

 <p>GUAM WATERWORKS AUTHORITY</p>	STANDARD OPERATING PROCEDURE	No.	SOP-1500-WD-005
	Operation & Maintenance Procedures for Finished Water Storage Facilities	Effective Date	6/15/2026
		Final Approver	 Miguel C. Bordallo, P.E. General Manager
		Revision Letter	A

1.0 Purpose

This Standard Operating Procedure (SOP) establishes guidelines for routine operation, inspection, and maintenance of the Guam Waterworks Authority’s (GWA) Finished Water Storage Facilities to safeguard water quality and ensure the integrity of the potable water distribution system. These procedures encompass daily inspections, water level monitoring, and structural assessments.

2.0 Scope

This SOP applies to all GWA personnel assigned to the Water Distribution section responsible for operating and maintaining the reservoirs.

3.0 Policy

All maintenance activities shall be done in accordance with the Safe Drinking Water Act (SDWA), United States Environmental Protection Agency (USEPA) regulations, and American Water Works Association (AWWA) Standards such as M42 Steel Water Storage Tanks, D110-13 Wire- and Strand-Wire, Circular, Pre-stressed Concrete Water Tanks, C652-19 Disinfection of Water Storage Facilities, and other applicable standards.

Operators should consult applicable Operations and Maintenance (O&M) manuals for detailed equipment maintenance procedures and specifications.

4.0 Definitions

- 4.1. **Altitude Valve:** A valve that automatically shuts off the flow into a water storage reservoir when the water level in the reservoir reaches a predetermined level. The valve automatically opens when a set level (pressure) in the reservoir is reached.
- 4.2. **Call-Out:** A request for immediate presence or assistance from field personnel to address an urgent operational issue due to reservoir levels and booster pump stations (BPS).
- 4.3. **Distribution System:** A network designed to deliver potable water from a treatment plant, wells, or reservoirs to its consumers, including residential, commercial, industrial, and public users.
- 4.4. **Fall Protection:** Equipment required by Occupational Safety and Health Administration (OSHA) to prevent falls when working at heights greater than four (4) feet. This equipment includes, but is not limited to, ladder cages, safety harness and line, safety nets, stair railings, and handrails.
- 4.5. **Hatch:** Opening on the reservoirs for personnel access or observation.
- 4.6. **Inlet:** The point in the reservoir where water enters.
- 4.7. **Outlet:** The point in the reservoir where water exits.

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- 4.8. **Pressure Reducing Valve (PRV):** A PRV reduces incoming water pressure to a safer, constant, predetermined downstream pressure. A pressure adjustment setting on the valve or by an external sensor establishes the downstream pressure.
- 4.9. **Pressure Sustaining Valve (PSV):** A PSV maintains a minimum pressure in the upstream system by responding to changes in upstream pressure, regardless of fluctuations in downstream demands.
- 4.10. **Screen:** 316 stainless steel wire mesh to keep birds/rodents (16x16 sized) and insects (24x24) from entering the reservoir. Screens are located at the tank roof ventilator and at the ring drain outlet.
- 4.11. **Trouble Dispatch Center (Dispatch):** The GWA 24/7 customer complaint response center. The Trouble Dispatch Center is responsible for receiving customer complaints and generating and assigning Work Order (WO) requests.
- 4.12. **Valve:** Regulates and controls flow and pressure in pumping systems.
- 4.13. **Variable Frequency Drive (VFD):** An electric device that controls the speed and torque of an AC (alternating current) motor by adjusting the frequency and voltage of the power supply.
- 4.14. **Vent:** An opening on reservoirs that allows interior and exterior pressure to equalize.
- 4.15. **Water Storage Facility:** A water storage tank or reservoir used to hold treated water that will not undergo any further treatment.
- 4.16. **Water / Wastewater System Control Center (SCC):** GWA's primary control/communications hub connecting field personnel and system operators with Operations Supervisors or Managers and executive management. SCC Dispatchers send and receive data to and from field personnel/operators providing critical asset information, additional support, or equipment needed. SCC is also responsible for documenting all transactions between SCC, the relevant Operations Supervisor or Manager, and the responding field personnel/operators.

