



Aboriginal Affairs and  
Northern Development Canada

Affaires autochtones et  
Développement du Nord Canada

# Maintenance Management Plan for Drinking Water and Wastewater Systems in First Nations Communities

Guide and Template



Canada 

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QS-6337-000-EE-A1

Catalogue :R3-205/2014E-PDF

ISBN: 978-1-100-23123-5

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This Publication is also available in French under the title: Plan de gestion de l'entretien des systèmes d'approvisionnement en eau potable et de traitement des eaux usées dans les collectivités des Premières Nations : guide et modèle

## Foreword

The goal of this guide is to provide First Nations communities with guidance to develop the maintenance management plans that are required by Aboriginal Affairs and Northern Development Canada's (AANDC) Protocols for their drinking water and wastewater systems. Each section of this document is accompanied by templates that First Nations can use to develop their own community-specific maintenance plans. These templates are not rigid or one-size-fits-all mandatory forms to fill out – they should be seen as generic tools that can be modified and improved to meet specific needs of the community.

As a starting point, this guide was developed based on available literature on maintenance management planning for water and wastewater systems. Additional efforts were invested to produce a user friendly and informative document that fits the context of First Nations communities and their typically small systems. AANDC's regional engineers and technicians shared their experience from the field, which was invaluable in producing a guide that is practical, straightforward to apply, and accompanied by templates that will hopefully address many maintenance management gaps identified in the past.





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# 1. Introduction

Aboriginal Affairs and Northern Development Canada's (AANDC) Water and Wastewater Policy (*Water and Wastewater Policy and Level of Service Standards*) requires that on-reserve water and wastewater systems meet a series of design and operational standards and good management practices. Among those management practices is the requirement for First Nations to develop a Maintenance Management Plan (MMP) for each of their systems. The purpose of this document is to provide guidance on the development of MMPs and to propose a series of templates that First Nations can readily use to create their own community-based plans.

The development and implementation of an MMP contributes to reduce overall system management risks by improving the effectiveness of preventative maintenance activities, by minimizing service disruptions, and by extending asset life.

This guide explains, in a simple and logical manner, the basic elements that should be considered in the preparation of an MMP. This guide applies to both water and wastewater systems — in fact, First Nations sometimes plan the maintenance of their drinking water and wastewater systems using a single maintenance schedule.

## **What is a Maintenance Management Plan?**

A Maintenance Management Plan is a compilation of records in the form of binders or computer files that formalizes the planning, scheduling, documentation and reporting of preventative maintenance activities, and provides a method of recording unscheduled or corrective maintenance activities.

**Preventative maintenance (PM)** can be defined as systematic and periodic maintenance work done on system components to prevent breakdown, reduce wear, improve efficiency, and extend the life of equipments and structures. Preventative maintenance can generally be performed by system operators while the system is in operation.

**Corrective maintenance (CM)** can be defined as unplanned work required for repairs and replacements as system component failures occur and emergency conditions arise. Corrective maintenance can be performed by system operators, but sometimes it has to be contracted out to a third party.

Preventative maintenance requirements must be determined and incorporated in an MMP to allow in-house and contracted maintenance tasks to be planned and scheduled into the normal flow of work.

## **Who develops and who uses Maintenance Management Plans?**

The maintenance of large water or wastewater systems is usually performed by a dedicated group or unit, whereas for small systems, a single operator may perform all operation and maintenance duties. In First Nations communities, MMPs are often developed by or in collaboration with system operators, with the assumption that they have a good knowledge and understanding of

their system. Where available, Circuit Rider Trainers (CRTs) and Tribal Council representatives can provide valuable support and expertise in the preparation of an MMP. Once developed, it is the system operators who will use the MMP to carry out and monitor maintenance procedures.

### **Important notes**

This Guide does not cover operations aspects of your system, such as carrying out inspections, reading meters, calibrating process units, water quality monitoring and testing, operating valves, backwashing filters, operating pumps, etc. This Guide focuses on the “maintenance” part of “operation and maintenance” only.

