DEPARTMENT OF OPERATIONAL SUPPORT

REF. NO: DOS/2022.10

Standard Operating Procedure

DEVELOPMENT OF WASTEWATER MANAGEMENT PLANS FOR PEACEKEEPING AND SPECIAL POLITICAL MISSIONS

Approved By: Atul Khare, Under-Secretary-General for Operational Support

Signature: _____ **Effective Date:** 1 November 2022

Contact: Environment Section, Office of the Under-Secretary-General, Department of Operational Support

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STANDARD OPERATING PROCEDURE FOR THE DEVELOPMENT OF WASTEWATER MANAGEMENT PLANS FOR PEACEKEEPING OPERATIONS AND SPECIAL POLITICAL MISSIONS

A. PURPOSE

1. This document sets out the global standard operating procedure (SOP) for the development of Wastewater Management Plans (WWMPs), at mission level, to achieve the vision of the Department of Operational Support (DOS) 2017 Environment Strategy for Peace Operations. The purpose of the document is also to comply with the requirements of the DOS Environmental Policy for Peacekeeping Operations and Field-Based Special Political Missions (DOS/2022.01): "*Each* [Peacekeeping Operation] *PKO and* [Special Political Mission] *SPM shall uphold the principle of "do no harm" and seek to achieve maximum efficiency in their use of natural resources and operate at minimum risk to people, societies and ecosystems, contributing to a positive impact on these wherever possible."* (C.1. Environmental Policy).

2. The Wastewater Management Plan shall be used as a key tool to support annual planning and budgeting processes. As such, it shall include a description of the Mission's current wastewater management set-up and existing infrastructure, along with an analysis to identify the gaps and improvements needed that will serve as a basis to plan for short and mid-term projects and required investments.

3. Wastewater management planning is part of a solid framework to enable safe and sustainable peace operations. Effective wastewater management planning helps ensure that resources are used efficiently and provided in a timely manner, accounting for various factors including the mission context, receiving environment, international standards and host country laws. The financial benefits will be accompanied by a range of non-financial but important environmental co-benefits including sustainable wastewater management to reduce risk of surface and groundwater pollution and spread of diseases from raw wastewater spillage, inadequate treatment and/or inappropriate wastewater or sludge disposal.

B. SCOPE AND APPLICABILITY

4. This SOP applies to all existing and future UN Peacekeeping Operations (PKO) and Special Political Missions (SPM) that manage their facilities and infrastructure. The technical scope of wastewater infrastructure covers all equipment (UN and Contingent Owned) and processes for the collection/conveyance, storage, treatment, reuse and disposal of wastewater and by-products of these wastewater processes (fats/oils/grease, screenings, grit, sludge, scum).

5. This SOP carries an expectation of compliance and all central support and Mission personnel involved in wastewater management planning, installation and operation shall be aware of it. The SOP contains mandatory and, although discretionary, recommended approaches which are denoted throughout the document with the use of "shall/shall not", or "must/must not" and "should/should not" or "may/may not," respectively.

C. PROCEDURE

6. As part as their wastewater management planning process, each existing and new Mission shall develop the following documents for which templates are provided in the annexes:

    - Wastewater Management Plan (WWMP) – refer to section C.1 and Annex A
    - Wastewater Project Plans (WWPPs), as needed – refer to section C.2 and Annex B

C.1 Wastewater Management Plan (WWMP) - (template provided in Annex A)

7. The WWMP is a living, mandatory document designed to plan and progress medium- to long-term projects or programs that lower wastewater risks to personnel, local communities and ecosystems and improve the wastewater management performance of missions. A WWMP shall be reviewed for relevance and updated as necessary on an annual basis.

8. For existing Missions/camps, the WWMP should include at least the following:

    a. Mission context: Brief description of Mission mandate and geographical, political and logistical aspects.

    b. Wastewater management existing set-up: Detailed characteristics of existing infrastructure and their performance, operation and maintenance procedures, wastewater management during temporary deployments, future handover considerations, etc.

    c. Gap analysis, opportunities for improvement: Identification of needs that result in risk factors such as additional treatment capacity requirements, infrastructure replacement or improvement needs, operation and maintenance issues, etc.

    d. Upgrade strategy: Multi-year plan including a list of required wastewater infrastructure projects and activities to address the gaps identified, budgeted and prioritized to ensure continuous risk management, along with a time frame for implementation and monitoring.

9. The actions listed in the Mission upgrade strategy can be classified into three levels, based on the scale and complexity of the projects:

    - Activity – plans that only need to refer to standard documentation (e.g., implementation of management plan, training, awareness campaigns).
    - Small project - plans that require details but can make use of reference business cases (e.g., installation of modularized/containerized treatment systems).
    - Large project – plans that require custom-made detailed plans and specific business cases (e.g., built-in-place, centralized treatment systems).

10. Mission's proposed activities and projects must comply with all relevant UN policies and regulations within the wastewater risk management framework. Priority shall be given to those that lead to achieve minimum risk (all wastewater produced is safely managed and the likelihood of pollution is reduced to a minimum) in all Mission camps and sites.

11. The proposed activities and projects shall always consider wider impact and positive legacy aspects that contribute to a reduction of operations' footprint and to facilitate handover processes after closure of mission or camps.

12. A Wastewater Decision Matrix as well as extracts of the Water and Wastewater Manual (2021.16), summarizing the key principles that apply to wastewater treatment in UN field mission settings, are included as appendices to the wastewater management plan (WWMP) template. These documents may be used to help guide missions during the evaluation process to determine the most suitable type of treatment needed for their camps.

C.2 Wastewater Project Plan (WWPP) – (template provided in Annex B)

13. A Wastewater Project Plan (WWPP) is a Mission's internal plan for implementation of a new or upgrade project defined in the WWMP. It is not confidential but is designed for DOS internal use only.

14. For existing Missions/camps, the WWPP should include the following as a minimum:

    a. Planned intervention

    b. Handover/positive legacy considerations

    c. Environmental Impact Assessment and associated mitigation measures

    d. Economics

    e. Impact on risk management

    f. Development and implementation plan

    g. Operation and monitoring

15. Only "Large projects" (refer to paragraph 9) should be subject to a WWPP.

16. For any given project, the WWPP should be started in outline form to support the annual budgeting process and can then be expanded by the wastewater task team upon confirmation of funding. The level of required detail in a project plan is linked to the scale and complexity of the project as described in the previous section. From the outset, environmental impact and related cost should be included in WWPP.

17. A Total Cost of Ownership (TCO) calculation tool is included as Appendix B2 and may be used to compare project implementation costs by considering not only the initial investment but also the whole-life costs for the project.

C.3 Wastewater management planning for new missions or missions in a start-up phase

18. New missions or missions in start-up phase, of all sizes, that manage their facilities and infrastructure, shall undertake a rapid and strategic-level planning process to develop an initial WWMP and linked projects to support mobilization. All such planning shall be integrated into the procedures set out in the Mission Start up Field Guide v 2010.1 and aligned with any other relevant start-up guidelines.

19. The initial WWMP and linked projects shall be documented in rapid mission planning notes, which are developed in the absence of a detailed baseline assessment. These planning notes usually have a lifespan of about two years and shall be superseded by a full WWMP as soon as possible. Planning teams in the UN Headquarters (UNHQ) and personnel in new missions may use the templates provided in Annex A and B as guidance for developing the planning notes, with the exception that the section on the mission's wastewater infrastructure can be replaced by a forecast for the new mission's wastewater production and costs.

20. The planning process aims to provide timely and reliable wastewater solutions to support mission mobilization while integrating cost-efficient and sustainable solutions for the mission's operational phase. Key activities should also include awareness campaigns, provision for training and other supporting actions for behavioral change.

D. ROLES AND RESPONSIBILITIES

D.1 For existing missions

21. **The Chief of Mission Support/Director of Mission Support (CMS/DMS)** shall ensure awareness of and compliance with this SOP. They shall ensure that sufficient in-house or externally contracted human resources are in place to meet the requirements of the SOP, including the delegation of the wastewater management planning process to the Chief Engineer or designated person. The CMS/DMS shall also regularly chair progress meetings on the Mission's WWMP and participate in major wastewater investment decisions.