5.0 Roles and Responsibilities

5.1.	General Manager	Approves this SOP and all its subsequent changes.
5.2.	Assistant General Manager for Operations (AGM-O)	Oversees the development, revision, and implementation of this SOP as the Policy Owner.
5.3.	Operations & Maintenance (O&M) Manager, Water Distribution	<p>Reviews <i>Daily Route Sheets</i> to verify identified issues have corresponding Corrective Maintenance (CM) Work Orders (WO).</p> <p>Initiates WOs if they have not been created and ensures they are completed.</p> <p>Tracks inspection schedules and ensures regulatory compliance.</p>

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		<p>Reviews this SOP annually and makes necessary changes to be presented to the AGM-O for consideration.</p> <p>Ensures that proper training and/or training guidelines are provided to the affected employees to ensure proper compliance with this SOP.</p> <p>Ensures applicable employees complete annual reviews and sign the <i>Employee Acknowledgment Receipt</i> (acknowledgment form).</p> <p>Ensures acknowledgment forms are documented and submitted to Human Resources Training and Development for recordkeeping.</p>
5.4.	O&M Supervisors	<p>Monitor personnel to ensure compliance with this SOP and provide guidance if needed.</p> <p>Provide daily work and vehicle assignment to Operators.</p>
5.5.	Water / Wastewater System Control Center (SCC)	<p>Receives critical reports or information from GWA field personnel about the operation of GWA facilities.</p> <p>Coordinates system adjustments when needed. Coordinates additional support from Deep Well team if necessary.</p> <p>Relays the report or information received and updates and logs all communications received in the Water System Control Center (WSCC) records for its reference.</p> <p>Prepares and submits the WSCC Shift Report via email at the end of each shift.</p>
5.6.	Personnel Services Administrator (PSA)	<p>Works with the Policy Owner and Authors to establish a training module and track compliance of employees involved in the activities of this SOP.</p>
5.7.	Operators	<p>Strictly abide by the contents of this SOP and conduct activities accordingly. When confronted by a situation not covered by this SOP or requiring clarification, seek the Manager's or Supervisor's assistance.</p>

6.0 Procedures Description

6.1. **Safety Considerations:** Operators must adhere to all safety protocols, including proper use of Personal Protective Equipment (PPE).

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- 6.1.1. **Confined Space Entry:** All personnel involved in confined space entry must receive comprehensive training and properly use appropriate PPE.
- 6.1.2. **Climbing Reservoirs:** Climbing the reservoirs are prohibited without approved fall protection and a second rover to ensure safety and provide assistance if necessary.
- 6.1.3. **Vault Entry:** Access to the altitude valve, flow meter, and valve vaults are prohibited without proper PPE and the presence of at least two (2) Operators to assist with operations and ensure a safe working environment.
- 6.1.4. **Unauthorized Personnel/Activity:** Operators are advised to remain alert due to the isolated locations of these facilities. If an employee observes any unauthorized vehicles or activities, notify SCC.¹
- 6.2. **Schedule and Assignment:** Operators operate on a rotating three (3) month shift schedule (morning, swing, and graveyard) to maintain 24/7 water distribution coverage, performing routine maintenance checks and data collection.
- 6.3. **Pre-Shift Preparations:** Operators must report to the Upper Tumon office or their designated work location to receive their daily work and vehicle assignment from the Supervisor or Leader. Prior to Operators leaving to perform daily tasks, they are required to do the following:
 - 6.3.1. Notify the Water / Wastewater System Control Center (SCC) of their daily work assignment and location, and obtain updates on any necessary system adjustments.
 - 6.3.2. Perform an inspection of their assigned vehicle to ensure it is safe and fully functional.²
- 6.4. **Documentation:** All required data and abnormal observations (e.g., leaks, corrosion, broken flow meters, pressure gauges, unusual sounds or vibrations, etc.) must be recorded in the *Daily Route Sheet (Attachment 1)*.
- 6.5. **Daily Routine Inspection:** Operators are required to conduct routine visual inspections and general structural assessments of the reservoirs.

Note: Inspections may be performed across multiple shifts (day, swing, and graveyard). However, valve chamber inspections shall be conducted during the day shift for better visibility and access to resources.

- 6.5.1. Upon arrival, record the date and time.
 - 6.5.1.1. Assess the access road and surrounding area to ensure it is clear of debris, excessive vegetation, and potential fire hazards or obstructions.
 - 6.5.1.2. Inspect the facility for signs of intrusion, vandalism, security integrity, general structural conditions (visible from the exterior), and obvious leakage from pipes.