This Guide is not a technical reference on maintenance tasks; it won’t tell you what specific maintenance tasks should be performed, how, or when. For example, it won’t tell you which oil to use in a diesel engine, or how frequently you have to flush the distribution network of your system. Rather, this Guide is about ensuring that maintenance tasks get done. This guide assumes that:

- As a system operator, you are qualified to operate and maintain your system;
- You have access to a Circuit Rider, a Tribal Council technical expert, or other technical support as needed;
- You have a detailed operation and maintenance (O&M) manual and the appropriate manufacturer’s manuals, drawings and other documents for your system and its components.

An MMP is not a set of new or detailed technical procedures for performing maintenance tasks in a better way. An MMP is a means of getting organized so that necessary maintenance activities (already described in detail in an O&M manual and asset manufacturer’s manuals) are scheduled and are performed at the right time and in an efficient and cost-effective manner.



## 2. Why do you need a Maintenance Management Plan?

You need an MMP to identify and describe maintenance tasks, develop maintenance schedules, outline resource requirements (time/human resources, consumable materials, tools, and equipment including health and safety (H&S) equipment and rental equipment), and to prepare associated budgets.

The main objective of an MMP is to prevent unplanned corrective maintenance — it is typically far less expensive and far more effective to regularly spend time and money to carry out preventative maintenance activities rather than to wait until system components (or assets, pieces of equipment) deteriorate and break down, causing service disruptions and higher repair costs. The greatest reliability and dependability of system components are experienced only when a well-planned and organized MMP is implemented.

The benefits of carrying out an MMP include:

- Increased reliability of system components
- Increased life expectancy
- Minimized service interruptions and downtime
- Increased system performance
- Minimized major repairs
- Detection and prevention of potential system failures
- Better use of system operators' time through planning and scheduling



- Reduced and controlled maintenance costs
- Accurate records of maintenance work performed
- Better financial information data and capital improvement planning

### 3. What should your Maintenance Management Plan include?

An MMP includes a number of interconnected components. Your MMP should contain at least the following four basic components:

1. **Asset Inventory and Asset Record Cards:** A list of maintenance tasks to be performed, their frequency, and a list of replacement parts for each system component that needs to be maintained.
2. **Task Description Cards:** A summary description of each maintenance task to be performed, by whom, necessary tools, consumable materials and equipment including H&S equipment and rental equipment, and other information.
3. **Maintenance Schedule and Checklist** forming an annual maintenance plan for all assets of a system, with resources and budget information.
4. **Maintenance Tracking Tool** to support operators and direct contracted parties according to planned activities and to track maintenance work done.

In addition to the above, MMPs often include an inventory system for spare parts and consumable materials, which are typically stored in a separate storage area for that purpose. System operators must have easy and rapid access to the required spare parts, supplies, tools, and equipment necessary to perform their work. Maintenance work should not have to wait for some parts to be delivered.

The following sections of this guide provide more information on each MMP component.

### 4. Asset Inventory and Asset Record Cards

#### Asset Inventory

The first step in developing an MMP for your water or wastewater system is to compile a list of all the components and pieces of equipment of that system that need maintenance. You can typically pull this information from the system's schematics, process flow diagrams, record drawings, O&M manual, etc. Those documents are typically provided by the design/build supplier upon delivery of the system. Another good source of asset inventory information is the Asset Condition Reporting System (ACRS) reports.

If you don't yet have a filing system for asset inventory documents, you should include with the MMP a list of all records that describe your system (plans, specifications, manufacturer's manuals, etc.) and note where they are located. The location of these documents should be noted in the MMP so they can be easily found and used.

In the event that such documents are not available for your system, you can compile an inventory of assets (or system components) to be maintained on a System Inventory Card that you can create for the purpose of your MMP. However, since asset inventory information is already

available in some shape or form for most systems, this Guide does not require any specific System Inventory Card template to be filled. Please refer to Appendix 5 – Supplementary Templates for additional guidance.

