acquired the assets in FY2017. Network comprises 500 metres of 80mm Carbon steel pipe and approximately 2 kilometres MP4 200nb PE.
Mt Maunganui MP4	Nil
Tip Lane MP4	Nil
Port Whangarei MP4	Nil

G.28. TE PUKE NETWORK SYSTEM

The Te Puke network system is supplied from the transmission system from one gate station located in Washer Road. This network system consists of one IP10 pressure system, two MP4 pressure systems and three DRS.

System	Planned Development
Te Puke IP10	Nil
Te Puke MP4	Nil
Washer Road MP4	Nil

G.29. KAWERAU NETWORK SYSTEM

The Kawerau network system is supplied from the transmission system from one gate station located in East Bank Road. This network system consists of one IP10 pressure system, two MP4 pressure systems and three DRS.

The Kawerau IP10 pressure system operates at a NOP of 1,000kPa and is fed from the Kawerau gate station which comprises three steel pipeline laterals. One lateral distributes gas to the Paora St MP4 and Kawerau MP4, while the other two supply gas to two large industrial consumers.

System	Planned Development
Kawerau IP10	Nil
Kawerau IP10 (ex-Caxton)	Nil
Kawerau IP10 (ex-Tasman)	Nil
Paora St MP4	Nil
Kawerau MP4	Nil

G.30. TE TEKO NETWORK SYSTEM

The Te Teko network system is supplied from the transmission system from one gate station located in Tahuna Road. This network system consists of one IP10 pressure system, one MP4 pressure system and one DRS.

System	Planned Development
Te Teko IP10	Nil
Te Teko MP4	Nil

G.31. EDGECUMBE NETWORK SYSTEM

The Edgecumbe network system is supplied from the transmission system from one gate station located in Awakeri Road. This network system consists of one IP20 pressure system and one MP4 pressure system. The Edgecumbe IP20 and the Edgecumbe MP4 pressure systems are metered separately inside the gate station.

System	Planned Development
Edgecumbe IP20	Nil
Edgecumbe MP4	Nil

G.32. WHAKATANE NETWORK SYSTEM

The Whakatane network system is supplied from the transmission system by one gate station located in Mill Road. This network system comprises one IP20 pressure system, two MP4 pressure systems and three DRS.

System	Planned Development
Whakatane IP20	Nil
Whakatane MP4	Nil
Mill Road MP4	Nil

G.33. OPOTIKI NETWORK SYSTEM

The Opotiki network system is supplied from the transmission system by one gate station located in Factory Road. This network system consists of one IP10 pressure system, two MP4 pressure systems and two DRS. There is an industrial consumer supplied directly from the Opotiki gate station, i.e. not connected to the IP20 network. For modelling accuracy, the load from the industrial consumer is deducted from the total gate station flow when modelling the Opotiki network system.

System	Planned Development
Opotiki IP20	Nil
Opotiki MP4	Nil
Hospital Hill MP4	Nil

G.34. GISBORNE NETWORK SYSTEM

The Gisborne network is supplied from the transmission system from one gate station and consists of one IP20 network and one MP4 network.

System	Planned Development
Gisborne IP20	Nil
Gisborne MP4	Nil

G.35. KUKU NETWORK SYSTEM

The Kuku network system is supplied from the transmission system from one gate station located in Kuku Beach Road. This network system consists of one MP2 pressure system. Flow data for the Kuku gate station is not currently available. As the system is considered low risk of breaching quality of supply, it is not intended to collect this information at this point in time.

System	Planned Development
Kuku MP4	Nil

G.36. OTAKI NETWORK SYSTEM

The Otaki network system is supplied from the transmission system from one gate station located in the southwest of Otaki. This network system consists of one MP4 pressure system.

System	Planned Development
Otaki MP4	Nil

G.37. TE HORO NETWORK SYSTEM

The Te Horo network system is supplied from the transmission system from one gate station located in Te Horo Beach Road near Pukenamu Road. This network system consists of one MP4 pressure system. Flow data for the Te Horo gate station is not currently available. As the system is considered low risk of breaching quality of supply, it is not intended to collect this information at this point in time.

System	Planned Development
Te Horo MP4	Nil

G.38. WAIKANAE NETWORK SYSTEM

The Waikanae network system is supplied from the transmission system from one gate station located in the west of Waikanae. This network system consists of MP4, MP7 and IP20 pressure systems.

System	Planned Development
Waikanae MP4	No constraints have been identified and the system pressure is not forecast to fall below the MinOP criteria during the planning period.
Waikanae IP20	No constraint.
Waikanae MP7	This network supplies Paraparaumu MP4 only.

G.39. PARAPARAUMU NETWORK SYSTEM

The Paraparaumu network system is supplied from the transmission system from Paraparaumu gate station located in Valley Road. The Paraparaumu network system consists of one IP20 pressure system, and one MP4 pressure system and four DRS.

System	Planned Development
Paraparaumu IP20	No constraint have been identified during the planning period.
Paraparaumu MP4	No constraint have been identified during the planning period.

Appendix H

Asset Management

This section describes First Gas Limited's (Firstgas) approach to asset management and how this supports meeting The Company's performance objectives and the expectations of stakeholders. It is structured as follows:

Asset Management Improvements: The adoption of ISO55001:2014 as a means to ensure best practice in delivering asset management activities.

Asset Management Framework: describes the approach to ensuring alignment between corporate objectives and day-to-day asset management activities.

Asset Management System: describes the components of the asset management system and provides an overview of the key elements.

Business Support: The role of managing assets with people with the right competencies to achieve asset management objectives over the planning period

Performance Measures: sets out the overall asset management performance objectives.

Asset Management Maturity Assessment Tool (AMMAT): describes the outcome of the AMMAT review and other benchmarking exercises.

H.1 ASSET MANAGEMENT IMPROVEMENTS

Firstgas has engaged with external consultants (Assetivity1) to provide independent advice on the maturity of Asset Management with 2 key objectives to:

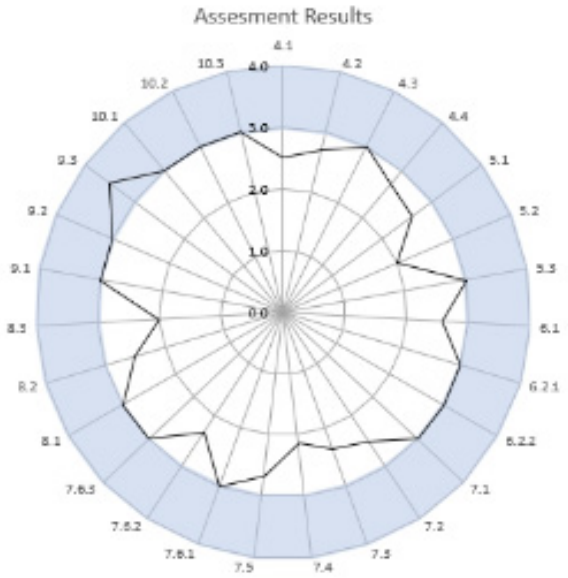
- Identify any gaps between current state and the state required to achieve alignment to ISO55001:2014 and
- From the findings, develop recommendations and a roadmap that would establish a clear path to improvement against ISO55001:2014 for the regulated businesses Firstgas Group Limited.

The outcome of the assessment has determined that Firstgas fully complies with 14 of the 27 clauses within ISO55001 2014: and in the process of improving processes and procedures with the remaining 13 clauses. These have been shaped into a roadmap for achieving full compliance which comprises of the following steps:

- Improve Internal Stakeholder Communication
- Review Asset Management System Performance
- Review Asset Management Information Capture and Management
- Ensure Contractor Management is Holistic
- Ensure Competence Management accounts for Asset Management Competence
- Review Stores and Inventory Management Processes and Impact on Asset Management System Risk.
- Consider a Combined Business Strategic Asset Management Plan

Findings from the Analysis

Clause ID	Clause
4.1	Understanding the Organization and its Context
4.2	Understanding the Needs and Expectations of Stakeholders
4.3	Determining the Scope of the Asset Management System
4.4	Asset Management System
5.1	Leadership and Commitment
5.2	Policy
5.3	Organization Roles, Responsibilities and Authorities
6.1	Addressing Risks and Opportunities
6.2.1	Asset Management Objectives
6.2.2	Planning to Achieve Asset Management Objectives
7.1	Resources
7.2	Competence
7.3	Awareness
7.4	Communication
7.5	Information Requirements
7.6.1	Documented Information General
7.6.2	Creating and Updating Documented Information
7.6.3	Control of Documented Information
8.1	Operational Planning and Control
8.2	Management of Change
8.3	Outsourcing
9.1	Monitoring, Measurement, Analysis and Evaluation
9.2	Internal Audit
9.3	Management Review
10.1	Non-conformity and Corrective Action
10.2	Preventative Action
10.3	Continual Improvement



The figure shows the results of the assessment across the 27 Clauses within the Standard. A score of 3 is required in all elements to achieve compliance with the standards. The chart reflects that Firstgas falls in the range between developing and competent.

The report identifies a number of Asset Management recommendations and opportunities for improvement mapped against ISO55001 requirements. Firstgas will use the outcomes from the report as a basis for its Asset Management Improvement Plan.

H.2 ASSET MANAGEMENT FRAMEWORK

The Asset Management Framework (Fig 42) is primarily designed to support the delivery of corporate objectives and stakeholder needs and demonstrates how they link with the components of the asset management system.

The Firstgas Strategic Plan sets the direction for the development of the primary elements of the Asset Management System; the Asset Management (AM) Policy, Strategy, Objectives and Plans. These, in turn, direct the optimal combination of life cycle activities to be applied across the portfolio of asset systems and assets (based on their criticality, condition and performance).

The Asset Management framework, therefore, provides a clear bi-directional "line of sight" throughout the Organisational Structure. Throughout this framework, there are means and ways developed, that enable Firstgas to continuously review and update their asset management processes and practices.

The interaction between the strategic plan and asset management system is shown below.

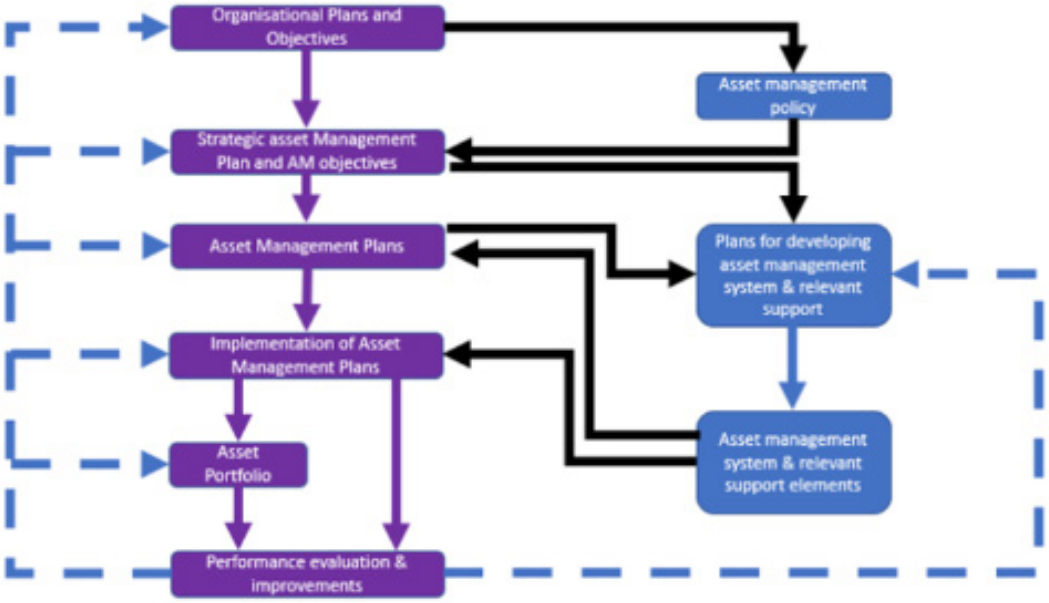


Figure 34: Interaction between strategic plan and asset management system

H.2 ASSET MANAGEMENT FRAMEWORK

The Asset Management System is an important function of this system in linking corporate objectives and stakeholder needs to specific asset management approaches through the Asset Management Policy.

The asset management system aligns with the requirements specified by ISO55001 and seeks to reflect good practice. This system includes the following components:

Asset Management Policy, Strategy and Objectives: aligns the asset management approach with corporate objectives. The asset management objectives reflect this policy by emphasising the need for safety, stakeholder needs and the importance of effective risk management.

Asset Management Plans: reflects the asset lifecycle model and aligns regular processes and activities with high-level objectives.

Asset Management Enablers and Controls: influence and apply to all the other elements of the asset management system.

Risk and Review: explains the approach to managing risk on the network, including how risk is identified and classified, and how appropriate actions are taken to manage the risks identified.

Life Cycle Delivery: provides an overview of the approach to managing the gas transmission assets.

H.2 ASSET MANAGEMENT POLICY, STRATEGY & OBJECTIVES

Asset Management Policy

The Asset Management Policy provides a high-level statement of the asset management direction, principles and guiding objectives. The policy provides direction for asset management decisions and how the assets are managed.

The purpose of the policy is to reflect corporate objectives and stakeholder needs in terms that can be translated into the asset management documentation.

The policy also sets out key asset management principles that flow through Firstgas processes and systems. This is important to ensure the necessary relationships between objectives and what the asset management practices aim to achieve.

The policy is set out below and has been approved by the Firstgas Board.

Firstgas

ASSET MANAGEMENT POLICY

Firstgas's asset management policy is to effectively manage the Firstgas Group assets across their entire lifecycle in a safe, efficient and environmentally appropriate way to serve the needs of our customers, stakeholders and end-users while optimising the long-term return of our shareholders.

Achieving Operational Excellence in Asset Management is key to delivering on First Gas's Mission:

Safely and reliably delivering energy that is affordable and acceptable to New Zealand families and businesses.

To deliver on our asset management policy First Gas will:

- Prioritise the integrity of our assets to ensure the safety of the people and places affected by our operations.
- Provide a reliable, resilient and secure service that meets customer needs.
- Preserve the environment by operating in a manner that mitigates environmental risks.
- Address and meet all legislative requirements.
- Communicate our investment plans to stakeholders, particularly the communities that host our assets.
- Operate in a manner that optimises the long-term financial outcomes for our shareholders.
- Balance the needs of competing objectives in a consistent and transparent manner.

To achieve and monitor this we will:

- Engage with our stakeholders in an open and transparent manner, integrating customers into our decision making.
- Provide efficient and effective systems for whole of life asset management processes.
- Regularly review our performance using relevant leading and lagging indicators.
- Grow the organisational competence and capability of Firstgas in step with our asset management objectives.
- Ensure our Board and management are fully informed with accurate and timely data to support their responsibilities.
- Communicate with all our people and key stakeholders on all aspects of this policy.
- Continuously strive for improvement in all areas of asset management and work to align with ISO 55000.

All our people are responsible for:

- Ensuring their own and others adherence to this policy.
- Escalating any issues that may put the aims of this policy at risk.

H.3.1 ASSET MANAGEMENT POLICY, STRATEGY & OBJECTIVES

Asset Management Strategy

The uncertainty within the gas sector has highlighted the need for Firstgas to redefine what the asset strategy is regarding the gas networks and articulate this into the asset management plans.

To understand what the future networks could look like, Firstgas is developing a set of future scenarios. These scenarios are not forecasts but present a set of credible outcomes as New Zealand transitions to net zero.
The outcome for the scenario development will provide Firstgas with a roadmap and signals that will assist with decision making and identify key trigger points. This is a work-in-progress and is expected to be completed within the current financial year. The outcome of this will then allow Firstgas to align the asset strategies to a "least regrets" path until more certainty develops within the sector. This is not expected to be a one off exercise but a continually evolving approach as New Zealand transitions to net-zero.|

Asset Management Objectives

The Asset Management Policy provides a suite of asset management performance objectives that performance can be measured against. These objectives are related to performance measures discussed later in this appendix, and remain consistent with previous submissions.

The objectives are:

Safety: prioritise the integrity of assets to ensure the safety of the people and places affected by operations

Security and reliability: provide a reliable, resilient and secure service that meets customer needs

Environment: preserve the environment by operating in a manner that mitigates environmental risks

Compliance: address and meet all legislative requirements

Communication: communicate The Company's investment plans to stakeholders, particularly the communities that host the assets

Value: operate in a manner that optimises the long-term financial outcomes for shareholders.

Decision making: balance the needs of competing objectives in a consistent and transparent manner.

H.3.2 ASSET MANAGEMENT PLAN (AMP)

The AMP captures the key elements of the asset management document suite in a summarised form. It is an important means of clarifying the asset management strategy and approach to managing all assets to internal and external stakeholders. It has also been developed to meet the Information Disclosure obligations under Part 4 of the Commerce Act 1986.

This AMP has been developed with oversight and input from the Commercial and Regulatory Team, which advises on the Information Disclosure and certification requirements.

Approval Process

Once the AMP and associated forecasts have been prepared, reviewed and challenged by Firstgas, it is then reviewed by a Board sub-committee prior to an initial Board submission. When the feedback from the Board has been incorporated, the AMP is submitted to a Board meeting for approval prior to publication.

Key Assumptions

This AMP is based on some fundamental assumptions that underpin the long-term strategic direction and operating environment. These key assumptions are:

- The present gas industry structure will broadly remain the same. For example, it is assumed that over the planning period gas will continue to flow from the Taranaki region to customers located in other parts of the North Island.
- Works will continue to be delivered through a mixture of insourced and outsourced activities. Decisions on what work to outsource is based on capability, cost and resource availability.
- There will be no major disruptive changes to the availability of service providers.
- Consumer demand and expectations will continue to follow long-term trends. While the aim to promote the use of the gas distribution network, a prudent approach has been taken to growth forecasts that are tied to historic trends in the uptake and use of gas in New Zealand.
-

- There will be no major changes to the regulatory regime that governs operational and investment decisions - for example, through structural changes to the regulatory institutions or the regulatory mechanisms currently in place that allow Firstgas to recover efficient costs.

To the extent possible, all relevant assumptions made in developing this AMP have been quantified and described in the relevant sections. Where an assumption is based on information that is sourced from a third party, that source is noted.

Financial Authority

Each project within the AMP is approved based on a delegated financial authority (DFA) policy. Any changes to project scope requiring additional expenditure triggers further review and a new approval process is required to agree any changes. DFAs set out the limits to what managers are allowed to authorise expenditure. This is reviewed annually. Table 13 below sets out the DFA levels.

Table 13: Delegated Financial Authority levels

Governance Level	Financial Authority Capex	Financial Authority Opex
CEO	$2,000,000	Budget
COO	$500,000	$500,000
Engineering and Projects Manager	$250,000	$ 250,000
Distribution Manager	$250,000	$250,000

Challenge Processes

The material included within the AMP reflects the system development plans, life cycle delivery plans, customer connections forecast, and the maintenance strategies. These plans and associated forecasts are prepared in consultation with relevant staff members and engineers.

Reflecting its role as a key stakeholder document, the draft AMP is subjected to a thorough testing process prior to board approval. As part of this process, proposed network expenditure plans are scrutinised and challenged by Firstgas to ensure alignment with the asset management policy and that the plans reflect efficient and effective approaches. Non-network expenditure is also subject to the same process of testing.

Investment Principles

Apart from normal business risk avoidance measures, specific actions to mitigate the risks associated with investing in distribution systems include the following:

Act prudently: where safety is not compromised make small incremental investments and defer large investments as long as reasonably practical (e.g. replace components rather than an entire asset). The small investments must, however, conform to the long-term investment plan for a region and not lead to future asset stranding.

Multiple planning timeframes: produce plans based on near, medium and longterm views. The near-term plan is the most accurate and generally captures load growth for the next three years. This timeframe identifies short-term growth patterns, mainly leveraging off historical trends. It allows sufficient time for planning, approval and network construction to be implemented ahead of new system demand.

The medium-term plan looks out 10 years: capturing regional development trends such as land rezoning, new transport routes and larger infrastructure projects. It also captures changes such as the adoption of new technologies or behavioural trends (e.g. consumers' response to issues such as climate change, increased energy conservation, etc.).

Review significant replacement projects: for larger system assets, rather than automatically replacing existing end-of-life assets with the modern equivalent, a review is carried out to confirm the continued need for the assets, as well as the optimal size and system configuration that will meet the needs for the next asset lifecycle.

Continuously review system performance: to identify and apply action in respect of where asset performance can be improved.

H.3.3 ASSET MANAGEMENT ENABLERS & CONTROLS

This section describes how appropriate oversight and challenge are in place during the development and execution of the plans. Enablers and controls also ensure that resources are available and there is a formal approach to decision making, promoting consistent, repeatable and auditable actions.

Key asset management enablers and control elements include:
Capital and operational expenditure guides: provide the basis for implementing a minimum standard to identify, prioritise, plan, budget, execute, control, and closeout capital expenditure projects and major operational expenditures.

Safety and operating plan: details the controls in place to mitigate the risks that have been identified under the formal safety assessment processes for the elimination, isolation or minimisation of harm to persons, property, the public, environment and assets.

Competency and training: demonstrate how staff and external parties performing design, construction, operations or maintenance on the distribution system meet the competency requirements as specified by the training matrix.

Capital and Operational Expenditure Guides

The purpose of the Capital and Operational Expenditure guides is to provide the basis for implementing a minimum standard to identify, prioritise, plan, budget, execute, control, and closeout capital expenditure projects and major operational expenditures. Key objectives are to:

- Evaluate Capex projects and major Opex according to the Business Plan, Strategic Plan, and Asset Management Policy and Strategy.
- Ensure a complete analysis has been conducted. (Build versus buy, lease versus buy, rent versus own, outsource versus in-house, should cost modelling, Original Equipment Manufacturer (OEM) vs non-OEM).
- Consumer demand and expectations will continue to follow long-term trends. While the aim to promote the use of the gas distribution network, a prudent approach has been taken to growth forecasts that are tied to historic trends in the uptake and use of gas in New Zealand.
- Leverage best practices used by Firstgas and the gas sector.
- Provide consistent evaluation of financial and non-financial factors to understand the total value during the life cycle.
- Evaluate the risk and exposure of not doing the capital or maintenance project.
- Compare alternatives to determine the best solution (e.g. replacing versus repairing equipment, doing the project now versus later).
- Evaluate the project costs on a life cycle basis (long-term value).
- Provide advance sourcing planning to meet long-term objectives and manage supply risk.
- Lower costs through consistent integration of business resources and reduce process duplication through integration of financial requirements.
- Select the options to ensure the best investment of funds through consistent prioritisation of projects and transparency in decision-making

Safety and Operating Plan

The constituents of NZS 7901:2014 Electricity and Gas Industries - Safety Management Systems for public safety are the following:

- Risks identification, assessment and treatment
- Asset descriptions
- Performance monitoring
- Safety and Operating Plan (SAOP).

It is in the format of an outline to safety and operating practices for compliance with the Gas Act and Gas (Safety and Measurement) Regulations and with the Health and Safety at Work Act. For more detailed requirements it provides references to Firstgas policies, procedures, work instructions and other documentation.

It covers the requirements from network planning and design through to performance measurement and auditing.

