









**BLIND RIVER
DRINKING WATER SYSTEM
WATERWORKS # 210000041
ANNUAL & SUMMARY
REPORTS 2018**

Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Blind River Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2018.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Blind River DWS) and how limits were met or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

 System Description	Page 3
 Water Quality	Page 4
 Compliance	Page 7
 Flows	Page 8
 Report Endorsement	Page 10
 Tables, Definition of Terms App: A/B	Page 11



System Description

The facility is owned by the Corporation of the Town of Blind River and operated under contract by PUC Services Inc. The system is classified as a Large Municipal Residential system, the water treatment plant is a Class 3 WT subsystem and the distribution is a Class 1 WD subsystem. The drinking water system serves a population of approximately 2,500. The surface water treatment plant is rated for a maximum capacity of 6,000m³/day.

Water is drawn from the Blind River well field located along the east shoreline of the Blind River on Riverside Drive, and subjected to alkalinity/pH adjustment, chemically assisted coagulation and flocculation, dual-media direct filtration and activated carbon adsorption. Sodium Hypochlorite is used for primary disinfection and secondary disinfection. Hydrofluosilicic acid is used for fluoridation. Treated water is pumped into an elevated tank as well as feeding the water distribution system.

Chemicals

Chemicals utilized at the Blind River Treatment plant during 2018 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Aluminum Chlorohydrate for coagulation
- Polymer as a coagulant aid
- Potassium Hydroxide for pH and alkalinity adjustment
- Hydrofluosilicic acid for fluoridation

2018 Expenditures

During the year of 2018, expenses were incurred to maintain treatment and distribution functions:

- Chemical Tank replacement (Potassium Hydroxide)
- Valve actuator repairs- rebuilds
- Electrical Safety Authority permits
- Third party equipment calibrations
- Fluoride analyzer probes
- Lab test kits (colorimeters)
- 12 month surveillance audit for DWQMS

2018 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

Form 2 – Record of Minor Modification or Replacements

- Chemical metering pumps (Post / trim chlorine dosing)
- Chemical tank replacement (Potassium Hydroxide)

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

Water Quality

Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 10 of O. Reg. 170/03 for Large Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	Each well	weekly
Treated	EC / TC / HPC	1 sample	weekly
Distribution	EC / TC / HPC-25%	8 samples	monthly

Blind River's raw samples are comprised of the five production wells (Wells 5, 6, 7, 8, & 9). Treated samples are collected from the WTP lab; distribution sampling sites are from locations from throughout the system not limited to but including: Colonization Bleeder, Woodward Bleeder, and Kennedy Bleeder.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	271	0	0 - 42	n/a	n/a
Treated	53	0	0	51	0 - 20
Distribution	157	0	0 - 4	148	0 - 20

Operational Checks and Testing

Operational testing is completed as per Schedule 7 of O. Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers are utilized for measurement of filter turbidity, chlorine and fluoride residuals.

Table 2: Monthly Filter Turbidity Results

Month	Avg turbidity (NTU)			Range (NTU)	Monthly Filter Efficiency
	DM #1	DM #2	DM #3		
January	0.17	0.20	0.18	0.05 - 1.38	97.3
February	0.16	0.18	0.17	0.04 - 5.20	97.2
March	0.16	0.17	0.17	0.04 - 1.25	96.1
April	0.17	0.18	0.17	0.04 - 2.20	97.4
May	0.14	0.14	0.12	0.04 - 2.35	99.1
June	0.15	0.15	0.14	0.04 - 0.92	98.5
July	0.13	0.13	0.12	0.04 - 0.83	99.3
August	0.12	0.12	0.11	0.04 - 2.14	99.6
September	0.10	0.10	0.09	0.04 - 0.79	99.6
October	0.11	0.11	0.10	0.03 - 3.98	99.7
November	0.07	0.10	0.07	0.03 - 1.42	99.7
December	0.07	0.10	0.07	0.03 - 2.33	99.9

Filter Efficiency is monitored by tracking the run time above and below 0.30 NTU during filter run time.

Blind River Operations maintained filter compliance each month above 95%, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection.