### **Asset Record Cards**

For each component or asset of your system that needs maintenance, you need to keep a list of required maintenance tasks, their frequency, and other key technical information about the asset that you will need to refer to on a regular basis. This information should be collected on an Asset Record Card. The following is an outline of the information that an Asset Record Card should contain:

- Asset or system component name
- Description, number and location in system
- Size, model, type and serial number
- Supplier with address, phone number, e-mail address and contact person
- Installation date, installer
- Important asset specifications: capacity, size, rating, electrical/mechanical data
- Preventative maintenance tasks to be accomplished, frequency and Task Description Card number (see further details in Section 5)
- Spare parts
- Consumable materials (proper lubricant, coatings, etc.)
- Manufacturer’s manual name and location

An Asset Record Card template is provided in Appendix 1.

The manufacturer of each asset usually provides a manual indicating the proper operating and maintenance procedures required. The manufacturer’s manual is generally the best maintenance guide for any particular system component. Putting together a list of required maintenance tasks is necessary to develop a maintenance schedule and to estimate resource requirements — Section 6 of this Guide focuses on those aspects.

## **5. Task Description Cards**

Once maintenance tasks and other key information for an asset have been listed on an Asset Record Card, the most important or complex preventative maintenance procedures should be described in more detail on a separate Task Description Card for that asset. Task Description Cards will serve as guidelines in planning and executing the work. Simple routine tasks that are performed everyday will probably not need a Task Description Card.

A Task Description Card typically includes the following information:

- Task or maintenance procedure name
- Asset or system component name it refers to
- Frequency (daily, weekly, monthly, annually, etc.)

- Step-by-step procedure (and/or reference to a detailed manual)
- Safety precautions
- Materials required (parts, supplies, etc.)
- Tools or special equipment required
- Skill level or qualifications required (who needs to do it)
- Average or estimated time to complete the task (performance target)

For situations where there are a large number of tasks for an asset, it will be worth developing a sequential numbering system for Task Description Cards. A Task Description Card template is provided in Appendix 2.

**Level of detail** — A manufacturer’s manual typically contains detailed specifications and descriptions of maintenance procedures that need to be performed, at what frequency, and the tools, spare parts, consumable materials and equipment you need to do the work. It also provides the qualifications or skills required, as well as recommendations for disassembling and assembling the asset or parts of it. Your objective when developing Task Description Cards for your MMP is not to repeat this information in a new location. Rather, your goal should be to include just enough details so that the person doing the work:

- can quickly refer to important steps, notices or advice without the need to constantly refer to the manufacturer’s manual (especially while working in the field);
- can use the Task Description Card as a checklist to avoid skipping or missing steps;
- can refer to site-specific considerations or particularities (e.g., wet or dusty conditions, modified or upgraded components) not included in the manual; and
- conforms to the manufacturer's recommendations to avoid cancellation of any warranties.

**In-house or contracted?** — Depending on the skills required, you need to determine who or what type of personnel will do the work. A maintenance task that must be done every day and requires no special skills or tools should be done by the system operator(s). Major tasks that are conducted only annually (e.g., motor bearing repacking) may need to be contracted out. The use of third party contractors is an option to consider when the tasks or repairs are complex, or when it would be too expensive to develop the capacity of system operators to do the work.

## 6. Maintenance Schedule and Checklist

This is the most important component of your MMP. All preventative maintenance tasks for all assets or system components of your system need to be distributed throughout the year on a single schedule according to their frequency (i.e., daily, weekly, monthly, quarterly, semi-annually, or annually). Preventative maintenance must be formally scheduled in coordination with operating schedules and not done “as time allows.” Maintenance work is ideally scheduled for specific time periods so there is a uniform workload over the calendar year.

Scheduling can be a complex task. It is a matter of ensuring that all the work gets done with the correct frequency, within available resources, and with a smooth workload. A precise maintenance work schedule should detail which work should happen when and where such as a

checklist of daily, monthly, semi-annual and annual tasks. This is where the information compiled on Asset Record Cards (Section 4), Task Description Cards (Section 5), and also information recorded through the Maintenance Tracking Tool (see Section 7) from previous years becomes very handy.