Its structure follows closely the recently introduced joint Standards AS/NZS4645.1 Gas distribution networks Part 1 Network management, AS/NZS4645 .2 Gas Distribution Networks Part 2: Steel pipe systems and AS/NZS4645.3 Gas Distribution Networks Part 3: Plastic pipe systems, which are now cited Standards.

Through a formal hazard identification and control process, the hazards associated with the gas distribution network are identified and the risks assessed. The safety and operating policies and procedures that are required to mitigate these risks have been identified and set out in the Safety and Operating Plan. These cover not only controls to minimise harm to persons and damage to property, but also for health and safety of its personnel and contractors, and for protection of the environment.

The Plan covers:

- Network development: to ensure adequate capacity and integrity and to minimise the risk of interference and damage.
- Network operations and maintenance: to ensure the on-going safety of the assets through appropriate operation, maintenance and awareness activities.
- Emergency response: to ensure that when a situation arises effective processes are in place to respond and restore safely.
- Resource requirements for all activities and the records management processes.
- Monitoring of performance to provide feedback on the effectiveness of the controls and to identify opportunities for continuous improvement.
- Administration of this document.

Competency and Training

All individuals performing design, construction, operations or maintenance on the distribution network must meet the competency requirements as specified by Firstgas standard GNS-0080 - Personnel Qualification.

As a part of the contractual agreement with Field Service Providers (FSPs) and contractors, contracted personnel must meet the competency criteria for all work being performed. As specified, competency and training levels are managed by service providers through a training matrix and green / red card system dictating competency levels for required works.

Internally, each staff role has a defined set of competency requirements within the position description that personnel performing that role are required to meet.

Training requirements are aligned with established competencies in technical operation and maintenance. A training and development plan exists to ensure that personnel involved with the operation and maintenance of the asset are appropriately trained. The training and competency recording is maintained in Maximo and the validation of competency forms part of the Firstgas NZ7901 accreditation.

H.3.4 RISK AND REVIEW

Risk management is a key component of good asset management. The consideration of risk plays a key role in asset management decisions - from network development planning, asset replacement decisions through to operational decisions. The assessment of risk and the effectiveness of options to minimise it, is one of the main factors of investment choices.

Key risk and review elements include:

Risk Management: core processes are designed to manage existing risks, and to ensure emerging risks are identified, evaluated and managed appropriately.

Contingency Planning and Response: ensures that Firstgas are prepared for, and can respond quickly to, a major incident that occurs or may occur on the gas distribution system.

Event Management: provides clear definitions and guidance for all disciplines working for Firstgas in order to ensure a consistent approach in recognising and reporting events.

RISK MANAGEMENT POLICY

Effective management of risk is central to the growth and success of First Gas. We are committed to developing a culture that provides greater certainty by understanding and managing the risks to our business.

The objectives of risk management within First Gas are to:

- Ensure that the Board and Executive Management are aware of the material business risks;
- Proactively identify and manage risk;
- Ensure that risks are understood so that decisions can be informed to allow opportunities to be realised and risk to be managed;
- Provide assurance to our shareholders that processes are in place to manage risk and to meet our commitments.

First Gas will implement a risk management framework across its organisation to ensure that the objectives above can be met.

This framework will require:

- Alignment with recognised industry standards and good practice
- Inclusion of specific legislative requirements where applicable
- Governance processes with regular updates and reports to the Board and Executive Management Team
- All business units and functions to be responsible for developing and implementing their own risk management plans, based on their strategic objectives and operational needs
- All managers to ensure risk controls are in place and effective for operations within their area of responsibility
- Reporting protocols, including the escalation of significant risks to the Executive Management Team and the Board
- All risks to be assigned suitable owners with the appropriate knowledge and authority to manage them
- Regular, routine reviews of all identified risks, including effectiveness of controls
- Appropriate review of existing and new activities to identify new risks
- Training and awareness for all workers so that risk management is well understood
- The development and maintenance of an environment where all workers are comfortable to raise risks as they arise

To ensure that the risk management framework is implemented and maintained we will make the necessary resources available to make sure that this policy is satisfied.

This policy and the associated risk management framework will be reviewed on an annual basis.

Risk Management

Given the potentially severe nature of failures in operation (particularly loss of containment) appropriate and effective risk management is integral to day-to-day asset management approach.

The asset management information systems and core processes are designed to manage existing risks, and ensure emerging risks are identified, evaluated and managed appropriately. The approach is to seek specific instances where features of the network that should provide resilience, are undermined. In particular, the following assessments are used.

- **Prioritise safety:** risks that may impact the safety of the public, staff and service providers is prioritised.
- **Ensure security of supply:** the asset management processes include formal evaluation of the assets against security criteria.
- **Address poor condition/non-standard equipment:** lifecycle management processes seek out critical items of equipment that are at a higher risk of failure or are non-standard.
- **Need for formal risk review and sign-off:** processes include formal requirements to manage the risks identified, including mandatory treatment of high-risk items and formal management signoff where acceptance of moderate risks is recommended.
- **Use of structured risk management:** structured risk capture and management processes are applied to ensure key residual risks are visible and signed off at an appropriate level.

Gas industry codes require risk management to be a continuous process at all stages throughout the lifecycle of the gas distribution network. The nature of the gas distribution business is such that there are many inherent risks. In addition, safety management is one of the highest operational priorities.

The gas distribution business unit has a risk management system that is outlined in GNS0083 Safety and Operating Plan. This document outlines the minimum requirements and ensures consistency in risk management by the business.

As risk severity is defined by the combination of likelihood and consequence, the approach to managing risk focuses on controls and treatments that either amend the likelihood of occurrence or address the severity of the consequences.

The risk management process is not solely about limiting risk by mitigating against adverse impacts. Rather, it is about fully appreciating and recognising all the risks the business carries and balancing them so as to take advantage of potential opportunities in an informed manner.

The risk management process is in accordance with the process outlined in AS/NZS ISO 31000:2009.

1. Contingency Planning and Response

Network and processes have been designed to be resilient to large events that are outside the realms of the Company's control, such as natural disasters. The following aspects of the asset management approach limit the consequences should these events occur.

- **Multiple control options:** alternative control and emergency management capability available in the event that a primary site is disabled.
- **Emergency response plans:** well tested response plans and demonstrated capability to manage significant natural events and widespread damage to the system.
- **Business continuity plans:** structured business continuity plans in place to ensure that the functional support aspects of the business are resilient and can support ongoing operations.

2. Emergency Response Plan

To ensure that Firstgas are prepared for, and can respond quickly to, a major incident that occurs or may occur on the gas distribution system, a comprehensive Emergency Response Plan has been developed. The plan describes the actions required and the responsibilities of staff during a major emergency or incident.

A key component of this plan is the formation of the emergency response management team. This team includes senior staff whose role is to oversee the management of potential loss of and restoration of supply following a significant event. The team is experienced and undertakes exercises at least annually.

3. Civil Defence and Emergency Management

As a "lifeline utility" under the Civil Defence and Emergency Management Act 2002 (CDEM), Firstgas are required to be "able to function to the fullest possible extent, even if this may be at a reduced level, during and after an emergency". Firstgas are also required to have plans regarding ongoing functions during and after an emergency and to participate in the development of a CDEM strategy and business continuity plans.

The Company participates in CDEM emergency exercises and area meetings on a regular basis to ensure CDEM protocols are understood, as well as to test aspects of emergency plans.

4. Critical Spares and Equipment

Key to minimising the consequence of any unwanted event involving equipment failure are readily available tools and materials to enable quick restoration to normal operation.

To this end, a stock of spares is maintained for critical components of the gas distribution system, so that fault repair is not hindered by the lack of availability of required parts. Whenever new equipment is introduced to the system, an evaluation is made of the necessary spares required to be retained to support repair of any equipment failures.

Event Management

The Event Management standard provides clear definitions and guidance for all disciplines working for Firstgas in order to ensure a consistent approach in recognising and reporting events, and also provide understanding of what to report and how to report. Additionally, it provides guidance on investigation methodologies and techniques to identify causes, contributing factors and hazards thereby producing valuable information on lessons learned and future improvements.

The objective of event reporting and investigation is to prevent harm and damage through learning and improving and comply with statutory requirements. The primary objectives of reporting all events including Learning Events (near misses) are:

- To ensure that any injury occurring or damage sustained receives the necessary treatment or repair.
- To gather initial information during the reporting stage that will be invaluable should further investigation be required.
- To provide valuable learning for the organisation.
- To collect information for reporting to the Authorities
- This will be achieved by:
- Immediate notification of an event
- Gathering good quality information
- A timely investigation process
- Analysis of investigation findings
- Identification and implementation of actions
- Sharing of information
- Ability to record and track actions

H.3.5 LIFE CYCLE DELIVERY

This section explains the approach to managing the gas distribution assets using a lifecycle-based methodology. This approach and the main activities it entails, is discussed during the planning period.

Key Life Cycle Delivery elements include:

Asset lifecycle management: provides an overview of the approach to managing the gas distribution assets.

Asset replacement and renewal: discusses approach to renewing asset fleets.

Asset relocations: discusses how assets are relocated to accommodate third parties.

Maintenance: sets out the approach to maintaining the gas distribution assets.

Other-network Opex: discusses additional network related Opex including Network Support costs and expenditure on compressor fuel.

Asset Lifecycle Management

Safety is the key consideration in the design, construction and maintenance of the gas distribution system. Assets are managed in accordance with relevant acts, regulations and industry standards. The distribution assets are designed and built to deliver gas to service levels set out in the Quality of Supply and to meet the needs of customers.

To cost-effectively achieve the required level of safety and service, the assets must be kept in good operating condition. This is achieved by replacing, renewing and maintaining the assets. The term asset lifecycle management is used to describe these activities.

The asset lifecycle approach used includes the following main activity phases[2]

Acquire: this includes investments in new (or larger) assets to ensure demand on the network at appropriate security levels can be met.

Operate: includes real-time network control, monitoring and event response. This involves planning for assets to be safely taken out of service (discussed in this appendix).

Maintain: is the care of assets to ensure they provide the required capability in a safe and reliable manner from commissioning through to their replacement or disposal (discussed in this appendix).

Asset replacement, renewal and disposal: includes the replacement of assets with new modern equivalents, investments that extend an asset's useful life or increase its functionality (discussed in this appendix).

Engineering Principles

To ensure the effective and consistent approach to lifecycle management of the assets Firstgas has developed a set of engineering principles. These outline the approach to all future engineering principles and decisions and is aligned to the Firstgas "Mission and Vision" and general "First Principles" already established.

The strategy defines the following key topics:

- Standards Compliance
- Consistent approach to process and guiding principles and the overall corporate business drivers that set the business direction
- Follows risk management principles and processes
- Commitment to continuous improvement and how the strategy will improve the Firstgas business
- Establish proactive maintenance programmes
- Efficient spending
- Stakeholder engagement
- Environmental awareness

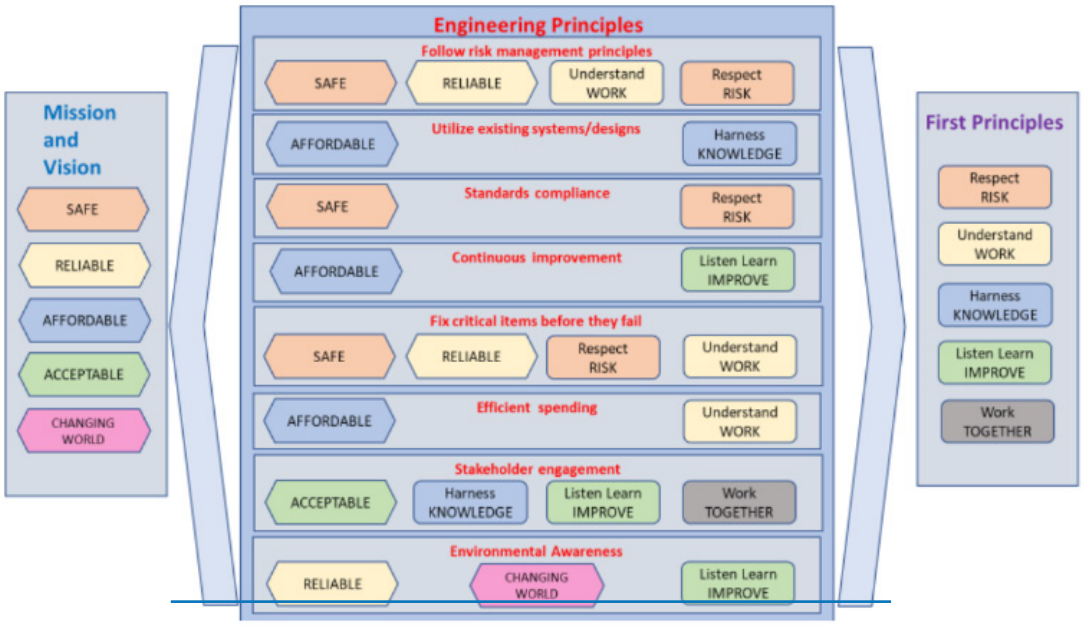


Figure 43: Firstgas Engineering Principles Diagram

Lifecycle Management Strategy

The design of gas transmission assets, in general, cannot conform to standardised designs due the complex and highly variable requirements of major users and downstream networks. Where possible, certain asset components (e.g. isolation valves) may conform to pre-specified standards for specific applications. This is to ensure, wherever possible, that design, procurement, installation and maintenance consistencies and efficiencies are made.

The approach to lifecycle asset management is influenced by a number of factors. These include the need for safety, characteristics of the assets, and external factors such as adverse weather, legislative requirements, customer needs, and commercial requirements.

To ensure that its assets meet the Asset Management objectives over the last few years Firstgas has developed a series of asset class strategies. These are specific to the asset class and define how the assets are to be managed over their lifecycle, and trigger points when assets are to be replaced.

Station Decommissioning

The lifecycle management of assets includes decommissioning unused sites. The gas transmission system installation began in the late 1960s. Since then, the delivery points have received periodic upgrades and renewal of station equipment as technology has developed, or organic growth has triggered an upgrade requirement. Technical evaluations are conducted on equipment for its suitability to be re-used on alternative sites and costs to remove the equipment are evaluated against the ongoing maintenance cost of the site to determine the most effective outcome

H.3.6 ASSET REPLACEMENT & RENEWAL

Asset Replacement and Renewal (ARR) is necessary to address asset deterioration and to ensure the system remains in a serviceable and safe condition. As the level of condition deterioration increases, the asset reaches a state where ongoing maintenance becomes ineffective or excessively costly. Once assets reach this stage replacement or renew is considered.

- **Replacement Capex:** includes replacing assets with like-for-like or new modern equivalents.
- **Renewal Capex:** is expenditure that extends an asset's useful life or increases its functionality.

If an asset is identified for replacement or renewal, the original design basis is reviewed for validity prior to confirming replacement. During this review other alternatives are assessed, such as decommissioning. The availability and feasibility of these options depends on a range of factors. ARR investments are generally managed as a series of programmes focused on a particular asset fleet.

Investment Drivers

Optimisation of Capex requires comprehensive evaluation of the condition, performance and risk associated with assets. From this evaluation, asset renewals are able to be scheduled. In some cases, it may be more efficient to extend the life of an asset beyond normal predicted life by renewing the asset.

There are a number of factors considered when assessing assets for replacement or renewal including:

- Ensuring safety
- Legislative and standards
- Asset condition
- Overall lifecycle cost

Ensuring Safety

A key strategy is to ensure the safety of the public, employees and contractors at all times. This includes making sure inspection regimes effectively identify safety hazards. Protecting the integrity of the network and assets by monitoring and managing the activities of third parties, is also a focus.

There are a number of events or changes that may impact on the system and result in a change of the identified risk level. Any such changes in design or substantive change to the operating environment can lead to a review of network safety. Such changes can include:

Third party incidents

- Findings from routine monitoring
- System improvements
- System modifications
- Inspections and audits

Safety-in-design

Firstgas Group Limited are committed to ensuring that operations do not put employees, contractors or the public at risk. This extends to safety being a key focus of the design phase of the work done. It is at the design stage of creating assets that the greatest opportunity exists to build in safe operability for the whole lifecycle of the asset.

Safety-in-design is about eliminating or controlling risks to health and safety as early as possible in the planning and design stage, so that whatever is designed will be safe to construct, operate, repair and maintain and ultimately, safe to decommission and dispose of at the end of its lifecycle. This concept is implicit in all work practices.

Legislation and Standards

The gas distribution assets have been designed, constructed, and operated in accordance with the following principal acts, Regulations and industry codes:

- Gas Act 1992 and Gas Amendment Act
- Health and Safety in Employment Act
- Gas (Safety and Measurement) Regulations
- Civil Defence and Emergency Management Act
- Hazardous Substances and New Organisms Act
- NZS 5258 Gas Distribution Networks
- NZS 7901 Electricity and Gas Industries - Safety Management Systems for Public Safety
- AS/NZS4645.1 Gas Network Management
- NZS 5263 Gas Detection and Odorization

These acts, regulations and industry codes include prescriptive and performance-based requirements that have been embedded into the suite of design, construction, maintenance and material specification standards. The purpose of these technical standards is to provide a comprehensive reference source for use by all personnel and others involved in the design, construction and maintenance of the distribution system.

Standardised Equipment and Designs

Standardised equipment and designs are used throughout the network. Standardisation has been applied to pipes, DRS equipment, and installation practices. Differing architectural treatments may be applied to DRS to better align with local architecture, however construction techniques, materials and fit outs align with well-established standards.

Typically, standard designs are introduced to avoid producing bespoke solutions for similar network installations. Firstgas have adopted the approach that when a design is repeatedly used on the network, a standard design is developed. Subsequently, as design improvements are identified (either by staff or as feedback from FSPs) standard designs are amended and updated.

A standardised design provides the following advantages when managing the distribution assets:

- Ensures a rigorous equipment selection process to select fit-for-purpose units while ensuring appropriate equipment performance over the life of the equipment
- Delivers cost savings in design
- Lowers project costs through competitive bulk materials supply agreements
- Simplified procurement and reduced stockholding
- Standardised maintenance practices
- Reduced rework during construction
- Safer outcomes and improved mechanism for capturing incremental improvements

Table 14 below identifies some of the key design standards used in the development of the distribution network.

Asset	Standard	Description
District regulating stations	00001	Design of district regulating stations
Pipes	0002	Piping system design
Corrosion protection systems	0003	Design of above ground corrosion protection systems
Corrosion protection systems	0004	Design of below ground corrosion protection systems

Table 14: Key design standards by asset

Overall Lifecycle Cost

Optimisation of Capex and Opex is a key consideration. This requires comprehensive evaluation of the condition, performance and risk associated with the assets, to provide a clear indication of the optimal time for asset replacement or renewal.

Efficiencies can often result from solutions that allow conventional system investment to be deferred without compromising performance or safety. In evaluating possible solutions, the following factors are considered:

- Estimation of maintenance costs over the remaining life of the asset relative to cost of replacement.
- Determine whether a change in maintenance or operational regimes would alleviate the identified issue and whether such a change could be implemented safely.
- The use of non-network solutions and demand management techniques.
- Scope to leverage off other projects (e.g. growth projects) to gain synergies.

Summary of ARR Capex

Once an asset is identified for replacement or renewal, the prioritisation methodology is applied to determine the ranking of replacement projects. This methodology is based on assessing the criteria giving rise to the need for replacement.

- Risk
- Asset criticality
- Asset health
- Customer needs
- Potential financial impacts

The final project prioritisation list, along with cost estimates, forms the basis of the annual renewal budgets for each fiscal year. The asset replacement and renewal investment decisions are made within the context of the wider asset management activities (e.g. system development), that ensures investments are optimised across all business objectives and constraints.

H.3.7 RELOCATIONS

Existing mains are relocated when required as a result of the activities of other utilities, authorities or customers. For example, the development of a state highway in the vicinity of assets may require the relocation of these assets. Relocations are identified following third party works notifications. Typically, asset relocation projects are predominantly funded through capital contributions by the third parties requesting the relocation.

H.3.8 MAINTENANCE

The overarching maintenance policy is to maintain all assets to ensure a safe, efficient and reliable network.

Maintenance Approach

The maintenance approach is designed to ensure that assets achieve their expected life and to minimise lifecycle costs. Information obtained in the course of maintenance work is used to guide future maintenance programmes and to inform renewal decisions.

Firstgas are required by the Gas Act to design, construct, maintain and operate the network in accordance with the Gas (Safety and Measurement) Regulations 2010. This regulation cites both NZS5258 and AS/NZS4645 as a means of compliance. Firstgas have adopted NZS5258 as the Company's means of compliance.

A comprehensive suite of asset maintenance standards exist, that describe the approach to maintaining Firstgas asset fleets. There are significant differences required in the approach for different asset types, but as a broad rule the maintenance standards specify the following.

- Required asset inspection frequency.
- Routine and special maintenance activities to be carried out during these inspections.
- Condition testing that needs to be carried out and the required response to the test results.

Maintenance objective

The overarching maintenance philosophy adopted for the asset is to provide timely, quality and cost-effective maintenance services to ensure that assets are maintained to support the required level of safety, reliability, availability, output capacity, and service quality.

During the planning period the main strategies to achieve this objective are as follows:

- Regularly review the effectiveness of routine maintenance for each asset type and update maintenance standards and activities as required to deliver optimum performance.
- Regularly review the effectiveness of monitoring programmes to identify components that may require more intrusive inspection or could have less frequent inspections.
- Ensure that staff are vigilant in identifying the activities of third parties working near Firstgas assets, and taking appropriate action to ensure the integrity of the network is not compromised.
- Educate the public, landowners and customers through regular communication about the dangers of working near the network.

Activity Drivers

The approach to maintenance is influenced by a number of factors. These include the number, type and diversity of the asset fleets, their condition and age, and external factors such as legislative requirements, environmental factors and third-party activity.

Maintenance Standards

Maintenance regimes have been developed for each asset fleet. The regimes form a key part of the schedule for planned maintenance. The purpose of these regimes, in conjunction with corrective maintenance, is to ensure assets operate safely and deliver their designed outcomes with regard to life and performance.

As part of the asset maintenance standards, the frequency of inspection and reporting per asset category has also been defined. This forms the basis of the asset maintenance schedule.

All relevant standards are available to personnel engaged in maintenance activities, as well as FSPs. They must comply with the standards and inspection schedules for each class of assets.

Firstgas standards are updated in accordance with an established review cycle, and any new findings or updates are incorporated in the standards as soon as they are reviewed by the Asset Management Team and signed off by all interested parties. Field Service Providers contribute to and form an integral part of this continuous improvement process.

Maintenance schedules and associated costs are progressively monitored on a monthly basis. Any concerns identified during asset maintenance or inspections are recorded in an asset management database. Field Service Providers offer recommendations for the priorities of remedial works for asset defects, which are then reviewed prior to issuing orders for the work. Maintenance priorities are based on cost, risks and safety criteria.

In deciding to repair an asset consideration will be given to recommendations submitted by FSPs, in conjunction with the factors discussed above. Longterm asset plans are also considered as supported by trend analysis when making these decisions.

Root cause analysis is normally undertaken as a result of faulty equipment. If this identifies systemic faults or performance issues with a particular type of asset, and if the risk exposure warrants it, a programme will be initiated to carry out the appropriate remedial actions on an asset fleet. The asset and maintenance standards are amended to reflect the learnings from such analysis.