¹ Refer to SOP on *Handling of Incidents Involving GWA Facilities or Properties*.

² Refer to SOP on *Operation and Safety Guidelines for the Use of GWA Vehicles*.

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- 6.5.1.3. Check that signs are in place and legible.
- 6.5.1.4. Inspect and record flow meter readings on display panels.
- 6.5.1.5. Inspect the water level indicator screen to ensure it functions correctly.
- 6.5.1.6. Inspect overflow piping to include flapper valve and ring drain discharge point screen. Remove any accumulated debris or vegetation from around the discharge point, which may inhibit flow; perform housekeeping as necessary.
- 6.5.1.7. Inspect valve vault covers for any signs of defects, damage, intrusion and vandalism.
- 6.5.1.8. Inspect the valve chamber, including inlet and outlet discharge piping, seals, and other appurtenances. Remove any accumulated water, debris, or vegetation from the valve chamber, which may affect sanitary conditions; perform housekeeping as necessary.
- 6.5.1.9. Upon inspecting the storage facility and its appurtenance, if any issues are identified that could not be properly addressed at the time of inspection or would require additional resources to resolve, a corrective maintenance work order shall be created to address the issue accordingly.
 - 6.5.1.9.1. The O&M Manager shall review *Route Sheets* for documented issues, deficiencies, or abnormal conditions and verify that corresponding corrective maintenance work orders have been created. If deficiencies are identified without a CM WO, the O&M manager shall ensure that a CM WO is generated and completed.

6.5.2. **Data Collection:** The following data must be collected and recorded in **Attachment 1**:

- 6.5.2.1. **Suction and Discharge Readings:** Record the suction and discharge readings at the sampling port at the reservoir. Compare the values with normal operating ranges. Ensure all valves are set as required.³
- 6.5.2.2. **Flow Meter Readings:** Record the flow rate in gallons per minute (gpm).
- 6.5.2.3. **Water Meter Readings:** Record the total water flow usage from the water meter.
- 6.5.2.4. **Power Meter Readings:** Record the power meter readings.
- 6.5.2.5. **Water Level:** Record the water levels using one of the methods. Include the time of collection:
 - 6.5.2.5.1. **Pressure-Based Calculation:** Convert pressure readings to water height using the following formulas:
 - a. 2.31 feet of head equals 1 pound per square inch (PSI) (preferred conversion).

³ For further guidance, refer to the SOP on *Operation and Maintenance for Booster Pump Stations*.

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b. 1 foot of height equals 0.433 PSI.

6.5.2.5.2. **Digital Level Display:** Water levels may also be obtained from the digital display screen located in the control room.

6.5.2.5.3. Operators will compare tank levels and any changes from the previous shift to normal operating patterns for each reservoir.

If a drop in water level between shifts is greater than expected or does not recover during low-demand periods, this is considered abnormal. The Operator must then notify SCC via email or text message and document the observation and any actions taken in **Attachment 1**.

6.5.2.6. If a reservoir is combined with a Booster Pump Station (BPS), the Operators shall collect the pump hours and pump status in operation.³

6.5.2.7. **SCC Notification:** Once all required data is collected and recorded in **Attachment 1**, the Operator must report the collected data to SCC via email or text message before leaving the facility.

6.5.2.7.1. SCC reviews the reported reservoir levels and determines whether system adjustments are necessary, such as adjusting the pressure reducing/sustaining valves or modifying BPS operations.

6.5.2.7.2. **Deep Well Verification:** If necessary, SCC may coordinate additional support from the Deep Well team to verify the status of the deep wells feeding the affected reservoir.⁴

6.6. **Inspections:** The O&M Manager is responsible for tracking inspection schedules and ensuring they are conducted in accordance with AWWA standards, regulatory requirements, and design specifications for each reservoir to maintain operational integrity and water quality.

6.6.1. **Periodic Inspections:** Operators shall conduct quarterly inspections of each reservoir, as outlined in **Attachment 2**. These inspections focus on identifying surface deterioration, foundation issues, and other visible signs of damage or issues.