The following suggests one way of doing it:

- Step 1: List all preventative maintenance tasks for all assets and summarize them by frequency group.
- Step 2: Estimate the time required to perform each preventative maintenance task. Such an estimate can be developed from Task Description Cards — it is simply a matter of adding the time requirements from individual or sub tasks.
- Step 3: Total the maintenance time requirements and compare this total to the available man-hours in the operation/maintenance work week.
- Step 4: Establish a maintenance schedule for a typical work week. Daily or weekly schedules provide a listing and checklist of maintenance tasks to be accomplished and initialed by system operators. In a similar fashion, establish a maintenance schedule for monthly, semi-annual and annual maintenance activities.

Maintenance schedule templates are provided in Appendix 3 for various frequencies. A maintenance schedule is meant to gather and show in a single place all the maintenance work to be done over the year on all assets and components of a water or wastewater system. Therefore the header of each schedule should mention the system it refers to. Consequently, when filling out the schedule, it is important that each entry in the list of tasks specifies the asset it refers to. For example, a weekly schedule should show all the maintenance work to be done and on which assets over the week. Use tick marks (✓) in the calendar cells as the work gets done.

### **Update your schedules**

Planning and scheduling preventative maintenance is an ongoing function. Planning must take contingencies into account and scheduling must be flexible enough to handle maintenance emergencies. Your maintenance schedules must be regularly adjusted to reflect unexpected corrective maintenance and any other work that takes time away from routine maintenance activities.

Because of unexpected work and emergencies, there is often a backlog of maintenance work to be done. A backlog develops when scheduled work isn't accomplished. When this happens, you should review your work backlog and assign the highest priority to the more critical tasks on a revised maintenance schedule.



## 7. Maintenance Tracking Tool

A Maintenance Tracking Tool (also often called a work order system) is a key component of an MMP because it directs system operators and/or contracted maintenance personnel according to the Maintenance Schedule (Section 6). It also helps tracking maintenance work done on individual system components to inform short and long term maintenance planning.

All maintenance work should be documented. Using a Maintenance Tracking Tool is one way to establish a permanent record of maintenance work performed. The Tool can be used to request work and record information for both preventative maintenance (PM) and corrective maintenance (CM) tasks. For preventative maintenance, the origin of the work is the Maintenance Schedule. For corrective maintenance, a work request is usually triggered by an observed problem (e.g., during an inspection) or equipment breakdown.

A good Maintenance Tracking Tool contains three sections:

## **Section 1: Statement of work to be done by a system operator, or work order to a third party contractor**

The goal is to direct maintenance personnel to conduct a particular set of tasks at a particular time, according to the Maintenance Schedule. In other words, it tells what to do, where, when, and by whom. The statement of work should not give full details of all the subtasks associated with a given activity — this information is already contained on a Task Description Card (Section 5) and/or in a manufacturer’s manual. However, it should provide an outline of maintenance work to be done and any relevant information on the condition of the asset or observed problems to be fixed.

This section is generally written by a system operator or supervisor and contains the following information:

- Type of work order: (PM) or (CM)
- Requestor, date
- System operator or contracted person to conduct the work
- System component needing attention including name and location
- Malfunction or problem observed as appropriate
- Action(s) already taken
- Nature of the work to be done
- Date and time to be completed

## **Section 2: Record of maintenance work done**

Once the work is finished, the operator needs to describe the work done, problems encountered, how they were resolved, new preventative maintenance work requirements, instructions to operators, and any other relevant observations on the asset condition. If the work is contracted, this section can also be filled and signed by the person who completed the work. The following information should be included:

- Completion date
- Person who did the work
- Summary of work performed
- Problems encountered, means of resolution
- Additional or follow-up work required and when
- Other observations or instructions

## **Section 3: Time and budgeting information**

The Maintenance Tracking Tool can also be used to record data on time spent, consumable materials used, and costs incurred. After the maintenance work is done, a system operator completes the remaining sections of the Tool by documenting:

- Time needed to complete the task
- Labour hours and costs
- Consumable materials/parts used and associated costs
- Other costs

Once completed, the Maintenance Tracking Tool form should be filed in a history file or binder for the asset. The responsible system operator should file current maintenance work records with previous ones for that system component, and mark the item as done on the Maintenance Schedule. A Maintenance Tracking Tool template is provided in Appendix 4.