Table 3: Chlorine and Fluoride Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)	Average Fluoride Residual (mg/L)	Fluoride Residual Range (mg/L)
January	1.22	0.99 – 1.38	0.69	0.13 – 0.80
February	1.33	1.00 – 1.78	0.67	0.15 – 0.75
March	1.24	0.95 – 1.47	0.74	0.15 – 1.09
April	1.16	0.83 – 1.51	0.57	0.42 – 0.88
May	1.06	0.78 – 1.24	0.57	0.43 – 0.65
June	1.11	0.60 – 1.39	0.62	0.11 – 0.69
July	1.11	0.79 – 1.40	0.64	0.47 – 0.70
August	1.09	0.75 – 1.27	0.62	0.31 – 0.74
September	1.10	0.72 – 1.30	0.77	0.47 – 0.86
October	1.14	0.79 – 1.47	0.74	0.10 – 0.92
November	1.06	0.80 – 1.40	0.56	0.20 – 0.89
December	1.02	0.63 – 1.51	0.59	0.38 – 0.75

Chlorine and fluoride residuals are continuously monitored and trended to real time on SCADA.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling regimens for Large Municipal Residential systems. Annual sampling is completed for Schedules 23 (inorganics) and 24 (organics), as well as quarterly sampling for Nitrites/Nitrates and THM's. Sodium and fluoride are required every 60 months. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Blind River's lead sampling under relief as outlined in the current DWWP which extended until the end of the first round of 2018. Round 2 was completed as per Schedule 15.1 of O. Reg. 170 based on population served by the system.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Result Value (µg/L)	Units	ODWS
Antimony	24-Jan-18	<0.60	µg/L	6
Arsenic	24-Jan-18	<1.0	µg/L	25
Barium	24-Jan-18	20	µg/L	1000
Boron	24-Jan-18	<50	µg/L	5000
Cadmium	24-Jan-18	<0.10	µg/L	5
Chromium	24-Jan-18	<1.0	µg/L	50
Fluoride	28-Jan-18	0.441	mg/L	1.5
Mercury	24-Jan-18	<0.10	µg/L	1
Selenium	24-Jan-18	<1.0	µg/L	10
Sodium	24-Jan-18	13.0	mg/L	20
Uranium	24-Jan-18	<2.0	µg/L	20

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03. No result is above the half MAC with the exception of sodium which has an aesthetic objective (AO) of 200 mg/L, but has a limit of 20 mg/L for medical reasons and would require notifications if exceeded.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	20-Mar-18	7-Jun-18	20-Sep-18	23-Nov-18
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.10	<0.10	<0.10	<0.10
Nitrate	10	0.446	0.421	0.621	0.547

All quarterly results for Nitrites and Nitrates are well below ODWS.

Table 5a: THM/HAA Results

Date	ODWS	Q1	Q2	Q3	Q4	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	69.7	67.7	69.4	50.1	64.2
HAA	80	61.3	56.2	52.5	56.8	56.7

ODWS established a MAC of 80 for HAAs effective January 1, 2020.

Table 6: Schedule 24 - Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	24-Jan-18	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	24-Jan-18	<0.20	µg/L	5
Azinphos-methyl	24-Jan-18	<0.10	µg/L	20
Benzene	29-Jan-18	<0.50	µg/L	5
Benzo(a)pyrene	24-Jan-18	<0.010	µg/L	0.01
Bromoxynil	24-Jan-18	<0.20	µg/L	5
Carbaryl	24-Jan-18	<0.20	µg/L	90
Carbofuran	24-Jan-18	<0.20	µg/L	90
Carbon Tetrachloride	29-Jan-18	<0.20	µg/L	5
Chlorpyrifos	24-Jan-18	<0.10	µg/L	90
Diazinon	24-Jan-18	<0.10	µg/L	20
Dicamba	24-Jan-18	<0.20	µg/L	120
1,2-Dichlorobenzene	29-Jan-18	<0.50	µg/L	200
1,4-Dichlorobenzene	29-Jan-18	<0.50	µg/L	5
1,2-Dichloroethane	29-Jan-18	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	29-Jan-18	<0.50	µg/L	14
Dichloromethane	29-Jan-18	<5.0	µg/L	50
2,4 Dichlorophenol	24-Jan-18	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	24-Jan-18	<0.20	µg/L	100
Diclofop-methyl	24-Jan-18	<0.20	µg/L	9
Dimethoate	24-Jan-18	<0.10	µg/L	20
Diquat	24-Jan-18	<1.0	µg/L	70
Diuron	24-Jan-18	<1.0	µg/L	150