Routine and Corrective Maintenance and Inspection (RCMI)

Immediately after new assets are commissioned, the RCMI maintenance regime begins. As an asset ages and its condition declines, the cost of corrective repairs to maintain fitness for purpose will escalate until it becomes more cost-effective to decommission or replace it. Ongoing condition monitoring is undertaken throughout the asset's life to identify the point when the asset should be decommissioned.

- Routine and corrective maintenance, and inspection activities may include:
- Pipe patrols, inspection and condition detection tasks and maintenance service work.
- The coordination of shutdowns at station facilities, restoration of supply along with the capture and management of all defined data.
- Painting and repair of buildings and asset enclosures, removal of decommissioned assets, one-off type inspection and condition detection tasks outside of planned maintenance standards.
- Repair of assets identified from programmed inspections or service work assessed to be unserviceable or in poor condition.
- Advanced investigative and corrective technologies are used to extend machinery life such as:
  - root cause failure analysis
  - installation/commissioning performance verification
  - purchase specification
  - spare parts management
  - reliability engineering and research.

Taking all of the above into account, maintenance strategies and plans are developed that determine maintenance activities and frequencies. The plans are updated as required on a monthly basis and used to inform the Network Opex forecasts. The routine maintenance and inspection tasks carried out on the distribution network are detailed in *Appendix K* – Asset Management Schedules, along with categorised forecasts for the activities over the planning period.

Service Interruptions, Incidents and Emergencies (SIE)

- The occurrence of SIEs will result in the need to carry out activities to understand the nature of the SIE and rectify asset failure or damage to assets caused by unplanned or unforeseen circumstances. This may include the following activities:
- Safety response and repair (or replacement) of any part of the asset damaged due to environmental factors or third-party interference.
- Response to any fault at a station where safety or supply integrity could be compromised.
- Remediation or isolation of unsafe network situations.

Every reasonably practicable precaution is taken to prevent third party interference with pipelines and carry out rigorous inspection and maintenance practices. However, experience and history has shown that emergency situations arise from time to time. In most circumstances pipeline integrity breaches do not result in catastrophic failure or rupture of the pipeline and suitable repair methodology and techniques can be applied. In more serious cases pipelines may have to be isolated and sections of pipeline replaced.

Delivery Model

A mix of insourcing and outsourcing approaches for field work delivery are used within Firstgas. This approach is currently considered appropriate and is driven by the concept of having scarce and specialised skills supplied internally. Where the skill set is more broadly available and a competitive market exists then outsourcing is preferred.

Some capital project construction is outsourced and a number of other technical roles to a group of 'service providers'. Sustainable and effective relationships are built with these service providers through appropriate commercial arrangements. This approach enables Firstgas to retain core engineering competencies in-house, while leveraging the expertise and resources of service providers. While this approach has several benefits, it requires effective alignment in respective aims and incentives.

Maintenance Delivery

Field maintenance is predominantly an outsourced activity. Omexom (previously Electrix) is responsible for the preventive, corrective and reactive maintenance works on the gas distribution network.

The process of working with FSPs on continuously improving the coordination of the various activities associated with the delivery of the capital works programme has begun. The objective is to achieve better utilisation of resources, enhance capital efficiency, and deliver improved customer outcomes. Improvement initiatives include:

- An integrated works planning across the end-to-end Capex process to drive an efficient and deliverable works plan that coordinates work to optimise outage impacts and resource requirements, has been introduced.
- Introduction of early contractor involvement to drive:
  - Improved risk management.
  - Clear understanding and development of scope and delivery sequence.
  - Early constructability input and reviews.
  - Earlier operational acceptance.
  - Improved innovation.
  - Improved cost certainty and better executed project management with less variations.

.

Asset maintenance is delivered by Field Service Providers based on the standards and inspection schedules for each class of asset. The FSPs are responsible for planning and scheduling maintenance requirements and ensuring that sufficient skilled resources are available to deliver against requirements.

Progress against the maintenance schedules and associated expenditure is monitored on a monthly basis.

H.3.9 SYSTEMS OPERATIONS AND NETWORK SUPPORT

System operations and network support Opex relates to expenditure where the primary driver is the management of the network. These expenses include the following activities:

- Asset planning, including preparation of the AMP, load forecasting and network modelling
- Network and engineering design (excluding design costs capitalised for capital project)
- Network policy development
- Standards and documentation development for network management
- Network record keeping and asset management database maintenance including GIS
- Outage recording
- Connection and customer records/customer management databases
- Customer queries and call centre
- Operational training for network management and field staff
- Field staff operational vehicles and transport
- IT and telecoms network management including IT support for asset management information systems
- Day-to-day customer management
- Engineering and technical consulting
- Network planning and systems audits
- Logistics and stores, easement management, surveying of new sites to identify work requirements
- Contractor/contract management
- Network related research and development.

H.3.10 ASSET MANAGEMENT SUPPORT

This section advises the functions and capabilities that support the day-to-day asset management activities. It describes:

- **Non-network assets:** including Information and Communications Technology (ICT) systems and office facilities.
- **Business support:** activities that support the gas distribution service.

H.3.11 NON-NETWORK ASSETS

This section includes non-network assets. It explains the approach to delivering ICT capabilities and managing associated assets. It also considers other non-network assets (e.g. buildings).

H.3.12 ICT ASSETS

A number of ICT systems have been implemented since the initial transition to Firstgas to improve organisational capability. These include:

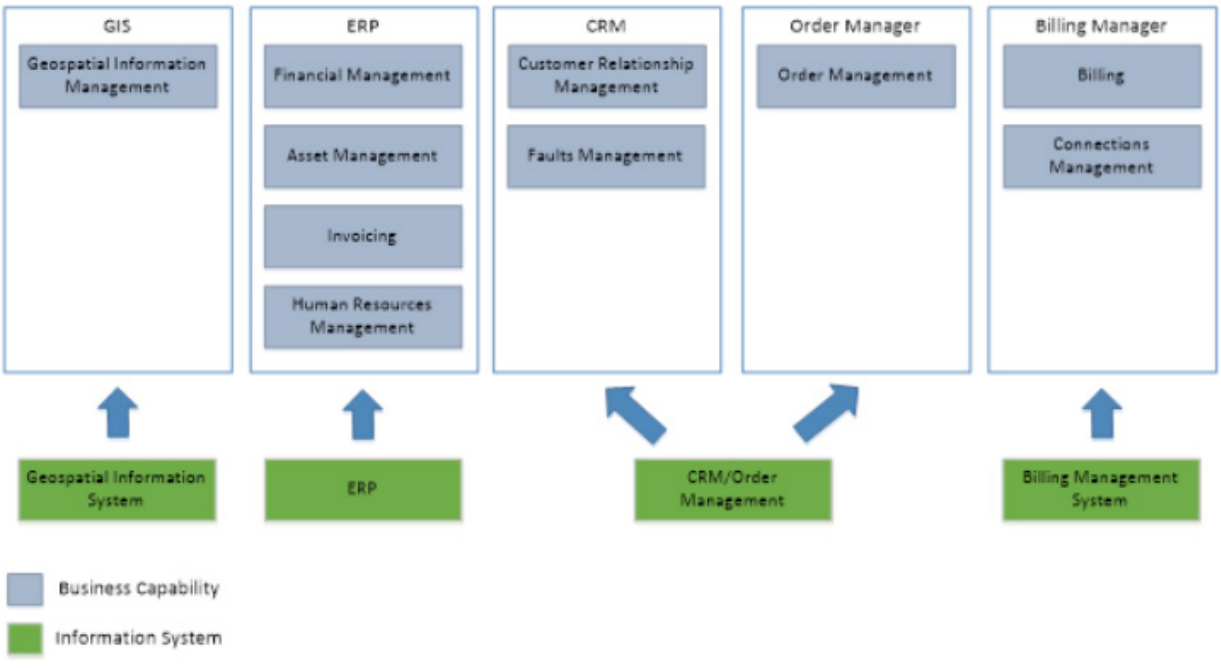
- X-Info Suite, a Land & Planning management toolset.
- Solufy Akwire, a field resource scheduling tool that interfaces with Maximo.
- ESRI ArcGIS for the transmission asset data so all GIS data is now in the same system.
- Project Server Online is the collaborative project management tool.

The ICT systems and functions include:

- Core network related systems: support capabilities that manage information directly relating to Firstgas network assets and their operation and management.
- Supporting network related systems: are smaller systems that support capabilities that manage information that directly relates to assets and their operation and management.
- Supporting ICT infrastructure systems: support the integration and operation of both the core network and supporting network related systems.

Figure 36 below illustrates the relationship between the business functions and processes - hereafter referred to as business capabilities - and the core network related systems.

Figure 36. Business Capabilities and Core Network Related Systems



Firstgas will continue investing over the next few years to ensure the systems are being used effectively and efficiently. Investment in digital workspace transformation and Information management strategies are a particular focus.

H.3.13 INFORMATION AND DATA

The network and supporting network information systems manage data that is necessary for the effective day-to-day operation of the network assets and the ongoing planning activities relating to those assets. The information can be divided into several categories:

- Asset (e.g. type, size, installation date, operating/maximum pressures)
- Location
- Customer
- Order
- Financial
- Faults and maintenance
- Real-time data and measurements

These information categories managed by information systems are shown in Figure 37

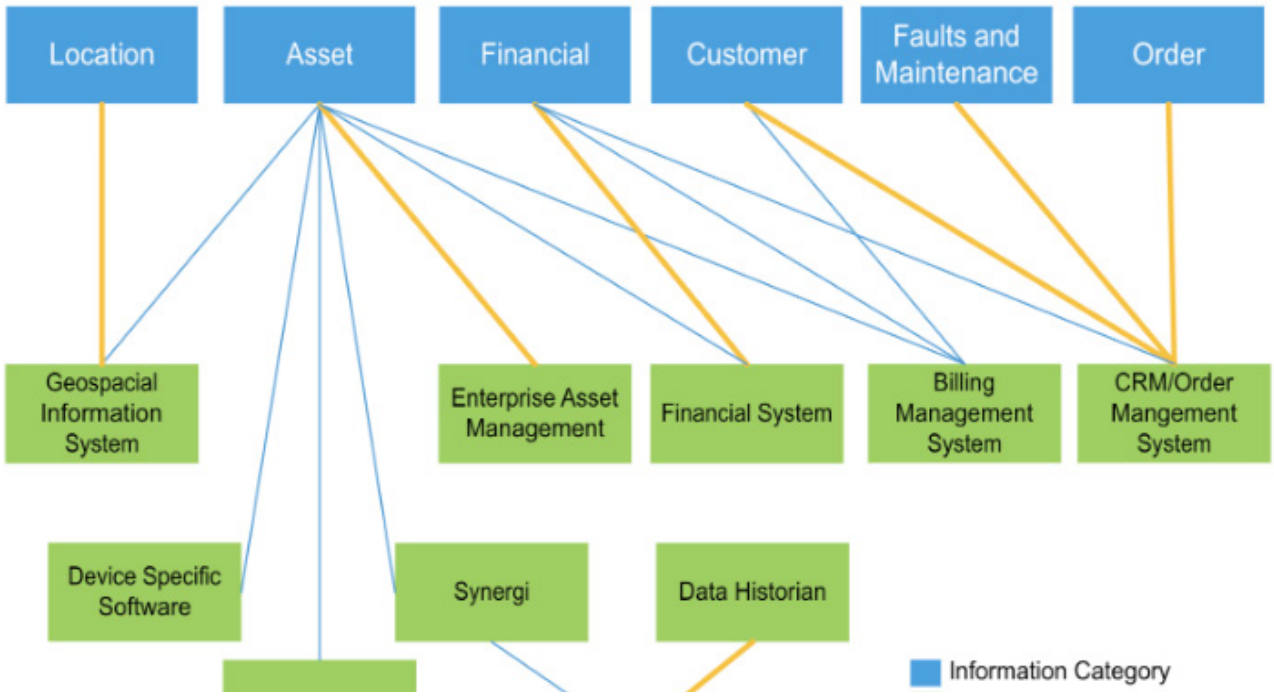


Figure 37. Information and systems relationships

Information Systems Strategic Plan (ISSP)

The ISSP aims to ensure Firstgas develop capabilities enabling the support of planned asset management changes over the planning period, including:

- Enhancing asset management analysis capabilities
- Supporting increased work volumes on the networks
- Providing real-time information to customers, including through new information channels
- Enhancing the way work is delivered to service providers

Over the planning period, it is recognised the range of available options to deliver ICT capability will shift and evolve rapidly. Strategies and plans are designed to maximise flexibility in a changing environment.

As a lifeline utility, Firstgas recognise that system resilience is a fundamental expectation.

System architecture must be developed to align with industry accepted standards for cyber security in an increasingly connected communications landscape. Over the planning period it is paramount that ICT assets are:

- **Flexible:** built on technologies forming a solid central platform that allow rapid development of new capabilities around the margins.
- **Scalable:** to accommodate increased data processing/storage and accessible to ensure customers and internal users have real-time access to the information they need and can rely on the quality and security of that information.
- **Resilient:** to maintain 'lifeline' utility levels of reliability, ensuring systems are resilient, reliable and responsive, designed with multiple layers of redundancy matched to the criticality of the capabilities they support.

ICT Investments

This section describes the approach to investing in ICT assets that support the asset management functions and the cost of maintaining these services.

It includes investments in ICT change initiatives and network related ICT. It covers the ICT programmes and projects that ensure processes, technology and systems help deliver asset management objectives.

Each component within technology architecture has a collection of supporting architecture documents. These documents are referred to as 'Architecture Artefacts'. They are used to define the strategy, roadmap, and detailed reference architecture specific to each component.

Figure 38:Architecture Artefacts

These 'Architecture Artefacts' are used to inform the investment planning for each information technology system and infrastructure component. Financial modelling is also used in addition to these artefacts to ensure that ICT investment decision-making considers financial constraints such as total cost of ownership and IS asset depreciation.

Furthermore, expenditure forecasts are informed by historical costs, expected unit cost, and price trends. Firstgas have worked with suppliers to determine unit costs for current technologies or their likely replacements. Due to the rapidly changing nature and relatively short lifecycle of ICT related hardware and software, it is difficult to determine accurate unit cost estimates for products and services more than two years out.

To develop 10-year expenditure forecasts, it is assumed that software costs will progressively move from Capex to Opex as software providers shift to the software as a service model. It is also assumed that hardware costs are likely to be stable over the next 10 years on a like-for-like basis.

It is expected an uplift in ICT expenditure will be required over the first two to three years of the planning period due to investments in new systems. From year four expenditure is expected to stabilise.

Main ICT Systems

System	Description
Finance and Operations 365 (FinOPs)	Finance
Maximo	Enterprise Asset Management
Akwire	Field Resource Scheduler
ESRI ArcGIS	Geospatial Information System
X-Info	Land & Planning Management
Microsoft Dynamics CRM	Customer Relationship Management
Axos	Billing

Table 15:Key Systems

Finance and Operations 365

The Financial Systems Strategy is to ensure that all financial solutions are fit for purpose and cost effective to maintain. This will allow us to leverage asset information without the systems becoming overly complex and costly. Finance and Operations 365 is a Microsoft product that provides integrated financial management and operational capabilities. FinOPs 365 was selected as the financial management system and implementation of this system occurred in FY2021

Enterprise Asset Management (EAM): Maximo

To meet organisational objectives, the focus on capturing accurate data at source and making information accessible to the business with tools that leverage value and improve performance is paramount to informing the right business decisions.

In line with the objective of optimising lifecycle asset management capability, the EAM and associated business processes have been designed to hold the planned maintenance schedule for each asset, according to the relevant engineering standard. It also captures transactional information against each asset record, including that gathered through inspection activities, maintenance activities and defects lists.

The format for transactional information entered into the EAM is defined by the engineering standards, including maintenance standards. Works management is enabled by deriving inspection and maintenance schedules from the information held in the EAM, in line with operational and engineering standards and supported by asset engineers. The EAM includes the functionality provided by a computerised maintenance management system.

Capturing field data regarding maintenance activities is carried out using both a paper system with data inputted by administrative staff, and an electronic based system comprising of tablet devices and associated software linking between tablets and the EAM.

The EAM includes four management modules in an enhanced service-oriented architecture. It allows the use of asset information to achieve customer and regulatory outcomes, increase operational efficiency and to identify opportunities for disciplined growth and improvements in cost efficiency. These modules are:

- Asset management
- Work management
- Service management
- Contract management

Geographical Information System (GIS)

The ESRI ArcGIS now holds both the distribution and transmission asset data. GIS is the master asset register for below ground pipeline assets and includes geospatial, technical, hierarchical, spatial, contextual, connectivity, CP and land management data. The locations of assets generated and recorded in the EAM are also recorded in GIS for cross referencing.

GIS provides a computerised mapping system, which shows the location of all assets against land-based data provided by Land Information New Zealand via CoreLogic. Its primary purposes are to provide pipeline information for the BeforeUDig service and to support Pipeline Integrity Management System (PIMS) and demand modelling systems.

A key piece of equipment used in the field to capture the location of assets is GPS receivers. GPS uses satellites to establish an accurate position and coordinates on the earth's surface and allows data to be captured about the asset loaded into the GIS.

Customer Relationship Management (CRM)

The CRM Systems Strategy ensures that all CRM solutions are used "as designed" with the minimal amount of customisation. Such solutions will allow Firstgas to better serve customers without the systems becoming overly complex and costly. It will enable interaction with customers effectively and efficiently to achieve customer and regulatory outcomes, increase operational efficiency and identify opportunities for improvements in cost efficiency.

Billing (Axos)

The Billing Systems Strategy ensures that the billing solution is

Training Manager

Training and competency recording is maintained in Maximo. This enables planning, budgeting and resourcing capability for internal and external courses. Industry and regulatory training is also able to be recorded and reported on. It allows for local configuration of set up so it can be customised to business requirements aligning with the organisational structure.

Data Quality Management

Asset data is largely captured and maintained through an as-building process. These activities are controlled by asset data standards, business rules, work instructions and the relevant provisions of any contractual agreements with service providers.

Asset data standards determine which assets are captured in the asset management information systems, the attributes of those assets recorded, and the transaction types required e.g. records of planned inspections, faults and defect data.

Data is gathered and uploaded in accordance with Firstgas standards and used in formulating maintenance plans or strategies on the basis of the information captured.

H.3.14 OTHER NON-NETWORK ASSETS

This includes all other Capex not encompassed within the direct network or ICT Capex. It comprises the following main expenditure types:

Offices and facilities: costs related to the relocation, refurbishment and development of office buildings and facilities.

Vehicles: includes investments that maintain the motor vehicle fleet.

Minor fixed assets: costs of ongoing replacement of office equipment including workstations, laptops, mobile phones and peripheral devices.

Offices and Facilities

The expenditure during the planning period mainly relates to the refurbishment of the New Plymouth offices. The main drivers are the improved productivity and effectiveness of a fit for purpose office. The current office is overdue for major refurbishments. Refurbishment costs are based on estimates of the likely 'fit-out' (e.g. interior partitioning and office furniture) costs.

Vehicles

Firstgas prefers to purchase its vehicle fleet as it makes better strategic sense to own a vehicle directly where certain towing abilities or specific plant equipment are required.

Minor Fixed Assets

All employees are provided with a standard workstation setup that includes a desk, chair, storage, PC and communication equipment. Minor fixed assets are classified as the following:

- Desktop and laptop hardware
- Monitors and screens
- Video conferencing equipment
- Other peripherals (e.g. printers and scanners)

Expenditure is driven by the need to provide staff with the tools necessary to carry out their roles efficiently and to leverage business improvements (such as new ICT systems) and increase staff mobility and collaboration.

H.3.14. NON-NETWORK CAPEX EXPENDITURE ALLOCATION METHODOLOGY

Non-network Capex is allocated between the transmission and distribution businesses based on factors such as size of asset base and staff headcount.

H.4.BUSINESS SUPPORT

People across the business play a central role in managing all Firstgas assets. Ensuring enough people with the right competencies is essential to achieve asset management objectives over the planning period.

H.4.1 BUSINESS SUPPORT EXPENDITURE

Firstgas directly employs about 282 people across the gas businesses (who also support the distribution assets). Many more field staff and engineers are employed through service providers. To support asset management teams, a number of corporate support functions exist. These include customer management, finance, and ICT. These functions either directly or indirectly support the distribution side of the business as set out in the examples below:

- **Finance:** financial management, management reporting and analysis and operations to support the business.
- **Human resources:** attracting and retaining capable and effective people, managing competency development and ensuring a positive working environment.
- **Health and safety:** leadership and coordination of safety across the company.
- **Legal and regulatory:** compliance with statutory requirements, including regulatory and environmental obligations.

This expenditure is largely driven by the human resource requirements. A large portion relates to direct staff costs. The other main elements are insurance, legal, audit and assurance fees (primarily to support regulatory compliance), office accommodation costs and travel costs.

Forecasts have been developed from the bottom up for each individual business unit by the executive manager responsible for that business unit. Each individual executive manager regularly assesses the resource requirements for their business unit/s.

- **Salaries and wages:** the majority of the costs are related to internal staff salaries and wages for permanent positions.
- **Staff costs:** the next major driver is staff costs which include training costs, travel, meals and accommodation, recruitment costs and mobile phones etc. These costs are driven by headcount and to some degree technology.
- **Professional and legal advice:** professional advice is sought for a wide range of purposes, including supplementing internal capabilities in legal, tax, internal audit, regulatory, and ICT teams with specialist skills and advice as required.

As a regional employer, it can be difficult to attract specialist professionals, particularly from overseas, who are less familiar with NZ locations. This means Firstgas needs to remain competitive with employee benefit packages.

These investments in people are essential to operate as an effective company and to ensure that the Firstgas workforce is appropriately skilled and qualified.

ICT Opex

ICT Opex covers ICT costs associated with operating the business. More specifically it covers software licensing, software support, data and hosting, and network running costs. These costs are driven from the need to support corporate and network operations with appropriate technology services. It is driven by the following factors.

- Increased technology capability requirements as a standalone business
- System complexity
- Increases in the number of staff and contractors
- Software audit requirements from vendors are met ensuring compliance with vendor End User Licensing Agreements
- Ensures access to appropriate levels of software support from vendors and access to bug fixes and maintenance packs
- Lifecycle stage of IT assets and data needs of the business
- SaaS – Software as a service costs

The software industry as a whole is moving to subscription 'pay-as-you-go' models due to cloud-delivered software and technologies.

Forecasts are based on the most accurate information obtainable from suppliers and service providers and is based on the current technologies available and required scale to meet Firstgas' needs.

H.4.2 BUSINESS SUPPORT EXPENDITURE OVER THE PLANNING PERIOD

The Business Support Opex forecast includes expenditure related to the functions that support the gas transmission business. It includes indirect staff costs and associated expenses advice. The other material elements are office accommodation costs, legal and insurance costs.

A portion of the Business Support Opex is allocated to the gas distribution business in accordance with the cost allocation policy.

H.4.3 BUSINESS SUPPORT ALLOCATION METHODOLOGY

The allocation of Business Support costs to the transmission and distribution businesses is based on a combination of the following factors:

The firstis applied to expenditure that has a relationship with the assets (such as ICT systems) and is an allocation on a proportion of RAB basis.