## **8. Inventory of Spare Parts and Supplies**

A storage area for spare parts, equipment, special tools and supplies should be established for your system. This will ensure that these items are available when you need them for maintenance work and repairs. The storage area may be a storage cabinet, a designated area within the treatment plant, or a small room with a log book in which to record items in the inventory, parts description, cost, date, supplier, and the minimum and maximum quantities to be maintained.

Inventory requirements for your MMP can be generated from recommended spare parts lists, which are typically provided with manufacturers' manuals. Inventory requirements can also be generated from experience and based on the size of the system.

Budgeting for the spare parts and supplies inventory involves finding a balance between too much and too little inventory. Too much is costly overhead, but too little can result in delays and lengthy system interruptions. The shelf-life/expiry date of the parts and materials in stock must also be considered when ordering new ones and maintaining the inventory. Keeping good maintenance history records will greatly help you make inventory decisions.

## **9. Ongoing maintenance planning and budgeting**

Developing an MMP is often not an easy process, especially the first year, where time and effort need to be invested to get organized, estimate the time needed for maintenance tasks, establish a budget without much cost information, and establish a maintenance schedule that meshes well with the operations work flow. However, it is worth the investment, and if you track and record maintenance activities for your system as described in this Guide, it will be much easier to update and fine-tune your MMP in future years.

A good MMP helps ensure that your system gets the most value from each asset and also helps in planning for adequate human and financial resources. It is also useful for reporting on maintenance work done and asset condition. This section explains how to get the most out of your MMP.



**Ongoing maintenance planning** — as you use your Maintenance Schedule as a checklist of work done and fill out your Maintenance Tracking Tool, this information can help provide answers to the following maintenance-related questions: Was overtime required? Is overhead cost for this type of work justified? Should this work be contracted? Maintenance tracking records will help you update time standards on your Task Description Cards and will help you make adjustments to your annual Maintenance Schedule to make it more efficient.

**Ongoing budgeting** — Completed Maintenance Tracking Tool sheets, as they accumulate, form a useful body of data for analyzing equipment performance and cost history. Once a full tabulation of maintenance costs (labour, consumable materials, etc.) has been made for each task/asset, these costs can be added up to form an annual maintenance cost budget for your system.

**Record keeping and accountability** — another important function of the Maintenance Tracking Tool (Section 7) is the establishment of a reliable proof of maintenance work done or accountability record for justifying decisions, expenditures, and recommendations. In fact, maintenance records are often the only sound basis for water or wastewater system operators to trigger manufacturers' warranty mechanisms, plan for system rehabilitations, capital improvements, or justify budgetary changes for expanding needs.

## 10. References

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- Maintenance Management Systems for Municipal Wastewater Facilities, Office of Water, USEPA, (1973)
- Preventive Maintenance Card File for Small Public Water Systems Using Groundwater, Office of Water, USEPA, (2004)
- Simplified Maintenance Management System, DIAND Technical Services, INAC (1990)



## **Appendices**

**Appendix 1. Asset Record Card**

Asset Name:		Location:	
ID No:		General Description/function:	
Model No:			
Serial No:		O&M Manual Ref.:	
Installation Date:		Manufacturer's Manual:	
Contractor:		Installer:	
Manufacturer: Name: Address: Phone No.: e-mail:		Local Service Provider: Name: Address: Phone No.: e-mail:	
Key Specifications: ▶ ▶ ▶ ▶ ▶		Warranty Dates: ▶ ▶ ▶ ▶ ▶	
Key Design Info: ▶ ▶ ▶		Key Field Values: ▶ ▶ ▶	
Preventative Maintenance Tasks	Frequency	Task Description Card No.	
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
Spare Parts	Local Supplier	Phone No.	
▶			
▶			
▶			
▶			