22. **The Chief Engineer (CE) or designated person** shall oversee the development and implementation of the Wastewater Management Plan and Wastewater Project Plans as per this SOP. They can delegate the wastewater management planning process to the Water and Sanitation (WATSAN) Engineer or designated person (Wastewater Task Team Leader). The CE provides advice and support to the CMS/DMS in decision-making on major investments. The CE shall ensure that the WWMP and Project Plans inform the development and/or amendment of Memoranda of Understanding and Statement of Unit Requirements with Troop Contributing Countries when relevant. The CE shall also ensure integration of wastewater performance data and actions into the DOS environmental reporting framework (environmental Action Planning and Performance, eAPP), which is updated every six months.

23. **The WATSAN Engineer or Wastewater Task Team Leader,** whoever is provided the delegated authority, shall manage the WWMP process in detail, report progress and issues to the Chief Engineer on a regular basis, and request adequate resource allocation, including expertise and staff time, for project development and management. They shall coordinate the wastewater task team in the development of wastewater project concept notes for approval and, if approved for funding by Member States, the development of detailed Project Plans for implementation.

24. **The Environment Unit Chief** shall be part of the wastewater task team for the development and periodic revisions of wastewater plans and projects, ensuring alignment with the requirements set forth in the DOS Environmental Policy. They shall conduct, along with WATSAN Unit representatives, periodic inspections to evaluate wastewater risks at all mission camps and monitor the implementation status of the plan, advising on corrective

measures if needed. They shall report on the findings to the CMS/DMS and the CE and support the demand planning and budgeting process by providing environmental expertise on wastewater risk management.

25. **The Military Force UNHQ environmental focal point** or whoever is provided the delegated authority, shall act as a focal point regarding responsible wastewater risk management on operating bases fully under military contingent operational responsibility (e.g., temporary deployments). The focal point shall coordinate between troops deployed in the field and the UN Mission Support Office, by ensuring the dissemination of relevant guidance and reporting, and by ensuring that the sanitation practices and infrastructure allow safe wastewater risk management in the field. If a problem arises, the focal point will ensure that the relevant military unit has liaised with the UN Mission Support Office. The UN Mission Support Office shall then provide the necessary technical and/or operational support, based on the conditions set in the corresponding Memorandum of Understanding between the unit and the mission.

D.2 For new missions or missions in start-up phase

26. The planning teams in UNHQ and personnel in new missions shall develop, refine and implement the initial wastewater strategy, plan and linked projects to support mobilization. They shall also ensure these activities are integrated into the overall mission start-up plan and any other relevant procedures set out in the Mission Start up Field Guide v 2010. The CMS/DMS, or whoever is provided the delegated authority during start-up phase, shall oversee the implementation of the strategy, plan and projects and shall periodically convene an oversight meeting with the Chief Engineer and other relevant personnel.

27. Technical assistance for this process may be provided by the Environmental Technical Support Unit of the Global Service Centre (ETSU/GSC) and/or the Rapid Environment and Climate Technical Assistance (REACT) as required, including technical guidance documents. This technical assistance may be particularly needed during initial development of the WWMP and associated WWPP given the broad span of skills needed in both engineering and project management.

E. ABBREVIATIONS, TERMS AND DEFINITIONS

Abbreviations	Definitions
CMS	Chief of Mission Support
CE	Mission Chief Engineer
DMS	Director of Mission Support
DPO	Department of Peace Operations
DOS	Department of Operational Support
GSC	Global Service Centre
PKO	Peacekeeping Operation
SPM	Special Political Mission

Abbreviations	Definitions
eAPP	Environmental Action Planning and Performance
EIA	Environmental Impact Assessment
ETSU	Environmental Technical Support Unit
UNHQ	UN Headquarters
MOB	Mobile Operating Bases
O&M	Operation & Maintenance
PCC	Police Contributing Countries
PE	Population Equivalent
POB	Permanent Operating Bases
RBB	Results-Based Budget
REACT	Rapid Environment and Climate Technical Assistance
SDGs	Sustainability Development Goals
SOP	Standard Operating Procedure
TCC	Troops Contributing Countries
TOB	Temporary Operating Base
TOC	Total Cost of Ownership
WATSAN	Water and Sanitation
WWMP	Wastewater Management Plan
WWPP	Wastewater Project Plan

F. REFERENCES

28. Normative or superior **references**:

    A. DOS Environmental Policy for Peacekeeping Operations and Field-Based Special Political Missions (2022.01)

    B. DPKO/DFS Governance of Major Construction projects in Field Missions (2018.15)

    C. Mission Start-up Field Guide 2010.01

29. Procedures, guidelines and other relevant documents:

    A. Water & Wastewater Manual for Peace Operations (2021.16),

    B. DOS Environment Strategy, January 2017 to June 2023

    C. Enterprise Risk Management and Internal Control Methodology, November 2016.

G. MONITORING AND COMPLIANCE

30. At mission-level, compliance with this SOP will be monitored, at least annually, by the relevant CMS/DMS. At the organizational level, compliance with this SOP will be monitored by the Environment Section, Office of the Under-Secretary-General for Operational Support.

H. CONTACT

31. The Director, GSC is the primary contact for this SOP.

I. HISTORY

32. This is the first version of this SOP.

Annex A: Wastewater Management Plan (WWMP) template

DEPARTMENT OF OPERATIONAL SUPPORT

Wastewater Management Plan for [Name of Mission]

Prepared in accordance with the SOP on Development of Wastewater Management Plans for Peacekeeping and Special Political Missions (DOS/2022.10)

Approved By : DMS/CMS [MISSION] **Signature** _____ **Date** _____

Template instructions

This template provides the primary format for the development of a Mission WWMP together with useful guidance for its preparation. The template includes editable text and formatted tables that may be used in the development of Mission WWMP to ensure a standardized format of WWMPs across missions. The use of a standardized format will also make it easier for UN personnel who move from one mission to another to quickly find information and understand the wastewater management situation. It is recognized, however, that each mission may have a particular set of circumstances that will be unique to their situation and require customization of the WWMP to suit their needs.

Standard text that may be used by all missions is in normal font. It should be used wherever possible to support all missions in consistent messaging and defense of annual budgets.

Guidance text to be deleted is presented in *black italics*.

Sample text to be changed to fit the mission situation is presented in ***red bold italics***.

Delete these instructions prior to finalization.

A. INTRODUCTION

A.1 Purpose

Primary purpose is to identify and address any issues, shortfalls, action needed and/or investment to ensure continued improvement of performance and the use of best practices. This document shall serve as key review and reference document for any environmental audit.

Wastewater Management Plan (WWMP) should be structured so that it may be easily updated each year.

A.2 WWMP Mandate

The mandate for the WWMP comes from the following:

- **(DOS/2022.10) Standard Operating Procedure for the Development of Wastewater Management Plan for Peacekeeping and Special Political Missions.** A global level SOP promulgated in 2022.
- DOS Environment Strategy for Peace Operations (2017-2023). This document came into effect in January 2017 and covers all peacekeeping missions. It includes the exploration of alternative water sources such as reuse and recycling and providing options for wastewater treatment approaches that account for mission specific details such as land availability, climate, costs, and available skills. The UN global Environmental Management System (EMS) came into force in 2017 to monitor progress in meeting these and other goals. Since 2017, all missions are required to report on their performance regularly and systematically on energy, solid waste management, water, wastewater and wider impacts. Link.
- **DOS/2022.01. Environmental Policy for Peacekeeping Operations and Field-based Special political Missions.** This document came into effect in March 2022 and it refers to the Policy for peacekeeping operations and special political missions that manage or maintain facilities and infrastructure, or have operational control of energy or water provision, or wastewater or waste treatment or disposal, or any other significant environmental aspect relevant to this Policy. Link.
- **(2019.09). Standard Operating Procedure for Environmental Impact Assessment for UN Field Missions.** This document came into effect in April 2019 and it refers to standard operating procedure (SOP) for undertaking an Environment Impact Assessment (EIA) and also covers the requirement for Environmental Baseline Studies (EBS) and Environmental Action Plans. Link.
- **(DOS/2021.16) DOS Water and Wastewater Manual for Peacekeeping & Special Political Missions in the context of field operations.** This Manual came into effect in December 2021 and is meant to provide strategic and operational direction to UN Peacekeeping Operations and relevant Special Political Missions in relation to water and wastewater management, recognizing the need for guidance on water resource development, management and control as well as on wastewater treatment, treated effluent quality standards and risk management. Link.

A.3 Methodology

Description of the steps and stakeholders involved in the preparation process.