The second is related more to supporting the people in the business (such as building costs) and is proportioned on the basis of the relative headcount working in each particular business.

The third allocation applies to other or miscellaneous spend and is an average of the first two methodologies.

H.5 PERFORMANCE MEASURES

This section describes the Firstgas performance targets. A key premise for the AMP is that existing reliability and supply quality levels will be maintained and improved.

The targets specified below are applicable for each year of the AMP planning period. Where appropriate the targets have been developed to align with the definitions developed by the Commerce Commission for Information Disclosure.

Field Service Providers undertake data capture activities in accordance with the Gas Distribution Network Reliability, Integrity and Consumer Service standard. Through collation of this data into the Engineering Asset Management and Customer Management systems, integrity and reliability measures are provided for disclosure reporting purposes. Reportable measures in addition to those described below include:

- Number of telephone calls to emergency numbers answered within 30 seconds
- Average call response time
- Number of reported emergencies
- Response time to all emergencies (service level within 60 minutes), (Commerce Commission requirement within 180 minutes)
- SAIDI/SAIFI

H.5.1 SAFETY

Firstgas routinely monitor HSE performance (internally and externally) and the HSE performance of core contractors. In addition, a strong reporting culture exists and all incidents are reviewed weekly to ensure the appropriate level of investigation and that incident owners are assigned.

Historical performance targets have been met, however Firstgas continues to increase its focus on critical risks, particularly those that can result in serious injury or fatality. Safety initiatives include the following:

- **Collaboration:** Firstgas works collaboratively with all partner service providers. For example, step changes are made on works planning to produce plans earlier and improve their stability. This creates an environment where staff and service providers can operate more safely. Firstgas are also working with service providers to develop better policies, work practices and reporting disciplines.

Asset management framework: is being used to drive safe outcomes. Safety in Design principles have been implemented and applied these across concept to design, construction contracting and management and disposal of assets. All workers are trained in these principles.

Communications: Firstgas are supporting health and safety committees to initiate meaningful projects, allocating resources to regularly communicate to workers, and setting up reward programmes to recognise individuals' behaviour.

Safety systems: providing service specifications and policies to service providers ensures best practice understanding, reviewing work management policies and providing an improved and transparent public safety management system.

Note: there is no historical data available for safety statistics on the distribution network.

Safty Target	
Lost Time Injury Frequency Rate:	0

H.5.2. SECURITY AND RELIABILITY: RESPONSE TIME TO EMERGENCIES (RTE)

Firstgas takes the safety of the public and its work force very seriously and aims to attend to emergencies occurring on the distribution system as soon as practical to prevent any damage or harm to the public, employees, contractors and neighbouring properties.

Table 16: RTE - historical performance

	FY2020	FY2021	FY2022
Proportion of RTE within one hour	88%	90%	89.86%
Proportion of RTE within three hours	100%	100%	100%

RTE within one hour has varied between 80% and 94% historically. Firstgas will endeavour to maintain RTE within the upper half of this band over time. RTE target and definitions are aligned to the quality standard specified in the DPP4.

RTE Target

Proportion of RTE within one hour:	80%
Proportion of RTE within three hours:	100%

H.5.3 SECURITY AND RELIABILITY: CUSTOMER COMPLAINTS

Although Firstgas seek to provide a high standard of service and a safe and reliable gas supply, there may be times when customers have concerns with their service.

Table 17:Complaints per customer - historical

	FY2020	FY2021	FY2022
Number of Complaints per Customer	0.0001	0.0003	0.000359

Historically, there has been a move to a relatively low number of complaints. Firstgas endeavours to maintain the level reached as the customer management systems are stabilised.

COMPLAINTS TARGET
Number of complaints per customer is less than: 0.0005

H.5.4 SAFETY AND RELIABILITY: OUTAGE TIMEFRAMES

System Average Interruption Duration Index (SAIDI) measures the total time, on average, that a customer could expect to be without gas over the reporting period. It is a measure of interruptions, including third party damage and excludes interruptions directly resulting from interruptions on the transmission system. It is calculated by dividing the product of the number of interrupted customers and the duration of the interruption (in minutes), by the total number of customers connected to the network and further dividing by 1,000.

Table 18v:SAIDI - historical performance

	FY2020	FY2021	FY2022
SAIDI (minutes per 1000 customers)	1054.78	1426.0	3583.99

The significant increase in the FY2022 SAIDI metric was the result of a single third-party event on Kawerau in November 2021. A gas main was damaged due to a contractor drilling.

Outage Timeframe Target

SAIDI (minutes per 1,000 customers): 1,300

H.5.5 SAFETY AND RELIABILITY: OUTAGE FREQUENCY

System Average Interruption Frequency Index (SAIFI) measures the average number of interruptions that a customer could expect over the reporting period, including those due to third party damage, but excluding those directly resulting from interruptions of the transmission system. SAIFI is calculated by dividing the total number of interruptions on the network in the relevant year by the total number of customers connected to the network and further dividing by 1,000.

Table 19: SAIFI - historical performance

	FY2020	FY2021	FY2022
SAIFI (interruptions per 1000 customers)	10.03	8.4	9.001

Firstgas intends to hold the challenging target to drive focus on reliability. However, it is also expected continue to see an elevated level due to the ongoing pre-1985 PE pipe replacement programme. Continued efforts to educate developers and contractors on the need to check the area before they commence works and dig will not stop. Firstgas are also members of the "before u dig" service and will actively promote its use and provide industry leadership in promoting the service to all industry stakeholders.

Outage Frequency Target

SAIFI (interruptions per 1,000 customers): 5.9

H.5.6 SAFETY AND RELIABILITY: OUTAGE DURATION

Customer Average Interruption Duration Index (CAIDI) measures the average outage duration of an interruption of supply per customer who experienced an interruption in the reporting period. CAIDI is the sum of the duration of each (excluding transmission) interruption, divided by the total number of (excluding transmission) interruptions.

Table 20: CAIDI - historical performance

	FY2020	FY2021	FY2022
CAIDI (minutes per interruption)	105.15	168.96	398.19

The significant increase in the FY2022 CAIDI metric was the result of a single third-party event on Kawerau in November 2021. A gas main was damaged due to a contractor drilling.

Customer Outage Duration Target

CAIDI (minutes per interruption): 152

H.5.7 SAFETY AND RELIABILITY:

PUBLICLY REPORTED GAS ESCAPES (PRE)

Public Reported Escapes (PRE) are used as the primary technical network service quality measure for operational purposes. It is a critical safety measure and a reliable indicator of the condition of the network. This measure is impacted by a number of factors, including the effectiveness of renewal strategies, the condition and composition of assets, the level of odorant added (which increases the likelihood of PREs), and the extent and effectiveness of leakage surveys.

PRE is calculated by dividing the total number of confirmed public reported escapes of gas on the network (including mains, service pipes, valves, and pressure stations) in the relevant year by the total length of network (mains and services) and further dividing by 1,000.

Table 21: PRE - historical performance

	FY2020	FY2021	FY2022
PRE events per 1000km	30	30	27.9

Historically the performance against this KPI has been good ranging between 52 and the most recent FY2022 result. The existing historical target will be maintained.

PUBLICLY REPORTED ESCAPES TARGET

Public reported escapes (events per 1,000km): 53

H.5.8 SAFETY AND RELIABILITY: LEAKAGE SURVEYS

Leakage surveys are a proactive maintenance strategy that attempts to locate gas leaks in the network. Leaks detected by system surveys are a clear indicator of the condition of the network and the effectiveness of maintenance strategies. Renewal strategies play an important role in improving the condition of the gas distribution network and reducing the number of leaks. Different parts of its network are surveyed every year, taking five years to complete an entire network survey. Therefore it is not meaningful to compare leak data on a yearly basis; a five-year rolling average is applied to any analysis of overall network condition.

Leak survey is calculated by adding up the number of leaks detected by routine survey and dividing this number into the total length of pipeline and further multiplying by 1,000.

Table 22: Leakage Surveys - historical performance

	FY2020	FY2021	FY2022
Leakage surveys (events per 1000km)	10	11	5.8

The leakage survey frequency has been increased to 2 yearly cycles (previously 5 yearly) to improve proactive monitoring in terms of identifying any developing trends and issues around the condition of the network. Firstgas uses a Street Evaluating Laser Methane Assessment (SELMA) that is mounted on vehicle has been used in leak detection survey. This system is sensitive in detecting gas leaks.

LEAKAGE SURVEY EVENTS TARGET

Leakage Surveys (events per 1,000km): 1.4

H.5.9 SAFETY AND RELIABILITY: POOR PRESSURE

Poor pressure due to network issues that cause unplanned incidents where delivery pressure drops below contracted delivery requirements. These events can be reported through customers or from Firstgas monitoring equipment.

Table 23: Poor Pressure - historical performance

	FY2020	FY2022	FY2023
Poor pressure due to network causes	8	8	18

Historical performance of poor pressure has not yet reduced target levels due to the large number of older type riser valves still in operation that are prone to seizing and gas escapes and therefore these target levels will remain.

POOR PRESSURE EVENTS TARGET

Poor pressure due to network causes: 3

H.5.10 SAFETY AND RELIABILITY: ODORISATION

The purpose of this measure is to ensure the odorant levels of gas conveyed through the gas networks are maintained in accordance with the requirements of the Gas Regulations 1993 and the New Zealand standard NZS 5263 Gas Detection and Odorisation.

Monitoring the number of non-compliant odour tests enables the level of odour in the gas to be monitored and identify if corrective action is required. A non-compliant odour test means the odour test result is above 0.9% gas-in-air or where the odorant concentration test result is less than 3 mg/m3.

Table 24:Non-compliant Odour Tests - historical performance

NON-COMPLIANT ODOUR TESTS TARGET

Number of non-compliant odour tests: 3

H.5.11 SAFETY AND RELIABILITY: THIRD PARTY DAMAGE

Third party damage events to networks are a significant cause of gas escapes and customer supply interruptions. The levels of third-party interference damage provide some indication of the network operator's level of success in communicating awareness to those who control and/or are directly engaged in any activities that put gas networks at risk.

Table 25: Third party damage - historical performance

	FY2020	FY2021	FY2022
Third party damage (events per 1,000km)	32	38	34.7

Historical performance has consistently met target and this level of target will remain.

THIRD PARTY DAMAGE EVENTS

Third party damage (events per 1,000km): 67

H.6 ASSET MANAGEMENT MATURITY ASSESSMENT TOOL (AMMAT):

Firstgas has conducted assessments using the Asset Management Maturity Assessment Tool as per the information disclosure requirements in schedule 13, the self-assessment is included in appendix B. Although the Schedule 13 AMMAT is not prescriptive in the use of which standard is used to conduct the self-assessment, it does reference PAS55 standard, which has been superseded by the ISO55000 suite of standards.

In addition to the self-assessment, Firstgas engaged Assetivity an external ISO55001 accredited organisation to conduct a gap assessment of the asset management practices evaluating alignment with ISO55001:2014 asset management standard.

Firstgas intends to use the outcome of this external body evaluation to develop an improvement plan to ensure that it is fully compliant and ultimately achieve accreditation with ISO55001:2014 International standard.

H.6.1 ASSESSMENT APPROACH

Assetivity applied the IAM self-assessment methodology tool to evaluate Firstgas Group's alignment with the requirements of ISO55001 and to identify areas for improvement. Staff were interviewed and key documents were reviewed to assess the maturity against the elements of ISO55001 as follows.

- **Management System and Context -** The assessment checks for an understanding of context and alignment with the business objectives; consistent decision-making criteria and a clear scope for the management system
- **Leadership –** The assessment covers the level of leadership commitment towards asset management and publication and implementation of an Asset Management Policy and strategy. It also assesses if roles and responsibilities are clearly defined.
- **Planning -** The assessment covers the existence of plans for its asset portfolio, how these align with the organisation's goals and objectives, and how these plans are developed.
- **Support elements –** The assessment evaluates the capability and capacity of supporting elements including resources, competence, communication, information and documentation.
- **Operational Control –** The processes for managing and controlling operations and maintenance activities are evaluated, as well as the process for managing technical change and for managing outsourced activities.
- **Performance Evaluation –** The systems for monitoring and evaluation performance and conformance with asset management system requirements are assessed.
- **Improvement –** The readiness assessment reviews the organisations processes for dealing with non-conformity, preventative actions and continual improvement of its perfromance and its asset management systems.

H.6.2 REPORT OUTCOME

The table below presents the maturity scale which First gas was measured against, a maturity score of 3 is required in all elements to achieve compliance with the standards.

Scale	Description	Definition
0	Innocent	The organisation has not recognised the need for this requirement and/or there is no evidence of commitment to put it in place.
1	Aware	The organisation has identified the need for this requirement, and there is evidence of intent to progress it.
2	Developing	The organisation has identified the means of systematically and consistently achieving the requirement and can demonstrate that these are being progressed with credible and resourced plans in place.
3	Competent	The organisation can demonstrate that is systematically and consistently achieves relevant requirements set out in *ISO55001*
4	Optimising	The organisation can demonstrate that it is systematically and consistently optimising its asset management practice, in-line with the organisation's objectives and operating context.
≠5	Excellent	The organisation can demonstrate that it employs the leading practices and achieves maximum value from the management of its assets, in line with the organisation's objectives and operating context.

The results presented below show that the Firstgas results fall in the range between Developing and competent.

Table showing the ISO 55001:2014 Clauses and the Rating assigned by Assetivity

Rating		AMMAT Score																											
Excellent	5																												
Optimising	4																												
Competent	3			3.00					3.00	3.00	3.00					3.00		3.00	3.00			3.00	3.00	3.50	3.00	3.00	3.00		
Developing	2	2.50	2.70		2.71	2.60	2.00	3.00	2.58				2.50	2.36	2.14	2.67		2.33			2.50	2.00							
Aware	1																												
Innocent	0																												
Clause		4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2.1	6.2.2	7.1	7.2	7.3	7.4	7.5	7.6.1	7.6.2	7.6.3	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3		

H.6.3 CONTEXT OF THE ORGANISATION

ISO55001 - Sections 4.1, 4.2, 4.3 & 4.4

The AMMAT report indicates that Firstgas are not fully compliant for 3 of the 4 sections. The main recommendation is to form an Asset Management Steering Committee to review the performance of the processes and implement a coordinated performance development process.

H.6.4 LEADERSHIP

ISO55001 - Sections 5.1, 5.2 & 5.3

Whilst Firstgas didn't fully meet the requirement for a Competent rating for two of the three sections. The other areas can be easily addressed with the formation of the AM Steering Committee

H.6.5 PLANNING

ISO55001 - Sections 6.1 & 6.2
The section heading is Planning, section 6.1 covers the risks and opportunities that can be addressed. Therefore, this is an area that will require effort to ensure that sufficient processes and practices are in place to support the documentation. Section 6.2 is concerned with AM objectives and planning, whereas competency was achieved but with a few 'opportunities for improvement' identified.

H.6.6 SUPPORT

ISO55001 - Sections 7.1,7.2,7.3,7.4,7.5 & 7.6
This section covers a wide range of areas across the business and is one of the main areas identified as 'Developing' and therefore requires the most work to bring us up to a competent level. Therefore, this is the section where the most improvement can be achieved.

H.6.7 OPERATION

ISO55001 - Sections 8.1, 8.2 & 8.3
Competency with the document control section was achieved but further improvement opportunities identified. These recommendations are in relation to the Management of Change and Outsourcing activities.

H.6.8 PERFORMANCE EVALUATION

ISO55001 - Sections 9.1, 9.2 & 9.3
Although competent with these sections there are several 'opportunities for improvement'.

H.6.9 IMPROVEMENT

ISO55001 - Sections 10.1, 10.2 & 10.3
Competency with all these sections was achieved with a recommendation that a process for managing non-conformities associated to the Asset Management System is implemented and systems are put in place for internal audits and management review processes involved.

H.6.10 SUMMARY

In order to achieve full alignment with ISO55001:2014, the report has made 19 recommendations and 23 opportunities for improvements. These have been developed into a road map to achieve full compliance. The following steps have been recommended:

- **Step 1** Improve Internal Stakeholder Communication
- **Step 2** Review Asset Management System Performance
- **Step 3** Review Asset Management Information capture and management.
- **Step 4** Ensure contractor management is holistic.
- **Step 5** Ensure competence management accounts for asset management competence
- **Step 6** Review stores and inventory management processes and impact on asset management system risk.
- **Step 7** Consider a combined business Strategic Asset Management Plan

Over the course of the next 12 to 18 months it is intended to work through the recommendations and improvements to prepare for accreditation with ISO55001.

Appendix I

LOAD FORECASTS

This appendix sets out the projected annual and total growth rates at each of our existing gate stations, as are applied in our network models. Load is provided in scmh.

Region	Network system	Gate station / Network system	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Annual Growth	Total growth
Bay of Plenty	Edgecumbe	Edgecumbe MP4 Pressure System	27	27	27	27	27	27	27	27	27	27	27	0%	0%
Bay of Plenty	Edgecumbe	Edgecumbe IP20 Pressure System	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	0%	0%
Bay of Plenty	Edgecumbe	Edgecumbe Gate Station (non-co-incident)	6,151	6,151	6,151	6,151	6,151	6,151	6,151	6,151	6,151	6,151	6,142	0%	0%
Bay of Plenty	Edgecumbe	Edgecumbe Gate Station (co-incident)	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	6,124	0%	0%
Bay of Plenty	Kawerau	Kawerau Network System (excl. loads of ex-Caxton & ex-Tasman)	122	122	122	122	122	122	122	122	122	122	122	0%	0%
Bay of Plenty	Kawerau	Kawerau (ex-Caxton) (20TJ site in IP network)	869	869	869	869	869	869	869	869	869	869	869	0%	0%
Bay of Plenty	Kawerau	Kawerau (ex-Tasman) (20TJ site in IP network)	2,235	2,235	2,235	2,235	2,235	2,235	2,235	2,235	2,235	2,235	2,235	0%	0%
Bay of Plenty	Kawerau	Kawerau Gate Station (non-co-incident)	3,324	3,324	3,324	3,324	3,324	3,324	3,324	3,324	3,324	3,324	3,324	0%	0%
Bay of Plenty	Kawerau	Kawerau Gate Station (co-incident)	2,988	2,988	2,988	2,988	2,988	2,988	2,988	2,988	2,988	2,988	2,988	0%	0%
Bay of Plenty	Mt Maunganui	Mt Maunganui Gate Station	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	0%	0%
Bay of Plenty	Mt Maunganui	Papamoa Gate Station	634	634	634	634	634	634	634	634	634	634	634	0%	0%
Bay of Plenty	Mt Maunganui	Papamoa No.2 Gate Station	661	661	661	661	661	661	661	661	661	661	661	0%	0%
Bay of Plenty	Mt Maunganui	Mt Maunganui Network System (non co-incident)	4,483	4,483	4,483	4,483	4,483	4,483	4,483	4,483	4,483	4,483	4,483	0%	0%
Bay of Plenty	Mt Maunganui	Mt Maunganui Network System (co-incident)	4,152	4,152	4,152	4,152	4,152	4,152	4,152	4,152	4,152	4,152	4,152	0%	0%
Bay of Plenty	Mt Maunganui	Papamoa Gate Station	1,086	1,097	1,108	1,119	1,130	1,141	1,152	1,163	1,174	1,185	1,196	1%	10%
Bay of Plenty	Opotiki	Opotiki Gate Station	217	217	217	217	217	217	217	217	217	217	217	0%	0%
Bay of Plenty	Tauranga	Tauranga Station	2,167	2,167	2,167	2,167	2,167	2,167	2,167	2,167	2,167	2,167	2,167	0%	0%
Bay of Plenty	Tauranga	Pyes Pa Station	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	1,272	0%	0%
Bay of Plenty	Tauranga	Tauranga Network System (non co-incident)	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	0%	0%
Bay of Plenty	Tauranga	Tauranga Network System (co-incident)	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	0%	0%
Bay of Plenty	Tauriko	Taurkio	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150	0%	0%
Bay of Plenty	Te Puke	Te Puke Gate Station	667	667	667	667	667	667	667	667	667	667	667	0%	0%
Bay of Plenty	Te Teko	Te Teko Gate Station	-	-	-	-	-	-	-	-	-	-	-		
Bay of Plenty	Whakatane	Whakatane Gate Station	678	678	678	678	678	678	678	678	678	678	678	0%	0%
Central Plateau	Rotorua	Rotorua Gate Station	3,525	3,525	3,525	3,525	3,525	3,525	3,525	3,525	3,525	3,525	3,525	0%	0%
Central Plateau	Taupo	Taupo Gate Station	1,353	1,353	1,353	1,353	1,353	1,353	1,353	1,353	1,353	1,353	1,353	0%	0%
Central Plateau	Kinleith	Kinleith Gate Station	287	287	287	287	287	287	287	287	287	287	287	0%	0%
Central Plateau	Okoroire Springs	Okoroire Springs Gate Station	-	-	-	-	-	-	-	-	-	-	-	0%	0%
Central Plateau	Putaruru	Putaruru Gate Station	481	481	481	481	481	481	481	481	481	481	481	0%	0%
Central Plateau	Tirau	Tirau Gate Station	60	60	60	60	60	60	60	60	60	60	60	0%	0%
Central Plateau	Tokoroa	Tokoroa Gate Station	1,622	1,622	1,622	1,622	1,622	1,622	1,622	1,622	1,622	1,622	1,622	0%	0%
Central Plateau	Reporoa	Reporoa Gate Station	2,652	2,652	2,652	2,652	2,652	2,652	2,652	2,652	2,652	2,652	2,652	0%	0%
Gisborne	Gisborne	Gisborne Gate Station	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144	3,144	0%	0%
Kapiti	Kuku	Kuku Gate Station	-	-	-	-	-	-	-	-	-	-	-		
Kapiti	Otaki	Otaki Gate Station	241	241	241	241	241	241	241	241	241	241	241	0%	0%
Kapiti	Paraparaumu	Paraparaumu Gate Station	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	1,154	0%	0%
Kapiti	Te Horo	Te Horo Gate Station	-	-	-	-	-	-	-	-	-	-	-	0%	0%
Kapiti	Waikanae	Waikanae Gate Station	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	0%	0%
Northland	Marsden Point	Marsden 2 Point Gate Station	218	218	218	218	218	218	218	218	218	218	218	0%	0%
Northland	Whangarei	Whangarei Gate Station	1,063	1,063	1,063	1,063	1,063	1,063	1,063	1,063	1,063	1,063	1,063	0%	0%
Waikato	Cambridge	Cambridge Network System (excl. load of Hautapu DF)	1,158	1,158	1,158	1,158	1,158	1,158	1,158	1,158	1,158	1,158	1,158	0%	0%
Waikato	Cambridge	Cambridge (Hautapu DF)	2,209	2,209	2,209	2,209	2,209	2,209	2,209	2,209	2,209	2,209	2,209	0%	0%
Waikato	Cambridge	Cambridge Gate Station (non co-incident)	3,368	3,368	3,368	3,368	3,368	3,368	3,368	3,368	3,368	3,368	3,368	0%	0%
Waikato	Cambridge	Cambridge Gate Station (co-incident)	3,148	3,148	3,148	3,148	3,148	3,148	3,148	3,148	3,148	3,148	3,148	0%	0%
Waikato	Hamilton	Hamilton - Te Kowhai Gate Station	5,722	5,722	5,722	5,722	5,722	5,722	5,722	5,722	5,722	5,722	5,722	0%	0%
Waikato	Hamilton	Hamilton - Temple View Gate Station	10,107	10,107	10,107	10,107	10,107	10,107	10,107	10,107	10,107	10,107	10,107	0%	0%
Waikato	Hamilton	Hamilton Network System (non co-incident)	15,221	15,221	15,221	15,221	15,221	15,221	15,221	15,221	15,221	15,221	15,221	0%	0%
Waikato	Hamilton	Hamilton Network System (co-incident)	15,204	15,204	15,204	15,204	15,204	15,204	15,204	15,204	15,204	15,204	15,204	0%	0%
Waikato	Horotiu	Horotiu Gate Station	2,149	2,149	2,149	2,149	2,149	2,149	2,149	2,149	2,149	2,149	2,149	0%	0%
Waikato	Huntly	Huntly Gate Station	334	334	334	334	334	334	334	334	334	334	334	0%	0%
Waikato	Kiwitahi	Kiwitahi Gate Station	211	211	211	211	211	211	211	211	211	211	211	0%	0%

Waikato	Matangi	Matangi Gate Station	18	18	18	18	18	18	18	18	18	18	18	0%	0%
Waikato	Morrinsville	Morrinsville Gate Station	456	456	456	456	456	456	456	456	456	456	456	0%	0%
Waikato	Ngaruawahia	Ngaruawahia Gate Station	80	80	80	80	80	80	80	80	80	80	80	0%	0%
Waikato	Otorohanga	Otorohanga Gate Station	150	150	150	150	150	150	150	150	150	150	150	0%	0%
Waikato	Pirongia	Pirongia Gate Station	26	26	26	26	26	26	26	26	26	26	26	0%	0%
Waikato	Te Awamutu	Te Awamutu North - No.2 Gate Station	505	505	505	505	505	505	505	505	505	505	505	0%	0%
Waikato	Te Awamutu	Kihikihi Gate Station	880	880	880	880	880	880	880	880	880	880	880	0%	0%
Waikato	Te Awamutu	Te Awamutu Network System (non co-incident)	1,278	1,278	1,278	1,278	1,278	1,278	1,278	1,278	1,278	1,278	1,278	0%	0%
Waikato	Te Awamutu	Te Awamutu Network System (co-incident)	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	0%	0%
Waikato	Te Rapa	Te Rapa (Inactive distribution network)	15,864	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	-3%	-26%
Waikato	Waikeria	Waikeria Gate Station	184	675	675	675	675	675	675	675	675	675	675	14%	266%
Waikato	Waitoa	Waitoa Gate Station	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	0%	0%

J. EXPENDITURE OVERVIEW

This appendix provides a summary of Firstgas Group Limited's forecast expenditure on the gas distribution network over the planning period. It is structured to align with the expenditure categories and with information provided throughout the AMP.