Parameter	Date	Result	Unit	ODWS
Glyphosate	24-Jan-18	<5.0	µg/L	280
Malathion	24-Jan-18	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	24-Jan-18	<0.20	µg/L	100
Metolachlor	24-Jan-18	<0.10	µg/L	50
Metribuzin	24-Jan-18	<0.10	µg/L	80
Monochlorobenzene	29-Jan-18	<0.50	µg/L	80
Paraquat	24-Jan-18	<1.0	µg/L	10
Pentachlorophenol	24-Jan-18	<0.50	µg/L	60
Phorate	24-Jan-18	<0.10	µg/L	2
Picloram	24-Jan-18	<0.20	µg/L	190
Polychlorinated Biphenols (PCB)	24-Jan-18	<0.035	µg/L	3
Prometryne	24-Jan-18	<0.10	µg/L	1
Simazine	24-Jan-18	<0.10	µg/L	10
Terbufos	24-Jan-18	<0.20	µg/L	1
Tetrachloroethylene	24-Jan-18	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	24-Jan-18	<0.50	µg/L	100
Triallate	24-Jan-18	<0.10	µg/L	230
Trichloroethylene	29-Jan-18	<0.50	µg/L	5
2,4,6-Trichlorophenol	24-Jan-18	<0.50	µg/L	5
Trifluralin	24-Jan-18	<0.10	µg/L	45
Vinyl Chloride	29-Jan-18	<0.20	µg/L	2

All results for the required organic sampling of schedule 24 are below the MAC. Parameters exceeding half MAC are noted in Table 6a.

Table 6a: Organics - Sampling exceeding half MAC

Date of Sample	Parameter	Result Value
20-Mar-2018	THM	69.7
07-Jun-2018	THM	67.7
20-Sept-2018	THM	69.4
23-Nov-2018	THM	58.9

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

Table 7: Community Lead Sampling Results

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	63	0 – 9.8	0
Distribution	16	0 – 3.7	0

Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar15 and June 15- Oct 15).



Compliance

Adverse Water Quality Incidents

During 2018, the Blind River DWS reported four incidents of adverse water quality.

Table 8: Adverse Water Quality Incidents

Date	Incident Reported
2018-02-21	Loss of Data in SCADA system
2018-04-17	Loss of distribution pressure due to main break
2018-07-19	Adverse bacteriological result (Total Coliform)
2018-09-28	Adverse bacteriological result (Total Coliform)

Annual Drinking Water System Inspection

The annual DWS inspection took place on September 19, 2018 by MECP Drinking Water inspector Parise Drolet. Zero non-conformances and zero recommendations and best practice were identified. The DWS received a final inspection rating of 100%.

FLOWS

Raw water flows are controlled by demand and operator determined set-points to maintain 24 hour operation. All well flow measurements are below the PTTW limits defined for each well.

Municipal Drinking Water Licence: 205-101 specifies a maximum rated flow of 6000 m³/d.

The max flow rate reported was 1,647 m³/d, 27.5 % of the rated capacity.

The Blind River WTP treated and distributed a total of 374.2 ML during the year of 2018. The average daily treated flow demand was 1025 m³/d, and the maximum daily flow was 1,672 m³/d on June 27, 2018.

The Blind River GUDI wells have a history of deterioration. Even though the current years flow demands are low, the well yield is declining and well rehabilitation will be required.

Plant flow rates are considered daily to evaluate required demand but also to ensure processes are monitored and held with minimum retention time for THM control. The plant buffers a higher capacity during winter months when breaks may occur and consumers may run water to avoid frozen services and mains.