The development of the present WWMP involves:

- ***MISSION*** Engineering, WATSAN and Environmental Team
- Environmental Technical Support Unit (ETSU) and Rapid Environment and Climate Technical Assistance (REACT)
- The Military Force UNHQ environmental focal point
- CMS/DMS

Methodology should include the following steps, as a minimum, in the order listed:

1) *A WWMP Task Team must be established by Mission CMS/DMS and a kick-off meeting must be held.*
2) *The initial phase must be conducted by WATSAN Team to define the Wastewater mission infrastructure and identify gaps. This is the most time-consuming phase because all locations must be considered as well as all temporary deployments.*
3) *A WWMP must be generated indicating the activities needed to fill those gaps, clearly stating priorities.*
4) *Results must be presented to the Wastewater Task Team for feedback and approval.*
5) *A final draft must be completed, circulated for review, and then finalized.*

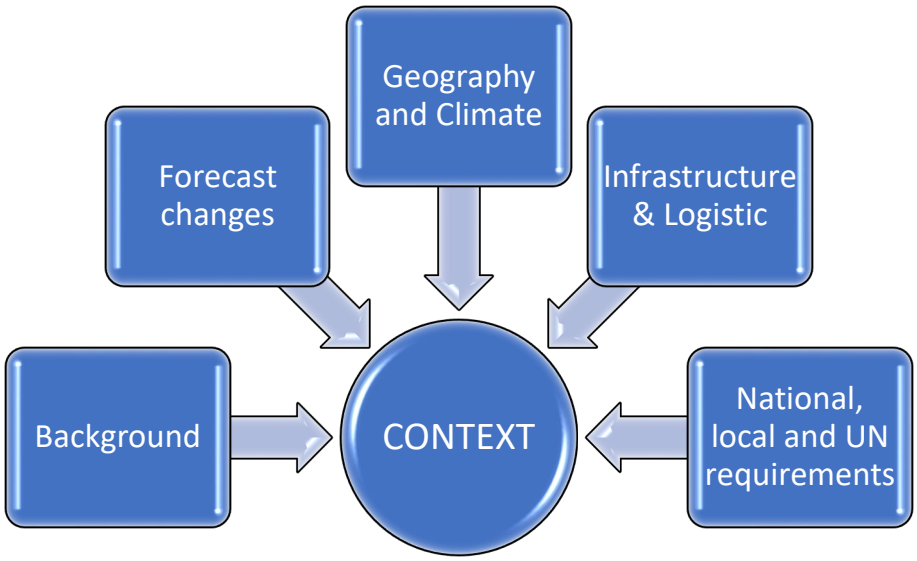
A.4 WWMP Documentation

This WWMP document is designed to provide a high-level framework that can be revised every year or in the event of a major change in ***MISSION*** mandate or operational footprint.

Implementation details such as individual wastewater project plans and business cases will be developed as freestanding documents.

B. MISSION CONTEXT

The purpose of this section is to define the mission context with relevant information needed to better understand the Mission and its constraints.



B.1 Background

Background is described in Appendix A6 ***columns from B to I*** *with data found in eAPP):*

Relevant topics include Mission's duration, TCCs, structure, field offices and extended camps, and camps and camp type (POB, TOB, etc.). This section shall also include information on mobile deployments (type, typical size and duration).

The purpose of this section is to:

- *Identify which sites are permanent and which sites are temporary (different scenarios and solutions):*
- *Determine how many people work/live in the site/camp*

A map should be added to better understand the locations.

B.2 Forecast Changes

Describe any major anticipated short to medium term (one to three years) changes in the mission context (e.g., strength, geographical deployment, etc.) or in the host country water/wastewater context that should be addressed by the WWMP. The purpose of this section is to identify solutions/actions that may be needed to accommodate the mission's developing plans.

Table below may be used as a guide.

Sector/Location	Forecast change and timeframe	Related WWM action
Xxxx	*New canteen opening in March 2023*	*N.1 grease trap needed to be connected to the XX Waste Water Treatment Plant (WWTP)*
Xxxx	*New contingent arriving in Dec 2022*	*N.2 WWTPs from system contract needed;* *Training to be planned;* *Awareness campaign*

Table 1 - Forecast changes and related wastewater management actions

B.3 Geography and Climate

The purpose of this section is to provide information on climate and geography that may have an impact on the appropriateness and efficacy of different wastewater treatment processes and technologies, as well as the options for treated wastewater disposal. Explanatory maps[1] may be used as needed.

- *Geography: Major land types and key features including hydrography and soil and groundwater main characteristics, local context and presence of communities.*
- *Climate: Seasonality, humidity and night-day temperatures. Regional extreme events such as flooding and droughts should be described, focusing on the impact on water and wastewater related activities.*

Only climatic/geographical constraints relevant to wastewater management for each camp should be mentioned.

Table below can be used as a guide.

Location	Geography	Climate
Xxxx	*Local community close to the WWTP in the down wind direction, odor control to be monitored.*	*Rainy season from June to October with high risk of flooding due to River XX passing close to the camp.*
Xxxx	*Rocky soil impossible to excavate and place tanks underground.*	

Table 2 - Geographical and climatic constraints

[1] Some useful links for data research:
- Climate change knowledge portal, World bank group (https://climateknowledgeportal.worldbank.org/)
- ArcGIS Living atlas of the world (https://livingatlas.arcgis.com)
- NASA: Climate Change and Global Warming (https://climate.nasa.gov)
- The European space agency, climate office (https://climate.esa.int)

B.4 Mission Infrastructure and Logistics

Summary of the Mission footprint and the key logistical issues including local market and labor pool, accessibility (road, air, waterways) and shipment of goods.

For this paragraph you may use Appendix A6 ***columns J-K.***

Provide an overview of TCCs and the UNOE-COE division and a standard MISSION deployment plan. The template table below may be used to indicate the typical arrangements in relation to wastewater management for different type of camps in the mission (e.g., permanent operating bases, mobile deployment, etc.), and clarify the arrangements between the mission and contingent over time (e.g., first six months / after six months) if relevant. Columns and rows to be added as needed. Add maps and explanatory graphics.

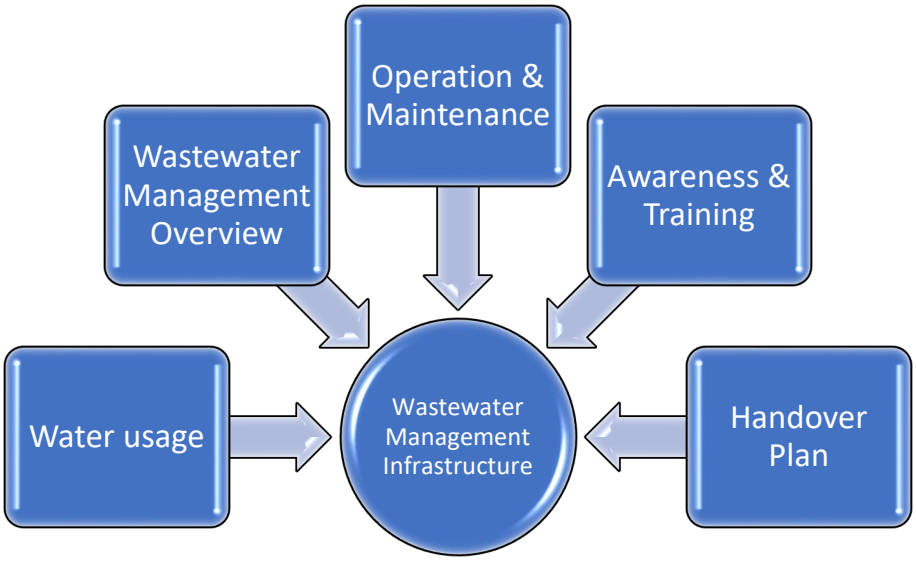
Sector XX – Location YY			
Type	**POB**		**Mobile Deployment(s)**
Duration	***From 0 to 6 months***	***After 6 months***	
Provision of ablution facilities			
Provision of wastewater treatment facilities			
Provision of grease traps			
Provision of oil separators			

Table 3 - Equipment provider and arrangements in relation to wastewater management (TCC/PCC)

B.5 National, Local and UN Requirements

Summary of the national and/or local requirements pertaining to wastewater management and information on the characteristics of wastewater treatment infrastructure and practices in the host country. This summary should help in determining if the local standards are more stringent than the UN requirements and will also be useful in the design of built-in-place infrastructure (if applicable) and to prepare for handing over facilities to host countries.