The forecasts presented here provide a consolidated view of the proposed expenditure. It provides further commentary and context on planned investments including key assumptions used in developing the forecasts.

The discussion focuses on providing high-level commentary and context for the forecasts. Each section includes cross-references to the appendix with more detailed information. To avoid duplication, discussions in previous Appendices have not been repeated.

Note on Expenditure Charts and Tables

The charts in this Appendix depict budgeted expenditure for FY2023 and forecasts for the remainder of the period.

Expenditure is presented according to internal categories. It is also provided in Information Disclosure categories in Schedules 11a and 11b, in **Appendix B**.

All expenditure figures are denominated in constant value terms using FY2023 New Zealand dollars.

J.1. INPUTS AND ASSUMPTIONS

This section describes the inputs and assumptions used to forecast Capex and Opex over the planning period.

J.1.1. FORECASTING INPUTS AND ASSUMPTIONS

The forecasts rely on several inputs and assumptions. These include:

- Escalation to nominal dollars
- Capital contributions
- Finance during construction

Escalation

Forecasts in this section are in constant value terms. In preparing Schedules 11a and 11b Firstgas have escalated real forecasts to produce nominal forecasts for Information Disclosure.

While Firstgas expect to face a range of input price pressures over the planning period, the escalation approach has been based on the consumer price index (CPI) to align forecast inflation with the initial 'exposure' financial model for the gas DPP. Therefore, for the purposes of this AMP, assumed changes are limited to CPI rather than adopting more specific indices or modelling trends in network components or commodity indices. Similarly, Firstgas have not sought to reflect trends in the labour market.

Table 29: Predicted CPI used

For Year Ended	CPI
FY2023	6.2%
FY2024	2.7%
FY2025	2.1%
FY2026	2.0%
FY2027	2.0%
FY2028	2.0%
FY2029	2.0%
FY2030	2.0%
FY2031	2.0%
FY2032	2.0%
FY2033	2.0%

Capital contributions

Customer connections and asset relocations expenditure included in the body of the AMP are gross amounts i.e. capital contributions have not been netted out from the forecast. Details of expected capital contributions can be found in Schedule 11a in **Appendix B.**

Finance During Construction (FDC)

Capex forecasts exclude FDC (or cost of financing) and a forecast of FDC based on expected commissioning dates in Schedule 11a in **Appendix B** have been included.

J.2. Expenditure summary

This section summarises the total Capex and Opex forecasts for the planning period.

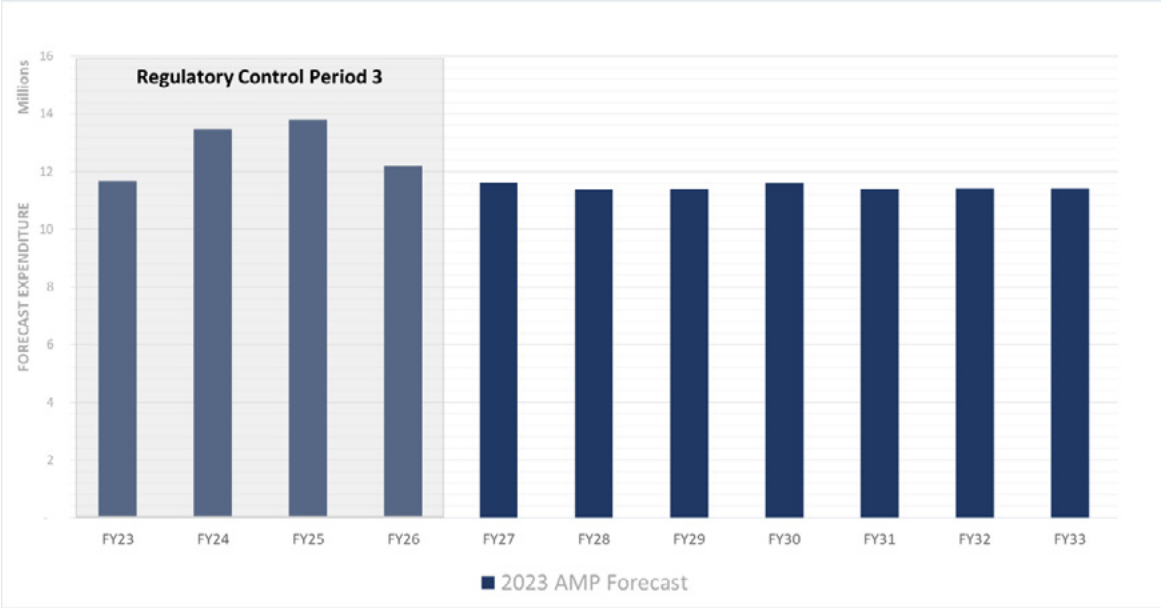
J.2.1. Total Capex

Total Capex includes expenditure in the following categories:

- System development Capex: discussed in **Appendix F**
- Lifecycle management Capex: discussed in **Appendix H**
- Investment in non-network assets: discussed in **Appendix H**

The total forecast Capex for the planning period is shown in the Figure 42 below.

Figure 42: Total Capex during the planning period



The Capex profile reflects the underlying network needs discussed in this AMP. Key drivers for the expenditure trend include:

Network growth: The reinforcement projects for the last 2 – 3 years on most of the heavy utilised networks noticeably improved the quality of supply and flow capacity. Trending from demand forecasts indicates that the demand through the planning period is not anticipated to increase. However, where there is an opportunity to expand the network to facilitate growth of the network, these will be evaluated on an individual basis.

Customer connections: is the main driver for expenditure across the period, with a continued focus on connecting customers to the Distribution business. Adjustments to forecast costs to reflect the true cost of connection activity going forward. **Renewals:** expenditure during FY2023- FY2026 is driven by 3 main asset areas.

- Continuation of the Pre-85 replacement programme
- Replacement of Cello network monitoring equipment
- Programme to improve the condition of bridge special crossings.
- These are discussed further in **Appendix H.**
- **Non-network**: expenditure in FY2023 includes a portion of total expenditure on IT systems and building refurbishment costs. These are discussed further in **Appendix H.**

Table 30 sets out the expenditure per year. These are consistent with our Schedule 11a disclosure included in **Appendix B**.

Table 30: Total Capex during the planning period ($000 in real 2023)

YEAR	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	11,666	13,475	13,805	12,193	11,606	11,383	11,384	11,585	11,387	11,413	11,415

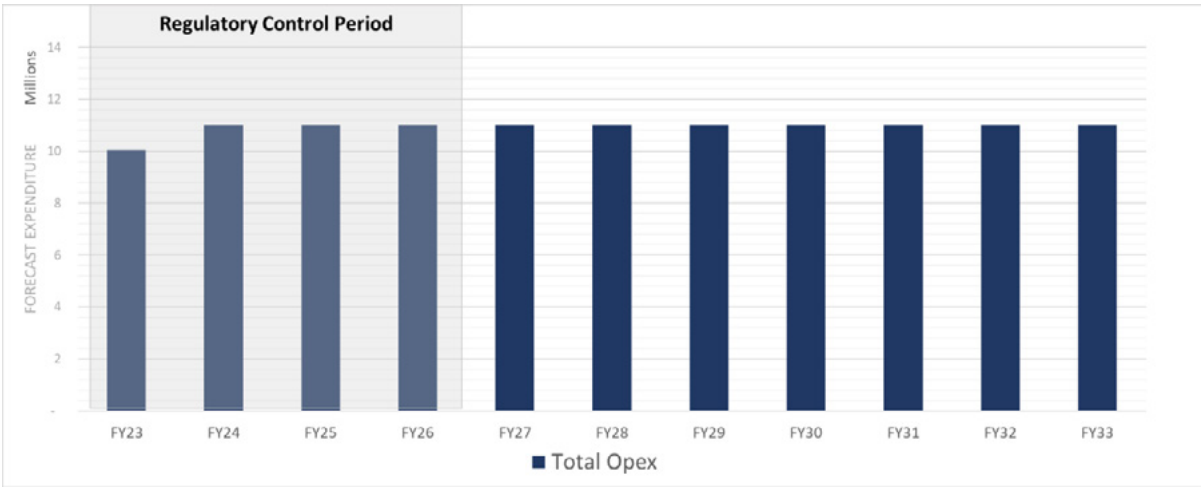
J.2.2. TOTAL OPEX

The Opex forecast includes expenditure relating to the following activity categories discussed in Appendix H:

- Maintenance related expenditure
- System operations and network support
- Business support activities
    -

The total Opex forecast for the planning period is shown in Figure 43 below.

Figure 43: Total Opex during the planning period



The increase in costs from those detailed in the previous AMP relate to:

- Higher premiums following the latest annual insurance renewal process.
- Increased communication and data line charges, as core IS systems are moved to cloud data centres.
- A lift in marketing programmes to drive new customer connections.
- Costs associated with strategic R&D programmes.

Several activities will require increased expenditure to ensure asset management objectives are met. However, opportunities for operational efficiencies will continue to be identified to fund these activities without increasing overall spend.

Table 31 sets out the expenditure per year. These are consistent with Schedule 11b disclosure included in **Appendix B**.

Table 31: Total Opex during the planning period ($000 in real 2023)

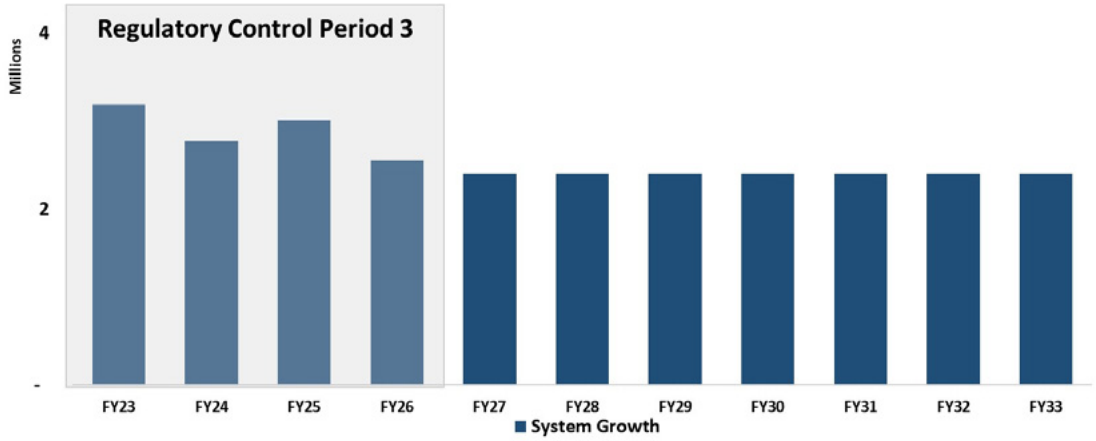
Table 31: Total Opex during the planning period ($000 in real 2023)

YEAR	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
OPEX	10,048	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996	10,996

J.3. NETWORK GROWTH CAPEX

This section summarises forecast asset investments to address expected network growth. The Capex forecast for the planning period is shown in Figure 44 below.

Figure 44: Network Growth Capex during the Planning Period



The reinforcement projects for the last 2–3 years on most of the heavy utilised networks has noticeably improved the quality of supply and flow capacity. This means these networks (e.g. Cambridge IP20, Waitoa MP4, Paraparaumu IP20) are no longer heavily utilised and reinforcement works are not currently required.

System reinforcement options are currently being assessed and planned under Engineering, which led to some reduction and reshaping of planned reinforcement projects for the remainder of the regulatory period.

Table 32 sets out the expenditure per year. These are consistent with Schedule 11a disclosures included in **Appendix B**.

Table 32: Network Growth Capex during the Planning Period ($000 in real 2023)

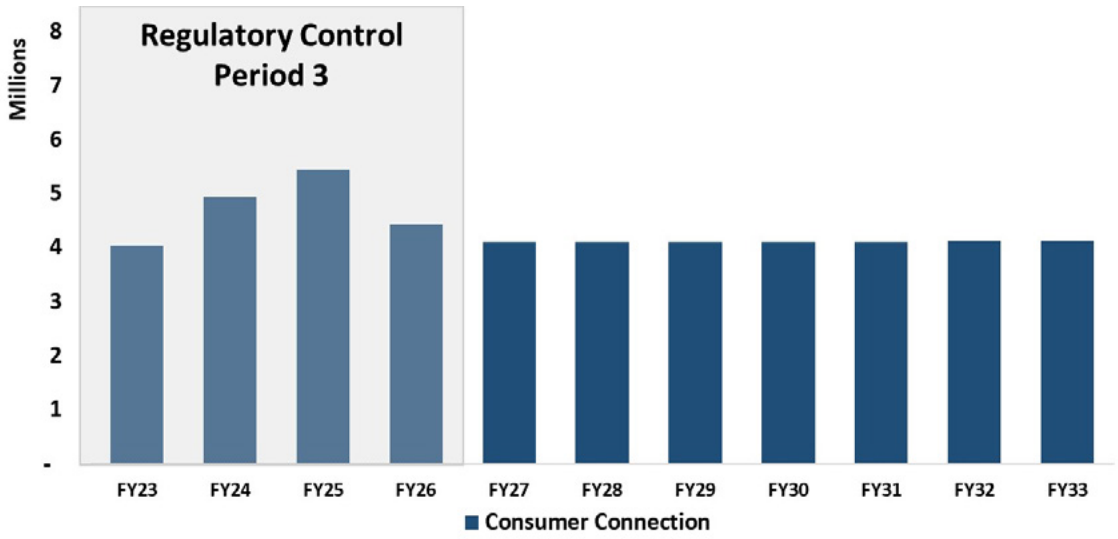
YEAR	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	3,190	2,780	3,017	2,558	2,405	2,405	2,405	2,405	2,405	2,405	2,405

J.4. CUSTOMER CONNECTIONS CAPEX

This section summarises expected investments to enable customer connections. Further detail on this expenditure is provided in **Appendix F**.

Figure 45: Gross Customer Connection Capex during the planning period

Figure 45: Gross Customer Connection Capex during the planning period



Consistent with historical trends and the ICP connection forecast, an increasing trend of customer connections for Capex over the period is being forecast.

Table 33 sets out the net expenditure by year. These are consistent with Schedule 11a disclosure included in **Appendix B**.

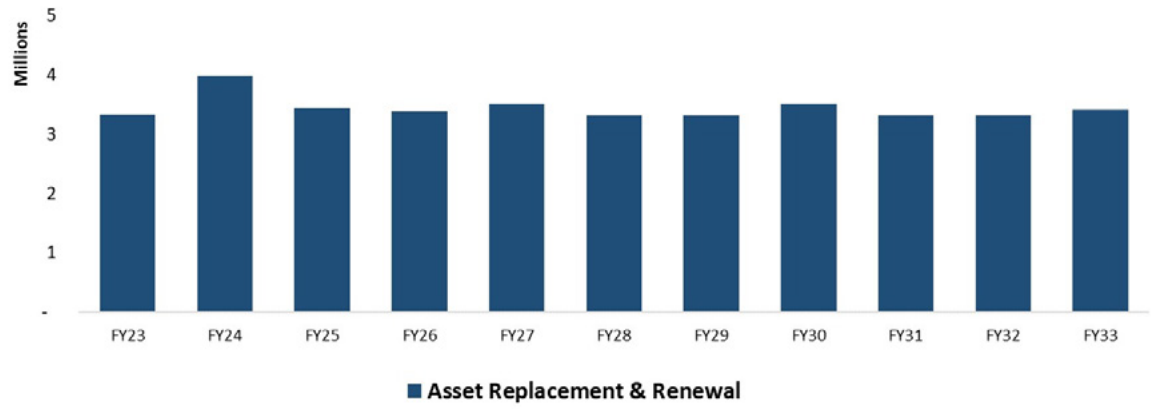
Table 33: Net Customer Connection Capex during the Planning Period ($000 in real 2023)

Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	4,040	4,936	5,463	4,443	4,104	4,104	4,104	4,104	4,104	4,129	4,129

J.5. Asset Replacement and Renewal Capex

This section summarises expected investments to replace and renew asset fleets. Detail on the included work and associated drivers is provided in **Appendix H**.

Figure 46: Replacement and Renewal Capex during the Planning Period



Replacement Capex includes replacing assets with like-for-like or new modern equivalents. Renewal Capex is an expenditure that extends an asset's useful life or increases its functionality. These investments are generally managed as a series of programmes focused on a particular asset fleet.

As discussed in the AMP Summary and **Appendix E**, one of the key drivers for ARR on the distribution network will be the on-going replacement programme of PE pipe, focusing on pipe installed prior to 1975, to mitigate fracture risk issues. In addition, the following are the main projects and programmes over the period:

- DRS upgrade programme targeting those have technical or regulatory compliance issues.
- Replacement of Cello network monitoring equipment
- Programme to improve the condition of bridge special crossings

Table 33 below sets out the expenditure by year. These are consistent with Schedule 11a disclosure included in **Appendix B**.

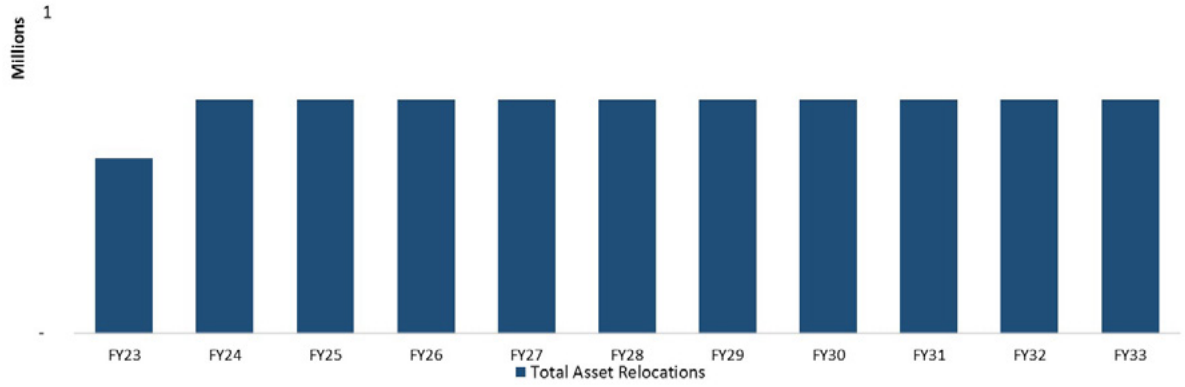
Table 33: Replacement and Renewal Capex during the planning period ($000 in real 2023)

Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	3,332	3,990	3,440	3,390	3,515	3,315	3,315	3,515	3,315	3,315	3,415

J.6. Asset Relocations Capex

This section summarises expected investments to relocate assets on behalf of third parties. Further detail on this expenditure is provided in **Appendix H**. The Capex forecast for the planning period is shown in Figure 47 below.

Figure 47: Total Asset Relocations Capex during the Planning Period



Consistent with average historical trends, a relatively constant trend of asset relocations Capex is being forecast over the period.

Table 34 below sets out the net expenditure per year. These are consistent with Schedule 11a disclosure included in **Appendix B**.

Table 34: Total Asset Relocations Capex during the Planning Period ($000 in real 2023)

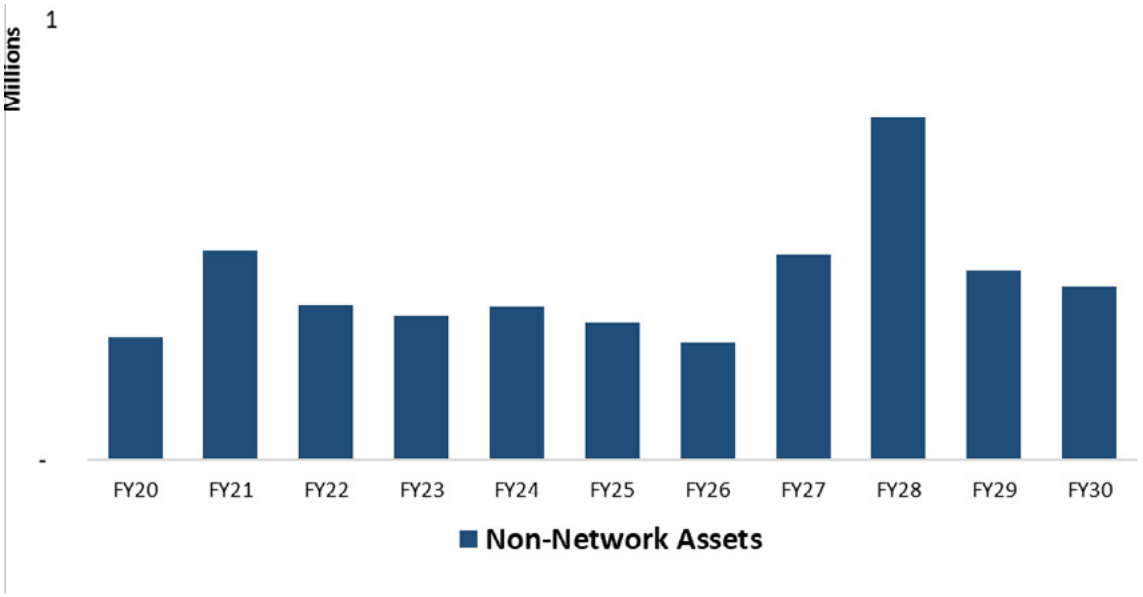
Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	546	727	727	727	727	727	727	727	727	727	727

J.7. Non-Network Capex

This section summarises expected investments in non-network assets to support asset management activities with further detail on the included projects provided in **Appendix H**.