## Appendix 2. Task Description Card

		Task Description Card No.	
Task Name			
Frequency:			
Overall Task Description			
Asset Name	(Note: You can add lines if the task applies to more than one asset (e.g., flushing water mains))		
Identification No.			
Location	(Note: add lines if the task applies to multiple locations)		
Manufacturer's Manual Ref.			
Qualifications/Skills Required: ▶ ▶ ▶	Safety Precautions: ▶ ▶ ▶		
Tools, Parts, Materials and Test Equipment: ▶ ▶ ▶ ▶ ▶ ▶	Protective Equipment: ▶ ▶ ▶		
	Disposal of Hazardous Materials: ▶ ▶		
Operator <input type="checkbox"/>	Outside Contractor <input type="checkbox"/>		Contact Info:
Procedure Steps / Checklist			
Step	Description	Manual Ref.	
<input type="checkbox"/> Step 1			
<input type="checkbox"/> Step 2			
<input type="checkbox"/> Step 3			
<input type="checkbox"/> Step 4			
<input type="checkbox"/> Step 5			
<input type="checkbox"/> Step 6			
Average / Estimated Completion Time:			



### Appendix 3b. Maintenance Schedule and Checklist – Monthly, Quarterly

Community:		System:											Year:				
No	Task Description	Month												Note	Hours	Cost	
		January	February	March	April	May	June	July	August	September	October	November	December				
1	Monthly																
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
	Initial of Operator																
															Total		

No	Quarterly	January	February	March	April	May	June	July	August	September	October	November	December	Note	Hours	Cost	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
	Initial of Operator																
															Total		

Operator's Signature: \_\_\_\_\_

Supervisor's: \_\_\_\_\_

### Appendix 3c. Maintenance Schedule and Checklist — Semi-Annual, Annual, Bi-Annual

Community:		System:											Year:			
No	Task Description	Month												Note	Hours	Cost
	Semi-Annual	January	February	March	April	May	June	July	August	September	October	November	December			
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
	Initial of Operator															
Total																

No	Annual	January	February	March	April	May	June	July	August	September	October	November	December	Note	Hours	Cost
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
	Initial of Operator															
Total																

No	Bi-Annual	January	February	March	April	May	June	July	August	September	October	November	December	Note	Hours	Cost
1																
2																
3																
4																
	Initial of Operator															
Total																

Operator's Signature: \_\_\_\_\_

Supervisor's: \_\_\_\_\_

#### Appendix 4. Maintenance Tracking Tool

<b>Statement of Work</b>		Work Request No.	
Requestor:		Date:	
Asset Needing Attention:		Maintenance type:	
Location:	ID No.:	<input type="checkbox"/> PM	<input type="checkbox"/> CM
Task Description Card No (s).		Manufacturer's Manual:	
Inspection Date/Time:		Inspector:	
Malfunction Observed:		<input type="checkbox"/> New	<input type="checkbox"/> Existing <input type="checkbox"/> Recurrent
Nature of Work To Be Done:			
Previous Maintenance/Tests Performed:			
Expected Cause of Problem			
Action(s) Already Taken			
Special Instructions			
Target Completion Date			

#### Maintenance Work Performed

Performed By:	Date:
Description of Work Done:	
Problems/Resolution:	
Follow-up Needed:	
Other Observations / Field Precautions:	

#### Budget Information

Labour		Materials / Parts		Equipment Rental		Other Costs	
Hours	Cost	Item/Qty	Cost	Item	Cost	Item	Cost
	\$		\$		\$		\$
	\$		\$		\$		\$
	\$		\$		\$	<b>Total</b>	\$
	\$		\$		\$	<b>TOTAL COST</b>	\$
<b>Total</b>	\$	<b>Total</b>	\$	<b>Total</b>	\$		

## Appendix 5 – Supplementary Templates

In addition to the generic “essential” MMP templates provided and explained in this Guide, this appendix provides further templates that you may find useful, especially when recording information on specific asset types.

### Generic Description of System

<b>Owner</b>				
First Nation				
Address				
City				
Postal code				
<b>Responsible Officials</b>				
Name (s)				
Title				
Address				
Telephone No.				
City				
Email				

<b>Service Area Map</b>
Location of Map

<b>Permit Information</b>			
Permit No.	Issue Date	Permit Location	Purpose

<b>Treatment System Information</b>		
Facility Name		
Treatment System Schematic Attached	Yes <input type="checkbox"/>	No <input type="checkbox"/>