C. MISSION WASTEWATER MANAGEMENT INFRASTRUCTURE



C.1 Water Usage

Describe the overall Mission approach to water sourcing, treatment, consumption, conservation and related risks. Also provide details on peak use of water (frequency and duration) and metering.

For each site, indicate:

- *If water sources are present on Mission operating bases or in the surroundings (e.g., boreholes, river/lake, community water points).*
- *How water usage is metered (or estimated in the case of TCC/PCC when water meters are not available). Provide the average consumption per type of usage if available or estimate so that the information can be used for wastewater facilities sizing.*

For this paragraph you may use Appendix A6 columns from L - O.

C.2 Wastewater Management Overview

Description of wastewater treatment facilities at each location, including:

- *Infrastructure present on site along with its characteristics (plant manufacturer, date of installation, capacity, functionality, etc.), layouts and key components including the configuration of piping (buried, surface laid), quality control in place, effluent disposal or reuse, sludge management, and relevant historical background (including any performance issues). Flow diagrams and drawings can be included where available.*

- *When in use, information and details on external wastewater/sludge disposal site(s) shall be provided as well (coordinates, owner/operator, description of the site and surroundings, latest date of visit).*

- *Stormwater management approach (and/or snow, ice, floods, etc.). Include information on drainage channel network and discharge point(s). Indicate especially if and how wastewater treatment facilities are protected from stormwater ingress or if sites are prone to flooding. If rainwater is collected and reused, it should be stated, and quantities should be mentioned.*

Detailed tables, maps, drawings, etc. for each Mission site may be provided.

For this paragraph you may use Appendix A7

C.3 Operation and Maintenance of Wastewater Infrastructure

Personnel

Describe the personnel involved in wastewater management: senior management, responsible unit members, UN personnel, military personnel, external stakeholder(s), contractors, etc. Describe the various roles and responsibilities in the form of a table.

Category and number of personnel dedicated to Wastewater management	**Field Engineers**	**Field supervisor**	**Lab Technician(s)**	**W/WWTP Operators**	**Plumber(s)**	**Electrician(s)**	**...**
Monthly cost per category of personnel							
Location #1							
Location #2							

Table 4 - Wastewater facilities management personnel

Contracts in use for wastewater related goods and services

Describe current contracts used to supply wastewater related goods and services.

# Contract	**Valid until**	**Contractor/vendor**	**Purpose of the contract**
PD/C0226/16	*23/02/2023 + 6 months*	*R.I. SpA*	*Prefabricated ablution structure*
PD/C0239/10	*28 February 2023 + 3 months*	*Peak Intl*	*Wastewater Treatment Plants*
PD/C0271/21	*04/11/2024 + 2 years*	*Idrofoglia Srl*	*Electric surface and submersible pump*

PD/C0280/21	*04/01/2025 + 2 years*	*Kreps handelsgesellschat*	*Automatic booster sets*
PD/C0318/21	*14/03/2025 + 2 years*	*Peak Intl trade*	*Diesel operated pumps*
PD/C0276/21	*25/11/2024 + 2 years*	*Agmin Italy*	*Sewage pumps*
xxx	*xxx*	*xxx*	*xxx*
PD/C0102/18	*5 July 2023*	*Odis Filtering LTD*	*Drinking water treatment systems*

Table 5 - Ongoing contracts related to water and wastewater

D. MONITORING

Provide a general description of the system(s) in place to monitor wastewater treatment efficiency: infrastructure inspections, treated effluent quality monitoring (frequency of analysis, parameters measured), usage of online/remote monitoring systems, etc.

Also indicate how contractors' personnel are supervised for services that are outsourced.

This information should already be included in the Mission's WATSAN SOP.

E. CONSUMABLES AND SPARE PARTS MANAGEMENT

Describe how spare parts and consumables are managed (purchase, storage, stock on sites, usage, disposal, etc.). Indicate the average yearly cost of consumables and spare parts replacement for each category of plant/infrastructure.

Indicate the quantity of expired/obsolete spare parts and consumables currently stockpiled in the Mission, if any.

That information should already be included in the Mission's WATSAN SOP.

F. AWARENESS AND TRAINING

Describe awareness campaign and training(s) conducted in the Mission on a regular basis to all type of personnel (civilian, police and force), aiming at supporting improvements in water usage and wastewater risk management.

Scheduled O&M trainings or roundtables should be described in this section: within the mission, inter-mission, UNHQ, GSC, working groups, equipment supplier, contractor, etc.

Scheduled date	Type	User	Purpose
Mar 2023	*Training*	*WATSAN field technicians*	*How to install new WWTP under system contracts*
Dec 2022	*Awareness Campaing*	*Military*	*Use of recycled water*
…			

Table 6 - Awareness and Training schedule

G. HANDOVER / CAMP CLOSURE PLAN

Describe the main dismantling/handover wastewater management infrastructure strategy and requirements for camp closure at key locations. Align with the information provided in sections 1.2 WWMP mandate and 2.5 National, local, and UN Requirements.

H. GAP ANALYSIS – ISSUES AND SHORTFALLS

Conduct an analysis of the gaps in wastewater management using the information collected in the previous chapters:

- *Highlight any gap or issue **resulting in risk level increase** in the wastewater risk assessment methodology framework (refer to the Risk assessment flowchart in Appendix A1 for detailed risk indicators and triggers). In particular, the following issues shall be identified if present and addressed in the following order of priority to reduce the risk level:*
    - *Site(s) where wastewater (blackwater or greywater) is not directed to a sewage network and to a functional treatment facility (e.g., discharged into open channel or outside the fence line without treatment);*
    - *Site(s) with undersized treatment facilities;*
    - *Insufficient effluent quality monitoring or quality below the expected standards for sites where wastewater treatment plants are present;*
    - *Site(s) with unsealed infrastructure allowing stormwater inflow into the wastewater network (e.g., absence of concrete slab on septic/holding tank, open drainage channels);*
    - *Absence of grease interceptor after kitchen facilities;*
    - *Absence of oil water separator after carwash and workshop facilities;*
    - *External disposal site(s) used that do not meet UN standards.*
- *Identify any non-compliance with the requirements of:*

- *DOS Water and Wastewater Manual for Peacekeeping & Special Political Missions in the context of field operations (DOS/2021.16) (refer to Appendix A2 and A3)*
- *DOS Environmental Policy for Peacekeeping Operations and Field-Based Special Political Missions (DOS/2022.01) (refer to Appendix A4)*

Shortfalls identification should encompass compliance with the required treatment levels, resources available for operation and maintenance, management tools, potential upstream improvements, etc.

Indicate also any key challenges that need to be considered for the purpose of wastewater management planning (e.g., aging infrastructure, weak local capacity, difficult logistics, major security problems, uncertain or short mission lifespan, climatic seasonal conditions, etc.).

The findings may be summarized in the form of a table (see template Appendix A8 column B). That same table may also be used to plan for the upgrade strategy.

I. UPGRADE STRATEGY

Develop overall strategy and build a list of potential wastewater interventions/upgrade projects and rank them using a multiple-stage process:

1. *Priority given to projects capable of improving wastewater risk management and achieving minimum wastewater risk, on the mid/long term.*
2. *Prioritize projects based on duration of camp (POB, TOB, etc.) and number of users (site size).*
3. *Prioritize projects that minimize Total Cost of Ownership (TCO).*
4. *Include potential wider impact and positive legacy considerations.*

Describe the sourcing strategy planned for implementation of key project(s): outsourcing (international or local contractor, etc.); in-house capacity required to undertake all, part, or a small percentage of the above projects; etc. Indicate priorities (technical, geographic, etc.).