The forecast non-network Capex for the planning period is shown in Figure 46 below.

Figure 46: Non-network Capex during the Planning Period



Non-network Capex is allocated between the transmission and distribution businesses based on factors such as size of asset base and staff headcount. Over the planning period Firstgas expect to invest in lifecycle-based asset renewals for ICT equipment and office assets.

Table 35 sets out the expenditure per year. These are consistent with Schedule 11a disclosure included in **Appendix B**.

Table 35: Non-network Capex during the Planning Period ($000 in real 2023)

Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
Capex	421	492	608	524	556	532	533	534	536	537	438

J.8. Network Opex

This section summarises the Network Opex expected to incur over the planning period. To align with Information Disclosure, the following expenditure categories are defined.[1]

- Service interruptions, incidents and emergencies (SIE)
- Routine and corrective maintenance and inspection (RCMI)

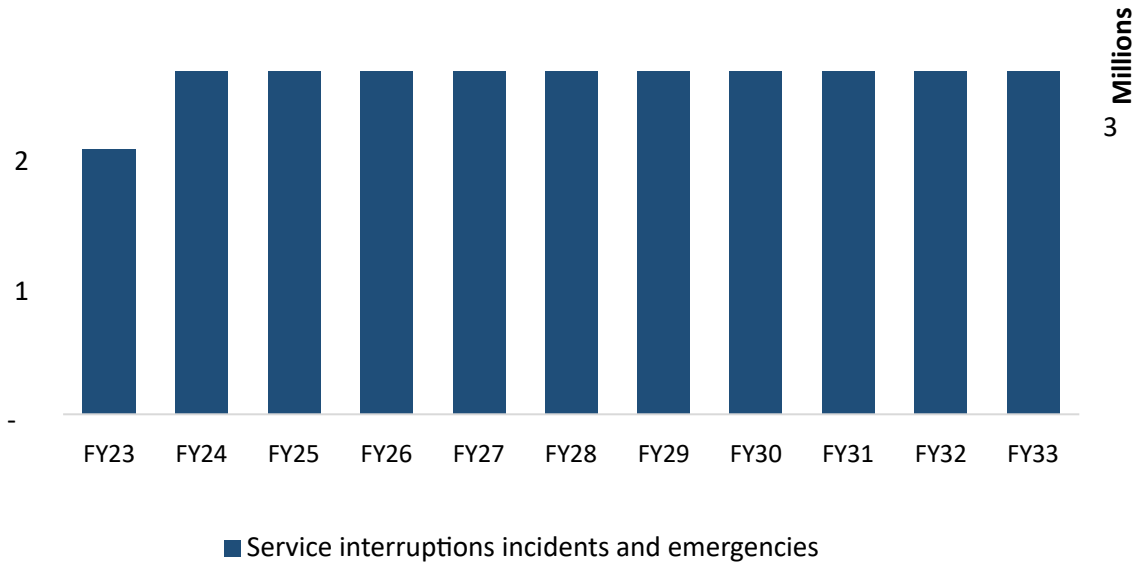
Detail on the activities included in these categories is provided in **Appendix H**.

1 We currently do not assign expenditure to the Asset Replacement and Renewal Opex category.

J.8.1. SERVICE INTERRUPTIONS, INCIDENTS AND EMERGENCIES

The SIE Opex forecast for the planning period is shown in Figure 47 below.

Figure 47: SIE Opex during the Planning Period



The cost of undertaking reactive maintenance (SIE) is expected to be largely stable over the period. This is consistent with arrangements with service providers. Higher work volumes are expected as the network expands in line with ICP growth projections. However, expenditure over the period has not been increased as it is expected this can be achieved through delivery efficiencies.

Table 36 sets out the expenditure per year. These are consistent with Schedule 11b disclosures included in **Appendix B**.

Table 36: SIE Opex during the planning period ($000 in real 2023)

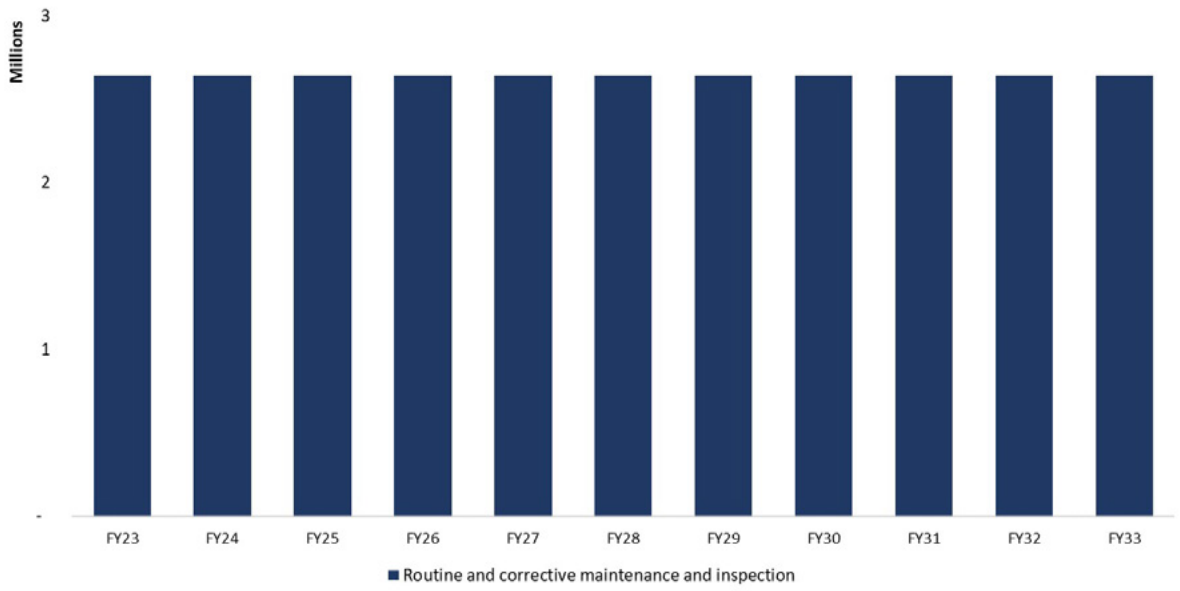
YEAR	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
OPEX	2,039	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645	2,645

J.8.2. ROUTINE AND CORRECTIVE MAINTENANCE AND INSPECTION (RCMI)

Our RCMI Opex forecast for the planning period is shown in Figure 48 below.

Figure 48: RCMI Opex during the Planning Period

Figure 48: RCMI Opex during the Planning Period



It is expected the cost of undertaking scheduled maintenance to be largely stable over the period. This is consistent with arrangements with service providers. However additional cost drivers and upward cost pressures are expected over the period.

- Firstgas are transitioning towards higher compliance with AS/NZS 4645. This will require a review of all maintenance standards and practices as the business moves away from the historical NZS 5258.
- Work volumes will increase as the network expands in line with ICP growth projections.

Expenditure forecasts have not materially increased over the period as it is expected this can be achieved through delivery efficiencies.

Table 37 sets out the expenditure per year. These are consistent with Schedule 11b disclosure included in **Appendix B**.

Table 17: RCMI Opex during the planning period ($000 in real 2023)

Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
OPEX	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642

J.9. Non-network Opex

This section summarises the Non-network Opex expected to incur over the planning period. To align with Information Disclosure, the following expenditure categories are defined.

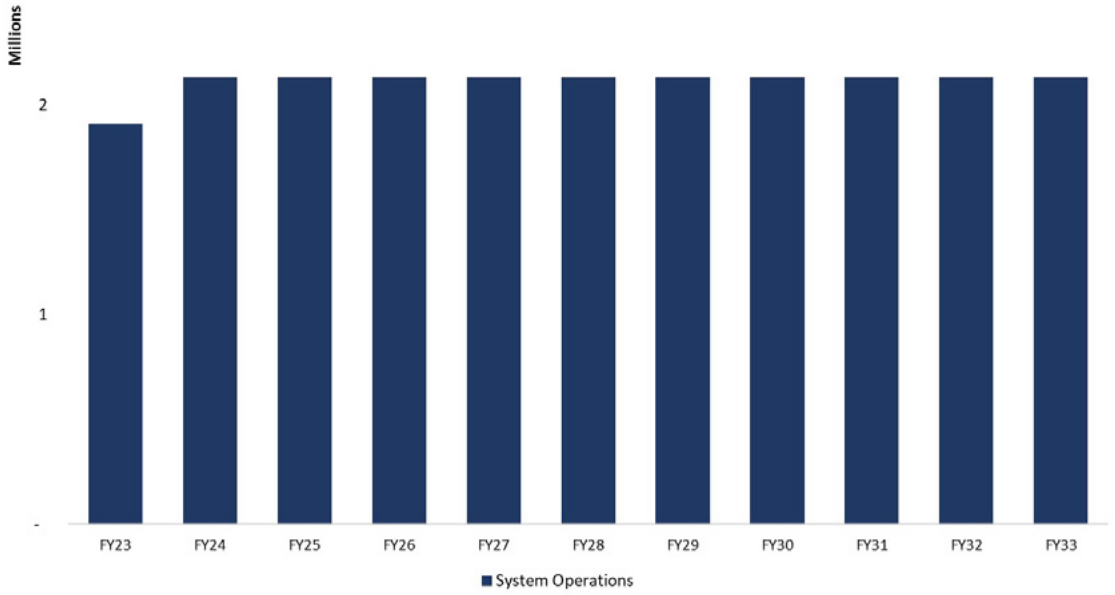
- System Operations and Network Support
- Business Support

Detail on the activities included in these categories is provided in **Appendix H**.

J.9.1. System Operations and Network Support

System Operations and Network Support Opex forecast for the planning period is shown in Figure 49 below.

Figure 49: System Operations and Network Support Opex during the planning period



Overall costs for Non-network Opex will be consistent with average historical spend.

Table 38 below sets out the expenditure per year. These are consistent with Schedule 11b disclosures included in **Appendix B**.

Table 38: System Operations and Network Support Opex during the planning period ($000 in real 2023)

Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
OPEX	1,913	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133	2,133

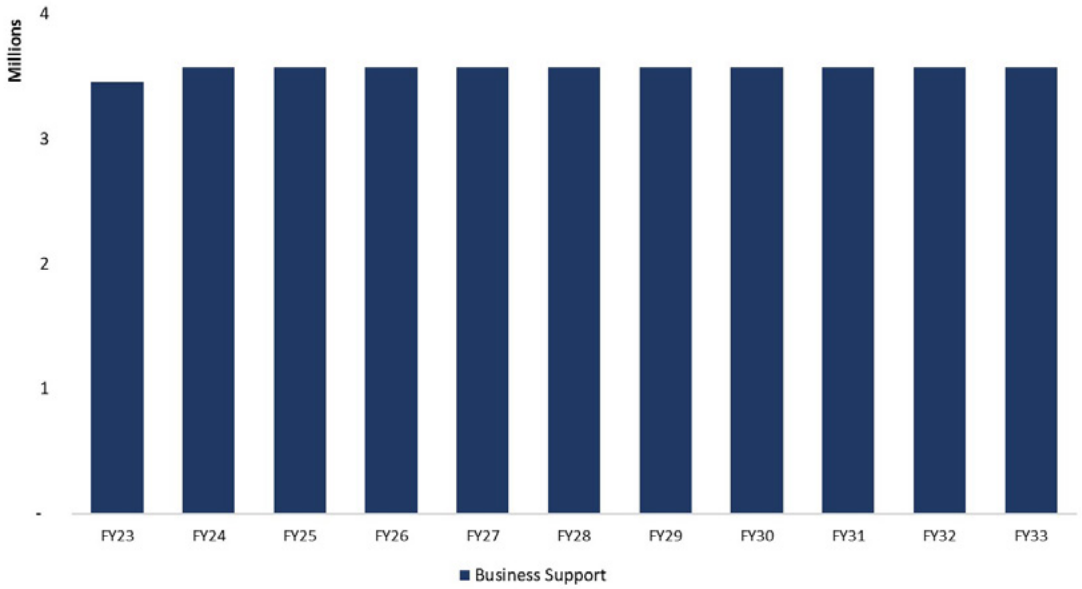
J.9.2. Business Support

Business Support includes expenditure related to the functions that support the gas distribution business. It includes direct staff costs and external specialist advice. The other material elements are office accommodation costs, legal and insurance costs. A portion of the Business Support Opex is allocated to the gas distribution business in accordance with the cost allocation policy.

The forecast for the planning period is shown in Figure 50 below.

Figure 50: Business Support Opex during the planning period

Figure 50: Business Support Opex during the planning period



It is expected this expenditure will stabilise for the remainder of the period.

Table 39 below sets out the expenditure per year. These are consistent with Schedule 11b disclosure included in **Appendix B**.

Table 39: Business Support Opex during the Planning Period ($000 in real 2023)

YEAR	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
OPEX	3,454	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576	3,576

K. SCHEDULED MAINTENANCE

This appendix summarises our main scheduled maintenance activities by asset fleet.

K.1. ROUTINE MAINTENANCE ACTIVITIES

Table 40: Routine Maintenance Activities

Asset category / Activity Standard	Interval	Preventive maintenance description
Leakage survey 00019	Yearly	Distribution systems adjacent to public buildings, hospitals, schools and business districts. Identified higher risk areas, steel pipelines without operating cathodic protection systems.
	Two-yearly	Service pipes located inside or under buildings. Distribution mains systems comprised predominantly of pre-1985 PE.
	Four-yearly	All other pipes located under hard-paved surfaces in close proximity to buildings. Shallow IP mains.
	Five-yearly	Balance of distribution system, including service connections.
Above ground steel pipework 00014	Yearly	Above ground corrosion inspection.
Cathodic protection 00015	Two-monthly	Inspect impressed current transformer/rectifier sites. Inspection of drainage bonds.
	Three / Six-monthly / yearly	Inspect and test on and instant-off pipe/soil potential in major urban, urban and rural areas. Electrical test of galvanic anodes in major urban, urban and rural areas. Test electrical isolation at casing test points in major urban, urban and rural areas.
	Three / Six-monthly	Inspect and test “On” pipe/soil potential in rural and urban areas.
Gate Stations and DRS 00012	Three-monthly	Below ground DRS operational check.
	Six-monthly	Above ground operational check.
	Three-yearly	All DRS. Full inspection and confirmation of settings and function.
Odorant checks 00020	Monthly	Gate station odorant and odorant concentration tests.
	Three-monthly	Extremity point ICP and designated DRS odorant and odorant concentration tests.
Valves 00013	Yearly	Full service of emergency and designated valves, and partial service of other designated plug valves.
	Two-yearly	Full service of other designated ball valves, and partial service of other plug valves. Audit of a sample of service riser valves.
Telnet	Yearly	Inspection of master station, field sites and repeater station.

Asset category / Activity Standard	Interval	Preventive maintenance description
00016	Four-yearly	Intrinsic safety inspections of field sites.
Patrols 00021	Three-monthly	Visual inspection of above ground pipework, vent pipes and ducted crossings.
	Yearly	Visual inspection of service pipes inside/under buildings.
Service regulators 00073	Yearly	Visual inspection of below ground installations.
	Yearly	Visual inspection of above ground installations.
Critical spares and equipment 00078	Monthly	Visual inspection.
	Yearly	Condition assessment of all critical spares and equipment. Review of inventory lists to determine level of inventory held is appropriate.
	Five-ten yearly	Manufacture's check/refurbishment of all major items of equipment.
Ground temperature	Monthly	Monitoring of ground temperature at key reference sites (Rotorua and Taupo).

K.2. MAINTENANCE ACTIVITIES FORECAST EXPENDITURE

Table 41: Maintenance activities forecast Opex by asset category

Expenditure description	Financial Year ($000)										
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Pipelines	3,932	4,442	4,442	4,442	4,442	4,442	4,442	4,442	4,442	4,442	4,442
Stations	140	158	158	158	158	158	158	158	158	158	158
Valves	284	317	317	317	317	317	317	317	317	317	317
Special crossings	94	106	106	106	106	106	106	106	106	106	106
Monitoring and control systems	46	52	52	52	52	52	52	52	52	52	52
CP systems	187	212	212	212	212	212	212	212	212	212	212
Other	0	0	0	0	0	0	0	0	0	0	0
Total	**4,681**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**	**5,287**

In this appendix, we provide a summary of the significant expenditure we are undertaking through the planning period.

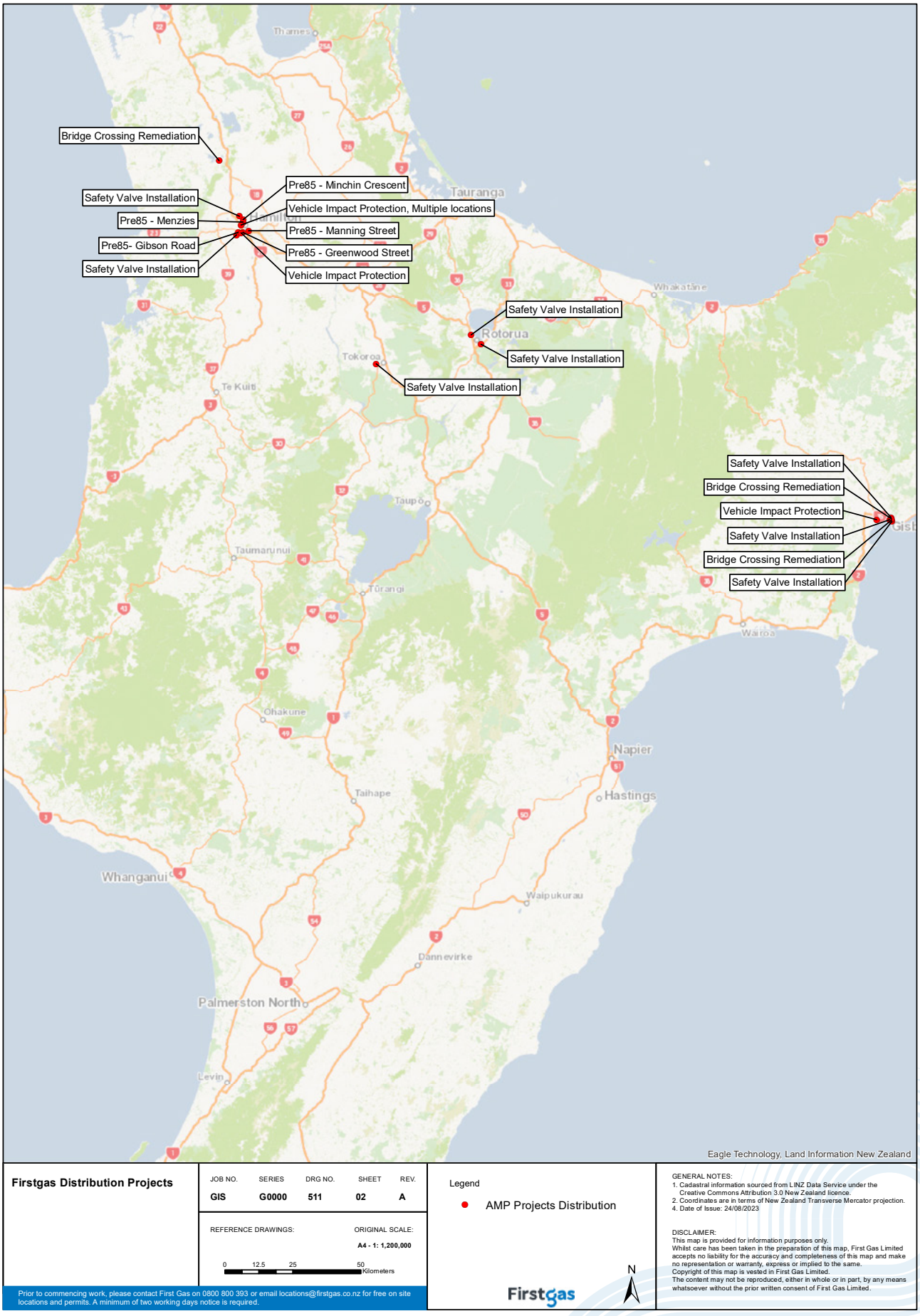


Table XX Largest Capex project over planning period.