6.6.2. **Comprehensive Inspections:** A comprehensive inspection must be performed at least every 3 to 5 years. These inspections include both internal and external evaluations, as well as reservoir washouts. This level of inspection requires the reservoir to be removed from service, cleaned, and assessed by a specialized contractor or structural engineer in coordination with the Engineering Department.⁵

6.7. **Emergency Call-Outs:** In the event of an equipment failure, malfunction, or other troubleshooting issues, swift action must be taken to mitigate the situation and ensure uninterrupted operations.

⁴ SOP-1500-WP-005, *Deep Well Preventive Maintenance and Monitoring Program*.

⁵ The Engineering Department is responsible for tracking inspection schedules and procuring the necessary contract services.

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- 6.7.1. **Notification and Assignment:** When operational issues are reported to the Trouble Dispatch Center (Dispatch), the Trouble Dispatcher will create a WO request and assign it to the responding Operator.
- 6.7.2. **Response Procedures:** All details of the work performed, including the scope of work, materials used, date and time the work was completed (if applicable), must be documented in the WO.
- 6.7.2.1. Upon arrival, conduct a visual inspection to identify the problem.
- 6.7.2.2. After identifying the problem, notify SCC and make repairs through corrective maintenance (CM) WO.⁶ If the problem cannot be resolved within 30 minutes, SCC should be updated every hour during long call-out procedures.
- 6.7.2.3. Contact SCC and the Supervisor to request additional support if needed.
- 6.7.2.4. Notify SCC when the work is complete and close out the WO. Operators must ensure all required fields are accurate and complete before closing the WO.
- 6.8. **Reporting Requirements:**
- 6.8.1. **Operator Reporting:** At the end of each shift,⁷ Operators shall submit **Attachment 1** to the Supervisor for review, action (if needed), and filing.
- 6.8.2. **SCC Reporting:** SCC shall prepare and submit the Water System Control Center (WSCC) Shift Report via email to gwascc@guamwaterworks.org at the end of each shift.⁷ The report will include a daily log of the current month's water levels and the available storage capacity for each reservoir.
- 6.9. **Training:** The O&M Manager should conduct training for the Operation and Maintenance of the Water Storage Facilities when needed. All new or applicable employees must receive training on this SOP and sign the *Employee's Acknowledgment Receipt (Attachment 3)* to confirm their understanding and compliance with the procedures outlined herein. Employees must review this SOP and re-sign the acknowledgment form at the start of each fiscal year. Division Managers are responsible for ensuring this requirement is completed, documented, and that signed acknowledgment forms are submitted to Human Resources Training and Development upon completion for recordkeeping.
- 6.9.1. The Personnel Services Administrator (PSA) will work with the Policy Owner and Authors to establish a training module and track compliance of employees involved in the activities of this SOP.
- 6.10. **Non-Compliance with this SOP:**
- 6.10.1. **Employees:** Failure of the employee to adhere and comply with any of the guidelines, policies, and procedures stated herein may result in progressive or adverse disciplinary action, including but not limited to suspension, demotion or termination of employment as provided by GWA Personnel Rules and Regulations (PR&R).

⁶ Operators should consult the manufacturer's guidelines to ensure proper repair and operation.

⁷ Each shift refers to the Day, Swing, and Graveyard shifts, in alignment with the 24/7 operational coverage schedule.

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6.10.2. **Supervisors and Managers:** Failure of the Manager or Supervisor to report and enforce all the guidelines, policies, and procedures stated herein may result in progressive or adverse disciplinary action, including but not limited to suspension, demotion, or termination of employment as provided by GWA PR&R

7.0 Document Approvals

Role	Position	Name of Approver	Approval Signature	Date Approved
Authors	O&M Manager, Water Distribution Management Analyst II	Vincent Pangelinan Antonette Dione Gutierrez	Approval on File	On File
Policy Owner	Assistant General Manager for Operations (AGM-O)	Thomas A. Cruz, P.E.	Approval on File	On File
Final Approver	General Manager	Miguel C. Bordallo, P.E.	Page 1	Page 1

By existing Guam and Federal laws, the contents of this SOP were reviewed thoroughly by its Policy Owner and was found to be:

- appropriate for publication on the GWA website without compromising the security of GWA's system or the public's health and safety.
- not appropriate for publication on the GWA website because it might jeopardize the security of GWA's system or the public's health and safety.