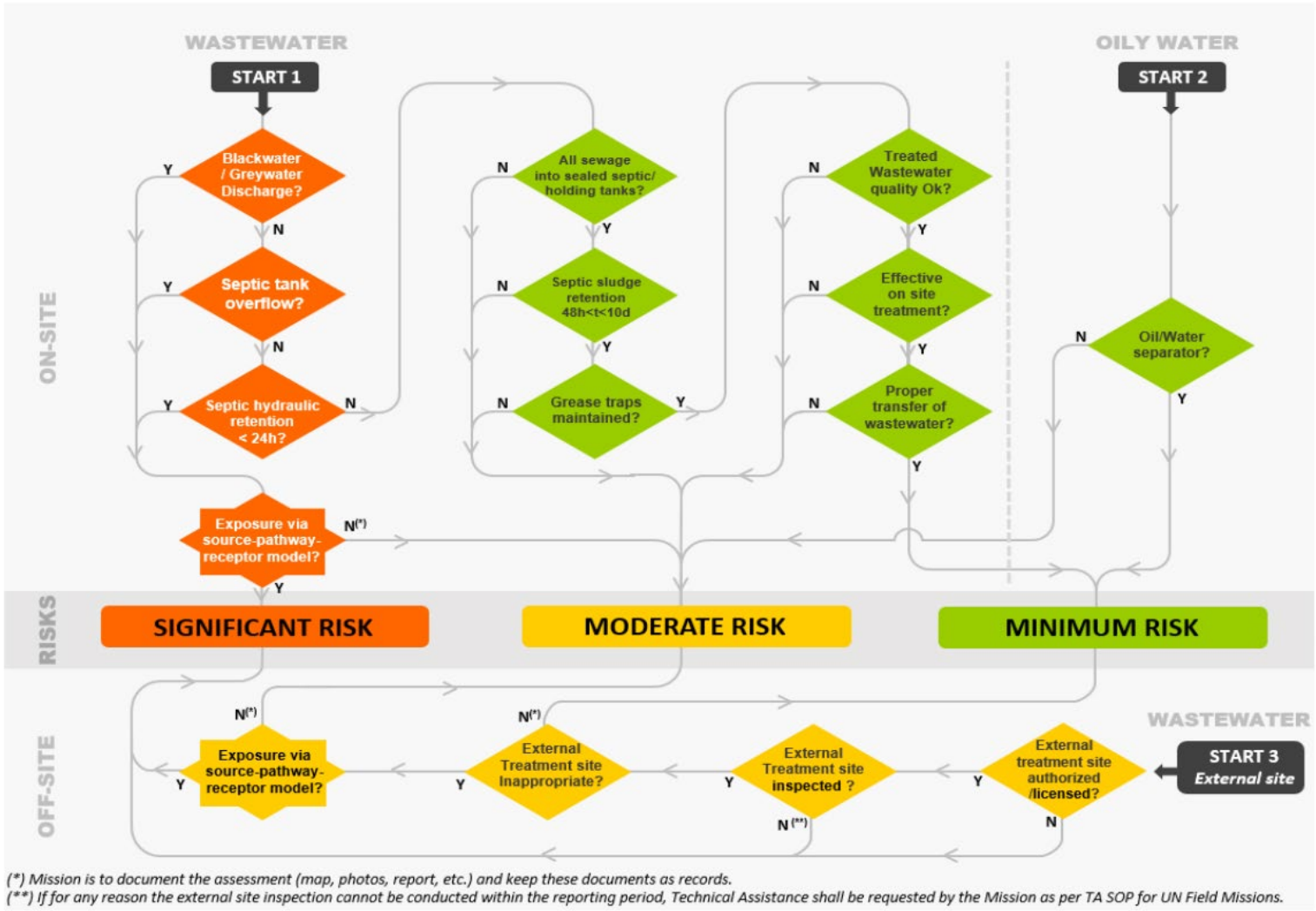
Estimate the anticipated cost/investment and provide a realistic implementation timeline of each project, considering mandatory preliminary steps if needed (e.g., environmental impact assessment). Include awareness and training needs.

Describe the WWMP implementation oversight process and any planned formal progress monitoring and impact evaluation: oversight committee, reporting mechanism, project impact evaluation, lessons learned, etc.

For this paragraph you may use Appendix A8.

J. APPENDICES

APPENDIX A1 Wastewater risk assessment methodology



(*) Mission is to document the assessment (map, photos, report, etc.) and keep these documents as records.
(**) If for any reason the external site inspection cannot be conducted within the reporting period, Technical Assistance shall be requested by the Mission as per TA SOP for UN Field Missions.

APPENDIX A2 Typical Effluent Process Stream Flowchart

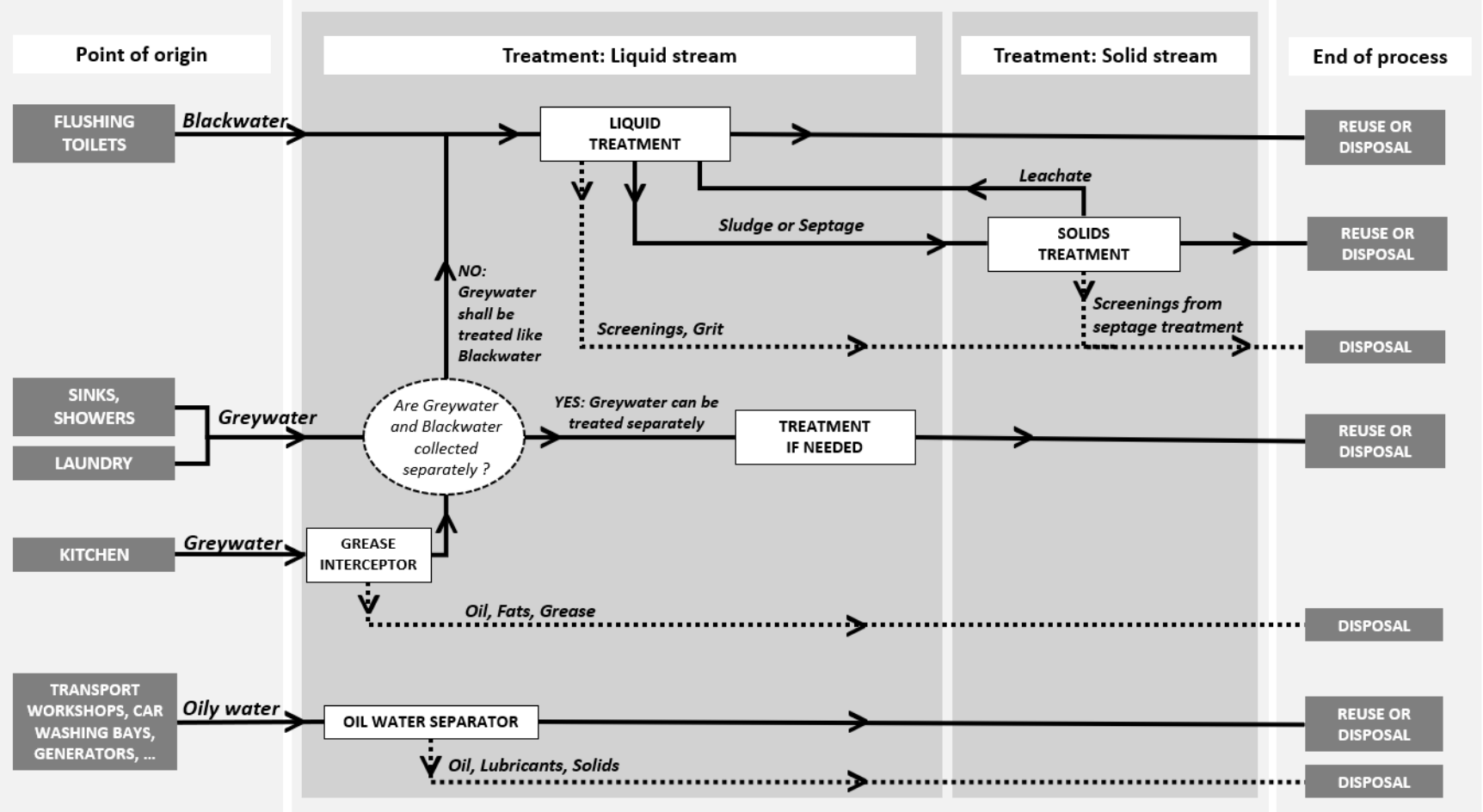
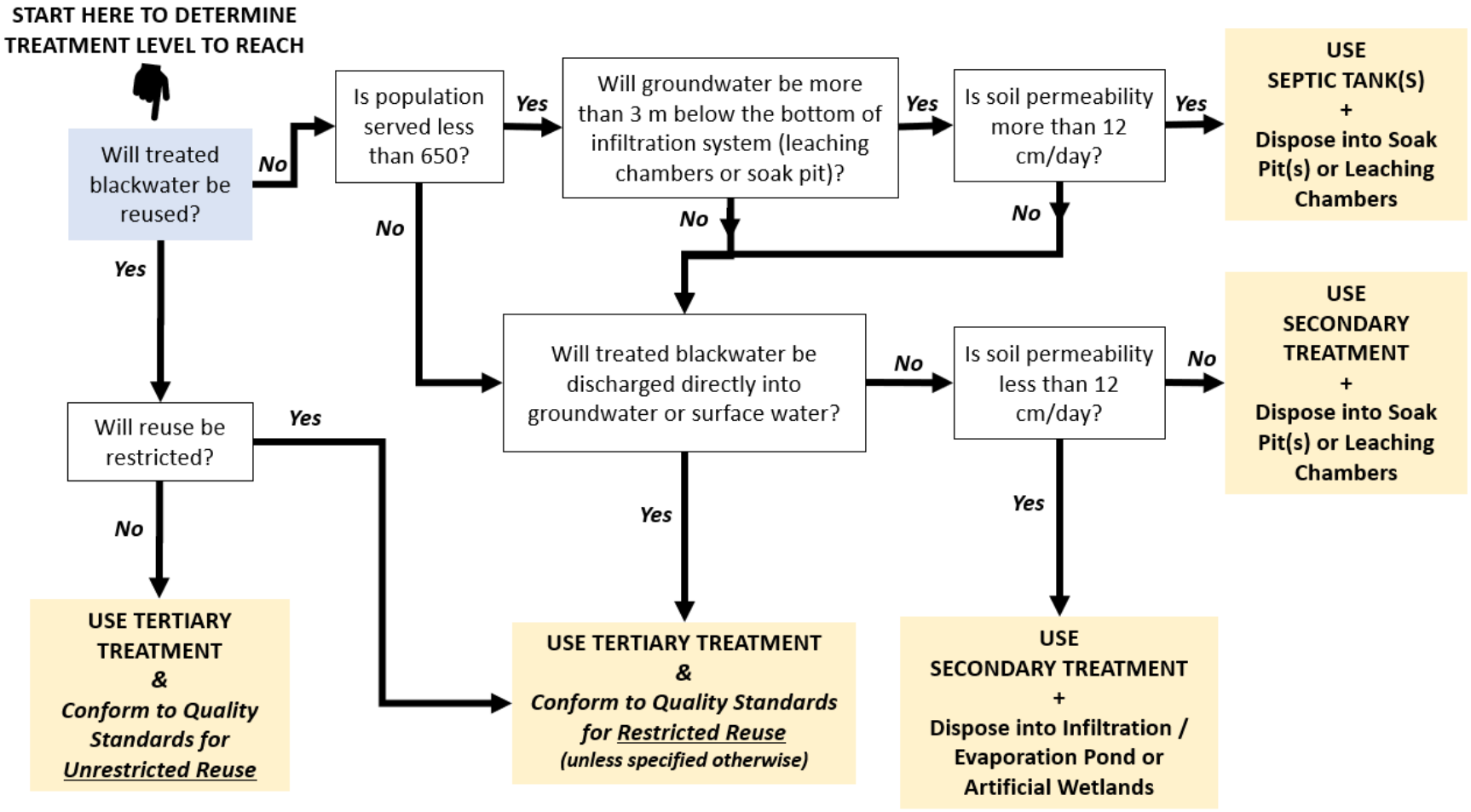