Schematic Indicates (Check those that apply):			
Sources of Supply <input type="checkbox"/>	Raw Water Taps <input type="checkbox"/>	Contact Tanks <input type="checkbox"/>	Other <input type="checkbox"/>
Chemical Treatment Injection Points <input type="checkbox"/>	Finished Water Taps <input type="checkbox"/>	Entry Points <input type="checkbox"/>	

<b>Treatment System Schematic</b>	
Facility Name	



**Asset / Equipment Record Card**

Equipment Registration	
Equipment Name	Equipment No.
Location	
Manufacturer	
Address	
City	
Postal Code	
Sales Representative	
Telephone Number	
Email	
Manufacturer's Manual No.	
Telephone Number	
Name Plate Data	Motor Data

Maintenance Required	Maintenance Type	Frequency

Contracted Labour	Address	Telephone

Maintenance Activities Performed	Date	Comments

Spare Part	Part No.	No. in Stock	Manufacturer	Telephone

<b>Asset / Equipment Specifications- Well</b>	
<b>Well No. 1 (Complete for Each Well)</b>	
Not Applicable	<input type="checkbox"/>
Name or Identification	
Permit No.	
Date of Permit	
Location	
Latitude	
Longitude	
Well Log Attached	<input type="checkbox"/> Yes <input type="checkbox"/> No
Date Drilled	
Well Driller	
Total Well Depth	m
Casing Length	m
Diameter	mm
Casing Diameter	m
Casing Grouted	<input type="checkbox"/> Yes <input type="checkbox"/> No
Depth of Grout	m
Pumping Capacity	L/s
Pumping Water Level	m
Static Water Level	m
Depth Gauge	Yes <input type="checkbox"/> No <input type="checkbox"/>

<b>Pumps</b>		
Not Applicable	<input type="checkbox"/>	
Name /Location		
Size (Size of Suction Piping x Size of Discharge Piping)	mm	
Capacity	L/s	
Head	m	
Manufacturer		
Model No.		
Pump Specifications Attached	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Impeller Diameter	mm	
Pump Curve		
Suction Pressure	psi	
Discharge Pressure	psi	
Metered	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Motor Manufacturer		
Motor Serial No.		
Horsepower		
RPM		
Volts		
Amps		
Phase		
Motor Frame No.		
Controls	Manual <input type="checkbox"/>	Automatic <input type="checkbox"/>

<b>Treatment</b>		
<b>Disinfection Unit</b>		
Chemical Supplier		
Address		
City		
Postal Code		
Contact Person		
Telephone No.		
Email		
Chemical Used		
Strength	%	
Container Size	L/kg	
<b>Type of Chemical Feeder</b>		
Equipment No.		
Manufacturer		
Model No.		
Pump Specifications Attached	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Capacity	L/s	
Pressure	psi	
<b>Chemical Feeder is Equipped With (Check those that apply):</b>		
Pressure Relief Valve <input type="checkbox"/>	De-gassing Valve <input type="checkbox"/>	Calibration Chamber <input type="checkbox"/>
Anti-siphon Valve <input type="checkbox"/>	Foot Valve <input type="checkbox"/>	Backpressure Valve <input type="checkbox"/>
Contact Time min.	At Flow Rate L/s	
Contact tank or Clearwell Volume	m <sup>3</sup>	
Transmission Pipe	Diameter mm	Length m
Controls	Manual <input type="checkbox"/>	Automatic <input type="checkbox"/>

<b>Other Treatment Unit</b>		
Purpose		
Chemical Used		
Container Size	L/kg	
Strength	%	
Chemical Supplier		
Address		
City		
Postal Code		
Contact Person		
Telephone No.		
<b>Type of Chemical Feeder</b>		
Equipment No.		
Manufacturer		
Model No.		
Feeder Specifications Attached	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Capacity	L/s	
Pressure	psi	
<b>Chemical Feeder is Equipped With (Check those that apply):</b>		
Pressure Relief Valve <input type="checkbox"/>	De-gassing Valve <input type="checkbox"/>	Calibration Chamber <input type="checkbox"/>
Anti-siphon Valve <input type="checkbox"/>	Foot Valve <input type="checkbox"/>	Backpressure Valve <input type="checkbox"/>
Method Used for Process Control		