8.0 Records of Revisions

All suggestions for improvement shall be directed to the Policy Owner indicated below. The Policy Owner will consider input received, develop recommendations on how to address the suggestions and obtain authorization to make the recommended changes. Updates, revisions, corrections, and waivers to this SOP shall be made in writing and be approved by the GM.

- 8.1. Policy Owner: Assistant General Manager of Operations
- 8.2. Authorization: General Manager

Effective Date	Revision Letter	Document Authors	Description of Change
Page 1	A	Vincent Pangelinan Antonette Dione Gutierrez	Initial Release of Policy/Procedure

9.0 References

- 9.1. Occupational Safety and Health Administration (OSHA). 29 CFR §1910-146 – Permit-Required Confined Spaces. [1910.146 - Permit-required confined spaces | Occupational Safety and Health Administration](#).
- 9.2. SOP C.109, *Confined Spaces*.
- 9.3. Occupational Safety and Health Administration (OSHA). 29 CFR §1926.502 – Fall Protection Systems Criteria and Practices. [1926.502 - Fall protection systems criteria and practices. | Occupational Safety and Health Administration](#).
- 9.4. SOP-1300-SAF-003, *Handling of Incidents Involving GWA Facilities or Properties*.

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- 9.5. SOP-1500-C&M-001, *Operation and Safety Guidelines for the Use of GWA Vehicles.*
- 9.6. SOP-1500-WD-003, *Operation and Maintenance for Booster Pump Stations.*
- 9.7. AWWA Manual M42: *Steel Water Storage Tanks.*
- 9.8. AWWA D110-13: *Wire- and Strand-Wire, Circular, Pre-stressed Concrete Water Tanks.*
- 9.9. AWWA C652-19: *Disinfection of Water Storage Facilities.*
- 9.10. SOP-1500-WP-005, *Deep Well Preventive Maintenance and Monitoring Program.*

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet



Gloria B. Nelson Public Service Building
 688 Route 15
 Mangilao, Guam 96913
ypangelinan@guamwaterworks.org

O&M PROCEDURES FOR FINISHED WATER STORAGE FACILITIES
Water Distribution Daily Route Sheet (South)

Employee Name: _____ Shift: _____ Date: _____

WBP-12 MALOJLOJ LINE	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

MALOJLOJ ELEVATED	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

IJA	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	

REMARKS: _____

WBP-14 GEUS	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

PIGUA	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	

REMARKS: _____

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)

WBP-15 TOGUAN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

WBP-02	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

WBP-01	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

RESERVOIR READINGS

SITE	TIME	LEVEL	REMARKS
MALOJLOJ			
PIGUA			
UMATAC SUB.			
AGAT-UMATAC			

Received By: _____
Supervisor's Signature

Date: _____

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)



Gloria B. Nelson Public Service Building
 688 Route 15
 Mangilao, Guam 96913
vpangellinan@guamwaterworks.org

**O&M PROCEDURES FOR FINISHED
 WATER STORAGE FACILITIES
 WATER DISTRIBUTION DAILY ROUTE
 SHEET (SOUTH)**

Employee Name: _____ Shift: _____ Date: _____

WBP-18 PAGO BAY	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

WBP-05 BRIGADE	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

WBP-25 WWH	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	

REMARKS: _____

CAMACHO	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	

REMARKS: _____

MAN TENORIO	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	

REMARKS: _____

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)

WBP-20 SR SPRINGS	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

SANTA ANA	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

SR MASTER METER	Time	GPM	READING	REMARKS

RESERVOIR READINGS


SITE	TIME	LEVEL	REMARKS
WWH			
SINIFA			
SPRINGS			
SR RES.			
SAN. ANA LOW			
SAN. ANA UP			

Received By: _____
Supervisor's Signature

Date: _____

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)



**GUAM
WATERWORKS
AUTHORITY**

Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913
vpangelinan@quamwaterworks.org

**O&M PROCEDURES FOR FINISHED
WATER STORAGE FACILITIES
WATER DISTRIBUTION DAILY ROUTE
SHEET (NORTH)**

Employee Name: _____ Shift: _____ Date: _____

HYUNDAI	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

SANTA ROSA	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

GAYINERO	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									


MATAGUAC	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

CHALAN PALAUAN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

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Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)



Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913
vpangelinan@guamwaterworks.org