Figure 1: Typical Effluent Process Streams Flowchart (Extract from the Water and Wastewater Manual for Peacekeeping and Special Political Missions (DOS 2021.16)

APPENDIX A3 Treatment level to reach for any effluent containing blackwater



*Sub-surface infiltration from soak-pit(s) or leaching chambers is to be considered as groundwater recharge when a 3 meters distance between the bottom of the infiltration system and the groundwater table cannot be respected

Figure 2: Treatment level to reach for any effluent containing blackwater (Extract from the Water and Wastewater Manual for Peacekeeping and Special Political Missions (DOS 2021.16)

APPENDIX A4 Environmental Policy requirements

Extracts from the Environmental Policy for Peacekeeping Operations and Field Base Special Political Missions (DOS/2022.01) –

Annex A Wastewater Quality Standards for Disposal or Restricted Reuse

Table A1: Wastewater quality standards for disposal[1] or restricted reuse[2]

Impact	Parameter	Operational Standard/Specification
Discharges to water	**BOD5 (five-day Biochemical Oxygen Demand)**	• Yearly average shall not exceed 30 ppm. • Quarterly sample shall not exceed 45 ppm. • BOD5 will be measured at least quarterly. • Monthly measurement is preferable; if needed, for practical reasons, this may be achieved by using a COD/BOD5 ratio, provided the ratio is determined specifically for each site. The ratio shall be checked quarterly and re-adjusted if necessary.
	COD (optional) (Chemical Oxygen Demand)	• Acceptable limit is site specific and shall be determined by correlation with BOD5. • Weekly monitoring is preferable, especially for large sites. • Monthly monitoring is acceptable for remote sites.
	TSS (Total Suspended Solids)	• Monthly average shall not exceed 30 ppm. • Weekly sample shall not exceed 45 ppm • TSS shall preferably be measured at least twice per month. • Monthly monitoring is acceptable for remote sites. • If needed, for practical reasons, weekly monitoring done using an NTU/TSS ratio is acceptable, provided ratio is i) determined specifically for each site, ii) checked monthly and re-adjusted if necessary.
	pH	• pH 6.0 to 9.0
	Faecal Coliforms	• Sample shall not exceed 1,000 CFU/100 ml. • Measurement frequency shall not be less than twice per month

[1]Discharge/disposal: discharge to the environment through a surface water discharge point, or groundwater recharge. It is important to note that if any of the following conditions exist, an environmental impact assessment shall be conducted to determine the most appropriate disposal option, the treatment level to be reached, and to identify any additional treated wastewater quality standards needed: i) drinking/domestic water source is < 100 m from the wastewater treatment facility site; ii) flooding risk or other natural disaster risk is present (e.g., earthquake, forest fires, land/mud slides, etc.); iii) treatment facility is located in an urban/peri-urban area; iv) rural area but local communities are located at less than 200 meters from the treatment facility; v) surface water bodies sensitive to eutrophication; vi) treatment facility located in a sensitive area (fauna/flora, cultural etc.).

[2]Restricted reuse: use for non-potable application and no direct contact with treated effluents, e.g., drip irrigation.

[3]Unrestricted reuse: use for non-potable application, with possibility of direct contact with treated effluent, e.g., toilet flushing, ablutions, car washing, dust control, spray irrigation.

Table A2: Wastewater treatment infrastructure / operational management controls[1]

Aspect	Operational Standard/Specification
Infrastructure	The infrastructure / operational management controls to reduce the risk that discharges exceed the wastewater quality standards would normally include: • All wastewater treatment infrastructure continuously fully operational and well maintained. • No uncontrolled discharge and/or overflow of wastewater from septic tanks, lift stations or from holding tanks or from sinks, showers, baths, clothes washing machines or dishwashers into the environment. • Septic tanks and wastewater infrastructure is watertight with no possibility for stormwater to mix with wastewater through open holes/pipes or structural cracks. Where there is no water network, pit latrines, showers etc., are designed/constructed to prevent the inflow or infiltration of storm or ground water, with sufficient setback from water sources to ensure no untreated wastewater discharges off-site. • Each septic tank provides a septic hydraulic retention time of 24 hours as a minimum. • Each kitchen is set up to capture and prevent fat, oil and grease from entering the sanitary sewer and septic systems (e.g., using a prefabricated or cast-in place grease interceptor, or holding tank not connected to the sanitary sewer). Grease interceptors are regularly inspected, emptied and maintained as soon as fat, oil and grease reach 25% of the depth. • Water generated in transport workshops, car wash bays, fuel farms, fuel storage tank areas, fuel dispensing areas, fuel distribution areas, used oil storage areas, or generator stands, is channelled through an oil/water separator to reduce the risk of oil pollution to ground and water sources. Oil/water separators are regularly maintained, and floating oil disposed of when exceeding 5% of wetted height.
Transfer	If part or all wastewater/sludge is transferred off site for treatment or disposal, the mission shall ensure that any UN personnel or contractors responsible for the transport to external sites are in fact bringing the waste to the designated site(s) and not to non-approved locations. In case of direct connection to an external site, the pipeline network should be inspected to check for the absence of leaks or overflow. A random inspection of the transport contractor or of the pipeline network should take place at least twice yearly, though ideally more frequently.
External (non-UN) sites	If an external wastewater treatment facility is used by a UN field mission, the following conditions would normally be expected to be met: • Facility is licensed and authorized by the host government. • Access for visiting the site is granted to mission personnel before signature of a written agreement and twice a year afterward. • Facility is secured from random access and protected from natural hazard (e.g. floods). • The treated effluent quality complies with the standards outlined in this Annex. In the absence of detailed information on the treated effluent quality, the following conditions are expected to be observed: – Site is engineered, with a configuration or design in place for wastewater treatment, including storm water management. – Site is managed and properly maintained, wastewater is treated and disposed of in a controlled manner with no overflows and absence of uncontrolled discharges.
Inspections	Inspection of UN and of external wastewater treatment facilities should take place at least twice yearly, though ideally more frequently.
Wastewater quality testing	Regular tests shall be carried out at UN treatment sites in accordance with Table A1 of this Annex. Appropriate records of these analyses should be maintained and readily available. In cases of nonconformity, corrective actions shall be implemented immediately to avoid causing any impact to the environment.