<b>Distribution System</b>		
Location of Distribution Map		
Distribution Map Indicates (Check those that apply)		
Pipe Material <input type="checkbox"/>	Fire Hydrants <input type="checkbox"/>	Pipe Length <input type="checkbox"/>
Pipe Diameter <input type="checkbox"/>	Dead Ends <input type="checkbox"/>	Valves <input type="checkbox"/>
Valves Open	Left <input type="checkbox"/>	Right <input type="checkbox"/>
Fire Hydrants Open	Left <input type="checkbox"/>	Right <input type="checkbox"/>
<b>Pressure Regulation Valve</b>		
Location		
Manufacturer		
Size		
Do you maintain records of residential meters? Yes <input type="checkbox"/> No <input type="checkbox"/>		
Where are they located?		
Do you maintain an inventory of distribution materials such as pipes, valves, etc.?		
		Yes <input type="checkbox"/> No <input type="checkbox"/>
Where are they located?		

<b>Water Storage</b>				
Not Applicable		<input type="checkbox"/>		
Tank Manufacturer				
Address				
City				
Postal Code				
Telephone No.				
Email				
Type				
Location				
Capacity		m <sup>3</sup>		
Dimensions				
If Elevated Tank	Height	m	Diameter	m
If Reservoir	Height	m	Width	m
			Depth	m
Elevations	Base	m	Overflow	m
Pipe Size	Inlet	m	Outlet	m
Year Constructed				
Type Foundation				
Type of Construction				
Type of Paint System				
Storage Facility is Equipped With (Check those that apply)?				
Water Level Recorder <input type="checkbox"/>	Overflow Pipe <input type="checkbox"/>	Float Gauge <input type="checkbox"/>	Fence <input type="checkbox"/>	
Altitude Valve <input type="checkbox"/>	Exterior Ladder <input type="checkbox"/>	Pump Controls <input type="checkbox"/>	Drain Pipe <input type="checkbox"/>	
Interior Ladder <input type="checkbox"/>	Other <input type="checkbox"/>			

**Valve Record**

Water Supplier					
Location					
Number					
Make					
Size					
No. of Turns (New)					
Direction to Open		Left <input type="checkbox"/> Right <input type="checkbox"/>			
Date Installed					
Installed by					
Date Inspected	Condition	Turns to Open	Turns to Close	Maintenance and Remarks	Done By

**Fire Hydrant Record**

Water Supplier					
Location					
Number					
Make					
No. of Outlets					
Hose					
Streamers					
Hydrant Size					
Size Valve Openings					
Lateral Size					
Lateral Valve Size					
Direction to Open					
Date Installed					
Installed By					
Date Inspected	Condition	Turns to Open	Turns to Close	Maintenance and Remarks	Done By

### Corrective Maintenance Work Order

Date of Work		Due Date		Priority (H-M-L)	Plant Area	Equipment Number	Equipment Name	Location	
Nature of Problem									
Requested By	Phone Number	Estimated Man Hours	Job Started						
			Month		Day			Time	
			Job Completed						
			Month		Day			Time	
<b>Materials</b>					<b>Labour/Equipment</b>				
Stock No.	Item	Qty.	Unit Price	Total	Name	Reg. Hours	O.T. Hours	Rate	Total
Total					Total				

Outside Contractor Required		Yes <input type="checkbox"/>	No <input type="checkbox"/>	If Yes, Name		
Contractor Cost						
What Was Found Wrong?						
How Was It Fixed?						
Apparent Cause of Problem						
Remarks						
Work Completed By		Date				
Work Accepted By		Date				

**Maintenance Procedure Form**

Maintenance Procedure Title	
Maintenance Description	
Equipment Name	
Equipment No.	
Location	
Job Safety Analysis	
Tools, Parts, Materials and Test Equipment	
Procedure	
Checklist	
Task	Description
<input type="checkbox"/> Task 1	
<input type="checkbox"/> Task 2	
<input type="checkbox"/> Task 3	
<input type="checkbox"/> Task 4	
<input type="checkbox"/> Task 5	
<input type="checkbox"/> Task 6	
<input type="checkbox"/> Task 7	