O&M PROCEDURES FOR FINISHED WATER STORAGE FACILITIES
Water Distribution Daily Route Sheet (North)

Employee Name: _____ Shift: _____ Date: _____

HYUNDAI	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

SANTA ROSA	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

GAYINERO	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									


MATAGUAC	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

CHALAN PALAUAN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

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Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)



Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913
vpangelinan@quamwaterworks.org

**O&M PROCEDURES FOR FINISHED
WATER STORAGE FACILITIES
WATER DISTRIBUTION DAILY ROUTE
SHEET (NORTH)**

Employee Name: _____ Shift: _____ Date: _____

NIMITZ HILL	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

ADAWAG	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

ULLOA UNTALAN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

PALE KIERIN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

ACCESS	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
REMARKS: _____									

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Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 1: Daily Route Sheet (Cont.)

AGANA HEIGHTS	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
PUMP # 2								on / off	
PUMP # 3								on / off	
REMARKS: _____									

ASAN	Time	SUC	DIS	GPM	Water Meter	Power Meter	Hourly RDG	Status	VFD Hz
PUMP # 1								on / off	
REMARKS: _____									

RESERVOIR READINGS

SITE	TIME	LEVEL	REMARKS
NIMITZ			
AGANA HEIGHTS			
CHAOT			
MANGILAO			
MANENGON			

Received By: _____ Date: _____
 Supervisor's Signature

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 2: Quarterly Storage Tank Inspection Log



Gloria B. Nelson Public Service
 Building
 688 Route 15
 Mangilao, Guam 96913
 vpangelinan@guamwaterworks.org

**OPERATIONS AND MAINTENANCE
 PROCEDURES FOR FINISHED WATER
 STORAGE FACILITIES
 QUARTERLY STORAGE TANK INSPECTION
 LOG**

Instructions:

- 1) This log is only applicable to finished ground drinking storage tanks.
- 2) Comments must be provided for any responses indicating problems or potential issues.
- 3) Photographs of any areas with problems or potential problems must accompany this log.
- 4) A copy of the inspection log shall be maintained by the GWA Engineering and Operations Departments.

Tank Name: _____ Date: _____

Start Time: _____ Operation's Representative: _____

End Time: _____ Engineering Representative: _____

Note: Fall protection is required when using the roof ladder access. If the ladder access is in poor or unsafe conditions, binoculars may be used to inspect the top of the tank (if possible).

Inspection Item	Yes	No	N/A	Comments
1) Is there damage to the fence?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
2) Are there signs of vandalism?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
3) Are there signs of forced entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
4) Are there signs of damage or corrosion to the ladder and/or cage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5) Is the roof cover/hatch closed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
6) Is the roof cover/hatch locked?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
7) Is the roof vent screen in place and clean?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
8) Is the intrusion alarm operational?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
9) Is the tank overflowing?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
10) Is the overflow pipe or box cover blocked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
11) Is the ground-level overflow screen in place and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
12) Does the ground-level overflow screen have a 12-inch minimum air gap?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
13) Are there visible leaks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
14) Are there signs of exterior surface deterioration or corrosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
15) Are there trees or brush encroaching on the tank or structure?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
16) Is the shell tank manhole or access hatch leaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
17) Are there visible foundation problems (i.e., anchor bolts, deep cracking, rust on chime, settlement, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
18) Are there working exterior sampling stations or tap for the tank?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
19) Is the valve pit accessible and free of standing water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
20) Are the cathodic protection meter readings within limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
21) Are there signs of wind or earthquake damage?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
22) Other concerns?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Operation & Maintenance Procedures for Finished Water Storage Facilities

Attachment 3: Employee's Acknowledgment Receipt



Gloria B. Nelson Public Service Building
688 Route 15
Mangilao, Guam 96913
vpangelinan@guamwaterworks.org

**OPERATIONS AND MAINTENANCE
PROCEDURES FOR FINISHED WATER
STORAGE FACILITIES
EMPLOYEE'S ACKNOWLEDGMENT RECEIPT**

I, the undersigned, an employee of the Guam Waterworks Authority, hereby acknowledge receipt of SOP-1500-WD-005 entitled "Operation and Maintenance Procedures for Finished Water Storage Facilities" this _____ day of _____, 20____.

Employee's Name/Badge No.:	Employee's Signature:	Date:
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