[1]These constitute minimum operational standards/specifications by which the UN's environmental mandates may normally be met. They are not sufficient in and of themselves, and appropriate engineering design and operational management processes applicable to the site context and treatment/disposal infrastructure should be implemented and regularly assessed. A risk assessment shall be conducted twice yearly using the methodology provided by DOS in the Environmental Action Planning and Performance application (e-APP)

APPENDIX A5 Decision matrix

Legend: Most convenient system

Possible but may not be the best choice

CAMP & SITE CONSIDERATIONS																	
No	CAT	SUB CAT	SOLUTION	CAMP SIZE (PE)						EXPECTED CAMP DURATION			AVAILABLE SPACE			Available O&M Human Resources	
				100	200	500	650	1000	>1000	<1 year	1 to 3 years	>3 years	Limited	Medium	Unlimited	None or Limited	Skilled
1	SEPTIC TANKS	SEPTIC SYSTEM COMPACT	Compact/Containerized Septic System	■	■	☒	☒	☒	☒	■	■	☒	■	■	■	■	■
2		SEPTIC SYSTEM BUILT-IN-PLACE	Built-in-Place Septic System	☒	☒	■	■	☒	☒	☒	☒	■	■	■	■	■	■
3	SECONDARY	SECONDARY COMPACT	Containerized Secondary Treatment (Activated Sludge)	■	■	☒	☒	☒	☒	■	■	☒	■	■	■	☒	■
4		SECONDARY BUILT-IN-PLACE	Oxidation Ponds	☒	☒	☒	■	■	■	☒	☒	■	☒	☒	■	■	■
5			Aerated Lagoons	☒	☒	☒	■	■	■	☒	☒	■	☒	■	■	■	■
6			Conventional Activated Sludge	☒	☒	■	■	■	■	☒	☒	■	☒	■	■	☒	■
7	TERTIARY	TERTIARY COMPACT	Compact Secondary plus Tertiary Filtration	■	■	☒	☒	☒	☒	■	■	☒	■	■	■	☒	■
8			Compact Tertiary Treatment with MBR	☒	☒	■	■	■	☒	■	■	☒	■	■	■	☒	■
9		TERTIARY BUILT-IN-PLACE	Built-in-Place Recirculated Sand Filter + Disinfection	☒	☒	■	■	■	☒	☒	☒	■	☒	■	■	■	■
10			Built-in-Place Secondary plus Tertiary Filtration	☒	☒	■	■	■	■	☒	☒	■	☒	☒	■	☒	■

11			Built-in-Place Tertiary Treatment with MBR																
12	EXTERNAL	EXTERNAL TREATMENT FACILITY conforming with the Environmental Policy requirements (refer to Appendix A4, Table A2)	Connection to existing sewer network (outside UN control)																
13			Trucking of sewage to external facility (outside UN control)																

INITIAL &OPERATION COSTS												
				INSTALLATION REQUIREMENTS		O&M REQUIREMENTS				INVESTMENT	
No	CAT	SUB CAT	SOLUTION	EASE of INSTALLATION: SITE WORKS, TIME (1=EASY - 4=COMPLEX)	COMMISSIONING DURATION (1 = FAST - 4= LONG)	ENERGY CONSUMPTION (0=NONE - 4=HIGH)	CHEMICAL CONSUMPTION (0=NONE - 4=HIGH)	SPARE PARTS MANAGEMENT (0=NONE - 4=HIGH)	SLUDGE REMOVAL	INITIAL INVESTIMENT COSTS ($=LOW - $$$=HIGH)	ONGOING COSTS FOR O&M ($=LOW - $$$=HIGH)
1	SEPTIC TANKS	SEPTIC SYSTEM COMPACT	Compact/Containerized Septic System	1	1	0	1 Enzymes at commissioning	0	1-2/year	$	$
2		SEPTIC SYSTEM BUILT-IN-PLACE	Built-in-Place Septic System	2	1	0	1 Enzymes at commissioning	0	1-2/year	$	$
3	SECONDARY	SECONDARY COMPACT	Containerized Secondary Treatment (Activated Sludge)	1	3	3	2 Enzymes at commissioning Coagulant & Disinfectant	3	Depending on sludge treatment	$$	$$
4		SECONDARY BUILT-IN-PLACE	Oxidation Ponds	2	2	0	0	0	1-2/year	$	$
5			Aerated Lagoons	2	3	2	0	2	1-2/year	$	$$

6			Conventional Activated Sludge	3	3	3	2 Enzymes at commissioning Coagulant & Disinfectant	3	Depending on sludge treatment	$$	$$
7	TERTIARY	TERTIARY COMPACT	Compact Secondary plus Tertiary Filtration	1	3	3	3 Enzymes at commissioning Coagulant & Disinfectant	3	Depending on sludge treatment	$$$	$$
8			Compact Tertiary Treatment with MBR	1	3	4	4 Enzymes at commissioning Coagulant & Disinfectant Membranes cleaners	4	Depending on sludge treatment	$$$	$$$
9		TERTIARY BUILT-IN-PLACE	Built-in-Place Recirculated Sand Filter + Disinfection	3	2	1	2 Disinfectant	1	Depending on sludge treatment	$$	$$
10			Built-in-Place Secondary plus Tertiary Filtration	4	3	3	3 Enzymes at commissioning Coagulant & Disinfectant	3	Depending on sludge treatment	$$$	$$
11			Built-in-Place Tertiary Treatment with MBR	4	3	4	4 Enzymes at commissioning Coagulant & Disinfectant Membranes cleaners	4	Depending on sludge treatment	$$$	$$$
12	EXTERNAL	**EXTERNAL TREATMENT FACILITY conforming with the Environmental Policy requirements (refer to Appendix A4, Table A2)**	Connection to existing sewer network (outside UN control)	1	N.A.	0-1	0	0-1	Initial connection to network	$	$
13			Trucking of sewage to external facility (outside UN control)	1	N.A.	0-1	0	0-1	Trucking to facility	$	$
NOTES			in ALL cases above enzymes during start up may be used to accelerate the biological process								

FINAL CONSIDERATIONS					
No.	**CAT.**	**SUB CAT.**		**BEST CHOICE WHEN…**	**NOTES**
1	**SEPTIC TANKS**	**SEPTIC SYSTEM COMPACT**	Compact/Containerized Septic System	Up to 200 PE, decentralized, any duration, easiest site work, limited space, fast installation time, zero energy, basic O&M, lowest chemicals, cheap, no training	Upcoming Wastewater Treatment Systems global System Contract will allow more flexibility
2		**SEPTIC SYSTEM BUILT-IN-PLACE**	Built-in-Place Septic System	Above 200 PE, centralized, long duration, easy site work, limited space, fast installation time, zero energy, basic O&M, lowest chemicals, cheap, no training	
3	**SECONDARY**	**SECONDARY COMPACT**	Containerized Secondary Treatment (Activated Sludge)	Up to 200 PE, any duration, decentralized, easiest site work, limited space, fastest installation	In order to keep it COMPACT, MBBR + sedimentation with Lamella Pack is needed. Upcoming Wastewater Treatment Systems global System Contract will allow more flexibility
4		**SECONDARY BUILT-IN-PLACE**	Oxidation Ponds	Above 500 PE, long duration, centralized, biggest area, low O&M, xero energy, zero chemicals, no training, cheap	
5			Aerated Lagoons	Above 500 PE, long duration, centralized, big area, low O&M, zero chemicals, cheap	
6			Conventional Activated Sludge	Above 200 PE, long duration, centralized, big area, low O&M, more control in the process	In order to keep it COMPACT, MBBR + sedimentation with Lamella Pack is needed.
7	**TERTIARY**	**TERTIARY COMPACT**	Compact Secondary plus Tertiary Filtration	Up to 200, any duration, decentralized, easiest site work, small space, fastest installation, low O&M	Upcoming Wastewater Treatment Systems global System Contract will allow more flexibility