Chart 1: 5 year Flow Comparison

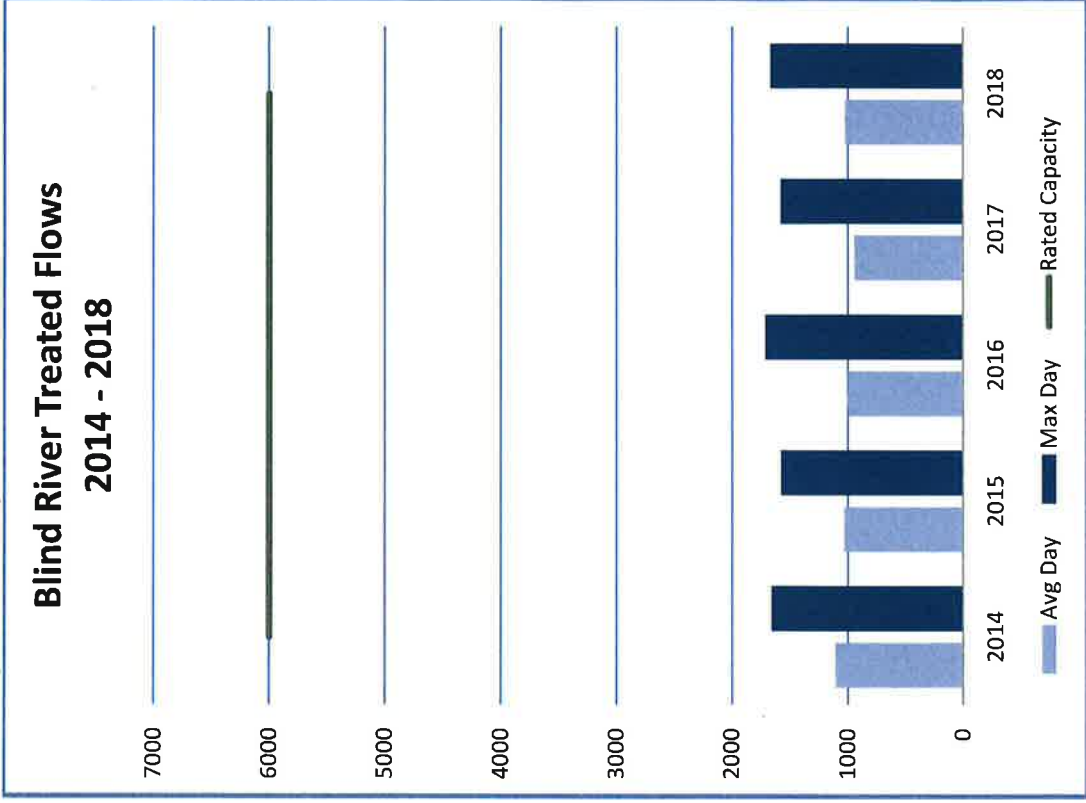
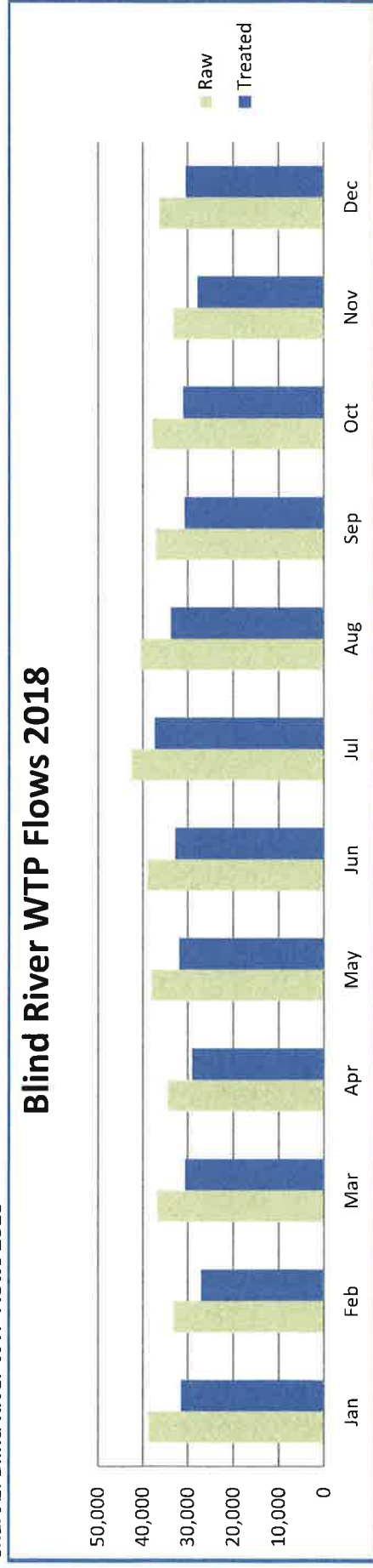