Activity	Decription	Region	Cost	Period
Pre85- Gibson Road	Pre-85 Pipe replacement	Hamilton	$700,000	FY2024
Pre85 - Manning Street	Pre-85 Pipe replacement	Hamilton		FY2024
Pre85 - Minchin Crescent	Pre-85 Pipe replacement	Hamilton		FY2024
Pre85 – Menzies Street	Pre-85 Pipe replacement	Hamilton		FY2024
Pre85 - Greenwood Street	Pre-85 Pipe replacement	Hamilton	$150,000	FY2024/25
Vehicle Impact Protection- Multiple locations	Asset Protection	Hamilton	$120,000	FY2024
Bridge Crossing	Asset Condition Risk Remediation	Gladstone rd, Gisborne	$200,000	FY2024
Bridge Crossing	Asset Condition Risk Remediation	Peel Street, Gisborne	$200,000	FY2024
Bridge Crossing	Asset Condition Risk Remediation	Huntly Rd, Huntly	$150,000	FY2024
DR-80132 Protection	Installation of safety isolation valves	Hamilton	$80,000	FY2024
DR-80043 Protection	Installation of safety isolation valves	Gisborne	$80,000	FY2024
DR-80039 Protection	Installation of safety isolation valves	Gisborne	$80,000	FY2024
DR-80045 Protection	Installation of safety isolation valves	Gisborne	$80,000	FY2025
DR-80010 Protection	Installation of safety isolation valves	Rotorua	$80,000	FY2025
DR-80153 Protection	Installation of safety isolation valves	Temple View	$80,000	FY2025
DR-80078 Protection	Installation of safety isolation valves	Tokoroa	$80,000	FY2026
DR-80170 Protection	Installation of safety isolation valves	Rotorua	$80,000	FY2026
DR-80124 Protection	Installation of vehicle impact protection and Safety isolation valve to DRS	Hamilton	$120,000	FY2024
Pre-85 Pipeline replacement - Multiple Locations	Pre-85 Pipe replacement	System Wide	$2,900 000/year	FY2025 – FY2033

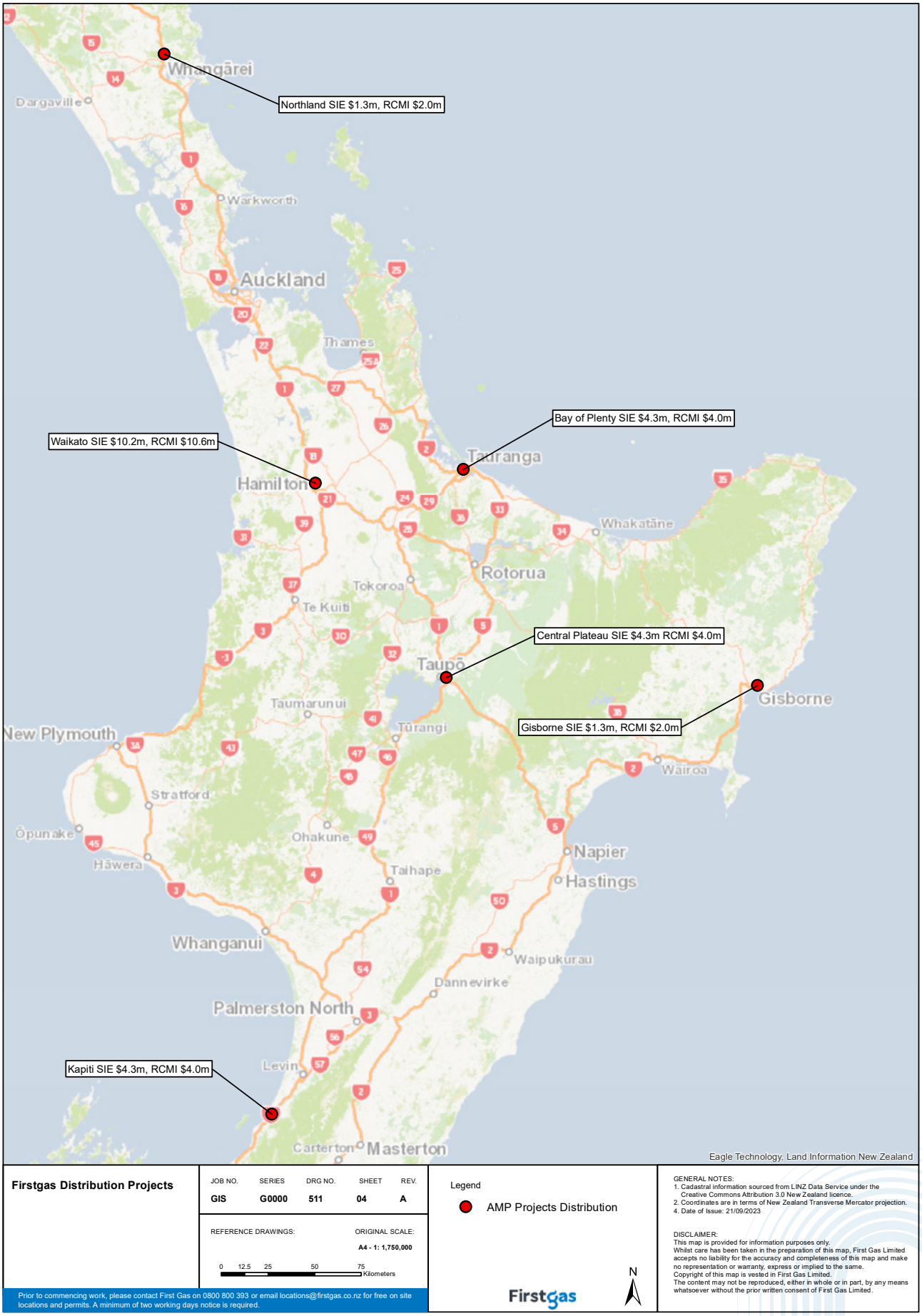

Northland SIE $1.3m, RCMI $2.0m
Bay of Plenty SIE $4.3m, RCMI $4.0m
Waikato SIE $10.2m, RCMI $10.6m
Central Plateau SIE $4.3m RCMI $4.0m
Gisborne SIE $1.3m, RCMI $2.0m
Kapiti SIE $4.3m, RCMI $4.0m
Whangārei
Dargaville
Warkworth
Auckland
Thames
Tauranga
Hamilton
Whakatāne
Rotorua
Tokoroa
Te Kuiti
Taupō
Gisborne
Taumarunui
Türangi
New Plymouth
Wairoa
Stratford
Ōpunake
Ohakune
Napier
Hāwera
Taihape
Hastings
Whanganui
Waipukurau
Dannevirke
Palmerston North
Levin
Carterton
Masterton
Eagle Technology, Land Information New Zealand
Firstgas Distribution Projects
JOB NO. GIS
SERIES G0000
DRG NO. 511
SHEET 04
REV. A
REFERENCE DRAWINGS:
ORIGINAL SCALE: A4 - 1: 1,750,000
0 12.5 25 50 75 Kilometers
Prior to commencing work, please contact First Gas on 0800 800 393 or email locations@firstgas.co.nz for free on site locations and permits. A minimum of two working days notice is required.
Legend
AMP Projects Distribution
Firstgas
N
GENERAL NOTES:
1. Cadastral information sourced from LINZ Data Service under the Creative Commons Attribution 3.0 New Zealand licence.
2. Coordinates are in terms of New Zealand Transverse Mercator projection.
4. Date of Issue: 21/09/2023
DISCLAIMER:
This map is provided for information purposes only.
Whilst care has been taken in the preparation of this map, First Gas Limited accepts no liability for the accuracy and completeness of this map and make no representation or warranty, express or implied to the same.
Copyright of this map is vested in First Gas Limited.
The content may not be reproduced, either in whole or in part, by any means whatsoever without the prior written consent of First Gas Limited.

Table XX Largest OPEX expenditure over planning period.

Activity	Decription	Region	Total Cost	Period
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Waikato Region Networks	SIE $10.2m RCMI $10.6m	FY2024 – FY2033
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Bay of Plenty	SIE $4.3m RCMI $4.0m	FY2024 – FY2033
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Central Plateau	SIE $4.3m RCMI $4.0m	FY2024 – FY2033
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Kapiti Coast networks	SIE $4.3m RCMI $4.0m	FY2024 – FY2033
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Northland Network	SIE $1.3m RCMI $2.0m	FY2024 – FY2033
SIE **RCMI**	Maintenance activites and response to service interruptions and Emergencies	Gissborne Network	SIE $1.3m RCMI $2.0M	FY2024 – FY2033

M. REGULATORY REQUIREMENTS LOOKUP

This table provides a look-up reference for each of the Information Disclosure requirements described in the *Gas Distribution Information Disclosure Determination 2012* (consolidated 3 April 2018).

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
	Disclosure relating to asset management plans and forecast information
2.6.1 Subject to clauses 2.6.3 and 2.13, before the start of each disclosure year commencing with the disclosure year 2014, every GDB must: (1) Complete an AMP that: (a) relates to the gas distribution services supplied by the GDB (b) meets the purposes of AMP disclosure set out in clause 2.6.2 (c) has been prepared in accordance with Attachment A to this determination; Gas Distribution Information Disclosure Determination 2012 - (consolidated in 2018) (d) contains the information set out in in the schedules described in clause 2.6.6 (e) contains the Report on Asset Management Maturity as described in Schedule 13.	1(a) *Section 1* of the *2024 GDB AMP Summary Document* describes the purpose of the Distribution AMP. It states the AMP relates to the Firstgas distribution network. 1(b) and (c) Compliance with Clause 2.6.2 and Attachment A – Asset Management Plans of the *Gas Transmission Information Disclosure Determination*, is summarised in the GDB AMP Summary Document and explained in greater detail in the accompanying appendices to the document, as noted below. 1(d) The schedules required in clause 2.6.6 are included in *Appendix B - Information Disclosure Schedules* of the AMP and provided to the Commerce Commission in native format. Expenditure for the planning period is summarised in *Section 6* of the AMP Summary Document. Other information from the schedules on asset condition, network utilisation and demand is also included, where relevant, in the AMP Summary Document. 1(e) The AMMAT report is included in *Appendix B – Information Disclosure Schedules* of the AMP.
(2) Complete the Report on Asset Management Maturity in accordance with the requirements specified in Schedule 13.	2. Firstgas has an asset management improvement programme in place. This is described in *Sections 2.6 and 5.6* of the GDB AMP Summary Document and considers the AMMAT results in *Appendix H - Asset Management Approach – H.6* in the application of the approach to asset management for future planning. Further detail on the Company's asset management approach is provided in *Appendix H - Asset Management Approach – H.1-H.3.15.* The AMMAT report Schedule 13 is included in *Appendix B – Information Disclosure Schedules*.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
(3) Publicly disclose the AMP.	3. The AMP and its appendices are publicly available on the Firstgas website www.firstgas.co.nz.
2.6.2 The purposes of AMP disclosure referred to in subclause 2.6.1(1)(b) are that the AMP: (1) Must provide sufficient information for interested persons to assess whether (a) assets are being managed for the long term. (b) the required level of performance is being delivered. (c) costs are efficient and performance efficiencies are being achieved. (2) Must be capable of being understood by interested persons with a reasonable understanding of the management of infrastructure assets. (3) Should provide a sound basis for the ongoing assessment of asset-related risks, particularly high impact asset-related risks.	1 (a) - (c) The AMP includes the following information: The purpose of the AMP is outlined in *Section 1* of the GDB AMP Summary Document. Information on the Asset Management Policy and Framework is included in the commentary in *Section 2.6* of the GDB AMP Summary Document and in greater detail in *Appendix H - Asset Management Approach – H.2 – H.3,* while the asset management improvement programme is described in *Section 5.6* GDB AMP Summary Document. *Appendix H* outlines the Company's asset management approach. The GDB AMP Summary Document outlines the work undertaken in FY2023 and significant projects planned for FY2024. More detail on the network development programme for the full 10-year planning period is available in *Appendix F – System Development* and *Appendix G – Network Development Programme*. Performance Measures and Targets are included in *Section 4.3* of the GDB AMP Summary Document and in *Appendix H – H.5 Performance Measures*. 2 The Asset Lifecycle Management Strategy is explained in detail in *Appendix H – H.3.5* and the asset management approach is described in the GDB AMP Summary Document *Section 2.6*. *Section 3* includes a diagram of the approach indicating a focus on life-cycle management. The AMP has been structured and presented in a manner that is intended to be easier for persons with a reasonable understanding of the management of infrastructure assets. This includes: • The detail of the asset management plan is located in the appendices leaving the GDB AMP Summary Document to deliver the core messages of the AMP. • Using common terminology to the extent possible.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
	• Inclusion of less common terms in the AMP Summary Document and in the glossary in *Appendix A - Glossary* to assist understanding of the terminology used in the AMP. • Clear description of expenditure forecasts presented in the AMP. 3. Risk management policy, framework and high-level risks are included in *Section 2.8* of the GDB AMP Summary Document. In *Sections 3 and 4*, the path between asset criticality and health, risk mitigation and resulting expenditure are described. Further detail on the approach to risk management is included in *Appendix H – H.3.4* and *Appendix L - Significant Projects*. Detailed asset related risks and issues are included in *Appendix E - Asset Fleets*.
Clauses 2.6.3 to 2.6.5 relate to AMP updates.	Not applicable as Firstgas have provided a full AMP this year.
2.6.6 Subject to clause 2.13.2, before the start of each disclosure year, each GDB must complete and publicly disclose each of the following reports by inserting all information relating to the gas distribution services supplied by the GDB for the disclosure years provided for in the following reports: (1) the Report on Forecast Capital Expenditure in Schedule 11a. (2) the Report on Forecast Operational Expenditure in Schedule 11b. (3) the Report on Asset Condition in Schedule 12a. (4) the Report on Forecast Utilisation in Schedule 12b. (5) the Report on Forecast Demand in Schedule 12c.	The expenditure forecasts are summarised in *Section 6* of the GDB AMP Summary Document. Asset condition, utilisation and demand are included in the AMP Summary Document where relevant or against specific asset details. The required reports are included in *Appendix B - Information Disclosure Schedules* and have been provided to the Commerce Commission in excel format.
Attachment A: Asset Management Plans	
AMP Design	
1 The core elements of asset management: 1.1 A focus on measuring network performance and managing the assets to achieve performance targets. 1.2 Monitoring and continuously improving asset management practices. 1.3 Close alignment with corporate vision and strategy. 1.4 That asset management is driven by clearly defined strategies, business objectives and service level targets. 1.5 That responsibilities and accountabilities for asset management are clearly assigned. 1.6 An emphasis on knowledge of what assets are owned and why, the location of the assets and the condition of the assets. 1.7 An emphasis on optimising asset utilisation and performance. 1.8 That a total life cycle approach should be taken to asset management. 1.9 That the use of 'non-network' solutions and demand management techniques as alternatives to asset acquisition is considered.	The asset management approach is aligned to the Company's vision and strategy. This is summarised in *Sections 1 and 2* of the GDB AMP Summary Document and these explain the Firstgas corporate objectives, the purpose of the AMP in meeting those objectives and governance over asset management decisions. The asset management improvement programme is included in *Section 5.6* of the GDB AMP Summary Document. *Appendix H – H.1 - Asset Improvements* provides a more detailed description and diagram overview of the asset management framework displaying the line of sight from the Strategic Plan through to the asset management system and lifecycle delivery. For more detail, *Appendix H* describes the asset management approach in general and in particular the following: • *H.5* outlines the performance measures for the network, including targets, and the asset management approach to achieving these targets. • *H.6* describes performance measures and AMMAT results, along with providing details about the approach to continuous improvement in *H.1* and defining several improvement initiatives. • *H.3* Illustrates how the approach to asset management links to, and aligns with, the corporate vision and strategy. • *H.5* describes service level targets and Asset Management Approach. • *H.3.2* describes the accountabilities for the asset management plan and asset management governance. • *H.3.6* explains optimisation of asset performance. • *H.3.5* describes the total lifecycle management approach. • *H.3.6* describes the considerations for deferring asset purchases or renewal/replacement. This includes the consideration of 'non-network' solutions where they are available. As part of the approach to asset management, Firstgas understands the assets owned, their location and asset condition. In the DGB AMP the following appendices are provided:

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
	• An overview of the network configuration in *Appendix C - Network Overview*. • Further information on asset condition and configuration in *Appendix E - Asset Fleets.* • Identification of key asset locations in *Appendix D - Network Maps*.
2 The disclosure requirements are designed to produce AMPs that: 2.1 Are based on, but are not limited to, the core elements of asset management identified in clause 1. 2.2 Are clearly documented and made available to all stakeholders. 2.3 Contain sufficient information to allow interested persons to make an informed judgement about the extent to which the GDB's asset management processes meet best practice criteria and outcomes are consistent with outcomes produced in competitive markets. 2.4 Specifically support the achievement of disclosed service level targets. 2.5 Emphasise knowledge of the performance and risks of assets and identify opportunities to improve performance and provide a sound basis for ongoing risk assessment. 2.6 Consider the mechanics of delivery including resourcing. 2.7 Consider the organisational structure and capability necessary to deliver the AMP. 2.8 Consider the organisational and contractor competencies and any training requirements. 2.9 Consider the systems, integration and information management necessary to deliver the plans. 2.10 To the extent practical, use unambiguous and consistent definitions of asset management processes and terminology consistent with the terms used in this attachment to enhance comparability of asset management practices over time and between GDBs. 2.11 Promote continual improvements to asset management practices. Disclosing an AMP does not constrain an GDB from managing its assets in a way that differs from the AMP if its circumstances change after preparing the plan or if the GDB adopts improved asset management practices.	2.1 The elements identified in clause 1 are described above. 2.2 The DGB AMP is distributed to major stakeholders and made publicly available on the Firstgas website (www.firstgas.co.nz). The AMP is formatted for stakeholders to focus on the level of detail that is useful to them (e.g. the DGB AMP Summary Document or the more detailed appendices). 2.3 The AMMAT reflects best practice criteria. Further detail is provided in *Appendix H – H.6 – Asset Management Maturity Assessment Tool*. 2.4 Key performance measures and target levels are summarised in *Section 4.3* of the AMP Summary Document and detailed in *Appendix H – H.5 Performance Measures*. 2.5 The Company's approach to risk management is discussed in *Section 2.8* of the AMP Summary Document. A more detailed representation of approach to risk management is included in *Appendix H – H.3.4. Appendix E – Asset Fleets* considers risks more specifically focussed on high-risk assets, along with opportunities and projects related to performance improvements. 2.6 Planning and scheduling is part of the delivery model and is mentioned in *Section 2.3* of the AMP Summary Document as part of the asset management framework and system. A key part of planning and scheduling is ensuring the required resources are available to deliver on the asset management plans and objectives. The delivery model, including consideration of resourcing and planning, is discussed in greater detail throughout *Appendix H – H.4.1 and H.3.12*. 2.7 The organisational structure and governance in relation to the delivery and responsibilities of the AMP are included in *Section 2.2* of the GDB AMP Summary. Refer *Appendix H – H.2* for further detail. 2.8 *Appendix H – H.3.3* outlines competency and training requirements. 2.9 Asset management systems, integration and information management are discussed briefly in *Section 2.6* of the GDB AMP summary and further detailed in *Appendix H – H.2, H.3, H.3.13*. 2.10 Throughout the AMP terminology and definitions have been used that are consistent with those used in Attachment A of the information disclosure determination and other disclosure documentation. Definitions of less common terms are included in *Appendix A - Glossary* and in the GDB AMP Summary Document to assist understanding of the terminology used in the AMP. 2.11 *Appendix H – H.5* describes Key performance measures and *H.6* includes AMMAT results and also describes the approach to continuous improvement defining several improvement initiatives.
3 The AMP must include the following: 3.1 A summary that provides a brief overview of the contents and highlights information that the GDB considers significant.	3.1 The GDB AMP Summary Document provides an overview of the: • Scope and structure of the AMP including the document appendices. • Key messages and themes. • the asset management framework and systems and planned improvements in these areas. • A regional dashboard (in map format) indicating the line of sight between asset health and expenditure. • Capex and Opex forecasts and key projects.
3.2 Details of the background and objectives of the GDB's asset management and planning processes.	3.2 The asset management framework is described in *Section 2.6* of the GDB AMP Summary Document and asset management improvement plans are included in *Section 5.6*. *Appendix H – H.* outlines the asset management background, objectives and planning processes.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
3.3 A purpose statement which: (a) makes clear the purpose and status of the AMP in the GDB's asset management practices. The purpose statement must also include a statement of the objectives of the asset management and planning processes. (b) states the corporate mission or vision as it relates to asset management. (c) identifies the documented plans produced as outputs of the annual business planning process adopted by the GDB. (d) states how the different documented plans relate to one another, with particular reference to any plans specifically dealing with asset management. (e) includes a description of the interaction between the objectives of the AMP and other corporate goals, business planning processes, and plans. The purpose statement should be consistent with the GDB's vision and mission statements and show a clear recognition of stakeholder interest.	3.3 *Section 1* of the AMP Summary Document outlines the statement of purpose of the AMP and the corporate focus for asset management. Section 3 provides an illustrative overview of the asset management framework showing how the asset management system, including the asset management plan, feeds into and out of the Firstgas strategic plan. The asset management framework and policy are outlined in *Appendix H – H.2 – H.3.2*. This appendix links the corporate vision and mission to the asset management approach and also describes how the different asset management plans and documentation relate to each other
3.4 Details of the AMP planning period, which must cover at least a projected period of 10 years commencing with the disclosure year following the date on which the AMP is disclosed. Good asset management practice recognises the greater accuracy of short-to-medium term planning and will allow for this in the AMP. The asset management planning information for the second five years of the AMP planning period need not be presented in the same detail as the first five years.	3.4 *Section 1.2* of the AMP Summary Document identifies the 10-year period covered by the AMP. This is defined as the "planning period".
3.5 The date that it was approved by the directors.	3.5 The date this AMP was approved by Directors is included in *Section 1* of the AMP Summary Document and on the Director's certificate in *Appendix N*.
3.6 A description of each of the legislative requirements directly affecting management of the assets, and details of: (a) how the GDB meets the requirements. (b) the impact on asset management.	*3.6 Appendix H* identifies any applicable legislations, regulations, and industry codes that affect the management of assets and describes how these requirements are incorporated into asset management.
3.7 A description of stakeholder interests (owners, consumers etc.) which identifies important stakeholders and indicates: (a) how the interests of stakeholders are identified. (b) what these interests are. (c) how these interests are accommodated in asset management practices. (d) how conflicting interests are managed.	3.7 *Section 7* of the GDB AMP Summary Document describes stakeholder engagement including how needs and interests of all stakeholders are identified and how conflicting interests are managed. The diagram in *Section 3* illustrates how asset management policy, strategies and objectives reflect stakeholder requirements. *Appendix H* provides greater detail on stakeholder interests and indicates how: (a) stakeholder's needs are identified. (b) the interests of each of the key stakeholders are identified (c) Stakeholder interests are accommodated in the decision making and asset management practices. (d) Conflicts are managed
3.8 A description of the accountabilities and responsibilities for asset management on at least 3 levels, including: (a) governance - a description of the extent of director approval required for key asset management decisions and the extent to which asset management outcomes are regularly reported to directors. (b) executive - an indication of how the in-house asset management and planning organisation is structured. (c) field operations - an overview of how field operations are managed, including a description of the extent to which field work is undertaken in-house and the areas where outsourced contractors are used.	3.8 *Section 2.3* of the AMP Summary Document describes the Firstgas corporate and organisational structure and delivery model for distribution. In greater detail, *Appendix H – H.2* describes: (a) and (b) Governance levels for Corporate and Organisational Structure. (c) The field operations delivery model – *H.3.8.7*.
3.9 All significant assumptions: (a) quantified where possible. (b) clearly identified in a manner that makes their significance understandable to interested persons, including: (c) a description of changes proposed where the information is not based on the GDB's existing business. (d) the sources of uncertainty and the potential effect of the uncertainty on the prospective information.	(a) and (b) Key assumptions for the development of the AMP are outlined in *Appendix H – H.2*. Expenditure assumptions are outlined in *Appendix J – Expenditure Overview*. (c) There are no changes proposed in this AMP where the information is not based on current business. (d) *Appendix H – H.3.1* identifies sources of uncertainty and possible effects and describes methods of managing these uncertainties.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
(e) the price inflator assumptions used to prepare the financial information disclosed in nominal New Zealand dollars in the Report on Forecast Capital Expenditure set out in Schedule 11a & the Report on Forecast Operational Expenditure set out in Schedule 11b.	(e) Escalation rates utilised for the purposes of disclosing nominal expenditure are *Appendix J – Expenditure Overview*.
3.10 A description of the factors that may lead to a material difference between the prospective information disclosed and the corresponding actual information recorded in future disclosures.	3.10 *Section 5* of the GDB AMP Summary Document includes areas of focus for the coming year beginning. Any significant projects on the radar but not yet certain, have been summarised in this section. *Appendix H – H.3.1* identifies, in more detail, any sources of uncertainty and possible effects, and describes methods of managing these uncertainties.
3.11 An overview of asset management strategy and delivery. To support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management strategy and delivery, the AMP should identify: (a) how the asset management strategy is consistent with the GDB's other strategy and policies. (b) how the asset strategy takes into account the life cycle of the assets. (c) the link between the asset management strategy and the AMP. (d) processes that ensure costs, risks and system performance will be effectively controlled when the AMP is implemented.	3.11 The AMP Summary Document includes a narrative on the asset management approach in *Section 2.6* and improvement programmes in *Section 5.6*. These sections provide an overview of the asset management strategy including how it aligns with corporate strategy, links with the AMP and life cycle of assets. *Section 2.3* provides information on the deliverability model for distribution. *Appendix H* describes in detail: (a) *H.2, H.3.1* - The Asset Management Framework and Policy and describes how the framework relates to corporate objectives. (b) *H.2* - How the Asset Management Framework includes asset lifecycle management. (c) *H.2* - The relationship between the Asset Management Framework / strategy and the Asset Management Plan. (d) *H.3.2.3* - The financial authority and control, risk management, and performance measures and targets. Processes to support the framework and governance described above are discussed throughout the GDB AMP document.
3.12 An overview of systems and information management data to support the AMMAT disclosure and assist interested persons to assess the maturity of systems and information management, the AMP should describe: (a) the processes used to identify asset management data requirements that cover the whole of life cycle of the assets. (b) the systems used to manage asset data and where the data is used, including an overview of the systems to record asset conditions and operation capacity and to monitor the performance of assets. (c) the systems and controls to ensure the quality and accuracy of asset management information. (d) the extent to which these systems, processes and controls are integrated.	3.12 *Section 2.6* of the AMP Summary Document includes a narrative on the asset management approach while improvement programmes are included in *Section 5.6*. The asset management approach supports the AMMAT disclosure and shows how the AMMAT is used to monitor improvement of the systems and data and identify gaps for future improvement. *Appendix H – H.3.13, H.6* provides a more detailed view of systems and information data supporting the AMMAT disclosure. Specifically, this appendix: (a) Defines the categorisation and relationships of asset management data and the related systems used to manage the lifecycle of Firstgas assets. (b) Identifies the systems used to manage asset data, including the condition and capacity of assets, and asset performance. (c) & (d) Outlines asset data quality management processes, and system integration.
3.13 A statement covering any limitations in the availability or completeness of asset management data and disclose any initiatives intended to improve the quality of this data. Discussion of the limitations of asset management data is intended to enhance the transparency of the AMP and identify gaps in the asset management system.	3.13 *Section 5.6* of the AMP Summary Document includes the asset management improvement program. *Appendix H - H.3.13.10* identifies data limitations and initiatives to improve data quality.
3.14 A description of the processes used within the GDB for: (a) managing routine asset inspections and network maintenance. (b) planning and implementing network development projects. (c) measuring network performance.	3.14 *Appendix H – H.3.5.3* how asset life cycle delivery is managed. *Section 4.3* includes a summary of key performance indicators. The detail of the underlying processes is included in *Appendix H – H.3.8*: (a) Maintenance approach and processes. This includes how routine asset inspections and network maintenance are managed. (b) System development and planning process. (c) The distribution network performance measures and targets. *Appendix F* describes the system development process.
3.15 An overview of asset management documentation, controls and review processes. To support the Report on Asset Management Maturity disclosure	*3.15 Appendix H – H.3* describes the key components of the asset management system including documentation, controls and the review process. This includes:

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should: (a) identify the documentation that describes the key components of the asset management system and the links between the key components. (b) describe the processes developed around documentation, control and review of key components of the asset management system. (c) where the GDB outsources components of the asset management system, the processes and controls that the GDB uses to ensure efficient and cost-effective delivery of its asset management strategy. (d) where the GDB outsources components of the asset management system, the systems it uses to retain core asset knowledge in-house. (e) audit or review procedures undertaken in respect of the asset management system.	(a) Identifying the documentation that describes the key components for the asset management system and the links between the key components outlining the organisational structure and financial controls. (b) Outlining the processes around documentation, control and review of the key components of the asset management system. This includes describing any audit or review procedures undertaken in respect of the asset management system. (c) Describing the systems for retaining asset knowledge. (d) Describing the works management of service providers.
3.16 An overview of communication and participation processes to support the Report on Asset Management Maturity disclosure and assist interested persons to assess the maturity of asset management documentation, controls and review processes, the AMP should: (a) communicate asset management strategies, objectives, policies and plans to stakeholders involved in the delivery of the asset management requirements, including contractors and consultants. (b) demonstrate staff engagement in the efficient and cost-effective delivery of the asset management requirements.	3.16 *Section 7* of the GDB AMP Summary Document outlines communication with key stakeholders on aspects of the AMP. In *Appendix H* outlines the following: (a) Communication with key stakeholders on aspects of the AMP. (b) Staff engagement in the preparation of the AMP. Where applicable, throughout the AMP key internal stakeholder teams are referenced in relation to delivery of the asset management requirements.
3.17 The AMP must present all financial values in constant price New Zealand dollars except where specified otherwise.	3.17 All expenditure figures are denominated in constant value terms using FY2023 New Zealand dollars as stated in *Appendix J - Expenditure Overview*, except where specified otherwise.
3.18 The AMP must be structured and presented in a way that the GDB considers will support the purposes of AMP disclosure set out in clause 2.6.2 of the determination.	3.18 The AMP has been structured and presented in a manner intended to simplify the presentation of information relevant to the disclosure. The AMP Summary Document can be read as a standalone document to provide a summarised view of the asset management plans including the development of the asset management strategy and implementation of an asset health and criticality approach to asset management. The appendices provide greater detail on the plans at an asset fleet level, the approach to asset management, and the systems and personnel to ensure the plans can be delivered.
Assets covered	
4 The AMP must provide details of the assets covered, including: 4.1 A map and high-level description of the areas covered by the GDB, including the region(s) covered.	4.1 A map of the gas distribution areas is provided in *Section 2.4* of the AMP summary and *Section 5.1* of the same document maps the significant areas of work focus linking asset health with expenditure. *Appendix C - Network Overview* and *Appendix D - Network Maps* provide overview maps and high-level region descriptions.
4.2 A description of the network configuration, including: if sub-networks exist, the network configuration information should be disclosed for each sub-network. (a) A map or maps, with any cross-referenced information contained in an accompanying schedule, showing the physical location of: (i) All main pipes distinguished by operating pressure. (ii) All ICPs that have a significant impact on network operations or asset management priorities, and a description of that impact. (iii) All gate stations. (iv) All pressure regulation stations. (b) if applicable, the locations where a significant change has occurred since the previous disclosure of the information referred to in subclause 4.2(a) above, including: (i) a description of the parts of the network that are affected by the change. (ii) a description of the nature of the change.	4.2 *Appendix D - Network Maps* includes network maps showing the following: (i) All mains' pipes, colour coded by operating pressure. (ii) All ICPs greater than 20TJ. (iii) All gate stations feeding the distribution network. (iv) All pressure regulation stations. Firstgas has no sub-networks as defined by the Information Disclosure Determination. There have been no significant network changes since the previous disclosure.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
Network Assets by Category	
5 The AMP must describe the network assets by providing the following information for each asset category: 5.1 pressure. 5.2 description and quantity of assets. 5.3 age profiles. 5.4 a discussion of the results of formal risk assessments of the assets, further broken down by subcategory as appropriate. Systemic issues leading to the premature replacement of assets or parts of assets should be discussed.	5 *Appendix E – Asset Fleets* 5.1 Details the pressure levels around the distribution network and quantities of pipes operating at each level. 5.2 Includes a description and quantity of each asset category. 5.3 Includes age profiles and condition of assets. 5.4 Lists risks and issues associated with assets and key projects.
6. The asset categories discussed in clause 5 above should include at least the following: 6.1 the categories listed in the Report on Forecast Capital Expenditure in Schedule 11a(iii). 6.2 assets owned by the GDB but installed at gate stations owned by others.	6.1 The distribution assets described in *Appendix C - Network Overview, Appendix D – Network Maps* and *Appendix E - Asset Fleets* include those specified in clause 6.1. 6.2 There are no Firstgas owned assets installed at gate stations owned by other distribution companies.
Service Levels	
7. The AMP must clearly identify or define a set of performance indicators for which annual performance targets have been defined. The annual performance targets must be consistent with business strategies and asset management objectives and be provided for each year of the AMP planning period. The targets should reflect what is practically achievable given the current network configuration, condition and planned expenditure levels. The targets should be disclosed for each year of the AMP planning period.	7 Performance measures and quantified targets for the distribution asset management are summarised in *Section 4.3* of the GDB AMP Summary Document and included in detail in *Appendix H – H.5* which details how these measures are consistent with the objectives of the AMP.
8 Performance indicators for which targets have been defined in clause 7 must include: 8.1 the DPP requirements required under the price quality path determination applying to the regulatory assessment period in which the next disclosure year falls. 8.2 consumer-oriented indicators that preferably differentiate between different consumer types. 8.3 indicators of asset performance, asset efficiency and effectiveness, and service efficiency, such as technical and financial performance indicators related to the efficiency of asset utilisation and operation. 8.4 the performance indicators disclosed in Schedule 10b of the determination.	8 Performance measures are summarised in *Section 4.3* of the GDB AMP Summary Document and included in detail in *Appendix H – H.5*. This includes: 8.1 Targets aligning with DPP quality standard requirements. 8.2 Consumer-oriented performance measures. 8.3 Indicators of asset performance and delivery. 8.4 The performance measures disclosed in Schedule 10b of the determination.
9 The AMP must describe the basis on which the target level for each performance indicator was determined. Justification for target levels of service includes consumer expectations or demands, legislative, regulatory, and other stakeholders' requirements or considerations. The AMP should demonstrate how stakeholder needs were ascertained and translated into service level targets.	*9 Appendix H- H.5* describes the basis for each performance target.
10 Targets should be compared to historic values where available to provide context and scale to the reader.	10 Historical performance values have been provided in *Appendix H- H.5* to provide context to the reader. Key performance measures and the trend of results are included in *Section 4.3* of the AMP Summary Document.
11 Where forecast expenditure is expected to materially affect performance against a target defined in clause 7 above, the target should be consistent with the expected change in the level of performance.	11 Forecast expenditure is not expected to materially affect performance against any performance targets.
Network Development Planning	
12 AMPs must provide a detailed description of network development plans, including -	12 *Section 5* of the AMP Summary Document identifies the significant activities planned for the coming financial year. Network development plans are described in *Appendix G - Network Development Programme* and further detailed in *Appendix F - System Development*.
12.1 A description of the planning criteria and assumptions for network development.	12.1 Development planning criteria are discussed in *Appendix G - Network Development Programme*.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
12.2 Planning criteria for network developments should be described logically and succinctly. Where probabilistic or scenario-based planning techniques are used, this should be indicated, and the methodology briefly described.	12.2 Development planning criteria are discussed in *Appendix G - Network Development Programme*.
12.3 The use of standardised designs may lead to improved cost efficiencies. This section should discuss: (a) the categories of assets and designs that are standardised. (b) the approach used to identify standard designs.	(a) Standardised equipment and designs are discussed in *Appendix H – H.3.8*, including the key design standards by asset type. (b) *Appendix H – H.3.8* discusses the approach adopted when identifying and developing a standard design.
12.4 A description of the criteria used to determine the capacity of equipment for different types of assets or different parts of the network. *The criteria described should relate to the GDB's philosophy in managing planning risks*.	12.4 Network and asset capacity is discussed in *Appendix G - Network Development Programme, Appendix I – Load Forecasts*, and can be read alongside the Company's philosophy in managing planned risks described in *Appendix H – Asset Management Approach*.
12.5 A description of the process and criteria used to prioritise network development projects and how these processes and criteria align with the overall corporate goals and vision.	12.4 The information on asset management improvements in *Section 5.6* of the GDB AMP Summary Document provides an overview of how all projects align with the overall corporate goals and vision. *Appendix H- H.3.3* describes project prioritisation in network development and how it is linked to the prioritisation of corporate investment.
12.6 Details of demand forecasts, the basis on which they are derived, and the specific network locations where constraints are expected due to forecast increases in demand. a) explain the load forecasting methodology and indicate all the factors used in preparing the load estimates. b) provide separate forecasts to at least the system level covering at least a minimum five-year forecast period. Discuss how uncertain but substantial individual projects/developments that affect load are considered in the forecasts, making clear the extent to which these uncertain increases in demand are reflected in the forecasts. c) identify any network or equipment constraints that may arise due to the anticipated growth in demand during the AMP planning period. The AMP should include a description of the methodology and assumptions used to produce the utilisation and capacity forecasts and a discussion of the limitations of the forecasts, methodology and assumptions. The AMP should also discuss any capacity limitations identified or resolved in years during which an AMP was not disclosed.	12.6 a) The Load / demand forecasting methodology is described in *Appendix F - System Development*. b) Detailed load forecasts for each gate station is provided in *Appendix I - Load Forecasts* for the planning period and discussed in *Appendix F* and *Appendix I*. c) Key areas on the network that are anticipated to be constrained due to growth during the planning period are discussed in *Appendix G - Network Development Programme*.
12.7 Analysis of the significant network level development options identified, and details of the decisions made to satisfy and meet target levels of service, including: (a) the reasons for choosing a selected option for projects where decisions have been made. (b) the alternative options considered for projects that are planned to start in the next five years. (c) consideration of planned innovations that improve efficiencies within the network, such as improved utilisation, extended asset lives, and deferred investment.	12.7 *Section 5* of the GDB AMP Summary Document identifies the significant projects for the coming year. *Appendix F - System Development* and *Appendix H - Asset Management Approach* describe the development projects and rationale for decisions. This includes: (a) The reasons for choosing selected options, where decisions are made. (b) Alternative options considered for projects. (c) Consideration of innovations that improve efficiencies within the network.
12.8 A description and identification of the network development programme and actions to be taken, including associated expenditure projections. The network development plan must include: (a) a detailed description of the material projects and a summary description of the non-material projects currently underway or planned to start within the next 12 months. (b) a summary description of the programmes and projects planned for the following four years (where known. (c) an overview of the material projects being considered for the remainder of the AMP planning period. For projects included in the AMP where decisions have been made, the reasons for choosing the selected option should be stated which should include how target levels of service will be impacted. For other projects planned to start in the next five years, alternative options should be discussed.	12.8 *Section 5* of the AMP Summary Document identifies the significant projects for the coming year. *Section 6* discusses the proposed expenditure for the planning period. *Appendix G - Network Development Programme* and *Appendix F - System Development* describe the development projects forecast for the planning period. Associated expenditure projections for network development are included in *Appendix J – Expenditure Overview*.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
Lifecycle Asset Management Planning (Maintenance and Renewal)	
13 The AMP must provide a detailed description of the lifecycle asset management processes, including:	*Section 5.6* of the GDB AMP Summary Document details the asset management improvement aims and *Appendix H – H.3.5.1* provides a summarised view of the approach to asset lifecycle management.
13.1 The key drivers for maintenance planning and assumptions.	The key drivers for the asset maintenance are described in *Appendix H – Asset Management Approach - H.3.8.*
13.2 Identification of routine and corrective maintenance and inspection policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include: (a) the approach to inspecting and maintaining each category of assets, including a description of the types of inspections, tests and condition monitoring carried out and the intervals at which this is done. (b) any systemic problems identified with any particular asset types and the proposed actions to address these problems. (c) budgets for maintenance activities broken down by asset category for the AMP planning period.	13.2 The total Opex forecast is included in *Section 6.2* of the GDB AMP Summary Document. (a) Routine inspections and maintenance are described in *Appendix K - Asset Maintenance Schedules*. (b) Key risks and issues identified for each asset type are described in *Appendix E - Asset Fleets* and *Appendix G - Network Development Programme*. (c) Categorised budgets for maintenance activities are included in *Appendix K - Asset Maintenance Schedule*.
13.3 Identification of asset replacement and renewal policies and programmes and actions to be taken for each asset category, including associated expenditure projections. This must include: (a) the processes used to decide when and whether an asset is replaced or refurbished, including a description of the factors on which decisions are based, and consideration of future demands on the network and the optimum use of existing network assets. (b) a description of innovations made that have deferred asset replacement. (c) a description of the projects currently underway or planned for the next 12 months. (d) a summary of the projects planned for the following four years (where known). (e) an overview of other work being considered for the remainder of the AMP planning period.	13.3 The Firstgas approach to asset management is summarised throughout *Section 2.6* of the GDB AMP Summary Document and highlights the view of asset health leading to investment (whether replacement or renewal) decisions. Key asset replacement projects undertaken in the previous financial year are discussed in *Section 4* and key projects for the coming year are described in *Section 5* of the Summary Document. Further detail identifying asset replacement and renewal policies is available in: *Appendix H – Asset Management Approach*. This appendix describes the approach to asset replacement and renewal, and the drivers behind investment. *Appendix L -Significant Projects* describes the asset replacement projects including innovations undertaken, if any, that have deferred asset replacement.
13.4 The asset categories discussed in clauses 13.2 and 13.3 should include at least the categories in clause 6 above.	The distribution assets identified in the appendices noted against Clauses 13.2 and 13.3 include those specified in Clause 6.
Non-Network development, maintenance and renewal	
14 AMPs must provide a summary description of material non-network development, maintenance and renewal plans, including:	14 *Sections 2 and 3* of the AMP Summary Document describe the asset management approach. The same approach to life cycle management and line of sight from the strategic plan to the asset management system applies to both network and non-network assets.
14.1 A description of non-network assets.	14.1 Non-network assets are described in *Appendix H – Asset Management Approach – H.3.11, H.3.14*
14.2 development, maintenance and renewal policies that cover them.	14.2 Non-network assets are described in *Appendix H – Asset Management Approach – H.3.11, H.3.14*
14.3 a description of material capital expenditure projects (where known) planned for the next five years.	14.3 Non-network asset projects are described in *Appendix H – Asset Management Approach - H.3.11, H.3.14*.
14.4 a description of material maintenance and renewal projects (where known) planned for the next five years.	14.4 Non-network asset projects are described in *Appendix H – Asset Management Approach - H.3.11, H.3.14*
Risk management	Chapter 4
15 AMPs must provide details of risk policies, assessment, and mitigation, including:	15 The asset management approach links expenditure to the assessment of asset condition and to areas needed to reduce risk and maintain asset reliability. This is summarised in the asset management improvement programme information in *Section 5.6* of the GDB AMP Summary Document. For more detail refer to *Appendix H – Asset Management Approach*. This appendix describes asset risk management policy, principles and framework, as well as key risk sources.

2.6 ASSET MANAGEMENT PLANS AND FORECAST INFORMATION	AMP section identifies where compliance addressed
15.1 Methods, details and conclusions of risk analysis.	15.1 The risk management framework and identified general risks are defined in *Appendix H – Asset Management Approach – H.3.4.*
15.2 Strategies used to identify areas of the network that are vulnerable to high impact low probability events and a description of the resilience of the network and asset management systems to such events.	15.2 *Appendix H – H.3.4* outlines various risk sources, with factors and strategies used to identify vulnerable areas.
15.3 A description of the policies to mitigate or manage the risks of events identified in clause 15.2.	*15.3 Appendix H – H.3.4.1* includes the policy, and the processes used to evaluate and treat risks associated with the network.
15.4 Details of emergency response and contingency plans. Asset risk management forms a component of a GDB's overall risk management plan or policy, focusing on the risks to assets and maintaining service levels. AMPs should demonstrate how the GDB identifies and assesses asset related risks and describe the main risks within the network. The focus should be on credible low-probability, high-impact risks. Risk evaluation may highlight the need for specific development projects or maintenance programmes. Where this is the case, the resulting projects or actions should be discussed, linking back to the development plan or maintenance programme.	15.4 *Appendix H – 3.4.2* outlines the emergency response and contingency plans.
Evaluation of performance	
16 AMPs must provide details of performance measurement, evaluation, and improvement, including:	16 Performance measures are outlined in *Appendix H – Asset Management Approach – H.5* and performance of the distribution network is included in *Section 4.3* of the GDB AMP Summary Document.
16.1 A review of progress against plan, both physical and financial. (a) referring to the most recent disclosures made under clause 2.5.1 of this determination, discussing any significant differences and highlighting reasons for substantial variances. (b) commenting on the progress of development projects against that planned in the previous AMP and provide reasons for substantial variances along with any significant construction or other problems experienced.	16.1 *Section 4.3* of the AMP Summary Document reviews progress against plan in 2023. Further detail on the progress of development projects and management initiatives/ programmes are included in *Appendix H – Asset Management Approach*
(c) commenting on progress against maintenance initiatives and programmes and discuss the effectiveness of these programmes noted.	
16.2 An evaluation and comparison of actual service level performance against targeted performance. (a) in particular, comparing the actual and target service level performance for all the targets discussed in the previous AMP under clause 7 and explain any significant variances.	16.2 A comparison of past performance measures is included in *Appendix H – Asset Management Approach.* The trend of results for key performance measures are included in *Section 4.3* of the AMP Summary Document. Firstgas has owned distribution assets since April 2016. All results post 2016 are available.
16.3 An evaluation and comparison of the results of the asset management maturity assessment disclosed in the Report on Asset Management Maturity set out in Schedule 13 against relevant objectives of the GDB's asset management and planning processes.	16.3 *Section 5.6* of the AMP Summary Document includes a section on the asset management improvement programme. This section considers the AMMAT results and references the asset management and planning processes. Evaluation of AMMAT results, and future improvement initiatives are included in *Appendix H – Asset Management Approach – H.1.*
16.4 An analysis of gaps identified in clauses 16.2 and 16.3. Where significant gaps exist (not caused by one-off factors), the AMP must describe any planned initiatives to address the situation.	16.4 Improvement initiatives based on gaps in the AMMAT results are included in Section 4.3 of the AMP Summary Document and in greater detail in *Appendix H – Asset Management Approach – H.1.*
Capability to Deliver	
17 AMPs must describe the processes used by the GDB to ensure that: 17.1 The AMP is realistic, and the objectives set out in the plan can be achieved.	17 The asset management approach sets a line of sight between corporate strategy and life cycle management (refer *Section 4* of the AMP Summary Document). This, alongside governance and organisation structure and delivery model outlined in *Section 2* of the AMP Summary Document ensures the AMP is realistic and the objectives are achievable. *Appendix H – Asset Management Approach – H.2* describes the governance and framework in place in greater detail to ensure a realistic AMP is achieved.
17.2 The organisation structure and the processes for authorisation and business capabilities will support the implementation of the AMP plans.	17.2 *Section 2* of the AMP Summary describes the governance and framework of the AMP, as well as the organisational structure that supports the implementation of the AMP plans.

Appendix N Director's Certificate

Certification for Year-beginning Disclosures

Clause 2.9.1

We, Mark Adrian Ratcliffe and Fiona Ann Oliver, being directors of First Gas Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a) The following attached information of First Gas Limited prepared for the purposes of clauses 2.6.1, 2.6.3, 2.6.6 and 2.7.2 of the *Gas Distribution Information Disclosure Determination 2012* in all material respects complies with that determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

c) The forecasts in Schedules 11a, 11b, 12a, 12b and 12c are based on objective and reasonable assumptions which both align with First Gas Limited's corporate vision and strategy and are documented in retained records.

Director: Mark Adrian Ratcliffe

Director: Fiona Ann Oliver

27 July 2023
Date

27 July 2023
Date