8			Compact Tertiary Treatment with MBR	Up to 1000, any duration, easy site work, compact area, fast installation, greatest quality	Upcoming Wastewater Treatment Systems global System Contract will allow more flexibility
9		**TERTIARY BUILT-IN-PLACE**	Built-in-Place Recirculated Sand Filter + Disinfection	Up to 1000, long duration, centralized, low O&M, cheap	
10			Built-in-Place Secondary plus Tertiary Filtration	From 200 to 1000, long duration, centralized, high quality	
11			Built-in-Place Tertiary Treatment with MBR	Above 200 , long duration, centralized, highest quality	

12	**EXTERNAL**	**EXTERNAL TREATMENT FACILITY conforming with the Environmental Policy requirements (refer to Appendix A4, Table A2)**	Connection to existing sewer network (outside UN control)	This solution, if available and conforming to the criteria defined in **Annex A, Table A2 of the Environmental Policy** , should always be PREFERRED	Refer to the **Environmental Policy** for more details
13			Trucking of sewage to external facility (outside UN control)	This solution, if available and conforming to the criteria defined in **Annex A, Table A2 of the Environmental Policy** , should always be PREFERRED	Refer to the **Environmental Policy** for more details

APPENDIX A6 Mission Context

MISSION CONTEXT														
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
SITE NAME *Location*	Type[1]	Expected duration	Military	Civilian	Civilian accommodated onsite	Hosted	Total [D+E+G]	Living in the camp [D+F]	Logistic constraints	Local market	Water origin	Is water measured?	Total water consumption [m^3/day]	Consumption per capita [l/p/day]

[1] Supercamp, TOB, POB, T/PCC

APPENDIX A7 Mission Wastewater Management Infrastructure

WASTEWATER MANAGEMENT INFRASTRUCTURE																					
SITE NAME	**Total Wastewater [m3/d]**			**Septic Tanks**			**Grease traps**		**Oil separator**		**WW managed ON/OFF site**	**Containerized WWTP**			**Oxidation Pond [n.]**	**Built in place WWTP**			**Disposal method**	**Need action? (Y/N)**	**Additional information**
Location	**Black**	**Grey**	**Oily**	**Qty**	**Vol [m^3]**	**Type**	**Qty**	**Vol [m^3]**	**Qty**	**Vol [m^3]**		**Qty**	**Tech & Year**	**Capacity [m^3/d]**		**Qty**	**Tech & Year**	**Capacity [m^3/d]**			

[1] For references, see (2021.16) DOS Water and Wastewater Manual for Peacekeeping & Special Political Missions in the context of field operations. Link.

APPENDIX A8 Gap Analysis & Strategy

MISSION - Gap Analysis & Strategy										
Sector/Site	**Gaps**	**Intervention / upgrade project**	**Quantity**	**Project type**	**Priority**	**Impact /benefit**	**Estimated budget (usd)**	**Deadline**	**HR needed: outsourcing or in-house**	**Ref to WWPP***
				Activity (A); Small project (S); Large project (L)	High, Medium, Low					

Annex B: Wastewater Project Plan (WWPP) template

DEPARTMENT OF OPERATIONAL SUPPORT

Wastewater Project Plan for [Name of Mission]

Approved By : Title (e.g. C/DMS [MISSION])
_____

Signature
Date _____

1.1 Purpose

This Wastewater Project Plan (WWPP) is a *MISSION* internal plan for the specific project *NAMED*, planned for implementation in *locations* in *financial year XX-XX*. It is not confidential but is designed for DOS internal use only.

Each large project should have its own dedicated WWPP.

1.2 Project Context and General Rationale

Provide summary on the context explained in the WWMP and additional info if relevant.

1.3 Planned Intervention

Describe the planned intervention.

Cover general purpose, scope, geography and phasing.

Add any referenced maps and site plans in Appendix B1 to this WWPP.

Add a summary of the environmental screening/EIA findings and mitigation measures.

Describe the proposed wastewater management system to be installed or constructed. Provide relevant details on the specific context of the Mission. Include any key details on operation, maintenance, performance monitoring after the implementation phase has concluded, and handover or dismantling.

List and briefly describe the remaining elements of the project life cycle:

- *Detailed design*
- *Internal and external approvals*
- *Co-financing/co-contributions if relevant*
- *Contracting including the proposed procurement route(s)*
- *Equipment ordering, freight forwarding and delivery to site*
- *Onsite civil construction*
- *Installation and commissioning*
- *Operational team training and handover*

Include a project schedule as Appendix B3 to this WWPP.

1.4 Economics

Describe and quantify the economic rationale for the project. Insert only a brief narrative here and refer all details and tables to Appendix B to this WWPP.

Use calculated Total Cost of Ownership (Refer to Appendix B2). Reference business cases or provide a customized business case.

1.5 Reduced Risk and Other Benefits

List the key additional benefits of the project, drawing from the list below as appropriate:

- *Reduced wastewater and other local environmental benefits*
- *Increased personnel safety*
- *Increased personnel security*
- *Increased operational autonomy*

- *Local employment and similar community benefits*
- *Handover, wider impact, positive legacy*

The two primary arguments are:

- *Investment will limit or reduce wastewater related risks.*
- *Investment will reduce the operation and maintenance cost of XX after XX months/years*

Note that operational imperatives such as the need for high quality treated wastewater for specific reuse needs can override economics in specific cases.

1.6 Project Management

Describe the project management arrangements. Include details on:

- *Mission client unit for the project*
- *Designated mission project manager and project team members*
- *Any external technical or project management support*
- *Site supervision and contractor oversight arrangements*
- *Progress reporting schedule and key milestones*
- *Any higher-level oversight arrangements, such as an oversight committee or regular reporting via the agenda of a mission level project/engineering/management board.*

1.7 Operations and Maintenance

Describe the O&M arrangements in place and/or planned. Specify any significant changes or additions to existing O&M systems and resource requirements.

Highlight any foreseen major maintenance events such as equipment overhauls and major parts replacements within the project lifecycle. Indicate any need for financial provisions for O&M including budgeting for major maintenance one to two years in advance.

1.8 Closure and End of Life Equipment Disposal

Describe the anticipated closure/end point of the project. Describe what is expected to happen to the installed project equipment once it has reached the end of its useful or operational life. This may include handover to the host country or other stakeholders/partners as an intact and operational asset via gifting or negotiated sale.

1.9 Risk Management

Include a risk management table, with the level of detail tailored to the complexity and difficulty of the project. A basic table is provided for guidance.

Identified risk	Likelihood (High/Medium/Low) & impact (High/Medium/Low)	Planned management measures

Appendix B1 Project maps site plans

Please include here a Map showing project location and its surroundings. All relevant information should be included and highlighted in the map.

Appendix B2 Total Cost of Ownership comparative tool for wastewater management projects

The tool may be used to determine the Total Cost of Ownership for Mission's wastewater infrastructure at key locations and therefore budgets needed within the whole life cycle of the project.

The Total Cost of Ownership (TCO) for a defined system in summary consists of all the forecasted lifetime costs (initial investment, operations and maintenance, cost of energy, cost of external services (e.g., sludge removal), etc.

Location specific TCO values may be used to direct the Mission WWMP strategy, as TCO values can help with purchasing decisions including whether to outsource services.

#	Cost Metric	Components	PROJECT		
			After 1 year	*After 3 years*	*After 5 years*
1	**Purchasing**	Acquisition, construction. Incl. mitigation measures if warranted (EIA)			
2	**Logistics/Transport**	Container(s), freight costs			
3	**Installation & Commissioning**	Site preparation, manpower, vendor rate			
4	**Training**	Costs of training (Vendor's fee)			
5	**Operation and Maintenance**	Spare parts replacement, consumables, personnel costs, quality monitoring costs			
6	**Energy**	Energy consumption => fuel litres			
7	**Byproducts Management Costs**	e.g., Sludge disposal costs			
8	**Decommissioning Costs**	Manpower, transport cost, hazardous waste, disposal costs			
TOTAL COST					

Appendix B3 Project schedule

Please include here a Gantt chart showing activities and their duration and timeframe foreseen.