Table 9: Raw and Treated water Flows 2018

2018 Month	Raw Water Flows					Treated Water Flows					% Max. Flow Day of rated Capacity
	Raw Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	% Max. Flow Day of PTTW	Treated Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)		
January	38,881	876	1,499	1,254	26	31,516	563	1,447	1,017	24	
February	33,404	1,052	1,405	1,193	24	27,050	486	1,367	966	23	
March	36,974	1,101	1,276	1,193	22	30,598	829	1,167	987	19	
April	34,648	1,041	1,218	1,155	21	29,060	848	1,090	969	18	
May	38,136	1,137	1,328	1,230	23	31,920	915	1,312	1,030	22	
June	39,096	1,047	1,531	1,303	26	32,796	676	1,672	1,093	28	
July	42,603	1,182	1,648	1,374	28	37,412	925	1,511	1,207	25	
August	40,607	926	1,454	1,310	25	33,771	663	1,410	1,089	24	
September	37,308	1,068	1,455	1,244	25	30,731	560	1,569	1,024	26	
October	38,021	1,082	1,410	1,227	24	31,047	824	1,468	1,002	24	
November	33,391	1,040	1,296	1,113	22	27,846	768	1,185	928	20	
December	36,509	1,061	1,243	1,178	21	30,450	891	1,132	982	19	

PTTW limit total – 5,785.2 m³/d, Rated Capacity plant flows – 6,000m³/d

Chart 2: Blind River WTP Flows 2018



Report Endorsement

Report Availability

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public on the Town Office.

Town of Blind River Municipal Office
11 Hudson St
Blind River, ON
POH 1B0

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the municipal council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's Safe Drinking Water Act also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system.

Report Endorsement

This Summary report for The Blind River Drinking Water System for the period of January 1st to December 31st, 2018 has been prepared in accordance to Schedule 22 of O. Reg. 170/03. The report has been reviewed and accepted by the Town of Blind River council.

Date

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

Table 1: Microbiological sampling requirements

Table 1a: Microbiological Sample Results

Table 2: Monthly Filter Turbidity Results

Table 3: Chlorine and Fluoride Residuals

Table 4: Schedule 23 - Inorganics

Table 5: Nitrite/ Nitrate Results

Table 5a: THM/RAA Results

Table 6: Schedule 24 - Organics

Table 6a: Organics - Sampling exceeding half MAC

Table 7: Community Lead Sampling Results

Table 8: Adverse Water Quality Incidents

Table 9: Raw and Treated water Flows 2018

Chart 1: 5 year Flow Comparison

Chart 2: Blind River WTP Flows 2018

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
DM	Dual Media
DWS	Drinking water system
EC	E. Coli
GUDI	Groundwater under direct influence of surface water
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
m ³	Cubic metres
m ³ /d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m ³)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant



DWQMS Report to Owner – Summary

- a) Incidents of regulatory non-compliance
- b) Incidents of adverse drinking water tests
- c) Deviations from critical control point limits and response actions
- d) Efficacy of the risk assessment process
- e) Results of audits (internal and external)
- f) Results of relevant emergency response testing
- g) Operational performance
- h) Raw water supply and drinking water quality trends
- i) Follow-up action items from previous management reviews
- j) Status of management action items identified between reviews
- k) Changes that could affect the QMS
- l) Summary of consumer feedback
- m) Resources needed to maintain the QMS
- n) Results of the infrastructure review
- o) Operational Plan currency, content and updates
- p) Summary of staff suggestions
- q) New Business – Other issues that impact on the quality management system
- r) Date of Next Meeting

